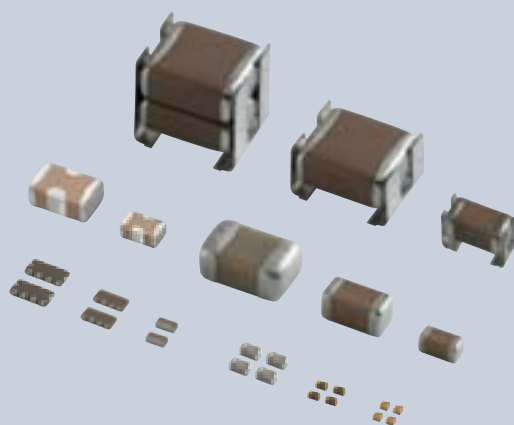




# THE DATASHEET OF GRM0335C1E5R0CA01D

# Chip Multilayer Ceramic Capacitors for General



2018

# Contents

Product specifications are as of September 2017.

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Please check the MURATA website (<https://www.murata.com/>) if you cannot find a part number in this catalog.

## EU RoHS Compliant

- All the products in this catalog comply with EU RoHS.
- EU RoHS is "the European Directive 2011/65/EU on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment."
- For more details, please refer to our web page, "Murata's Approach for EU RoHS" (<https://www.murata.com/en-eu/support/compliance/rohs>).

## Qualified Standards

- The products listed here have been produced by ISO 9001 certified factory.
- <Plant>
- Fukui Murata Mfg. Co., Ltd.
  - Izumo Murata Mfg. Co., Ltd.
  - Murata Electronics Singapore (Pte.) Ltd.
  - Wuxi Murata Electronics Co., Ltd.
  - PHILIPPINE MANUFACTURING CO. OF MURATA, INC.

# Explanation of Symbols in This Catalog



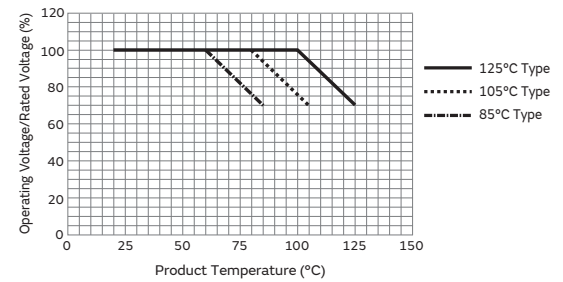
Links are provided to the latest information from the PDF version of the catalog, which is available on the web.

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>General</b>             | For applications that do not require the particular reliability such as the general equipment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Info-tainment</b>       | Infotainment for Automotive<br>The product for entertainment equipment like car navigations, car audios, and body control equipment like wipers, power windows.                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Power-train</b>         | Powertrain/Safety for Automotive<br>Product used for applications (running, turning, stopping and safety devices) which particularly concern human life, such as in devices for automobiles.                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Medical Device</b>      | Medical-grade products for Implanted Medical Devices<br>These products are intended for use in implanted medical devices such as cardiac pacemakers, cochlear implants, insulin pumps and gastric electrostimulators.<br>They are suitable for use in non-critical circuits. *1<br>*1 Non-critical circuits<br>This term refers to circuits in implanted medical devices that are not directly linked to life support, i.e. circuits that will not directly endanger the life of the patient should the functionality of the device be reduced or halted by failure of the circuit. |
| <b>AEC-Q200</b>            | AEC-Q200 compliant product                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Safety standard</b>     | Safety Standard Certified Product<br>Products that acquired safety standard certification IEC60384-14 and products based on the Electrical Appliance and Material Safety Law of Japan.                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Japanese Safety Law</b> | Based on the Electrical Appliance and Material Safety Law of Japan<br>Products that are based on the electrical appliance and material safety law of Japan.                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>High Q</b>              | Low dissipation for high frequency<br>By devising ceramic materials and electrode materials, low dissipation is achieved in frequency bands of VHF, UHF and microwave or beyond.                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Low ESL</b>             | Low inductance<br>This capacitor is designed so that the parasitic inductance component (ESL) that the capacitor has on the high frequency side becomes lower.                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Fail safe</b>           | Fail safe product<br>This capacitor is designed to prevent failures as much as possible by short mode.                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Deflecting crack</b>    | Product resistant to deflection cracking<br>This capacitor is designed to prevent failures as much as possible by short mode caused by cracking when there is board deflection.                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Soldering crack</b>     | Product with solder cracking suppression<br>“This capacitor is configured with metal terminals and leads connected to the chip. The metal terminals and leads relieve the stress from expansion and contraction of the solder, to suppress solder cracking.”                                                                                                                                                                                                                                                                                                                        |
| <b>Anti-noise</b>          | Product suitable for acoustic noise reduction and low distortion<br>This product suppresses acoustic noise, which occurs when a ceramic capacitor is used, by devising the materials and configuration.                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Effective Cap</b>       | No DC bias characteristics<br>Polymer capacitor is no capacitance change with DC bias due to aluminum oxidized film for dielectric.                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>EMI FIL®</b>            | Low-inductance product suitable for noise suppression.<br>This product has extremely low ESL and is suitable for suppression of noise, including high frequencies.<br>This product can also be used as a low-ESL, high-performance bypass capacitor.                                                                                                                                                                                                                                                                                                                                |
| <b>Bonding</b>             | Product for bonding<br>Since gold is used for the external electrodes, the capacitor can be mounted by die bonding/wire bonding.                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## Derating 1

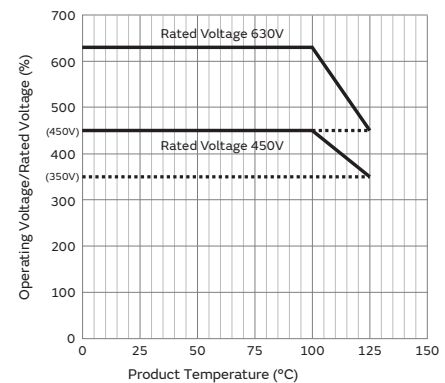
This product is suitable when a voltage continuously applied to a capacitor in an operating circuit, is used below (derated) the rated voltage of the capacitor. This model guarantees the test conditions in the endurance test, at a rated voltage x 100% at the maximum operating temperature. A reliability assurance level equivalent to a common product can be secured, by using this product within the voltage and temperature derated conditions recommended in the figure below.

Recommended Conditions of the Derating Operating Voltage and Temperature



## Derating 2

When the product temperature exceeds 105°C, please use this product within the voltage and temperature derated conditions in the figure below.

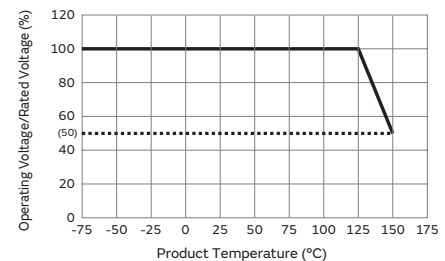


## Derating 3

Please apply the derating curve according to the operating temperature.  
Please refer to detailed specifications sheet for details.

## Derating 4

When the product temperature exceeds 125°C, please use this product within the voltage and temperature derated conditions in the figure below.



## Derating 5

Please apply the rated voltage derating over 150 °C.  
Please refer to detailed specifications sheet for details.

# Selection Guide for Capacitors

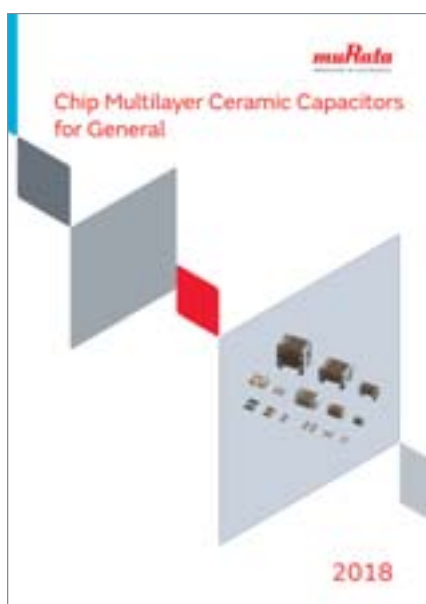
| For general |                            |     |                                                                    |
|-------------|----------------------------|-----|--------------------------------------------------------------------|
| General     | SMD                        |     |                                                                    |
|             | Solder mounting            |     |                                                                    |
|             | Chip type                  |     |                                                                    |
|             |                            | GRM | p40                                                                |
|             |                            | GRM | For LCD backlight inverter circuit only                            |
|             |                            | GR3 | High effective capacitance & high ripple current                   |
|             |                            | GRJ | Soft termination                                                   |
|             |                            | GXM |                                                                    |
|             |                            | GR4 | For information devices only                                       |
|             |                            | GR7 | For camera flash circuit only                                      |
|             |                            | GJM | High Q                                                             |
|             |                            | GQM | High power                                                         |
|             |                            | GA2 | Based on the Electrical Appliance and Material Safety Law of Japan |
|             |                            | GA3 | Safety standard                                                    |
|             |                            | LLL | Low ESL                                                            |
|             |                            | LLA | Low ESL                                                            |
|             |                            | LLM | Low ESL                                                            |
|             |                            | LLR | Low ESL                                                            |
|             |                            | NFM | Low ESL                                                            |
|             |                            | GJ4 | Anti-noise                                                         |
|             |                            | GJ8 | Anti-noise                                                         |
|             | On interposer board        |     |                                                                    |
|             |                            | ZRA | Anti-noise                                                         |
|             |                            | ZRB | Anti-noise                                                         |
|             | Metal terminal type        |     |                                                                    |
|             |                            | KRM | Anti-noise                                                         |
|             |                            | KR3 | Anti-noise                                                         |
|             | Resin molding SMD type     |     |                                                                    |
|             |                            | DK1 | Safety standard                                                    |
|             | Wire bonding mounting      |     |                                                                    |
|             | Chip type                  |     |                                                                    |
|             |                            | GMA | Microchip                                                          |
|             |                            | GMD |                                                                    |
|             | Lead type                  |     |                                                                    |
|             | Solder mounting            |     |                                                                    |
|             |                            | RDE | Anti-noise                                                         |
|             |                            | DEH | High temperature low loss                                          |
|             |                            | DEA | High temperature Class 1                                           |
|             |                            | DEB | Class 2                                                            |
|             |                            | DEC |                                                                    |
|             |                            | DEF | For LCD backlight inverter circuit only                            |
|             |                            | DHR | Ultra-high voltage                                                 |
|             |                            | DEJ | Based on the Electrical Appliance and Material Safety Law of Japan |
|             |                            | DE1 | Safety standard                                                    |
|             |                            | DE2 | Safety standard                                                    |
|             | Screw termination mounting |     |                                                                    |
|             |                            | DHS | Ultra-high voltage                                                 |
|             |                            | DHK | Ultra-high voltage                                                 |

| Infotainment for automotive |                                     |     |                  |
|-----------------------------|-------------------------------------|-----|------------------|
| Info-tainment               | SMD                                 |     |                  |
|                             | Solder mounting                     |     |                  |
|                             | Chip type                           |     |                  |
|                             |                                     | GRT |                  |
|                             | Powertrain/Safety for automotive    |     |                  |
| Power-train                 | SMD                                 |     |                  |
|                             | Solder mounting                     |     |                  |
|                             | Chip type                           |     |                  |
|                             |                                     | GCM |                  |
|                             |                                     | GC3 | Anti-noise       |
|                             |                                     | GCJ | Fail safe        |
|                             |                                     | GGM | Water Repellent  |
|                             |                                     | GCQ | High Q           |
|                             |                                     | GCD | Fail safe        |
|                             |                                     | GCE | Fail safe        |
|                             |                                     | GGD | Fail safe        |
|                             |                                     | NFM | Low ESL          |
|                             | Metal terminal type                 |     |                  |
|                             |                                     | KCM | Anti-noise       |
|                             |                                     | KC3 | Anti-noise       |
|                             |                                     | KCA | Safety standard  |
|                             | Limited to Conductive Glue Mounting |     |                  |
|                             | Chip type                           |     |                  |
|                             |                                     | GCB | Deflecting crack |
|                             |                                     | GCG | Deflecting crack |
|                             | Lead type                           |     |                  |
|                             | Solder mounting                     |     |                  |
|                             |                                     | RCE | Anti-noise       |
|                             |                                     | RHE | Anti-noise       |
|                             |                                     | RHS | Anti-noise       |
|                             |                                     | DE6 | Safety standard  |

| Medical-grade products for implanted medical devices |                 |     |  |
|------------------------------------------------------|-----------------|-----|--|
| Medical Device                                       | SMD             |     |  |
|                                                      | Solder mounting |     |  |
|                                                      | Chip type       |     |  |
|                                                      |                 | GCH |  |

# Catalog Information

Catalog relates to a multilayer ceramic capacitor is below.



## Chip Multilayer Ceramic Capacitors for General

Cat No. C02E-21



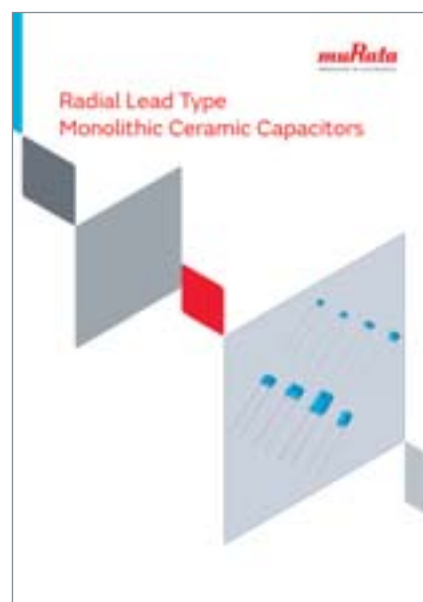
## Chip Multilayer Ceramic Capacitors for Automotive

Cat No. C03E-9



## Safety Certified Ceramic Capacitors/ High Voltage Ceramic Capacitors

Cat No. C85E-5



## Radial Lead Type Monolithic Ceramic Capacitors

Cat No. C49E-23

## ● Part Numbering

### Chip Multilayer Ceramic Capacitors for General



(Part Number)

|    |   |    |   |    |    |     |   |     |   |
|----|---|----|---|----|----|-----|---|-----|---|
| GR | M | 18 | 8 | B1 | 1H | 102 | K | A01 | D |
| ①  | ② | ③  | ④ | ⑤  | ⑥  | ⑦   | ⑧ | ⑨   | ⑩ |

①Product ID ②Series

| Product ID | Code | Series                                                                                                                           |
|------------|------|----------------------------------------------------------------------------------------------------------------------------------|
| GA         | 2    | Based on the Electrical Appliance and Material Safety Law of Japan Chip Multilayer Ceramic Capacitors for General Purpose        |
|            | 3    | Safety Standard Certified Chip Multilayer Ceramic Capacitors for General Purpose                                                 |
| GJ         | M    | High Q Chip Multilayer Ceramic Capacitors for General Purpose                                                                    |
| GM         | A    | Wire Bonding Mount Multilayer Microchip Capacitors for General Purpose                                                           |
|            | D    | Wire Bonding/AuSn Soldering Mount Chip Multilayer Ceramic Capacitors for General Purpose                                         |
| GQ         | M    | High Q and High Power Chip Multilayer Ceramic Capacitors for General Purpose                                                     |
| GR         | 3    | High Effective Capacitance & High Ripple Current Chip Multilayer Ceramic Capacitors for General Purpose                          |
|            | 4    | Chip Multilayer Ceramic Capacitors for Camera Flash Circuit only                                                                 |
|            | 7    | Chip Multilayer Ceramic Capacitors for Ethernet LAN and Primary-secondary Coupling of DC-DC Converters                           |
|            | J    | Soft Termination Chip Multilayer Ceramic Capacitors for General Purpose                                                          |
| KR         | M    | Chip Multilayer Ceramic Capacitors for General Purpose                                                                           |
|            | 3    | High Effective Capacitance & High Allowable Ripple Current Metal Terminal Type Multilayer Ceramic Capacitors for General Purpose |
| LL         | M    | Metal Terminal Type Multilayer Ceramic Capacitors for General Purpose                                                            |
|            | A    | 8 Terminals Low ESL Chip Multilayer Ceramic Capacitors for General Purpose                                                       |
|            | L    | LW Reversed Low ESL Chip Multilayer Ceramic Capacitors for General Purpose                                                       |
|            | M    | 10 Terminals Low ESL Chip Multilayer Ceramic Capacitors for General Purpose                                                      |
|            | R    | LW Reversed Controlled ESR Low ESL Chip Multilayer Ceramic Capacitors for General Purpose                                        |

③Chip Dimensions (LxW)

| Code | Dimensions (LxW) | EIA    |
|------|------------------|--------|
| 02   | 0.4x0.2mm        | 01005  |
| 0D   | 0.38x0.38mm      | 015015 |
| 03   | 0.6x0.3mm        | 0201   |
| 05   | 0.5x0.5mm        | 0202   |
| 08   | 0.8x0.8mm        | 0303   |
| 1U   | 0.6x1.0mm        | 02404  |
| 15   | 1.0x0.5mm        | 0402   |
| 18   | 1.6x0.8mm        | 0603   |
| 21   | 2.0x1.25mm       | 0805   |
| 22   | 2.8x2.8mm        | 1111   |
| 31   | 3.2x1.6mm        | 1206   |
| 32   | 3.2x2.5mm        | 1210   |
| 42   | 4.5x2.0mm        | 1808   |
| 43   | 4.5x3.2mm        | 1812   |
| 52   | 5.7x2.8mm        | 2211   |
| 55   | 5.7x5.0mm        | 2220   |

Continued on the following page. ↗

(Part Number)

| GR | M | 18 | 8 | B1 | 1H | 102 | K | A01 | D  |
|----|---|----|---|----|----|-----|---|-----|----|
| 1  | 2 | 3  | 4 | 5  | 6  | 7   | 8 | 9   | 10 |

Continued from the preceding page. ↘

④ Height Dimension (T) (Except KR□)

| Code | Dimension (T)                    |
|------|----------------------------------|
| 2    | 0.2mm                            |
| 3    | 0.3mm                            |
| 4    | 0.4mm                            |
| 5    | 0.5mm                            |
| 6    | 0.6mm                            |
| 7    | 0.7mm                            |
| 8    | 0.8mm                            |
| 9    | 0.85mm                           |
| A    | 1.0mm                            |
| B    | 1.25mm                           |
| C    | 1.6mm                            |
| D    | 2.0mm                            |
| E    | 2.5mm                            |
| M    | 1.15mm                           |
| Q    | 1.5mm                            |
| X    | Depends on individual standards. |

④ Height Dimension (T) (KR□ Only)

| Code | Dimension (T) |
|------|---------------|
| E    | 1.8mm         |
| F    | 1.9mm         |
| K    | 2.7mm         |
| L    | 2.8mm         |
| Q    | 3.7mm         |
| T    | 4.8mm         |
| W    | 6.4mm         |

⑤ Temperature Characteristics

| Temperature Characteristic Codes |                 |                       | Temperature Characteristics |                                               |                     | Operating Temperature Range | Capacitance Change Each Temperature (%) |       |       |       |      |       |
|----------------------------------|-----------------|-----------------------|-----------------------------|-----------------------------------------------|---------------------|-----------------------------|-----------------------------------------|-------|-------|-------|------|-------|
| Code                             | Public STD Code | Reference Temperature | Temperature Range           | Capacitance Change or Temperature Coefficient | -55°C               |                             | *6                                      |       | -10°C |       |      |       |
|                                  |                 |                       |                             |                                               | Max.                |                             | Min.                                    | Max.  | Min.  | Max.  | Min. |       |
| 1X                               | SL              | JIS                   | 20°C                        | 20 to 85°C                                    | +350 to -1000ppm/°C | -55 to 125°C                | -                                       | -     | -     | -     | -    | -     |
| 2C                               | CH              | JIS                   | 20°C                        | 20 to 125°C                                   | 0±60ppm/°C          | -55 to 125°C                | 0.82                                    | -0.45 | 0.49  | -0.27 | 0.33 | -0.18 |
| 3C                               | CJ              | JIS                   | 20°C                        | 20 to 125°C                                   | 0±120ppm/°C         | -55 to 125°C                | 1.37                                    | -0.9  | 0.82  | -0.54 | 0.55 | -0.36 |
| 3U                               | UJ              | JIS                   | 20°C                        | 20 to 85°C                                    | -750±120ppm/°C      | -25 to 85°C                 | -                                       | -     | 4.94  | 2.84  | 3.29 | 1.89  |
| 4C                               | CK              | JIS                   | 20°C                        | 20 to 125°C                                   | 0±250ppm/°C         | -55 to 125°C                | 2.56                                    | -1.88 | 1.54  | -1.13 | 1.02 | -0.75 |
| 5C                               | C0G             | EIA                   | 25°C                        | 25 to 125°C                                   | 0±30ppm/°C          | -55 to 125°C                | 0.58                                    | -0.24 | 0.4   | -0.17 | 0.25 | -0.11 |
| 5G                               | X8G             | *2                    | 25°C                        | 25 to 150°C                                   | 0±30ppm/°C          | -55 to 150°C                | 0.58                                    | -0.24 | 0.4   | -0.17 | 0.25 | -0.11 |
| 7U                               | U2J             | EIA                   | 25°C                        | 25 to 125°C *3                                | -750±120ppm/°C      | -55 to 125°C                | 8.78                                    | 5.04  | 6.04  | 3.47  | 3.84 | 2.21  |
| B1                               | B *1            | JIS                   | 20°C                        | -25 to 85°C                                   | ±10%                | -25 to 85°C                 | -                                       | -     | -     | -     | -    | -     |
| B3                               | B               | JIS                   | 20°C                        | -25 to 85°C                                   | ±10%                | -25 to 85°C                 | -                                       | -     | -     | -     | -    | -     |
| C7                               | X7S             | EIA                   | 25°C                        | -55 to 125°C                                  | ±22%                | -55 to 125°C                | -                                       | -     | -     | -     | -    | -     |
| C8                               | X6S             | EIA                   | 25°C                        | -55 to 105°C                                  | ±22%                | -55 to 105°C                | -                                       | -     | -     | -     | -    | -     |
| D7                               | X7T             | EIA                   | 25°C                        | -55 to 125°C                                  | +22%, -33%          | -55 to 125°C                | -                                       | -     | -     | -     | -    | -     |
| D8                               | X6T             | EIA                   | 25°C                        | -55 to 105°C                                  | +22%, -33%          | -55 to 105°C                | -                                       | -     | -     | -     | -    | -     |
| E7                               | X7U             | EIA                   | 25°C                        | -55 to 125°C                                  | +22%, -56%          | -55 to 125°C                | -                                       | -     | -     | -     | -    | -     |
| R1                               | R *1            | JIS                   | 20°C                        | -55 to 125°C                                  | ±15%                | -55 to 125°C                | -                                       | -     | -     | -     | -    | -     |
| R6                               | X5R             | EIA                   | 25°C                        | -55 to 85°C                                   | ±15%                | -55 to 85°C                 | -                                       | -     | -     | -     | -    | -     |
| R7                               | X7R             | EIA                   | 25°C                        | -55 to 125°C                                  | ±15%                | -55 to 125°C                | -                                       | -     | -     | -     | -    | -     |
| W0                               | X7T             | EIA                   | 25°C                        | -55 to 125°C                                  | ±10% *4             | -55 to 125°C                | -                                       | -     | -     | -     | -    | -     |
|                                  |                 |                       |                             |                                               | +22%, -33% *5       |                             | -                                       | -     | -     | -     | -    | -     |

\*1 Capacitance change is specified with 50% rated voltage applied.

\*2 Murata Temperature Characteristic Code.

\*3 Rated Voltage 100Vdc max: 25 to 85°C

\*4 Apply DC350V bias.

\*5 No DC bias.

\*6 -25°C (Reference Temperature 20°C) / -30°C (Reference Temperature 25°C)

Continued on the following page. ↗

(Part Number)

| GR | M | 18 | 8 | B1 | 1H | 102 | K | A01 | D  |
|----|---|----|---|----|----|-----|---|-----|----|
| 1  | 2 | 3  | 4 | 5  | 6  | 7   | 8 | 9   | 10 |

Continued from the preceding page. ↘

#### ⑥ Rated Voltage

| Code | Rated Voltage                                         |
|------|-------------------------------------------------------|
| OE   | DC2.5V                                                |
| OG   | DC4V                                                  |
| OJ   | DC6.3V                                                |
| 1A   | DC10V                                                 |
| 1C   | DC16V                                                 |
| 1E   | DC25V                                                 |
| 1H   | DC50V                                                 |
| 1J   | DC63V                                                 |
| 1K   | DC80V                                                 |
| 2A   | DC100V                                                |
| 2D   | DC200V                                                |
| 2E   | DC250V                                                |
| 2W   | DC450V                                                |
| 2H   | DC500V                                                |
| 2J   | DC630V                                                |
| 3A   | DC1kV                                                 |
| 3D   | DC2kV                                                 |
| 3F   | DC3.15kV                                              |
| BB   | DC350V                                                |
| E2   | AC250V                                                |
| GB   | X2; AC250V (Safety Standard Certified Type GB)        |
| GD   | Y3; AC250V (Safety Standard Certified Type GD)        |
| GF   | Y2, X1/Y2; AC250V (Safety Standard Certified Type GF) |
| YA   | DC35V                                                 |

#### ⑦ Capacitance

Expressed by three-digit alphanumerics. The unit is picofarad (pF). The first and second figures are significant digits, and the third figure expresses the number of zeros which follow the two numbers. If there is a decimal point, it is expressed by the capital letter "R." In this case, all figures are significant digits. If any alphabet, other than "R", is included, this indicates the specific part number is a non-standard part.

Ex.)

| Code | Capacitance |
|------|-------------|
| R50  | 0.50pF      |
| 1R0  | 1.0pF       |
| 100  | 10pF        |
| 103  | 10000pF     |

#### ⑧ Capacitance Tolerance

| Code | Capacitance Tolerance                            |
|------|--------------------------------------------------|
| B    | ±0.1pF                                           |
| C    | ±0.25pF                                          |
| D    | ±0.5pF (Less than 10pF)<br>±0.5% (10pF and over) |
| F    | ±1%                                              |
| G    | ±2%                                              |
| J    | ±5%                                              |
| K    | ±10%                                             |
| M    | ±20%                                             |
| W    | ±0.05pF                                          |

#### ⑨ Individual Specification Code (Except LLR)

Expressed by three figures.

#### ⑨ ESR (LLR Only)

| Code | ESR    |
|------|--------|
| E01  | 100mΩ  |
| E03  | 220mΩ  |
| E05  | 470mΩ  |
| E07  | 1000mΩ |

#### ⑩ Packaging

| Code  | Packaging              |
|-------|------------------------|
| L     | ø180mm Embossed Taping |
| D/E/W | ø180mm Paper Taping    |
| K     | ø330mm Embossed Taping |
| J/F   | ø330mm Paper Taping    |
| T     | Bulk Tray              |

Please contact us if you find any part number not provided in this table.

### 3 Terminal Low ESL Multilayer Ceramic Capacitors

WEB 

(Part Number)

|    |   |    |    |     |   |    |   |   |
|----|---|----|----|-----|---|----|---|---|
| NF | M | 3D | CC | 102 | R | 1H | 3 | L |
| 1  | 2 | 3  | 4  | 5   | 6 | 7  | 8 | 9 |

#### ①Product ID ②Series

| Product ID | Series                                                    |
|------------|-----------------------------------------------------------|
| NFM        | 3 Terminals Low ESL<br>Chip Multilayer Ceramic Capacitors |

#### ③Dimensions (LxW)

| Code | Dimensions (LxW) | EIA  |
|------|------------------|------|
| 15   | 1.0x0.5mm        | 0402 |
| 18   | 1.6x0.8mm        | 0603 |
| 21   | 2.0x1.25mm       | 0805 |
| 3D   | 3.2x1.25mm       | 1205 |
| 31   | 3.2x1.6mm        | 1206 |
| 41   | 4.5x1.6mm        | 1806 |

#### ④Features

| Code | Features    |                                               |
|------|-------------|-----------------------------------------------|
| CC   | For General | For Signal Lines                              |
| PC   |             | For Large Current                             |
| PS   |             | High Insertion Loss Type<br>for Large Current |
| KC   |             | For Very Large Current                        |

#### ⑤Capacitance

Expressed by three figures. The unit is in pico-farad (pF). The first and second figures are significant digits, and the third figure expresses the number of zeros that follow the two figures.

#### ⑥Characteristics

| Code | Capacitance Temperature Characteristics |
|------|-----------------------------------------|
| B    | ±10%, ±12.5%, +10/-13%                  |
| C    | ±22%                                    |
| D    | +22/-33%                                |
| F    | +30/-80%, +30/-84%                      |
| R    | ±15%, +15/-18%                          |

#### ⑦Rated Voltage

| Code | Rated Voltage |
|------|---------------|
| 0E   | 2.5V          |
| 0G   | 4V            |
| 0J   | 6.3V          |
| 1A   | 10V           |
| 1C   | 16V           |
| 1E   | 25V           |
| 1H   | 50V           |
| 2A   | 100V          |

#### ⑧Electrode

| Code | Electrode  |
|------|------------|
| 3    | Sn Plating |

#### ⑨Packaging

| Code | Packaging                     |
|------|-------------------------------|
| B    | Bulk                          |
| L    | Embossed Taping (ø180mm Reel) |
| D    | Paper Taping (ø180mm Reel)    |

# Capacitance Table

## How to read the Capacitance Table

|                     |         |      |      |      |      |
|---------------------|---------|------|------|------|------|
| L×W (mm)            | 0.4×0.2 |      | 0.6  |      |      |
| T max. (mm)         | 0.22    |      | 0.   |      |      |
| Rated Voltage (Vdc) | 25      |      | 50   |      |      |
| Cap. / TC Code      | C0G     | CA   | C0G  | CK   | CJ   |
| 0.10pF              |         |      |      |      |      |
| 0.20pF              | p140    | p143 | p146 | p146 |      |
| 1.0pF               | p140    | p143 |      | p146 |      |
| 2.0pF               | p140    | p143 |      | p146 |      |
| 3.0pF               | p140    | p143 |      |      | p146 |

The values can be narrowed down in the order of size, rated voltage, and temperature characteristics.

Refers to the page of the part number list.  
Check the part number list for the applicable product number.

## Temperature Characteristics Table

The Table is colored by temperature characteristic codes.  
Refer to the following Table for the meaning of each code.

|                                    |     |     |     |     |     |     |     |     |     |
|------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| EIA:                               | C0G | U2J | X7R | X7S | X7T | X7U | X6S | X6T | X5R |
| JIS:                               | CK  | CJ  | CH  | SL  | UJ  | R   | B   |     |     |
| Murata Temperature Characteristic: | X8G |     |     |     |     |     |     |     |     |

| Temperature Characteristic Codes |                       | Temperature Characteristics |                                               |                     | Operating Temperature Range | Capacitance Change Each Temperature (%) |       |       |       |      |       |
|----------------------------------|-----------------------|-----------------------------|-----------------------------------------------|---------------------|-----------------------------|-----------------------------------------|-------|-------|-------|------|-------|
| Public STD Code                  | Reference Temperature | Temperature Range           | Capacitance Change or Temperature Coefficient | -55°C               |                             | *3                                      |       | -10°C |       |      |       |
|                                  |                       |                             |                                               | Max.                |                             | Min.                                    | Max.  | Min.  | Max.  | Min. |       |
| C0G                              | EIA                   | 25°C                        | 25 to 125°C                                   | 0±30ppm/°C          | -55 to 125°C                | 0.58                                    | -0.24 | 0.4   | -0.17 | 0.25 | -0.11 |
| CK                               | JIS                   | 20°C                        | 20 to 125°C                                   | 0±250ppm/°C         | -55 to 125°C                | 2.56                                    | -1.88 | 1.54  | -1.13 | 1.02 | -0.75 |
| CJ                               | JIS                   | 20°C                        | 20 to 125°C                                   | 0±120ppm/°C         | -55 to 125°C                | 1.37                                    | -0.9  | 0.82  | -0.54 | 0.55 | -0.36 |
| CH                               | JIS                   | 20°C                        | 20 to 125°C                                   | 0±60ppm/°C          | -55 to 125°C                | 0.82                                    | -0.45 | 0.49  | -0.27 | 0.33 | -0.18 |
| SL                               | JIS                   | 20°C                        | 20 to 85°C                                    | +350 to -1000ppm/°C | -55 to 125°C                | -                                       | -     | -     | -     | -    | -     |
| U2J                              | EIA                   | 25°C                        | 25 to 125°C *2                                | -750±120ppm/°C      | -55 to 125°C                | 8.78                                    | 5.04  | 6.04  | 3.47  | 3.84 | 2.21  |
| UJ                               | JIS                   | 20°C                        | 20 to 85°C                                    | -750±120ppm/°C      | -25 to 85°C                 | -                                       | -     | 4.94  | 2.84  | 3.29 | 1.89  |
| X8G                              | *1                    | 25°C                        | 25 to 150°C                                   | 0±30ppm/°C          | -55 to 150°C                | 0.58                                    | -0.24 | 0.4   | -0.17 | 0.25 | -0.11 |
| X7R                              | EIA                   | 25°C                        | -55 to 125°C                                  | ±15%                | -55 to 125°C                | -                                       | -     | -     | -     | -    | -     |
| X7S                              | EIA                   | 25°C                        | -55 to 125°C                                  | ±22%                | -55 to 125°C                | -                                       | -     | -     | -     | -    | -     |
| X7T                              | EIA                   | 25°C                        | -55 to 125°C                                  | +22%, -33%          | -55 to 125°C                | -                                       | -     | -     | -     | -    | -     |
| X7U                              | EIA                   | 25°C                        | -55 to 125°C                                  | +22%, -56%          | -55 to 125°C                | -                                       | -     | -     | -     | -    | -     |
| R                                | JIS                   | 20°C                        | -55 to 125°C                                  | ±15%                | -55 to 125°C                | -                                       | -     | -     | -     | -    | -     |
| X6S                              | EIA                   | 25°C                        | -55 to 105°C                                  | ±22%                | -55 to 105°C                | -                                       | -     | -     | -     | -    | -     |
| X6T                              | EIA                   | 25°C                        | -55 to 105°C                                  | +22%, -33%          | -55 to 105°C                | -                                       | -     | -     | -     | -    | -     |
| X5R                              | EIA                   | 25°C                        | -55 to 85°C                                   | ±15%                | -55 to 85°C                 | -                                       | -     | -     | -     | -    | -     |
| B                                | JIS                   | 20°C                        | -25 to 85°C                                   | ±10%                | -25 to 85°C                 | -                                       | -     | -     | -     | -    | -     |

\*1 Murata Temperature Characteristic Code.

\*2 Rated Voltage 100Vdc max: 25 to 85°C

\*3 -25°C (Reference Temperature 20°C) / -30°C (Reference Temperature 25°C)

## GRM Series Temperature Compensating Type

Continued on the following page. ↗

(→ GRM Series Temperature Compensating Type)

Continued on the following page. ↗

## Capacitance Table

(→ GRM Series Temperature Compensating Type)

| p00                 | ← Part Number List |     |     |     | JIS: <div>CK</div> <div>CJ</div> <div>CH</div> <div>SL</div> <div>UJ</div> |     |    |     | EIA: <div>C0G</div> <div>U2J</div> |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
|---------------------|--------------------|-----|-----|-----|----------------------------------------------------------------------------|-----|----|-----|------------------------------------|-----|-----|-----|---------|-----|-----|-----|------|----|-----|----|------|------|-----|-----|-----|-----|-----|-----|
| L×W (mm)            | 2.0×1.25           |     |     |     |                                                                            |     |    |     |                                    |     |     |     | 3.2×1.6 |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| T max. (mm)         | 1.0                |     |     |     | 1.35                                                                       |     |    |     |                                    |     |     |     | 1.45    |     |     |     | 0.95 |    |     |    |      |      |     |     | 1.0 |     |     |     |
| Rated Voltage (Vdc) | 200                | 50  |     |     | 50                                                                         |     |    |     | 10                                 |     |     |     | 630     | 250 | 200 | 100 | 50   |    |     |    | 2000 | 1000 | 630 |     |     |     |     |     |
| Cap. / TC Code      | U2J                | SL  | U2J | UJ  | C0G                                                                        | CH  | SL | U2J | UJ                                 | SL  | U2J | UJ  | C0G     | C0G | U2J | U2J | C0G  | CH | C0G | CH | SL   | UJ   | U2J | U2J | C0G | U2J | C0G |     |
| 0.10pF              |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 0.20pF              |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 0.50pF              |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 1.0pF               |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 2.0pF               |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 3.0pF               |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 4.0pF               |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 5.0pF               |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 6.0pF               |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 7.0pF               |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 8.0pF               |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 9.0pF               |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 10pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     | p93 | p93 | p93 | p93 |
| 11pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     | p93 | p93 | p93 | p93 |
| 12pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     | p93 | p93 | p93 | p93 |
| 13pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     | p93 | p93 | p93 | p93 |
| 15pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 16pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 17pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 18pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     | p93 | p93 | p93 | p93 |
| 19pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 20pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 21pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 22pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     | p93 | p93 | p93 | p93 |
| 23pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 24pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 27pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     | p93 | p93 | p93 | p93 |
| 30pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 33pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     | p93 | p93 | p93 | p93 |
| 36pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 39pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     | p93 | p93 | p93 | p93 |
| 43pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 47pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     | p93 | p93 | p93 | p93 |
| 51pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     | p93 | p93 | p93 | p93 |
| 56pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     | p93 | p93 | p93 | p93 |
| 62pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 68pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     | p93 | p93 | p93 | p93 |
| 75pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 82pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 91pF                |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 100pF               | p92                |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     | p93 | p93 | p93 |
| 120pF               | p92                |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     | p93 | p93 | p93 |
| 150pF               | p92                |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     | p93 | p93 | p93 |
| 180pF               | p92                |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     | p93 | p93 | p93 |
| 220pF               | p92                |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     | p93 | p93 | p93 |
| 270pF               | p92                |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     | p93 | p93 | p93 |
| 330pF               | p92                |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     | p93 | p93 | p93 |
| 390pF               | p92                |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     | p93 | p93 | p93 |
| 470pF               | p92                |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     | p93 | p93 | p93 |
| 560pF               | p92                |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 680pF               | p92                |     |     |     |                                                                            |     |    |     |                                    |     |     |     | p92     |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 820pF               | p92                |     |     |     |                                                                            |     |    |     |                                    |     |     |     | p92     |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 910pF               |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 1000pF              | p92                |     |     |     |                                                                            |     |    |     |                                    |     |     |     | p92     |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 1200pF              | p92                |     |     |     |                                                                            |     |    |     |                                    |     |     |     | p92     |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 1500pF              | p92                |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 1800pF              | p92                |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 2200pF              | p92                |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 2700pF              |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 3300pF              |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 3900pF              |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 4700pF              |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 5600pF              |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 6800pF              |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 8200pF              |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 10000pF             |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 12000pF             |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 15000pF             |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 18000pF             |                    |     |     |     | p92                                                                        | p92 |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 22000pF             |                    |     |     |     | p92                                                                        | p92 |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 27000pF             |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 33000pF             |                    | p92 | p92 | p92 |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 39000pF             |                    |     |     |     |                                                                            |     |    |     |                                    | p92 | p92 | p92 |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 47000pF             |                    |     |     |     |                                                                            |     |    |     |                                    | p92 | p92 | p92 |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 56000pF             |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 68000pF             |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 82000pF             |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 0.10μF              |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |
| 0.12μF              |                    |     |     |     |                                                                            |     |    |     |                                    |     |     |     |         |     |     |     |      |    |     |    |      |      |     |     |     |     |     |     |

Continued on the following page. ↗

(→ GRM Series Temperature Compensating Type)

Continued on the following page. ↗

## Capacitance Table

(→ GRM Series Temperature Compensating Type)

| p00                 | ← Part Number List |     |     |    |     |    |     |    |     |    | JIS: <div>CK</div> <div>CJ</div> <div>CH</div> <div>SL</div> <div>UJ</div> |     |     |      |      | EIA: <div>COG</div> <div>U2J</div> |     |      |     |     |     |      |     |     |         |         |      |
|---------------------|--------------------|-----|-----|----|-----|----|-----|----|-----|----|----------------------------------------------------------------------------|-----|-----|------|------|------------------------------------|-----|------|-----|-----|-----|------|-----|-----|---------|---------|------|
| L×W (mm)            | 3.2×1.6            |     |     |    |     |    |     |    |     |    | 3.2×2.5                                                                    |     |     |      |      |                                    |     |      |     |     |     |      |     |     | 4.5×2.0 | 4.5×3.2 |      |
| T max. (mm)         | 1.8                |     |     |    |     |    |     |    |     |    | 1.0                                                                        |     |     | 1.25 |      |                                    | 1.5 |      |     |     | 2.0 |      |     |     | 1.0     | 1.5     |      |
| Rated Voltage (Vdc) | 250                |     | 100 |    | 50  |    | 25  |    | 16  |    | 2000                                                                       | 630 | 500 | 2000 | 1000 | 630                                | 500 | 1000 | 630 | 500 | 250 | 1000 | 630 | 500 | 250     | 3150    | 1000 |
| Cap. / TC Code      | COG                | U2J | COG | CH | COG | CH | COG | CH | COG | CH | U2J                                                                        | U2J | U2J | U2J  | U2J  | U2J                                | U2J | U2J  | U2J | U2J | U2J | U2J  | U2J | U2J | U2J     | U2J     | U2J  |
| 0.10pF              |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 0.20pF              |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 0.50pF              |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 1.0pF               |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 2.0pF               |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 3.0pF               |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 4.0pF               |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 5.0pF               |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 6.0pF               |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 7.0pF               |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 8.0pF               |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 9.0pF               |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 10pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         | p95  |
| 11pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 12pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         | p95  |
| 13pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 15pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         | p95  |
| 16pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 17pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 18pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         | p95  |
| 19pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 20pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 21pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 22pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         | p95  |
| 23pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 24pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 27pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         | p95  |
| 30pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 33pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         | p96  |
| 36pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 39pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         | p96  |
| 43pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         | p96  |
| 47pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         | p96  |
| 51pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         | p96  |
| 56pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         | p96  |
| 62pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         | p96  |
| 68pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         | p96  |
| 75pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         | p96  |
| 82pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            | p95 |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         | p96  |
| 91pF                |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 100pF               |                    |     |     |    |     |    |     |    |     |    |                                                                            | p95 |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         | p96  |
| 120pF               |                    |     |     |    |     |    |     |    |     |    |                                                                            | p95 | p95 |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 150pF               |                    |     |     |    |     |    |     |    |     |    |                                                                            | p95 | p95 |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 180pF               |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     | p95  |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 220pF               |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 270pF               |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 330pF               |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 390pF               |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 470pF               |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 560pF               |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 680pF               |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 820pF               |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 910pF               |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 1000pF              |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 1200pF              |                    |     |     |    |     |    |     |    |     |    |                                                                            | p95 | p95 |      | p95  |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 1500pF              |                    |     |     |    |     |    |     |    |     |    |                                                                            | p95 | p95 |      |      |                                    |     | p95  |     |     |     |      |     |     |         |         |      |
| 1800pF              |                    |     |     |    |     |    |     |    |     |    |                                                                            | p95 | p95 |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 2200pF              |                    |     |     |    |     |    |     |    |     |    |                                                                            | p95 | p95 |      |      |                                    |     |      |     |     |     |      | p95 |     |         |         |      |
| 2700pF              |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 3300pF              |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         | p96  |
| 3900pF              |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         | p96  |
| 4700pF              |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 5600pF              |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 6800pF              |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 8200pF              |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 10000pF             |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 12000pF             |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 15000pF             |                    | p95 | p95 |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 18000pF             |                    |     | p95 |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 22000pF             |                    |     | p95 |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 27000pF             |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 33000pF             |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 39000pF             |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 47000pF             |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 56000pF             |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 68000pF             |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 82000pF             |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 0.10μF              |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |
| 0.12μF              |                    |     |     |    |     |    |     |    |     |    |                                                                            |     |     |      |      |                                    |     |      |     |     |     |      |     |     |         |         |      |

Continued on the following page. ↗

## Capacitance Table

(→ GRM Series Temperature Compensating Type)

| p00                 | ← Part Number List |         |     |      |     |     |         |     |     |      | JIS: | CK  | CJ   | CH  | SL  | UJ   | EIA: | C0G | U2J  |
|---------------------|--------------------|---------|-----|------|-----|-----|---------|-----|-----|------|------|-----|------|-----|-----|------|------|-----|------|
| L×W (mm)            |                    | 4.5×3.2 |     |      |     |     | 5.7×5.0 |     |     |      |      | 1.5 |      | 2.0 |     | 1.5  |      | 2.0 |      |
| T max. (mm)         |                    | 1.5     |     | 2.0  |     | 1.5 |         | 2.0 |     | 1.5  |      | 2.0 |      | 1.5 |     | 2.0  |      | 1.5 |      |
| Rated Voltage (Vdc) |                    | 630     | 500 | 1000 | 630 | 500 | 1000    | 630 | 500 | 1000 | 630  | 500 | 1000 | 630 | 500 | 1000 | 630  | 500 | 1000 |
| Cap. / TC Code      |                    | U2J     | U2J | U2J  | U2J | U2J | U2J     | U2J | U2J | U2J  | U2J  | U2J | U2J  | U2J | U2J | U2J  | U2J  | U2J | U2J  |
| 0.10pF              |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 0.20pF              |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 0.50pF              |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 1.0pF               |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 2.0pF               |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 3.0pF               |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 4.0pF               |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 5.0pF               |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 6.0pF               |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 7.0pF               |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 8.0pF               |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 9.0pF               |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 10pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 11pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 12pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 13pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 15pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 16pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 17pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 18pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 19pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 20pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 21pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 22pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 23pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 24pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 27pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 30pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 33pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 36pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 39pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 43pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 47pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 51pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 56pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 62pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 68pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 75pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 82pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 91pF                |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 100pF               |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 120pF               |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 150pF               |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 180pF               |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 220pF               |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 270pF               |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 330pF               |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 390pF               |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 470pF               |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 560pF               |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 680pF               |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 820pF               |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 910pF               |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 1000pF              |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 1200pF              |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 1500pF              |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 1800pF              |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 2200pF              |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 2700pF              |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 3300pF              |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 3900pF              |                    |         |     | p96  |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 4700pF              |                    |         |     | p96  |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 5600pF              |                    |         |     |      |     |     | p96     |     |     |      |      |     |      |     |     |      |      |     |      |
| 6800pF              |                    |         |     |      |     |     | p96     |     |     |      |      |     |      |     |     |      |      |     |      |
| 8200pF              |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     | p96  |      |     |      |
| 10000pF             |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     | p96  |      |     |      |
| 12000pF             | p96                | p96     |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 15000pF             |                    |         |     | p96  | p96 |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 18000pF             |                    |         |     | p96  | p96 |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 22000pF             |                    |         |     | p96  | p96 |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 27000pF             |                    |         |     |      |     |     |         | p96 | p96 |      |      |     |      |     |     |      |      |     |      |
| 33000pF             |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      | p96  | p96 |      |
| 39000pF             |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      | p96  | p96 |      |
| 47000pF             |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      | p96  | p96 |      |
| 56000pF             |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 68000pF             |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 82000pF             |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 0.10μF              |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |
| 0.12μF              |                    |         |     |      |     |     |         |     |     |      |      |     |      |     |     |      |      |     |      |

## Capacitance Table

### GRM Series High Dielectric Constant Type

|                     |                    |         |        |        |     |     |      |         |        |      |        |     |        |        |     |        |        |        |        |     |        |         |        |      |        |
|---------------------|--------------------|---------|--------|--------|-----|-----|------|---------|--------|------|--------|-----|--------|--------|-----|--------|--------|--------|--------|-----|--------|---------|--------|------|--------|
| p00                 | ← Part Number List |         |        |        |     |     | JIS: | R       | B      | EIA: | X7R    | X7S | X7T    | X7U    | X6S | X6T    | X5R    |        |        |     |        |         |        |      |        |
| L×W (mm)            |                    | 0.4×0.2 |        |        |     |     |      | 0.6×0.3 |        |      |        |     |        |        |     |        |        |        |        |     |        | 1.0×0.5 |        |      |        |
| T max. (mm)         |                    | 0.22    |        |        |     |     |      | 0.33    |        |      |        |     |        |        |     |        |        |        |        |     |        | 0.22    |        |      |        |
| Rated Voltage (Vdc) | 16                 | 10      | 6.3    | 4      | 2.5 |     | 50   | 35      | 25     | 16   | 10     | 6.3 | 4      | 10     | 6.3 |        |        |        |        |     |        |         |        |      |        |
| Cap. / TC Code      | X7R                | X7R     | X5R, B | X5R, B | X6T | X5R | X6T  | X7R     | X5R, B | X5R  | X7R, R | X6S | X5R, B | X7Δ, R | X6S | X5R, B | X7Δ, R | X5R, B | X7R, R | X6S | X5R, B | X6S     | X5R, B | X6S  | X5R, B |
| 100pF               | p97                | p97     | p97    | p97    |     |     |      | p98     | p98    |      | p98    |     |        |        |     |        |        |        |        |     |        |         |        |      |        |
| 150pF               | p97                | p97     | p97    | p97    |     |     |      | p98     | p98    |      | p98    |     |        |        |     |        |        |        |        |     |        |         |        |      |        |
| 220pF               | p97                | p97     | p97    | p97    |     |     |      | p98     | p98    |      | p98    |     |        |        |     |        |        |        |        |     |        |         |        |      |        |
| 330pF               | p97                | p97     | p97    | p97    |     |     |      | p98     | p98    |      | p98    |     |        |        |     |        |        |        |        |     |        |         |        |      |        |
| 470pF               | p97                | p97     | p97    | p97    |     |     |      | p98     | p98    | p98  | p98    |     |        |        |     |        |        |        |        |     |        |         |        |      |        |
| 680pF               |                    | p97     | p97    | p97    |     |     |      | p98     | p98    |      | p98    |     |        |        |     |        |        |        |        |     |        |         |        |      |        |
| 820pF               |                    | p97     |        |        |     |     |      |         |        |      |        |     |        |        |     |        |        |        |        |     |        |         |        |      |        |
| 1000pF              | p97                | p97     | p97    | p97    | p97 |     |      | p98     | p98    |      | p98    | p98 |        | p98    |     |        |        |        |        |     |        |         |        |      |        |
| 1500pF              |                    |         | p97    | p97    | p97 | p97 |      | p98     | p98    |      | p98    | p98 |        | p98    |     |        |        |        |        |     |        |         |        |      |        |
| 2200pF              |                    |         | p97    | p97    | p97 | p97 |      |         |        |      | p98    | p98 | p98    | p99    |     |        |        |        |        |     |        |         |        |      |        |
| 3300pF              |                    |         | p97    | p97    | p97 | p97 |      |         |        |      | p98    | p98 | p98    | p99    |     |        |        |        |        |     |        |         |        |      |        |
| 4700pF              |                    |         | p97    | p97    | p97 | p97 |      |         |        |      | p98    | p98 | p98    | p99    | p99 | p99    | p99    | p99    | p99    |     |        |         |        |      |        |
| 6800pF              |                    |         | p97    | p97    | p97 | p97 |      |         |        |      | p98    | p98 | p98    | p99    | p99 | p99    | p99    | p99    | p99    |     |        |         |        |      |        |
| 10000pF             |                    |         | p97    | p97    | p97 | p97 |      |         |        |      | p98    | p98 | p98    | p99    | p99 | p99    | p99    | p99    | p99    |     |        |         |        |      |        |
| 15000pF             |                    |         |        | p97    |     | p97 |      |         |        |      |        |     |        | p98    | p99 |        | p99    | p99    |        | p99 | p99    |         |        |      |        |
| 22000pF             |                    |         |        | p97    |     | p97 |      |         |        |      |        |     |        | p98    | p99 |        | p99    | p99    |        | p99 | p99    |         |        |      |        |
| 33000pF             |                    |         |        | p97    |     | p98 |      |         |        |      |        |     |        | p98    | p99 |        | p99    | p99    |        | p99 | p99    |         |        |      |        |
| 47000pF             |                    |         |        | p97    |     | p98 |      |         |        |      |        |     |        | p98    | p99 |        | p99    | p99    |        | p99 | p99    |         |        |      |        |
| 68000pF             |                    |         |        | p97    |     | p98 |      |         |        |      |        |     |        | p98    | p99 |        | p99    | p99    |        | p99 | p99    |         |        |      |        |
| 0.10μF              |                    |         |        | p97    | p97 | p98 | p98  |         | p98    |      | p98    | p98 | p98    | p98    | p99 | p99    | p99    | p99    | p99    |     |        | p99     | p100   | p100 | p100   |
| 0.15μF              |                    |         |        |        |     |     |      |         |        |      |        |     |        |        |     |        |        |        |        |     |        |         |        |      |        |
| 0.22μF              |                    |         |        |        |     |     |      |         |        |      |        |     |        |        |     |        | p99    |        | p99    | p99 | p99    | p100    | p100   | p100 | p100   |
| 0.33μF              |                    |         |        |        |     |     |      |         |        |      |        |     |        |        |     |        |        |        |        |     |        |         |        |      |        |
| 0.47μF              |                    |         |        |        |     |     |      |         |        |      |        |     |        |        |     |        |        |        |        |     |        |         |        |      | p100   |
| 0.68μF              |                    |         |        |        |     |     |      |         |        |      |        |     |        |        |     |        |        |        |        |     |        |         |        |      |        |
| 1.0μF               |                    |         |        |        |     |     |      |         |        |      |        |     |        |        |     |        |        |        |        |     |        |         |        |      | p100   |
| 2.2μF               |                    |         |        |        |     |     |      |         |        |      |        |     |        |        |     |        |        |        |        |     |        |         |        |      |        |
| 4.7μF               |                    |         |        |        |     |     |      |         |        |      |        |     |        |        |     |        |        |        |        |     |        |         |        |      |        |
| 10μF                |                    |         |        |        |     |     |      |         |        |      |        |     |        |        |     |        |        |        |        |     |        |         |        |      |        |
| 22μF                |                    |         |        |        |     |     |      |         |        |      |        |     |        |        |     |        |        |        |        |     |        |         |        |      |        |
| 47μF                |                    |         |        |        |     |     |      |         |        |      |        |     |        |        |     |        |        |        |        |     |        |         |        |      |        |
| 100μF               |                    |         |        |        |     |     |      |         |        |      |        |     |        |        |     |        |        |        |        |     |        |         |        |      |        |
| 150μF               |                    |         |        |        |     |     |      |         |        |      |        |     |        |        |     |        |        |        |        |     |        |         |        |      |        |
| 220μF               |                    |         |        |        |     |     |      |         |        |      |        |     |        |        |     |        |        |        |        |     |        |         |        |      |        |

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## Capacitance Table

(→ GRM Series High Dielectric Constant Type)

|                     |                    |         |      |      |      |        |      |      |      |      |      |      |        |      |        |      |      |        |      |        |      |      |        |      |        |        |
|---------------------|--------------------|---------|------|------|------|--------|------|------|------|------|------|------|--------|------|--------|------|------|--------|------|--------|------|------|--------|------|--------|--------|
| p00                 | ← Part Number List |         |      | JIS: | R    | B      | EIA: | X7R  | X7S  | X7T  | X7U  | X6S  | X6T    | X5R  |        |      |      |        |      |        |      |      |        |      |        |        |
| L×W (mm)            |                    | 1.0×0.5 |      |      |      |        |      |      |      |      |      |      |        |      |        |      |      |        |      |        |      |      |        |      |        |        |
| T max. (mm)         |                    | 0.22    |      |      | 0.3  |        |      |      |      |      |      | 0.33 |        |      |        | 0.55 |      |        |      |        |      |      |        |      |        |        |
| Rated Voltage (Vdc) |                    | 4       |      | 2.5  | 50   |        | 25   |      | 16   |      | 10   | 10   | 6.3    | 4    | 100    | 50   |      | 35     |      | 25     |      | 16   |        |      |        |        |
| Cap. / TC Code      |                    | X7T     | X6Δ  | X5R  | X7T  | X7R, R | B    | X7R  | B    | X7R  | B    | X5R  | X5R, B | X6T  | X5R, B | X6T  | X7R  | X7R, R | X6S  | X5R, B | X6S  | X5R  | X7R, R | X6S  | X5R, B | X7R, R |
| 100pF               |                    |         |      |      |      |        |      |      |      |      |      |      |        |      |        |      |      |        |      |        |      |      |        |      |        |        |
| 150pF               |                    |         |      |      |      |        |      |      |      |      |      |      |        |      |        |      |      |        |      |        |      |      |        |      |        |        |
| 220pF               |                    |         |      |      |      | p100   | p100 |      |      |      |      |      |        |      |        |      | p100 | p101   | p100 |        | p101 |      |        |      |        |        |
| 330pF               |                    |         |      |      |      | p100   | p100 |      |      |      |      |      |        |      |        |      | p100 | p101   | p100 |        | p101 |      |        |      |        |        |
| 470pF               |                    |         |      |      |      | p100   | p100 |      |      |      |      |      |        |      |        |      | p100 | p101   | p100 |        | p101 |      |        |      |        |        |
| 680pF               |                    |         |      |      |      | p100   | p100 |      |      |      |      |      |        |      |        |      | p100 | p101   | p100 |        | p101 |      |        |      |        |        |
| 820pF               |                    |         |      |      |      |        |      |      |      |      |      |      |        |      |        |      |      |        |      |        |      |      |        |      |        |        |
| 1000pF              |                    |         |      |      |      | p100   | p100 |      |      |      |      |      |        |      |        |      | p100 | p101   | p100 |        | p101 |      |        |      |        |        |
| 1500pF              |                    |         |      |      |      | p100   | p100 |      |      |      |      |      |        |      |        |      | p100 | p101   | p100 |        | p101 |      |        |      |        |        |
| 2200pF              |                    |         |      |      |      |        |      | p100 | p100 |      |      |      |        |      |        |      | p100 | p101   | p100 |        | p101 |      |        | p101 |        | p101   |
| 3300pF              |                    |         |      |      |      |        |      |      |      | p100 | p100 |      |        |      |        |      | p100 | p101   | p101 |        | p101 |      |        |      |        |        |
| 4700pF              |                    |         |      |      |      |        |      |      |      | p100 | p100 |      |        |      |        |      | p100 | p101   | p101 |        | p101 |      |        |      |        | p102   |
| 6800pF              |                    |         |      |      |      |        |      |      |      | p100 | p100 |      |        |      |        |      |      | p101   | p101 |        | p101 |      |        | p101 |        |        |
| 10000pF             |                    |         |      |      |      |        |      |      |      |      |      | p100 |        |      |        |      |      | p101   | p101 |        | p101 |      |        | p101 | p101   | p102   |
| 15000pF             |                    |         |      |      |      |        |      |      |      |      |      | p100 |        |      |        |      |      | p101   | p101 |        | p101 |      |        | p101 | p101   |        |
| 22000pF             |                    |         |      |      |      |        |      |      |      |      |      | p100 |        |      |        |      |      | p101   | p101 |        | p101 |      |        | p101 | p101   |        |
| 33000pF             |                    |         |      |      |      |        |      |      |      |      |      | p100 |        |      |        |      |      | p101   | p101 |        | p101 |      |        | p101 | p101   |        |
| 47000pF             |                    |         |      |      |      |        |      |      |      |      |      |      |        |      |        |      |      | p101   | p101 |        | p101 |      |        | p101 | p101   |        |
| 68000pF             |                    |         |      |      |      |        |      |      |      |      |      |      |        |      |        |      |      | p101   | p101 |        | p101 |      |        | p101 | p101   |        |
| 0.10μF              |                    | p100    | p100 |      | p100 |        |      |      |      |      |      |      |        |      |        |      |      | p101   |      |        |      | p101 |        |      | p101   | p102   |
| 0.15μF              |                    |         |      |      |      |        |      |      |      |      |      |      |        |      |        |      |      |        |      |        |      |      |        |      |        | p102   |
| 0.22μF              |                    | p100    | p100 |      | p100 |        |      |      |      |      |      |      |        |      |        |      |      |        |      |        | p101 | p101 |        | p101 | p101   | p102   |
| 0.33μF              |                    |         |      |      |      |        |      |      |      |      |      |      |        |      |        |      |      |        |      |        |      |      |        |      |        |        |
| 0.47μF              |                    |         | p100 |      |      |        |      |      |      |      |      |      |        |      |        |      |      |        |      |        |      | p101 |        |      | p101   |        |
| 0.68μF              |                    |         |      |      |      |        |      |      |      |      |      |      |        |      |        |      |      |        |      |        |      |      |        |      |        |        |
| 1.0μF               |                    |         | p100 | p100 |      |        |      |      |      |      |      |      | p100   | p100 | p100   | p100 |      |        | p101 |        |      |      |        | p101 | p102   |        |
| 2.2μF               |                    |         |      |      |      |        |      |      |      |      |      |      |        |      |        |      |      |        |      |        |      |      |        |      |        |        |
| 4.7μF               |                    |         |      |      |      |        |      |      |      |      |      |      |        |      |        |      |      |        |      |        |      |      |        |      |        |        |
| 10μF                |                    |         |      |      |      |        |      |      |      |      |      |      |        |      |        |      |      |        |      |        |      |      |        |      |        |        |
| 22μF                |                    |         |      |      |      |        |      |      |      |      |      |      |        |      |        |      |      |        |      |        |      |      |        |      |        |        |
| 47μF                |                    |         |      |      |      |        |      |      |      |      |      |      |        |      |        |      |      |        |      |        |      |      |        |      |        |        |
| 100μF               |                    |         |      |      |      |        |      |      |      |      |      |      |        |      |        |      |      |        |      |        |      |      |        |      |        |        |
| 150μF               |                    |         |      |      |      |        |      |      |      |      |      |      |        |      |        |      |      |        |      |        |      |      |        |      |        |        |
| 220μF               |                    |         |      |      |      |        |      |      |      |      |      |      |        |      |        |      |      |        |      |        |      |      |        |      |        |        |

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## Capacitance Table

(→ GRM Series High Dielectric Constant Type)

|                     |                    |  |                                |        |                                                                                                               |     |        |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
|---------------------|--------------------|--|--------------------------------|--------|---------------------------------------------------------------------------------------------------------------|-----|--------|------|------|--------|------|------|------|-----|------|--------|--------|------|------|------|------|------|------|-----|-----|--|-----|
| p00                 | ← Part Number List |  | JIS: <div>R</div> <div>B</div> |        | EIA: <div>X7R</div> <div>X7S</div> <div>X7T</div> <div>X7U</div> <div>X6S</div> <div>X6T</div> <div>X5R</div> |     |        |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| L×W (mm)            |                    |  | 1.0×0.5                        |        |                                                                                                               |     |        |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| T max. (mm)         |                    |  | 0.55                           |        |                                                                                                               |     |        |      |      |        |      |      |      |     | 0.6  |        |        |      |      |      |      |      | 0.65 |     |     |  | 0.7 |
| Rated Voltage (Vdc) |                    |  | 16                             |        | 10                                                                                                            |     | 6.3    |      | 4    |        | 50   | 35   | 25   | 16  | 6.3  | 4      | 2.5    | 25   | 16   | 10   | 6.3  | 25   |      |     |     |  |     |
| Cap. / TC Code      |                    |  | X6S                            | X5R, B | X7R                                                                                                           | X6S | X5R, B | X7R  | X6S  | X5R, B | X7R  | X6S  | X5R  | X5R | X6S  | X5R, B | X5R, B | X6T  | X6T  | X7T  | X6T  | X7T  | X5R  | X6S | X5R |  |     |
| 100pF               |                    |  |                                |        |                                                                                                               |     |        |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 150pF               |                    |  |                                |        |                                                                                                               |     |        |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 220pF               |                    |  |                                |        |                                                                                                               |     |        |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 330pF               |                    |  |                                |        |                                                                                                               |     |        |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 470pF               |                    |  |                                |        |                                                                                                               |     |        |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 680pF               |                    |  |                                |        |                                                                                                               |     |        |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 820pF               |                    |  |                                |        |                                                                                                               |     |        |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 1000pF              |                    |  |                                |        |                                                                                                               |     |        |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 1500pF              |                    |  |                                |        |                                                                                                               |     |        |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 2200pF              |                    |  |                                |        |                                                                                                               |     |        |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 3300pF              |                    |  |                                |        |                                                                                                               |     |        |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 4700pF              |                    |  |                                |        |                                                                                                               |     |        |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 6800pF              |                    |  |                                |        |                                                                                                               |     |        |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 10000pF             |                    |  |                                | p102   |                                                                                                               |     |        |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 15000pF             |                    |  |                                |        |                                                                                                               |     |        |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 22000pF             |                    |  |                                |        |                                                                                                               |     |        |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 33000pF             |                    |  |                                |        |                                                                                                               |     | p102   |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 47000pF             |                    |  |                                |        |                                                                                                               |     |        |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 68000pF             |                    |  |                                |        |                                                                                                               |     |        |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 0.10μF              |                    |  |                                |        |                                                                                                               |     | p102   |      |      |        | p102 |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 0.15μF              |                    |  |                                |        |                                                                                                               |     | p102   | p102 |      |        | p102 | p102 |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 0.22μF              |                    |  |                                | p102   | p102                                                                                                          |     | p102   | p102 |      |        | p102 | p102 |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 0.33μF              |                    |  |                                |        |                                                                                                               |     | p102   | p102 |      |        | p102 | p102 |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 0.47μF              |                    |  | p102                           |        | p102                                                                                                          |     | p102   | p102 |      |        | p102 | p102 |      |     | p102 |        |        |      |      |      |      |      |      |     |     |  |     |
| 0.68μF              |                    |  |                                |        |                                                                                                               |     | p102   | p102 |      |        | p102 | p102 |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 1.0μF               |                    |  |                                | p102   | p102                                                                                                          |     | p102   | p102 | p102 |        |      | p102 | p102 |     |      | p102   | p102   | p102 |      |      |      |      |      |     |     |  |     |
| 2.2μF               |                    |  |                                |        |                                                                                                               |     | p102   |      |      | p102   | p102 |      |      |     |      |        |        |      | p102 | p103 | p103 | p103 |      |     |     |  |     |
| 4.7μF               |                    |  |                                |        |                                                                                                               |     |        |      |      |        |      |      |      |     |      |        |        | p102 | p102 | p102 | p102 |      |      |     |     |  |     |
| 10μF                |                    |  |                                |        |                                                                                                               |     |        |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 22μF                |                    |  |                                |        |                                                                                                               |     |        |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 47μF                |                    |  |                                |        |                                                                                                               |     |        |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 100μF               |                    |  |                                |        |                                                                                                               |     |        |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 150μF               |                    |  |                                |        |                                                                                                               |     |        |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |
| 220μF               |                    |  |                                |        |                                                                                                               |     |        |      |      |        |      |      |      |     |      |        |        |      |      |      |      |      |      |     |     |  |     |

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## Capacitance Table

(→ GRM Series High Dielectric Constant Type)

|                     |                    |         |      |      |      |      |         |        |      |      |      |      |      |      |      |      |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
|---------------------|--------------------|---------|------|------|------|------|---------|--------|------|------|------|------|------|------|------|------|------|--------|------|--------|------|------|------|-----|-----|-----|-----|-----|-----|-----|
| p00                 | ← Part Number List |         |      |      |      |      |         |        |      |      |      |      |      |      |      |      |      | JIS:   |      | R      | B    | EIA: |      | X7R | X7S | X7T | X7U | X6S | X6T | X5R |
| L×W (mm)            |                    | 1.0×0.5 |      |      |      |      | 1.6×0.8 |        |      |      |      |      |      |      |      |      |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| T max. (mm)         |                    | 0.7     |      |      |      |      | 0.5     |        |      |      | 0.55 |      |      |      | 0.9  |      |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| Rated Voltage (Vdc) | 16                 | 10      | 6.3  | 4    | 2.5  | 25   | 16      | 6.3    | 4    | 16   | 10   | 6.3  | 250  | 200  | 25   | 16   | 10   | 6.3    |      |        |      |      |      |     |     |     |     |     |     |     |
| Cap. / TC Code      | X6S                | X5R     | X7S  | X6S  | X7S  | X5R  | X5R, B  | X5R, B | X5R  | X5R  | X6S  | X5R  | X7T  | X6S  | X7R  | X7R  | X7R  | X5R, B | X6S  | X5R, B | X7R  | X5R  | X6S  |     |     |     |     |     |     |     |
| 100pF               |                    |         |      |      |      |      |         |        |      |      |      |      |      |      |      |      |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 150pF               |                    |         |      |      |      |      |         |        |      |      |      |      |      |      |      |      |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 220pF               |                    |         |      |      |      |      |         |        |      |      |      |      |      |      | p103 | p103 |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 330pF               |                    |         |      |      |      |      |         |        |      |      |      |      |      |      | p103 | p103 |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 470pF               |                    |         |      |      |      |      |         |        |      |      |      |      |      |      | p103 | p103 |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 680pF               |                    |         |      |      |      |      |         |        |      |      |      |      |      |      | p103 | p103 |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 820pF               |                    |         |      |      |      |      |         |        |      |      |      |      |      |      |      |      |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 1000pF              |                    |         |      |      |      |      |         |        |      |      |      |      |      |      | p103 | p103 |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 1500pF              |                    |         |      |      |      |      |         |        |      |      |      |      |      |      | p103 | p103 |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 2200pF              |                    |         |      |      |      |      |         |        |      |      |      |      |      |      | p103 | p103 |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 3300pF              |                    |         |      |      |      |      |         |        |      |      |      |      |      |      |      |      |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 4700pF              |                    |         |      |      |      |      |         |        |      |      |      |      |      |      |      |      |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 6800pF              |                    |         |      |      |      |      |         |        |      |      |      |      |      |      |      |      |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 10000pF             |                    |         |      |      |      |      |         |        |      |      |      |      |      |      |      |      |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 15000pF             |                    |         |      |      |      |      |         |        |      |      |      |      |      |      |      |      |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 22000pF             |                    |         |      |      |      |      |         |        |      |      |      |      |      |      |      |      |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 33000pF             |                    |         |      |      |      |      |         |        |      |      |      |      |      |      |      |      |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 47000pF             |                    |         |      |      |      |      |         |        |      |      |      |      |      |      |      |      |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 68000pF             |                    |         |      |      |      |      |         |        |      |      |      |      |      |      |      |      |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 0.10μF              |                    |         |      |      |      |      |         |        |      |      |      |      |      |      |      |      |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 0.15μF              |                    |         |      |      |      |      |         |        |      |      |      |      |      |      |      |      |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 0.22μF              |                    |         |      |      |      |      |         |        |      |      |      |      |      |      |      |      |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 0.33μF              |                    |         |      |      |      |      |         |        |      |      |      |      |      |      |      |      |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 0.47μF              |                    |         |      |      |      |      |         |        |      |      |      |      |      |      |      |      |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 0.68μF              |                    |         |      |      |      |      |         |        |      |      |      |      |      |      |      |      |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 1.0μF               |                    |         |      |      |      |      | p103    | p103   | p103 | p103 |      |      |      |      |      | p103 |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 2.2μF               | p103               | p103    | p103 | p103 | p103 |      |         |        |      |      |      |      |      |      |      |      | p103 | p103   | p103 | p103   | p103 |      |      |     |     |     |     |     |     |     |
| 4.7μF               |                    |         |      |      |      |      |         |        |      |      | p103 | p103 | p103 | p103 | p103 |      |      | p103   | p103 | p103   |      |      |      |     |     |     |     |     |     |     |
| 10μF                |                    |         |      |      |      | p103 | p103    |        |      | p103 | p103 |      |      |      |      |      |      |        |      |        |      | p103 | p103 |     |     |     |     |     |     |     |
| 22μF                |                    |         |      |      |      |      |         |        |      |      |      |      |      |      |      |      |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 47μF                |                    |         |      |      |      |      |         |        |      |      |      |      |      |      |      |      |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 100μF               |                    |         |      |      |      |      |         |        |      |      |      |      |      |      |      |      |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 150μF               |                    |         |      |      |      |      |         |        |      |      |      |      |      |      |      |      |      |        |      |        |      |      |      |     |     |     |     |     |     |     |
| 220μF               |                    |         |      |      |      |      |         |        |      |      |      |      |      |      |      |      |      |        |      |        |      |      |      |     |     |     |     |     |     |     |

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## Capacitance Table

(→ GRM Series High Dielectric Constant Type)

|                     |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
|---------------------|--------------------|--|--------------------------------|-----|---------------------------------------------------------------------------------------------------------------|-----|--------|-----|--------|-----|-----|-----|-----|-----|-----|-----|-----|--------|-----|--------|-----|--------|----------|-----|-----|--|
| p00                 | ← Part Number List |  | JIS: <div>R</div> <div>B</div> |     | EIA: <div>X7R</div> <div>X7S</div> <div>X7T</div> <div>X7U</div> <div>X6S</div> <div>X6T</div> <div>X5R</div> |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| L×W (mm)            |                    |  | 1.6×0.8                        |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        | 2.0×1.25 |     |     |  |
| T max. (mm)         |                    |  | 0.9                            |     | 0.95                                                                                                          |     |        |     | 1.0    |     |     |     |     |     |     |     |     |        |     |        | 0.7 |        | 0.95     |     |     |  |
| Rated Voltage (Vdc) |                    |  | 6.3                            | 4   | 25                                                                                                            | 16  | 10     | 50  | 35     | 25  | 16  | 10  | 6.3 | 4   | 16  | 50  | 35  | 25     |     |        |     |        |          |     |     |  |
| Cap. / TC Code      |                    |  | X5R, B                         | X5R | X5R                                                                                                           | X6S | X5R, B | X7S | X5R, B | X5R | X6S | X5R | X7S | X6S | X5R | X7T | X6S | X5R, B | X6S | X5R, B | X6S | X5R, B | X6S      | X5R | X7R |  |
| 100pF               |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 150pF               |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 220pF               |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 330pF               |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 470pF               |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 680pF               |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 820pF               |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 1000pF              |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 1500pF              |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 2200pF              |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 3300pF              |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 4700pF              |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 6800pF              |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 10000pF             |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 15000pF             |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 22000pF             |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 33000pF             |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 47000pF             |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 68000pF             |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 0.10μF              |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 0.15μF              |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 0.22μF              |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 0.33μF              |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 0.47μF              |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 0.68μF              |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 1.0μF               |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 2.2μF               |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 4.7μF               |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 10μF                |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 22μF                |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 47μF                |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 100μF               |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 150μF               |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |
| 220μF               |                    |  |                                |     |                                                                                                               |     |        |     |        |     |     |     |     |     |     |     |     |        |     |        |     |        |          |     |     |  |

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## Capacitance Table

(→ GRM Series High Dielectric Constant Type)

|                     |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      |      |      |      |      |      |      |      |      |     |        |      |        |        |      |
|---------------------|--------------------|----------|--------------------------------|------|---------------------------------------------------------------------------------------------------------------|------|--------|------|--------|------|------|------|------|------|------|------|------|------|------|------|-----|--------|------|--------|--------|------|
| p00                 | ← Part Number List |          | JIS: <div>R</div> <div>B</div> |      | EIA: <div>X7R</div> <div>X7S</div> <div>X7T</div> <div>X7U</div> <div>X6S</div> <div>X6T</div> <div>X5R</div> |      |        |      |        |      |      |      |      |      |      |      |      |      |      |      |     |        |      |        |        |      |
| L×W (mm)            |                    | 2.0×1.25 |                                |      |                                                                                                               |      |        |      |        |      |      |      |      |      |      |      |      |      |      |      |     |        |      |        |        |      |
| T max. (mm)         |                    | 0.95     |                                |      |                                                                                                               |      |        |      |        |      |      | 1.0  |      |      |      |      |      | 1.35 |      |      |     | 1.4    |      |        |        |      |
| Rated Voltage (Vdc) |                    | 25       |                                | 16   |                                                                                                               | 10   |        | 6.3  |        | 4    |      | 2.5  |      | 500  | 250  | 200  | 35   | 25   |      | 16   |     | 25     |      | 16     | 50     | 25   |
| Cap. / TC Code      |                    | X6S      | X5R, B                         | X7R  | X5R, B                                                                                                        | X7Δ  | X5R, B | X6S  | X5R, B | X6S  | X5R  | X6T  | X7R  | X7R  | X7R  | X6S  | X7S  | X6S  | X7S  | X5R  | X6S | X5R, B | X7R  | X5R, B | X5R, B | X7R  |
| 100pF               |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      |      |      |      |      |      |      |      |      |     |        |      |        |        |      |
| 150pF               |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      |      |      |      |      |      |      |      |      |     |        |      |        |        |      |
| 220pF               |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      |      |      |      |      |      |      |      |      |     |        |      |        |        |      |
| 330pF               |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      |      |      |      |      |      |      |      |      |     |        |      |        |        |      |
| 470pF               |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      |      |      |      |      |      |      |      |      |     |        |      |        |        |      |
| 680pF               |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      |      |      |      |      |      |      |      |      |     |        |      |        |        |      |
| 820pF               |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      |      |      |      |      |      |      |      |      |     |        |      |        |        |      |
| 1000pF              |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      | p104 | p104 | p104 |      |      |      |      |      |     |        |      |        |        |      |
| 1500pF              |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      | p104 | p104 | p104 |      |      |      |      |      |     |        |      |        |        |      |
| 2200pF              |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      | p104 | p104 | p104 |      |      |      |      |      |     |        |      |        |        |      |
| 3300pF              |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      | p104 | p104 | p104 |      |      |      |      |      |     |        |      |        |        |      |
| 4700pF              |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      | p104 | p104 | p104 |      |      |      |      |      |     |        |      |        |        |      |
| 6800pF              |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      | p104 | p104 | p104 |      |      |      |      |      |     |        |      |        |        |      |
| 10000pF             |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      |      |      |      |      |      |      |      |      |     |        |      |        |        |      |
| 15000pF             |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      |      |      |      |      |      |      |      |      |     |        |      |        |        |      |
| 22000pF             |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      |      |      |      |      |      |      |      |      |     |        |      |        |        |      |
| 33000pF             |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      |      |      |      |      |      |      |      |      |     |        |      |        |        |      |
| 47000pF             |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      |      |      |      |      |      |      |      |      |     |        |      |        |        |      |
| 68000pF             |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      |      |      |      |      |      |      |      |      |     |        |      |        |        |      |
| 0.10μF              |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      |      |      |      |      |      |      |      |      |     |        |      |        |        |      |
| 0.15μF              |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      |      |      |      |      |      |      |      |      |     |        |      |        |        |      |
| 0.22μF              |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      |      |      |      |      |      |      |      |      |     |        |      |        |        |      |
| 0.33μF              |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      |      |      |      |      |      |      |      |      |     |        |      |        |        |      |
| 0.47μF              |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      |      |      |      |      |      |      |      |      |     |        |      |        |        |      |
| 0.68μF              |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      |      |      |      |      |      |      |      |      |     |        |      |        |        |      |
| 1.0μF               |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      |      |      |      |      |      |      |      |      |     |        |      |        |        |      |
| 2.2μF               |                    | p104     | p104                           | p104 | p104                                                                                                          |      | p104   |      |        |      |      |      |      |      |      |      |      |      |      |      |     | p104   | p104 |        | p104   | p104 |
| 4.7μF               |                    |          | p104                           |      |                                                                                                               | p104 | p104   | p104 |        |      |      |      |      |      |      | p104 | p104 | p104 | p104 |      |     | p104   | p104 | p104   |        | p104 |
| 10μF                |                    |          | p104                           | p104 |                                                                                                               |      | p104   | p104 |        | p104 |      | p104 |      |      |      |      |      |      |      |      |     | p104   | p104 |        | p104   | p104 |
| 22μF                |                    |          |                                |      |                                                                                                               |      |        |      |        |      | p104 | p104 |      |      |      |      |      |      |      | p104 |     |        |      | p104   | p104   |      |
| 47μF                |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      | p104 | p104 |      |      |      |      |      |      |     |        |      |        |        |      |
| 100μF               |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      |      |      |      |      |      |      |      |      |     |        |      |        |        |      |
| 150μF               |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      |      |      |      |      |      |      |      |      |     |        |      |        |        |      |
| 220μF               |                    |          |                                |      |                                                                                                               |      |        |      |        |      |      |      |      |      |      |      |      |      |      |      |     |        |      |        |        |      |

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## Capacitance Table

(→ GRM Series High Dielectric Constant Type)

|                     |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
|---------------------|--------------------|----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|------|-----|------|------|------|------|------|--|
| p00                 | ← Part Number List |          |      | JIS: | R    | B    | EIA: | X7R  | X7S  | X7T  | X7U  | X6S  | X6T  | X5R  |      |      |      |     |      |     |      |      |      |      |      |  |
| L×W (mm)            |                    | 2.0×1.25 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| T max. (mm)         |                    | 1.4      |      |      |      |      |      | 1.45 |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| Rated Voltage (Vdc) | 25                 | 16       | 10   | 6.3  |      | 4    |      | 500  | 250  | 200  | 50   |      | 35   |      |      | 25   |      |     | 16   |     |      | 10   |      |      | 6.3  |  |
| Cap. / TC Code      | X5R, B             | X6S      | B    | X7R  | X6S  | X7U  | X6S  | X7R  | X7R  | X7R  | X7S  | X6S  | X7S  | X6S  | X5R  | X7S  | X6S  | X5R | X7S  | X6S | X5R  | X7T  | X6S  | X5R  | X7T  |  |
| 100pF               |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 150pF               |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 220pF               |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 330pF               |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 470pF               |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 680pF               |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 820pF               |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 1000pF              |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 1500pF              |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 2200pF              |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 3300pF              |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 4700pF              |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 6800pF              |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 10000pF             |                    |          |      |      |      |      |      | p105 | p105 | p105 |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 15000pF             |                    |          |      |      |      |      |      | p105 | p105 |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 22000pF             |                    |          |      |      |      |      |      | p105 | p105 |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 33000pF             |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 47000pF             |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 68000pF             |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 0.10μF              |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 0.15μF              |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 0.22μF              |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 0.33μF              |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 0.47μF              |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 0.68μF              |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 1.0μF               |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 2.2μF               |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 4.7μF               |                    |          |      |      |      |      |      |      |      |      | p105 | p105 | p105 |      |      | p105 |      |     |      |     |      |      |      |      |      |  |
| 10μF                | p105               | p105     | p105 |      | p105 |      |      |      |      |      |      |      |      | p105 | p105 | p105 | p105 |     | p105 |     |      |      |      |      |      |  |
| 22μF                |                    |          | p105 |      | p105 | p105 | p105 |      |      |      |      |      |      | p105 | p105 | p105 | p105 |     | p105 |     | p105 | p105 | p105 | p105 | p105 |  |
| 47μF                |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      | p105 |      |  |
| 100μF               |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 150μF               |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |
| 220μF               |                    |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |     |      |      |      |      |      |  |

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## Capacitance Table

(→ GRM Series High Dielectric Constant Type)

|                     |                    |      |        |      |                                |        |                                                                                                               |      |        |      |      |      |      |      |      |      |      |      |      |      |      |      |        |
|---------------------|--------------------|------|--------|------|--------------------------------|--------|---------------------------------------------------------------------------------------------------------------|------|--------|------|------|------|------|------|------|------|------|------|------|------|------|------|--------|
| p00                 | ← Part Number List |      |        |      | JIS: <div>R</div> <div>B</div> |        | EIA: <div>X7R</div> <div>X7S</div> <div>X7T</div> <div>X7U</div> <div>X6S</div> <div>X6T</div> <div>X5R</div> |      |        |      |      |      |      |      |      |      |      |      |      |      |      |      |        |
| L×W (mm)            | 2.0×1.25           |      |        |      | 3.2×1.6                        |        |                                                                                                               |      |        |      |      |      |      |      |      |      |      |      |      |      |      |      |        |
| T max. (mm)         | 1.45               |      |        |      | 0.95                           |        |                                                                                                               |      |        | 1.0  | 1.25 |      |      |      |      |      | 1.8  |      |      |      |      |      |        |
| Rated Voltage (Vdc) | 6.3                | 4    | 2.5    |      | 35                             | 16     | 10                                                                                                            | 6.3  | 630    | 1000 | 630  | 500  | 250  | 200  | 50   | 25   | 1000 | 630  | 500  | 250  | 200  | 100  | 50     |
| Cap. / TC Code      | X5R, B             | X6S  | X5R, B | X6S  | X5R                            | X5R, B | X5R, B                                                                                                        | X6S  | X5R, B | X7R  | X7R  | X7R  | X7R  | X7R  | B    | X5R  | X7R  | X7R  | X7R  | X7R  | X7R  | X7R  | X5R, B |
| 100pF               |                    |      |        |      |                                |        |                                                                                                               |      |        |      |      |      |      |      |      |      |      |      |      |      |      |      |        |
| 150pF               |                    |      |        |      |                                |        |                                                                                                               |      |        |      |      |      |      |      |      |      |      |      |      |      |      |      |        |
| 220pF               |                    |      |        |      |                                |        |                                                                                                               |      |        |      |      |      |      |      |      |      |      |      |      |      |      |      |        |
| 330pF               |                    |      |        |      |                                |        |                                                                                                               |      |        |      |      |      |      |      |      |      |      |      |      |      |      |      |        |
| 470pF               |                    |      |        |      |                                |        |                                                                                                               |      |        |      | p105 |      |      |      |      |      |      |      |      |      |      |      |        |
| 680pF               |                    |      |        |      |                                |        |                                                                                                               |      |        |      | p105 |      |      |      |      |      |      |      |      |      |      |      |        |
| 820pF               |                    |      |        |      |                                |        |                                                                                                               |      |        |      |      |      |      |      |      |      |      |      |      |      |      |      |        |
| 1000pF              |                    |      |        |      |                                |        |                                                                                                               |      |        |      | p105 | p105 |      |      |      |      |      |      |      |      |      |      |        |
| 1500pF              |                    |      |        |      |                                |        |                                                                                                               |      |        |      | p105 | p105 |      |      |      |      |      |      |      |      |      |      |        |
| 2200pF              |                    |      |        |      |                                |        |                                                                                                               |      |        |      | p105 | p105 |      |      |      |      |      |      |      |      |      |      |        |
| 3300pF              |                    |      |        |      |                                |        |                                                                                                               |      |        |      | p105 | p105 |      |      |      |      |      |      |      |      |      |      |        |
| 4700pF              |                    |      |        |      |                                |        |                                                                                                               |      |        |      | p105 | p105 |      |      |      |      |      |      |      |      |      |      |        |
| 6800pF              |                    |      |        |      |                                |        |                                                                                                               |      |        |      | p105 |      | p105 |      |      |      | p105 |      |      |      |      |      |        |
| 10000pF             |                    |      |        |      |                                |        |                                                                                                               |      |        |      | p105 |      |      |      |      |      | p105 |      |      |      |      |      |        |
| 15000pF             |                    |      |        |      |                                |        |                                                                                                               |      |        |      |      |      | p105 | p105 | p105 |      |      | p105 |      |      |      |      |        |
| 22000pF             |                    |      |        |      |                                |        |                                                                                                               |      |        |      |      |      | p105 | p105 | p105 |      |      | p105 |      |      |      |      |        |
| 33000pF             |                    |      |        |      |                                |        |                                                                                                               |      |        |      |      |      |      |      |      |      |      |      | p105 | p105 | p105 |      |        |
| 47000pF             |                    |      |        |      |                                |        |                                                                                                               |      |        |      |      |      |      |      |      |      |      |      | p105 | p105 | p105 |      |        |
| 68000pF             |                    |      |        |      |                                |        |                                                                                                               |      |        |      |      |      | p105 | p105 |      |      |      |      |      |      |      |      |        |
| 0.10μF              |                    |      |        |      |                                |        |                                                                                                               |      |        |      |      |      |      |      |      |      |      |      |      | p105 | p105 |      |        |
| 0.15μF              |                    |      |        |      |                                |        |                                                                                                               |      |        |      |      |      |      |      |      |      |      |      |      |      |      |      |        |
| 0.22μF              |                    |      |        |      |                                |        |                                                                                                               |      |        |      |      |      |      |      |      |      |      |      |      |      |      |      |        |
| 0.33μF              |                    |      |        |      |                                |        |                                                                                                               |      |        |      |      |      |      |      |      |      |      |      |      |      |      |      |        |
| 0.47μF              |                    |      |        |      |                                |        |                                                                                                               |      |        |      |      |      |      |      |      |      |      |      |      |      |      |      |        |
| 0.68μF              |                    |      |        |      |                                |        |                                                                                                               |      |        |      |      |      |      |      |      |      |      |      |      |      |      |      |        |
| 1.0μF               |                    |      |        |      |                                |        |                                                                                                               |      |        |      |      |      |      |      |      | p105 |      |      |      |      |      | p105 |        |
| 2.2μF               |                    |      |        |      |                                |        |                                                                                                               |      |        |      |      |      |      |      |      |      |      |      |      |      |      |      |        |
| 4.7μF               |                    |      |        |      |                                |        |                                                                                                               |      |        |      |      |      |      |      |      |      |      |      |      |      |      | p105 | p106   |
| 10μF                |                    |      |        |      | p105                           | p105   | p105                                                                                                          |      |        |      |      |      |      |      |      | p105 |      |      |      |      |      | p106 | p106   |
| 22μF                |                    |      |        |      |                                | p105   | p105                                                                                                          | p105 | p105   | p105 | p105 | p105 |      |      |      |      |      |      |      |      |      |      |        |
| 47μF                | p105               | p105 | p105   | p105 |                                |        |                                                                                                               |      |        |      |      |      |      |      |      |      |      |      |      |      |      |      |        |
| 100μF               | p105               | p105 |        | p105 |                                |        |                                                                                                               |      |        |      |      |      |      |      |      |      |      |      |      |      |      |      |        |
| 150μF               |                    |      |        |      |                                |        |                                                                                                               |      |        |      |      |      |      |      |      |      |      |      |      |      |      |      |        |
| 220μF               |                    |      |        |      |                                |        |                                                                                                               |      |        |      |      |      |      |      |      |      |      |      |      |      |      |      |        |

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## Capacitance Table

(→ GRM Series High Dielectric Constant Type)

|                     |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
|---------------------|--------------------|---------|--------------------------------|------|---------------------------------------------------------------------------------------------------------------|------|--------|------|------|--------|------|-----|------|------|-----|------|------|------|------|------|------|------|------|---------|-----|------|
| p00                 | ← Part Number List |         | JIS: <div>R</div> <div>B</div> |      | EIA: <div>X7R</div> <div>X7S</div> <div>X7T</div> <div>X7U</div> <div>X6S</div> <div>X6T</div> <div>X5R</div> |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
| L×W (mm)            |                    | 3.2×1.6 |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      | 3.2×2.5 |     |      |
| T max. (mm)         |                    | 1.8     |                                |      |                                                                                                               |      |        |      |      |        |      | 1.9 |      |      |     |      |      |      |      |      |      | 1.5  |      |         |     |      |
| Rated Voltage (Vdc) |                    | 25      |                                | 16   |                                                                                                               | 10   |        | 6.3  |      | 4      |      | 25  |      | 16   |     | 10   |      | 6.3  |      | 4    |      | 2.5  |      | 1000    | 630 |      |
| Cap. / TC Code      |                    | X7R     | X5R, B                         | X6S  | X5R, B                                                                                                        | X7R  | X5R, B | X7Δ  | X6S  | X5R, B | X7U  | X6S | X6S  | X7S  | X5R | X6S  | X5R  | X6T  | X5R  | X7U  | X6Δ  | X5R  | X6S  | X5R     | X7R | X7R  |
| 100pF               |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
| 150pF               |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
| 220pF               |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
| 330pF               |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
| 470pF               |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
| 680pF               |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
| 820pF               |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
| 1000pF              |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
| 1500pF              |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
| 2200pF              |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
| 3300pF              |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
| 4700pF              |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
| 6800pF              |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     | p106 |
| 10000pF             |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     | p106 |
| 15000pF             |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
| 22000pF             |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     | p106 |
| 33000pF             |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
| 47000pF             |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
| 68000pF             |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
| 0.10μF              |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
| 0.15μF              |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
| 0.22μF              |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
| 0.33μF              |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
| 0.47μF              |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
| 0.68μF              |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
| 1.0μF               |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
| 2.2μF               |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
| 4.7μF               |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
| 10μF                |                    | p106    | p106                           |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      |      |      |         |     |      |
| 22μF                |                    |         | p106                           | p106 | p106                                                                                                          | p106 | p106   |      |      |        |      |     | p106 | p106 |     |      |      |      |      |      |      |      |      |         |     |      |
| 47μF                |                    |         |                                |      |                                                                                                               |      | p106   | p106 | p106 | p106   | p106 |     |      |      |     | p106 | p106 |      |      |      |      |      |      |         |     |      |
| 100μF               |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      | p106 | p106 | p106 | p106 | p106 | p106 |      |         |     |      |
| 150μF               |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      | p106 |      |      | p106 | p106 | p106 |         |     |      |
| 220μF               |                    |         |                                |      |                                                                                                               |      |        |      |      |        |      |     |      |      |     |      |      |      |      |      |      | p106 |      | p106    |     |      |

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## Capacitance Table

(→ GRM Series High Dielectric Constant Type)

|                     |                    |  |  |         |      |      |      |      |      |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
|---------------------|--------------------|--|--|---------|------|------|------|------|------|------|------|------|------|------|-----|------|------|--------|------|--------|------|--------|------|------|--------|------|--------|
| p00                 | ← Part Number List |  |  | JIS:    | R    | B    | EIA: | X7R  | X7S  | X7T  | X7U  | X6S  | X6T  | X5R  |     |      |      |        |      |        |      |        |      |      |        |      |        |
| L×W (mm)            |                    |  |  | 3.2×2.5 |      |      |      |      |      |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| T max. (mm)         |                    |  |  | 1.5     |      |      | 1.8  |      | 2.0  |      |      |      |      | 2.2  |     | 2.7  |      |        |      |        |      |        |      |      |        |      |        |
| Rated Voltage (Vdc) |                    |  |  | 500     | 250  | 200  | 100  | 1000 | 630  | 500  | 250  | 200  | 100  | 25   | 100 | 80   | 63   | 50     | 35   | 25     | 16   | 10     |      |      |        |      |        |
| Cap. / TC Code      |                    |  |  | X7R     | X7R  | X7R  | X7R  | X7R  | X7R  | X7R  | X7R  | X7S  | X7R  | X7R  | X7R | X7R  | X7R  | X5R, B | X7R  | X5R, B | X7R  | X5R, B | X7R  | X6S  | X5R, B | X7R  | X5R, B |
| 100pF               |                    |  |  |         |      |      |      |      |      |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 150pF               |                    |  |  |         |      |      |      |      |      |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 220pF               |                    |  |  |         |      |      |      |      |      |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 330pF               |                    |  |  |         |      |      |      |      |      |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 470pF               |                    |  |  |         |      |      |      |      |      |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 680pF               |                    |  |  |         |      |      |      |      |      |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 820pF               |                    |  |  |         |      |      |      |      |      |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 1000pF              |                    |  |  |         |      |      |      |      |      |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 1500pF              |                    |  |  |         |      |      |      |      |      |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 2200pF              |                    |  |  |         |      |      |      |      |      |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 3300pF              |                    |  |  |         |      |      |      |      |      |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 4700pF              |                    |  |  |         |      |      |      |      |      |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 6800pF              |                    |  |  |         |      |      |      |      |      |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 10000pF             |                    |  |  |         |      |      |      |      |      |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 15000pF             |                    |  |  |         |      |      |      | p106 |      |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 22000pF             |                    |  |  |         |      |      |      | p106 |      |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 33000pF             |                    |  |  |         |      |      |      |      | p106 |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 47000pF             |                    |  |  |         |      |      |      |      | p106 |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 68000pF             |                    |  |  | p106    | p106 | p106 |      |      |      |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 0.10μF              |                    |  |  |         |      |      |      |      | p106 | p106 | p106 |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 0.15μF              |                    |  |  |         | p106 | p106 |      |      |      |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 0.22μF              |                    |  |  |         |      |      |      |      |      | p106 | p106 |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 0.33μF              |                    |  |  |         |      |      |      |      |      |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 0.47μF              |                    |  |  |         |      |      |      |      |      |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 0.68μF              |                    |  |  |         |      |      |      |      |      |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 1.0μF               |                    |  |  |         |      |      | p106 |      |      |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 2.2μF               |                    |  |  |         |      |      |      |      |      |      |      |      | p106 |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 4.7μF               |                    |  |  |         |      |      |      |      |      |      |      | p106 |      | p106 |     | p106 |      |        |      |        |      |        |      |      |        |      |        |
| 10μF                |                    |  |  |         |      |      |      |      |      |      |      |      | p106 |      |     | p106 | p106 | p106   | p106 | p106   | p106 |        |      |      |        |      |        |
| 22μF                |                    |  |  |         |      |      |      |      |      |      |      |      |      |      |     |      |      |        |      | p106   | p106 | p106   | p106 |      |        |      |        |
| 47μF                |                    |  |  |         |      |      |      |      |      |      |      |      |      |      |     |      |      |        |      |        |      |        | p106 | p106 | p106   | p106 |        |
| 100μF               |                    |  |  |         |      |      |      |      |      |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        | p106 |        |
| 150μF               |                    |  |  |         |      |      |      |      |      |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |
| 220μF               |                    |  |  |         |      |      |      |      |      |      |      |      |      |      |     |      |      |        |      |        |      |        |      |      |        |      |        |

Continued on the following page. ↗

## Capacitance Table

(→ GRM Series High Dielectric Constant Type)

|                     |                    |         |        |         |      |      |      |     |      |      |      |         |     |      |      |      |      |      |
|---------------------|--------------------|---------|--------|---------|------|------|------|-----|------|------|------|---------|-----|------|------|------|------|------|
| p00                 | ← Part Number List |         |        | JIS:    | R    | B    | EIA: | X7R | X7S  | X7T  | X7U  | X6S     | X6T | X5R  |      |      |      |      |
| L×W (mm)            |                    | 3.2×2.5 |        | 4.5×3.2 |      |      |      |     |      |      |      | 5.7×5.0 |     |      |      |      |      |      |
| T max. (mm)         |                    | 2.7     |        | 1.5     |      |      |      | 2.0 |      |      |      | 2.0     |     |      |      |      |      |      |
| Rated Voltage (Vdc) |                    | 6.3     |        | 4       | 630  | 500  | 250  | 200 | 1000 | 630  | 500  | 250     | 200 | 1000 | 630  | 500  | 250  | 200  |
| Cap. / TC Code      |                    | X7Δ     | X5R, B | X7U     | X7R  | X7R  | X7R  | X7R | X7R  | X7R  | X7R  | X7R     | X7R | X7R  | X7R  | X7R  | X7R  | X7R  |
| 100pF               |                    |         |        |         |      |      |      |     |      |      |      |         |     |      |      |      |      |      |
| 150pF               |                    |         |        |         |      |      |      |     |      |      |      |         |     |      |      |      |      |      |
| 220pF               |                    |         |        |         |      |      |      |     |      |      |      |         |     |      |      |      |      |      |
| 330pF               |                    |         |        |         |      |      |      |     |      |      |      |         |     |      |      |      |      |      |
| 470pF               |                    |         |        |         |      |      |      |     |      |      |      |         |     |      |      |      |      |      |
| 680pF               |                    |         |        |         |      |      |      |     |      |      |      |         |     |      |      |      |      |      |
| 820pF               |                    |         |        |         |      |      |      |     |      |      |      |         |     |      |      |      |      |      |
| 1000pF              |                    |         |        |         |      |      |      |     |      |      |      |         |     |      |      |      |      |      |
| 1500pF              |                    |         |        |         |      |      |      |     |      |      |      |         |     |      |      |      |      |      |
| 2200pF              |                    |         |        |         |      |      |      |     |      |      |      |         |     |      |      |      |      |      |
| 3300pF              |                    |         |        |         |      |      |      |     |      |      |      |         |     |      |      |      |      |      |
| 4700pF              |                    |         |        |         |      |      |      |     |      |      |      |         |     |      |      |      |      |      |
| 6800pF              |                    |         |        |         |      |      |      |     |      |      |      |         |     |      |      |      |      |      |
| 10000pF             |                    |         |        |         |      |      |      |     |      |      |      |         |     |      |      |      |      |      |
| 15000pF             |                    |         |        |         |      |      |      |     |      |      |      |         |     |      |      |      |      |      |
| 22000pF             |                    |         |        |         |      |      |      |     |      |      |      |         |     |      |      |      |      |      |
| 33000pF             |                    |         |        |         |      |      |      |     | p107 |      |      |         |     |      |      |      |      |      |
| 47000pF             |                    |         |        |         |      |      |      |     | p107 |      |      |         |     |      |      |      |      |      |
| 68000pF             |                    |         |        |         | p107 |      |      |     |      |      |      |         |     | p107 |      |      |      |      |
| 0.10μF              |                    |         |        |         |      |      |      |     | p107 |      |      |         |     | p107 |      |      |      |      |
| 0.15μF              |                    |         |        |         | p107 | p107 | p107 |     |      |      |      |         |     |      | p107 |      |      |      |
| 0.22μF              |                    |         |        |         |      |      |      |     |      | p107 | p107 | p107    |     |      | p107 |      |      |      |
| 0.33μF              |                    |         |        |         |      |      |      |     |      |      | p107 | p107    |     |      |      | p107 | p107 | p107 |
| 0.47μF              |                    |         |        |         |      |      |      |     |      |      | p107 | p107    |     |      |      | p107 | p107 | p107 |
| 0.68μF              |                    |         |        |         |      |      |      |     |      |      |      |         |     |      |      |      | p107 | p107 |
| 1.0μF               |                    |         |        |         |      |      |      |     |      |      |      |         |     |      |      |      | p107 | p107 |
| 2.2μF               |                    |         |        |         |      |      |      |     |      |      |      |         |     |      |      |      |      |      |
| 4.7μF               |                    |         |        |         |      |      |      |     |      |      |      |         |     |      |      |      |      |      |
| 10μF                |                    |         |        |         |      |      |      |     |      |      |      |         |     |      |      |      |      |      |
| 22μF                |                    |         |        |         |      |      |      |     |      |      |      |         |     |      |      |      |      |      |
| 47μF                |                    | p106    |        |         |      |      |      |     |      |      |      |         |     |      |      |      |      |      |
| 100μF               |                    | p106    | p106   | p106    | p106 |      |      |     |      |      |      |         |     |      |      |      |      |      |
| 150μF               |                    |         |        |         |      |      |      |     |      |      |      |         |     |      |      |      |      |      |
| 220μF               |                    |         |        |         |      |      |      |     |      |      |      |         |     |      |      |      |      |      |

## Capacitance Table

### GR3 Series High Dielectric Constant Type

p00 ← Part Number List EIA: X7T

| L×W (mm)            | 2.0×1.25 |      | 3.2×1.6 |      |      |      |      |      |      |      | 3.2×2.5 |      |      |      |      | 4.5×3.2 |      |      |      | 5.7×5.0 |      |     |      |      |  |
|---------------------|----------|------|---------|------|------|------|------|------|------|------|---------|------|------|------|------|---------|------|------|------|---------|------|-----|------|------|--|
| T max. (mm)         | 1.0      | 1.45 | 1.0     |      | 1.25 |      |      | 1.8  |      |      | 1.5     |      | 2.0  |      |      | 1.5     | 2.0  |      | 2.0  |         |      | 2.7 |      |      |  |
| Rated Voltage (Vdc) | 250      | 250  | 450     | 250  | 630  | 450  | 250  | 630  | 450  | 250  | 630     | 250  | 630  | 450  | 250  | 250     | 630  | 450  | 250  | 630     | 450  | 250 | 630  | 250  |  |
| Cap. / TC Code      | X7T      | X7T  | X7T     | X7T  | X7T  | X7T  | X7T  | X7T  | X7T  | X7T  | X7T     | X7T  | X7T  | X7T  | X7T  | X7T     | X7T  | X7T  | X7T  | X7T     | X7T  | X7T | X7T  | X7T  |  |
| 10000pF             | p110     |      | p110    |      | p110 |      |      |      |      |      |         |      |      |      |      |         |      |      |      |         |      |     |      |      |  |
| 15000pF             | p110     |      | p110    |      |      |      |      | p110 |      |      |         |      |      |      |      |         |      |      |      |         |      |     |      |      |  |
| 22000pF             |          | p110 |         |      |      | p110 |      |      |      |      | p110    |      |      |      |      |         |      |      |      |         |      |     |      |      |  |
| 33000pF             |          |      |         | p110 |      | p110 |      |      |      |      |         |      | p110 |      |      |         |      |      |      |         |      |     |      |      |  |
| 47000pF             |          |      |         |      |      |      | p110 |      | p110 |      |         |      | p110 |      |      |         |      |      |      |         |      |     |      |      |  |
| 68000pF             |          |      |         |      |      |      |      |      |      | p110 |         |      |      | p110 |      |         | p110 |      |      |         |      |     |      |      |  |
| 0.10μF              |          |      |         |      |      |      |      |      |      |      |         | p110 |      | p110 |      |         |      |      |      | p110    |      |     |      |      |  |
| 0.15μF              |          |      |         |      |      |      |      |      |      |      |         |      |      |      | p110 |         |      | p110 |      | p110    |      |     |      |      |  |
| 0.22μF              |          |      |         |      |      |      |      |      |      |      |         |      |      |      |      |         | p110 |      |      |         | p110 |     | p110 |      |  |
| 0.33μF              |          |      |         |      |      |      |      |      |      |      |         |      |      |      |      |         |      |      | p110 |         | p110 |     |      |      |  |
| 0.47μF              |          |      |         |      |      |      |      |      |      |      |         |      |      |      |      |         |      |      |      | p110    | p110 |     |      |      |  |
| 0.68μF              |          |      |         |      |      |      |      |      |      |      |         |      |      |      |      |         |      |      |      |         | p110 |     |      |      |  |
| 1.0μF               |          |      |         |      |      |      |      |      |      |      |         |      |      |      |      |         |      |      |      |         |      |     |      | p110 |  |

## Capacitance Table

### GRJ Series High Dielectric Constant Type

p00 ← Part Number List EIA: X7R X7S X5R

| L×W (mm)            | 1.6×0.8 |      |      |      |      |      |      | 2.0×1.25 |      |      |      |      |      |      |      |      |      |      | 3.2×1.6 |      |      |      |      |  |  |
|---------------------|---------|------|------|------|------|------|------|----------|------|------|------|------|------|------|------|------|------|------|---------|------|------|------|------|--|--|
| T max. (mm)         | 0.9     |      |      |      |      |      |      | 1.0      | 0.7  |      | 0.95 | 1.0  | 1.45 |      |      |      |      |      |         | 1.5  | 0.95 |      | 1.25 |  |  |
| Rated Voltage (Vdc) | 100     | 50   | 35   | 25   | 16   | 6.3  | 6.3  | 100      | 50   | 100  | 250  | 250  | 100  | 50   | 25   | 16   | 10   | 100  | 100     | 50   | 1000 | 630  |      |  |  |
| Cap. / TC Code      | X7R     | X7R  | X5R  | X7R  | X7R  | X7R  | X7S  | X7R      | X7R  | X7R  | X7R  | X7R  | X7R  | X7R  | X7R  | X7R  | X7R  | X7S  | X7R     | X7R  | X7R  | X7R  |      |  |  |
| 220pF               |         |      |      |      |      |      |      |          |      | p121 |      |      |      |      |      |      |      |      |         |      |      |      |      |  |  |
| 470pF               |         |      |      |      |      |      |      |          | p121 | p121 |      |      |      |      |      |      |      |      |         |      | p122 |      |      |  |  |
| 680pF               |         |      |      |      |      |      |      |          |      |      |      |      |      |      |      |      |      |      |         |      | p122 |      |      |  |  |
| 1000pF              | p121    | p121 |      |      |      |      |      | p121     | p121 |      | p121 |      |      |      |      |      |      |      |         |      | p122 | p122 |      |  |  |
| 1500pF              |         |      |      |      |      |      |      |          |      |      | p121 |      |      |      |      |      |      |      |         |      | p122 | p122 |      |  |  |
| 2200pF              | p121    | p121 |      |      |      |      |      | p121     | p121 |      | p121 |      |      |      |      |      |      |      |         |      | p122 | p122 |      |  |  |
| 3300pF              |         |      |      |      |      |      |      |          |      |      | p121 |      |      |      |      |      |      |      |         |      | p122 | p122 |      |  |  |
| 4700pF              | p121    | p121 |      |      |      |      |      | p121     | p121 |      | p121 |      |      |      |      |      |      |      |         |      | p122 | p122 |      |  |  |
| 6800pF              |         |      |      |      |      |      |      |          |      |      | p121 |      |      |      |      |      |      |      |         |      |      | p122 |      |  |  |
| 10000pF             | p121    | p121 |      |      |      |      |      | p121     | p121 |      |      | p121 |      |      |      |      |      |      |         |      |      | p122 |      |  |  |
| 15000pF             |         |      |      |      |      |      |      |          |      |      |      | p121 |      |      |      |      |      |      |         |      |      | p122 |      |  |  |
| 22000pF             | p121    | p121 |      |      |      |      |      | p121     | p121 |      |      | p121 |      |      |      |      |      |      |         |      |      |      |      |  |  |
| 33000pF             |         |      |      |      |      |      |      |          |      |      |      |      |      |      |      |      |      |      |         |      |      |      |      |  |  |
| 47000pF             |         | p121 |      | p121 |      |      |      |          |      |      |      |      | p121 | p121 |      |      |      |      |         |      |      |      |      |  |  |
| 68000pF             |         |      |      |      |      |      |      |          |      |      |      |      |      |      |      |      |      |      |         |      |      |      |      |  |  |
| 0.10μF              | p121    | p121 |      |      |      |      |      |          |      |      |      |      | p121 | p121 |      |      |      |      | p122    | p122 |      |      |      |  |  |
| 0.15μF              |         |      |      |      |      |      |      |          |      |      |      |      |      |      |      |      |      |      |         |      |      |      |      |  |  |
| 0.22μF              |         | p121 |      | p121 |      |      |      |          |      |      |      |      |      |      | p121 |      |      |      |         |      |      |      |      |  |  |
| 0.33μF              |         |      |      |      |      |      |      |          |      |      |      |      |      |      |      |      |      |      |         |      |      |      |      |  |  |
| 0.47μF              |         |      |      |      | p121 |      |      |          |      |      |      |      |      |      | p121 |      |      |      |         |      |      |      |      |  |  |
| 0.68μF              |         |      |      |      |      |      |      |          |      |      |      |      |      |      |      |      |      |      |         |      |      |      |      |  |  |
| 1.0μF               |         |      | p121 | p121 |      |      |      |          |      |      |      |      |      |      | p121 | p121 |      | p121 |         |      |      |      |      |  |  |
| 2.2μF               |         |      |      |      |      | p121 |      |          |      |      |      |      |      |      |      | p121 |      |      |         |      |      |      |      |  |  |
| 4.7μF               |         |      |      |      |      |      | p121 |          |      |      |      |      |      |      |      |      | p121 |      |         |      |      |      |      |  |  |
| 10μF                |         |      |      |      |      |      |      |          |      |      |      |      |      |      |      |      | p121 |      |         |      |      |      |      |  |  |
| 22μF                |         |      |      |      |      |      |      |          |      |      |      |      |      |      |      |      |      |      |         |      |      |      |      |  |  |
| 47μF                |         |      |      |      |      |      |      |          |      |      |      |      |      |      |      |      |      |      |         |      |      |      |      |  |  |

| L×W (mm)            | 3.2×2.5 |      |      |      |      |      | 4.5×3.2 |      |      |      |      | 5.7×5.0 |      |      |      |
|---------------------|---------|------|------|------|------|------|---------|------|------|------|------|---------|------|------|------|
| T max. (mm)         | 2.8     |      |      |      |      |      | 2.85    | 1.5  |      | 2.0  |      |         | 2.0  |      |      |
| Rated Voltage (Vdc) | 50      |      | 25   | 16   | 10   | 6.3  | 25      | 630  | 250  | 1000 | 630  | 250     | 1000 | 630  | 250  |
| Cap. / TC Code      | X7R     | X7S  | X7R  | X7R  | X7R  | X7R  | X7S     | X7R  | X7R  | X7R  | X7R  | X7R     | X7R  | X7R  | X7R  |
| 33000pF             |         |      |      |      |      |      |         |      |      | p123 |      |         |      |      |      |
| 47000pF             |         |      |      |      |      |      |         |      |      | p123 |      |         |      |      |      |
| 68000pF             |         |      |      |      |      |      |         | p123 |      |      |      |         | p123 |      |      |
| 0.10μF              |         |      |      |      |      |      |         |      |      |      | p123 |         | p123 |      |      |
| 0.15μF              |         |      |      |      |      |      |         |      | p123 |      |      |         |      | p123 |      |
| 0.22μF              |         |      |      |      |      |      |         |      |      |      |      | p123    |      | p123 |      |
| 0.33μF              |         |      |      |      |      |      |         |      |      |      |      | p123    |      |      | p123 |
| 0.47μF              |         |      |      |      |      |      |         |      |      |      |      | p123    |      |      | p123 |
| 0.68μF              |         |      |      |      |      |      |         |      |      |      |      |         |      |      | p123 |
| 1.0μF               |         |      |      |      |      |      |         |      |      |      |      |         |      |      | p123 |
| 2.2μF               |         |      |      |      |      |      |         |      |      |      |      |         |      |      |      |
| 4.7μF               | p122    |      |      |      |      |      |         |      |      |      |      |         |      |      |      |
| 10μF                | p122    | p122 | p122 |      |      |      |         |      |      |      |      |         |      |      |      |
| 22μF                |         |      |      | p122 | p122 |      | p122    |      |      |      |      |         |      |      |      |
| 47μF                |         |      |      |      | p122 | p122 |         |      |      |      |      |         |      |      |      |

| 3.2×1.6 |     |      |     |     |     |      |     |     |     |     |     |     |     | 3.2×2.5 |      |     |     |      |     |     | L×W (mm) |     |                     |
|---------|-----|------|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|---------|------|-----|-----|------|-----|-----|----------|-----|---------------------|
| 1.25    |     | 1.35 |     |     |     | 1.8  |     |     | 1.9 |     |     |     |     |         | 1.5  |     |     | 2.0  |     |     | 2.3      |     | T max. (mm)         |
|         | 250 | 100  | 50  | 25  | 16  | 1000 | 630 | 250 | 100 | 50  | 25  | 16  | 10  | 6.3     | 1000 | 630 | 250 | 1000 | 630 | 250 | 100      |     | Rated Voltage (Vdc) |
|         | X7R | X7R  | X7R | X7R | X7R | X7R  | X7R | X7R | X7R | X7R | X7R | X7R | X7R | X7R     | X7R  | X7R | X7R | X7R  | X7R | X7R | X7R      | X7S | Cap. / TC Code      |
|         |     |      |     |     |     |      |     |     |     |     |     |     |     |         |      |     |     |      |     |     |          |     | 220pF               |
|         |     |      |     |     |     |      |     |     |     |     |     |     |     |         |      |     |     |      |     |     |          |     | 470pF               |
|         |     |      |     |     |     |      |     |     |     |     |     |     |     |         |      |     |     |      |     |     |          |     | 680pF               |
|         |     |      |     |     |     |      |     |     |     |     |     |     |     |         |      |     |     |      |     |     |          |     | 1000pF              |
|         |     |      |     |     |     |      |     |     |     |     |     |     |     |         |      |     |     |      |     |     |          |     | 1500pF              |
|         |     |      |     |     |     |      |     |     |     |     |     |     |     |         |      |     |     |      |     |     |          |     | 2200pF              |
|         |     |      |     |     |     |      |     |     |     |     |     |     |     |         |      |     |     |      |     |     |          |     | 3300pF              |
|         |     |      |     |     |     |      |     |     |     |     |     |     |     |         |      |     |     |      |     |     |          |     | 4700pF              |
|         |     |      |     |     |     |      |     |     |     |     |     |     |     |         |      |     |     |      |     |     |          |     | 6800pF              |
|         |     |      |     |     |     |      |     |     |     |     |     |     |     |         |      |     |     |      |     |     |          |     | 10000pF             |
|         |     |      |     |     |     |      |     |     |     |     |     |     |     |         |      |     |     |      |     |     |          |     | 15000pF             |
|         |     |      |     |     |     |      |     |     |     |     |     |     |     |         |      |     |     |      |     |     |          |     | 22000pF             |
|         |     |      |     |     |     |      |     |     |     |     |     |     |     |         |      |     |     |      |     |     |          |     | 33000pF             |
|         |     |      |     |     |     |      |     |     |     |     |     |     |     |         |      |     |     |      |     |     |          |     | 47000pF             |
|         |     |      |     |     |     |      |     |     |     |     |     |     |     |         |      |     |     |      |     |     |          |     | 68000pF             |
|         |     |      |     |     |     |      |     |     |     |     |     |     |     |         |      |     |     |      |     |     |          |     | 0.10μF              |
|         |     |      |     |     |     |      |     |     |     |     |     |     |     |         |      |     |     |      |     |     |          |     | 0.15μF              |
|         |     |      |     |     |     |      |     |     |     |     |     |     |     |         |      |     |     |      |     |     |          |     | 0.22μF              |
|         |     |      |     |     |     |      |     |     |     |     |     |     |     |         |      |     |     |      |     |     |          |     | 0.33μF              |
|         |     |      |     |     |     |      |     |     |     |     |     |     |     |         |      |     |     |      |     |     |          |     | 0.47μF              |
|         |     |      |     |     |     |      |     |     |     |     |     |     |     |         |      |     |     |      |     |     |          |     | 0.68μF              |
|         |     |      |     |     |     |      |     |     |     |     |     |     |     |         |      |     |     |      |     |     |          |     | 1.0μF               |
|         |     |      |     |     |     |      |     |     |     |     |     |     |     |         |      |     |     |      |     |     |          |     | 2.2μF               |
|         |     |      |     |     |     |      |     |     |     |     |     |     |     |         |      |     |     |      |     |     |          |     | 4.7μF               |
|         |     |      |     |     |     |      |     |     |     |     |     |     |     |         |      |     |     |      |     |     |          |     | 10μF                |
|         |     |      |     |     |     |      |     |     |     |     |     |     |     |         |      |     |     |      |     |     |          |     | 22μF                |
|         |     |      |     |     |     |      |     |     |     |     |     |     |     |         |      |     |     |      |     |     |          |     | 47μF                |

Continued to the following table. ↗

## Capacitance Table

### GR4 Series High Dielectric Constant Type

|                     |                    |         |      |         |     |
|---------------------|--------------------|---------|------|---------|-----|
| p00                 | ← Part Number List |         |      | EIA:    | X7R |
| L×W (mm)            | 0.4×0.2            | 4.5×3.2 |      | 5.7×5.0 |     |
| T max. (mm)         | 1.5                | 1.5     | 2.0  | 2.0     |     |
| Rated Voltage (Vdc) | 2000               | 2000    | 2000 | 2000    |     |
| Cap. / TC Code      | X7R                | X7R     | X7R  | X7R     |     |
| 100pF               | p126               |         |      |         |     |
| 120pF               | p126               |         |      |         |     |
| 150pF               | p126               |         |      |         |     |
| 180pF               | p126               |         |      |         |     |
| 220pF               | p126               |         |      |         |     |
| 270pF               | p126               |         |      |         |     |
| 330pF               | p126               |         |      |         |     |
| 390pF               | p126               |         |      |         |     |
| 470pF               | p126               |         |      |         |     |
| 560pF               | p126               |         |      |         |     |
| 680pF               | p126               |         |      |         |     |
| 820pF               | p126               |         |      |         |     |
| 1000pF              | p126               |         |      |         |     |
| 1200pF              | p126               |         |      |         |     |
| 1500pF              | p126               |         |      |         |     |
| 1800pF              |                    | p126    |      |         |     |
| 2200pF              |                    | p126    |      |         |     |
| 2700pF              |                    | p126    |      |         |     |
| 3300pF              |                    | p126    |      |         |     |
| 3900pF              |                    | p126    |      |         |     |
| 4700pF              |                    |         | p126 |         |     |
| 10000pF             |                    |         |      | p126    |     |

### GR7 Series High Dielectric Constant Type

|                     |                    |      |          |      |      |
|---------------------|--------------------|------|----------|------|------|
| p00                 | ← Part Number List |      | EIA: X7T |      |      |
| L×W (mm)            | 2.0×1.25           |      | 3.2×1.6  |      |      |
| T max. (mm)         | 1.0                | 1.45 | 1.0      | 1.25 | 1.8  |
| Rated Voltage (Vdc) | 350                | 350  | 350      | 350  | 350  |
| Cap. / TC Code      | X7T                | X7T  | X7T      | X7T  | X7T  |
| 10000pF             | p131               |      | p131     |      |      |
| 15000pF             | p131               |      | p131     |      |      |
| 22000pF             |                    | p131 | p131     | p131 |      |
| 27000pF             |                    | p131 | p131     |      |      |
| 33000pF             |                    |      | p131     | p131 |      |
| 47000pF             |                    |      |          |      | p131 |

### GJM Series Temperature Compensating Type

|                     |                    |      |         |      |      |      |      |      |          |      |
|---------------------|--------------------|------|---------|------|------|------|------|------|----------|------|
| p00                 | ← Part Number List |      | JIS: CK |      | CJ   |      | CH   |      | EIA: C0G |      |
| L×W (mm)            | 0.4×0.2            |      | 0.6×0.3 |      |      |      |      |      | 1.0×0.5  |      |
| T max. (mm)         | 0.22               |      | 0.33    |      |      |      |      |      | 0.55     |      |
| Rated Voltage (Vdc) | 25                 |      | 50      |      |      |      | 25   |      | 50       |      |
| Cap. / TC Code      | C0G                | CΔ   | C0G     | CK   | CJ   | CH   | C0G  | CΔ   | C0G      | CΔ   |
| 0.10pF              |                    |      |         |      |      |      |      |      | p149     | p153 |
| 0.20pF              | p136               | p139 | p142    | p142 |      | p142 |      |      | p149     | p153 |
| 1.0pF               | p136               | p139 |         | p142 |      |      | p143 | p146 | p149     | p153 |
| 2.0pF               | p136               | p139 |         | p142 |      |      | p143 | p146 | p149     | p153 |
| 3.0pF               | p136               | p139 |         |      | p142 |      | p143 | p146 | p150     | p153 |
| 4.0pF               | p137               | p140 |         |      |      |      | p143 | p147 | p150     | p154 |
| 5.0pF               | p137               | p140 |         |      |      |      | p144 | p147 | p150     | p154 |
| 6.0pF               | p137               | p140 |         |      |      |      | p144 | p147 | p151     | p154 |
| 7.0pF               | p138               | p141 |         |      |      |      | p144 | p148 | p151     | p155 |
| 8.0pF               | p138               | p141 |         |      |      |      | p145 | p148 | p151     | p155 |
| 9.0pF               | p138               | p142 |         |      |      |      | p145 | p148 | p152     | p155 |
| 10pF                | p139               | p142 |         |      |      |      | p146 | p149 | p152     | p156 |
| 11pF                | p139               | p142 |         |      |      |      | p146 | p149 | p152     | p156 |
| 12pF                | p139               | p142 |         |      |      |      | p146 | p149 | p152     | p156 |
| 13pF                | p139               | p142 |         |      |      |      | p146 | p149 | p152     | p156 |
| 15pF                | p139               | p142 |         |      |      |      | p146 | p149 | p152     | p156 |
| 16pF                | p139               | p142 |         |      |      |      | p146 | p149 | p152     | p156 |
| 18pF                | p139               | p142 |         |      |      |      | p146 | p149 | p152     | p156 |
| 20pF                | p139               | p142 |         |      |      |      | p146 | p149 | p152     | p156 |
| 22pF                | p139               | p142 |         |      |      |      | p146 | p149 | p152     | p156 |
| 24pF                |                    |      |         |      |      |      | p146 | p149 | p152     | p156 |
| 27pF                |                    |      |         |      |      |      | p146 | p149 | p152     | p156 |
| 30pF                |                    |      |         |      |      |      | p146 | p149 | p152     | p156 |
| 33pF                |                    |      |         |      |      |      | p146 | p149 | p152     | p156 |
| 36pF                |                    |      |         |      |      |      |      |      | p152     | p156 |
| 39pF                |                    |      |         |      |      |      |      |      | p152     | p156 |
| 43pF                |                    |      |         |      |      |      |      |      | p152     | p156 |
| 47pF                |                    |      |         |      |      |      |      |      | p153     | p156 |

The indication for every 0.1 pF has been omitted for less than 10 pF. Refer to the Part Number List for details.

## Capacitance Table

### GQM Series Temperature Compensating Type

p00 ← Part Number List EIA: C0G Murata Temperature Characteristic: X8G

| L×W (mm)            | 1.0×0.5 |      | 1.6×0.8 |      | 2.0×1.25 |      | 2.8×2.8 |
|---------------------|---------|------|---------|------|----------|------|---------|
| T max. (mm)         | 0.55    |      | 0.8     |      | 1.0      |      | 1.35    |
| Rated Voltage (Vdc) | 200     | 100  | 250     | 500  | 250      | 500  |         |
| Cap. / TC Code      | C0G     | C0G  | C0G     | X8G  | X8G      | C0G  | C0G     |
| 0.10pF              | p165    |      |         |      |          |      |         |
| 1.0pF               | p165    |      | p166    | p166 | p167     | p168 | p169    |
| 1.1pF               | p165    |      | p166    | p166 | p167     | p168 | p169    |
| 1.2pF               | p165    |      | p166    | p167 | p167     | p168 | p169    |
| 1.3pF               | p165    |      | p166    | p167 | p167     | p168 | p169    |
| 1.5pF               | p165    |      | p166    | p167 | p167     | p168 | p169    |
| 1.6pF               | p165    |      | p166    | p167 | p167     | p168 | p169    |
| 1.8pF               | p165    |      | p166    | p167 | p167     | p168 | p169    |
| 2.0pF               | p165    |      | p166    | p167 | p167     | p168 | p169    |
| 2.2pF               | p165    |      | p166    | p167 | p167     | p168 | p169    |
| 2.4pF               | p165    |      | p166    | p167 | p167     | p168 | p169    |
| 2.7pF               | p165    |      | p166    | p167 | p167     | p168 | p169    |
| 3.0pF               | p165    |      | p166    | p167 | p168     | p168 | p169    |
| 3.3pF               | p165    |      | p166    | p167 | p168     | p168 | p169    |
| 3.6pF               | p165    |      | p166    | p167 | p168     | p168 | p169    |
| 3.9pF               | p165    |      | p166    | p167 | p168     | p168 | p169    |
| 4.0pF               | p165    |      | p166    | p167 | p168     | p168 | p169    |
| 4.3pF               | p165    |      | p166    | p167 | p168     | p168 | p169    |
| 4.7pF               | p165    |      | p166    | p167 | p168     | p168 | p169    |
| 5.0pF               | p165    |      | p166    | p167 | p168     | p168 | p169    |
| 5.1pF               | p165    |      | p166    | p167 | p168     | p168 | p169    |
| 5.6pF               | p165    |      | p166    | p167 | p168     | p168 | p169    |
| 6.0pF               | p165    |      | p166    | p167 | p168     | p168 | p169    |
| 6.2pF               | p165    |      | p166    | p167 | p168     | p168 | p169    |
| 6.8pF               | p165    |      | p166    | p167 | p168     | p168 | p169    |
| 7.0pF               | p165    |      | p166    | p167 | p168     | p168 | p169    |
| 7.5pF               | p165    |      | p166    | p167 | p168     | p168 | p170    |
| 8.0pF               | p165    |      | p166    | p167 | p168     | p169 | p170    |
| 8.2pF               | p165    |      | p166    | p167 | p168     | p169 | p170    |
| 9.0pF               | p165    |      | p166    | p167 | p168     | p169 | p170    |
| 9.1pF               | p165    |      | p166    | p167 | p168     | p169 | p170    |
| 10pF                | p165    |      | p166    | p167 | p168     | p169 | p170    |
| 11pF                | p165    |      | p166    | p167 | p168     | p169 | p170    |
| 12pF                | p165    |      | p166    | p167 | p168     | p169 | p170    |
| 13pF                | p165    |      | p166    | p167 | p168     | p169 | p170    |
| 15pF                | p165    |      | p166    | p167 | p168     | p169 | p170    |
| 16pF                | p165    |      | p166    | p167 | p168     | p169 | p170    |
| 18pF                | p165    |      | p166    | p167 | p168     | p169 | p170    |
| 20pF                | p165    |      | p166    | p167 | p168     | p169 | p170    |
| 22pF                | p165    |      | p166    | p167 | p168     | p169 | p170    |
| 24pF                | p165    |      | p166    | p167 |          | p169 | p170    |
| 27pF                | p165    |      | p166    | p167 |          | p169 | p170    |
| 30pF                | p165    |      | p166    | p167 |          | p169 | p170    |
| 33pF                | p165    |      | p166    |      |          | p169 | p170    |
| 36pF                |         | p165 | p166    |      |          | p169 | p170    |
| 39pF                |         | p166 | p166    |      |          | p169 | p170    |
| 43pF                |         | p166 | p166    |      |          | p169 | p170    |
| 47pF                |         | p166 | p166    |      |          | p169 | p170    |
| 51pF                |         |      |         |      |          | p169 | p170    |
| 56pF                |         |      |         |      |          | p169 | p170    |
| 62pF                |         |      |         |      |          | p169 | p170    |
| 68pF                |         |      |         |      |          | p169 | p170    |
| 75pF                |         |      |         |      |          | p169 | p170    |
| 82pF                |         |      |         |      |          | p169 | p170    |
| 91pF                |         |      |         |      |          | p169 | p171    |
| 100pF               |         |      |         |      |          | p169 | p171    |

The indication for every 0.1 pF has been omitted for less than 10 pF.  
Refer to the Part Number List for details.

## Capacitance Table

### GR2 Series High Dielectric Constant Type

p00 ← Part Number List EIA: X7R

| L×W (mm)            | 4.5×<br>2.0 | 4.5×3.2 | 5.7×<br>5.0 |
|---------------------|-------------|---------|-------------|
| T max. (mm)         | 1.5         | 1.5     | 2.0         |
| Rated Voltage (Vac) | 250         | 250     | 250         |
| Cap. / TC Code      | X7R         | X7R     | X7R         |
| 470pF               | p185        |         |             |
| 1000pF              | p185        |         |             |
| 2200pF              |             | p185    |             |
| 3300pF              |             | p185    |             |
| 4700pF              |             |         | p185        |
| 10000pF             |             | p185    |             |
| 22000pF             |             | p185    |             |
| 47000pF             |             |         | p185        |
| 0.10μF              |             |         | p185        |

### GA3 Series Type GD Temperature Compensating Type

p00 ← Part Number List JIS: SL

| L×W (mm)            | 4.5×<br>2.0 |
|---------------------|-------------|
| T max. (mm)         | 1.0         |
| Rated Voltage (Vac) | 250         |
| Cap. / TC Code      | SL          |
| 10pF                | p197        |
| 12pF                | p197        |
| 15pF                | p197        |
| 18pF                | p197        |
| 22pF                | p197        |
| 27pF                | p197        |
| 33pF                | p197        |
| 39pF                | p197        |
| 47pF                | p197        |
| 56pF                | p197        |
| 68pF                | p197        |
| 82pF                | p197        |

### GA3 Series Type GB High Dielectric Constant Type

p00

← Part Number List

EIA: X7R

|                     |         |      |      |      |
|---------------------|---------|------|------|------|
| L×W (mm)            | 5.7×5.0 |      |      |      |
| T max. (mm)         | 1.5     | 2.0  | 2.5  | 2.9  |
| Rated Voltage (Vac) | 250     | 250  | 250  | 250  |
| Cap. / TC Code      | X7R     | X7R  | X7R  | X7R  |
| 10000pF             | p191    |      |      |      |
| 15000pF             | p191    |      |      |      |
| 22000pF             |         | p191 |      |      |
| 33000pF             |         |      | p191 |      |
| 47000pF             |         |      | p191 |      |
| 56000pF             |         |      |      | p191 |

### GA3 Series Type GD High Dielectric Constant Type

p00 ← Part Number List EIA: X7R

| L×W (mm)            | 4.5×2.0 | 4.5×3.2 |      |
|---------------------|---------|---------|------|
| T max. (mm)         | 1.5     | 1.5     | 2.0  |
| Rated Voltage (Vac) | 250     | 250     | 250  |
| Cap. / TC Code      | X7R     | X7R     | X7R  |
| 100pF               | p198    |         |      |
| 150pF               | p198    |         |      |
| 220pF               | p198    |         |      |
| 330pF               | p198    |         |      |
| 470pF               | p198    |         |      |
| 680pF               | p198    |         |      |
| 1000pF              | p198    |         |      |
| 1500pF              | p198    |         |      |
| 1800pF              |         | p198    |      |
| 2200pF              |         | p198    |      |
| 4700pF              |         |         | p198 |

## Capacitance Table

### GA3 Series Type GF Temperature Compensating Type

p00 ← Part Number List JIS: SL

|                     |         |
|---------------------|---------|
| L×W (mm)            | 4.5×2.0 |
| T max. (mm)         | 1.0     |
| Rated Voltage (Vac) | 250     |
| Cap. / TC Code      | SL      |
| 10pF                | p209    |
| 12pF                | p209    |
| 15pF                | p209    |
| 18pF                | p209    |
| 22pF                | p209    |
| 27pF                | p209    |
| 33pF                | p209    |
| 39pF                | p209    |
| 47pF                | p209    |
| 56pF                | p209    |
| 68pF                | p209    |
| 82pF                | p209    |

### GA3 Series Type GF High Dielectric Constant Type

p00 ← Part Number List EIA: X7R

| L×W (mm)            | 4.5×2.0 |      | 5.7×2.8 | 5.7×5.0 |      |
|---------------------|---------|------|---------|---------|------|
| T max. (mm)         | 1.5     | 2.2  | 1.5     | 1.5     | 2.0  |
| Rated Voltage (Vac) | 250     | 250  | 250     | 250     | 250  |
| Cap. / TC Code      | X7R     | X7R  | X7R     | X7R     | X7R  |
| 100pF               | p210    |      | p210    |         |      |
| 150pF               | p210    |      | p210    |         |      |
| 220pF               |         | p210 | p210    |         |      |
| 330pF               |         | p210 | p210    |         |      |
| 470pF               | p210    |      | p210    |         |      |
| 680pF               | p210    |      | p210    |         |      |
| 1000pF              |         | p210 | p210    |         |      |
| 1500pF              |         |      | p210    |         |      |
| 1800pF              |         |      |         | p210    |      |
| 2200pF              |         |      |         | p210    |      |
| 3300pF              |         |      |         | p210    |      |
| 4700pF              |         |      |         |         | p210 |

## Capacitance Table

### LLL Series High Dielectric Constant Type

p00 ← Part Number List EIA: X7R X7S X6S X5R

| L×W (mm)            | 0.5×1.0 |      |      | 0.6×1.0 | 0.8×1.6 |      |      |      |      |      |      |      |      |      | 1.25×2.0 |      |      |      |      |      |      |      |  |
|---------------------|---------|------|------|---------|---------|------|------|------|------|------|------|------|------|------|----------|------|------|------|------|------|------|------|--|
| T max. (mm)         | 0.35    |      |      | 0.45    | 0.5     |      |      |      | 0.55 | 0.6  |      |      |      |      | 0.5      |      |      |      |      |      |      | 0.7  |  |
| Rated Voltage (Vdc) | 6.3     | 4    |      | 4       | 25      | 16   | 10   | 4    | 4    | 50   | 25   | 16   | 10   | 4    | 50       | 25   | 16   | 10   | 6.3  | 4    | 50   | 25   |  |
| Cap. / TC Code      | X6S     | X7S  | X6S  | X5R     | X7R     | X7R  | X7R  | X7S  | X7S  | X7R  | X7R  | X7R  | X7R  | X7S  | X7R      | X7R  | X7R  | X7R  | X7R  | X7S  | X7R  | X7R  |  |
| 2200pF              |         |      |      |         |         |      |      |      |      | p220 |      |      |      |      |          |      |      |      |      |      |      |      |  |
| 4700pF              |         |      |      |         |         |      |      |      |      | p220 |      |      |      |      |          |      |      |      |      |      |      |      |  |
| 10000pF             |         |      |      |         | p220    |      |      |      |      |      | p220 |      |      |      | p220     |      |      |      |      |      | p220 |      |  |
| 22000pF             |         |      |      |         |         | p220 |      |      |      |      | p220 |      |      |      |          | p220 |      |      |      |      | p220 |      |  |
| 47000pF             |         |      |      |         |         | p220 |      |      |      |      |      | p220 |      |      |          |      | p220 |      |      |      |      | p220 |  |
| 0.10μF              | p220    |      |      |         |         |      | p220 |      |      |      |      |      | p220 |      |          |      | p220 |      |      |      |      | p220 |  |
| 0.22μF              | p220    |      |      |         |         |      |      | p220 |      |      |      |      | p220 |      |          |      |      | p220 |      |      |      |      |  |
| 0.47μF              |         | p220 |      |         |         |      |      |      |      |      |      |      |      | p220 |          |      |      |      | p220 |      |      |      |  |
| 1.0μF               |         |      | p220 |         |         |      |      |      |      |      |      |      |      |      |          |      |      |      |      | p220 |      |      |  |
| 2.2μF               |         |      |      |         |         |      |      |      | p220 |      |      |      |      |      |          |      |      |      |      |      |      |      |  |
| 4.3μF               |         |      |      | p220    |         |      |      |      |      |      |      |      |      |      |          |      |      |      |      |      |      |      |  |
| 4.7μF               |         |      |      |         |         |      |      |      |      |      |      |      |      |      |          |      |      |      |      |      |      |      |  |
| 10μF                |         |      |      |         |         |      |      |      |      |      |      |      |      |      |          |      |      |      |      |      |      |      |  |

Continued to the following table. ↗

| L×W (mm)            | 1.25×2.0 |      |      |      | 1.6×3.2 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|---------------------|----------|------|------|------|---------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| T max. (mm)         | 0.7      | 0.95 |      |      | 0.5     |      |      |      | 0.8  |      |      |      |      | 1.25 |      |      |      |      |      |
| Rated Voltage (Vdc) | 10       | 16   | 10   | 4    | 50      | 25   | 16   | 10   | 50   | 25   | 16   | 10   | 6.3  | 50   | 25   | 16   | 10   | 6.3  |      |
| Cap. / TC Code      | X7R      | X7R  | X7R  | X7S  | X7R     | X7R  | X7R  | X7R  | X7R  | X7R  | X7R  | X7R  | X7R  | X7R  | X7R  | X7R  | X7R  | X7R  | X5R  |
| 2200pF              |          |      |      |      |         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 4700pF              |          |      |      |      |         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 10000pF             |          |      |      |      | p220    |      |      |      | p220 |      |      |      |      |      |      |      |      |      |      |
| 22000pF             |          |      |      |      | p220    |      |      |      | p220 |      |      |      |      |      |      |      |      |      |      |
| 47000pF             |          |      |      |      |         | p220 |      |      | p220 |      |      |      |      |      |      |      |      |      |      |
| 0.10μF              |          |      |      |      |         | p220 |      |      |      | p220 |      |      |      |      | p220 |      |      |      |      |
| 0.22μF              | p220     | p220 |      |      |         |      | p220 |      |      |      | p220 |      |      |      |      | p220 |      |      |      |
| 0.47μF              |          |      | p220 |      |         |      |      | p220 |      |      |      | p220 |      |      |      | p220 |      |      |      |
| 1.0μF               |          |      | p220 |      |         |      |      |      |      |      |      |      | p220 |      |      |      | p220 |      |      |
| 2.2μF               |          |      |      | p220 |         |      |      |      |      |      |      |      |      | p220 |      |      |      | p220 |      |
| 4.3μF               |          |      |      |      |         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 4.7μF               |          |      |      |      |         |      |      |      |      |      |      |      |      |      |      |      |      | p220 |      |
| 10μF                |          |      |      |      |         |      |      |      |      |      |      |      |      |      |      |      |      |      | p220 |

### LLA Series High Dielectric Constant Type

p00 ← Part Number List EIA: X7R X7S

| L×W (mm)            | 1.6×0.8 | 2.0×1.25 |      |      |      |      |      |      |      |      |      |
|---------------------|---------|----------|------|------|------|------|------|------|------|------|------|
| T max. (mm)         | 0.55    | 0.55     |      |      |      |      | 0.95 |      |      |      |      |
| Rated Voltage (Vdc) | 4       | 25       | 16   | 10   | 6.3  | 4    | 25   | 16   | 10   | 6.3  | 4    |
| Cap. / TC Code      | X7S     | X7R      | X7R  | X7R  | X7R  | X7S  | X7R  | X7R  | X7R  | X7R  | X7S  |
| 10000pF             |         | p223     |      |      |      |      | p223 |      |      |      |      |
| 22000pF             |         | p223     |      |      |      |      | p223 |      |      |      |      |
| 47000pF             |         |          | p223 |      |      |      | p223 |      |      |      |      |
| 0.10μF              | p223    |          | p223 |      |      |      |      | p223 |      |      |      |
| 0.22μF              | p223    |          |      | p223 |      |      |      | p223 |      |      |      |
| 0.47μF              | p223    |          |      |      | p223 |      |      |      | p223 |      |      |
| 1.0μF               |         |          |      |      |      | p223 |      |      |      | p223 |      |
| 2.2μF               | p223    |          |      |      |      |      |      |      |      |      | p223 |
| 4.7μF               |         |          |      |      |      | p223 |      |      |      |      |      |

## Capacitance Table

### LLM Series High Dielectric Constant Type

p00 ← Part Number List EIA: X7R X7S

|                     |          |      |
|---------------------|----------|------|
| L×W (mm)            | 2.0×1.25 |      |
| T max. (mm)         | 0.55     |      |
| Rated Voltage (Vdc) | 6.3      | 4    |
| Cap. / TC Code      | X7R      | X7S  |
| 0.22μF              | p229     |      |
| 0.47μF              | p229     |      |
| 1.0μF               |          | p229 |

### LLR Series High Dielectric Constant Type

p00 ← Part Number List EIA: X7S

|                     |         |      |      |      |
|---------------------|---------|------|------|------|
| L×W (mm)            | 0.8×1.6 |      |      |      |
| T max. (mm)         | 0.55    |      |      |      |
| Rated Voltage (Vdc) | 4       |      |      |      |
| TC Code             | X7S     |      |      |      |
| Cap. / ESR (mΩ)     | 100     | 220  | 470  | 1000 |
| 1.0μF               | p233    | p233 | p233 | p233 |

### NFM Series

p00 ← Part Number List

| L×W (mm)            | 1.0×0.5 |      |      |      |      |      |      |      | 1.6×0.8 |      |      |      | 2.0×1.25 |      |      |      |      |      | 3.2×<br>1.25 | 3.2×1.6 |      |     |      | 4.5×1.6 |  |  |
|---------------------|---------|------|------|------|------|------|------|------|---------|------|------|------|----------|------|------|------|------|------|--------------|---------|------|-----|------|---------|--|--|
| T max. (mm)         | 0.35    |      | 0.5  |      |      |      | 0.65 | 0.7  | 0.7     |      | 0.9  |      | 0.95     |      |      |      |      |      | 0.9          | 1.5     |      |     | 1.2  |         |  |  |
| Rated Voltage (Vdc) | 6.3     | 4    | 16   | 10   | 6.3  | 2.5  | 2.5  | 2.5  | 16      | 6.3  | 10   | 6.3  | 50       | 25   | 16   | 10   | 6.3  | 50   | 100          | 50      | 6.3  | 100 | 50   | 25      |  |  |
| Cap. / TC Code      | -       | -    | -    | -    | -    | -    | -    | -    | -       | -    | -    | -    | -        | -    | -    | -    | -    | -    | -            | -       | -    | -   | -    | -       |  |  |
| 100pF               |         |      |      |      |      |      |      |      | p237    |      |      |      |          |      |      |      |      |      |              |         |      |     |      |         |  |  |
| 220pF               |         |      |      |      |      |      |      |      | p237    |      |      |      | p237     |      |      |      |      | p237 |              |         |      |     |      |         |  |  |
| 470pF               |         |      |      |      |      |      |      |      | p237    |      |      |      | p237     |      |      |      |      | p237 |              |         |      |     | p237 |         |  |  |
| 1000pF              |         |      |      |      |      |      |      |      | p237    |      |      |      | p237     |      |      |      |      | p237 |              |         |      |     | p237 |         |  |  |
| 2200pF              |         |      | p237 | p237 |      |      |      |      | p237    |      |      |      | p237     |      |      |      |      | p237 |              |         |      |     | p237 |         |  |  |
| 10000pF             |         |      |      |      |      |      |      |      |         |      |      |      |          |      |      |      |      |      | p237         | p237    |      |     |      |         |  |  |
| 15000pF             |         |      |      |      |      |      |      |      |         |      |      |      |          |      |      |      |      |      | p237         | p237    |      |     |      |         |  |  |
| 22000pF             |         |      | p237 | p237 |      |      |      |      | p237    |      |      |      | p237     |      |      |      |      | p237 | p237         | p237    |      |     | p237 |         |  |  |
| 47000pF             |         |      | p237 | p237 |      |      |      |      |         |      |      |      |          |      |      |      |      |      |              |         |      |     |      |         |  |  |
| 0.10μF              |         |      |      | p237 | p237 |      |      |      | p237    |      |      |      |          | p237 |      |      |      |      | p237         | p237    |      |     |      |         |  |  |
| 0.20μF              |         |      |      |      |      |      |      |      |         |      |      |      |          |      |      |      |      |      |              |         |      |     |      |         |  |  |
| 0.22μF              |         |      |      | p237 | p237 |      |      |      |         | p237 |      |      |          |      | p237 |      |      |      |              |         |      |     |      |         |  |  |
| 0.47μF              | p237    | p237 |      |      |      |      |      |      |         | p237 |      |      |          |      | p237 |      |      |      |              |         |      |     |      |         |  |  |
| 1.0μF               |         | p237 |      |      |      |      |      |      |         | p237 |      | p237 |          |      | p237 | p237 |      |      |              |         |      |     |      |         |  |  |
| 1.5μF               |         |      |      |      |      |      |      |      |         |      |      |      |          |      |      |      |      |      |              |         |      |     | p237 | p237    |  |  |
| 2.2μF               |         |      |      |      |      |      |      |      |         | p237 | p237 |      |          |      |      |      | p237 |      |              |         |      |     |      |         |  |  |
| 4.3μF               |         |      |      |      |      | p237 |      |      |         |      |      |      |          |      |      |      |      |      |              |         |      |     |      |         |  |  |
| 4.7μF               |         |      |      |      |      |      |      |      |         |      |      |      |          |      |      | p237 |      |      |              |         |      |     |      |         |  |  |
| 7.5μF               |         |      |      |      |      |      | p237 |      |         |      |      |      |          |      |      |      |      |      |              |         |      |     |      |         |  |  |
| 9.1μF               |         |      |      |      |      |      |      | p237 |         |      |      |      |          |      |      |      |      |      |              |         |      |     |      |         |  |  |
| 10μF                |         |      |      |      |      |      |      |      |         |      |      |      |          |      |      |      | p237 |      |              |         |      |     |      |         |  |  |
| 27μF                |         |      |      |      |      |      |      |      |         |      |      |      |          |      |      |      |      |      |              |         | p237 |     |      |         |  |  |

## Capacitance Table

### KRM Series High Dielectric Constant Type

p00 ← Part Number List EIA: X7R X7S X6S X5R

| L×W (mm)            | 2.2×1.25 |      |      |      |      | 3.5×1.7 |      |      |      |      |      | 3.6×<br>1.7 | 3.7×<br>1.85 | 6.1×5.3 |      |      |      |      |      |      |      |      |     |
|---------------------|----------|------|------|------|------|---------|------|------|------|------|------|-------------|--------------|---------|------|------|------|------|------|------|------|------|-----|
| T max. (mm)         | 1.9      |      | 2.0  |      |      | 2.0     | 2.9  |      |      |      | 2.9  | 2.9         | 3.0          |         |      |      |      |      |      |      |      |      | 3.9 |
| Rated Voltage (Vdc) | 25       | 16   | 25   |      |      | 25      | 100  | 50   | 35   | 25   | 50   | 100         | 1000         | 630     | 450  | 250  | 100  | 63   | 50   | 35   | 25   | 100  |     |
| Cap. / TC Code      | X5R      | X5R  | X7S  | X6S  | X5R  | X5R     | X7R  | X7R  | X6S  | X6S  | X7R  | X7R         | X7R          | X7R     | X7R  | X7R  | X7R  | X7R  | X7R  | X7R  | X7R  |      |     |
| 68000pF             |          |      |      |      |      |         |      |      |      |      |      |             | p241         |         |      |      |      |      |      |      |      |      |     |
| 0.10μF              |          |      |      |      |      |         |      |      |      |      |      |             | p241         |         |      |      |      |      |      |      |      |      |     |
| 0.15μF              |          |      |      |      |      |         |      |      |      |      |      |             |              | p241    |      |      |      |      |      |      |      |      |     |
| 0.22μF              |          |      |      |      |      |         |      |      |      |      |      |             |              | p241    |      |      |      |      |      |      |      |      |     |
| 0.33μF              |          |      |      |      |      |         |      |      |      |      |      |             |              |         | p241 |      |      |      |      |      |      |      |     |
| 0.47μF              |          |      |      |      |      |         |      |      |      |      |      |             |              |         | p241 |      |      |      |      |      |      |      |     |
| 0.68μF              |          |      |      |      |      |         |      |      |      |      |      |             |              |         |      | p241 |      |      |      |      |      |      |     |
| 1.0μF               |          |      |      |      |      |         | p241 |      |      |      |      |             |              |         |      | p241 |      |      |      |      |      |      |     |
| 1.5μF               |          |      |      |      |      |         |      |      |      |      |      |             |              |         |      |      |      |      |      |      |      |      |     |
| 2.2μF               |          |      |      |      |      |         |      |      |      |      | p241 | p241        |              |         |      |      |      |      |      |      |      |      |     |
| 4.7μF               |          |      |      |      |      |         |      | p241 |      |      |      |             |              |         |      |      | p241 | p241 | p241 |      |      |      |     |
| 6.8μF               |          |      |      |      |      |         |      |      |      |      |      |             |              |         |      |      |      |      |      |      | p241 |      |     |
| 10μF                | p241     | p241 | p241 | p241 |      | p241    |      |      | p241 | p241 |      |             |              |         |      |      |      |      | p241 | p241 |      | p241 |     |
| 15μF                |          |      |      |      |      |         |      |      |      |      |      |             |              |         |      |      |      |      | p241 | p241 |      |      |     |
| 17μF                |          |      |      |      |      |         |      |      |      |      |      |             |              |         |      |      |      |      | p241 | p241 |      |      |     |
| 22μF                |          |      |      |      | p241 |         |      |      |      |      |      |             |              |         |      |      |      |      |      |      |      |      |     |
| 33μF                |          |      |      |      |      |         |      |      |      |      |      |             |              |         |      |      |      |      |      |      |      |      |     |
| 47μF                |          |      |      |      |      |         |      |      |      |      |      |             |              |         |      |      |      |      |      |      |      |      |     |
| 68μF                |          |      |      |      |      |         |      |      |      |      |      |             |              |         |      |      |      |      |      |      |      |      |     |
| 100μF               |          |      |      |      |      |         |      |      |      |      |      |             |              |         |      |      |      |      |      |      |      |      |     |

Continued to the following table. ↗

| L×W (mm)            | 6.1×5.3 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |      |
|---------------------|---------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|------|------|
| T max. (mm)         | 3.9     |      |      |      |      | 5.0  |      |      |      |      |      |      |      | 6.7  |      |     |      |      |
| Rated Voltage (Vdc) | 63      | 50   | 35   | 25   |      | 1000 | 630  | 450  | 250  | 100  | 50   | 35   | 25   | 100  | 63   | 50  | 35   | 25   |
| Cap. / TC Code      | X7R     | X7R  | X7R  | X7R  | X7S  | X7R  | X7R  | X7R  | X7R  | X7R  | X7R  | X7R  | X7R  | X7R  | X7R  | X7R | X7R  | X7S  |
| 68000pF             |         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |      |
| 0.10μF              |         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |      |
| 0.15μF              |         |      |      |      |      | p241 |      |      |      |      |      |      |      |      |      |     |      |      |
| 0.22μF              |         |      |      |      |      | p241 |      |      |      |      |      |      |      |      |      |     |      |      |
| 0.33μF              |         |      |      |      |      |      | p241 |      |      |      |      |      |      |      |      |     |      |      |
| 0.47μF              |         |      |      |      |      |      | p241 |      |      |      |      |      |      |      |      |     |      |      |
| 0.68μF              |         |      |      |      |      |      |      | p241 |      |      |      |      |      |      |      |     |      |      |
| 1.0μF               |         |      |      |      |      |      |      | p241 |      |      |      |      |      |      |      |     |      |      |
| 1.5μF               |         |      |      |      |      |      |      |      | p241 |      |      |      |      |      |      |     |      |      |
| 2.2μF               |         |      |      |      |      |      |      |      | p241 |      |      |      |      |      |      |     |      |      |
| 4.7μF               |         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |      |
| 6.8μF               |         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      |      |
| 10μF                | p241    |      |      |      |      |      |      |      |      | p241 |      |      |      |      |      |     |      |      |
| 15μF                |         |      |      |      |      |      |      |      |      |      |      |      |      | p241 |      |     |      |      |
| 17μF                |         | p241 | p241 |      |      |      |      |      |      |      |      |      |      |      |      |     |      |      |
| 22μF                |         |      | p241 | p241 |      |      |      |      |      |      | p241 | p241 |      | p241 | p241 |     |      |      |
| 33μF                |         |      |      | p241 |      |      |      |      |      |      |      | p241 | p241 |      |      |     | p241 |      |
| 47μF                |         |      |      |      | p241 |      |      |      |      |      |      |      |      |      |      |     | p241 | p241 |
| 68μF                |         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      | p241 |
| 100μF               |         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |      | p241 |

## Capacitance Table

### KR3 Series High Dielectric Constant Type

p00

← Part Number List

EIA: X7T

| L×W (mm)            | 6.1×5.3 |      |      |      |      |      |      |      |      |      |      |
|---------------------|---------|------|------|------|------|------|------|------|------|------|------|
| T max. (mm)         | 3.0     |      |      | 3.9  |      |      | 5.0  |      | 6.7  |      |      |
| Rated Voltage (Vdc) | 630     | 450  | 250  | 630  | 450  | 250  | 450  | 250  | 630  | 450  | 250  |
| Cap. / TC Code      | X7T     | X7T  | X7T  | X7T  | X7T  | X7T  | X7T  | X7T  | X7T  | X7T  | X7T  |
| 0.10μF              | p245    |      |      |      |      |      |      |      |      |      |      |
| 0.15μF              | p245    |      |      |      |      |      |      |      |      |      |      |
| 0.22μF              |         | p245 |      | p245 |      |      |      |      |      |      |      |
| 0.27μF              |         |      |      | p245 |      |      |      |      |      |      |      |
| 0.33μF              |         | p245 |      |      |      |      |      |      |      |      |      |
| 0.47μF              |         | p245 | p245 |      |      |      |      |      | p245 |      |      |
| 0.56μF              |         |      |      |      | p245 |      |      |      | p245 |      |      |
| 0.68μF              |         |      | p245 |      |      |      | p245 |      |      |      |      |
| 1.0μF               |         |      |      |      |      | p245 | p245 |      |      |      |      |
| 1.2μF               |         |      |      |      |      |      |      |      |      | p245 |      |
| 1.5μF               |         |      |      |      |      |      |      | p245 |      |      |      |
| 2.2μF               |         |      |      |      |      |      |      |      |      |      | p245 |

### GMA Series High Dielectric Constant Type

p00

← Part Number List

JIS:

R

B

EIA:

X7R

X5R

| L×W (mm)            | 0.38×0.38 |      |      | 0.5×0.5 |      |      |      |      |      |      |      | 0.8×0.8 |      |      |      |      |      |      |      |
|---------------------|-----------|------|------|---------|------|------|------|------|------|------|------|---------|------|------|------|------|------|------|------|
| T max. (mm)         | 0.35      |      |      | 0.4     |      |      |      |      |      |      |      | 0.6     |      |      |      |      |      |      |      |
| Rated Voltage (Vdc) | 10        |      |      | 100     | 25   |      | 10   |      |      | 6.3  |      | 100     | 25   |      | 10   |      |      | 6.3  |      |
| Cap. / TC Code      | X7R       | R    | B    | X7R     | X7R  | B    | X7R  | R    | B    | X5R  | B    | X7R     | X7R  | B    | X7R  | R    | B    | X5R  | B    |
| 100pF               |           |      |      | p251    |      |      |      |      |      |      |      |         |      |      |      |      |      |      |      |
| 150pF               |           |      |      | p251    |      |      |      |      |      |      |      |         |      |      |      |      |      |      |      |
| 220pF               |           |      |      | p251    |      |      |      |      |      |      |      |         |      |      |      |      |      |      |      |
| 330pF               |           |      |      | p251    |      |      |      |      |      |      |      |         |      |      |      |      |      |      |      |
| 470pF               |           |      |      | p251    |      |      |      |      |      |      |      |         |      |      |      |      |      |      |      |
| 680pF               |           |      |      | p251    |      |      |      |      |      |      |      |         |      |      |      |      |      |      |      |
| 1000pF              | p251      | p251 | p251 | p251    |      |      |      |      |      |      |      |         |      |      |      |      |      |      |      |
| 1500pF              | p251      | p251 | p251 |         | p251 | p251 |      |      |      |      |      | p251    |      |      |      |      |      |      |      |
| 1800pF              | p251      | p251 | p251 |         |      |      |      |      |      |      |      |         |      |      |      |      |      |      |      |
| 2200pF              |           |      |      |         | p251 | p251 |      |      |      |      |      | p251    |      |      |      |      |      |      |      |
| 3300pF              |           |      |      |         | p251 | p251 |      |      |      |      |      | p251    |      |      |      |      |      |      |      |
| 4700pF              |           |      |      |         | p251 | p251 |      |      |      |      |      | p251    |      |      |      |      |      |      |      |
| 6800pF              |           |      |      |         |      |      | p251 | p251 | p251 |      |      | p251    |      |      |      |      |      |      |      |
| 10000pF             | p251      | p251 |      |         |      |      | p251 | p251 | p251 |      |      |         | p251 | p251 |      |      |      |      |      |
| 15000pF             |           |      |      |         |      |      | p251 | p251 | p251 |      |      |         | p251 | p251 |      |      |      |      |      |
| 22000pF             |           |      |      |         |      |      | p251 | p251 | p251 |      |      |         | p251 | p251 |      |      |      |      |      |
| 33000pF             |           |      |      |         |      |      |      |      |      |      |      |         |      |      | p251 | p251 | p251 |      |      |
| 47000pF             |           |      |      |         |      |      |      |      |      |      |      |         |      |      | p251 | p251 | p251 |      |      |
| 68000pF             |           |      |      |         |      |      |      |      |      |      |      |         |      |      | p251 | p251 | p251 |      |      |
| 0.10μF              |           |      |      |         |      |      |      |      |      | p251 | p251 |         |      |      | p251 | p251 | p251 |      |      |
| 0.47μF              |           |      |      |         |      |      |      |      |      |      |      |         |      |      |      |      |      | p251 | p251 |

## Capacitance Table

### GMD Series High Dielectric Constant Type

p00 ← Part Number List JIS: R B EIA: X7R X5R

| L×W (mm)            | 0.6×0.3 |      |      |      |      |      |      |      |      |      |      | 1.0×0.5 |      |      |      |      |      |      |      |      |      |      |
|---------------------|---------|------|------|------|------|------|------|------|------|------|------|---------|------|------|------|------|------|------|------|------|------|------|
| T max. (mm)         | 0.33    |      |      |      |      |      |      |      |      |      |      | 0.55    |      |      |      |      |      |      |      |      |      |      |
| Rated Voltage (Vdc) | 25      |      |      | 16   |      |      | 10   |      |      | 6.3  |      | 50      |      |      | 25   |      |      | 16   |      |      | 10   |      |
| Cap. / TC Code      | X7R     | R    | B    | X7R  | R    | B    | X7R  | R    | B    | X5R  | B    | X7R     | R    | B    | X7R  | R    | B    | X7R  | R    | B    | X5R  | B    |
| 100pF               | p257    | p257 | p257 |      |      |      |      |      |      |      |      |         |      |      |      |      |      |      |      |      |      |      |
| 120pF               | p257    | p257 | p257 |      |      |      |      |      |      |      |      |         |      |      |      |      |      |      |      |      |      |      |
| 150pF               | p257    | p257 | p257 |      |      |      |      |      |      |      |      |         |      |      |      |      |      |      |      |      |      |      |
| 180pF               | p257    | p257 | p257 |      |      |      |      |      |      |      |      |         |      |      |      |      |      |      |      |      |      |      |
| 220pF               | p257    | p257 | p257 |      |      |      |      |      |      |      |      | p257    | p257 | p258 |      |      |      |      |      |      |      |      |
| 270pF               | p257    | p257 | p257 |      |      |      |      |      |      |      |      | p257    | p258 | p258 |      |      |      |      |      |      |      |      |
| 330pF               | p257    | p257 | p257 |      |      |      |      |      |      |      |      | p257    | p258 | p258 |      |      |      |      |      |      |      |      |
| 390pF               | p257    | p257 | p257 |      |      |      |      |      |      |      |      | p257    | p258 | p258 |      |      |      |      |      |      |      |      |
| 470pF               | p257    | p257 | p257 |      |      |      |      |      |      |      |      | p257    | p258 | p258 |      |      |      |      |      |      |      |      |
| 560pF               | p257    | p257 | p257 |      |      |      |      |      |      |      |      | p257    | p258 | p258 |      |      |      |      |      |      |      |      |
| 680pF               | p257    | p257 | p257 |      |      |      |      |      |      |      |      | p257    | p258 | p258 |      |      |      |      |      |      |      |      |
| 820pF               | p257    | p257 | p257 |      |      |      |      |      |      |      |      | p257    | p258 | p258 |      |      |      |      |      |      |      |      |
| 1000pF              | p257    | p257 | p257 |      |      |      |      |      |      |      |      | p257    | p258 | p258 |      |      |      |      |      |      |      |      |
| 1200pF              | p257    | p257 | p257 |      |      |      |      |      |      |      |      | p257    | p258 | p258 |      |      |      |      |      |      |      |      |
| 1500pF              | p257    | p257 | p257 |      |      |      |      |      |      |      |      | p257    | p258 | p258 |      |      |      |      |      |      |      |      |
| 1800pF              |         |      |      | p257 | p257 | p257 |      |      |      |      |      | p257    | p258 | p258 |      |      |      |      |      |      |      |      |
| 2200pF              |         |      |      | p257 | p257 | p257 |      |      |      |      |      | p257    | p258 | p258 |      |      |      |      |      |      |      |      |
| 2700pF              |         |      |      | p257 | p257 | p257 |      |      |      |      |      | p257    | p258 | p258 |      |      |      |      |      |      |      |      |
| 3300pF              |         |      |      | p257 | p257 | p257 |      |      |      |      |      | p257    | p258 | p258 |      |      |      |      |      |      |      |      |
| 3900pF              |         |      |      |      |      |      | p257 | p257 | p257 |      |      | p257    | p258 | p258 |      |      |      |      |      |      |      |      |
| 4700pF              |         |      |      |      |      |      | p257 | p257 | p257 |      |      | p257    | p258 | p258 |      |      |      |      |      |      |      |      |
| 5600pF              |         |      |      |      |      |      | p257 | p257 | p257 |      |      |         |      |      | p258 | p258 | p258 |      |      |      |      |      |
| 6800pF              |         |      |      |      |      |      | p257 | p257 | p257 |      |      |         |      |      | p258 | p258 | p258 |      |      |      |      |      |
| 8200pF              |         |      |      |      |      |      | p257 | p257 | p257 |      |      |         |      |      | p258 | p258 | p258 |      |      |      |      |      |
| 10000pF             |         |      |      |      |      |      | p257 | p257 | p257 |      |      |         |      |      | p258 | p258 | p258 |      |      |      |      |      |
| 12000pF             |         |      |      |      |      |      |      |      |      |      |      |         |      |      | p258 | p258 | p258 |      |      |      |      |      |
| 15000pF             |         |      |      |      |      |      |      |      |      |      |      |         |      |      | p258 | p258 | p258 |      |      |      |      |      |
| 18000pF             |         |      |      |      |      |      |      |      |      |      |      |         |      |      | p258 | p258 | p258 |      |      |      |      |      |
| 22000pF             |         |      |      |      |      |      |      |      |      |      |      |         |      |      | p258 | p258 | p258 |      |      |      |      |      |
| 27000pF             |         |      |      |      |      |      |      |      |      |      |      |         |      |      | p258 | p258 | p258 |      |      |      |      |      |
| 33000pF             |         |      |      |      |      |      |      |      |      |      |      |         |      |      | p258 | p258 | p258 |      |      |      |      |      |
| 39000pF             |         |      |      |      |      |      |      |      |      |      |      |         |      |      | p258 | p258 | p258 |      |      |      |      |      |
| 47000pF             |         |      |      |      |      |      |      |      |      |      |      |         |      |      | p258 | p258 | p258 |      |      |      |      |      |
| 56000pF             |         |      |      |      |      |      |      |      |      | p257 | p257 |         |      |      |      |      |      | p258 | p258 | p258 |      |      |
| 68000pF             |         |      |      |      |      |      |      |      |      | p257 | p257 |         |      |      |      |      |      | p258 | p258 | p258 |      |      |
| 82000pF             |         |      |      |      |      |      |      |      |      | p257 | p257 |         |      |      |      |      |      | p258 | p258 | p258 |      |      |
| 0.10μF              |         |      |      |      |      |      |      |      |      | p257 | p257 |         |      |      |      |      |      | p258 | p258 | p258 |      |      |
| 0.12μF              |         |      |      |      |      |      |      |      |      |      |      |         |      |      |      |      |      |      |      |      | p258 | p258 |
| 0.15μF              |         |      |      |      |      |      |      |      |      |      |      |         |      |      |      |      |      |      |      |      | p258 | p258 |
| 0.18μF              |         |      |      |      |      |      |      |      |      |      |      |         |      |      |      |      |      |      |      |      | p258 | p258 |
| 0.22μF              |         |      |      |      |      |      |      |      |      |      |      |         |      |      |      |      |      |      |      |      | p258 | p258 |
| 0.27μF              |         |      |      |      |      |      |      |      |      |      |      |         |      |      |      |      |      |      |      |      | p258 | p258 |
| 0.33μF              |         |      |      |      |      |      |      |      |      |      |      |         |      |      |      |      |      |      |      |      | p258 | p258 |
| 0.39μF              |         |      |      |      |      |      |      |      |      |      |      |         |      |      |      |      |      |      |      |      | p258 | p258 |
| 0.47μF              |         |      |      |      |      |      |      |      |      |      |      |         |      |      |      |      |      |      |      |      | p258 | p258 |

## Search Capacitors

Specifications and Test Methods, Package, Chart of Characteristic Data, please refer to the search web page.  
<https://www.murata.com/en-global/products/capacitor>

Links are provided to the product detail pages on the web, and are shown below in the product number table from the PDF version of the catalog which is available on the web.

GRM Series Temperature Compensating

0.4×0.2mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol.    | Part Number       |  |
|--------|---------------|---------|--------|---------|-------------------|--|
| 0.22mm | 50Vdc         | COG     | 0.20pF | ±0.05pF | GRM022C1HR20WA03# |  |
|        |               |         |        | ±0.1pF  | GRM022C1HR20BA03# |  |
|        |               |         | 0.30pF | ±0.05pF | GRM022C1HR30WA03# |  |
|        |               |         |        | ±0.1pF  | GRM022C1HR30BA03# |  |
|        |               |         | 0.40pF | ±0.05pF | GRM022C1HR40WA03# |  |
|        |               |         |        | ±0.1pF  | GRM022C1HR40BA03# |  |
|        |               |         | 0.50pF | ±0.05pF | GRM022C1HR50WA03# |  |
|        |               |         |        | ±0.1pF  | GRM022C1HR50BA03# |  |

### Status and Features Icons

The status and features of products can be checked at once. When ? is clicked, a description of each icon will be displayed

### Stock Check (Where to buy)

Some products can request free samples. Reference inventory information from agents and web-based companies.

### Data Sheet

The product details page can be output in PDF.

### How to read part numbers

Describes the meaning of the part number

### Series Information

This links to the introduction page of each series.

### Detailed Specifications Sheet

- Rated value
- Specifications and Test Methods
- Package
- Caution, Notice (Storage, Soldering and Mounting, ....etc.)

### Characteristics Data

The following characteristics data of the main products can be acquired.

- SPICE Netlist (mod type)
- S parameter (S2P type)
- Reliability Test Data \*Typical data

- Shape (Dimensions)

- Rated Values

- Specification by Packaging Code/ Minimum Order Quantity
- Weight (1 pc/ø180mm reel)

### Chart of Characteristic Data

The main products published characteristic data.

- Frequency characteristics (ESR, Impedance)
- DC bias characteristics
- AC voltage characteristics
- Capacitance - temperature characteristics
- Calorific property by ripple current

### Design Tools SimSurfing

The SimSurfing design tools are useful for displaying the graph, downloading CSV data and overwriting the product number graph.

Click Multitool (General) Capabilities for General Purpose

GRM0222C1C121JA02#

Shape

Specifications

Reference

Chart of characteristic data

Go to the detailed chart

## Chip Multilayer Ceramic Capacitors for General Purpose

# GRM Series

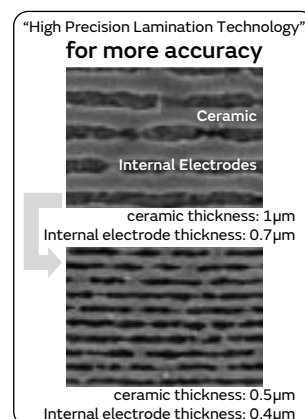
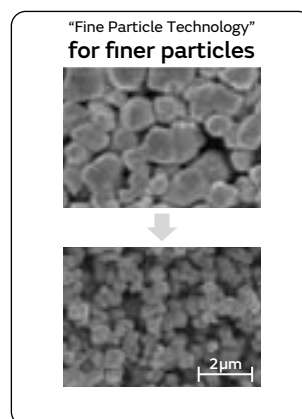
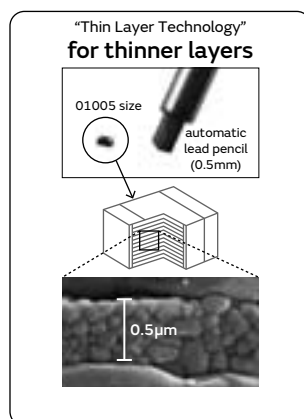
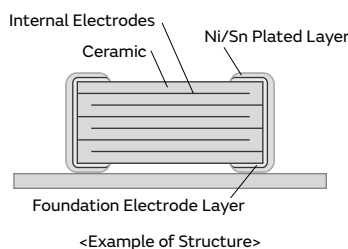


WEB

This is Murata primary products renowned for both small size and large capacitance value with latest advanced technology.

## Features

### ① Achieves large-capacity and small size in a multilayer structure.



### ② Sn plating is applied to the external electrodes; excellent solderability.

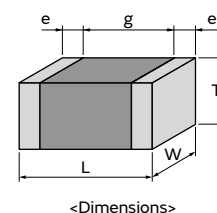
### ③ High reliability with no polarity.

|                                                        | Ceramic Capacitors | Tantalum Capacitor | Aluminum Electrolytic Capacitor | Conductive Polymer Capacitor |
|--------------------------------------------------------|--------------------|--------------------|---------------------------------|------------------------------|
| Price                                                  | ○                  | ○                  | ◎                               | ○                            |
| Comparison between Impedance Frequency Characteristics | ◎                  | △                  | △                               | ○                            |
| Capacitance temperature characteristics                | ○                  | ◎                  | ○                               | ○                            |
| DC breakdown voltage                                   | ◎                  | △                  | △                               | △                            |
| Polarity                                               | No                 | Yes                | Yes                             | Yes                          |
| Pulse response                                         | ◎                  | △                  | △                               | ○                            |
| Allowable ripple current                               | ◎                  | △                  | △                               | △                            |
| Reliability                                            | ◎                  | ○                  | ○                               | ○                            |
| DC bias characteristics                                | △                  | ◎                  | ◎                               | ◎                            |

◎: Particularly excellent ○: Excellent △: Inferior

## Specifications

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Size (mm)         | 0.25×0.125mm to 5.7×5.0mm                                                                                                                                                                                                                                                                                                                                                                                                             |
| Rated Voltage     | 2.5Vdc to 3150Vdc                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Capacitance       | 0.10pF to 330μF                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Main Applications | <p>1. Rated voltage 100V Max.<br/>High Dielectric Constant Type . . . For decoupling and smoothing circuits<br/>Temperature Compensating Type . . . For tuning circuits, oscillating circuits, and high frequency filter circuits</p> <p>2. Rated voltage 200V min.<br/>High Dielectric Constant Type . . . For clamp snubber circuits and smoothing circuits<br/>Temperature Compensating Type . . . Power supply damper snubber</p> |



This catalog contains only a portion of the product lineup.  
Please refer to the capacitor search tool on the Murata Web site for details.

## GRM Series Temperature Compensating Type Part Number List

### 0.4×0.2mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol.    | Part Number        |
|--------|---------------|---------|--------|---------|--------------------|
| 0.22mm | 50Vdc         | COG     | 0.20pF | ±0.05pF | GRM0225C1HR20WA03# |
|        |               |         |        | ±0.1pF  | GRM0225C1HR20BA03# |
|        |               |         | 0.30pF | ±0.05pF | GRM0225C1HR30WA03# |
|        |               |         |        | ±0.1pF  | GRM0225C1HR30BA03# |
|        |               |         | 0.40pF | ±0.05pF | GRM0225C1HR40WA03# |
|        |               |         |        | ±0.1pF  | GRM0225C1HR40BA03# |
|        |               |         | 0.50pF | ±0.05pF | GRM0225C1HR50WA03# |
|        |               |         |        | ±0.1pF  | GRM0225C1HR50BA03# |
|        |               |         | 0.60pF | ±0.05pF | GRM0225C1HR60WA03# |
|        |               |         |        | ±0.1pF  | GRM0225C1HR60BA03# |
|        |               |         | 0.70pF | ±0.05pF | GRM0225C1HR70WA03# |
|        |               |         |        | ±0.1pF  | GRM0225C1HR70BA03# |
|        |               |         | 0.80pF | ±0.05pF | GRM0225C1HR80WA03# |
|        |               |         |        | ±0.1pF  | GRM0225C1HR80BA03# |
|        |               |         | 0.90pF | ±0.05pF | GRM0225C1HR90WA03# |
|        |               |         |        | ±0.1pF  | GRM0225C1HR90BA03# |
|        |               |         | 1.0pF  | ±0.05pF | GRM0225C1H1R0WA03# |
|        |               |         |        | ±0.1pF  | GRM0225C1H1R0BA03# |
|        |               |         |        | ±0.25pF | GRM0225C1H1R0CA03# |
|        |               |         | 1.1pF  | ±0.05pF | GRM0225C1H1R1WA03# |
|        |               |         |        | ±0.1pF  | GRM0225C1H1R1BA03# |
|        |               |         |        | ±0.25pF | GRM0225C1H1R1CA03# |
|        |               |         | 1.2pF  | ±0.05pF | GRM0225C1H1R2WA03# |
|        |               |         |        | ±0.1pF  | GRM0225C1H1R2BA03# |
|        |               |         |        | ±0.25pF | GRM0225C1H1R2CA03# |
|        |               |         | 1.3pF  | ±0.05pF | GRM0225C1H1R3WA03# |
|        |               |         |        | ±0.1pF  | GRM0225C1H1R3BA03# |
|        |               |         |        | ±0.25pF | GRM0225C1H1R3CA03# |
|        |               |         | 1.4pF  | ±0.05pF | GRM0225C1H1R4WA03# |
|        |               |         |        | ±0.1pF  | GRM0225C1H1R4BA03# |
|        |               |         |        | ±0.25pF | GRM0225C1H1R4CA03# |
|        |               |         | 1.5pF  | ±0.05pF | GRM0225C1H1R5WA03# |
|        |               |         |        | ±0.1pF  | GRM0225C1H1R5BA03# |
|        |               |         |        | ±0.25pF | GRM0225C1H1R5CA03# |
|        |               |         | 1.6pF  | ±0.05pF | GRM0225C1H1R6WA03# |
|        |               |         |        | ±0.1pF  | GRM0225C1H1R6BA03# |
|        |               |         |        | ±0.25pF | GRM0225C1H1R6CA03# |
|        |               |         | 1.7pF  | ±0.05pF | GRM0225C1H1R7WA03# |
|        |               |         |        | ±0.1pF  | GRM0225C1H1R7BA03# |
|        |               |         |        | ±0.25pF | GRM0225C1H1R7CA03# |
|        |               |         | 1.8pF  | ±0.05pF | GRM0225C1H1R8WA03# |
|        |               |         |        | ±0.1pF  | GRM0225C1H1R8BA03# |
|        |               |         |        | ±0.25pF | GRM0225C1H1R8CA03# |
|        |               |         | 1.9pF  | ±0.05pF | GRM0225C1H1R9WA03# |
|        |               |         |        | ±0.1pF  | GRM0225C1H1R9BA03# |
|        |               |         |        | ±0.25pF | GRM0225C1H1R9CA03# |
|        |               |         | 2.0pF  | ±0.05pF | GRM0225C1H2R0WA03# |
|        |               |         |        | ±0.1pF  | GRM0225C1H2R0BA03# |
|        |               |         |        | ±0.25pF | GRM0225C1H2R0CA03# |
|        |               |         | 2.1pF  | ±0.05pF | GRM0225C1H2R1WA03# |
|        |               |         |        | ±0.1pF  | GRM0225C1H2R1BA03# |
|        |               |         |        | ±0.25pF | GRM0225C1H2R1CA03# |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |
|--------|---------------|---------|-------|---------|--------------------|
| 0.22mm | 50Vdc         | COG     | 2.2pF | ±0.05pF | GRM0225C1H2R2WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H2R2BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H2R2CA03# |
|        |               |         | 2.3pF | ±0.05pF | GRM0225C1H2R3WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H2R3BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H2R3CA03# |
|        |               |         | 2.4pF | ±0.05pF | GRM0225C1H2R4WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H2R4BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H2R4CA03# |
|        |               |         | 2.5pF | ±0.05pF | GRM0225C1H2R5WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H2R5BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H2R5CA03# |
|        |               |         | 2.6pF | ±0.05pF | GRM0225C1H2R6WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H2R6BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H2R6CA03# |
|        |               |         | 2.7pF | ±0.05pF | GRM0225C1H2R7WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H2R7BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H2R7CA03# |
|        |               |         | 2.8pF | ±0.05pF | GRM0225C1H2R8WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H2R8BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H2R8CA03# |
|        |               |         | 2.9pF | ±0.05pF | GRM0225C1H2R9WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H2R9BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H2R9CA03# |
|        |               |         | 3.0pF | ±0.05pF | GRM0225C1H3R0WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H3R0BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H3R0CA03# |
|        |               |         | 3.1pF | ±0.05pF | GRM0225C1H3R1WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H3R1BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H3R1CA03# |
|        |               |         | 3.2pF | ±0.05pF | GRM0225C1H3R2WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H3R2BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H3R2CA03# |
|        |               |         | 3.3pF | ±0.05pF | GRM0225C1H3R3WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H3R3BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H3R3CA03# |
|        |               |         | 3.4pF | ±0.05pF | GRM0225C1H3R4WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H3R4BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H3R4CA03# |
|        |               |         | 3.5pF | ±0.05pF | GRM0225C1H3R5WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H3R5BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H3R5CA03# |
|        |               |         | 3.6pF | ±0.05pF | GRM0225C1H3R6WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H3R6BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H3R6CA03# |
|        |               |         | 3.7pF | ±0.05pF | GRM0225C1H3R7WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H3R7BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H3R7CA03# |
|        |               |         | 3.8pF | ±0.05pF | GRM0225C1H3R8WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H3R8BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H3R8CA03# |
|        |               |         | 3.9pF | ±0.05pF | GRM0225C1H3R9WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H3R9BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H3R9CA03# |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 0.4×0.2mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |
|--------|---------------|---------|-------|---------|--------------------|
| 0.22mm | 50Vdc         | COG     | 4.0pF | ±0.05pF | GRM0225C1H4R0WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H4R0BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H4R0CA03# |
|        |               |         | 4.1pF | ±0.05pF | GRM0225C1H4R1WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H4R1BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H4R1CA03# |
|        |               |         | 4.2pF | ±0.05pF | GRM0225C1H4R2WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H4R2BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H4R2CA03# |
|        |               |         | 4.3pF | ±0.05pF | GRM0225C1H4R3WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H4R3BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H4R3CA03# |
|        |               |         | 4.4pF | ±0.05pF | GRM0225C1H4R4WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H4R4BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H4R4CA03# |
|        |               |         | 4.5pF | ±0.05pF | GRM0225C1H4R5WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H4R5BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H4R5CA03# |
|        |               |         | 4.6pF | ±0.05pF | GRM0225C1H4R6WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H4R6BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H4R6CA03# |
|        |               |         | 4.7pF | ±0.05pF | GRM0225C1H4R7WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H4R7BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H4R7CA03# |
|        |               |         | 4.8pF | ±0.05pF | GRM0225C1H4R8WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H4R8BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H4R8CA03# |
|        |               |         | 4.9pF | ±0.05pF | GRM0225C1H4R9WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H4R9BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H4R9CA03# |
|        |               |         | 5.0pF | ±0.05pF | GRM0225C1H5R0WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H5R0BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H5R0CA03# |
|        |               |         | 5.1pF | ±0.05pF | GRM0225C1H5R1WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H5R1BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H5R1CA03# |
|        |               |         | 5.2pF | ±0.05pF | GRM0225C1H5R2WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H5R2BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H5R2CA03# |
|        |               |         | 5.3pF | ±0.05pF | GRM0225C1H5R3WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H5R3BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H5R3CA03# |
|        |               |         | 5.4pF | ±0.05pF | GRM0225C1H5R4WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H5R4BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H5R4CA03# |
|        |               |         | 5.5pF | ±0.05pF | GRM0225C1H5R5WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H5R5BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H5R5CA03# |
|        |               |         | 5.6pF | ±0.05pF | GRM0225C1H5R6WA03# |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |
|--------|---------------|---------|-------|---------|--------------------|
| 0.22mm | 50Vdc         | COG     | 5.6pF | ±0.1pF  | GRM0225C1H5R6BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H5R6CA03# |
|        |               |         |       | ±0.5pF  | GRM0225C1H5R6DA03# |
|        |               |         | 5.7pF | ±0.05pF | GRM0225C1H5R7WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H5R7BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H5R7CA03# |
|        |               |         | 5.8pF | ±0.05pF | GRM0225C1H5R8WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H5R8BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H5R8CA03# |
|        |               |         | 5.9pF | ±0.05pF | GRM0225C1H5R9WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H5R9BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H5R9CA03# |
|        |               |         | 6.0pF | ±0.05pF | GRM0225C1H6R0WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H6R0BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H6R0CA03# |
|        |               |         | 6.1pF | ±0.05pF | GRM0225C1H6R1WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H6R1BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H6R1CA03# |
|        |               |         | 6.2pF | ±0.05pF | GRM0225C1H6R2WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H6R2BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H6R2CA03# |
|        |               |         | 6.3pF | ±0.05pF | GRM0225C1H6R3WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H6R3BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H6R3CA03# |
|        |               |         | 6.4pF | ±0.05pF | GRM0225C1H6R4WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H6R4BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H6R4CA03# |
|        |               |         | 6.5pF | ±0.05pF | GRM0225C1H6R5WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H6R5BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H6R5CA03# |
|        |               |         | 6.6pF | ±0.05pF | GRM0225C1H6R6WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H6R6BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H6R6CA03# |
|        |               |         | 6.7pF | ±0.05pF | GRM0225C1H6R7WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H6R7BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H6R7CA03# |
|        |               |         | 6.8pF | ±0.05pF | GRM0225C1H6R8WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H6R8BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H6R8CA03# |
|        |               |         | 6.9pF | ±0.05pF | GRM0225C1H6R9WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H6R9BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H6R9CA03# |

Part number # indicates the package specification code.

# GRM Series Temperature Compensating Type Part Number List

(→ 0.4×0.2mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |
|--------|---------------|---------|-------|---------|--------------------|
| 0.22mm | 50Vdc         | COG     | 6.9pF | ±0.5pF  | GRM0225C1H6R9DA03# |
|        |               |         |       | ±0.05pF | GRM0225C1H7R0WA03# |
|        |               |         | 7.0pF | ±0.1pF  | GRM0225C1H7R0BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H7R0CA03# |
|        |               |         |       | ±0.5pF  | GRM0225C1H7R0DA03# |
|        |               |         | 7.1pF | ±0.05pF | GRM0225C1H7R1WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H7R1BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H7R1CA03# |
|        |               |         |       | ±0.5pF  | GRM0225C1H7R1DA03# |
|        |               |         | 7.2pF | ±0.05pF | GRM0225C1H7R2WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H7R2BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H7R2CA03# |
|        |               |         |       | ±0.5pF  | GRM0225C1H7R2DA03# |
|        |               |         | 7.3pF | ±0.05pF | GRM0225C1H7R3WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H7R3BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H7R3CA03# |
|        |               |         |       | ±0.5pF  | GRM0225C1H7R3DA03# |
|        |               |         | 7.4pF | ±0.05pF | GRM0225C1H7R4WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H7R4BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H7R4CA03# |
|        |               |         |       | ±0.5pF  | GRM0225C1H7R4DA03# |
|        |               |         | 7.5pF | ±0.05pF | GRM0225C1H7R5WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H7R5BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H7R5CA03# |
|        |               |         |       | ±0.5pF  | GRM0225C1H7R5DA03# |
|        |               |         | 7.6pF | ±0.05pF | GRM0225C1H7R6WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H7R6BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H7R6CA03# |
|        |               |         |       | ±0.5pF  | GRM0225C1H7R6DA03# |
|        |               |         | 7.7pF | ±0.05pF | GRM0225C1H7R7WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H7R7BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H7R7CA03# |
|        |               |         |       | ±0.5pF  | GRM0225C1H7R7DA03# |
|        |               |         | 7.8pF | ±0.05pF | GRM0225C1H7R8WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H7R8BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H7R8CA03# |
|        |               |         |       | ±0.5pF  | GRM0225C1H7R8DA03# |
|        |               |         | 7.9pF | ±0.05pF | GRM0225C1H7R9WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H7R9BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H7R9CA03# |
|        |               |         |       | ±0.5pF  | GRM0225C1H7R9DA03# |
|        |               |         | 8.0pF | ±0.05pF | GRM0225C1H8R0WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H8R0BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H8R0CA03# |
|        |               |         |       | ±0.5pF  | GRM0225C1H8R0DA03# |
|        |               |         | 8.1pF | ±0.05pF | GRM0225C1H8R1WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H8R1BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H8R1CA03# |
|        |               |         |       | ±0.5pF  | GRM0225C1H8R1DA03# |
|        |               |         | 8.2pF | ±0.05pF | GRM0225C1H8R2WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H8R2BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H8R2CA03# |
|        |               |         |       | ±0.5pF  | GRM0225C1H8R2DA03# |
|        |               |         | 8.3pF | ±0.05pF | GRM0225C1H8R3WA03# |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |
|--------|---------------|---------|-------|---------|--------------------|
| 0.22mm | 50Vdc         | COG     | 8.3pF | ±0.1pF  | GRM0225C1H8R3BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H8R3CA03# |
|        |               |         |       | ±0.5pF  | GRM0225C1H8R3DA03# |
|        |               |         | 8.4pF | ±0.05pF | GRM0225C1H8R4WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H8R4BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H8R4CA03# |
|        |               |         | 8.5pF | ±0.05pF | GRM0225C1H8R5WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H8R5BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H8R5CA03# |
|        |               |         | 8.6pF | ±0.05pF | GRM0225C1H8R6WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H8R6BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H8R6CA03# |
|        |               |         | 8.7pF | ±0.05pF | GRM0225C1H8R7WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H8R7BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H8R7CA03# |
|        |               |         | 8.8pF | ±0.05pF | GRM0225C1H8R8WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H8R8BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H8R8CA03# |
|        |               |         | 8.9pF | ±0.05pF | GRM0225C1H8R9WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H8R9BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H8R9CA03# |
|        |               |         | 9.0pF | ±0.05pF | GRM0225C1H9R0WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H9R0BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H9R0CA03# |
|        |               |         | 9.1pF | ±0.05pF | GRM0225C1H9R1WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H9R1BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H9R1CA03# |
|        |               |         | 9.2pF | ±0.05pF | GRM0225C1H9R2WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H9R2BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H9R2CA03# |
|        |               |         | 9.3pF | ±0.05pF | GRM0225C1H9R3WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H9R3BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H9R3CA03# |
|        |               |         | 9.4pF | ±0.05pF | GRM0225C1H9R4WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H9R4BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H9R4CA03# |
|        |               |         | 9.5pF | ±0.05pF | GRM0225C1H9R5WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H9R5BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H9R5CA03# |
|        |               |         | 9.6pF | ±0.05pF | GRM0225C1H9R6WA03# |
|        |               |         |       | ±0.1pF  | GRM0225C1H9R6BA03# |
|        |               |         |       | ±0.25pF | GRM0225C1H9R6CA03# |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 0.4×0.2mm)

| T max. | Rated Voltage | TC Code | Cap.   | Tol.    | Part Number        |
|--------|---------------|---------|--------|---------|--------------------|
| 0.22mm | 50Vdc         | C0G     | 9.6pF  | ±0.5pF  | GRM0225C1H9R6DA03# |
|        |               |         | 9.7pF  | ±0.05pF | GRM0225C1H9R7WA03# |
|        |               |         |        | ±0.1pF  | GRM0225C1H9R7BA03# |
|        |               |         |        | ±0.25pF | GRM0225C1H9R7CA03# |
|        |               |         |        | ±0.5pF  | GRM0225C1H9R7DA03# |
|        |               |         | 9.8pF  | ±0.05pF | GRM0225C1H9R8WA03# |
|        |               |         |        | ±0.1pF  | GRM0225C1H9R8BA03# |
|        |               |         |        | ±0.25pF | GRM0225C1H9R8CA03# |
|        |               |         |        | ±0.5pF  | GRM0225C1H9R8DA03# |
|        |               |         | 9.9pF  | ±0.05pF | GRM0225C1H9R9WA03# |
|        |               |         |        | ±0.1pF  | GRM0225C1H9R9BA03# |
|        |               |         |        | ±0.25pF | GRM0225C1H9R9CA03# |
|        |               |         |        | ±0.5pF  | GRM0225C1H9R9DA03# |
|        |               |         | 10pF   | ±2%     | GRM0225C1H100GA03# |
|        |               |         |        | ±5%     | GRM0225C1H100JA03# |
|        |               |         | 11pF   | ±2%     | GRM0225C1H110GA03# |
|        |               |         |        | ±5%     | GRM0225C1H110JA03# |
|        |               |         | 12pF   | ±2%     | GRM0225C1H120GA03# |
|        |               |         |        | ±5%     | GRM0225C1H120JA03# |
|        |               |         | 13pF   | ±2%     | GRM0225C1H130GA03# |
|        |               |         |        | ±5%     | GRM0225C1H130JA03# |
|        |               |         | 15pF   | ±2%     | GRM0225C1H150GA03# |
|        |               |         |        | ±5%     | GRM0225C1H150JA03# |
|        |               |         | 16pF   | ±2%     | GRM0225C1H160GA03# |
|        |               |         |        | ±5%     | GRM0225C1H160JA03# |
|        |               |         | 17pF   | ±5%     | GRM0225C1H170JA02# |
|        |               |         | 18pF   | ±5%     | GRM0225C1H180JA02# |
|        |               |         | 19pF   | ±5%     | GRM0225C1H190JA02# |
|        |               |         | 20pF   | ±5%     | GRM0225C1H200JA02# |
|        |               |         | 21pF   | ±5%     | GRM0225C1H210JA02# |
|        |               |         | 22pF   | ±5%     | GRM0225C1H220JA02# |
|        |               |         | 23pF   | ±5%     | GRM0225C1H230JA02# |
|        |               |         | 24pF   | ±5%     | GRM0225C1H240JA02# |
|        |               |         | 27pF   | ±5%     | GRM0225C1H270JA02# |
|        |               |         | 30pF   | ±5%     | GRM0225C1H300JA02# |
|        |               |         | 33pF   | ±5%     | GRM0225C1H330JA02# |
|        |               |         | 36pF   | ±5%     | GRM0225C1H360JA02# |
|        |               |         | 39pF   | ±5%     | GRM0225C1H390JA02# |
|        |               |         | 43pF   | ±5%     | GRM0225C1H430JA02# |
|        |               |         | 47pF   | ±5%     | GRM0225C1H470JA02# |
|        |               |         | 51pF   | ±5%     | GRM0225C1H510JA02# |
|        |               |         | 56pF   | ±5%     | GRM0225C1H560JA02# |
|        |               |         | 62pF   | ±5%     | GRM0225C1H620JA02# |
|        |               |         | 68pF   | ±5%     | GRM0225C1H680JA02# |
|        |               |         | 75pF   | ±5%     | GRM0225C1H750JA02# |
|        |               |         | 82pF   | ±5%     | GRM0225C1H820JA02# |
|        |               |         | 91pF   | ±5%     | GRM0225C1H910JA02# |
|        |               |         | 100pF  | ±5%     | GRM0225C1H101JA02# |
|        |               | CK      | 0.20pF | ±0.05pF | GRM0224C1HR20WA03# |
|        |               |         |        | ±0.1pF  | GRM0224C1HR20BA03# |
|        |               |         | 0.30pF | ±0.05pF | GRM0224C1HR30WA03# |
|        |               |         |        | ±0.1pF  | GRM0224C1HR30BA03# |
|        |               |         | 0.40pF | ±0.05pF | GRM0224C1HR40WA03# |
|        |               |         |        | ±0.1pF  | GRM0224C1HR40BA03# |

| T max. | Rated Voltage | TC Code | Cap.   | Tol.    | Part Number        |
|--------|---------------|---------|--------|---------|--------------------|
| 0.22mm | 50Vdc         | CK      | 0.50pF | ±0.05pF | GRM0224C1HR50WA03# |
|        |               |         |        | ±0.1pF  | GRM0224C1HR50BA03# |
|        |               |         | 0.51pF | ±0.05pF | GRM0224C1HR51WA03# |
|        |               |         | 0.60pF | ±0.05pF | GRM0224C1HR60WA03# |
|        |               |         |        | ±0.1pF  | GRM0224C1HR60BA03# |
|        |               |         | 0.70pF | ±0.05pF | GRM0224C1HR70WA03# |
|        |               |         |        | ±0.1pF  | GRM0224C1HR70BA03# |
|        |               |         | 0.80pF | ±0.05pF | GRM0224C1HR80WA03# |
|        |               |         |        | ±0.1pF  | GRM0224C1HR80BA03# |
|        |               |         | 0.90pF | ±0.05pF | GRM0224C1HR90WA03# |
|        |               |         |        | ±0.1pF  | GRM0224C1HR90BA03# |
|        |               |         | 1.0pF  | ±0.05pF | GRM0224C1H1R0WA03# |
|        |               |         |        | ±0.1pF  | GRM0224C1H1R0BA03# |
|        |               |         |        | ±0.25pF | GRM0224C1H1R0CA03# |
|        |               |         | 1.1pF  | ±0.05pF | GRM0224C1H1R1WA03# |
|        |               |         |        | ±0.1pF  | GRM0224C1H1R1BA03# |
|        |               |         |        | ±0.25pF | GRM0224C1H1R1CA03# |
|        |               |         | 1.2pF  | ±0.05pF | GRM0224C1H1R2WA03# |
|        |               |         |        | ±0.1pF  | GRM0224C1H1R2BA03# |
|        |               |         |        | ±0.25pF | GRM0224C1H1R2CA03# |
|        |               |         | 1.3pF  | ±0.05pF | GRM0224C1H1R3WA03# |
|        |               |         |        | ±0.1pF  | GRM0224C1H1R3BA03# |
|        |               |         |        | ±0.25pF | GRM0224C1H1R3CA03# |
|        |               |         | 1.4pF  | ±0.05pF | GRM0224C1H1R4WA03# |
|        |               |         |        | ±0.1pF  | GRM0224C1H1R4BA03# |
|        |               |         |        | ±0.25pF | GRM0224C1H1R4CA03# |
|        |               |         | 1.5pF  | ±0.05pF | GRM0224C1H1R5WA03# |
|        |               |         |        | ±0.1pF  | GRM0224C1H1R5BA03# |
|        |               |         |        | ±0.25pF | GRM0224C1H1R5CA03# |
|        |               |         | 1.6pF  | ±0.05pF | GRM0224C1H1R6WA03# |
|        |               |         |        | ±0.1pF  | GRM0224C1H1R6BA03# |
|        |               |         |        | ±0.25pF | GRM0224C1H1R6CA03# |
|        |               |         | 1.7pF  | ±0.05pF | GRM0224C1H1R7WA03# |
|        |               |         |        | ±0.1pF  | GRM0224C1H1R7BA03# |
|        |               |         |        | ±0.25pF | GRM0224C1H1R7CA03# |
|        |               |         | 1.8pF  | ±0.05pF | GRM0224C1H1R8WA03# |
|        |               |         |        | ±0.1pF  | GRM0224C1H1R8BA03# |
|        |               |         |        | ±0.25pF | GRM0224C1H1R8CA03# |
|        |               |         | 1.9pF  | ±0.05pF | GRM0224C1H1R9WA03# |
|        |               |         |        | ±0.1pF  | GRM0224C1H1R9BA03# |
|        |               |         |        | ±0.25pF | GRM0224C1H1R9CA03# |
|        |               | CJ      | 2.0pF  | ±0.05pF | GRM0224C1H2R0WA03# |
|        |               |         |        | ±0.1pF  | GRM0224C1H2R0BA03# |
|        |               |         |        | ±0.25pF | GRM0224C1H2R0CA03# |
|        |               |         | 2.1pF  | ±0.05pF | GRM0223C1H2R1WA03# |
|        |               |         |        | ±0.1pF  | GRM0223C1H2R1BA03# |
|        |               |         |        | ±0.25pF | GRM0223C1H2R1CA03# |
|        |               |         | 2.2pF  | ±0.05pF | GRM0223C1H2R2WA03# |
|        |               |         |        | ±0.1pF  | GRM0223C1H2R2BA03# |
|        |               |         |        | ±0.25pF | GRM0223C1H2R2CA03# |
|        |               |         | 2.3pF  | ±0.05pF | GRM0223C1H2R3WA03# |
|        |               |         |        | ±0.1pF  | GRM0223C1H2R3BA03# |
|        |               |         |        | ±0.25pF | GRM0223C1H2R3CA03# |
|        |               |         | 2.4pF  | ±0.05pF | GRM0223C1H2R4WA03# |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 0.4×0.2mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  | T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|--------|---------------|---------|-------|---------|--------------------|--|
| 0.22mm | 50Vdc         | CJ      | 2.4pF | ±0.1pF  | GRM0223C1H2R4BA03# |  | 0.22mm | 50Vdc         | CH      | 4.2pF | ±0.1pF  | GRM0222C1H4R2BA03# |  |
|        |               |         |       | ±0.25pF | GRM0223C1H2R4CA03# |  |        |               |         |       | ±0.25pF | GRM0222C1H4R2CA03# |  |
|        |               |         | 2.5pF | ±0.05pF | GRM0223C1H2R5WA03# |  |        |               |         | 4.3pF | ±0.05pF | GRM0222C1H4R3WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0223C1H2R5BA03# |  |        |               |         |       | ±0.1pF  | GRM0222C1H4R3BA03# |  |
|        |               |         |       | ±0.25pF | GRM0223C1H2R5CA03# |  |        |               |         |       | ±0.25pF | GRM0222C1H4R3CA03# |  |
|        |               |         | 2.6pF | ±0.05pF | GRM0223C1H2R6WA03# |  |        |               |         | 4.4pF | ±0.05pF | GRM0222C1H4R4WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0223C1H2R6BA03# |  |        |               |         |       | ±0.1pF  | GRM0222C1H4R4BA03# |  |
|        |               |         |       | ±0.25pF | GRM0223C1H2R6CA03# |  |        |               |         |       | ±0.25pF | GRM0222C1H4R4CA03# |  |
|        |               |         | 2.7pF | ±0.05pF | GRM0223C1H2R7WA03# |  |        |               |         | 4.5pF | ±0.05pF | GRM0222C1H4R5WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0223C1H2R7BA03# |  |        |               |         |       | ±0.1pF  | GRM0222C1H4R5BA03# |  |
|        |               |         |       | ±0.25pF | GRM0223C1H2R7CA03# |  |        |               |         |       | ±0.25pF | GRM0222C1H4R5CA03# |  |
|        |               |         | 2.8pF | ±0.05pF | GRM0223C1H2R8WA03# |  |        |               |         | 4.6pF | ±0.05pF | GRM0222C1H4R6WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0223C1H2R8BA03# |  |        |               |         |       | ±0.1pF  | GRM0222C1H4R6BA03# |  |
|        |               |         |       | ±0.25pF | GRM0223C1H2R8CA03# |  |        |               |         |       | ±0.25pF | GRM0222C1H4R6CA03# |  |
|        |               |         | 2.9pF | ±0.05pF | GRM0223C1H2R9WA03# |  |        |               |         | 4.7pF | ±0.05pF | GRM0222C1H4R7WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0223C1H2R9BA03# |  |        |               |         |       | ±0.1pF  | GRM0222C1H4R7BA03# |  |
|        |               |         |       | ±0.25pF | GRM0223C1H2R9CA03# |  |        |               |         |       | ±0.25pF | GRM0222C1H4R7CA03# |  |
|        |               |         | 3.0pF | ±0.05pF | GRM0223C1H3R0WA03# |  |        |               |         | 4.8pF | ±0.05pF | GRM0222C1H4R8WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0223C1H3R0BA03# |  |        |               |         |       | ±0.1pF  | GRM0222C1H4R8BA03# |  |
|        |               |         |       | ±0.25pF | GRM0223C1H3R0CA03# |  |        |               |         |       | ±0.25pF | GRM0222C1H4R8CA03# |  |
|        |               |         | 3.1pF | ±0.05pF | GRM0223C1H3R1WA03# |  |        |               |         | 4.9pF | ±0.05pF | GRM0222C1H4R9WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0223C1H3R1BA03# |  |        |               |         |       | ±0.1pF  | GRM0222C1H4R9BA03# |  |
|        |               |         |       | ±0.25pF | GRM0223C1H3R1CA03# |  |        |               |         |       | ±0.25pF | GRM0222C1H4R9CA03# |  |
|        |               |         | 3.2pF | ±0.05pF | GRM0223C1H3R2WA03# |  |        |               |         | 5.0pF | ±0.05pF | GRM0222C1H5R0WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0223C1H3R2BA03# |  |        |               |         |       | ±0.1pF  | GRM0222C1H5R0BA03# |  |
|        |               |         |       | ±0.25pF | GRM0223C1H3R2CA03# |  |        |               |         |       | ±0.25pF | GRM0222C1H5R0CA03# |  |
|        |               |         | 3.3pF | ±0.05pF | GRM0223C1H3R3WA03# |  |        |               |         | 5.1pF | ±0.05pF | GRM0222C1H5R1WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0223C1H3R3BA03# |  |        |               |         |       | ±0.1pF  | GRM0222C1H5R1BA03# |  |
|        |               |         |       | ±0.25pF | GRM0223C1H3R3CA03# |  |        |               |         |       | ±0.25pF | GRM0222C1H5R1CA03# |  |
|        |               |         | 3.4pF | ±0.05pF | GRM0223C1H3R4WA03# |  |        |               |         | 5.2pF | ±0.05pF | GRM0222C1H5R2WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0223C1H3R4BA03# |  |        |               |         |       | ±0.1pF  | GRM0222C1H5R2BA03# |  |
|        |               |         |       | ±0.25pF | GRM0223C1H3R4CA03# |  |        |               |         |       | ±0.25pF | GRM0222C1H5R2CA03# |  |
|        |               |         | 3.5pF | ±0.05pF | GRM0223C1H3R5WA03# |  |        |               |         | 5.3pF | ±0.05pF | GRM0222C1H5R3WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0223C1H3R5BA03# |  |        |               |         |       | ±0.1pF  | GRM0222C1H5R3BA03# |  |
|        |               |         |       | ±0.25pF | GRM0223C1H3R5CA03# |  |        |               |         |       | ±0.25pF | GRM0222C1H5R3CA03# |  |
|        |               |         | 3.6pF | ±0.05pF | GRM0223C1H3R6WA03# |  |        |               |         | 5.4pF | ±0.05pF | GRM0222C1H5R4WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0223C1H3R6BA03# |  |        |               |         |       | ±0.1pF  | GRM0222C1H5R4BA03# |  |
|        |               |         |       | ±0.25pF | GRM0223C1H3R6CA03# |  |        |               |         |       | ±0.25pF | GRM0222C1H5R4CA03# |  |
|        |               |         | 3.7pF | ±0.05pF | GRM0223C1H3R7WA03# |  |        |               |         | 5.5pF | ±0.05pF | GRM0222C1H5R5WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0223C1H3R7BA03# |  |        |               |         |       | ±0.1pF  | GRM0222C1H5R5BA03# |  |
|        |               |         |       | ±0.25pF | GRM0223C1H3R7CA03# |  |        |               |         |       | ±0.25pF | GRM0222C1H5R5CA03# |  |
|        |               |         | 3.8pF | ±0.05pF | GRM0223C1H3R8WA03# |  |        |               |         | 5.6pF | ±0.05pF | GRM0222C1H5R6WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0223C1H3R8BA03# |  |        |               |         |       | ±0.1pF  | GRM0222C1H5R6BA03# |  |
|        |               |         |       | ±0.25pF | GRM0223C1H3R8CA03# |  |        |               |         |       | ±0.25pF | GRM0222C1H5R6CA03# |  |
|        |               |         | 3.9pF | ±0.05pF | GRM0223C1H3R9WA03# |  |        |               |         | 5.7pF | ±0.05pF | GRM0222C1H5R7WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0223C1H3R9BA03# |  |        |               |         |       | ±0.1pF  | GRM0222C1H5R7BA03# |  |
|        |               |         |       | ±0.25pF | GRM0223C1H3R9CA03# |  |        |               |         |       | ±0.25pF | GRM0222C1H5R7CA03# |  |
|        |               | CH      | 4.0pF | ±0.05pF | GRM0222C1H4R0WA03# |  |        |               |         | 5.8pF | ±0.05pF | GRM0222C1H5R8WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H4R0BA03# |  |        |               |         |       | ±0.1pF  | GRM0222C1H5R8BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H4R0CA03# |  |        |               |         |       | ±0.25pF | GRM0222C1H5R8CA03# |  |
|        |               |         | 4.1pF | ±0.05pF | GRM0222C1H4R1WA03# |  |        |               |         | 5.9pF | ±0.05pF | GRM0222C1H5R9WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H4R1BA03# |  |        |               |         |       | ±0.1pF  | GRM0222C1H5R9BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H4R1CA03# |  |        |               |         |       | ±0.25pF | GRM0222C1H5R9CA03# |  |
|        |               |         | 4.2pF | ±0.05pF | GRM0222C1H4R2WA03# |  |        |               |         | 6.0pF | ±0.05pF | GRM0222C1H6R0WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H4R2BA03# |  |        |               |         |       | ±0.1pF  | GRM0222C1H6R0BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H4R2CA03# |  |        |               |         |       | ±0.25pF | GRM0222C1H6R0CA03# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 0.4×0.2mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.22mm | 50Vdc         | CH      | 5.8pF | ±0.05pF | GRM0222C1H5R8WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H5R8BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H5R8CA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H5R8DA03# |  |
|        |               |         | 5.9pF | ±0.05pF | GRM0222C1H5R9WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H5R9BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H5R9CA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H5R9DA03# |  |
|        |               |         | 6.0pF | ±0.05pF | GRM0222C1H6R0WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H6R0BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H6R0CA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H6R0DA03# |  |
|        |               |         | 6.1pF | ±0.05pF | GRM0222C1H6R1WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H6R1BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H6R1CA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H6R1DA03# |  |
|        |               |         | 6.2pF | ±0.05pF | GRM0222C1H6R2WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H6R2BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H6R2CA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H6R2DA03# |  |
|        |               |         | 6.3pF | ±0.05pF | GRM0222C1H6R3WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H6R3BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H6R3CA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H6R3DA03# |  |
|        |               |         | 6.4pF | ±0.05pF | GRM0222C1H6R4WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H6R4BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H6R4CA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H6R4DA03# |  |
|        |               |         | 6.5pF | ±0.05pF | GRM0222C1H6R5WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H6R5BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H6R5CA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H6R5DA03# |  |
|        |               |         | 6.6pF | ±0.05pF | GRM0222C1H6R6WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H6R6BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H6R6CA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H6R6DA03# |  |
|        |               |         | 6.7pF | ±0.05pF | GRM0222C1H6R7WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H6R7BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H6R7CA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H6R7DA03# |  |
|        |               |         | 6.8pF | ±0.05pF | GRM0222C1H6R8WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H6R8BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H6R8CA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H6R8DA03# |  |
|        |               |         | 6.9pF | ±0.05pF | GRM0222C1H6R9WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H6R9BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H6R9CA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H6R9DA03# |  |
|        |               |         | 7.0pF | ±0.05pF | GRM0222C1H7R0WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H7R0BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H7R0CA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H7R0DA03# |  |
|        |               |         | 7.1pF | ±0.05pF | GRM0222C1H7R1WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H7R1BA03# |  |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.22mm | 50Vdc         | CH      | 7.1pF | ±0.25pF | GRM0222C1H7R1CA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H7R1DA03# |  |
|        |               |         | 7.2pF | ±0.05pF | GRM0222C1H7R2WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H7R2BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H7R2CA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H7R2DA03# |  |
|        |               |         | 7.3pF | ±0.05pF | GRM0222C1H7R3WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H7R3BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H7R3CA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H7R3DA03# |  |
|        |               |         | 7.4pF | ±0.05pF | GRM0222C1H7R4WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H7R4BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H7R4CA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H7R4DA03# |  |
|        |               |         | 7.5pF | ±0.05pF | GRM0222C1H7R5WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H7R5BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H7R5CA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H7R5DA03# |  |
|        |               |         | 7.6pF | ±0.05pF | GRM0222C1H7R6WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H7R6BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H7R6CA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H7R6DA03# |  |
|        |               |         | 7.7pF | ±0.05pF | GRM0222C1H7R7WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H7R7BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H7R7CA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H7R7DA03# |  |
|        |               |         | 7.8pF | ±0.05pF | GRM0222C1H7R8WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H7R8BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H7R8CA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H7R8DA03# |  |
|        |               |         | 7.9pF | ±0.05pF | GRM0222C1H7R9WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H7R9BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H7R9CA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H7R9DA03# |  |
|        |               |         | 8.0pF | ±0.05pF | GRM0222C1H8R0WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H8R0BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H8R0CA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H8R0DA03# |  |
|        |               |         | 8.1pF | ±0.05pF | GRM0222C1H8R1WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H8R1BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H8R1CA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H8R1DA03# |  |
|        |               |         | 8.2pF | ±0.05pF | GRM0222C1H8R2WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H8R2BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H8R2CA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H8R2DA03# |  |
|        |               |         | 8.3pF | ±0.05pF | GRM0222C1H8R3WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H8R3BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H8R3CA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H8R3DA03# |  |
|        |               |         | 8.4pF | ±0.05pF | GRM0222C1H8R4WA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H8R4BA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H8R4CA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H8R4DA03# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 0.4×0.2mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  | T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|--------|---------------|---------|-------|---------|--------------------|--|
| 0.22mm | 50Vdc         | CH      | 8.5pF | ±0.05pF | GRM0222C1H8R5WA03# |  | 0.22mm | 50Vdc         | CH      | 9.8pF | ±0.25pF | GRM0222C1H9R8CA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H8R5BA03# |  |        |               |         |       | ±0.5pF  | GRM0222C1H9R8DA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H8R5CA03# |  |        |               |         | 9.9pF | ±0.05pF | GRM0222C1H9R9WA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H8R5DA03# |  |        |               |         |       | ±0.1pF  | GRM0222C1H9R9BA03# |  |
|        |               |         | 8.6pF | ±0.05pF | GRM0222C1H8R6WA03# |  |        |               |         |       | ±0.25pF | GRM0222C1H9R9CA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H8R6BA03# |  |        |               |         |       | ±0.5pF  | GRM0222C1H9R9DA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H8R6CA03# |  |        |               |         | 10pF  | ±2%     | GRM0222C1H100GA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H8R6DA03# |  |        |               |         |       | ±5%     | GRM0222C1H100JA03# |  |
|        |               |         | 8.7pF | ±0.05pF | GRM0222C1H8R7WA03# |  |        |               |         | 11pF  | ±2%     | GRM0222C1H110GA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H8R7BA03# |  |        |               |         |       | ±5%     | GRM0222C1H110JA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H8R7CA03# |  |        |               |         | 12pF  | ±2%     | GRM0222C1H120GA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H8R7DA03# |  |        |               |         |       | ±5%     | GRM0222C1H120JA03# |  |
|        |               |         | 8.8pF | ±0.05pF | GRM0222C1H8R8WA03# |  |        |               |         | 13pF  | ±2%     | GRM0222C1H130GA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H8R8BA03# |  |        |               |         |       | ±5%     | GRM0222C1H130JA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H8R8CA03# |  |        |               |         | 15pF  | ±2%     | GRM0222C1H150GA03# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H8R8DA03# |  |        |               |         |       | ±5%     | GRM0222C1H150JA03# |  |
|        |               |         | 8.9pF | ±0.05pF | GRM0222C1H8R9WA03# |  |        |               |         | 16pF  | ±2%     | GRM0222C1H160GA03# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H8R9BA03# |  |        |               |         |       | ±5%     | GRM0222C1H160JA03# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H8R9CA03# |  |        |               |         | 17pF  | ±5%     | GRM0222C1H170JA02# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H8R9DA03# |  |        |               |         |       | ±5%     | GRM0222C1H180JA02# |  |
|        |               |         | 9.0pF | ±0.05pF | GRM0222C1H9R0WA03# |  |        |               |         | 18pF  | ±5%     | GRM0222C1H180JA02# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H9R0BA03# |  |        |               |         |       | ±5%     | GRM0222C1H190JA02# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H9R0CA03# |  |        |               |         | 20pF  | ±5%     | GRM0222C1H200JA02# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H9R0DA03# |  |        |               |         |       | ±5%     | GRM0222C1H210JA02# |  |
|        |               |         | 9.1pF | ±0.05pF | GRM0222C1H9R1WA03# |  |        |               |         | 21pF  | ±5%     | GRM0222C1H210JA02# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H9R1BA03# |  |        |               |         |       | ±5%     | GRM0222C1H220JA02# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H9R1CA03# |  |        |               |         | 23pF  | ±5%     | GRM0222C1H230JA02# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H9R1DA03# |  |        |               |         |       | ±5%     | GRM0222C1H240JA02# |  |
|        |               |         | 9.2pF | ±0.05pF | GRM0222C1H9R2WA03# |  |        |               |         | 24pF  | ±5%     | GRM0222C1H240JA02# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H9R2BA03# |  |        |               |         |       | ±5%     | GRM0222C1H270JA02# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H9R2CA03# |  |        |               |         | 27pF  | ±5%     | GRM0222C1H270JA02# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H9R2DA03# |  |        |               |         |       | ±5%     | GRM0222C1H300JA02# |  |
|        |               |         | 9.3pF | ±0.05pF | GRM0222C1H9R3WA03# |  |        |               |         | 30pF  | ±5%     | GRM0222C1H300JA02# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H9R3BA03# |  |        |               |         |       | ±5%     | GRM0222C1H330JA02# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H9R3CA03# |  |        |               |         | 33pF  | ±5%     | GRM0222C1H330JA02# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H9R3DA03# |  |        |               |         |       | ±5%     | GRM0222C1H360JA02# |  |
|        |               |         | 9.4pF | ±0.05pF | GRM0222C1H9R4WA03# |  |        |               |         | 36pF  | ±5%     | GRM0222C1H360JA02# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H9R4BA03# |  |        |               |         |       | ±5%     | GRM0222C1H390JA02# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H9R4CA03# |  |        |               |         | 39pF  | ±5%     | GRM0222C1H390JA02# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H9R4DA03# |  |        |               |         |       | ±5%     | GRM0222C1H430JA02# |  |
|        |               |         | 9.5pF | ±0.05pF | GRM0222C1H9R5WA03# |  |        |               |         | 43pF  | ±5%     | GRM0222C1H430JA02# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H9R5BA03# |  |        |               |         |       | ±5%     | GRM0222C1H470JA02# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H9R5CA03# |  |        |               |         | 47pF  | ±5%     | GRM0222C1H470JA02# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H9R5DA03# |  |        |               |         |       | ±5%     | GRM0222C1H510JA02# |  |
|        |               |         | 9.6pF | ±0.05pF | GRM0222C1H9R6WA03# |  |        |               |         | 51pF  | ±5%     | GRM0222C1H510JA02# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H9R6BA03# |  |        |               |         |       | ±5%     | GRM0222C1H560JA02# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H9R6CA03# |  |        |               |         | 56pF  | ±5%     | GRM0222C1H560JA02# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H9R6DA03# |  |        |               |         |       | ±5%     | GRM0222C1H620JA02# |  |
|        |               |         | 9.7pF | ±0.05pF | GRM0222C1H9R7WA03# |  |        |               |         | 62pF  | ±5%     | GRM0222C1H620JA02# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H9R7BA03# |  |        |               |         |       | ±5%     | GRM0222C1H680JA02# |  |
|        |               |         |       | ±0.25pF | GRM0222C1H9R7CA03# |  |        |               |         | 68pF  | ±5%     | GRM0222C1H680JA02# |  |
|        |               |         |       | ±0.5pF  | GRM0222C1H9R7DA03# |  |        |               |         |       | ±5%     | GRM0222C1H750JA02# |  |
|        |               |         | 9.8pF | ±0.05pF | GRM0222C1H9R8WA03# |  |        |               |         | 75pF  | ±5%     | GRM0222C1H750JA02# |  |
|        |               |         |       | ±0.1pF  | GRM0222C1H9R8BA03# |  |        |               |         |       | ±5%     | GRM0222C1H820JA02# |  |
|        |               |         |       |         |                    |  |        |               |         | 82pF  | ±5%     | GRM0222C1H820JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0222C1H910JA02# |  |
|        |               |         |       |         |                    |  |        |               |         | 91pF  | ±5%     | GRM0222C1H910JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0222C1H101JA02# |  |
|        |               |         |       |         |                    |  |        |               |         | 100pF | ±5%     | GRM0222C1H101JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E121JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E121JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E151JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E181JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E221JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E221JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E151JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E181JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E221JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E221JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E151JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E181JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E221JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E221JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E151JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E181JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E221JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E221JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E151JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E181JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E221JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E221JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E151JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E181JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E221JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E221JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E151JA02# |  |
|        |               |         |       |         |                    |  |        |               |         |       | ±5%     | GRM0225C1E181JA02# |  |

## GRM Series Temperature Compensating Type Part Number List

(→ 0.4×0.2mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol. | Part Number        |  |
|--------|---------------|---------|-------|------|--------------------|--|
| 0.22mm | 16Vdc         | CH      | 150pF | ±5%  | GRM0222C1C151JA02# |  |
|        |               |         | 180pF | ±5%  | GRM0222C1C181JA02# |  |
|        |               |         | 220pF | ±5%  | GRM0222C1C221JA02# |  |

0.6×0.3mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol.    | Part Number        |  |
|--------|---------------|---------|--------|---------|--------------------|--|
| 0.33mm | 100Vdc        | COG     | 0.10pF | ±0.05pF | GRM0335C2AR10WA01# |  |
|        |               |         |        | ±0.05pF | GRM0335C2AR20WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C2AR20BA01# |  |
|        |               |         | 0.30pF | ±0.05pF | GRM0335C2AR30WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C2AR30BA01# |  |
|        |               |         | 0.40pF | ±0.05pF | GRM0335C2AR40WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C2AR40BA01# |  |
|        |               |         | 0.50pF | ±0.05pF | GRM0335C2AR50WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C2AR50BA01# |  |
|        |               |         | 0.60pF | ±0.05pF | GRM0335C2AR60WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C2AR60BA01# |  |
|        |               |         | 0.70pF | ±0.05pF | GRM0335C2AR70WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C2AR70BA01# |  |
|        |               |         | 0.80pF | ±0.05pF | GRM0335C2AR80WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C2AR80BA01# |  |
|        |               |         | 0.90pF | ±0.05pF | GRM0335C2AR90WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C2AR90BA01# |  |
|        |               |         | 1.0pF  | ±0.05pF | GRM0335C2A1R0WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C2A1R0BA01# |  |
|        |               |         |        | ±0.25pF | GRM0335C2A1R0CA01# |  |
|        |               |         | 1.1pF  | ±0.05pF | GRM0335C2A1R1WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C2A1R1BA01# |  |
|        |               |         |        | ±0.25pF | GRM0335C2A1R1CA01# |  |
|        |               |         | 1.2pF  | ±0.05pF | GRM0335C2A1R2WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C2A1R2BA01# |  |
|        |               |         |        | ±0.25pF | GRM0335C2A1R2CA01# |  |
|        |               |         | 1.3pF  | ±0.05pF | GRM0335C2A1R3WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C2A1R3BA01# |  |
|        |               |         |        | ±0.25pF | GRM0335C2A1R3CA01# |  |
|        |               |         | 1.4pF  | ±0.05pF | GRM0335C2A1R4WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C2A1R4BA01# |  |
|        |               |         |        | ±0.25pF | GRM0335C2A1R4CA01# |  |
|        |               |         | 1.5pF  | ±0.05pF | GRM0335C2A1R5WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C2A1R5BA01# |  |
|        |               |         |        | ±0.25pF | GRM0335C2A1R5CA01# |  |
|        |               |         | 1.6pF  | ±0.05pF | GRM0335C2A1R6WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C2A1R6BA01# |  |
|        |               |         |        | ±0.25pF | GRM0335C2A1R6CA01# |  |
|        |               |         | 1.7pF  | ±0.05pF | GRM0335C2A1R7WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C2A1R7BA01# |  |
|        |               |         |        | ±0.25pF | GRM0335C2A1R7CA01# |  |
|        |               |         | 1.8pF  | ±0.05pF | GRM0335C2A1R8WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C2A1R8BA01# |  |
|        |               |         |        | ±0.25pF | GRM0335C2A1R8CA01# |  |
|        |               |         | 1.9pF  | ±0.05pF | GRM0335C2A1R9WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C2A1R9BA01# |  |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.33mm | 100Vdc        | COG     | 1.9pF | ±0.25pF | GRM0335C2A1R9CA01# |  |
|        |               |         |       | ±0.05pF | GRM0335C2A2R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A2R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A2R0CA01# |  |
|        |               |         | 2.1pF | ±0.05pF | GRM0335C2A2R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A2R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A2R1CA01# |  |
|        |               |         | 2.2pF | ±0.05pF | GRM0335C2A2R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A2R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A2R2CA01# |  |
|        |               |         | 2.3pF | ±0.05pF | GRM0335C2A2R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A2R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A2R3CA01# |  |
|        |               |         | 2.4pF | ±0.05pF | GRM0335C2A2R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A2R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A2R4CA01# |  |
|        |               |         | 2.5pF | ±0.05pF | GRM0335C2A2R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A2R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A2R5CA01# |  |
|        |               |         | 2.6pF | ±0.05pF | GRM0335C2A2R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A2R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A2R6CA01# |  |
|        |               |         | 2.7pF | ±0.05pF | GRM0335C2A2R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A2R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A2R7CA01# |  |
|        |               |         | 2.8pF | ±0.05pF | GRM0335C2A2R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A2R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A2R8CA01# |  |
|        |               |         | 2.9pF | ±0.05pF | GRM0335C2A2R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A2R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A2R9CA01# |  |
|        |               |         | 3.0pF | ±0.05pF | GRM0335C2A3R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A3R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A3R0CA01# |  |
|        |               |         | 3.1pF | ±0.05pF | GRM0335C2A3R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A3R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A3R1CA01# |  |
|        |               |         | 3.2pF | ±0.05pF | GRM0335C2A3R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A3R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A3R2CA01# |  |
|        |               |         | 3.3pF | ±0.05pF | GRM0335C2A3R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A3R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A3R3CA01# |  |
|        |               |         | 3.4pF | ±0.05pF | GRM0335C2A3R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A3R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A3R4CA01# |  |
|        |               |         | 3.5pF | ±0.05pF | GRM0335C2A3R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A3R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A3R5CA01# |  |
|        |               |         | 3.6pF | ±0.05pF | GRM0335C2A3R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A3R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A3R6CA01# |  |
|        |               |         | 3.7pF | ±0.05pF | GRM0335C2A3R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A3R7BA01# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 0.6×0.3mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |
|--------|---------------|---------|-------|---------|--------------------|
| 0.33mm | 100Vdc        | COG     | 3.7pF | ±0.25pF | GRM0335C2A3R7CA01# |
|        |               |         |       | ±0.05pF | GRM0335C2A3R8WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A3R8BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A3R8CA01# |
|        |               |         | 3.9pF | ±0.05pF | GRM0335C2A3R9WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A3R9BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A3R9CA01# |
|        |               |         | 4.0pF | ±0.05pF | GRM0335C2A4R0WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A4R0BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A4R0CA01# |
|        |               |         | 4.1pF | ±0.05pF | GRM0335C2A4R1WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A4R1BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A4R1CA01# |
|        |               |         | 4.2pF | ±0.05pF | GRM0335C2A4R2WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A4R2BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A4R2CA01# |
|        |               |         | 4.3pF | ±0.05pF | GRM0335C2A4R3WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A4R3BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A4R3CA01# |
|        |               |         | 4.4pF | ±0.05pF | GRM0335C2A4R4WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A4R4BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A4R4CA01# |
|        |               |         | 4.5pF | ±0.05pF | GRM0335C2A4R5WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A4R5BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A4R5CA01# |
|        |               |         | 4.6pF | ±0.05pF | GRM0335C2A4R6WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A4R6BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A4R6CA01# |
|        |               |         | 4.7pF | ±0.05pF | GRM0335C2A4R7WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A4R7BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A4R7CA01# |
|        |               |         | 4.8pF | ±0.05pF | GRM0335C2A4R8WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A4R8BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A4R8CA01# |
|        |               |         | 4.9pF | ±0.05pF | GRM0335C2A4R9WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A4R9BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A4R9CA01# |
|        |               |         | 5.0pF | ±0.05pF | GRM0335C2A5R0WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A5R0BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A5R0CA01# |
|        |               |         | 5.1pF | ±0.05pF | GRM0335C2A5R1WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A5R1BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A5R1CA01# |
|        |               |         |       | ±0.5pF  | GRM0335C2A5R1DA01# |
|        |               |         | 5.2pF | ±0.05pF | GRM0335C2A5R2WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A5R2BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A5R2CA01# |
|        |               |         |       | ±0.5pF  | GRM0335C2A5R2DA01# |
|        |               |         | 5.3pF | ±0.05pF | GRM0335C2A5R3WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A5R3BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A5R3CA01# |
|        |               |         |       | ±0.5pF  | GRM0335C2A5R3DA01# |
|        |               |         | 5.4pF | ±0.05pF | GRM0335C2A5R4WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A5R4BA01# |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |
|--------|---------------|---------|-------|---------|--------------------|
| 0.33mm | 100Vdc        | COG     | 5.4pF | ±0.25pF | GRM0335C2A5R4CA01# |
|        |               |         |       | ±0.5pF  | GRM0335C2A5R4DA01# |
|        |               |         | 5.5pF | ±0.05pF | GRM0335C2A5R5WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A5R5BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A5R5CA01# |
|        |               |         |       | ±0.5pF  | GRM0335C2A5R5DA01# |
|        |               |         | 5.6pF | ±0.05pF | GRM0335C2A5R6WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A5R6BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A5R6CA01# |
|        |               |         |       | ±0.5pF  | GRM0335C2A5R6DA01# |
|        |               |         | 5.7pF | ±0.05pF | GRM0335C2A5R7WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A5R7BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A5R7CA01# |
|        |               |         |       | ±0.5pF  | GRM0335C2A5R7DA01# |
|        |               |         | 5.8pF | ±0.05pF | GRM0335C2A5R8WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A5R8BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A5R8CA01# |
|        |               |         |       | ±0.5pF  | GRM0335C2A5R8DA01# |
|        |               |         | 5.9pF | ±0.05pF | GRM0335C2A5R9WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A5R9BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A5R9CA01# |
|        |               |         |       | ±0.5pF  | GRM0335C2A5R9DA01# |
|        |               |         | 6.0pF | ±0.05pF | GRM0335C2A6R0WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A6R0BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A6R0CA01# |
|        |               |         |       | ±0.5pF  | GRM0335C2A6R0DA01# |
|        |               |         | 6.1pF | ±0.05pF | GRM0335C2A6R1WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A6R1BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A6R1CA01# |
|        |               |         |       | ±0.5pF  | GRM0335C2A6R1DA01# |
|        |               |         | 6.2pF | ±0.05pF | GRM0335C2A6R2WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A6R2BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A6R2CA01# |
|        |               |         |       | ±0.5pF  | GRM0335C2A6R2DA01# |
|        |               |         | 6.3pF | ±0.05pF | GRM0335C2A6R3WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A6R3BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A6R3CA01# |
|        |               |         |       | ±0.5pF  | GRM0335C2A6R3DA01# |
|        |               |         | 6.4pF | ±0.05pF | GRM0335C2A6R4WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A6R4BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A6R4CA01# |
|        |               |         |       | ±0.5pF  | GRM0335C2A6R4DA01# |
|        |               |         | 6.5pF | ±0.05pF | GRM0335C2A6R5WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A6R5BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A6R5CA01# |
|        |               |         |       | ±0.5pF  | GRM0335C2A6R5DA01# |
|        |               |         | 6.6pF | ±0.05pF | GRM0335C2A6R6WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A6R6BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A6R6CA01# |
|        |               |         |       | ±0.5pF  | GRM0335C2A6R6DA01# |
|        |               |         | 6.7pF | ±0.05pF | GRM0335C2A6R7WA01# |
|        |               |         |       | ±0.1pF  | GRM0335C2A6R7BA01# |
|        |               |         |       | ±0.25pF | GRM0335C2A6R7CA01# |
|        |               |         |       | ±0.5pF  | GRM0335C2A6R7DA01# |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 0.6×0.3mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.33mm | 100Vdc        | COG     | 6.8pF | ±0.05pF | GRM0335C2A6R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A6R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A6R8CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C2A6R8DA01# |  |
|        |               |         | 6.9pF | ±0.05pF | GRM0335C2A6R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A6R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A6R9CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C2A6R9DA01# |  |
|        |               |         | 7.0pF | ±0.05pF | GRM0335C2A7R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A7R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A7R0CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C2A7R0DA01# |  |
|        |               |         | 7.1pF | ±0.05pF | GRM0335C2A7R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A7R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A7R1CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C2A7R1DA01# |  |
|        |               |         | 7.2pF | ±0.05pF | GRM0335C2A7R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A7R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A7R2CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C2A7R2DA01# |  |
|        |               |         | 7.3pF | ±0.05pF | GRM0335C2A7R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A7R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A7R3CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C2A7R3DA01# |  |
|        |               |         | 7.4pF | ±0.05pF | GRM0335C2A7R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A7R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A7R4CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C2A7R4DA01# |  |
|        |               |         | 7.5pF | ±0.05pF | GRM0335C2A7R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A7R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A7R5CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C2A7R5DA01# |  |
|        |               |         | 7.6pF | ±0.05pF | GRM0335C2A7R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A7R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A7R6CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C2A7R6DA01# |  |
|        |               |         | 7.7pF | ±0.05pF | GRM0335C2A7R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A7R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A7R7CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C2A7R7DA01# |  |
|        |               |         | 7.8pF | ±0.05pF | GRM0335C2A7R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A7R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A7R8CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C2A7R8DA01# |  |
|        |               |         | 7.9pF | ±0.05pF | GRM0335C2A7R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A7R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A7R9CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C2A7R9DA01# |  |
|        |               |         | 8.0pF | ±0.05pF | GRM0335C2A8R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A8R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A8R0CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C2A8R0DA01# |  |
|        |               |         | 8.1pF | ±0.05pF | GRM0335C2A8R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A8R1BA01# |  |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.33mm | 100Vdc        | COG     | 8.1pF | ±0.25pF | GRM0335C2A8R1CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C2A8R1DA01# |  |
|        |               |         | 8.2pF | ±0.05pF | GRM0335C2A8R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A8R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A8R2CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C2A8R2DA01# |  |
|        |               |         | 8.3pF | ±0.05pF | GRM0335C2A8R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A8R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A8R3CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C2A8R3DA01# |  |
|        |               |         | 8.4pF | ±0.05pF | GRM0335C2A8R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A8R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A8R4CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C2A8R4DA01# |  |
|        |               |         | 8.5pF | ±0.05pF | GRM0335C2A8R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A8R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A8R5CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C2A8R5DA01# |  |
|        |               |         | 8.6pF | ±0.05pF | GRM0335C2A8R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A8R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A8R6CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C2A8R6DA01# |  |
|        |               |         | 8.7pF | ±0.05pF | GRM0335C2A8R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A8R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A8R7CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C2A8R7DA01# |  |
|        |               |         | 8.8pF | ±0.05pF | GRM0335C2A8R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A8R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A8R8CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C2A8R8DA01# |  |
|        |               |         | 8.9pF | ±0.05pF | GRM0335C2A8R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A8R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A8R9CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C2A8R9DA01# |  |
|        |               |         | 9.0pF | ±0.05pF | GRM0335C2A9R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A9R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A9R0CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C2A9R0DA01# |  |
|        |               |         | 9.1pF | ±0.05pF | GRM0335C2A9R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A9R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A9R1CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C2A9R1DA01# |  |
|        |               |         | 9.2pF | ±0.05pF | GRM0335C2A9R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A9R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A9R2CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C2A9R2DA01# |  |
|        |               |         | 9.3pF | ±0.05pF | GRM0335C2A9R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A9R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A9R3CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C2A9R3DA01# |  |
|        |               |         | 9.4pF | ±0.05pF | GRM0335C2A9R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C2A9R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C2A9R4CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C2A9R4DA01# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 0.6×0.3mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  | T max. | Rated Voltage | TC Code | Cap.   | Tol.    | Part Number        |                    |
|--------|---------------|---------|-------|---------|--------------------|--|--------|---------------|---------|--------|---------|--------------------|--------------------|
| 0.33mm | 100Vdc        | COG     | 9.5pF | ±0.05pF | GRM0335C2A9R5WA01# |  | 0.33mm | 100Vdc        | COG     | 68pF   | ±2%     | GRM0335C2A680GA01# |                    |
|        |               |         |       | ±0.1pF  | GRM0335C2A9R5BA01# |  |        |               |         |        | ±5%     | GRM0335C2A680JA01# |                    |
|        |               |         |       | ±0.25pF | GRM0335C2A9R5CA01# |  |        |               |         | 75pF   | ±2%     | GRM0335C2A750GA01# |                    |
|        |               |         |       | ±0.5pF  | GRM0335C2A9R5DA01# |  |        |               |         |        | ±5%     | GRM0335C2A750JA01# |                    |
|        |               |         | 9.6pF | ±0.05pF | GRM0335C2A9R6WA01# |  |        |               |         | 82pF   | ±2%     | GRM0335C2A820GA01# |                    |
|        |               |         |       | ±0.1pF  | GRM0335C2A9R6BA01# |  |        |               |         |        | ±5%     | GRM0335C2A820JA01# |                    |
|        |               |         |       | ±0.25pF | GRM0335C2A9R6CA01# |  |        |               |         | 91pF   | ±2%     | GRM0335C2A910GA01# |                    |
|        |               |         |       | ±0.5pF  | GRM0335C2A9R6DA01# |  |        |               |         |        | ±5%     | GRM0335C2A910JA01# |                    |
|        |               |         | 9.7pF | ±0.05pF | GRM0335C2A9R7WA01# |  |        |               |         | 100pF  | ±2%     | GRM0335C2A101GA01# |                    |
|        |               |         |       | ±0.1pF  | GRM0335C2A9R7BA01# |  |        |               |         |        | ±5%     | GRM0335C2A101JA01# |                    |
|        |               |         |       | ±0.25pF | GRM0335C2A9R7CA01# |  |        |               | CK      | 0.10pF | ±0.05pF | GRM0334C2AR10WA01# |                    |
|        |               |         |       | ±0.5pF  | GRM0335C2A9R7DA01# |  |        |               |         |        | 0.20pF  | ±0.05pF            | GRM0334C2AR20WA01# |
|        |               |         | 9.8pF | ±0.05pF | GRM0335C2A9R8WA01# |  |        |               |         | ±0.1pF |         | GRM0334C2AR20BA01# |                    |
|        |               |         |       | ±0.1pF  | GRM0335C2A9R8BA01# |  |        |               |         | 0.30pF | ±0.05pF | GRM0334C2AR30WA01# |                    |
|        |               |         |       | ±0.25pF | GRM0335C2A9R8CA01# |  |        |               |         |        | ±0.1pF  | GRM0334C2AR30BA01# |                    |
|        |               |         |       | ±0.5pF  | GRM0335C2A9R8DA01# |  |        |               |         | 0.40pF | ±0.05pF | GRM0334C2AR40WA01# |                    |
|        |               |         | 9.9pF | ±0.05pF | GRM0335C2A9R9WA01# |  |        |               |         |        | ±0.1pF  | GRM0334C2AR40BA01# |                    |
|        |               |         |       | ±0.1pF  | GRM0335C2A9R9BA01# |  |        |               |         | 0.50pF | ±0.05pF | GRM0334C2AR50WA01# |                    |
|        |               |         |       | ±0.25pF | GRM0335C2A9R9CA01# |  |        |               |         |        | ±0.1pF  | GRM0334C2AR50BA01# |                    |
|        |               |         |       | ±0.5pF  | GRM0335C2A9R9DA01# |  |        |               |         | 0.60pF | ±0.05pF | GRM0334C2AR60WA01# |                    |
|        |               |         | 10pF  | ±2%     | GRM0335C2A100GA01# |  |        |               |         |        | ±0.1pF  | GRM0334C2AR60BA01# |                    |
|        |               |         |       | ±5%     | GRM0335C2A100JA01# |  |        |               |         | 0.70pF | ±0.05pF | GRM0334C2AR70WA01# |                    |
|        |               |         | 12pF  | ±2%     | GRM0335C2A120GA01# |  |        |               |         |        | ±0.1pF  | GRM0334C2AR70BA01# |                    |
|        |               |         |       | ±5%     | GRM0335C2A120JA01# |  |        |               |         | 0.80pF | ±0.05pF | GRM0334C2AR80WA01# |                    |
|        |               |         | 15pF  | ±2%     | GRM0335C2A150GA01# |  |        |               |         |        | ±0.1pF  | GRM0334C2AR80BA01# |                    |
|        |               |         |       | ±5%     | GRM0335C2A150JA01# |  |        |               |         | 0.90pF | ±0.05pF | GRM0334C2AR90WA01# |                    |
|        |               |         | 18pF  | ±2%     | GRM0335C2A180GA01# |  |        |               |         |        | ±0.1pF  | GRM0334C2AR90BA01# |                    |
|        |               |         |       | ±5%     | GRM0335C2A180JA01# |  |        |               |         | 1.0pF  | ±0.05pF | GRM0334C2A1R0WA01# |                    |
|        |               |         | 20pF  | ±2%     | GRM0335C2A200GA01# |  |        |               |         |        | ±0.1pF  | GRM0334C2A1R0BA01# |                    |
|        |               |         |       | ±5%     | GRM0335C2A200JA01# |  |        |               |         |        | ±0.25pF | GRM0334C2A1R0CA01# |                    |
|        |               |         | 22pF  | ±2%     | GRM0335C2A220GA01# |  |        |               |         | 1.1pF  | ±0.05pF | GRM0334C2A1R1WA01# |                    |
|        |               |         |       | ±5%     | GRM0335C2A220JA01# |  |        |               |         |        | ±0.1pF  | GRM0334C2A1R1BA01# |                    |
|        |               |         | 24pF  | ±2%     | GRM0335C2A240GA01# |  |        |               |         |        | ±0.25pF | GRM0334C2A1R1CA01# |                    |
|        |               |         |       | ±5%     | GRM0335C2A240JA01# |  |        |               |         | 1.2pF  | ±0.05pF | GRM0334C2A1R2WA01# |                    |
|        |               |         | 27pF  | ±2%     | GRM0335C2A270GA01# |  |        |               |         |        | ±0.1pF  | GRM0334C2A1R2BA01# |                    |
|        |               |         |       | ±5%     | GRM0335C2A270JA01# |  |        |               |         |        | ±0.25pF | GRM0334C2A1R2CA01# |                    |
|        |               |         | 30pF  | ±2%     | GRM0335C2A300GA01# |  |        |               |         | 1.3pF  | ±0.05pF | GRM0334C2A1R3WA01# |                    |
|        |               |         |       | ±5%     | GRM0335C2A300JA01# |  |        |               |         |        | ±0.1pF  | GRM0334C2A1R3BA01# |                    |
|        |               |         | 33pF  | ±2%     | GRM0335C2A330GA01# |  |        |               |         |        | ±0.25pF | GRM0334C2A1R3CA01# |                    |
|        |               |         |       | ±5%     | GRM0335C2A330JA01# |  |        |               |         | 1.4pF  | ±0.05pF | GRM0334C2A1R4WA01# |                    |
|        |               |         | 36pF  | ±2%     | GRM0335C2A360GA01# |  |        |               |         |        | ±0.1pF  | GRM0334C2A1R4BA01# |                    |
|        |               |         |       | ±5%     | GRM0335C2A360JA01# |  |        |               |         |        | ±0.25pF | GRM0334C2A1R4CA01# |                    |
|        |               |         | 39pF  | ±2%     | GRM0335C2A390GA01# |  |        |               |         | 1.5pF  | ±0.05pF | GRM0334C2A1R5WA01# |                    |
|        |               |         |       | ±5%     | GRM0335C2A390JA01# |  |        |               |         |        | ±0.1pF  | GRM0334C2A1R5BA01# |                    |
|        |               |         | 43pF  | ±2%     | GRM0335C2A430GA01# |  |        |               |         |        | ±0.25pF | GRM0334C2A1R5CA01# |                    |
|        |               |         |       | ±5%     | GRM0335C2A430JA01# |  |        |               |         | 1.6pF  | ±0.05pF | GRM0334C2A1R6WA01# |                    |
|        |               |         | 47pF  | ±2%     | GRM0335C2A470GA01# |  |        |               |         |        | ±0.1pF  | GRM0334C2A1R6BA01# |                    |
|        |               |         |       | ±5%     | GRM0335C2A470JA01# |  |        |               |         |        | ±0.25pF | GRM0334C2A1R6CA01# |                    |
|        |               |         | 51pF  | ±2%     | GRM0335C2A510GA01# |  |        |               |         | 1.7pF  | ±0.05pF | GRM0334C2A1R7WA01# |                    |
|        |               |         |       | ±5%     | GRM0335C2A510JA01# |  |        |               |         |        | ±0.1pF  | GRM0334C2A1R7BA01# |                    |
|        |               |         | 56pF  | ±2%     | GRM0335C2A560GA01# |  |        |               |         |        | ±0.25pF | GRM0334C2A1R7CA01# |                    |
|        |               |         |       | ±5%     | GRM0335C2A560JA01# |  |        |               |         | 1.8pF  | ±0.05pF | GRM0334C2A1R8WA01# |                    |
|        |               |         | 62pF  | ±2%     | GRM0335C2A620GA01# |  |        |               |         |        | ±0.1pF  | GRM0334C2A1R8BA01# |                    |
|        |               |         |       | ±5%     | GRM0335C2A620JA01# |  |        |               |         |        | ±0.25pF | GRM0334C2A1R8CA01# |                    |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 0.6×0.3mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.33mm | 100Vdc        | CK      | 1.9pF | ±0.05pF | GRM0334C2A1R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0334C2A1R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM0334C2A1R9CA01# |  |
|        |               |         | 2.0pF | ±0.05pF | GRM0334C2A2R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0334C2A2R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM0334C2A2R0CA01# |  |
|        |               | CJ      | 2.1pF | ±0.05pF | GRM0333C2A2R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0333C2A2R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM0333C2A2R1CA01# |  |
|        |               |         | 2.2pF | ±0.05pF | GRM0333C2A2R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0333C2A2R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM0333C2A2R2CA01# |  |
|        |               |         | 2.3pF | ±0.05pF | GRM0333C2A2R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0333C2A2R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM0333C2A2R3CA01# |  |
|        |               |         | 2.4pF | ±0.05pF | GRM0333C2A2R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0333C2A2R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM0333C2A2R4CA01# |  |
|        |               |         | 2.5pF | ±0.05pF | GRM0333C2A2R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0333C2A2R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM0333C2A2R5CA01# |  |
|        |               |         | 2.6pF | ±0.05pF | GRM0333C2A2R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0333C2A2R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM0333C2A2R6CA01# |  |
|        |               |         | 2.7pF | ±0.05pF | GRM0333C2A2R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0333C2A2R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM0333C2A2R7CA01# |  |
|        |               |         | 2.8pF | ±0.05pF | GRM0333C2A2R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0333C2A2R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM0333C2A2R8CA01# |  |
|        |               |         | 2.9pF | ±0.05pF | GRM0333C2A2R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0333C2A2R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM0333C2A2R9CA01# |  |
|        |               |         | 3.0pF | ±0.05pF | GRM0333C2A3R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0333C2A3R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM0333C2A3R0CA01# |  |
|        |               |         | 3.1pF | ±0.05pF | GRM0333C2A3R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0333C2A3R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM0333C2A3R1CA01# |  |
|        |               |         | 3.2pF | ±0.05pF | GRM0333C2A3R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0333C2A3R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM0333C2A3R2CA01# |  |
|        |               |         | 3.3pF | ±0.05pF | GRM0333C2A3R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0333C2A3R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM0333C2A3R3CA01# |  |
|        |               |         | 3.4pF | ±0.05pF | GRM0333C2A3R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0333C2A3R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM0333C2A3R4CA01# |  |
|        |               |         | 3.5pF | ±0.05pF | GRM0333C2A3R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0333C2A3R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM0333C2A3R5CA01# |  |
|        |               |         | 3.6pF | ±0.05pF | GRM0333C2A3R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0333C2A3R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM0333C2A3R6CA01# |  |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.33mm | 100Vdc        | CJ      | 3.7pF | ±0.05pF | GRM0333C2A3R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0333C2A3R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM0333C2A3R7CA01# |  |
|        |               |         | 3.8pF | ±0.05pF | GRM0333C2A3R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0333C2A3R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM0333C2A3R8CA01# |  |
|        |               |         | 3.9pF | ±0.05pF | GRM0333C2A3R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0333C2A3R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM0333C2A3R9CA01# |  |
|        |               | CH      | 4.0pF | ±0.05pF | GRM0332C2A4R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A4R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A4R0CA01# |  |
|        |               |         | 4.1pF | ±0.05pF | GRM0332C2A4R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A4R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A4R1CA01# |  |
|        |               |         | 4.2pF | ±0.05pF | GRM0332C2A4R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A4R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A4R2CA01# |  |
|        |               |         | 4.3pF | ±0.05pF | GRM0332C2A4R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A4R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A4R3CA01# |  |
|        |               |         | 4.4pF | ±0.05pF | GRM0332C2A4R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A4R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A4R4CA01# |  |
|        |               |         | 4.5pF | ±0.05pF | GRM0332C2A4R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A4R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A4R5CA01# |  |
|        |               |         | 4.6pF | ±0.05pF | GRM0332C2A4R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A4R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A4R6CA01# |  |
|        |               |         | 4.7pF | ±0.05pF | GRM0332C2A4R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A4R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A4R7CA01# |  |
|        |               |         | 4.8pF | ±0.05pF | GRM0332C2A4R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A4R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A4R8CA01# |  |
|        |               |         | 4.9pF | ±0.05pF | GRM0332C2A4R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A4R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A4R9CA01# |  |
|        |               |         | 5.0pF | ±0.05pF | GRM0332C2A5R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A5R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A5R0CA01# |  |
|        |               |         | 5.1pF | ±0.05pF | GRM0332C2A5R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A5R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A5R1CA01# |  |
|        |               |         | 5.2pF | ±0.05pF | GRM0332C2A5R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A5R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A5R2CA01# |  |
|        |               |         | 5.3pF | ±0.05pF | GRM0332C2A5R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A5R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A5R3CA01# |  |
|        |               |         | 5.4pF | ±0.05pF | GRM0332C2A5R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A5R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A5R4CA01# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 0.6×0.3mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  | T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|--------|---------------|---------|-------|---------|--------------------|--|
| 0.33mm | 100Vdc        | CH      | 5.4pF | ±0.05pF | GRM0332C2A5R4WA01# |  | 0.33mm | 100Vdc        | CH      | 6.7pF | ±0.25pF | GRM0332C2A6R7CA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A5R4BA01# |  |        |               |         |       | ±0.5pF  | GRM0332C2A6R7DA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A5R4CA01# |  |        |               |         | 6.8pF | ±0.05pF | GRM0332C2A6R8WA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C2A5R4DA01# |  |        |               |         |       | ±0.1pF  | GRM0332C2A6R8BA01# |  |
|        |               |         | 5.5pF | ±0.05pF | GRM0332C2A5R5WA01# |  |        |               |         |       | ±0.25pF | GRM0332C2A6R8CA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A5R5BA01# |  |        |               |         |       | ±0.5pF  | GRM0332C2A6R8DA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A5R5CA01# |  |        |               |         | 6.9pF | ±0.05pF | GRM0332C2A6R9WA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C2A5R5DA01# |  |        |               |         |       | ±0.1pF  | GRM0332C2A6R9BA01# |  |
|        |               |         | 5.6pF | ±0.05pF | GRM0332C2A5R6WA01# |  |        |               |         |       | ±0.25pF | GRM0332C2A6R9CA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A5R6BA01# |  |        |               |         |       | ±0.5pF  | GRM0332C2A6R9DA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A5R6CA01# |  |        |               |         | 7.0pF | ±0.05pF | GRM0332C2A7R0WA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C2A5R6DA01# |  |        |               |         |       | ±0.1pF  | GRM0332C2A7R0BA01# |  |
|        |               |         | 5.7pF | ±0.05pF | GRM0332C2A5R7WA01# |  |        |               |         |       | ±0.25pF | GRM0332C2A7R0CA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A5R7BA01# |  |        |               |         |       | ±0.5pF  | GRM0332C2A7R0DA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A5R7CA01# |  |        |               |         | 7.1pF | ±0.05pF | GRM0332C2A7R1WA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C2A5R7DA01# |  |        |               |         |       | ±0.1pF  | GRM0332C2A7R1BA01# |  |
|        |               |         | 5.8pF | ±0.05pF | GRM0332C2A5R8WA01# |  |        |               |         |       | ±0.25pF | GRM0332C2A7R1CA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A5R8BA01# |  |        |               |         |       | ±0.5pF  | GRM0332C2A7R1DA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A5R8CA01# |  |        |               |         | 7.2pF | ±0.05pF | GRM0332C2A7R2WA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C2A5R8DA01# |  |        |               |         |       | ±0.1pF  | GRM0332C2A7R2BA01# |  |
|        |               |         | 5.9pF | ±0.05pF | GRM0332C2A5R9WA01# |  |        |               |         |       | ±0.25pF | GRM0332C2A7R2CA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A5R9BA01# |  |        |               |         |       | ±0.5pF  | GRM0332C2A7R2DA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A5R9CA01# |  |        |               |         | 7.3pF | ±0.05pF | GRM0332C2A7R3WA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C2A5R9DA01# |  |        |               |         |       | ±0.1pF  | GRM0332C2A7R3BA01# |  |
|        |               |         | 6.0pF | ±0.05pF | GRM0332C2A6R0WA01# |  |        |               |         |       | ±0.25pF | GRM0332C2A7R3CA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A6R0BA01# |  |        |               |         |       | ±0.5pF  | GRM0332C2A7R3DA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A6R0CA01# |  |        |               |         | 7.4pF | ±0.05pF | GRM0332C2A7R4WA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C2A6R0DA01# |  |        |               |         |       | ±0.1pF  | GRM0332C2A7R4BA01# |  |
|        |               |         | 6.1pF | ±0.05pF | GRM0332C2A6R1WA01# |  |        |               |         |       | ±0.25pF | GRM0332C2A7R4CA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A6R1BA01# |  |        |               |         |       | ±0.5pF  | GRM0332C2A7R4DA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A6R1CA01# |  |        |               |         | 7.5pF | ±0.05pF | GRM0332C2A7R5WA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C2A6R1DA01# |  |        |               |         |       | ±0.1pF  | GRM0332C2A7R5BA01# |  |
|        |               |         | 6.2pF | ±0.05pF | GRM0332C2A6R2WA01# |  |        |               |         |       | ±0.25pF | GRM0332C2A7R5CA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A6R2BA01# |  |        |               |         |       | ±0.5pF  | GRM0332C2A7R5DA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A6R2CA01# |  |        |               |         | 7.6pF | ±0.05pF | GRM0332C2A7R6WA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C2A6R2DA01# |  |        |               |         |       | ±0.1pF  | GRM0332C2A7R6BA01# |  |
|        |               |         | 6.3pF | ±0.05pF | GRM0332C2A6R3WA01# |  |        |               |         |       | ±0.25pF | GRM0332C2A7R6CA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A6R3BA01# |  |        |               |         |       | ±0.5pF  | GRM0332C2A7R6DA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A6R3CA01# |  |        |               |         | 7.7pF | ±0.05pF | GRM0332C2A7R7WA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C2A6R3DA01# |  |        |               |         |       | ±0.1pF  | GRM0332C2A7R7BA01# |  |
|        |               |         | 6.4pF | ±0.05pF | GRM0332C2A6R4WA01# |  |        |               |         |       | ±0.25pF | GRM0332C2A7R7CA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A6R4BA01# |  |        |               |         |       | ±0.5pF  | GRM0332C2A7R7DA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A6R4CA01# |  |        |               |         | 7.8pF | ±0.05pF | GRM0332C2A7R8WA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C2A6R4DA01# |  |        |               |         |       | ±0.1pF  | GRM0332C2A7R8BA01# |  |
|        |               |         | 6.5pF | ±0.05pF | GRM0332C2A6R5WA01# |  |        |               |         |       | ±0.25pF | GRM0332C2A7R8CA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A6R5BA01# |  |        |               |         |       | ±0.5pF  | GRM0332C2A7R8DA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A6R5CA01# |  |        |               |         | 7.9pF | ±0.05pF | GRM0332C2A7R9WA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C2A6R5DA01# |  |        |               |         |       | ±0.1pF  | GRM0332C2A7R9BA01# |  |
|        |               |         | 6.6pF | ±0.05pF | GRM0332C2A6R6WA01# |  |        |               |         |       | ±0.25pF | GRM0332C2A7R9CA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A6R6BA01# |  |        |               |         |       | ±0.5pF  | GRM0332C2A7R9DA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C2A6R6CA01# |  |        |               |         | 8.0pF | ±0.05pF | GRM0332C2A8R0WA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C2A6R6DA01# |  |        |               |         |       | ±0.1pF  | GRM0332C2A8R0BA01# |  |
|        |               |         | 6.7pF | ±0.05pF | GRM0332C2A6R7WA01# |  |        |               |         |       | ±0.25pF | GRM0332C2A8R0CA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C2A6R7BA01# |  |        |               |         |       | ±0.5pF  | GRM0332C2A8R0DA01# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 0.6×0.3mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |
|--------|---------------|---------|-------|---------|--------------------|
| 0.33mm | 100Vdc        | CH      | 8.1pF | ±0.05pF | GRM0332C2A8R1WA01# |
|        |               |         |       | ±0.1pF  | GRM0332C2A8R1BA01# |
|        |               |         |       | ±0.25pF | GRM0332C2A8R1CA01# |
|        |               |         |       | ±0.5pF  | GRM0332C2A8R1DA01# |
|        |               |         | 8.2pF | ±0.05pF | GRM0332C2A8R2WA01# |
|        |               |         |       | ±0.1pF  | GRM0332C2A8R2BA01# |
|        |               |         |       | ±0.25pF | GRM0332C2A8R2CA01# |
|        |               |         |       | ±0.5pF  | GRM0332C2A8R2DA01# |
|        |               |         | 8.3pF | ±0.05pF | GRM0332C2A8R3WA01# |
|        |               |         |       | ±0.1pF  | GRM0332C2A8R3BA01# |
|        |               |         |       | ±0.25pF | GRM0332C2A8R3CA01# |
|        |               |         |       | ±0.5pF  | GRM0332C2A8R3DA01# |
|        |               |         | 8.4pF | ±0.05pF | GRM0332C2A8R4WA01# |
|        |               |         |       | ±0.1pF  | GRM0332C2A8R4BA01# |
|        |               |         |       | ±0.25pF | GRM0332C2A8R4CA01# |
|        |               |         |       | ±0.5pF  | GRM0332C2A8R4DA01# |
|        |               |         | 8.5pF | ±0.05pF | GRM0332C2A8R5WA01# |
|        |               |         |       | ±0.1pF  | GRM0332C2A8R5BA01# |
|        |               |         |       | ±0.25pF | GRM0332C2A8R5CA01# |
|        |               |         |       | ±0.5pF  | GRM0332C2A8R5DA01# |
|        |               |         | 8.6pF | ±0.05pF | GRM0332C2A8R6WA01# |
|        |               |         |       | ±0.1pF  | GRM0332C2A8R6BA01# |
|        |               |         |       | ±0.25pF | GRM0332C2A8R6CA01# |
|        |               |         |       | ±0.5pF  | GRM0332C2A8R6DA01# |
|        |               |         | 8.7pF | ±0.05pF | GRM0332C2A8R7WA01# |
|        |               |         |       | ±0.1pF  | GRM0332C2A8R7BA01# |
|        |               |         |       | ±0.25pF | GRM0332C2A8R7CA01# |
|        |               |         |       | ±0.5pF  | GRM0332C2A8R7DA01# |
|        |               |         | 8.8pF | ±0.05pF | GRM0332C2A8R8WA01# |
|        |               |         |       | ±0.1pF  | GRM0332C2A8R8BA01# |
|        |               |         |       | ±0.25pF | GRM0332C2A8R8CA01# |
|        |               |         |       | ±0.5pF  | GRM0332C2A8R8DA01# |
|        |               |         | 8.9pF | ±0.05pF | GRM0332C2A8R9WA01# |
|        |               |         |       | ±0.1pF  | GRM0332C2A8R9BA01# |
|        |               |         |       | ±0.25pF | GRM0332C2A8R9CA01# |
|        |               |         |       | ±0.5pF  | GRM0332C2A8R9DA01# |
|        |               |         | 9.0pF | ±0.05pF | GRM0332C2A9R0WA01# |
|        |               |         |       | ±0.1pF  | GRM0332C2A9R0BA01# |
|        |               |         |       | ±0.25pF | GRM0332C2A9R0CA01# |
|        |               |         |       | ±0.5pF  | GRM0332C2A9R0DA01# |
|        |               |         | 9.1pF | ±0.05pF | GRM0332C2A9R1WA01# |
|        |               |         |       | ±0.1pF  | GRM0332C2A9R1BA01# |
|        |               |         |       | ±0.25pF | GRM0332C2A9R1CA01# |
|        |               |         |       | ±0.5pF  | GRM0332C2A9R1DA01# |
|        |               |         | 9.2pF | ±0.05pF | GRM0332C2A9R2WA01# |
|        |               |         |       | ±0.1pF  | GRM0332C2A9R2BA01# |
|        |               |         |       | ±0.25pF | GRM0332C2A9R2CA01# |
|        |               |         |       | ±0.5pF  | GRM0332C2A9R2DA01# |
|        |               |         | 9.3pF | ±0.05pF | GRM0332C2A9R3WA01# |
|        |               |         |       | ±0.1pF  | GRM0332C2A9R3BA01# |
|        |               |         |       | ±0.25pF | GRM0332C2A9R3CA01# |
|        |               |         |       | ±0.5pF  | GRM0332C2A9R3DA01# |
|        |               |         | 9.4pF | ±0.05pF | GRM0332C2A9R4WA01# |
|        |               |         |       | ±0.1pF  | GRM0332C2A9R4BA01# |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |
|--------|---------------|---------|-------|---------|--------------------|
| 0.33mm | 100Vdc        | CH      | 9.4pF | ±0.25pF | GRM0332C2A9R4CA01# |
|        |               |         |       | ±0.5pF  | GRM0332C2A9R4DA01# |
|        |               |         | 9.5pF | ±0.05pF | GRM0332C2A9R5WA01# |
|        |               |         |       | ±0.1pF  | GRM0332C2A9R5BA01# |
|        |               |         |       | ±0.25pF | GRM0332C2A9R5CA01# |
|        |               |         |       | ±0.5pF  | GRM0332C2A9R5DA01# |
|        |               |         | 9.6pF | ±0.05pF | GRM0332C2A9R6WA01# |
|        |               |         |       | ±0.1pF  | GRM0332C2A9R6BA01# |
|        |               |         |       | ±0.25pF | GRM0332C2A9R6CA01# |
|        |               |         |       | ±0.5pF  | GRM0332C2A9R6DA01# |
|        |               |         | 9.7pF | ±0.05pF | GRM0332C2A9R7WA01# |
|        |               |         |       | ±0.1pF  | GRM0332C2A9R7BA01# |
|        |               |         |       | ±0.25pF | GRM0332C2A9R7CA01# |
|        |               |         |       | ±0.5pF  | GRM0332C2A9R7DA01# |
|        |               |         | 9.8pF | ±0.05pF | GRM0332C2A9R8WA01# |
|        |               |         |       | ±0.1pF  | GRM0332C2A9R8BA01# |
|        |               |         |       | ±0.25pF | GRM0332C2A9R8CA01# |
|        |               |         |       | ±0.5pF  | GRM0332C2A9R8DA01# |
|        |               |         | 9.9pF | ±0.05pF | GRM0332C2A9R9WA01# |
|        |               |         |       | ±0.1pF  | GRM0332C2A9R9BA01# |
|        |               |         |       | ±0.25pF | GRM0332C2A9R9CA01# |
|        |               |         |       | ±0.5pF  | GRM0332C2A9R9DA01# |
|        |               |         | 10pF  | ±2%     | GRM0332C2A100GA01# |
|        |               |         |       | ±5%     | GRM0332C2A100JA01# |
|        |               |         | 12pF  | ±2%     | GRM0332C2A120GA01# |
|        |               |         |       | ±5%     | GRM0332C2A120JA01# |
|        |               |         | 15pF  | ±2%     | GRM0332C2A150GA01# |
|        |               |         |       | ±5%     | GRM0332C2A150JA01# |
|        |               |         | 18pF  | ±2%     | GRM0332C2A180GA01# |
|        |               |         |       | ±5%     | GRM0332C2A180JA01# |
|        |               |         | 20pF  | ±2%     | GRM0332C2A200GA01# |
|        |               |         |       | ±5%     | GRM0332C2A200JA01# |
|        |               |         | 22pF  | ±2%     | GRM0332C2A220GA01# |
|        |               |         |       | ±5%     | GRM0332C2A220JA01# |
|        |               |         | 24pF  | ±2%     | GRM0332C2A240GA01# |
|        |               |         |       | ±5%     | GRM0332C2A240JA01# |
|        |               |         | 27pF  | ±2%     | GRM0332C2A270GA01# |
|        |               |         |       | ±5%     | GRM0332C2A270JA01# |
|        |               |         | 30pF  | ±2%     | GRM0332C2A300GA01# |
|        |               |         |       | ±5%     | GRM0332C2A300JA01# |
|        |               |         | 33pF  | ±2%     | GRM0332C2A330GA01# |
|        |               |         |       | ±5%     | GRM0332C2A330JA01# |
|        |               |         | 36pF  | ±2%     | GRM0332C2A360GA01# |
|        |               |         |       | ±5%     | GRM0332C2A360JA01# |
|        |               |         | 39pF  | ±2%     | GRM0332C2A390GA01# |
|        |               |         |       | ±5%     | GRM0332C2A390JA01# |
|        |               |         | 43pF  | ±2%     | GRM0332C2A430GA01# |
|        |               |         |       | ±5%     | GRM0332C2A430JA01# |
|        |               |         | 47pF  | ±2%     | GRM0332C2A470GA01# |
|        |               |         |       | ±5%     | GRM0332C2A470JA01# |
|        |               |         | 51pF  | ±2%     | GRM0332C2A510GA01# |
|        |               |         |       | ±5%     | GRM0332C2A510JA01# |
|        |               |         | 56pF  | ±2%     | GRM0332C2A560GA01# |
|        |               |         |       | ±5%     | GRM0332C2A560JA01# |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 0.6×0.3mm)

| T max. | Rated Voltage | TC Code | Cap.   | Tol.    | Part Number        |  | T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|--------|---------|--------------------|--|--------|---------------|---------|-------|---------|--------------------|--|
| 0.33mm | 100Vdc        | CH      | 62pF   | ±2%     | GRM0332C2A620GA01# |  | 0.33mm | 50Vdc         | COG     | 1.8pF | ±0.1pF  | GRM0335C1H1R8BA01# |  |
|        |               |         |        | ±5%     | GRM0332C2A620JA01# |  |        |               |         |       | ±0.25pF | GRM0335C1H1R8CA01# |  |
|        |               |         | 68pF   | ±2%     | GRM0332C2A680GA01# |  |        |               |         | 1.9pF | ±0.05pF | GRM0335C1H1R9WA01# |  |
|        |               |         |        | ±5%     | GRM0332C2A680JA01# |  |        |               |         |       | ±0.1pF  | GRM0335C1H1R9BA01# |  |
|        |               |         | 75pF   | ±2%     | GRM0332C2A750GA01# |  |        |               |         | 2.0pF | ±0.25pF | GRM0335C1H1R9CA01# |  |
|        |               |         |        | ±5%     | GRM0332C2A750JA01# |  |        |               |         |       | ±0.05pF | GRM0335C1H2R0WA01# |  |
|        |               |         | 82pF   | ±2%     | GRM0332C2A820GA01# |  |        |               |         |       | ±0.1pF  | GRM0335C1H2R0BA01# |  |
|        |               |         |        | ±5%     | GRM0332C2A820JA01# |  |        |               |         |       | ±0.25pF | GRM0335C1H2R0CA01# |  |
|        |               |         | 91pF   | ±2%     | GRM0332C2A910GA01# |  |        |               |         | 2.1pF | ±0.05pF | GRM0335C1H2R1WA01# |  |
|        |               |         |        | ±5%     | GRM0332C2A910JA01# |  |        |               |         |       | ±0.1pF  | GRM0335C1H2R1BA01# |  |
|        |               |         | 100pF  | ±2%     | GRM0332C2A101GA01# |  |        |               |         |       | ±0.25pF | GRM0335C1H2R1CA01# |  |
|        |               |         |        | ±5%     | GRM0332C2A101JA01# |  |        |               |         | 2.2pF | ±0.05pF | GRM0335C1H2R2WA01# |  |
|        | 50Vdc         | COG     | 0.10pF | ±0.05pF | GRM0335C1HR10WA01# |  |        |               |         |       | ±0.1pF  | GRM0335C1H2R2BA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C1HR20BA01# |  |        |               |         |       | ±0.25pF | GRM0335C1H2R2CA01# |  |
|        |               |         | 0.20pF | ±0.05pF | GRM0335C1HR20WA01# |  |        |               |         | 2.3pF | ±0.05pF | GRM0335C1H2R3WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C1HR30BA01# |  |        |               |         |       | ±0.1pF  | GRM0335C1H2R3BA01# |  |
|        |               |         | 0.30pF | ±0.05pF | GRM0335C1HR30WA01# |  |        |               |         |       | ±0.25pF | GRM0335C1H2R3CA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C1HR30BA01# |  |        |               |         | 2.4pF | ±0.05pF | GRM0335C1H2R4WA01# |  |
|        |               |         | 0.40pF | ±0.05pF | GRM0335C1HR40WA01# |  |        |               |         |       | ±0.1pF  | GRM0335C1H2R4BA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C1HR40BA01# |  |        |               |         |       | ±0.25pF | GRM0335C1H2R4CA01# |  |
|        |               |         | 0.50pF | ±0.05pF | GRM0335C1HR50WA01# |  |        |               |         | 2.5pF | ±0.05pF | GRM0335C1H2R5WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C1HR50BA01# |  |        |               |         |       | ±0.1pF  | GRM0335C1H2R5BA01# |  |
|        |               |         | 0.60pF | ±0.05pF | GRM0335C1HR60WA01# |  |        |               |         |       | ±0.25pF | GRM0335C1H2R5CA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C1HR60BA01# |  |        |               |         | 2.6pF | ±0.05pF | GRM0335C1H2R6WA01# |  |
|        |               |         | 0.70pF | ±0.05pF | GRM0335C1HR70WA01# |  |        |               |         |       | ±0.1pF  | GRM0335C1H2R6BA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C1HR70BA01# |  |        |               |         |       | ±0.25pF | GRM0335C1H2R6CA01# |  |
|        |               |         | 0.80pF | ±0.05pF | GRM0335C1HR80WA01# |  |        |               |         | 2.7pF | ±0.05pF | GRM0335C1H2R7WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C1HR80BA01# |  |        |               |         |       | ±0.1pF  | GRM0335C1H2R7BA01# |  |
|        |               |         | 0.90pF | ±0.05pF | GRM0335C1HR90WA01# |  |        |               |         |       | ±0.25pF | GRM0335C1H2R7CA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C1HR90BA01# |  |        |               |         | 2.8pF | ±0.05pF | GRM0335C1H2R8WA01# |  |
|        |               |         | 1.0pF  | ±0.05pF | GRM0335C1H1R0WA01# |  |        |               |         |       | ±0.1pF  | GRM0335C1H2R8BA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C1H1R0BA01# |  |        |               |         |       | ±0.25pF | GRM0335C1H2R8CA01# |  |
|        |               |         | 1.1pF  | ±0.05pF | GRM0335C1H1R1WA01# |  |        |               |         | 2.9pF | ±0.05pF | GRM0335C1H2R9WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C1H1R1BA01# |  |        |               |         |       | ±0.1pF  | GRM0335C1H2R9BA01# |  |
|        |               |         | 1.2pF  | ±0.05pF | GRM0335C1H1R2WA01# |  |        |               |         |       | ±0.25pF | GRM0335C1H2R9CA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C1H1R2BA01# |  |        |               |         | 3.0pF | ±0.05pF | GRM0335C1H3R0WA01# |  |
|        |               |         |        | ±0.25pF | GRM0335C1H1R2CA01# |  |        |               |         |       | ±0.1pF  | GRM0335C1H3R0BA01# |  |
|        |               |         | 1.3pF  | ±0.05pF | GRM0335C1H1R3WA01# |  |        |               |         |       | ±0.25pF | GRM0335C1H3R0CA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C1H1R3BA01# |  |        |               |         | 3.1pF | ±0.05pF | GRM0335C1H3R1WA01# |  |
|        |               |         | 1.4pF  | ±0.05pF | GRM0335C1H1R4WA01# |  |        |               |         |       | ±0.1pF  | GRM0335C1H3R1BA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C1H1R4BA01# |  |        |               |         |       | ±0.25pF | GRM0335C1H3R1CA01# |  |
|        |               |         | 1.5pF  | ±0.05pF | GRM0335C1H1R5WA01# |  |        |               |         | 3.2pF | ±0.05pF | GRM0335C1H3R2WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C1H1R5BA01# |  |        |               |         |       | ±0.1pF  | GRM0335C1H3R2BA01# |  |
|        |               |         | 1.6pF  | ±0.05pF | GRM0335C1H1R6WA01# |  |        |               |         |       | ±0.25pF | GRM0335C1H3R2CA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C1H1R6BA01# |  |        |               |         | 3.3pF | ±0.05pF | GRM0335C1H3R3WA01# |  |
|        |               |         | 1.7pF  | ±0.05pF | GRM0335C1H1R7WA01# |  |        |               |         |       | ±0.1pF  | GRM0335C1H3R3BA01# |  |
|        |               |         |        | ±0.1pF  | GRM0335C1H1R7BA01# |  |        |               |         |       | ±0.25pF | GRM0335C1H3R3CA01# |  |
|        |               |         | 1.8pF  | ±0.05pF | GRM0335C1H1R8WA01# |  |        |               |         | 3.4pF | ±0.05pF | GRM0335C1H3R4WA01# |  |
|        |               |         |        | ±0.05pF | GRM0335C1H1R8BA01# |  |        |               |         |       | ±0.1pF  | GRM0335C1H3R4BA01# |  |
|        |               |         | 1.9pF  | ±0.05pF | GRM0335C1H1R9WA01# |  |        |               |         |       | ±0.25pF | GRM0335C1H3R4CA01# |  |
|        |               |         |        | ±0.05pF | GRM0335C1H1R9BA01# |  |        |               |         | 3.5pF | ±0.05pF | GRM0335C1H3R5WA01# |  |
|        |               |         | 2.0pF  | ±0.05pF | GRM0335C1H2R0WA01# |  |        |               |         |       | ±0.1pF  | GRM0335C1H3R5BA01# |  |
|        |               |         |        | ±0.05pF | GRM0335C1H2R0BA01# |  |        |               |         |       | ±0.25pF | GRM0335C1H3R5CA01# |  |
|        |               |         | 2.1pF  | ±0.05pF | GRM0335C1H2R1WA01# |  |        |               |         | 3.6pF | ±0.05pF | GRM0335C1H3R6WA01# |  |
|        |               |         |        | ±0.05pF | GRM0335C1H2R1BA01# |  |        |               |         |       | ±0.05pF | GRM0335C1H3R6BA01# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 0.6×0.3mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.33mm | 50Vdc         | COG     | 3.6pF | ±0.1pF  | GRM0335C1H3R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H3R6CA01# |  |
|        |               |         | 3.7pF | ±0.05pF | GRM0335C1H3R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H3R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H3R7CA01# |  |
|        |               |         | 3.8pF | ±0.05pF | GRM0335C1H3R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H3R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H3R8CA01# |  |
|        |               |         | 3.9pF | ±0.05pF | GRM0335C1H3R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H3R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H3R9CA01# |  |
|        |               |         | 4.0pF | ±0.05pF | GRM0335C1H4R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H4R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H4R0CA01# |  |
|        |               |         | 4.1pF | ±0.05pF | GRM0335C1H4R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H4R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H4R1CA01# |  |
|        |               |         | 4.2pF | ±0.05pF | GRM0335C1H4R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H4R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H4R2CA01# |  |
|        |               |         | 4.3pF | ±0.05pF | GRM0335C1H4R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H4R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H4R3CA01# |  |
|        |               |         | 4.4pF | ±0.05pF | GRM0335C1H4R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H4R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H4R4CA01# |  |
|        |               |         | 4.5pF | ±0.05pF | GRM0335C1H4R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H4R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H4R5CA01# |  |
|        |               |         | 4.6pF | ±0.05pF | GRM0335C1H4R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H4R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H4R6CA01# |  |
|        |               |         | 4.7pF | ±0.05pF | GRM0335C1H4R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H4R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H4R7CA01# |  |
|        |               |         | 4.8pF | ±0.05pF | GRM0335C1H4R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H4R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H4R8CA01# |  |
|        |               |         | 4.9pF | ±0.05pF | GRM0335C1H4R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H4R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H4R9CA01# |  |
|        |               |         | 5.0pF | ±0.05pF | GRM0335C1H5R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H5R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H5R0CA01# |  |
|        |               |         | 5.1pF | ±0.05pF | GRM0335C1H5R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H5R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H5R1CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H5R1DA01# |  |
|        |               |         | 5.2pF | ±0.05pF | GRM0335C1H5R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H5R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H5R2CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H5R2DA01# |  |
|        |               |         | 5.3pF | ±0.05pF | GRM0335C1H5R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H5R3BA01# |  |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.33mm | 50Vdc         | COG     | 5.3pF | ±0.25pF | GRM0335C1H5R3CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H5R3DA01# |  |
|        |               |         | 5.4pF | ±0.05pF | GRM0335C1H5R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H5R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H5R4CA01# |  |
|        |               |         | 5.5pF | ±0.05pF | GRM0335C1H5R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H5R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H5R5CA01# |  |
|        |               |         | 5.6pF | ±0.05pF | GRM0335C1H5R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H5R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H5R6CA01# |  |
|        |               |         | 5.7pF | ±0.05pF | GRM0335C1H5R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H5R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H5R7CA01# |  |
|        |               |         | 5.8pF | ±0.05pF | GRM0335C1H5R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H5R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H5R8CA01# |  |
|        |               |         | 5.9pF | ±0.05pF | GRM0335C1H5R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H5R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H5R9CA01# |  |
|        |               |         | 6.0pF | ±0.05pF | GRM0335C1H6R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H6R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H6R0CA01# |  |
|        |               |         | 6.1pF | ±0.05pF | GRM0335C1H6R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H6R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H6R1CA01# |  |
|        |               |         | 6.2pF | ±0.05pF | GRM0335C1H6R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H6R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H6R2CA01# |  |
|        |               |         | 6.3pF | ±0.05pF | GRM0335C1H6R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H6R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H6R3CA01# |  |
|        |               |         | 6.4pF | ±0.05pF | GRM0335C1H6R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H6R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H6R4CA01# |  |
|        |               |         | 6.5pF | ±0.05pF | GRM0335C1H6R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H6R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H6R5CA01# |  |
|        |               |         | 6.6pF | ±0.05pF | GRM0335C1H6R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H6R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H6R6CA01# |  |
|        |               |         | 6.7pF | ±0.05pF | GRM0335C1H6R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H6R7BA01# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 0.6×0.3mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.33mm | 50Vdc         | COG     | 6.7pF | ±0.05pF | GRM0335C1H6R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H6R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H6R7CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H6R7DA01# |  |
|        |               |         | 6.8pF | ±0.05pF | GRM0335C1H6R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H6R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H6R8CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H6R8DA01# |  |
|        |               |         | 6.9pF | ±0.05pF | GRM0335C1H6R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H6R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H6R9CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H6R9DA01# |  |
|        |               |         | 7.0pF | ±0.05pF | GRM0335C1H7R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H7R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H7R0CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H7R0DA01# |  |
|        |               |         | 7.1pF | ±0.05pF | GRM0335C1H7R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H7R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H7R1CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H7R1DA01# |  |
|        |               |         | 7.2pF | ±0.05pF | GRM0335C1H7R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H7R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H7R2CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H7R2DA01# |  |
|        |               |         | 7.3pF | ±0.05pF | GRM0335C1H7R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H7R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H7R3CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H7R3DA01# |  |
|        |               |         | 7.4pF | ±0.05pF | GRM0335C1H7R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H7R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H7R4CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H7R4DA01# |  |
|        |               |         | 7.5pF | ±0.05pF | GRM0335C1H7R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H7R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H7R5CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H7R5DA01# |  |
|        |               |         | 7.6pF | ±0.05pF | GRM0335C1H7R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H7R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H7R6CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H7R6DA01# |  |
|        |               |         | 7.7pF | ±0.05pF | GRM0335C1H7R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H7R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H7R7CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H7R7DA01# |  |
|        |               |         | 7.8pF | ±0.05pF | GRM0335C1H7R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H7R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H7R8CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H7R8DA01# |  |
|        |               |         | 7.9pF | ±0.05pF | GRM0335C1H7R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H7R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H7R9CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H7R9DA01# |  |
|        |               |         | 8.0pF | ±0.05pF | GRM0335C1H8R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H8R0BA01# |  |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.33mm | 50Vdc         | COG     | 8.0pF | ±0.25pF | GRM0335C1H8R0CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H8R0DA01# |  |
|        |               |         | 8.1pF | ±0.05pF | GRM0335C1H8R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H8R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H8R1CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H8R1DA01# |  |
|        |               |         | 8.2pF | ±0.05pF | GRM0335C1H8R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H8R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H8R2CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H8R2DA01# |  |
|        |               |         | 8.3pF | ±0.05pF | GRM0335C1H8R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H8R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H8R3CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H8R3DA01# |  |
|        |               |         | 8.4pF | ±0.05pF | GRM0335C1H8R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H8R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H8R4CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H8R4DA01# |  |
|        |               |         | 8.5pF | ±0.05pF | GRM0335C1H8R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H8R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H8R5CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H8R5DA01# |  |
|        |               |         | 8.6pF | ±0.05pF | GRM0335C1H8R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H8R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H8R6CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H8R6DA01# |  |
|        |               |         | 8.7pF | ±0.05pF | GRM0335C1H8R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H8R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H8R7CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H8R7DA01# |  |
|        |               |         | 8.8pF | ±0.05pF | GRM0335C1H8R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H8R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H8R8CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H8R8DA01# |  |
|        |               |         | 8.9pF | ±0.05pF | GRM0335C1H8R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H8R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H8R9CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H8R9DA01# |  |
|        |               |         | 9.0pF | ±0.05pF | GRM0335C1H9R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H9R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H9R0CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H9R0DA01# |  |
|        |               |         | 9.1pF | ±0.05pF | GRM0335C1H9R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H9R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H9R1CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H9R1DA01# |  |
|        |               |         | 9.2pF | ±0.05pF | GRM0335C1H9R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H9R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H9R2CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H9R2DA01# |  |
|        |               |         | 9.3pF | ±0.05pF | GRM0335C1H9R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H9R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H9R3CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H9R3DA01# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 0.6×0.3mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.33mm | 50Vdc         | COG     | 9.4pF | ±0.05pF | GRM0335C1H9R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H9R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H9R4CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H9R4DA01# |  |
|        |               |         | 9.5pF | ±0.05pF | GRM0335C1H9R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H9R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H9R5CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H9R5DA01# |  |
|        |               |         | 9.6pF | ±0.05pF | GRM0335C1H9R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H9R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H9R6CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H9R6DA01# |  |
|        |               |         | 9.7pF | ±0.05pF | GRM0335C1H9R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H9R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H9R7CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H9R7DA01# |  |
|        |               |         | 9.8pF | ±0.05pF | GRM0335C1H9R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H9R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H9R8CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H9R8DA01# |  |
|        |               |         | 9.9pF | ±0.05pF | GRM0335C1H9R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0335C1H9R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM0335C1H9R9CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0335C1H9R9DA01# |  |
|        |               |         | 10pF  | ±2%     | GRM0335C1H100GA01# |  |
|        |               |         |       | ±5%     | GRM0335C1H100JA01# |  |
|        |               |         | 12pF  | ±2%     | GRM0335C1H120GA01# |  |
|        |               |         |       | ±5%     | GRM0335C1H120JA01# |  |
|        |               |         | 15pF  | ±2%     | GRM0335C1H150GA01# |  |
|        |               |         |       | ±5%     | GRM0335C1H150JA01# |  |
|        |               |         | 18pF  | ±2%     | GRM0335C1H180GA01# |  |
|        |               |         |       | ±5%     | GRM0335C1H180JA01# |  |
|        |               |         | 22pF  | ±2%     | GRM0335C1H220GA01# |  |
|        |               |         |       | ±5%     | GRM0335C1H220JA01# |  |
|        |               |         | 27pF  | ±2%     | GRM0335C1H270GA01# |  |
|        |               |         |       | ±5%     | GRM0335C1H270JA01# |  |
|        |               |         | 33pF  | ±2%     | GRM0335C1H330GA01# |  |
|        |               |         |       | ±5%     | GRM0335C1H330JA01# |  |
|        |               |         | 39pF  | ±2%     | GRM0335C1H390GA01# |  |
|        |               |         |       | ±5%     | GRM0335C1H390JA01# |  |
|        |               |         | 47pF  | ±2%     | GRM0335C1H470GA01# |  |
|        |               |         |       | ±5%     | GRM0335C1H470JA01# |  |
|        |               |         | 56pF  | ±2%     | GRM0335C1H560GA01# |  |
|        |               |         |       | ±5%     | GRM0335C1H560JA01# |  |
|        |               |         | 68pF  | ±2%     | GRM0335C1H680GA01# |  |
|        |               |         |       | ±5%     | GRM0335C1H680JA01# |  |
|        |               |         | 82pF  | ±2%     | GRM0335C1H820GA01# |  |
|        |               |         |       | ±5%     | GRM0335C1H820JA01# |  |
|        |               |         | 100pF | ±2%     | GRM0335C1H101GA01# |  |
|        |               |         |       | ±5%     | GRM0335C1H101JA01# |  |
|        |               |         | 120pF | ±2%     | GRM0335C1H121GA01# |  |
|        |               |         |       | ±5%     | GRM0335C1H121JA01# |  |
|        |               |         | 150pF | ±2%     | GRM0335C1H151GA01# |  |
|        |               |         |       | ±5%     | GRM0335C1H151JA01# |  |

| T max. | Rated Voltage | TC Code | Cap.   | Tol.    | Part Number        |  |
|--------|---------------|---------|--------|---------|--------------------|--|
| 0.33mm | 50Vdc         | COG     | 180pF  | ±2%     | GRM0335C1H181GA01# |  |
|        |               |         |        | ±5%     | GRM0335C1H181JA01# |  |
|        |               |         | 220pF  | ±2%     | GRM0335C1H221GA01# |  |
|        |               |         |        | ±5%     | GRM0335C1H221JA01# |  |
|        |               | CK      | 0.10pF | ±0.05pF | GRM0334C1HR10WA01# |  |
|        |               |         |        | ±0.05pF | GRM0334C1HR20WA01# |  |
|        |               |         | 0.20pF | ±0.1pF  | GRM0334C1HR20BA01# |  |
|        |               |         |        | ±0.05pF | GRM0334C1HR30WA01# |  |
|        |               |         | 0.30pF | ±0.1pF  | GRM0334C1HR30BA01# |  |
|        |               |         |        | ±0.05pF | GRM0334C1HR40WA01# |  |
|        |               |         | 0.40pF | ±0.1pF  | GRM0334C1HR40BA01# |  |
|        |               |         |        | ±0.05pF | GRM0334C1HR50WA01# |  |
|        |               |         | 0.50pF | ±0.1pF  | GRM0334C1HR50BA01# |  |
|        |               |         |        | ±0.05pF | GRM0334C1HR60WA01# |  |
|        |               |         | 0.60pF | ±0.1pF  | GRM0334C1HR60BA01# |  |
|        |               |         |        | ±0.05pF | GRM0334C1HR70WA01# |  |
|        |               |         | 0.70pF | ±0.1pF  | GRM0334C1HR70BA01# |  |
|        |               |         |        | ±0.05pF | GRM0334C1HR80WA01# |  |
|        |               |         | 0.80pF | ±0.1pF  | GRM0334C1HR80BA01# |  |
|        |               |         |        | ±0.05pF | GRM0334C1HR90WA01# |  |
|        |               |         | 0.90pF | ±0.1pF  | GRM0334C1HR90BA01# |  |
|        |               |         |        | ±0.05pF | GRM0334C1H1R0WA01# |  |
|        |               |         | 1.0pF  | ±0.1pF  | GRM0334C1H1R0BA01# |  |
|        |               |         |        | ±0.25pF | GRM0334C1H1R0CA01# |  |
|        |               |         |        | ±0.05pF | GRM0334C1H1R1WA01# |  |
|        |               |         | 1.1pF  | ±0.1pF  | GRM0334C1H1R1BA01# |  |
|        |               |         |        | ±0.25pF | GRM0334C1H1R1CA01# |  |
|        |               |         | 1.2pF  | ±0.05pF | GRM0334C1H1R2WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0334C1H1R2BA01# |  |
|        |               |         |        | ±0.25pF | GRM0334C1H1R2CA01# |  |
|        |               |         | 1.3pF  | ±0.05pF | GRM0334C1H1R3WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0334C1H1R3BA01# |  |
|        |               |         |        | ±0.25pF | GRM0334C1H1R3CA01# |  |
|        |               |         | 1.4pF  | ±0.05pF | GRM0334C1H1R4WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0334C1H1R4BA01# |  |
|        |               |         |        | ±0.25pF | GRM0334C1H1R4CA01# |  |
|        |               |         | 1.5pF  | ±0.05pF | GRM0334C1H1R5WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0334C1H1R5BA01# |  |
|        |               |         |        | ±0.25pF | GRM0334C1H1R5CA01# |  |
|        |               |         | 1.6pF  | ±0.05pF | GRM0334C1H1R6WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0334C1H1R6BA01# |  |
|        |               |         |        | ±0.25pF | GRM0334C1H1R6CA01# |  |
|        |               |         | 1.7pF  | ±0.05pF | GRM0334C1H1R7WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0334C1H1R7BA01# |  |
|        |               |         |        | ±0.25pF | GRM0334C1H1R7CA01# |  |
|        |               |         | 1.8pF  | ±0.05pF | GRM0334C1H1R8WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0334C1H1R8BA01# |  |
|        |               |         |        | ±0.25pF | GRM0334C1H1R8CA01# |  |
|        |               |         | 1.9pF  | ±0.05pF | GRM0334C1H1R9WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0334C1H1R9BA01# |  |
|        |               |         |        | ±0.25pF | GRM0334C1H1R9CA01# |  |
|        |               |         | 2.0pF  | ±0.05pF | GRM0334C1H2R0WA01# |  |
|        |               |         |        | ±0.1pF  | GRM0334C1H2R0BA01# |  |
|        |               |         |        | ±0.25pF | GRM0334C1H2R0CA01# |  |

Part number # indicates the package specification code.

# GRM Series Temperature Compensating Type Part Number List

(→ 0.6×0.3mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  | T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |                    |  |
|--------|---------------|---------|-------|---------|--------------------|--|--------|---------------|---------|-------|---------|--------------------|--------------------|--|
| 0.33mm | 50Vdc         | CJ      | 2.1pF | ±0.05pF | GRM0333C1H2R1WA01# |  | 0.33mm | 50Vdc         | CJ      | 3.9pF | ±0.05pF | GRM0333C1H3R9WA01# |                    |  |
|        |               |         |       | ±0.1pF  | GRM0333C1H2R1BA01# |  |        |               |         |       | ±0.1pF  | GRM0333C1H3R9BA01# |                    |  |
|        |               |         |       | ±0.25pF | GRM0333C1H2R1CA01# |  |        |               |         |       | ±0.25pF | GRM0333C1H3R9CA01# |                    |  |
|        |               |         | 2.2pF | ±0.05pF | GRM0333C1H2R2WA01# |  |        |               | CH      | 4.0pF | ±0.05pF | GRM0332C1H4R0WA01# |                    |  |
|        |               |         |       | ±0.1pF  | GRM0333C1H2R2BA01# |  |        |               |         |       | ±0.1pF  | GRM0332C1H4R0BA01# |                    |  |
|        |               |         |       | ±0.25pF | GRM0333C1H2R2CA01# |  |        |               |         |       | ±0.25pF | GRM0332C1H4R0CA01# |                    |  |
|        |               |         | 2.3pF | ±0.05pF | GRM0333C1H2R3WA01# |  |        |               |         | 4.1pF | ±0.05pF | GRM0332C1H4R1WA01# |                    |  |
|        |               |         |       | ±0.1pF  | GRM0333C1H2R3BA01# |  |        |               |         |       | ±0.1pF  | GRM0332C1H4R1BA01# |                    |  |
|        |               |         |       | ±0.25pF | GRM0333C1H2R3CA01# |  |        |               |         |       | ±0.25pF | GRM0332C1H4R1CA01# |                    |  |
|        |               |         | 2.4pF | ±0.05pF | GRM0333C1H2R4WA01# |  |        |               |         | 4.2pF | ±0.05pF | GRM0332C1H4R2WA01# |                    |  |
|        |               |         |       | ±0.1pF  | GRM0333C1H2R4BA01# |  |        |               |         |       | ±0.1pF  | GRM0332C1H4R2BA01# |                    |  |
|        |               |         |       | ±0.25pF | GRM0333C1H2R4CA01# |  |        |               |         |       | ±0.25pF | GRM0332C1H4R2CA01# |                    |  |
|        |               |         | 2.5pF | ±0.05pF | GRM0333C1H2R5WA01# |  |        |               |         | 4.3pF | ±0.05pF | GRM0332C1H4R3WA01# |                    |  |
|        |               |         |       | ±0.1pF  | GRM0333C1H2R5BA01# |  |        |               |         |       | ±0.1pF  | GRM0332C1H4R3BA01# |                    |  |
|        |               |         |       | ±0.25pF | GRM0333C1H2R5CA01# |  |        |               |         |       | ±0.25pF | GRM0332C1H4R3CA01# |                    |  |
|        |               |         | 2.6pF | ±0.05pF | GRM0333C1H2R6WA01# |  |        |               |         | 4.4pF | ±0.05pF | GRM0332C1H4R4WA01# |                    |  |
|        |               |         |       | ±0.1pF  | GRM0333C1H2R6BA01# |  |        |               |         |       | ±0.1pF  | GRM0332C1H4R4BA01# |                    |  |
|        |               |         |       | ±0.25pF | GRM0333C1H2R6CA01# |  |        |               |         |       | ±0.25pF | GRM0332C1H4R4CA01# |                    |  |
|        |               |         | 2.7pF | ±0.05pF | GRM0333C1H2R7WA01# |  |        |               |         | 4.5pF | ±0.05pF | GRM0332C1H4R5WA01# |                    |  |
|        |               |         |       | ±0.1pF  | GRM0333C1H2R7BA01# |  |        |               |         |       | ±0.1pF  | GRM0332C1H4R5BA01# |                    |  |
|        |               |         |       | ±0.25pF | GRM0333C1H2R7CA01# |  |        |               |         |       | ±0.25pF | GRM0332C1H4R5CA01# |                    |  |
|        |               |         | 2.8pF | ±0.05pF | GRM0333C1H2R8WA01# |  |        |               |         | 4.6pF | ±0.05pF | GRM0332C1H4R6WA01# |                    |  |
|        |               |         |       | ±0.1pF  | GRM0333C1H2R8BA01# |  |        |               |         |       | ±0.1pF  | GRM0332C1H4R6BA01# |                    |  |
|        |               |         |       | ±0.25pF | GRM0333C1H2R8CA01# |  |        |               |         |       | ±0.25pF | GRM0332C1H4R6CA01# |                    |  |
|        |               |         | 2.9pF | ±0.05pF | GRM0333C1H2R9WA01# |  |        |               |         | 4.7pF | ±0.05pF | GRM0332C1H4R7WA01# |                    |  |
|        |               |         |       | ±0.1pF  | GRM0333C1H2R9BA01# |  |        |               |         |       | ±0.1pF  | GRM0332C1H4R7BA01# |                    |  |
|        |               |         |       | ±0.25pF | GRM0333C1H2R9CA01# |  |        |               |         |       | ±0.25pF | GRM0332C1H4R7CA01# |                    |  |
|        |               |         | 3.0pF | ±0.05pF | GRM0333C1H3R0WA01# |  |        |               |         | 4.8pF | ±0.05pF | GRM0332C1H4R8WA01# |                    |  |
|        |               |         |       | ±0.1pF  | GRM0333C1H3R0BA01# |  |        |               |         |       | ±0.1pF  | GRM0332C1H4R8BA01# |                    |  |
|        |               |         |       | ±0.25pF | GRM0333C1H3R0CA01# |  |        |               |         |       | ±0.25pF | GRM0332C1H4R8CA01# |                    |  |
|        |               |         | 3.1pF | ±0.05pF | GRM0333C1H3R1WA01# |  |        |               |         | 4.9pF | ±0.05pF | GRM0332C1H4R9WA01# |                    |  |
|        |               |         |       | ±0.1pF  | GRM0333C1H3R1BA01# |  |        |               |         |       | ±0.1pF  | GRM0332C1H4R9BA01# |                    |  |
|        |               |         |       | ±0.25pF | GRM0333C1H3R1CA01# |  |        |               |         |       | ±0.25pF | GRM0332C1H4R9CA01# |                    |  |
|        |               |         | 3.2pF | ±0.05pF | GRM0333C1H3R2WA01# |  |        |               |         | 5.0pF | ±0.05pF | GRM0332C1H5R0WA01# |                    |  |
|        |               |         |       | ±0.1pF  | GRM0333C1H3R2BA01# |  |        |               |         |       | ±0.1pF  | GRM0332C1H5R0BA01# |                    |  |
|        |               |         |       | ±0.25pF | GRM0333C1H3R2CA01# |  |        |               |         |       | ±0.25pF | GRM0332C1H5R0CA01# |                    |  |
|        |               |         | 3.3pF | ±0.05pF | GRM0333C1H3R3WA01# |  |        |               |         | 5.1pF | ±0.05pF | GRM0332C1H5R1WA01# |                    |  |
|        |               |         |       | ±0.1pF  | GRM0333C1H3R3BA01# |  |        |               |         |       | ±0.1pF  | GRM0332C1H5R1BA01# |                    |  |
|        |               |         |       | ±0.25pF | GRM0333C1H3R3CA01# |  |        |               |         |       | ±0.25pF | GRM0332C1H5R1CA01# |                    |  |
|        |               |         | 3.4pF | ±0.05pF | GRM0333C1H3R4WA01# |  |        |               |         | 5.2pF | ±0.05pF | GRM0332C1H5R2WA01# |                    |  |
|        |               |         |       | ±0.1pF  | GRM0333C1H3R4BA01# |  |        |               |         |       | ±0.1pF  | GRM0332C1H5R2BA01# |                    |  |
|        |               |         |       | ±0.25pF | GRM0333C1H3R4CA01# |  |        |               |         |       | ±0.25pF | GRM0332C1H5R2CA01# |                    |  |
|        |               |         | 3.5pF | ±0.05pF | GRM0333C1H3R5WA01# |  |        |               |         | 5.3pF | ±0.05pF | GRM0332C1H5R3WA01# |                    |  |
|        |               |         |       | ±0.1pF  | GRM0333C1H3R5BA01# |  |        |               |         |       | ±0.1pF  | GRM0332C1H5R3BA01# |                    |  |
|        |               |         |       | ±0.25pF | GRM0333C1H3R5CA01# |  |        |               |         |       | ±0.25pF | GRM0332C1H5R3CA01# |                    |  |
|        |               |         | 3.6pF | ±0.05pF | GRM0333C1H3R6WA01# |  |        |               |         | 5.4pF | ±0.05pF | GRM0332C1H5R4WA01# |                    |  |
|        |               |         |       | ±0.1pF  | GRM0333C1H3R6BA01# |  |        |               |         |       | ±0.1pF  | GRM0332C1H5R4BA01# |                    |  |
|        |               |         |       | ±0.25pF | GRM0333C1H3R6CA01# |  |        |               |         |       | ±0.25pF | GRM0332C1H5R4CA01# |                    |  |
|        |               |         | 3.7pF | ±0.05pF | GRM0333C1H3R7WA01# |  |        |               |         | 5.5pF | ±0.05pF | GRM0332C1H5R5WA01# |                    |  |
|        |               |         |       | ±0.1pF  | GRM0333C1H3R7BA01# |  |        |               |         |       | ±0.1pF  | GRM0332C1H5R5BA01# |                    |  |
|        |               |         |       | ±0.25pF | GRM0333C1H3R7CA01# |  |        |               |         |       | ±0.25pF | GRM0332C1H5R5CA01# |                    |  |
|        |               |         | 3.8pF | ±0.05pF | GRM0333C1H3R8WA01# |  |        |               |         |       | 5.5pF   | ±0.05pF            | GRM0332C1H5R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0333C1H3R8BA01# |  |        |               |         |       |         | ±0.1pF             | GRM0332C1H5R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM0333C1H3R8CA01# |  |        |               |         |       |         |                    |                    |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 0.6×0.3mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.33mm | 50Vdc         | CH      | 5.5pF | ±0.25pF | GRM0332C1H5R5CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H5R5DA01# |  |
|        |               |         | 5.6pF | ±0.05pF | GRM0332C1H5R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H5R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H5R6CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H5R6DA01# |  |
|        |               |         | 5.7pF | ±0.05pF | GRM0332C1H5R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H5R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H5R7CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H5R7DA01# |  |
|        |               |         | 5.8pF | ±0.05pF | GRM0332C1H5R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H5R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H5R8CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H5R8DA01# |  |
|        |               |         | 5.9pF | ±0.05pF | GRM0332C1H5R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H5R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H5R9CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H5R9DA01# |  |
|        |               |         | 6.0pF | ±0.05pF | GRM0332C1H6R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H6R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H6R0CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H6R0DA01# |  |
|        |               |         | 6.1pF | ±0.05pF | GRM0332C1H6R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H6R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H6R1CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H6R1DA01# |  |
|        |               |         | 6.2pF | ±0.05pF | GRM0332C1H6R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H6R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H6R2CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H6R2DA01# |  |
|        |               |         | 6.3pF | ±0.05pF | GRM0332C1H6R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H6R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H6R3CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H6R3DA01# |  |
|        |               |         | 6.4pF | ±0.05pF | GRM0332C1H6R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H6R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H6R4CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H6R4DA01# |  |
|        |               |         | 6.5pF | ±0.05pF | GRM0332C1H6R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H6R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H6R5CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H6R5DA01# |  |
|        |               |         | 6.6pF | ±0.05pF | GRM0332C1H6R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H6R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H6R6CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H6R6DA01# |  |
|        |               |         | 6.7pF | ±0.05pF | GRM0332C1H6R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H6R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H6R7CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H6R7DA01# |  |
|        |               |         | 6.8pF | ±0.05pF | GRM0332C1H6R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H6R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H6R8CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H6R8DA01# |  |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.33mm | 50Vdc         | CH      | 6.9pF | ±0.05pF | GRM0332C1H6R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H6R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H6R9CA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H6R9DA01# |  |
|        |               |         | 7.0pF | ±0.05pF | GRM0332C1H7R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H7R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H7R0CA01# |  |
|        |               |         | 7.1pF | ±0.05pF | GRM0332C1H7R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H7R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H7R1CA01# |  |
|        |               |         | 7.2pF | ±0.05pF | GRM0332C1H7R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H7R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H7R2CA01# |  |
|        |               |         | 7.3pF | ±0.05pF | GRM0332C1H7R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H7R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H7R3CA01# |  |
|        |               |         | 7.4pF | ±0.05pF | GRM0332C1H7R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H7R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H7R4CA01# |  |
|        |               |         | 7.5pF | ±0.05pF | GRM0332C1H7R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H7R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H7R5CA01# |  |
|        |               |         | 7.6pF | ±0.05pF | GRM0332C1H7R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H7R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H7R6CA01# |  |
|        |               |         | 7.7pF | ±0.05pF | GRM0332C1H7R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H7R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H7R7CA01# |  |
|        |               |         | 7.8pF | ±0.05pF | GRM0332C1H7R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H7R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H7R8CA01# |  |
|        |               |         | 7.9pF | ±0.05pF | GRM0332C1H7R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H7R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H7R9CA01# |  |
|        |               |         | 8.0pF | ±0.05pF | GRM0332C1H8R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H8R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H8R0CA01# |  |
|        |               |         | 8.1pF | ±0.05pF | GRM0332C1H8R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H8R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H8R1CA01# |  |
|        |               |         | 8.2pF | ±0.05pF | GRM0332C1H8R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H8R2BA01# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 0.6×0.3mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  | T max. | Rated Voltage | TC Code | Cap.    | Tol.               | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|--------|---------------|---------|---------|--------------------|--------------------|--|
| 0.33mm | 50Vdc         | CH      | 8.2pF | ±0.25pF | GRM0332C1H8R2CA01# |  | 0.33mm | 50Vdc         | CH      | 9.6pF   | ±0.05pF            | GRM0332C1H9R6WA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H8R2DA01# |  |        |               |         |         | ±0.1pF             | GRM0332C1H9R6BA01# |  |
|        |               |         | 8.3pF | ±0.05pF | GRM0332C1H8R3WA01# |  |        |               |         | ±0.25pF | GRM0332C1H9R6CA01# |                    |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H8R3BA01# |  |        |               |         | ±0.5pF  | GRM0332C1H9R6DA01# |                    |  |
|        |               |         |       | ±0.25pF | GRM0332C1H8R3CA01# |  |        |               |         | 9.7pF   | ±0.05pF            | GRM0332C1H9R7WA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H8R3DA01# |  |        |               |         |         | ±0.1pF             | GRM0332C1H9R7BA01# |  |
|        |               |         | 8.4pF | ±0.05pF | GRM0332C1H8R4WA01# |  |        |               |         |         | ±0.25pF            | GRM0332C1H9R7CA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H8R4BA01# |  |        |               |         | ±0.5pF  | GRM0332C1H9R7DA01# |                    |  |
|        |               |         |       | ±0.25pF | GRM0332C1H8R4CA01# |  |        |               |         | 9.8pF   | ±0.05pF            | GRM0332C1H9R8WA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H8R4DA01# |  |        |               |         |         | ±0.1pF             | GRM0332C1H9R8BA01# |  |
|        |               |         | 8.5pF | ±0.05pF | GRM0332C1H8R5WA01# |  |        |               |         |         | ±0.25pF            | GRM0332C1H9R8CA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H8R5BA01# |  |        |               |         | ±0.5pF  | GRM0332C1H9R8DA01# |                    |  |
|        |               |         |       | ±0.25pF | GRM0332C1H8R5CA01# |  |        |               |         | 9.9pF   | ±0.05pF            | GRM0332C1H9R9WA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H8R5DA01# |  |        |               |         |         | ±0.1pF             | GRM0332C1H9R9BA01# |  |
|        |               |         | 8.6pF | ±0.05pF | GRM0332C1H8R6WA01# |  |        |               |         |         | ±0.25pF            | GRM0332C1H9R9CA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H8R6BA01# |  |        |               |         | ±0.5pF  | GRM0332C1H9R9DA01# |                    |  |
|        |               |         |       | ±0.25pF | GRM0332C1H8R6CA01# |  |        |               |         | 10pF    | ±2%                | GRM0332C1H100GA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H8R6DA01# |  |        |               |         |         | ±5%                | GRM0332C1H100JA01# |  |
|        |               |         | 8.7pF | ±0.05pF | GRM0332C1H8R7WA01# |  |        |               |         | 12pF    | ±2%                | GRM0332C1H120GA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H8R7BA01# |  |        |               |         |         | ±5%                | GRM0332C1H120JA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H8R7CA01# |  |        |               |         | 15pF    | ±2%                | GRM0332C1H150GA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H8R7DA01# |  |        |               |         |         | ±5%                | GRM0332C1H150JA01# |  |
|        |               |         | 8.8pF | ±0.05pF | GRM0332C1H8R8WA01# |  |        |               |         | 18pF    | ±2%                | GRM0332C1H180GA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H8R8BA01# |  |        |               |         |         | ±5%                | GRM0332C1H180JA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H8R8CA01# |  |        |               |         | 22pF    | ±2%                | GRM0332C1H220GA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H8R8DA01# |  |        |               |         |         | ±5%                | GRM0332C1H220JA01# |  |
|        |               |         | 8.9pF | ±0.05pF | GRM0332C1H8R9WA01# |  |        |               |         | 27pF    | ±2%                | GRM0332C1H270GA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H8R9BA01# |  |        |               |         |         | ±5%                | GRM0332C1H270JA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H8R9CA01# |  |        |               |         | 33pF    | ±2%                | GRM0332C1H330GA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H8R9DA01# |  |        |               |         |         | ±5%                | GRM0332C1H330JA01# |  |
|        |               |         | 9.0pF | ±0.05pF | GRM0332C1H9R0WA01# |  |        |               |         | 39pF    | ±2%                | GRM0332C1H390GA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H9R0BA01# |  |        |               |         |         | ±5%                | GRM0332C1H390JA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H9R0CA01# |  |        |               |         | 47pF    | ±2%                | GRM0332C1H470GA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H9R0DA01# |  |        |               |         |         | ±5%                | GRM0332C1H470JA01# |  |
|        |               |         | 9.1pF | ±0.05pF | GRM0332C1H9R1WA01# |  |        |               |         | 56pF    | ±2%                | GRM0332C1H560GA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H9R1BA01# |  |        |               |         |         | ±5%                | GRM0332C1H560JA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H9R1CA01# |  |        |               |         | 68pF    | ±2%                | GRM0332C1H680GA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H9R1DA01# |  |        |               |         |         | ±5%                | GRM0332C1H680JA01# |  |
|        |               |         | 9.2pF | ±0.05pF | GRM0332C1H9R2WA01# |  |        |               |         | 82pF    | ±2%                | GRM0332C1H820GA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H9R2BA01# |  |        |               |         |         | ±5%                | GRM0332C1H820JA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H9R2CA01# |  |        |               |         | 100pF   | ±2%                | GRM0332C1H101GA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H9R2DA01# |  |        |               |         |         | ±5%                | GRM0332C1H101JA01# |  |
|        |               |         | 9.3pF | ±0.05pF | GRM0332C1H9R3WA01# |  |        |               |         | 120pF   | ±2%                | GRM0332C1H121GA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H9R3BA01# |  |        |               |         |         | ±5%                | GRM0332C1H121JA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H9R3CA01# |  |        |               |         | 150pF   | ±2%                | GRM0332C1H151GA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H9R3DA01# |  |        |               |         |         | ±5%                | GRM0332C1H151JA01# |  |
|        |               |         | 9.4pF | ±0.05pF | GRM0332C1H9R4WA01# |  |        |               |         | 180pF   | ±2%                | GRM0332C1H181GA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H9R4BA01# |  |        |               |         |         | ±5%                | GRM0332C1H181JA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H9R4CA01# |  |        |               |         | 220pF   | ±2%                | GRM0332C1H221GA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H9R4DA01# |  |        |               |         |         | ±5%                | GRM0332C1H221JA01# |  |
|        |               |         | 9.5pF | ±0.05pF | GRM0332C1H9R5WA01# |  | 25Vdc  | COG           |         | 270pF   | ±2%                | GRM0335C1E271GA01# |  |
|        |               |         |       | ±0.1pF  | GRM0332C1H9R5BA01# |  |        |               |         |         | ±5%                | GRM0335C1E271JA01# |  |
|        |               |         |       | ±0.25pF | GRM0332C1H9R5CA01# |  |        |               |         | 330pF   | ±2%                | GRM0335C1E331GA01# |  |
|        |               |         |       | ±0.5pF  | GRM0332C1H9R5DA01# |  |        |               |         |         | ±5%                | GRM0335C1E331JA01# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 0.6×0.3mm)

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number        |  |
|--------|---------------|---------|--------|------|--------------------|--|
| 0.33mm | 25Vdc         | COG     | 390pF  | ±2%  | GRM0335C1E391GA01# |  |
|        |               |         |        | ±5%  | GRM0335C1E391JA01# |  |
|        |               |         | 470pF  | ±2%  | GRM0335C1E471GA01# |  |
|        |               |         |        | ±5%  | GRM0335C1E471JA01# |  |
|        |               |         | 560pF  | ±2%  | GRM0335C1E561GA01# |  |
|        |               |         |        | ±5%  | GRM0335C1E561JA01# |  |
|        |               |         | 680pF  | ±2%  | GRM0335C1E681GA01# |  |
|        |               |         |        | ±5%  | GRM0335C1E681JA01# |  |
|        |               |         | 820pF  | ±2%  | GRM0335C1E821GA01# |  |
|        |               |         |        | ±5%  | GRM0335C1E821JA01# |  |
|        |               |         | 910pF  | ±2%  | GRM0335C1E911GA01# |  |
|        |               |         |        | ±5%  | GRM0335C1E911JA01# |  |
|        |               |         | 1000pF | ±2%  | GRM0335C1E102GA01# |  |
|        |               |         |        | ±5%  | GRM0335C1E102JA01# |  |
|        |               | CH      | 270pF  | ±2%  | GRM0332C1E271GA01# |  |
|        |               |         |        | ±5%  | GRM0332C1E271JA01# |  |
|        |               |         | 330pF  | ±2%  | GRM0332C1E331GA01# |  |
|        |               |         |        | ±5%  | GRM0332C1E331JA01# |  |
|        |               |         | 390pF  | ±2%  | GRM0332C1E391GA01# |  |
|        |               |         |        | ±5%  | GRM0332C1E391JA01# |  |
|        |               |         | 470pF  | ±2%  | GRM0332C1E471GA01# |  |
|        |               |         |        | ±5%  | GRM0332C1E471JA01# |  |
|        |               |         | 560pF  | ±2%  | GRM0332C1E561GA01# |  |
|        |               |         |        | ±5%  | GRM0332C1E561JA01# |  |
|        |               |         | 680pF  | ±2%  | GRM0332C1E681GA01# |  |
|        |               |         |        | ±5%  | GRM0332C1E681JA01# |  |
|        |               |         | 820pF  | ±2%  | GRM0332C1E821GA01# |  |
|        |               |         |        | ±5%  | GRM0332C1E821JA01# |  |
|        |               |         | 1000pF | ±2%  | GRM0332C1E102GA01# |  |
|        |               |         |        | ±5%  | GRM0332C1E102JA01# |  |

1.0×0.5mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol.    | Part Number        |  |
|--------|---------------|---------|--------|---------|--------------------|--|
| 0.55mm | 100Vdc        | COG     | 0.10pF | ±0.05pF | GRM1555C2AR10WA01# |  |
|        |               |         |        | ±0.05pF | GRM1555C2AR20WA01# |  |
|        |               |         | 0.20pF | ±0.1pF  | GRM1555C2AR20BA01# |  |
|        |               |         |        | ±0.05pF | GRM1555C2AR30WA01# |  |
|        |               |         | 0.30pF | ±0.1pF  | GRM1555C2AR30BA01# |  |
|        |               |         |        | ±0.05pF | GRM1555C2AR40WA01# |  |
|        |               |         | 0.40pF | ±0.1pF  | GRM1555C2AR40BA01# |  |
|        |               |         |        | ±0.05pF | GRM1555C2AR50WA01# |  |
|        |               |         | 0.50pF | ±0.1pF  | GRM1555C2AR50BA01# |  |
|        |               |         |        | ±0.05pF | GRM1555C2AR60WA01# |  |
|        |               |         | 0.60pF | ±0.1pF  | GRM1555C2AR60BA01# |  |
|        |               |         |        | ±0.05pF | GRM1555C2AR70WA01# |  |
|        |               |         | 0.70pF | ±0.1pF  | GRM1555C2AR70BA01# |  |
|        |               |         |        | ±0.05pF | GRM1555C2AR80WA01# |  |
|        |               |         | 0.80pF | ±0.1pF  | GRM1555C2AR80BA01# |  |
|        |               |         |        | ±0.05pF | GRM1555C2AR90WA01# |  |
|        |               |         | 0.90pF | ±0.1pF  | GRM1555C2AR90BA01# |  |
|        |               |         |        | ±0.05pF | GRM1555C2A1R0WA01# |  |
|        |               |         | 1.0pF  | ±0.1pF  | GRM1555C2A1R0BA01# |  |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.55mm | 100Vdc        | COG     | 1.0pF | ±0.25pF | GRM1555C2A1R0CA01# |  |
|        |               |         |       | ±0.05pF | GRM1555C2A1R1WA01# |  |
|        |               |         | 1.1pF | ±0.1pF  | GRM1555C2A1R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A1R1CA01# |  |
|        |               |         | 1.2pF | ±0.05pF | GRM1555C2A1R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A1R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A1R2CA01# |  |
|        |               |         | 1.3pF | ±0.05pF | GRM1555C2A1R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A1R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A1R3CA01# |  |
|        |               |         | 1.4pF | ±0.05pF | GRM1555C2A1R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A1R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A1R4CA01# |  |
|        |               |         | 1.5pF | ±0.05pF | GRM1555C2A1R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A1R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A1R5CA01# |  |
|        |               |         | 1.6pF | ±0.05pF | GRM1555C2A1R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A1R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A1R6CA01# |  |
|        |               |         | 1.7pF | ±0.05pF | GRM1555C2A1R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A1R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A1R7CA01# |  |
|        |               |         | 1.8pF | ±0.05pF | GRM1555C2A1R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A1R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A1R8CA01# |  |
|        |               |         | 1.9pF | ±0.05pF | GRM1555C2A1R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A1R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A1R9CA01# |  |
|        |               |         | 2.0pF | ±0.05pF | GRM1555C2A2R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A2R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A2R0CA01# |  |
|        |               |         | 2.1pF | ±0.05pF | GRM1555C2A2R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A2R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A2R1CA01# |  |
|        |               |         | 2.2pF | ±0.05pF | GRM1555C2A2R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A2R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A2R2CA01# |  |
|        |               |         | 2.3pF | ±0.05pF | GRM1555C2A2R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A2R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A2R3CA01# |  |
|        |               |         | 2.4pF | ±0.05pF | GRM1555C2A2R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A2R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A2R4CA01# |  |
|        |               |         | 2.5pF | ±0.05pF | GRM1555C2A2R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A2R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A2R5CA01# |  |
|        |               |         | 2.6pF | ±0.05pF | GRM1555C2A2R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A2R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A2R6CA01# |  |
|        |               |         | 2.7pF | ±0.05pF | GRM1555C2A2R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A2R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A2R7CA01# |  |
|        |               |         | 2.8pF | ±0.05pF | GRM1555C2A2R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A2R8BA01# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 1.0×0.5mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.55mm | 100Vdc        | COG     | 2.8pF | ±0.25pF | GRM1555C2A2R8CA01# |  |
|        |               |         |       | ±0.05pF | GRM1555C2A2R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A2R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A2R9CA01# |  |
|        |               |         | 3.0pF | ±0.05pF | GRM1555C2A3R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A3R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A3R0CA01# |  |
|        |               |         | 3.1pF | ±0.05pF | GRM1555C2A3R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A3R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A3R1CA01# |  |
|        |               |         | 3.2pF | ±0.05pF | GRM1555C2A3R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A3R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A3R2CA01# |  |
|        |               |         | 3.3pF | ±0.05pF | GRM1555C2A3R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A3R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A3R3CA01# |  |
|        |               |         | 3.4pF | ±0.05pF | GRM1555C2A3R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A3R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A3R4CA01# |  |
|        |               |         | 3.5pF | ±0.05pF | GRM1555C2A3R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A3R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A3R5CA01# |  |
|        |               |         | 3.6pF | ±0.05pF | GRM1555C2A3R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A3R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A3R6CA01# |  |
|        |               |         | 3.7pF | ±0.05pF | GRM1555C2A3R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A3R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A3R7CA01# |  |
|        |               |         | 3.8pF | ±0.05pF | GRM1555C2A3R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A3R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A3R8CA01# |  |
|        |               |         | 3.9pF | ±0.05pF | GRM1555C2A3R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A3R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A3R9CA01# |  |
|        |               |         | 4.0pF | ±0.05pF | GRM1555C2A4R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A4R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A4R0CA01# |  |
|        |               |         | 4.1pF | ±0.05pF | GRM1555C2A4R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A4R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A4R1CA01# |  |
|        |               |         | 4.2pF | ±0.05pF | GRM1555C2A4R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A4R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A4R2CA01# |  |
|        |               |         | 4.3pF | ±0.05pF | GRM1555C2A4R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A4R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A4R3CA01# |  |
|        |               |         | 4.4pF | ±0.05pF | GRM1555C2A4R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A4R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A4R4CA01# |  |
|        |               |         | 4.5pF | ±0.05pF | GRM1555C2A4R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A4R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A4R5CA01# |  |
|        |               |         | 4.6pF | ±0.05pF | GRM1555C2A4R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A4R6BA01# |  |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.55mm | 100Vdc        | COG     | 4.6pF | ±0.25pF | GRM1555C2A4R6CA01# |  |
|        |               |         |       | ±0.05pF | GRM1555C2A4R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A4R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A4R7CA01# |  |
|        |               |         | 4.8pF | ±0.05pF | GRM1555C2A4R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A4R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A4R8CA01# |  |
|        |               |         | 4.9pF | ±0.05pF | GRM1555C2A4R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A4R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A4R9CA01# |  |
|        |               |         | 5.0pF | ±0.05pF | GRM1555C2A5R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A5R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A5R0CA01# |  |
|        |               |         | 5.1pF | ±0.05pF | GRM1555C2A5R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A5R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A5R1CA01# |  |
|        |               |         | 5.2pF | ±0.05pF | GRM1555C2A5R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A5R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A5R2CA01# |  |
|        |               |         | 5.3pF | ±0.05pF | GRM1555C2A5R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A5R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A5R3CA01# |  |
|        |               |         | 5.4pF | ±0.05pF | GRM1555C2A5R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A5R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A5R4CA01# |  |
|        |               |         | 5.5pF | ±0.05pF | GRM1555C2A5R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A5R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A5R5CA01# |  |
|        |               |         | 5.6pF | ±0.05pF | GRM1555C2A5R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A5R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A5R6CA01# |  |
|        |               |         | 5.7pF | ±0.05pF | GRM1555C2A5R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A5R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A5R7CA01# |  |
|        |               |         | 5.8pF | ±0.05pF | GRM1555C2A5R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A5R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A5R8CA01# |  |
|        |               |         | 5.9pF | ±0.05pF | GRM1555C2A5R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A5R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A5R9CA01# |  |
|        |               |         | 6.0pF | ±0.05pF | GRM1555C2A6R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A6R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A6R0CA01# |  |
|        |               |         | 6.1pF | ±0.05pF | GRM1555C2A6R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A6R1BA01# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 1.0×0.5mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |
|--------|---------------|---------|-------|---------|--------------------|
| 0.55mm | 100Vdc        | COG     | 6.1pF | ±0.1pF  | GRM1555C2A6R1BA01# |
|        |               |         |       | ±0.25pF | GRM1555C2A6R1CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C2A6R1DA01# |
|        |               |         | 6.2pF | ±0.05pF | GRM1555C2A6R2WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C2A6R2BA01# |
|        |               |         |       | ±0.25pF | GRM1555C2A6R2CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C2A6R2DA01# |
|        |               |         | 6.3pF | ±0.05pF | GRM1555C2A6R3WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C2A6R3BA01# |
|        |               |         |       | ±0.25pF | GRM1555C2A6R3CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C2A6R3DA01# |
|        |               |         | 6.4pF | ±0.05pF | GRM1555C2A6R4WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C2A6R4BA01# |
|        |               |         |       | ±0.25pF | GRM1555C2A6R4CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C2A6R4DA01# |
|        |               |         | 6.5pF | ±0.05pF | GRM1555C2A6R5WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C2A6R5BA01# |
|        |               |         |       | ±0.25pF | GRM1555C2A6R5CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C2A6R5DA01# |
|        |               |         | 6.6pF | ±0.05pF | GRM1555C2A6R6WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C2A6R6BA01# |
|        |               |         |       | ±0.25pF | GRM1555C2A6R6CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C2A6R6DA01# |
|        |               |         | 6.7pF | ±0.05pF | GRM1555C2A6R7WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C2A6R7BA01# |
|        |               |         |       | ±0.25pF | GRM1555C2A6R7CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C2A6R7DA01# |
|        |               |         | 6.8pF | ±0.05pF | GRM1555C2A6R8WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C2A6R8BA01# |
|        |               |         |       | ±0.25pF | GRM1555C2A6R8CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C2A6R8DA01# |
|        |               |         | 6.9pF | ±0.05pF | GRM1555C2A6R9WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C2A6R9BA01# |
|        |               |         |       | ±0.25pF | GRM1555C2A6R9CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C2A6R9DA01# |
|        |               |         | 7.0pF | ±0.05pF | GRM1555C2A7R0WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C2A7R0BA01# |
|        |               |         |       | ±0.25pF | GRM1555C2A7R0CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C2A7R0DA01# |
|        |               |         | 7.1pF | ±0.05pF | GRM1555C2A7R1WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C2A7R1BA01# |
|        |               |         |       | ±0.25pF | GRM1555C2A7R1CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C2A7R1DA01# |
|        |               |         | 7.2pF | ±0.05pF | GRM1555C2A7R2WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C2A7R2BA01# |
|        |               |         |       | ±0.25pF | GRM1555C2A7R2CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C2A7R2DA01# |
|        |               |         | 7.3pF | ±0.05pF | GRM1555C2A7R3WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C2A7R3BA01# |
|        |               |         |       | ±0.25pF | GRM1555C2A7R3CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C2A7R3DA01# |
|        |               |         | 7.4pF | ±0.05pF | GRM1555C2A7R4WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C2A7R4BA01# |
|        |               |         |       | ±0.25pF | GRM1555C2A7R4CA01# |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |
|--------|---------------|---------|-------|---------|--------------------|
| 0.55mm | 100Vdc        | COG     | 7.4pF | ±0.5pF  | GRM1555C2A7R4DA01# |
|        |               |         |       | ±0.05pF | GRM1555C2A7R5WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C2A7R5BA01# |
|        |               |         | 7.5pF | ±0.25pF | GRM1555C2A7R5CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C2A7R5DA01# |
|        |               |         | 7.6pF | ±0.05pF | GRM1555C2A7R6WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C2A7R6BA01# |
|        |               |         |       | ±0.25pF | GRM1555C2A7R6CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C2A7R6DA01# |
|        |               |         | 7.7pF | ±0.05pF | GRM1555C2A7R7WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C2A7R7BA01# |
|        |               |         |       | ±0.25pF | GRM1555C2A7R7CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C2A7R7DA01# |
|        |               |         | 7.8pF | ±0.05pF | GRM1555C2A7R8WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C2A7R8BA01# |
|        |               |         |       | ±0.25pF | GRM1555C2A7R8CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C2A7R8DA01# |
|        |               |         | 7.9pF | ±0.05pF | GRM1555C2A7R9WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C2A7R9BA01# |
|        |               |         |       | ±0.25pF | GRM1555C2A7R9CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C2A7R9DA01# |
|        |               |         | 8.0pF | ±0.05pF | GRM1555C2A8R0WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C2A8R0BA01# |
|        |               |         |       | ±0.25pF | GRM1555C2A8R0CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C2A8R0DA01# |
|        |               |         | 8.1pF | ±0.05pF | GRM1555C2A8R1WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C2A8R1BA01# |
|        |               |         |       | ±0.25pF | GRM1555C2A8R1CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C2A8R1DA01# |
|        |               |         | 8.2pF | ±0.05pF | GRM1555C2A8R2WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C2A8R2BA01# |
|        |               |         |       | ±0.25pF | GRM1555C2A8R2CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C2A8R2DA01# |
|        |               |         | 8.3pF | ±0.05pF | GRM1555C2A8R3WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C2A8R3BA01# |
|        |               |         |       | ±0.25pF | GRM1555C2A8R3CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C2A8R3DA01# |
|        |               |         | 8.4pF | ±0.05pF | GRM1555C2A8R4WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C2A8R4BA01# |
|        |               |         |       | ±0.25pF | GRM1555C2A8R4CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C2A8R4DA01# |
|        |               |         | 8.5pF | ±0.05pF | GRM1555C2A8R5WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C2A8R5BA01# |
|        |               |         |       | ±0.25pF | GRM1555C2A8R5CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C2A8R5DA01# |
|        |               |         | 8.6pF | ±0.05pF | GRM1555C2A8R6WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C2A8R6BA01# |
|        |               |         |       | ±0.25pF | GRM1555C2A8R6CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C2A8R6DA01# |
|        |               |         | 8.7pF | ±0.05pF | GRM1555C2A8R7WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C2A8R7BA01# |
|        |               |         |       | ±0.25pF | GRM1555C2A8R7CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C2A8R7DA01# |
|        |               |         | 8.8pF | ±0.05pF | GRM1555C2A8R8WA01# |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 1.0×0.5mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.55mm | 100Vdc        | C0G     | 8.8pF | ±0.1pF  | GRM1555C2A8R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A8R8CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1555C2A8R8DA01# |  |
|        |               |         | 8.9pF | ±0.05pF | GRM1555C2A8R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A8R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A8R9CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1555C2A8R9DA01# |  |
|        |               |         | 9.0pF | ±0.05pF | GRM1555C2A9R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A9R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A9R0CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1555C2A9R0DA01# |  |
|        |               |         | 9.1pF | ±0.05pF | GRM1555C2A9R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A9R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A9R1CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1555C2A9R1DA01# |  |
|        |               |         | 9.2pF | ±0.05pF | GRM1555C2A9R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A9R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A9R2CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1555C2A9R2DA01# |  |
|        |               |         | 9.3pF | ±0.05pF | GRM1555C2A9R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A9R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A9R3CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1555C2A9R3DA01# |  |
|        |               |         | 9.4pF | ±0.05pF | GRM1555C2A9R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A9R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A9R4CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1555C2A9R4DA01# |  |
|        |               |         | 9.5pF | ±0.05pF | GRM1555C2A9R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A9R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A9R5CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1555C2A9R5DA01# |  |
|        |               |         | 9.6pF | ±0.05pF | GRM1555C2A9R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A9R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A9R6CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1555C2A9R6DA01# |  |
|        |               |         | 9.7pF | ±0.05pF | GRM1555C2A9R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A9R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A9R7CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1555C2A9R7DA01# |  |
|        |               |         | 9.8pF | ±0.05pF | GRM1555C2A9R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A9R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A9R8CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1555C2A9R8DA01# |  |
|        |               |         | 9.9pF | ±0.05pF | GRM1555C2A9R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C2A9R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C2A9R9CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1555C2A9R9DA01# |  |
|        |               |         | 10pF  | ±2%     | GRM1555C2A100GA01# |  |
|        |               |         |       | ±5%     | GRM1555C2A100JA01# |  |
|        |               |         | 12pF  | ±2%     | GRM1555C2A120GA01# |  |
|        |               |         |       | ±5%     | GRM1555C2A120JA01# |  |
|        |               |         | 15pF  | ±2%     | GRM1555C2A150GA01# |  |
|        |               |         |       | ±5%     | GRM1555C2A150JA01# |  |
|        |               |         | 18pF  | ±2%     | GRM1555C2A180GA01# |  |

| T max. | Rated Voltage | TC Code | Cap.   | Tol.    | Part Number        |  |
|--------|---------------|---------|--------|---------|--------------------|--|
| 0.55mm | 100Vdc        | C0G     | 18pF   | ±5%     | GRM1555C2A180JA01# |  |
|        |               |         |        | ±2%     | GRM1555C2A220GA01# |  |
|        |               |         | 22pF   | ±2%     | GRM1555C2A220JA01# |  |
|        |               |         |        | ±5%     | GRM1555C2A220JA01# |  |
|        |               |         | 27pF   | ±2%     | GRM1555C2A270GA01# |  |
|        |               |         |        | ±5%     | GRM1555C2A270JA01# |  |
|        |               |         | 33pF   | ±2%     | GRM1555C2A330GA01# |  |
|        |               |         |        | ±5%     | GRM1555C2A330JA01# |  |
|        |               |         | 39pF   | ±2%     | GRM1555C2A390GA01# |  |
|        |               |         |        | ±5%     | GRM1555C2A390JA01# |  |
|        |               |         | 47pF   | ±2%     | GRM1555C2A470GA01# |  |
|        |               |         |        | ±5%     | GRM1555C2A470JA01# |  |
|        |               |         | 56pF   | ±2%     | GRM1555C2A560GA01# |  |
|        |               |         |        | ±5%     | GRM1555C2A560JA01# |  |
|        |               |         | 68pF   | ±2%     | GRM1555C2A680GA01# |  |
|        |               |         |        | ±5%     | GRM1555C2A680JA01# |  |
|        |               |         | 82pF   | ±2%     | GRM1555C2A820GA01# |  |
|        |               |         |        | ±5%     | GRM1555C2A820JA01# |  |
|        |               |         | 100pF  | ±2%     | GRM1555C2A101GA01# |  |
|        |               |         |        | ±5%     | GRM1555C2A101JA01# |  |
|        |               | CK      | 0.10pF | ±0.05pF | GRM1554C2AR10WA01# |  |
|        |               |         |        | ±0.05pF | GRM1554C2AR20WA01# |  |
|        |               |         | 0.20pF | ±0.05pF | GRM1554C2AR20BA01# |  |
|        |               |         |        | ±0.1pF  | GRM1554C2AR20BA01# |  |
|        |               |         | 0.30pF | ±0.05pF | GRM1554C2AR30WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1554C2AR30BA01# |  |
|        |               |         | 0.40pF | ±0.05pF | GRM1554C2AR40WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1554C2AR40BA01# |  |
|        |               |         | 0.50pF | ±0.05pF | GRM1554C2AR50WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1554C2AR50BA01# |  |
|        |               |         | 0.60pF | ±0.05pF | GRM1554C2AR60WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1554C2AR60BA01# |  |
|        |               |         | 0.70pF | ±0.05pF | GRM1554C2AR70WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1554C2AR70BA01# |  |
|        |               |         | 0.80pF | ±0.05pF | GRM1554C2AR80WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1554C2AR80BA01# |  |
|        |               |         | 0.90pF | ±0.05pF | GRM1554C2AR90WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1554C2AR90BA01# |  |
|        |               |         | 1.0pF  | ±0.05pF | GRM1554C2A1R0WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1554C2A1R0BA01# |  |
|        |               |         |        | ±0.25pF | GRM1554C2A1R0CA01# |  |
|        |               |         | 1.1pF  | ±0.05pF | GRM1554C2A1R1WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1554C2A1R1BA01# |  |
|        |               |         |        | ±0.25pF | GRM1554C2A1R1CA01# |  |
|        |               |         | 1.2pF  | ±0.05pF | GRM1554C2A1R2WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1554C2A1R2BA01# |  |
|        |               |         |        | ±0.25pF | GRM1554C2A1R2CA01# |  |
|        |               |         | 1.3pF  | ±0.05pF | GRM1554C2A1R3WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1554C2A1R3BA01# |  |
|        |               |         |        | ±0.25pF | GRM1554C2A1R3CA01# |  |
|        |               |         | 1.4pF  | ±0.05pF | GRM1554C2A1R4WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1554C2A1R4BA01# |  |
|        |               |         |        | ±0.25pF | GRM1554C2A1R4CA01# |  |
|        |               |         | 1.5pF  | ±0.05pF | GRM1554C2A1R5WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1554C2A1R5BA01# |  |
|        |               |         |        | ±0.25pF | GRM1554C2A1R5CA01# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 1.0×0.5mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.55mm | 100Vdc        | CK      | 1.6pF | ±0.05pF | GRM1554C2A1R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1554C2A1R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1554C2A1R6CA01# |  |
|        |               |         | 1.7pF | ±0.05pF | GRM1554C2A1R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1554C2A1R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1554C2A1R7CA01# |  |
|        |               |         | 1.8pF | ±0.05pF | GRM1554C2A1R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1554C2A1R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1554C2A1R8CA01# |  |
|        |               |         | 1.9pF | ±0.05pF | GRM1554C2A1R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1554C2A1R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1554C2A1R9CA01# |  |
|        |               |         | 2.0pF | ±0.05pF | GRM1554C2A2R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1554C2A2R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1554C2A2R0CA01# |  |
|        |               | CJ      | 2.1pF | ±0.05pF | GRM1553C2A2R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C2A2R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C2A2R1CA01# |  |
|        |               |         | 2.2pF | ±0.05pF | GRM1553C2A2R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C2A2R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C2A2R2CA01# |  |
|        |               |         | 2.3pF | ±0.05pF | GRM1553C2A2R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C2A2R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C2A2R3CA01# |  |
|        |               |         | 2.4pF | ±0.05pF | GRM1553C2A2R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C2A2R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C2A2R4CA01# |  |
|        |               |         | 2.5pF | ±0.05pF | GRM1553C2A2R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C2A2R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C2A2R5CA01# |  |
|        |               |         | 2.6pF | ±0.05pF | GRM1553C2A2R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C2A2R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C2A2R6CA01# |  |
|        |               |         | 2.7pF | ±0.05pF | GRM1553C2A2R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C2A2R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C2A2R7CA01# |  |
|        |               |         | 2.8pF | ±0.05pF | GRM1553C2A2R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C2A2R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C2A2R8CA01# |  |
|        |               |         | 2.9pF | ±0.05pF | GRM1553C2A2R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C2A2R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C2A2R9CA01# |  |
|        |               |         | 3.0pF | ±0.05pF | GRM1553C2A3R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C2A3R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C2A3R0CA01# |  |
|        |               |         | 3.1pF | ±0.05pF | GRM1553C2A3R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C2A3R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C2A3R1CA01# |  |
|        |               |         | 3.2pF | ±0.05pF | GRM1553C2A3R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C2A3R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C2A3R2CA01# |  |
|        |               |         | 3.3pF | ±0.05pF | GRM1553C2A3R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C2A3R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C2A3R3CA01# |  |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.55mm | 100Vdc        | CJ      | 3.4pF | ±0.05pF | GRM1553C2A3R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C2A3R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C2A3R4CA01# |  |
|        |               |         | 3.5pF | ±0.05pF | GRM1553C2A3R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C2A3R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C2A3R5CA01# |  |
|        |               |         | 3.6pF | ±0.05pF | GRM1553C2A3R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C2A3R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C2A3R6CA01# |  |
|        |               |         | 3.7pF | ±0.05pF | GRM1553C2A3R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C2A3R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C2A3R7CA01# |  |
|        |               |         | 3.8pF | ±0.05pF | GRM1553C2A3R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C2A3R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C2A3R8CA01# |  |
|        |               |         | 3.9pF | ±0.05pF | GRM1553C2A3R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C2A3R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C2A3R9CA01# |  |
|        |               | CH      | 4.0pF | ±0.05pF | GRM1552C2A4R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C2A4R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C2A4R0CA01# |  |
|        |               |         | 4.1pF | ±0.05pF | GRM1552C2A4R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C2A4R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C2A4R1CA01# |  |
|        |               |         | 4.2pF | ±0.05pF | GRM1552C2A4R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C2A4R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C2A4R2CA01# |  |
|        |               |         | 4.3pF | ±0.05pF | GRM1552C2A4R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C2A4R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C2A4R3CA01# |  |
|        |               |         | 4.4pF | ±0.05pF | GRM1552C2A4R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C2A4R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C2A4R4CA01# |  |
|        |               |         | 4.5pF | ±0.05pF | GRM1552C2A4R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C2A4R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C2A4R5CA01# |  |
|        |               |         | 4.6pF | ±0.05pF | GRM1552C2A4R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C2A4R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C2A4R6CA01# |  |
|        |               |         | 4.7pF | ±0.05pF | GRM1552C2A4R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C2A4R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C2A4R7CA01# |  |
|        |               |         | 4.8pF | ±0.05pF | GRM1552C2A4R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C2A4R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C2A4R8CA01# |  |
|        |               |         | 4.9pF | ±0.05pF | GRM1552C2A4R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C2A4R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C2A4R9CA01# |  |
|        |               |         | 5.0pF | ±0.05pF | GRM1552C2A5R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C2A5R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C2A5R0CA01# |  |
|        |               |         | 5.1pF | ±0.05pF | GRM1552C2A5R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C2A5R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C2A5R1CA01# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 1.0×0.5mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  | T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|--------|---------------|---------|-------|---------|--------------------|--|
| 0.55mm | 100Vdc        | CH      | 5.1pF | ±0.5pF  | GRM1552C2A5R1DA01# |  | 0.55mm | 100Vdc        | CH      | 6.5pF | ±0.1pF  | GRM1552C2A6R5BA01# |  |
|        |               |         |       | ±0.05pF | GRM1552C2A5R2WA01# |  |        |               |         |       | ±0.25pF | GRM1552C2A6R5CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C2A5R2BA01# |  |        |               |         |       | ±0.5pF  | GRM1552C2A6R5DA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C2A5R2CA01# |  |        |               |         | 6.6pF | ±0.05pF | GRM1552C2A6R6WA01# |  |
|        |               |         | 5.2pF | ±0.5pF  | GRM1552C2A5R2DA01# |  |        |               |         |       | ±0.1pF  | GRM1552C2A6R6BA01# |  |
|        |               |         |       | ±0.05pF | GRM1552C2A5R3WA01# |  |        |               |         |       | ±0.25pF | GRM1552C2A6R6CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C2A5R3BA01# |  |        |               |         |       | ±0.5pF  | GRM1552C2A6R6DA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C2A5R3CA01# |  |        |               |         | 6.7pF | ±0.05pF | GRM1552C2A6R7WA01# |  |
|        |               |         | 5.3pF | ±0.5pF  | GRM1552C2A5R3DA01# |  |        |               |         |       | ±0.1pF  | GRM1552C2A6R7BA01# |  |
|        |               |         |       | ±0.05pF | GRM1552C2A5R4WA01# |  |        |               |         |       | ±0.25pF | GRM1552C2A6R7CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C2A5R4BA01# |  |        |               |         |       | ±0.5pF  | GRM1552C2A6R7DA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C2A5R4CA01# |  |        |               |         | 6.8pF | ±0.05pF | GRM1552C2A6R8WA01# |  |
|        |               |         | 5.4pF | ±0.5pF  | GRM1552C2A5R4DA01# |  |        |               |         |       | ±0.1pF  | GRM1552C2A6R8BA01# |  |
|        |               |         |       | ±0.05pF | GRM1552C2A5R5WA01# |  |        |               |         |       | ±0.25pF | GRM1552C2A6R8CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C2A5R5BA01# |  |        |               |         |       | ±0.5pF  | GRM1552C2A6R8DA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C2A5R5CA01# |  |        |               |         | 6.9pF | ±0.05pF | GRM1552C2A6R9WA01# |  |
|        |               |         | 5.5pF | ±0.5pF  | GRM1552C2A5R5DA01# |  |        |               |         |       | ±0.1pF  | GRM1552C2A6R9BA01# |  |
|        |               |         |       | ±0.05pF | GRM1552C2A5R6WA01# |  |        |               |         |       | ±0.25pF | GRM1552C2A6R9CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C2A5R6BA01# |  |        |               |         |       | ±0.5pF  | GRM1552C2A6R9DA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C2A5R6CA01# |  |        |               |         | 7.0pF | ±0.05pF | GRM1552C2A7R0WA01# |  |
|        |               |         | 5.6pF | ±0.5pF  | GRM1552C2A5R6DA01# |  |        |               |         |       | ±0.1pF  | GRM1552C2A7R0BA01# |  |
|        |               |         |       | ±0.05pF | GRM1552C2A5R7WA01# |  |        |               |         |       | ±0.25pF | GRM1552C2A7R0CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C2A5R7BA01# |  |        |               |         |       | ±0.5pF  | GRM1552C2A7R0DA01# |  |
|        |               |         | 5.7pF | ±0.25pF | GRM1552C2A5R7CA01# |  |        |               |         | 7.1pF | ±0.05pF | GRM1552C2A7R1WA01# |  |
|        |               |         |       | ±0.5pF  | GRM1552C2A5R7DA01# |  |        |               |         |       | ±0.1pF  | GRM1552C2A7R1BA01# |  |
|        |               |         |       | ±0.05pF | GRM1552C2A5R8WA01# |  |        |               |         |       | ±0.25pF | GRM1552C2A7R1CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C2A5R8BA01# |  |        |               |         |       | ±0.5pF  | GRM1552C2A7R1DA01# |  |
|        |               |         | 5.8pF | ±0.25pF | GRM1552C2A5R8CA01# |  |        |               |         | 7.2pF | ±0.05pF | GRM1552C2A7R2WA01# |  |
|        |               |         |       | ±0.5pF  | GRM1552C2A5R8DA01# |  |        |               |         |       | ±0.1pF  | GRM1552C2A7R2BA01# |  |
|        |               |         | 5.9pF | ±0.05pF | GRM1552C2A5R9WA01# |  |        |               |         |       | ±0.25pF | GRM1552C2A7R2CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C2A5R9BA01# |  |        |               |         |       | ±0.5pF  | GRM1552C2A7R2DA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C2A5R9CA01# |  |        |               |         | 7.3pF | ±0.05pF | GRM1552C2A7R3WA01# |  |
|        |               |         |       | ±0.5pF  | GRM1552C2A5R9DA01# |  |        |               |         |       | ±0.1pF  | GRM1552C2A7R3BA01# |  |
|        |               |         | 6.0pF | ±0.05pF | GRM1552C2A6R0WA01# |  |        |               |         |       | ±0.25pF | GRM1552C2A7R3CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C2A6R0BA01# |  |        |               |         |       | ±0.5pF  | GRM1552C2A7R3DA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C2A6R0CA01# |  |        |               |         | 7.4pF | ±0.05pF | GRM1552C2A7R4WA01# |  |
|        |               |         |       | ±0.5pF  | GRM1552C2A6R0DA01# |  |        |               |         |       | ±0.1pF  | GRM1552C2A7R4BA01# |  |
|        |               |         | 6.1pF | ±0.05pF | GRM1552C2A6R1WA01# |  |        |               |         |       | ±0.25pF | GRM1552C2A7R4CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C2A6R1BA01# |  |        |               |         |       | ±0.5pF  | GRM1552C2A7R4DA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C2A6R1CA01# |  |        |               |         | 7.5pF | ±0.05pF | GRM1552C2A7R5WA01# |  |
|        |               |         |       | ±0.5pF  | GRM1552C2A6R1DA01# |  |        |               |         |       | ±0.1pF  | GRM1552C2A7R5BA01# |  |
|        |               |         | 6.2pF | ±0.05pF | GRM1552C2A6R2WA01# |  |        |               |         |       | ±0.25pF | GRM1552C2A7R5CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C2A6R2BA01# |  |        |               |         |       | ±0.5pF  | GRM1552C2A7R5DA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C2A6R2CA01# |  |        |               |         | 7.6pF | ±0.05pF | GRM1552C2A7R6WA01# |  |
|        |               |         |       | ±0.5pF  | GRM1552C2A6R2DA01# |  |        |               |         |       | ±0.1pF  | GRM1552C2A7R6BA01# |  |
|        |               |         | 6.3pF | ±0.05pF | GRM1552C2A6R3WA01# |  |        |               |         |       | ±0.25pF | GRM1552C2A7R6CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C2A6R3BA01# |  |        |               |         |       | ±0.5pF  | GRM1552C2A7R6DA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C2A6R3CA01# |  |        |               |         | 7.7pF | ±0.05pF | GRM1552C2A7R7WA01# |  |
|        |               |         |       | ±0.5pF  | GRM1552C2A6R3DA01# |  |        |               |         |       | ±0.1pF  | GRM1552C2A7R7BA01# |  |
|        |               |         | 6.4pF | ±0.05pF | GRM1552C2A6R4WA01# |  |        |               |         |       | ±0.25pF | GRM1552C2A7R7CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C2A6R4BA01# |  |        |               |         |       | ±0.5pF  | GRM1552C2A7R7DA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C2A6R4CA01# |  |        |               |         | 7.8pF | ±0.05pF | GRM1552C2A7R8WA01# |  |
|        |               |         |       | ±0.5pF  | GRM1552C2A6R4DA01# |  |        |               |         |       | ±0.1pF  | GRM1552C2A7R8BA01# |  |
|        |               |         | 6.5pF | ±0.05pF | GRM1552C2A6R5WA01# |  |        |               |         |       | ±0.25pF | GRM1552C2A7R8CA01# |  |
|        |               |         |       |         |                    |  |        |               |         |       |         |                    |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 1.0×0.5mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |
|--------|---------------|---------|-------|---------|--------------------|
| 0.55mm | 100Vdc        | CH      | 7.8pF | ±0.5pF  | GRM1552C2A7R8DA01# |
|        |               |         |       | ±0.05pF | GRM1552C2A7R9WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C2A7R9BA01# |
|        |               |         |       | ±0.25pF | GRM1552C2A7R9CA01# |
|        |               |         | 7.9pF | ±0.5pF  | GRM1552C2A7R9DA01# |
|        |               |         |       | ±0.05pF | GRM1552C2A8R0WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C2A8R0BA01# |
|        |               |         |       | ±0.25pF | GRM1552C2A8R0CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C2A8R0DA01# |
|        |               |         | 8.0pF | ±0.05pF | GRM1552C2A8R1WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C2A8R1BA01# |
|        |               |         |       | ±0.25pF | GRM1552C2A8R1CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C2A8R1DA01# |
|        |               |         | 8.1pF | ±0.05pF | GRM1552C2A8R2WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C2A8R2BA01# |
|        |               |         |       | ±0.25pF | GRM1552C2A8R2CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C2A8R2DA01# |
|        |               |         | 8.2pF | ±0.05pF | GRM1552C2A8R3WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C2A8R3BA01# |
|        |               |         |       | ±0.25pF | GRM1552C2A8R3CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C2A8R3DA01# |
|        |               |         | 8.3pF | ±0.05pF | GRM1552C2A8R4WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C2A8R4BA01# |
|        |               |         |       | ±0.25pF | GRM1552C2A8R4CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C2A8R4DA01# |
|        |               |         | 8.4pF | ±0.05pF | GRM1552C2A8R5WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C2A8R5BA01# |
|        |               |         |       | ±0.25pF | GRM1552C2A8R5CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C2A8R5DA01# |
|        |               |         | 8.5pF | ±0.05pF | GRM1552C2A8R6WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C2A8R6BA01# |
|        |               |         |       | ±0.25pF | GRM1552C2A8R6CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C2A8R6DA01# |
|        |               |         | 8.6pF | ±0.05pF | GRM1552C2A8R7WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C2A8R7BA01# |
|        |               |         |       | ±0.25pF | GRM1552C2A8R7CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C2A8R7DA01# |
|        |               |         | 8.7pF | ±0.05pF | GRM1552C2A8R8WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C2A8R8BA01# |
|        |               |         |       | ±0.25pF | GRM1552C2A8R8CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C2A8R8DA01# |
|        |               |         | 8.8pF | ±0.05pF | GRM1552C2A8R9WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C2A8R9BA01# |
|        |               |         |       | ±0.25pF | GRM1552C2A8R9CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C2A8R9DA01# |
|        |               |         | 8.9pF | ±0.05pF | GRM1552C2A9R0WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C2A9R0BA01# |
|        |               |         |       | ±0.25pF | GRM1552C2A9R0CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C2A9R0DA01# |
|        |               |         | 9.0pF | ±0.05pF | GRM1552C2A9R1WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C2A9R1BA01# |
|        |               |         |       | ±0.25pF | GRM1552C2A9R1CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C2A9R1DA01# |
|        |               |         | 9.1pF | ±0.05pF | GRM1552C2A9R2WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C2A9R2BA01# |
|        |               |         |       | ±0.25pF | GRM1552C2A9R2CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C2A9R2DA01# |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |
|--------|---------------|---------|-------|---------|--------------------|
| 0.55mm | 100Vdc        | CH      | 9.2pF | ±0.1pF  | GRM1552C2A9R2BA01# |
|        |               |         |       | ±0.25pF | GRM1552C2A9R2CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C2A9R2DA01# |
|        |               |         | 9.3pF | ±0.05pF | GRM1552C2A9R3WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C2A9R3BA01# |
|        |               |         |       | ±0.25pF | GRM1552C2A9R3CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C2A9R3DA01# |
|        |               |         | 9.4pF | ±0.05pF | GRM1552C2A9R4WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C2A9R4BA01# |
|        |               |         |       | ±0.25pF | GRM1552C2A9R4CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C2A9R4DA01# |
|        |               |         | 9.5pF | ±0.05pF | GRM1552C2A9R5WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C2A9R5BA01# |
|        |               |         |       | ±0.25pF | GRM1552C2A9R5CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C2A9R5DA01# |
|        |               |         | 9.6pF | ±0.05pF | GRM1552C2A9R6WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C2A9R6BA01# |
|        |               |         |       | ±0.25pF | GRM1552C2A9R6CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C2A9R6DA01# |
|        |               |         | 9.7pF | ±0.05pF | GRM1552C2A9R7WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C2A9R7BA01# |
|        |               |         |       | ±0.25pF | GRM1552C2A9R7CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C2A9R7DA01# |
|        |               |         | 9.8pF | ±0.05pF | GRM1552C2A9R8WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C2A9R8BA01# |
|        |               |         |       | ±0.25pF | GRM1552C2A9R8CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C2A9R8DA01# |
|        |               |         | 9.9pF | ±0.05pF | GRM1552C2A9R9WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C2A9R9BA01# |
|        |               |         |       | ±0.25pF | GRM1552C2A9R9CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C2A9R9DA01# |
|        |               |         | 10pF  | ±2%     | GRM1552C2A100GA01# |
|        |               |         |       | ±5%     | GRM1552C2A100JA01# |
|        |               |         | 12pF  | ±2%     | GRM1552C2A120GA01# |
|        |               |         |       | ±5%     | GRM1552C2A120JA01# |
|        |               |         | 15pF  | ±2%     | GRM1552C2A150GA01# |
|        |               |         |       | ±5%     | GRM1552C2A150JA01# |
|        |               |         | 18pF  | ±2%     | GRM1552C2A180GA01# |
|        |               |         |       | ±5%     | GRM1552C2A180JA01# |
|        |               |         | 22pF  | ±2%     | GRM1552C2A220GA01# |
|        |               |         |       | ±5%     | GRM1552C2A220JA01# |
|        |               |         | 27pF  | ±2%     | GRM1552C2A270GA01# |
|        |               |         |       | ±5%     | GRM1552C2A270JA01# |
|        |               |         | 33pF  | ±2%     | GRM1552C2A330GA01# |
|        |               |         |       | ±5%     | GRM1552C2A330JA01# |
|        |               |         | 39pF  | ±2%     | GRM1552C2A390GA01# |
|        |               |         |       | ±5%     | GRM1552C2A390JA01# |
|        |               |         | 47pF  | ±2%     | GRM1552C2A470GA01# |
|        |               |         |       | ±5%     | GRM1552C2A470JA01# |
|        |               |         | 56pF  | ±2%     | GRM1552C2A560GA01# |
|        |               |         |       | ±5%     | GRM1552C2A560JA01# |
|        |               |         | 68pF  | ±2%     | GRM1552C2A680GA01# |
|        |               |         |       | ±5%     | GRM1552C2A680JA01# |
|        |               |         | 82pF  | ±2%     | GRM1552C2A820GA01# |
|        |               |         |       | ±5%     | GRM1552C2A820JA01# |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 1.0×0.5mm)

| T max. | Rated Voltage | TC Code | Cap.   | Tol.    | Part Number        |
|--------|---------------|---------|--------|---------|--------------------|
| 0.55mm | 100Vdc        | CH      | 82pF   | ±5%     | GRM1552C2A820JA01# |
|        |               |         | 100pF  | ±2%     | GRM1552C2A101GA01# |
|        |               |         |        | ±5%     | GRM1552C2A101JA01# |
|        | 50Vdc         | COG     | 0.10pF | ±0.05pF | GRM1555C1HR10WA01# |
|        |               |         |        | ±0.05pF | GRM1555C1HR20WA01# |
|        |               |         |        | ±0.1pF  | GRM1555C1HR20BA01# |
|        |               |         | 0.30pF | ±0.05pF | GRM1555C1HR30WA01# |
|        |               |         |        | ±0.1pF  | GRM1555C1HR30BA01# |
|        |               |         | 0.40pF | ±0.05pF | GRM1555C1HR40WA01# |
|        |               |         |        | ±0.1pF  | GRM1555C1HR40BA01# |
|        |               |         | 0.50pF | ±0.05pF | GRM1555C1HR50WA01# |
|        |               |         |        | ±0.1pF  | GRM1555C1HR50BA01# |
|        |               |         | 0.60pF | ±0.05pF | GRM1555C1HR60WA01# |
|        |               |         |        | ±0.1pF  | GRM1555C1HR60BA01# |
|        |               |         | 0.70pF | ±0.05pF | GRM1555C1HR70WA01# |
|        |               |         |        | ±0.1pF  | GRM1555C1HR70BA01# |
|        |               |         | 0.80pF | ±0.05pF | GRM1555C1HR80WA01# |
|        |               |         |        | ±0.1pF  | GRM1555C1HR80BA01# |
|        |               |         | 0.90pF | ±0.05pF | GRM1555C1HR90WA01# |
|        |               |         |        | ±0.1pF  | GRM1555C1HR90BA01# |
|        |               |         | 1.0pF  | ±0.05pF | GRM1555C1H1R0WA01# |
|        |               |         |        | ±0.1pF  | GRM1555C1H1R0BA01# |
|        |               |         |        | ±0.25pF | GRM1555C1H1R0CA01# |
|        |               |         | 1.1pF  | ±0.05pF | GRM1555C1H1R1WA01# |
|        |               |         |        | ±0.1pF  | GRM1555C1H1R1BA01# |
|        |               |         |        | ±0.25pF | GRM1555C1H1R1CA01# |
|        |               |         | 1.2pF  | ±0.05pF | GRM1555C1H1R2WA01# |
|        |               |         |        | ±0.1pF  | GRM1555C1H1R2BA01# |
|        |               |         |        | ±0.25pF | GRM1555C1H1R2CA01# |
|        |               |         | 1.3pF  | ±0.05pF | GRM1555C1H1R3WA01# |
|        |               |         |        | ±0.1pF  | GRM1555C1H1R3BA01# |
|        |               |         |        | ±0.25pF | GRM1555C1H1R3CA01# |
|        |               |         | 1.4pF  | ±0.05pF | GRM1555C1H1R4WA01# |
|        |               |         |        | ±0.1pF  | GRM1555C1H1R4BA01# |
|        |               |         |        | ±0.25pF | GRM1555C1H1R4CA01# |
|        |               |         | 1.5pF  | ±0.05pF | GRM1555C1H1R5WA01# |
|        |               |         |        | ±0.1pF  | GRM1555C1H1R5BA01# |
|        |               |         |        | ±0.25pF | GRM1555C1H1R5CA01# |
|        |               |         | 1.6pF  | ±0.05pF | GRM1555C1H1R6WA01# |
|        |               |         |        | ±0.1pF  | GRM1555C1H1R6BA01# |
|        |               |         |        | ±0.25pF | GRM1555C1H1R6CA01# |
|        |               |         | 1.7pF  | ±0.05pF | GRM1555C1H1R7WA01# |
|        |               |         |        | ±0.1pF  | GRM1555C1H1R7BA01# |
|        |               |         |        | ±0.25pF | GRM1555C1H1R7CA01# |
|        |               |         | 1.8pF  | ±0.05pF | GRM1555C1H1R8WA01# |
|        |               |         |        | ±0.1pF  | GRM1555C1H1R8BA01# |
|        |               |         |        | ±0.25pF | GRM1555C1H1R8CA01# |
|        |               |         | 1.9pF  | ±0.05pF | GRM1555C1H1R9WA01# |
|        |               |         |        | ±0.1pF  | GRM1555C1H1R9BA01# |
|        |               |         |        | ±0.25pF | GRM1555C1H1R9CA01# |
|        |               |         | 2.0pF  | ±0.05pF | GRM1555C1H2R0WA01# |
|        |               |         |        | ±0.1pF  | GRM1555C1H2R0BA01# |
|        |               |         |        | ±0.25pF | GRM1555C1H2R0CA01# |
|        |               |         | 2.1pF  | ±0.05pF | GRM1555C1H2R1WA01# |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |
|--------|---------------|---------|-------|---------|--------------------|
| 0.55mm | 50Vdc         | COG     | 2.1pF | ±0.1pF  | GRM1555C1H2R1BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H2R1CA01# |
|        |               |         | 2.2pF | ±0.05pF | GRM1555C1H2R2WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H2R2BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H2R2CA01# |
|        |               |         | 2.3pF | ±0.05pF | GRM1555C1H2R3WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H2R3BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H2R3CA01# |
|        |               |         | 2.4pF | ±0.05pF | GRM1555C1H2R4WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H2R4BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H2R4CA01# |
|        |               |         | 2.5pF | ±0.05pF | GRM1555C1H2R5WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H2R5BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H2R5CA01# |
|        |               |         | 2.6pF | ±0.05pF | GRM1555C1H2R6WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H2R6BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H2R6CA01# |
|        |               |         | 2.7pF | ±0.05pF | GRM1555C1H2R7WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H2R7BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H2R7CA01# |
|        |               |         | 2.8pF | ±0.05pF | GRM1555C1H2R8WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H2R8BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H2R8CA01# |
|        |               |         | 2.9pF | ±0.05pF | GRM1555C1H2R9WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H2R9BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H2R9CA01# |
|        |               |         | 3.0pF | ±0.05pF | GRM1555C1H3R0WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H3R0BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H3R0CA01# |
|        |               |         | 3.1pF | ±0.05pF | GRM1555C1H3R1WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H3R1BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H3R1CA01# |
|        |               |         | 3.2pF | ±0.05pF | GRM1555C1H3R2WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H3R2BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H3R2CA01# |
|        |               |         | 3.3pF | ±0.05pF | GRM1555C1H3R3WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H3R3BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H3R3CA01# |
|        |               |         | 3.4pF | ±0.05pF | GRM1555C1H3R4WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H3R4BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H3R4CA01# |
|        |               |         | 3.5pF | ±0.05pF | GRM1555C1H3R5WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H3R5BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H3R5CA01# |
|        |               |         | 3.6pF | ±0.05pF | GRM1555C1H3R6WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H3R6BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H3R6CA01# |
|        |               |         | 3.7pF | ±0.05pF | GRM1555C1H3R7WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H3R7BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H3R7CA01# |
|        |               |         | 3.8pF | ±0.05pF | GRM1555C1H3R8WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H3R8BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H3R8CA01# |
|        |               |         | 3.9pF | ±0.05pF | GRM1555C1H3R9WA01# |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 1.0×0.5mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |
|--------|---------------|---------|-------|---------|--------------------|
| 0.55mm | 50Vdc         | COG     | 3.9pF | ±0.1pF  | GRM1555C1H3R9BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H3R9CA01# |
|        |               |         | 4.0pF | ±0.05pF | GRM1555C1H4R0WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H4R0BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H4R0CA01# |
|        |               |         | 4.1pF | ±0.05pF | GRM1555C1H4R1WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H4R1BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H4R1CA01# |
|        |               |         | 4.2pF | ±0.05pF | GRM1555C1H4R2WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H4R2BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H4R2CA01# |
|        |               |         | 4.3pF | ±0.05pF | GRM1555C1H4R3WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H4R3BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H4R3CA01# |
|        |               |         | 4.4pF | ±0.05pF | GRM1555C1H4R4WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H4R4BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H4R4CA01# |
|        |               |         | 4.5pF | ±0.05pF | GRM1555C1H4R5WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H4R5BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H4R5CA01# |
|        |               |         | 4.6pF | ±0.05pF | GRM1555C1H4R6WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H4R6BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H4R6CA01# |
|        |               |         | 4.7pF | ±0.05pF | GRM1555C1H4R7WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H4R7BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H4R7CA01# |
|        |               |         | 4.8pF | ±0.05pF | GRM1555C1H4R8WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H4R8BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H4R8CA01# |
|        |               |         | 4.9pF | ±0.05pF | GRM1555C1H4R9WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H4R9BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H4R9CA01# |
|        |               |         | 5.0pF | ±0.05pF | GRM1555C1H5R0WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H5R0BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H5R0CA01# |
|        |               |         | 5.1pF | ±0.05pF | GRM1555C1H5R1WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H5R1BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H5R1CA01# |
|        |               |         | 5.2pF | ±0.05pF | GRM1555C1H5R2WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H5R2BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H5R2CA01# |
|        |               |         | 5.3pF | ±0.05pF | GRM1555C1H5R3WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H5R3BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H5R3CA01# |
|        |               |         | 5.4pF | ±0.05pF | GRM1555C1H5R4WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H5R4BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H5R4CA01# |
|        |               |         | 5.5pF | ±0.05pF | GRM1555C1H5R5WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H5R5BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H5R5CA01# |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |
|--------|---------------|---------|-------|---------|--------------------|
| 0.55mm | 50Vdc         | COG     | 5.5pF | ±0.5pF  | GRM1555C1H5R5DA01# |
|        |               |         |       | ±0.05pF | GRM1555C1H5R6WA01# |
|        |               |         | 5.6pF | ±0.1pF  | GRM1555C1H5R6BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H5R6CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C1H5R6DA01# |
|        |               |         | 5.7pF | ±0.05pF | GRM1555C1H5R7WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H5R7BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H5R7CA01# |
|        |               |         | 5.8pF | ±0.05pF | GRM1555C1H5R8WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H5R8BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H5R8CA01# |
|        |               |         | 5.9pF | ±0.05pF | GRM1555C1H5R9WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H5R9BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H5R9CA01# |
|        |               |         | 6.0pF | ±0.05pF | GRM1555C1H6R0WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H6R0BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H6R0CA01# |
|        |               |         | 6.1pF | ±0.05pF | GRM1555C1H6R1WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H6R1BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H6R1CA01# |
|        |               |         | 6.2pF | ±0.05pF | GRM1555C1H6R2WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H6R2BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H6R2CA01# |
|        |               |         | 6.3pF | ±0.05pF | GRM1555C1H6R3WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H6R3BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H6R3CA01# |
|        |               |         | 6.4pF | ±0.05pF | GRM1555C1H6R4WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H6R4BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H6R4CA01# |
|        |               |         | 6.5pF | ±0.05pF | GRM1555C1H6R5WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H6R5BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H6R5CA01# |
|        |               |         | 6.6pF | ±0.05pF | GRM1555C1H6R6WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H6R6BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H6R6CA01# |
|        |               |         | 6.7pF | ±0.05pF | GRM1555C1H6R7WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H6R7BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H6R7CA01# |
|        |               |         | 6.8pF | ±0.05pF | GRM1555C1H6R8WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H6R8BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H6R8CA01# |
|        |               |         | 6.9pF | ±0.05pF | GRM1555C1H6R9WA01# |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 1.0×0.5mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  | T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|--------|---------------|---------|-------|---------|--------------------|--|
| 0.55mm | 50Vdc         | COG     | 6.9pF | ±0.1pF  | GRM1555C1H6R9BA01# |  | 0.55mm | 50Vdc         | COG     | 8.2pF | ±0.5pF  | GRM1555C1H8R2DA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C1H6R9CA01# |  |        |               |         |       | ±0.05pF | GRM1555C1H8R3WA01# |  |
|        |               |         |       | ±0.5pF  | GRM1555C1H6R9DA01# |  |        |               |         |       | ±0.1pF  | GRM1555C1H8R3BA01# |  |
|        |               |         | 7.0pF | ±0.05pF | GRM1555C1H7R0WA01# |  |        |               |         | 8.3pF | ±0.25pF | GRM1555C1H8R3CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C1H7R0BA01# |  |        |               |         |       | ±0.5pF  | GRM1555C1H8R3DA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C1H7R0CA01# |  |        |               |         | 8.4pF | ±0.05pF | GRM1555C1H8R4WA01# |  |
|        |               |         | 7.1pF | ±0.05pF | GRM1555C1H7R1WA01# |  |        |               |         |       | ±0.1pF  | GRM1555C1H8R4BA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C1H7R1BA01# |  |        |               |         |       | ±0.25pF | GRM1555C1H8R4CA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C1H7R1CA01# |  |        |               |         | 8.5pF | ±0.5pF  | GRM1555C1H8R4DA01# |  |
|        |               |         | 7.2pF | ±0.05pF | GRM1555C1H7R2WA01# |  |        |               |         |       | ±0.05pF | GRM1555C1H8R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C1H7R2BA01# |  |        |               |         |       | ±0.1pF  | GRM1555C1H8R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C1H7R2CA01# |  |        |               |         |       | ±0.25pF | GRM1555C1H8R5CA01# |  |
|        |               |         | 7.3pF | ±0.5pF  | GRM1555C1H7R2DA01# |  |        |               |         | 8.6pF | ±0.5pF  | GRM1555C1H8R5DA01# |  |
|        |               |         |       | ±0.05pF | GRM1555C1H7R3WA01# |  |        |               |         |       | ±0.05pF | GRM1555C1H8R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C1H7R3BA01# |  |        |               |         |       | ±0.1pF  | GRM1555C1H8R6BA01# |  |
|        |               |         | 7.4pF | ±0.25pF | GRM1555C1H7R3CA01# |  |        |               |         |       | ±0.25pF | GRM1555C1H8R6CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1555C1H7R3DA01# |  |        |               |         | 8.7pF | ±0.5pF  | GRM1555C1H8R6DA01# |  |
|        |               |         |       | ±0.05pF | GRM1555C1H7R4WA01# |  |        |               |         |       | ±0.05pF | GRM1555C1H8R7WA01# |  |
|        |               |         | 7.5pF | ±0.1pF  | GRM1555C1H7R4BA01# |  |        |               |         |       | ±0.1pF  | GRM1555C1H8R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C1H7R4CA01# |  |        |               |         |       | ±0.25pF | GRM1555C1H8R7CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1555C1H7R4DA01# |  |        |               |         | 8.8pF | ±0.5pF  | GRM1555C1H8R7DA01# |  |
|        |               |         | 7.6pF | ±0.05pF | GRM1555C1H7R5WA01# |  |        |               |         |       | ±0.05pF | GRM1555C1H8R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C1H7R5BA01# |  |        |               |         |       | ±0.1pF  | GRM1555C1H8R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C1H7R5CA01# |  |        |               |         |       | ±0.25pF | GRM1555C1H8R8CA01# |  |
|        |               |         | 7.7pF | ±0.5pF  | GRM1555C1H7R5DA01# |  |        |               |         |       | ±0.5pF  | GRM1555C1H8R8DA01# |  |
|        |               |         |       | ±0.05pF | GRM1555C1H7R6WA01# |  |        |               |         | 8.9pF | ±0.05pF | GRM1555C1H8R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C1H7R6BA01# |  |        |               |         |       | ±0.1pF  | GRM1555C1H8R9BA01# |  |
|        |               |         | 7.8pF | ±0.25pF | GRM1555C1H7R6CA01# |  |        |               |         |       | ±0.25pF | GRM1555C1H8R9CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1555C1H7R6DA01# |  |        |               |         |       | ±0.5pF  | GRM1555C1H8R9DA01# |  |
|        |               |         | 7.9pF | ±0.05pF | GRM1555C1H7R7WA01# |  |        |               |         | 9.0pF | ±0.05pF | GRM1555C1H9R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C1H7R7BA01# |  |        |               |         |       | ±0.1pF  | GRM1555C1H9R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C1H7R7CA01# |  |        |               |         |       | ±0.25pF | GRM1555C1H9R0CA01# |  |
|        |               |         | 8.0pF | ±0.5pF  | GRM1555C1H7R7DA01# |  |        |               |         | 9.1pF | ±0.5pF  | GRM1555C1H9R0DA01# |  |
|        |               |         |       | ±0.05pF | GRM1555C1H7R8WA01# |  |        |               |         |       | ±0.05pF | GRM1555C1H9R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C1H7R8BA01# |  |        |               |         |       | ±0.1pF  | GRM1555C1H9R1BA01# |  |
|        |               |         | 8.1pF | ±0.25pF | GRM1555C1H7R8CA01# |  |        |               |         |       | ±0.25pF | GRM1555C1H9R1CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1555C1H7R8DA01# |  |        |               |         |       | ±0.5pF  | GRM1555C1H9R1DA01# |  |
|        |               |         | 8.2pF | ±0.05pF | GRM1555C1H7R9WA01# |  |        |               |         | 9.2pF | ±0.05pF | GRM1555C1H9R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C1H7R9BA01# |  |        |               |         |       | ±0.1pF  | GRM1555C1H9R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C1H7R9CA01# |  |        |               |         |       | ±0.25pF | GRM1555C1H9R2CA01# |  |
|        |               |         | 8.3pF | ±0.5pF  | GRM1555C1H7R9DA01# |  |        |               |         |       | ±0.5pF  | GRM1555C1H9R2DA01# |  |
|        |               |         |       | ±0.05pF | GRM1555C1H8R0WA01# |  |        |               |         | 9.3pF | ±0.05pF | GRM1555C1H9R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C1H8R0BA01# |  |        |               |         |       | ±0.1pF  | GRM1555C1H9R3BA01# |  |
|        |               |         | 8.4pF | ±0.25pF | GRM1555C1H8R0CA01# |  |        |               |         |       | ±0.25pF | GRM1555C1H9R3CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1555C1H8R0DA01# |  |        |               |         |       | ±0.5pF  | GRM1555C1H9R3DA01# |  |
|        |               |         | 8.5pF | ±0.05pF | GRM1555C1H8R1WA01# |  |        |               |         | 9.4pF | ±0.05pF | GRM1555C1H9R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C1H8R1BA01# |  |        |               |         |       | ±0.1pF  | GRM1555C1H9R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C1H8R1CA01# |  |        |               |         |       | ±0.25pF | GRM1555C1H9R4CA01# |  |
|        |               |         | 8.6pF | ±0.5pF  | GRM1555C1H8R1DA01# |  |        |               |         |       | ±0.5pF  | GRM1555C1H9R4DA01# |  |
|        |               |         |       | ±0.05pF | GRM1555C1H8R2WA01# |  |        |               |         | 9.5pF | ±0.05pF | GRM1555C1H9R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C1H8R2BA01# |  |        |               |         |       | ±0.1pF  | GRM1555C1H9R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C1H8R2CA01# |  |        |               |         |       | ±0.25pF | GRM1555C1H9R5CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1555C1H8R2DA01# |  |        |               |         |       | ±0.5pF  | GRM1555C1H9R5DA01# |  |
|        |               |         |       | ±0.05pF | GRM1555C1H8R3WA01# |  |        |               |         | 9.6pF | ±0.05pF | GRM1555C1H9R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1555C1H8R3BA01# |  |        |               |         |       | ±0.1pF  | GRM1555C1H9R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1555C1H8R3CA01# |  |        |               |         |       | ±0.25pF | GRM1555C1H9R6CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1555C1H8R3DA01# |  |        |               |         |       | ±0.5pF  | GRM1555C1H9R6DA01# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 1.0×0.5mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |
|--------|---------------|---------|-------|---------|--------------------|
| 0.55mm | 50Vdc         | COG     | 9.6pF | ±0.1pF  | GRM1555C1H9R6BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H9R6CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C1H9R6DA01# |
|        |               |         | 9.7pF | ±0.05pF | GRM1555C1H9R7WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H9R7BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H9R7CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C1H9R7DA01# |
|        |               |         | 9.8pF | ±0.05pF | GRM1555C1H9R8WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H9R8BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H9R8CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C1H9R8DA01# |
|        |               |         | 9.9pF | ±0.05pF | GRM1555C1H9R9WA01# |
|        |               |         |       | ±0.1pF  | GRM1555C1H9R9BA01# |
|        |               |         |       | ±0.25pF | GRM1555C1H9R9CA01# |
|        |               |         |       | ±0.5pF  | GRM1555C1H9R9DA01# |
|        |               |         | 10pF  | ±2%     | GRM1555C1H100GA01# |
|        |               |         |       | ±5%     | GRM1555C1H100JA01# |
|        |               |         | 12pF  | ±2%     | GRM1555C1H120GA01# |
|        |               |         |       | ±5%     | GRM1555C1H120JA01# |
|        |               |         | 15pF  | ±2%     | GRM1555C1H150GA01# |
|        |               |         |       | ±5%     | GRM1555C1H150JA01# |
|        |               |         | 18pF  | ±2%     | GRM1555C1H180GA01# |
|        |               |         |       | ±5%     | GRM1555C1H180JA01# |
|        |               |         | 22pF  | ±2%     | GRM1555C1H220GA01# |
|        |               |         |       | ±5%     | GRM1555C1H220JA01# |
|        |               |         | 27pF  | ±2%     | GRM1555C1H270GA01# |
|        |               |         |       | ±5%     | GRM1555C1H270JA01# |
|        |               |         | 33pF  | ±2%     | GRM1555C1H330GA01# |
|        |               |         |       | ±5%     | GRM1555C1H330JA01# |
|        |               |         | 39pF  | ±2%     | GRM1555C1H390GA01# |
|        |               |         |       | ±5%     | GRM1555C1H390JA01# |
|        |               |         | 47pF  | ±2%     | GRM1555C1H470GA01# |
|        |               |         |       | ±5%     | GRM1555C1H470JA01# |
|        |               |         | 56pF  | ±2%     | GRM1555C1H560GA01# |
|        |               |         |       | ±5%     | GRM1555C1H560JA01# |
|        |               |         | 68pF  | ±2%     | GRM1555C1H680GA01# |
|        |               |         |       | ±5%     | GRM1555C1H680JA01# |
|        |               |         | 82pF  | ±2%     | GRM1555C1H820GA01# |
|        |               |         |       | ±5%     | GRM1555C1H820JA01# |
|        |               |         | 100pF | ±2%     | GRM1555C1H101GA01# |
|        |               |         |       | ±5%     | GRM1555C1H101JA01# |
|        |               |         | 120pF | ±2%     | GRM1555C1H121GA01# |
|        |               |         |       | ±5%     | GRM1555C1H121JA01# |
|        |               |         | 150pF | ±2%     | GRM1555C1H151GA01# |
|        |               |         |       | ±5%     | GRM1555C1H151JA01# |
|        |               |         | 180pF | ±2%     | GRM1555C1H181GA01# |
|        |               |         |       | ±5%     | GRM1555C1H181JA01# |
|        |               |         | 220pF | ±2%     | GRM1555C1H221GA01# |
|        |               |         |       | ±5%     | GRM1555C1H221JA01# |
|        |               |         | 270pF | ±2%     | GRM1555C1H271GA01# |
|        |               |         |       | ±5%     | GRM1555C1H271JA01# |
|        |               |         | 330pF | ±2%     | GRM1555C1H331GA01# |
|        |               |         |       | ±5%     | GRM1555C1H331JA01# |
|        |               |         | 390pF | ±2%     | GRM1555C1H391GA01# |

| T max. | Rated Voltage | TC Code | Cap.   | Tol.    | Part Number        |
|--------|---------------|---------|--------|---------|--------------------|
| 0.55mm | 50Vdc         | COG     | 390pF  | ±5%     | GRM1555C1H391JA01# |
|        |               |         |        | ±2%     | GRM1555C1H471GA01# |
|        |               |         |        | ±5%     | GRM1555C1H471JA01# |
|        |               |         | 560pF  | ±2%     | GRM1555C1H561GA01# |
|        |               |         |        | ±5%     | GRM1555C1H561JA01# |
|        |               |         | 680pF  | ±2%     | GRM1555C1H681GA01# |
|        |               |         |        | ±5%     | GRM1555C1H681JA01# |
|        |               |         | 820pF  | ±2%     | GRM1555C1H821GA01# |
|        |               |         |        | ±5%     | GRM1555C1H821JA01# |
|        |               |         | 1000pF | ±2%     | GRM1555C1H102GA01# |
|        |               |         |        | ±5%     | GRM1555C1H102JA01# |
|        |               | CK      | 0.10pF | ±0.05pF | GRM1554C1HR10WA01# |
|        |               |         |        | ±0.05pF | GRM1554C1HR20WA01# |
|        |               |         |        | ±0.1pF  | GRM1554C1HR20BA01# |
|        |               |         |        | ±0.05pF | GRM1554C1HR30WA01# |
|        |               |         | 0.30pF | ±0.1pF  | GRM1554C1HR30BA01# |
|        |               |         |        | ±0.05pF | GRM1554C1HR40WA01# |
|        |               |         | 0.40pF | ±0.1pF  | GRM1554C1HR40BA01# |
|        |               |         |        | ±0.05pF | GRM1554C1HR50WA01# |
|        |               |         | 0.50pF | ±0.1pF  | GRM1554C1HR50BA01# |
|        |               |         |        | ±0.05pF | GRM1554C1HR60WA01# |
|        |               |         | 0.60pF | ±0.1pF  | GRM1554C1HR60BA01# |
|        |               |         |        | ±0.05pF | GRM1554C1HR70WA01# |
|        |               |         | 0.70pF | ±0.1pF  | GRM1554C1HR70BA01# |
|        |               |         |        | ±0.05pF | GRM1554C1HR80WA01# |
|        |               |         | 0.80pF | ±0.1pF  | GRM1554C1HR80BA01# |
|        |               |         |        | ±0.05pF | GRM1554C1HR90WA01# |
|        |               |         | 0.90pF | ±0.1pF  | GRM1554C1HR90BA01# |
|        |               |         |        | ±0.05pF | GRM1554C1H1R0WA01# |
|        |               |         | 1.0pF  | ±0.1pF  | GRM1554C1H1R0BA01# |
|        |               |         |        | ±0.25pF | GRM1554C1H1R0CA01# |
|        |               |         |        | ±0.05pF | GRM1554C1H1R1WA01# |
|        |               |         | 1.1pF  | ±0.1pF  | GRM1554C1H1R1BA01# |
|        |               |         |        | ±0.25pF | GRM1554C1H1R1CA01# |
|        |               |         |        | ±0.05pF | GRM1554C1H1R2WA01# |
|        |               |         | 1.2pF  | ±0.1pF  | GRM1554C1H1R2BA01# |
|        |               |         |        | ±0.25pF | GRM1554C1H1R2CA01# |
|        |               |         |        | ±0.05pF | GRM1554C1H1R3WA01# |
|        |               |         | 1.3pF  | ±0.1pF  | GRM1554C1H1R3BA01# |
|        |               |         |        | ±0.25pF | GRM1554C1H1R3CA01# |
|        |               |         |        | ±0.05pF | GRM1554C1H1R4WA01# |
|        |               |         | 1.4pF  | ±0.1pF  | GRM1554C1H1R4BA01# |
|        |               |         |        | ±0.25pF | GRM1554C1H1R4CA01# |
|        |               |         |        | ±0.05pF | GRM1554C1H1R5WA01# |
|        |               |         | 1.5pF  | ±0.1pF  | GRM1554C1H1R5BA01# |
|        |               |         |        | ±0.25pF | GRM1554C1H1R5CA01# |
|        |               |         |        | ±0.05pF | GRM1554C1H1R6WA01# |
|        |               |         | 1.6pF  | ±0.1pF  | GRM1554C1H1R6BA01# |
|        |               |         |        | ±0.25pF | GRM1554C1H1R6CA01# |
|        |               |         |        | ±0.05pF | GRM1554C1H1R7WA01# |
|        |               |         | 1.7pF  | ±0.1pF  | GRM1554C1H1R7BA01# |
|        |               |         |        | ±0.25pF | GRM1554C1H1R7CA01# |
|        |               |         |        | ±0.05pF | GRM1554C1H1R8WA01# |
|        |               |         | 1.8pF  | ±0.1pF  | GRM1554C1H1R8BA01# |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 1.0×0.5mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  | T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|--------|---------------|---------|-------|---------|--------------------|--|
| 0.55mm | 50Vdc         | CK      | 1.8pF | ±0.25pF | GRM1554C1H1R8CA01# |  | 0.55mm | 50Vdc         | CJ      | 3.6pF | ±0.25pF | GRM1553C1H3R6CA01# |  |
|        |               |         | 1.9pF | ±0.05pF | GRM1554C1H1R9WA01# |  |        |               |         | 3.7pF | ±0.05pF | GRM1553C1H3R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1554C1H1R9BA01# |  |        |               |         |       | ±0.1pF  | GRM1553C1H3R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1554C1H1R9CA01# |  |        |               |         |       | ±0.25pF | GRM1553C1H3R7CA01# |  |
|        |               |         | 2.0pF | ±0.05pF | GRM1554C1H2R0WA01# |  |        |               |         | 3.8pF | ±0.05pF | GRM1553C1H3R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1554C1H2R0BA01# |  |        |               |         |       | ±0.1pF  | GRM1553C1H3R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1554C1H2R0CA01# |  |        |               |         |       | ±0.25pF | GRM1553C1H3R8CA01# |  |
|        |               | CJ      | 2.1pF | ±0.05pF | GRM1553C1H2R1WA01# |  |        |               | CH      | 3.9pF | ±0.05pF | GRM1553C1H3R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C1H2R1BA01# |  |        |               |         |       | ±0.1pF  | GRM1553C1H3R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C1H2R1CA01# |  |        |               |         |       | ±0.25pF | GRM1553C1H3R9CA01# |  |
|        |               |         | 2.2pF | ±0.05pF | GRM1553C1H2R2WA01# |  |        |               |         | 4.0pF | ±0.05pF | GRM1552C1H4R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C1H2R2BA01# |  |        |               |         |       | ±0.1pF  | GRM1552C1H4R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C1H2R2CA01# |  |        |               |         |       | ±0.25pF | GRM1552C1H4R0CA01# |  |
|        |               |         | 2.3pF | ±0.05pF | GRM1553C1H2R3WA01# |  |        |               |         | 4.1pF | ±0.05pF | GRM1552C1H4R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C1H2R3BA01# |  |        |               |         |       | ±0.1pF  | GRM1552C1H4R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C1H2R3CA01# |  |        |               |         |       | ±0.25pF | GRM1552C1H4R1CA01# |  |
|        |               |         | 2.4pF | ±0.05pF | GRM1553C1H2R4WA01# |  |        |               |         | 4.2pF | ±0.05pF | GRM1552C1H4R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C1H2R4BA01# |  |        |               |         |       | ±0.1pF  | GRM1552C1H4R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C1H2R4CA01# |  |        |               |         |       | ±0.25pF | GRM1552C1H4R2CA01# |  |
|        |               |         | 2.5pF | ±0.05pF | GRM1553C1H2R5WA01# |  |        |               |         | 4.3pF | ±0.05pF | GRM1552C1H4R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C1H2R5BA01# |  |        |               |         |       | ±0.1pF  | GRM1552C1H4R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C1H2R5CA01# |  |        |               |         |       | ±0.25pF | GRM1552C1H4R3CA01# |  |
|        |               |         | 2.6pF | ±0.05pF | GRM1553C1H2R6WA01# |  |        |               |         | 4.4pF | ±0.05pF | GRM1552C1H4R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C1H2R6BA01# |  |        |               |         |       | ±0.1pF  | GRM1552C1H4R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C1H2R6CA01# |  |        |               |         |       | ±0.25pF | GRM1552C1H4R4CA01# |  |
|        |               |         | 2.7pF | ±0.05pF | GRM1553C1H2R7WA01# |  |        |               |         | 4.5pF | ±0.05pF | GRM1552C1H4R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C1H2R7BA01# |  |        |               |         |       | ±0.1pF  | GRM1552C1H4R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C1H2R7CA01# |  |        |               |         |       | ±0.25pF | GRM1552C1H4R5CA01# |  |
|        |               |         | 2.8pF | ±0.05pF | GRM1553C1H2R8WA01# |  |        |               |         | 4.6pF | ±0.05pF | GRM1552C1H4R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C1H2R8BA01# |  |        |               |         |       | ±0.1pF  | GRM1552C1H4R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C1H2R8CA01# |  |        |               |         |       | ±0.25pF | GRM1552C1H4R6CA01# |  |
|        |               |         | 2.9pF | ±0.05pF | GRM1553C1H2R9WA01# |  |        |               |         | 4.7pF | ±0.05pF | GRM1552C1H4R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C1H2R9BA01# |  |        |               |         |       | ±0.1pF  | GRM1552C1H4R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C1H2R9CA01# |  |        |               |         |       | ±0.25pF | GRM1552C1H4R7CA01# |  |
|        |               |         | 3.0pF | ±0.05pF | GRM1553C1H3R0WA01# |  |        |               |         | 4.8pF | ±0.05pF | GRM1552C1H4R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C1H3R0BA01# |  |        |               |         |       | ±0.1pF  | GRM1552C1H4R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C1H3R0CA01# |  |        |               |         |       | ±0.25pF | GRM1552C1H4R8CA01# |  |
|        |               |         | 3.1pF | ±0.05pF | GRM1553C1H3R1WA01# |  |        |               |         | 4.9pF | ±0.05pF | GRM1552C1H4R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C1H3R1BA01# |  |        |               |         |       | ±0.1pF  | GRM1552C1H4R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C1H3R1CA01# |  |        |               |         |       | ±0.25pF | GRM1552C1H4R9CA01# |  |
|        |               |         | 3.2pF | ±0.05pF | GRM1553C1H3R2WA01# |  |        |               |         | 5.0pF | ±0.05pF | GRM1552C1H5R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C1H3R2BA01# |  |        |               |         |       | ±0.1pF  | GRM1552C1H5R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C1H3R2CA01# |  |        |               |         |       | ±0.25pF | GRM1552C1H5R0CA01# |  |
|        |               |         | 3.3pF | ±0.05pF | GRM1553C1H3R3WA01# |  |        |               |         | 5.1pF | ±0.05pF | GRM1552C1H5R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C1H3R3BA01# |  |        |               |         |       | ±0.1pF  | GRM1552C1H5R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C1H3R3CA01# |  |        |               |         |       | ±0.25pF | GRM1552C1H5R1CA01# |  |
|        |               |         | 3.4pF | ±0.05pF | GRM1553C1H3R4WA01# |  |        |               |         |       | ±0.5pF  | GRM1552C1H5R1DA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C1H3R4BA01# |  |        |               |         | 5.2pF | ±0.05pF | GRM1552C1H5R2WA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C1H3R4CA01# |  |        |               |         |       | ±0.1pF  | GRM1552C1H5R2BA01# |  |
|        |               |         | 3.5pF | ±0.05pF | GRM1553C1H3R5WA01# |  |        |               |         |       | ±0.25pF | GRM1552C1H5R2CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C1H3R5BA01# |  |        |               |         |       | ±0.5pF  | GRM1552C1H5R2DA01# |  |
|        |               |         |       | ±0.25pF | GRM1553C1H3R5CA01# |  |        |               |         | 5.3pF | ±0.05pF | GRM1552C1H5R3WA01# |  |
|        |               |         | 3.6pF | ±0.05pF | GRM1553C1H3R6WA01# |  |        |               |         |       | ±0.1pF  | GRM1552C1H5R3BA01# |  |
|        |               |         |       | ±0.1pF  | GRM1553C1H3R6BA01# |  |        |               |         |       | ±0.25pF | GRM1552C1H5R3CA01# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 1.0×0.5mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |
|--------|---------------|---------|-------|---------|--------------------|
| 0.55mm | 50Vdc         | CH      | 5.3pF | ±0.5pF  | GRM1552C1H5R3DA01# |
|        |               |         |       | ±0.05pF | GRM1552C1H5R4WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C1H5R4BA01# |
|        |               |         |       | ±0.25pF | GRM1552C1H5R4CA01# |
|        |               |         | 5.4pF | ±0.5pF  | GRM1552C1H5R4DA01# |
|        |               |         |       | ±0.05pF | GRM1552C1H5R5WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C1H5R5BA01# |
|        |               |         |       | ±0.25pF | GRM1552C1H5R5CA01# |
|        |               |         | 5.5pF | ±0.5pF  | GRM1552C1H5R5DA01# |
|        |               |         |       | ±0.05pF | GRM1552C1H5R6WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C1H5R6BA01# |
|        |               |         |       | ±0.25pF | GRM1552C1H5R6CA01# |
|        |               |         | 5.6pF | ±0.5pF  | GRM1552C1H5R6DA01# |
|        |               |         |       | ±0.05pF | GRM1552C1H5R7WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C1H5R7BA01# |
|        |               |         |       | ±0.25pF | GRM1552C1H5R7CA01# |
|        |               |         | 5.7pF | ±0.5pF  | GRM1552C1H5R7DA01# |
|        |               |         |       | ±0.05pF | GRM1552C1H5R8WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C1H5R8BA01# |
|        |               |         |       | ±0.25pF | GRM1552C1H5R8CA01# |
|        |               |         | 5.8pF | ±0.5pF  | GRM1552C1H5R8DA01# |
|        |               |         |       | ±0.05pF | GRM1552C1H5R9WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C1H5R9BA01# |
|        |               |         |       | ±0.25pF | GRM1552C1H5R9CA01# |
|        |               |         | 5.9pF | ±0.5pF  | GRM1552C1H5R9DA01# |
|        |               |         |       | ±0.05pF | GRM1552C1H6R0WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C1H6R0BA01# |
|        |               |         |       | ±0.25pF | GRM1552C1H6R0CA01# |
|        |               |         | 6.0pF | ±0.5pF  | GRM1552C1H6R0DA01# |
|        |               |         |       | ±0.05pF | GRM1552C1H6R1WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C1H6R1BA01# |
|        |               |         |       | ±0.25pF | GRM1552C1H6R1CA01# |
|        |               |         | 6.1pF | ±0.5pF  | GRM1552C1H6R1DA01# |
|        |               |         |       | ±0.05pF | GRM1552C1H6R2WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C1H6R2BA01# |
|        |               |         |       | ±0.25pF | GRM1552C1H6R2CA01# |
|        |               |         | 6.2pF | ±0.5pF  | GRM1552C1H6R2DA01# |
|        |               |         |       | ±0.05pF | GRM1552C1H6R3WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C1H6R3BA01# |
|        |               |         |       | ±0.25pF | GRM1552C1H6R3CA01# |
|        |               |         | 6.3pF | ±0.5pF  | GRM1552C1H6R3DA01# |
|        |               |         |       | ±0.05pF | GRM1552C1H6R4WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C1H6R4BA01# |
|        |               |         |       | ±0.25pF | GRM1552C1H6R4CA01# |
|        |               |         | 6.4pF | ±0.5pF  | GRM1552C1H6R4DA01# |
|        |               |         |       | ±0.05pF | GRM1552C1H6R5WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C1H6R5BA01# |
|        |               |         |       | ±0.25pF | GRM1552C1H6R5CA01# |
|        |               |         | 6.5pF | ±0.5pF  | GRM1552C1H6R5DA01# |
|        |               |         |       | ±0.05pF | GRM1552C1H6R6WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C1H6R6BA01# |
|        |               |         |       | ±0.25pF | GRM1552C1H6R6CA01# |
|        |               |         | 6.6pF | ±0.5pF  | GRM1552C1H6R6DA01# |
|        |               |         |       | ±0.05pF | GRM1552C1H6R7WA01# |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |
|--------|---------------|---------|-------|---------|--------------------|
| 0.55mm | 50Vdc         | CH      | 6.7pF | ±0.1pF  | GRM1552C1H6R7BA01# |
|        |               |         |       | ±0.25pF | GRM1552C1H6R7CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C1H6R7DA01# |
|        |               |         | 6.8pF | ±0.05pF | GRM1552C1H6R8WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C1H6R8BA01# |
|        |               |         |       | ±0.25pF | GRM1552C1H6R8CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C1H6R8DA01# |
|        |               |         | 6.9pF | ±0.05pF | GRM1552C1H6R9WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C1H6R9BA01# |
|        |               |         |       | ±0.25pF | GRM1552C1H6R9CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C1H6R9DA01# |
|        |               |         | 7.0pF | ±0.05pF | GRM1552C1H7R0WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C1H7R0BA01# |
|        |               |         |       | ±0.25pF | GRM1552C1H7R0CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C1H7R0DA01# |
|        |               |         | 7.1pF | ±0.05pF | GRM1552C1H7R1WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C1H7R1BA01# |
|        |               |         |       | ±0.25pF | GRM1552C1H7R1CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C1H7R1DA01# |
|        |               |         | 7.2pF | ±0.05pF | GRM1552C1H7R2WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C1H7R2BA01# |
|        |               |         |       | ±0.25pF | GRM1552C1H7R2CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C1H7R2DA01# |
|        |               |         | 7.3pF | ±0.05pF | GRM1552C1H7R3WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C1H7R3BA01# |
|        |               |         |       | ±0.25pF | GRM1552C1H7R3CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C1H7R3DA01# |
|        |               |         | 7.4pF | ±0.05pF | GRM1552C1H7R4WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C1H7R4BA01# |
|        |               |         |       | ±0.25pF | GRM1552C1H7R4CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C1H7R4DA01# |
|        |               |         | 7.5pF | ±0.05pF | GRM1552C1H7R5WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C1H7R5BA01# |
|        |               |         |       | ±0.25pF | GRM1552C1H7R5CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C1H7R5DA01# |
|        |               |         | 7.6pF | ±0.05pF | GRM1552C1H7R6WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C1H7R6BA01# |
|        |               |         |       | ±0.25pF | GRM1552C1H7R6CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C1H7R6DA01# |
|        |               |         | 7.7pF | ±0.05pF | GRM1552C1H7R7WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C1H7R7BA01# |
|        |               |         |       | ±0.25pF | GRM1552C1H7R7CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C1H7R7DA01# |
|        |               |         | 7.8pF | ±0.05pF | GRM1552C1H7R8WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C1H7R8BA01# |
|        |               |         |       | ±0.25pF | GRM1552C1H7R8CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C1H7R8DA01# |
|        |               |         | 7.9pF | ±0.05pF | GRM1552C1H7R9WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C1H7R9BA01# |
|        |               |         |       | ±0.25pF | GRM1552C1H7R9CA01# |
|        |               |         |       | ±0.5pF  | GRM1552C1H7R9DA01# |
|        |               |         | 8.0pF | ±0.05pF | GRM1552C1H8R0WA01# |
|        |               |         |       | ±0.1pF  | GRM1552C1H8R0BA01# |
|        |               |         |       | ±0.25pF | GRM1552C1H8R0CA01# |

Part number # indicates the package specification code.

# GRM Series Temperature Compensating Type Part Number List

(→ 1.0×0.5mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.55mm | 50Vdc         | CH      | 8.0pF | ±0.5pF  | GRM1552C1H8R0DA01# |  |
|        |               |         |       | ±0.05pF | GRM1552C1H8R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C1H8R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C1H8R1CA01# |  |
|        |               |         | 8.1pF | ±0.5pF  | GRM1552C1H8R1DA01# |  |
|        |               |         |       | ±0.05pF | GRM1552C1H8R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C1H8R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C1H8R2CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1552C1H8R2DA01# |  |
|        |               |         | 8.2pF | ±0.05pF | GRM1552C1H8R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C1H8R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C1H8R3CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1552C1H8R3DA01# |  |
|        |               |         | 8.3pF | ±0.05pF | GRM1552C1H8R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C1H8R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C1H8R4CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1552C1H8R4DA01# |  |
|        |               |         | 8.4pF | ±0.05pF | GRM1552C1H8R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C1H8R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C1H8R5CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1552C1H8R5DA01# |  |
|        |               |         | 8.5pF | ±0.05pF | GRM1552C1H8R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C1H8R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C1H8R6CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1552C1H8R6DA01# |  |
|        |               |         | 8.6pF | ±0.05pF | GRM1552C1H8R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C1H8R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C1H8R7CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1552C1H8R7DA01# |  |
|        |               |         | 8.7pF | ±0.05pF | GRM1552C1H8R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C1H8R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C1H8R8CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1552C1H8R8DA01# |  |
|        |               |         | 8.8pF | ±0.05pF | GRM1552C1H8R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C1H8R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C1H8R9CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1552C1H8R9DA01# |  |
|        |               |         | 8.9pF | ±0.05pF | GRM1552C1H9R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C1H9R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C1H9R0CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1552C1H9R0DA01# |  |
|        |               |         | 9.0pF | ±0.05pF | GRM1552C1H9R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C1H9R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C1H9R1CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1552C1H9R1DA01# |  |
|        |               |         | 9.1pF | ±0.05pF | GRM1552C1H9R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C1H9R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C1H9R2CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1552C1H9R2DA01# |  |
|        |               |         | 9.2pF | ±0.05pF | GRM1552C1H9R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C1H9R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C1H9R3CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1552C1H9R3DA01# |  |
|        |               |         | 9.3pF | ±0.05pF | GRM1552C1H9R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C1H9R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C1H9R4CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1552C1H9R4DA01# |  |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.55mm | 50Vdc         | CH      | 9.4pF | ±0.1pF  | GRM1552C1H9R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C1H9R4CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1552C1H9R4DA01# |  |
|        |               |         | 9.5pF | ±0.05pF | GRM1552C1H9R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C1H9R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C1H9R5CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1552C1H9R5DA01# |  |
|        |               |         | 9.6pF | ±0.05pF | GRM1552C1H9R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C1H9R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C1H9R6CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1552C1H9R6DA01# |  |
|        |               |         | 9.7pF | ±0.05pF | GRM1552C1H9R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C1H9R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C1H9R7CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1552C1H9R7DA01# |  |
|        |               |         | 9.8pF | ±0.05pF | GRM1552C1H9R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C1H9R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C1H9R8CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1552C1H9R8DA01# |  |
|        |               |         | 9.9pF | ±0.05pF | GRM1552C1H9R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1552C1H9R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1552C1H9R9CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1552C1H9R9DA01# |  |
|        |               |         | 10pF  | ±2%     | GRM1552C1H100GA01# |  |
|        |               |         |       | ±5%     | GRM1552C1H100JA01# |  |
|        |               |         | 12pF  | ±2%     | GRM1552C1H120GA01# |  |
|        |               |         |       | ±5%     | GRM1552C1H120JA01# |  |
|        |               |         | 15pF  | ±2%     | GRM1552C1H150GA01# |  |
|        |               |         |       | ±5%     | GRM1552C1H150JA01# |  |
|        |               |         | 18pF  | ±2%     | GRM1552C1H180GA01# |  |
|        |               |         |       | ±5%     | GRM1552C1H180JA01# |  |
|        |               |         | 22pF  | ±2%     | GRM1552C1H220GA01# |  |
|        |               |         |       | ±5%     | GRM1552C1H220JA01# |  |
|        |               |         | 27pF  | ±2%     | GRM1552C1H270GA01# |  |
|        |               |         |       | ±5%     | GRM1552C1H270JA01# |  |
|        |               |         | 33pF  | ±2%     | GRM1552C1H330GA01# |  |
|        |               |         |       | ±5%     | GRM1552C1H330JA01# |  |
|        |               |         | 39pF  | ±2%     | GRM1552C1H390GA01# |  |
|        |               |         |       | ±5%     | GRM1552C1H390JA01# |  |
|        |               |         | 47pF  | ±2%     | GRM1552C1H470GA01# |  |
|        |               |         |       | ±5%     | GRM1552C1H470JA01# |  |
|        |               |         | 56pF  | ±2%     | GRM1552C1H560GA01# |  |
|        |               |         |       | ±5%     | GRM1552C1H560JA01# |  |
|        |               |         | 68pF  | ±2%     | GRM1552C1H680GA01# |  |
|        |               |         |       | ±5%     | GRM1552C1H680JA01# |  |
|        |               |         | 82pF  | ±2%     | GRM1552C1H820GA01# |  |
|        |               |         |       | ±5%     | GRM1552C1H820JA01# |  |
|        |               |         | 100pF | ±2%     | GRM1552C1H101GA01# |  |
|        |               |         |       | ±5%     | GRM1552C1H101JA01# |  |
|        |               |         | 120pF | ±2%     | GRM1552C1H121GA01# |  |
|        |               |         |       | ±5%     | GRM1552C1H121JA01# |  |
|        |               |         | 150pF | ±2%     | GRM1552C1H151GA01# |  |
|        |               |         |       | ±5%     | GRM1552C1H151JA01# |  |
|        |               |         | 180pF | ±2%     | GRM1552C1H181GA01# |  |
|        |               |         |       | ±5%     | GRM1552C1H181JA01# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 1.0×0.5mm)

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number        |  |
|--------|---------------|---------|--------|------|--------------------|--|
| 0.55mm | 50Vdc         | CH      | 180pF  | ±5%  | GRM1552C1H181JA01# |  |
|        |               |         |        | ±2%  | GRM1552C1H221GA01# |  |
|        |               |         |        | ±5%  | GRM1552C1H221JA01# |  |
|        |               |         | 270pF  | ±2%  | GRM1552C1H271GA01# |  |
|        |               |         |        | ±5%  | GRM1552C1H271JA01# |  |
|        |               |         | 330pF  | ±2%  | GRM1552C1H331GA01# |  |
|        |               |         |        | ±5%  | GRM1552C1H331JA01# |  |
|        |               |         | 390pF  | ±2%  | GRM1552C1H391GA01# |  |
|        |               |         |        | ±5%  | GRM1552C1H391JA01# |  |
|        |               |         | 470pF  | ±2%  | GRM1552C1H471GA01# |  |
|        |               |         |        | ±5%  | GRM1552C1H471JA01# |  |
|        |               |         | 560pF  | ±2%  | GRM1552C1H561GA01# |  |
|        |               |         |        | ±5%  | GRM1552C1H561JA01# |  |
|        |               |         | 680pF  | ±2%  | GRM1552C1H681GA01# |  |
|        |               |         |        | ±5%  | GRM1552C1H681JA01# |  |
|        |               |         | 820pF  | ±2%  | GRM1552C1H821GA01# |  |
|        |               |         |        | ±5%  | GRM1552C1H821JA01# |  |
|        |               |         | 1000pF | ±2%  | GRM1552C1H102GA01# |  |
|        |               |         |        | ±5%  | GRM1552C1H102JA01# |  |
|        | 10Vdc         | SL      | 1200pF | ±5%  | GRM1551X1A122JA01# |  |
|        |               |         | 1500pF | ±5%  | GRM1551X1A152JA01# |  |
|        |               |         | 1800pF | ±5%  | GRM1551X1A182JA01# |  |
|        |               |         | 2200pF | ±5%  | GRM1551X1A222JA01# |  |
|        |               |         | 2700pF | ±5%  | GRM1551X1A272JA01# |  |
|        |               |         | 3300pF | ±5%  | GRM1551X1A332JA01# |  |
|        |               |         | 3900pF | ±5%  | GRM1551X1A392JA01# |  |
|        |               |         | 4700pF | ±5%  | GRM1551X1A472JA01# |  |
|        |               | U2J     | 1200pF | ±5%  | GRM1557U1A122JA01# |  |
|        |               |         | 1500pF | ±5%  | GRM1557U1A152JA01# |  |
|        |               |         | 1800pF | ±5%  | GRM1557U1A182JA01# |  |
|        |               |         | 2200pF | ±5%  | GRM1557U1A222JA01# |  |
|        |               |         | 2700pF | ±5%  | GRM1557U1A272JA01# |  |
|        |               |         | 3300pF | ±5%  | GRM1557U1A332JA01# |  |
|        |               |         | 3900pF | ±5%  | GRM1557U1A392JA01# |  |
|        |               |         | 4700pF | ±5%  | GRM1557U1A472JA01# |  |
|        |               | UJ      | 1200pF | ±5%  | GRM1553U1A122JA01# |  |
|        |               |         | 1500pF | ±5%  | GRM1553U1A152JA01# |  |
|        |               |         | 1800pF | ±5%  | GRM1553U1A182JA01# |  |
|        |               |         | 2200pF | ±5%  | GRM1553U1A222JA01# |  |
|        |               |         | 2700pF | ±5%  | GRM1553U1A272JA01# |  |
|        |               |         | 3300pF | ±5%  | GRM1553U1A332JA01# |  |
|        |               |         | 3900pF | ±5%  | GRM1553U1A392JA01# |  |
|        |               |         | 4700pF | ±5%  | GRM1553U1A472JA01# |  |

| T max. | Rated Voltage | TC Code | Cap.    | Tol.    | Part Number        |  |
|--------|---------------|---------|---------|---------|--------------------|--|
| 0.5mm  | 50Vdc         | U2J     | 2700pF  | ±5%     | GRM1857U1H272JA44# |  |
|        |               |         | 3300pF  | ±5%     | GRM1857U1H332JA44# |  |
|        |               |         | 3900pF  | ±5%     | GRM1857U1H392JA44# |  |
|        |               |         | 4700pF  | ±5%     | GRM1857U1H472JA44# |  |
|        |               |         |         |         |                    |  |
|        |               | UJ      | 2200pF  | ±5%     | GRM1853U1H222JA44# |  |
|        |               |         | 2700pF  | ±5%     | GRM1853U1H272JA44# |  |
|        |               |         | 3300pF  | ±5%     | GRM1853U1H332JA44# |  |
|        |               |         | 3900pF  | ±5%     | GRM1853U1H392JA44# |  |
|        |               |         | 4700pF  | ±5%     | GRM1853U1H472JA44# |  |
|        | 10Vdc         | SL      | 5600pF  | ±5%     | GRM1851X1A562JA44# |  |
|        |               |         | 6800pF  | ±5%     | GRM1851X1A682JA44# |  |
|        |               |         | 8200pF  | ±5%     | GRM1851X1A822JA44# |  |
|        |               |         | 10000pF | ±5%     | GRM1851X1A103JA44# |  |
|        |               |         |         |         |                    |  |
|        |               | U2J     | 5600pF  | ±5%     | GRM1857U1A562JA44# |  |
|        |               |         | 6800pF  | ±5%     | GRM1857U1A682JA44# |  |
|        |               |         | 8200pF  | ±5%     | GRM1857U1A822JA44# |  |
|        |               |         | 10000pF | ±5%     | GRM1857U1A103JA44# |  |
|        |               |         |         |         |                    |  |
|        |               | UJ      | 5600pF  | ±5%     | GRM1853U1A562JA44# |  |
|        |               |         | 6800pF  | ±5%     | GRM1853U1A682JA44# |  |
|        |               |         | 8200pF  | ±5%     | GRM1853U1A822JA44# |  |
|        |               |         | 10000pF | ±5%     | GRM1853U1A103JA44# |  |
|        |               |         |         |         |                    |  |
| 0.9mm  | 100Vdc        | C0G     | 0.50pF  | ±0.05pF | GRM1885C2AR50WA01# |  |
|        |               |         |         | ±0.1pF  | GRM1885C2AR50BA01# |  |
|        |               |         | 0.60pF  | ±0.05pF | GRM1885C2AR60WA01# |  |
|        |               |         |         | ±0.1pF  | GRM1885C2AR60BA01# |  |
|        |               |         | 0.70pF  | ±0.05pF | GRM1885C2AR70WA01# |  |
|        |               |         |         | ±0.1pF  | GRM1885C2AR70BA01# |  |
|        |               |         | 0.80pF  | ±0.05pF | GRM1885C2AR80WA01# |  |
|        |               |         |         | ±0.1pF  | GRM1885C2AR80BA01# |  |
|        |               |         | 0.90pF  | ±0.05pF | GRM1885C2AR90WA01# |  |
|        |               |         |         | ±0.1pF  | GRM1885C2AR90BA01# |  |
|        |               |         | 1.0pF   | ±0.05pF | GRM1885C2A1R0WA01# |  |
|        |               |         |         | ±0.1pF  | GRM1885C2A1R0BA01# |  |
|        |               |         |         | ±0.25pF | GRM1885C2A1R0CA01# |  |
|        |               |         | 1.1pF   | ±0.05pF | GRM1885C2A1R1WA01# |  |
|        |               |         |         | ±0.1pF  | GRM1885C2A1R1BA01# |  |
|        |               |         |         | ±0.25pF | GRM1885C2A1R1CA01# |  |
|        |               |         | 1.2pF   | ±0.05pF | GRM1885C2A1R2WA01# |  |
|        |               |         |         | ±0.1pF  | GRM1885C2A1R2BA01# |  |
|        |               |         |         | ±0.25pF | GRM1885C2A1R2CA01# |  |
|        |               |         | 1.3pF   | ±0.05pF | GRM1885C2A1R3WA01# |  |
|        |               |         |         | ±0.1pF  | GRM1885C2A1R3BA01# |  |
|        |               |         |         | ±0.25pF | GRM1885C2A1R3CA01# |  |
|        |               |         | 1.4pF   | ±0.05pF | GRM1885C2A1R4WA01# |  |
|        |               |         |         | ±0.1pF  | GRM1885C2A1R4BA01# |  |
|        |               |         |         | ±0.25pF | GRM1885C2A1R4CA01# |  |
|        |               |         | 1.5pF   | ±0.05pF | GRM1885C2A1R5WA01# |  |
|        |               |         |         | ±0.1pF  | GRM1885C2A1R5BA01# |  |
|        |               |         |         | ±0.25pF | GRM1885C2A1R5CA01# |  |
|        |               |         | 1.6pF   | ±0.05pF | GRM1885C2A1R6WA01# |  |
|        |               |         |         | ±0.1pF  | GRM1885C2A1R6BA01# |  |
|        |               |         |         | ±0.25pF | GRM1885C2A1R6CA01# |  |
|        |               |         | 1.7pF   | ±0.05pF | GRM1885C2A1R7WA01# |  |
|        |               |         |         | ±0.1pF  | GRM1885C2A1R7BA01# |  |

1.6×0.8mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number        |  |
|--------|---------------|---------|--------|------|--------------------|--|
| 0.5mm  | 50Vdc         | SL      | 2200pF | ±5%  | GRM1851X1H222JA44# |  |
|        |               |         | 2700pF | ±5%  | GRM1851X1H272JA44# |  |
|        |               |         | 3300pF | ±5%  | GRM1851X1H332JA44# |  |
|        |               |         | 3900pF | ±5%  | GRM1851X1H392JA44# |  |
|        |               |         | 4700pF | ±5%  | GRM1851X1H472JA44# |  |
|        |               |         |        |      |                    |  |
|        |               | U2J     | 2200pF | ±5%  | GRM1857U1H222JA44# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 1.6×0.8mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  | T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|--------|---------------|---------|-------|---------|--------------------|--|
| 0.9mm  | 100Vdc        | COG     | 1.7pF | ±0.25pF | GRM1885C2A1R7CA01# |  | 0.9mm  | 100Vdc        | COG     | 3.5pF | ±0.25pF | GRM1885C2A3R5CA01# |  |
|        |               |         |       | ±0.05pF | GRM1885C2A1R8WA01# |  |        |               |         |       | ±0.05pF | GRM1885C2A3R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A1R8BA01# |  |        |               |         |       | ±0.1pF  | GRM1885C2A3R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A1R8CA01# |  |        |               |         |       | ±0.25pF | GRM1885C2A3R6CA01# |  |
|        |               |         | 1.9pF | ±0.05pF | GRM1885C2A1R9WA01# |  |        |               |         | 3.7pF | ±0.05pF | GRM1885C2A3R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A1R9BA01# |  |        |               |         |       | ±0.1pF  | GRM1885C2A3R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A1R9CA01# |  |        |               |         |       | ±0.25pF | GRM1885C2A3R7CA01# |  |
|        |               |         | 2.0pF | ±0.05pF | GRM1885C2A2R0WA01# |  |        |               |         | 3.8pF | ±0.05pF | GRM1885C2A3R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A2R0BA01# |  |        |               |         |       | ±0.1pF  | GRM1885C2A3R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A2R0CA01# |  |        |               |         |       | ±0.25pF | GRM1885C2A3R8CA01# |  |
|        |               |         | 2.1pF | ±0.05pF | GRM1885C2A2R1WA01# |  |        |               |         | 3.9pF | ±0.05pF | GRM1885C2A3R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A2R1BA01# |  |        |               |         |       | ±0.1pF  | GRM1885C2A3R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A2R1CA01# |  |        |               |         |       | ±0.25pF | GRM1885C2A3R9CA01# |  |
|        |               |         | 2.2pF | ±0.05pF | GRM1885C2A2R2WA01# |  |        |               |         | 4.0pF | ±0.05pF | GRM1885C2A4R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A2R2BA01# |  |        |               |         |       | ±0.1pF  | GRM1885C2A4R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A2R2CA01# |  |        |               |         |       | ±0.25pF | GRM1885C2A4R0CA01# |  |
|        |               |         | 2.3pF | ±0.05pF | GRM1885C2A2R3WA01# |  |        |               |         | 4.1pF | ±0.05pF | GRM1885C2A4R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A2R3BA01# |  |        |               |         |       | ±0.1pF  | GRM1885C2A4R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A2R3CA01# |  |        |               |         |       | ±0.25pF | GRM1885C2A4R1CA01# |  |
|        |               |         | 2.4pF | ±0.05pF | GRM1885C2A2R4WA01# |  |        |               |         | 4.2pF | ±0.05pF | GRM1885C2A4R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A2R4BA01# |  |        |               |         |       | ±0.1pF  | GRM1885C2A4R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A2R4CA01# |  |        |               |         |       | ±0.25pF | GRM1885C2A4R2CA01# |  |
|        |               |         | 2.5pF | ±0.05pF | GRM1885C2A2R5WA01# |  |        |               |         | 4.3pF | ±0.05pF | GRM1885C2A4R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A2R5BA01# |  |        |               |         |       | ±0.1pF  | GRM1885C2A4R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A2R5CA01# |  |        |               |         |       | ±0.25pF | GRM1885C2A4R3CA01# |  |
|        |               |         | 2.6pF | ±0.05pF | GRM1885C2A2R6WA01# |  |        |               |         | 4.4pF | ±0.05pF | GRM1885C2A4R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A2R6BA01# |  |        |               |         |       | ±0.1pF  | GRM1885C2A4R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A2R6CA01# |  |        |               |         |       | ±0.25pF | GRM1885C2A4R4CA01# |  |
|        |               |         | 2.7pF | ±0.05pF | GRM1885C2A2R7WA01# |  |        |               |         | 4.5pF | ±0.05pF | GRM1885C2A4R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A2R7BA01# |  |        |               |         |       | ±0.1pF  | GRM1885C2A4R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A2R7CA01# |  |        |               |         |       | ±0.25pF | GRM1885C2A4R5CA01# |  |
|        |               |         | 2.8pF | ±0.05pF | GRM1885C2A2R8WA01# |  |        |               |         | 4.6pF | ±0.05pF | GRM1885C2A4R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A2R8BA01# |  |        |               |         |       | ±0.1pF  | GRM1885C2A4R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A2R8CA01# |  |        |               |         |       | ±0.25pF | GRM1885C2A4R6CA01# |  |
|        |               |         | 2.9pF | ±0.05pF | GRM1885C2A2R9WA01# |  |        |               |         | 4.7pF | ±0.05pF | GRM1885C2A4R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A2R9BA01# |  |        |               |         |       | ±0.1pF  | GRM1885C2A4R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A2R9CA01# |  |        |               |         |       | ±0.25pF | GRM1885C2A4R7CA01# |  |
|        |               |         | 3.0pF | ±0.05pF | GRM1885C2A3R0WA01# |  |        |               |         | 4.8pF | ±0.05pF | GRM1885C2A4R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A3R0BA01# |  |        |               |         |       | ±0.1pF  | GRM1885C2A4R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A3R0CA01# |  |        |               |         |       | ±0.25pF | GRM1885C2A4R8CA01# |  |
|        |               |         | 3.1pF | ±0.05pF | GRM1885C2A3R1WA01# |  |        |               |         | 4.9pF | ±0.05pF | GRM1885C2A4R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A3R1BA01# |  |        |               |         |       | ±0.1pF  | GRM1885C2A4R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A3R1CA01# |  |        |               |         |       | ±0.25pF | GRM1885C2A4R9CA01# |  |
|        |               |         | 3.2pF | ±0.05pF | GRM1885C2A3R2WA01# |  |        |               |         | 5.0pF | ±0.05pF | GRM1885C2A5R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A3R2BA01# |  |        |               |         |       | ±0.1pF  | GRM1885C2A5R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A3R2CA01# |  |        |               |         |       | ±0.25pF | GRM1885C2A5R0CA01# |  |
|        |               |         | 3.3pF | ±0.05pF | GRM1885C2A3R3WA01# |  |        |               |         | 5.1pF | ±0.05pF | GRM1885C2A5R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A3R3BA01# |  |        |               |         |       | ±0.1pF  | GRM1885C2A5R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A3R3CA01# |  |        |               |         |       | ±0.25pF | GRM1885C2A5R1CA01# |  |
|        |               |         | 3.4pF | ±0.05pF | GRM1885C2A3R4WA01# |  |        |               |         | 5.2pF | ±0.05pF | GRM1885C2A5R1DA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A3R4BA01# |  |        |               |         |       | ±0.1pF  | GRM1885C2A5R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A3R4CA01# |  |        |               |         |       | ±0.25pF | GRM1885C2A5R2CA01# |  |
|        |               |         | 3.5pF | ±0.05pF | GRM1885C2A3R5WA01# |  |        |               |         |       | ±0.5pF  | GRM1885C2A5R2DA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A3R5BA01# |  |        |               |         |       |         |                    |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 1.6×0.8mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.9mm  | 100Vdc        | COG     | 5.3pF | ±0.05pF | GRM1885C2A5R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A5R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A5R3CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A5R3DA01# |  |
|        |               |         | 5.4pF | ±0.05pF | GRM1885C2A5R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A5R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A5R4CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A5R4DA01# |  |
|        |               |         | 5.5pF | ±0.05pF | GRM1885C2A5R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A5R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A5R5CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A5R5DA01# |  |
|        |               |         | 5.6pF | ±0.05pF | GRM1885C2A5R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A5R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A5R6CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A5R6DA01# |  |
|        |               |         | 5.7pF | ±0.05pF | GRM1885C2A5R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A5R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A5R7CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A5R7DA01# |  |
|        |               |         | 5.8pF | ±0.05pF | GRM1885C2A5R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A5R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A5R8CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A5R8DA01# |  |
|        |               |         | 5.9pF | ±0.05pF | GRM1885C2A5R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A5R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A5R9CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A5R9DA01# |  |
|        |               |         | 6.0pF | ±0.05pF | GRM1885C2A6R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A6R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A6R0CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A6R0DA01# |  |
|        |               |         | 6.1pF | ±0.05pF | GRM1885C2A6R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A6R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A6R1CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A6R1DA01# |  |
|        |               |         | 6.2pF | ±0.05pF | GRM1885C2A6R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A6R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A6R2CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A6R2DA01# |  |
|        |               |         | 6.3pF | ±0.05pF | GRM1885C2A6R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A6R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A6R3CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A6R3DA01# |  |
|        |               |         | 6.4pF | ±0.05pF | GRM1885C2A6R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A6R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A6R4CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A6R4DA01# |  |
|        |               |         | 6.5pF | ±0.05pF | GRM1885C2A6R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A6R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A6R5CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A6R5DA01# |  |
|        |               |         | 6.6pF | ±0.05pF | GRM1885C2A6R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A6R6BA01# |  |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.9mm  | 100Vdc        | COG     | 6.6pF | ±0.25pF | GRM1885C2A6R6CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A6R6DA01# |  |
|        |               |         | 6.7pF | ±0.05pF | GRM1885C2A6R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A6R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A6R7CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A6R7DA01# |  |
|        |               |         | 6.8pF | ±0.05pF | GRM1885C2A6R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A6R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A6R8CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A6R8DA01# |  |
|        |               |         | 6.9pF | ±0.05pF | GRM1885C2A6R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A6R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A6R9CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A6R9DA01# |  |
|        |               |         | 7.0pF | ±0.05pF | GRM1885C2A7R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A7R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A7R0CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A7R0DA01# |  |
|        |               |         | 7.1pF | ±0.05pF | GRM1885C2A7R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A7R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A7R1CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A7R1DA01# |  |
|        |               |         | 7.2pF | ±0.05pF | GRM1885C2A7R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A7R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A7R2CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A7R2DA01# |  |
|        |               |         | 7.3pF | ±0.05pF | GRM1885C2A7R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A7R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A7R3CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A7R3DA01# |  |
|        |               |         | 7.4pF | ±0.05pF | GRM1885C2A7R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A7R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A7R4CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A7R4DA01# |  |
|        |               |         | 7.5pF | ±0.05pF | GRM1885C2A7R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A7R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A7R5CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A7R5DA01# |  |
|        |               |         | 7.6pF | ±0.05pF | GRM1885C2A7R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A7R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A7R6CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A7R6DA01# |  |
|        |               |         | 7.7pF | ±0.05pF | GRM1885C2A7R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A7R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A7R7CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A7R7DA01# |  |
|        |               |         | 7.8pF | ±0.05pF | GRM1885C2A7R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A7R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A7R8CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A7R8DA01# |  |
|        |               |         | 7.9pF | ±0.05pF | GRM1885C2A7R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A7R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A7R9CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A7R9DA01# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 1.6×0.8mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  | T max. | Rated Voltage | TC Code | Cap.   | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|--------|---------------|---------|--------|---------|--------------------|--|
| 0.9mm  | 100Vdc        | C0G     | 8.0pF | ±0.05pF | GRM1885C2A8R0WA01# |  | 0.9mm  | 100Vdc        | C0G     | 9.3pF  | ±0.25pF | GRM1885C2A9R3CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A8R0BA01# |  |        |               |         |        | ±0.5pF  | GRM1885C2A9R3DA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A8R0CA01# |  |        |               |         | 9.4pF  | ±0.05pF | GRM1885C2A9R4WA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A8R0DA01# |  |        |               |         |        | ±0.1pF  | GRM1885C2A9R4BA01# |  |
|        |               |         | 8.1pF | ±0.05pF | GRM1885C2A8R1WA01# |  |        |               |         |        | ±0.25pF | GRM1885C2A9R4CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A8R1BA01# |  |        |               |         |        | ±0.5pF  | GRM1885C2A9R4DA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A8R1CA01# |  |        |               |         | 9.5pF  | ±0.05pF | GRM1885C2A9R5WA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A8R1DA01# |  |        |               |         |        | ±0.1pF  | GRM1885C2A9R5BA01# |  |
|        |               |         | 8.2pF | ±0.05pF | GRM1885C2A8R2WA01# |  |        |               |         |        | ±0.25pF | GRM1885C2A9R5CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A8R2BA01# |  |        |               |         |        | ±0.5pF  | GRM1885C2A9R5DA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A8R2CA01# |  |        |               |         | 9.6pF  | ±0.05pF | GRM1885C2A9R6WA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A8R2DA01# |  |        |               |         |        | ±0.1pF  | GRM1885C2A9R6BA01# |  |
|        |               |         | 8.3pF | ±0.05pF | GRM1885C2A8R3WA01# |  |        |               |         |        | ±0.25pF | GRM1885C2A9R6CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A8R3BA01# |  |        |               |         |        | ±0.5pF  | GRM1885C2A9R6DA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A8R3CA01# |  |        |               |         | 9.7pF  | ±0.05pF | GRM1885C2A9R7WA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A8R3DA01# |  |        |               |         |        | ±0.1pF  | GRM1885C2A9R7BA01# |  |
|        |               |         | 8.4pF | ±0.05pF | GRM1885C2A8R4WA01# |  |        |               |         |        | ±0.25pF | GRM1885C2A9R7CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A8R4BA01# |  |        |               |         |        | ±0.5pF  | GRM1885C2A9R7DA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A8R4CA01# |  |        |               |         | 9.8pF  | ±0.05pF | GRM1885C2A9R8WA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A8R4DA01# |  |        |               |         |        | ±0.1pF  | GRM1885C2A9R8BA01# |  |
|        |               |         | 8.5pF | ±0.05pF | GRM1885C2A8R5WA01# |  |        |               |         |        | ±0.25pF | GRM1885C2A9R8CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A8R5BA01# |  |        |               |         |        | ±0.5pF  | GRM1885C2A9R8DA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A8R5CA01# |  |        |               |         | 9.9pF  | ±0.05pF | GRM1885C2A9R9WA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A8R5DA01# |  |        |               |         |        | ±0.1pF  | GRM1885C2A9R9BA01# |  |
|        |               |         | 8.6pF | ±0.05pF | GRM1885C2A8R6WA01# |  |        |               |         |        | ±0.25pF | GRM1885C2A9R9CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A8R6BA01# |  |        |               |         |        | ±0.5pF  | GRM1885C2A9R9DA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A8R6CA01# |  |        |               |         | 10pF   | ±5%     | GRM1885C2A100JA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A8R6DA01# |  |        |               |         | 12pF   | ±5%     | GRM1885C2A120JA01# |  |
|        |               |         | 8.7pF | ±0.05pF | GRM1885C2A8R7WA01# |  |        |               |         | 15pF   | ±5%     | GRM1885C2A150JA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A8R7BA01# |  |        |               |         | 18pF   | ±5%     | GRM1885C2A180JA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A8R7CA01# |  |        |               |         | 22pF   | ±5%     | GRM1885C2A220JA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A8R7DA01# |  |        |               |         | 27pF   | ±5%     | GRM1885C2A270JA01# |  |
|        |               |         | 8.8pF | ±0.05pF | GRM1885C2A8R8WA01# |  |        |               |         | 33pF   | ±5%     | GRM1885C2A330JA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A8R8BA01# |  |        |               |         | 39pF   | ±5%     | GRM1885C2A390JA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A8R8CA01# |  |        |               |         | 47pF   | ±5%     | GRM1885C2A470JA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A8R8DA01# |  |        |               |         | 56pF   | ±5%     | GRM1885C2A560JA01# |  |
|        |               |         | 8.9pF | ±0.05pF | GRM1885C2A8R9WA01# |  |        |               |         | 68pF   | ±5%     | GRM1885C2A680JA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A8R9BA01# |  |        |               |         | 82pF   | ±5%     | GRM1885C2A820JA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A8R9CA01# |  |        |               |         | 100pF  | ±5%     | GRM1885C2A101JA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A8R9DA01# |  |        |               |         | 120pF  | ±5%     | GRM1885C2A121JA01# |  |
|        |               |         | 9.0pF | ±0.05pF | GRM1885C2A9R0WA01# |  |        |               |         | 150pF  | ±5%     | GRM1885C2A151JA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A9R0BA01# |  |        |               |         | 180pF  | ±5%     | GRM1885C2A181JA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A9R0CA01# |  |        |               |         | 220pF  | ±5%     | GRM1885C2A221JA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A9R0DA01# |  |        |               |         | 270pF  | ±5%     | GRM1885C2A271JA01# |  |
|        |               |         | 9.1pF | ±0.05pF | GRM1885C2A9R1WA01# |  |        |               |         | 330pF  | ±5%     | GRM1885C2A331JA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A9R1BA01# |  |        |               |         | 390pF  | ±5%     | GRM1885C2A391JA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A9R1CA01# |  |        |               |         | 470pF  | ±5%     | GRM1885C2A471JA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A9R1DA01# |  |        |               |         | 560pF  | ±5%     | GRM1885C2A561JA01# |  |
|        |               |         | 9.2pF | ±0.05pF | GRM1885C2A9R2WA01# |  |        |               |         | 680pF  | ±5%     | GRM1885C2A681JA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A9R2BA01# |  |        |               |         | 820pF  | ±5%     | GRM1885C2A821JA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C2A9R2CA01# |  |        |               |         | 1000pF | ±5%     | GRM1885C2A102JA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C2A9R2DA01# |  |        |               |         | 1200pF | ±5%     | GRM1885C2A122JA01# |  |
|        |               |         | 9.3pF | ±0.05pF | GRM1885C2A9R3WA01# |  |        |               |         | 1500pF | ±5%     | GRM1885C2A152JA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C2A9R3BA01# |  |        |               |         | 0.50pF | ±0.05pF | GRM1884C2AR50WA01# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 1.6×0.8mm)

| T max. | Rated Voltage | TC Code | Cap.   | Tol.    | Part Number        |  |
|--------|---------------|---------|--------|---------|--------------------|--|
| 0.9mm  | 100Vdc        | CK      | 0.50pF | ±0.1pF  | GRM1884C2AR50BA01# |  |
|        |               |         |        | ±0.05pF | GRM1884C2AR60WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1884C2AR60BA01# |  |
|        |               |         | 0.70pF | ±0.05pF | GRM1884C2AR70WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1884C2AR70BA01# |  |
|        |               |         | 0.80pF | ±0.05pF | GRM1884C2AR80WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1884C2AR80BA01# |  |
|        |               |         | 0.90pF | ±0.05pF | GRM1884C2AR90WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1884C2AR90BA01# |  |
|        |               |         | 1.0pF  | ±0.05pF | GRM1884C2A1R0WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1884C2A1R0BA01# |  |
|        |               |         |        | ±0.25pF | GRM1884C2A1R0CA01# |  |
|        |               |         | 1.1pF  | ±0.05pF | GRM1884C2A1R1WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1884C2A1R1BA01# |  |
|        |               |         |        | ±0.25pF | GRM1884C2A1R1CA01# |  |
|        |               |         | 1.2pF  | ±0.05pF | GRM1884C2A1R2WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1884C2A1R2BA01# |  |
|        |               |         |        | ±0.25pF | GRM1884C2A1R2CA01# |  |
|        |               |         | 1.3pF  | ±0.05pF | GRM1884C2A1R3WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1884C2A1R3BA01# |  |
|        |               |         |        | ±0.25pF | GRM1884C2A1R3CA01# |  |
|        |               |         | 1.4pF  | ±0.05pF | GRM1884C2A1R4WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1884C2A1R4BA01# |  |
|        |               |         |        | ±0.25pF | GRM1884C2A1R4CA01# |  |
|        |               |         | 1.5pF  | ±0.05pF | GRM1884C2A1R5WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1884C2A1R5BA01# |  |
|        |               |         |        | ±0.25pF | GRM1884C2A1R5CA01# |  |
|        |               |         | 1.6pF  | ±0.05pF | GRM1884C2A1R6WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1884C2A1R6BA01# |  |
|        |               |         |        | ±0.25pF | GRM1884C2A1R6CA01# |  |
|        |               |         | 1.7pF  | ±0.05pF | GRM1884C2A1R7WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1884C2A1R7BA01# |  |
|        |               |         |        | ±0.25pF | GRM1884C2A1R7CA01# |  |
|        |               |         | 1.8pF  | ±0.05pF | GRM1884C2A1R8WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1884C2A1R8BA01# |  |
|        |               |         |        | ±0.25pF | GRM1884C2A1R8CA01# |  |
|        |               |         | 1.9pF  | ±0.05pF | GRM1884C2A1R9WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1884C2A1R9BA01# |  |
|        |               |         |        | ±0.25pF | GRM1884C2A1R9CA01# |  |
|        |               |         | 2.0pF  | ±0.05pF | GRM1884C2A2R0WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1884C2A2R0BA01# |  |
|        |               |         |        | ±0.25pF | GRM1884C2A2R0CA01# |  |
|        |               | CJ      | 2.1pF  | ±0.05pF | GRM1883C2A2R1WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1883C2A2R1BA01# |  |
|        |               |         |        | ±0.25pF | GRM1883C2A2R1CA01# |  |
|        |               |         | 2.2pF  | ±0.05pF | GRM1883C2A2R2WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1883C2A2R2BA01# |  |
|        |               |         |        | ±0.25pF | GRM1883C2A2R2CA01# |  |
|        |               |         | 2.3pF  | ±0.05pF | GRM1883C2A2R3WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1883C2A2R3BA01# |  |
|        |               |         |        | ±0.25pF | GRM1883C2A2R3CA01# |  |
|        |               |         | 2.4pF  | ±0.05pF | GRM1883C2A2R4WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1883C2A2R4BA01# |  |
|        |               |         |        | ±0.25pF | GRM1883C2A2R4CA01# |  |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.9mm  | 100Vdc        | CJ      | 2.5pF | ±0.05pF | GRM1883C2A2R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C2A2R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C2A2R5CA01# |  |
|        |               |         | 2.6pF | ±0.05pF | GRM1883C2A2R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C2A2R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C2A2R6CA01# |  |
|        |               |         | 2.7pF | ±0.05pF | GRM1883C2A2R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C2A2R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C2A2R7CA01# |  |
|        |               |         | 2.8pF | ±0.05pF | GRM1883C2A2R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C2A2R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C2A2R8CA01# |  |
|        |               |         | 2.9pF | ±0.05pF | GRM1883C2A2R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C2A2R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C2A2R9CA01# |  |
|        |               |         | 3.0pF | ±0.05pF | GRM1883C2A3R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C2A3R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C2A3R0CA01# |  |
|        |               |         | 3.1pF | ±0.05pF | GRM1883C2A3R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C2A3R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C2A3R1CA01# |  |
|        |               |         | 3.2pF | ±0.05pF | GRM1883C2A3R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C2A3R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C2A3R2CA01# |  |
|        |               |         | 3.3pF | ±0.05pF | GRM1883C2A3R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C2A3R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C2A3R3CA01# |  |
|        |               |         | 3.4pF | ±0.05pF | GRM1883C2A3R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C2A3R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C2A3R4CA01# |  |
|        |               |         | 3.5pF | ±0.05pF | GRM1883C2A3R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C2A3R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C2A3R5CA01# |  |
|        |               |         | 3.6pF | ±0.05pF | GRM1883C2A3R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C2A3R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C2A3R6CA01# |  |
|        |               |         | 3.7pF | ±0.05pF | GRM1883C2A3R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C2A3R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C2A3R7CA01# |  |
|        |               |         | 3.8pF | ±0.05pF | GRM1883C2A3R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C2A3R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C2A3R8CA01# |  |
|        |               |         | 3.9pF | ±0.05pF | GRM1883C2A3R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C2A3R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C2A3R9CA01# |  |
|        |               | CH      | 4.0pF | ±0.05pF | GRM1882C2A4R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A4R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A4R0CA01# |  |
|        |               |         | 4.1pF | ±0.05pF | GRM1882C2A4R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A4R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A4R1CA01# |  |
|        |               |         | 4.2pF | ±0.05pF | GRM1882C2A4R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A4R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A4R2CA01# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 1.6×0.8mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  | T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|--------|---------------|---------|-------|---------|--------------------|--|
| 0.9mm  | 100Vdc        | CH      | 4.3pF | ±0.05pF | GRM1882C2A4R3WA01# |  | 0.9mm  | 100Vdc        | CH      | 5.8pF | ±0.25pF | GRM1882C2A5R8CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A4R3BA01# |  |        |               |         |       | ±0.5pF  | GRM1882C2A5R8DA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A4R3CA01# |  |        |               |         | 5.9pF | ±0.05pF | GRM1882C2A5R9WA01# |  |
|        |               |         | 4.4pF | ±0.05pF | GRM1882C2A4R4WA01# |  |        |               |         |       | ±0.1pF  | GRM1882C2A5R9BA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A4R4BA01# |  |        |               |         |       | ±0.25pF | GRM1882C2A5R9CA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A4R4CA01# |  |        |               |         | 6.0pF | ±0.05pF | GRM1882C2A6R0WA01# |  |
|        |               |         | 4.5pF | ±0.05pF | GRM1882C2A4R5WA01# |  |        |               |         |       | ±0.1pF  | GRM1882C2A6R0BA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A4R5BA01# |  |        |               |         |       | ±0.25pF | GRM1882C2A6R0CA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A4R5CA01# |  |        |               |         |       | ±0.5pF  | GRM1882C2A6R0DA01# |  |
|        |               |         | 4.6pF | ±0.05pF | GRM1882C2A4R6WA01# |  |        |               |         | 6.1pF | ±0.05pF | GRM1882C2A6R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A4R6BA01# |  |        |               |         |       | ±0.1pF  | GRM1882C2A6R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A4R6CA01# |  |        |               |         |       | ±0.25pF | GRM1882C2A6R1CA01# |  |
|        |               |         | 4.7pF | ±0.05pF | GRM1882C2A4R7WA01# |  |        |               |         |       | ±0.5pF  | GRM1882C2A6R1DA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A4R7BA01# |  |        |               |         | 6.2pF | ±0.05pF | GRM1882C2A6R2WA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A4R7CA01# |  |        |               |         |       | ±0.1pF  | GRM1882C2A6R2BA01# |  |
|        |               |         | 4.8pF | ±0.05pF | GRM1882C2A4R8WA01# |  |        |               |         |       | ±0.25pF | GRM1882C2A6R2CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A4R8BA01# |  |        |               |         |       | ±0.5pF  | GRM1882C2A6R2DA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A4R8CA01# |  |        |               |         | 6.3pF | ±0.05pF | GRM1882C2A6R3WA01# |  |
|        |               |         | 4.9pF | ±0.05pF | GRM1882C2A4R9WA01# |  |        |               |         |       | ±0.1pF  | GRM1882C2A6R3BA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A4R9BA01# |  |        |               |         |       | ±0.25pF | GRM1882C2A6R3CA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A4R9CA01# |  |        |               |         |       | ±0.5pF  | GRM1882C2A6R3DA01# |  |
|        |               |         | 5.0pF | ±0.05pF | GRM1882C2A5R0WA01# |  |        |               |         | 6.4pF | ±0.05pF | GRM1882C2A6R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A5R0BA01# |  |        |               |         |       | ±0.1pF  | GRM1882C2A6R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A5R0CA01# |  |        |               |         |       | ±0.25pF | GRM1882C2A6R4CA01# |  |
|        |               |         | 5.1pF | ±0.05pF | GRM1882C2A5R1WA01# |  |        |               |         |       | ±0.5pF  | GRM1882C2A6R4DA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A5R1BA01# |  |        |               |         | 6.5pF | ±0.05pF | GRM1882C2A6R5WA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A5R1CA01# |  |        |               |         |       | ±0.1pF  | GRM1882C2A6R5BA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A5R1DA01# |  |        |               |         |       | ±0.25pF | GRM1882C2A6R5CA01# |  |
|        |               |         | 5.2pF | ±0.05pF | GRM1882C2A5R2WA01# |  |        |               |         |       | ±0.5pF  | GRM1882C2A6R5DA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A5R2BA01# |  |        |               |         | 6.6pF | ±0.05pF | GRM1882C2A6R6WA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A5R2CA01# |  |        |               |         |       | ±0.1pF  | GRM1882C2A6R6BA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A5R2DA01# |  |        |               |         |       | ±0.25pF | GRM1882C2A6R6CA01# |  |
|        |               |         | 5.3pF | ±0.05pF | GRM1882C2A5R3WA01# |  |        |               |         |       | ±0.5pF  | GRM1882C2A6R6DA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A5R3BA01# |  |        |               |         | 6.7pF | ±0.05pF | GRM1882C2A6R7WA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A5R3CA01# |  |        |               |         |       | ±0.1pF  | GRM1882C2A6R7BA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A5R3DA01# |  |        |               |         |       | ±0.25pF | GRM1882C2A6R7CA01# |  |
|        |               |         | 5.4pF | ±0.05pF | GRM1882C2A5R4WA01# |  |        |               |         |       | ±0.5pF  | GRM1882C2A6R7DA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A5R4BA01# |  |        |               |         | 6.8pF | ±0.05pF | GRM1882C2A6R8WA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A5R4CA01# |  |        |               |         |       | ±0.1pF  | GRM1882C2A6R8BA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A5R4DA01# |  |        |               |         |       | ±0.25pF | GRM1882C2A6R8CA01# |  |
|        |               |         | 5.5pF | ±0.05pF | GRM1882C2A5R5WA01# |  |        |               |         |       | ±0.5pF  | GRM1882C2A6R8DA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A5R5BA01# |  |        |               |         | 6.9pF | ±0.05pF | GRM1882C2A6R9WA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A5R5CA01# |  |        |               |         |       | ±0.1pF  | GRM1882C2A6R9BA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A5R5DA01# |  |        |               |         |       | ±0.25pF | GRM1882C2A6R9CA01# |  |
|        |               |         | 5.6pF | ±0.05pF | GRM1882C2A5R6WA01# |  |        |               |         |       | ±0.5pF  | GRM1882C2A6R9DA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A5R6BA01# |  |        |               |         | 7.0pF | ±0.05pF | GRM1882C2A7R0WA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A5R6CA01# |  |        |               |         |       | ±0.1pF  | GRM1882C2A7R0BA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A5R6DA01# |  |        |               |         |       | ±0.25pF | GRM1882C2A7R0CA01# |  |
|        |               |         | 5.7pF | ±0.05pF | GRM1882C2A5R7WA01# |  |        |               |         |       | ±0.5pF  | GRM1882C2A7R0DA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A5R7BA01# |  |        |               |         | 7.1pF | ±0.05pF | GRM1882C2A7R1WA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A5R7CA01# |  |        |               |         |       | ±0.1pF  | GRM1882C2A7R1BA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A5R7DA01# |  |        |               |         |       | ±0.25pF | GRM1882C2A7R1CA01# |  |
|        |               |         | 5.8pF | ±0.05pF | GRM1882C2A5R8WA01# |  |        |               |         |       | ±0.5pF  | GRM1882C2A7R1DA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A5R8BA01# |  |        |               |         |       |         |                    |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 1.6×0.8mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.9mm  | 100Vdc        | CH      | 7.2pF | ±0.05pF | GRM1882C2A7R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A7R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A7R2CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A7R2DA01# |  |
|        |               |         | 7.3pF | ±0.05pF | GRM1882C2A7R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A7R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A7R3CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A7R3DA01# |  |
|        |               |         | 7.4pF | ±0.05pF | GRM1882C2A7R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A7R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A7R4CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A7R4DA01# |  |
|        |               |         | 7.5pF | ±0.05pF | GRM1882C2A7R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A7R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A7R5CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A7R5DA01# |  |
|        |               |         | 7.6pF | ±0.05pF | GRM1882C2A7R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A7R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A7R6CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A7R6DA01# |  |
|        |               |         | 7.7pF | ±0.05pF | GRM1882C2A7R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A7R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A7R7CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A7R7DA01# |  |
|        |               |         | 7.8pF | ±0.05pF | GRM1882C2A7R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A7R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A7R8CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A7R8DA01# |  |
|        |               |         | 7.9pF | ±0.05pF | GRM1882C2A7R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A7R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A7R9CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A7R9DA01# |  |
|        |               |         | 8.0pF | ±0.05pF | GRM1882C2A8R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A8R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A8R0CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A8R0DA01# |  |
|        |               |         | 8.1pF | ±0.05pF | GRM1882C2A8R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A8R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A8R1CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A8R1DA01# |  |
|        |               |         | 8.2pF | ±0.05pF | GRM1882C2A8R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A8R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A8R2CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A8R2DA01# |  |
|        |               |         | 8.3pF | ±0.05pF | GRM1882C2A8R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A8R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A8R3CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A8R3DA01# |  |
|        |               |         | 8.4pF | ±0.05pF | GRM1882C2A8R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A8R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A8R4CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A8R4DA01# |  |
|        |               |         | 8.5pF | ±0.05pF | GRM1882C2A8R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A8R5BA01# |  |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.9mm  | 100Vdc        | CH      | 8.5pF | ±0.25pF | GRM1882C2A8R5CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A8R5DA01# |  |
|        |               |         | 8.6pF | ±0.05pF | GRM1882C2A8R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A8R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A8R6CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A8R6DA01# |  |
|        |               |         | 8.7pF | ±0.05pF | GRM1882C2A8R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A8R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A8R7CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A8R7DA01# |  |
|        |               |         | 8.8pF | ±0.05pF | GRM1882C2A8R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A8R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A8R8CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A8R8DA01# |  |
|        |               |         | 8.9pF | ±0.05pF | GRM1882C2A8R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A8R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A8R9CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A8R9DA01# |  |
|        |               |         | 9.0pF | ±0.05pF | GRM1882C2A9R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A9R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A9R0CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A9R0DA01# |  |
|        |               |         | 9.1pF | ±0.05pF | GRM1882C2A9R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A9R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A9R1CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A9R1DA01# |  |
|        |               |         | 9.2pF | ±0.05pF | GRM1882C2A9R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A9R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A9R2CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A9R2DA01# |  |
|        |               |         | 9.3pF | ±0.05pF | GRM1882C2A9R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A9R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A9R3CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A9R3DA01# |  |
|        |               |         | 9.4pF | ±0.05pF | GRM1882C2A9R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A9R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A9R4CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A9R4DA01# |  |
|        |               |         | 9.5pF | ±0.05pF | GRM1882C2A9R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A9R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A9R5CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A9R5DA01# |  |
|        |               |         | 9.6pF | ±0.05pF | GRM1882C2A9R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A9R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A9R6CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A9R6DA01# |  |
|        |               |         | 9.7pF | ±0.05pF | GRM1882C2A9R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A9R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A9R7CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A9R7DA01# |  |
|        |               |         | 9.8pF | ±0.05pF | GRM1882C2A9R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C2A9R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C2A9R8CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C2A9R8DA01# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 1.6×0.8mm)

| T max. | Rated Voltage | TC Code | Cap.   | Tol.    | Part Number        |  | T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|--------|---------|--------------------|--|--------|---------------|---------|-------|---------|--------------------|--|
| 0.9mm  | 100Vdc        | CH      | 9.9pF  | ±0.05pF | GRM1882C2A9R9WA01# |  | 0.9mm  | 50Vdc         | COG     | 1.4pF | ±0.1pF  | GRM1885C1H1R4BA01# |  |
|        |               |         |        | ±0.1pF  | GRM1882C2A9R9BA01# |  |        |               |         |       | ±0.25pF | GRM1885C1H1R4CA01# |  |
|        |               |         |        | ±0.25pF | GRM1882C2A9R9CA01# |  |        |               |         | 1.5pF | ±0.05pF | GRM1885C1H1R5WA01# |  |
|        |               |         |        | ±0.5pF  | GRM1882C2A9R9DA01# |  |        |               |         |       | ±0.1pF  | GRM1885C1H1R5BA01# |  |
|        |               |         | 10pF   | ±5%     | GRM1882C2A100JA01# |  |        |               |         |       | ±0.25pF | GRM1885C1H1R5CA01# |  |
|        |               |         |        | ±5%     | GRM1882C2A120JA01# |  |        |               |         | 1.6pF | ±0.05pF | GRM1885C1H1R6WA01# |  |
|        |               |         |        | ±5%     | GRM1882C2A150JA01# |  |        |               |         |       | ±0.1pF  | GRM1885C1H1R6BA01# |  |
|        |               |         |        | ±5%     | GRM1882C2A180JA01# |  |        |               |         |       | ±0.25pF | GRM1885C1H1R6CA01# |  |
|        |               |         | 12pF   | ±5%     | GRM1882C2A220JA01# |  |        |               |         | 1.7pF | ±0.05pF | GRM1885C1H1R7WA01# |  |
|        |               |         |        | ±5%     | GRM1882C2A270JA01# |  |        |               |         |       | ±0.1pF  | GRM1885C1H1R7BA01# |  |
|        |               |         |        | ±5%     | GRM1882C2A330JA01# |  |        |               |         |       | ±0.25pF | GRM1885C1H1R7CA01# |  |
|        |               |         |        | ±5%     | GRM1882C2A390JA01# |  |        |               |         | 1.8pF | ±0.05pF | GRM1885C1H1R8WA01# |  |
|        |               |         | 15pF   | ±5%     | GRM1882C2A470JA01# |  |        |               |         |       | ±0.1pF  | GRM1885C1H1R8BA01# |  |
|        |               |         |        | ±5%     | GRM1882C2A560JA01# |  |        |               |         |       | ±0.25pF | GRM1885C1H1R8CA01# |  |
|        |               |         |        | ±5%     | GRM1882C2A680JA01# |  |        |               |         | 1.9pF | ±0.05pF | GRM1885C1H1R9WA01# |  |
|        |               |         |        | ±5%     | GRM1882C2A820JA01# |  |        |               |         |       | ±0.1pF  | GRM1885C1H1R9BA01# |  |
|        |               |         |        | ±5%     | GRM1882C2A101JA01# |  |        |               |         |       | ±0.25pF | GRM1885C1H1R9CA01# |  |
|        |               |         | 18pF   | ±5%     | GRM1882C2A121JA01# |  |        |               |         | 2.0pF | ±0.05pF | GRM1885C1H2R0WA01# |  |
|        |               |         |        | ±5%     | GRM1882C2A151JA01# |  |        |               |         |       | ±0.1pF  | GRM1885C1H2R0BA01# |  |
|        |               |         |        | ±5%     | GRM1882C2A181JA01# |  |        |               |         |       | ±0.25pF | GRM1885C1H2R0CA01# |  |
|        |               |         |        | ±5%     | GRM1882C2A221JA01# |  |        |               |         | 2.1pF | ±0.05pF | GRM1885C1H2R1WA01# |  |
|        |               |         | 22pF   | ±5%     | GRM1882C2A271JA01# |  |        |               |         |       | ±0.1pF  | GRM1885C1H2R1BA01# |  |
|        |               |         |        | ±5%     | GRM1882C2A331JA01# |  |        |               |         |       | ±0.25pF | GRM1885C1H2R1CA01# |  |
|        |               |         |        | ±5%     | GRM1882C2A391JA01# |  |        |               |         | 2.2pF | ±0.05pF | GRM1885C1H2R2WA01# |  |
|        |               |         | 27pF   | ±5%     | GRM1882C2A471JA01# |  |        |               |         |       | ±0.1pF  | GRM1885C1H2R2BA01# |  |
|        |               |         |        | ±5%     | GRM1882C2A561JA01# |  |        |               |         |       | ±0.25pF | GRM1885C1H2R2CA01# |  |
|        |               |         |        | ±5%     | GRM1882C2A681JA01# |  |        |               |         | 2.3pF | ±0.05pF | GRM1885C1H2R3WA01# |  |
|        |               |         | 33pF   | ±5%     | GRM1882C2A821JA01# |  |        |               |         |       | ±0.1pF  | GRM1885C1H2R3BA01# |  |
|        |               |         |        | ±5%     | GRM1882C2A102JA01# |  |        |               |         |       | ±0.25pF | GRM1885C1H2R3CA01# |  |
|        |               |         |        | ±5%     | GRM1882C2A122JA01# |  |        |               |         | 2.4pF | ±0.05pF | GRM1885C1H2R4WA01# |  |
|        |               |         | 39pF   | ±5%     | GRM1882C2A152JA01# |  |        |               |         |       | ±0.1pF  | GRM1885C1H2R4BA01# |  |
|        |               |         |        | ±5%     | GRM1885C1HR50WA01# |  |        |               |         |       | ±0.25pF | GRM1885C1H2R4CA01# |  |
|        |               |         |        | ±0.1pF  | GRM1885C1HR50BA01# |  |        |               |         | 2.5pF | ±0.05pF | GRM1885C1H2R5WA01# |  |
|        |               |         | 0.60pF | ±0.05pF | GRM1885C1HR60WA01# |  |        |               |         |       | ±0.1pF  | GRM1885C1H2R5BA01# |  |
|        |               |         |        | ±0.1pF  | GRM1885C1HR60BA01# |  |        |               |         |       | ±0.25pF | GRM1885C1H2R5CA01# |  |
|        |               |         |        | ±0.05pF | GRM1885C1HR70WA01# |  |        |               |         | 2.6pF | ±0.05pF | GRM1885C1H2R6WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1885C1HR70BA01# |  |        |               |         |       | ±0.1pF  | GRM1885C1H2R6BA01# |  |
|        |               |         | 0.80pF | ±0.05pF | GRM1885C1HR80WA01# |  |        |               |         |       | ±0.25pF | GRM1885C1H2R6CA01# |  |
|        |               |         |        | ±0.1pF  | GRM1885C1HR80BA01# |  |        |               |         | 2.7pF | ±0.05pF | GRM1885C1H2R7WA01# |  |
|        |               |         |        | ±0.05pF | GRM1885C1HR90WA01# |  |        |               |         |       | ±0.1pF  | GRM1885C1H2R7BA01# |  |
|        |               |         |        | ±0.1pF  | GRM1885C1HR90BA01# |  |        |               |         |       | ±0.25pF | GRM1885C1H2R7CA01# |  |
|        |               |         | 1.0pF  | ±0.05pF | GRM1885C1H1R0WA01# |  |        |               |         | 2.8pF | ±0.05pF | GRM1885C1H2R8WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1885C1H1R0BA01# |  |        |               |         |       | ±0.1pF  | GRM1885C1H2R8BA01# |  |
|        |               |         |        | ±0.25pF | GRM1885C1H1R0CA01# |  |        |               |         |       | ±0.25pF | GRM1885C1H2R8CA01# |  |
|        |               |         | 1.1pF  | ±0.05pF | GRM1885C1H1R1WA01# |  |        |               |         | 2.9pF | ±0.05pF | GRM1885C1H2R9WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1885C1H1R1BA01# |  |        |               |         |       | ±0.1pF  | GRM1885C1H2R9BA01# |  |
|        |               |         |        | ±0.25pF | GRM1885C1H1R1CA01# |  |        |               |         |       | ±0.25pF | GRM1885C1H2R9CA01# |  |
|        |               |         | 1.2pF  | ±0.05pF | GRM1885C1H1R2WA01# |  |        |               |         | 3.0pF | ±0.05pF | GRM1885C1H3R0WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1885C1H1R2BA01# |  |        |               |         |       | ±0.1pF  | GRM1885C1H3R0BA01# |  |
|        |               |         |        | ±0.25pF | GRM1885C1H1R2CA01# |  |        |               |         |       | ±0.25pF | GRM1885C1H3R0CA01# |  |
|        |               |         | 1.3pF  | ±0.05pF | GRM1885C1H1R3WA01# |  |        |               |         | 3.1pF | ±0.05pF | GRM1885C1H3R1WA01# |  |
|        |               |         |        | ±0.1pF  | GRM1885C1H1R3BA01# |  |        |               |         |       | ±0.1pF  | GRM1885C1H3R1BA01# |  |
|        |               |         |        | ±0.25pF | GRM1885C1H1R3CA01# |  |        |               |         |       | ±0.25pF | GRM1885C1H3R1CA01# |  |
|        |               |         | 1.4pF  | ±0.05pF | GRM1885C1H1R4WA01# |  |        |               |         | 3.2pF | ±0.05pF | GRM1885C1H3R2WA01# |  |
|        |               |         |        | ±0.05pF | GRM1885C1H1R4BA01# |  |        |               |         |       | ±0.05pF | GRM1885C1H3R2BA01# |  |
|        |               |         |        | ±0.05pF | GRM1885C1H1R4CA01# |  |        |               |         |       | ±0.05pF | GRM1885C1H3R2CA01# |  |
|        |               |         |        | ±0.05pF | GRM1885C1H1R4DA01# |  |        |               |         |       | ±0.05pF | GRM1885C1H3R2CA01# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 1.6×0.8mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.9mm  | 50Vdc         | COG     | 3.2pF | ±0.1pF  | GRM1885C1H3R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H3R2CA01# |  |
|        |               |         | 3.3pF | ±0.05pF | GRM1885C1H3R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H3R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H3R3CA01# |  |
|        |               |         | 3.4pF | ±0.05pF | GRM1885C1H3R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H3R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H3R4CA01# |  |
|        |               |         | 3.5pF | ±0.05pF | GRM1885C1H3R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H3R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H3R5CA01# |  |
|        |               |         | 3.6pF | ±0.05pF | GRM1885C1H3R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H3R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H3R6CA01# |  |
|        |               |         | 3.7pF | ±0.05pF | GRM1885C1H3R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H3R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H3R7CA01# |  |
|        |               |         | 3.8pF | ±0.05pF | GRM1885C1H3R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H3R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H3R8CA01# |  |
|        |               |         | 3.9pF | ±0.05pF | GRM1885C1H3R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H3R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H3R9CA01# |  |
|        |               |         | 4.0pF | ±0.05pF | GRM1885C1H4R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H4R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H4R0CA01# |  |
|        |               |         | 4.1pF | ±0.05pF | GRM1885C1H4R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H4R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H4R1CA01# |  |
|        |               |         | 4.2pF | ±0.05pF | GRM1885C1H4R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H4R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H4R2CA01# |  |
|        |               |         | 4.3pF | ±0.05pF | GRM1885C1H4R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H4R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H4R3CA01# |  |
|        |               |         | 4.4pF | ±0.05pF | GRM1885C1H4R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H4R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H4R4CA01# |  |
|        |               |         | 4.5pF | ±0.05pF | GRM1885C1H4R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H4R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H4R5CA01# |  |
|        |               |         | 4.6pF | ±0.05pF | GRM1885C1H4R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H4R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H4R6CA01# |  |
|        |               |         | 4.7pF | ±0.05pF | GRM1885C1H4R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H4R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H4R7CA01# |  |
|        |               |         | 4.8pF | ±0.05pF | GRM1885C1H4R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H4R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H4R8CA01# |  |
|        |               |         | 4.9pF | ±0.05pF | GRM1885C1H4R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H4R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H4R9CA01# |  |
|        |               |         | 5.0pF | ±0.05pF | GRM1885C1H5R0WA01# |  |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.9mm  | 50Vdc         | COG     | 5.0pF | ±0.1pF  | GRM1885C1H5R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H5R0CA01# |  |
|        |               |         | 5.1pF | ±0.05pF | GRM1885C1H5R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H5R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H5R1CA01# |  |
|        |               |         | 5.2pF | ±0.05pF | GRM1885C1H5R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H5R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H5R2CA01# |  |
|        |               |         | 5.3pF | ±0.05pF | GRM1885C1H5R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H5R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H5R3CA01# |  |
|        |               |         | 5.4pF | ±0.05pF | GRM1885C1H5R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H5R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H5R4CA01# |  |
|        |               |         | 5.5pF | ±0.05pF | GRM1885C1H5R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H5R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H5R5CA01# |  |
|        |               |         | 5.6pF | ±0.05pF | GRM1885C1H5R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H5R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H5R6CA01# |  |
|        |               |         | 5.7pF | ±0.05pF | GRM1885C1H5R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H5R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H5R7CA01# |  |
|        |               |         | 5.8pF | ±0.05pF | GRM1885C1H5R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H5R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H5R8CA01# |  |
|        |               |         | 5.9pF | ±0.05pF | GRM1885C1H5R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H5R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H5R9CA01# |  |
|        |               |         | 6.0pF | ±0.05pF | GRM1885C1H6R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H6R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H6R0CA01# |  |
|        |               |         | 6.1pF | ±0.05pF | GRM1885C1H6R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H6R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H6R1CA01# |  |
|        |               |         | 6.2pF | ±0.05pF | GRM1885C1H6R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H6R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H6R2CA01# |  |
|        |               |         | 6.3pF | ±0.05pF | GRM1885C1H6R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H6R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H6R3CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H6R3DA01# |  |

Part number # indicates the package specification code.

# GRM Series Temperature Compensating Type Part Number List

(→ 1.6×0.8mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.9mm  | 50Vdc         | COG     | 6.4pF | ±0.05pF | GRM1885C1H6R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H6R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H6R4CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H6R4DA01# |  |
|        |               |         | 6.5pF | ±0.05pF | GRM1885C1H6R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H6R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H6R5CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H6R5DA01# |  |
|        |               |         | 6.6pF | ±0.05pF | GRM1885C1H6R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H6R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H6R6CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H6R6DA01# |  |
|        |               |         | 6.7pF | ±0.05pF | GRM1885C1H6R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H6R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H6R7CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H6R7DA01# |  |
|        |               |         | 6.8pF | ±0.05pF | GRM1885C1H6R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H6R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H6R8CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H6R8DA01# |  |
|        |               |         | 6.9pF | ±0.05pF | GRM1885C1H6R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H6R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H6R9CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H6R9DA01# |  |
|        |               |         | 7.0pF | ±0.05pF | GRM1885C1H7R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H7R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H7R0CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H7R0DA01# |  |
|        |               |         | 7.1pF | ±0.05pF | GRM1885C1H7R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H7R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H7R1CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H7R1DA01# |  |
|        |               |         | 7.2pF | ±0.05pF | GRM1885C1H7R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H7R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H7R2CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H7R2DA01# |  |
|        |               |         | 7.3pF | ±0.05pF | GRM1885C1H7R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H7R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H7R3CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H7R3DA01# |  |
|        |               |         | 7.4pF | ±0.05pF | GRM1885C1H7R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H7R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H7R4CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H7R4DA01# |  |
|        |               |         | 7.5pF | ±0.05pF | GRM1885C1H7R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H7R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H7R5CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H7R5DA01# |  |
|        |               |         | 7.6pF | ±0.05pF | GRM1885C1H7R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H7R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H7R6CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H7R6DA01# |  |
|        |               |         | 7.7pF | ±0.05pF | GRM1885C1H7R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H7R7BA01# |  |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.9mm  | 50Vdc         | COG     | 7.7pF | ±0.25pF | GRM1885C1H7R7CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H7R7DA01# |  |
|        |               |         | 7.8pF | ±0.05pF | GRM1885C1H7R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H7R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H7R8CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H7R8DA01# |  |
|        |               |         | 7.9pF | ±0.05pF | GRM1885C1H7R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H7R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H7R9CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H7R9DA01# |  |
|        |               |         | 8.0pF | ±0.05pF | GRM1885C1H8R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H8R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H8R0CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H8R0DA01# |  |
|        |               |         | 8.1pF | ±0.05pF | GRM1885C1H8R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H8R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H8R1CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H8R1DA01# |  |
|        |               |         | 8.2pF | ±0.05pF | GRM1885C1H8R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H8R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H8R2CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H8R2DA01# |  |
|        |               |         | 8.3pF | ±0.05pF | GRM1885C1H8R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H8R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H8R3CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H8R3DA01# |  |
|        |               |         | 8.4pF | ±0.05pF | GRM1885C1H8R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H8R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H8R4CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H8R4DA01# |  |
|        |               |         | 8.5pF | ±0.05pF | GRM1885C1H8R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H8R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H8R5CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H8R5DA01# |  |
|        |               |         | 8.6pF | ±0.05pF | GRM1885C1H8R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H8R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H8R6CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H8R6DA01# |  |
|        |               |         | 8.7pF | ±0.05pF | GRM1885C1H8R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H8R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H8R7CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H8R7DA01# |  |
|        |               |         | 8.8pF | ±0.05pF | GRM1885C1H8R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H8R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H8R8CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H8R8DA01# |  |
|        |               |         | 8.9pF | ±0.05pF | GRM1885C1H8R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H8R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H8R9CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H8R9DA01# |  |
|        |               |         | 9.0pF | ±0.05pF | GRM1885C1H9R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H9R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H9R0CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H9R0DA01# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 1.6×0.8mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  | T max. | Rated Voltage | TC Code | Cap.   | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|--------|---------------|---------|--------|---------|--------------------|--|
| 0.9mm  | 50Vdc         | COG     | 9.1pF | ±0.05pF | GRM1885C1H9R1WA01# |  | 0.9mm  | 50Vdc         | COG     | 330pF  | ±5%     | GRM1885C1H331JA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H9R1BA01# |  |        |               |         |        | ±5%     | GRM1885C1H391JA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H9R1CA01# |  |        |               |         |        | ±5%     | GRM1885C1H471JA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H9R1DA01# |  |        |               |         |        | ±5%     | GRM1885C1H561JA01# |  |
|        |               |         | 9.2pF | ±0.05pF | GRM1885C1H9R2WA01# |  |        |               |         |        | ±5%     | GRM1885C1H681JA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H9R2BA01# |  |        |               |         |        | ±5%     | GRM1885C1H821JA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H9R2CA01# |  |        |               |         |        | ±5%     | GRM1885C1H102JA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H9R2DA01# |  |        |               |         |        | ±5%     | GRM1885C1H122JA01# |  |
|        |               |         | 9.3pF | ±0.05pF | GRM1885C1H9R3WA01# |  |        |               |         |        | ±5%     | GRM1885C1H152JA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H9R3BA01# |  |        |               |         |        | ±5%     | GRM1885C1H182JA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H9R3CA01# |  |        |               |         |        | ±5%     | GRM1885C1H222JA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H9R3DA01# |  |        |               |         |        | ±5%     | GRM1885C1H272JA01# |  |
|        |               |         | 9.4pF | ±0.05pF | GRM1885C1H9R4WA01# |  |        |               |         |        | ±5%     | GRM1885C1H332JA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H9R4BA01# |  |        |               |         |        | ±5%     | GRM1885C1H392JA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H9R4CA01# |  |        |               |         |        | ±5%     | GRM1885C1H472JA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H9R4DA01# |  |        |               |         |        | ±5%     | GRM1885C1H562JA01# |  |
|        |               |         | 9.5pF | ±0.05pF | GRM1885C1H9R5WA01# |  |        |               |         |        | ±5%     | GRM1885C1H682JA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H9R5BA01# |  |        |               |         |        | ±5%     | GRM1885C1H822JA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H9R5CA01# |  |        |               |         |        | ±5%     | GRM1885C1H822JA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H9R5DA01# |  |        |               |         |        | ±5%     | GRM1885C1H103JA01# |  |
|        |               |         | 9.6pF | ±0.05pF | GRM1885C1H9R6WA01# |  |        |               | CK      | 0.50pF | ±0.05pF | GRM1884C1HR50WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H9R6BA01# |  |        |               |         |        | ±0.1pF  | GRM1884C1HR50BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H9R6CA01# |  |        |               |         | 0.60pF | ±0.05pF | GRM1884C1HR60WA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H9R6DA01# |  |        |               |         |        | ±0.1pF  | GRM1884C1HR60BA01# |  |
|        |               |         | 9.7pF | ±0.05pF | GRM1885C1H9R7WA01# |  |        |               |         | 0.70pF | ±0.05pF | GRM1884C1HR70WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H9R7BA01# |  |        |               |         |        | ±0.1pF  | GRM1884C1HR70BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H9R7CA01# |  |        |               |         | 0.80pF | ±0.05pF | GRM1884C1HR80WA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H9R7DA01# |  |        |               |         |        | ±0.1pF  | GRM1884C1HR80BA01# |  |
|        |               |         | 9.8pF | ±0.05pF | GRM1885C1H9R8WA01# |  |        |               |         | 0.90pF | ±0.05pF | GRM1884C1HR90WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H9R8BA01# |  |        |               |         |        | ±0.1pF  | GRM1884C1HR90BA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H9R8CA01# |  |        |               |         | 1.0pF  | ±0.05pF | GRM1884C1H1R0WA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H9R8DA01# |  |        |               |         |        | ±0.1pF  | GRM1884C1H1R0BA01# |  |
|        |               |         | 9.9pF | ±0.05pF | GRM1885C1H9R9WA01# |  |        |               |         |        | ±0.25pF | GRM1884C1H1R0CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1885C1H9R9BA01# |  |        |               |         | 1.1pF  | ±0.05pF | GRM1884C1H1R1WA01# |  |
|        |               |         |       | ±0.25pF | GRM1885C1H9R9CA01# |  |        |               |         |        | ±0.1pF  | GRM1884C1H1R1BA01# |  |
|        |               |         |       | ±0.5pF  | GRM1885C1H9R9DA01# |  |        |               |         |        | ±0.25pF | GRM1884C1H1R1CA01# |  |
|        |               |         | 10pF  | ±5%     | GRM1885C1H100JA01# |  |        |               |         | 1.2pF  | ±0.05pF | GRM1884C1H1R2WA01# |  |
|        |               |         |       | ±5%     | GRM1885C1H120JA01# |  |        |               |         |        | ±0.1pF  | GRM1884C1H1R2BA01# |  |
|        |               |         |       | ±5%     | GRM1885C1H150JA01# |  |        |               |         |        | ±0.25pF | GRM1884C1H1R2CA01# |  |
|        |               |         | 18pF  | ±5%     | GRM1885C1H180JA01# |  |        |               |         | 1.3pF  | ±0.05pF | GRM1884C1H1R3WA01# |  |
|        |               |         |       | ±5%     | GRM1885C1H220JA01# |  |        |               |         |        | ±0.1pF  | GRM1884C1H1R3BA01# |  |
|        |               |         |       | ±5%     | GRM1885C1H270JA01# |  |        |               |         |        | ±0.25pF | GRM1884C1H1R3CA01# |  |
|        |               |         | 27pF  | ±5%     | GRM1885C1H330JA01# |  |        |               |         | 1.4pF  | ±0.05pF | GRM1884C1H1R4WA01# |  |
|        |               |         |       | ±5%     | GRM1885C1H390JA01# |  |        |               |         |        | ±0.1pF  | GRM1884C1H1R4BA01# |  |
|        |               |         |       | ±5%     | GRM1885C1H470JA01# |  |        |               |         |        | ±0.25pF | GRM1884C1H1R4CA01# |  |
|        |               |         | 39pF  | ±5%     | GRM1885C1H560JA01# |  |        |               |         | 1.5pF  | ±0.05pF | GRM1884C1H1R5WA01# |  |
|        |               |         |       | ±5%     | GRM1885C1H680JA01# |  |        |               |         |        | ±0.1pF  | GRM1884C1H1R5BA01# |  |
|        |               |         |       | ±5%     | GRM1885C1H820JA01# |  |        |               |         |        | ±0.25pF | GRM1884C1H1R5CA01# |  |
|        |               |         | 82pF  | ±5%     | GRM1885C1H820JA01# |  |        |               |         | 1.6pF  | ±0.05pF | GRM1884C1H1R6WA01# |  |
|        |               |         |       | ±5%     | GRM1885C1H101JA01# |  |        |               |         |        | ±0.1pF  | GRM1884C1H1R6BA01# |  |
|        |               |         |       | ±5%     | GRM1885C1H121JA01# |  |        |               |         |        | ±0.25pF | GRM1884C1H1R6CA01# |  |
|        |               |         | 150pF | ±5%     | GRM1885C1H151JA01# |  |        |               |         | 1.7pF  | ±0.05pF | GRM1884C1H1R7WA01# |  |
|        |               |         |       | ±5%     | GRM1885C1H181JA01# |  |        |               |         |        | ±0.1pF  | GRM1884C1H1R7BA01# |  |
|        |               |         |       | ±5%     | GRM1885C1H221JA01# |  |        |               |         |        | ±0.25pF | GRM1884C1H1R7CA01# |  |
|        |               |         | 220pF | ±5%     | GRM1885C1H271JA01# |  |        |               |         | 1.8pF  | ±0.05pF | GRM1884C1H1R8WA01# |  |
|        |               |         |       | ±5%     | GRM1885C1H271JA01# |  |        |               |         |        |         |                    |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 1.6×0.8mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  | T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|--------|---------------|---------|-------|---------|--------------------|--|
| 0.9mm  | 50Vdc         | CK      | 1.8pF | ±0.1pF  | GRM1884C1H1R8BA01# |  | 0.9mm  | 50Vdc         | CJ      | 3.6pF | ±0.1pF  | GRM1883C1H3R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1884C1H1R8CA01# |  |        |               |         |       | ±0.25pF | GRM1883C1H3R6CA01# |  |
|        |               |         | 1.9pF | ±0.05pF | GRM1884C1H1R9WA01# |  |        |               |         | 3.7pF | ±0.05pF | GRM1883C1H3R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1884C1H1R9BA01# |  |        |               |         |       | ±0.1pF  | GRM1883C1H3R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1884C1H1R9CA01# |  |        |               |         |       | ±0.25pF | GRM1883C1H3R7CA01# |  |
|        |               |         | 2.0pF | ±0.05pF | GRM1884C1H2R0WA01# |  |        |               |         | 3.8pF | ±0.05pF | GRM1883C1H3R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1884C1H2R0BA01# |  |        |               |         |       | ±0.1pF  | GRM1883C1H3R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1884C1H2R0CA01# |  |        |               |         |       | ±0.25pF | GRM1883C1H3R8CA01# |  |
|        |               | CJ      | 2.1pF | ±0.05pF | GRM1883C1H2R1WA01# |  |        |               |         | 3.9pF | ±0.05pF | GRM1883C1H3R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C1H2R1BA01# |  |        |               |         |       | ±0.1pF  | GRM1883C1H3R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C1H2R1CA01# |  |        |               |         |       | ±0.25pF | GRM1883C1H3R9CA01# |  |
|        |               |         | 2.2pF | ±0.05pF | GRM1883C1H2R2WA01# |  |        |               | CH      | 4.0pF | ±0.05pF | GRM1882C1H4R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C1H2R2BA01# |  |        |               |         |       | ±0.1pF  | GRM1882C1H4R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C1H2R2CA01# |  |        |               |         |       | ±0.25pF | GRM1882C1H4R0CA01# |  |
|        |               |         | 2.3pF | ±0.05pF | GRM1883C1H2R3WA01# |  |        |               |         | 4.1pF | ±0.05pF | GRM1882C1H4R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C1H2R3BA01# |  |        |               |         |       | ±0.1pF  | GRM1882C1H4R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C1H2R3CA01# |  |        |               |         |       | ±0.25pF | GRM1882C1H4R1CA01# |  |
|        |               |         | 2.4pF | ±0.05pF | GRM1883C1H2R4WA01# |  |        |               |         | 4.2pF | ±0.05pF | GRM1882C1H4R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C1H2R4BA01# |  |        |               |         |       | ±0.1pF  | GRM1882C1H4R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C1H2R4CA01# |  |        |               |         |       | ±0.25pF | GRM1882C1H4R2CA01# |  |
|        |               |         | 2.5pF | ±0.05pF | GRM1883C1H2R5WA01# |  |        |               |         | 4.3pF | ±0.05pF | GRM1882C1H4R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C1H2R5BA01# |  |        |               |         |       | ±0.1pF  | GRM1882C1H4R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C1H2R5CA01# |  |        |               |         |       | ±0.25pF | GRM1882C1H4R3CA01# |  |
|        |               |         | 2.6pF | ±0.05pF | GRM1883C1H2R6WA01# |  |        |               |         | 4.4pF | ±0.05pF | GRM1882C1H4R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C1H2R6BA01# |  |        |               |         |       | ±0.1pF  | GRM1882C1H4R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C1H2R6CA01# |  |        |               |         |       | ±0.25pF | GRM1882C1H4R4CA01# |  |
|        |               |         | 2.7pF | ±0.05pF | GRM1883C1H2R7WA01# |  |        |               |         | 4.5pF | ±0.05pF | GRM1882C1H4R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C1H2R7BA01# |  |        |               |         |       | ±0.1pF  | GRM1882C1H4R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C1H2R7CA01# |  |        |               |         |       | ±0.25pF | GRM1882C1H4R5CA01# |  |
|        |               |         | 2.8pF | ±0.05pF | GRM1883C1H2R8WA01# |  |        |               |         | 4.6pF | ±0.05pF | GRM1882C1H4R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C1H2R8BA01# |  |        |               |         |       | ±0.1pF  | GRM1882C1H4R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C1H2R8CA01# |  |        |               |         |       | ±0.25pF | GRM1882C1H4R6CA01# |  |
|        |               |         | 2.9pF | ±0.05pF | GRM1883C1H2R9WA01# |  |        |               |         | 4.7pF | ±0.05pF | GRM1882C1H4R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C1H2R9BA01# |  |        |               |         |       | ±0.1pF  | GRM1882C1H4R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C1H2R9CA01# |  |        |               |         |       | ±0.25pF | GRM1882C1H4R7CA01# |  |
|        |               |         | 3.0pF | ±0.05pF | GRM1883C1H3R0WA01# |  |        |               |         | 4.8pF | ±0.05pF | GRM1882C1H4R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C1H3R0BA01# |  |        |               |         |       | ±0.1pF  | GRM1882C1H4R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C1H3R0CA01# |  |        |               |         |       | ±0.25pF | GRM1882C1H4R8CA01# |  |
|        |               |         | 3.1pF | ±0.05pF | GRM1883C1H3R1WA01# |  |        |               |         | 4.9pF | ±0.05pF | GRM1882C1H4R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C1H3R1BA01# |  |        |               |         |       | ±0.1pF  | GRM1882C1H4R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C1H3R1CA01# |  |        |               |         |       | ±0.25pF | GRM1882C1H4R9CA01# |  |
|        |               |         | 3.2pF | ±0.05pF | GRM1883C1H3R2WA01# |  |        |               |         | 5.0pF | ±0.05pF | GRM1882C1H5R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C1H3R2BA01# |  |        |               |         |       | ±0.1pF  | GRM1882C1H5R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C1H3R2CA01# |  |        |               |         |       | ±0.25pF | GRM1882C1H5R0CA01# |  |
|        |               |         | 3.3pF | ±0.05pF | GRM1883C1H3R3WA01# |  |        |               |         | 5.1pF | ±0.05pF | GRM1882C1H5R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C1H3R3BA01# |  |        |               |         |       | ±0.1pF  | GRM1882C1H5R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C1H3R3CA01# |  |        |               |         |       | ±0.25pF | GRM1882C1H5R1CA01# |  |
|        |               |         | 3.4pF | ±0.05pF | GRM1883C1H3R4WA01# |  |        |               |         | 5.2pF | ±0.05pF | GRM1882C1H5R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C1H3R4BA01# |  |        |               |         |       | ±0.1pF  | GRM1882C1H5R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C1H3R4CA01# |  |        |               |         |       | ±0.25pF | GRM1882C1H5R2CA01# |  |
|        |               |         | 3.5pF | ±0.05pF | GRM1883C1H3R5WA01# |  |        |               |         | 5.3pF | ±0.05pF | GRM1882C1H5R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1883C1H3R5BA01# |  |        |               |         |       | ±0.1pF  | GRM1882C1H5R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1883C1H3R5CA01# |  |        |               |         |       | ±0.25pF | GRM1882C1H5R3CA01# |  |
|        |               |         | 3.6pF | ±0.05pF | GRM1883C1H3R6WA01# |  |        |               |         |       |         |                    |  |
|        |               |         |       | ±0.1pF  | GRM1883C1H3R6BA01# |  |        |               |         |       |         |                    |  |
|        |               |         |       | ±0.25pF | GRM1883C1H3R6CA01# |  |        |               |         |       |         |                    |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 1.6×0.8mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.9mm  | 50Vdc         | CH      | 5.3pF | ±0.25pF | GRM1882C1H5R3CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H5R3DA01# |  |
|        |               |         | 5.4pF | ±0.05pF | GRM1882C1H5R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H5R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H5R4CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H5R4DA01# |  |
|        |               |         | 5.5pF | ±0.05pF | GRM1882C1H5R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H5R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H5R5CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H5R5DA01# |  |
|        |               |         | 5.6pF | ±0.05pF | GRM1882C1H5R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H5R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H5R6CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H5R6DA01# |  |
|        |               |         | 5.7pF | ±0.05pF | GRM1882C1H5R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H5R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H5R7CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H5R7DA01# |  |
|        |               |         | 5.8pF | ±0.05pF | GRM1882C1H5R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H5R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H5R8CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H5R8DA01# |  |
|        |               |         | 5.9pF | ±0.05pF | GRM1882C1H5R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H5R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H5R9CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H5R9DA01# |  |
|        |               |         | 6.0pF | ±0.05pF | GRM1882C1H6R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H6R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H6R0CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H6R0DA01# |  |
|        |               |         | 6.1pF | ±0.05pF | GRM1882C1H6R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H6R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H6R1CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H6R1DA01# |  |
|        |               |         | 6.2pF | ±0.05pF | GRM1882C1H6R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H6R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H6R2CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H6R2DA01# |  |
|        |               |         | 6.3pF | ±0.05pF | GRM1882C1H6R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H6R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H6R3CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H6R3DA01# |  |
|        |               |         | 6.4pF | ±0.05pF | GRM1882C1H6R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H6R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H6R4CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H6R4DA01# |  |
|        |               |         | 6.5pF | ±0.05pF | GRM1882C1H6R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H6R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H6R5CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H6R5DA01# |  |
|        |               |         | 6.6pF | ±0.05pF | GRM1882C1H6R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H6R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H6R6CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H6R6DA01# |  |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|
| 0.9mm  | 50Vdc         | CH      | 6.7pF | ±0.05pF | GRM1882C1H6R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H6R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H6R7CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H6R7DA01# |  |
|        |               |         | 6.8pF | ±0.05pF | GRM1882C1H6R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H6R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H6R8CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H6R8DA01# |  |
|        |               |         | 6.9pF | ±0.05pF | GRM1882C1H6R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H6R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H6R9CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H6R9DA01# |  |
|        |               |         | 7.0pF | ±0.05pF | GRM1882C1H7R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H7R0BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H7R0CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H7R0DA01# |  |
|        |               |         | 7.1pF | ±0.05pF | GRM1882C1H7R1WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H7R1BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H7R1CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H7R1DA01# |  |
|        |               |         | 7.2pF | ±0.05pF | GRM1882C1H7R2WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H7R2BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H7R2CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H7R2DA01# |  |
|        |               |         | 7.3pF | ±0.05pF | GRM1882C1H7R3WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H7R3BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H7R3CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H7R3DA01# |  |
|        |               |         | 7.4pF | ±0.05pF | GRM1882C1H7R4WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H7R4BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H7R4CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H7R4DA01# |  |
|        |               |         | 7.5pF | ±0.05pF | GRM1882C1H7R5WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H7R5BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H7R5CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H7R5DA01# |  |
|        |               |         | 7.6pF | ±0.05pF | GRM1882C1H7R6WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H7R6BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H7R6CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H7R6DA01# |  |
|        |               |         | 7.7pF | ±0.05pF | GRM1882C1H7R7WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H7R7BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H7R7CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H7R7DA01# |  |
|        |               |         | 7.8pF | ±0.05pF | GRM1882C1H7R8WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H7R8BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H7R8CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H7R8DA01# |  |
|        |               |         | 7.9pF | ±0.05pF | GRM1882C1H7R9WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H7R9BA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H7R9CA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H7R9DA01# |  |
|        |               |         | 8.0pF | ±0.05pF | GRM1882C1H8R0WA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H8R0BA01# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 1.6×0.8mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        |  | T max. | Rated Voltage | TC Code | Cap.   | Tol.    | Part Number        |  |
|--------|---------------|---------|-------|---------|--------------------|--|--------|---------------|---------|--------|---------|--------------------|--|
| 0.9mm  | 50Vdc         | CH      | 8.0pF | ±0.25pF | GRM1882C1H8R0CA01# |  | 0.9mm  | 50Vdc         | CH      | 9.4pF  | ±0.05pF | GRM1882C1H9R4WA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H8R0DA01# |  |        |               |         |        | ±0.1pF  | GRM1882C1H9R4BA01# |  |
|        |               |         | 8.1pF | ±0.05pF | GRM1882C1H8R1WA01# |  |        |               |         |        | ±0.25pF | GRM1882C1H9R4CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H8R1BA01# |  |        |               |         |        | ±0.5pF  | GRM1882C1H9R4DA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H8R1CA01# |  |        |               |         | 9.5pF  | ±0.05pF | GRM1882C1H9R5WA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H8R1DA01# |  |        |               |         |        | ±0.1pF  | GRM1882C1H9R5BA01# |  |
|        |               |         | 8.2pF | ±0.05pF | GRM1882C1H8R2WA01# |  |        |               |         |        | ±0.25pF | GRM1882C1H9R5CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H8R2BA01# |  |        |               |         |        | ±0.5pF  | GRM1882C1H9R5DA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H8R2CA01# |  |        |               |         | 9.6pF  | ±0.05pF | GRM1882C1H9R6WA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H8R2DA01# |  |        |               |         |        | ±0.1pF  | GRM1882C1H9R6BA01# |  |
|        |               |         | 8.3pF | ±0.05pF | GRM1882C1H8R3WA01# |  |        |               |         |        | ±0.25pF | GRM1882C1H9R6CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H8R3BA01# |  |        |               |         |        | ±0.5pF  | GRM1882C1H9R6DA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H8R3CA01# |  |        |               |         | 9.7pF  | ±0.05pF | GRM1882C1H9R7WA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H8R3DA01# |  |        |               |         |        | ±0.1pF  | GRM1882C1H9R7BA01# |  |
|        |               |         | 8.4pF | ±0.05pF | GRM1882C1H8R4WA01# |  |        |               |         |        | ±0.25pF | GRM1882C1H9R7CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H8R4BA01# |  |        |               |         |        | ±0.5pF  | GRM1882C1H9R7DA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H8R4CA01# |  |        |               |         | 9.8pF  | ±0.05pF | GRM1882C1H9R8WA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H8R4DA01# |  |        |               |         |        | ±0.1pF  | GRM1882C1H9R8BA01# |  |
|        |               |         | 8.5pF | ±0.05pF | GRM1882C1H8R5WA01# |  |        |               |         |        | ±0.25pF | GRM1882C1H9R8CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H8R5BA01# |  |        |               |         |        | ±0.5pF  | GRM1882C1H9R8DA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H8R5CA01# |  |        |               |         | 9.9pF  | ±0.05pF | GRM1882C1H9R9WA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H8R5DA01# |  |        |               |         |        | ±0.1pF  | GRM1882C1H9R9BA01# |  |
|        |               |         | 8.6pF | ±0.05pF | GRM1882C1H8R6WA01# |  |        |               |         |        | ±0.25pF | GRM1882C1H9R9CA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H8R6BA01# |  |        |               |         |        | ±0.5pF  | GRM1882C1H9R9DA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H8R6CA01# |  |        |               |         | 10pF   | ±5%     | GRM1882C1H100JA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H8R6DA01# |  |        |               |         | 12pF   | ±5%     | GRM1882C1H120JA01# |  |
|        |               |         | 8.7pF | ±0.05pF | GRM1882C1H8R7WA01# |  |        |               |         | 15pF   | ±5%     | GRM1882C1H150JA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H8R7BA01# |  |        |               |         | 18pF   | ±5%     | GRM1882C1H180JA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H8R7CA01# |  |        |               |         | 22pF   | ±5%     | GRM1882C1H220JA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H8R7DA01# |  |        |               |         | 27pF   | ±5%     | GRM1882C1H270JA01# |  |
|        |               |         | 8.8pF | ±0.05pF | GRM1882C1H8R8WA01# |  |        |               |         | 33pF   | ±5%     | GRM1882C1H330JA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H8R8BA01# |  |        |               |         | 39pF   | ±5%     | GRM1882C1H390JA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H8R8CA01# |  |        |               |         | 47pF   | ±5%     | GRM1882C1H470JA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H8R8DA01# |  |        |               |         | 56pF   | ±5%     | GRM1882C1H560JA01# |  |
|        |               |         | 8.9pF | ±0.05pF | GRM1882C1H8R9WA01# |  |        |               |         | 68pF   | ±5%     | GRM1882C1H680JA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H8R9BA01# |  |        |               |         | 82pF   | ±5%     | GRM1882C1H820JA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H8R9CA01# |  |        |               |         | 100pF  | ±5%     | GRM1882C1H101JA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H8R9DA01# |  |        |               |         | 120pF  | ±5%     | GRM1882C1H121JA01# |  |
|        |               |         | 9.0pF | ±0.05pF | GRM1882C1H9R0WA01# |  |        |               |         | 150pF  | ±5%     | GRM1882C1H151JA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H9R0BA01# |  |        |               |         | 180pF  | ±5%     | GRM1882C1H181JA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H9R0CA01# |  |        |               |         | 220pF  | ±5%     | GRM1882C1H221JA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H9R0DA01# |  |        |               |         | 270pF  | ±5%     | GRM1882C1H271JA01# |  |
|        |               |         | 9.1pF | ±0.05pF | GRM1882C1H9R1WA01# |  |        |               |         | 330pF  | ±5%     | GRM1882C1H331JA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H9R1BA01# |  |        |               |         | 390pF  | ±5%     | GRM1882C1H391JA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H9R1CA01# |  |        |               |         | 470pF  | ±5%     | GRM1882C1H471JA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H9R1DA01# |  |        |               |         | 560pF  | ±5%     | GRM1882C1H561JA01# |  |
|        |               |         | 9.2pF | ±0.05pF | GRM1882C1H9R2WA01# |  |        |               |         | 680pF  | ±5%     | GRM1882C1H681JA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H9R2BA01# |  |        |               |         | 820pF  | ±5%     | GRM1882C1H821JA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H9R2CA01# |  |        |               |         | 1000pF | ±5%     | GRM1882C1H102JA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H9R2DA01# |  |        |               |         | 1200pF | ±5%     | GRM1882C1H122JA01# |  |
|        |               |         | 9.3pF | ±0.05pF | GRM1882C1H9R3WA01# |  |        |               |         | 1500pF | ±5%     | GRM1882C1H152JA01# |  |
|        |               |         |       | ±0.1pF  | GRM1882C1H9R3BA01# |  |        |               |         | 1800pF | ±5%     | GRM1882C1H182JA01# |  |
|        |               |         |       | ±0.25pF | GRM1882C1H9R3CA01# |  |        |               |         | 2200pF | ±5%     | GRM1882C1H222JA01# |  |
|        |               |         |       | ±0.5pF  | GRM1882C1H9R3DA01# |  |        |               |         | 2700pF | ±5%     | GRM1882C1H272JA01# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 1.6×0.8mm)

| T max. | Rated Voltage | TC Code | Cap.    | Tol.               | Part Number        |                    |  |
|--------|---------------|---------|---------|--------------------|--------------------|--------------------|--|
| 0.9mm  | 50Vdc         | CH      | 3300pF  | ±5%                | GRM1882C1H332JA01# |                    |  |
|        |               |         | 3900pF  | ±5%                | GRM1882C1H392JA01# |                    |  |
|        |               |         | 4700pF  | ±5%                | GRM1882C1H472JA01# |                    |  |
|        |               |         | 5600pF  | ±5%                | GRM1882C1H562JA01# |                    |  |
|        |               |         | 6800pF  | ±5%                | GRM1882C1H682JA01# |                    |  |
|        |               |         | 8200pF  | ±5%                | GRM1882C1H822JA01# |                    |  |
|        |               |         | 10000pF | ±5%                | GRM1882C1H103JA01# |                    |  |
|        |               | SL      | 1200pF  | ±5%                | GRM1881X1H122JA01# |                    |  |
|        |               |         | 1500pF  | ±5%                | GRM1881X1H152JA01# |                    |  |
|        |               |         | 1800pF  | ±5%                | GRM1881X1H182JA01# |                    |  |
|        |               |         | 2200pF  | ±5%                | GRM1881X1H222JA01# |                    |  |
|        |               |         | 2700pF  | ±5%                | GRM1881X1H272JA01# |                    |  |
|        |               |         | 3300pF  | ±5%                | GRM1881X1H332JA01# |                    |  |
|        |               |         | 3900pF  | ±5%                | GRM1881X1H392JA01# |                    |  |
|        |               |         | 4700pF  | ±5%                | GRM1881X1H472JA01# |                    |  |
|        |               |         | 5600pF  | ±5%                | GRM1881X1H562JA01# |                    |  |
|        |               |         | 6800pF  | ±5%                | GRM1881X1H682JA01# |                    |  |
|        |               |         | 8200pF  | ±5%                | GRM1881X1H822JA01# |                    |  |
|        |               |         | 10000pF | ±5%                | GRM1881X1H103JA01# |                    |  |
|        |               | U2J     | 1200pF  | ±5%                | GRM1887U1H122JA01# |                    |  |
|        |               |         | 1500pF  | ±5%                | GRM1887U1H152JA01# |                    |  |
|        |               |         | 1800pF  | ±5%                | GRM1887U1H182JA01# |                    |  |
|        |               |         | 2200pF  | ±5%                | GRM1887U1H222JA01# |                    |  |
|        |               |         | 2700pF  | ±5%                | GRM1887U1H272JA01# |                    |  |
|        |               |         | 3300pF  | ±5%                | GRM1887U1H332JA01# |                    |  |
|        |               |         | 3900pF  | ±5%                | GRM1887U1H392JA01# |                    |  |
|        |               |         | 4700pF  | ±5%                | GRM1887U1H472JA01# |                    |  |
|        |               |         | 5600pF  | ±5%                | GRM1887U1H562JA01# |                    |  |
|        |               |         | 6800pF  | ±5%                | GRM1887U1H682JA01# |                    |  |
|        |               | UJ      | 1000pF  | ±5%                | GRM1883U1H102JA01# |                    |  |
|        |               |         | 1200pF  | ±5%                | GRM1883U1H122JA01# |                    |  |
|        |               |         | 1500pF  | ±5%                | GRM1883U1H152JA01# |                    |  |
|        |               |         | 1800pF  | ±5%                | GRM1883U1H182JA01# |                    |  |
|        |               |         | 2200pF  | ±5%                | GRM1883U1H222JA01# |                    |  |
|        |               |         | 2700pF  | ±5%                | GRM1883U1H272JA01# |                    |  |
|        | 3300pF        |         | ±5%     | GRM1883U1H332JA01# |                    |                    |  |
|        | 3900pF        |         | ±5%     | GRM1883U1H392JA01# |                    |                    |  |
|        | 4700pF        |         | ±5%     | GRM1883U1H472JA01# |                    |                    |  |
|        | 5600pF        |         | ±5%     | GRM1883U1H562JA01# |                    |                    |  |
|        |               | 6800pF  | ±5%     | GRM1883U1H682JA01# |                    |                    |  |
|        |               | 8200pF  | ±5%     | GRM1883U1H822JA01# |                    |                    |  |
|        |               | 10000pF | ±5%     | GRM1883U1H103JA01# |                    |                    |  |
|        |               | 10Vdc   | SL      | 12000pF            | ±5%                | GRM1881X1A123JA01# |  |
|        |               |         |         | 15000pF            | ±5%                | GRM1881X1A153JA01# |  |
|        |               |         |         | 18000pF            | ±5%                | GRM1881X1A183JA01# |  |
|        |               |         |         | 22000pF            | ±5%                | GRM1881X1A223JA01# |  |
|        |               | U2J     | 12000pF | ±5%                | GRM1887U1A123JA01# |                    |  |
|        |               |         | 15000pF | ±5%                | GRM1887U1A153JA01# |                    |  |
|        |               |         | 18000pF | ±5%                | GRM1887U1A183JA01# |                    |  |
|        | 22000pF       |         | ±5%     | GRM1887U1A223JA01# |                    |                    |  |
|        | UJ            | 12000pF | ±5%     | GRM1883U1A123JA01# |                    |                    |  |
|        |               | 15000pF | ±5%     | GRM1883U1A153JA01# |                    |                    |  |

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |  |
|--------|---------------|---------|---------|------|--------------------|--|
| 0.9mm  | 10Vdc         | UJ      | 18000pF | ±5%  | GRM1883U1A183JA01# |  |
|        |               |         | 22000pF | ±5%  | GRM1883U1A223JA01# |  |

2.0×1.25mm

| T max. | Rated Voltage | TC Code | Cap.               | Tol. | Part Number        |  |
|--------|---------------|---------|--------------------|------|--------------------|--|
| 0.7mm  | 100Vdc        | COG     | 100pF              | ±5%  | GRM2165C2A101JA01# |  |
|        |               |         | 120pF              | ±5%  | GRM2165C2A121JA01# |  |
|        |               |         | 150pF              | ±5%  | GRM2165C2A151JA01# |  |
|        |               |         | 180pF              | ±5%  | GRM2165C2A181JA01# |  |
|        |               |         | 220pF              | ±5%  | GRM2165C2A221JA01# |  |
|        |               |         | 270pF              | ±5%  | GRM2165C2A271JA01# |  |
|        |               |         | 330pF              | ±5%  | GRM2165C2A331JA01# |  |
|        |               |         | 390pF              | ±5%  | GRM2165C2A391JA01# |  |
|        |               |         | 470pF              | ±5%  | GRM2165C2A471JA01# |  |
|        |               |         | 560pF              | ±5%  | GRM2165C2A561JA01# |  |
|        |               |         | 680pF              | ±5%  | GRM2165C2A681JA01# |  |
|        |               |         | 820pF              | ±5%  | GRM2165C2A821JA01# |  |
|        |               |         | 1000pF             | ±5%  | GRM2165C2A102JA01# |  |
|        |               |         | 1200pF             | ±5%  | GRM2165C2A122JA01# |  |
|        |               |         | 1500pF             | ±5%  | GRM2165C2A152JA01# |  |
|        |               |         | 1800pF             | ±5%  | GRM2165C2A182JA01# |  |
|        |               |         | 2200pF             | ±5%  | GRM2165C2A222JA01# |  |
|        |               |         | 2700pF             | ±5%  | GRM2165C2A272JA01# |  |
|        |               |         | 3300pF             | ±5%  | GRM2165C2A332JA01# |  |
|        |               | CH      | 100pF              | ±5%  | GRM2162C2A101JA01# |  |
|        |               |         | 120pF              | ±5%  | GRM2162C2A121JA01# |  |
|        |               |         | 150pF              | ±5%  | GRM2162C2A151JA01# |  |
|        |               |         | 180pF              | ±5%  | GRM2162C2A181JA01# |  |
|        |               |         | 220pF              | ±5%  | GRM2162C2A221JA01# |  |
|        |               |         | 270pF              | ±5%  | GRM2162C2A271JA01# |  |
|        |               |         | 330pF              | ±5%  | GRM2162C2A331JA01# |  |
|        |               |         | 390pF              | ±5%  | GRM2162C2A391JA01# |  |
|        |               |         | 470pF              | ±5%  | GRM2162C2A471JA01# |  |
|        |               |         | 560pF              | ±5%  | GRM2162C2A561JA01# |  |
|        |               |         | 680pF              | ±5%  | GRM2162C2A681JA01# |  |
|        |               |         | 820pF              | ±5%  | GRM2162C2A821JA01# |  |
|        |               |         | 1000pF             | ±5%  | GRM2162C2A102JA01# |  |
|        |               |         | 1200pF             | ±5%  | GRM2162C2A122JA01# |  |
|        | 1500pF        | ±5%     | GRM2162C2A152JA01# |      |                    |  |
|        | 1800pF        | ±5%     | GRM2162C2A182JA01# |      |                    |  |
|        | 2200pF        | ±5%     | GRM2162C2A222JA01# |      |                    |  |
|        | 2700pF        | ±5%     | GRM2162C2A272JA01# |      |                    |  |
|        | 3300pF        | ±5%     | GRM2162C2A332JA01# |      |                    |  |
|        | 50Vdc         | COG     | 1200pF             | ±5%  | GRM2165C1H122JA01# |  |
|        |               |         | 1500pF             | ±5%  | GRM2165C1H152JA01# |  |
|        |               |         | 1800pF             | ±5%  | GRM2165C1H182JA01# |  |
|        |               |         | 2200pF             | ±5%  | GRM2165C1H222JA01# |  |
|        |               |         | 2700pF             | ±5%  | GRM2165C1H272JA01# |  |
|        |               |         | 3300pF             | ±5%  | GRM2165C1H332JA01# |  |
|        |               |         | 3900pF             | ±5%  | GRM2165C1H392JA01# |  |
|        |               |         | 4700pF             | ±5%  | GRM2165C1H472JA01# |  |
|        |               | CH      | 1200pF             | ±5%  | GRM2162C1H122JA01# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 2.0×1.25mm)

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |  | T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number        |  |
|--------|---------------|---------|---------|------|--------------------|--|--------|---------------|---------|--------|------|--------------------|--|
| 0.7mm  | 50Vdc         | CH      | 1500pF  | ±5%  | GRM2162C1H152JA01# |  | 1.0mm  | 630Vdc        | COG     | 220pF  | ±5%  | GRM21A5C2J221JWA1# |  |
|        |               |         | 1800pF  | ±5%  | GRM2162C1H182JA01# |  |        |               |         | 270pF  | ±5%  | GRM21A5C2J271JWA1# |  |
|        |               |         | 2200pF  | ±5%  | GRM2162C1H222JA01# |  |        |               |         | 330pF  | ±5%  | GRM21A5C2J331JWA1# |  |
|        |               |         | 2700pF  | ±5%  | GRM2162C1H272JA01# |  |        |               |         | 390pF  | ±5%  | GRM21A5C2J391JWA1# |  |
|        |               |         | 3300pF  | ±5%  | GRM2162C1H332JA01# |  |        |               |         | 470pF  | ±5%  | GRM21A5C2J471JWA1# |  |
|        |               |         | 3900pF  | ±5%  | GRM2162C1H392JA01# |  |        |               |         | 560pF  | ±5%  | GRM21A5C2J561JWA1# |  |
|        |               |         | 4700pF  | ±5%  | GRM2162C1H472JA01# |  |        |               |         |        |      |                    |  |
|        |               | SL      | 12000pF | ±5%  | GRM2161X1H123JA01# |  |        | 250Vdc        | COG     | 10pF   | ±5%  | GRM21A5C2E100JW01# |  |
|        |               |         | 15000pF | ±5%  | GRM2161X1H153JA01# |  |        |               |         | 12pF   | ±5%  | GRM21A5C2E120JW01# |  |
|        |               |         | 18000pF | ±5%  | GRM2161X1H183JA01# |  |        |               |         | 15pF   | ±5%  | GRM21A5C2E150JW01# |  |
|        |               | U2J     | 12000pF | ±5%  | GRM2167U1H123JA01# |  |        |               |         | 18pF   | ±5%  | GRM21A5C2E180JW01# |  |
|        |               |         | 15000pF | ±5%  | GRM2167U1H153JA01# |  |        |               |         | 22pF   | ±5%  | GRM21A5C2E220JW01# |  |
|        |               |         | 18000pF | ±5%  | GRM2167U1H183JA01# |  |        |               |         | 27pF   | ±5%  | GRM21A5C2E270JW01# |  |
|        |               | UJ      | 10000pF | ±5%  | GRM2163U1H103JA01# |  |        |               |         | 33pF   | ±5%  | GRM21A5C2E330JW01# |  |
|        |               |         | 12000pF | ±5%  | GRM2163U1H123JA01# |  |        |               |         | 39pF   | ±5%  | GRM21A5C2E390JW01# |  |
|        |               |         | 15000pF | ±5%  | GRM2163U1H153JA01# |  |        |               |         | 47pF   | ±5%  | GRM21A5C2E470JW01# |  |
|        |               |         | 18000pF | ±5%  | GRM2163U1H183JA01# |  |        |               |         | 56pF   | ±5%  | GRM21A5C2E560JW01# |  |
| 0.95mm | 50Vdc         | COG     | 5600pF  | ±5%  | GRM2195C1H562JA01# |  |        |               |         | 68pF   | ±5%  | GRM21A5C2E680JW01# |  |
|        |               |         | 6800pF  | ±5%  | GRM2195C1H682JA01# |  |        |               |         | 82pF   | ±5%  | GRM21A5C2E820JW01# |  |
|        |               |         | 8200pF  | ±5%  | GRM2195C1H822JA01# |  |        |               |         | 100pF  | ±5%  | GRM21A5C2E101JW01# |  |
|        |               |         | 10000pF | ±5%  | GRM2195C1H103JA01# |  |        |               |         | 120pF  | ±5%  | GRM21A5C2E121JW01# |  |
|        |               |         | 12000pF | ±5%  | GRM2195C1H123JA01# |  |        |               |         | 150pF  | ±5%  | GRM21A5C2E151JW01# |  |
|        |               |         | 15000pF | ±5%  | GRM2195C1H153JA01# |  |        |               |         | 180pF  | ±5%  | GRM21A5C2E181JW01# |  |
|        |               | CH      | 5600pF  | ±5%  | GRM2192C1H562JA01# |  |        |               |         | 220pF  | ±5%  | GRM21A5C2E221JW01# |  |
|        |               |         | 6800pF  | ±5%  | GRM2192C1H682JA01# |  |        |               |         | 270pF  | ±5%  | GRM21A5C2E271JW01# |  |
|        |               |         | 8200pF  | ±5%  | GRM2192C1H822JA01# |  |        |               |         | 330pF  | ±5%  | GRM21A5C2E331JW01# |  |
|        |               |         | 10000pF | ±5%  | GRM2192C1H103JA01# |  |        |               |         | 390pF  | ±5%  | GRM21A5C2E391JWA1# |  |
|        |               |         | 12000pF | ±5%  | GRM2192C1H123JA01# |  |        |               |         | 470pF  | ±5%  | GRM21A5C2E471JWA1# |  |
|        |               |         | 15000pF | ±5%  | GRM2192C1H153JA01# |  |        |               |         | 560pF  | ±5%  | GRM21A5C2E561JWA1# |  |
|        |               | SL      | 22000pF | ±5%  | GRM2191X1H223JA01# |  |        |               |         | 680pF  | ±5%  | GRM21A5C2E681JWA1# |  |
|        |               |         | 27000pF | ±5%  | GRM2191X1H273JA01# |  |        |               |         | 820pF  | ±5%  | GRM21A5C2E821JWA1# |  |
|        |               | U2J     | 22000pF | ±5%  | GRM2197U1H223JA01# |  |        |               |         | 1000pF | ±5%  | GRM21A5C2E102JWA1# |  |
|        |               |         | 27000pF | ±5%  | GRM2197U1H273JA01# |  |        |               |         | 1200pF | ±5%  | GRM21A5C2E122JWA1# |  |
|        |               | UJ      | 22000pF | ±5%  | GRM2193U1H223JA01# |  |        |               |         | 1500pF | ±5%  | GRM21A5C2E152JWA1# |  |
|        |               |         | 27000pF | ±5%  | GRM2193U1H273JA01# |  |        |               |         | 1800pF | ±5%  | GRM21A5C2E182JWA1# |  |
|        | 10Vdc         | SL      | 56000pF | ±5%  | GRM2191X1A563JA01# |  |        |               | U2J     | 2200pF | ±5%  | GRM21A5C2E222JWA1# |  |
|        |               | U2J     | 56000pF | ±5%  | GRM2197U1A563JA01# |  |        |               |         | 2700pF | ±5%  | GRM21A5C2E272JWA1# |  |
|        |               | UJ      | 56000pF | ±5%  | GRM2193U1A563JA01# |  |        |               |         | 100pF  | ±5%  | GRM21A7U2E101JW31# |  |
| 1.0mm  | 630Vdc        | COG     | 10pF    | ±5%  | GRM21A5C2J100JWA1# |  |        |               |         | 120pF  | ±5%  | GRM21A7U2E121JW31# |  |
|        |               |         | 12pF    | ±5%  | GRM21A5C2J120JWA1# |  |        |               |         | 150pF  | ±5%  | GRM21A7U2E151JW31# |  |
|        |               |         | 15pF    | ±5%  | GRM21A5C2J150JWA1# |  |        |               |         | 180pF  | ±5%  | GRM21A7U2E181JW31# |  |
|        |               |         | 18pF    | ±5%  | GRM21A5C2J180JWA1# |  |        |               |         | 220pF  | ±5%  | GRM21A7U2E221JW31# |  |
|        |               |         | 22pF    | ±5%  | GRM21A5C2J220JWA1# |  |        |               |         | 270pF  | ±5%  | GRM21A7U2E271JW31# |  |
|        |               |         | 27pF    | ±5%  | GRM21A5C2J270JWA1# |  |        |               |         | 330pF  | ±5%  | GRM21A7U2E331JW31# |  |
|        |               |         | 33pF    | ±5%  | GRM21A5C2J330JWA1# |  |        |               |         | 390pF  | ±5%  | GRM21A7U2E391JW31# |  |
|        |               |         | 39pF    | ±5%  | GRM21A5C2J390JWA1# |  |        |               |         | 470pF  | ±5%  | GRM21A7U2E471JW31# |  |
|        |               |         | 47pF    | ±5%  | GRM21A5C2J470JWA1# |  |        |               |         | 560pF  | ±5%  | GRM21A7U2E561JW31# |  |
|        |               |         | 56pF    | ±5%  | GRM21A5C2J560JWA1# |  |        |               |         | 680pF  | ±5%  | GRM21A7U2E681JW31# |  |
|        |               |         | 68pF    | ±5%  | GRM21A5C2J680JWA1# |  |        |               |         | 820pF  | ±5%  | GRM21A7U2E821JW31# |  |
|        |               |         | 82pF    | ±5%  | GRM21A5C2J820JWA1# |  |        |               |         | 1000pF | ±5%  | GRM21A7U2E102JW31# |  |
|        |               |         | 100pF   | ±5%  | GRM21A5C2J101JWA1# |  |        |               |         | 1200pF | ±5%  | GRM21A7U2E122JW31# |  |
|        |               |         | 120pF   | ±5%  | GRM21A5C2J121JWA1# |  |        |               |         | 1500pF | ±5%  | GRM21A7U2E152JW31# |  |
|        |               |         | 150pF   | ±5%  | GRM21A5C2J151JWA1# |  |        |               |         | 1800pF | ±5%  | GRM21A7U2E182JW31# |  |
|        |               |         | 180pF   | ±5%  | GRM21A5C2J181JWA1# |  |        |               |         | 2200pF | ±5%  | GRM21A7U2E222JW31# |  |
|        |               | COG     | 10pF    | ±5%  | GRM21A5C2D100JW01# |  |        |               |         |        |      |                    |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 2.0×1.25mm)

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |  |
|--------|---------------|---------|---------|------|--------------------|--|
| 1.0mm  | 200Vdc        | COG     | 12pF    | ±5%  | GRM21A5C2D120JW01# |  |
|        |               |         | 15pF    | ±5%  | GRM21A5C2D150JW01# |  |
|        |               |         | 18pF    | ±5%  | GRM21A5C2D180JW01# |  |
|        |               |         | 22pF    | ±5%  | GRM21A5C2D220JW01# |  |
|        |               |         | 27pF    | ±5%  | GRM21A5C2D270JW01# |  |
|        |               |         | 33pF    | ±5%  | GRM21A5C2D330JW01# |  |
|        |               |         | 39pF    | ±5%  | GRM21A5C2D390JW01# |  |
|        |               |         | 47pF    | ±5%  | GRM21A5C2D470JW01# |  |
|        |               |         | 56pF    | ±5%  | GRM21A5C2D560JW01# |  |
|        |               |         | 68pF    | ±5%  | GRM21A5C2D680JW01# |  |
|        |               |         | 82pF    | ±5%  | GRM21A5C2D820JW01# |  |
|        |               |         | 100pF   | ±5%  | GRM21A5C2D101JW01# |  |
|        |               |         | 120pF   | ±5%  | GRM21A5C2D121JW01# |  |
|        |               |         | 150pF   | ±5%  | GRM21A5C2D151JW01# |  |
|        |               |         | 180pF   | ±5%  | GRM21A5C2D181JW01# |  |
|        |               |         | 220pF   | ±5%  | GRM21A5C2D221JW01# |  |
|        |               |         | 270pF   | ±5%  | GRM21A5C2D271JW01# |  |
|        |               |         | 330pF   | ±5%  | GRM21A5C2D331JW01# |  |
|        |               | U2J     | 100pF   | ±5%  | GRM21A7U2D101JW31# |  |
|        |               |         | 120pF   | ±5%  | GRM21A7U2D121JW31# |  |
|        |               |         | 150pF   | ±5%  | GRM21A7U2D151JW31# |  |
|        |               |         | 180pF   | ±5%  | GRM21A7U2D181JW31# |  |
|        |               |         | 220pF   | ±5%  | GRM21A7U2D221JW31# |  |
|        |               |         | 270pF   | ±5%  | GRM21A7U2D271JW31# |  |
|        |               |         | 330pF   | ±5%  | GRM21A7U2D331JW31# |  |
|        |               |         | 390pF   | ±5%  | GRM21A7U2D391JW31# |  |
|        |               |         | 470pF   | ±5%  | GRM21A7U2D471JW31# |  |
|        |               |         | 560pF   | ±5%  | GRM21A7U2D561JW31# |  |
|        |               |         | 680pF   | ±5%  | GRM21A7U2D681JW31# |  |
|        |               |         | 820pF   | ±5%  | GRM21A7U2D821JW31# |  |
|        |               |         | 1000pF  | ±5%  | GRM21A7U2D102JW31# |  |
|        |               |         | 1200pF  | ±5%  | GRM21A7U2D122JW31# |  |
|        |               |         | 1500pF  | ±5%  | GRM21A7U2D152JW31# |  |
|        |               |         | 1800pF  | ±5%  | GRM21A7U2D182JW31# |  |
|        |               |         | 2200pF  | ±5%  | GRM21A7U2D222JW31# |  |
|        | 50Vdc         | SL      | 33000pF | ±5%  | GRM21A1X1H333JA39# |  |
|        |               | U2J     | 33000pF | ±5%  | GRM21A7U1H333JA39# |  |
|        |               | UJ      | 33000pF | ±5%  | GRM21A3U1H333JA39# |  |
| 1.35mm | 50Vdc         | COG     | 18000pF | ±5%  | GRM21B5C1H183JA01# |  |
|        |               |         | 22000pF | ±5%  | GRM21B5C1H223JA01# |  |
|        |               | CH      | 18000pF | ±5%  | GRM21B2C1H183JA01# |  |
|        |               |         | 22000pF | ±5%  | GRM21B2C1H223JA01# |  |
|        |               | SL      | 39000pF | ±5%  | GRM21B1X1H393JA01# |  |
|        |               |         | 47000pF | ±5%  | GRM21B1X1H473JA01# |  |
|        |               | U2J     | 39000pF | ±5%  | GRM21B7U1H393JA01# |  |
|        |               |         | 47000pF | ±5%  | GRM21B7U1H473JA01# |  |
|        |               | UJ      | 39000pF | ±5%  | GRM21B3U1H393JA01# |  |
|        |               |         | 47000pF | ±5%  | GRM21B3U1H473JA01# |  |
|        | 10Vdc         | SL      | 68000pF | ±5%  | GRM21B1X1A683JA01# |  |
|        |               |         | 82000pF | ±5%  | GRM21B1X1A823JA01# |  |
|        |               |         | 0.10μF  | ±5%  | GRM21B1X1A104JA01# |  |
|        |               | U2J     | 68000pF | ±5%  | GRM21B7U1A683JA01# |  |
|        |               |         | 82000pF | ±5%  | GRM21B7U1A823JA01# |  |
|        |               |         | 0.10μF  | ±5%  | GRM21B7U1A104JA01# |  |

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |  |
|--------|---------------|---------|---------|------|--------------------|--|
| 1.35mm | 10Vdc         | UJ      | 68000pF | ±5%  | GRM21B3U1A683JA01# |  |
|        |               |         | 82000pF | ±5%  | GRM21B3U1A823JA01# |  |
|        |               |         | 0.10μF  | ±5%  | GRM21B3U1A104JA01# |  |
| 1.45mm | 630Vdc        | COG     | 680pF   | ±5%  | GRM21B5C2J681JWA3# |  |
|        |               |         | 820pF   | ±5%  | GRM21B5C2J821JWA3# |  |
|        |               |         | 1000pF  | ±5%  | GRM21B5C2J102JWA3# |  |
|        |               |         | 1200pF  | ±5%  | GRM21B5C2J122JWA3# |  |
|        |               |         |         |      |                    |  |
|        |               |         |         |      |                    |  |
|        | 250Vdc        | COG     | 3300pF  | ±5%  | GRM21B5C2E332JWA1# |  |
|        |               |         | 3900pF  | ±5%  | GRM21B5C2E392JWA1# |  |
|        |               |         | 4700pF  | ±5%  | GRM21B5C2E472JWA1# |  |
|        |               | U2J     | 2700pF  | ±5%  | GRM21B7U2E272JW32# |  |
|        |               |         | 3300pF  | ±5%  | GRM21B7U2E332JW32# |  |
|        |               |         | 3900pF  | ±5%  | GRM21B7U2E392JW32# |  |
|        |               |         | 4700pF  | ±5%  | GRM21B7U2E472JW32# |  |
|        |               |         | 5600pF  | ±5%  | GRM21B7U2E562JW32# |  |
|        | 200Vdc        | U2J     | 2700pF  | ±5%  | GRM21B7U2D272JW32# |  |
|        |               |         | 3300pF  | ±5%  | GRM21B7U2D332JW32# |  |
|        |               |         | 3900pF  | ±5%  | GRM21B7U2D392JW32# |  |
|        |               |         | 4700pF  | ±5%  | GRM21B7U2D472JW32# |  |
|        |               |         | 5600pF  | ±5%  | GRM21B7U2D562JW32# |  |

### 3.2×1.6mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |    |
|--------|---------------|---------|---------|------|--------------------|----|
| 0.95mm | 100Vdc        | COG     | 1800pF  | ±5%  | GRM3195C2A182JA01# |    |
|        |               |         | 2200pF  | ±5%  | GRM3195C2A222JA01# |    |
|        |               |         | 2700pF  | ±5%  | GRM3195C2A272JA01# |    |
|        |               |         | 3300pF  | ±5%  | GRM3195C2A332JA01# |    |
|        |               |         | 3900pF  | ±5%  | GRM3195C2A392JA01# |    |
|        |               |         | 4700pF  | ±5%  | GRM3195C2A472JA01# |    |
|        |               |         | 5600pF  | ±5%  | GRM3195C2A562JA01# |    |
|        |               |         | 6800pF  | ±5%  | GRM3195C2A682JA01# |    |
|        |               |         | 8200pF  | ±5%  | GRM3195C2A822JA01# |    |
|        |               |         | 10000pF | ±5%  | GRM3195C2A103JA01# |    |
|        |               |         | 12000pF | ±5%  | GRM3195C2A123JA01# |    |
|        |               |         | 15000pF | ±5%  | GRM3195C2A153JA01# |    |
|        |               |         | 18000pF | ±5%  | GRM3195C2A183JA01# |    |
|        |               |         | 22000pF | ±5%  | GRM3195C2A223JA01# |    |
|        |               |         | 27000pF | ±5%  | GRM3195C2A273JA01# | D1 |
|        |               |         | 33000pF | ±5%  | GRM3195C2A333JA01# | D1 |
|        |               |         | 39000pF | ±5%  | GRM3195C2A393JA01# | D1 |
|        |               | CH      | 1800pF  | ±5%  | GRM3192C2A182JA01# |    |
|        |               |         | 2200pF  | ±5%  | GRM3192C2A222JA01# |    |
|        |               |         | 2700pF  | ±5%  | GRM3192C2A272JA01# |    |
|        |               |         | 3300pF  | ±5%  | GRM3192C2A332JA01# |    |
|        |               |         | 3900pF  | ±5%  | GRM3192C2A392JA01# |    |
|        |               |         | 4700pF  | ±5%  | GRM3192C2A472JA01# |    |
|        |               |         | 5600pF  | ±5%  | GRM3192C2A562JA01# |    |
|        |               |         | 6800pF  | ±5%  | GRM3192C2A682JA01# |    |
|        |               |         | 8200pF  | ±5%  | GRM3192C2A822JA01# |    |
|        |               |         | 10000pF | ±5%  | GRM3192C2A103JA01# |    |
|        |               |         | 12000pF | ±5%  | GRM3192C2A123JA01# |    |
|        |               |         | 15000pF | ±5%  | GRM3192C2A153JA01# |    |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 3.2×1.6mm)

| T max. | Rated Voltage | TC Code | Cap.               | Tol.    | Part Number        |                    | T max. | Rated Voltage      | TC Code            | Cap.  | Tol.   | Part Number        |                    |                    |                    |  |
|--------|---------------|---------|--------------------|---------|--------------------|--------------------|--------|--------------------|--------------------|-------|--------|--------------------|--------------------|--------------------|--------------------|--|
| 0.95mm | 100Vdc        | CH      | 18000pF            | ±5%     | GRM3192C2A183JA01# |                    | 1.0mm  | 1000Vdc            | U2J                | 10pF  | ±5%    | GRM31A7U3A100JW31# |                    |                    |                    |  |
|        |               |         | 22000pF            | ±5%     | GRM3192C2A223JA01# |                    |        |                    |                    | 12pF  | ±5%    | GRM31A7U3A120JW31# |                    |                    |                    |  |
|        |               |         | 27000pF            | ±5%     | GRM3192C2A273JA01# | D1                 |        |                    |                    | 15pF  | ±5%    | GRM31A7U3A150JW31# |                    |                    |                    |  |
|        |               |         | 33000pF            | ±5%     | GRM3192C2A333JA01# | D1                 |        |                    |                    | 18pF  | ±5%    | GRM31A7U3A180JW31# |                    |                    |                    |  |
|        |               |         | 39000pF            | ±5%     | GRM3192C2A393JA01# | D1                 |        |                    |                    | 22pF  | ±5%    | GRM31A7U3A220JW31# |                    |                    |                    |  |
|        | 50Vdc         | COG     | 12000pF            | ±5%     | GRM3195C1H123JA01# |                    |        |                    |                    | 27pF  | ±5%    | GRM31A7U3A270JW31# |                    |                    |                    |  |
|        |               |         | 15000pF            | ±5%     | GRM3195C1H153JA01# |                    |        |                    |                    | 33pF  | ±5%    | GRM31A7U3A330JW31# |                    |                    |                    |  |
|        |               |         | 18000pF            | ±5%     | GRM3195C1H183JA01# |                    |        |                    |                    | 39pF  | ±5%    | GRM31A7U3A390JW31# |                    |                    |                    |  |
|        |               |         | 22000pF            | ±5%     | GRM3195C1H223JA01# |                    |        |                    |                    | 47pF  | ±5%    | GRM31A7U3A470JW31# |                    |                    |                    |  |
|        |               |         | 27000pF            | ±5%     | GRM3195C1H273JA01# |                    |        |                    |                    | 56pF  | ±5%    | GRM31A7U3A560JW31# |                    |                    |                    |  |
|        |               |         | 33000pF            | ±5%     | GRM3195C1H333JA01# |                    |        |                    |                    | 68pF  | ±5%    | GRM31A7U3A680JW31# |                    |                    |                    |  |
|        |               |         | 39000pF            | ±5%     | GRM3195C1H393JA01# |                    |        |                    |                    | 82pF  | ±5%    | GRM31A7U3A820JW31# |                    |                    |                    |  |
|        |               |         | CH                 | 12000pF | ±5%                | GRM3192C1H123JA01# |        |                    |                    |       | 100pF  | ±5%                | GRM31A7U3A101JW31# |                    |                    |  |
|        |               | 15000pF |                    | ±5%     | GRM3192C1H153JA01# |                    |        |                    |                    | 120pF | ±5%    | GRM31A7U3A121JW31# |                    |                    |                    |  |
|        |               | 18000pF |                    | ±5%     | GRM3192C1H183JA01# |                    |        |                    |                    | 150pF | ±5%    | GRM31A7U3A151JW31# |                    |                    |                    |  |
|        |               | 22000pF |                    | ±5%     | GRM3192C1H223JA01# |                    |        |                    |                    | 180pF | ±5%    | GRM31A7U3A181JW31# |                    |                    |                    |  |
|        |               | 27000pF |                    | ±5%     | GRM3192C1H273JA01# |                    |        |                    |                    | 220pF | ±5%    | GRM31A7U3A221JW31# |                    |                    |                    |  |
|        |               | 33000pF |                    | ±5%     | GRM3192C1H333JA01# |                    |        |                    |                    | 270pF | ±5%    | GRM31A7U3A271JW31# |                    |                    |                    |  |
|        |               | 39000pF |                    | ±5%     | GRM3192C1H393JA01# |                    |        |                    |                    | 330pF | ±5%    | GRM31A7U3A331JW31# |                    |                    |                    |  |
|        |               | SL      |                    | 56000pF | ±5%                | GRM3191X1H563JA01# |        |                    |                    |       | 630Vdc | COG                | 10pF               | ±5%                | GRM31A5C2J100JW01# |  |
|        |               | U2J     |                    | 56000pF | ±5%                | GRM3197U1H563JA01# |        |                    |                    |       |        |                    | 12pF               | ±5%                | GRM31A5C2J120JW01# |  |
|        |               | UJ      | 56000pF            | ±5%     | GRM3193U1H563JA01# |                    |        |                    |                    | 15pF  |        |                    | ±5%                | GRM31A5C2J150JW01# |                    |  |
| 1.0mm  | 2000Vdc       | U2J     | 10pF               | ±5%     | GRM31A7U3D100JW31# |                    |        |                    |                    | 18pF  |        |                    | ±5%                | GRM31A5C2J180JW01# |                    |  |
|        |               |         | 12pF               | ±5%     | GRM31A7U3D120JW31# |                    |        |                    |                    | 22pF  |        |                    | ±5%                | GRM31A5C2J220JW01# |                    |  |
|        |               |         | 15pF               | ±5%     | GRM31A7U3D150JW31# |                    |        |                    |                    | 27pF  |        |                    | ±5%                | GRM31A5C2J270JW01# |                    |  |
|        |               |         | 18pF               | ±5%     | GRM31A7U3D180JW31# |                    |        |                    |                    | 33pF  |        |                    | ±5%                | GRM31A5C2J330JW01# |                    |  |
|        |               |         | 22pF               | ±5%     | GRM31A7U3D220JW31# |                    |        |                    |                    | 39pF  |        |                    | ±5%                | GRM31A5C2J390JW01# |                    |  |
|        |               |         | 27pF               | ±5%     | GRM31A7U3D270JW31# |                    |        |                    | 47pF               | ±5%   |        |                    | GRM31A5C2J470JW01# |                    |                    |  |
|        |               |         | 33pF               | ±5%     | GRM31A7U3D330JW31# |                    |        |                    | 56pF               | ±5%   |        |                    | GRM31A5C2J560JW01# |                    |                    |  |
|        |               |         | 39pF               | ±5%     | GRM31A7U3D390JW31# |                    |        |                    | 68pF               | ±5%   |        |                    | GRM31A5C2J680JW01# |                    |                    |  |
|        |               |         | 47pF               | ±5%     | GRM31A7U3D470JW31# |                    |        |                    | 82pF               | ±5%   |        |                    | GRM31A5C2J820JW01# |                    |                    |  |
|        |               |         | 56pF               | ±5%     | GRM31A7U3D560JW31# |                    |        |                    | 100pF              | ±5%   |        |                    | GRM31A5C2J101JW01# |                    |                    |  |
|        |               |         | 68pF               | ±5%     | GRM31A7U3D680JW31# |                    |        |                    | 120pF              | ±5%   |        |                    | GRM31A5C2J121JW01# |                    |                    |  |
|        | 1000Vdc       | COG     | 10pF               | ±5%     | GRM31A5C3A100JW01# |                    | 150pF  | ±5%                | GRM31A5C2J151JW01# |       |        |                    |                    |                    |                    |  |
|        |               |         | 12pF               | ±5%     | GRM31A5C3A120JW01# |                    | 180pF  | ±5%                | GRM31A5C2J181JW01# |       |        |                    |                    |                    |                    |  |
|        |               |         | 15pF               | ±5%     | GRM31A5C3A150JW01# |                    | 220pF  | ±5%                | GRM31A5C2J221JW01# |       |        |                    |                    |                    |                    |  |
|        |               |         | 18pF               | ±5%     | GRM31A5C3A180JW01# |                    | 270pF  | ±5%                | GRM31A5C2J271JW01# |       |        |                    |                    |                    |                    |  |
|        |               |         | 22pF               | ±5%     | GRM31A5C3A220JW01# |                    | 330pF  | ±5%                | GRM31A5C2J331JW01# |       |        |                    |                    |                    |                    |  |
|        |               |         | 27pF               | ±5%     | GRM31A5C3A270JW01# |                    | 390pF  | ±5%                | GRM31A5C2J391JW01# |       |        |                    |                    |                    |                    |  |
|        |               |         | 33pF               | ±5%     | GRM31A5C3A330JW01# |                    | 470pF  | ±5%                | GRM31A5C2J471JW01# |       |        |                    |                    |                    |                    |  |
|        |               |         | 39pF               | ±5%     | GRM31A5C3A390JW01# |                    | 560pF  | ±5%                | GRM31A5C2J561JW01# |       |        |                    |                    |                    |                    |  |
|        |               |         | 47pF               | ±5%     | GRM31A5C3A470JW01# |                    | 1200pF | ±5%                | GRM31A5C2J122JWA1# |       |        |                    |                    |                    |                    |  |
|        |               |         | 56pF               | ±5%     | GRM31A5C3A560JW01# |                    | 1500pF | ±5%                | GRM31A5C2J152JWA1# |       |        |                    |                    |                    |                    |  |
|        |               |         | 68pF               | ±5%     | GRM31A5C3A680JW01# |                    | 1800pF | ±5%                | GRM31A5C2J182JWA1# |       |        |                    |                    |                    |                    |  |
| 82pF   | ±5%           |         | GRM31A5C3A820JW01# |         | U2J                | 10pF               | ±5%    | GRM31A7U2J100JW31# |                    |       |        |                    |                    |                    |                    |  |
| 100pF  | ±5%           |         | GRM31A5C3A101JW01# |         |                    | 12pF               | ±5%    | GRM31A7U2J120JW31# |                    |       |        |                    |                    |                    |                    |  |
| 120pF  | ±5%           |         | GRM31A5C3A121JW01# |         |                    | 15pF               | ±5%    | GRM31A7U2J150JW31# |                    |       |        |                    |                    |                    |                    |  |
| 150pF  | ±5%           |         | GRM31A5C3A151JW01# |         |                    | 18pF               | ±5%    | GRM31A7U2J180JW31# |                    |       |        |                    |                    |                    |                    |  |
| 180pF  | ±5%           |         | GRM31A5C3A181JW01# |         |                    | 22pF               | ±5%    | GRM31A7U2J220JW31# |                    |       |        |                    |                    |                    |                    |  |
| 220pF  | ±5%           |         | GRM31A5C3A221JW01# |         |                    | 27pF               | ±5%    | GRM31A7U2J270JW31# |                    |       |        |                    |                    |                    |                    |  |
| 270pF  | ±5%           |         | GRM31A5C3A271JWA1# |         |                    | 33pF               | ±5%    | GRM31A7U2J330JW31# |                    |       |        |                    |                    |                    |                    |  |
| 330pF  | ±5%           |         | GRM31A5C3A331JWA1# |         |                    | 39pF               | ±5%    | GRM31A7U2J390JW31# |                    |       |        |                    |                    |                    |                    |  |
| 390pF  | ±5%           |         | GRM31A5C3A391JWA1# |         |                    | 47pF               | ±5%    | GRM31A7U2J470JW31# |                    |       |        |                    |                    |                    |                    |  |
| 470pF  | ±5%           |         | GRM31A5C3A471JWA1# |         |                    | 56pF               | ±5%    | GRM31A7U2J560JW31# |                    |       |        |                    |                    |                    |                    |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 3.2×1.6mm)

| T max. | Rated Voltage | TC Code | Cap.   | Tol.               | Part Number        |     |
|--------|---------------|---------|--------|--------------------|--------------------|-----|
| 1.0mm  | 630Vdc        | U2J     | 68pF   | ±5%                | GRM31A7U2J680JW31# |     |
|        |               |         | 82pF   | ±5%                | GRM31A7U2J820JW31# |     |
|        |               |         | 100pF  | ±5%                | GRM31A7U2J101JW31# |     |
|        |               |         | 120pF  | ±5%                | GRM31A7U2J121JW31# |     |
|        |               |         | 150pF  | ±5%                | GRM31A7U2J151JW31# |     |
|        |               |         | 180pF  | ±5%                | GRM31A7U2J181JW31# |     |
|        |               |         | 220pF  | ±5%                | GRM31A7U2J221JW31# |     |
|        |               |         | 270pF  | ±5%                | GRM31A7U2J271JW31# |     |
|        |               |         | 330pF  | ±5%                | GRM31A7U2J331JW31# |     |
|        |               |         | 390pF  | ±5%                | GRM31A7U2J391JW31# |     |
|        |               |         | 470pF  | ±5%                | GRM31A7U2J471JW31# |     |
|        |               |         | 560pF  | ±5%                | GRM31A7U2J561JW31# |     |
|        |               |         | 680pF  | ±5%                | GRM31A7U2J681JW31# |     |
|        |               |         | 820pF  | ±5%                | GRM31A7U2J821JW31# |     |
|        |               |         | 1000pF | ±5%                | GRM31A7U2J102JW31# |     |
|        |               |         | 1200pF | ±5%                | GRM31A7U2J122JW31# |     |
|        |               |         | 1500pF | ±5%                | GRM31A7U2J152JW31# |     |
|        |               |         | 1800pF | ±5%                | GRM31A7U2J182JW31# |     |
|        |               |         | 2200pF | ±5%                | GRM31A7U2J222JW31# |     |
|        |               |         | 500Vdc | COG                | 10pF               | ±5% |
|        | 12pF          | ±5%     |        |                    | GRM31A5C2H120JW01# |     |
|        | 15pF          | ±5%     |        |                    | GRM31A5C2H150JW01# |     |
|        | 18pF          | ±5%     |        |                    | GRM31A5C2H180JW01# |     |
|        | 22pF          | ±5%     |        |                    | GRM31A5C2H220JW01# |     |
|        | 27pF          | ±5%     |        |                    | GRM31A5C2H270JW01# |     |
|        | 33pF          | ±5%     |        |                    | GRM31A5C2H330JW01# |     |
|        | 39pF          | ±5%     |        |                    | GRM31A5C2H390JW01# |     |
|        | 47pF          | ±5%     |        |                    | GRM31A5C2H470JW01# |     |
|        | 56pF          | ±5%     |        |                    | GRM31A5C2H560JW01# |     |
|        | 68pF          | ±5%     |        |                    | GRM31A5C2H680JW01# |     |
|        | 82pF          | ±5%     |        |                    | GRM31A5C2H820JW01# |     |
|        | 100pF         | ±5%     |        |                    | GRM31A5C2H101JW01# |     |
|        | 120pF         | ±5%     |        |                    | GRM31A5C2H121JW01# |     |
|        | 150pF         | ±5%     |        |                    | GRM31A5C2H151JW01# |     |
|        | 180pF         | ±5%     |        |                    | GRM31A5C2H181JW01# |     |
|        | 220pF         | ±5%     |        |                    | GRM31A5C2H221JW01# |     |
|        | 270pF         | ±5%     |        |                    | GRM31A5C2H271JW01# |     |
|        | 330pF         | ±5%     |        |                    | GRM31A5C2H331JW01# |     |
|        | 390pF         | ±5%     |        |                    | GRM31A5C2H391JW01# |     |
|        | 470pF         | ±5%     |        | GRM31A5C2H471JW01# |                    |     |
|        | 560pF         | ±5%     |        | GRM31A5C2H561JW01# |                    |     |
|        | U2J           | 10pF    |        | ±5%                | GRM31A7U2H100JW31# |     |
|        |               | 12pF    |        | ±5%                | GRM31A7U2H120JW31# |     |
|        |               | 15pF    |        | ±5%                | GRM31A7U2H150JW31# |     |
|        |               | 18pF    |        | ±5%                | GRM31A7U2H180JW31# |     |
|        |               | 22pF    |        | ±5%                | GRM31A7U2H220JW31# |     |
|        |               | 27pF    |        | ±5%                | GRM31A7U2H270JW31# |     |
|        |               | 33pF    |        | ±5%                | GRM31A7U2H330JW31# |     |
|        |               | 39pF    |        | ±5%                | GRM31A7U2H390JW31# |     |
|        |               | 47pF    |        | ±5%                | GRM31A7U2H470JW31# |     |
|        |               | 56pF    |        | ±5%                | GRM31A7U2H560JW31# |     |
|        |               | 68pF    |        | ±5%                | GRM31A7U2H680JW31# |     |
|        |               | 82pF    |        | ±5%                | GRM31A7U2H820JW31# |     |
|        |               | 100pF   | ±5%    | GRM31A7U2H101JW31# |                    |     |

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number        |  |
|--------|---------------|---------|--------|------|--------------------|--|
| 1.0mm  | 500Vdc        | U2J     | 120pF  | ±5%  | GRM31A7U2H121JW31# |  |
|        |               |         | 150pF  | ±5%  | GRM31A7U2H151JW31# |  |
|        |               |         | 180pF  | ±5%  | GRM31A7U2H181JW31# |  |
|        |               |         | 220pF  | ±5%  | GRM31A7U2H221JW31# |  |
|        |               |         | 270pF  | ±5%  | GRM31A7U2H271JW31# |  |
|        |               |         | 330pF  | ±5%  | GRM31A7U2H331JW31# |  |
|        |               |         | 390pF  | ±5%  | GRM31A7U2H391JW31# |  |
|        |               |         | 470pF  | ±5%  | GRM31A7U2H471JW31# |  |
|        |               |         | 560pF  | ±5%  | GRM31A7U2H561JW31# |  |
|        |               |         | 680pF  | ±5%  | GRM31A7U2H681JW31# |  |
|        |               |         | 820pF  | ±5%  | GRM31A7U2H821JW31# |  |
|        |               |         | 1000pF | ±5%  | GRM31A7U2H102JW31# |  |
|        |               |         | 1200pF | ±5%  | GRM31A7U2H122JW31# |  |
|        |               |         | 1500pF | ±5%  | GRM31A7U2H152JW31# |  |
|        |               |         | 1800pF | ±5%  | GRM31A7U2H182JW31# |  |
|        |               |         | 2200pF | ±5%  | GRM31A7U2H222JW31# |  |
|        | 250Vdc        | COG     | 390pF  | ±5%  | GRM31A5C2E391JWA1# |  |
|        |               |         | 470pF  | ±5%  | GRM31A5C2E471JWA1# |  |
|        |               |         | 560pF  | ±5%  | GRM31A5C2E561JWA1# |  |
|        |               |         | 680pF  | ±5%  | GRM31A5C2E681JWA1# |  |
|        |               |         | 820pF  | ±5%  | GRM31A5C2E821JWA1# |  |
|        |               |         | 1000pF | ±5%  | GRM31A5C2E102JWA1# |  |
|        |               |         | 1200pF | ±5%  | GRM31A5C2E122JWA1# |  |
|        |               |         | 1500pF | ±5%  | GRM31A5C2E152JWA1# |  |
|        |               |         | 1800pF | ±5%  | GRM31A5C2E182JWA1# |  |
|        |               |         | 2200pF | ±5%  | GRM31A5C2E222JWA1# |  |
|        |               |         | 2700pF | ±5%  | GRM31A5C2E272JWA1# |  |
|        |               |         | 3300pF | ±5%  | GRM31A5C2E332JWA1# |  |
|        |               |         | 3900pF | ±5%  | GRM31A5C2E392JWA1# |  |
|        |               |         | 4700pF | ±5%  | GRM31A5C2E472JWA1# |  |
|        |               |         | 5600pF | ±5%  | GRM31A5C2E562JWA1# |  |
|        |               |         | 6800pF | ±5%  | GRM31A5C2E682JWA1# |  |
|        |               | U2J     | 2700pF | ±5%  | GRM31A7U2E272JW31# |  |
|        |               |         | 3300pF | ±5%  | GRM31A7U2E332JW31# |  |
|        |               |         | 3900pF | ±5%  | GRM31A7U2E392JW31# |  |
|        |               |         | 4700pF | ±5%  | GRM31A7U2E472JW31# |  |
|        | 200Vdc        | U2J     | 5600pF | ±5%  | GRM31A7U2E562JW31# |  |
|        |               |         | 2700pF | ±5%  | GRM31A7U2D272JW31# |  |
|        |               |         | 3300pF | ±5%  | GRM31A7U2D332JW31# |  |
|        |               |         | 3900pF | ±5%  | GRM31A7U2D392JW31# |  |
|        | 1.25mm        | COG     | 4700pF | ±5%  | GRM31A7U2D472JW31# |  |
|        |               |         | 5600pF | ±5%  | GRM31A7U2D562JW31# |  |
|        |               |         | 560pF  | ±5%  | GRM31B5C3A561JWA1# |  |
|        |               |         | 680pF  | ±5%  | GRM31B5C3A681JWA1# |  |
|        |               | U2J     | 390pF  | ±5%  | GRM31B7U3A391JW31# |  |
|        |               |         | 470pF  | ±5%  | GRM31B7U3A471JW31# |  |
|        |               |         | 560pF  | ±5%  | GRM31B7U3A561JW31# |  |
|        |               |         | 680pF  | ±5%  | GRM31B7U3A681JW31# |  |
|        | 630Vdc        | COG     | 680pF  | ±5%  | GRM31B5C2J681JW01# |  |
|        |               |         | 820pF  | ±5%  | GRM31B5C2J821JW01# |  |
|        |               |         | 1000pF | ±5%  | GRM31B5C2J102JW01# |  |
|        |               |         | 2200pF | ±5%  | GRM31B5C2J222JWA1# |  |
|        |               | U2J     | 2700pF | ±5%  | GRM31B5C2J272JWA1# |  |
|        |               |         | 2700pF | ±5%  | GRM31B7U2J272JW31# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 3.2×1.6mm)

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |    |
|--------|---------------|---------|---------|------|--------------------|----|
| 1.25mm | 630Vdc        | U2J     | 3300pF  | ±5%  | GRM31B7U2J332JW31# |    |
|        |               | COG     | 680pF   | ±5%  | GRM31B5C2H681JW01# |    |
|        |               |         | 820pF   | ±5%  | GRM31B5C2H821JW01# |    |
|        |               |         | 1000pF  | ±5%  | GRM31B5C2H102JW01# |    |
|        | 500Vdc        | U2J     | 2700pF  | ±5%  | GRM31B7U2H272JW31# |    |
|        |               |         | 3300pF  | ±5%  | GRM31B7U2H332JW31# |    |
|        |               | COG     | 8200pF  | ±5%  | GRM31B5C2E822JWA1# |    |
|        |               |         | 10000pF | ±5%  | GRM31B5C2E103JWA1# |    |
|        | 250Vdc        | COG     | 12000pF | ±5%  | GRM31B5C2E123JWA1# |    |
|        |               |         | 6800pF  | ±5%  | GRM31B7U2E682JW31# |    |
|        |               |         | 8200pF  | ±5%  | GRM31B7U2E822JW31# |    |
|        |               | U2J     | 10000pF | ±5%  | GRM31B7U2E103JW31# |    |
|        |               |         | 12000pF | ±5%  | GRM31B7U2E123JW31# |    |
|        | 200Vdc        | U2J     | 6800pF  | ±5%  | GRM31B7U2D682JW31# |    |
|        |               |         | 8200pF  | ±5%  | GRM31B7U2D822JW31# |    |
|        |               |         | 10000pF | ±5%  | GRM31B7U2D103JW31# |    |
|        | 100Vdc        | COG     | 47000pF | ±5%  | GRM31M5C2A473JA01# | D1 |
|        |               |         | 56000pF | ±5%  | GRM31M5C2A563JA01# | D1 |
|        |               | CH      | 47000pF | ±5%  | GRM31M2C2A473JA01# | D1 |
|        |               |         | 56000pF | ±5%  | GRM31M2C2A563JA01# | D1 |
|        | 50Vdc         | COG     | 47000pF | ±5%  | GRM31M5C1H473JA01# |    |
|        |               |         | 56000pF | ±5%  | GRM31M5C1H563JA01# |    |
|        |               | CH      | 47000pF | ±5%  | GRM31M2C1H473JA01# |    |
|        |               |         | 56000pF | ±5%  | GRM31M2C1H563JA01# |    |
|        |               | SL      | 68000pF | ±5%  | GRM31M1X1H683JA01# |    |
|        |               |         | 82000pF | ±5%  | GRM31M1X1H823JA01# |    |
|        |               |         | 0.10μF  | ±5%  | GRM31M1X1H104JA01# |    |
|        |               | U2J     | 68000pF | ±5%  | GRM31M7U1H683JA01# |    |
|        |               |         | 82000pF | ±5%  | GRM31M7U1H823JA01# |    |
|        |               |         | 0.10μF  | ±5%  | GRM31M7U1H104JA01# |    |
|        |               | UJ      | 68000pF | ±5%  | GRM31M3U1H683JA01# |    |
|        |               |         | 82000pF | ±5%  | GRM31M3U1H823JA01# |    |
|        |               |         | 0.10μF  | ±5%  | GRM31M3U1H104JA01# |    |
| 1.8mm  | 1000Vdc       | COG     | 820pF   | ±5%  | GRM31C5C3A821JWA3# |    |
|        |               |         | 1000pF  | ±5%  | GRM31C5C3A102JWA3# |    |
|        |               | U2J     | 820pF   | ±5%  | GRM31C7U3A821JW32# |    |
|        |               |         | 1000pF  | ±5%  | GRM31C7U3A102JW32# |    |
|        | 630Vdc        | COG     | 3300pF  | ±5%  | GRM31C5C2J332JWA3# |    |
|        |               |         | 3900pF  | ±5%  | GRM31C7U2J392JW32# |    |
|        |               | U2J     | 4700pF  | ±5%  | GRM31C7U2J472JW32# |    |
|        |               |         | 3900pF  | ±5%  | GRM31C7U2H392JW32# |    |
|        | 500Vdc        | U2J     | 4700pF  | ±5%  | GRM31C7U2H472JW32# |    |
|        |               |         | 3900pF  | ±5%  | GRM31C7U2H392JW32# |    |
|        |               | COG     | 15000pF | ±5%  | GRM31C5C2E153JWA3# |    |
|        |               |         | 15000pF | ±5%  | GRM31C7U2E153JW32# |    |
|        | 250Vdc        | COG     | 18000pF | ±5%  | GRM31C7U2E183JW32# |    |
|        |               |         | 22000pF | ±5%  | GRM31C7U2E223JW32# |    |
|        |               | U2J     | 68000pF | ±5%  | GRM31C5C2A683JA01# | D1 |
|        |               |         | 82000pF | ±5%  | GRM31C5C2A823JA01# | D1 |
|        | 100Vdc        | COG     | 0.10μF  | ±5%  | GRM31C5C2A104JA01# | D1 |
|        |               |         | 68000pF | ±5%  | GRM31C2C2A683JA01# | D1 |
|        |               | CH      | 82000pF | ±5%  | GRM31C2C2A823JA01# | D1 |
|        |               |         | 0.10μF  | ±5%  | GRM31C2C2A104JA01# | D1 |
|        | 50Vdc         | COG     | 68000pF | ±5%  | GRM31C5C1H683JA01# |    |
|        |               |         | 82000pF | ±5%  | GRM31C5C1H823JA01# |    |

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |  |
|--------|---------------|---------|---------|------|--------------------|--|
| 1.8mm  | 50Vdc         | COG     | 0.10μF  | ±5%  | GRM31C5C1H104JA01# |  |
|        |               | CH      | 68000pF | ±5%  | GRM31C2C1H683JA01# |  |
|        |               |         | 82000pF | ±5%  | GRM31C2C1H823JA01# |  |
|        |               |         | 0.10μF  | ±5%  | GRM31C2C1H104JA01# |  |
|        | 25Vdc         | COG     | 0.12μF  | ±5%  | GRM31C5C1E124JA01# |  |
|        |               | CH      | 0.12μF  | ±5%  | GRM31C2C1E124JA01# |  |
|        | 16Vdc         | COG     | 0.12μF  | ±5%  | GRM31C5C1C124JA01# |  |
|        |               | CH      | 0.12μF  | ±5%  | GRM31C2C1C124JA01# |  |

### 3.2×2.5mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |  |
|--------|---------------|---------|---------|------|--------------------|--|
| 1.0mm  | 2000Vdc       | U2J     | 82pF    | ±5%  | GRM32A7U3D820JW31# |  |
|        |               |         | 100pF   | ±5%  | GRM32A7U3D101JW31# |  |
|        |               |         | 120pF   | ±5%  | GRM32A7U3D121JW31# |  |
|        |               |         | 150pF   | ±5%  | GRM32A7U3D151JW31# |  |
|        | 630Vdc        | U2J     | 1200pF  | ±5%  | GRM32A7U2J122JW31# |  |
|        |               |         | 1500pF  | ±5%  | GRM32A7U2J152JW31# |  |
|        |               |         | 1800pF  | ±5%  | GRM32A7U2J182JW31# |  |
|        |               |         | 2200pF  | ±5%  | GRM32A7U2J222JW31# |  |
|        | 500Vdc        | U2J     | 1200pF  | ±5%  | GRM32A7U2H122JW31# |  |
|        |               |         | 1500pF  | ±5%  | GRM32A7U2H152JW31# |  |
|        |               |         | 1800pF  | ±5%  | GRM32A7U2H182JW31# |  |
|        |               |         | 2200pF  | ±5%  | GRM32A7U2H222JW31# |  |
| 1.25mm | 2000Vdc       | U2J     | 180pF   | ±5%  | GRM32B7U3D181JW31# |  |
|        |               |         | 220pF   | ±5%  | GRM32B7U3D221JW31# |  |
|        | 1000Vdc       | U2J     | 1200pF  | ±5%  | GRM32B7U3A122JW31# |  |
|        | 630Vdc        | U2J     | 5600pF  | ±5%  | GRM32B7U2J562JW31# |  |
| 1.5mm  | 500Vdc        | U2J     | 5600pF  | ±5%  | GRM32B7U2H562JW31# |  |
|        | 1000Vdc       | U2J     | 1500pF  | ±5%  | GRM32Q7U3A152JW31# |  |
|        | 630Vdc        | U2J     | 6800pF  | ±5%  | GRM32Q7U2J682JW31# |  |
|        | 500Vdc        | U2J     | 6800pF  | ±5%  | GRM32Q7U2H682JW31# |  |
| 2.0mm  | 250Vdc        | U2J     | 27000pF | ±5%  | GRM32Q7U2E273JW31# |  |
|        |               |         | 1800pF  | ±5%  | GRM32D7U3A182JW31# |  |
|        | 1000Vdc       | U2J     | 2200pF  | ±5%  | GRM32D7U3A222JW31# |  |
|        |               |         | 8200pF  | ±5%  | GRM32D7U2J822JW31# |  |
| 2.0mm  | 630Vdc        | U2J     | 10000pF | ±5%  | GRM32D7U2J103JW31# |  |
|        |               |         | 8200pF  | ±5%  | GRM32D7U2H822JW31# |  |
|        | 500Vdc        | U2J     | 10000pF | ±5%  | GRM32D7U2H103JW31# |  |
|        |               |         | 8200pF  | ±5%  | GRM32D7U2E333JW31# |  |
| 2.0mm  | 250Vdc        | U2J     | 39000pF | ±5%  | GRM32D7U2E393JW31# |  |
|        |               |         | 47000pF | ±5%  | GRM32D7U2E473JW31# |  |

### 4.5×2.0mm

| T max. | Rated Voltage | TC Code | Cap. | Tol. | Part Number        |  |
|--------|---------------|---------|------|------|--------------------|--|
| 1.0mm  | 3150Vdc       | U2J     | 10pF | ±5%  | GRM42A7U3F100JW31# |  |
|        |               |         | 12pF | ±5%  | GRM42A7U3F120JW31# |  |
|        |               |         | 15pF | ±5%  | GRM42A7U3F150JW31# |  |
|        |               |         | 18pF | ±5%  | GRM42A7U3F180JW31# |  |
|        |               |         | 22pF | ±5%  | GRM42A7U3F220JW31# |  |
|        |               |         | 27pF | ±5%  | GRM42A7U3F270JW31# |  |

Part number # indicates the package specification code.

## GRM Series Temperature Compensating Type Part Number List

(→ 4.5×2.0mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol. | Part Number        |  |
|--------|---------------|---------|-------|------|--------------------|--|
| 1.0mm  | 3150Vdc       | U2J     | 33pF  | ±5%  | GRM42A7U3F330JW31# |  |
|        |               |         | 39pF  | ±5%  | GRM42A7U3F390JW31# |  |
|        |               |         | 47pF  | ±5%  | GRM42A7U3F470JW31# |  |
|        |               |         | 56pF  | ±5%  | GRM42A7U3F560JW31# |  |
|        |               |         | 68pF  | ±5%  | GRM42A7U3F680JW31# |  |
|        |               |         | 82pF  | ±5%  | GRM42A7U3F820JW31# |  |
|        |               |         | 100pF | ±5%  | GRM42A7U3F101JW31# |  |

### 4.5×3.2mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |  |
|--------|---------------|---------|---------|------|--------------------|--|
| 1.5mm  | 1000Vdc       | U2J     | 2700pF  | ±5%  | GRM43Q7U3A272JW31# |  |
|        |               |         | 3300pF  | ±5%  | GRM43Q7U3A332JW31# |  |
|        | 630Vdc        | U2J     | 12000pF | ±5%  | GRM43Q7U2J123JW31# |  |
|        | 500Vdc        | U2J     | 12000pF | ±5%  | GRM43Q7U2H123JW31# |  |
| 2.0mm  | 1000Vdc       | U2J     | 3900pF  | ±5%  | GRM43D7U3A392JW31# |  |
|        |               |         | 4700pF  | ±5%  | GRM43D7U3A472JW31# |  |
|        | 630Vdc        | U2J     | 15000pF | ±5%  | GRM43D7U2J153JW31# |  |
|        |               |         | 18000pF | ±5%  | GRM43D7U2J183JW31# |  |
|        |               |         | 22000pF | ±5%  | GRM43D7U2J223JW31# |  |
|        | 500Vdc        | U2J     | 15000pF | ±5%  | GRM43D7U2H153JW31# |  |
|        |               |         | 18000pF | ±5%  | GRM43D7U2H183JW31# |  |
|        |               |         | 22000pF | ±5%  | GRM43D7U2H223JW31# |  |
|        |               |         |         |      |                    |  |
|        |               |         |         |      |                    |  |

### 5.7×5.0mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |  |
|--------|---------------|---------|---------|------|--------------------|--|
| 1.5mm  | 1000Vdc       | U2J     | 5600pF  | ±5%  | GRM55Q7U3A562JW31# |  |
|        |               |         | 6800pF  | ±5%  | GRM55Q7U3A682JW31# |  |
|        | 630Vdc        | U2J     | 27000pF | ±5%  | GRM55Q7U2J273JW31# |  |
|        | 500Vdc        | U2J     | 27000pF | ±5%  | GRM55Q7U2H273JW31# |  |
| 2.0mm  | 1000Vdc       | U2J     | 8200pF  | ±5%  | GRM55D7U3A822JW31# |  |
|        |               |         | 10000pF | ±5%  | GRM55D7U3A103JW31# |  |
|        | 630Vdc        | U2J     | 33000pF | ±5%  | GRM55D7U2J333JW31# |  |
|        |               |         | 39000pF | ±5%  | GRM55D7U2J393JW31# |  |
|        |               |         | 47000pF | ±5%  | GRM55D7U2J473JW31# |  |
|        | 500Vdc        | U2J     | 33000pF | ±5%  | GRM55D7U2H333JW31# |  |
|        |               |         | 39000pF | ±5%  | GRM55D7U2H393JW31# |  |
|        |               |         | 47000pF | ±5%  | GRM55D7U2H473JW31# |  |
|        |               |         |         |      |                    |  |
|        |               |         |         |      |                    |  |

## GRM Series High Dielectric Constant Type Part Number List

### 0.4×0.2mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number        |  |
|--------|---------------|---------|--------|------|--------------------|--|
| 0.22mm | 16Vdc         | X7R     | 100pF  | ±10% | GRM022R71C101KE14# |  |
|        |               |         |        | ±20% | GRM022R71C101ME14# |  |
|        |               |         | 150pF  | ±10% | GRM022R71C151KE14# |  |
|        |               |         |        | ±20% | GRM022R71C151ME14# |  |
|        |               |         | 220pF  | ±10% | GRM022R71C221KE14# |  |
|        |               |         |        | ±20% | GRM022R71C221ME14# |  |
|        |               |         | 330pF  | ±10% | GRM022R71C331KE14# |  |
|        |               |         |        | ±20% | GRM022R71C331ME14# |  |
|        |               |         | 470pF  | ±10% | GRM022R71C471KE14# |  |
|        |               |         |        | ±20% | GRM022R71C471ME14# |  |
|        |               |         | 1000pF | ±10% | GRM022R71C102KE14# |  |
|        |               |         |        | ±20% | GRM022R71C102ME14# |  |
|        | 10Vdc         | X7R     | 100pF  | ±10% | GRM022R71A101KA01# |  |
|        |               |         |        | ±20% | GRM022R71A101MA01# |  |
|        |               |         | 150pF  | ±10% | GRM022R71A151KA01# |  |
|        |               |         |        | ±20% | GRM022R71A151MA01# |  |
|        |               |         | 220pF  | ±10% | GRM022R71A221KA01# |  |
|        |               |         |        | ±20% | GRM022R71A221MA01# |  |
|        |               |         | 330pF  | ±10% | GRM022R71A331KA01# |  |
|        |               |         |        | ±20% | GRM022R71A331MA01# |  |
|        |               |         | 470pF  | ±10% | GRM022R71A471KA01# |  |
|        |               |         |        | ±20% | GRM022R71A471MA01# |  |
|        |               |         | 680pF  | ±10% | GRM022R71A681KA12# |  |
|        |               |         |        | ±20% | GRM022R71A681MA12# |  |
|        |               |         | 820pF  | ±10% | GRM022R71A821KA12# |  |
|        |               |         |        | ±20% | GRM022R71A821MA12# |  |
|        |               |         | 1000pF | ±10% | GRM022R71A102KA12# |  |
|        |               |         |        | ±20% | GRM022R71A102MA12# |  |
|        |               | X5R     | 100pF  | ±10% | GRM022R61A101KA01# |  |
|        |               |         |        | ±20% | GRM022R61A101MA01# |  |
|        |               |         | 150pF  | ±10% | GRM022R61A151KA01# |  |
|        |               |         |        | ±20% | GRM022R61A151MA01# |  |
|        |               |         | 220pF  | ±10% | GRM022R61A221KA01# |  |
|        |               |         |        | ±20% | GRM022R61A221MA01# |  |
|        |               |         | 330pF  | ±10% | GRM022R61A331KA01# |  |
|        |               |         |        | ±20% | GRM022R61A331MA01# |  |
|        |               |         | 470pF  | ±10% | GRM022R61A471KA01# |  |
|        |               |         |        | ±20% | GRM022R61A471MA01# |  |
|        |               |         | 680pF  | ±10% | GRM022R61A681KE19# |  |
|        |               |         |        | ±20% | GRM022R61A681ME19# |  |
|        |               |         | 1000pF | ±10% | GRM022R61A102KE19# |  |
|        |               |         |        | ±20% | GRM022R61A102ME19# |  |
|        |               |         | 1500pF | ±10% | GRM022R61A152KE19# |  |
|        |               |         |        | ±20% | GRM022R61A152ME19# |  |
|        |               |         | 2200pF | ±10% | GRM022R61A222KE19# |  |
|        |               |         |        | ±20% | GRM022R61A222ME19# |  |
|        |               |         | 3300pF | ±10% | GRM022R61A332KE19# |  |
|        |               |         |        | ±20% | GRM022R61A332ME19# |  |
|        |               |         | 4700pF | ±10% | GRM022R61A472KE19# |  |
|        |               |         |        | ±20% | GRM022R61A472ME19# |  |
|        |               |         | 6800pF | ±10% | GRM022R61A682KE19# |  |
|        |               |         |        | ±20% | GRM022R61A682ME19# |  |

| T max. | Rated Voltage | TC Code | Cap.    | Tol.               | Part Number        |                    |                    |
|--------|---------------|---------|---------|--------------------|--------------------|--------------------|--------------------|
| 0.22mm | 10Vdc         | X5R     | 10000pF | ±10%               | GRM022R61A103KE19# |                    |                    |
|        |               |         |         | ±20%               | GRM022R61A103ME19# |                    |                    |
|        |               | B       | 100pF   | ±10%               | GRM022B11A101KA01# |                    |                    |
|        |               |         |         | ±20%               | GRM022B11A101MA01# |                    |                    |
|        |               | 150pF   | ±10%    | GRM022B11A151KA01# |                    |                    |                    |
|        |               |         | ±20%    | GRM022B11A151MA01# |                    |                    |                    |
|        |               | 220pF   | ±10%    | GRM022B11A221KA01# |                    |                    |                    |
|        |               |         | ±20%    | GRM022B11A221MA01# |                    |                    |                    |
|        |               | 330pF   | ±10%    | GRM022B11A331KA01# |                    |                    |                    |
|        |               |         | ±20%    | GRM022B11A331MA01# |                    |                    |                    |
|        |               | 470pF   | ±10%    | GRM022B11A471KA01# |                    |                    |                    |
|        |               |         | ±20%    | GRM022B11A471MA01# |                    |                    |                    |
|        |               | 680pF   | ±10%    | GRM022B31A681KE19# |                    |                    |                    |
|        |               |         | ±20%    | GRM022B31A681ME19# |                    |                    |                    |
|        |               | 1000pF  | ±10%    | GRM022B31A102KE19# |                    |                    |                    |
|        |               |         | ±20%    | GRM022B31A102ME19# |                    |                    |                    |
|        |               | 1500pF  | ±10%    | GRM022B31A152KE19# |                    |                    |                    |
|        |               |         | ±20%    | GRM022B31A152ME19# |                    |                    |                    |
|        |               | 2200pF  | ±10%    | GRM022B31A222KE19# |                    |                    |                    |
|        |               |         | ±20%    | GRM022B31A222ME19# |                    |                    |                    |
|        |               | 3300pF  | ±10%    | GRM022B31A332KE19# |                    |                    |                    |
|        |               |         | ±20%    | GRM022B31A332ME19# |                    |                    |                    |
|        |               | 4700pF  | ±10%    | GRM022B31A472KE19# |                    |                    |                    |
|        |               |         | ±20%    | GRM022B31A472ME19# |                    |                    |                    |
|        |               | 6800pF  | ±10%    | GRM022B31A682KE19# |                    |                    |                    |
|        |               |         | ±20%    | GRM022B31A682ME19# |                    |                    |                    |
|        |               | 10000pF | ±10%    | GRM022B31A103KE19# |                    |                    |                    |
|        |               |         | ±20%    | GRM022B31A103ME19# |                    |                    |                    |
|        | 6.3Vdc        | X5R     | 1000pF  | ±20%               | GRM022R60J102ME19# |                    |                    |
|        |               |         | 1500pF  | ±20%               | GRM022R60J152ME19# |                    |                    |
|        |               |         | 2200pF  | ±20%               | GRM022R60J222ME19# |                    |                    |
|        |               |         | 3300pF  | ±20%               | GRM022R60J332ME19# |                    |                    |
|        |               |         | 4700pF  | ±20%               | GRM022R60J472ME19# |                    |                    |
|        |               |         | 6800pF  | ±20%               | GRM022R60J682ME19# |                    |                    |
|        |               |         | 10000pF | ±20%               | GRM022R60J103ME19# |                    |                    |
|        |               |         | 15000pF | ±20%               | GRM022R60J153ME15# | D1                 |                    |
|        |               |         | 22000pF | ±10%               | GRM022R60J223KE15# | D1                 |                    |
|        |               |         |         | ±20%               | GRM022R60J223ME15# | D1                 |                    |
|        |               |         | 33000pF | ±20%               | GRM022R60J333ME15# | D1                 |                    |
|        |               |         | 47000pF | ±20%               | GRM022R60J473ME15# | D1                 |                    |
|        |               |         | 68000pF | ±20%               | GRM022R60J683ME15# | D1                 |                    |
|        |               |         | 0.10μF  | ±20%               | GRM022R60J104ME15# | D1                 |                    |
|        |               |         | B       | 1000pF             | ±20%               | GRM022B30J102ME19# |                    |
|        |               |         |         | 1500pF             | ±20%               | GRM022B30J152ME19# |                    |
|        |               |         |         | 2200pF             | ±20%               | GRM022B30J222ME19# |                    |
|        |               |         |         | 3300pF             | ±20%               | GRM022B30J332ME19# |                    |
|        |               |         |         | 4700pF             | ±20%               | GRM022B30J472ME19# |                    |
|        |               |         |         | 6800pF             | ±20%               | GRM022B30J682ME19# |                    |
|        |               | 10000pF |         | ±20%               | GRM022B30J103ME19# |                    |                    |
|        |               | 4Vdc    |         | X6T                | 0.10μF             | ±20%               | GRM022D80G104ME15# |
|        |               |         |         |                    |                    |                    |                    |
|        |               |         | X5R     | 15000pF            | ±10%               | GRM022R60G153KE15# |                    |
|        |               |         |         |                    | ±20%               | GRM022R60G153ME15# |                    |
|        |               |         |         | 22000pF            | ±10%               | GRM022R60G223KE15# |                    |
|        |               |         |         |                    | ±20%               | GRM022R60G223ME15# |                    |

Part number # indicates the package specification code.

## GRM Series High Dielectric Constant Type Part Number List

(→ 0.4×0.2mm)

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |  |
|--------|---------------|---------|---------|------|--------------------|--|
| 0.22mm | 4Vdc          | X5R     | 33000pF | ±10% | GRM022R60G333KE15# |  |
|        |               |         |         | ±20% | GRM022R60G333ME15# |  |
|        |               |         | 47000pF | ±10% | GRM022R60G473KE15# |  |
|        |               |         |         | ±20% | GRM022R60G473ME15# |  |
|        |               |         | 68000pF | ±20% | GRM022R60G683ME15# |  |
|        |               |         | 0.10μF  | ±20% | GRM022R60G104ME15# |  |
|        | 2.5Vdc        | X6T     | 0.10μF  | ±20% | GRM022D80E104ME15# |  |

0.6×0.3mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number        |    |
|--------|---------------|---------|--------|------|--------------------|----|
| 0.33mm | 50Vdc         | X7R     | 100pF  | ±10% | GRM033R71H101KA12# |    |
|        |               |         |        | ±20% | GRM033R71H101MA12# |    |
|        |               |         | 150pF  | ±10% | GRM033R71H151KA12# |    |
|        |               |         |        | ±20% | GRM033R71H151MA12# |    |
|        |               |         | 220pF  | ±10% | GRM033R71H221KA12# |    |
|        |               |         |        | ±20% | GRM033R71H221MA12# |    |
|        |               |         | 330pF  | ±10% | GRM033R71H331KA12# |    |
|        |               |         |        | ±20% | GRM033R71H331MA12# |    |
|        |               |         | 470pF  | ±10% | GRM033R71H471KA12# |    |
|        |               |         |        | ±20% | GRM033R71H471MA12# |    |
|        |               |         | 680pF  | ±10% | GRM033R71H681KA12# |    |
|        |               |         |        | ±20% | GRM033R71H681MA12# |    |
|        |               |         | 1000pF | ±10% | GRM033R71H102KA12# |    |
|        |               |         |        | ±20% | GRM033R71H102MA12# |    |
|        |               |         | 1500pF | ±10% | GRM033R71H152KA12# |    |
|        |               |         |        | ±20% | GRM033R71H152MA12# |    |
|        |               | X5R     | 470pF  | ±10% | GRM033R61H471KA12# |    |
|        |               | B       | 100pF  | ±10% | GRM033B31H101KA12# |    |
|        |               |         |        | ±20% | GRM033B31H101MA12# |    |
|        |               |         | 150pF  | ±10% | GRM033B31H151KA12# |    |
|        |               |         |        | ±20% | GRM033B31H151MA12# |    |
|        |               |         | 220pF  | ±10% | GRM033B31H221KA12# |    |
|        |               |         |        | ±20% | GRM033B31H221MA12# |    |
|        |               |         | 330pF  | ±10% | GRM033B31H331KA12# |    |
|        |               |         |        | ±20% | GRM033B31H331MA12# |    |
|        |               |         | 470pF  | ±10% | GRM033B31H471KA12# |    |
|        |               |         |        | ±20% | GRM033B31H471MA12# |    |
|        |               |         | 680pF  | ±10% | GRM033B31H681KA12# |    |
|        |               |         |        | ±20% | GRM033B31H681MA12# |    |
|        |               |         | 1000pF | ±10% | GRM033B31H102KA12# |    |
|        |               |         |        | ±20% | GRM033B31H102MA12# |    |
|        |               |         | 1500pF | ±10% | GRM033B31H152KA12# |    |
|        |               |         |        | ±20% | GRM033B31H152MA12# |    |
|        | 35Vdc         | X5R     | 0.10μF | ±10% | GRM033R6YA104KE14# | D1 |
|        |               |         |        | ±20% | GRM033R6YA104ME14# | D1 |
|        | 25Vdc         | X7R     | 1000pF | ±10% | GRM033R71E102KA01# |    |
|        |               |         | 1500pF | ±10% | GRM033R71E152KA01# |    |
|        |               |         | 2200pF | ±10% | GRM033R71E222KA12# |    |
|        |               |         |        | ±20% | GRM033R71E222MA12# |    |
|        |               |         | 3300pF | ±10% | GRM033R71E332KA12# |    |
|        |               |         |        | ±20% | GRM033R71E332MA12# |    |
|        |               |         | 4700pF | ±10% | GRM033R71E472KE14# | D1 |

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |    |
|--------|---------------|---------|---------|------|--------------------|----|
| 0.33mm | 25Vdc         | X7R     | 4700pF  | ±20% | GRM033R71E472ME14# | D1 |
|        |               |         | 6800pF  | ±10% | GRM033R71E682KE14# | D1 |
|        |               |         |         | ±20% | GRM033R71E682ME14# | D1 |
|        |               |         | 10000pF | ±10% | GRM033R71E103KE14# | D1 |
|        |               |         |         | ±20% | GRM033R71E103ME14# | D1 |
|        |               | R       | 100pF   | ±10% | GRM033R11E101KA01# |    |
|        |               |         | 150pF   | ±10% | GRM033R11E151KA01# |    |
|        |               |         | 220pF   | ±10% | GRM033R11E221KA01# |    |
|        |               |         | 330pF   | ±10% | GRM033R11E331KA01# |    |
|        |               |         | 470pF   | ±10% | GRM033R11E471KA01# |    |
|        |               |         | 680pF   | ±10% | GRM033R11E681KA01# |    |
|        |               |         | 1000pF  | ±10% | GRM033R11E102KA01# |    |
|        |               |         | 1500pF  | ±10% | GRM033R11E152KA01# |    |
|        |               | X6S     | 0.10μF  | ±10% | GRM033C81E104KE14# | D1 |
|        |               |         |         | ±20% | GRM033C81E104ME14# | D1 |
|        |               | X5R     | 4700pF  | ±10% | GRM033R61E472KA12# | D1 |
|        |               |         |         | ±20% | GRM033R61E472MA12# | D1 |
|        |               |         | 6800pF  | ±10% | GRM033R61E682KA12# | D1 |
|        |               |         |         | ±20% | GRM033R61E682MA12# | D1 |
|        |               |         | 10000pF | ±10% | GRM033R61E103KA12# | D1 |
|        |               |         |         | ±20% | GRM033R61E103MA12# | D1 |
|        |               |         | 0.10μF  | ±10% | GRM033R61E104KE14# |    |
|        |               |         |         | ±20% | GRM033R61E104ME14# |    |
|        |               | B       | 1000pF  | ±10% | GRM033B11E102KA01# |    |
|        |               |         |         | ±20% | GRM033B11E102MA01# |    |
|        |               |         | 1500pF  | ±10% | GRM033B11E152KA01# |    |
|        |               |         |         | ±20% | GRM033B11E152MA01# |    |
|        |               |         | 2200pF  | ±10% | GRM033B31E222KA12# |    |
|        |               |         |         | ±20% | GRM033B31E222MA12# |    |
|        |               |         | 3300pF  | ±10% | GRM033B31E332KA12# |    |
|        |               |         |         | ±20% | GRM033B31E332MA12# |    |
|        |               |         | 10000pF | ±10% | GRM033B31E103KA12# | D1 |
|        |               |         |         | ±20% | GRM033B31E103MA12# | D1 |
|        | 16Vdc         | X7R     | 2200pF  | ±10% | GRM033R71C222KA88# |    |
|        |               |         | 3300pF  | ±10% | GRM033R71C332KA88# |    |
|        |               |         | 4700pF  | ±10% | GRM033R71C472KE14# |    |
|        |               |         |         | ±20% | GRM033R71C472ME14# |    |
|        |               |         | 6800pF  | ±10% | GRM033R71C682KE14# |    |
|        |               |         |         | ±20% | GRM033R71C682ME14# |    |
|        |               |         | 10000pF | ±10% | GRM033R71C103KE14# |    |
|        |               |         |         | ±20% | GRM033R71C103ME14# |    |
|        |               | X7S     | 0.10μF  | ±10% | GRM033C71C104KE14# | D1 |
|        |               |         |         | ±20% | GRM033C71C104ME14# | D1 |
|        |               | R       | 2200pF  | ±10% | GRM033R11C222KA88# |    |
|        |               |         | 3300pF  | ±10% | GRM033R11C332KA88# |    |
|        |               | X6S     | 0.10μF  | ±10% | GRM033C81C104KE14# |    |
|        |               |         |         | ±20% | GRM033C81C104ME14# |    |
|        |               | X5R     | 10000pF | ±10% | GRM033R61C103KA12# |    |
|        |               |         |         | ±20% | GRM033R61C103MA12# |    |
|        |               |         | 15000pF | ±10% | GRM033R61C153KE84# | D1 |
|        |               |         |         | ±20% | GRM033R61C153ME84# | D1 |
|        |               |         | 22000pF | ±10% | GRM033R61C223KE84# | D1 |
|        |               |         |         | ±20% | GRM033R61C223ME84# | D1 |
|        |               |         | 33000pF | ±10% | GRM033R61C333KE84# | D1 |

Part number # indicates the package specification code.

## GRM Series High Dielectric Constant Type Part Number List

(→ 0.6×0.3mm)

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |           |
|--------|---------------|---------|---------|------|--------------------|-----------|
| 0.33mm | 16Vdc         | X5R     | 33000pF | ±20% | GRM033R61C333ME84# | <b>D1</b> |
|        |               |         | 47000pF | ±10% | GRM033R61C473KE84# | <b>D1</b> |
|        |               |         |         | ±20% | GRM033R61C473ME84# | <b>D1</b> |
|        |               |         | 68000pF | ±10% | GRM033R61C683KE84# | <b>D1</b> |
|        |               |         |         | ±20% | GRM033R61C683ME84# | <b>D1</b> |
|        |               |         | 0.10μF  | ±10% | GRM033R61C104KE14# |           |
|        |               |         |         | ±20% | GRM033R61C104ME14# |           |
|        |               | B       | 2200pF  | ±10% | GRM033B31C222KA87# |           |
|        |               |         |         | ±20% | GRM033B31C222MA87# |           |
|        |               |         | 3300pF  | ±10% | GRM033B31C332KA87# |           |
|        |               |         |         | ±20% | GRM033B31C332MA87# |           |
|        |               |         | 10000pF | ±10% | GRM033B31C103KA12# |           |
|        |               |         |         | ±20% | GRM033B31C103MA12# |           |
|        |               |         | 15000pF | ±10% | GRM033B31C153KE84# | <b>D1</b> |
|        |               |         |         | ±20% | GRM033B31C153ME84# | <b>D1</b> |
|        |               |         | 22000pF | ±10% | GRM033B31C223KE84# | <b>D1</b> |
|        |               |         |         | ±20% | GRM033B31C223ME84# | <b>D1</b> |
|        |               |         | 33000pF | ±10% | GRM033B31C333KE84# | <b>D1</b> |
|        |               |         |         | ±20% | GRM033B31C333ME84# | <b>D1</b> |
|        |               |         | 47000pF | ±10% | GRM033B31C473KE84# | <b>D1</b> |
|        |               |         |         | ±20% | GRM033B31C473ME84# | <b>D1</b> |
|        |               |         | 68000pF | ±10% | GRM033B31C683KE84# | <b>D1</b> |
|        |               |         |         | ±20% | GRM033B31C683ME84# | <b>D1</b> |
|        |               |         | 0.10μF  | ±10% | GRM033B31C104KE84# | <b>D1</b> |
|        |               |         |         | ±20% | GRM033B31C104ME84# | <b>D1</b> |
|        | 10Vdc         | X7R     | 4700pF  | ±10% | GRM033R71A472KA01# |           |
|        |               |         |         | ±20% | GRM033R71A472MA01# |           |
|        |               |         | 6800pF  | ±10% | GRM033R71A682KA01# |           |
|        |               |         |         | ±20% | GRM033R71A682MA01# |           |
|        |               |         | 10000pF | ±10% | GRM033R71A103KA01# |           |
|        |               |         |         | ±20% | GRM033R71A103MA01# |           |
|        |               | X7S     | 0.10μF  | ±10% | GRM033C71A104KE14# |           |
|        |               |         |         | ±20% | GRM033C71A104ME14# |           |
|        |               | R       | 4700pF  | ±10% | GRM033R11A472KA01# |           |
|        |               |         |         | ±20% | GRM033R11A472MA01# |           |
|        |               |         | 6800pF  | ±10% | GRM033R11A682KA01# |           |
|        |               |         |         | ±20% | GRM033R11A682MA01# |           |
|        |               | 10000pF |         | ±10% | GRM033R11A103KA01# |           |
|        |               |         |         | ±20% | GRM033R11A103MA01# |           |
|        |               | X5R     | 4700pF  | ±10% | GRM033R61A472KA01# |           |
|        |               |         |         | ±20% | GRM033R61A472MA01# |           |
|        |               |         | 6800pF  | ±10% | GRM033R61A682KA01# |           |
|        |               |         |         | ±20% | GRM033R61A682MA01# |           |
|        |               |         | 15000pF | ±10% | GRM033R61A153KE84# |           |
|        |               |         |         | ±20% | GRM033R61A153ME84# |           |
|        |               |         | 22000pF | ±10% | GRM033R61A223KE84# |           |
|        |               |         |         | ±20% | GRM033R61A223ME84# |           |
|        |               |         | 33000pF | ±10% | GRM033R61A333KE84# |           |
|        |               |         |         | ±20% | GRM033R61A333ME84# |           |
|        |               | 47000pF |         | ±10% | GRM033R61A473KE84# |           |
|        |               |         |         | ±20% | GRM033R61A473ME84# |           |
|        |               |         | 68000pF | ±10% | GRM033R61A683KE84# |           |
|        |               |         |         | ±20% | GRM033R61A683ME84# |           |
|        |               | 0.10μF  |         | ±10% | GRM033R61A104KE84# |           |
|        |               |         |         | ±20% | GRM033R61A104ME84# |           |

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |           |
|--------|---------------|---------|---------|------|--------------------|-----------|
| 0.33mm | 10Vdc         | X5R     | 0.10μF  | ±20% | GRM033R61A104ME84# |           |
|        |               |         | 0.22μF  | ±20% | GRM033R61A224ME90# | <b>D1</b> |
|        |               | B       | 4700pF  | ±10% | GRM033B11A472KA01# |           |
|        |               |         |         | ±20% | GRM033B11A472MA01# |           |
|        |               |         | 6800pF  | ±10% | GRM033B11A682KA01# |           |
|        |               |         |         | ±20% | GRM033B11A682MA01# |           |
|        |               |         | 15000pF | ±10% | GRM033B31A153KE84# |           |
|        |               |         |         | ±20% | GRM033B31A153ME84# |           |
|        |               |         | 22000pF | ±10% | GRM033B31A223KE84# |           |
|        |               |         |         | ±20% | GRM033B31A223ME84# |           |
|        |               |         | 33000pF | ±10% | GRM033B31A333KE84# |           |
|        |               |         |         | ±20% | GRM033B31A333ME84# |           |
|        |               |         | 47000pF | ±10% | GRM033B31A473KE84# |           |
|        |               |         |         | ±20% | GRM033B31A473ME84# |           |
|        |               |         | 68000pF | ±10% | GRM033B31A683KE84# |           |
|        |               |         |         | ±20% | GRM033B31A683ME84# |           |
|        |               |         | 0.10μF  | ±10% | GRM033B31A104KE84# |           |
|        |               |         |         | ±20% | GRM033B31A104ME84# |           |
|        | 6.3Vdc        | X7R     | 4700pF  | ±10% | GRM033R70J472KA01# |           |
|        |               |         | 6800pF  | ±10% | GRM033R70J682KA01# |           |
|        |               |         | 10000pF | ±10% | GRM033R70J103KA01# |           |
|        |               | R       | 4700pF  | ±10% | GRM033R10J472KA01# |           |
|        |               |         | 6800pF  | ±10% | GRM033R10J682KA01# |           |
|        |               |         | 10000pF | ±10% | GRM033R10J103KA01# |           |
|        |               | X6S     | 15000pF | ±10% | GRM033C80J153KE01# |           |
|        |               |         |         | ±20% | GRM033C80J153ME01# |           |
|        |               |         | 22000pF | ±10% | GRM033C80J223KE01# |           |
|        |               |         |         | ±20% | GRM033C80J223ME01# |           |
|        |               |         | 33000pF | ±10% | GRM033C80J333KE01# |           |
|        |               |         |         | ±20% | GRM033C80J333ME01# |           |
|        |               |         | 47000pF | ±10% | GRM033C80J473KE19# |           |
|        |               |         |         | ±20% | GRM033C80J473ME19# |           |
|        |               |         | 68000pF | ±10% | GRM033C80J683KE84# | <b>D1</b> |
|        |               |         |         | ±20% | GRM033C80J683ME84# | <b>D1</b> |
|        |               |         | 0.10μF  | ±10% | GRM033C80J104KE84# | <b>D1</b> |
|        |               |         |         | ±20% | GRM033C80J104ME84# | <b>D1</b> |
|        |               |         | 0.22μF  | ±20% | GRM033C80J224ME90# | <b>D1</b> |
|        |               |         |         |      |                    |           |
|        |               | X5R     | 0.22μF  | ±20% | GRM033R60J224ME90# |           |
|        |               | B       | 4700pF  | ±10% | GRM033B10J472KA01# |           |
|        |               |         |         | ±10% | GRM033B10J682KA01# |           |
|        |               |         | 15000pF | ±10% | GRM033B10J153KE01# |           |
|        |               |         |         | ±20% | GRM033B10J153ME01# |           |
|        |               |         | 22000pF | ±10% | GRM033B10J223KE01# |           |
|        |               |         |         | ±20% | GRM033B10J223ME01# |           |
|        |               | 33000pF |         | ±10% | GRM033B10J333KE01# |           |
|        |               |         |         | ±20% | GRM033B10J333ME01# |           |
|        | 4Vdc          | X6S     | 0.22μF  | ±20% | GRM033C80G224ME90# |           |

1.0×0.5mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number        |           |
|--------|---------------|---------|--------|------|--------------------|-----------|
| 0.22mm | 10Vdc         | X5R     | 0.10μF | ±10% | GRM152R61A104KE19# | <b>D1</b> |
|        |               |         |        | ±20% | GRM152R61A104ME19# | <b>D1</b> |

Part number # indicates the package specification code.

# GRM Series High Dielectric Constant Type Part Number List

(→ 1.0×0.5mm)

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number        |           |
|--------|---------------|---------|--------|------|--------------------|-----------|
| 0.22mm | 10Vdc         | X5R     | 0.22μF | ±10% | GRM152R61A224KE19# | <b>D1</b> |
|        |               |         |        | ±20% | GRM152R61A224ME19# | <b>D1</b> |
|        |               | B       | 0.10μF | ±10% | GRM152B31A104KE19# | <b>D1</b> |
|        |               |         |        | ±20% | GRM152B31A104ME19# | <b>D1</b> |
|        |               |         | 0.22μF | ±10% | GRM152B31A224KE19# | <b>D1</b> |
|        |               |         |        | ±20% | GRM152B31A224ME19# | <b>D1</b> |
|        | 6.3Vdc        | X6S     | 0.10μF | ±10% | GRM152C80J104KE19# | <b>D1</b> |
|        |               |         |        | ±20% | GRM152C80J104ME19# | <b>D1</b> |
|        |               |         | 0.22μF | ±10% | GRM152C80J224KE19# | <b>D1</b> |
|        |               |         |        | ±20% | GRM152C80J224ME19# | <b>D1</b> |
|        |               | X5R     | 0.10μF | ±10% | GRM152R60J104KE19# |           |
|        |               |         |        | ±20% | GRM152R60J104ME19# |           |
|        |               |         | 0.22μF | ±10% | GRM152R60J224KE19# |           |
|        |               |         |        | ±20% | GRM152R60J224ME19# |           |
|        |               |         | 0.47μF | ±20% | GRM152R60J474ME15# | <b>D1</b> |
|        |               |         | 1.0μF  | ±20% | GRM152R60J105ME15# | <b>D1</b> |
|        |               | B       | 0.10μF | ±10% | GRM152B30J104KE19# |           |
|        |               |         |        | ±20% | GRM152B30J104ME19# |           |
|        |               |         | 0.22μF | ±10% | GRM152B30J224KE19# |           |
|        |               |         |        | ±20% | GRM152B30J224ME19# |           |
|        |               |         | 0.47μF | ±20% | GRM152B30J474ME15# | <b>D1</b> |
|        | 4Vdc          | X7T     | 0.10μF | ±10% | GRM152D70G104KE15# | <b>D1</b> |
|        |               |         |        | ±20% | GRM152D70G104ME15# | <b>D1</b> |
|        |               |         | 0.22μF | ±10% | GRM152D70G224KE15# | <b>D1</b> |
|        |               |         |        | ±20% | GRM152D70G224ME15# | <b>D1</b> |
|        |               | X6S     | 0.10μF | ±10% | GRM152C80G104KE19# |           |
|        |               |         |        | ±20% | GRM152C80G104ME19# |           |
|        |               |         | 0.22μF | ±10% | GRM152C80G224KE19# |           |
|        |               |         |        | ±20% | GRM152C80G224ME19# |           |
|        |               | X6T     | 0.47μF | ±20% | GRM152D80G474ME15# |           |
|        |               |         | 1.0μF  | ±20% | GRM152D80G105ME15# | <b>D1</b> |
|        |               | X5R     | 1.0μF  | ±20% | GRM152R60G105ME15# |           |
|        | 2.5Vdc        | X7T     | 0.10μF | ±10% | GRM152D70E104KE19# |           |
|        |               |         |        | ±20% | GRM152D70E104ME19# |           |
|        |               |         | 0.22μF | ±10% | GRM152D70E224KE19# |           |
|        |               |         |        | ±20% | GRM152D70E224ME19# |           |
| 0.3mm  | 50Vdc         | X7R     | 220pF  | ±10% | GRM15XR71H221KA86# |           |
|        |               |         | 330pF  | ±10% | GRM15XR71H331KA86# |           |
|        |               |         | 470pF  | ±10% | GRM15XR71H471KA86# |           |
|        |               |         | 680pF  | ±10% | GRM15XR71H681KA86# |           |
|        |               |         | 1000pF | ±10% | GRM15XR71H102KA86# |           |
|        |               |         | 1500pF | ±10% | GRM15XR71H152KA86# |           |
|        |               | R       | 220pF  | ±10% | GRM15XR11H221KA86# |           |
|        |               |         | 330pF  | ±10% | GRM15XR11H331KA86# |           |
|        |               |         | 470pF  | ±10% | GRM15XR11H471KA86# |           |
|        |               |         | 680pF  | ±10% | GRM15XR11H681KA86# |           |
|        |               |         | 1000pF | ±10% | GRM15XR11H102KA86# |           |
|        |               |         | 1500pF | ±10% | GRM15XR11H152KA86# |           |
|        |               | B       | 220pF  | ±10% | GRM15XB11H221KA86# |           |
|        |               |         |        | ±20% | GRM15XB11H221MA86# |           |
|        |               |         | 330pF  | ±10% | GRM15XB11H331KA86# |           |
|        |               |         |        | ±20% | GRM15XB11H331MA86# |           |
|        |               |         | 470pF  | ±10% | GRM15XB11H471KA86# |           |
|        |               |         |        | ±20% | GRM15XB11H471MA86# |           |
|        | 50Vdc         | X7R     | 220pF  | ±10% | GRM15XR71H221KA01# |           |
|        |               |         | 330pF  | ±10% | GRM15XR71H331KA01# |           |
|        |               |         | 470pF  | ±10% | GRM15XR71H471KA01# |           |
|        |               |         | 680pF  | ±10% | GRM15XR71H681KA01# |           |
|        |               |         | 1000pF | ±10% | GRM15XR71H102KA01# |           |
|        |               |         | 1500pF | ±10% | GRM15XR71H152KA01# |           |
|        |               | B       | 220pF  | ±10% | GRM15XB11H221KA01# |           |
|        |               |         | 330pF  | ±10% | GRM15XB11H331KA01# |           |
|        |               |         | 470pF  | ±10% | GRM15XB11H471KA01# |           |
|        |               |         | 680pF  | ±10% | GRM15XB11H681KA01# |           |
|        |               |         | 1000pF | ±10% | GRM15XB11H102KA01# |           |
|        |               |         | 1500pF | ±10% | GRM15XB11H152KA01# |           |

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |           |
|--------|---------------|---------|---------|------|--------------------|-----------|
| 0.3mm  | 50Vdc         | B       | 680pF   | ±10% | GRM15XB11H681KA86# |           |
|        |               |         |         | ±20% | GRM15XB11H681MA86# |           |
|        |               |         | 1000pF  | ±10% | GRM15XB11H102KA86# |           |
|        |               |         |         | ±20% | GRM15XB11H102MA86# |           |
|        |               |         | 1500pF  | ±10% | GRM15XB11H152KA86# |           |
|        |               |         |         | ±20% | GRM15XB11H152MA86# |           |
|        | 25Vdc         | X7R     | 2200pF  | ±10% | GRM15XR71E222KA86# |           |
|        |               |         |         | ±20% | GRM15XR71E222MA86# |           |
|        |               | B       | 2200pF  | ±10% | GRM15XB11E222KA86# |           |
|        |               |         |         | ±20% | GRM15XB11E222MA86# |           |
|        |               |         | 3300pF  | ±10% | GRM15XR71C332KA86# |           |
|        |               |         |         | ±20% | GRM15XR71C332MA86# |           |
|        | 16Vdc         | X7R     | 4700pF  | ±10% | GRM15XR71C472KA86# |           |
|        |               |         |         | ±20% | GRM15XR71C472MA86# |           |
|        |               |         | 6800pF  | ±10% | GRM15XR71C682KA86# |           |
|        |               |         |         | ±20% | GRM15XR71C682MA86# |           |
|        |               |         | 10000pF | ±10% | GRM15XR71C103KA86# |           |
|        |               |         |         | ±20% | GRM15XR71C103MA86# |           |
|        |               | B       | 3300pF  | ±10% | GRM15XB11C332KA86# |           |
|        |               |         |         | ±20% | GRM15XB11C332MA86# |           |
|        |               |         | 4700pF  | ±10% | GRM15XB11C472KA86# |           |
|        |               |         |         | ±20% | GRM15XB11C472MA86# |           |
|        |               |         | 6800pF  | ±10% | GRM15XB11C682KA86# |           |
|        |               |         |         | ±20% | GRM15XB11C682MA86# |           |
|        | 10Vdc         | X5R     | 15000pF | ±10% | GRM15XR61A153KA86# |           |
|        |               |         |         | ±20% | GRM15XR61A153MA86# |           |
|        |               |         | 22000pF | ±10% | GRM15XR61A223KA86# |           |
|        |               |         |         | ±20% | GRM15XR61A223MA86# |           |
|        |               |         | 33000pF | ±10% | GRM15XR61A333KA86# |           |
|        |               |         |         | ±20% | GRM15XR61A333MA86# |           |
| 0.33mm | 10Vdc         | X5R     | 1.0μF   | ±20% | GRM153R61A105ME95# | <b>D1</b> |
|        |               | B       | 1.0μF   | ±20% | GRM153B31A105ME95# | <b>D1</b> |
|        | 6.3Vdc        | X6T     | 1.0μF   | ±20% | GRM153D80J105ME95# | <b>D1</b> |
|        |               | X5R     | 1.0μF   | ±20% | GRM153R60J105ME95# |           |
|        |               | B       | 1.0μF   | ±20% | GRM153B30J105ME95# |           |
|        |               |         |         | ±20% | GRM153B30J105ME95# |           |
|        | 4Vdc          | X6T     | 1.0μF   | ±20% | GRM153D80G105ME95# |           |
| 0.55mm | 100Vdc        | X7R     | 220pF   | ±10% | GRM155R72A221KA01# |           |
|        |               |         | 330pF   | ±10% | GRM155R72A331KA01# |           |
|        |               |         | 470pF   | ±10% | GRM155R72A471KA01# |           |
|        |               |         | 680pF   | ±10% | GRM155R72A681KA01# |           |
|        |               |         | 1000pF  | ±10% | GRM155R72A102KA01# |           |
|        |               |         | 1500pF  | ±10% | GRM155R72A152KA01# |           |
|        |               |         | 2200pF  | ±10% | GRM155R72A222KA01# |           |
|        |               |         | 3300pF  | ±10% | GRM155R72A332KA01# |           |
|        |               |         | 4700pF  | ±10% | GRM155R72A472KA01# |           |
|        | 50Vdc         | X7R     | 220pF   | ±10% | GRM155R71H221KA01# |           |
|        |               |         | 330pF   | ±10% | GRM155R71H331KA01# |           |
|        |               |         | 470pF   | ±10% | GRM155R71H471KA01# |           |
|        |               |         | 680pF   | ±10% | GRM155R71H681KA01# |           |
|        |               |         | 1000pF  | ±10% | GRM155R71H102KA01# |           |
|        |               |         | 1500pF  | ±10% | GRM155R71H152KA01# |           |

Part number # indicates the package specification code.

# GRM Series High Dielectric Constant Type Part Number List

(→ 1.0×0.5mm)

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |  | T max. | Rated Voltage | TC Code | Cap.    | Tol.    | Part Number        |                    |                    |    |
|--------|---------------|---------|---------|------|--------------------|--|--------|---------------|---------|---------|---------|--------------------|--------------------|--------------------|----|
| 0.55mm | 50Vdc         | X7R     | 3300pF  | ±10% | GRM155R71H332KA01# |  | 0.55mm | 50Vdc         | B       | 3300pF  | ±20%    | GRM155B11H332MA01# |                    |                    |    |
|        |               |         | 4700pF  | ±10% | GRM155R71H472KA01# |  |        |               |         | 4700pF  | ±10%    | GRM155B11H472KA01# |                    |                    |    |
|        |               |         | 6800pF  | ±10% | GRM155R71H682KA88# |  |        |               |         |         | ±20%    | GRM155B11H472MA01# |                    |                    |    |
|        |               |         | 10000pF | ±10% | GRM155R71H103KA88# |  |        |               |         | 6800pF  | ±10%    | GRM155B31H682KA88# |                    |                    |    |
|        |               |         | 15000pF | ±10% | GRM155R71H153KA12# |  |        |               |         |         | ±20%    | GRM155B31H682MA88# |                    |                    |    |
|        |               |         | 22000pF | ±10% | GRM155R71H223KA12# |  |        |               |         | 10000pF | ±10%    | GRM155B31H103KA88# |                    |                    |    |
|        |               |         | 33000pF | ±10% | GRM155R71H333KE14# |  |        |               |         |         | ±20%    | GRM155B31H103MA88# |                    |                    |    |
|        |               |         |         | ±20% | GRM155R71H333ME14# |  |        |               |         | 15000pF | ±10%    | GRM155B31H153KA12# |                    |                    |    |
|        |               |         | 47000pF | ±10% | GRM155R71H473KE14# |  |        |               |         |         | ±20%    | GRM155B31H153MA12# |                    |                    |    |
|        |               |         |         | ±20% | GRM155R71H473ME14# |  |        |               |         | 22000pF | ±10%    | GRM155B31H223KA12# |                    |                    |    |
|        |               |         | 68000pF | ±10% | GRM155R71H683KE14# |  |        |               |         |         | ±20%    | GRM155B31H223MA12# |                    |                    |    |
|        |               |         |         | ±20% | GRM155R71H683ME14# |  |        |               |         | 0.10μF  | ±10%    | GRM155B31H104KE14# |                    |                    |    |
|        |               |         | 0.10μF  | ±10% | GRM155R71H104KE14# |  |        |               |         |         | ±20%    | GRM155B31H104ME14# |                    |                    |    |
|        |               |         |         | ±20% | GRM155R71H104ME14# |  |        |               | 35Vdc   | X6S     | 0.22μF  | ±10%               | GRM155C8YA224KE01# | D1                 |    |
|        |               | R       | 220pF   | ±10% | GRM155R11H221KA01# |  |        |               |         |         |         | ±20%               | GRM155C8YA224ME01# | D1                 |    |
|        |               |         | 330pF   | ±10% | GRM155R11H331KA01# |  |        |               |         | X5R     | 0.22μF  | ±10%               | GRM155R6YA224KE01# | D1                 |    |
|        |               |         | 470pF   | ±10% | GRM155R11H471KA01# |  |        |               |         |         |         | ±20%               | GRM155R6YA224ME01# | D1                 |    |
|        |               |         | 680pF   | ±10% | GRM155R11H681KA01# |  |        |               |         |         | 0.47μF  | ±10%               | GRM155R6YA474KE01# | D1                 |    |
|        |               |         | 1000pF  | ±10% | GRM155R11H102KA01# |  |        |               |         |         |         | ±20%               | GRM155R6YA474ME01# | D1                 |    |
|        |               |         | 1500pF  | ±10% | GRM155R11H152KA01# |  |        |               | 25Vdc   | X7R     | 2200pF  | ±10%               | GRM155R71E222KA01# |                    |    |
|        |               |         | 2200pF  | ±10% | GRM155R11H222KA01# |  |        |               |         |         | 10000pF | ±10%               | GRM155R71E103KA01# |                    |    |
|        |               |         | 3300pF  | ±10% | GRM155R11H332KA01# |  |        |               |         |         | 15000pF | ±10%               | GRM155R71E153KA61# |                    |    |
|        |               |         | 4700pF  | ±10% | GRM155R11H472KA01# |  |        |               |         |         | 22000pF | ±10%               | GRM155R71E223KA61# |                    |    |
|        |               |         | 6800pF  | ±10% | GRM155R11H682KA88# |  |        |               |         |         | 33000pF | ±10%               | GRM155R71E333KA88# |                    |    |
|        |               |         | 10000pF | ±10% | GRM155R11H103KA88# |  |        |               |         |         | 47000pF | ±10%               | GRM155R71E473KA88# |                    |    |
|        |               | X6S     | 33000pF | ±10% | GRM155C81H333KE14# |  |        |               |         |         | 68000pF | ±10%               | GRM155R71E683KE14# |                    |    |
|        |               |         |         | ±20% | GRM155C81H333ME14# |  |        |               |         |         |         | ±20%               | GRM155R71E683ME14# |                    |    |
|        |               |         | 47000pF | ±10% | GRM155C81H473KE14# |  |        |               |         |         | 0.10μF  | ±10%               | GRM155R71E104KE14# |                    |    |
|        |               |         |         | ±20% | GRM155C81H473ME14# |  |        |               |         |         |         | ±20%               | GRM155R71E104ME14# |                    |    |
|        |               |         | 68000pF | ±10% | GRM155C81H683KE14# |  |        |               |         | R       |         | 6800pF             | ±10%               | GRM155R11E682KA01# |    |
|        |               |         |         | ±20% | GRM155C81H683ME14# |  |        |               |         |         |         | 10000pF            | ±10%               | GRM155R11E103KA01# |    |
|        |               | X5R     | 33000pF | ±10% | GRM155R61H333KE14# |  |        |               |         |         |         | 15000pF            | ±10%               | GRM155R11E153KA61# |    |
|        |               |         |         | ±20% | GRM155R61H333ME14# |  |        |               |         |         |         | 22000pF            | ±10%               | GRM155R11E223KA61# |    |
|        |               |         | 47000pF | ±10% | GRM155R61H473KE14# |  |        |               |         |         |         | 33000pF            | ±10%               | GRM155R11E333KA88# |    |
|        |               |         |         | ±20% | GRM155R61H473ME14# |  |        |               |         |         |         | 47000pF            | ±10%               | GRM155R11E473KA88# |    |
|        |               |         | 68000pF | ±10% | GRM155R61H683KE14# |  |        |               |         | X6S     |         | 0.22μF             | ±10%               | GRM155C81E224KE01# |    |
|        |               |         |         | ±20% | GRM155R61H683ME14# |  |        |               |         |         |         |                    | ±20%               | GRM155C81E224ME01# |    |
|        |               |         | 0.10μF  | ±10% | GRM155R61H104KE14# |  |        |               |         | X5R     |         | 68000pF            | ±10%               | GRM155R61E683KA87# |    |
|        |               |         |         | ±20% | GRM155R61H104ME14# |  |        |               |         |         |         |                    | ±20%               | GRM155R61E683MA87# |    |
|        |               | B       | 220pF   | ±10% | GRM155B11H221KA01# |  |        |               |         |         |         | 0.10μF             | ±10%               | GRM155R61E104KA87# |    |
|        |               |         |         | ±20% | GRM155B11H221MA01# |  |        |               |         |         |         |                    | ±20%               | GRM155R61E104MA87# |    |
|        |               |         | 330pF   | ±10% | GRM155B11H331KA01# |  |        |               |         |         |         | 0.22μF             | ±10%               | GRM155R61E224KE01# |    |
|        |               |         |         | ±20% | GRM155B11H331MA01# |  |        |               |         |         |         |                    | ±20%               | GRM155R61E224ME01# |    |
|        |               |         | 470pF   | ±10% | GRM155B11H471KA01# |  |        |               |         |         |         | 0.47μF             | ±10%               | GRM155R61E474KE01# |    |
|        |               |         |         | ±20% | GRM155B11H471MA01# |  |        |               |         |         |         | 1.0μF              | ±10%               | GRM155R61E105KA12# | D1 |
|        |               |         | 680pF   | ±10% | GRM155B11H681KA01# |  |        |               |         |         |         |                    | ±20%               | GRM155R61E105MA12# | D1 |
|        |               |         |         | ±20% | GRM155B11H681MA01# |  |        |               |         | B       |         | 2200pF             | ±10%               | GRM155B11E222KA01# |    |
|        |               |         | 1000pF  | ±10% | GRM155B11H102KA01# |  |        |               |         |         |         | 10000pF            | ±10%               | GRM155B11E103KA01# |    |
|        |               |         |         | ±20% | GRM155B11H102MA01# |  |        |               |         |         |         |                    | ±20%               | GRM155B11E103MA01# |    |
|        |               |         | 1500pF  | ±10% | GRM155B11H152KA01# |  |        |               |         |         |         | 15000pF            | ±10%               | GRM155B11E153KA61# |    |
|        |               |         |         | ±20% | GRM155B11H152MA01# |  |        |               |         |         |         |                    | ±20%               | GRM155B11E153MA61# |    |
|        |               |         | 2200pF  | ±10% | GRM155B11H222KA01# |  |        |               |         |         |         | 22000pF            | ±10%               | GRM155B11E223KA61# |    |
|        |               |         |         | ±20% | GRM155B11H222MA01# |  |        |               |         |         |         |                    | ±20%               | GRM155B11E223MA61# |    |
|        |               |         | 3300pF  | ±10% | GRM155B11H332KA01# |  |        |               |         |         |         | 33000pF            | ±10%               | GRM155B31E333KA87# |    |

Part number # indicates the package specification code.

## GRM Series High Dielectric Constant Type Part Number List

(→ 1.0×0.5mm)

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |           |
|--------|---------------|---------|---------|------|--------------------|-----------|
| 0.55mm | 25Vdc         | B       | 33000pF | ±20% | GRM155B31E333MA87# |           |
|        |               |         | 47000pF | ±10% | GRM155B31E473KA87# |           |
|        |               |         |         | ±20% | GRM155B31E473MA87# |           |
|        |               |         | 68000pF | ±10% | GRM155B31E683KA87# |           |
|        |               |         |         | ±20% | GRM155B31E683MA87# |           |
|        |               |         | 0.10μF  | ±10% | GRM155B31E104KA87# |           |
|        |               |         |         | ±20% | GRM155B31E104MA87# |           |
|        |               |         | 1.0μF   | ±10% | GRM155B31E105KA12# | <b>D1</b> |
|        |               |         |         | ±20% | GRM155B31E105MA12# | <b>D1</b> |
|        | 16Vdc         | X7R     | 4700pF  | ±10% | GRM155R71C472KA01# |           |
|        |               |         | 10000pF | ±10% | GRM155R71C103KA01# |           |
|        |               |         |         | ±20% | GRM155R71C103MA01# |           |
|        |               |         | 68000pF | ±10% | GRM155R71C683KA88# |           |
|        |               |         |         | ±10% | GRM155R71C154KA12# |           |
|        |               |         | 0.22μF  | ±10% | GRM155R71C224KA12# |           |
|        |               |         |         | ±10% | GRM155R11C683KA88# |           |
|        |               | X6S     | 0.47μF  | ±10% | GRM155C81C474KE01# |           |
|        |               |         |         | ±20% | GRM155C81C474ME01# |           |
|        |               | X5R     | 0.22μF  | ±10% | GRM155R61C224KA12# |           |
|        |               |         |         | ±20% | GRM155R61C224MA12# |           |
|        |               |         | 1.0μF   | ±10% | GRM155R61C105KA12# |           |
|        |               |         |         | ±20% | GRM155R61C105MA12# |           |
|        |               | B       | 10000pF | ±10% | GRM155B11C103KA01# |           |
|        |               |         |         | ±20% | GRM155B11C103MA01# |           |
|        |               |         | 1.0μF   | ±10% | GRM155B31C105KA12# |           |
|        |               |         |         | ±20% | GRM155B31C105MA12# |           |
|        | 10Vdc         | X7R     | 0.22μF  | ±10% | GRM155R71A224KE01# |           |
|        |               |         |         | ±20% | GRM155R71A224ME01# |           |
|        |               |         | 0.47μF  | ±10% | GRM155R71A474KE01# |           |
|        |               |         |         | ±20% | GRM155R71A474ME01# |           |
|        |               | X6S     | 1.0μF   | ±10% | GRM155C81A105KA12# |           |
|        |               |         |         | ±20% | GRM155C81A105MA12# |           |
|        |               | X5R     | 33000pF | ±10% | GRM155R61A333KA01# |           |
|        |               |         |         | ±10% | GRM155R61A104KA01# |           |
|        |               |         |         | ±20% | GRM155R61A104MA01# |           |
|        |               |         | 0.10μF  | ±10% | GRM155R61A154KE19# |           |
|        |               |         |         | ±20% | GRM155R61A154ME19# |           |
|        |               |         | 0.22μF  | ±10% | GRM155R61A224KE19# |           |
|        |               |         |         | ±20% | GRM155R61A224ME19# |           |
|        |               |         | 0.33μF  | ±10% | GRM155R61A334KE15# |           |
|        |               |         |         | ±20% | GRM155R61A334ME15# |           |
|        |               |         | 0.47μF  | ±10% | GRM155R61A474KE15# |           |
|        |               |         |         | ±20% | GRM155R61A474ME15# |           |
|        |               |         | 0.68μF  | ±10% | GRM155R61A684KE15# |           |
|        |               |         |         | ±20% | GRM155R61A684ME15# |           |
|        |               |         | 1.0μF   | ±20% | GRM155R61A105ME01# |           |
|        |               |         |         | ±10% | GRM155B31A154KE18# |           |
|        |               | B       | 0.15μF  | ±10% | GRM155B31A154ME18# |           |
|        |               |         |         | ±20% | GRM155B31A154ME18# |           |
|        |               |         | 0.22μF  | ±10% | GRM155B31A224KE18# |           |
|        |               |         |         | ±20% | GRM155B31A224ME18# |           |
|        |               |         | 0.33μF  | ±10% | GRM155B31A334KE14# |           |
|        |               |         |         | ±20% | GRM155B31A334ME14# |           |
|        |               |         | 0.47μF  | ±10% | GRM155B31A474KE14# |           |
|        |               |         |         | ±20% | GRM155B31A474ME14# |           |

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number        |           |
|--------|---------------|---------|--------|------|--------------------|-----------|
| 0.55mm | 10Vdc         | B       | 0.68μF | ±10% | GRM155B31A684KE15# |           |
|        |               |         |        | ±20% | GRM155B31A684ME15# |           |
|        |               |         | 1.0μF  | ±20% | GRM155B31A105ME01# |           |
|        |               |         |        | ±10% | GRM155B31A225KE95# | <b>D1</b> |
|        |               |         | 2.2μF  | ±10% | GRM155B31A225ME95# | <b>D1</b> |
|        |               |         |        | ±20% | GRM155B31A225ME95# | <b>D1</b> |
|        | 6.3Vdc        | X7R     | 1.0μF  | ±10% | GRM155R70J105KA12# | <b>D1</b> |
|        |               |         |        | ±20% | GRM155R70J105MA12# | <b>D1</b> |
|        |               | X6S     | 0.22μF | ±10% | GRM155C80J224KE01# |           |
|        |               |         |        | ±20% | GRM155C80J224ME01# |           |
|        |               |         | 2.2μF  | ±10% | GRM155C80J225KE95# | <b>D1</b> |
|        |               |         |        | ±20% | GRM155C80J225ME95# | <b>D1</b> |
|        |               | X5R     | 0.10μF | ±10% | GRM155R60J104KA01# |           |
|        |               |         |        | ±20% | GRM155R60J104MA01# |           |
|        |               |         | 0.15μF | ±10% | GRM155R60J154KE01# |           |
|        |               |         |        | ±20% | GRM155R60J154ME01# |           |
|        |               |         | 0.22μF | ±10% | GRM155R60J224KE01# |           |
|        |               |         |        | ±20% | GRM155R60J224ME01# |           |
|        |               |         | 0.33μF | ±10% | GRM155R60J334KE01# |           |
|        |               |         |        | ±20% | GRM155R60J334ME01# |           |
|        |               |         | 0.47μF | ±10% | GRM155R60J474KE19# |           |
|        |               |         |        | ±20% | GRM155R60J474ME19# |           |
|        |               |         | 0.68μF | ±10% | GRM155R60J684KE19# |           |
|        |               |         |        | ±20% | GRM155R60J684ME19# |           |
|        |               |         | 1.0μF  | ±20% | GRM155R60J105ME19# |           |
|        |               |         |        | ±10% | GRM155B10J154KE01# |           |
|        |               | B       | 0.15μF | ±10% | GRM155B10J154ME01# |           |
|        |               |         |        | ±20% | GRM155B10J154ME01# |           |
|        |               |         | 0.22μF | ±10% | GRM155B10J224KE01# |           |
|        |               |         |        | ±20% | GRM155B10J224ME01# |           |
|        |               |         | 0.33μF | ±10% | GRM155B10J334KE01# |           |
|        |               |         |        | ±20% | GRM155B10J334ME01# |           |
|        |               |         | 0.47μF | ±10% | GRM155B30J474KE18# |           |
|        |               |         |        | ±20% | GRM155B30J474ME18# |           |
|        |               |         | 0.68μF | ±10% | GRM155B30J684KE18# |           |
|        |               |         |        | ±20% | GRM155B30J684ME18# |           |
|        |               |         | 1.0μF  | ±20% | GRM155B30J105ME18# |           |
|        |               |         |        | ±10% | GRM155B30J225KE95# |           |
|        |               |         | 2.2μF  | ±10% | GRM155B30J225ME95# |           |
|        |               |         |        | ±20% | GRM155B30J225ME95# |           |
|        | 4Vdc          | X7R     | 1.0μF  | ±10% | GRM155R70G105KA12# |           |
|        |               |         |        | ±20% | GRM155R70G105MA12# |           |
|        |               | X6S     | 0.22μF | ±10% | GRM155C80G224KE01# |           |
|        |               |         |        | ±20% | GRM155C80G224ME01# |           |
|        |               | X5R     | 1.0μF  | ±20% | GRM155R60G105ME01# |           |
|        |               |         |        | ±10% | GRM155R61H474KE11# | <b>D1</b> |
|        | 0.6mm         | X5R     | 0.47μF | ±10% | GRM155R61H474KE11# | <b>D1</b> |
|        |               |         |        | ±10% | GRM155R61H474KE11# | <b>D1</b> |
|        |               | X6S     | 1.0μF  | ±10% | GRM155C81E105KE11# | <b>D1</b> |
|        |               |         |        | ±20% | GRM155C81E105ME11# | <b>D1</b> |
|        |               | X5R     | 1.0μF  | ±10% | GRM155C81C105KE11# |           |
|        |               |         |        | ±20% | GRM155C81C105ME11# |           |
|        |               | X6S     | 1.0μF  | ±10% | GRM155C81C105KE11# |           |
|        |               |         |        | ±20% | GRM155C81C105ME11# |           |
|        |               | X5R     | 4.7μF  | ±20% | GRM155R60J475ME47# | <b>D1</b> |
|        |               |         |        | ±20% | GRM155B30J475ME47# | <b>D1</b> |
|        |               | B       | 4.7μF  | ±20% | GRM155R60G475ME47# |           |
|        |               |         |        | ±20% | GRM155B30G475ME47# |           |
|        | 2.5Vdc        | X6T     | 4.7μF  | ±20% | GRM155D80E475ME47# | <b>D1</b> |
|        |               |         |        | ±20% | GRM155D81E225ME11# | <b>D1</b> |

Part number # indicates the package specification code.

## GRM Series High Dielectric Constant Type Part Number List

(→ 1.0×0.5mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol. | Part Number        |           |
|--------|---------------|---------|-------|------|--------------------|-----------|
| 0.65mm | 16Vdc         | X7T     | 2.2μF | ±20% | GRM155D71C225ME11# | <b>D1</b> |
|        |               | X6T     | 2.2μF | ±20% | GRM155D81C225ME11# |           |
|        | 10Vdc         | X7T     | 2.2μF | ±20% | GRM155D71A225ME11# |           |
|        |               | X5R     | 4.7μF | ±20% | GRM155R61A475MEAA# | <b>D1</b> |
|        | 6.3Vdc        | X6S     | 4.7μF | ±20% | GRM155C80J475MEAA# | <b>D1</b> |
| 0.7mm  | 25Vdc         | X5R     | 2.2μF | ±10% | GRM155R61E225KE11# |           |
|        |               |         |       | ±20% | GRM155R61E225ME11# |           |
|        | 16Vdc         | X6S     | 2.2μF | ±10% | GRM155C81C225KE11# |           |
|        |               |         |       | ±20% | GRM155C81C225ME11# |           |
|        |               | X5R     | 2.2μF | ±10% | GRM155R61C225KE11# |           |
|        |               |         |       | ±20% | GRM155R61C225ME11# |           |
|        | 10Vdc         | X7S     | 2.2μF | ±10% | GRM155C71A225KE11# |           |
|        |               |         |       | ±20% | GRM155C71A225ME11# |           |
|        |               | X6S     | 2.2μF | ±10% | GRM155C81A225KE11# |           |
|        |               |         |       | ±20% | GRM155C81A225ME11# |           |
|        | 6.3Vdc        | X7S     | 2.2μF | ±10% | GRM155C70J225KE11# |           |
|        |               |         |       | ±20% | GRM155C70J225ME11# |           |
|        | 4Vdc          | X5R     | 10μF  | ±20% | GRM155R60G106ME44# |           |
|        | 2.5Vdc        | X5R     | 10μF  | ±20% | GRM155R60E106ME16# |           |

1.6×0.8mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number        |           |
|--------|---------------|---------|--------|------|--------------------|-----------|
| 0.5mm  | 25Vdc         | X5R     | 1.0μF  | ±10% | GRM185R61E105KA12# | <b>D1</b> |
|        |               |         |        | ±20% | GRM185R61E105MA12# | <b>D1</b> |
|        |               | B       | 1.0μF  | ±10% | GRM185B31E105KA12# | <b>D1</b> |
|        |               |         |        | ±20% | GRM185B31E105MA12# | <b>D1</b> |
|        |               |         |        |      |                    |           |
|        | 16Vdc         | X5R     | 1.0μF  | ±10% | GRM185R61C105KE44# |           |
|        |               |         |        | ±20% | GRM185R61C105ME44# |           |
|        |               | B       | 1.0μF  | ±10% | GRM185B31C105KE43# |           |
|        |               |         |        | ±20% | GRM185B31C105ME43# |           |
|        | 6.3Vdc        | X5R     | 10μF   | ±20% | GRM185R60J106ME15# | <b>D1</b> |
| 0.55mm | 4Vdc          | X5R     | 10μF   | ±20% | GRM185R60G106ME15# |           |
|        | 16Vdc         | X5R     | 4.7μF  | ±10% | GRM185R61C475KE11# |           |
|        |               |         |        | ±20% | GRM185R61C475ME11# |           |
|        | 10Vdc         | X6S     | 4.7μF  | ±10% | GRM185C81A475KE11# | <b>D1</b> |
|        |               |         |        | ±20% | GRM185C81A475ME11# | <b>D1</b> |
|        |               | X5R     | 4.7μF  | ±10% | GRM185R61A475KE11# |           |
|        |               |         |        | ±20% | GRM185R61A475ME11# |           |
|        | 6.3Vdc        | X7T     | 4.7μF  | ±20% | GRM185D70J475ME11# | <b>D1</b> |
|        |               | X6S     | 4.7μF  | ±20% | GRM185C80J475ME11# |           |
| 0.9mm  | 250Vdc        | X7R     | 220pF  | ±10% | GRM188R72E221KW07# |           |
|        |               |         | 330pF  | ±10% | GRM188R72E331KW07# |           |
|        |               |         | 470pF  | ±10% | GRM188R72E471KW07# |           |
|        |               |         | 680pF  | ±10% | GRM188R72E681KW07# |           |
|        |               |         | 1000pF | ±10% | GRM188R72E102KW07# |           |
|        |               |         | 1500pF | ±10% | GRM188R72E152KW07# |           |
|        |               |         | 2200pF | ±10% | GRM188R72E222KW07# |           |
|        |               |         |        |      |                    |           |
|        |               |         |        |      |                    |           |
|        |               |         |        |      |                    |           |
|        | 200Vdc        | X7R     | 220pF  | ±10% | GRM188R72D221KW07# |           |
|        |               |         | 330pF  | ±10% | GRM188R72D331KW07# |           |
|        |               |         | 470pF  | ±10% | GRM188R72D471KW07# |           |
|        |               |         | 680pF  | ±10% | GRM188R72D681KW07# |           |
|        |               |         | 1000pF | ±10% | GRM188R72D102KW07# |           |

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number        |           |
|--------|---------------|---------|--------|------|--------------------|-----------|
| 0.9mm  | 200Vdc        | X7R     | 1500pF | ±10% | GRM188R72D152KW07# |           |
|        |               |         | 2200pF | ±10% | GRM188R72D222KW07# |           |
|        | 25Vdc         | X7R     | 1.0μF  | ±10% | GRM188R71E105KA12# |           |
|        |               |         |        | ±20% | GRM188R71E105MA12# |           |
|        |               | X5R     | 2.2μF  | ±10% | GRM188R61E225KA12# |           |
|        |               |         |        | ±20% | GRM188R61E225MA12# |           |
|        | 16Vdc         | B       | 2.2μF  | ±10% | GRM188B31E225KA12# |           |
|        |               |         |        | ±20% | GRM188B31E225MA12# |           |
|        |               | X6S     | 2.2μF  | ±10% | GRM188C81C225KA12# |           |
|        |               |         |        | ±20% | GRM188C81C225MA12# |           |
|        | 10Vdc         | X5R     | 2.2μF  | ±10% | GRM188R61C225KE15# |           |
|        |               |         |        | ±20% | GRM188R61C225ME15# |           |
|        |               | B       | 2.2μF  | ±10% | GRM188B31C225KE14# |           |
|        |               |         |        | ±20% | GRM188B31C225ME15# |           |
|        | 6.3Vdc        | X5R     | 4.7μF  | ±10% | GRM188R61A475KE15# | <b>D1</b> |
|        |               |         |        | ±20% | GRM188R61A475ME15# | <b>D1</b> |
|        |               | X6S     | 4.7μF  | ±20% | GRM188C80J475ME15# | <b>D1</b> |
|        |               |         |        | ±20% | GRM188C80J475ME15# | <b>D1</b> |
| 0.95mm | 4Vdc          | X5R     | 10μF   | ±20% | GRM188R60G106ME47# |           |
|        |               |         |        | ±20% | GRM188B30J106ME47# |           |
|        |               | X6S     | 10μF   | ±20% | GRM188C80J106ME47# |           |
|        |               |         |        | ±20% | GRM188C80J106ME47# |           |
|        | 25Vdc         | X5R     | 4.7μF  | ±10% | GRM188R61E475KE11# |           |
|        |               |         |        | ±20% | GRM188R61E475ME11# |           |
|        | 16Vdc         | X6S     | 4.7μF  | ±10% | GRM188C81C475KE11# |           |
|        |               |         |        | ±20% | GRM188C81C475ME11# |           |
|        |               | X5R     | 4.7μF  | ±10% | GRM188R61C475KE11# |           |
|        |               |         |        | ±20% | GRM188R61C475ME11# |           |
|        | 10Vdc         | B       | 4.7μF  | ±10% | GRM188B31C475KAAJ# | <b>D1</b> |
|        |               |         |        | ±20% | GRM188B31C475MAAJ# | <b>D1</b> |
|        |               | X7S     | 4.7μF  | ±10% | GRM188C71A475KE11# |           |
|        |               |         |        | ±20% | GRM188C71A475ME11# |           |
| 1.0mm  | 50Vdc         | X5R     | 2.2μF  | ±10% | GRM188R61H225KE11# |           |
|        |               |         |        | ±20% | GRM188R61H225ME11# |           |
|        |               | X6S     | 2.2μF  | ±10% | GRM188C81H225KE11# |           |
|        |               |         |        | ±20% | GRM188C81H225ME11# |           |
|        | 35Vdc         | X6S     | 2.2μF  | ±10% | GRM188C81A225KE11# |           |
|        |               |         |        | ±20% | GRM188C81A225ME11# |           |
|        |               | X5R     | 4.7μF  | ±10% | GRM188R61A475KE15# |           |
|        |               |         |        | ±20% | GRM188R61A475ME15# |           |
|        | 25Vdc         | X7S     | 2.2μF  | ±10% | GRM188C71E225KE11# |           |
|        |               |         |        | ±20% | GRM188C71E225ME11# |           |
|        |               | X6S     | 2.2μF  | ±10% | GRM188C81E225KE11# |           |
|        |               |         |        | ±20% | GRM188C81E225ME11# |           |
|        | 16Vdc         | B       | 4.7μF  | ±10% | GRM188B31E475KE11# | <b>D1</b> |
|        |               |         |        | ±20% | GRM188B31E475ME11# | <b>D1</b> |
|        |               | X5R     | 10μF   | ±20% | GRM188R61E106MA73# |           |
|        |               |         |        | ±20% | GRM188R61E106ME73# |           |
| 1.0mm  | 10Vdc         | X7T     | 10μF   | ±20% | GRM188D71A106MA73# |           |
|        |               |         |        | ±20% | GRM188D71A106ME73# |           |
|        | 6.3Vdc        | X7T     | 10μF   | ±20% | GRM188D70J106MA73# |           |
|        |               |         |        | ±20% | GRM188D70J106ME73# |           |

Part number # indicates the package specification code.

## GRM Series High Dielectric Constant Type Part Number List

(→ 1.6×0.8mm)

| T max. | Rated Voltage | TC Code | Cap. | Tol. | Part Number        |           |
|--------|---------------|---------|------|------|--------------------|-----------|
| 1.0mm  | 6.3Vdc        | X5R     | 22μF | ±20% | GRM188R60J226MEA0# | <b>D1</b> |
|        |               | B       | 22μF | ±20% | GRM188B30J226MEA0# | <b>D1</b> |
|        | 4Vdc          | X6S     | 22μF | ±20% | GRM188C80G226MEA0# | <b>D1</b> |
|        |               | X5R     | 22μF | ±20% | GRM188R60G226MEA0# |           |
|        |               | B       | 22μF | ±20% | GRM188B30G226MEA0# |           |
|        |               |         |      |      |                    |           |

2.0×1.25mm

| T max. | Rated Voltage | TC Code | Cap.               | Tol.               | Part Number        |                    |    |
|--------|---------------|---------|--------------------|--------------------|--------------------|--------------------|----|
| 0.7mm  | 16Vdc         | X6S     | 1.0μF              | ±10%               | GRM216C81C105KA12# |                    |    |
| 0.95mm | 50Vdc         | X5R     | 1.0μF              | ±10%               | GRM219R61H105KA73# |                    |    |
|        |               |         |                    | ±20%               | GRM219R61H105MA73# |                    |    |
|        |               |         | 2.2μF              | ±10%               | GRM219R61H225KE15# |                    |    |
|        |               |         |                    | ±20%               | GRM219R61H225ME15# |                    |    |
|        |               | B       | 1.0μF              | ±10%               | GRM219B31H105KA73# |                    |    |
|        |               |         |                    | ±20%               | GRM219B31H105MA73# |                    |    |
|        |               |         | 2.2μF              | ±10%               | GRM219B31H225KE15# |                    |    |
|        |               |         |                    | ±20%               | GRM219B31H225ME15# |                    |    |
|        |               | 35Vdc   | X6S                | 2.2μF              | ±10%               | GRM219C8YA225KE15# |    |
|        |               |         |                    |                    | ±20%               | GRM219C8YA225ME15# |    |
|        |               |         | X5R                | 4.7μF              | ±10%               | GRM219R6YA475KA73# | D1 |
|        |               |         |                    |                    | ±20%               | GRM219R6YA475MA73# | D1 |
|        |               | 25Vdc   | X7R                | 1.0μF              | ±10%               | GRM219R71E105KA88# |    |
|        |               |         |                    |                    | ±20%               | GRM219C81E225KE15# |    |
|        |               |         |                    | 2.2μF              | ±10%               | GRM219C81E225ME15# |    |
|        |               |         |                    |                    | ±20%               | GRM219C81E225ME15# |    |
|        | X5R           |         | 2.2μF              | ±10%               | GRM219R61E225KA12# |                    |    |
|        |               |         |                    | ±20%               | GRM219R61E225MA12# |                    |    |
|        |               |         | 4.7μF              | ±10%               | GRM219R61E475KA73# |                    |    |
|        |               |         |                    | ±20%               | GRM219R61E475MA73# |                    |    |
|        | 10μF          |         | ±10%               | GRM219R61E106KA12# | D1                 |                    |    |
|        |               |         | ±20%               | GRM219R61E106MA12# | D1                 |                    |    |
|        |               |         | B                  | 2.2μF              | ±10%               | GRM219B31E225KA75# |    |
|        |               |         |                    |                    | ±20%               | GRM219B31E225MA75# |    |
| 10μF   | ±10%          |         |                    | GRM219B31E106KA12# | D1                 |                    |    |
|        | ±20%          |         |                    | GRM219B31E106MA12# | D1                 |                    |    |
| 16Vdc  | X7R           |         | 2.2μF              | ±10%               | GRM219R71C225KE15# |                    |    |
|        |               |         |                    | ±20%               | GRM219R71C225ME15# |                    |    |
|        |               |         | X5R                | 4.7μF              | ±10%               | GRM219R61C475KE15# |    |
|        |               |         |                    |                    | ±20%               | GRM219R61C106KA73# |    |
|        | B             | 4.7μF   | ±10%               | GRM219B31C475KE15# |                    |                    |    |
|        |               |         | ±10%               | GRM219B31C106KA73# |                    |                    |    |
|        |               | ±20%    | GRM219B31C106MA73# |                    |                    |                    |    |
|        |               |         |                    |                    |                    |                    |    |
| 10Vdc  | X7R           | 2.2μF   | ±10%               | GRM219R71A225KE15# |                    |                    |    |
|        |               |         | ±20%               | GRM219R71A225ME15# |                    |                    |    |
|        |               | X7T     | 4.7μF              | ±10%               | GRM219D71A475KE15# | D1                 |    |
|        |               |         |                    | ±20%               | GRM219D71A475ME15# | D1                 |    |
|        | X5R           | 22μF    | ±20%               | GRM219R61A226MEA0# | D1                 |                    |    |
|        |               |         | ±20%               | GRM219B31A226MEA0# | D1                 |                    |    |
|        | B             | 22μF    | ±20%               | GRM219B31A226MEA0# | D1                 |                    |    |
|        |               |         | ±20%               | GRM219B31A226MEA0# | D1                 |                    |    |
|        |               | 6.3Vdc  | X6S                | 10μF               | ±10%               | GRM219C80J106KE39# |    |
|        |               |         |                    |                    | ±20%               | GRM219C80J106ME39# |    |
|        | X5R           |         | 22μF               | ±20%               | GRM219R60J226MEA0# |                    |    |
|        |               |         |                    | ±20%               | GRM219B30J226ME47# | D1                 |    |

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number        |           |
|--------|---------------|---------|--------|------|--------------------|-----------|
| 0.95mm | 4Vdc          | X6S     | 10μF   | ±10% | GRM219C80G106KE19# |           |
|        |               |         |        | ±20% | GRM219C80G106ME19# |           |
|        | 2.5Vdc        | X6T     | 47μF   | ±20% | GRM219R60G476ME44# | <b>D1</b> |
|        |               |         |        | ±20% | GRM219D80E476ME44# |           |
| 1.0mm  | 500Vdc        | X7R     | 1000pF | ±10% | GRM21AR72H102KW10# |           |
|        |               |         | 1500pF | ±10% | GRM21AR72H152KW10# |           |
|        |               |         | 2200pF | ±10% | GRM21AR72H222KW10# |           |
|        |               |         | 3300pF | ±10% | GRM21AR72H332KW10# |           |
|        |               |         | 4700pF | ±10% | GRM21AR72H472KW10# |           |
|        |               |         | 6800pF | ±10% | GRM21AR72H682KW10# |           |
|        |               |         |        |      |                    |           |
|        |               |         |        |      |                    |           |
|        | 250Vdc        | X7R     | 1000pF | ±10% | GRM21AR72E102KW01# |           |
|        |               |         | 1500pF | ±10% | GRM21AR72E152KW01# |           |
|        |               |         | 2200pF | ±10% | GRM21AR72E222KW01# |           |
|        |               |         | 3300pF | ±10% | GRM21AR72E332KW01# |           |
|        |               |         | 4700pF | ±10% | GRM21AR72E472KW01# |           |
|        |               |         | 6800pF | ±10% | GRM21AR72E682KW01# |           |
|        |               |         |        |      |                    |           |
|        |               |         |        |      |                    |           |
|        | 200Vdc        | X7R     | 1000pF | ±10% | GRM21AR72D102KW01# |           |
|        |               |         | 1500pF | ±10% | GRM21AR72D152KW01# |           |
|        |               |         | 2200pF | ±10% | GRM21AR72D222KW01# |           |
|        |               |         | 3300pF | ±10% | GRM21AR72D332KW01# |           |
|        |               |         | 4700pF | ±10% | GRM21AR72D472KW01# |           |
|        |               |         | 6800pF | ±10% | GRM21AR72D682KW01# |           |
|        |               |         |        |      |                    |           |
|        |               |         |        |      |                    |           |
|        | 35Vdc         | X6S     | 4.7μF  | ±10% | GRM219C8YA475KE21# | <b>D1</b> |
|        |               |         |        | ±20% | GRM219C8YA475ME21# | <b>D1</b> |
|        | 25Vdc         | X7S     | 4.7μF  | ±10% | GRM219C71E475KE21# | <b>D1</b> |
|        |               |         |        | ±20% | GRM219C71E475ME21# | <b>D1</b> |
|        |               | X6S     | 4.7μF  | ±10% | GRM219C81E475KE21# | <b>D1</b> |
|        |               |         |        | ±20% | GRM219C81E475ME21# | <b>D1</b> |
|        | 16Vdc         | X7S     | 4.7μF  | ±10% | GRM219C71C475KE21# |           |
|        |               |         |        | ±20% | GRM219C71C475ME21# |           |
|        |               | X5R     | 22μF   | ±20% | GRM219R61C226ME15# | <b>D1</b> |
|        |               |         |        |      |                    |           |
| 1.35mm | 25Vdc         | X6S     | 4.7μF  | ±10% | GRM21BC81E475KA12# |           |
|        |               |         |        | ±20% | GRM21BC81E475MA12# |           |
|        |               | X5R     | 4.7μF  | ±10% | GRM21BR61E475KA12# |           |
|        |               |         |        | ±20% | GRM21BR61E475MA12# |           |
|        |               | B       | 2.2μF  | ±10% | GRM21BB31E225KA75# |           |
|        |               |         |        | ±20% | GRM21BB31E225MA75# |           |
|        |               |         | 4.7μF  | ±10% | GRM21BB31E475KA75# |           |
|        |               |         |        | ±20% | GRM21BB31E475MA75# |           |
|        | 16Vdc         | X7R     | 2.2μF  | ±10% | GRM21BR71C225KA12# |           |
|        |               |         |        | ±20% | GRM21BR71C225MA12# |           |
|        |               | X5R     | 10μF   | ±10% | GRM21BR61C106KE15# |           |
|        |               |         |        | ±20% | GRM21BR61C106ME15# |           |
|        |               | B       | 10μF   | ±10% | GRM21BB31C106KE15# |           |
|        |               |         |        | ±20% | GRM21BB31C106ME15# |           |
|        |               |         |        |      |                    |           |
|        |               |         |        |      |                    |           |
| 1.4mm  | 50Vdc         | X5R     | 2.2μF  | ±10% | GRM21BR61H225KA73# |           |
|        |               |         |        | ±20% | GRM21BR61H225MA73# |           |
|        |               |         | 4.7μF  | ±10% | GRM21BR61H475KE51# |           |
|        |               |         |        | ±20% | GRM21BR61H475ME51# |           |
|        |               | B       | 2.2μF  | ±10% | GRM21BB31H225KA73# |           |
|        |               |         |        | ±20% | GRM21BB31H225MA73# |           |
|        |               |         | 4.7μF  | ±10% | GRM21BB31H475KE51# |           |
|        |               |         |        | ±20% | GRM21BB31H475ME51# |           |
|        | 25Vdc         | X7R     | 2.2μF  | ±10% | GRM21BR71E225KE11# |           |
|        |               |         |        |      |                    |           |
|        |               |         |        |      |                    |           |
|        |               |         |        |      |                    |           |

Part number # indicates the package specification code.

## GRM Series High Dielectric Constant Type Part Number List

(→ 2.0×1.25mm)

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |           |
|--------|---------------|---------|---------|------|--------------------|-----------|
| 1.4mm  | 25Vdc         | X7R     | 2.2μF   | ±20% | GRM21BR71E225ME11# |           |
|        |               |         | 10μF    | ±10% | GRM21BR61E106KA73# |           |
|        |               | B       | 10μF    | ±20% | GRM21BR61E106MA73# |           |
|        |               |         |         | ±10% | GRM21BB31E106KA73# |           |
|        |               |         |         | ±20% | GRM21BB31E106MA73# |           |
|        |               |         |         | ±20% | GRM21BB31E106MA73# |           |
|        | 16Vdc         | X6S     | 10μF    | ±10% | GRM21BC81C106KA73# |           |
|        |               |         |         | ±20% | GRM21BC81C106MA73# |           |
|        | 10Vdc         | B       | 22μF    | ±20% | GRM21BB31A226ME51# | <b>D1</b> |
|        | 6.3Vdc        | X7R     | 10μF    | ±10% | GRM21BR70J106KE76# |           |
|        |               | X6S     | 22μF    | ±20% | GRM21BC80J226ME51# | <b>D1</b> |
|        | 4Vdc          | X7U     | 22μF    | ±20% | GRM21BE70G226ME51# |           |
|        |               | X6S     | 22μF    | ±20% | GRM21BC80G226ME39# |           |
| 1.45mm | 500Vdc        | X7R     | 10000pF | ±10% | GRM21BR72H103KW09# |           |
|        |               |         | 10000pF | ±10% | GRM21BR72E103KW03# |           |
|        |               |         | 15000pF | ±10% | GRM21BR72E153KW03# |           |
|        |               |         | 22000pF | ±10% | GRM21BR72E223KW03# |           |
|        | 200Vdc        | X7R     | 10000pF | ±10% | GRM21BR72D103KW03# |           |
|        |               |         | 15000pF | ±10% | GRM21BR72D153KW03# |           |
|        |               |         | 22000pF | ±10% | GRM21BR72D223KW03# |           |
|        |               |         | 22000pF | ±10% | GRM21BR72D223KW03# |           |
|        | 50Vdc         | X7S     | 4.7μF   | ±10% | GRM21BC71H475KE11# |           |
|        |               |         |         | ±20% | GRM21BC71H475ME11# |           |
|        |               | X6S     | 4.7μF   | ±10% | GRM21BC81H475KE11# |           |
|        |               |         |         | ±20% | GRM21BC81H475ME11# |           |
|        | 35Vdc         | X7S     | 4.7μF   | ±10% | GRM21BC7YA475KE11# |           |
|        |               |         |         | ±20% | GRM21BC7YA475ME11# |           |
|        |               |         |         | ±10% | GRM21BC8YA106KE11# | <b>D1</b> |
|        |               |         |         | ±20% | GRM21BC8YA106ME11# | <b>D1</b> |
|        |               | X6S     | 10μF    | ±10% | GRM21BR6YA106KE43# | <b>D1</b> |
|        |               |         |         | ±20% | GRM21BR6YA106ME43# | <b>D1</b> |
|        |               | X5R     | 10μF    | ±10% | GRM21BR6YA106KE43# | <b>D1</b> |
|        |               |         |         | ±20% | GRM21BR6YA106ME43# | <b>D1</b> |
|        | 25Vdc         | X7S     | 4.7μF   | ±10% | GRM21BC71E475KE11# |           |
|        |               |         |         | ±20% | GRM21BC71E475ME11# |           |
|        |               |         |         | ±10% | GRM21BC71E106KE11# | <b>D1</b> |
|        |               |         |         | ±20% | GRM21BC71E106ME11# | <b>D1</b> |
|        |               | X6S     | 10μF    | ±10% | GRM21BC81E106KE11# | <b>D1</b> |
|        |               |         |         | ±20% | GRM21BC81E106ME11# | <b>D1</b> |
|        |               | X5R     | 22μF    | ±20% | GRM21BR61E226ME44# |           |
|        |               |         |         | ±20% | GRM21BR61E226ME44# |           |
|        | 16Vdc         | X7S     | 10μF    | ±10% | GRM21BC71C106KE11# |           |
|        |               |         |         | ±20% | GRM21BC71C106ME11# |           |
|        |               | X6S     | 22μF    | ±20% | GRM21BC81C226ME44# | <b>D1</b> |
|        |               |         |         | ±20% | GRM21BR61C226ME44# |           |
|        | 10Vdc         | X7T     | 22μF    | ±20% | GRM21BD71A226ME44# | <b>D1</b> |
|        |               |         |         | ±20% | GRM21BC81A226ME44# |           |
|        |               | X5R     | 22μF    | ±20% | GRM21BR61A226ME44# |           |
|        |               |         |         | ±20% | GRM21BR61A476ME15# | <b>D1</b> |
|        | 6.3Vdc        | X7T     | 22μF    | ±20% | GRM21BD70J226ME44# |           |
|        |               |         |         | ±20% | GRM21BR60J476ME15# | <b>D1</b> |
|        |               | X5R     | 47μF    | ±20% | GRM21BR60J107ME15# | <b>D1</b> |
|        |               |         |         | ±20% | GRM21BB30J476ME15# | <b>D1</b> |
|        | 4Vdc          | X6S     | 47μF    | ±20% | GRM21BC80G476ME15# | <b>D1</b> |
|        |               |         |         | ±20% | GRM21BC80G107ME15# | <b>D1</b> |
|        |               | X5R     | 47μF    | ±20% | GRM21BR60G476ME15# |           |
|        |               |         |         | ±20% | GRM21BB30G476ME15# |           |
|        | 2.5Vdc        | X6S     | 100μF   | ±20% | GRM21BC80E107ME15# |           |

3.2×1.6mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |           |
|--------|---------------|---------|---------|------|--------------------|-----------|
| 0.95mm | 35Vdc         | X5R     | 10μF    | ±10% | GRM319R6YA106KA12# | <b>D1</b> |
|        |               |         |         | ±20% | GRM319R6YA106MA12# | <b>D1</b> |
|        |               |         | 10μF    | ±10% | GRM319R61C106KE15# |           |
|        |               |         |         | ±20% | GRM319R61C106ME15# |           |
|        | 16Vdc         | X5R     | 22μF    | ±20% | GRM319R61C226ME15# | <b>D1</b> |
|        |               |         |         | ±20% | GRM319R61C226ME15# |           |
|        |               | B       | 10μF    | ±10% | GRM319B31C106KE15# |           |
|        |               |         |         | ±20% | GRM319B31C106ME15# |           |
|        | 10Vdc         | X5R     | 22μF    | ±20% | GRM319R61A226ME15# |           |
|        |               |         |         | ±20% | GRM319B31A226ME15# |           |
|        |               | B       | 22μF    | ±20% | GRM319B31C226ME15# | <b>D1</b> |
|        |               |         |         | ±20% | GRM319B31C226ME15# | <b>D1</b> |
| 1.0mm  | 630Vdc        | X7R     | 1000pF  | ±10% | GRM31AR72J102KW01# |           |
|        |               |         | 1500pF  | ±10% | GRM31AR72J152KW01# |           |
|        |               |         | 2200pF  | ±10% | GRM31AR72J222KW01# |           |
|        |               |         | 3300pF  | ±10% | GRM31AR72J332KW01# |           |
|        |               |         | 4700pF  | ±10% | GRM31AR72J472KW01# |           |
|        |               |         | 6800pF  | ±10% | GRM31AR72J682KW01# |           |
|        |               |         | 10000pF | ±10% | GRM31AR72J103KW01# |           |
|        | 1.25mm        | X7R     | 470pF   | ±10% | GRM31BR73A471KW01# |           |
|        |               |         | 680pF   | ±10% | GRM31BR73A681KW01# |           |
|        |               |         | 1000pF  | ±10% | GRM31BR73A102KW01# |           |
|        |               |         | 1500pF  | ±10% | GRM31BR73A152KW01# |           |
|        |               |         | 2200pF  | ±10% | GRM31BR73A222KW01# |           |
|        |               |         | 3300pF  | ±10% | GRM31BR73A332KW01# |           |
|        |               |         | 4700pF  | ±10% | GRM31BR73A472KW01# |           |
|        |               |         | 4700pF  | ±10% | GRM31BR73A472KW01# |           |
| 1.25mm | 630Vdc        | X7R     | 6800pF  | ±10% | GRM31BR72J682KW01# |           |
|        |               |         | 15000pF | ±10% | GRM31BR72H153KW10# |           |
|        |               |         | 22000pF | ±10% | GRM31BR72H223KW10# |           |
|        |               |         | 22000pF | ±10% | GRM31BR72H223KW10# |           |
|        | 500Vdc        | X7R     | 15000pF | ±10% | GRM31BR72E153KW01# |           |
|        |               |         | 22000pF | ±10% | GRM31BR72E223KW01# |           |
|        |               |         | 68000pF | ±10% | GRM31BR72E683KW01# |           |
|        |               |         | 68000pF | ±10% | GRM31BR72E683KW01# |           |
|        | 250Vdc        | X7R     | 15000pF | ±10% | GRM31BR72D153KW01# |           |
|        |               |         | 22000pF | ±10% | GRM31BR72D223KW01# |           |
|        |               |         | 68000pF | ±10% | GRM31BR72D683KW01# |           |
|        |               |         | 68000pF | ±10% | GRM31BR72D683KW01# |           |
| 1.8mm  | 1000Vdc       | X7R     | 6800pF  | ±10% | GRM31CR73A682KW03# |           |
|        |               |         | 10000pF | ±10% | GRM31CR73A103KW03# |           |
|        |               |         | 15000pF | ±10% | GRM31CR72J153KW03# |           |
|        |               |         | 22000pF | ±10% | GRM31CR72J223KW03# |           |
|        | 630Vdc        | X7R     | 15000pF | ±10% | GRM31CR72J223KW03# |           |
|        |               |         | 22000pF | ±10% | GRM31CR72J223KW03# |           |
|        |               |         | 33000pF | ±10% | GRM31CR72H333KW09# |           |
|        |               |         | 47000pF | ±10% | GRM31CR72H473KW09# |           |
|        | 500Vdc        | X7R     | 33000pF | ±10% | GRM31CR72H333KW09# |           |
|        |               |         | 47000pF | ±10% | GRM31CR72H473KW09# |           |
|        |               | X7R     | 33000pF | ±10% | GRM31CR72E333KW03# |           |
|        |               |         | 47000pF | ±10% | GRM31CR72E473KW03# |           |
| 1.8mm  | 250Vdc        | X7R     | 0.10μF  | ±10% | GRM31CR72E104KW03# |           |
|        |               |         | 0.10μF  | ±10% | GRM31CR72E104KW03# |           |
|        |               |         | 0.10μF  | ±10% | GRM31CR72E104KW03# |           |
|        |               |         | 0.10μF  | ±10% | GRM31CR72E104KW03# |           |
|        | 200Vdc        | X7R     | 33000pF | ±10% | GRM31CR72D333KW03# |           |
|        |               |         | 47000pF | ±10% | GRM31CR72D473KW03# |           |
|        |               |         | 0.10μF  | ±10% | GRM31CR72D104KW03# |           |
|        |               |         | 0.10μF  | ±10% | GRM31CR72D104KW03# |           |
|        | 100Vdc        | X7R     | 1.0μF   | ±10% | GRM31CR72A105KA01# |           |
|        |               |         | 1.0μF   | ±10% | GRM31CR72A105KA01# |           |
|        |               |         | 4.7μF   | ±10% | GRM31CR71H475KA12# |           |
|        |               |         | 4.7μF   | ±10% | GRM31CR71H475KA12# |           |

Part number # indicates the package specification code.

## GRM Series High Dielectric Constant Type Part Number List

(→ 3.2×1.6mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol. | Part Number        |    |
|--------|---------------|---------|-------|------|--------------------|----|
| 1.8mm  | 50Vdc         | X7R     | 4.7μF | ±20% | GRM31CR71H475MA12# |    |
|        |               |         | 10μF  | ±10% | GRM31CR61H106KA12# |    |
|        |               |         |       | ±20% | GRM31CR61H106MA12# |    |
|        |               | B       | 4.7μF | ±10% | GRM31CB31H475KA12# |    |
|        |               |         |       | ±20% | GRM31CB31H475MA12# |    |
|        |               |         | 10μF  | ±10% | GRM31CB31H106KA12# |    |
|        |               |         |       | ±20% | GRM31CB31H106MA12# |    |
|        |               | 25Vdc   | 10μF  | ±10% | GRM31CR71E106KA12# |    |
|        |               |         |       | ±20% | GRM31CR71E106MA12# |    |
|        |               |         | 22μF  | ±20% | GRM31CR61E226ME15# |    |
|        |               |         |       | ±10% | GRM31CB31E106KA75# |    |
|        |               |         | 22μF  | ±20% | GRM31CB31E226ME15# |    |
|        |               |         |       | ±20% | GRM31CC81C226ME15# |    |
|        | 16Vdc         | X6S     | 22μF  | ±20% | GRM31CR61C226ME15# |    |
|        |               | B       | 22μF  | ±20% | GRM31CB31C226ME15# |    |
|        |               | X7R     | 22μF  | ±20% | GRM31CR71A226ME15# |    |
|        | 10Vdc         | X5R     | 47μF  | ±20% | GRM31CR61A476ME15# |    |
|        |               | B       | 47μF  | ±20% | GRM31CB31A476ME15# |    |
|        |               | X7R     | 22μF  | ±20% | GRM31CR70J226ME19# |    |
|        | 6.3Vdc        | X7U     | 47μF  | ±20% | GRM31CE70J476ME15# | D1 |
|        |               | X6S     | 47μF  | ±20% | GRM31CC80J476ME18# |    |
|        |               | X5R     | 47μF  | ±20% | GRM31CR60J476ME19# |    |
|        |               | B       | 47μF  | ±20% | GRM31CB30J476ME18# |    |
|        |               | X7U     | 47μF  | ±20% | GRM31CE70G476ME15# |    |
| 1.9mm  | 25Vdc         | X6S     | 22μF  | ±20% | GRM31CC81E226ME11# |    |
|        |               | X7S     | 22μF  | ±20% | GRM31CC71C226ME11# |    |
|        |               | X5R     | 47μF  | ±20% | GRM31CR61C476ME44# |    |
|        | 10Vdc         | X6S     | 47μF  | ±20% | GRM31CC81A476ME44# |    |
|        |               | X5R     | 100μF | ±20% | GRM31CR61A107ME05# | D1 |
|        |               | X6T     | 100μF | ±20% | GRM31CD80J107ME39# | D1 |
|        | 6.3Vdc        | X5R     | 100μF | ±20% | GRM31CR60J107ME39# |    |
|        |               |         | 150μF | ±20% | GRM31CR60J157ME11# | D1 |
|        |               | X7U     | 100μF | ±20% | GRM31CE70G107ME39# | D1 |
|        |               |         | 150μF | ±20% | GRM31CC80G157ME11# | D1 |
|        |               |         | 100μF | ±20% | GRM31CD80G107ME39# |    |
|        | 4Vdc          | X5R     | 100μF | ±20% | GRM31CR60G107ME39# |    |
|        |               |         | 150μF | ±20% | GRM31CR60G157ME11# |    |
|        |               | X6T     | 220μF | ±20% | GRM31CR60G227ME11# |    |
|        |               |         | 150μF | ±20% | GRM31CC80E157ME11# |    |
|        |               |         | 220μF | ±20% | GRM31CR60E227ME11# |    |

### 3.2×2.5mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |  |
|--------|---------------|---------|---------|------|--------------------|--|
| 1.5mm  | 1000Vdc       | X7R     | 6800pF  | ±10% | GRM32QR73A682KW01# |  |
|        |               |         | 10000pF | ±10% | GRM32QR73A103KW01# |  |
|        | 630Vdc        | X7R     | 22000pF | ±10% | GRM32QR72J223KW01# |  |
|        | 500Vdc        | X7R     | 68000pF | ±10% | GRM32QR72H683KW10# |  |
|        | 250Vdc        | X7R     | 68000pF | ±10% | GRM32QR72E683KW01# |  |
|        |               |         | 0.15μF  | ±10% | GRM32QR72E154KW01# |  |
|        | 200Vdc        | X7R     | 68000pF | ±10% | GRM32QR72D683KW01# |  |
|        |               |         | 0.15μF  | ±10% | GRM32QR72D154KW01# |  |

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |    |
|--------|---------------|---------|---------|------|--------------------|----|
| 1.8mm  | 100Vdc        | X7R     | 1.0μF   | ±10% | GRM32CR72A105KA35# |    |
|        |               |         |         | ±20% | GRM32CR72A105MA35# |    |
|        | 2.0mm         | 1000Vdc | 15000pF | ±10% | GRM32DR73A153KW01# |    |
|        |               |         | 22000pF | ±10% | GRM32DR73A223KW01# |    |
|        |               | 630Vdc  | 33000pF | ±10% | GRM32DR72J333KW01# |    |
|        |               |         | 47000pF | ±10% | GRM32DR72J473KW01# |    |
|        | 500Vdc        | X7R     | 0.10μF  | ±10% | GRM32DR72H104KW10# |    |
|        | 250Vdc        | X7R     | 0.10μF  | ±10% | GRM32DR72E104KW01# |    |
|        |               |         | 0.22μF  | ±10% | GRM32DR72E224KW01# |    |
|        |               |         | 0.10μF  | ±10% | GRM32DR72D104KW01# |    |
| 2.2mm  | 100Vdc        | X7S     | 4.7μF   | ±10% | GRM32DC72A475KE01# |    |
|        |               |         |         | ±20% | GRM32DC72A475ME01# |    |
|        | 25Vdc         | X7R     | 10μF    | ±10% | GRM32DR71E106KA12# |    |
|        |               |         |         | ±20% | GRM32DR71E106MA12# |    |
|        | 100Vdc        | X7R     | 2.2μF   | ±10% | GRM32ER72A225KA35# |    |
|        |               |         |         | ±20% | GRM32ER72A225MA35# |    |
|        |               | 80Vdc   | 4.7μF   | ±10% | GRM32ER71K475KE14# | D1 |
|        |               |         |         | ±20% | GRM32ER71K475ME14# | D1 |
|        | 63Vdc         | X7R     | 10μF    | ±10% | GRM32ER71J106KA12# | D1 |
|        |               |         |         | ±20% | GRM32ER71J106MA12# | D1 |
| 2.7mm  | 50Vdc         | X7R     | 4.7μF   | ±10% | GRM32ER71H475KA88# |    |
|        |               |         |         | ±10% | GRM32ER71H106KA12# |    |
|        |               |         | 10μF    | ±20% | GRM32ER71H106MA12# |    |
|        |               |         |         | ±20% | GRM32ER71H106MA12# |    |
|        |               | X5R     | 10μF    | ±10% | GRM32ER61H106KA12# |    |
|        |               |         |         | ±20% | GRM32ER61H106MA12# |    |
|        |               | B       | 10μF    | ±10% | GRM32EB31H106KA12# |    |
|        |               |         |         | ±20% | GRM32EB31H106MA12# |    |
|        | 35Vdc         | X7R     | 10μF    | ±10% | GRM32ER7YA106KA12# |    |
|        |               |         |         | ±20% | GRM32ER7YA106MA12# |    |
|        |               | X5R     | 10μF    | ±10% | GRM32ER6YA106KA12# |    |
|        |               |         |         | ±20% | GRM32ER6YA106MA12# |    |
|        | 25Vdc         | X7R     | 22μF    | ±20% | GRM32ER71E226ME15# |    |
|        |               |         |         | ±20% | GRM32ER61E226ME15# |    |
|        |               | X5R     | 22μF    | ±20% | GRM32EB31E226ME15# |    |
|        |               |         |         | ±20% | GRM32EB31E226ME15# |    |
|        | 16Vdc         | X7R     | 22μF    | ±20% | GRM32ER71C226ME15# | D1 |
|        |               |         |         | ±20% | GRM32EC81C476ME15# |    |
|        |               | X5R     | 47μF    | ±20% | GRM32ER61C476ME15# |    |
|        |               |         |         | ±20% | GRM32EB31C476ME15# |    |
| 3.2mm  | 10Vdc         | X7R     | 47μF    | ±20% | GRM32ER71A476ME15# |    |
|        |               |         |         | ±20% | GRM32ER61A476ME20# |    |
|        |               | X5R     | 100μF   | ±20% | GRM32ER61A107ME20# | D1 |
|        |               |         |         | ±20% | GRM32EB31A476ME20# |    |
|        | 6.3Vdc        | X7R     | 47μF    | ±20% | GRM32ER70J476ME20# |    |
|        |               |         |         | ±20% | GRM32EE70J107ME15# | D1 |
|        |               | X5R     | 100μF   | ±20% | GRM32ER60J107ME20# |    |
|        |               |         |         | ±20% | GRM32EB30J107ME16# |    |
|        | 4Vdc          | X7U     | 100μF   | ±20% | GRM32EE70G107ME19# |    |

Part number # indicates the package specification code.

## GRM Series High Dielectric Constant Type Part Number List

### 4.5×3.2mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |  |
|--------|---------------|---------|---------|------|--------------------|--|
| 1.5mm  | 630Vdc        | X7R     | 68000pF | ±10% | GRM43QR72J683KW01# |  |
|        | 500Vdc        | X7R     | 0.15μF  | ±10% | GRM43QR72H154KW10# |  |
|        | 250Vdc        | X7R     | 0.15μF  | ±10% | GRM43QR72E154KW01# |  |
|        | 200Vdc        | X7R     | 0.15μF  | ±10% | GRM43QR72D154KW01# |  |
| 2.0mm  | 1000Vdc       | X7R     | 33000pF | ±10% | GRM43DR73A333KW01# |  |
|        |               |         | 47000pF | ±10% | GRM43DR73A473KW01# |  |
|        | 630Vdc        | X7R     | 0.10μF  | ±10% | GRM43DR72J104KW01# |  |
|        | 500Vdc        | X7R     | 0.22μF  | ±10% | GRM43DR72H224KW10# |  |
|        | 250Vdc        | X7R     | 0.22μF  | ±10% | GRM43DR72E224KW01# |  |
|        |               |         | 0.33μF  | ±10% | GRM43DR72E334KW01# |  |
|        |               |         | 0.47μF  | ±10% | GRM43DR72E474KW01# |  |
|        | 200Vdc        | X7R     | 0.22μF  | ±10% | GRM43DR72D224KW01# |  |
|        |               |         | 0.33μF  | ±10% | GRM43DR72D334KW01# |  |
|        |               |         | 0.47μF  | ±10% | GRM43DR72D474KW01# |  |

### 5.7×5.0mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |  |
|--------|---------------|---------|---------|------|--------------------|--|
| 2.0mm  | 1000Vdc       | X7R     | 68000pF | ±10% | GRM55DR73A683KW01# |  |
|        |               |         | 0.10μF  | ±10% | GRM55DR73A104KW01# |  |
|        | 630Vdc        | X7R     | 0.15μF  | ±10% | GRM55DR72J154KW01# |  |
|        |               |         | 0.22μF  | ±10% | GRM55DR72J224KW01# |  |
|        | 500Vdc        | X7R     | 0.33μF  | ±10% | GRM55DR72H334KW10# |  |
|        |               |         | 0.47μF  | ±10% | GRM55DR72H474KW10# |  |
|        | 250Vdc        | X7R     | 0.33μF  | ±10% | GRM55DR72E334KW01# |  |
|        |               |         | 0.47μF  | ±10% | GRM55DR72E474KW01# |  |
|        |               |         | 0.68μF  | ±10% | GRM55DR72E684KW01# |  |
|        |               |         | 1.0μF   | ±10% | GRM55DR72E105KW01# |  |
|        | 200Vdc        | X7R     | 0.33μF  | ±10% | GRM55DR72D334KW01# |  |
|        |               |         | 0.47μF  | ±10% | GRM55DR72D474KW01# |  |
|        |               |         | 0.68μF  | ±10% | GRM55DR72D684KW01# |  |
|        |               |         | 1.0μF   | ±10% | GRM55DR72D105KW01# |  |

## GRM Series Specifications and Test Methods

Specifications and Test Methods, please refer to the search web page.  
<https://www.murata.com/en-global/products/capacitor>

**GRM Series Temperature Compensating**

0.4×0.2mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol.    | Part Number         |
|--------|---------------|---------|--------|---------|---------------------|
| 0.22mm | 50Vdc         | COG     | 0.20pF | ±0.05pF | GRM022C1C1HR20WA03# |
|        |               |         |        | ±0.1pF  | GRM022C1C1HR20BA03# |
|        |               |         | 0.30pF | ±0.05pF | GRM022C1C1HR30WA03# |
|        |               |         |        | ±0.1pF  | GRM022C1C1HR30BA03# |
|        |               |         | 0.40pF | ±0.05pF | GRM022C1C1HR40WA03# |
|        |               |         |        | ±0.1pF  | GRM022C1C1HR40BA03# |
|        |               |         | 0.50pF | ±0.05pF | GRM022C1C1HR50WA03# |
|        |               |         |        | ±0.1pF  | GRM022C1C1HR50BA03# |

Links are provided to the product detail pages on the web, and are shown below in the product number table from the PDF version of the catalog which is available on the web.

Chip Multilayer Ceramic Capacitors for General Purpose

GRM0222C1C121JA02#

Shape

Specifications

| Item                                             | Value          |
|--------------------------------------------------|----------------|
| Capacitance                                      | 0.20pF ±0.05pF |
| Rated voltage                                    | 50Vdc          |
| Temperature characteristic (nominal standard)    | COG            |
| Temperature coefficient                          | ±0.05ppm/°C    |
| Temperature range of temperature characteristics | -55 to +125    |
| Operating temperature range                      | -55 to +125    |

References

Marking

Chart of characteristic data

### Detailed Specifications Sheet

- Rated value
- Specifications and Test Methods
- Package
- Caution, Notice

### Specifications and Test Methods

| No              | Item                                       | Specification                                                                                                                                                                                                              | Test Method<br>(Ref. Standard:JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             |                 |         |                      |            |                           |              |                      |             |                           |   |                      |
|-----------------|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------------|---------|----------------------|------------|---------------------------|--------------|----------------------|-------------|---------------------------|---|----------------------|
| 1               | Rated Voltage                              | Shown in Rated value.                                                                                                                                                                                                      | The rated voltage is defined as the maximum voltage which may be applied continuously to the capacitor. When AC voltage is superimposed on DC voltage, $V^{A-P}$ or $V^{D-P}$ , whichever is larger, should be maintained within the rated voltage range.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                 |         |                      |            |                           |              |                      |             |                           |   |                      |
| 2               | Appearance                                 | No defects or abnormalities.                                                                                                                                                                                               | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |                 |         |                      |            |                           |              |                      |             |                           |   |                      |
| 3               | Dimension                                  | Within the specified dimensions.                                                                                                                                                                                           | Using calipers. (GRM02 size is based on Microscope)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             |                 |         |                      |            |                           |              |                      |             |                           |   |                      |
| 4               | Voltage proof                              | No defects or abnormalities.                                                                                                                                                                                               | Measurement Point : Between the terminations<br>Test Voltage : 300% of the rated voltage<br>(Temperature compensating type)<br>Applied Time : 1s to 5 s<br>Charge/discharge current : 50mA max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |                 |         |                      |            |                           |              |                      |             |                           |   |                      |
| 5               | Insulation Resistance(I.R.)                | $C \leq 0.047\mu F$ : More than 1000MΩ<br>$C > 0.047\mu F$ : More than 500Ω·F<br>C:Nominal Capacitance                                                                                                                     | Measurement Point : Between the terminations<br>Measurement Voltage : DC Rated Voltage<br>Charging Time : 1 min<br>Charge/discharge current : 50mA max.<br>Measurement Temperature : Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                 |         |                      |            |                           |              |                      |             |                           |   |                      |
| 6               | Capacitance                                | Shown in Rated value.                                                                                                                                                                                                      | Measurement Temperature : Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |                 |         |                      |            |                           |              |                      |             |                           |   |                      |
| 7               | Q or Dissipation Factor (D.F.)             | 30pF and over: $Q \geq 1000$<br>30pF and below: $Q \geq 400+20C$<br>C:Nominal Capacitance(pF)                                                                                                                              | (1)Temperature Compensating Type<br><table><tr><th>Capacitance</th><th>Frequency</th><th>Voltage</th></tr><tr><td><math>C \leq 1000pF</math></td><td>1.0±0.1MHz</td><td>0.5 to 5.0Vrms</td></tr><tr><td><math>C &gt; 1000pF</math></td><td>1.0±0.1kHz</td><td>1.0±0.2Vrms</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Capacitance | Frequency       | Voltage | $C \leq 1000pF$      | 1.0±0.1MHz | 0.5 to 5.0Vrms            | $C > 1000pF$ | 1.0±0.1kHz           | 1.0±0.2Vrms |                           |   |                      |
| Capacitance     | Frequency                                  | Voltage                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |                 |         |                      |            |                           |              |                      |             |                           |   |                      |
| $C \leq 1000pF$ | 1.0±0.1MHz                                 | 0.5 to 5.0Vrms                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |                 |         |                      |            |                           |              |                      |             |                           |   |                      |
| $C > 1000pF$    | 1.0±0.1kHz                                 | 1.0±0.2Vrms                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |                 |         |                      |            |                           |              |                      |             |                           |   |                      |
| 8               | Temperature Characteristics of Capacitance | Nominal values of the temperature coefficient is shown in Rated value.<br><br>But,the Capacitance Change under 20°C is shown in Table A.<br><br>Capacitance Drift<br>Within +/-0.2% or +/-0.05pF<br>(Whichever is larger.) | The capacitance change should be measured after 5 min at each specified temp. stage.<br><br>In case of applying voltage, the capacitance change should be measured after 1 min with applying voltage in equilibration of each temp. stage.<br>Capacitance value as a reference is the value in step 3.<br><br>The capacitance drift is calculated by dividing the differences between the maximum and minimum measured values in the step 1,3 and 5 by the cap. value in step 3.<br><br><table><tr><th>Step</th><th>Temperature(°C)</th></tr><tr><td>1</td><td>Reference Temp. +/-2</td></tr><tr><td>2</td><td>Min. Operating Temp. +/-3</td></tr><tr><td>3</td><td>Reference Temp. +/-2</td></tr><tr><td>4</td><td>Max. Operating Temp. +/-3</td></tr><tr><td>5</td><td>Reference Temp. +/-2</td></tr></table> | Step        | Temperature(°C) | 1       | Reference Temp. +/-2 | 2          | Min. Operating Temp. +/-3 | 3            | Reference Temp. +/-2 | 4           | Max. Operating Temp. +/-3 | 5 | Reference Temp. +/-2 |
| Step            | Temperature(°C)                            |                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |                 |         |                      |            |                           |              |                      |             |                           |   |                      |
| 1               | Reference Temp. +/-2                       |                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |                 |         |                      |            |                           |              |                      |             |                           |   |                      |
| 2               | Min. Operating Temp. +/-3                  |                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |                 |         |                      |            |                           |              |                      |             |                           |   |                      |
| 3               | Reference Temp. +/-2                       |                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |                 |         |                      |            |                           |              |                      |             |                           |   |                      |
| 4               | Max. Operating Temp. +/-3                  |                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |                 |         |                      |            |                           |              |                      |             |                           |   |                      |
| 5               | Reference Temp. +/-2                       |                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |                 |         |                      |            |                           |              |                      |             |                           |   |                      |

High Effective Capacitance & High Ripple Current Chip Multilayer Ceramic Capacitors for General Purpose

## GR3 Series



Anti-noise

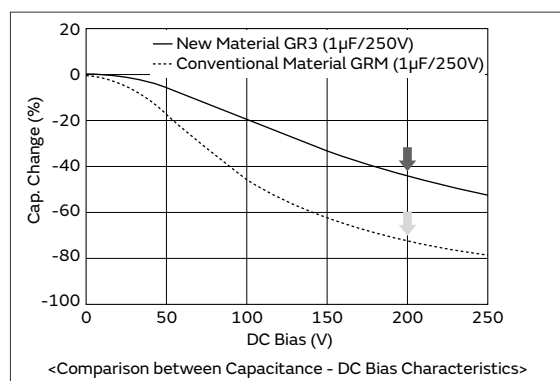
WEB

This is a general purpose high ripple resistance product excellent in DC bias characteristics.

### Features

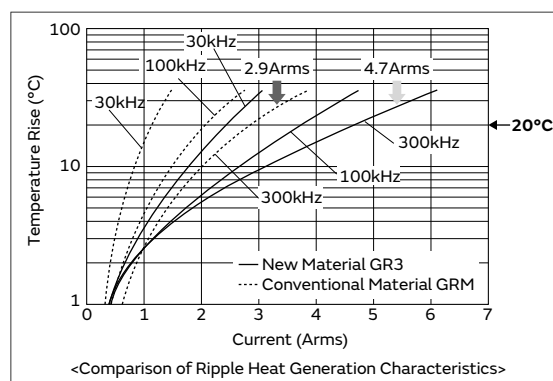
- ① When a DC bias is applied, a capacitance higher than conventional products (X7R characteristics) can be acquired.

About twice the capacitance can be secured when DC200V is applied.



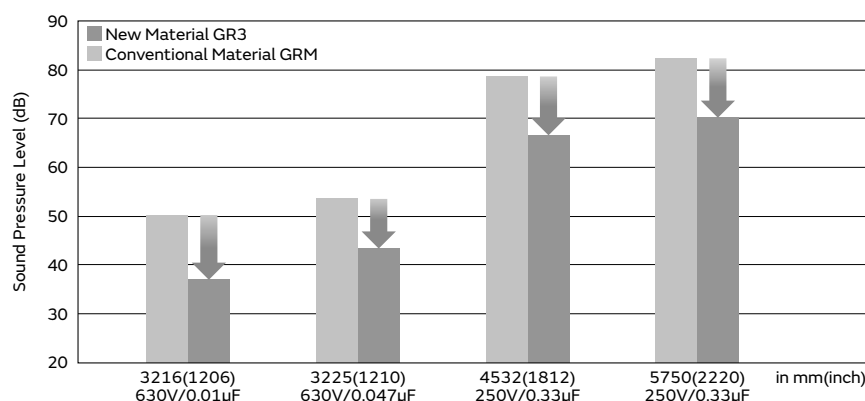
- ② Improved ripple resistance performance compared to conventional products (X7R characteristics).

In the case of a product with a capacitance of 1μF, when the exothermic temperature reaches 20°C at frequency f=300kHz, the amount of resistance of a product with conventional material is 2.9Arms; however, the new material is 4.7Arms.



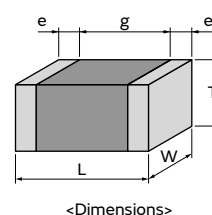
- ③ This product has a noise reduction effect.

Since dielectric materials which enable a reduction of noise are used, this product is more effective for reducing noise compared to the general purpose GRM series.



### Specifications

|                   |                                                                                                      |
|-------------------|------------------------------------------------------------------------------------------------------|
| Size (mm)         | 2.0×1.25mm to 5.7×5.0mm                                                                              |
| Rated Voltage     | 250Vdc to 630Vdc                                                                                     |
| Capacitance       | 10000pF to 1.0μF                                                                                     |
| Main Applications | For PFC (Power Factor Correction) Circuits of Power Supplies, EMI Suppression and Smoothing Circuits |



This catalog contains only a portion of the product lineup.  
Please refer to the capacitor search tool on the Murata Web site for details.

## GR3 Series High Dielectric Constant Type Anti-noise Part Number List

### 2.0×1.25mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        | p*   |
|--------|---------------|---------|---------|------|--------------------|------|
| 1.0mm  | 250Vdc        | X7T     | 10000pF | ±10% | GR321AD72E103KW01# | p111 |
|        |               |         | 15000pF | ±10% | GR321AD72E153KW01# | p111 |
| 1.45mm | 250Vdc        | X7T     | 22000pF | ±10% | GR321BD72E223KW03# | p111 |

| T max. | Rated Voltage | TC Code | Cap.  | Tol. | Part Number        | p*   |
|--------|---------------|---------|-------|------|--------------------|------|
| 2.7mm  | 250Vdc        | X7T     | 1.0μF | ±10% | GR355XD72E105KW05# | p111 |

### 3.2×1.6mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        | p*   |
|--------|---------------|---------|---------|------|--------------------|------|
| 1.0mm  | 450Vdc        | X7T     | 10000pF | ±10% | GR331AD72W103KW01# | p114 |
|        |               |         | 15000pF | ±10% | GR331AD72W153KW01# | p114 |
|        | 250Vdc        | X7T     | 33000pF | ±10% | GR331AD72E333KW01# | p111 |
| 1.25mm | 630Vdc        | X7T     | 10000pF | ±10% | GR331BD72J103KW01# | p117 |
|        | 450Vdc        | X7T     | 22000pF | ±10% | GR331BD72W223KW01# | p114 |
|        |               |         | 33000pF | ±10% | GR331BD72W333KW01# | p114 |
|        | 250Vdc        | X7T     | 47000pF | ±10% | GR331BD72E473KW01# | p111 |
| 1.8mm  | 630Vdc        | X7T     | 15000pF | ±10% | GR331CD72J153KW03# | p117 |
|        | 450Vdc        | X7T     | 47000pF | ±10% | GR331CD72W473KW03# | p114 |
|        | 250Vdc        | X7T     | 68000pF | ±10% | GR331CD72E683KW03# | p111 |

### 3.2×2.5mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        | p*   |
|--------|---------------|---------|---------|------|--------------------|------|
| 1.5mm  | 630Vdc        | X7T     | 22000pF | ±10% | GR332QD72J223KW01# | p117 |
|        | 250Vdc        | X7T     | 0.10μF  | ±10% | GR332QD72E104KW01# | p111 |
| 2.0mm  | 630Vdc        | X7T     | 33000pF | ±10% | GR332DD72J333KW01# | p117 |
|        |               |         | 47000pF | ±10% | GR332DD72J473KW01# | p117 |
|        | 450Vdc        | X7T     | 68000pF | ±10% | GR332DD72W683KW01# | p114 |
|        |               |         | 0.10μF  | ±10% | GR332DD72W104KW01# | p114 |
|        | 250Vdc        | X7T     | 0.15μF  | ±10% | GR332DD72E154KW01# | p111 |

### 4.5×3.2mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        | p*   |
|--------|---------------|---------|---------|------|--------------------|------|
| 1.5mm  | 250Vdc        | X7T     | 0.22μF  | ±10% | GR343QD72E224KW01# | p111 |
| 2.0mm  | 630Vdc        | X7T     | 68000pF | ±10% | GR343DD72J683KW01# | p117 |
|        | 450Vdc        | X7T     | 0.15μF  | ±10% | GR343DD72W154KW01# | p114 |
|        | 250Vdc        | X7T     | 0.33μF  | ±10% | GR343DD72E334KW01# | p111 |

### 5.7×5.0mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number        | p*   |
|--------|---------------|---------|--------|------|--------------------|------|
| 2.0mm  | 630Vdc        | X7T     | 0.10μF | ±10% | GR355DD72J104KW01# | p117 |
|        |               |         | 0.15μF | ±10% | GR355DD72J154KW01# | p117 |
|        | 450Vdc        | X7T     | 0.22μF | ±10% | GR355DD72W224KW01# | p114 |
|        |               |         | 0.33μF | ±10% | GR355DD72W334KW01# | p114 |
|        |               |         | 0.47μF | ±10% | GR355DD72W474KW01# | p114 |
|        | 250Vdc        | X7T     | 0.47μF | ±10% | GR355DD72E474KW01# | p111 |
|        |               |         | 0.68μF | ±10% | GR355DD72E684KW01# | p111 |
| 2.7mm  | 630Vdc        | X7T     | 0.22μF | ±10% | GR355XD72J224KW05# | p117 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

# 1

## GR3 Series Specifications and Test Methods (1)

| No   | Item                                       |                    | Specification                                                      | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|------|--------------------------------------------|--------------------|--------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------|---|--------------------|---|-------------------------|---|--------------------|---|-------------------------|---|--------------------|
| 1    | Appearance                                 |                    | No defects or abnormalities.                                       | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 2    | Dimension                                  |                    | Within the specified dimensions.                                   | Using calipers and micrometers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 3    | Voltage Proof                              |                    | No defects or abnormalities.                                       | Measurement Point: Between the terminations<br>Test Voltage: DC500V (200% of the rated voltage)<br>Applied Time: 1 to 5s<br>Charge/discharge current: 50mA max.                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 4    | Insulation Resistance (I.R.)               |                    | More than 10000MΩ or 100MΩ • μF<br>(Whichever is smaller)          | Measurement Point: Between the terminations<br>Measurement Voltage: DC250±25V<br>Charging Time: 60±5s<br>Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 5    | Capacitance                                |                    | Shown in Rated value.                                              | Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 6    | Dissipation Factor (D.F.)                  |                    | 0.01 max.                                                          | Measurement Frequency: 1.0±0.1kHz<br>Measurement Voltage: AC1.0±0.2V (r.m.s.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 7    | Temperature Characteristics of Capacitance |                    | D7: Within +22/-33% (-55 to +125°C)                                | <p>The capacitance change should be measured after 5 minutes at each specified temp. stage.<br/>Capacitance value as a reference is the value in step 3.</p> <table><tr><th>Step</th><th>Temperature (°C)</th></tr><tr><td>1</td><td>Reference Temp. ±2</td></tr><tr><td>2</td><td>Min. Operating Temp. ±3</td></tr><tr><td>3</td><td>Reference Temp. ±2</td></tr><tr><td>4</td><td>Max. Operating Temp. ±3</td></tr><tr><td>5</td><td>Reference Temp. ±2</td></tr></table> <p>• Pretreatment<br/>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h at room condition*.</p> | Step | Temperature (°C) | 1 | Reference Temp. ±2 | 2 | Min. Operating Temp. ±3 | 3 | Reference Temp. ±2 | 4 | Max. Operating Temp. ±3 | 5 | Reference Temp. ±2 |
| Step | Temperature (°C)                           |                    |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 1    | Reference Temp. ±2                         |                    |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 2    | Min. Operating Temp. ±3                    |                    |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 3    | Reference Temp. ±2                         |                    |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 4    | Max. Operating Temp. ±3                    |                    |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 5    | Reference Temp. ±2                         |                    |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 8    | Vibration                                  | Appearance         | No defects or abnormalities.                                       | <p>Solder the capacitor on the test substrate A shown in “Complement of Test Method”.</p> <p>Kind of Vibration: A simple harmonic motion<br/>10Hz to 55Hz to 10Hz (1min)</p> <p>Total amplitude: 1.5mm<br/>This motion should be applied for a period of 2h in each 3 mutually perpendicular directions (total of 6h).</p>                                                                                                                                                                                                                                                                               |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | Capacitance        | Within the specified initial value.                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | D.F.               | Within the specified initial value.                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 9    | Solderability                              |                    | 95% of the terminations is to be soldered evenly and continuously. | <p>Test Method: Solder bath method<br/>Flux: Solution of rosin ethanol 25 (wt)%<br/>Preheat: 80 to 120°C for 10 to 30s<br/>Solder: Sn-3.0Ag-0.5Cu (Lead Free Solder)<br/>Solder Temp.: 245±5°C<br/>Immersion time: 2±0.5s<br/>Immersing in speed: 25±2.5mm/s.</p>                                                                                                                                                                                                                                                                                                                                        |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 10   | Resistance to Soldering Heat               | Appearance         | No defects or abnormalities.                                       | <p>Test Method: Solder bath method<br/>Solder: Sn-3.0Ag-0.5Cu (Lead Free Solder)<br/>Solder Temp.: 260±5°C<br/>Immersion time: 10±1s<br/>Immersing in speed: 25±2.5mm/s.<br/>Exposure Time: 24±2h at room condition*.<br/>Preheat: GR331 size max.: 120 to 150°C for 1min<br/>GR332 size min.: 100 to 120°C for 1min and 170 to 200°C for 1min</p> <p>• Pretreatment<br/>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h at room condition*.</p>                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | Capacitance Change | Within ±10%                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | D.F.               | Within the specified initial value.                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | I.R.               | Within the specified initial value.                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | Voltage Proof      | No defects.                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 11   | Adhesive Strength of Termination           |                    | No removal of the terminations or other defect should occur.       | <p>Solder the capacitor on the test substrate A shown in “Complement of Test Method”.</p> <div>10N, 10±1s</div> <p>Applied Direction: In parallel with the test substrate and vertical with the capacitor side.</p>                                                                                                                                                                                                                                                                                                  |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 12   | Substrate Bending Test                     |                    | No defects or abnormalities.                                       | <p>Solder the capacitor on the test substrate B shown in “Complement of Test Method”.</p> <p>Then apply the force in the direction shown in “Test Method of Substrate Bending Test” of “Complement of Test Method”.</p> <p>Flexure: 2mm (GR321 size: 1mm)<br/>Holding Time: 5±1s<br/>Soldering Method: Reflow soldering</p>                                                                                                                                                                                                                                                                              |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |

\* Room Condition: Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. ↗

## GR3 Series Specifications and Test Methods (1)

Continued from the preceding page. ↘

| No                 | Item                                    |                    | Specification                                        | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|--------------------|-----------------------------------------|--------------------|------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|------------|---|----------------------------|------|---|------------|--------|---|----------------------------|------|---|------------|--------|
| 13                 | Temperature Sudden Change               | Appearance         | No defects or abnormalities.                         | <div>Fix the capacitor to the supporting Test substrate A (glass epoxy board) shown in "Complement of Test Method".</div> <div>Perform the 5 cycles according to the four heat treatments shown in the following table.</div> <table><tr><th>Step</th><th>Temp. (°C)</th><th>Time (min)</th></tr><tr><td>1</td><td>Min. Operating Temp. +0/-3</td><td>30±3</td></tr><tr><td>2</td><td>Room Temp.</td><td>2 to 3</td></tr><tr><td>3</td><td>Max. Operating Temp. +3/-0</td><td>30±3</td></tr><tr><td>4</td><td>Room Temp.</td><td>2 to 3</td></tr></table> <div>Exposure Time: 24±2h at room condition*.</div> <div>• Pretreatment</div> <div>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h. at room condition *.</div> | Step       | Temp. (°C) | Time (min) | 1 | Min. Operating Temp. +0/-3 | 30±3 | 2 | Room Temp. | 2 to 3 | 3 | Max. Operating Temp. +3/-0 | 30±3 | 4 | Room Temp. | 2 to 3 |
|                    |                                         | Step               | Temp. (°C)                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Time (min) |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | 1                  | Min. Operating Temp. +0/-3                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 30±3       |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | 2                  | Room Temp.                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2 to 3     |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | 3                  | Max. Operating Temp. +3/-0                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 30±3       |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 4                  | Room Temp.                              | 2 to 3             |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Capacitance Change | Within ±7.5%                            |                    |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| D.F.               | Within the specified initial value.     |                    |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| I.R.               | Within the specified initial value.     |                    |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Voltage Proof      | No defects.                             |                    |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 14                 | High Temperature High Humidity (Steady) | Appearance         | No defects or abnormalities.                         | <div>Fix the capacitor to the supporting Test substrate A (glass epoxy board) shown in "Complement of Test Method".</div> <div>Test Temperature: 40±2°C</div> <div>Test Humidity: 90 to 95%RH</div> <div>Test Time: 500+24/-0h</div> <div>Applied Voltage: DC250V(DC Rated Voltage)</div> <div>Exposure Time: 24±2h at room condition*.</div> <div>• Pretreatment</div> <div>Apply test voltage for 1h±5min at test temperature.</div> <div>Remove and let sit for 24±2h at room condition*.</div>                                                                                                                                                                                                                                                      |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | Capacitance Change | Within ±12.5%                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | D.F.               | 0.02 max.                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | I.R.               | More than 1000MΩ or 10MΩ • μF (Whichever is smaller) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | Voltage Proof      | No defects.                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 15                 | Durability                              | Appearance         | No defects or abnormalities.                         | <div>Fix the capacitor to the supporting Test substrate A (glass epoxy board) shown in "Complement of Test Method".</div> <div>Test Temperature: Max. Operating Temp. ±3°C</div> <div>Test Time: 1000+48/-0h</div> <div>Applied Voltage: DC375V (150% of the rated voltage)</div> <div>Charge/discharge current: 50mA max.</div> <div>Exposure Time: 24±2h at room condition*.</div> <div>• Pretreatment</div> <div>Apply test voltage for 1h±5min at test temperature.</div> <div>Remove and let sit for 24±2h at room condition*.</div>                                                                                                                                                                                                               |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | Capacitance Change | Within ±12.5%                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | D.F.               | 0.02 max.                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | I.R.               | More than 1000MΩ or 10MΩ • μF (Whichever is smaller) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | Voltage Proof      | No defects.                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |

\* Room Condition: Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. ↗

## GR3 Series Specifications and Test Methods (1)

Continued from the preceding page. ↘

### Complement of Test Method

#### 1. Test Substrate

The test substrate should be Substrate A or Substrate B as described in “Specifications and Test Methods”.

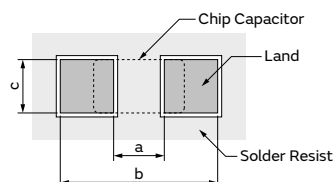
The specimen should be soldered by the conditions as described below.

Soldering Method: Reflow soldering

Solder: Sn-3.0Ag-0.5Cu

##### (1) Test Substrate A

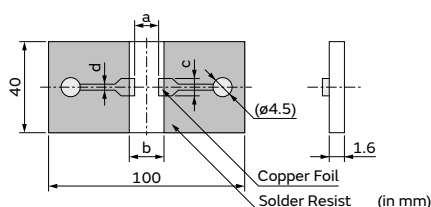
###### • Land Dimensions



- Material: Glass Epoxy Board
- Thickness: 1.6mm
- Thickness of Copper Foil: 0.035mm

| Part Number | Dimension (mm) |     |      |
|-------------|----------------|-----|------|
|             | a              | b   | c    |
| GR321       | 1.2            | 4.0 | 1.65 |
| GR331       | 2.2            | 5.0 | 2.0  |
| GR332       | 2.2            | 5.0 | 2.9  |
| GR342       | 3.5            | 7.0 | 2.4  |
| GR343       | 3.5            | 7.0 | 3.7  |
| GR352       | 4.5            | 8.0 | 3.2  |
| GR355       | 4.5            | 8.0 | 5.6  |

##### (2) Test Substrate B

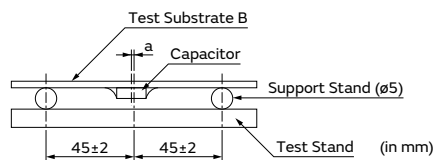


- Material: Glass Epoxy Board
- Thickness of Copper Foil: 0.035mm

| Part Number | Dimension (mm) |     |      |     |
|-------------|----------------|-----|------|-----|
|             | a              | b   | c    | d   |
| GR321       | 1.2            | 4.0 | 1.65 | 1.0 |
| GR331       | 2.2            | 5.0 | 2.0  | 1.0 |
| GR332       | 2.2            | 5.0 | 2.9  | 1.0 |
| GR342       | 3.5            | 7.0 | 2.4  | 1.0 |
| GR343       | 3.5            | 7.0 | 3.7  | 1.0 |
| GR352       | 4.5            | 8.0 | 3.2  | 1.0 |
| GR355       | 4.5            | 8.0 | 5.6  | 1.0 |

#### 2. Test Method of Substrate Bending Test

##### (a) Support State



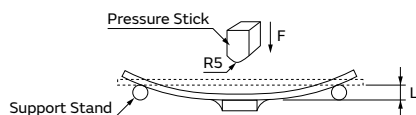
a: ±2 gap between support stand center and test stand

- Material of Test Stand and Pressure Stick

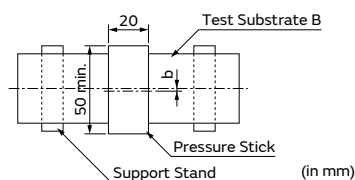
The material should be a metal where a remarkable transformation and the distortion are not caused even if it is pressurized.

- Pressurizing Speed

The pressurizing speed is pressurized at the speed of about 1mm/s until the flexure reaches a regulated value.



##### (b) Test State



b: ±5 gap between support stand center and test stand center

GRM

GR3

GRJ

GR4

GR7

GJM

GQM

GA2

GA3

GA3

GA3

GA3

LLL

LLA

LLM

LLR

NFM

KRM

KR3

GMA

GMD

⚠Caution / Notice

## 2

## GR3 Series Specifications and Test Methods (2)

| No   | Item                                       |                                                                                                              | Specification                                                                                                                                                                       | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|------|--------------------------------------------|--------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------|---|--------------------|---|-------------------------|---|--------------------|---|-------------------------|---|--------------------|
| 1    | Appearance                                 |                                                                                                              | No defects or abnormalities.                                                                                                                                                        | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 2    | Dimension                                  |                                                                                                              | Within the specified dimensions.                                                                                                                                                    | Using calipers and micrometers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 3    | Voltage Proof                              |                                                                                                              | No defects or abnormalities.                                                                                                                                                        | Measurement Point: Between the terminations<br>Test Voltage: DC675V (150% of the rated voltage)<br>Applied Time: 1 to 5s<br>Charge/discharge current: 50mA max.                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 4    | Insulation Resistance (I.R.)               |                                                                                                              | More than 10000MΩ or 100MΩ • μF<br>(Whichever is smaller)                                                                                                                           | Measurement Point: Between the terminations<br>Measurement Voltage: DC250±25V<br>Charging Time: 60±5s<br>Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 5    | Capacitance                                |                                                                                                              | Shown in Rated value.                                                                                                                                                               | Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 6    | Dissipation Factor (D.F.)                  |                                                                                                              | 0.01 max.                                                                                                                                                                           | Measurement Frequency: 1.0±0.1kHz<br>Measurement Voltage: AC1.0±0.2V (r.m.s.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 7    | Temperature Characteristics of Capacitance |                                                                                                              | D7: Within +22/-33% (-55 to +125°C)                                                                                                                                                 | <p>The capacitance change should be measured after 5 minutes at each specified temp. stage.<br/>Capacitance value as a reference is the value in step 3.</p> <table><tr><th>Step</th><th>Temperature (°C)</th></tr><tr><td>1</td><td>Reference Temp. ±2</td></tr><tr><td>2</td><td>Min. Operating Temp. ±3</td></tr><tr><td>3</td><td>Reference Temp. ±2</td></tr><tr><td>4</td><td>Max. Operating Temp. ±3</td></tr><tr><td>5</td><td>Reference Temp. ±2</td></tr></table> <p>• Pretreatment<br/>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h at room condition*.</p> | Step | Temperature (°C) | 1 | Reference Temp. ±2 | 2 | Min. Operating Temp. ±3 | 3 | Reference Temp. ±2 | 4 | Max. Operating Temp. ±3 | 5 | Reference Temp. ±2 |
| Step | Temperature (°C)                           |                                                                                                              |                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 1    | Reference Temp. ±2                         |                                                                                                              |                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 2    | Min. Operating Temp. ±3                    |                                                                                                              |                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 3    | Reference Temp. ±2                         |                                                                                                              |                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 4    | Max. Operating Temp. ±3                    |                                                                                                              |                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 5    | Reference Temp. ±2                         |                                                                                                              |                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 8    | Vibration                                  | <div>Appearance</div> <div>Capacitance</div> <div>D.F.</div>                                                 | <div>No defects or abnormalities.</div> <div>Within the specified initial value.</div> <div>Within the specified initial value.</div>                                               | <p>Solder the capacitor on the test substrate A shown in “Complement of Test Method”.</p> <p>Kind of Vibration: A simple harmonic motion<br/>10Hz to 55Hz to 10Hz (1min)</p> <p>Total amplitude: 1.5mm<br/>This motion should be applied for a period of 2h in each 3 mutually perpendicular directions (total of 6h).</p>                                                                                                                                                                                                                                                                               |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 9    | Solderability                              |                                                                                                              | 95% of the terminations is to be soldered evenly and continuously.                                                                                                                  | <p>Test Method: Solder bath method<br/>Flux: Solution of rosin ethanol 25 (wt)%<br/>Preheat: 80 to 120°C for 10 to 30s<br/>Solder: Sn-3.0Ag-0.5Cu (Lead Free Solder)<br/>Solder Temp.: 245±5°C<br/>Immersion time: 2±0.5s<br/>Immersing in speed: 25±2.5mm/s.</p>                                                                                                                                                                                                                                                                                                                                        |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 10   | Resistance to Soldering Heat               | <div>Appearance</div> <div>Capacitance Change</div> <div>D.F.</div> <div>I.R.</div> <div>Voltage Proof</div> | <div>No defects or abnormalities.</div> <div>Within ±10%</div> <div>Within the specified initial value.</div> <div>Within the specified initial value.</div> <div>No defects.</div> | <p>Test Method: Solder bath method<br/>Solder: Sn-3.0Ag-0.5Cu (Lead Free Solder)<br/>Solder Temp.: 260±5°C<br/>Immersion time: 10±1s<br/>Immersing in speed: 25±2.5mm/s.<br/>Exposure Time: 24±2h at room condition*.<br/>Preheat: GR331 size max.: 120 to 150°C for 1min<br/>GR332 size min.: 100 to 120°C for 1min and 170 to 200°C for 1min</p> <p>• Pretreatment<br/>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h at room condition*.</p>                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 11   | Adhesive Strength of Termination           |                                                                                                              | No removal of the terminations or other defect should occur.                                                                                                                        | <p>Solder the capacitor on the test substrate A shown in “Complement of Test Method”.</p> <div></div> <p>Applied Direction: In parallel with the test substrate and vertical with the capacitor side.</p>                                                                                                                                                                                                                                                                                                            |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 12   | Substrate Bending Test                     |                                                                                                              | No defects or abnormalities.                                                                                                                                                        | <p>Solder the capacitor on the test substrate B shown in “Complement of Test Method”.</p> <p>Then apply the force in the direction shown in “Test Method of Substrate Bending Test” of “Complement of Test Method”.</p> <p>Flexure: 2mm<br/>Holding Time: 5±1s<br/>Soldering Method: Reflow soldering</p>                                                                                                                                                                                                                                                                                                |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |

\* Room Condition: Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. ↗

## GR3 Series Specifications and Test Methods (2)

Continued from the preceding page. ↘

| No                 | Item                                    |                    | Specification                                        | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|--------------------|-----------------------------------------|--------------------|------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|------------|---|----------------------------|------|---|------------|--------|---|----------------------------|------|---|------------|--------|
| 13                 | Temperature Sudden Change               | Appearance         | No defects or abnormalities.                         | <div>Fix the capacitor to the supporting Test substrate A (glass epoxy board) shown in “Complement of Test Method”.</div> <div>Perform the 5 cycles according to the four heat treatments shown in the following table.</div> <table><tr><th>Step</th><th>Temp. (°C)</th><th>Time (min)</th></tr><tr><td>1</td><td>Min. Operating Temp. +0/-3</td><td>30±3</td></tr><tr><td>2</td><td>Room Temp.</td><td>2 to 3</td></tr><tr><td>3</td><td>Max. Operating Temp. +3/-0</td><td>30±3</td></tr><tr><td>4</td><td>Room Temp.</td><td>2 to 3</td></tr></table> <div>Exposure Time: 24±2h at room condition*.</div> <div>• Pretreatment</div> <div>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h. at room condition *.</div> | Step       | Temp. (°C) | Time (min) | 1 | Min. Operating Temp. +0/-3 | 30±3 | 2 | Room Temp. | 2 to 3 | 3 | Max. Operating Temp. +3/-0 | 30±3 | 4 | Room Temp. | 2 to 3 |
|                    |                                         | Step               | Temp. (°C)                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Time (min) |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | 1                  | Min. Operating Temp. +0/-3                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 30±3       |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | 2                  | Room Temp.                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2 to 3     |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | 3                  | Max. Operating Temp. +3/-0                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 30±3       |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 4                  | Room Temp.                              | 2 to 3             |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Capacitance Change | Within ±7.5%                            |                    |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| D.F.               | Within the specified initial value.     |                    |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| I.R.               | Within the specified initial value.     |                    |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Voltage Proof      | No defects.                             |                    |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 14                 | High Temperature High Humidity (Steady) | Appearance         | No defects or abnormalities.                         | <div>Fix the capacitor to the supporting Test substrate A (glass epoxy board) shown in “Complement of Test Method”.</div> <div>Test Temperature: 40±2°C</div> <div>Test Humidity: 90 to 95%RH</div> <div>Test Time: 500+24/-0h</div> <div>Applied Voltage: DC450V (DC Rated Voltage)</div> <div>Exposure Time: 24±2h at room condition*.</div> <div>• Pretreatment</div> <div>Apply test voltage for 1h±5min at test temperature.</div> <div>Remove and let sit for 24±2h at room condition*.</div>                                                                                                                                                                                                                                                     |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | Capacitance Change | Within ±12.5%                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | D.F.               | 0.02 max.                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | I.R.               | More than 1000MΩ or 10MΩ • μF (Whichever is smaller) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | Voltage Proof      | No defects.                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 15                 | Durability                              | Appearance         | No defects or abnormalities.                         | <div>Fix the capacitor to the supporting Test substrate A (glass epoxy board) shown in “Complement of Test Method”.</div> <div>Test Temperature: Max. Operating Temp. ±3°C</div> <div>Test Time: 1000+48/-0h</div> <div>Applied Voltage: DC585V (130% of the rated voltage)</div> <div>Charge/discharge current: 50mA max.</div> <div>Exposure Time: 24±2h at room condition*.</div> <div>• Pretreatment</div> <div>Apply test voltage for 1h±5min at test temperature.</div> <div>Remove and let sit for 24±2h at room condition*.</div>                                                                                                                                                                                                               |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | Capacitance Change | Within ±12.5%                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | D.F.               | 0.02 max.                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | I.R.               | More than 1000MΩ or 10MΩ • μF (Whichever is smaller) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | Voltage Proof      | No defects.                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |

\* Room Condition: Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. ↗

GRM

GR3

GRJ

GR4

GR7

GJM

GQM

GA2

GA3 GB

GA3 GD

GA3 GF

LLL

LLA

LLM

LLR

NFM

KRM

KR3

GMA

GMD

⚠Caution /Notice

## GR3 Series Specifications and Test Methods (2)

Continued from the preceding page. ↘

### Complement of Test Method

#### 1. Test Substrate

The test substrate should be Substrate A or Substrate B as described in "Specifications and Test Methods".

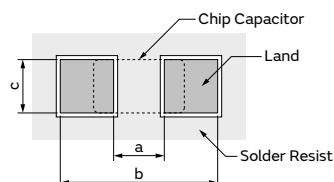
The specimen should be soldered by the conditions as described below.

Soldering Method: Reflow soldering

Solder: Sn-3.0Ag-0.5Cu

##### (1) Test Substrate A

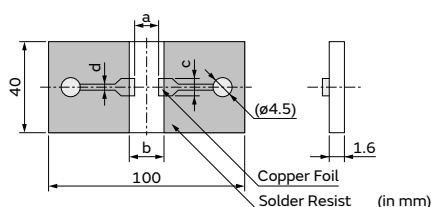
###### • Land Dimensions



- Material: Glass Epoxy Board
- Thickness: 1.6mm
- Thickness of Copper Foil: 0.035mm

| Part Number | Dimension (mm) |     |      |
|-------------|----------------|-----|------|
|             | a              | b   | c    |
| GR318       | 1.0            | 3.0 | 1.2  |
| GR321       | 1.2            | 4.0 | 1.65 |
| GR331       | 2.2            | 5.0 | 2.0  |
| GR332       | 2.2            | 5.0 | 2.9  |
| GR342       | 3.5            | 7.0 | 2.4  |
| GR343       | 3.5            | 7.0 | 3.7  |
| GR352       | 4.5            | 8.0 | 3.2  |
| GR355       | 4.5            | 8.0 | 5.6  |

##### (2) Test Substrate B

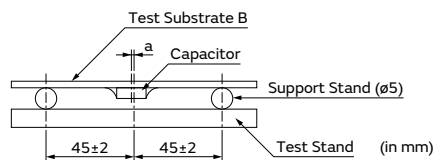


- Material: Glass Epoxy Board
- Thickness of Copper Foil: 0.035mm

| Part Number | Dimension (mm) |     |      |     |
|-------------|----------------|-----|------|-----|
|             | a              | b   | c    | d   |
| GR318       | 1.0            | 3.0 | 1.2  | 1.0 |
| GR321       | 1.2            | 4.0 | 1.65 | 1.0 |
| GR331       | 2.2            | 5.0 | 2.0  | 1.0 |
| GR332       | 2.2            | 5.0 | 2.9  | 1.0 |
| GR342       | 3.5            | 7.0 | 2.4  | 1.0 |
| GR343       | 3.5            | 7.0 | 3.7  | 1.0 |
| GR352       | 4.5            | 8.0 | 3.2  | 1.0 |
| GR355       | 4.5            | 8.0 | 5.6  | 1.0 |

#### 2. Test Method of Substrate Bending Test

##### (a) Support State



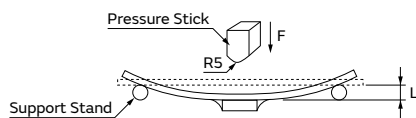
a: ±2 gap between support stand center and test stand

- Material of Test Stand and Pressure Stick

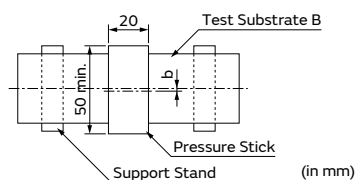
The material should be a metal where a remarkable transformation and the distortion are not caused even if it is pressurized.

- Pressurizing Speed

The pressurizing speed is pressurized at the speed of about 1mm/s until the flexure reaches a regulated value.



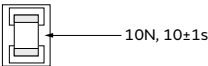
##### (b) Test State



b: ±5 gap between support stand center and test stand center

# 3

## GR3 Series Specifications and Test Methods (3)

| No   | Item                                       |                    | Specification                                                      | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|------|--------------------------------------------|--------------------|--------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------|---|--------------------|---|-------------------------|---|--------------------|---|-------------------------|---|--------------------|
| 1    | Appearance                                 |                    | No defects or abnormalities.                                       | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 2    | Dimension                                  |                    | Within the specified dimensions.                                   | Using calipers and micrometers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 3    | Voltage Proof                              |                    | No defects or abnormalities.                                       | Measurement Point: Between the terminations<br>Test Voltage: DC756V (120% of the rated voltage)<br>Applied Time: 1 to 5s<br>Charge/discharge current: 50mA max.                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 4    | Insulation Resistance (I.R.)               |                    | More than 10000MΩ or 100MΩ • μF<br>(Whichever is smaller)          | Measurement Point: Between the terminations<br>Measurement Voltage: DC500±50V<br>Charging Time: 60±5s<br>Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 5    | Capacitance                                |                    | Shown in Rated value.                                              | Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 6    | Dissipation Factor (D.F.)                  |                    | 0.01 max.                                                          | Measurement Frequency: 1.0±0.1kHz<br>Measurement Voltage: AC1.0±0.2V (r.m.s.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 7    | Temperature Characteristics of Capacitance |                    | D7: Within +22/-33% (-55 to +125°C)                                | <p>The capacitance change should be measured after 5 minutes at each specified temp. stage.<br/>Capacitance value as a reference is the value in step 3.</p> <table><tr><th>Step</th><th>Temperature (°C)</th></tr><tr><td>1</td><td>Reference Temp. ±2</td></tr><tr><td>2</td><td>Min. Operating Temp. ±3</td></tr><tr><td>3</td><td>Reference Temp. ±2</td></tr><tr><td>4</td><td>Max. Operating Temp. ±3</td></tr><tr><td>5</td><td>Reference Temp. ±2</td></tr></table> <p>• Pretreatment<br/>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h at room condition*.</p> | Step | Temperature (°C) | 1 | Reference Temp. ±2 | 2 | Min. Operating Temp. ±3 | 3 | Reference Temp. ±2 | 4 | Max. Operating Temp. ±3 | 5 | Reference Temp. ±2 |
| Step | Temperature (°C)                           |                    |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 1    | Reference Temp. ±2                         |                    |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 2    | Min. Operating Temp. ±3                    |                    |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 3    | Reference Temp. ±2                         |                    |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 4    | Max. Operating Temp. ±3                    |                    |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 5    | Reference Temp. ±2                         |                    |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 8    | Vibration                                  | Appearance         | No defects or abnormalities.                                       | <p>Solder the capacitor on the test substrate A shown in “Complement of Test Method”.</p> <p>Kind of Vibration: A simple harmonic motion<br/>10Hz to 55Hz to 10Hz (1min)</p> <p>Total amplitude: 1.5mm<br/>This motion should be applied for a period of 2h. in each 3 mutually perpendicular directions (total of 6h).</p>                                                                                                                                                                                                                                                                              |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | Capacitance        | Within the specified initial value.                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | D.F.               | Within the specified initial value.                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 9    | Solderability                              |                    | 95% of the terminations is to be soldered evenly and continuously. | <p>Test Method: Solder bath method<br/>Flux: Solution of rosin ethanol 25 (wt)%<br/>Preheat: 80 to 120°C for 10 to 30s<br/>Solder: Sn-3.0Ag-0.5Cu (Lead Free Solder)<br/>Solder Temp.: 245±5°C<br/>Immersion time: 2±0.5s<br/>Immersing in speed: 25±2.5mm/s.</p>                                                                                                                                                                                                                                                                                                                                        |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 10   | Resistance to Soldering Heat               | Appearance         | No defects or abnormalities.                                       | <p>Test Method: Solder bath method<br/>Solder: Sn-3.0Ag-0.5Cu (Lead Free Solder)<br/>Solder Temp.: 260±5°C<br/>Immersion time: 10±1s<br/>Immersing in speed: 25±2.5mm/s.<br/>Exposure Time: 24±2h at room condition*.<br/>Preheat: GR331 size max.: 120 to 150°C for 1min<br/>GR332 size min.: 100 to 120°C for 1min and 170 to 200°C for 1min</p> <p>• Pretreatment<br/>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h at room condition*.</p>                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | Capacitance Change | Within ±10%                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | D.F.               | Within the specified initial value.                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | I.R.               | Within the specified initial value.                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | Voltage Proof      | No defects.                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 11   | Adhesive Strength of Termination           |                    | No removal of the terminations or other defect should occur.       | <p>Solder the capacitor on the test substrate A shown in "Complement of Test Method".</p> <div></div> <p>Applied Direction: In parallel with the test substrate and vertical with the capacitor side.</p>                                                                                                                                                                                                                                                                                                            |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |

\* Room Condition: Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. ➤

## GR3 Series Specifications and Test Methods (3)

Continued from the preceding page. ↘

| No                 | Item                                    |                    | Specification                                        | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|--------------------|-----------------------------------------|--------------------|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|------------|---|----------------------------|------|---|------------|--------|---|----------------------------|------|---|------------|--------|
| 12                 | Substrate Bending Test                  |                    | No defects or abnormalities.                         | Solder the capacitor on the test substrate B shown in “Complement of Test Method”.<br>Then apply the force in the direction shown in “Test Method of Substrate Bending Test” of “Complement of Test Method”.<br>Flexure: 2mm<br>Holding Time: 5±1s<br>Soldering Method: Reflow soldering                                                                                                                                                                                                                                                                                                                                                                                                                     |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 13                 | Temperature Sudden Change               | Appearance         | No defects or abnormalities.                         | Fix the capacitor to the supporting Test substrate A (glass epoxy board) shown in “Complement of Test Method”.<br>Perform the 5 cycles according to the four heat treatments shown in the following table. <table><tr><th>Step</th><th>Temp. (°C)</th><th>Time (min)</th></tr><tr><td>1</td><td>Min. Operating Temp. +0/-3</td><td>30±3</td></tr><tr><td>2</td><td>Room Temp.</td><td>2 to 3</td></tr><tr><td>3</td><td>Max. Operating Temp. +3/-0</td><td>30±3</td></tr><tr><td>4</td><td>Room Temp.</td><td>2 to 3</td></tr></table><br>Exposure Time: 24±2h at room condition*.<br>• Pretreatment<br>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h. at room condition *. | Step       | Temp. (°C) | Time (min) | 1 | Min. Operating Temp. +0/-3 | 30±3 | 2 | Room Temp. | 2 to 3 | 3 | Max. Operating Temp. +3/-0 | 30±3 | 4 | Room Temp. | 2 to 3 |
|                    |                                         | Step               | Temp. (°C)                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Time (min) |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | 1                  | Min. Operating Temp. +0/-3                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 30±3       |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | 2                  | Room Temp.                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2 to 3     |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | 3                  | Max. Operating Temp. +3/-0                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 30±3       |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 4                  | Room Temp.                              | 2 to 3             |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Capacitance Change | Within ±7.5%                            |                    |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| D.F.               | Within the specified initial value.     |                    |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| I.R.               | Within the specified initial value.     |                    |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Voltage Proof      | No defects.                             |                    |                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 14                 | High Temperature High Humidity (Steady) | Appearance         | No defects or abnormalities.                         | Fix the capacitor to the supporting Test substrate A (glass epoxy board) shown in “Complement of Test Method”.<br>Test Temperature: 40±2°C<br>Test Humidity: 90 to 95%RH<br>Test Time: 500+24/-0h<br>Applied Voltage: DC630V (DC Rated Voltage)<br>Exposure Time: 24±2h at room condition*.<br>• Pretreatment<br>Apply test voltage for 1h±5min at test temperature.<br>Remove and let sit for 24±2h at room condition*.                                                                                                                                                                                                                                                                                     |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | Capacitance Change | Within ±12.5%                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | D.F.               | 0.02 max.                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | I.R.               | More than 1000MΩ or 10MΩ • μF (Whichever is smaller) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | Voltage Proof      | No defects.                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 15                 | Durability                              | Appearance         | No defects or abnormalities.                         | Fix the capacitor to the supporting Test substrate A (glass epoxy board) shown in “Complement of Test Method”.<br>Test Temperature: Max. Operating Temp. ±3°C<br>Test Time: 1000+48/-0h<br>Applied Voltage: DC756V (120% of the rated voltage)<br>Charge/discharge current: 50mA max.<br>Exposure Time: 24±2h at room condition*.<br>• Pretreatment<br>Apply test voltage for 1h±5min at test temperature.<br>Remove and let sit for 24±2h at room condition*.                                                                                                                                                                                                                                               |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | Capacitance Change | Within ±12.5%                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | D.F.               | 0.02 max.                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | I.R.               | More than 1000MΩ or 10MΩ • μF (Whichever is smaller) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | Voltage Proof      | No defects.                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |

\* Room Condition: Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. ↗

## GR3 Series Specifications and Test Methods (3)

Continued from the preceding page. ↘

### Complement of Test Method

#### 1. Test Substrate

The test substrate should be Substrate A or Substrate B as described in "Specifications and Test Methods".

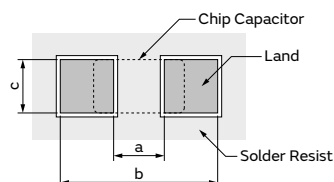
The specimen should be soldered by the conditions as described below.

Soldering Method: Reflow soldering

Solder: Sn-3.0Ag-0.5Cu

##### (1) Test Substrate A

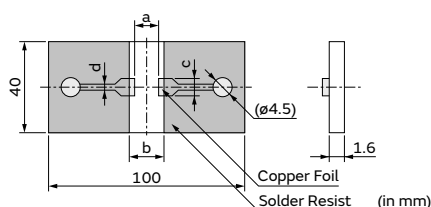
###### • Land Dimensions



- Material: Glass Epoxy Board
- Thickness: 1.6mm
- Thickness of Copper Foil: 0.035mm

| Part Number | Dimension (mm) |     |      |
|-------------|----------------|-----|------|
|             | a              | b   | c    |
| GR318       | 1.0            | 3.0 | 1.2  |
| GR321       | 1.2            | 4.0 | 1.65 |
| GR331       | 2.2            | 5.0 | 2.0  |
| GR332       | 2.2            | 5.0 | 2.9  |
| GR342       | 3.5            | 7.0 | 2.4  |
| GR343       | 3.5            | 7.0 | 3.7  |
| GR352       | 4.5            | 8.0 | 3.2  |
| GR355       | 4.5            | 8.0 | 5.6  |

##### (2) Test Substrate B

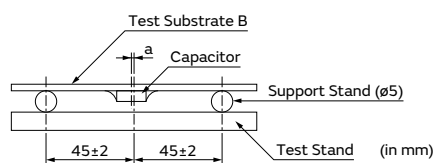


- Material: Glass Epoxy Board
- Thickness of Copper Foil: 0.035mm

| Part Number | Dimension (mm) |     |      |     |
|-------------|----------------|-----|------|-----|
|             | a              | b   | c    | d   |
| GR318       | 1.0            | 3.0 | 1.2  | 1.0 |
| GR321       | 1.2            | 4.0 | 1.65 | 1.0 |
| GR331       | 2.2            | 5.0 | 2.0  | 1.0 |
| GR332       | 2.2            | 5.0 | 2.9  | 1.0 |
| GR342       | 3.5            | 7.0 | 2.4  | 1.0 |
| GR343       | 3.5            | 7.0 | 3.7  | 1.0 |
| GR352       | 4.5            | 8.0 | 3.2  | 1.0 |
| GR355       | 4.5            | 8.0 | 5.6  | 1.0 |

#### 2. Test Method of Substrate Bending Test

##### (a) Support State



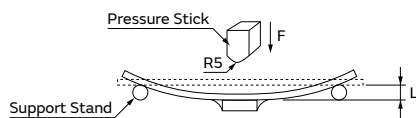
a: ±2 gap between support stand center and test stand

- Material of Test Stand and Pressure Stick

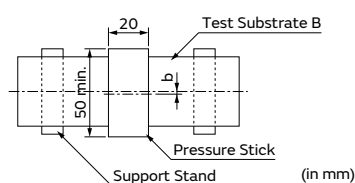
The material should be a metal where a remarkable transformation and the distortion are not caused even if it is pressurized.

- Pressurizing Speed

The pressurizing speed is pressurized at the speed of about 1mm/s until the flexure reaches a regulated value.



##### (b) Test State



b: ±5 gap between support stand center and test stand center

GRM

GR3

GRJ

GR4

GR7

GJM

GQM

GA2

GA3

GA3

GA3

GA3

LL

LLA

LLM

LLR

NFM

KRM

KR3

GMA

GMD

⚠Caution / Notice

## Soft Termination Chip Multilayer Ceramic Capacitors for General Purpose

# GRJ Series

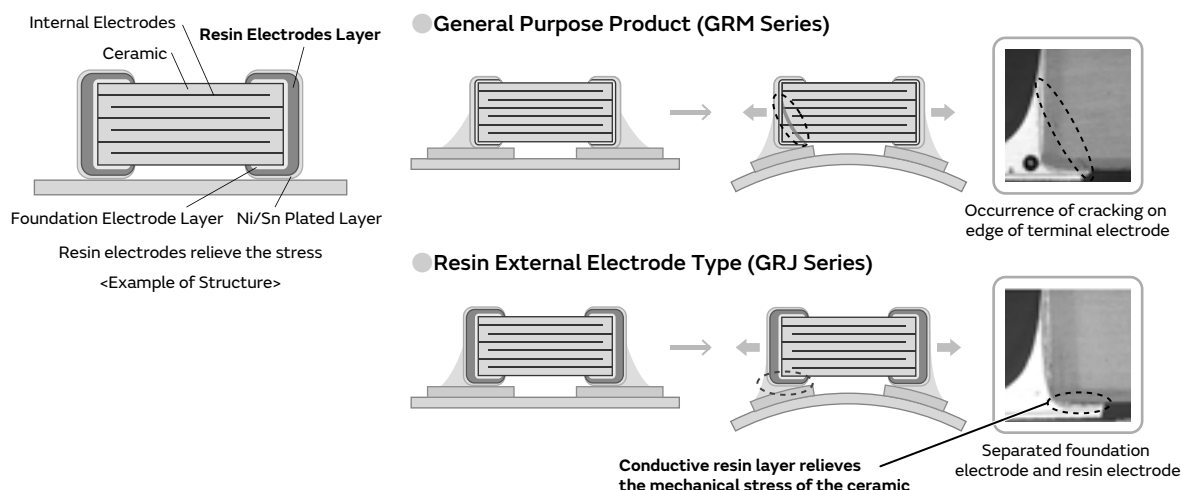


**Cracking caused by flexing stress after board mounting is minimized due to resin external electrodes!**

## Features

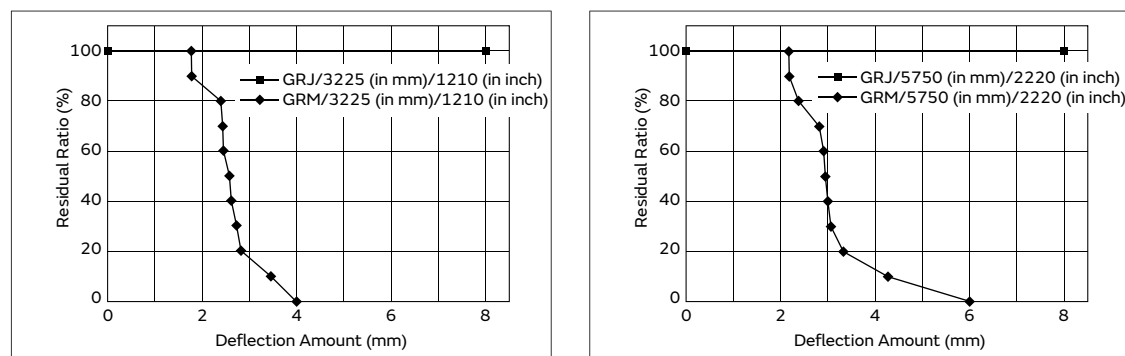
### ① The resin external electrodes suppress cracks by board deflection.

Cracking of the ceramic element is suppressed by the resin of the external electrodes, which releases the stress.



Note: Cracks may occur in the capacitor body if excessive stress beyond the "guaranteed range of board bending strength (\*)" provided in the specifications is applied. Capacitors with cracks in them may cause a drop in insulation resistance, which could lead to a short circuit.  
(\*) For details on the guaranteed range of board bending strength, check the "Detailed Specification Sheet" on the Product Details Page.

### ② Suppresses the occurrence of cracking caused by deflection stress at the time of board mounting, etc.

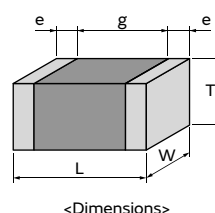


Due to the specification of the measuring instrument, measurements can be performed up to 8mm.

### ③ Ideal for consumer and industrial electronic equipment, etc. where there heat stress, vibration and impact are applied.

## Specifications

|                   |                                            |
|-------------------|--------------------------------------------|
| Size (mm)         | 0.6×0.3mm to 5.7×5.0mm                     |
| Rated Voltage     | 6.3Vdc to 1000Vdc                          |
| Capacitance       | 220pF to 47μF                              |
| Main Applications | Consumer & Industrial Electronic Equipment |



This catalog contains only a portion of the product lineup.  
Please refer to the capacitor search tool on the Murata Web site for details.

# GRJ Series High Dielectric Constant Type Part Number List

## 1.6×0.8mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |  |
|--------|---------------|---------|---------|------|--------------------|--|
| 0.9mm  | 100Vdc        | X7R     | 1000pF  | ±10% | GRJ188R72A102KE11# |  |
|        |               |         |         | ±20% | GRJ188R72A102ME11# |  |
|        |               |         | 2200pF  | ±10% | GRJ188R72A222KE11# |  |
|        |               |         |         | ±20% | GRJ188R72A222ME11# |  |
|        |               |         | 4700pF  | ±10% | GRJ188R72A472KE11# |  |
|        |               |         |         | ±20% | GRJ188R72A472ME11# |  |
|        |               |         | 10000pF | ±10% | GRJ188R72A103KE11# |  |
|        |               |         |         | ±20% | GRJ188R72A103ME11# |  |
|        |               |         | 22000pF | ±10% | GRJ188R72A223KE11# |  |
|        |               |         |         | ±20% | GRJ188R72A223ME11# |  |
|        |               |         | 0.10μF  | ±10% | GRJ188R72A104KE11# |  |
|        |               |         |         | ±20% | GRJ188R72A104ME11# |  |
|        | 50Vdc         | X7R     | 1000pF  | ±10% | GRJ188R71H102KE11# |  |
|        |               |         |         | ±20% | GRJ188R71H102ME11# |  |
|        |               |         | 2200pF  | ±10% | GRJ188R71H222KE11# |  |
|        |               |         |         | ±20% | GRJ188R71H222ME11# |  |
|        |               |         | 4700pF  | ±10% | GRJ188R71H472KE11# |  |
|        |               |         |         | ±20% | GRJ188R71H472ME11# |  |
|        |               |         | 10000pF | ±10% | GRJ188R71H103KE11# |  |
|        |               |         |         | ±20% | GRJ188R71H103ME11# |  |
|        |               |         | 22000pF | ±10% | GRJ188R71H223KE11# |  |
|        |               |         |         | ±20% | GRJ188R71H223ME11# |  |
|        |               |         | 47000pF | ±10% | GRJ188R71H473KE11# |  |
|        |               |         |         | ±20% | GRJ188R71H473ME11# |  |
|        | 35Vdc         | X5R     | 1.0μF   | ±10% | GRJ188R6YA105KE11# |  |
|        |               |         |         | ±20% | GRJ188R6YA105ME11# |  |
|        |               |         | 2.2μF   | ±10% | GRJ188R70J225KE11# |  |
|        |               |         |         | ±20% | GRJ188R70J225ME11# |  |
|        | 25Vdc         | X7R     | 47000pF | ±10% | GRJ188R71E473KE11# |  |
|        |               |         |         | ±20% | GRJ188R71E473ME11# |  |
|        |               |         | 0.22μF  | ±10% | GRJ188R71E224KE11# |  |
|        |               |         |         | ±20% | GRJ188R71E224ME11# |  |
|        | 16Vdc         | X7R     | 0.47μF  | ±10% | GRJ188R71C474KE11# |  |
|        |               |         |         | ±20% | GRJ188R71C474ME11# |  |
|        |               |         | 2.2μF   | ±10% | GRJ188R70J225KE11# |  |
|        |               |         |         | ±20% | GRJ188R70J225ME11# |  |
| 1.0mm  | 6.3Vdc        | X7S     | 4.7μF   | ±10% | GRJ188C70J475KE11# |  |
|        |               |         |         | ±20% | GRJ188C70J475ME11# |  |

## 2.0×1.25mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number        |  |
|--------|---------------|---------|--------|------|--------------------|--|
| 0.7mm  | 100Vdc        | X7R     | 1000pF | ±10% | GRJ216R72A102KE01# |  |
|        |               |         |        | ±20% | GRJ216R72A102ME01# |  |
|        |               |         | 2200pF | ±10% | GRJ216R72A222KE01# |  |
|        |               |         |        | ±20% | GRJ216R72A222ME01# |  |
|        |               |         | 4700pF | ±10% | GRJ216R72A472KE01# |  |
|        |               |         |        | ±20% | GRJ216R72A472ME01# |  |
|        |               |         |        | ±10% | GRJ216R72A103KE01# |  |
|        |               |         |        | ±20% | GRJ216R72A103ME01# |  |

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |  |
|--------|---------------|---------|---------|------|--------------------|--|
| 0.7mm  | 100Vdc        | X7R     | 10000pF | ±10% | GRJ216R72A103KE01# |  |
|        |               |         |         | ±20% | GRJ216R72A103ME01# |  |
|        |               |         | 22000pF | ±10% | GRJ216R72A223KE01# |  |
|        |               |         |         | ±20% | GRJ216R72A223ME01# |  |
|        |               |         | 470pF   | ±10% | GRJ216R71H471KE01# |  |
|        |               |         |         | ±20% | GRJ216R71H471ME01# |  |
|        | 50Vdc         | X7R     | 1000pF  | ±10% | GRJ216R71H102KE01# |  |
|        |               |         |         | ±20% | GRJ216R71H102ME01# |  |
|        |               |         | 2200pF  | ±10% | GRJ216R71H222KE01# |  |
|        |               |         |         | ±20% | GRJ216R71H222ME01# |  |
|        |               |         | 4700pF  | ±10% | GRJ216R71H472KE01# |  |
|        |               |         |         | ±20% | GRJ216R71H472ME01# |  |
| 0.95mm | 100Vdc        | X7R     | 220pF   | ±10% | GRJ219R72A221KE01# |  |
|        |               |         |         | ±20% | GRJ219R72A221ME01# |  |
|        |               |         | 470pF   | ±10% | GRJ219R72A471KE01# |  |
|        |               |         |         | ±20% | GRJ219R72A471ME01# |  |
|        | 250Vdc        | X7R     | 1000pF  | ±10% | GRJ21AR72E102KWJ1# |  |
|        |               |         |         | ±10% | GRJ21AR72E152KWJ1# |  |
|        |               |         | 2200pF  | ±10% | GRJ21AR72E222KWJ1# |  |
|        |               |         |         | ±10% | GRJ21AR72E332KWJ1# |  |
|        |               |         | 4700pF  | ±10% | GRJ21AR72E472KWJ1# |  |
|        |               |         |         | ±10% | GRJ21AR72E682KWJ1# |  |
| 1.45mm | 250Vdc        | X7R     | 10000pF | ±10% | GRJ21BR72E103KWJ3# |  |
|        |               |         |         | ±10% | GRJ21BR72E153KWJ3# |  |
|        |               |         | 15000pF | ±10% | GRJ21BR72E223KWJ3# |  |
|        |               |         |         | ±10% | GRJ21BR72E223KWJ3# |  |
|        |               |         | 22000pF | ±10% | GRJ21BR72E223KWJ3# |  |
|        |               |         |         | ±10% | GRJ21BR72E223KWJ3# |  |
|        | 100Vdc        | X7R     | 47000pF | ±10% | GRJ21BR72A473KE01# |  |
|        |               |         |         | ±20% | GRJ21BR72A473ME01# |  |
|        |               |         | 0.10μF  | ±10% | GRJ21BR72A104KE01# |  |
|        |               |         |         | ±20% | GRJ21BR72A104ME01# |  |
|        |               |         | 0.22μF  | ±10% | GRJ21BR71H473KE01# |  |
|        |               |         |         | ±20% | GRJ21BR71H473ME01# |  |
|        | 50Vdc         | X7R     | 47000pF | ±10% | GRJ21BR71H473KE01# |  |
|        |               |         |         | ±20% | GRJ21BR71H473ME01# |  |
|        |               |         | 0.10μF  | ±10% | GRJ21BR71H104KE01# |  |
|        |               |         |         | ±20% | GRJ21BR71H104ME01# |  |
|        |               |         | 0.22μF  | ±10% | GRJ21BR71H224KE01# |  |
|        |               |         |         | ±20% | GRJ21BR71H224ME01# |  |
|        | 25Vdc         | X7R     | 1.0μF   | ±10% | GRJ21BR71E105KE11# |  |
|        |               |         |         | ±20% | GRJ21BR71E105ME11# |  |
|        |               |         | 2.2μF   | ±10% | GRJ21BR71E225KE01# |  |
|        |               |         |         | ±20% | GRJ21BR71E225ME01# |  |
|        |               |         | 4.7μF   | ±10% | GRJ21BR71C475KE01# |  |
|        |               |         |         | ±20% | GRJ21BR71C475ME01# |  |
| 1.5mm  | 10Vdc         | X7R     | 10μF    | ±10% | GRJ21BR71A106KE01# |  |
|        |               |         |         | ±20% | GRJ21BR71A106ME01# |  |
|        |               |         | 100μF   | ±10% | GRJ21BR71A106KE01# |  |
|        |               |         |         | ±20% | GRJ21BR71A106ME01# |  |
|        | 100Vdc        | X7S     | 1.0μF   | ±10% | GRJ21BC72A105KE11# |  |
|        |               |         |         | ±20% | GRJ21BC72A105ME11# |  |
|        |               |         | 10μF    | ±10% | GRJ21BC72A105KE11# |  |
|        |               |         |         | ±20% | GRJ21BC72A105ME11# |  |

Part number # indicates the package specification code.

# GRJ Series High Dielectric Constant Type Part Number List

## 3.2×1.6mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |    |
|--------|---------------|---------|---------|------|--------------------|----|
| 0.95mm | 100Vdc        | X7R     | 0.10μF  | ±10% | GRJ319R72A104KE11# |    |
|        |               |         |         | ±20% | GRJ319R72A104ME11# |    |
|        | 50Vdc         | X7R     | 0.10μF  | ±10% | GRJ319R71H104KE11# |    |
|        |               |         |         | ±20% | GRJ319R71H104ME11# |    |
|        | 1.25mm        | X7R     | 470pF   | ±10% | GRJ31BR73A471KWJ1# |    |
|        |               |         |         | ±10% | GRJ31BR73A681KWJ1# |    |
|        |               |         |         | ±10% | GRJ31BR73A102KWJ1# |    |
|        |               |         |         | ±10% | GRJ31BR73A152KWJ1# |    |
|        |               |         |         | ±10% | GRJ31BR73A222KWJ1# |    |
|        |               |         |         | ±10% | GRJ31BR73A332KWJ1# |    |
|        |               |         |         | ±10% | GRJ31BR73A472KWJ1# |    |
|        |               |         |         | ±10% | GRJ31BR72J102KWJ1# |    |
| 1.35mm | 630Vdc        | X7R     | 1000pF  | ±10% | GRJ31BR72J152KWJ1# |    |
|        |               |         |         | ±10% | GRJ31BR72J222KWJ1# |    |
|        |               |         |         | ±10% | GRJ31BR72J332KWJ1# |    |
|        |               |         |         | ±10% | GRJ31BR72J472KWJ1# |    |
|        |               |         |         | ±10% | GRJ31BR72J682KWJ1# |    |
|        |               |         |         | ±10% | GRJ31BR72J103KWJ1# |    |
|        |               |         |         | ±10% | GRJ31BR72E153KWJ1# |    |
|        |               |         |         | ±10% | GRJ31BR72E223KWJ1# |    |
|        | 250Vdc        | X7R     | 15000pF | ±10% | GRJ31BR72E683KWJ1# |    |
|        |               |         |         | ±10% | GRJ31BR72E683KWJ1# |    |
|        |               |         |         | ±10% | GRJ31MR72A224KE01# |    |
|        |               |         |         | ±20% | GRJ31MR72A224ME01# |    |
|        | 50Vdc         | X7R     | 0.10μF  | ±10% | GRJ31MR71H104KE01# |    |
|        |               |         |         | ±20% | GRJ31MR71H104ME01# |    |
|        |               |         |         | ±10% | GRJ31MR71H224KE01# |    |
|        |               |         |         | ±20% | GRJ31MR71H224ME01# |    |
|        |               |         |         | ±10% | GRJ31MR71H474KE01# |    |
|        |               |         |         | ±20% | GRJ31MR71H474ME01# |    |
|        |               |         |         | ±10% | GRJ31MR71H105KE01# |    |
|        |               |         |         | ±20% | GRJ31MR71H105ME01# |    |
|        | 25Vdc         | X7R     | 2.2μF   | ±10% | GRJ31MR71E225KE11# |    |
|        |               |         |         | ±20% | GRJ31MR71E225ME11# |    |
|        | 16Vdc         | X7R     | 2.2μF   | ±10% | GRJ31MR71C225KE11# |    |
|        |               |         |         | ±20% | GRJ31MR71C225ME11# |    |
| 1.8mm  | 1000Vdc       | X7R     | 6800pF  | ±10% | GRJ31CR73A682KWJ3# |    |
|        |               |         |         | ±10% | GRJ31CR73A103KWJ3# |    |
|        | 630Vdc        | X7R     | 15000pF | ±10% | GRJ31CR72J153KWJ3# |    |
|        |               |         |         | ±10% | GRJ31CR72J223KWJ3# |    |
|        | 250Vdc        | X7R     | 33000pF | ±10% | GRJ31CR72E333KWJ3# |    |
|        |               |         |         | ±10% | GRJ31CR72E473KWJ3# |    |
|        |               |         |         | ±10% | GRJ31CR72E104KWJ3# |    |
|        |               |         |         | ±10% | GRJ31CR72A105KE11# |    |
|        | 50Vdc         | X7R     | 1.0μF   | ±10% | GRJ31CR71H105KE11# |    |
|        |               |         |         | ±20% | GRJ31CR71H105ME11# |    |
| 1.9mm  | 100Vdc        | X7R     | 1.0μF   | ±10% | GRJ31CR71H225KE11# |    |
|        |               |         |         | ±20% | GRJ31CR71H225ME11# |    |
|        |               |         |         | ±10% | GRJ31CR71H475KE11# |    |
|        |               |         |         | ±20% | GRJ31CR71H475ME11# |    |
|        | 50Vdc         | X7R     | 1.0μF   | ±10% | GRJ31CC8YA106KE01# | D1 |
|        |               |         |         | ±20% | GRJ31CC8YA106ME01# | D1 |
|        |               |         |         | ±10% | GRJ31CC8YA106KE01# |    |
|        |               |         |         | ±20% | GRJ31CC8YA106ME01# |    |
|        |               |         |         | ±10% | GRJ31CC8YA106KE01# |    |
|        |               |         |         | ±20% | GRJ31CC8YA106ME01# |    |

| T max. | Rated Voltage | TC Code | Cap.  | Tol. | Part Number        |  |
|--------|---------------|---------|-------|------|--------------------|--|
| 1.9mm  | 25Vdc         | X7R     | 10μF  | ±10% | GRJ31CR71E106KE11# |  |
|        |               |         |       | ±20% | GRJ31CR71E106ME11# |  |
|        | 16Vdc         | X7R     | 4.7μF | ±10% | GRJ31CR71C475KE11# |  |
|        |               |         |       | ±20% | GRJ31CR71C475ME11# |  |
|        |               |         | 10μF  | ±10% | GRJ31CR71C106KE11# |  |
|        |               |         |       | ±20% | GRJ31CR71C106ME11# |  |
|        | 10Vdc         | X7R     | 10μF  | ±10% | GRJ31CR71A106KE11# |  |
|        |               |         |       | ±20% | GRJ31CR71A106ME11# |  |
|        |               |         | 22μF  | ±10% | GRJ31CR71A226KE12# |  |
|        |               |         |       | ±20% | GRJ31CR71A226ME12# |  |
|        | 6.3Vdc        | X7R     | 22μF  | ±10% | GRJ31CR70J226KE12# |  |
|        |               |         |       | ±20% | GRJ31CR70J226ME12# |  |

## 3.2×2.5mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |  |
|--------|---------------|---------|---------|------|--------------------|--|
| 1.5mm  | 1000Vdc       | X7R     | 6800pF  | ±10% | GRJ32QR73A682KWJ1# |  |
|        |               |         |         | ±10% | GRJ32QR73A103KWJ1# |  |
|        | 630Vdc        | X7R     | 22000pF | ±10% | GRJ32QR72J223KWJ1# |  |
|        |               |         |         | ±10% | GRJ32QR72E683KWJ1# |  |
|        | 250Vdc        | X7R     | 0.15μF  | ±10% | GRJ32QR72E154KWJ1# |  |
|        |               |         |         | ±10% | GRJ32QR72E154KWJ1# |  |
| 2.0mm  | 1000Vdc       | X7R     | 15000pF | ±10% | GRJ32DR73A153KWJ1# |  |
|        |               |         |         | ±10% | GRJ32DR73A223KWJ1# |  |
|        | 630Vdc        | X7R     | 33000pF | ±10% | GRJ32DR72J333KWJ1# |  |
|        |               |         |         | ±10% | GRJ32DR72J473KWJ1# |  |
|        | 250Vdc        | X7R     | 0.10μF  | ±10% | GRJ32DR72E104KWJ1# |  |
|        |               |         |         | ±10% | GRJ32DR72E224KWJ1# |  |
| 2.3mm  | 100Vdc        | X7R     | 2.2μF   | ±10% | GRJ32DR72A225KE11# |  |
|        |               |         |         | ±20% | GRJ32DR72A225ME11# |  |
|        |               | X7S     | 4.7μF   | ±10% | GRJ32DC72A475KE11# |  |
|        |               |         |         | ±20% | GRJ32DC72A475ME11# |  |
|        | 50Vdc         | X7R     | 4.7μF   | ±10% | GRJ32ER71H475KE11# |  |
|        |               |         |         | ±20% | GRJ32ER71H475ME11# |  |
| 2.8mm  | 10μF          | X7R     | 10μF    | ±10% | GRJ32ER71H106KE11# |  |
|        |               |         |         | ±20% | GRJ32ER71H106ME11# |  |
|        | X7S           | 10μF    | 10μF    | ±10% | GRJ32EC71H106KE11# |  |
|        |               |         |         | ±20% | GRJ32EC71H106ME11# |  |
|        | 25Vdc         | X7R     | 10μF    | ±10% | GRJ32ER71E106KE11# |  |
|        |               |         |         | ±20% | GRJ32ER71E106ME11# |  |
|        | 16Vdc         | X7R     | 22μF    | ±10% | GRJ32ER71C226KE11# |  |
|        |               |         |         | ±20% | GRJ32ER71C226ME11# |  |
|        | 10Vdc         | X7R     | 22μF    | ±10% | GRJ32ER71A226KE11# |  |
|        |               |         |         | ±20% | GRJ32ER71A226ME11# |  |
|        |               |         | 47μF    | ±10% | GRJ32ER71A476KE11# |  |
|        |               |         |         | ±20% | GRJ32ER71A476ME11# |  |
| 2.85mm | 25Vdc         | X7S     | 22μF    | ±10% | GRJ32ER70J476KE11# |  |
|        |               |         |         | ±20% | GRJ32ER70J476ME11# |  |

Part number # indicates the package specification code.

## GRJ Series High Dielectric Constant Type Part Number List

### 4.5×3.2mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |  |
|--------|---------------|---------|---------|------|--------------------|--|
| 1.5mm  | 630Vdc        | X7R     | 68000pF | ±10% | GRJ43QR72J683KWJ1# |  |
|        | 250Vdc        | X7R     | 0.15μF  | ±10% | GRJ43QR72E154KWJ1# |  |
| 2.0mm  | 1000Vdc       | X7R     | 33000pF | ±10% | GRJ43DR73A333KWJ1# |  |
|        |               |         | 47000pF | ±10% | GRJ43DR73A473KWJ1# |  |
|        | 630Vdc        | X7R     | 0.10μF  | ±10% | GRJ43DR72J104KWJ1# |  |
|        | 250Vdc        | X7R     | 0.22μF  | ±10% | GRJ43DR72E224KWJ1# |  |
|        |               |         | 0.33μF  | ±10% | GRJ43DR72E334KWJ1# |  |
|        |               |         | 0.47μF  | ±10% | GRJ43DR72E474KWJ1# |  |

### 5.7×5.0mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |  |
|--------|---------------|---------|---------|------|--------------------|--|
| 2.0mm  | 1000Vdc       | X7R     | 68000pF | ±10% | GRJ55DR73A683KWJ1# |  |
|        |               |         | 0.10μF  | ±10% | GRJ55DR73A104KWJ1# |  |
|        | 630Vdc        | X7R     | 0.15μF  | ±10% | GRJ55DR72J154KWJ1# |  |
|        |               |         | 0.22μF  | ±10% | GRJ55DR72J224KWJ1# |  |
|        | 250Vdc        | X7R     | 0.33μF  | ±10% | GRJ55DR72E334KWJ1# |  |
|        |               |         | 0.47μF  | ±10% | GRJ55DR72E474KWJ1# |  |
|        |               |         | 0.68μF  | ±10% | GRJ55DR72E684KWJ1# |  |
|        |               |         | 1.0μF   | ±10% | GRJ55DR72E105KWJ1# |  |

## GRJ Series Specifications and Test Methods

Specifications and Test Methods, please refer to the search web page.  
<https://www.murata.com/en-global/products/capacitor>

### GRJ Series High Dielectric Constant Type

1.6×0.8mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |
|--------|---------------|---------|---------|------|--------------------|
| 0.9mm  | 100Vdc        | X7R     | 1000pF  | ±10% | GRJ188R72A102KE11# |
|        |               |         |         | ±20% | GRJ188R72A102ME11# |
|        |               |         | 2200pF  | ±10% | GRJ188R72A222KE11# |
|        |               |         |         | ±20% | GRJ188R72A222ME11# |
|        |               |         | 4700pF  | ±10% | GRJ188R72A472KE11# |
|        |               |         |         | ±20% | GRJ188R72A472ME11# |
|        |               |         | 10000pF | ±10% | GRJ188R72A103KE11# |
|        |               |         |         | ±20% | GRJ188R72A103ME11# |

Links are provided to the product detail pages on the web, and are shown below in the product number table from the PDF version of the catalog which is available on the web.

Self Termination Chip Multilayer Ceramic Capacitors for General Purpose

→ Please refer to the introduction using symbols. → Continue about introduction.

GRJ188C70J475KE11# → indicates package, specification code.

→ Click on the part numbers with package codes → GRJ188C70J475KE11# → GRJ188C70J475KE11#

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### Detailed Specifications Sheet

- Rated value
- Specifications and Test Methods
- Package
- Caution, Notice

### Specifications and Test Methods

# Specifications and Test Methods

| No                   | Item                                       | Specification                                                                                                                                                                                                                                                                                                                              | Test Method<br>(Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             |                 |                       |                     |                      |               |                      |              |                 |          |            |               |
|----------------------|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------------|-----------------------|---------------------|----------------------|---------------|----------------------|--------------|-----------------|----------|------------|---------------|
| 1                    | Rated Voltage                              | Shown in Rated value.                                                                                                                                                                                                                                                                                                                      | The rated voltage is defined as the maximum voltage which may be applied continuously to the capacitor. When AC voltage is superimposed on DC voltage, $V^{P-P}$ or $V^{Q-P}$ , whichever is larger, should be maintained within the rated voltage range.                                                                                                                                                                                                                                                                        |             |                 |                       |                     |                      |               |                      |              |                 |          |            |               |
| 2                    | Appearance                                 | No defects or abnormalities.                                                                                                                                                                                                                                                                                                               | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                 |                       |                     |                      |               |                      |              |                 |          |            |               |
| 3                    | Dimension                                  | Within the specified dimensions.                                                                                                                                                                                                                                                                                                           | Using Measuring instrument of dimension.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |                 |                       |                     |                      |               |                      |              |                 |          |            |               |
| 4                    | Voltage proof                              | No defects or abnormalities.                                                                                                                                                                                                                                                                                                               | Measurement Point : Between the terminations<br>Test Voltage : 250% of the rated voltage<br>Applied Time : 1 to 5 s<br>Charge/discharge current : 50mA max.                                                                                                                                                                                                                                                                                                                                                                      |             |                 |                       |                     |                      |               |                      |              |                 |          |            |               |
| 5                    | Insulation Resistance(I.R.)                | More than 2000MΩ or 50Ω · F (Whichever is smaller)                                                                                                                                                                                                                                                                                         | Measurement Point : Between the terminations<br>Measurement Voltage : DC Rated Voltage<br>Charging Time : 1 min<br>Charge/discharge current : 50mA max.<br>Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                             |             |                 |                       |                     |                      |               |                      |              |                 |          |            |               |
| 6                    | Capacitance                                | Shown in Rated value.                                                                                                                                                                                                                                                                                                                      | Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |                 |                       |                     |                      |               |                      |              |                 |          |            |               |
| 7                    | Dissipation Factor (D.F.)                  | B1,R1,B3,R6,R7,C6,C7,C8,D7 : 0.1 max.<br>D8 : 0.15 max                                                                                                                                                                                                                                                                                     | <table> <tr> <th>Capacitance</th> <th>Frequency</th> <th>Voltage</th> </tr> <tr> <td>C ≤ 10μF (10V min.)</td> <td>1.0+/-0.1kHz</td> <td>1.0+/-0.2Vrms</td> </tr> <tr> <td>C ≤ 10μF (6.3V max.)</td> <td>1.0+/-0.1kHz</td> <td>0.5+/-0.1Vrms *</td> </tr> <tr> <td>C &gt; 10μF</td> <td>120+/-24Hz</td> <td>0.5+/-0.1Vrms</td> </tr> </table> <p>* For item GRJ188C70J475, the capacitance should be measured using a voltage of 1.0+/-0.2Vrms instead of 0.5+/-0.1Vrms.</p>                                                      | Capacitance | Frequency       | Voltage               | C ≤ 10μF (10V min.) | 1.0+/-0.1kHz         | 1.0+/-0.2Vrms | C ≤ 10μF (6.3V max.) | 1.0+/-0.1kHz | 0.5+/-0.1Vrms * | C > 10μF | 120+/-24Hz | 0.5+/-0.1Vrms |
| Capacitance          | Frequency                                  | Voltage                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |                 |                       |                     |                      |               |                      |              |                 |          |            |               |
| C ≤ 10μF (10V min.)  | 1.0+/-0.1kHz                               | 1.0+/-0.2Vrms                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |                 |                       |                     |                      |               |                      |              |                 |          |            |               |
| C ≤ 10μF (6.3V max.) | 1.0+/-0.1kHz                               | 0.5+/-0.1Vrms *                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |                 |                       |                     |                      |               |                      |              |                 |          |            |               |
| C > 10μF             | 120+/-24Hz                                 | 0.5+/-0.1Vrms                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |                 |                       |                     |                      |               |                      |              |                 |          |            |               |
| 8                    | Temperature Characteristics of Capacitance | No bias<br>B1,B3 : Within +/-10% (-25°C to +85°C)<br>R1,R7 : Within +/-15% (-55°C to +125°C)<br>R6 : Within +/-15% (-55°C to +85°C)<br>C6 : Within +/-22% (-55°C to +85°C)<br>C7 : Within +/-22% (-55°C to +125°C)<br>C8 : Within +/-22% (-55°C to +105°C)<br>D7 : Within +/-22% (-55°C to +125°C)<br>D8 : Within +/-22% (-55°C to +105°C) | <p>The capacitance change should be measured after 5 min. at each specified temp. stage.</p> <p>In case of applying voltage, the capacitance change should be measured after 1 min. with applying voltage in equilibration of each temp. stage.</p> <p>Capacitance value as a reference is the value in step 3.</p> <p>Measurement Voltage : 0.20+/-0.05Vrms</p> <table> <tr> <th>Step</th> <th>Temperature(°C)</th> <th>Applying Voltage(VDC)</th> </tr> <tr> <td>1</td> <td>Reference Temp. +/-2</td> <td></td> </tr> </table> | Step        | Temperature(°C) | Applying Voltage(VDC) | 1                   | Reference Temp. +/-2 |               |                      |              |                 |          |            |               |
| Step                 | Temperature(°C)                            | Applying Voltage(VDC)                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |                 |                       |                     |                      |               |                      |              |                 |          |            |               |
| 1                    | Reference Temp. +/-2                       |                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |                 |                       |                     |                      |               |                      |              |                 |          |            |               |

Chip Multilayer Ceramic Capacitors for Ethernet LAN and Primary-secondary Coupling of DC-DC Converters

## GR4 Series



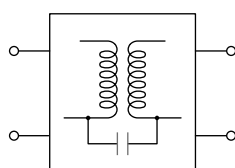
Size (L\*W) : 4.5x2.0mm - 5.7x5.0mm / X7R Char. / DC2kV

Realized large capacity and small size while maintaining high withstand voltages by the multilayer structure.

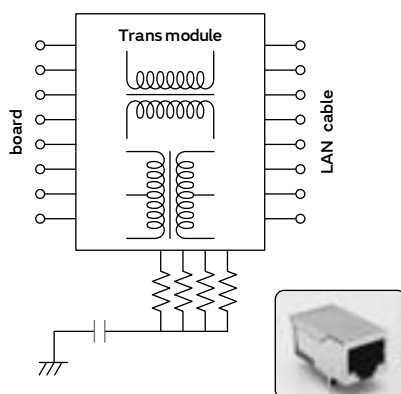
### Features

- 1 For information devices of Ethernet LAN (IEEE802.3.) and primary - secondary couplings of DC-DC converters.

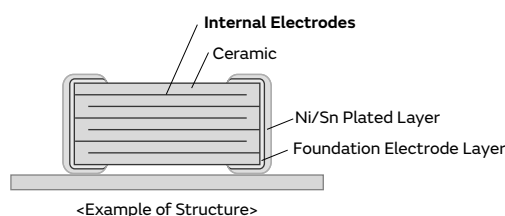
ex) DC-DC Converter



ex) LAN Connector



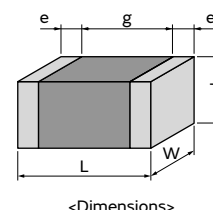
- 2 Realized large capacity and small size while maintaining high withstand voltages by the multilayer structure.



- 3 Dedicated for reflow soldering.

### Specifications

|                   |                                                                   |
|-------------------|-------------------------------------------------------------------|
| Size (mm)         | 4.5×2.0mm to 5.7×5.0mm                                            |
| Rated Voltage     | 2000Vdc                                                           |
| Capacitance       | 100pF to 10000pF                                                  |
| Main Applications | For Ethernet LAN, Primary-secondary coupling for DC-DC converters |



This catalog contains only a portion of the product lineup.

Please refer to the capacitor search tool on the Murata Web site for details.

## GR4 Series High Dielectric Constant Type Part Number List

### 4.5×2.0mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number        | p*   |
|--------|---------------|---------|--------|------|--------------------|------|
| 1.5mm  | 2000Vdc       | X7R     | 100pF  | ±10% | GR442QR73D101KW01# | p127 |
|        |               |         | 120pF  | ±10% | GR442QR73D121KW01# | p127 |
|        |               |         | 150pF  | ±10% | GR442QR73D151KW01# | p127 |
|        |               |         | 180pF  | ±10% | GR442QR73D181KW01# | p127 |
|        |               |         | 220pF  | ±10% | GR442QR73D221KW01# | p127 |
|        |               |         | 270pF  | ±10% | GR442QR73D271KW01# | p127 |
|        |               |         | 330pF  | ±10% | GR442QR73D331KW01# | p127 |
|        |               |         | 390pF  | ±10% | GR442QR73D391KW01# | p127 |
|        |               |         | 470pF  | ±10% | GR442QR73D471KW01# | p127 |
|        |               |         | 560pF  | ±10% | GR442QR73D561KW01# | p127 |
|        |               |         | 680pF  | ±10% | GR442QR73D681KW01# | p127 |
|        |               |         | 820pF  | ±10% | GR442QR73D821KW01# | p127 |
|        |               |         | 1000pF | ±10% | GR442QR73D102KW01# | p127 |
|        |               |         | 1200pF | ±10% | GR442QR73D122KW01# | p127 |
|        |               |         | 1500pF | ±10% | GR442QR73D152KW01# | p127 |

### 4.5×3.2mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number        | p*   |
|--------|---------------|---------|--------|------|--------------------|------|
| 1.5mm  | 2000Vdc       | X7R     | 1800pF | ±10% | GR443QR73D182KW01# | p127 |
|        |               |         | 2200pF | ±10% | GR443QR73D222KW01# | p127 |
|        |               |         | 2700pF | ±10% | GR443QR73D272KW01# | p127 |
|        |               |         | 3300pF | ±10% | GR443QR73D332KW01# | p127 |
|        |               |         | 3900pF | ±10% | GR443QR73D392KW01# | p127 |
| 2.0mm  | 2000Vdc       | X7R     | 4700pF | ±10% | GR443DR73D472KW01# | p127 |

### 5.7×5.0mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        | p*   |
|--------|---------------|---------|---------|------|--------------------|------|
| 2.0mm  | 2000Vdc       | X7R     | 10000pF | ±10% | GR455DR73D103KW01# | p127 |

1

## GR4 Series Specifications and Test Methods (1)

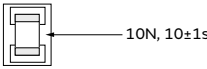
| No              | Item                                       |                    | Specification                                                                 | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |              |                  |         |                    |                 |                         |   |                    |   |                         |   |                    |
|-----------------|--------------------------------------------|--------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------------|---------|--------------------|-----------------|-------------------------|---|--------------------|---|-------------------------|---|--------------------|
| 1               | Appearance                                 |                    | No defects or abnormalities.                                                  | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |              |                  |         |                    |                 |                         |   |                    |   |                         |   |                    |
| 2               | Dimension                                  |                    | Within the specified dimensions.                                              | Using calipers and micrometers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |                  |         |                    |                 |                         |   |                    |   |                         |   |                    |
| 3               | Voltage Proof                              |                    | No defects or abnormalities.                                                  | Measurement Point: Between the terminations<br><table><tr><th>Test Voltage</th><th>Time</th></tr><tr><td>DC2400V</td><td>60s</td></tr><tr><td>AC1.5kV (r.m.s)</td><td>60s</td></tr></table> Charge/discharge current: 50mA max.                                                                                                                                                                                                                                                                                                                                                                | Test Voltage | Time             | DC2400V | 60s                | AC1.5kV (r.m.s) | 60s                     |   |                    |   |                         |   |                    |
| Test Voltage    | Time                                       |                    |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |                  |         |                    |                 |                         |   |                    |   |                         |   |                    |
| DC2400V         | 60s                                        |                    |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |                  |         |                    |                 |                         |   |                    |   |                         |   |                    |
| AC1.5kV (r.m.s) | 60s                                        |                    |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |                  |         |                    |                 |                         |   |                    |   |                         |   |                    |
| 4               | Impulse Voltage                            |                    | No self healing break downs or flash-overs have taken place in the capacitor. | 10 impulse of alternating polarity is subjected. (5 impulse for each polarity)<br>The interval between impulse is 60s.<br>Applied Pulse: 1.2/50μs<br>Applied Voltage: 2.5kVo-p                                                                                                                                                                                                                                                                                                                                                                                                                 |              |                  |         |                    |                 |                         |   |                    |   |                         |   |                    |
| 5               | Insulation Resistance (I.R.)               |                    | 6000MΩ or more                                                                | Measurement Point: Between the terminations<br>Measurement Voltage: DC500±50V<br>Charging Time: 60±5s<br>Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                             |              |                  |         |                    |                 |                         |   |                    |   |                         |   |                    |
| 6               | Capacitance                                |                    | Shown in Rated value.                                                         | Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |              |                  |         |                    |                 |                         |   |                    |   |                         |   |                    |
| 7               | Dissipation Factor (D.F.)                  |                    | 0.025 max.                                                                    | Measurement Frequency: 1.0±0.1kHz<br>Measurement Voltage: AC1.0±0.2V (r.m.s.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |              |                  |         |                    |                 |                         |   |                    |   |                         |   |                    |
| 8               | Temperature Characteristics of Capacitance |                    | R7: Within ±15% (-55 to +125°C)                                               | The capacitance change should be measured after 5 minutes at each specified temp. stage.<br>Capacitance value as a reference is the value in step 3.<br><table><tr><th>Step</th><th>Temperature (°C)</th></tr><tr><td>1</td><td>Reference Temp. ±2</td></tr><tr><td>2</td><td>Min. Operating Temp. ±3</td></tr><tr><td>3</td><td>Reference Temp. ±2</td></tr><tr><td>4</td><td>Max. Operating Temp. ±3</td></tr><tr><td>5</td><td>Reference Temp. ±2</td></tr></table><br>▪ Pretreatment<br>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h at room condition*. | Step         | Temperature (°C) | 1       | Reference Temp. ±2 | 2               | Min. Operating Temp. ±3 | 3 | Reference Temp. ±2 | 4 | Max. Operating Temp. ±3 | 5 | Reference Temp. ±2 |
| Step            | Temperature (°C)                           |                    |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |                  |         |                    |                 |                         |   |                    |   |                         |   |                    |
| 1               | Reference Temp. ±2                         |                    |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |                  |         |                    |                 |                         |   |                    |   |                         |   |                    |
| 2               | Min. Operating Temp. ±3                    |                    |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |                  |         |                    |                 |                         |   |                    |   |                         |   |                    |
| 3               | Reference Temp. ±2                         |                    |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |                  |         |                    |                 |                         |   |                    |   |                         |   |                    |
| 4               | Max. Operating Temp. ±3                    |                    |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |                  |         |                    |                 |                         |   |                    |   |                         |   |                    |
| 5               | Reference Temp. ±2                         |                    |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |                  |         |                    |                 |                         |   |                    |   |                         |   |                    |
| 9               | Vibration                                  | Appearance         | No defects or abnormalities.                                                  | Solder the capacitor on the test substrate A shown in “Complement of Test Method”.<br>Kind of Vibration: A simple harmonic motion<br>10Hz to 55Hz to 10Hz (1min)<br>Total amplitude: 1.5mm<br>This motion should be applied for a period of 2h in each 3 mutually perpendicular directions (total of 6h).                                                                                                                                                                                                                                                                                      |              |                  |         |                    |                 |                         |   |                    |   |                         |   |                    |
|                 |                                            | Capacitance        | Within the specified initial value.                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |                  |         |                    |                 |                         |   |                    |   |                         |   |                    |
|                 |                                            | D.F.               | Within the specified initial value.                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |                  |         |                    |                 |                         |   |                    |   |                         |   |                    |
| 10              | Solderability                              |                    | 95% of the terminations is to be soldered evenly and continuously.            | Test Method: Solder bath method<br>Flux: Solution of rosin ethanol 25 (wt) %<br>Preheat: 80 to 120°C for 10 to 30s<br>Solder: Sn-3.0Ag-0.5Cu (Lead Free Solder)<br>Solder Temp.: 245±5°C<br>Immersion time: 2±0.5s<br>Immersing in speed: 25±2.5mm/s.                                                                                                                                                                                                                                                                                                                                          |              |                  |         |                    |                 |                         |   |                    |   |                         |   |                    |
| 11              | Resistance to Soldering Heat               | Appearance         | No defects or abnormalities.                                                  | Test Method: Solder bath method<br>Solder: Sn-3.0Ag-0.5Cu (Lead Free Solder)<br>Solder Temp.: 260±5°C<br>Immersion time: 10±1s<br>Immersing in speed: 25±2.5mm/s.<br>Exposure Time: 24±2h. at room condition *.<br>Preheat: GR442 size min.: 100 to 120°C for 1min and 170 to 200°C for 1min<br><br>▪ Pretreatment<br>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h. at room condition *.                                                                                                                                                                     |              |                  |         |                    |                 |                         |   |                    |   |                         |   |                    |
|                 |                                            | Capacitance Change | Within ±10%                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |                  |         |                    |                 |                         |   |                    |   |                         |   |                    |
|                 |                                            | D.F.               | Within the specified initial value.                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |                  |         |                    |                 |                         |   |                    |   |                         |   |                    |
|                 |                                            | I.R.               | 1000MΩ or more                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |                  |         |                    |                 |                         |   |                    |   |                         |   |                    |
|                 |                                            | Voltage Proof      | No defects.                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |              |                  |         |                    |                 |                         |   |                    |   |                         |   |                    |

\* Room Condition: Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. ➤

## GR4 Series Specifications and Test Methods (1)

Continued from the preceding page. ↘

| No | Item                             | Specification                                                | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                         |
|----|----------------------------------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12 | Adhesive Strength of Termination | No removal of the terminations or other defect should occur. | <p>Solder the capacitor on the test substrate A shown in "Complement of Test Method".</p>  <p>Applied Direction: In parallel with the test substrate and vertical with the capacitor side.</p>                          |
| 13 | Substrate Bending Test           | No defects or abnormalities.                                 | <p>Solder the capacitor on the test substrate B shown in "Complement of Test Method".</p> <p>Then apply the force in the direction shown in "Test Method of Substrate Bending Test" of "Complement of Test Method".</p> <p>Flexure: 1mm<br/>Holding Time: 5±1s<br/>Soldering Method: Reflow soldering</p> |
| 14 | Temperature Sudden Change        | Appearance                                                   | No defects or abnormalities.                                                                                                                                                                                                                                                                              |
|    |                                  | Capacitance Change                                           | Within ±15%                                                                                                                                                                                                                                                                                               |
|    |                                  | D.F.                                                         | 0.05 max.                                                                                                                                                                                                                                                                                                 |
|    |                                  | I.R.                                                         | 3000MΩ or more                                                                                                                                                                                                                                                                                            |
|    |                                  | Voltage Proof                                                | No defects.                                                                                                                                                                                                                                                                                               |
| 15 | Humidity (Steady State)          | Appearance                                                   | No defects or abnormalities.                                                                                                                                                                                                                                                                              |
|    |                                  | Capacitance Change                                           | Within ±15%                                                                                                                                                                                                                                                                                               |
|    |                                  | D.F.                                                         | 0.05 max.                                                                                                                                                                                                                                                                                                 |
|    |                                  | I.R.                                                         | 1000MΩ or more                                                                                                                                                                                                                                                                                            |
|    |                                  | Voltage Proof                                                | No defects.                                                                                                                                                                                                                                                                                               |
| 16 | Durability                       | Appearance                                                   | No defects or abnormalities.                                                                                                                                                                                                                                                                              |
|    |                                  | Capacitance Change                                           | Within ±20%                                                                                                                                                                                                                                                                                               |
|    |                                  | D.F.                                                         | 0.05 max.                                                                                                                                                                                                                                                                                                 |
|    |                                  | I.R.                                                         | 2000MΩ or more                                                                                                                                                                                                                                                                                            |
|    |                                  | Voltage Proof                                                | No defects.                                                                                                                                                                                                                                                                                               |

| Step | Temp. (°C)                 | Time (min) |
|------|----------------------------|------------|
| 1    | Min. Operating Temp. +0/-3 | 30±3       |
| 2    | Room Temp                  | 2 to 3     |
| 3    | Max. Operating Temp. +3/-0 | 30±3       |
| 4    | Room Temp                  | 2 to 3     |

Fix the capacitor to the supporting Test substrate A (glass epoxy board) shown in "Complement of Test Method".  
Perform the 5 cycles according to the four heat treatments shown in the following table.

Exposure Time: 24±2h at room condition\*.  
• Pretreatment  
Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h. at room condition\*.

Fix the capacitor to the supporting Test substrate A (glass epoxy board) shown in "Complement of Test Method".  
Test Temperature: 40±2°C  
Test Humidity: 90 to 95%RH  
Test Time: 500+24/-0h.  
Exposure Time: 24±2h. at room condition\*.  
• Pretreatment  
Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h at room condition\*.

Fix the capacitor to the supporting Test substrate A (glass epoxy board) shown in "Complement of Test Method".  
Test Temperature: Max. Operating Temp. ±3°C  
Test Time: 1000+48/-0h  
Applied Voltage: DC2.2kV (110% of the rated voltage)  
Charge/discharge current: 50mA max.  
Exposure Time: 24±2h at room condition\*.  
• Pretreatment  
Apply test voltage for 1h±5min at test temperature.  
Remove and let sit for 24±2h at room condition\*.

\* Room Condition: Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. ↗

## GR4 Series Specifications and Test Methods (1)

Continued from the preceding page. ↘

### Complement of Test Method

#### 1. Test Substrate

The test substrate should be Substrate A or Substrate B as described in "Specifications and Test Methods".

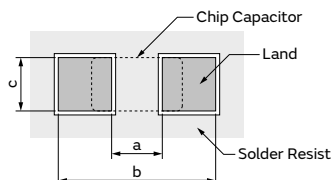
The specimen should be soldered by the conditions as described below.

Soldering Method: Reflow soldering

Solder: Sn-3.0Ag-0.5Cu

##### (1) Test Substrate A

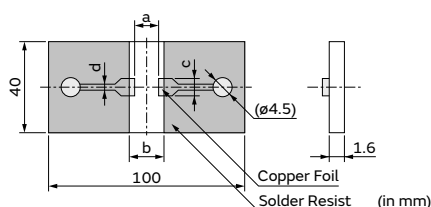
###### • Land Dimensions



- Material: Glass Epoxy Board
- Thickness: 1.6mm
- Thickness of Copper Foil: 0.035mm

| Part Number  | Dimension (mm) |     |     |
|--------------|----------------|-----|-----|
|              | a              | b   | c   |
| <b>GR442</b> | 3.5            | 7.0 | 2.4 |
| <b>GR443</b> | 3.5            | 7.0 | 3.7 |
| <b>GR455</b> | 4.5            | 8.0 | 5.6 |

##### (2) Test Substrate B

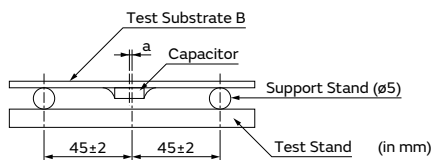


- Material: Glass Epoxy Board
- Thickness of Copper Foil: 0.035mm

| Part Number  | Dimension (mm) |     |     |     |
|--------------|----------------|-----|-----|-----|
|              | a              | b   | c   | d   |
| <b>GR442</b> | 3.5            | 7.0 | 2.4 | 1.0 |
| <b>GR443</b> | 3.5            | 7.0 | 3.7 | 1.0 |
| <b>GR455</b> | 4.5            | 8.0 | 5.6 | 1.0 |

#### 2. Test Method of Substrate Bending Test

##### (a) Support State



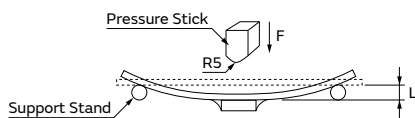
a: ±2 gap between support stand center and test stand

- Material of Test Stand and Pressure Stick

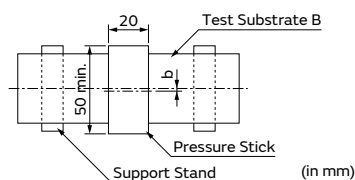
The material should be a metal where a remarkable transformation and the distortion are not caused even if it is pressurized.

- Pressurizing Speed

The pressurizing speed is pressurized at the speed of about 1mm/s until the flexure reaches a regulated value.



##### (b) Test State



b: ±5 gap between support stand center and test stand center

GRM

GR3

GRJ

GR4

GR7

GJM

GQM

GA2

GA3

GA3

GA3

LLL

LLA

LLM

LLR

NFM

KRM

KR3

GMA

GMD

⚠Caution  
/Notice

## Chip Multilayer Ceramic Capacitors for Camera Flash circuit only

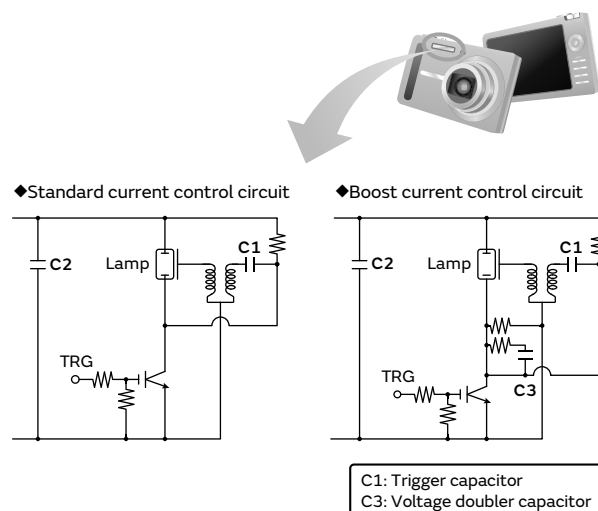
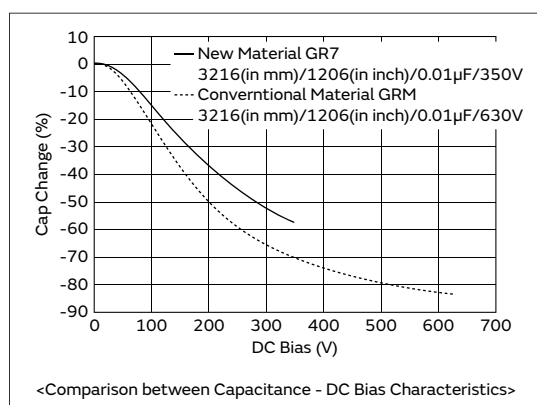
# GR7 Series



**Limited to camera flashes. Ideal for trigger capacitors and voltage doubler capacitors!**

## Features

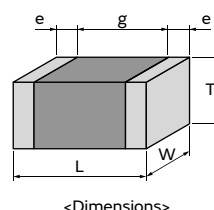
- 1 Ideal for the trigger of flash circuits, as a higher capacitance can be acquired compared to conventional products (X7R characteristics) when a DC bias is applied.



- 2 Contributes to the miniaturization of cameras with the low profile.

## Specifications

|                   |                         |
|-------------------|-------------------------|
| Size (mm)         | 2.0×1.25mm to 3.2×1.6mm |
| Rated Voltage     | 350Vdc                  |
| Capacitance       | 10000pF to 47000pF      |
| Main Applications | For camera flash        |



This catalog contains only a portion of the product lineup.  
Please refer to the capacitor search tool on the Murata Web site for details.

## GR7 Series High Dielectric Constant Type Part Number List

### 2.0×1.25mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        | p*   |
|--------|---------------|---------|---------|------|--------------------|------|
| 1.0mm  | 350Vdc        | X7T     | 10000pF | ±10% | GR721AW0BB103KW01# | p132 |
|        |               |         | 15000pF | ±10% | GR721AW0BB153KW01# | p132 |
| 1.45mm | 350Vdc        | X7T     | 22000pF | ±10% | GR721BW0BB223KW03# | p132 |
|        |               |         | 27000pF | ±10% | GR721BW0BB273KW03# | p132 |

### 3.2×1.6mm

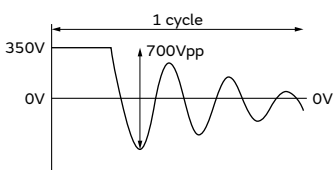
| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        | p*   |
|--------|---------------|---------|---------|------|--------------------|------|
| 1.0mm  | 350Vdc        | X7T     | 10000pF | ±10% | GR731AW0BB103KW01# | p132 |
|        |               |         | 15000pF | ±10% | GR731AW0BB153KW01# | p132 |
|        |               |         | 22000pF | ±10% | GR731AW0BB223KW01# | p132 |
|        |               |         | 27000pF | ±10% | GR731AW0BB273KW01# | p132 |
|        |               |         | 33000pF | ±10% | GR731AW0BB333KW01# | p132 |
| 1.25mm | 350Vdc        | X7T     | 22000pF | ±10% | GR731BW0BB223KW01# | p132 |
|        |               |         | 33000pF | ±10% | GR731BW0BB333KW01# | p132 |
| 1.8mm  | 350Vdc        | X7T     | 47000pF | ±10% | GR731CW0BB473KW03# | p132 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

# 1

## GR7 Series Specifications and Test Methods (1)

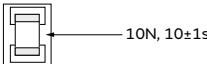
| No                | Item                                       |                    | Specification                                                      | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|-------------------|--------------------------------------------|--------------------|--------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------|---|--------------------|---|-------------------------|---|--------------------|---|-------------------------|---|--------------------|
| 1                 | Appearance                                 |                    | No defects or abnormalities.                                       | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 2                 | Dimension                                  |                    | Within the specified dimensions.                                   | Using calipers and micrometers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 3                 | Voltage Proof                              |                    | No defects or abnormalities.                                       | Measurement Point: Between the terminations<br>Test Voltage: DC500V<br>Applied Time: 1 to 5s<br>Charge/discharge current: 50mA max.                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 4                 | Charge and Discharge Cycle                 | Appearance         | No defects or abnormalities.                                       | Test temperature: 25°C<br>Discharge voltage: below figure<br>Discharge cycle: 100k cycle<br>Discharge frequency: 100Hz<br>Exposure Time: 24±2h at room condition*.<br><br><br>• Pretreatment<br>Apply test voltage (DC350V) for 1h±5min at test temperature.<br>Remove and let sit for 24±2h at room condition*.                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|                   |                                            | Capacitance Change | Within ±15%                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|                   |                                            | D.F.               | 0.05 max.                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|                   |                                            | I.R.               | C ≥ 0.01μF: 10MΩ • μF or more<br>C < 0.01μF: 1000MΩ or more        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|                   |                                            | Voltage Proof      | No defects.                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 5                 | Insulation Resistance (I.R.)               |                    | C ≥ 0.01μF: 100MΩ • μF or more<br>C < 0.01μF: 10000MΩ or more      | Measurement Point: Between the terminations<br>Measurement Voltage: DC250±25V<br>Charging Time: 60±5s<br>Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 6                 | Capacitance                                |                    | Shown in Rated value.                                              | Measurement Temperature:Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 7                 | Dissipation Factor (D.F.)                  |                    | 0.025 max.                                                         | Measurement Frequency: 1.0±0.1kHz<br>Measurement Voltage: AC1.0±0.2V (r.m.s.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 8                 | Temperature Characteristics of Capacitance | No Bias            | W0: Within +22/-33% (-55 to +125°C)                                | The capacitance change should be measured after 5 minutes at each specified temp. stage.<br>Capacitance value as a reference is the value in step 3. <table><tr><th>Step</th><th>Temperature (°C)</th></tr><tr><td>1</td><td>Reference Temp. ±2</td></tr><tr><td>2</td><td>Min. Operating Temp. ±3</td></tr><tr><td>3</td><td>Reference Temp. ±2</td></tr><tr><td>4</td><td>Max. Operating Temp. ±3</td></tr><tr><td>5</td><td>Reference Temp. ±2</td></tr></table><br>• Pretreatment<br>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h at room condition*. | Step | Temperature (°C) | 1 | Reference Temp. ±2 | 2 | Min. Operating Temp. ±3 | 3 | Reference Temp. ±2 | 4 | Max. Operating Temp. ±3 | 5 | Reference Temp. ±2 |
|                   |                                            | Step               | Temperature (°C)                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 1                 | Reference Temp. ±2                         |                    |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 2                 | Min. Operating Temp. ±3                    |                    |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 3                 | Reference Temp. ±2                         |                    |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 4                 | Max. Operating Temp. ±3                    |                    |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 5                 | Reference Temp. ±2                         |                    |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| Apply DC350V Bias | W0: Within ±10% (-55 to +125°C)            |                    |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 9                 | Vibration                                  | Appearance         | No defects or abnormalities.                                       | Solder the capacitor on the test substrate A shown in “Complement of Test Method”.<br>Kind of Vibration: A simple harmonic motion<br>10Hz to 55Hz to 10Hz (1min)<br>Total amplitude: 1.5mm<br>This motion should be applied for a period of 2h in each 3 mutually perpendicular directions (total of 6h).                                                                                                                                                                                                                                                                                   |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|                   |                                            | Capacitance        | Within the specified initial value.                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|                   |                                            | D.F.               | Within the specified initial value.                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 10                | Solderability                              |                    | 95% of the terminations is to be soldered evenly and continuously. | Test Method: Solder bath method<br>Flux: Solution of rosin ethanol 25 (wt)%<br>Preheat: 80 to 120°C for 10 to 30s<br>Solder: Sn-3.0Ag-0.5Cu (Lead Free Solder)<br>Solder Temp.: 245±5°C<br>Immersion time: 2±0.5s<br>Immersing in speed: 25±2.5mm/s.                                                                                                                                                                                                                                                                                                                                        |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 11                | Resistance to Soldering Heat               | Appearance         | No defects or abnormalities.                                       | Test Method: Solder bath method<br>Solder: Sn-3.0Ag-0.5Cu (Lead Free Solder)<br>Solder Temp.: 260±5°C<br>Immersion time: 10±1s<br>Immersing in speed: 25±2.5mm/s.<br>Exposure Time: 24±2h at room condition*.<br>Preheat: GR731 size max.: 120 to 150°C for 1min<br>• Pretreatment<br>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h at room condition*.                                                                                                                                                                                                    |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|                   |                                            | Capacitance Change | Within ±10%                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|                   |                                            | D.F.               | Within the specified initial value.                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|                   |                                            | I.R.               | Within the specified initial value.                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|                   |                                            | Voltage Proof      | No defects.                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |

\* Room Condition: Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. ➤

## GR7 Series Specifications and Test Methods (1)

Continued from the preceding page. ↘

| No | Item                                    | Specification                                                | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                         |
|----|-----------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12 | Adhesive Strength of Termination        | No removal of the terminations or other defect should occur. | <p>Solder the capacitor on the test substrate A shown in "Complement of Test Method".</p>  <p>Applied Direction: In parallel with the test substrate and vertical with the capacitor side.</p>                          |
| 13 | Substrate Bending Test                  | No defects or abnormalities.                                 | <p>Solder the capacitor on the test substrate B shown in "Complement of Test Method".</p> <p>Then apply the force in the direction shown in "Test Method of Substrate Bending Test" of "Complement of Test Method".</p> <p>Flexure: 1mm<br/>Holding Time: 5±1s<br/>Soldering Method: Reflow soldering</p> |
| 14 | Temperature Sudden Change               | Appearance                                                   | No defects or abnormalities.                                                                                                                                                                                                                                                                              |
|    |                                         | Capacitance Change                                           | Within ±7.5%                                                                                                                                                                                                                                                                                              |
|    |                                         | D.F.                                                         | Within the specified initial value.                                                                                                                                                                                                                                                                       |
|    |                                         | I.R.                                                         | Within the specified initial value.                                                                                                                                                                                                                                                                       |
|    |                                         | Voltage Proof                                                | No defects.                                                                                                                                                                                                                                                                                               |
| 15 | High Temperature High Humidity (Steady) | Appearance                                                   | No defects or abnormalities.                                                                                                                                                                                                                                                                              |
|    |                                         | Capacitance Change                                           | Within ±15%                                                                                                                                                                                                                                                                                               |
|    |                                         | D.F.                                                         | 0.05 max.                                                                                                                                                                                                                                                                                                 |
|    |                                         | I.R.                                                         | C ≥ 0.01μF: 10MΩ • μF or more<br>C < 0.01μF: 1000MΩ or more                                                                                                                                                                                                                                               |
|    |                                         | Voltage Proof                                                | No defects.                                                                                                                                                                                                                                                                                               |
| 16 | Durability                              | Appearance                                                   | No defects or abnormalities.                                                                                                                                                                                                                                                                              |
|    |                                         | Capacitance Change                                           | Within ±15%                                                                                                                                                                                                                                                                                               |
|    |                                         | D.F.                                                         | 0.05 max.                                                                                                                                                                                                                                                                                                 |
|    |                                         | I.R.                                                         | C ≥ 0.01μF: 10MΩ • μF or more<br>C < 0.01μF: 1000MΩ or more                                                                                                                                                                                                                                               |
|    |                                         | Voltage Proof                                                | No defects.                                                                                                                                                                                                                                                                                               |

\* Room Condition: Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. ↗

## GR7 Series Specifications and Test Methods (1)

Continued from the preceding page. ↘

### Complement of Test Method

#### 1. Test Substrate

The test substrate should be Substrate A or Substrate B as described in "Specifications and Test Methods".

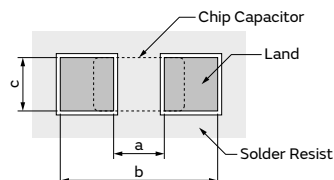
The specimen should be soldered by the conditions as described below.

Soldering Method: Reflow soldering

Solder: Sn-3.0Ag-0.5Cu

##### (1) Test Substrate A

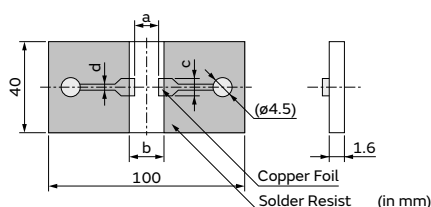
###### • Land Dimensions



- Material: Glass Epoxy Board
- Thickness: 1.6mm
- Thickness of Copper Foil: 0.035mm

| Part Number | Dimension (mm) |     |      |
|-------------|----------------|-----|------|
|             | a              | b   | c    |
| GR721       | 1.2            | 4.0 | 1.65 |
| GR731       | 2.2            | 5.0 | 2.0  |

##### (2) Test Substrate B

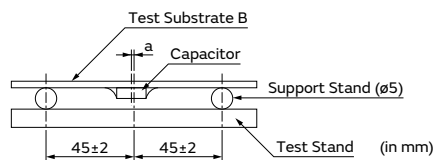


- Material: Glass Epoxy Board
- Thickness of Copper Foil: 0.035mm

| Part Number | Dimension (mm) |     |      |     |
|-------------|----------------|-----|------|-----|
|             | a              | b   | c    | d   |
| GR721       | 1.2            | 4.0 | 1.65 | 1.0 |
| GR731       | 2.2            | 5.0 | 2.0  | 1.0 |

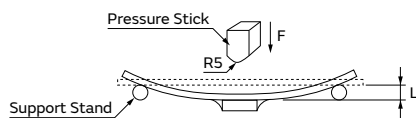
#### 2. Test Method of Substrate Bending Test

##### (a) Support State

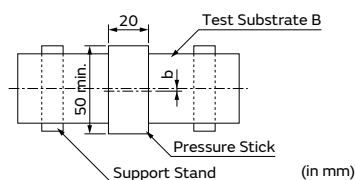


a:  $\pm 2$  gap between support stand center and test stand

- Material of Test Stand and Pressure Stick  
The material should be a metal where a remarkable transformation and the distortion are not caused even if it is pressurized.
- Pressurizing Speed  
The pressurizing speed is pressurized at the speed of about 1mm/s until the flexure reaches a regulated value.



##### (b) Test State



b:  $\pm 5$  gap between support stand center and test stand center

## High Q Chip Multilayer Ceramic Capacitors for General Purpose

# GJM Series

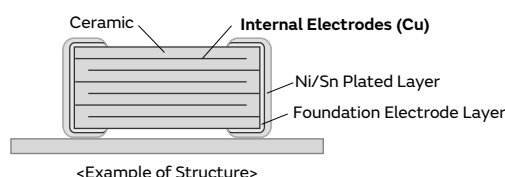


This product improves the high frequency characteristics and contributes to a reduction of power consumption by the High Q and low ESR.

### Features

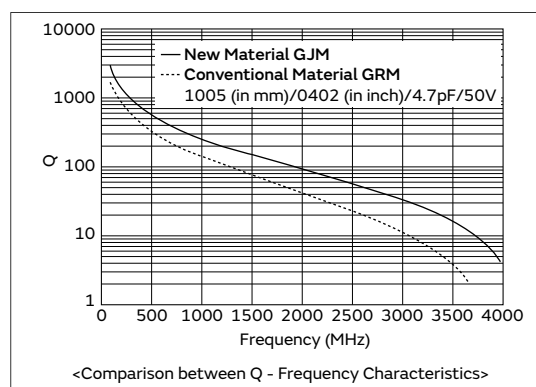
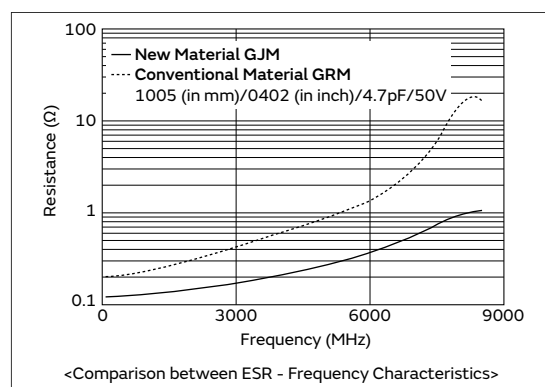
#### ① Mainly ideal for mobile communication devices and temperature compensation of related modules.

This product is ideal for temperature compensation of high frequency circuits, such as resonant circuits, tuning circuits, and impedance matching circuits where the operating characteristics of the device are greatly affected by the capacitance fluctuation.



#### ② High Q and low ESR in VHF, UHF and microwave frequency bands.

High Q and low ESR were achieved at a high frequency by adopting ceramic material as the dielectric material which enables an extremely low loss at high frequency, and base metal electrodes as the internal electrodes.



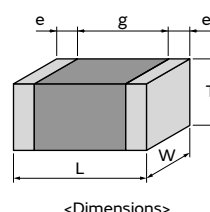
#### ③ Can be used for tight tolerance.

In addition to standard tolerance, the allowable range of this product is also suitable for the following tight tolerance.

| Capacitance Range | Standard Capacitance Tolerance<br>(Capacitance Tolerance Symbol) | Narrow Capacitance Tolerance<br>(Capacitance Tolerance Symbol)           |
|-------------------|------------------------------------------------------------------|--------------------------------------------------------------------------|
| to 0.9pF          | $\pm 0.1\text{pF}$ (B)                                           | $\pm 0.05\text{pF}$ (W)                                                  |
| 1.0 to 5.0pF      | $\pm 0.25\text{pF}$ (C)                                          | $\pm 0.05\text{pF}$ (W), $\pm 0.1\text{pF}$ (B)                          |
| 5.1 to 9.9pF      | $\pm 0.5\text{pF}$ (D)                                           | $\pm 0.05\text{pF}$ (W), $\pm 0.1\text{pF}$ (B), $\pm 0.25\text{pF}$ (C) |
| 10pF to           | $\pm 5\%$ (J)                                                    | $\pm 2\%$ (G)                                                            |

### Specifications

|                   |                                                                                             |
|-------------------|---------------------------------------------------------------------------------------------|
| Size (mm)         | 0.4×0.2mm to 1.0×0.5mm                                                                      |
| Rated Voltage     | 6.3Vdc to 50Vdc                                                                             |
| Capacitance       | 0.10pF to 47pF                                                                              |
| Main Applications | Small communication devices, such as mobile phones and high frequency communication modules |



This catalog contains only a portion of the product lineup.  
Please refer to the capacitor search tool on the Murata Web site for details.

## GJM Series Temperature Compensating Type Part Number List

### 0.4×0.2mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol.    | Part Number        | p*   |
|--------|---------------|---------|--------|---------|--------------------|------|
| 0.22mm | 25Vdc         | COG     | 0.20pF | ±0.05pF | GJM0225C1ER20WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0225C1ER20BB01# | p157 |
|        |               |         | 0.30pF | ±0.05pF | GJM0225C1ER30WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0225C1ER30BB01# | p157 |
|        |               |         | 0.40pF | ±0.05pF | GJM0225C1ER40WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0225C1ER40BB01# | p157 |
|        |               |         | 0.50pF | ±0.05pF | GJM0225C1ER50WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0225C1ER50BB01# | p157 |
|        |               |         | 0.60pF | ±0.05pF | GJM0225C1ER60WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0225C1ER60BB01# | p157 |
|        |               |         | 0.70pF | ±0.05pF | GJM0225C1ER70WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0225C1ER70BB01# | p157 |
|        |               |         | 0.80pF | ±0.05pF | GJM0225C1ER80WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0225C1ER80BB01# | p157 |
|        |               |         | 0.90pF | ±0.05pF | GJM0225C1ER90WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0225C1ER90BB01# | p157 |
|        |               |         | 1.0pF  | ±0.05pF | GJM0225C1E1R0WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0225C1E1R0BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0225C1E1R0CB01# | p157 |
|        |               |         | 1.1pF  | ±0.05pF | GJM0225C1E1R1WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0225C1E1R1BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0225C1E1R1CB01# | p157 |
|        |               |         | 1.2pF  | ±0.05pF | GJM0225C1E1R2WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0225C1E1R2BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0225C1E1R2CB01# | p157 |
|        |               |         | 1.3pF  | ±0.05pF | GJM0225C1E1R3WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0225C1E1R3BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0225C1E1R3CB01# | p157 |
|        |               |         | 1.4pF  | ±0.05pF | GJM0225C1E1R4WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0225C1E1R4BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0225C1E1R4CB01# | p157 |
|        |               |         | 1.5pF  | ±0.05pF | GJM0225C1E1R5WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0225C1E1R5BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0225C1E1R5CB01# | p157 |
|        |               |         | 1.6pF  | ±0.05pF | GJM0225C1E1R6WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0225C1E1R6BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0225C1E1R6CB01# | p157 |
|        |               |         | 1.7pF  | ±0.05pF | GJM0225C1E1R7WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0225C1E1R7BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0225C1E1R7CB01# | p157 |
|        |               |         | 1.8pF  | ±0.05pF | GJM0225C1E1R8WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0225C1E1R8BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0225C1E1R8CB01# | p157 |
|        |               |         | 1.9pF  | ±0.05pF | GJM0225C1E1R9WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0225C1E1R9BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0225C1E1R9CB01# | p157 |
|        |               |         | 2.0pF  | ±0.05pF | GJM0225C1E2R0WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0225C1E2R0BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0225C1E2R0CB01# | p157 |
|        |               |         | 2.1pF  | ±0.05pF | GJM0225C1E2R1WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0225C1E2R1BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0225C1E2R1CB01# | p157 |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.22mm | 25Vdc         | COG     | 2.2pF | ±0.05pF | GJM0225C1E2R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E2R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E2R2CB01# | p157 |
|        |               |         | 2.3pF | ±0.05pF | GJM0225C1E2R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E2R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E2R3CB01# | p157 |
|        |               |         | 2.4pF | ±0.05pF | GJM0225C1E2R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E2R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E2R4CB01# | p157 |
|        |               |         | 2.5pF | ±0.05pF | GJM0225C1E2R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E2R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E2R5CB01# | p157 |
|        |               |         | 2.6pF | ±0.05pF | GJM0225C1E2R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E2R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E2R6CB01# | p157 |
|        |               |         | 2.7pF | ±0.05pF | GJM0225C1E2R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E2R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E2R7CB01# | p157 |
|        |               |         | 2.8pF | ±0.05pF | GJM0225C1E2R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E2R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E2R8CB01# | p157 |
|        |               |         | 2.9pF | ±0.05pF | GJM0225C1E2R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E2R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E2R9CB01# | p157 |
|        |               |         | 3.0pF | ±0.05pF | GJM0225C1E3R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E3R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E3R0CB01# | p157 |
|        |               |         | 3.1pF | ±0.05pF | GJM0225C1E3R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E3R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E3R1CB01# | p157 |
|        |               |         | 3.2pF | ±0.05pF | GJM0225C1E3R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E3R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E3R2CB01# | p157 |
|        |               |         | 3.3pF | ±0.05pF | GJM0225C1E3R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E3R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E3R3CB01# | p157 |
|        |               |         | 3.4pF | ±0.05pF | GJM0225C1E3R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E3R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E3R4CB01# | p157 |
|        |               |         | 3.5pF | ±0.05pF | GJM0225C1E3R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E3R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E3R5CB01# | p157 |
|        |               |         | 3.6pF | ±0.05pF | GJM0225C1E3R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E3R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E3R6CB01# | p157 |
|        |               |         | 3.7pF | ±0.05pF | GJM0225C1E3R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E3R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E3R7CB01# | p157 |
|        |               |         | 3.8pF | ±0.05pF | GJM0225C1E3R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E3R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E3R8CB01# | p157 |
|        |               |         | 3.9pF | ±0.05pF | GJM0225C1E3R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E3R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E3R9CB01# | p157 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

## GJM Series Temperature Compensating Type Part Number List

(→ 0.4×0.2mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.22mm | 25Vdc         | COG     | 4.0pF | ±0.05pF | GJM0225C1E4R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E4R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E4R0CB01# | p157 |
|        |               |         | 4.1pF | ±0.05pF | GJM0225C1E4R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E4R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E4R1CB01# | p157 |
|        |               |         | 4.2pF | ±0.05pF | GJM0225C1E4R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E4R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E4R2CB01# | p157 |
|        |               |         | 4.3pF | ±0.05pF | GJM0225C1E4R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E4R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E4R3CB01# | p157 |
|        |               |         | 4.4pF | ±0.05pF | GJM0225C1E4R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E4R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E4R4CB01# | p157 |
|        |               |         | 4.5pF | ±0.05pF | GJM0225C1E4R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E4R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E4R5CB01# | p157 |
|        |               |         | 4.6pF | ±0.05pF | GJM0225C1E4R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E4R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E4R6CB01# | p157 |
|        |               |         | 4.7pF | ±0.05pF | GJM0225C1E4R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E4R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E4R7CB01# | p157 |
|        |               |         | 4.8pF | ±0.05pF | GJM0225C1E4R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E4R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E4R8CB01# | p157 |
|        |               |         | 4.9pF | ±0.05pF | GJM0225C1E4R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E4R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E4R9CB01# | p157 |
|        |               |         | 5.0pF | ±0.05pF | GJM0225C1E5R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E5R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E5R0CB01# | p157 |
|        |               |         | 5.1pF | ±0.05pF | GJM0225C1E5R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E5R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E5R1CB01# | p157 |
|        |               |         | 5.2pF | ±0.05pF | GJM0225C1E5R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E5R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E5R2CB01# | p157 |
|        |               |         | 5.3pF | ±0.05pF | GJM0225C1E5R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E5R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E5R3CB01# | p157 |
|        |               |         | 5.4pF | ±0.05pF | GJM0225C1E5R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E5R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E5R4CB01# | p157 |
|        |               |         | 5.5pF | ±0.05pF | GJM0225C1E5R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E5R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E5R5CB01# | p157 |
|        |               |         | 5.6pF | ±0.05pF | GJM0225C1E5R5DB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0225C1E5R6WB01# | p157 |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.22mm | 25Vdc         | COG     | 5.6pF | ±0.1pF  | GJM0225C1E5R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E5R6CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0225C1E5R6DB01# | p157 |
|        |               |         | 5.7pF | ±0.05pF | GJM0225C1E5R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E5R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E5R7CB01# | p157 |
|        |               |         | 5.8pF | ±0.05pF | GJM0225C1E5R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E5R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E5R8CB01# | p157 |
|        |               |         | 5.9pF | ±0.05pF | GJM0225C1E5R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E5R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E5R9CB01# | p157 |
|        |               |         | 6.0pF | ±0.05pF | GJM0225C1E6R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E6R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E6R0CB01# | p157 |
|        |               |         | 6.1pF | ±0.05pF | GJM0225C1E6R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E6R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E6R1CB01# | p157 |
|        |               |         | 6.2pF | ±0.05pF | GJM0225C1E6R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E6R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E6R2CB01# | p157 |
|        |               |         | 6.3pF | ±0.05pF | GJM0225C1E6R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E6R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E6R3CB01# | p157 |
|        |               |         | 6.4pF | ±0.05pF | GJM0225C1E6R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E6R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E6R4CB01# | p157 |
|        |               |         | 6.5pF | ±0.05pF | GJM0225C1E6R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E6R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E6R5CB01# | p157 |
|        |               |         | 6.6pF | ±0.05pF | GJM0225C1E6R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E6R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E6R6CB01# | p157 |
|        |               |         | 6.7pF | ±0.05pF | GJM0225C1E6R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E6R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E6R7CB01# | p157 |
|        |               |         | 6.8pF | ±0.05pF | GJM0225C1E6R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E6R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E6R8CB01# | p157 |
|        |               |         | 6.9pF | ±0.05pF | GJM0225C1E6R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E6R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E6R9CB01# | p157 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

## GJM Series Temperature Compensating Type Part Number List

(→ 0.4×0.2mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.22mm | 25Vdc         | COG     | 6.9pF | ±0.5pF  | GJM0225C1E6R9DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0225C1E7R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E7R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E7R0CB01# | p157 |
|        |               |         | 7.0pF | ±0.5pF  | GJM0225C1E7R0DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0225C1E7R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E7R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E7R1CB01# | p157 |
|        |               |         | 7.1pF | ±0.5pF  | GJM0225C1E7R1DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0225C1E7R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E7R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E7R2CB01# | p157 |
|        |               |         | 7.2pF | ±0.5pF  | GJM0225C1E7R2DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0225C1E7R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E7R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E7R3CB01# | p157 |
|        |               |         | 7.3pF | ±0.5pF  | GJM0225C1E7R3DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0225C1E7R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E7R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E7R4CB01# | p157 |
|        |               |         | 7.4pF | ±0.5pF  | GJM0225C1E7R4DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0225C1E7R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E7R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E7R5CB01# | p157 |
|        |               |         | 7.5pF | ±0.5pF  | GJM0225C1E7R5DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0225C1E7R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E7R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E7R6CB01# | p157 |
|        |               |         | 7.6pF | ±0.5pF  | GJM0225C1E7R6DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0225C1E7R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E7R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E7R7CB01# | p157 |
|        |               |         | 7.7pF | ±0.5pF  | GJM0225C1E7R7DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0225C1E7R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E7R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E7R8CB01# | p157 |
|        |               |         | 7.8pF | ±0.5pF  | GJM0225C1E7R8DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0225C1E7R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E7R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E7R9CB01# | p157 |
|        |               |         | 7.9pF | ±0.5pF  | GJM0225C1E7R9DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0225C1E8ROWB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E8R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E8R0CB01# | p157 |
|        |               |         | 8.0pF | ±0.5pF  | GJM0225C1E8R0DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0225C1E8R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E8R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E8R1CB01# | p157 |
|        |               |         | 8.1pF | ±0.5pF  | GJM0225C1E8R1DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0225C1E8R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E8R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E8R2CB01# | p157 |
|        |               |         | 8.2pF | ±0.5pF  | GJM0225C1E8R2DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0225C1E8R3WB01# | p157 |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.22mm | 25Vdc         | COG     | 8.3pF | ±0.1pF  | GJM0225C1E8R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E8R3CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0225C1E8R3DB01# | p157 |
|        |               |         | 8.4pF | ±0.05pF | GJM0225C1E8R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E8R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E8R4CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0225C1E8R4DB01# | p157 |
|        |               |         | 8.5pF | ±0.05pF | GJM0225C1E8R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E8R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E8R5CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0225C1E8R5DB01# | p157 |
|        |               |         | 8.6pF | ±0.05pF | GJM0225C1E8R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E8R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E8R6CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0225C1E8R6DB01# | p157 |
|        |               |         | 8.7pF | ±0.05pF | GJM0225C1E8R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E8R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E8R7CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0225C1E8R7DB01# | p157 |
|        |               |         | 8.8pF | ±0.05pF | GJM0225C1E8R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E8R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E8R8CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0225C1E8R8DB01# | p157 |
|        |               |         | 8.9pF | ±0.05pF | GJM0225C1E8R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E8R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E8R9CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0225C1E8R9DB01# | p157 |
|        |               |         | 9.0pF | ±0.05pF | GJM0225C1E9ROWB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E9R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E9R0CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0225C1E9R0DB01# | p157 |
|        |               |         | 9.1pF | ±0.05pF | GJM0225C1E9R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E9R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E9R1CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0225C1E9R1DB01# | p157 |
|        |               |         | 9.2pF | ±0.05pF | GJM0225C1E9R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E9R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E9R2CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0225C1E9R2DB01# | p157 |
|        |               |         | 9.3pF | ±0.05pF | GJM0225C1E9R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E9R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E9R3CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0225C1E9R3DB01# | p157 |
|        |               |         | 9.4pF | ±0.05pF | GJM0225C1E9R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E9R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E9R4CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0225C1E9R4DB01# | p157 |
|        |               |         | 9.5pF | ±0.05pF | GJM0225C1E9R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E9R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E9R5CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0225C1E9R5DB01# | p157 |
|        |               |         | 9.6pF | ±0.05pF | GJM0225C1E9R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0225C1E9R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0225C1E9R6CB01# | p157 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

## GJM Series Temperature Compensating Type Part Number List

(→ 0.4×0.2mm)

| T max. | Rated Voltage | TC Code | Cap.   | Tol.    | Part Number        | p*   | T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|--------|---------|--------------------|------|--------|---------------|---------|-------|---------|--------------------|------|
| 0.22mm | 25Vdc         | COG     | 9.6pF  | ±0.5pF  | GJM0225C1E9R6DB01# | p157 | 0.22mm | 25Vdc         | CK      | 1.2pF | ±0.1pF  | GJM0224C1E1R2BB01# | p157 |
|        |               |         | 9.7pF  | ±0.05pF | GJM0225C1E9R7WB01# | p157 |        |               |         | 1.3pF | ±0.25pF | GJM0224C1E1R2CB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0225C1E9R7BB01# | p157 |        |               |         |       | ±0.05pF | GJM0224C1E1R3WB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0225C1E9R7CB01# | p157 |        |               |         |       | ±0.1pF  | GJM0224C1E1R3BB01# | p157 |
|        |               |         |        | ±0.5pF  | GJM0225C1E9R7DB01# | p157 |        |               |         |       | ±0.25pF | GJM0224C1E1R3CB01# | p157 |
|        |               |         | 9.8pF  | ±0.05pF | GJM0225C1E9R8WB01# | p157 |        |               |         | 1.4pF | ±0.05pF | GJM0224C1E1R4WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0225C1E9R8BB01# | p157 |        |               |         |       | ±0.1pF  | GJM0224C1E1R4BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0225C1E9R8CB01# | p157 |        |               |         |       | ±0.25pF | GJM0224C1E1R4CB01# | p157 |
|        |               |         |        | ±0.5pF  | GJM0225C1E9R8DB01# | p157 |        |               |         | 1.5pF | ±0.05pF | GJM0224C1E1R5WB01# | p157 |
|        |               |         | 9.9pF  | ±0.05pF | GJM0225C1E9R9WB01# | p157 |        |               |         |       | ±0.1pF  | GJM0224C1E1R5BB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0225C1E9R9BB01# | p157 |        |               |         |       | ±0.25pF | GJM0224C1E1R5CB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0225C1E9R9CB01# | p157 |        |               |         | 1.6pF | ±0.05pF | GJM0224C1E1R6WB01# | p157 |
|        |               |         |        | ±0.5pF  | GJM0225C1E9R9DB01# | p157 |        |               |         |       | ±0.1pF  | GJM0224C1E1R6BB01# | p157 |
|        |               |         | 10pF   | ±2%     | GJM0225C1E100GB01# | p157 |        |               |         |       | ±0.25pF | GJM0224C1E1R6CB01# | p157 |
|        |               |         |        | ±5%     | GJM0225C1E100JB01# | p157 |        |               |         | 1.7pF | ±0.05pF | GJM0224C1E1R7WB01# | p157 |
|        |               |         | 11pF   | ±2%     | GJM0225C1E110GB01# | p157 |        |               |         |       | ±0.1pF  | GJM0224C1E1R7BB01# | p157 |
|        |               |         |        | ±5%     | GJM0225C1E110JB01# | p157 |        |               |         |       | ±0.25pF | GJM0224C1E1R7CB01# | p157 |
|        |               |         | 12pF   | ±2%     | GJM0225C1E120GB01# | p157 |        |               |         | 1.8pF | ±0.05pF | GJM0224C1E1R8WB01# | p157 |
|        |               |         |        | ±5%     | GJM0225C1E120JB01# | p157 |        |               |         |       | ±0.1pF  | GJM0224C1E1R8BB01# | p157 |
|        |               |         | 13pF   | ±2%     | GJM0225C1E130GB01# | p157 |        |               |         |       | ±0.25pF | GJM0224C1E1R8CB01# | p157 |
|        |               |         |        | ±5%     | GJM0225C1E130JB01# | p157 |        |               |         | 1.9pF | ±0.05pF | GJM0224C1E1R9WB01# | p157 |
|        |               |         | 15pF   | ±2%     | GJM0225C1E150GB01# | p157 |        |               |         |       | ±0.1pF  | GJM0224C1E1R9BB01# | p157 |
|        |               |         |        | ±5%     | GJM0225C1E150JB01# | p157 |        |               |         |       | ±0.25pF | GJM0224C1E1R9CB01# | p157 |
|        |               |         | 16pF   | ±2%     | GJM0225C1E160GB01# | p157 |        |               |         | 2.0pF | ±0.05pF | GJM0224C1E2R0WB01# | p157 |
|        |               |         |        | ±5%     | GJM0225C1E160JB01# | p157 |        |               |         |       | ±0.1pF  | GJM0224C1E2R0BB01# | p157 |
|        |               |         | 18pF   | ±2%     | GJM0225C1E180GB01# | p157 |        |               |         |       | ±0.25pF | GJM0224C1E2R0CB01# | p157 |
|        |               |         |        | ±5%     | GJM0225C1E180JB01# | p157 |        |               | CJ      | 2.1pF | ±0.05pF | GJM0223C1E2R1WB01# | p157 |
|        |               |         | 20pF   | ±2%     | GJM0225C1E200GB01# | p157 |        |               |         |       | ±0.1pF  | GJM0223C1E2R1BB01# | p157 |
|        |               |         |        | ±5%     | GJM0225C1E200JB01# | p157 |        |               |         |       | ±0.25pF | GJM0223C1E2R1CB01# | p157 |
|        |               |         | 22pF   | ±2%     | GJM0225C1E220GB01# | p157 |        |               |         | 2.2pF | ±0.05pF | GJM0223C1E2R2WB01# | p157 |
|        |               |         |        | ±5%     | GJM0225C1E220JB01# | p157 |        |               |         |       | ±0.1pF  | GJM0223C1E2R2BB01# | p157 |
|        |               | CK      | 0.20pF | ±0.05pF | GJM0224C1ER20WB01# | p157 |        |               |         |       | ±0.25pF | GJM0223C1E2R2CB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0224C1ER20BB01# | p157 |        |               |         | 2.3pF | ±0.05pF | GJM0223C1E2R3WB01# | p157 |
|        |               |         | 0.30pF | ±0.05pF | GJM0224C1ER30WB01# | p157 |        |               |         |       | ±0.1pF  | GJM0223C1E2R3BB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0224C1ER30BB01# | p157 |        |               |         |       | ±0.25pF | GJM0223C1E2R3CB01# | p157 |
|        |               |         | 0.40pF | ±0.05pF | GJM0224C1ER40WB01# | p157 |        |               |         | 2.4pF | ±0.05pF | GJM0223C1E2R4WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0224C1ER40BB01# | p157 |        |               |         |       | ±0.1pF  | GJM0223C1E2R4BB01# | p157 |
|        |               |         | 0.50pF | ±0.05pF | GJM0224C1ER50WB01# | p157 |        |               |         |       | ±0.25pF | GJM0223C1E2R4CB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0224C1ER50BB01# | p157 |        |               |         | 2.5pF | ±0.05pF | GJM0223C1E2R5WB01# | p157 |
|        |               |         | 0.60pF | ±0.05pF | GJM0224C1ER60WB01# | p157 |        |               |         |       | ±0.1pF  | GJM0223C1E2R5BB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0224C1ER60BB01# | p157 |        |               |         |       | ±0.25pF | GJM0223C1E2R5CB01# | p157 |
|        |               |         | 0.70pF | ±0.05pF | GJM0224C1ER70WB01# | p157 |        |               |         | 2.6pF | ±0.05pF | GJM0223C1E2R6WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0224C1ER70BB01# | p157 |        |               |         |       | ±0.1pF  | GJM0223C1E2R6BB01# | p157 |
|        |               |         | 0.80pF | ±0.05pF | GJM0224C1ER80WB01# | p157 |        |               |         |       | ±0.25pF | GJM0223C1E2R6CB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0224C1ER80BB01# | p157 |        |               |         | 2.7pF | ±0.05pF | GJM0223C1E2R7WB01# | p157 |
|        |               |         | 0.90pF | ±0.05pF | GJM0224C1ER90WB01# | p157 |        |               |         |       | ±0.1pF  | GJM0223C1E2R7BB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0224C1ER90BB01# | p157 |        |               |         |       | ±0.25pF | GJM0223C1E2R7CB01# | p157 |
|        |               |         | 1.0pF  | ±0.05pF | GJM0224C1E1R0WB01# | p157 |        |               |         | 2.8pF | ±0.05pF | GJM0223C1E2R8WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0224C1E1R0BB01# | p157 |        |               |         |       | ±0.1pF  | GJM0223C1E2R8BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0224C1E1R0CB01# | p157 |        |               |         |       | ±0.25pF | GJM0223C1E2R8CB01# | p157 |
|        |               |         | 1.1pF  | ±0.05pF | GJM0224C1E1R1WB01# | p157 |        |               |         | 2.9pF | ±0.05pF | GJM0223C1E2R9WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0224C1E1R1BB01# | p157 |        |               |         |       | ±0.1pF  | GJM0223C1E2R9BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0224C1E1R1CB01# | p157 |        |               |         |       | ±0.25pF | GJM0223C1E2R9CB01# | p157 |
|        |               |         | 1.2pF  | ±0.05pF | GJM0224C1E1R2WB01# | p157 |        |               |         | 3.0pF | ±0.05pF | GJM0223C1E3R0WB01# | p157 |
|        |               |         |        |         |                    |      |        |               |         |       |         |                    |      |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

## GJM Series Temperature Compensating Type Part Number List

(→ 0.4×0.2mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.22mm | 25Vdc         | CJ      | 3.0pF | ±0.1pF  | GJM0223C1E3R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0223C1E3R0CB01# | p157 |
|        |               |         | 3.1pF | ±0.05pF | GJM0223C1E3R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0223C1E3R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0223C1E3R1CB01# | p157 |
|        |               |         | 3.2pF | ±0.05pF | GJM0223C1E3R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0223C1E3R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0223C1E3R2CB01# | p157 |
|        |               |         | 3.3pF | ±0.05pF | GJM0223C1E3R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0223C1E3R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0223C1E3R3CB01# | p157 |
|        |               |         | 3.4pF | ±0.05pF | GJM0223C1E3R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0223C1E3R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0223C1E3R4CB01# | p157 |
|        |               |         | 3.5pF | ±0.05pF | GJM0223C1E3R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0223C1E3R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0223C1E3R5CB01# | p157 |
|        |               |         | 3.6pF | ±0.05pF | GJM0223C1E3R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0223C1E3R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0223C1E3R6CB01# | p157 |
|        |               |         | 3.7pF | ±0.05pF | GJM0223C1E3R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0223C1E3R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0223C1E3R7CB01# | p157 |
|        |               |         | 3.8pF | ±0.05pF | GJM0223C1E3R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0223C1E3R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0223C1E3R8CB01# | p157 |
|        |               |         | 3.9pF | ±0.05pF | GJM0223C1E3R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0223C1E3R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0223C1E3R9CB01# | p157 |
|        |               | CH      | 4.0pF | ±0.05pF | GJM0222C1E4R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E4R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E4R0CB01# | p157 |
|        |               |         | 4.1pF | ±0.05pF | GJM0222C1E4R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E4R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E4R1CB01# | p157 |
|        |               |         | 4.2pF | ±0.05pF | GJM0222C1E4R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E4R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E4R2CB01# | p157 |
|        |               |         | 4.3pF | ±0.05pF | GJM0222C1E4R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E4R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E4R3CB01# | p157 |
|        |               |         | 4.4pF | ±0.05pF | GJM0222C1E4R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E4R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E4R4CB01# | p157 |
|        |               |         | 4.5pF | ±0.05pF | GJM0222C1E4R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E4R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E4R5CB01# | p157 |
|        |               |         | 4.6pF | ±0.05pF | GJM0222C1E4R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E4R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E4R6CB01# | p157 |
|        |               |         | 4.7pF | ±0.05pF | GJM0222C1E4R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E4R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E4R7CB01# | p157 |
|        |               |         | 4.8pF | ±0.05pF | GJM0222C1E4R8WB01# | p157 |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.22mm | 25Vdc         | CH      | 4.8pF | ±0.1pF  | GJM0222C1E4R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E4R8CB01# | p157 |
|        |               |         | 4.9pF | ±0.05pF | GJM0222C1E4R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E4R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E4R9CB01# | p157 |
|        |               |         | 5.0pF | ±0.05pF | GJM0222C1E5R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E5R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E5R0CB01# | p157 |
|        |               |         | 5.1pF | ±0.05pF | GJM0222C1E5R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E5R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E5R1CB01# | p157 |
|        |               |         | 5.2pF | ±0.05pF | GJM0222C1E5R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E5R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E5R2CB01# | p157 |
|        |               |         | 5.3pF | ±0.05pF | GJM0222C1E5R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E5R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E5R3CB01# | p157 |
|        |               |         | 5.4pF | ±0.05pF | GJM0222C1E5R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E5R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E5R4CB01# | p157 |
|        |               |         | 5.5pF | ±0.05pF | GJM0222C1E5R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E5R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E5R5CB01# | p157 |
|        |               |         | 5.6pF | ±0.05pF | GJM0222C1E5R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E5R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E5R6CB01# | p157 |
|        |               |         | 5.7pF | ±0.05pF | GJM0222C1E5R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E5R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E5R7CB01# | p157 |
|        |               |         | 5.8pF | ±0.05pF | GJM0222C1E5R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E5R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E5R8CB01# | p157 |
|        |               |         | 5.9pF | ±0.05pF | GJM0222C1E5R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E5R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E5R9CB01# | p157 |
|        |               |         | 6.0pF | ±0.05pF | GJM0222C1E6R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E6R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E6R0CB01# | p157 |
|        |               |         | 6.1pF | ±0.05pF | GJM0222C1E6R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E6R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E6R1CB01# | p157 |
|        |               |         | 6.2pF | ±0.05pF | GJM0222C1E6R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E6R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E6R2CB01# | p157 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

## GJM Series Temperature Compensating Type Part Number List

(→ 0.4×0.2mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.22mm | 25Vdc         | CH      | 6.2pF | ±0.25pF | GJM0222C1E6R2CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E6R2DB01# | p157 |
|        |               |         | 6.3pF | ±0.05pF | GJM0222C1E6R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E6R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E6R3CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E6R3DB01# | p157 |
|        |               |         | 6.4pF | ±0.05pF | GJM0222C1E6R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E6R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E6R4CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E6R4DB01# | p157 |
|        |               |         | 6.5pF | ±0.05pF | GJM0222C1E6R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E6R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E6R5CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E6R5DB01# | p157 |
|        |               |         | 6.6pF | ±0.05pF | GJM0222C1E6R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E6R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E6R6CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E6R6DB01# | p157 |
|        |               |         | 6.7pF | ±0.05pF | GJM0222C1E6R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E6R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E6R7CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E6R7DB01# | p157 |
|        |               |         | 6.8pF | ±0.05pF | GJM0222C1E6R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E6R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E6R8CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E6R8DB01# | p157 |
|        |               |         | 6.9pF | ±0.05pF | GJM0222C1E6R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E6R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E6R9CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E6R9DB01# | p157 |
|        |               |         | 7.0pF | ±0.05pF | GJM0222C1E7R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E7R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E7R0CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E7R0DB01# | p157 |
|        |               |         | 7.1pF | ±0.05pF | GJM0222C1E7R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E7R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E7R1CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E7R1DB01# | p157 |
|        |               |         | 7.2pF | ±0.05pF | GJM0222C1E7R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E7R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E7R2CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E7R2DB01# | p157 |
|        |               |         | 7.3pF | ±0.05pF | GJM0222C1E7R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E7R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E7R3CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E7R3DB01# | p157 |
|        |               |         | 7.4pF | ±0.05pF | GJM0222C1E7R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E7R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E7R4CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E7R4DB01# | p157 |
|        |               |         | 7.5pF | ±0.05pF | GJM0222C1E7R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E7R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E7R5CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E7R5DB01# | p157 |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.22mm | 25Vdc         | CH      | 7.6pF | ±0.05pF | GJM0222C1E7R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E7R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E7R6CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E7R6DB01# | p157 |
|        |               |         | 7.7pF | ±0.05pF | GJM0222C1E7R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E7R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E7R7CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E7R7DB01# | p157 |
|        |               |         | 7.8pF | ±0.05pF | GJM0222C1E7R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E7R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E7R8CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E7R8DB01# | p157 |
|        |               |         | 7.9pF | ±0.05pF | GJM0222C1E7R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E7R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E7R9CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E7R9DB01# | p157 |
|        |               |         | 8.0pF | ±0.05pF | GJM0222C1E8R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E8R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E8R0CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E8R0DB01# | p157 |
|        |               |         | 8.1pF | ±0.05pF | GJM0222C1E8R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E8R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E8R1CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E8R1DB01# | p157 |
|        |               |         | 8.2pF | ±0.05pF | GJM0222C1E8R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E8R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E8R2CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E8R2DB01# | p157 |
|        |               |         | 8.3pF | ±0.05pF | GJM0222C1E8R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E8R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E8R3CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E8R3DB01# | p157 |
|        |               |         | 8.4pF | ±0.05pF | GJM0222C1E8R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E8R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E8R4CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E8R4DB01# | p157 |
|        |               |         | 8.5pF | ±0.05pF | GJM0222C1E8R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E8R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E8R5CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E8R5DB01# | p157 |
|        |               |         | 8.6pF | ±0.05pF | GJM0222C1E8R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E8R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E8R6CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E8R6DB01# | p157 |
|        |               |         | 8.7pF | ±0.05pF | GJM0222C1E8R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E8R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E8R7CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E8R7DB01# | p157 |
|        |               |         | 8.8pF | ±0.05pF | GJM0222C1E8R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E8R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E8R8CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E8R8DB01# | p157 |
|        |               |         | 8.9pF | ±0.05pF | GJM0222C1E8R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E8R9BB01# | p157 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

## GJM Series Temperature Compensating Type Part Number List

(→ 0.4×0.2mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.22mm | 25Vdc         | CH      | 8.9pF | ±0.25pF | GJM0222C1E8R9CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E8R9DB01# | p157 |
|        |               |         | 9.0pF | ±0.05pF | GJM0222C1E9R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E9R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E9R0CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E9R0DB01# | p157 |
|        |               |         | 9.1pF | ±0.05pF | GJM0222C1E9R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E9R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E9R1CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E9R1DB01# | p157 |
|        |               |         | 9.2pF | ±0.05pF | GJM0222C1E9R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E9R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E9R2CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E9R2DB01# | p157 |
|        |               |         | 9.3pF | ±0.05pF | GJM0222C1E9R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E9R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E9R3CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E9R3DB01# | p157 |
|        |               |         | 9.4pF | ±0.05pF | GJM0222C1E9R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E9R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E9R4CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E9R4DB01# | p157 |
|        |               |         | 9.5pF | ±0.05pF | GJM0222C1E9R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E9R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E9R5CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E9R5DB01# | p157 |
|        |               |         | 9.6pF | ±0.05pF | GJM0222C1E9R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E9R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E9R6CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E9R6DB01# | p157 |
|        |               |         | 9.7pF | ±0.05pF | GJM0222C1E9R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E9R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E9R7CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E9R7DB01# | p157 |
|        |               |         | 9.8pF | ±0.05pF | GJM0222C1E9R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E9R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E9R8CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E9R8DB01# | p157 |
|        |               |         | 9.9pF | ±0.05pF | GJM0222C1E9R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0222C1E9R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0222C1E9R9CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0222C1E9R9DB01# | p157 |
|        |               |         | 10pF  | ±2%     | GJM0222C1E100GB01# | p157 |
|        |               |         |       | ±5%     | GJM0222C1E100JB01# | p157 |
|        |               |         | 11pF  | ±2%     | GJM0222C1E110GB01# | p157 |
|        |               |         |       | ±5%     | GJM0222C1E110JB01# | p157 |
|        |               |         | 12pF  | ±2%     | GJM0222C1E120GB01# | p157 |
|        |               |         |       | ±5%     | GJM0222C1E120JB01# | p157 |
|        |               |         | 13pF  | ±2%     | GJM0222C1E130GB01# | p157 |
|        |               |         |       | ±5%     | GJM0222C1E130JB01# | p157 |
|        |               |         | 15pF  | ±2%     | GJM0222C1E150GB01# | p157 |
|        |               |         |       | ±5%     | GJM0222C1E150JB01# | p157 |
|        |               |         | 16pF  | ±2%     | GJM0222C1E160GB01# | p157 |
|        |               |         |       | ±5%     | GJM0222C1E160JB01# | p157 |

| T max. | Rated Voltage | TC Code | Cap. | Tol. | Part Number        | p*   |
|--------|---------------|---------|------|------|--------------------|------|
| 0.22mm | 25Vdc         | CH      | 18pF | ±2%  | GJM0222C1E180GB01# | p157 |
|        |               |         |      | ±5%  | GJM0222C1E180JB01# | p157 |
|        |               |         | 20pF | ±2%  | GJM0222C1E200GB01# | p157 |
|        |               |         |      | ±5%  | GJM0222C1E200JB01# | p157 |
|        |               |         | 22pF | ±2%  | GJM0222C1E220GB01# | p157 |
|        |               |         |      | ±5%  | GJM0222C1E220JB01# | p157 |

### 0.6×0.3mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol.    | Part Number        | p*   |
|--------|---------------|---------|--------|---------|--------------------|------|
| 0.33mm | 50Vdc         | COG     | 0.20pF | ±0.05pF | GJM0335C1HR20WB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0335C1HR20BB01# | p160 |
|        |               |         | 0.30pF | ±0.05pF | GJM0335C1HR30WB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0335C1HR30BB01# | p160 |
|        |               |         | 0.40pF | ±0.05pF | GJM0335C1HR40WB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0335C1HR40BB01# | p160 |
|        |               |         | 0.50pF | ±0.05pF | GJM0335C1HR50WB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0335C1HR50BB01# | p160 |
|        |               |         | 0.60pF | ±0.05pF | GJM0335C1HR60WB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0335C1HR60BB01# | p160 |
|        |               |         | 0.70pF | ±0.05pF | GJM0335C1HR70WB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0335C1HR70BB01# | p160 |
|        |               |         | 0.80pF | ±0.05pF | GJM0335C1HR80WB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0335C1HR80BB01# | p160 |
|        |               |         | 0.90pF | ±0.05pF | GJM0335C1HR90WB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0335C1HR90BB01# | p160 |
|        |               | CK      | 0.20pF | ±0.05pF | GJM0334C1HR20WB01# | p160 |
|        |               |         |        | ±0.05pF | GJM0334C1HR30WB01# | p160 |
|        |               |         | 0.30pF | ±0.05pF | GJM0334C1HR30WB01# | p160 |
|        |               |         |        | ±0.05pF | GJM0334C1HR40WB01# | p160 |
|        |               |         | 0.40pF | ±0.05pF | GJM0334C1HR40WB01# | p160 |
|        |               |         |        | ±0.05pF | GJM0334C1HR50WB01# | p160 |
|        |               |         | 0.50pF | ±0.05pF | GJM0334C1HR50WB01# | p160 |
|        |               |         |        | ±0.05pF | GJM0334C1HR60WB01# | p160 |
|        |               |         | 0.60pF | ±0.05pF | GJM0334C1HR60WB01# | p160 |
|        |               |         |        | ±0.05pF | GJM0334C1HR70WB01# | p160 |
|        |               |         | 0.70pF | ±0.05pF | GJM0334C1HR70WB01# | p160 |
|        |               |         |        | ±0.05pF | GJM0334C1HR80WB01# | p160 |
|        |               |         | 0.80pF | ±0.05pF | GJM0334C1HR80WB01# | p160 |
|        |               |         |        | ±0.05pF | GJM0334C1HR90WB01# | p160 |
|        |               |         | 0.90pF | ±0.05pF | GJM0334C1HR90WB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0334C1H1R0BB01# | p160 |
|        |               | CJ      | 1.0pF  | ±0.1pF  | GJM0334C1H1R0BB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0334C1H1R1BB01# | p160 |
|        |               |         | 1.1pF  | ±0.1pF  | GJM0334C1H1R1BB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0334C1H1R2BB01# | p160 |
|        |               |         | 1.2pF  | ±0.1pF  | GJM0334C1H1R2BB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0334C1H1R3BB01# | p160 |
|        |               |         | 1.3pF  | ±0.1pF  | GJM0334C1H1R3BB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0334C1H1R5BB01# | p160 |
|        |               |         | 1.5pF  | ±0.1pF  | GJM0334C1H1R5BB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0334C1H1R6BB01# | p160 |
|        |               |         | 1.6pF  | ±0.1pF  | GJM0334C1H1R6BB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0334C1H1R8BB01# | p160 |
|        |               |         | 1.8pF  | ±0.1pF  | GJM0334C1H1R8BB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0334C1H2R0BB01# | p160 |
|        |               |         | 2.0pF  | ±0.1pF  | GJM0334C1H2R0BB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0333C1H2R2BB01# | p160 |
|        |               | CH      | 2.2pF  | ±0.1pF  | GJM0333C1H2R2BB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0333C1H2R7BB01# | p160 |
|        |               |         | 2.7pF  | ±0.1pF  | GJM0333C1H2R7BB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0333C1H3R0BB01# | p160 |
|        |               |         | 3.0pF  | ±0.1pF  | GJM0333C1H3R0BB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0333C1H3R3BB01# | p160 |
|        |               |         | 3.3pF  | ±0.1pF  | GJM0333C1H3R3BB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0333C1H3R6BB01# | p160 |
|        |               |         | 3.6pF  | ±0.1pF  | GJM0333C1H3R6BB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0333C1H3R9BB01# | p160 |
|        |               |         | 3.9pF  | ±0.1pF  | GJM0333C1H3R9BB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0332C1HR20WB01# | p160 |
|        |               |         | 0.20pF | ±0.05pF | GJM0332C1HR20WB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0332C1HR20BB01# | p160 |
|        |               |         | 0.30pF | ±0.05pF | GJM0332C1HR30WB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0332C1HR30BB01# | p160 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

## GJM Series Temperature Compensating Type Part Number List

(→ 0.6×0.3mm)

| T max. | Rated Voltage | TC Code | Cap.   | Tol.    | Part Number        | p*   |
|--------|---------------|---------|--------|---------|--------------------|------|
| 0.33mm | 50Vdc         | CH      | 0.40pF | ±0.05pF | GJM0332C1HR40WB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0332C1HR40BB01# | p160 |
|        |               |         | 0.50pF | ±0.05pF | GJM0332C1HR50WB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0332C1HR50BB01# | p160 |
|        |               |         | 0.60pF | ±0.05pF | GJM0332C1HR60WB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0332C1HR60BB01# | p160 |
|        |               |         | 0.70pF | ±0.05pF | GJM0332C1HR70WB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0332C1HR70BB01# | p160 |
|        |               |         | 0.80pF | ±0.05pF | GJM0332C1HR80WB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0332C1HR80BB01# | p160 |
|        |               |         | 0.90pF | ±0.05pF | GJM0332C1HR90WB01# | p160 |
|        |               |         |        | ±0.1pF  | GJM0332C1HR90BB01# | p160 |
|        | 25Vdc         | COG     | 1.0pF  | ±0.05pF | GJM0335C1E1R0WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0335C1E1R0BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0335C1E1R0CB01# | p157 |
|        |               |         | 1.1pF  | ±0.05pF | GJM0335C1E1R1WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0335C1E1R1BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0335C1E1R1CB01# | p157 |
|        |               |         | 1.2pF  | ±0.05pF | GJM0335C1E1R2WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0335C1E1R2BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0335C1E1R2CB01# | p157 |
|        |               |         | 1.3pF  | ±0.05pF | GJM0335C1E1R3WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0335C1E1R3BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0335C1E1R3CB01# | p157 |
|        |               |         | 1.4pF  | ±0.05pF | GJM0335C1E1R4WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0335C1E1R4BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0335C1E1R4CB01# | p157 |
|        |               |         | 1.5pF  | ±0.05pF | GJM0335C1E1R5WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0335C1E1R5BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0335C1E1R5CB01# | p157 |
|        |               |         | 1.6pF  | ±0.05pF | GJM0335C1E1R6WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0335C1E1R6BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0335C1E1R6CB01# | p157 |
|        |               |         | 1.7pF  | ±0.05pF | GJM0335C1E1R7WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0335C1E1R7BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0335C1E1R7CB01# | p157 |
|        |               |         | 1.8pF  | ±0.05pF | GJM0335C1E1R8WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0335C1E1R8BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0335C1E1R8CB01# | p157 |
|        |               |         | 1.9pF  | ±0.05pF | GJM0335C1E1R9WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0335C1E1R9BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0335C1E1R9CB01# | p157 |
|        |               |         | 2.0pF  | ±0.05pF | GJM0335C1E2R0WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0335C1E2R0BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0335C1E2R0CB01# | p157 |
|        |               |         | 2.1pF  | ±0.05pF | GJM0335C1E2R1WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0335C1E2R1BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0335C1E2R1CB01# | p157 |
|        |               |         | 2.2pF  | ±0.05pF | GJM0335C1E2R2WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0335C1E2R2BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0335C1E2R2CB01# | p157 |
|        |               |         | 2.3pF  | ±0.05pF | GJM0335C1E2R3WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM0335C1E2R3BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM0335C1E2R3CB01# | p157 |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.33mm | 25Vdc         | COG     | 2.4pF | ±0.05pF | GJM0335C1E2R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E2R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E2R4CB01# | p157 |
|        |               |         | 2.5pF | ±0.05pF | GJM0335C1E2R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E2R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E2R5CB01# | p157 |
|        |               |         | 2.6pF | ±0.05pF | GJM0335C1E2R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E2R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E2R6CB01# | p157 |
|        |               |         | 2.7pF | ±0.05pF | GJM0335C1E2R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E2R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E2R7CB01# | p157 |
|        |               |         | 2.8pF | ±0.05pF | GJM0335C1E2R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E2R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E2R8CB01# | p157 |
|        |               |         | 2.9pF | ±0.05pF | GJM0335C1E2R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E2R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E2R9CB01# | p157 |
|        |               |         | 3.0pF | ±0.05pF | GJM0335C1E3R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E3R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E3R0CB01# | p157 |
|        |               |         | 3.1pF | ±0.05pF | GJM0335C1E3R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E3R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E3R1CB01# | p157 |
|        |               |         | 3.2pF | ±0.05pF | GJM0335C1E3R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E3R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E3R2CB01# | p157 |
|        |               |         | 3.3pF | ±0.05pF | GJM0335C1E3R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E3R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E3R3CB01# | p157 |
|        |               |         | 3.4pF | ±0.05pF | GJM0335C1E3R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E3R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E3R4CB01# | p157 |
|        |               |         | 3.5pF | ±0.05pF | GJM0335C1E3R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E3R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E3R5CB01# | p157 |
|        |               |         | 3.6pF | ±0.05pF | GJM0335C1E3R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E3R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E3R6CB01# | p157 |
|        |               |         | 3.7pF | ±0.05pF | GJM0335C1E3R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E3R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E3R7CB01# | p157 |
|        |               |         | 3.8pF | ±0.05pF | GJM0335C1E3R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E3R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E3R8CB01# | p157 |
|        |               |         | 3.9pF | ±0.05pF | GJM0335C1E3R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E3R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E3R9CB01# | p157 |
|        |               |         | 4.0pF | ±0.05pF | GJM0335C1E4R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E4R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E4R0CB01# | p157 |
|        |               |         | 4.1pF | ±0.05pF | GJM0335C1E4R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E4R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E4R1CB01# | p157 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

## GJM Series Temperature Compensating Type Part Number List

(→ 0.6×0.3mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.33mm | 25Vdc         | COG     | 4.2pF | ±0.05pF | GJM0335C1E4R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E4R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E4R2CB01# | p157 |
|        |               |         | 4.3pF | ±0.05pF | GJM0335C1E4R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E4R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E4R3CB01# | p157 |
|        |               |         | 4.4pF | ±0.05pF | GJM0335C1E4R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E4R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E4R4CB01# | p157 |
|        |               |         | 4.5pF | ±0.05pF | GJM0335C1E4R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E4R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E4R5CB01# | p157 |
|        |               |         | 4.6pF | ±0.05pF | GJM0335C1E4R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E4R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E4R6CB01# | p157 |
|        |               |         | 4.7pF | ±0.05pF | GJM0335C1E4R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E4R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E4R7CB01# | p157 |
|        |               |         | 4.8pF | ±0.05pF | GJM0335C1E4R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E4R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E4R8CB01# | p157 |
|        |               |         | 4.9pF | ±0.05pF | GJM0335C1E4R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E4R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E4R9CB01# | p157 |
|        |               |         | 5.0pF | ±0.05pF | GJM0335C1E5R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E5R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E5R0CB01# | p157 |
|        |               |         | 5.1pF | ±0.05pF | GJM0335C1E5R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E5R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E5R1CB01# | p157 |
|        |               |         | 5.2pF | ±0.05pF | GJM0335C1E5R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E5R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E5R2CB01# | p157 |
|        |               |         | 5.3pF | ±0.05pF | GJM0335C1E5R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E5R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E5R3CB01# | p157 |
|        |               |         | 5.4pF | ±0.05pF | GJM0335C1E5R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E5R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E5R4CB01# | p157 |
|        |               |         | 5.5pF | ±0.05pF | GJM0335C1E5R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E5R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E5R5CB01# | p157 |
|        |               |         | 5.6pF | ±0.05pF | GJM0335C1E5R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E5R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E5R6CB01# | p157 |
|        |               |         | 5.7pF | ±0.05pF | GJM0335C1E5R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E5R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E5R7CB01# | p157 |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.33mm | 25Vdc         | COG     | 5.7pF | ±0.5pF  | GJM0335C1E5R7DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0335C1E5R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E5R8BB01# | p157 |
|        |               |         | 5.8pF | ±0.25pF | GJM0335C1E5R8CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E5R8DB01# | p157 |
|        |               |         | 5.9pF | ±0.05pF | GJM0335C1E5R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E5R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E5R9CB01# | p157 |
|        |               |         | 6.0pF | ±0.5pF  | GJM0335C1E5R9DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0335C1E6R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E6R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E6R0CB01# | p157 |
|        |               |         | 6.1pF | ±0.5pF  | GJM0335C1E6R0DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0335C1E6R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E6R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E6R1CB01# | p157 |
|        |               |         | 6.2pF | ±0.5pF  | GJM0335C1E6R1DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0335C1E6R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E6R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E6R2CB01# | p157 |
|        |               |         | 6.3pF | ±0.5pF  | GJM0335C1E6R2DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0335C1E6R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E6R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E6R3CB01# | p157 |
|        |               |         | 6.4pF | ±0.5pF  | GJM0335C1E6R3DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0335C1E6R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E6R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E6R4CB01# | p157 |
|        |               |         | 6.5pF | ±0.5pF  | GJM0335C1E6R4DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0335C1E6R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E6R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E6R5CB01# | p157 |
|        |               |         | 6.6pF | ±0.5pF  | GJM0335C1E6R5DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0335C1E6R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E6R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E6R6CB01# | p157 |
|        |               |         | 6.7pF | ±0.5pF  | GJM0335C1E6R6DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0335C1E6R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E6R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E6R7CB01# | p157 |
|        |               |         | 6.8pF | ±0.5pF  | GJM0335C1E6R7DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0335C1E6R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E6R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E6R8CB01# | p157 |
|        |               |         | 6.9pF | ±0.5pF  | GJM0335C1E6R8DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0335C1E6R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E6R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E6R9CB01# | p157 |
|        |               |         | 7.0pF | ±0.5pF  | GJM0335C1E6R9DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0335C1E7R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E7R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E7R0CB01# | p157 |
|        |               |         | 7.1pF | ±0.5pF  | GJM0335C1E7R0DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0335C1E7R1WB01# | p157 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

## GJM Series Temperature Compensating Type Part Number List

(→ 0.6×0.3mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.33mm | 25Vdc         | COG     | 7.1pF | ±0.1pF  | GJM0335C1E7R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E7R1CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E7R1DB01# | p157 |
|        |               |         | 7.2pF | ±0.05pF | GJM0335C1E7R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E7R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E7R2CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E7R2DB01# | p157 |
|        |               |         | 7.3pF | ±0.05pF | GJM0335C1E7R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E7R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E7R3CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E7R3DB01# | p157 |
|        |               |         | 7.4pF | ±0.05pF | GJM0335C1E7R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E7R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E7R4CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E7R4DB01# | p157 |
|        |               |         | 7.5pF | ±0.05pF | GJM0335C1E7R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E7R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E7R5CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E7R5DB01# | p157 |
|        |               |         | 7.6pF | ±0.05pF | GJM0335C1E7R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E7R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E7R6CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E7R6DB01# | p157 |
|        |               |         | 7.7pF | ±0.05pF | GJM0335C1E7R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E7R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E7R7CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E7R7DB01# | p157 |
|        |               |         | 7.8pF | ±0.05pF | GJM0335C1E7R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E7R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E7R8CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E7R8DB01# | p157 |
|        |               |         | 7.9pF | ±0.05pF | GJM0335C1E7R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E7R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E7R9CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E7R9DB01# | p157 |
|        |               |         | 8.0pF | ±0.05pF | GJM0335C1E8R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E8R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E8R0CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E8R0DB01# | p157 |
|        |               |         | 8.1pF | ±0.05pF | GJM0335C1E8R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E8R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E8R1CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E8R1DB01# | p157 |
|        |               |         | 8.2pF | ±0.05pF | GJM0335C1E8R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E8R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E8R2CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E8R2DB01# | p157 |
|        |               |         | 8.3pF | ±0.05pF | GJM0335C1E8R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E8R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E8R3CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E8R3DB01# | p157 |
|        |               |         | 8.4pF | ±0.05pF | GJM0335C1E8R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E8R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E8R4CB01# | p157 |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.33mm | 25Vdc         | COG     | 8.4pF | ±0.5pF  | GJM0335C1E8R4DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM0335C1E8R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E8R5BB01# | p157 |
|        |               |         | 8.5pF | ±0.25pF | GJM0335C1E8R5CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E8R5DB01# | p157 |
|        |               |         | 8.6pF | ±0.05pF | GJM0335C1E8R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E8R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E8R6CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E8R6DB01# | p157 |
|        |               |         | 8.7pF | ±0.05pF | GJM0335C1E8R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E8R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E8R7CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E8R7DB01# | p157 |
|        |               |         | 8.8pF | ±0.05pF | GJM0335C1E8R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E8R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E8R8CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E8R8DB01# | p157 |
|        |               |         | 8.9pF | ±0.05pF | GJM0335C1E8R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E8R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E8R9CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E8R9DB01# | p157 |
|        |               |         | 9.0pF | ±0.05pF | GJM0335C1E9R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E9R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E9R0CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E9R0DB01# | p157 |
|        |               |         | 9.1pF | ±0.05pF | GJM0335C1E9R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E9R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E9R1CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E9R1DB01# | p157 |
|        |               |         | 9.2pF | ±0.05pF | GJM0335C1E9R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E9R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E9R2CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E9R2DB01# | p157 |
|        |               |         | 9.3pF | ±0.05pF | GJM0335C1E9R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E9R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E9R3CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E9R3DB01# | p157 |
|        |               |         | 9.4pF | ±0.05pF | GJM0335C1E9R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E9R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E9R4CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E9R4DB01# | p157 |
|        |               |         | 9.5pF | ±0.05pF | GJM0335C1E9R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E9R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E9R5CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E9R5DB01# | p157 |
|        |               |         | 9.6pF | ±0.05pF | GJM0335C1E9R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E9R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E9R6CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E9R6DB01# | p157 |
|        |               |         | 9.7pF | ±0.05pF | GJM0335C1E9R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E9R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E9R7CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E9R7DB01# | p157 |
|        |               |         | 9.8pF | ±0.05pF | GJM0335C1E9R8WB01# | p157 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

# GJM Series Temperature Compensating Type Part Number List

(→ 0.6×0.3mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.33mm | 25Vdc         | COG     | 9.8pF | ±0.1pF  | GJM0335C1E9R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E9R8CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0335C1E9R8DB01# | p157 |
|        |               |         | 9.9pF | ±0.05pF | GJM0335C1E9R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0335C1E9R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0335C1E9R9CB01# | p157 |
|        |               |         | 10pF  | ±2%     | GJM0335C1E100GB01# | p157 |
|        |               |         |       | ±5%     | GJM0335C1E100JB01# | p157 |
|        |               |         | 11pF  | ±2%     | GJM0335C1E110GB01# | p157 |
|        |               |         |       | ±5%     | GJM0335C1E110JB01# | p157 |
|        |               |         | 12pF  | ±2%     | GJM0335C1E120GB01# | p157 |
|        |               |         |       | ±5%     | GJM0335C1E120JB01# | p157 |
|        |               |         | 13pF  | ±2%     | GJM0335C1E130GB01# | p157 |
|        |               |         |       | ±5%     | GJM0335C1E130JB01# | p157 |
|        |               |         | 15pF  | ±2%     | GJM0335C1E150GB01# | p157 |
|        |               |         |       | ±5%     | GJM0335C1E150JB01# | p157 |
|        |               |         | 16pF  | ±2%     | GJM0335C1E160GB01# | p157 |
|        |               |         |       | ±5%     | GJM0335C1E160JB01# | p157 |
|        |               |         | 18pF  | ±2%     | GJM0335C1E180GB01# | p157 |
|        |               |         |       | ±5%     | GJM0335C1E180JB01# | p157 |
|        |               |         | 20pF  | ±2%     | GJM0335C1E200GB01# | p157 |
|        |               |         |       | ±5%     | GJM0335C1E200JB01# | p157 |
|        |               |         | 22pF  | ±2%     | GJM0335C1E220GB01# | p157 |
|        |               |         |       | ±5%     | GJM0335C1E220JB01# | p157 |
|        |               |         | 24pF  | ±2%     | GJM0335C1E240GB01# | p157 |
|        |               |         |       | ±5%     | GJM0335C1E240JB01# | p157 |
|        |               |         | 27pF  | ±2%     | GJM0335C1E270GB01# | p157 |
|        |               |         |       | ±5%     | GJM0335C1E270JB01# | p157 |
|        |               |         | 30pF  | ±2%     | GJM0335C1E300GB01# | p157 |
|        |               |         |       | ±5%     | GJM0335C1E300JB01# | p157 |
|        |               |         | 33pF  | ±2%     | GJM0335C1E330GB01# | p157 |
|        |               |         |       | ±5%     | GJM0335C1E330JB01# | p157 |
|        |               | CK      | 1.0pF | ±0.05pF | GJM0334C1E1R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0334C1E1R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0334C1E1R0CB01# | p157 |
|        |               |         | 1.1pF | ±0.05pF | GJM0334C1E1R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0334C1E1R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0334C1E1R1CB01# | p157 |
|        |               |         | 1.2pF | ±0.05pF | GJM0334C1E1R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0334C1E1R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0334C1E1R2CB01# | p157 |
|        |               |         | 1.3pF | ±0.05pF | GJM0334C1E1R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0334C1E1R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0334C1E1R3CB01# | p157 |
|        |               |         | 1.4pF | ±0.05pF | GJM0334C1E1R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0334C1E1R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0334C1E1R4CB01# | p157 |
|        |               |         | 1.5pF | ±0.05pF | GJM0334C1E1R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0334C1E1R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0334C1E1R5CB01# | p157 |
|        |               |         | 1.6pF | ±0.05pF | GJM0334C1E1R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0334C1E1R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0334C1E1R6CB01# | p157 |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.33mm | 25Vdc         | CK      | 1.7pF | ±0.05pF | GJM0334C1E1R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0334C1E1R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0334C1E1R7CB01# | p157 |
|        |               |         | 1.8pF | ±0.05pF | GJM0334C1E1R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0334C1E1R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0334C1E1R8CB01# | p157 |
|        |               |         | 1.9pF | ±0.05pF | GJM0334C1E1R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0334C1E1R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0334C1E1R9CB01# | p157 |
|        |               |         | 2.0pF | ±0.05pF | GJM0334C1E2R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0334C1E2R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0334C1E2R0CB01# | p157 |
|        |               | CJ      | 2.1pF | ±0.05pF | GJM0333C1E2R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0333C1E2R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0333C1E2R1CB01# | p157 |
|        |               |         | 2.2pF | ±0.05pF | GJM0333C1E2R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0333C1E2R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0333C1E2R2CB01# | p157 |
|        |               |         | 2.3pF | ±0.05pF | GJM0333C1E2R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0333C1E2R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0333C1E2R3CB01# | p157 |
|        |               |         | 2.4pF | ±0.05pF | GJM0333C1E2R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0333C1E2R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0333C1E2R4CB01# | p157 |
|        |               |         | 2.5pF | ±0.05pF | GJM0333C1E2R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0333C1E2R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0333C1E2R5CB01# | p157 |
|        |               |         | 2.6pF | ±0.05pF | GJM0333C1E2R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0333C1E2R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0333C1E2R6CB01# | p157 |
|        |               |         | 2.7pF | ±0.05pF | GJM0333C1E2R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0333C1E2R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0333C1E2R7CB01# | p157 |
|        |               |         | 2.8pF | ±0.05pF | GJM0333C1E2R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0333C1E2R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0333C1E2R8CB01# | p157 |
|        |               |         | 2.9pF | ±0.05pF | GJM0333C1E2R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0333C1E2R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0333C1E2R9CB01# | p157 |
|        |               |         | 3.0pF | ±0.05pF | GJM0333C1E3R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0333C1E3R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0333C1E3R0CB01# | p157 |
|        |               |         | 3.1pF | ±0.05pF | GJM0333C1E3R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0333C1E3R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0333C1E3R1CB01# | p157 |
|        |               |         | 3.2pF | ±0.05pF | GJM0333C1E3R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0333C1E3R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0333C1E3R2CB01# | p157 |
|        |               |         | 3.3pF | ±0.05pF | GJM0333C1E3R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0333C1E3R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0333C1E3R3CB01# | p157 |
|        |               |         | 3.4pF | ±0.05pF | GJM0333C1E3R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0333C1E3R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0333C1E3R4CB01# | p157 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

## GJM Series Temperature Compensating Type Part Number List

(→ 0.6×0.3mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.33mm | 25Vdc         | CJ      | 3.5pF | ±0.05pF | GJM0333C1E3R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0333C1E3R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0333C1E3R5CB01# | p157 |
|        |               |         | 3.6pF | ±0.05pF | GJM0333C1E3R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0333C1E3R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0333C1E3R6CB01# | p157 |
|        |               |         | 3.7pF | ±0.05pF | GJM0333C1E3R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0333C1E3R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0333C1E3R7CB01# | p157 |
|        |               |         | 3.8pF | ±0.05pF | GJM0333C1E3R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0333C1E3R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0333C1E3R8CB01# | p157 |
|        |               |         | 3.9pF | ±0.05pF | GJM0333C1E3R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0333C1E3R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0333C1E3R9CB01# | p157 |
|        |               | CH      | 4.0pF | ±0.05pF | GJM0332C1E4R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E4R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E4R0CB01# | p157 |
|        |               |         | 4.1pF | ±0.05pF | GJM0332C1E4R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E4R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E4R1CB01# | p157 |
|        |               |         | 4.2pF | ±0.05pF | GJM0332C1E4R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E4R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E4R2CB01# | p157 |
|        |               |         | 4.3pF | ±0.05pF | GJM0332C1E4R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E4R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E4R3CB01# | p157 |
|        |               |         | 4.4pF | ±0.05pF | GJM0332C1E4R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E4R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E4R4CB01# | p157 |
|        |               |         | 4.5pF | ±0.05pF | GJM0332C1E4R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E4R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E4R5CB01# | p157 |
|        |               |         | 4.6pF | ±0.05pF | GJM0332C1E4R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E4R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E4R6CB01# | p157 |
|        |               |         | 4.7pF | ±0.05pF | GJM0332C1E4R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E4R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E4R7CB01# | p157 |
|        |               |         | 4.8pF | ±0.05pF | GJM0332C1E4R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E4R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E4R8CB01# | p157 |
|        |               |         | 4.9pF | ±0.05pF | GJM0332C1E4R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E4R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E4R9CB01# | p157 |
|        |               |         | 5.0pF | ±0.05pF | GJM0332C1E5R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E5R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E5R0CB01# | p157 |
|        |               |         | 5.1pF | ±0.05pF | GJM0332C1E5R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E5R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E5R1CB01# | p157 |
|        |               |         | 5.2pF | ±0.5pF  | GJM0332C1E5R1DB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E5R2BB01# | p157 |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.33mm | 25Vdc         | CH      | 5.2pF | ±0.25pF | GJM0332C1E5R2CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E5R2DB01# | p157 |
|        |               |         | 5.3pF | ±0.05pF | GJM0332C1E5R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E5R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E5R3CB01# | p157 |
|        |               |         | 5.4pF | ±0.05pF | GJM0332C1E5R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E5R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E5R4CB01# | p157 |
|        |               |         | 5.5pF | ±0.05pF | GJM0332C1E5R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E5R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E5R5CB01# | p157 |
|        |               |         | 5.6pF | ±0.05pF | GJM0332C1E5R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E5R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E5R6CB01# | p157 |
|        |               |         | 5.7pF | ±0.05pF | GJM0332C1E5R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E5R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E5R7CB01# | p157 |
|        |               |         | 5.8pF | ±0.05pF | GJM0332C1E5R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E5R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E5R8CB01# | p157 |
|        |               |         | 5.9pF | ±0.05pF | GJM0332C1E5R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E5R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E5R9CB01# | p157 |
|        |               |         | 6.0pF | ±0.05pF | GJM0332C1E6R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E6R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E6R0CB01# | p157 |
|        |               |         | 6.1pF | ±0.05pF | GJM0332C1E6R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E6R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E6R1CB01# | p157 |
|        |               |         | 6.2pF | ±0.05pF | GJM0332C1E6R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E6R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E6R2CB01# | p157 |
|        |               |         | 6.3pF | ±0.05pF | GJM0332C1E6R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E6R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E6R3CB01# | p157 |
|        |               |         | 6.4pF | ±0.05pF | GJM0332C1E6R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E6R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E6R4CB01# | p157 |
|        |               |         | 6.5pF | ±0.05pF | GJM0332C1E6R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E6R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E6R5CB01# | p157 |
|        |               |         | 6.5pF | ±0.5pF  | GJM0332C1E6R5DB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E6R5CB01# | p157 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

## GJM Series Temperature Compensating Type Part Number List

(→ 0.6×0.3mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.33mm | 25Vdc         | CH      | 6.6pF | ±0.05pF | GJM0332C1E6R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E6R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E6R6CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E6R6DB01# | p157 |
|        |               |         | 6.7pF | ±0.05pF | GJM0332C1E6R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E6R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E6R7CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E6R7DB01# | p157 |
|        |               |         | 6.8pF | ±0.05pF | GJM0332C1E6R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E6R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E6R8CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E6R8DB01# | p157 |
|        |               |         | 6.9pF | ±0.05pF | GJM0332C1E6R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E6R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E6R9CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E6R9DB01# | p157 |
|        |               |         | 7.0pF | ±0.05pF | GJM0332C1E7R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E7R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E7R0CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E7R0DB01# | p157 |
|        |               |         | 7.1pF | ±0.05pF | GJM0332C1E7R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E7R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E7R1CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E7R1DB01# | p157 |
|        |               |         | 7.2pF | ±0.05pF | GJM0332C1E7R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E7R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E7R2CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E7R2DB01# | p157 |
|        |               |         | 7.3pF | ±0.05pF | GJM0332C1E7R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E7R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E7R3CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E7R3DB01# | p157 |
|        |               |         | 7.4pF | ±0.05pF | GJM0332C1E7R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E7R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E7R4CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E7R4DB01# | p157 |
|        |               |         | 7.5pF | ±0.05pF | GJM0332C1E7R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E7R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E7R5CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E7R5DB01# | p157 |
|        |               |         | 7.6pF | ±0.05pF | GJM0332C1E7R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E7R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E7R6CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E7R6DB01# | p157 |
|        |               |         | 7.7pF | ±0.05pF | GJM0332C1E7R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E7R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E7R7CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E7R7DB01# | p157 |
|        |               |         | 7.8pF | ±0.05pF | GJM0332C1E7R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E7R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E7R8CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E7R8DB01# | p157 |
|        |               |         | 7.9pF | ±0.05pF | GJM0332C1E7R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E7R9BB01# | p157 |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.33mm | 25Vdc         | CH      | 7.9pF | ±0.25pF | GJM0332C1E7R9CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E7R9DB01# | p157 |
|        |               |         | 8.0pF | ±0.05pF | GJM0332C1E8R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E8R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E8R0CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E8R0DB01# | p157 |
|        |               |         | 8.1pF | ±0.05pF | GJM0332C1E8R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E8R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E8R1CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E8R1DB01# | p157 |
|        |               |         | 8.2pF | ±0.05pF | GJM0332C1E8R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E8R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E8R2CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E8R2DB01# | p157 |
|        |               |         | 8.3pF | ±0.05pF | GJM0332C1E8R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E8R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E8R3CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E8R3DB01# | p157 |
|        |               |         | 8.4pF | ±0.05pF | GJM0332C1E8R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E8R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E8R4CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E8R4DB01# | p157 |
|        |               |         | 8.5pF | ±0.05pF | GJM0332C1E8R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E8R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E8R5CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E8R5DB01# | p157 |
|        |               |         | 8.6pF | ±0.05pF | GJM0332C1E8R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E8R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E8R6CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E8R6DB01# | p157 |
|        |               |         | 8.7pF | ±0.05pF | GJM0332C1E8R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E8R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E8R7CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E8R7DB01# | p157 |
|        |               |         | 8.8pF | ±0.05pF | GJM0332C1E8R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E8R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E8R8CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E8R8DB01# | p157 |
|        |               |         | 8.9pF | ±0.05pF | GJM0332C1E8R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E8R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E8R9CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E8R9DB01# | p157 |
|        |               |         | 9.0pF | ±0.05pF | GJM0332C1E9R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E9R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E9R0CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E9R0DB01# | p157 |
|        |               |         | 9.1pF | ±0.05pF | GJM0332C1E9R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E9R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E9R1CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E9R1DB01# | p157 |
|        |               |         | 9.2pF | ±0.05pF | GJM0332C1E9R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E9R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E9R2CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E9R2DB01# | p157 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

## GJM Series Temperature Compensating Type Part Number List

(→ 0.6×0.3mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.33mm | 25Vdc         | CH      | 9.3pF | ±0.05pF | GJM0332C1E9R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E9R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E9R3CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E9R3DB01# | p157 |
|        |               |         | 9.4pF | ±0.05pF | GJM0332C1E9R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E9R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E9R4CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E9R4DB01# | p157 |
|        |               |         | 9.5pF | ±0.05pF | GJM0332C1E9R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E9R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E9R5CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E9R5DB01# | p157 |
|        |               |         | 9.6pF | ±0.05pF | GJM0332C1E9R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E9R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E9R6CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E9R6DB01# | p157 |
|        |               |         | 9.7pF | ±0.05pF | GJM0332C1E9R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E9R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E9R7CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E9R7DB01# | p157 |
|        |               |         | 9.8pF | ±0.05pF | GJM0332C1E9R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E9R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E9R8CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E9R8DB01# | p157 |
|        |               |         | 9.9pF | ±0.05pF | GJM0332C1E9R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM0332C1E9R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM0332C1E9R9CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM0332C1E9R9DB01# | p157 |
|        |               |         | 10pF  | ±2%     | GJM0332C1E100GB01# | p157 |
|        |               |         |       | ±5%     | GJM0332C1E100JB01# | p157 |
|        |               |         | 11pF  | ±2%     | GJM0332C1E110GB01# | p157 |
|        |               |         |       | ±5%     | GJM0332C1E110JB01# | p157 |
|        |               |         | 12pF  | ±2%     | GJM0332C1E120GB01# | p157 |
|        |               |         |       | ±5%     | GJM0332C1E120JB01# | p157 |
|        |               |         | 13pF  | ±2%     | GJM0332C1E130GB01# | p157 |
|        |               |         |       | ±5%     | GJM0332C1E130JB01# | p157 |
|        |               |         | 15pF  | ±2%     | GJM0332C1E150GB01# | p157 |
|        |               |         |       | ±5%     | GJM0332C1E150JB01# | p157 |
|        |               |         | 16pF  | ±2%     | GJM0332C1E160GB01# | p157 |
|        |               |         |       | ±5%     | GJM0332C1E160JB01# | p157 |
|        |               |         | 18pF  | ±2%     | GJM0332C1E180GB01# | p157 |
|        |               |         |       | ±5%     | GJM0332C1E180JB01# | p157 |
|        |               |         | 20pF  | ±2%     | GJM0332C1E200GB01# | p157 |
|        |               |         |       | ±5%     | GJM0332C1E200JB01# | p157 |
|        |               |         | 22pF  | ±2%     | GJM0332C1E220GB01# | p157 |
|        |               |         |       | ±5%     | GJM0332C1E220JB01# | p157 |
|        |               |         | 24pF  | ±2%     | GJM0332C1E240GB01# | p157 |
|        |               |         |       | ±5%     | GJM0332C1E240JB01# | p157 |
|        |               |         | 27pF  | ±2%     | GJM0332C1E270GB01# | p157 |
|        |               |         |       | ±5%     | GJM0332C1E270JB01# | p157 |
|        |               |         | 30pF  | ±2%     | GJM0332C1E300GB01# | p157 |
|        |               |         |       | ±5%     | GJM0332C1E300JB01# | p157 |
|        |               |         | 33pF  | ±2%     | GJM0332C1E330GB01# | p157 |
|        |               |         |       | ±5%     | GJM0332C1E330JB01# | p157 |

1.0×0.5mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol.    | Part Number        | p*   |
|--------|---------------|---------|--------|---------|--------------------|------|
| 0.55mm | 50Vdc         | COG     | 0.10pF | ±0.05pF | GJM1555C1HR10WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1555C1HR10BB01# | p157 |
|        |               |         | 0.20pF | ±0.05pF | GJM1555C1HR20WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1555C1HR20BB01# | p157 |
|        |               |         | 0.30pF | ±0.05pF | GJM1555C1HR30WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1555C1HR30BB01# | p157 |
|        |               |         | 0.40pF | ±0.05pF | GJM1555C1HR40WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1555C1HR40BB01# | p157 |
|        |               |         | 0.50pF | ±0.05pF | GJM1555C1HR50WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1555C1HR50BB01# | p157 |
|        |               |         | 0.60pF | ±0.05pF | GJM1555C1HR60WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1555C1HR60BB01# | p157 |
|        |               |         | 0.70pF | ±0.05pF | GJM1555C1HR70WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1555C1HR70BB01# | p157 |
|        |               |         | 0.80pF | ±0.05pF | GJM1555C1HR80WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1555C1HR80BB01# | p157 |
|        |               |         | 0.90pF | ±0.05pF | GJM1555C1HR90WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1555C1HR90BB01# | p157 |
|        |               |         | 1.0pF  | ±0.05pF | GJM1555C1H1R0WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1555C1H1R0BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM1555C1H1R0CB01# | p157 |
|        |               |         | 1.1pF  | ±0.05pF | GJM1555C1H1R1WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1555C1H1R1BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM1555C1H1R1CB01# | p157 |
|        |               |         | 1.2pF  | ±0.05pF | GJM1555C1H1R2WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1555C1H1R2BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM1555C1H1R2CB01# | p157 |
|        |               |         | 1.3pF  | ±0.05pF | GJM1555C1H1R3WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1555C1H1R3BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM1555C1H1R3CB01# | p157 |
|        |               |         | 1.4pF  | ±0.05pF | GJM1555C1H1R4WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1555C1H1R4BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM1555C1H1R4CB01# | p157 |
|        |               |         | 1.5pF  | ±0.05pF | GJM1555C1H1R5WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1555C1H1R5BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM1555C1H1R5CB01# | p157 |
|        |               |         | 1.6pF  | ±0.05pF | GJM1555C1H1R6WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1555C1H1R6BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM1555C1H1R6CB01# | p157 |
|        |               |         | 1.7pF  | ±0.05pF | GJM1555C1H1R7WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1555C1H1R7BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM1555C1H1R7CB01# | p157 |
|        |               |         | 1.8pF  | ±0.05pF | GJM1555C1H1R8WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1555C1H1R8BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM1555C1H1R8CB01# | p157 |
|        |               |         | 1.9pF  | ±0.05pF | GJM1555C1H1R9WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1555C1H1R9BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM1555C1H1R9CB01# | p157 |
|        |               |         | 2.0pF  | ±0.05pF | GJM1555C1H2R0WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1555C1H2R0BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM1555C1H2R0CB01# | p157 |
|        |               |         | 2.1pF  | ±0.05pF | GJM1555C1H2R1WB01# | p157 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

## GJM Series Temperature Compensating Type Part Number List

(→ 1.0×0.5mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.55mm | 50Vdc         | COG     | 2.1pF | ±0.1pF  | GJM1555C1H2R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H2R1CB01# | p157 |
|        |               |         | 2.2pF | ±0.05pF | GJM1555C1H2R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H2R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H2R2CB01# | p157 |
|        |               |         | 2.3pF | ±0.05pF | GJM1555C1H2R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H2R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H2R3CB01# | p157 |
|        |               |         | 2.4pF | ±0.05pF | GJM1555C1H2R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H2R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H2R4CB01# | p157 |
|        |               |         | 2.5pF | ±0.05pF | GJM1555C1H2R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H2R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H2R5CB01# | p157 |
|        |               |         | 2.6pF | ±0.05pF | GJM1555C1H2R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H2R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H2R6CB01# | p157 |
|        |               |         | 2.7pF | ±0.05pF | GJM1555C1H2R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H2R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H2R7CB01# | p157 |
|        |               |         | 2.8pF | ±0.05pF | GJM1555C1H2R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H2R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H2R8CB01# | p157 |
|        |               |         | 2.9pF | ±0.05pF | GJM1555C1H2R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H2R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H2R9CB01# | p157 |
|        |               |         | 3.0pF | ±0.05pF | GJM1555C1H3R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H3R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H3R0CB01# | p157 |
|        |               |         | 3.1pF | ±0.05pF | GJM1555C1H3R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H3R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H3R1CB01# | p157 |
|        |               |         | 3.2pF | ±0.05pF | GJM1555C1H3R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H3R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H3R2CB01# | p157 |
|        |               |         | 3.3pF | ±0.05pF | GJM1555C1H3R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H3R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H3R3CB01# | p157 |
|        |               |         | 3.4pF | ±0.05pF | GJM1555C1H3R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H3R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H3R4CB01# | p157 |
|        |               |         | 3.5pF | ±0.05pF | GJM1555C1H3R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H3R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H3R5CB01# | p157 |
|        |               |         | 3.6pF | ±0.05pF | GJM1555C1H3R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H3R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H3R6CB01# | p157 |
|        |               |         | 3.7pF | ±0.05pF | GJM1555C1H3R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H3R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H3R7CB01# | p157 |
|        |               |         | 3.8pF | ±0.05pF | GJM1555C1H3R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H3R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H3R8CB01# | p157 |
|        |               |         | 3.9pF | ±0.05pF | GJM1555C1H3R9WB01# | p157 |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.55mm | 50Vdc         | COG     | 3.9pF | ±0.1pF  | GJM1555C1H3R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H3R9CB01# | p157 |
|        |               |         | 4.0pF | ±0.05pF | GJM1555C1H4R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H4R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H4R0CB01# | p157 |
|        |               |         | 4.1pF | ±0.05pF | GJM1555C1H4R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H4R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H4R1CB01# | p157 |
|        |               |         | 4.2pF | ±0.05pF | GJM1555C1H4R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H4R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H4R2CB01# | p157 |
|        |               |         | 4.3pF | ±0.05pF | GJM1555C1H4R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H4R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H4R3CB01# | p157 |
|        |               |         | 4.4pF | ±0.05pF | GJM1555C1H4R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H4R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H4R4CB01# | p157 |
|        |               |         | 4.5pF | ±0.05pF | GJM1555C1H4R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H4R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H4R5CB01# | p157 |
|        |               |         | 4.6pF | ±0.05pF | GJM1555C1H4R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H4R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H4R6CB01# | p157 |
|        |               |         | 4.7pF | ±0.05pF | GJM1555C1H4R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H4R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H4R7CB01# | p157 |
|        |               |         | 4.8pF | ±0.05pF | GJM1555C1H4R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H4R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H4R8CB01# | p157 |
|        |               |         | 4.9pF | ±0.05pF | GJM1555C1H4R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H4R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H4R9CB01# | p157 |
|        |               |         | 5.0pF | ±0.05pF | GJM1555C1H5R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H5R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H5R0CB01# | p157 |
|        |               |         | 5.1pF | ±0.05pF | GJM1555C1H5R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H5R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H5R1CB01# | p157 |
|        |               |         | 5.2pF | ±0.05pF | GJM1555C1H5R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H5R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H5R2CB01# | p157 |
|        |               |         | 5.3pF | ±0.05pF | GJM1555C1H5R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H5R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H5R3CB01# | p157 |
|        |               |         | 5.4pF | ±0.05pF | GJM1555C1H5R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H5R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H5R4CB01# | p157 |
|        |               |         | 5.5pF | ±0.05pF | GJM1555C1H5R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H5R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H5R5CB01# | p157 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

## GJM Series Temperature Compensating Type Part Number List

(→ 1.0×0.5mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.55mm | 50Vdc         | COG     | 5.5pF | ±0.5pF  | GJM1555C1H5R5DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1555C1H5R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H5R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H5R6CB01# | p157 |
|        |               |         | 5.6pF | ±0.5pF  | GJM1555C1H5R6DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1555C1H5R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H5R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H5R7CB01# | p157 |
|        |               |         | 5.7pF | ±0.5pF  | GJM1555C1H5R7DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1555C1H5R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H5R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H5R8CB01# | p157 |
|        |               |         | 5.8pF | ±0.5pF  | GJM1555C1H5R8DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1555C1H5R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H5R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H5R9CB01# | p157 |
|        |               |         | 5.9pF | ±0.5pF  | GJM1555C1H5R9DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1555C1H6R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H6R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H6R0CB01# | p157 |
|        |               |         | 6.0pF | ±0.5pF  | GJM1555C1H6R0DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1555C1H6R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H6R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H6R1CB01# | p157 |
|        |               |         | 6.1pF | ±0.5pF  | GJM1555C1H6R1DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1555C1H6R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H6R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H6R2CB01# | p157 |
|        |               |         | 6.2pF | ±0.5pF  | GJM1555C1H6R2DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1555C1H6R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H6R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H6R3CB01# | p157 |
|        |               |         | 6.3pF | ±0.5pF  | GJM1555C1H6R3DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1555C1H6R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H6R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H6R4CB01# | p157 |
|        |               |         | 6.4pF | ±0.5pF  | GJM1555C1H6R4DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1555C1H6R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H6R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H6R5CB01# | p157 |
|        |               |         | 6.5pF | ±0.5pF  | GJM1555C1H6R5DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1555C1H6R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H6R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H6R6CB01# | p157 |
|        |               |         | 6.6pF | ±0.5pF  | GJM1555C1H6R6DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1555C1H6R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H6R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H6R7CB01# | p157 |
|        |               |         | 6.7pF | ±0.5pF  | GJM1555C1H6R7DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1555C1H6R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H6R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H6R8CB01# | p157 |
|        |               |         | 6.8pF | ±0.5pF  | GJM1555C1H6R8DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1555C1H6R9WB01# | p157 |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.55mm | 50Vdc         | COG     | 6.9pF | ±0.1pF  | GJM1555C1H6R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H6R9CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H6R9DB01# | p157 |
|        |               |         | 7.0pF | ±0.05pF | GJM1555C1H7R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H7R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H7R0CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H7R0DB01# | p157 |
|        |               |         | 7.1pF | ±0.05pF | GJM1555C1H7R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H7R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H7R1CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H7R1DB01# | p157 |
|        |               |         | 7.2pF | ±0.05pF | GJM1555C1H7R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H7R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H7R2CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H7R2DB01# | p157 |
|        |               |         | 7.3pF | ±0.05pF | GJM1555C1H7R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H7R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H7R3CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H7R3DB01# | p157 |
|        |               |         | 7.4pF | ±0.05pF | GJM1555C1H7R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H7R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H7R4CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H7R4DB01# | p157 |
|        |               |         | 7.5pF | ±0.05pF | GJM1555C1H7R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H7R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H7R5CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H7R5DB01# | p157 |
|        |               |         | 7.6pF | ±0.05pF | GJM1555C1H7R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H7R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H7R6CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H7R6DB01# | p157 |
|        |               |         | 7.7pF | ±0.05pF | GJM1555C1H7R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H7R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H7R7CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H7R7DB01# | p157 |
|        |               |         | 7.8pF | ±0.05pF | GJM1555C1H7R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H7R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H7R8CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H7R8DB01# | p157 |
|        |               |         | 7.9pF | ±0.05pF | GJM1555C1H7R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H7R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H7R9CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H7R9DB01# | p157 |
|        |               |         | 8.0pF | ±0.05pF | GJM1555C1H8R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H8R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H8R0CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H8R0DB01# | p157 |
|        |               |         | 8.1pF | ±0.05pF | GJM1555C1H8R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H8R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H8R1CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H8R1DB01# | p157 |
|        |               |         | 8.2pF | ±0.05pF | GJM1555C1H8R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H8R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H8R2CB01# | p157 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

## GJM Series Temperature Compensating Type Part Number List

(→ 1.0×0.5mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.55mm | 50Vdc         | COG     | 8.2pF | ±0.5pF  | GJM1555C1H8R2DB01# | p157 |
|        |               |         | 8.3pF | ±0.05pF | GJM1555C1H8R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H8R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H8R3CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H8R3DB01# | p157 |
|        |               |         | 8.4pF | ±0.05pF | GJM1555C1H8R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H8R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H8R4CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H8R4DB01# | p157 |
|        |               |         | 8.5pF | ±0.05pF | GJM1555C1H8R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H8R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H8R5CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H8R5DB01# | p157 |
|        |               |         | 8.6pF | ±0.05pF | GJM1555C1H8R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H8R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H8R6CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H8R6DB01# | p157 |
|        |               |         | 8.7pF | ±0.05pF | GJM1555C1H8R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H8R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H8R7CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H8R7DB01# | p157 |
|        |               |         | 8.8pF | ±0.05pF | GJM1555C1H8R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H8R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H8R8CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H8R8DB01# | p157 |
|        |               |         | 8.9pF | ±0.05pF | GJM1555C1H8R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H8R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H8R9CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H8R9DB01# | p157 |
|        |               |         | 9.0pF | ±0.05pF | GJM1555C1H9R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H9R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H9R0CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H9R0DB01# | p157 |
|        |               |         | 9.1pF | ±0.05pF | GJM1555C1H9R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H9R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H9R1CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H9R1DB01# | p157 |
|        |               |         | 9.2pF | ±0.05pF | GJM1555C1H9R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H9R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H9R2CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H9R2DB01# | p157 |
|        |               |         | 9.3pF | ±0.05pF | GJM1555C1H9R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H9R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H9R3CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H9R3DB01# | p157 |
|        |               |         | 9.4pF | ±0.05pF | GJM1555C1H9R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H9R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H9R4CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H9R4DB01# | p157 |
|        |               |         | 9.5pF | ±0.05pF | GJM1555C1H9R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H9R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H9R5CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H9R5DB01# | p157 |
|        |               |         | 9.6pF | ±0.05pF | GJM1555C1H9R6WB01# | p157 |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.55mm | 50Vdc         | COG     | 9.6pF | ±0.1pF  | GJM1555C1H9R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H9R6CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H9R6DB01# | p157 |
|        |               |         | 9.7pF | ±0.05pF | GJM1555C1H9R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H9R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H9R7CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H9R7DB01# | p157 |
|        |               |         | 9.8pF | ±0.05pF | GJM1555C1H9R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H9R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H9R8CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H9R8DB01# | p157 |
|        |               |         | 9.9pF | ±0.05pF | GJM1555C1H9R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1555C1H9R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1555C1H9R9CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1555C1H9R9DB01# | p157 |
|        |               |         | 10pF  | ±2%     | GJM1555C1H100GB01# | p157 |
|        |               |         |       | ±5%     | GJM1555C1H100JB01# | p157 |
|        |               |         | 11pF  | ±2%     | GJM1555C1H110GB01# | p157 |
|        |               |         |       | ±5%     | GJM1555C1H110JB01# | p157 |
|        |               |         | 12pF  | ±2%     | GJM1555C1H120GB01# | p157 |
|        |               |         |       | ±5%     | GJM1555C1H120JB01# | p157 |
|        |               |         | 13pF  | ±2%     | GJM1555C1H130GB01# | p157 |
|        |               |         |       | ±5%     | GJM1555C1H130JB01# | p157 |
|        |               |         | 15pF  | ±2%     | GJM1555C1H150GB01# | p157 |
|        |               |         |       | ±5%     | GJM1555C1H150JB01# | p157 |
|        |               |         | 16pF  | ±2%     | GJM1555C1H160GB01# | p157 |
|        |               |         |       | ±5%     | GJM1555C1H160JB01# | p157 |
|        |               |         | 18pF  | ±2%     | GJM1555C1H180GB01# | p157 |
|        |               |         |       | ±5%     | GJM1555C1H180JB01# | p157 |
|        |               |         | 20pF  | ±2%     | GJM1555C1H200GB01# | p157 |
|        |               |         |       | ±5%     | GJM1555C1H200JB01# | p157 |
|        |               |         | 22pF  | ±1%     | GJM1555C1H220FB01# | p157 |
|        |               |         |       | ±2%     | GJM1555C1H220GB01# | p157 |
|        |               |         |       | ±5%     | GJM1555C1H220JB01# | p157 |
|        |               |         | 24pF  | ±1%     | GJM1555C1H240FB01# | p157 |
|        |               |         |       | ±2%     | GJM1555C1H240GB01# | p157 |
|        |               |         |       | ±5%     | GJM1555C1H240JB01# | p157 |
|        |               |         | 27pF  | ±1%     | GJM1555C1H270FB01# | p157 |
|        |               |         |       | ±2%     | GJM1555C1H270GB01# | p157 |
|        |               |         |       | ±5%     | GJM1555C1H270JB01# | p157 |
|        |               |         | 30pF  | ±1%     | GJM1555C1H300FB01# | p157 |
|        |               |         |       | ±2%     | GJM1555C1H300GB01# | p157 |
|        |               |         |       | ±5%     | GJM1555C1H300JB01# | p157 |
|        |               |         | 33pF  | ±1%     | GJM1555C1H330FB01# | p157 |
|        |               |         |       | ±2%     | GJM1555C1H330GB01# | p157 |
|        |               |         |       | ±5%     | GJM1555C1H330JB01# | p157 |
|        |               |         | 36pF  | ±1%     | GJM1555C1H360FB01# | p157 |
|        |               |         |       | ±2%     | GJM1555C1H360GB01# | p157 |
|        |               |         |       | ±5%     | GJM1555C1H360JB01# | p157 |
|        |               |         | 39pF  | ±1%     | GJM1555C1H390FB01# | p157 |
|        |               |         |       | ±2%     | GJM1555C1H390GB01# | p157 |
|        |               |         |       | ±5%     | GJM1555C1H390JB01# | p157 |
|        |               |         | 43pF  | ±1%     | GJM1555C1H430FB01# | p157 |
|        |               |         |       | ±2%     | GJM1555C1H430GB01# | p157 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

## GJM Series Temperature Compensating Type Part Number List

(→ 1.0×0.5mm)

| T max. | Rated Voltage | TC Code | Cap.   | Tol.    | Part Number        | p*   |
|--------|---------------|---------|--------|---------|--------------------|------|
| 0.55mm | 50Vdc         | COG     | 43pF   | ±5%     | GJM1555C1H430JB01# | p157 |
|        |               |         |        | ±1%     | GJM1555C1H470FB01# | p157 |
|        |               |         |        | ±2%     | GJM1555C1H470GB01# | p157 |
|        |               |         |        | ±5%     | GJM1555C1H470JB01# | p157 |
|        |               | CK      | 0.10pF | ±0.05pF | GJM1554C1HR10WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1554C1HR10BB01# | p157 |
|        |               |         | 0.20pF | ±0.05pF | GJM1554C1HR20WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1554C1HR20BB01# | p157 |
|        |               |         | 0.30pF | ±0.05pF | GJM1554C1HR30WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1554C1HR30BB01# | p157 |
|        |               |         | 0.40pF | ±0.05pF | GJM1554C1HR40WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1554C1HR40BB01# | p157 |
|        |               |         | 0.50pF | ±0.05pF | GJM1554C1HR50WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1554C1HR50BB01# | p157 |
|        |               |         | 0.60pF | ±0.05pF | GJM1554C1HR60WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1554C1HR60BB01# | p157 |
|        |               |         | 0.70pF | ±0.05pF | GJM1554C1HR70WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1554C1HR70BB01# | p157 |
|        |               |         | 0.80pF | ±0.05pF | GJM1554C1HR80WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1554C1HR80BB01# | p157 |
|        |               |         | 0.90pF | ±0.05pF | GJM1554C1HR90WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1554C1HR90BB01# | p157 |
|        |               |         | 1.0pF  | ±0.05pF | GJM1554C1H1R0WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1554C1H1R0BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM1554C1H1R0CB01# | p157 |
|        |               |         | 1.1pF  | ±0.05pF | GJM1554C1H1R1WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1554C1H1R1BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM1554C1H1R1CB01# | p157 |
|        |               |         | 1.2pF  | ±0.05pF | GJM1554C1H1R2WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1554C1H1R2BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM1554C1H1R2CB01# | p157 |
|        |               |         | 1.3pF  | ±0.05pF | GJM1554C1H1R3WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1554C1H1R3BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM1554C1H1R3CB01# | p157 |
|        |               |         | 1.4pF  | ±0.05pF | GJM1554C1H1R4WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1554C1H1R4BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM1554C1H1R4CB01# | p157 |
|        |               |         | 1.5pF  | ±0.05pF | GJM1554C1H1R5WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1554C1H1R5BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM1554C1H1R5CB01# | p157 |
|        |               |         | 1.6pF  | ±0.05pF | GJM1554C1H1R6WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1554C1H1R6BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM1554C1H1R6CB01# | p157 |
|        |               |         | 1.7pF  | ±0.05pF | GJM1554C1H1R7WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1554C1H1R7BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM1554C1H1R7CB01# | p157 |
|        |               |         | 1.8pF  | ±0.05pF | GJM1554C1H1R8WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1554C1H1R8BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM1554C1H1R8CB01# | p157 |
|        |               |         | 1.9pF  | ±0.05pF | GJM1554C1H1R9WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1554C1H1R9BB01# | p157 |
|        |               |         |        | ±0.25pF | GJM1554C1H1R9CB01# | p157 |
|        |               |         | 2.0pF  | ±0.05pF | GJM1554C1H2R0WB01# | p157 |
|        |               |         |        | ±0.1pF  | GJM1554C1H2R0BB01# | p157 |

| T max. | Rated Voltage | TC Code | Cap.    | Tol.               | Part Number        | p*                 |
|--------|---------------|---------|---------|--------------------|--------------------|--------------------|
| 0.55mm | 50Vdc         | CK      | 2.0pF   | ±0.25pF            | GJM1554C1H2R0CB01# | p157               |
|        |               |         | CJ      | 2.1pF              | ±0.05pF            | GJM1553C1H2R1WB01# |
|        |               | ±0.1pF  |         |                    | GJM1553C1H2R1BB01# | p157               |
|        |               | ±0.25pF |         |                    | GJM1553C1H2R1CB01# | p157               |
|        |               | 2.2pF   |         | ±0.05pF            | GJM1553C1H2R2WB01# | p157               |
|        |               |         | ±0.1pF  | GJM1553C1H2R2BB01# | p157               |                    |
|        |               |         | ±0.25pF | GJM1553C1H2R2CB01# | p157               |                    |
|        |               | 2.3pF   | ±0.05pF | GJM1553C1H2R3WB01# | p157               |                    |
|        |               |         | ±0.1pF  | GJM1553C1H2R3BB01# | p157               |                    |
|        |               |         | ±0.25pF | GJM1553C1H2R3CB01# | p157               |                    |
|        |               | 2.4pF   | ±0.05pF | GJM1553C1H2R4WB01# | p157               |                    |
|        |               |         | ±0.1pF  | GJM1553C1H2R4BB01# | p157               |                    |
|        |               |         | ±0.25pF | GJM1553C1H2R4CB01# | p157               |                    |
|        |               | 2.5pF   | ±0.05pF | GJM1553C1H2R5WB01# | p157               |                    |
|        |               |         | ±0.1pF  | GJM1553C1H2R5BB01# | p157               |                    |
|        |               |         | ±0.25pF | GJM1553C1H2R5CB01# | p157               |                    |
|        |               | 2.6pF   | ±0.05pF | GJM1553C1H2R6WB01# | p157               |                    |
|        |               |         | ±0.1pF  | GJM1553C1H2R6BB01# | p157               |                    |
|        |               |         | ±0.25pF | GJM1553C1H2R6CB01# | p157               |                    |
|        |               | 2.7pF   | ±0.05pF | GJM1553C1H2R7WB01# | p157               |                    |
|        |               |         | ±0.1pF  | GJM1553C1H2R7BB01# | p157               |                    |
|        |               |         | ±0.25pF | GJM1553C1H2R7CB01# | p157               |                    |
|        |               | 2.8pF   | ±0.05pF | GJM1553C1H2R8WB01# | p157               |                    |
|        |               |         | ±0.1pF  | GJM1553C1H2R8BB01# | p157               |                    |
|        |               |         | ±0.25pF | GJM1553C1H2R8CB01# | p157               |                    |
|        |               | 2.9pF   | ±0.05pF | GJM1553C1H2R9WB01# | p157               |                    |
|        |               |         | ±0.1pF  | GJM1553C1H2R9BB01# | p157               |                    |
|        |               |         | ±0.25pF | GJM1553C1H2R9CB01# | p157               |                    |
|        |               | 3.0pF   | ±0.05pF | GJM1553C1H3R0WB01# | p157               |                    |
|        |               |         | ±0.1pF  | GJM1553C1H3R0BB01# | p157               |                    |
|        |               |         | ±0.25pF | GJM1553C1H3R0CB01# | p157               |                    |
|        |               | 3.1pF   | ±0.05pF | GJM1553C1H3R1WB01# | p157               |                    |
|        |               |         | ±0.1pF  | GJM1553C1H3R1BB01# | p157               |                    |
|        |               |         | ±0.25pF | GJM1553C1H3R1CB01# | p157               |                    |
|        |               | 3.2pF   | ±0.05pF | GJM1553C1H3R2WB01# | p157               |                    |
|        |               |         | ±0.1pF  | GJM1553C1H3R2BB01# | p157               |                    |
|        |               |         | ±0.25pF | GJM1553C1H3R2CB01# | p157               |                    |
|        |               | 3.3pF   | ±0.05pF | GJM1553C1H3R3WB01# | p157               |                    |
|        |               |         | ±0.1pF  | GJM1553C1H3R3BB01# | p157               |                    |
|        |               |         | ±0.25pF | GJM1553C1H3R3CB01# | p157               |                    |
|        |               | 3.4pF   | ±0.05pF | GJM1553C1H3R4WB01# | p157               |                    |
|        |               |         | ±0.1pF  | GJM1553C1H3R4BB01# | p157               |                    |
|        |               |         | ±0.25pF | GJM1553C1H3R4CB01# | p157               |                    |
|        |               | 3.5pF   | ±0.05pF | GJM1553C1H3R5WB01# | p157               |                    |
|        |               |         | ±0.1pF  | GJM1553C1H3R5BB01# | p157               |                    |
|        |               |         | ±0.25pF | GJM1553C1H3R5CB01# | p157               |                    |
|        |               | 3.6pF   | ±0.05pF | GJM1553C1H3R6WB01# | p157               |                    |
|        |               |         | ±0.1pF  | GJM1553C1H3R6BB01# | p157               |                    |
|        |               |         | ±0.25pF | GJM1553C1H3R6CB01# | p157               |                    |
|        |               | 3.7pF   | ±0.05pF | GJM1553C1H3R7WB01# | p157               |                    |
|        |               |         | ±0.1pF  | GJM1553C1H3R7BB01# | p157               |                    |
|        |               |         | ±0.25pF | GJM1553C1H3R7CB01# | p157               |                    |
|        |               | 3.8pF   | ±0.05pF | GJM1553C1H3R8WB01# | p157               |                    |
|        |               |         | ±0.1pF  | GJM1553C1H3R8BB01# | p157               |                    |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

## GJM Series Temperature Compensating Type Part Number List

(→ 1.0×0.5mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.55mm | 50Vdc         | CJ      | 3.8pF | ±0.25pF | GJM1553C1H3R8CB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1553C1H3R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1553C1H3R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1553C1H3R9CB01# | p157 |
|        |               | CH      | 4.0pF | ±0.05pF | GJM1552C1H4R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H4R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H4R0CB01# | p157 |
|        |               |         | 4.1pF | ±0.05pF | GJM1552C1H4R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H4R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H4R1CB01# | p157 |
|        |               |         | 4.2pF | ±0.05pF | GJM1552C1H4R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H4R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H4R2CB01# | p157 |
|        |               |         | 4.3pF | ±0.05pF | GJM1552C1H4R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H4R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H4R3CB01# | p157 |
|        |               |         | 4.4pF | ±0.05pF | GJM1552C1H4R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H4R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H4R4CB01# | p157 |
|        |               |         | 4.5pF | ±0.05pF | GJM1552C1H4R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H4R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H4R5CB01# | p157 |
|        |               |         | 4.6pF | ±0.05pF | GJM1552C1H4R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H4R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H4R6CB01# | p157 |
|        |               |         | 4.7pF | ±0.05pF | GJM1552C1H4R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H4R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H4R7CB01# | p157 |
|        |               |         | 4.8pF | ±0.05pF | GJM1552C1H4R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H4R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H4R8CB01# | p157 |
|        |               |         | 4.9pF | ±0.05pF | GJM1552C1H4R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H4R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H4R9CB01# | p157 |
|        |               |         | 5.0pF | ±0.05pF | GJM1552C1H5R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H5R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H5R0CB01# | p157 |
|        |               |         | 5.1pF | ±0.05pF | GJM1552C1H5R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H5R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H5R1CB01# | p157 |
|        |               |         | 5.2pF | ±0.05pF | GJM1552C1H5R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H5R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H5R2CB01# | p157 |
|        |               |         | 5.3pF | ±0.05pF | GJM1552C1H5R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H5R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H5R3CB01# | p157 |
|        |               |         | 5.4pF | ±0.05pF | GJM1552C1H5R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H5R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H5R4CB01# | p157 |
|        |               |         | 5.5pF | ±0.05pF | GJM1552C1H5R5WB01# | p157 |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.55mm | 50Vdc         | CH      | 5.5pF | ±0.1pF  | GJM1552C1H5R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H5R5CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H5R5DB01# | p157 |
|        |               |         | 5.6pF | ±0.05pF | GJM1552C1H5R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H5R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H5R6CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H5R6DB01# | p157 |
|        |               |         | 5.7pF | ±0.05pF | GJM1552C1H5R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H5R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H5R7CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H5R7DB01# | p157 |
|        |               |         | 5.8pF | ±0.05pF | GJM1552C1H5R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H5R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H5R8CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H5R8DB01# | p157 |
|        |               |         | 5.9pF | ±0.05pF | GJM1552C1H5R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H5R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H5R9CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H5R9DB01# | p157 |
|        |               |         | 6.0pF | ±0.05pF | GJM1552C1H6R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H6R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H6R0CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H6R0DB01# | p157 |
|        |               |         | 6.1pF | ±0.05pF | GJM1552C1H6R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H6R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H6R1CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H6R1DB01# | p157 |
|        |               |         | 6.2pF | ±0.05pF | GJM1552C1H6R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H6R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H6R2CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H6R2DB01# | p157 |
|        |               |         | 6.3pF | ±0.05pF | GJM1552C1H6R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H6R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H6R3CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H6R3DB01# | p157 |
|        |               |         | 6.4pF | ±0.05pF | GJM1552C1H6R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H6R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H6R4CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H6R4DB01# | p157 |
|        |               |         | 6.5pF | ±0.05pF | GJM1552C1H6R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H6R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H6R5CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H6R5DB01# | p157 |
|        |               |         | 6.6pF | ±0.05pF | GJM1552C1H6R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H6R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H6R6CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H6R6DB01# | p157 |
|        |               |         | 6.7pF | ±0.05pF | GJM1552C1H6R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H6R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H6R7CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H6R7DB01# | p157 |
|        |               |         | 6.8pF | ±0.05pF | GJM1552C1H6R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H6R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H6R8CB01# | p157 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

## GJM Series Temperature Compensating Type Part Number List

(→ 1.0×0.5mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.55mm | 50Vdc         | CH      | 6.8pF | ±0.5pF  | GJM1552C1H6R8DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1552C1H6R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H6R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H6R9CB01# | p157 |
|        |               |         | 6.9pF | ±0.5pF  | GJM1552C1H6R9DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1552C1H7R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H7R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H7R0CB01# | p157 |
|        |               |         | 7.0pF | ±0.5pF  | GJM1552C1H7R0DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1552C1H7R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H7R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H7R1CB01# | p157 |
|        |               |         | 7.1pF | ±0.5pF  | GJM1552C1H7R1DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1552C1H7R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H7R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H7R2CB01# | p157 |
|        |               |         | 7.2pF | ±0.5pF  | GJM1552C1H7R2DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1552C1H7R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H7R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H7R3CB01# | p157 |
|        |               |         | 7.3pF | ±0.5pF  | GJM1552C1H7R3DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1552C1H7R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H7R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H7R4CB01# | p157 |
|        |               |         | 7.4pF | ±0.5pF  | GJM1552C1H7R4DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1552C1H7R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H7R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H7R5CB01# | p157 |
|        |               |         | 7.5pF | ±0.5pF  | GJM1552C1H7R5DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1552C1H7R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H7R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H7R6CB01# | p157 |
|        |               |         | 7.6pF | ±0.5pF  | GJM1552C1H7R6DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1552C1H7R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H7R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H7R7CB01# | p157 |
|        |               |         | 7.7pF | ±0.5pF  | GJM1552C1H7R7DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1552C1H7R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H7R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H7R8CB01# | p157 |
|        |               |         | 7.8pF | ±0.5pF  | GJM1552C1H7R8DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1552C1H7R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H7R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H7R9CB01# | p157 |
|        |               |         | 7.9pF | ±0.5pF  | GJM1552C1H7R9DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1552C1H8R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H8R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H8R0CB01# | p157 |
|        |               |         | 8.0pF | ±0.5pF  | GJM1552C1H8R0DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1552C1H8R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H8R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H8R1CB01# | p157 |
|        |               |         | 8.1pF | ±0.5pF  | GJM1552C1H8R1DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1552C1H8R2WB01# | p157 |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.55mm | 50Vdc         | CH      | 8.2pF | ±0.1pF  | GJM1552C1H8R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H8R2CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H8R2DB01# | p157 |
|        |               |         | 8.3pF | ±0.05pF | GJM1552C1H8R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H8R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H8R3CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H8R3DB01# | p157 |
|        |               |         | 8.4pF | ±0.05pF | GJM1552C1H8R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H8R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H8R4CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H8R4DB01# | p157 |
|        |               |         | 8.5pF | ±0.05pF | GJM1552C1H8R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H8R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H8R5CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H8R5DB01# | p157 |
|        |               |         | 8.6pF | ±0.05pF | GJM1552C1H8R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H8R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H8R6CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H8R6DB01# | p157 |
|        |               |         | 8.7pF | ±0.05pF | GJM1552C1H8R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H8R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H8R7CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H8R7DB01# | p157 |
|        |               |         | 8.8pF | ±0.05pF | GJM1552C1H8R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H8R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H8R8CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H8R8DB01# | p157 |
|        |               |         | 8.9pF | ±0.05pF | GJM1552C1H8R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H8R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H8R9CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H8R9DB01# | p157 |
|        |               |         | 9.0pF | ±0.05pF | GJM1552C1H9R0WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H9R0BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H9R0CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H9R0DB01# | p157 |
|        |               |         | 9.1pF | ±0.05pF | GJM1552C1H9R1WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H9R1BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H9R1CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H9R1DB01# | p157 |
|        |               |         | 9.2pF | ±0.05pF | GJM1552C1H9R2WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H9R2BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H9R2CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H9R2DB01# | p157 |
|        |               |         | 9.3pF | ±0.05pF | GJM1552C1H9R3WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H9R3BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H9R3CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H9R3DB01# | p157 |
|        |               |         | 9.4pF | ±0.05pF | GJM1552C1H9R4WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H9R4BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H9R4CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H9R4DB01# | p157 |
|        |               |         | 9.5pF | ±0.05pF | GJM1552C1H9R5WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H9R5BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H9R5CB01# | p157 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

## GJM Series Temperature Compensating Type Part Number List

(→ 1.0×0.5mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.55mm | 50Vdc         | CH      | 9.5pF | ±0.5pF  | GJM1552C1H9R5DB01# | p157 |
|        |               |         |       | ±0.05pF | GJM1552C1H9R6WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H9R6BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H9R6CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H9R6DB01# | p157 |
|        |               |         | 9.7pF | ±0.05pF | GJM1552C1H9R7WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H9R7BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H9R7CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H9R7DB01# | p157 |
|        |               |         | 9.8pF | ±0.05pF | GJM1552C1H9R8WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H9R8BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H9R8CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H9R8DB01# | p157 |
|        |               |         | 9.9pF | ±0.05pF | GJM1552C1H9R9WB01# | p157 |
|        |               |         |       | ±0.1pF  | GJM1552C1H9R9BB01# | p157 |
|        |               |         |       | ±0.25pF | GJM1552C1H9R9CB01# | p157 |
|        |               |         |       | ±0.5pF  | GJM1552C1H9R9DB01# | p157 |
|        |               |         | 10pF  | ±2%     | GJM1552C1H100GB01# | p157 |
|        |               |         |       | ±5%     | GJM1552C1H100JB01# | p157 |
|        |               |         | 11pF  | ±2%     | GJM1552C1H110GB01# | p157 |
|        |               |         |       | ±5%     | GJM1552C1H110JB01# | p157 |
|        |               |         | 12pF  | ±2%     | GJM1552C1H120GB01# | p157 |
|        |               |         |       | ±5%     | GJM1552C1H120JB01# | p157 |
|        |               |         | 13pF  | ±2%     | GJM1552C1H130GB01# | p157 |
|        |               |         |       | ±5%     | GJM1552C1H130JB01# | p157 |
|        |               |         | 15pF  | ±2%     | GJM1552C1H150GB01# | p157 |
|        |               |         |       | ±5%     | GJM1552C1H150JB01# | p157 |
|        |               |         | 16pF  | ±2%     | GJM1552C1H160GB01# | p157 |
|        |               |         |       | ±5%     | GJM1552C1H160JB01# | p157 |
|        |               |         | 18pF  | ±2%     | GJM1552C1H180GB01# | p157 |
|        |               |         |       | ±5%     | GJM1552C1H180JB01# | p157 |
|        |               |         | 20pF  | ±2%     | GJM1552C1H200GB01# | p157 |
|        |               |         |       | ±5%     | GJM1552C1H200JB01# | p157 |
|        |               |         | 22pF  | ±1%     | GJM1552C1H220FB01# | p157 |
|        |               |         |       | ±2%     | GJM1552C1H220GB01# | p157 |
|        |               |         |       | ±5%     | GJM1552C1H220JB01# | p157 |
|        |               |         | 24pF  | ±1%     | GJM1552C1H240FB01# | p157 |
|        |               |         |       | ±2%     | GJM1552C1H240GB01# | p157 |
|        |               |         |       | ±5%     | GJM1552C1H240JB01# | p157 |
|        |               |         | 27pF  | ±1%     | GJM1552C1H270FB01# | p157 |
|        |               |         |       | ±2%     | GJM1552C1H270GB01# | p157 |
|        |               |         |       | ±5%     | GJM1552C1H270JB01# | p157 |
|        |               |         | 30pF  | ±1%     | GJM1552C1H300FB01# | p157 |
|        |               |         |       | ±2%     | GJM1552C1H300GB01# | p157 |
|        |               |         |       | ±5%     | GJM1552C1H300JB01# | p157 |
|        |               |         | 33pF  | ±1%     | GJM1552C1H330FB01# | p157 |
|        |               |         |       | ±2%     | GJM1552C1H330GB01# | p157 |
|        |               |         |       | ±5%     | GJM1552C1H330JB01# | p157 |
|        |               |         | 36pF  | ±1%     | GJM1552C1H360FB01# | p157 |
|        |               |         |       | ±2%     | GJM1552C1H360GB01# | p157 |
|        |               |         |       | ±5%     | GJM1552C1H360JB01# | p157 |
|        |               |         | 39pF  | ±1%     | GJM1552C1H390FB01# | p157 |
|        |               |         |       | ±2%     | GJM1552C1H390GB01# | p157 |
|        |               |         |       | ±5%     | GJM1552C1H390JB01# | p157 |

| T max. | Rated Voltage | TC Code | Cap. | Tol. | Part Number        | p*   |
|--------|---------------|---------|------|------|--------------------|------|
| 0.55mm | 50Vdc         | CH      | 43pF | ±1%  | GJM1552C1H430FB01# | p157 |
|        |               |         |      | ±2%  | GJM1552C1H430GB01# | p157 |
|        |               |         |      | ±5%  | GJM1552C1H430JB01# | p157 |
|        |               |         | 47pF | ±1%  | GJM1552C1H470FB01# | p157 |
|        |               |         |      | ±2%  | GJM1552C1H470GB01# | p157 |
|        |               |         |      | ±5%  | GJM1552C1H470JB01# | p157 |
|        |               |         |      |      |                    |      |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

1

# GJM Series Specifications and Test Methods (1)

| No              | Item                                       |                    | Specification                                                                                                                                                                                                  | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             |                   |         |                    |            |                         |       |                    |   |                         |   |                    |
|-----------------|--------------------------------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------------|---------|--------------------|------------|-------------------------|-------|--------------------|---|-------------------------|---|--------------------|
| 1               | Rated Voltage                              |                    | Shown in Rated value.                                                                                                                                                                                          | The rated voltage is defined as the maximum voltage which may be applied continuously to the capacitor.<br>When AC voltage is superimposed on DC voltage, $V^{P-P}$ or $V^{O-P}$ , whichever is larger, should be maintained within the rated voltage range.                                                                                                                                                                                                                                                                                                                                                                                  |             |                   |         |                    |            |                         |       |                    |   |                         |   |                    |
| 2               | Appearance                                 |                    | No defects or abnormalities.                                                                                                                                                                                   | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                   |         |                    |            |                         |       |                    |   |                         |   |                    |
| 3               | Dimension                                  |                    | Within the specified dimensions.                                                                                                                                                                               | Using Measuring instrument of dimension.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |                   |         |                    |            |                         |       |                    |   |                         |   |                    |
| 4               | Impulse Voltage                            |                    | No defects or abnormalities.                                                                                                                                                                                   | Measurement Point: Between the terminations<br>Test Voltage: 300% of the rated voltage<br>Applied Time: 1 to 5s<br>Charge/discharge current: 50mA max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |                   |         |                    |            |                         |       |                    |   |                         |   |                    |
| 5               | Insulation Resistance (I.R.)               |                    | $C \leq 0.047\mu F$ : More than 10000MΩ<br>$C > 0.047\mu F$ : More than $500\Omega \cdot F$<br>C: Nominal Capacitance                                                                                          | Measurement Point: Between the terminations<br>Measurement Voltage: DC Rated Voltage<br>Charging Time: 2min<br>Charge/discharge current: 50mA max.<br>Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                   |         |                    |            |                         |       |                    |   |                         |   |                    |
| 6               | Capacitance                                |                    | Shown in Rated value.                                                                                                                                                                                          | Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                   |         |                    |            |                         |       |                    |   |                         |   |                    |
| 7               | Q                                          |                    | 30pF and over: $Q \geq 1000$<br>30pF and below: $Q \geq 400+20C$<br>C: Nominal Capacitance (pF)                                                                                                                | <table><tr><th>Capacitance</th><th>Frequency</th><th>Voltage</th></tr><tr><td><math>C \leq 1000pF</math></td><td>1.0±0.1MHz</td><td>0.5 to 5.0Vrms</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Capacitance | Frequency         | Voltage | $C \leq 1000pF$    | 1.0±0.1MHz | 0.5 to 5.0Vrms          |       |                    |   |                         |   |                    |
| Capacitance     | Frequency                                  | Voltage            |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                   |         |                    |            |                         |       |                    |   |                         |   |                    |
| $C \leq 1000pF$ | 1.0±0.1MHz                                 | 0.5 to 5.0Vrms     |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                   |         |                    |            |                         |       |                    |   |                         |   |                    |
| 8               | Temperature Characteristics of Capacitance |                    | Nominal values of the temperature coefficient is shown in Rated value.<br>But,the Capacitance Change under 20°C is shown in Table A.<br>Capacitance Drift<br>Within ±0.2% or ±0.05pF<br>(Whichever is larger.) | The capacitance change should be measured after 5 minutes at each specified temp. stage.<br>Capacitance value as a reference is the value in step 3.<br>The capacitance drift is calculated by dividing the differences between the maximum and minimum measured values in the step 1, 3 and 5 by the cap. value in step 3.<br><table><tr><th>Step</th><th>Temperature (°C)</th></tr><tr><td>1</td><td>Reference Temp. ±2</td></tr><tr><td>2</td><td>Min. Operating Temp. ±3</td></tr><tr><td>3</td><td>Reference Temp. ±2</td></tr><tr><td>4</td><td>Max. Operating Temp. ±3</td></tr><tr><td>5</td><td>Reference Temp. ±2</td></tr></table> | Step        | Temperature (°C)  | 1       | Reference Temp. ±2 | 2          | Min. Operating Temp. ±3 | 3     | Reference Temp. ±2 | 4 | Max. Operating Temp. ±3 | 5 | Reference Temp. ±2 |
| Step            | Temperature (°C)                           |                    |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                   |         |                    |            |                         |       |                    |   |                         |   |                    |
| 1               | Reference Temp. ±2                         |                    |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                   |         |                    |            |                         |       |                    |   |                         |   |                    |
| 2               | Min. Operating Temp. ±3                    |                    |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                   |         |                    |            |                         |       |                    |   |                         |   |                    |
| 3               | Reference Temp. ±2                         |                    |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                   |         |                    |            |                         |       |                    |   |                         |   |                    |
| 4               | Max. Operating Temp. ±3                    |                    |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                   |         |                    |            |                         |       |                    |   |                         |   |                    |
| 5               | Reference Temp. ±2                         |                    |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                   |         |                    |            |                         |       |                    |   |                         |   |                    |
| 9               | Adhesive Strength of Termination           |                    | No removal of the terminations or other defect should occur.                                                                                                                                                   | Solder the capacitor on the test substrate shown in Fig.3.<br><table><tr><th>Type</th><th>Applied Force (N)</th></tr><tr><td>GJM02</td><td>1</td></tr><tr><td>GJM03</td><td>2</td></tr><tr><td>GJM15</td><td>5</td></tr></table><br>Holding Time: 10±1s<br>Applied Direction: In parallel with the test substrate and vertical with the capacitor side.                                                                                                                                                                                                                                                                                       | Type        | Applied Force (N) | GJM02   | 1                  | GJM03      | 2                       | GJM15 | 5                  |   |                         |   |                    |
| Type            | Applied Force (N)                          |                    |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                   |         |                    |            |                         |       |                    |   |                         |   |                    |
| GJM02           | 1                                          |                    |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                   |         |                    |            |                         |       |                    |   |                         |   |                    |
| GJM03           | 2                                          |                    |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                   |         |                    |            |                         |       |                    |   |                         |   |                    |
| GJM15           | 5                                          |                    |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                   |         |                    |            |                         |       |                    |   |                         |   |                    |
| 10              | Vibration                                  | Appearance         | No defects or abnormalities.                                                                                                                                                                                   | Solder the capacitor on the test substrate shown in Fig.3.<br>Kind of Vibration: A simple harmonic motion<br>10Hz to 55Hz to 10Hz (1min)<br>Total amplitude: 1.5mm<br>This motion should be applied for a period of 2h in each 3 mutually perpendicular directions (total of 6h).                                                                                                                                                                                                                                                                                                                                                             |             |                   |         |                    |            |                         |       |                    |   |                         |   |                    |
|                 |                                            | Capacitance        | Within the specified initial value.                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                   |         |                    |            |                         |       |                    |   |                         |   |                    |
|                 |                                            | Q                  | Within the specified initial value.                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                   |         |                    |            |                         |       |                    |   |                         |   |                    |
| 11              | Substrate Bending Test                     | Appearance         | No defects or abnormalities.                                                                                                                                                                                   | Solder the capacitor on the test substrate shown in Fig.1.<br>Pressurization method: Shown in Fig.2<br>Flexure: 1mm<br>Holding Time: 5±1s<br>Soldering Method: Reflow soldering                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                   |         |                    |            |                         |       |                    |   |                         |   |                    |
|                 |                                            | Capacitance Change | Within ±5% or ±0.5pF<br>(Whichever is larger)                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                   |         |                    |            |                         |       |                    |   |                         |   |                    |
| 12              | Solderability                              |                    | 95% of the terminations is to be soldered evenly and continuously.                                                                                                                                             | Test Method: Solder bath method<br>Flux: Solution of rosin ethanol 25 (mass)%<br>Preheat: 80 to 120°C for 10 to 30s<br>Solder: Sn-3.0Ag-0.5Cu<br>Solder Temp.: 245±5°C<br>Immersion time: 2±0.5s                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |                   |         |                    |            |                         |       |                    |   |                         |   |                    |

Continued on the following page. ➤

## GJM Series Specifications and Test Methods (1)

Continued from the preceding page. ↘

| No                 | Item                                          |                    | Specification                                                                                                                                                                            | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|--------------------|-----------------------------------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|------------|---|----------------------------|------|---|------------|--------|---|----------------------------|------|---|------------|--------|
| 13                 | Resistance to Soldering Heat                  | Appearance         | No defects or abnormalities.                                                                                                                                                             | <GJM02 size only><br>Test Method: Reflow soldering (hot plate)<br>Solder: Sn-3.0Ag-0.5Cu<br>Solder Temp.: 270±5°C<br>Reflow Time: 10±0.5s<br>Test Substrate: Glass epoxy PCB<br>Exposure Time: 24±2h<br>Preheat: 120 to 150°C for 1min<br><GJM03/GJM15 size><br>Test Method: Solder bath method<br>Solder: Sn-3.0Ag-0.5Cu<br>Solder Temp.: 270±5°C<br>Immersion time: 10±0.5s<br>Exposure Time: 24±2h<br>Preheat: 120 to 150°C for 1min                                                                    |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Capacitance Change | Within ±2.5% or ±0.25pF (Whichever is larger)                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Q                  | Within the specified initial value.                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | I.R.               | Within the specified initial value.                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Voltage Proof      | No defects.                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 14                 | Temperature Sudden Change                     | Appearance         | No defects or abnormalities.                                                                                                                                                             | Solder the capacitor on the test substrate shown in Fig.3.<br>Perform the five cycles according to the four heat treatments shown in the following table. <table><tr><th>Step</th><th>Temp. (°C)</th><th>Time (min)</th></tr><tr><td>1</td><td>Min. Operating Temp. +0/-3</td><td>30±3</td></tr><tr><td>2</td><td>Room Temp.</td><td>2 to 3</td></tr><tr><td>3</td><td>Max. Operating Temp. +3/-0</td><td>30±3</td></tr><tr><td>4</td><td>Room Temp.</td><td>2 to 3</td></tr></table> Exposure Time: 24±2h | Step       | Temp. (°C) | Time (min) | 1 | Min. Operating Temp. +0/-3 | 30±3 | 2 | Room Temp. | 2 to 3 | 3 | Max. Operating Temp. +3/-0 | 30±3 | 4 | Room Temp. | 2 to 3 |
|                    |                                               | Step               | Temp. (°C)                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Time (min) |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | 1                  | Min. Operating Temp. +0/-3                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 30±3       |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | 2                  | Room Temp.                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2 to 3     |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | 3                  | Max. Operating Temp. +3/-0                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 30±3       |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 4                  | Room Temp.                                    | 2 to 3             |                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Capacitance Change | Within ±2.5% or ±0.25pF (Whichever is larger) |                    |                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Q                  | Within the specified initial value.           |                    |                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| I.R.               | Within the specified initial value.           |                    |                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Voltage Proof      | No defects.                                   |                    |                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 15                 | High Temperature High Humidity (Steady)       | Appearance         | No defects or abnormalities.                                                                                                                                                             | Solder the capacitor on the test substrate shown in Fig.3.<br>Test Temperature: 40±2°C<br>Test Humidity: 90 to 95%RH<br>Test Time: 500±12h<br>Applied Voltage: DC Rated Voltage<br>Charge/discharge current: 50mA max.<br>Exposure Time: 24±2h                                                                                                                                                                                                                                                             |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Capacitance Change | Within ±7.5% or ±0.75pF (Whichever is larger)                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Q                  | 30pF and over: Q ≥ 200<br>30pF and below: Q ≥ 100+10C/3<br>C: Nominal Capacitance (pF)                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | I.R.               | More than 500MΩ or 25Ω・F (Whichever is smaller)                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 16                 | Durability                                    | Appearance         | No defects or abnormalities.                                                                                                                                                             | Solder the capacitor on the test substrate shown in Fig.3.<br>Test Temperature: Max. Operating Temp. ±3°C<br>Test Time: 1000±12h<br>Applied Voltage: 200% of the rated voltage<br>Charge/discharge current: 50mA max.<br>Exposure Time: 24±2h                                                                                                                                                                                                                                                              |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Capacitance Change | Within ±3% or ±0.3pF (Whichever is larger)                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Q                  | 30pF and over: Q ≥ 350<br>10pF and over, 30pF and below: Q ≥ 275+5C/2<br>10pF and below: Q ≥ 200+10C<br>C: Nominal Capacitance (pF)                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | I.R.               | More than 1000MΩ or 50Ω・F (Whichever is smaller)                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 17                 | ESR (GJM02)                                   |                    | 0.2pF ≤ C ≤ 1pF: 700mΩ/C below<br>1pF < C ≤ 2pF: 600mΩ below<br>2pF < C ≤ 5pF: 500mΩ below<br>5pF < C ≤ 10pF: 300mΩ below<br>10pF < C ≤ 22pF: 350mΩ below<br>C: Nominal Capacitance (pF) | Measurement Frequency: 1.0±0.1GHz<br>Measurement Temperature: Room Temp.<br>Measurement Instrument: Equivalent to E4991A                                                                                                                                                                                                                                                                                                                                                                                   |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    | ESR (GJM03/GJM15)                             |                    | 0.1pF ≤ C ≤ 1pF: 350mΩ/C below<br>1pF < C ≤ 5pF: 300mΩ below<br>5pF < C ≤ 10pF: 250mΩ below<br>C: Nominal Capacitance (pF)                                                               | Measurement Frequency: 1.0±0.2GHz<br>Measurement Temperature: Room Temp.<br>Measurement Instrument: Equivalent to BOONTON Model 34A                                                                                                                                                                                                                                                                                                                                                                        |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               |                    | 10pF < C ≤ 47pF: 400mΩ below                                                                                                                                                             | Measurement Frequency: 500±50MHz<br>Measurement Temperature: Room Temp.<br>Measurement Instrument: Equivalent to HP8753B                                                                                                                                                                                                                                                                                                                                                                                   |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |

Continued on the following page. ↗

## GJM Series Specifications and Test Methods (1)

Continued from the preceding page. ↘

Table A

| Char. | Capacitance Change from Value at Reference Temp. (%) |       |       |       |       |       |       |       |
|-------|------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|
|       | -55°C                                                |       | -30°C |       | -25°C |       | -10°C |       |
|       | Max.                                                 | Min.  | Max.  | Min.  | Max.  | Min.  | Max.  | Min.  |
| 1C    | 0.54                                                 | -0.23 | -     | -     | 0.33  | -0.14 | 0.22  | -0.09 |
| 2C    | 0.82                                                 | -0.45 | -     | -     | 0.49  | -0.27 | 0.33  | -0.18 |
| 3C    | 1.37                                                 | -0.90 | -     | -     | 0.82  | -0.54 | 0.55  | -0.36 |
| 4C    | 2.56                                                 | -1.88 | -     | -     | 1.54  | -1.13 | 1.02  | -0.75 |
| 5C    | 0.58                                                 | -0.24 | 0.40  | -0.17 | -     | -     | 0.25  | -0.11 |
| 6C    | 0.87                                                 | -0.48 | 0.59  | -0.33 | -     | -     | 0.38  | -0.21 |

### Substrate Bending Test

#### • Test Substrate

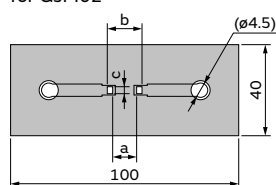
Material: Copper-clad laminated sheets for PCBs  
(Glass fabric base, epoxy resin)

Thickness: 0.8mm

□: Solder resist

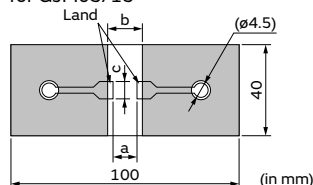
(Coat with heat resistant resin for solder)

for GJM02



Copper foil thickness: 0.018mm

for GJM03/15



Copper foil thickness: 0.035mm

| Part Number | Dimension (mm) |      |      |
|-------------|----------------|------|------|
|             | a              | b    | c    |
| GJM02       | 0.2            | 0.56 | 0.23 |
| GJM03       | 0.3            | 0.9  | 0.3  |
| GJM15       | 0.4            | 1.5  | 0.5  |

Fig.1

#### • Kind of Solder: Sn-3.0Ag-0.5Cu

#### • Pressurization Method

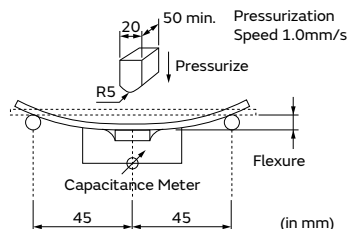


Fig.2

### Adhesive Strength of Termination, Vibration, Temperature Sudden Change, Resistance to Soldering Heat (Reflow method) High Temperature High Humidity (Steady), Durability

#### • Test Substrate

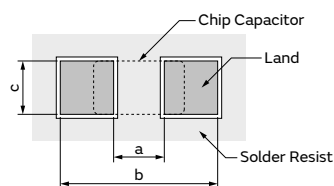
Material: Copper-clad laminated sheets for PCBs  
(Glass fabric base, epoxy resin)

Thickness: 1.6mm or 0.8mm

Copper foil thickness: 0.035mm

#### • Kind of Solder: Sn-3.0Ag-0.5Cu

#### • Land Dimensions



| Part Number | Dimension (mm) |      |      |
|-------------|----------------|------|------|
|             | a              | b    | c    |
| GJM02       | 0.2            | 0.56 | 0.23 |
| GJM03       | 0.3            | 0.9  | 0.3  |
| GJM15       | 0.4            | 1.5  | 0.5  |

Fig.3

2

## GJM Series Specifications and Test Methods (2)

| No                     | Item                                          |                                                                                                                                                                                                                          | Specification                                                                                                                                                                                                  | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                                               |                                                                                                                                                                                            |                                     |                                                                                                                                                                                                                                                                                              |                    |       |                         |       |                    |   |                         |   |                    |
|------------------------|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------|-------------------------|-------|--------------------|---|-------------------------|---|--------------------|
| 1                      | Rated Voltage                                 |                                                                                                                                                                                                                          | Shown in Rated value.                                                                                                                                                                                          | The rated voltage is defined as the maximum voltage which may be applied continuously to the capacitor.<br>When AC voltage is superimposed on DC voltage, $V^P$ -P or $V^O$ -P, whichever is larger, should be maintained within the rated voltage range.                                                                                                                                                                                                                                                                                                                                                                                           |                    |                                               |                                                                                                                                                                                            |                                     |                                                                                                                                                                                                                                                                                              |                    |       |                         |       |                    |   |                         |   |                    |
| 2                      | Appearance                                    |                                                                                                                                                                                                                          | No defects or abnormalities.                                                                                                                                                                                   | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |                                               |                                                                                                                                                                                            |                                     |                                                                                                                                                                                                                                                                                              |                    |       |                         |       |                    |   |                         |   |                    |
| 3                      | Dimension                                     |                                                                                                                                                                                                                          | Within the specified dimensions.                                                                                                                                                                               | Using Measuring instrument of dimension.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                                               |                                                                                                                                                                                            |                                     |                                                                                                                                                                                                                                                                                              |                    |       |                         |       |                    |   |                         |   |                    |
| 4                      | Voltage Proof                                 |                                                                                                                                                                                                                          | No defects or abnormalities.                                                                                                                                                                                   | Measurement Point: Between the terminations<br>Test Voltage: 300% of the rated voltage<br>Applied Time: 1 to 5s<br>Charge/discharge current: 50mA max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |                                               |                                                                                                                                                                                            |                                     |                                                                                                                                                                                                                                                                                              |                    |       |                         |       |                    |   |                         |   |                    |
| 5                      | Insulation Resistance (I.R.)                  |                                                                                                                                                                                                                          | $C \leq 0.047\mu\text{F}$ : More than 10000MΩ<br>$C > 0.047\mu\text{F}$ : More than $500\Omega \cdot \text{F}$<br>C: Nominal Capacitance                                                                       | Measurement Point: Between the terminations<br>Measurement Voltage: DC Rated Voltage<br>Charging Time: 2min<br>Charge/discharge current: 50mA max.<br>Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                                               |                                                                                                                                                                                            |                                     |                                                                                                                                                                                                                                                                                              |                    |       |                         |       |                    |   |                         |   |                    |
| 6                      | Capacitance                                   |                                                                                                                                                                                                                          | Shown in Rated value.                                                                                                                                                                                          | Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                                               |                                                                                                                                                                                            |                                     |                                                                                                                                                                                                                                                                                              |                    |       |                         |       |                    |   |                         |   |                    |
| 7                      | Q                                             |                                                                                                                                                                                                                          | 30pF and over: $Q \geq 1000$<br>30pF and below: $Q \geq 400+20C$<br>C: Nominal Capacitance (pF)                                                                                                                | <table><tr><th>Capacitance</th><th>Frequency</th><th>Voltage</th></tr><tr><td><math>C \leq 1000\text{pF}</math></td><td>1.0±0.1MHz</td><td>0.5 to 5.0Vrms</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Capacitance        | Frequency                                     | Voltage                                                                                                                                                                                    | $C \leq 1000\text{pF}$              | 1.0±0.1MHz                                                                                                                                                                                                                                                                                   | 0.5 to 5.0Vrms     |       |                         |       |                    |   |                         |   |                    |
| Capacitance            | Frequency                                     | Voltage                                                                                                                                                                                                                  |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                                               |                                                                                                                                                                                            |                                     |                                                                                                                                                                                                                                                                                              |                    |       |                         |       |                    |   |                         |   |                    |
| $C \leq 1000\text{pF}$ | 1.0±0.1MHz                                    | 0.5 to 5.0Vrms                                                                                                                                                                                                           |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                                               |                                                                                                                                                                                            |                                     |                                                                                                                                                                                                                                                                                              |                    |       |                         |       |                    |   |                         |   |                    |
| 8                      | Temperature Characteristics of Capacitance    |                                                                                                                                                                                                                          | Nominal values of the temperature coefficient is shown in Rated value.<br>But,the Capacitance Change under 20°C is shown in Table A.<br>Capacitance Drift<br>Within ±0.2% or ±0.05pF<br>(Whichever is larger.) | <p>The capacitance change should be measured after 5 minutes at each specified temp. stage.<br/>Capacitance value as a reference is the value in step 3.<br/>The capacitance drift is calculated by dividing the differences between the maximum and minimum measured values in the step 1, 3 and 5 by the cap. value in step 3.</p> <table><tr><th>Step</th><th>Temperature (°C)</th></tr><tr><td>1</td><td>Reference Temp. ±2</td></tr><tr><td>2</td><td>Min. Operating Temp. ±3</td></tr><tr><td>3</td><td>Reference Temp. ±2</td></tr><tr><td>4</td><td>Max. Operating Temp. ±3</td></tr><tr><td>5</td><td>Reference Temp. ±2</td></tr></table> |                    |                                               | Step                                                                                                                                                                                       | Temperature (°C)                    | 1                                                                                                                                                                                                                                                                                            | Reference Temp. ±2 | 2     | Min. Operating Temp. ±3 | 3     | Reference Temp. ±2 | 4 | Max. Operating Temp. ±3 | 5 | Reference Temp. ±2 |
| Step                   | Temperature (°C)                              |                                                                                                                                                                                                                          |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                                               |                                                                                                                                                                                            |                                     |                                                                                                                                                                                                                                                                                              |                    |       |                         |       |                    |   |                         |   |                    |
| 1                      | Reference Temp. ±2                            |                                                                                                                                                                                                                          |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                                               |                                                                                                                                                                                            |                                     |                                                                                                                                                                                                                                                                                              |                    |       |                         |       |                    |   |                         |   |                    |
| 2                      | Min. Operating Temp. ±3                       |                                                                                                                                                                                                                          |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                                               |                                                                                                                                                                                            |                                     |                                                                                                                                                                                                                                                                                              |                    |       |                         |       |                    |   |                         |   |                    |
| 3                      | Reference Temp. ±2                            |                                                                                                                                                                                                                          |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                                               |                                                                                                                                                                                            |                                     |                                                                                                                                                                                                                                                                                              |                    |       |                         |       |                    |   |                         |   |                    |
| 4                      | Max. Operating Temp. ±3                       |                                                                                                                                                                                                                          |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                                               |                                                                                                                                                                                            |                                     |                                                                                                                                                                                                                                                                                              |                    |       |                         |       |                    |   |                         |   |                    |
| 5                      | Reference Temp. ±2                            |                                                                                                                                                                                                                          |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                                               |                                                                                                                                                                                            |                                     |                                                                                                                                                                                                                                                                                              |                    |       |                         |       |                    |   |                         |   |                    |
| 9                      | Adhesive Strength of Termination              |                                                                                                                                                                                                                          | No removal of the terminations or other defect should occur.                                                                                                                                                   | <p>Solder the capacitor on the test substrate shown in Fig.3.</p> <table><tr><th>Part Number</th><th>Applied Force (N)</th></tr><tr><td>GJM02</td><td>1</td></tr><tr><td>GJM03</td><td>2</td></tr><tr><td>GJM15</td><td>5</td></tr></table> <p>Holding Time: 10±1s<br/>Applied Direction: In parallel with the test substrate and vertical with the capacitor side.</p>                                                                                                                                                                                                                                                                             |                    |                                               | Part Number                                                                                                                                                                                | Applied Force (N)                   | GJM02                                                                                                                                                                                                                                                                                        | 1                  | GJM03 | 2                       | GJM15 | 5                  |   |                         |   |                    |
| Part Number            | Applied Force (N)                             |                                                                                                                                                                                                                          |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                                               |                                                                                                                                                                                            |                                     |                                                                                                                                                                                                                                                                                              |                    |       |                         |       |                    |   |                         |   |                    |
| GJM02                  | 1                                             |                                                                                                                                                                                                                          |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                                               |                                                                                                                                                                                            |                                     |                                                                                                                                                                                                                                                                                              |                    |       |                         |       |                    |   |                         |   |                    |
| GJM03                  | 2                                             |                                                                                                                                                                                                                          |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                                               |                                                                                                                                                                                            |                                     |                                                                                                                                                                                                                                                                                              |                    |       |                         |       |                    |   |                         |   |                    |
| GJM15                  | 5                                             |                                                                                                                                                                                                                          |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                                               |                                                                                                                                                                                            |                                     |                                                                                                                                                                                                                                                                                              |                    |       |                         |       |                    |   |                         |   |                    |
| 10                     | Vibration                                     | <table><tr><td>Appearance</td><td>No defects or abnormalities.</td></tr><tr><td>Capacitance</td><td>Within the specified initial value.</td></tr><tr><td>Q</td><td>Within the specified initial value.</td></tr></table> | Appearance                                                                                                                                                                                                     | No defects or abnormalities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Capacitance        | Within the specified initial value.           | Q                                                                                                                                                                                          | Within the specified initial value. | <p>Solder the capacitor on the test substrate shown in Fig.3.<br/>Kind of Vibration: A simple harmonic motion<br/>10Hz to 55Hz to 10Hz (1min)<br/>Total amplitude: 1.5mm<br/>This motion should be applied for a period of 2h in each 3 mutually perpendicular directions (total of 6h).</p> |                    |       |                         |       |                    |   |                         |   |                    |
| Appearance             | No defects or abnormalities.                  |                                                                                                                                                                                                                          |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                                               |                                                                                                                                                                                            |                                     |                                                                                                                                                                                                                                                                                              |                    |       |                         |       |                    |   |                         |   |                    |
| Capacitance            | Within the specified initial value.           |                                                                                                                                                                                                                          |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                                               |                                                                                                                                                                                            |                                     |                                                                                                                                                                                                                                                                                              |                    |       |                         |       |                    |   |                         |   |                    |
| Q                      | Within the specified initial value.           |                                                                                                                                                                                                                          |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                                               |                                                                                                                                                                                            |                                     |                                                                                                                                                                                                                                                                                              |                    |       |                         |       |                    |   |                         |   |                    |
| 11                     | Substrate Bending Test                        | <table><tr><td>Appearance</td><td>No defects or abnormalities.</td></tr><tr><td>Capacitance Change</td><td>Within ±5% or ±0.5pF<br/>(Whichever is larger)</td></tr></table>                                              | Appearance                                                                                                                                                                                                     | No defects or abnormalities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Capacitance Change | Within ±5% or ±0.5pF<br>(Whichever is larger) | <p>Solder the capacitor on the test substrate shown in Fig.1.<br/>Pressurization method: Shown in Fig.2<br/>Flexure: 1mm<br/>Holding Time: 5±1s<br/>Soldering Method: Reflow soldering</p> |                                     |                                                                                                                                                                                                                                                                                              |                    |       |                         |       |                    |   |                         |   |                    |
| Appearance             | No defects or abnormalities.                  |                                                                                                                                                                                                                          |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                                               |                                                                                                                                                                                            |                                     |                                                                                                                                                                                                                                                                                              |                    |       |                         |       |                    |   |                         |   |                    |
| Capacitance Change     | Within ±5% or ±0.5pF<br>(Whichever is larger) |                                                                                                                                                                                                                          |                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                                               |                                                                                                                                                                                            |                                     |                                                                                                                                                                                                                                                                                              |                    |       |                         |       |                    |   |                         |   |                    |
| 12                     | Solderability                                 |                                                                                                                                                                                                                          | 95% of the terminations is to be soldered evenly and continuously.                                                                                                                                             | <p>Test Method: Solder bath method<br/>Flux: Solution of rosin ethanol 25 (mass)%<br/>Preheat: 80 to 120°C for 10 to 30s<br/>Solder: Sn-3.0Ag-0.5Cu<br/>Solder Temp.: 245±5°C<br/>Immersion time: 2±0.5s</p>                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                                               |                                                                                                                                                                                            |                                     |                                                                                                                                                                                                                                                                                              |                    |       |                         |       |                    |   |                         |   |                    |

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## GJM Series Specifications and Test Methods (2)

Continued from the preceding page. ↘

| No | Item                                    | Specification                                                                                                                                                                                                                                                                                         | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                  |
|----|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| 13 | Resistance to Soldering Heat            | Appearance                                                                                                                                                                                                                                                                                            | No defects or abnormalities.                                                                                                                       |
|    |                                         | Capacitance Change                                                                                                                                                                                                                                                                                    | Within $\pm 2.5\%$ or $\pm 0.25\text{pF}$ (Whichever is larger)                                                                                    |
|    |                                         | Q                                                                                                                                                                                                                                                                                                     | Within the specified initial value.                                                                                                                |
|    |                                         | I.R.                                                                                                                                                                                                                                                                                                  | Within the specified initial value.                                                                                                                |
|    |                                         | Voltage Proof                                                                                                                                                                                                                                                                                         | No defects.                                                                                                                                        |
| 14 | Temperature Sudden Change               | Appearance                                                                                                                                                                                                                                                                                            | No defects or abnormalities.                                                                                                                       |
|    |                                         | Capacitance Change                                                                                                                                                                                                                                                                                    | Within $\pm 2.5\%$ or $\pm 0.25\text{pF}$ (Whichever is larger)                                                                                    |
|    |                                         | Q                                                                                                                                                                                                                                                                                                     | Within the specified initial value.                                                                                                                |
|    |                                         | I.R.                                                                                                                                                                                                                                                                                                  | Within the specified initial value.                                                                                                                |
|    |                                         | Voltage Proof                                                                                                                                                                                                                                                                                         | No defects.                                                                                                                                        |
| 15 | High Temperature High Humidity (Steady) | Appearance                                                                                                                                                                                                                                                                                            | No defects or abnormalities.                                                                                                                       |
|    |                                         | Capacitance Change                                                                                                                                                                                                                                                                                    | Within $\pm 7.5\%$ or $\pm 0.75\text{pF}$ (Whichever is larger)                                                                                    |
|    |                                         | Q                                                                                                                                                                                                                                                                                                     | 30pF and over: $Q \geq 200$<br>30pF and below: $Q \geq 100+10C/3$<br>C: Nominal Capacitance (pF)                                                   |
|    |                                         | I.R.                                                                                                                                                                                                                                                                                                  | More than 500M $\Omega$ or 25 $\Omega \cdot F$ (Whichever is smaller)                                                                              |
|    |                                         |                                                                                                                                                                                                                                                                                                       | Exposure Time: 24 $\pm$ 2h                                                                                                                         |
| 16 | Durability                              | Appearance                                                                                                                                                                                                                                                                                            | No defects or abnormalities.                                                                                                                       |
|    |                                         | Capacitance Change                                                                                                                                                                                                                                                                                    | Within $\pm 3\%$ or $\pm 0.3\text{pF}$ (Whichever is larger)                                                                                       |
|    |                                         | Q                                                                                                                                                                                                                                                                                                     | 30pF and over: $Q \geq 350$<br>10pF and over, 30pF and below: $Q \geq 275+5C/2$<br>10pF and below: $Q \geq 200+10C$<br>C: Nominal Capacitance (pF) |
|    |                                         | I.R.                                                                                                                                                                                                                                                                                                  | More than 1000M $\Omega$ or 50 $\Omega \cdot F$ (Whichever is smaller)                                                                             |
|    |                                         |                                                                                                                                                                                                                                                                                                       | Exposure Time: 24 $\pm$ 2h                                                                                                                         |
| 17 | ESR (GJM02)                             | 0.2pF $\leq C \leq 1\text{pF}$ : 700m $\Omega$ /C below<br>1pF $< C \leq 2\text{pF}$ : 600m $\Omega$ below<br>2pF $< C \leq 5\text{pF}$ : 500m $\Omega$ below<br>5pF $< C \leq 10\text{pF}$ : 300m $\Omega$ below<br>10pF $< C \leq 22\text{pF}$ : 350m $\Omega$ below<br>C: Nominal Capacitance (pF) | Measurement Frequency: 1.0 $\pm$ 0.1GHz<br>Measurement Temperature: Room Temp.<br>Measurement Instrument: Equivalent to E4991A                     |
|    | ESR (GJM03/GJM15)                       | 0.1pF $\leq C \leq 1\text{pF}$ : 350m $\Omega$ /C below<br>1pF $< C \leq 5\text{pF}$ : 300m $\Omega$ below<br>5pF $< C \leq 10\text{pF}$ : 250m $\Omega$ below<br>C: Nominal Capacitance (pF)                                                                                                         | Measurement Frequency: 1.0 $\pm$ 0.2GHz<br>Measurement Temperature: Room Temp.<br>Measurement Instrument: Equivalent to BOONTON Model 34A          |
|    |                                         | 10pF $< C \leq 47\text{pF}$ : 400m $\Omega$ below                                                                                                                                                                                                                                                     | Measurement Frequency: 500 $\pm$ 50MHz<br>Measurement Temperature: Room Temp.<br>Measurement Instrument: Equivalent to HP8753B                     |

Continued on the following page. ↗

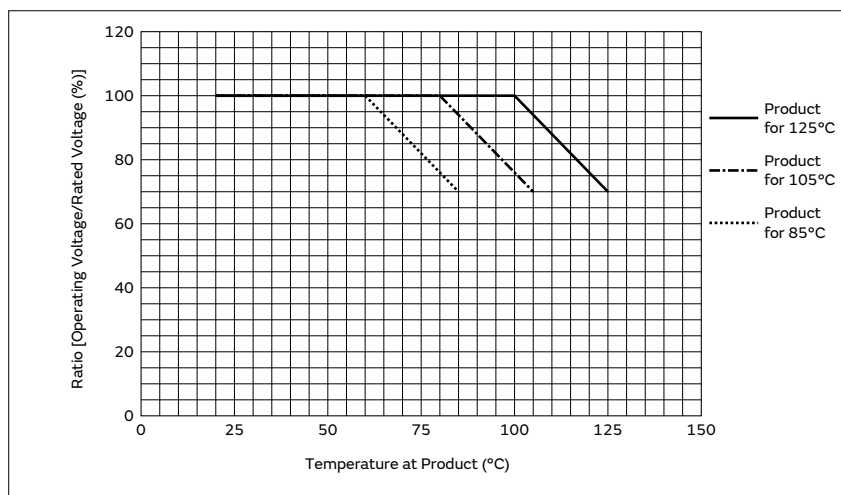
## GJM Series Specifications and Test Methods (2)

Continued from the preceding page. ↘

Table A

| Char. | Capacitance Change from Value at Reference Temp. (%) |       |       |       |       |       |       |       |
|-------|------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|
|       | -55°C                                                |       | -30°C |       | -25°C |       | -10°C |       |
|       | Max.                                                 | Min.  | Max.  | Min.  | Max.  | Min.  | Max.  | Min.  |
| 1C    | 0.54                                                 | -0.23 | -     | -     | 0.33  | -0.14 | 0.22  | -0.09 |
| 2C    | 0.82                                                 | -0.45 | -     | -     | 0.49  | -0.27 | 0.33  | -0.18 |
| 3C    | 1.37                                                 | -0.90 | -     | -     | 0.82  | -0.54 | 0.55  | -0.36 |
| 4C    | 2.56                                                 | -1.88 | -     | -     | 1.54  | -1.13 | 1.02  | -0.75 |
| 5C    | 0.58                                                 | -0.24 | 0.40  | -0.17 | -     | -     | 0.25  | -0.11 |
| 6C    | 0.87                                                 | -0.48 | 0.59  | -0.33 | -     | -     | 0.38  | -0.21 |

Recommended derating conditions on voltage and temperature



These Part Numbers are designed for use in the circuits where continuous applied voltage to the capacitor is derated than rated voltage, and guarantee Durability Test with 100% × rated voltage as testing voltage at the maximum operating temperature.

The voltage and temperature derating conditions on the upside are recommended for use to ensure the same reliability level as normal specification.

Continued on the following page. ↗

## GJM Series Specifications and Test Methods (2)

Continued from the preceding page. ↘

### Substrate Bending Test

#### • Test Substrate

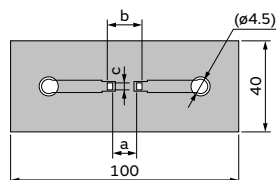
Material: Copper-clad laminated sheets for PCBs  
(Glass fabric base, epoxy resin)

Thickness: 0.8mm

□: Solder resist

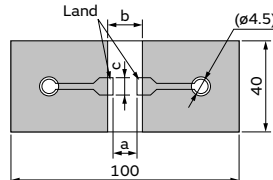
(Coat with heat resistant resin for solder)

for GJM02



Copper foil thickness: 0.018mm

for GJM03/15



Copper foil thickness: 0.035mm

| Part Number | Dimension (mm) |      |      |
|-------------|----------------|------|------|
|             | a              | b    | c    |
| GJM02       | 0.2            | 0.56 | 0.23 |
| GJM03       | 0.3            | 0.9  | 0.3  |
| GJM15       | 0.4            | 1.5  | 0.5  |

Fig.1 (in mm)

#### • Kind of Solder: Sn-3.0Ag-0.5Cu

#### • Pressurization Method

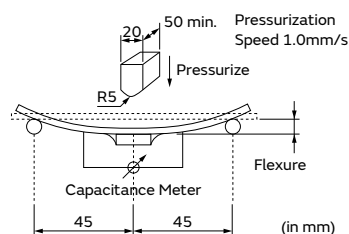


Fig.2

### Adhesive Strength of Termination, Vibration, Temperature Sudden Change, Resistance to Soldering Heat (Reflow method) High Temperature High Humidity (Steady), Durability

#### • Test Substrate

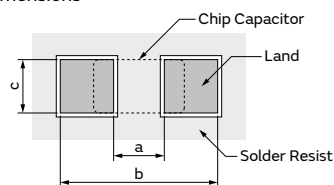
Material: Copper-clad laminated sheets for PCBs  
(Glass fabric base, epoxy resin)

Thickness: 1.6mm or 0.8mm

Copper foil thickness: 0.035mm

#### • Kind of Solder: Sn-3.0Ag-0.5Cu

#### • Land Dimensions



| Part Number | Dimension (mm) |      |      |
|-------------|----------------|------|------|
|             | a              | b    | c    |
| GJM02       | 0.2            | 0.56 | 0.23 |
| GJM03       | 0.3            | 0.9  | 0.3  |
| GJM15       | 0.4            | 1.5  | 0.5  |

Fig.3

## High Q and High Power Chip Multilayer Ceramic Capacitors for General Purpose

# GQM Series

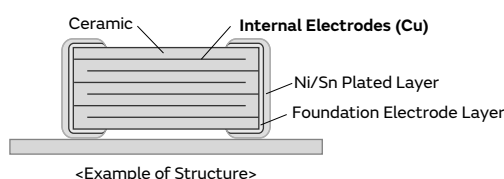


## High Frequency Capacitor Ideal for PA Design of Base Stations

### Features

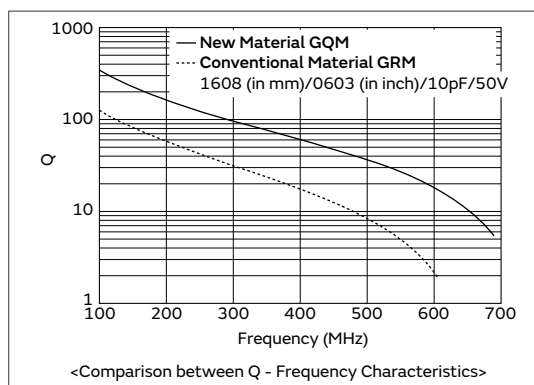
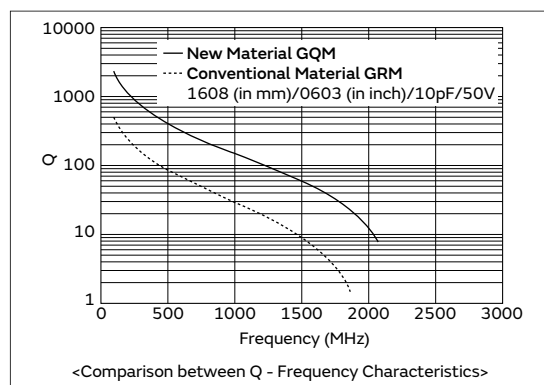
- 1 **Mainly ideal for base stations of mobile communication devices and temperature compensation of related modules.**

This product is ideal for temperature compensation of high frequency circuits, such as resonant circuits, tuning circuits, and impedance matching circuits where the operating characteristics of the device are greatly affected by the capacitance fluctuation.



- 2 **High Q and low ESR in VHF, UHF and microwave frequency bands.**

High Q and low ESR were achieved at a high frequency by adopting ceramic material as the dielectric material which enables an extremely low loss at high frequency, and base metal electrodes as the internal electrodes.



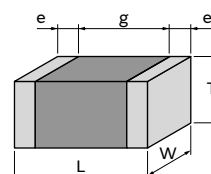
- 3 **Can be used for tight tolerance.**

In addition to standard tolerance, the allowable range of this product is also suitable for the following narrow tolerance.

| Capacitance Range | Standard Capacitance Tolerance<br>(Capacitance Tolerance Symbol) | Narrow Capacitance Tolerance<br>(Capacitance Tolerance Symbol) |
|-------------------|------------------------------------------------------------------|----------------------------------------------------------------|
| to 0.9pF          | ±0.1pF (B)                                                       | ±0.05pF (W)                                                    |
| 1.0 to 5.0pF      | ±0.25pF (C)                                                      | ±0.05pF (W), ±0.1pF (B)                                        |
| 5.1 to 9.9pF      | ±0.5pF (D)                                                       | ±0.05pF (W), ±0.1pF (B), ±0.25pF (C)                           |
| 10pF to           | ±5% (J)                                                          | ±2% (G)                                                        |

### Specifications

|                   |                                                         |
|-------------------|---------------------------------------------------------|
| Size (mm)         | 1.0×0.5mm to 2.8×2.8mm                                  |
| Rated Voltage     | 50Vdc to 500Vdc                                         |
| Capacitance       | 0.10pF to 510pF                                         |
| Main Applications | Measuring instruments, other ultra compact/thin devices |



<Dimensions>

This catalog contains only a portion of the product lineup.  
Please refer to the capacitor search tool on the Murata Web site for details.

## GQM Series Temperature Compensating Type Part Number List

### 1.0×0.5mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol.    | Part Number        | p*   |
|--------|---------------|---------|--------|---------|--------------------|------|
| 0.55mm | 200Vdc        | COG     | 0.10pF | ±0.1pF  | GQM1555C2DR10BB01# | p172 |
|        |               |         |        | ±0.25pF | GQM1555C2DR10CB01# | p172 |
|        |               |         | 0.20pF | ±0.1pF  | GQM1555C2DR20BB01# | p172 |
|        |               |         |        | ±0.25pF | GQM1555C2DR20CB01# | p172 |
|        |               |         | 0.30pF | ±0.1pF  | GQM1555C2DR30BB01# | p172 |
|        |               |         |        | ±0.25pF | GQM1555C2DR30CB01# | p172 |
|        |               |         | 0.40pF | ±0.1pF  | GQM1555C2DR40BB01# | p172 |
|        |               |         |        | ±0.25pF | GQM1555C2DR40CB01# | p172 |
|        |               |         | 0.50pF | ±0.1pF  | GQM1555C2DR50BB01# | p172 |
|        |               |         |        | ±0.25pF | GQM1555C2DR50CB01# | p172 |
|        |               |         | 0.60pF | ±0.1pF  | GQM1555C2DR60BB01# | p172 |
|        |               |         |        | ±0.25pF | GQM1555C2DR60CB01# | p172 |
|        |               |         | 0.70pF | ±0.1pF  | GQM1555C2DR70BB01# | p172 |
|        |               |         |        | ±0.25pF | GQM1555C2DR70CB01# | p172 |
|        |               |         | 0.75pF | ±0.1pF  | GQM1555C2DR75BB01# | p172 |
|        |               |         |        | ±0.25pF | GQM1555C2DR75CB01# | p172 |
|        |               |         | 0.80pF | ±0.1pF  | GQM1555C2DR80BB01# | p172 |
|        |               |         |        | ±0.25pF | GQM1555C2DR80CB01# | p172 |
|        |               |         | 0.90pF | ±0.1pF  | GQM1555C2DR90BB01# | p172 |
|        |               |         |        | ±0.25pF | GQM1555C2DR90CB01# | p172 |
|        |               |         | 1.0pF  | ±0.1pF  | GQM1555C2D1R0BB01# | p172 |
|        |               |         |        | ±0.25pF | GQM1555C2D1R0CB01# | p172 |
|        |               |         | 1.1pF  | ±0.1pF  | GQM1555C2D1R1BB01# | p172 |
|        |               |         |        | ±0.25pF | GQM1555C2D1R1CB01# | p172 |
|        |               |         | 1.2pF  | ±0.1pF  | GQM1555C2D1R2BB01# | p172 |
|        |               |         |        | ±0.25pF | GQM1555C2D1R2CB01# | p172 |
|        |               |         | 1.3pF  | ±0.1pF  | GQM1555C2D1R3BB01# | p172 |
|        |               |         |        | ±0.25pF | GQM1555C2D1R3CB01# | p172 |
|        |               |         | 1.5pF  | ±0.1pF  | GQM1555C2D1R5BB01# | p172 |
|        |               |         |        | ±0.25pF | GQM1555C2D1R5CB01# | p172 |
|        |               |         | 1.6pF  | ±0.1pF  | GQM1555C2D1R6BB01# | p172 |
|        |               |         |        | ±0.25pF | GQM1555C2D1R6CB01# | p172 |
|        |               |         | 1.8pF  | ±0.1pF  | GQM1555C2D1R8BB01# | p172 |
|        |               |         |        | ±0.25pF | GQM1555C2D1R8CB01# | p172 |
|        |               |         | 2.0pF  | ±0.1pF  | GQM1555C2D2R0BB01# | p172 |
|        |               |         |        | ±0.25pF | GQM1555C2D2R0CB01# | p172 |
|        |               |         | 2.2pF  | ±0.1pF  | GQM1555C2D2R2BB01# | p172 |
|        |               |         |        | ±0.25pF | GQM1555C2D2R2CB01# | p172 |
|        |               |         | 2.4pF  | ±0.1pF  | GQM1555C2D2R4BB01# | p172 |
|        |               |         |        | ±0.25pF | GQM1555C2D2R4CB01# | p172 |
|        |               |         | 2.7pF  | ±0.1pF  | GQM1555C2D2R7BB01# | p172 |
|        |               |         |        | ±0.25pF | GQM1555C2D2R7CB01# | p172 |
|        |               |         | 3.0pF  | ±0.1pF  | GQM1555C2D3R0BB01# | p172 |
|        |               |         |        | ±0.25pF | GQM1555C2D3R0CB01# | p172 |
|        |               |         | 3.3pF  | ±0.1pF  | GQM1555C2D3R3BB01# | p172 |
|        |               |         |        | ±0.25pF | GQM1555C2D3R3CB01# | p172 |
|        |               |         | 3.6pF  | ±0.1pF  | GQM1555C2D3R6BB01# | p172 |
|        |               |         |        | ±0.25pF | GQM1555C2D3R6CB01# | p172 |
|        |               |         | 3.9pF  | ±0.1pF  | GQM1555C2D3R9BB01# | p172 |
|        |               |         |        | ±0.25pF | GQM1555C2D3R9CB01# | p172 |
|        |               |         | 4.0pF  | ±0.1pF  | GQM1555C2D4R0BB01# | p172 |
|        |               |         |        | ±0.25pF | GQM1555C2D4R0CB01# | p172 |
|        |               |         | 4.3pF  | ±0.1pF  | GQM1555C2D4R3BB01# | p172 |
|        |               |         |        | ±0.25pF | GQM1555C2D4R3CB01# | p172 |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.55mm | 200Vdc        | COG     | 4.7pF | ±0.1pF  | GQM1555C2D4R7BB01# | p172 |
|        |               |         |       | ±0.25pF | GQM1555C2D4R7CB01# | p172 |
|        |               |         | 5.0pF | ±0.1pF  | GQM1555C2D5R0BB01# | p172 |
|        |               |         |       | ±0.25pF | GQM1555C2D5R0CB01# | p172 |
|        |               |         | 5.1pF | ±0.1pF  | GQM1555C2D5R1BB01# | p172 |
|        |               |         |       | ±0.25pF | GQM1555C2D5R1CB01# | p172 |
|        |               |         | 5.6pF | ±0.1pF  | GQM1555C2D5R6BB01# | p172 |
|        |               |         |       | ±0.25pF | GQM1555C2D5R6CB01# | p172 |
|        |               |         | 6.0pF | ±0.1pF  | GQM1555C2D6R0BB01# | p172 |
|        |               |         |       | ±0.25pF | GQM1555C2D6R0CB01# | p172 |
|        |               |         | 6.2pF | ±0.1pF  | GQM1555C2D6R2BB01# | p172 |
|        |               |         |       | ±0.25pF | GQM1555C2D6R2CB01# | p172 |
|        |               |         | 6.8pF | ±0.1pF  | GQM1555C2D6R8BB01# | p172 |
|        |               |         |       | ±0.25pF | GQM1555C2D6R8CB01# | p172 |
|        |               |         | 7.0pF | ±0.1pF  | GQM1555C2D7R0BB01# | p172 |
|        |               |         |       | ±0.25pF | GQM1555C2D7R0CB01# | p172 |
|        |               |         | 7.5pF | ±0.1pF  | GQM1555C2D7R5BB01# | p172 |
|        |               |         |       | ±0.25pF | GQM1555C2D7R5CB01# | p172 |
|        |               |         | 8.0pF | ±0.1pF  | GQM1555C2D8R0BB01# | p172 |
|        |               |         |       | ±0.25pF | GQM1555C2D8R0CB01# | p172 |
|        |               |         | 8.2pF | ±0.1pF  | GQM1555C2D8R2BB01# | p172 |
|        |               |         |       | ±0.25pF | GQM1555C2D8R2CB01# | p172 |
|        |               |         | 9.0pF | ±0.1pF  | GQM1555C2D9R0BB01# | p172 |
|        |               |         |       | ±0.25pF | GQM1555C2D9R0CB01# | p172 |
|        |               |         | 9.1pF | ±0.1pF  | GQM1555C2D9R1BB01# | p172 |
|        |               |         |       | ±0.25pF | GQM1555C2D9R1CB01# | p172 |
|        |               |         | 10pF  | ±2%     | GQM1555C2D100GB01# | p172 |
|        |               |         |       | ±5%     | GQM1555C2D100JB01# | p172 |
|        |               |         | 11pF  | ±2%     | GQM1555C2D110GB01# | p172 |
|        |               |         |       | ±5%     | GQM1555C2D110JB01# | p172 |
|        |               |         | 12pF  | ±2%     | GQM1555C2D120GB01# | p172 |
|        |               |         |       | ±5%     | GQM1555C2D120JB01# | p172 |
|        |               |         | 13pF  | ±2%     | GQM1555C2D130GB01# | p172 |
|        |               |         |       | ±5%     | GQM1555C2D130JB01# | p172 |
|        |               |         | 15pF  | ±2%     | GQM1555C2D150GB01# | p172 |
|        |               |         |       | ±5%     | GQM1555C2D150JB01# | p172 |
|        |               |         | 16pF  | ±2%     | GQM1555C2D160GB01# | p172 |
|        |               |         |       | ±5%     | GQM1555C2D160JB01# | p172 |
|        |               |         | 18pF  | ±2%     | GQM1555C2D180GB01# | p172 |
|        |               |         |       | ±5%     | GQM1555C2D180JB01# | p172 |
|        |               |         | 20pF  | ±2%     | GQM1555C2D200GB01# | p172 |
|        |               |         |       | ±5%     | GQM1555C2D200JB01# | p172 |
|        |               |         | 22pF  | ±2%     | GQM1555C2D220GB01# | p172 |
|        |               |         |       | ±5%     | GQM1555C2D220JB01# | p172 |
|        |               |         | 24pF  | ±2%     | GQM1555C2D240GB01# | p172 |
|        |               |         |       | ±5%     | GQM1555C2D240JB01# | p172 |
|        |               |         | 27pF  | ±2%     | GQM1555C2D270GB01# | p172 |
|        |               |         |       | ±5%     | GQM1555C2D270JB01# | p172 |
|        |               |         | 30pF  | ±2%     | GQM1555C2D300GB01# | p172 |
|        |               |         |       | ±5%     | GQM1555C2D300JB01# | p172 |
|        |               |         | 33pF  | ±2%     | GQM1555C2D330GB01# | p172 |
|        |               |         |       | ±5%     | GQM1555C2D330JB01# | p172 |
|        | 100Vdc        | COG     | 36pF  | ±2%     | GQM1555C2A360GB01# | p172 |
|        |               |         |       | ±5%     | GQM1555C2A360JB01# | p172 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

## GQM Series Temperature Compensating Type Part Number List

(→ 1.0×0.5mm)

| T max. | Rated Voltage | TC Code | Cap. | Tol. | Part Number        | p*   |
|--------|---------------|---------|------|------|--------------------|------|
| 0.55mm | 100Vdc        | COG     | 39pF | ±2%  | GQM1555C2A390GB01# | p172 |
|        |               |         |      | ±5%  | GQM1555C2A390JB01# | p172 |
|        |               |         | 43pF | ±2%  | GQM1555C2A430GB01# | p172 |
|        |               |         |      | ±5%  | GQM1555C2A430JB01# | p172 |
|        |               |         | 47pF | ±2%  | GQM1555C2A470GB01# | p172 |
|        |               |         |      | ±5%  | GQM1555C2A470JB01# | p172 |

1.6×0.8mm

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.8mm  | 250Vdc        | COG     | 1.0pF | ±0.1pF  | GQM1875C2E1R0BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM1875C2E1R0CB12# | p178 |
|        |               |         | 1.1pF | ±0.1pF  | GQM1875C2E1R1BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM1875C2E1R1CB12# | p178 |
|        |               |         | 1.2pF | ±0.1pF  | GQM1875C2E1R2BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM1875C2E1R2CB12# | p178 |
|        |               |         | 1.3pF | ±0.1pF  | GQM1875C2E1R3BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM1875C2E1R3CB12# | p178 |
|        |               |         | 1.5pF | ±0.1pF  | GQM1875C2E1R5BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM1875C2E1R5CB12# | p178 |
|        |               |         | 1.6pF | ±0.1pF  | GQM1875C2E1R6BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM1875C2E1R6CB12# | p178 |
|        |               |         | 1.8pF | ±0.1pF  | GQM1875C2E1R8BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM1875C2E1R8CB12# | p178 |
|        |               |         | 2.0pF | ±0.1pF  | GQM1875C2E2R0BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM1875C2E2R0CB12# | p178 |
|        |               |         | 2.2pF | ±0.1pF  | GQM1875C2E2R2BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM1875C2E2R2CB12# | p178 |
|        |               |         | 2.4pF | ±0.1pF  | GQM1875C2E2R4BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM1875C2E2R4CB12# | p178 |
|        |               |         | 2.7pF | ±0.1pF  | GQM1875C2E2R7BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM1875C2E2R7CB12# | p178 |
|        |               |         | 3.0pF | ±0.1pF  | GQM1875C2E3R0BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM1875C2E3R0CB12# | p178 |
|        |               |         | 3.3pF | ±0.1pF  | GQM1875C2E3R3BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM1875C2E3R3CB12# | p178 |
|        |               |         | 3.6pF | ±0.1pF  | GQM1875C2E3R6BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM1875C2E3R6CB12# | p178 |
|        |               |         | 3.9pF | ±0.1pF  | GQM1875C2E3R9BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM1875C2E3R9CB12# | p178 |
|        |               |         | 4.0pF | ±0.1pF  | GQM1875C2E4R0BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM1875C2E4R0CB12# | p178 |
|        |               |         | 4.3pF | ±0.1pF  | GQM1875C2E4R3BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM1875C2E4R3CB12# | p178 |
|        |               |         | 4.7pF | ±0.1pF  | GQM1875C2E4R7BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM1875C2E4R7CB12# | p178 |
|        |               |         | 5.0pF | ±0.1pF  | GQM1875C2E5R0BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM1875C2E5R0CB12# | p178 |
|        |               |         | 5.1pF | ±0.25pF | GQM1875C2E5R1CB12# | p178 |
|        |               |         |       | ±0.5pF  | GQM1875C2E5R1DB12# | p178 |
|        |               |         | 5.6pF | ±0.25pF | GQM1875C2E5R6CB12# | p178 |
|        |               |         |       | ±0.5pF  | GQM1875C2E5R6DB12# | p178 |
|        |               |         | 6.0pF | ±0.25pF | GQM1875C2E6R0CB12# | p178 |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.8mm  | 250Vdc        | COG     | 6.0pF | ±0.5pF  | GQM1875C2E6R0DB12# | p178 |
|        |               |         |       | ±0.25pF | GQM1875C2E6R2CB12# | p178 |
|        |               |         | 6.2pF | ±0.5pF  | GQM1875C2E6R2DB12# | p178 |
|        |               |         |       | ±0.25pF | GQM1875C2E6R8CB12# | p178 |
|        |               |         | 6.8pF | ±0.5pF  | GQM1875C2E6R8DB12# | p178 |
|        |               |         |       | ±0.25pF | GQM1875C2E7R0CB12# | p178 |
|        |               |         | 7.0pF | ±0.5pF  | GQM1875C2E7R0DB12# | p178 |
|        |               |         |       | ±0.25pF | GQM1875C2E7R5CB12# | p178 |
|        |               |         | 7.5pF | ±0.5pF  | GQM1875C2E7R5DB12# | p178 |
|        |               |         |       | ±0.25pF | GQM1875C2E8R0CB12# | p178 |
|        |               |         | 8.0pF | ±0.5pF  | GQM1875C2E8R0DB12# | p178 |
|        |               |         |       | ±0.25pF | GQM1875C2E8R2CB12# | p178 |
|        |               |         | 8.2pF | ±0.5pF  | GQM1875C2E8R2DB12# | p178 |
|        |               |         |       | ±0.25pF | GQM1875C2E9R0CB12# | p178 |
|        |               |         | 9.0pF | ±0.5pF  | GQM1875C2E9R0DB12# | p178 |
|        |               |         |       | ±0.25pF | GQM1875C2E9R1CB12# | p178 |
|        |               |         | 9.1pF | ±0.5pF  | GQM1875C2E9R1DB12# | p178 |
|        |               |         |       | ±2%     | GQM1875C2E100GB12# | p178 |
|        |               |         | 10pF  | ±5%     | GQM1875C2E100JB12# | p178 |
|        |               |         |       | ±2%     | GQM1875C2E110GB12# | p178 |
|        |               |         | 11pF  | ±5%     | GQM1875C2E110JB12# | p178 |
|        |               |         |       | ±2%     | GQM1875C2E120GB12# | p178 |
|        |               |         | 12pF  | ±5%     | GQM1875C2E120JB12# | p178 |
|        |               |         |       | ±2%     | GQM1875C2E130GB12# | p178 |
|        |               |         | 13pF  | ±5%     | GQM1875C2E130JB12# | p178 |
|        |               |         |       | ±2%     | GQM1875C2E150GB12# | p178 |
|        |               |         | 15pF  | ±5%     | GQM1875C2E150JB12# | p178 |
|        |               |         |       | ±2%     | GQM1875C2E160GB12# | p178 |
|        |               |         | 16pF  | ±5%     | GQM1875C2E160JB12# | p178 |
|        |               |         |       | ±2%     | GQM1875C2E180GB12# | p178 |
|        |               |         | 18pF  | ±5%     | GQM1875C2E180JB12# | p178 |
|        |               |         |       | ±2%     | GQM1875C2E200GB12# | p178 |
|        |               |         | 20pF  | ±5%     | GQM1875C2E200JB12# | p178 |
|        |               |         |       | ±2%     | GQM1875C2E220GB12# | p178 |
|        |               |         | 22pF  | ±5%     | GQM1875C2E220JB12# | p178 |
|        |               |         |       | ±2%     | GQM1875C2E240GB12# | p178 |
|        |               |         | 24pF  | ±5%     | GQM1875C2E240JB12# | p178 |
|        |               |         |       | ±2%     | GQM1875C2E270GB12# | p178 |
|        |               |         | 27pF  | ±5%     | GQM1875C2E270JB12# | p178 |
|        |               |         |       | ±2%     | GQM1875C2E300GB12# | p178 |
|        |               |         | 30pF  | ±5%     | GQM1875C2E300JB12# | p178 |
|        |               |         |       | ±2%     | GQM1875C2E330GB12# | p178 |
|        |               |         | 33pF  | ±5%     | GQM1875C2E330JB12# | p178 |
|        |               |         |       | ±2%     | GQM1875C2E360GB12# | p178 |
|        |               |         | 36pF  | ±5%     | GQM1875C2E360JB12# | p178 |
|        |               |         |       | ±2%     | GQM1875C2E390GB12# | p178 |
|        |               |         | 39pF  | ±5%     | GQM1875C2E390JB12# | p178 |
|        |               |         |       | ±2%     | GQM1875C2E430GB12# | p178 |
|        |               |         | 43pF  | ±5%     | GQM1875C2E430JB12# | p178 |
|        |               |         |       | ±2%     | GQM1875C2E470GB12# | p178 |
|        |               |         | 47pF  | ±5%     | GQM1875C2E470JB12# | p178 |
|        |               |         |       | ±0.1pF  | GQM1875G2E1R0BB12# | p175 |
|        |               | X8G     | 1.0pF | ±0.25pF | GQM1875G2E1R0CB12# | p175 |
|        |               |         |       | ±0.1pF  | GQM1875G2E1R1BB12# | p175 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

## GQM Series Temperature Compensating Type Part Number List

(→ 1.6×0.8mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.8mm  | 250Vdc        | X8G     | 1.1pF | ±0.25pF | GQM1875G2E1R1CB12# | p175 |
|        |               |         |       | ±0.1pF  | GQM1875G2E1R2BB12# | p175 |
|        |               |         | 1.2pF | ±0.25pF | GQM1875G2E1R2CB12# | p175 |
|        |               |         |       | ±0.1pF  | GQM1875G2E1R3BB12# | p175 |
|        |               |         | 1.3pF | ±0.1pF  | GQM1875G2E1R3CB12# | p175 |
|        |               |         |       | ±0.25pF | GQM1875G2E1R5BB12# | p175 |
|        |               |         | 1.5pF | ±0.1pF  | GQM1875G2E1R5CB12# | p175 |
|        |               |         |       | ±0.25pF | GQM1875G2E1R6BB12# | p175 |
|        |               |         | 1.6pF | ±0.1pF  | GQM1875G2E1R6CB12# | p175 |
|        |               |         |       | ±0.25pF | GQM1875G2E1R8BB12# | p175 |
|        |               |         | 1.8pF | ±0.1pF  | GQM1875G2E1R8CB12# | p175 |
|        |               |         |       | ±0.25pF | GQM1875G2E2R0BB12# | p175 |
|        |               |         | 2.0pF | ±0.1pF  | GQM1875G2E2R0CB12# | p175 |
|        |               |         |       | ±0.25pF | GQM1875G2E2R2BB12# | p175 |
|        |               |         | 2.2pF | ±0.1pF  | GQM1875G2E2R2CB12# | p175 |
|        |               |         |       | ±0.25pF | GQM1875G2E2R4BB12# | p175 |
|        |               |         | 2.4pF | ±0.1pF  | GQM1875G2E2R4CB12# | p175 |
|        |               |         |       | ±0.25pF | GQM1875G2E2R7BB12# | p175 |
|        |               |         | 2.7pF | ±0.1pF  | GQM1875G2E2R7CB12# | p175 |
|        |               |         |       | ±0.25pF | GQM1875G2E3R0BB12# | p175 |
|        |               |         | 3.0pF | ±0.1pF  | GQM1875G2E3R0CB12# | p175 |
|        |               |         |       | ±0.25pF | GQM1875G2E3R3BB12# | p175 |
|        |               |         | 3.3pF | ±0.1pF  | GQM1875G2E3R3CB12# | p175 |
|        |               |         |       | ±0.25pF | GQM1875G2E3R6BB12# | p175 |
|        |               |         | 3.6pF | ±0.1pF  | GQM1875G2E3R6CB12# | p175 |
|        |               |         |       | ±0.25pF | GQM1875G2E3R9BB12# | p175 |
|        |               |         | 3.9pF | ±0.1pF  | GQM1875G2E3R9CB12# | p175 |
|        |               |         |       | ±0.25pF | GQM1875G2E4R0BB12# | p175 |
|        |               |         | 4.0pF | ±0.1pF  | GQM1875G2E4R0CB12# | p175 |
|        |               |         |       | ±0.25pF | GQM1875G2E4R3BB12# | p175 |
|        |               |         | 4.3pF | ±0.1pF  | GQM1875G2E4R3CB12# | p175 |
|        |               |         |       | ±0.25pF | GQM1875G2E4R7BB12# | p175 |
|        |               |         | 4.7pF | ±0.1pF  | GQM1875G2E4R7CB12# | p175 |
|        |               |         |       | ±0.25pF | GQM1875G2E5R0BB12# | p175 |
|        |               |         | 5.0pF | ±0.1pF  | GQM1875G2E5R0CB12# | p175 |
|        |               |         |       | ±0.25pF | GQM1875G2E5R1CB12# | p175 |
|        |               |         | 5.1pF | ±0.25pF | GQM1875G2E5R1DB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM1875G2E5R6CB12# | p175 |
|        |               |         | 5.6pF | ±0.25pF | GQM1875G2E5R6DB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM1875G2E6R0CB12# | p175 |
|        |               |         | 6.0pF | ±0.25pF | GQM1875G2E6R0DB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM1875G2E6R2CB12# | p175 |
|        |               |         | 6.2pF | ±0.25pF | GQM1875G2E6R2DB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM1875G2E6R8CB12# | p175 |
|        |               |         | 6.8pF | ±0.25pF | GQM1875G2E6R8DB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM1875G2E7R0CB12# | p175 |
|        |               |         | 7.0pF | ±0.25pF | GQM1875G2E7R0DB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM1875G2E7R5CB12# | p175 |
|        |               |         | 7.5pF | ±0.25pF | GQM1875G2E7R5DB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM1875G2E8R0CB12# | p175 |
|        |               |         | 8.0pF | ±0.25pF | GQM1875G2E8R0DB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM1875G2E8R2CB12# | p175 |
|        |               |         | 8.2pF | ±0.25pF | GQM1875G2E8R2DB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM1875G2E9R0CB12# | p175 |
|        |               |         | 9.0pF | ±0.25pF | GQM1875G2E9R0DB12# | p175 |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 0.8mm  | 250Vdc        | X8G     | 9.0pF | ±0.5pF  | GQM1875G2E9R0DB12# | p175 |
|        |               |         |       | ±0.25pF | GQM1875G2E9R1CB12# | p175 |
|        |               |         | 9.1pF | ±0.5pF  | GQM1875G2E9R1DB12# | p175 |
|        |               |         |       | ±2%     | GQM1875G2E100GB12# | p175 |
|        |               |         | 10pF  | ±5%     | GQM1875G2E100JB12# | p175 |
|        |               |         |       | ±2%     | GQM1875G2E110GB12# | p175 |
|        |               |         | 11pF  | ±5%     | GQM1875G2E110JB12# | p175 |
|        |               |         |       | ±2%     | GQM1875G2E120GB12# | p175 |
|        |               |         | 12pF  | ±5%     | GQM1875G2E120JB12# | p175 |
|        |               |         |       | ±2%     | GQM1875G2E130GB12# | p175 |
|        |               |         | 13pF  | ±5%     | GQM1875G2E130JB12# | p175 |
|        |               |         |       | ±2%     | GQM1875G2E150GB12# | p175 |
|        |               |         | 15pF  | ±5%     | GQM1875G2E150JB12# | p175 |
|        |               |         |       | ±2%     | GQM1875G2E160GB12# | p175 |
|        |               |         | 16pF  | ±5%     | GQM1875G2E160JB12# | p175 |
|        |               |         |       | ±2%     | GQM1875G2E180GB12# | p175 |
|        |               |         | 18pF  | ±5%     | GQM1875G2E180JB12# | p175 |
|        |               |         |       | ±2%     | GQM1875G2E200GB12# | p175 |
|        |               |         | 20pF  | ±5%     | GQM1875G2E200JB12# | p175 |
|        |               |         |       | ±2%     | GQM1875G2E220GB12# | p175 |
|        |               |         | 22pF  | ±5%     | GQM1875G2E220JB12# | p175 |
|        |               |         |       | ±2%     | GQM1875G2E240GB12# | p175 |
|        |               |         | 24pF  | ±5%     | GQM1875G2E240JB12# | p175 |
|        |               |         |       | ±2%     | GQM1875G2E270GB12# | p175 |
|        |               |         | 27pF  | ±5%     | GQM1875G2E270JB12# | p175 |
|        |               |         |       | ±2%     | GQM1875G2E300GB12# | p175 |
|        |               |         | 30pF  | ±5%     | GQM1875G2E300JB12# | p175 |

### 2.0×1.25mm

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 1.0mm  | 500Vdc        | X8G     | 1.0pF | ±0.1pF  | GQM2195G2H1R0BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2H1R0CB12# | p175 |
|        |               |         | 1.1pF | ±0.1pF  | GQM2195G2H1R1BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2H1R1CB12# | p175 |
|        |               |         | 1.2pF | ±0.1pF  | GQM2195G2H1R2BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2H1R2CB12# | p175 |
|        |               |         | 1.3pF | ±0.1pF  | GQM2195G2H1R3BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2H1R3CB12# | p175 |
|        |               |         | 1.5pF | ±0.1pF  | GQM2195G2H1R5BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2H1R5CB12# | p175 |
|        |               |         | 1.6pF | ±0.1pF  | GQM2195G2H1R6BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2H1R6CB12# | p175 |
|        |               |         | 1.8pF | ±0.1pF  | GQM2195G2H1R8BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2H1R8CB12# | p175 |
|        |               |         | 2.0pF | ±0.1pF  | GQM2195G2H2R0BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2H2R0CB12# | p175 |
|        |               |         | 2.2pF | ±0.1pF  | GQM2195G2H2R2BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2H2R2CB12# | p175 |
|        |               |         | 2.4pF | ±0.1pF  | GQM2195G2H2R4BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2H2R4CB12# | p175 |
|        |               |         | 2.7pF | ±0.1pF  | GQM2195G2H2R7BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2H2R7CB12# | p175 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

## GQM Series Temperature Compensating Type Part Number List

(→ 2.0×1.25mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 1.0mm  | 500Vdc        | X8G     | 3.0pF | ±0.1pF  | GQM2195G2H3R0BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2H3R0CB12# | p175 |
|        |               |         | 3.3pF | ±0.1pF  | GQM2195G2H3R3BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2H3R3CB12# | p175 |
|        |               |         | 3.6pF | ±0.1pF  | GQM2195G2H3R6BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2H3R6CB12# | p175 |
|        |               |         | 3.9pF | ±0.1pF  | GQM2195G2H3R9BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2H3R9CB12# | p175 |
|        |               |         | 4.0pF | ±0.1pF  | GQM2195G2H4R0BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2H4R0CB12# | p175 |
|        |               |         | 4.3pF | ±0.1pF  | GQM2195G2H4R3BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2H4R3CB12# | p175 |
|        |               |         | 4.7pF | ±0.1pF  | GQM2195G2H4R7BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2H4R7CB12# | p175 |
|        |               |         | 5.0pF | ±0.1pF  | GQM2195G2H5R0BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2H5R0CB12# | p175 |
|        |               |         | 5.1pF | ±0.25pF | GQM2195G2H5R1CB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM2195G2H5R1DB12# | p175 |
|        |               |         | 5.6pF | ±0.25pF | GQM2195G2H5R6CB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM2195G2H5R6DB12# | p175 |
|        |               |         | 6.0pF | ±0.25pF | GQM2195G2H6R0CB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM2195G2H6R0DB12# | p175 |
|        |               |         | 6.2pF | ±0.25pF | GQM2195G2H6R2CB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM2195G2H6R2DB12# | p175 |
|        |               |         | 6.8pF | ±0.25pF | GQM2195G2H6R8CB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM2195G2H6R8DB12# | p175 |
|        |               |         | 7.0pF | ±0.25pF | GQM2195G2H7R0CB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM2195G2H7R0DB12# | p175 |
|        |               |         | 7.5pF | ±0.25pF | GQM2195G2H7R5CB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM2195G2H7R5DB12# | p175 |
|        |               |         | 8.0pF | ±0.25pF | GQM2195G2H8R0CB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM2195G2H8R0DB12# | p175 |
|        |               |         | 8.2pF | ±0.25pF | GQM2195G2H8R2CB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM2195G2H8R2DB12# | p175 |
|        |               |         | 9.0pF | ±0.25pF | GQM2195G2H9R0CB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM2195G2H9R0DB12# | p175 |
|        |               |         | 9.1pF | ±0.25pF | GQM2195G2H9R1CB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM2195G2H9R1DB12# | p175 |
|        |               |         | 10pF  | ±2%     | GQM2195G2H100GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2H100JB12# | p175 |
|        |               |         | 11pF  | ±2%     | GQM2195G2H110GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2H110JB12# | p175 |
|        |               |         | 12pF  | ±2%     | GQM2195G2H120GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2H120JB12# | p175 |
|        |               |         | 13pF  | ±2%     | GQM2195G2H130GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2H130JB12# | p175 |
|        |               |         | 15pF  | ±2%     | GQM2195G2H150GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2H150JB12# | p175 |
|        |               |         | 16pF  | ±2%     | GQM2195G2H160GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2H160JB12# | p175 |
|        |               |         | 18pF  | ±2%     | GQM2195G2H180GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2H180JB12# | p175 |
|        |               |         | 20pF  | ±2%     | GQM2195G2H200GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2H200JB12# | p175 |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 1.0mm  | 500Vdc        | X8G     | 22pF  | ±2%     | GQM2195G2H220GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2H220JB12# | p175 |
|        | 250Vdc        | COG     | 1.0pF | ±0.1pF  | GQM2195C2E1R0BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM2195C2E1R0CB12# | p178 |
|        |               |         | 1.1pF | ±0.1pF  | GQM2195C2E1R1BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM2195C2E1R1CB12# | p178 |
|        |               |         | 1.2pF | ±0.1pF  | GQM2195C2E1R2BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM2195C2E1R2CB12# | p178 |
|        |               |         | 1.3pF | ±0.1pF  | GQM2195C2E1R3BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM2195C2E1R3CB12# | p178 |
|        |               |         | 1.5pF | ±0.1pF  | GQM2195C2E1R5BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM2195C2E1R5CB12# | p178 |
|        |               |         | 1.6pF | ±0.1pF  | GQM2195C2E1R6BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM2195C2E1R6CB12# | p178 |
|        |               |         | 1.8pF | ±0.1pF  | GQM2195C2E1R8BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM2195C2E1R8CB12# | p178 |
|        |               |         | 2.0pF | ±0.1pF  | GQM2195C2E2R0BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM2195C2E2R0CB12# | p178 |
|        |               |         | 2.2pF | ±0.1pF  | GQM2195C2E2R2BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM2195C2E2R2CB12# | p178 |
|        |               |         | 2.4pF | ±0.1pF  | GQM2195C2E2R4BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM2195C2E2R4CB12# | p178 |
|        |               |         | 2.7pF | ±0.1pF  | GQM2195C2E2R7BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM2195C2E2R7CB12# | p178 |
|        |               |         | 3.0pF | ±0.1pF  | GQM2195C2E3R0BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM2195C2E3R0CB12# | p178 |
|        |               |         | 3.3pF | ±0.1pF  | GQM2195C2E3R3BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM2195C2E3R3CB12# | p178 |
|        |               |         | 3.6pF | ±0.1pF  | GQM2195C2E3R6BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM2195C2E3R6CB12# | p178 |
|        |               |         | 3.9pF | ±0.1pF  | GQM2195C2E3R9BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM2195C2E3R9CB12# | p178 |
|        |               |         | 4.0pF | ±0.1pF  | GQM2195C2E4R0BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM2195C2E4R0CB12# | p178 |
|        |               |         | 4.3pF | ±0.1pF  | GQM2195C2E4R3BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM2195C2E4R3CB12# | p178 |
|        |               |         | 4.7pF | ±0.1pF  | GQM2195C2E4R7BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM2195C2E4R7CB12# | p178 |
|        |               |         | 5.0pF | ±0.1pF  | GQM2195C2E5R0BB12# | p178 |
|        |               |         |       | ±0.25pF | GQM2195C2E5R0CB12# | p178 |
|        |               |         | 5.1pF | ±0.25pF | GQM2195C2E5R1CB12# | p178 |
|        |               |         |       | ±0.5pF  | GQM2195C2E5R1DB12# | p178 |
|        |               |         | 5.6pF | ±0.25pF | GQM2195C2E5R6CB12# | p178 |
|        |               |         |       | ±0.5pF  | GQM2195C2E5R6DB12# | p178 |
|        |               |         | 6.0pF | ±0.25pF | GQM2195C2E6R0CB12# | p178 |
|        |               |         |       | ±0.5pF  | GQM2195C2E6R0DB12# | p178 |
|        |               |         | 6.2pF | ±0.25pF | GQM2195C2E6R2CB12# | p178 |
|        |               |         |       | ±0.5pF  | GQM2195C2E6R2DB12# | p178 |
|        |               |         | 6.8pF | ±0.25pF | GQM2195C2E6R8CB12# | p178 |
|        |               |         |       | ±0.5pF  | GQM2195C2E6R8DB12# | p178 |
|        |               |         | 7.0pF | ±0.25pF | GQM2195C2E7R0CB12# | p178 |
|        |               |         |       | ±0.5pF  | GQM2195C2E7R0DB12# | p178 |
|        |               |         | 7.5pF | ±0.25pF | GQM2195C2E7R5CB12# | p178 |
|        |               |         |       | ±0.5pF  | GQM2195C2E7R5DB12# | p178 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

## GQM Series Temperature Compensating Type Part Number List

(→ 2.0×1.25mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 1.0mm  | 250Vdc        | COG     | 8.0pF | ±0.25pF | GQM2195C2E8R0CB12# | p178 |
|        |               |         |       | ±0.5pF  | GQM2195C2E8R0DB12# | p178 |
|        |               |         | 8.2pF | ±0.25pF | GQM2195C2E8R2CB12# | p178 |
|        |               |         |       | ±0.5pF  | GQM2195C2E8R2DB12# | p178 |
|        |               |         | 9.0pF | ±0.25pF | GQM2195C2E9R0CB12# | p178 |
|        |               |         |       | ±0.5pF  | GQM2195C2E9R0DB12# | p178 |
|        |               |         | 9.1pF | ±0.25pF | GQM2195C2E9R1CB12# | p178 |
|        |               |         |       | ±0.5pF  | GQM2195C2E9R1DB12# | p178 |
|        |               |         | 10pF  | ±2%     | GQM2195C2E100GB12# | p178 |
|        |               |         |       | ±5%     | GQM2195C2E100JB12# | p178 |
|        |               |         | 11pF  | ±2%     | GQM2195C2E110GB12# | p178 |
|        |               |         |       | ±5%     | GQM2195C2E110JB12# | p178 |
|        |               |         | 12pF  | ±2%     | GQM2195C2E120GB12# | p178 |
|        |               |         |       | ±5%     | GQM2195C2E120JB12# | p178 |
|        |               |         | 13pF  | ±2%     | GQM2195C2E130GB12# | p178 |
|        |               |         |       | ±5%     | GQM2195C2E130JB12# | p178 |
|        |               |         | 15pF  | ±2%     | GQM2195C2E150GB12# | p178 |
|        |               |         |       | ±5%     | GQM2195C2E150JB12# | p178 |
|        |               |         | 16pF  | ±2%     | GQM2195C2E160GB12# | p178 |
|        |               |         |       | ±5%     | GQM2195C2E160JB12# | p178 |
|        |               |         | 18pF  | ±2%     | GQM2195C2E180GB12# | p178 |
|        |               |         |       | ±5%     | GQM2195C2E180JB12# | p178 |
|        |               |         | 20pF  | ±2%     | GQM2195C2E200GB12# | p178 |
|        |               |         |       | ±5%     | GQM2195C2E200JB12# | p178 |
|        |               |         | 22pF  | ±2%     | GQM2195C2E220GB12# | p178 |
|        |               |         |       | ±5%     | GQM2195C2E220JB12# | p178 |
|        |               |         | 24pF  | ±2%     | GQM2195C2E240GB12# | p178 |
|        |               |         |       | ±5%     | GQM2195C2E240JB12# | p178 |
|        |               |         | 27pF  | ±2%     | GQM2195C2E270GB12# | p178 |
|        |               |         |       | ±5%     | GQM2195C2E270JB12# | p178 |
|        |               |         | 30pF  | ±2%     | GQM2195C2E300GB12# | p178 |
|        |               |         |       | ±5%     | GQM2195C2E300JB12# | p178 |
|        |               |         | 33pF  | ±2%     | GQM2195C2E330GB12# | p178 |
|        |               |         |       | ±5%     | GQM2195C2E330JB12# | p178 |
|        |               |         | 36pF  | ±2%     | GQM2195C2E360GB12# | p178 |
|        |               |         |       | ±5%     | GQM2195C2E360JB12# | p178 |
|        |               |         | 39pF  | ±2%     | GQM2195C2E390GB12# | p178 |
|        |               |         |       | ±5%     | GQM2195C2E390JB12# | p178 |
|        |               |         | 43pF  | ±2%     | GQM2195C2E430GB12# | p178 |
|        |               |         |       | ±5%     | GQM2195C2E430JB12# | p178 |
|        |               |         | 47pF  | ±2%     | GQM2195C2E470GB12# | p178 |
|        |               |         |       | ±5%     | GQM2195C2E470JB12# | p178 |
|        |               |         | 51pF  | ±2%     | GQM2195C2E510GB12# | p178 |
|        |               |         |       | ±5%     | GQM2195C2E510JB12# | p178 |
|        |               |         | 56pF  | ±2%     | GQM2195C2E560GB12# | p178 |
|        |               |         |       | ±5%     | GQM2195C2E560JB12# | p178 |
|        |               |         | 62pF  | ±2%     | GQM2195C2E620GB12# | p178 |
|        |               |         |       | ±5%     | GQM2195C2E620JB12# | p178 |
|        |               |         | 68pF  | ±2%     | GQM2195C2E680GB12# | p178 |
|        |               |         |       | ±5%     | GQM2195C2E680JB12# | p178 |
|        |               |         | 75pF  | ±2%     | GQM2195C2E750GB12# | p178 |
|        |               |         |       | ±5%     | GQM2195C2E750JB12# | p178 |
|        |               |         | 82pF  | ±2%     | GQM2195C2E820GB12# | p178 |
|        |               |         |       | ±5%     | GQM2195C2E820JB12# | p178 |

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 1.0mm  | 250Vdc        | COG     | 91pF  | ±2%     | GQM2195C2E910GB12# | p178 |
|        |               |         |       | ±5%     | GQM2195C2E910JB12# | p178 |
|        |               |         | 100pF | ±2%     | GQM2195C2E101GB12# | p178 |
|        |               |         |       | ±5%     | GQM2195C2E101JB12# | p178 |
|        |               | X8G     | 1.0pF | ±0.1pF  | GQM2195G2E1R0BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2E1R0CB12# | p175 |
|        |               |         | 1.1pF | ±0.1pF  | GQM2195G2E1R1BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2E1R1CB12# | p175 |
|        |               |         | 1.2pF | ±0.1pF  | GQM2195G2E1R2BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2E1R2CB12# | p175 |
|        |               |         | 1.3pF | ±0.1pF  | GQM2195G2E1R3BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2E1R3CB12# | p175 |
|        |               |         | 1.5pF | ±0.1pF  | GQM2195G2E1R5BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2E1R5CB12# | p175 |
|        |               |         | 1.6pF | ±0.1pF  | GQM2195G2E1R6BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2E1R6CB12# | p175 |
|        |               |         | 1.8pF | ±0.1pF  | GQM2195G2E1R8BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2E1R8CB12# | p175 |
|        |               |         | 2.0pF | ±0.1pF  | GQM2195G2E2R0BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2E2R0CB12# | p175 |
|        |               |         | 2.2pF | ±0.1pF  | GQM2195G2E2R2BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2E2R2CB12# | p175 |
|        |               |         | 2.4pF | ±0.1pF  | GQM2195G2E2R4BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2E2R4CB12# | p175 |
|        |               |         | 2.7pF | ±0.1pF  | GQM2195G2E2R7BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2E2R7CB12# | p175 |
|        |               |         | 3.0pF | ±0.1pF  | GQM2195G2E3R0BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2E3R0CB12# | p175 |
|        |               |         | 3.3pF | ±0.1pF  | GQM2195G2E3R3BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2E3R3CB12# | p175 |
|        |               |         | 3.6pF | ±0.1pF  | GQM2195G2E3R6BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2E3R6CB12# | p175 |
|        |               |         | 3.9pF | ±0.1pF  | GQM2195G2E3R9BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2E3R9CB12# | p175 |
|        |               |         | 4.0pF | ±0.1pF  | GQM2195G2E4R0BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2E4R0CB12# | p175 |
|        |               |         | 4.3pF | ±0.1pF  | GQM2195G2E4R3BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2E4R3CB12# | p175 |
|        |               |         | 4.7pF | ±0.1pF  | GQM2195G2E4R7BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2E4R7CB12# | p175 |
|        |               |         | 5.0pF | ±0.1pF  | GQM2195G2E5R0BB12# | p175 |
|        |               |         |       | ±0.25pF | GQM2195G2E5R0CB12# | p175 |
|        |               |         | 5.1pF | ±0.25pF | GQM2195G2E5R1CB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM2195G2E5R1DB12# | p175 |
|        |               |         | 5.6pF | ±0.25pF | GQM2195G2E5R6CB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM2195G2E5R6DB12# | p175 |
|        |               |         | 6.0pF | ±0.25pF | GQM2195G2E6R0CB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM2195G2E6R0DB12# | p175 |
|        |               |         | 6.2pF | ±0.25pF | GQM2195G2E6R2CB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM2195G2E6R2DB12# | p175 |
|        |               |         | 6.8pF | ±0.25pF | GQM2195G2E6R8CB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM2195G2E6R8DB12# | p175 |
|        |               |         | 7.0pF | ±0.25pF | GQM2195G2E7R0CB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM2195G2E7R0DB12# | p175 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

## GQM Series Temperature Compensating Type Part Number List

(→ 2.0×1.25mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 1.0mm  | 250Vdc        | X8G     | 7.5pF | ±0.25pF | GQM2195G2E7R5CB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM2195G2E7R5DB12# | p175 |
|        |               |         | 8.0pF | ±0.25pF | GQM2195G2E8R0CB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM2195G2E8R0DB12# | p175 |
|        |               |         | 8.2pF | ±0.25pF | GQM2195G2E8R2CB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM2195G2E8R2DB12# | p175 |
|        |               |         | 9.0pF | ±0.25pF | GQM2195G2E9R0CB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM2195G2E9R0DB12# | p175 |
|        |               |         | 9.1pF | ±0.25pF | GQM2195G2E9R1CB12# | p175 |
|        |               |         |       | ±0.5pF  | GQM2195G2E9R1DB12# | p175 |
|        |               |         | 10pF  | ±2%     | GQM2195G2E100GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2E100JB12# | p175 |
|        |               |         | 11pF  | ±2%     | GQM2195G2E110GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2E110JB12# | p175 |
|        |               |         | 12pF  | ±2%     | GQM2195G2E120GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2E120JB12# | p175 |
|        |               |         | 13pF  | ±2%     | GQM2195G2E130GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2E130JB12# | p175 |
|        |               |         | 15pF  | ±2%     | GQM2195G2E150GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2E150JB12# | p175 |
|        |               |         | 16pF  | ±2%     | GQM2195G2E160GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2E160JB12# | p175 |
|        |               |         | 18pF  | ±2%     | GQM2195G2E180GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2E180JB12# | p175 |
|        |               |         | 20pF  | ±2%     | GQM2195G2E200GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2E200JB12# | p175 |
|        |               |         | 22pF  | ±2%     | GQM2195G2E220GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2E220JB12# | p175 |
|        |               |         | 24pF  | ±2%     | GQM2195G2E240GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2E240JB12# | p175 |
|        |               |         | 27pF  | ±2%     | GQM2195G2E270GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2E270JB12# | p175 |
|        |               |         | 30pF  | ±2%     | GQM2195G2E300GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2E300JB12# | p175 |
|        |               |         | 33pF  | ±2%     | GQM2195G2E330GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2E330JB12# | p175 |
|        |               |         | 36pF  | ±2%     | GQM2195G2E360GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2E360JB12# | p175 |
|        |               |         | 39pF  | ±2%     | GQM2195G2E390GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2E390JB12# | p175 |
|        |               |         | 43pF  | ±2%     | GQM2195G2E430GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2E430JB12# | p175 |
|        |               |         | 47pF  | ±2%     | GQM2195G2E470GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2E470JB12# | p175 |
|        |               |         | 51pF  | ±2%     | GQM2195G2E510GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2E510JB12# | p175 |
|        |               |         | 56pF  | ±2%     | GQM2195G2E560GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2E560JB12# | p175 |
|        |               |         | 62pF  | ±2%     | GQM2195G2E620GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2E620JB12# | p175 |
|        |               |         | 68pF  | ±2%     | GQM2195G2E680GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2E680JB12# | p175 |
|        |               |         | 75pF  | ±2%     | GQM2195G2E750GB12# | p175 |
|        |               |         |       | ±5%     | GQM2195G2E750JB12# | p175 |

| T max. | Rated Voltage | TC Code | Cap. | Tol. | Part Number        | p*   |
|--------|---------------|---------|------|------|--------------------|------|
| 1.0mm  | 250Vdc        | X8G     | 82pF | ±2%  | GQM2195G2E820GB12# | p175 |
|        |               |         |      | ±5%  | GQM2195G2E820JB12# | p175 |
|        |               |         |      |      |                    |      |

### 2.8×2.8mm

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 1.35mm | 500Vdc        | COG     | 1.0pF | ±0.1pF  | GQM22M5C2H1R0BB01# | p181 |
|        |               |         |       | ±0.25pF | GQM22M5C2H1R0CB01# | p181 |
|        |               |         | 1.1pF | ±0.1pF  | GQM22M5C2H1R1BB01# | p181 |
|        |               |         |       | ±0.25pF | GQM22M5C2H1R1CB01# | p181 |
|        |               |         | 1.2pF | ±0.1pF  | GQM22M5C2H1R2BB01# | p181 |
|        |               |         |       | ±0.25pF | GQM22M5C2H1R2CB01# | p181 |
|        |               |         | 1.3pF | ±0.1pF  | GQM22M5C2H1R3BB01# | p181 |
|        |               |         |       | ±0.25pF | GQM22M5C2H1R3CB01# | p181 |
|        |               |         | 1.5pF | ±0.1pF  | GQM22M5C2H1R5BB01# | p181 |
|        |               |         |       | ±0.25pF | GQM22M5C2H1R5CB01# | p181 |
|        |               |         | 1.6pF | ±0.1pF  | GQM22M5C2H1R6BB01# | p181 |
|        |               |         |       | ±0.25pF | GQM22M5C2H1R6CB01# | p181 |
|        |               |         | 1.8pF | ±0.1pF  | GQM22M5C2H1R8BB01# | p181 |
|        |               |         |       | ±0.25pF | GQM22M5C2H1R8CB01# | p181 |
|        |               |         | 2.0pF | ±0.1pF  | GQM22M5C2H2R0BB01# | p181 |
|        |               |         |       | ±0.25pF | GQM22M5C2H2R0CB01# | p181 |
|        |               |         | 2.2pF | ±0.1pF  | GQM22M5C2H2R2BB01# | p181 |
|        |               |         |       | ±0.25pF | GQM22M5C2H2R2CB01# | p181 |
|        |               |         | 2.4pF | ±0.1pF  | GQM22M5C2H2R4BB01# | p181 |
|        |               |         |       | ±0.25pF | GQM22M5C2H2R4CB01# | p181 |
|        |               |         | 2.7pF | ±0.1pF  | GQM22M5C2H2R7BB01# | p181 |
|        |               |         |       | ±0.25pF | GQM22M5C2H2R7CB01# | p181 |
|        |               |         | 3.0pF | ±0.1pF  | GQM22M5C2H3R0BB01# | p181 |
|        |               |         |       | ±0.25pF | GQM22M5C2H3R0CB01# | p181 |
|        |               |         | 3.3pF | ±0.1pF  | GQM22M5C2H3R3BB01# | p181 |
|        |               |         |       | ±0.25pF | GQM22M5C2H3R3CB01# | p181 |
|        |               |         | 3.6pF | ±0.1pF  | GQM22M5C2H3R6BB01# | p181 |
|        |               |         |       | ±0.25pF | GQM22M5C2H3R6CB01# | p181 |
|        |               |         | 3.9pF | ±0.1pF  | GQM22M5C2H3R9BB01# | p181 |
|        |               |         |       | ±0.25pF | GQM22M5C2H3R9CB01# | p181 |
|        |               |         | 4.0pF | ±0.1pF  | GQM22M5C2H4R0BB01# | p181 |
|        |               |         |       | ±0.25pF | GQM22M5C2H4R0CB01# | p181 |
|        |               |         | 4.3pF | ±0.1pF  | GQM22M5C2H4R3BB01# | p181 |
|        |               |         |       | ±0.25pF | GQM22M5C2H4R3CB01# | p181 |
|        |               |         | 4.7pF | ±0.1pF  | GQM22M5C2H4R7BB01# | p181 |
|        |               |         |       | ±0.25pF | GQM22M5C2H4R7CB01# | p181 |
|        |               |         | 5.0pF | ±0.1pF  | GQM22M5C2H5R0BB01# | p181 |
|        |               |         |       | ±0.25pF | GQM22M5C2H5R0CB01# | p181 |
|        |               |         | 5.1pF | ±0.25pF | GQM22M5C2H5R1CB01# | p181 |
|        |               |         |       | ±0.5pF  | GQM22M5C2H5R1DB01# | p181 |
|        |               |         | 5.6pF | ±0.25pF | GQM22M5C2H5R6CB01# | p181 |
|        |               |         |       | ±0.5pF  | GQM22M5C2H5R6DB01# | p181 |
|        |               |         | 6.0pF | ±0.25pF | GQM22M5C2H6R0CB01# | p181 |
|        |               |         |       | ±0.5pF  | GQM22M5C2H6R0DB01# | p181 |
|        |               |         | 6.2pF | ±0.25pF | GQM22M5C2H6R2CB01# | p181 |
|        |               |         |       | ±0.5pF  | GQM22M5C2H6R2DB01# | p181 |
|        |               |         | 6.8pF | ±0.25pF | GQM22M5C2H6R8CB01# | p181 |
|        |               |         |       |         |                    |      |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

## GQM Series Temperature Compensating Type Part Number List

(→ 2.8×2.8mm)

| T max. | Rated Voltage | TC Code | Cap.  | Tol.    | Part Number        | p*   |
|--------|---------------|---------|-------|---------|--------------------|------|
| 1.35mm | 500Vdc        | COG     | 6.8pF | ±0.5pF  | GQM22M5C2H6R8DB01# | p181 |
|        |               |         | 7.0pF | ±0.25pF | GQM22M5C2H7R0CB01# | p181 |
|        |               |         |       | ±0.5pF  | GQM22M5C2H7R0DB01# | p181 |
|        |               |         | 7.5pF | ±0.25pF | GQM22M5C2H7R5CB01# | p181 |
|        |               |         |       | ±0.5pF  | GQM22M5C2H7R5DB01# | p181 |
|        |               |         | 8.0pF | ±0.25pF | GQM22M5C2H8R0CB01# | p181 |
|        |               |         |       | ±0.5pF  | GQM22M5C2H8R0DB01# | p181 |
|        |               |         | 8.2pF | ±0.25pF | GQM22M5C2H8R2CB01# | p181 |
|        |               |         |       | ±0.5pF  | GQM22M5C2H8R2DB01# | p181 |
|        |               |         | 9.0pF | ±0.25pF | GQM22M5C2H9R0CB01# | p181 |
|        |               |         |       | ±0.5pF  | GQM22M5C2H9R0DB01# | p181 |
|        |               |         | 9.1pF | ±0.25pF | GQM22M5C2H9R1CB01# | p181 |
|        |               |         |       | ±0.5pF  | GQM22M5C2H9R1DB01# | p181 |
|        |               |         | 10pF  | ±2%     | GQM22M5C2H100GB01# | p181 |
|        |               |         |       | ±5%     | GQM22M5C2H100JB01# | p181 |
|        |               |         | 11pF  | ±2%     | GQM22M5C2H110GB01# | p181 |
|        |               |         |       | ±5%     | GQM22M5C2H110JB01# | p181 |
|        |               |         | 12pF  | ±2%     | GQM22M5C2H120GB01# | p181 |
|        |               |         |       | ±5%     | GQM22M5C2H120JB01# | p181 |
|        |               |         | 13pF  | ±2%     | GQM22M5C2H130GB01# | p181 |
|        |               |         |       | ±5%     | GQM22M5C2H130JB01# | p181 |
|        |               |         | 15pF  | ±2%     | GQM22M5C2H150GB01# | p181 |
|        |               |         |       | ±5%     | GQM22M5C2H150JB01# | p181 |
|        |               |         | 16pF  | ±2%     | GQM22M5C2H160GB01# | p181 |
|        |               |         |       | ±5%     | GQM22M5C2H160JB01# | p181 |
|        |               |         | 18pF  | ±2%     | GQM22M5C2H180GB01# | p181 |
|        |               |         |       | ±5%     | GQM22M5C2H180JB01# | p181 |
|        |               |         | 20pF  | ±2%     | GQM22M5C2H200GB01# | p181 |
|        |               |         |       | ±5%     | GQM22M5C2H200JB01# | p181 |
|        |               |         | 22pF  | ±2%     | GQM22M5C2H220GB01# | p181 |
|        |               |         |       | ±5%     | GQM22M5C2H220JB01# | p181 |
|        |               |         | 24pF  | ±2%     | GQM22M5C2H240GB01# | p181 |
|        |               |         |       | ±5%     | GQM22M5C2H240JB01# | p181 |
|        |               |         | 27pF  | ±2%     | GQM22M5C2H270GB01# | p181 |
|        |               |         |       | ±5%     | GQM22M5C2H270JB01# | p181 |
|        |               |         | 30pF  | ±2%     | GQM22M5C2H300GB01# | p181 |
|        |               |         |       | ±5%     | GQM22M5C2H300JB01# | p181 |
|        |               |         | 33pF  | ±2%     | GQM22M5C2H330GB01# | p181 |
|        |               |         |       | ±5%     | GQM22M5C2H330JB01# | p181 |
|        |               |         | 36pF  | ±2%     | GQM22M5C2H360GB01# | p181 |
|        |               |         |       | ±5%     | GQM22M5C2H360JB01# | p181 |
|        |               |         | 39pF  | ±2%     | GQM22M5C2H390GB01# | p181 |
|        |               |         |       | ±5%     | GQM22M5C2H390JB01# | p181 |
|        |               |         | 43pF  | ±2%     | GQM22M5C2H430GB01# | p181 |
|        |               |         |       | ±5%     | GQM22M5C2H430JB01# | p181 |
|        |               |         | 47pF  | ±2%     | GQM22M5C2H470GB01# | p181 |
|        |               |         |       | ±5%     | GQM22M5C2H470JB01# | p181 |
|        |               |         | 51pF  | ±2%     | GQM22M5C2H510GB01# | p181 |
|        |               |         |       | ±5%     | GQM22M5C2H510JB01# | p181 |
|        |               |         | 56pF  | ±2%     | GQM22M5C2H560GB01# | p181 |
|        |               |         |       | ±5%     | GQM22M5C2H560JB01# | p181 |
|        |               |         | 62pF  | ±2%     | GQM22M5C2H620GB01# | p181 |
|        |               |         |       | ±5%     | GQM22M5C2H620JB01# | p181 |
|        |               |         | 68pF  | ±2%     | GQM22M5C2H680GB01# | p181 |

| T max. | Rated Voltage | TC Code | Cap.  | Tol. | Part Number        | p*   |
|--------|---------------|---------|-------|------|--------------------|------|
| 1.35mm | 500Vdc        | COG     | 68pF  | ±5%  | GQM22M5C2H680JB01# | p181 |
|        |               |         | 75pF  | ±2%  | GQM22M5C2H750GB01# | p181 |
|        |               |         |       | ±5%  | GQM22M5C2H750JB01# | p181 |
|        |               |         | 82pF  | ±2%  | GQM22M5C2H820GB01# | p181 |
|        |               |         |       | ±5%  | GQM22M5C2H820JB01# | p181 |
|        |               |         | 91pF  | ±2%  | GQM22M5C2H910GB01# | p181 |
|        |               |         |       | ±5%  | GQM22M5C2H910JB01# | p181 |
|        |               |         | 100pF | ±2%  | GQM22M5C2H101GB01# | p181 |
|        |               |         |       | ±5%  | GQM22M5C2H101JB01# | p181 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

# 1

## GQM Series Specifications and Test Methods (1)

| No              | Item                                       |                       | Specification                                                                                                                                                                                                           | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
|-----------------|--------------------------------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|---------|-------------------------|------------------|------------------------------|---|-------------------------|---|------------------------------|---|-------------------------|
| 1               | Rated Voltage                              |                       | Shown in Rated value.                                                                                                                                                                                                   | The rated voltage is defined as the maximum voltage which may be applied continuously to the capacitor.<br>When AC voltage is superimposed on DC voltage, $V^{P-P}$ or $V^{O-P}$ , whichever is larger, should be maintained within the rated voltage range.                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
| 2               | Appearance                                 |                       | No defects or abnormalities.                                                                                                                                                                                            | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
| 3               | Dimension                                  |                       | Within the specified dimensions.                                                                                                                                                                                        | Using Measuring instrument of dimension.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
| 4               | Voltage Proof                              |                       | No defects or abnormalities.                                                                                                                                                                                            | Measurement Point: Between the terminations<br>Applied Time: 1 to 5s<br>Charge/discharge current: 50mA max.<br>Test Voltage: <table><tr><th>Rated Voltage</th><th>Test Voltage</th></tr><tr><td>100V</td><td>300% of Rated Voltage</td></tr><tr><td>200V</td><td>250% of Rated Voltage</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                      | Rated Voltage | Test Voltage     | 100V    | 300% of Rated Voltage   | 200V             | 250% of Rated Voltage        |   |                         |   |                              |   |                         |
| Rated Voltage   | Test Voltage                               |                       |                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
| 100V            | 300% of Rated Voltage                      |                       |                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
| 200V            | 250% of Rated Voltage                      |                       |                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
| 5               | Insulation Resistance (I.R.)               |                       | More than 10000MΩ                                                                                                                                                                                                       | Measurement Point: Between the terminations<br>Measurement Voltage: DC Rated Voltage<br>Charging Time: 2min<br>Charge/discharge current: 50mA max.<br>Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
| 6               | Capacitance                                |                       | Shown in Rated value.                                                                                                                                                                                                   | Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
| 7               | Q                                          |                       | 30pF and over: $Q \geq 1400$<br>30pF and below: $Q \geq 800+20C$<br>C: Nominal Capacitance(pF)                                                                                                                          | <table><tr><th>Capacitance</th><th>Frequency</th><th>Voltage</th></tr><tr><td><math>C \leq 1000pF</math></td><td><math>1.0 \pm 0.1kHz</math></td><td><math>0.5</math> to <math>5.0V_{rms}</math></td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Capacitance   | Frequency        | Voltage | $C \leq 1000pF$         | $1.0 \pm 0.1kHz$ | $0.5$ to $5.0V_{rms}$        |   |                         |   |                              |   |                         |
| Capacitance     | Frequency                                  | Voltage               |                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
| $C \leq 1000pF$ | $1.0 \pm 0.1kHz$                           | $0.5$ to $5.0V_{rms}$ |                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
| 8               | Temperature Characteristics of Capacitance |                       | Nominal values of the temperature coefficient is shown in Rated value.<br>But, the Capacitance Change under 25°C is shown in Table A.<br>Capacitance Drift<br>Within $\pm 0.2\%$ or $\pm 0.05pF$ (Whichever is larger.) | The capacitance change should be measured after 5 minutes at each specified temp. stage.<br>Capacitance value as a reference is the value in step 3.<br>The capacitance drift is calculated by dividing the differences between the maximum and minimum measured values in the step 1, 3 and 5 by the cap. value in step 3.<br><table><tr><th>Step</th><th>Temperature (°C)</th></tr><tr><td>1</td><td>Reference Temp. <math>\pm 2</math></td></tr><tr><td>2</td><td>Min. Operating Temp. <math>\pm 3</math></td></tr><tr><td>3</td><td>Reference Temp. <math>\pm 2</math></td></tr><tr><td>4</td><td>Max. Operating Temp. <math>\pm 3</math></td></tr><tr><td>5</td><td>Reference Temp. <math>\pm 2</math></td></tr></table> | Step          | Temperature (°C) | 1       | Reference Temp. $\pm 2$ | 2                | Min. Operating Temp. $\pm 3$ | 3 | Reference Temp. $\pm 2$ | 4 | Max. Operating Temp. $\pm 3$ | 5 | Reference Temp. $\pm 2$ |
| Step            | Temperature (°C)                           |                       |                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
| 1               | Reference Temp. $\pm 2$                    |                       |                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
| 2               | Min. Operating Temp. $\pm 3$               |                       |                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
| 3               | Reference Temp. $\pm 2$                    |                       |                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
| 4               | Max. Operating Temp. $\pm 3$               |                       |                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
| 5               | Reference Temp. $\pm 2$                    |                       |                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
| 9               | Adhesive Strength of Termination           |                       | No removal of the terminations or other defect should occur.                                                                                                                                                            | Solder the capacitor on the test substrate shown in Fig.3.<br>Applied Force: 5N<br>Holding Time: $10 \pm 1s$<br>Applied Direction: In parallel with the test substrate and vertical with the capacitor side.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
| 10              | Vibration                                  | Appearance            | No defects or abnormalities.                                                                                                                                                                                            | Solder the capacitor on the test substrate shown in Fig.3.<br>Kind of Vibration: A simple harmonic motion<br>$10Hz$ to $55Hz$ to $10Hz$ (1min)<br>Total amplitude: 1.5mm<br>This motion should be applied for a period of 2h in each 3 mutually perpendicular directions (total of 6h).                                                                                                                                                                                                                                                                                                                                                                                                                                       |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
|                 |                                            | Capacitance           | Within the specified initial value.                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
|                 |                                            | Q                     | Within the specified initial value.                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
| 11              | Substrate Bending Test                     | Appearance            | No defects or abnormalities.                                                                                                                                                                                            | Solder the capacitor on the test substrate shown in Fig.1.<br>Pressurization method: Shown in Fig.2<br>Flexure: 1mm<br>Holding Time: $5 \pm 1s$<br>Soldering Method: Reflow soldering                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
|                 |                                            | Capacitance Change    | Within $\pm 5\%$ or $\pm 0.5pF$ (Whichever is larger)                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
| 12              | Solderability                              |                       | 95% of the terminations is to be soldered evenly and continuously.                                                                                                                                                      | Test Method: Solder bath method<br>Flux: Solution of rosin ethanol 25 (mass)%<br>Preheat: 80 to 120°C for 10 to 30s<br>Solder: Sn-3.0Ag-0.5Cu<br>Solder Temp.: $245 \pm 5^{\circ}C$<br>Immersion time: $2 \pm 0.5s$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
| 13              | Resistance to Soldering Heat               | Appearance            | No defects or abnormalities.                                                                                                                                                                                            | Test Method: Solder bath method<br>Solder: Sn-3.0Ag-0.5Cu<br>Solder Temp.: $270 \pm 5^{\circ}C$<br>Immersion time: $10 \pm 0.5s$<br>Exposure Time: $24 \pm 2h$<br>Preheat: 120 to 150°C for 1min                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
|                 |                                            | Capacitance Change    | Within $\pm 2.5\%$ or $\pm 0.25pF$ (Whichever is larger)                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
|                 |                                            | Q                     | Within the specified initial value.                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
|                 |                                            | I.R.                  | Within the specified initial value.                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |
|                 |                                            | Voltage Proof         | No defects.                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |               |                  |         |                         |                  |                              |   |                         |   |                              |   |                         |

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## GQM Series Specifications and Test Methods (1)

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| No                 | Item                                          |                    | Specification                                                                                                                       | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|--------------------|-----------------------------------------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|------------|---|----------------------------|------|---|------------|--------|---|----------------------------|------|---|------------|--------|
| 14                 | Temperature Sudden Change                     | Appearance         | No defects or abnormalities.                                                                                                        | <div>Solder the capacitor on the test substrate shown in Fig.3.<br/>Perform the 5 cycles according to the four heat treatments shown in the following table.</div> <table><tr><th>Step</th><th>Temp. (°C)</th><th>Time (min)</th></tr><tr><td>1</td><td>Min. Operating Temp. +0/-3</td><td>30±3</td></tr><tr><td>2</td><td>Room Temp.</td><td>2 to 3</td></tr><tr><td>3</td><td>Max. Operating Temp. +3/-0</td><td>30±3</td></tr><tr><td>4</td><td>Room Temp.</td><td>2 to 3</td></tr></table> <div>Exposure Time: 24±2h</div> | Step       | Temp. (°C) | Time (min) | 1 | Min. Operating Temp. +0/-3 | 30±3 | 2 | Room Temp. | 2 to 3 | 3 | Max. Operating Temp. +3/-0 | 30±3 | 4 | Room Temp. | 2 to 3 |
|                    |                                               | Step               | Temp. (°C)                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Time (min) |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | 1                  | Min. Operating Temp. +0/-3                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 30±3       |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | 2                  | Room Temp.                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2 to 3     |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | 3                  | Max. Operating Temp. +3/-0                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 30±3       |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 4                  | Room Temp.                                    | 2 to 3             |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Capacitance Change | Within ±2.5% or ±0.25pF (Whichever is larger) |                    |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Q                  | Within the specified initial value.           |                    |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| I.R.               | Within the specified initial value.           |                    |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Voltage Proof      | No defects.                                   |                    |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 15                 | High Temperature High Humidity (Steady)       | Appearance         | No defects or abnormalities.                                                                                                        | <div>Solder the capacitor on the test substrate shown in Fig.3.<br/>Test Temperature: 40±2°C<br/>Test Humidity: 90 to 95%RH<br/>Test Time: 500±12h<br/>Applied Voltage: DC Rated Voltage<br/>Charge/discharge current: 50mA max.<br/>Exposure Time: 24±2h</div>                                                                                                                                                                                                                                                                |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Capacitance Change | Within ±7.5% or ±0.75pF (Whichever is larger)                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Q                  | 30pF and over: Q ≥ 200<br>30pF and below: Q ≥ 100+10C/3<br>C: Nominal Capacitance(pF)                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | I.R.               | More than 500MΩ                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 16                 | Durability                                    | Appearance         | No defects or abnormalities.                                                                                                        | <div>Solder the capacitor on the test substrate shown in Fig.3.<br/>Test Temperature: Max. Operating Temp. ±3°C<br/>Test Time: 1000±12h<br/>Applied Voltage: 200% of the rated voltage<br/>Charge/discharge current: 50mA max.<br/>Exposure Time: 24±2h</div>                                                                                                                                                                                                                                                                  |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Capacitance Change | Within ±3% or ±0.3pF (Whichever is larger)                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Q                  | 30pF and over: Q ≥ 350<br>10pF and over, 30pF and below: Q ≥ 275+5C/2<br>10pF and below: Q ≥ 200+10C<br>C: Nominal Capacitance (pF) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | I.R.               | More than 1000MΩ                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |

Table A

| Char. | Capacitance Change from 25°C(%) |       |       |       |       |       |
|-------|---------------------------------|-------|-------|-------|-------|-------|
|       | -55°C                           |       | -30°C |       | -10°C |       |
|       | Max.                            | Min.  | Max.  | Min.  | Max.  | Min.  |
| 5C    | 0.58                            | -0.24 | 0.40  | -0.17 | 0.25  | -0.11 |

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## GQM Series Specifications and Test Methods (1)

Continued from the preceding page. ↘

### Substrate Bending Test

#### • Test Substrate

Material: Copper-clad laminated sheets for PCBs (Glass fabric base, epoxy resin)

Thickness: 0.8mm

Copper foil thickness: 0.035mm

□: Solder resist (Coat with heat resistant resin for solder)

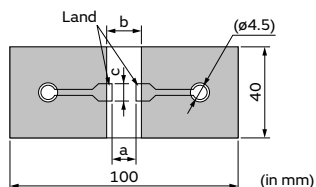


Fig.1

| Part Number  | Dimension (mm) |     |     |
|--------------|----------------|-----|-----|
|              | a              | b   | c   |
| <b>GQM15</b> | 0.4            | 1.5 | 0.5 |

#### • Kind of Solder: Sn-3.0Ag-0.5Cu

#### • Pressurization Method

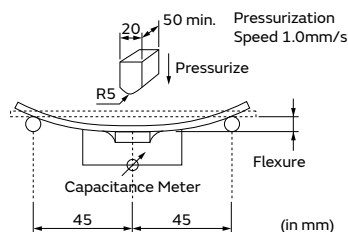


Fig.2

### Adhesive Strength of Termination, Vibration, Temperature Sudden Change, High Temperature High Humidity (Steady) , Durability

#### • Test Substrate

Material: Copper-clad laminated sheets for PCBs (Glass fabric base, epoxy resin)

Thickness: 1.6mm or 0.8mm

Copper foil thickness: 0.035mm

#### • Kind of Solder: Sn-3.0Ag-0.5Cu

#### • Land Dimensions

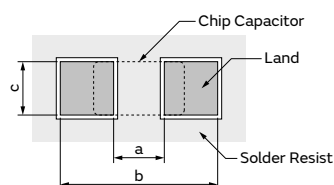


Fig.3

| Part Number  | Dimension (mm) |     |     |
|--------------|----------------|-----|-----|
|              | a              | b   | c   |
| <b>GQM15</b> | 0.4            | 1.5 | 0.5 |

2

## GQM Series Specifications and Test Methods (2)

| No                     | Item                                       |                    | Specification                                                                                                                                                                                                        | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             |                  |         |                        |            |                         |   |                    |   |                         |   |                    |
|------------------------|--------------------------------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------|---------|------------------------|------------|-------------------------|---|--------------------|---|-------------------------|---|--------------------|
| 1                      | Rated Voltage                              |                    | Shown in Rated value.                                                                                                                                                                                                | The rated voltage is defined as the maximum voltage which may be applied continuously to the capacitor.<br>When AC voltage is superimposed on DC voltage, $V^{P-P}$ or $V^{O-P}$ , whichever is larger, should be maintained within the rated voltage range.                                                                                                                                                                                                                                                                                                                                                                                  |             |                  |         |                        |            |                         |   |                    |   |                         |   |                    |
| 2                      | Appearance                                 |                    | No defects or abnormalities.                                                                                                                                                                                         | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                  |         |                        |            |                         |   |                    |   |                         |   |                    |
| 3                      | Dimension                                  |                    | Within the specified dimensions.                                                                                                                                                                                     | Using Measuring instrument of dimension.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |                  |         |                        |            |                         |   |                    |   |                         |   |                    |
| 4                      | Voltage Proof                              |                    | No defects or abnormalities.                                                                                                                                                                                         | Measurement Point: Between the terminations<br>Test Voltage : 250% of the rated voltage<br>Applied Time: 1 to 5s<br>Charge/discharge current: 50mA max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                  |         |                        |            |                         |   |                    |   |                         |   |                    |
| 5                      | Insulation Resistance (I.R.)               |                    | More than 10000MΩ                                                                                                                                                                                                    | Measurement Point: Between the terminations<br>Measurement Voltage: DC Rated Voltage<br>Charging Time: 1min<br>Charge/discharge current: 50mA max.<br>Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                        |            |                         |   |                    |   |                         |   |                    |
| 6                      | Capacitance                                |                    | Shown in Rated value.                                                                                                                                                                                                | Measurement Temperature :Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |         |                        |            |                         |   |                    |   |                         |   |                    |
| 7                      | Q                                          |                    | 30pF and over: $Q \geq 1400$<br>30pF and below: $Q \geq 800+20C$<br>C: Nominal Capacitance(pF)                                                                                                                       | <table><tr><th>Capacitance</th><th>Frequency</th><th>Voltage</th></tr><tr><td><math>C \leq 1000\text{pF}</math></td><td>1.0±0.1MHz</td><td>0.5 to 5.0Vrms</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Capacitance | Frequency        | Voltage | $C \leq 1000\text{pF}$ | 1.0±0.1MHz | 0.5 to 5.0Vrms          |   |                    |   |                         |   |                    |
| Capacitance            | Frequency                                  | Voltage            |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                        |            |                         |   |                    |   |                         |   |                    |
| $C \leq 1000\text{pF}$ | 1.0±0.1MHz                                 | 0.5 to 5.0Vrms     |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                        |            |                         |   |                    |   |                         |   |                    |
| 8                      | Temperature Characteristics of Capacitance |                    | Nominal values of the temperature coefficient is shown in Rated value.<br>But, the Capacitance Change under 20°C/25°C is shown in Table A.<br>Capacitance Drift<br>Within ±0.2% or ±0.05pF<br>(Whichever is larger.) | The capacitance change should be measured after 5 minutes at each specified temp. stage.<br>Capacitance value as a reference is the value in step 3.<br>The capacitance drift is calculated by dividing the differences between the maximum and minimum measured values in the step 1, 3 and 5 by the cap. value in step 3.<br><table><tr><th>Step</th><th>Temperature (°C)</th></tr><tr><td>1</td><td>Reference Temp. ±2</td></tr><tr><td>2</td><td>Min. Operating Temp. ±3</td></tr><tr><td>3</td><td>Reference Temp. ±2</td></tr><tr><td>4</td><td>Max. Operating Temp. ±3</td></tr><tr><td>5</td><td>Reference Temp. ±2</td></tr></table> | Step        | Temperature (°C) | 1       | Reference Temp. ±2     | 2          | Min. Operating Temp. ±3 | 3 | Reference Temp. ±2 | 4 | Max. Operating Temp. ±3 | 5 | Reference Temp. ±2 |
| Step                   | Temperature (°C)                           |                    |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                        |            |                         |   |                    |   |                         |   |                    |
| 1                      | Reference Temp. ±2                         |                    |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                        |            |                         |   |                    |   |                         |   |                    |
| 2                      | Min. Operating Temp. ±3                    |                    |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                        |            |                         |   |                    |   |                         |   |                    |
| 3                      | Reference Temp. ±2                         |                    |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                        |            |                         |   |                    |   |                         |   |                    |
| 4                      | Max. Operating Temp. ±3                    |                    |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                        |            |                         |   |                    |   |                         |   |                    |
| 5                      | Reference Temp. ±2                         |                    |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                        |            |                         |   |                    |   |                         |   |                    |
| 9                      | Adhesive Strength of Termination           |                    | No removal of the terminations or other defect should occur.                                                                                                                                                         | Solder the capacitor on the test substrate shown in Fig.3.<br><table><tr><th>Part Number</th><th>Applied Force(N)</th></tr><tr><td>GQM18</td><td>5</td></tr><tr><td>GQM21</td><td>10</td></tr></table><br>Holding Time: 10±1s<br>Applied Direction: In parallel with the test substrate and vertical with the capacitor side.                                                                                                                                                                                                                                                                                                                 | Part Number | Applied Force(N) | GQM18   | 5                      | GQM21      | 10                      |   |                    |   |                         |   |                    |
| Part Number            | Applied Force(N)                           |                    |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                        |            |                         |   |                    |   |                         |   |                    |
| GQM18                  | 5                                          |                    |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                        |            |                         |   |                    |   |                         |   |                    |
| GQM21                  | 10                                         |                    |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                        |            |                         |   |                    |   |                         |   |                    |
| 10                     | Vibration                                  | Appearance         | No defects or abnormalities.                                                                                                                                                                                         | Solder the capacitor on the test substrate shown in Fig.3.<br>Kind of Vibration: A simple harmonic motion<br>10Hz to 55Hz to 10Hz (1min)<br>Total amplitude: 1.5mm<br>This motion should be applied for a period of 2h in each 3 mutually perpendicular directions (total of 6h).                                                                                                                                                                                                                                                                                                                                                             |             |                  |         |                        |            |                         |   |                    |   |                         |   |                    |
|                        |                                            | Capacitance        | Within the specified initial value.                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                        |            |                         |   |                    |   |                         |   |                    |
|                        |                                            | Q                  | Within the specified initial value.                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                        |            |                         |   |                    |   |                         |   |                    |
| 11                     | Substrate Bending Test                     | Appearance         | No defects or abnormalities.                                                                                                                                                                                         | Solder the capacitor on the test substrate shown in Fig.1.<br>Pressurization method: Shown in Fig.2<br>Flexure: 1mm<br>Holding Time: 5±1s<br>Soldering Method: Reflow soldering                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                        |            |                         |   |                    |   |                         |   |                    |
|                        |                                            | Capacitance Change | Within ±5% or ±0.5pF<br>(Whichever is larger)                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                        |            |                         |   |                    |   |                         |   |                    |
| 12                     | Solderability                              |                    | 95% of the terminations is to be soldered evenly and continuously.                                                                                                                                                   | Test Method: Solder bath method<br>Flux: Solution of rosin ethanol 25 (mass)%<br>Preheat: 80 to 120°C for 10 to 30s<br>Solder: Sn-3.0Ag-0.5Cu<br>Solder Temp.: 245±5°C<br>Immersion time: 2±0.5s                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |                  |         |                        |            |                         |   |                    |   |                         |   |                    |

Continued on the following page. ➤

## GQM Series Specifications and Test Methods (2)

Continued from the preceding page. ↘

| No                 | Item                                          |                    | Specification                                                                                                                       | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|--------------------|-----------------------------------------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|------------|---|----------------------------|------|---|------------|--------|---|----------------------------|------|---|------------|--------|
| 13                 | Resistance to Soldering Heat                  | Appearance         | No defects or abnormalities.                                                                                                        | Test Method: Solder bath method<br>Solder: Sn-3.0Ag-0.5Cu<br>Solder Temp.: 270±5°C<br>Immersion time: 10±0.5s<br>Exposure Time: 24±2h<br>Preheat: 120 to 150°C for 1min                                                                                                                                                                                                                                                                                                                                 |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Capacitance Change | Within ±2.5% or ±0.25pF (Whichever is larger)                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Q                  | Within the specified initial value.                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | I.R.               | Within the specified initial value.                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Voltage Proof      | No defects.                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 14                 | Temperature Sudden Change                     | Appearance         | No defects or abnormalities.                                                                                                        | Solder the capacitor on the test substrate shown in Fig.3.<br>Perform the 5 cycles according to the four heat treatments shown in the following table. <table><tr><th>Step</th><th>Temp. (°C)</th><th>Time (min)</th></tr><tr><td>1</td><td>Min. Operating Temp. +0/-3</td><td>30±3</td></tr><tr><td>2</td><td>Room Temp.</td><td>2 to 3</td></tr><tr><td>3</td><td>Max. Operating Temp. +3/-0</td><td>30±3</td></tr><tr><td>4</td><td>Room Temp.</td><td>2 to 3</td></tr></table> Exposure Time: 24±2h | Step       | Temp. (°C) | Time (min) | 1 | Min. Operating Temp. +0/-3 | 30±3 | 2 | Room Temp. | 2 to 3 | 3 | Max. Operating Temp. +3/-0 | 30±3 | 4 | Room Temp. | 2 to 3 |
|                    |                                               | Step               | Temp. (°C)                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Time (min) |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | 1                  | Min. Operating Temp. +0/-3                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 30±3       |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | 2                  | Room Temp.                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2 to 3     |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | 3                  | Max. Operating Temp. +3/-0                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 30±3       |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 4                  | Room Temp.                                    | 2 to 3             |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Capacitance Change | Within ±2.5% or ±0.25pF (Whichever is larger) |                    |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Q.                 | Within the specified initial value.           |                    |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| I.R.               | Within the specified initial value.           |                    |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Voltage Proof      | No defects.                                   |                    |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 15                 | High Temperature High Humidity (Steady)       | Appearance         | No defects or abnormalities.                                                                                                        | Solder the capacitor on the test substrate shown in Fig.3.<br>Test Temperature: 40±2°C<br>Test Humidity: 90 to 95%RH<br>Test Time: 500±12h<br>Applied Voltage: DC Rated Voltage<br>Charge/discharge current: 50mA max.<br>Exposure Time: 24±2h                                                                                                                                                                                                                                                          |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Capacitance Change | Within ±7.5% or ±0.75pF (Whichever is larger)                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Q                  | 30pF and over: Q ≥ 200<br>30pF and below: Q ≥ 100+10C/3<br>C: Nominal Capacitance(pF)                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | I.R.               | More than 500MΩ                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 16                 | Durability                                    | Appearance         | No defects or abnormalities.                                                                                                        | Solder the capacitor on the test substrate shown in Fig.3.<br>Test Temperature: Max. Operating Temp. ±3°C<br>Test Time: 1000±12h<br>Applied Voltage: 200% of the rated voltage<br>Charge/discharge current: 50mA max.<br>Exposure Time: 24±2h                                                                                                                                                                                                                                                           |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Capacitance Change | Within ±3% or ±0.3pF (Whichever is larger)                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Q                  | 30pF and over: Q ≥ 350<br>10pF and over, 30pF and below: Q ≥ 275+5C/2<br>10pF and below: Q ≥ 200+10C<br>C: Nominal Capacitance (pF) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | I.R.               | More than 1000MΩ                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |

Table A

| Char. | Capacitance Change from $20^\circ\text{C}/25^\circ\text{C}$ (%) |       |                     |       |                     |       |                     |       |
|-------|-----------------------------------------------------------------|-------|---------------------|-------|---------------------|-------|---------------------|-------|
|       | $-55^\circ\text{C}$                                             |       | $-30^\circ\text{C}$ |       | $-25^\circ\text{C}$ |       | $-10^\circ\text{C}$ |       |
|       | Max.                                                            | Min.  | Max.                | Min.  | Max.                | Min.  | Max.                | Min.  |
| 2C    | 0.82                                                            | -0.45 | -                   | -     | 0.49                | -0.27 | 0.33                | -0.18 |
| 5C/5G | 0.58                                                            | -0.24 | 0.40                | -0.17 | -                   | -     | 0.25                | -0.11 |

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## GQM Series Specifications and Test Methods (2)

Continued from the preceding page. ↘

### Substrate Bending Test

#### • Test Substrate

Material: Copper-clad laminated sheets for PCBs (Glass fabric base, epoxy resin)

Thickness: 1.6mm

Copper foil thickness: 0.035mm

□: Solder resist (Coat with heat resistant resin for solder)

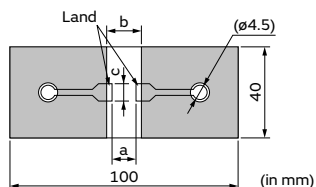


Fig.1

| Part Number  | Dimension (mm) |     |      |
|--------------|----------------|-----|------|
|              | a              | b   | c    |
| <b>GQM18</b> | 1.0            | 3.0 | 1.2  |
| <b>GQM21</b> | 1.2            | 4.0 | 1.65 |

#### • Kind of Solder: Sn-3.0Ag-0.5Cu

#### • Pressurization Method

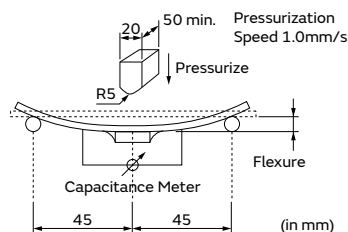


Fig.2

### Adhesive Strength of Termination, Vibration, Temperature Sudden Change, High Temperature High Humidity (Steady) , Durability

#### • Test Substrate

Material: Copper-clad laminated sheets for PCBs (Glass fabric base, epoxy resin)

Thickness: 1.6mm or 0.8mm

Copper foil thickness: 0.035mm

#### • Kind of Solder: Sn-3.0Ag-0.5Cu

#### • Land Dimensions

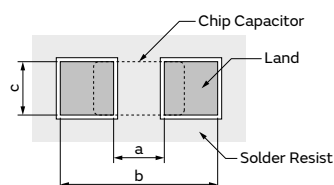


Fig.3

| Part Number  | Dimension (mm) |     |      |
|--------------|----------------|-----|------|
|              | a              | b   | c    |
| <b>GQM18</b> | 1.0            | 3.0 | 1.2  |
| <b>GQM21</b> | 1.2            | 4.0 | 1.65 |

GRM

GR3

GRJ

GR4

GR7

GJM

GQM

GA2

GA3

GA3

GA3

LLA

LLA

LLM

LLR

NFM

KRM

KR3

GMA

GMD

⚠Caution /Notice

# 3

## GQM Series Specifications and Test Methods (3)

| No                 | Item                                       |                                                   | Specification                                                                                                                                                                                                        | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
|--------------------|--------------------------------------------|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------|---------|--------------------|------------|-------------------------|---|--------------------|---|-------------------------|---|--------------------|
| 1                  | Rated Voltage                              |                                                   | Shown in Rated value.                                                                                                                                                                                                | The rated voltage is defined as the maximum voltage which may be applied continuously to the capacitor.<br>When AC voltage is superimposed on DC voltage, $V^{P-P}$ or $V^{O-P}$ , whichever is larger, should be maintained within the rated voltage range.                                                                                                                                                                                                                                                                                                                                                                                  |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
| 2                  | Appearance                                 |                                                   | No defects or abnormalities.                                                                                                                                                                                         | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
| 3                  | Dimension                                  |                                                   | Within the specified dimensions.                                                                                                                                                                                     | Using Measuring instrument of dimension.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
| 4                  | Voltage Proof                              |                                                   | No defects or abnormalities.                                                                                                                                                                                         | Measurement Point: Between the terminations<br>Test Voltage: 250% of the rated voltage<br>Applied Time: 1 to 5s<br>Charge/discharge current: 50mA max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
| 5                  | Insulation Resistance (I.R.)               |                                                   | More than 10000MΩ                                                                                                                                                                                                    | Measurement Point: Between the terminations<br>Measurement Voltage: DC Rated Voltage<br>Charging Time: 2min<br>Charge/discharge current: 50mA max.<br>Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
| 6                  | Capacitance                                |                                                   | Shown in Rated value.                                                                                                                                                                                                | Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
| 7                  | Q                                          |                                                   | 30pF and over: $Q \geq 1400$<br>30pF and below: $Q \geq 800+20C$<br>C: Nominal Capacitance (pF)                                                                                                                      | <table><tr><th>Capacitance</th><th>Frequency</th><th>Voltage</th></tr><tr><td><math>C \leq 1000pF</math></td><td>1.0±0.1kHz</td><td>0.5 to 5.0Vrms</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Capacitance | Frequency        | Voltage | $C \leq 1000pF$    | 1.0±0.1kHz | 0.5 to 5.0Vrms          |   |                    |   |                         |   |                    |
| Capacitance        | Frequency                                  | Voltage                                           |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
| $C \leq 1000pF$    | 1.0±0.1kHz                                 | 0.5 to 5.0Vrms                                    |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
| 8                  | Temperature Characteristics of Capacitance |                                                   | Nominal values of the temperature coefficient is shown in Rated value.<br>But, the Capacitance Change under 20°C/25°C is shown in Table A.<br>Capacitance Drift<br>Within ±0.2% or ±0.05pF<br>(Whichever is larger.) | The capacitance change should be measured after 5 minutes at each specified temp. stage.<br>Capacitance value as a reference is the value in step 3.<br>The capacitance drift is calculated by dividing the differences between the maximum and minimum measured values in the step 1, 3 and 5 by the cap. value in step 3.<br><table><tr><th>Step</th><th>Temperature (°C)</th></tr><tr><td>1</td><td>Reference Temp. ±2</td></tr><tr><td>2</td><td>Min. Operating Temp. ±3</td></tr><tr><td>3</td><td>Reference Temp. ±2</td></tr><tr><td>4</td><td>Max. Operating Temp. ±3</td></tr><tr><td>5</td><td>Reference Temp. ±2</td></tr></table> | Step        | Temperature (°C) | 1       | Reference Temp. ±2 | 2          | Min. Operating Temp. ±3 | 3 | Reference Temp. ±2 | 4 | Max. Operating Temp. ±3 | 5 | Reference Temp. ±2 |
| Step               | Temperature (°C)                           |                                                   |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
| 1                  | Reference Temp. ±2                         |                                                   |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
| 2                  | Min. Operating Temp. ±3                    |                                                   |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
| 3                  | Reference Temp. ±2                         |                                                   |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
| 4                  | Max. Operating Temp. ±3                    |                                                   |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
| 5                  | Reference Temp. ±2                         |                                                   |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
| 9                  | Adhesive Strength of Termination           |                                                   | No removal of the terminations or other defect should occur.                                                                                                                                                         | Solder the capacitor on the test substrate shown in Fig.3.<br><table><tr><th>Part Number</th><th>Applied Force(N)</th></tr><tr><td>GQM18</td><td>5</td></tr><tr><td>GQM21</td><td>10</td></tr></table><br>Holding Time: 10±1s<br>Applied Direction: In parallel with the test substrate and vertical with the capacitor side.                                                                                                                                                                                                                                                                                                                 | Part Number | Applied Force(N) | GQM18   | 5                  | GQM21      | 10                      |   |                    |   |                         |   |                    |
| Part Number        | Applied Force(N)                           |                                                   |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
| GQM18              | 5                                          |                                                   |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
| GQM21              | 10                                         |                                                   |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
| 10                 | Vibration                                  | Appearance                                        | No defects or abnormalities.                                                                                                                                                                                         | Solder the capacitor on the test substrate shown in Fig.3.<br>Kind of Vibration: A simple harmonic motion<br>10Hz to 55Hz to 10Hz (1min)<br>Total amplitude: 1.5mm<br>This motion should be applied for a period of 2h in each 3 mutually perpendicular directions (total of 6h).                                                                                                                                                                                                                                                                                                                                                             |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
| Capacitance        |                                            | Within the specified initial value.               |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
| Q                  |                                            | Within the specified initial value.               |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
| 11                 | Substrate Bending Test                     | Appearance                                        | No defects or abnormalities.                                                                                                                                                                                         | Solder the capacitor on the test substrate shown in Fig.1.<br>Pressurization method: Shown in Fig.2<br>Flexure: 1mm<br>Holding Time: 5±1s<br>Soldering Method: Reflow soldering                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
| Capacitance Change |                                            | Within ±5% or ±0.5pF<br>(Whichever is larger)     |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
| 12                 | Solderability                              |                                                   | 95% of the terminations is to be soldered evenly and continuously.                                                                                                                                                   | Test Method: Solder bath method<br>Flux: Solution of rosin ethanol 25 (mass)%<br>Preheat: 80 to 120°C for 10 to 30s<br>Solder: Sn-3.0Ag-0.5Cu<br>Solder Temp.: 245±5°C<br>Immersion time: 2±0.5s                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
| 13                 | Resistance to Soldering Heat               | Appearance                                        | No defects or abnormalities.                                                                                                                                                                                         | Test Method: Solder bath method<br>Solder: Sn-3.0Ag-0.5Cu<br>Solder Temp.: 270±5°C<br>Immersion time: 10±0.5s<br>Exposure Time: 24±2h<br>Preheat: 120 to 150°C for 1min                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
| Capacitance Change |                                            | Within ±2.5% or ± 0.25pF<br>(Whichever is larger) |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
| Q                  |                                            | Within the specified initial value.               |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
| I.R.               |                                            | Within the specified initial value.               |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |
| Voltage Proof      |                                            | No defects.                                       |                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |         |                    |            |                         |   |                    |   |                         |   |                    |

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## GQM Series Specifications and Test Methods (3)

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| No                 | Item                                          |                    | Specification                                                                                                                       | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|--------------------|-----------------------------------------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|------------|---|----------------------------|------|---|------------|--------|---|----------------------------|------|---|------------|--------|
| 14                 | Temperature Sudden Change                     | Appearance         | No defects or abnormalities.                                                                                                        | <p>Solder the capacitor on the test substrate shown in Fig.3.<br/>Perform the 5 cycles according to the four heat treatments shown in the following table.</p> <table><tr><th>Step</th><th>Temp. (°C)</th><th>Time (min)</th></tr><tr><td>1</td><td>Min. Operating Temp. +0/-3</td><td>30±3</td></tr><tr><td>2</td><td>Room Temp.</td><td>2 to 3</td></tr><tr><td>3</td><td>Max. Operating Temp. +3/-0</td><td>30±3</td></tr><tr><td>4</td><td>Room Temp.</td><td>2 to 3</td></tr></table> <p>Exposure Time: 24±2h</p> | Step       | Temp. (°C) | Time (min) | 1 | Min. Operating Temp. +0/-3 | 30±3 | 2 | Room Temp. | 2 to 3 | 3 | Max. Operating Temp. +3/-0 | 30±3 | 4 | Room Temp. | 2 to 3 |
|                    |                                               | Step               | Temp. (°C)                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Time (min) |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | 1                  | Min. Operating Temp. +0/-3                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 30±3       |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | 2                  | Room Temp.                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 2 to 3     |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | 3                  | Max. Operating Temp. +3/-0                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 30±3       |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 4                  | Room Temp.                                    | 2 to 3             |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Capacitance Change | Within ±2.5% or ±0.25pF (Whichever is larger) |                    |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Q                  | Within the specified initial value.           |                    |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| I.R.               | Within the specified initial value.           |                    |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Voltage Proof      | No defects.                                   |                    |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 15                 | High Temperature High Humidity (Steady)       | Appearance         | No defects or abnormalities.                                                                                                        | <p>Solder the capacitor on the test substrate shown in Fig.3.<br/>Test Temperature: 40±2°C<br/>Test Humidity: 90 to 95%RH<br/>Test Time: 500±12h<br/>Applied Voltage: DC Rated Voltage<br/>Charge/discharge current: 50mA max.<br/>Exposure Time: 24±2h</p>                                                                                                                                                                                                                                                            |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Capacitance Change | Within ±7.5% or ±0.75pF (Whichever is larger)                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Q                  | 30pF and over: Q ≥ 200<br>30pF and below: Q ≥ 100+10C/3<br>C: Nominal Capacitance(pF)                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | I.R.               | More than 500MΩ                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 16                 | Durability                                    | Appearance         | No defects or abnormalities.                                                                                                        | <p>Solder the capacitor on the test substrate shown in Fig.3.<br/>Test Temperature: Max. Operating Temp. ±3°C<br/>Test Time: 1000±12h<br/>Applied Voltage: 200% of the rated voltage<br/>Charge/discharge current: 50mA max.<br/>Exposure Time: 24±2h</p>                                                                                                                                                                                                                                                              |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Capacitance Change | Within ±3% or ±0.3pF (Whichever is larger)                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Q                  | 30pF and over: Q ≥ 350<br>10pF and over, 30pF and below: Q ≥ 275+5C/2<br>10pF and below: Q ≥ 200+10C<br>C: Nominal Capacitance (pF) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | I.R.               | More than 1000MΩ                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |

Table A

| Char. | Capacitance Change from 20°C/25°C (%) |       |       |       |       |       |       |       |
|-------|---------------------------------------|-------|-------|-------|-------|-------|-------|-------|
|       | -55°C                                 |       | -30°C |       | -25°C |       | -10°C |       |
|       | Max.                                  | Min.  | Max.  | Min.  | Max.  | Min.  | Max.  | Min.  |
| 2C    | 0.82                                  | -0.45 | -     | -     | 0.49  | -0.27 | 0.33  | -0.18 |
| 5C/5G | 0.58                                  | -0.24 | 0.40  | -0.17 | -     | -     | 0.25  | -0.11 |

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## GQM Series Specifications and Test Methods (3)

Continued from the preceding page. ↘

### Substrate Bending Test

#### • Test Substrate

Material: Copper-clad laminated sheets for PCBs (Glass fabric base, epoxy resin)

Thickness: 1.6mm

Copper foil thickness: 0.035mm

□: Solder resist (Coat with heat resistant resin for solder)

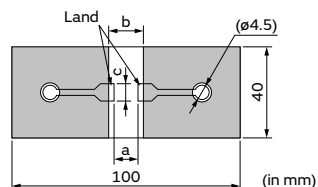


Fig.1

| Part Number  | Dimension (mm) |     |      |
|--------------|----------------|-----|------|
|              | a              | b   | c    |
| <b>GQM18</b> | 1.0            | 3.0 | 1.2  |
| <b>GQM21</b> | 1.2            | 4.0 | 1.65 |

#### • Kind of Solder: Sn-3.0Ag-0.5Cu

#### • Pressurization Method

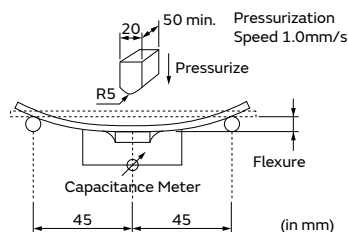


Fig.2

### Adhesive Strength of Termination, Vibration, Temperature Sudden Change, High Temperature High Humidity (Steady) , Durability

#### • Test Substrate

Material: Copper-clad laminated sheets for PCBs (Glass fabric base, epoxy resin)

Thickness: 1.6mm or 0.8mm

Copper foil thickness: 0.035mm

#### • Kind of Solder: Sn-3.0Ag-0.5Cu

#### • Land Dimensions

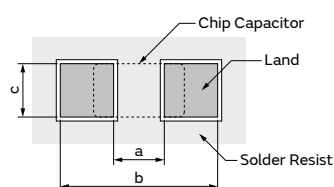


Fig.3

| Part Number  | Dimension (mm) |     |      |
|--------------|----------------|-----|------|
|              | a              | b   | c    |
| <b>GQM18</b> | 1.0            | 3.0 | 1.2  |
| <b>GQM21</b> | 1.2            | 4.0 | 1.65 |

4

# GQM Series Specifications and Test Methods (4)

| No                     | Item                                       |                                  | Specification                                                                                                                                                                                                                   | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |                  |         |                        |                       |                                  |   |                        |   |                             |   |                        |
|------------------------|--------------------------------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------|---------|------------------------|-----------------------|----------------------------------|---|------------------------|---|-----------------------------|---|------------------------|
| 1                      | Rated Voltage                              |                                  | Shown in Rated value.                                                                                                                                                                                                           | The rated voltage is defined as the maximum voltage which may be applied continuously to the capacitor.<br>When AC voltage is superimposed on DC voltage, $V^{P-P}$ or $V^{O-P}$ , whichever is larger, should be maintained within the rated voltage range.                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             |                  |         |                        |                       |                                  |   |                        |   |                             |   |                        |
| 2                      | Appearance                                 |                                  | No defects or abnormalities.                                                                                                                                                                                                    | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                  |         |                        |                       |                                  |   |                        |   |                             |   |                        |
| 3                      | Dimension                                  |                                  | Within the specified dimensions.                                                                                                                                                                                                | Using Measuring instrument of dimension.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |                  |         |                        |                       |                                  |   |                        |   |                             |   |                        |
| 4                      | Voltage Proof                              |                                  | No defects or abnormalities.                                                                                                                                                                                                    | Measurement Point: Between the terminations<br>Test Voltage: 250% of the rated voltage<br>Applied Time: 1 to 5s<br>Charge/discharge current: 50mA max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             |                  |         |                        |                       |                                  |   |                        |   |                             |   |                        |
| 5                      | Insulation Resistance (I.R.)               |                                  | More than 10000MΩ                                                                                                                                                                                                               | Measurement Point: Between the terminations<br>Measurement Voltage: DC Rated Voltage<br>Charging Time: 2min<br>Charge/discharge current: 50mA max.<br>Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |                  |         |                        |                       |                                  |   |                        |   |                             |   |                        |
| 6                      | Capacitance                                |                                  | Shown in Rated value.                                                                                                                                                                                                           | Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                  |         |                        |                       |                                  |   |                        |   |                             |   |                        |
| 7                      | Q                                          |                                  | 30pF and over: $Q \geq 1400$<br>30pF and below: $Q \geq 800+20C$<br>C: Nominal Capacitance(pF)                                                                                                                                  | <table><tr><th>Capacitance</th><th>Frequency</th><th>Voltage</th></tr><tr><td><math>C \leq 1000\text{pF}</math></td><td><math>1.0\pm0.1\text{kHz}</math></td><td><math>0.5 \text{ to } 5.0\text{Vrms}</math></td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Capacitance | Frequency        | Voltage | $C \leq 1000\text{pF}$ | $1.0\pm0.1\text{kHz}$ | $0.5 \text{ to } 5.0\text{Vrms}$ |   |                        |   |                             |   |                        |
| Capacitance            | Frequency                                  | Voltage                          |                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |                  |         |                        |                       |                                  |   |                        |   |                             |   |                        |
| $C \leq 1000\text{pF}$ | $1.0\pm0.1\text{kHz}$                      | $0.5 \text{ to } 5.0\text{Vrms}$ |                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |                  |         |                        |                       |                                  |   |                        |   |                             |   |                        |
| 8                      | Temperature Characteristics of Capacitance |                                  | Nominal values of the temperature coefficient is shown in Rated value.<br>But, the Capacitance Change under 25°C is shown in Table A.<br>Capacitance Drift<br>Within $\pm0.2\%$ or $\pm0.05\text{pF}$<br>(Whichever is larger.) | The capacitance change should be measured after 5 minutes at each specified temp. stage.<br>Capacitance value as a reference is the value in step 3.<br>The capacitance drift is calculated by dividing the differences between the maximum and minimum measured values in the step 1, 3 and 5 by the cap. value in step 3.<br><table><tr><th>Step</th><th>Temperature (°C)</th></tr><tr><td>1</td><td>Reference Temp. <math>\pm2</math></td></tr><tr><td>2</td><td>Min. Operating Temp. <math>\pm3</math></td></tr><tr><td>3</td><td>Reference Temp. <math>\pm2</math></td></tr><tr><td>4</td><td>Max. Operating Temp. <math>\pm3</math></td></tr><tr><td>5</td><td>Reference Temp. <math>\pm2</math></td></tr></table> | Step        | Temperature (°C) | 1       | Reference Temp. $\pm2$ | 2                     | Min. Operating Temp. $\pm3$      | 3 | Reference Temp. $\pm2$ | 4 | Max. Operating Temp. $\pm3$ | 5 | Reference Temp. $\pm2$ |
| Step                   | Temperature (°C)                           |                                  |                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |                  |         |                        |                       |                                  |   |                        |   |                             |   |                        |
| 1                      | Reference Temp. $\pm2$                     |                                  |                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |                  |         |                        |                       |                                  |   |                        |   |                             |   |                        |
| 2                      | Min. Operating Temp. $\pm3$                |                                  |                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |                  |         |                        |                       |                                  |   |                        |   |                             |   |                        |
| 3                      | Reference Temp. $\pm2$                     |                                  |                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |                  |         |                        |                       |                                  |   |                        |   |                             |   |                        |
| 4                      | Max. Operating Temp. $\pm3$                |                                  |                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |                  |         |                        |                       |                                  |   |                        |   |                             |   |                        |
| 5                      | Reference Temp. $\pm2$                     |                                  |                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |                  |         |                        |                       |                                  |   |                        |   |                             |   |                        |
| 9                      | Adhesive Strength of Termination           |                                  | No removal of the terminations or other defect should occur.                                                                                                                                                                    | Solder the capacitor on the test substrate shown in Fig.3.<br>Applied Force: 10N<br>Holding Time: $10\pm1\text{s}$<br>Applied Direction: In parallel with the test substrate and vertical with the capacitor side.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                  |         |                        |                       |                                  |   |                        |   |                             |   |                        |
| 10                     | Vibration                                  | Appearance                       | No defects or abnormalities.                                                                                                                                                                                                    | Solder the capacitor on the test substrate shown in Fig.3.<br>Kind of Vibration: A simple harmonic motion<br>10Hz to 55Hz to 10Hz (1min)<br>Total amplitude: 1.5mm<br>This motion should be applied for a period of 2h in each 3 mutually perpendicular directions (total of 6h).                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |                  |         |                        |                       |                                  |   |                        |   |                             |   |                        |
|                        |                                            | Capacitance                      | Within the specified initial value.                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |                  |         |                        |                       |                                  |   |                        |   |                             |   |                        |
|                        |                                            | Q                                | Within the specified initial value.                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |                  |         |                        |                       |                                  |   |                        |   |                             |   |                        |
| 11                     | Substrate Bending Test                     | Appearance                       | No defects or abnormalities.                                                                                                                                                                                                    | Solder the capacitor on the test substrate shown in Fig.1.<br>Pressurization method: Shown in Fig.2<br>Flexure:1mm<br>Holding Time: $5\pm1\text{s}$<br>Soldering Method: Reflow soldering                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                  |         |                        |                       |                                  |   |                        |   |                             |   |                        |
|                        |                                            | Capacitance Change               | Within $\pm5\%$ or $\pm0.5\text{pF}$<br>(Whichever is larger)                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |                  |         |                        |                       |                                  |   |                        |   |                             |   |                        |
| 12                     | Solderability                              |                                  | 95% of the terminations is to be soldered evenly and continuously.                                                                                                                                                              | Test Method: Solder bath method<br>Flux: Solution of rosin ethanol 25 (mass)%<br>Preheat: 80 to 120°C for 10 to 30s<br>Solder: Sn-3.0Ag-0.5Cu<br>Solder Temp.: $245\pm5^\circ\text{C}$<br>Immersion time: $2\pm0.5\text{s}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |                  |         |                        |                       |                                  |   |                        |   |                             |   |                        |
| 13                     | Resistance to Soldering Heat               | Appearance                       | No defects or abnormalities.                                                                                                                                                                                                    | Test Method: Solder bath method<br>Solder: Sn-3.0Ag-0.5Cu<br>Solder Temp.: $270\pm5^\circ\text{C}$<br>Immersion time: $10\pm0.5\text{s}$<br>Exposure Time: $24\pm2\text{h}$<br>Preheat: 120 to 150°C for 1min                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                  |         |                        |                       |                                  |   |                        |   |                             |   |                        |
|                        |                                            | Capacitance Change               | Within $\pm2.5\%$ or $\pm0.25\text{pF}$<br>(Whichever is larger)                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |                  |         |                        |                       |                                  |   |                        |   |                             |   |                        |
|                        |                                            | Q                                | Within the specified initial value.                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |                  |         |                        |                       |                                  |   |                        |   |                             |   |                        |
|                        |                                            | I.R.                             | Within the specified initial value.                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |                  |         |                        |                       |                                  |   |                        |   |                             |   |                        |
|                        |                                            | Voltage Proof                    | No defects.                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |                  |         |                        |                       |                                  |   |                        |   |                             |   |                        |

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GRM

GR3

GRJ

GR4

GR7

GJM

GQM

GA2

GA3

GA3

GA3

LL

LLA

LLM

LLR

NFM

KRM

KR3

GMA

GMD

⚠Caution / Notice

## GQM Series Specifications and Test Methods (4)

Continued from the preceding page. ↘

| No                 | Item                                          |                    | Specification                                                                                                                       | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|--------------------|-----------------------------------------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|------------|---|----------------------------|------|---|------------|--------|---|----------------------------|------|---|------------|--------|
| 14                 | Temperature Sudden Change                     | Appearance         | No defects or abnormalities.                                                                                                        | <div>Solder the capacitor on the test substrate shown in Fig.3.<br/>Perform the 5 cycles according to the four heat treatments shown in the following table.</div> <table><tr><th>Step</th><th>Temp. (°C)</th><th>Time (min)</th></tr><tr><td>1</td><td>Min. Operating Temp. +0/-3</td><td>30±3</td></tr><tr><td>2</td><td>Room Temp.</td><td>2 to 3</td></tr><tr><td>3</td><td>Max. Operating Temp. +3/-0</td><td>30±3</td></tr><tr><td>4</td><td>Room Temp.</td><td>2 to 3</td></tr></table> <div>Exposure Time: 24±2h</div> | Step       | Temp. (°C) | Time (min) | 1 | Min. Operating Temp. +0/-3 | 30±3 | 2 | Room Temp. | 2 to 3 | 3 | Max. Operating Temp. +3/-0 | 30±3 | 4 | Room Temp. | 2 to 3 |
|                    |                                               | Step               | Temp. (°C)                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Time (min) |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | 1                  | Min. Operating Temp. +0/-3                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 30±3       |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | 2                  | Room Temp.                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2 to 3     |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | 3                  | Max. Operating Temp. +3/-0                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 30±3       |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 4                  | Room Temp.                                    | 2 to 3             |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Capacitance Change | Within ±2.5% or ±0.25pF (Whichever is larger) |                    |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Q                  | Within the specified initial value.           |                    |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| I.R.               | Within the specified initial value.           |                    |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Voltage Proof      | No defects.                                   |                    |                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 15                 | High Temperature High Humidity (Steady)       | Appearance         | No defects or abnormalities.                                                                                                        | <div>Solder the capacitor on the test substrate shown in Fig.3.<br/>Test Temperature: 40±2°C<br/>Test Humidity: 90 to 95%RH<br/>Test Time: 500±12h<br/>Applied Voltage: DC Rated Voltage<br/>Charge/discharge current: 50mA max.<br/>Exposure Time: 24±2h</div>                                                                                                                                                                                                                                                                |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Capacitance Change | Within ±7.5% or ±0.75pF (Whichever is larger)                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Q                  | 30pF and over: Q ≥ 200<br>30pF and below: Q ≥ 100+10C/3<br>C: Nominal Capacitance(pF)                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | I.R.               | More than 500MΩ                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 16                 | Durability                                    | Appearance         | No defects or abnormalities.                                                                                                        | <div>Solder the capacitor on the test substrate shown in Fig.3.<br/>Test Temperature: Max. Operating Temp. ±3°C<br/>Test Time: 1000±12h<br/>Applied Voltage: 150% of the rated voltage<br/>Charge/discharge current: 50mA max.<br/>Exposure Time: 24±2h</div>                                                                                                                                                                                                                                                                  |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Capacitance Change | Within ±3% or ±0.3pF (Whichever is larger)                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Q                  | 30pF and over: Q ≥ 350<br>10pF and over, 30pF and below: Q ≥ 275+5C/2<br>10pF and below: Q ≥ 200+10C<br>C: Nominal Capacitance (pF) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | I.R.               | More than 1000MΩ                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |

Table A

| Char. | Capacitance Change from 25°C(%) |       |       |       |       |       |
|-------|---------------------------------|-------|-------|-------|-------|-------|
|       | -55°C                           |       | -30°C |       | -10°C |       |
|       | Max.                            | Min.  | Max.  | Min.  | Max.  | Min.  |
| 5C    | 0.58                            | -0.24 | 0.40  | -0.17 | 0.25  | -0.11 |

Continued on the following page. ↗

## GQM Series Specifications and Test Methods (4)

Continued from the preceding page. ↘

### Substrate Bending Test

#### • Test Substrate

Material: Copper-clad laminated sheets for PCBs (Glass fabric base, epoxy resin)

Thickness: 1.6mm

Copper foil thickness: 0.035mm

□: Solder resist (Coat with heat resistant resin for solder)

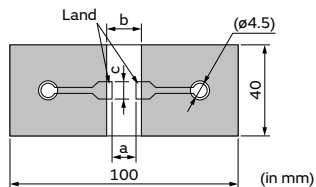


Fig.1

| Part Number  | Dimension (mm) |     |     |
|--------------|----------------|-----|-----|
|              | a              | b   | c   |
| <b>GQM22</b> | 2.2            | 5.0 | 2.9 |

#### • Kind of Solder: Sn-3.0Ag-0.5Cu

#### • Pressurization Method

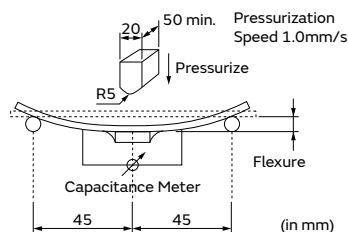


Fig.2

### Adhesive Strength of Termination, Vibration, Temperature Sudden Change, High Temperature High Humidity (Steady) , Durability

#### • Test Substrate

Material: Copper-clad laminated sheets for PCBs (Glass fabric base, epoxy resin)

Thickness: 1.6mm or 0.8mm

Copper foil thickness: 0.035mm

#### • Kind of Solder: Sn-3.0Ag-0.5Cu

#### • Land Dimensions

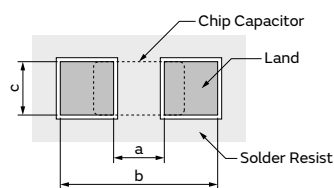


Fig.3

| Part Number  | Dimension (mm) |     |     |
|--------------|----------------|-----|-----|
|              | a              | b   | c   |
| <b>GQM22</b> | 2.2            | 5.0 | 2.9 |

Based on the Electrical Appliance and Material Safety Law of Japan Chip Multilayer Ceramic Capacitors for General Purpose

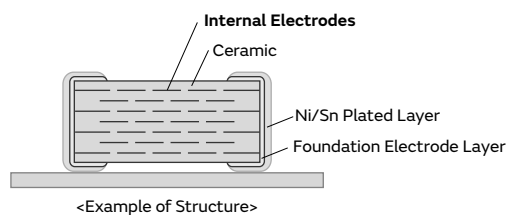
## GA2 Series



This product is for commercial power supplies, compliant with the Electrical Appliance and Material Safety Law of Japan.

### Features

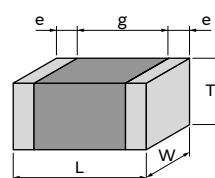
- 1 Sn plating is applied to the external electrodes, providing excellent solderability.



- 2 Realized large capacitance value and small size while maintaining high withstand voltages by the multilayer structure.
- 3 This product is only for reflow soldering.
- 4 There are types for connections between lines and connections between lines and ground.

### Specifications

|                   |                           |
|-------------------|---------------------------|
| Size (mm)         | 4.5×2.0mm to 5.7×5.0mm    |
| Rated Voltage     | 250Vac                    |
| Capacitance       | 470pF to 0.10μF           |
| Main Applications | General purpose for Japan |



<Dimensions>

This catalog contains only a portion of the product lineup.  
Please refer to the capacitor search tool on the Murata Web site for details.

## GA2 Series High Dielectric Constant Type Part Number List

### 4.5×2.0mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number               | p*   |
|--------|---------------|---------|--------|------|---------------------------|------|
| 1.5mm  | 250Vac        | X7R     | 470pF  | ±20% | <b>GA242QR7E2471MW01#</b> | p186 |
|        |               |         | 1000pF | ±20% | <b>GA242QR7E2102MW01#</b> | p186 |

### 4.5×3.2mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number               | p*   |
|--------|---------------|---------|---------|------|---------------------------|------|
| 1.5mm  | 250Vac        | X7R     | 2200pF  | ±20% | <b>GA243QR7E2222MW01#</b> | p186 |
|        |               |         | 3300pF  | ±20% | <b>GA243QR7E2332MW01#</b> | p186 |
|        |               |         | 10000pF | ±20% | <b>GA243QR7E2103MW01#</b> | p186 |
|        |               |         | 22000pF | ±20% | <b>GA243QR7E2223MW01#</b> | p186 |
| 2.0mm  | 250Vac        | X7R     | 4700pF  | ±20% | <b>GA243DR7E2472MW01#</b> | p186 |
|        |               |         | 47000pF | ±20% | <b>GA243DR7E2473MW01#</b> | p186 |

### 5.7×5.0mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number               | p*   |
|--------|---------------|---------|--------|------|---------------------------|------|
| 2.0mm  | 250Vac        | X7R     | 0.10μF | ±20% | <b>GA255DR7E2104MW01#</b> | p186 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

# 1

## GA2 Series Specifications and Test Methods (1)

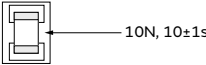
| No   | Item                                                                   |                                                                                                              | Specification                                                                                                                                                                       | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|------|------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------|---|--------------------|---|-------------------------|---|--------------------|---|-------------------------|---|--------------------|
| 1    | Appearance                                                             |                                                                                                              | No defects or abnormalities.                                                                                                                                                        | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 2    | Dimension                                                              |                                                                                                              | Within the specified dimensions.                                                                                                                                                    | Using calipers and micrometers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 3    | Voltage Proof                                                          |                                                                                                              | No defects or abnormalities.                                                                                                                                                        | Measurement Point: Between the terminations<br>Test Voltage: 10000pF min.: AC575V (r.m.s.)<br>less than 10000pF: AC1500V (r.m.s.)<br>Applied Time: 60±1s<br>Charge/discharge current: 50mA max.                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 4    | Insulation Resistance (I.R.)                                           |                                                                                                              | 2000MΩ or more                                                                                                                                                                      | Measurement Point: Between the terminations<br>Measurement Voltage: DC500±50V<br>Charging Time: 60±5s<br>Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 5    | Capacitance                                                            |                                                                                                              | Shown in Rated value.                                                                                                                                                               | Measurement Temperature: Room Temperature<br>Measurement Frequency: 1.0±0.1kHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 6    | Dissipation Factor (D.F.)                                              |                                                                                                              | 0.025 max.                                                                                                                                                                          | Measurement Voltage: AC1.0±0.2V (r.m.s.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 7    | Temperature Characteristics of Capacitance                             |                                                                                                              | R7: Within ±15% (-55 to +125°C)                                                                                                                                                     | <p>The capacitance change should be measured after 5 minutes at each specified temp. stage.<br/>Capacitance value as a reference is the value in step 3.</p> <table><tr><th>Step</th><th>Temperature (°C)</th></tr><tr><td>1</td><td>Reference Temp. ±2</td></tr><tr><td>2</td><td>Min. Operating Temp. ±3</td></tr><tr><td>3</td><td>Reference Temp. ±2</td></tr><tr><td>4</td><td>Max. Operating Temp. ±3</td></tr><tr><td>5</td><td>Reference Temp. ±2</td></tr></table> <p>•Pretreatment<br/>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h at room condition (*1).</p> | Step | Temperature (°C) | 1 | Reference Temp. ±2 | 2 | Min. Operating Temp. ±3 | 3 | Reference Temp. ±2 | 4 | Max. Operating Temp. ±3 | 5 | Reference Temp. ±2 |
| Step | Temperature (°C)                                                       |                                                                                                              |                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 1    | Reference Temp. ±2                                                     |                                                                                                              |                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 2    | Min. Operating Temp. ±3                                                |                                                                                                              |                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 3    | Reference Temp. ±2                                                     |                                                                                                              |                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 4    | Max. Operating Temp. ±3                                                |                                                                                                              |                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 5    | Reference Temp. ±2                                                     |                                                                                                              |                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 8    | Discharge Test<br>(Application: C < 10000pF)<br>C: Nominal Capacitance |                                                                                                              | No defects or abnormalities.                                                                                                                                                        | <p>As in below figure, discharge is made 50 times at 5s intervals from the capacitor (Cd) charged at DC voltage of specified.</p> <div></div> <p>Ct: Capacitor under test, Cd: 0.001μF<br/>R1: 1000Ω, R2: 100MΩ, R3: Surge resistance</p>                                                                                                                                                                                                                                                                                                                                                                   |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 9    | Vibration                                                              | <div>Appearance</div> <div>Capacitance</div> <div>D.F.</div>                                                 | <div>No defects or abnormalities.</div> <div>Within the specified initial value.</div> <div>Within the specified initial value.</div>                                               | <p>Solder the capacitor on the test substrate A shown in “Complement of Test Method”.</p> <p>Kind of Vibration: A simple harmonic motion<br/>10Hz to 55Hz to 10Hz (1min)</p> <p>Total amplitude: 1.5mm<br/>This motion should be applied for a period of 2h in each 3 mutually perpendicular directions (total of 6h).</p>                                                                                                                                                                                                                                                                                  |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 10   | Solderability                                                          |                                                                                                              | 95% of the terminations is to be soldered evenly and continuously.                                                                                                                  | Test Method: Solder bath method<br>Flux: Solution of rosin ethanol 25 (wt) %<br>Preheat: 80 to 120°C for 10 to 30s<br>Solder: Sn-3.0Ag-0.5Cu (Lead Free Solder)<br>Solder Temp.: 245±5°C<br>Immersion time: 2±0.5s<br>Immersing in speed: 25±2.5mm/s.                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 11   | Resistance to Soldering Heat                                           | <div>Appearance</div> <div>Capacitance Change</div> <div>D.F.</div> <div>I.R.</div> <div>Voltage Proof</div> | <div>No defects or abnormalities.</div> <div>Within ±10%</div> <div>Within the specified initial value.</div> <div>Within the specified initial value.</div> <div>No defects.</div> | <p>Test Method: Solder bath method<br/>Solder: Sn-3.0Ag-0.5Cu (Lead Free Solder)<br/>Solder Temp.: 260±5°C<br/>Immersion time: 10±1s<br/>Immersing in speed: 25±2.5mm/s.<br/>Exposure Time: 24±2h at room condition (*1).<br/>Preheat: GA242 size min.: 100 to 120°C for 1min and 170 to 200°C for 1min</p> <p>• Pretreatment<br/>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h at room condition (*1).</p>                                                                                                                                                                |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |

\*1 Room Condition: Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. ↗

## GA2 Series Specifications and Test Methods (1)

Continued from the preceding page. ↘

| No                 | Item                                    |                     | Specification                                                | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                     |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
|--------------------|-----------------------------------------|---------------------|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------|--------------|-------------|----------------------------|-----------------|-------------|------------------|-----------------|---|----------------------------|------|---|------------|--------|
| 12                 | Adhesive Strength of Termination        |                     | No removal of the terminations or other defect should occur. | Solder the capacitor on the test substrate A shown in “Complement of Test Method”.<br><br>Applied Direction: In parallel with the test substrate and vertical with the capacitor side.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                     |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
| 13                 | Substrate Bending Test                  |                     | No defects or abnormalities.                                 | Solder the capacitor on the test substrate B shown in “Complement of Test Method”.<br>Then apply the force in the direction shown in “Test Method of Substrate Bending Test” of “Complement of Test Method”.<br>Flexure: 1mm<br>Holding Time: 5±1s<br>Soldering Method: Reflow soldering                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                     |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
| 14                 | Temperature Sudden Change               | Appearance          | No defects or abnormalities.                                 | Fix the capacitor to the supporting test substrate A (glass epoxy board) shown in “Complement of Test Method”.<br>Perform the 5 cycles according to the four heat treatments shown in the following table.<br><table border="1"><thead><tr><th>Step</th><th>Temp. (°C)</th><th>Time (min)</th></tr></thead><tbody><tr><td>1</td><td>Min. Operating Temp. +0/-3</td><td>30±3</td></tr><tr><td>2</td><td>Room Temp.</td><td>2 to 3</td></tr><tr><td>3</td><td>Max. Operating Temp. +3/-0</td><td>30±3</td></tr><tr><td>4</td><td>Room Temp.</td><td>2 to 3</td></tr></tbody></table><br>Exposure Time: 24±2h at room condition (*1).<br>• Pretreatment<br>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h at room condition (*1).                  | Step                | Temp. (°C) | Time (min)   | 1           | Min. Operating Temp. +0/-3 | 30±3            | 2           | Room Temp.       | 2 to 3          | 3 | Max. Operating Temp. +3/-0 | 30±3 | 4 | Room Temp. | 2 to 3 |
|                    |                                         | Step                | Temp. (°C)                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Time (min)          |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
|                    |                                         | 1                   | Min. Operating Temp. +0/-3                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 30±3                |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
|                    |                                         | 2                   | Room Temp.                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2 to 3              |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
|                    |                                         | 3                   | Max. Operating Temp. +3/-0                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 30±3                |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
| 4                  | Room Temp.                              | 2 to 3              |                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
| Capacitance Change | Within ±15%                             |                     |                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
| D.F.               | 0.05 max.                               |                     |                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
| I.R.               | Within the specified initial value.     |                     |                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
| Voltage Proof      | No defects.                             |                     |                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
| 15                 | Humidity Insulation                     | Appearance          | No defects or abnormalities.                                 | The capacitor shall be subjected to 40±2°C, relative humidity of 90 to 95% for 8h, and then removed in room condition (*1) for 16h until 5 cycles.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                     |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
|                    |                                         | Capacitance Change  | Within ±15%                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
|                    |                                         | D.F.                | 0.05 max.                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
|                    |                                         | I.R.                | 1000MΩ or more                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
|                    |                                         | Voltage Proof       | No defects.                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
| 16                 | High Temperature High Humidity (Steady) | Appearance          | No defects or abnormalities.                                 | Fix the capacitor to the supporting test substrate A (glass epoxy board) shown in “Complement of Test Method”.<br>Test Temperature: 40±2°C<br>Test Humidity: 90 to 95%RH<br>Test Time: 500+24/-0h.<br>Applied Voltage: Rated voltage<br>Exposure Time: 24±2h at room condition (*1).<br>• Pretreatment<br>Apply test voltage for 1h±5min at test temperature.<br>Remove and let sit for 24±2h at room condition (*1).                                                                                                                                                                                                                                                                                                                                                           |                     |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
|                    |                                         | Capacitance Change  | Within ±15%                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
|                    |                                         | D.F.                | 0.05 max.                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
|                    |                                         | I.R.                | 1000MΩ or more                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
|                    |                                         | Voltage Proof       | No defects.                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
| 17                 | Durability                              | Appearance          | No defects or abnormalities.                                 | Fix the capacitor to the supporting test substrate A (glass epoxy board) shown in “Complement of Test Method”.<br>Test Temperature: Max. Operating Temp. ±3°C<br>Charge/discharge current: 50mA max.<br><table border="1"><thead><tr><th>Nominal Capacitance</th><th>Test Time</th><th>Test Voltage</th></tr></thead><tbody><tr><td>C ≥ 10000pF</td><td>1000+48/-0h</td><td>AC300V (r.m.s.)</td></tr><tr><td>C &lt; 10000pF</td><td>1500+48/-0h (*2)</td><td>AC500V (r.m.s.)</td></tr></tbody></table><br>*2 Except that once each hour the voltage is increased to AC1000V (r.m.s.) for 0.1s.<br>Exposure Time: 24±2h at room condition (*1).<br>• Pretreatment<br>Apply test voltage for 1h±5min at test temperature.<br>Remove and let sit for 24±2h at room condition (*1). | Nominal Capacitance | Test Time  | Test Voltage | C ≥ 10000pF | 1000+48/-0h                | AC300V (r.m.s.) | C < 10000pF | 1500+48/-0h (*2) | AC500V (r.m.s.) |   |                            |      |   |            |        |
|                    |                                         | Nominal Capacitance | Test Time                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Test Voltage        |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
|                    |                                         | C ≥ 10000pF         | 1000+48/-0h                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | AC300V (r.m.s.)     |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
|                    |                                         | C < 10000pF         | 1500+48/-0h (*2)                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | AC500V (r.m.s.)     |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
|                    |                                         | Capacitance Change  | Within ±20%                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
| D.F.               | 0.05 max.                               |                     |                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
| I.R.               | 1000MΩ or more                          |                     |                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |
| Voltage Proof      | No defects.                             |                     |                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |            |              |             |                            |                 |             |                  |                 |   |                            |      |   |            |        |

\*1 Room Condition: Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. ↗

## GA2 Series Specifications and Test Methods (1)

Continued from the preceding page. ↘

### Complement of Test Method

#### 1. Test Substrate

The test substrate should be Substrate A or Substrate B as described in "Specifications and Test Methods".

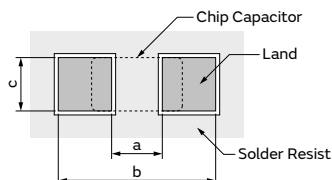
The specimen should be soldered by the conditions as described below.

Soldering Method: Reflow soldering

Solder: Sn-3.0Ag-0.5Cu

##### (1) Test Substrate A

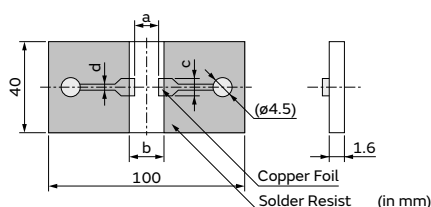
###### • Land Dimensions



- Material: Glass Epoxy Board
- Thickness: 1.6mm
- Thickness of Copper Foil: 0.035mm

| Part Number  | Dimension (mm) |     |     |
|--------------|----------------|-----|-----|
|              | a              | b   | c   |
| <b>GRM42</b> | 3.5            | 7.0 | 2.4 |
| <b>GRM43</b> | 3.5            | 7.0 | 3.7 |
| <b>GRM52</b> | 4.5            | 8.0 | 3.2 |
| <b>GRM55</b> | 4.5            | 8.0 | 5.6 |

##### (2) Test Substrate B

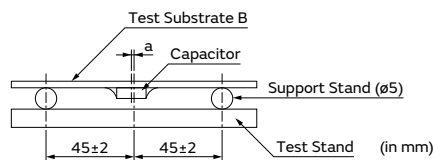


- Material: Glass Epoxy Board
- Thickness of Copper Foil: 0.035mm

| Part Number  | Dimension of Pattern (mm) |     |     |     |
|--------------|---------------------------|-----|-----|-----|
|              | a                         | b   | c   | d   |
| <b>GRM42</b> | 3.5                       | 7.0 | 2.4 | 1.0 |
| <b>GRM43</b> | 3.5                       | 7.0 | 3.7 | 1.0 |
| <b>GRM52</b> | 4.5                       | 8.0 | 3.2 | 1.0 |
| <b>GRM55</b> | 4.5                       | 8.0 | 5.6 | 1.0 |

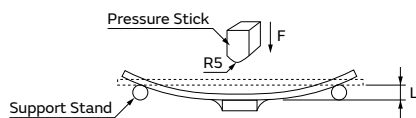
#### 2. Test Method of Substrate Bending Test

##### (a) Support State

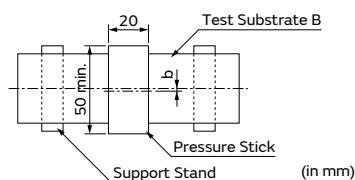


a: ±2 gap between support stand center and test stand

- Material of Test Stand and Pressure Stick  
The material should be a metal where a remarkable transformation and the distortion are not caused even if it is pressurized.
- Pressurizing Speed  
The pressurizing speed is pressurized at the speed of about 1mm/s until the flexure reaches a regulated value.



##### (b) Test State



b: ±5 gap between support stand center and test stand center

Safety Standard Certified Chip Multilayer Ceramic Capacitors for General Purpose / IEC60384-14 Class X2

# GA3 Series Type GB



## IEC60384-14 X2 Class Certified Product

### Features

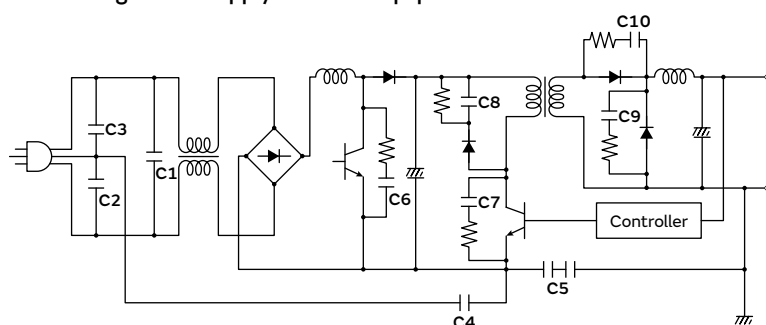
- 1 International Standard (IEC60384-14) certified product.

Please down load Safety Standard Certification (Type GB: X2) from here.



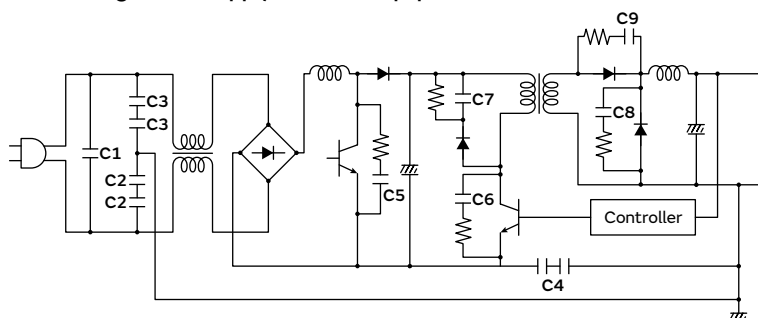
- 2 Can be used as a Class X2 capacitor.

#### ● Switching Power Supply - Class 1 Equipment



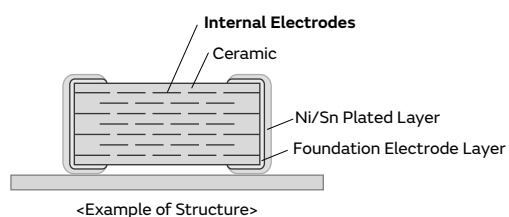
| No. | Application                  | Recommend MLCC Type |
|-----|------------------------------|---------------------|
| C1  | X Cap                        | Type: GB            |
| C2  | Y Cap                        | Type: GF            |
| C3  |                              |                     |
| C4  |                              |                     |
| C5  | Primary - Secondary Coupling | Type: GF×2          |

#### ● Switching Power Supply - Class 2 Equipment



| No. | Application                  | Recommend MLCC Type |
|-----|------------------------------|---------------------|
| C1  | X Cap                        | Type: GB            |
| C2  | Y Cap                        | Type: GF×2          |
| C3  |                              |                     |
| C4  | Primary - Secondary Coupling |                     |

- ③ Realized large capacitance value and small size while maintaining high withstand voltages by the multilayer structure.

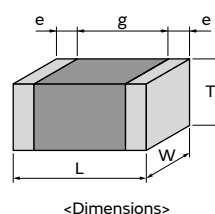


- ④ Compared with conventional lead type capacitors, this product realized great reductions in size and height, with a volume of 1/10 or less, and height of 1/4 or less.

- ⑤ This product is only for reflow soldering.

## Specifications

|                   |                    |
|-------------------|--------------------|
| Size (mm)         | 5.7×5.0mm          |
| Rated Voltage     | 250Vac             |
| Capacitance       | 10000pF to 56000pF |
| Main Applications | AC-DC power supply |



This catalog contains only a portion of the product lineup.  
 Please refer to the capacitor search tool on the Murata Web site for details.

## GA3 Series Type GB High Dielectric Constant Type Part Number List

5.7×5.0mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number               | p*   |
|--------|---------------|---------|---------|------|---------------------------|------|
| 1.5mm  | 250Vac        | X7R     | 10000pF | ±10% | <b>GA355QR7GB103KW01#</b> | p192 |
|        |               |         | 15000pF | ±10% | <b>GA355QR7GB153KW01#</b> | p192 |
| 2.0mm  | 250Vac        | X7R     | 22000pF | ±10% | <b>GA355DR7GB223KW01#</b> | p192 |
| 2.5mm  | 250Vac        | X7R     | 33000pF | ±10% | <b>GA355ER7GB333KW01#</b> | p192 |
|        |               |         | 47000pF | ±10% | <b>GA355ER7GB473KW01#</b> | p192 |
| 2.9mm  | 250Vac        | X7R     | 56000pF | ±10% | <b>GA355XR7GB563KW06#</b> | p192 |

\*: Refers to the page of the “Specifications and Test Methods”.

Part number # indicates the package specification code.

# 1

## GA3 Series Type GB Specifications and Test Methods (1)

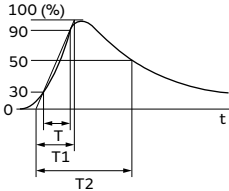
| No   | Item                                       |                    | Specification                                                      | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|------|--------------------------------------------|--------------------|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------|---|--------------------|---|-------------------------|---|--------------------|---|-------------------------|---|--------------------|
| 1    | Appearance                                 |                    | No defects or abnormalities.                                       | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 2    | Dimension                                  |                    | Within the specified dimensions.                                   | Using calipers and micrometers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 3    | Voltage Proof                              |                    | No defects or abnormalities.                                       | Measurement Point: Between the terminations<br>Test Voltage: DC1075V<br>Applied Time: 60±1s<br>Charge/discharge current: 50mA max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 4    | Insulation Resistance (I.R.)               |                    | 6000MΩ or more                                                     | Measurement Point: Between the terminations<br>Measurement Voltage: DC500±50V<br>Charging Time: 60±5s<br>Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 5    | Capacitance                                |                    | Shown in Rated value.                                              | Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 6    | Dissipation Factor (D.F.)                  |                    | 0.025 max.                                                         | Measurement Frequency: 1.0±0.1kHz<br>Measurement Voltage: AC1.0±0.2V (r.m.s.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 7    | Temperature Characteristics of Capacitance |                    | R7: Within ±15% (-55 to +125°C)                                    | <p>The capacitance change should be measured after 5 minutes at each specified temp. stage.<br/>Capacitance value as a reference is the value in step 3.</p> <table><tr><th>Step</th><th>Temperature (°C)</th></tr><tr><td>1</td><td>Reference Temp. ±2</td></tr><tr><td>2</td><td>Min. Operating Temp. ±3</td></tr><tr><td>3</td><td>Reference Temp. ±2</td></tr><tr><td>4</td><td>Max. Operating Temp. ±3</td></tr><tr><td>5</td><td>Reference Temp. ±2</td></tr></table> <p>• Pretreatment<br/>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h. at room condition*.</p> | Step | Temperature (°C) | 1 | Reference Temp. ±2 | 2 | Min. Operating Temp. ±3 | 3 | Reference Temp. ±2 | 4 | Max. Operating Temp. ±3 | 5 | Reference Temp. ±2 |
| Step | Temperature (°C)                           |                    |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 1    | Reference Temp. ±2                         |                    |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 2    | Min. Operating Temp. ±3                    |                    |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 3    | Reference Temp. ±2                         |                    |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 4    | Max. Operating Temp. ±3                    |                    |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 5    | Reference Temp. ±2                         |                    |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 8    | Vibration                                  | Appearance         | No defects or abnormalities.                                       | Solder the capacitor on the test substrate A shown in “Complement of Test Method”.<br>Kind of Vibration: A simple harmonic motion<br>10Hz to 55Hz to 10Hz (1min)<br>Total amplitude: 1.5mm<br>This motion should be applied for a period of 2h in each 3 mutually perpendicular directions (total of 6h).                                                                                                                                                                                                                                                                                                 |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | Capacitance        | Within the specified initial value.                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | D.F.               | Within the specified initial value.                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 9    | Solderability                              |                    | 95% of the terminations is to be soldered evenly and continuously. | Test Method: Solder bath method<br>Flux: Solution of rosin ethanol 25 (wt)%<br>Preheat: 80 to 120°C for 10 to 30s<br>Solder: Sn-3.0Ag-0.5Cu (Lead Free Solder)<br>Solder Temp.: 245±5°C<br>Immersion time: 2±0.5s<br>Immersing in speed: 25±2.5mm/s.                                                                                                                                                                                                                                                                                                                                                      |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 10   | Resistance to Soldering Heat               | Appearance         | No defects or abnormalities.                                       | Test Method: Solder bath method<br>Solder: Sn-3.0Ag-0.5Cu (Lead Free Solder)<br>Solder Temp.: 260±5°C<br>Immersion time: 10±1s<br>Immersing in speed: 25±2.5mm/s.<br>Exposure Time: 24±2h at room condition*.<br>Preheat: GA355 size: 100 to 120°C for 1min and 170 to 200°C for 1min<br><br>• Pretreatment<br>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h at room condition*.                                                                                                                                                                                         |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | Capacitance Change | Within ±10%                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | I.R.               | 1000MΩ or more                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | Voltage Proof      | No defects.                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 11   | Adhesive Strength of Termination           |                    | No removal of the terminations or other defect should occur.       | <p>Solder the capacitor on the test substrate A shown in “Complement of Test Method”.</p> <div>10N, 10±1s</div> <p>Applied Direction: In parallel with the test substrate and vertical with the capacitor side.</p>                                                                                                                                                                                                                                                                                                   |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 12   | Substrate Bending Test                     |                    | No defects or abnormalities.                                       | Solder the capacitor on the test substrate B shown in “Complement of Test Method”.<br>Then apply the force in the direction shown in “Test Method of Substrate Bending Test” of “Complement of Test Method”.<br>Flexure: 1mm<br>Holding Time: 5±1s<br>Soldering Method: Reflow soldering                                                                                                                                                                                                                                                                                                                  |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |

\* Room Condition: Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. ➤

## GA3 Series Type GB Specifications and Test Methods (1)

Continued from the preceding page. ↘

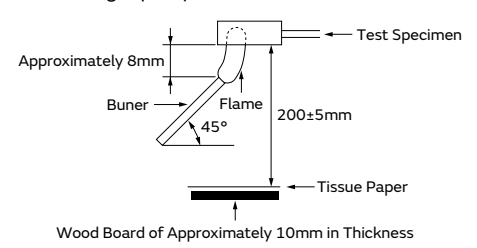
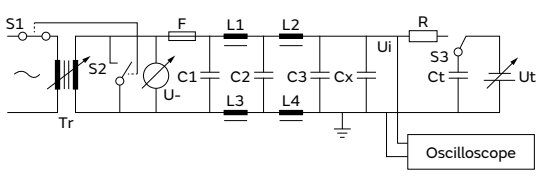
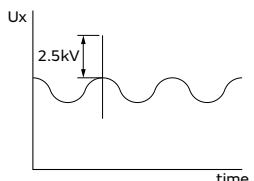
| No                 | Item                                    |                                                                                                      | Specification                | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                 |                                                                                                      |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|--------------------|-----------------------------------------|------------------------------------------------------------------------------------------------------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------------------------------------------------------------------------------------------|------------|---|----------------------------|------|---|------------|--------|---|----------------------------|------|---|------------|--------|
| 13                 | Temperature Sudden Change               | Appearance                                                                                           | No defects or abnormalities. | <div>Fix the capacitor to the supporting test substrate A (glass epoxy board) shown in "Complement of Test Method".</div> <div>Perform the 5 cycles according to the four heat treatments shown in the following table.</div> <table><tr><th>Step</th><th>Temp. (°C)</th><th>Time (min)</th></tr><tr><td>1</td><td>Min. Operating Temp. +0/-3</td><td>30±3</td></tr><tr><td>2</td><td>Room Temp.</td><td>2 to 3</td></tr><tr><td>3</td><td>Max. Operating Temp. +3/-0</td><td>30±3</td></tr><tr><td>4</td><td>Room Temp.</td><td>2 to 3</td></tr></table> <div>Exposure Time: 24±2h at room condition*.</div> <div>• Pretreatment</div> <div>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h at room condition*.</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Step            | Temp. (°C)                                                                                           | Time (min) | 1 | Min. Operating Temp. +0/-3 | 30±3 | 2 | Room Temp. | 2 to 3 | 3 | Max. Operating Temp. +3/-0 | 30±3 | 4 | Room Temp. | 2 to 3 |
|                    |                                         | Step                                                                                                 | Temp. (°C)                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Time (min)      |                                                                                                      |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | 1                                                                                                    | Min. Operating Temp. +0/-3   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 30±3            |                                                                                                      |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | 2                                                                                                    | Room Temp.                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2 to 3          |                                                                                                      |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | 3                                                                                                    | Max. Operating Temp. +3/-0   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 30±3            |                                                                                                      |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 4                  | Room Temp.                              | 2 to 3                                                                                               |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                                                                                                      |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Capacitance Change | Within±15%                              |                                                                                                      |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                                                                                                      |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| D.F.               | 0.05 max.                               |                                                                                                      |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                                                                                                      |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| I.R.               | 3000MΩ or more                          |                                                                                                      |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                                                                                                      |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Voltage Proof      | No defects.                             |                                                                                                      |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                                                                                                      |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 14                 | High Temperature High Humidity (Steady) | Appearance                                                                                           | No defects or abnormalities. | <div>Fix the capacitor to the supporting test substrate B (glass epoxy board) shown in "Complement of Test Method".</div> <div>Before this test, the test shown in the following is performed.</div> <div>• No.11 Adhesive Strength of Termination (apply force: 5N)</div> <div>• No.12 Substrate Bending Test</div> <div>Test Temperature: 40±2°C</div> <div>Test Humidity: 90 to 95%RH</div> <div>Test Time: 500+24/-0h</div> <div>Applied Voltage: Rated voltage</div> <div>Exposure Time: 24±2h at room condition*.</div> <div>• Pretreatment</div> <div>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h at room condition*.</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                 |                                                                                                      |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | Capacitance Change                                                                                   | Within±15%                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                                                                                                      |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | D.F.                                                                                                 | 0.05 max.                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                                                                                                      |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | I.R.                                                                                                 | 3000MΩ or more               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                                                                                                      |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | Voltage Proof                                                                                        | No defects.                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                                                                                                      |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 15                 | Durability                              | Appearance                                                                                           | No defects or abnormalities. | <div>Fix the capacitor to the supporting test substrate B (glass epoxy board) shown in "Complement of Test Method".</div> <div>Before this test, the test shown in the following is performed.</div> <div>• No.11 Adhesive Strength of Termination (apply force: 5N)</div> <div>• No.12 Substrate Bending Test</div> <div>Next, Impulse Voltage test is performed.</div> <div>Each individual capacitor shall be subjected to a 2.5kV Impulse (the voltage value means zero to peak) for 3 times.</div> <div>Then the capacitors are applied to life test.</div> <div></div> <div>Front time (T1) = 1.2μs=1.67T</div> <div>Time to half-value (T2) = 50μs</div> <div>Apply voltage as Table for 1000h at 125+2/-0°C , relative humidity 50% max.</div> <table><tr><th>Applied Voltage</th></tr><tr><td>AC312.5V (r.m.s.), except that once each hour the voltage is increased to AC1000V (r.m.s.) for 0.1s.</td></tr></table> <div>Exposure Time: 24±2h at room condition*.</div> <div>• Pretreatment</div> <div>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h at room condition*.</div> | Applied Voltage | AC312.5V (r.m.s.), except that once each hour the voltage is increased to AC1000V (r.m.s.) for 0.1s. |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | Applied Voltage                                                                                      |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                                                                                                      |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | AC312.5V (r.m.s.), except that once each hour the voltage is increased to AC1000V (r.m.s.) for 0.1s. |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                                                                                                      |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | Capacitance Change                                                                                   | Within ±20%                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                                                                                                      |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | D.F.                                                                                                 | 0.05 max.                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                                                                                                      |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| I.R.               | 3000MΩ or more                          |                                                                                                      |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                                                                                                      |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Voltage Proof      | No defects.                             |                                                                                                      |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                                                                                                      |            |   |                            |      |   |            |        |   |                            |      |   |            |        |

\* Room Condition: Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. ↗

## GA3 Series Type GB Specifications and Test Methods (1)

Continued from the preceding page. ↘

| No | Item                 | Specification                                                                              | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----|----------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 16 | Passive Flammability | The burning time shall not be exceeded the time 30s.<br>The tissue paper shall not ignite. | <p>The capacitor under test shall be held in the flame in the position which best promotes burning.<br/>Each specimen shall only be exposed once to the flame.<br/>Time of exposure to flame: 30s<br/>Length of flame: <math>12 \pm 1</math>mm<br/>Gas burner: Length 35mm min.<br/>Inside dia: <math>0.5 \pm 0.1</math>mm<br/>Outside dia: 0.9mm max.<br/>Gas: Butane gas purity 95% min.</p>  <p>Approximately 8mm<br/>Buner<br/>Flame<br/>45°<br/>200±5mm<br/>Tissue Paper<br/>Wood Board of Approximately 10mm in Thickness</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 17 | Active Flammability  | The cheesecloth shall not be on fire.                                                      | <p>The specimens shall be individually wrapped in at least one but more than two complete layers of cheesecloth.<br/>The specimens shall be subjected to 20 discharges.<br/>The interval between successive discharges shall be 5s.<br/>The UAC shall be maintained for 2min after the last discharge.</p>  <p>C1,C2: Filter capacitor <math>1\mu\text{F} \pm 10\%</math><br/>C3: Capacitor <math>0.033\mu\text{F} \pm 5\%</math><br/>L1 to L4: Rod coa choke <math>1.5\text{mH} \pm 20\%</math>, 16A<br/>R: Resistor <math>100\Omega \pm 2\%</math> <math>C_x &lt; 0.068\mu\text{F}</math><br/>Ct: Tank capacitor <math>3\mu\text{F} \pm 5\%</math> 10kV <math>C_x \leq 1\mu\text{F}</math><br/>U-: <math>UR \pm 5\%</math><br/>UR: Rated voltage<br/>Cx: Capacitor under test<br/>F: Slow-blow fuse, rated 16A<br/>Ut: Voltage to which the tank capacitor Ct is charged</p>  <p>Ux<br/>2.5kV<br/>time</p> |

## GA3 Series Type GB Specifications and Test Methods (1)

Continued from the preceding page. ↘

### Complement of Test Method

#### 1. Test Substrate

The test substrate should be Substrate A or Substrate B as described in “Specifications and Test Methods”.

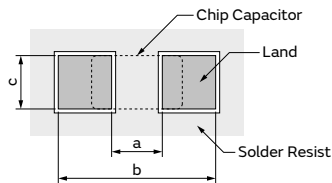
The specimen should be soldered by the conditions as described below.

Soldering Method: Reflow soldering

Solder: Sn-3.0Ag-0.5Cu

##### (1) Test Substrate A

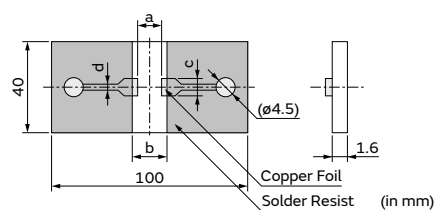
###### • Land Dimensions



- Material: Glass Epoxy Board
- Thickness: 1.6mm
- Thickness of Copper Foil: 0.035mm

| Part Number  | Dimension (mm) |     |     |
|--------------|----------------|-----|-----|
|              | a              | b   | c   |
| <b>GA355</b> | 4.5            | 8.0 | 5.6 |

##### (2) Test Substrate B

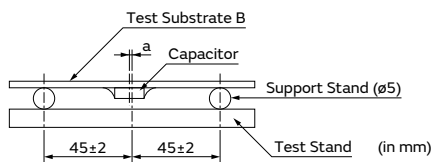


- Material: Glass Epoxy Board
- Thickness of Copper Foil: 0.035mm

| Part Number  | Dimension of Pattern (mm) |     |     |     |
|--------------|---------------------------|-----|-----|-----|
|              | a                         | b   | c   | d   |
| <b>GA355</b> | 4.5                       | 8.0 | 5.6 | 1.0 |

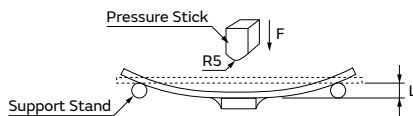
#### 2. Test Method of Substrate Bending Test

##### (a) Support State

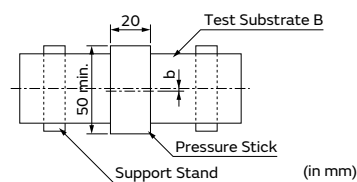


a: ±2 gap between support stand center and test stand

- Material of Test Stand and Pressure Stick  
The material should be a metal where a remarkable transformation and the distortion are not caused even if it is pressurized.
- Pressurizing Speed  
The pressurizing speed is pressurized at the speed of about 1mm/s until the flexure reaches a regulated value.



##### (b) Test State



b: ±5 gap between support stand center and test stand center

GRM

GR3

GRJ

GR4

GR7

GJM

GQM

GA2

GA3  
GB

GA3  
GD

GA3  
GF

LLL

LLA

LLM

LLR

NFM

KRM

KR3

GMA

GMD

⚠Caution  
/Notice

195

Safety Standard Certified Chip Multilayer Ceramic Capacitors for General Purpose / Acquired certifications of UL60950-1

# GA3 Series Type GD



## UL60950-1 Certified Product

### Features

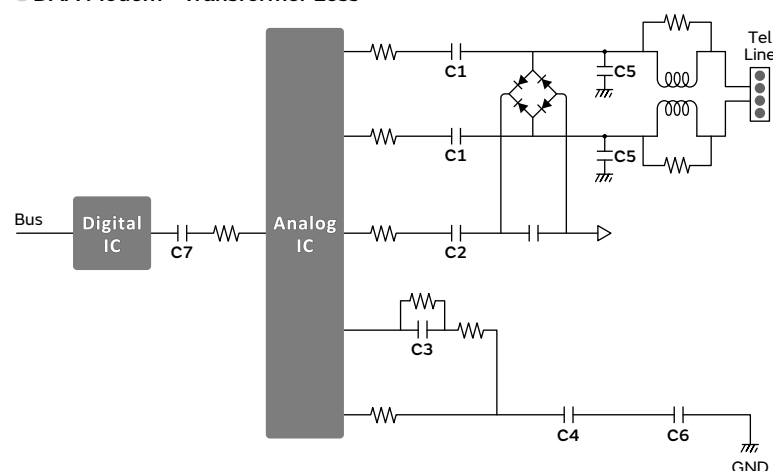
#### ① International Standard (IEC60384-14) certified product.

Please down load Safety Standard Certification (Type GD) from here.



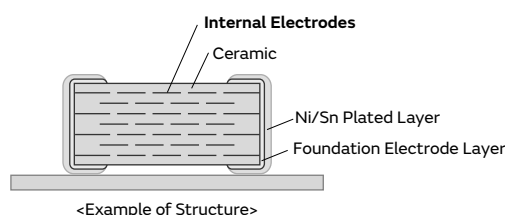
#### ② Can be used for UL60950-1 devices.

● DAA Modem - Transformer Less



| No. | Application               | Recommend MLCC Type |
|-----|---------------------------|---------------------|
| C5  | Lighting Surge Absorption | Type: GD / GF       |
| C6  | Noise Immunity            |                     |
| C7  | D/A Isolation Barrier     |                     |

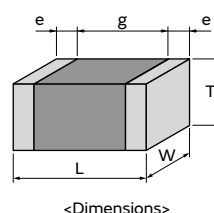
#### ③ Realized large capacitance value and small size while maintaining high withstand voltages by the multilayer structure.



#### ④ This product is only for reflow soldering.

### Specifications

|                   |                        |
|-------------------|------------------------|
| Size (mm)         | 4.5×2.0mm to 4.5×3.2mm |
| Rated Voltage     | 250Vac                 |
| Capacitance       | 10pF to 4700pF         |
| Main Applications | Modem                  |



This catalog contains only a portion of the product lineup.  
Please refer to the capacitor search tool on the Murata Web site for details.

## GA3 Series Type GD Temperature Compensating Type Part Number List

4.5×2.0mm

| T max. | Rated Voltage | TC Code | Cap. | Tol. | Part Number        | p*   |
|--------|---------------|---------|------|------|--------------------|------|
| 1.0mm  | 250Vac        | SL      | 10pF | ±5%  | GA342A1XGD100JW31# | p199 |
|        |               |         | 12pF | ±5%  | GA342A1XGD120JW31# | p199 |
|        |               |         | 15pF | ±5%  | GA342A1XGD150JW31# | p199 |
|        |               |         | 18pF | ±5%  | GA342A1XGD180JW31# | p199 |
|        |               |         | 22pF | ±5%  | GA342A1XGD220JW31# | p199 |
|        |               |         | 27pF | ±5%  | GA342A1XGD270JW31# | p199 |
|        |               |         | 33pF | ±5%  | GA342A1XGD330JW31# | p199 |
|        |               |         | 39pF | ±5%  | GA342A1XGD390JW31# | p199 |
|        |               |         | 47pF | ±5%  | GA342A1XGD470JW31# | p199 |
|        |               |         | 56pF | ±5%  | GA342A1XGD560JW31# | p199 |
|        |               |         | 68pF | ±5%  | GA342A1XGD680JW31# | p199 |
|        |               |         | 82pF | ±5%  | GA342A1XGD820JW31# | p199 |

\*: Refers to the page of the “Specifications and Test Methods”.

Part number # indicates the package specification code.

## GA3 Series Type GD High Dielectric Constant Type Part Number List

### 4.5×2.0mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number               | p*   |
|--------|---------------|---------|--------|------|---------------------------|------|
| 1.5mm  | 250Vac        | X7R     | 100pF  | ±10% | <b>GA342QR7GD101KW01#</b> | p203 |
|        |               |         | 150pF  | ±10% | <b>GA342QR7GD151KW01#</b> | p203 |
|        |               |         | 220pF  | ±10% | <b>GA342QR7GD221KW01#</b> | p203 |
|        |               |         | 330pF  | ±10% | <b>GA342QR7GD331KW01#</b> | p203 |
|        |               |         | 470pF  | ±10% | <b>GA342QR7GD471KW01#</b> | p203 |
|        |               |         | 680pF  | ±10% | <b>GA342QR7GD681KW01#</b> | p203 |
|        |               |         | 1000pF | ±10% | <b>GA342QR7GD102KW01#</b> | p203 |
|        |               |         | 1500pF | ±10% | <b>GA342QR7GD152KW01#</b> | p203 |

### 4.5×3.2mm

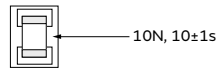
| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number               | p*   |
|--------|---------------|---------|--------|------|---------------------------|------|
| 1.5mm  | 250Vac        | X7R     | 1800pF | ±10% | <b>GA343QR7GD182KW01#</b> | p203 |
|        |               |         | 2200pF | ±10% | <b>GA343QR7GD222KW01#</b> | p203 |
| 2.0mm  | 250Vac        | X7R     | 4700pF | ±10% | <b>GA343DR7GD472KW01#</b> | p203 |

\*: Refers to the page of the “Specifications and Test Methods”.

Part number # indicates the package specification code.

# 1

## GA3 Series Type GD Specifications and Test Methods (1)

| No   | Item                                       |                    | Specification                                                                      | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|------|--------------------------------------------|--------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------|---|--------------------|---|-------------------------|---|--------------------|---|-------------------------|---|--------------------|
| 1    | Appearance                                 |                    | No defects or abnormalities.                                                       | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 2    | Dimension                                  |                    | Within the specified dimensions.                                                   | Using calipers and micrometers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 3    | Voltage Proof                              |                    | No defects or abnormalities.                                                       | Measurement Point: Between the terminations<br>Test Voltage: AC1500V (r.m.s.)<br>Applied Time: 60±1s<br>Charge/discharge current: 50mA max.                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 4    | Impulse Voltage                            |                    | No self healing break downs or flash-overs have taken place in the capacitor.      | 10 impulse of alternating polarity is subjected. (5 impulse for each polarity)<br>The interval between impulse is 60s.<br>Applied Voltage: 2.5kVo-p                                                                                                                                                                                                                                                                                                                                                                                                                   |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 5    | Insulation Resistance (I.R.)               |                    | 6000MΩ or more                                                                     | Measurement Point: Between the terminations<br>Measurement Voltage: DC500±50V<br>Charging Time: 60±5s<br>Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 6    | Capacitance                                |                    | Shown in Rated value.                                                              | Measurement Temperature: Room Temperature<br>Measurement Frequency: 1.0±0.1MHz<br>Measurement Voltage: AC1.0±0.2V (r.m.s.)                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 7    | Q                                          |                    | C ≥ 30pF: 1000 or more<br>C < 30pF: 400+20C or more<br>C: Nominal Capacitance (pF) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 8    | Temperature Characteristics of Capacitance |                    | 1X: +350 to -1000 ppm/°C<br>(Temp.Range:+20 to +85°C)                              | <p>The capacitance change should be measured after 5 minutes at each specified temp. stage.<br/>Capacitance value as a reference is the value in step 3.</p> <table><tr><th>Step</th><th>Temperature (°C)</th></tr><tr><td>1</td><td>Reference Temp. ±2</td></tr><tr><td>2</td><td>Min. Operating Temp. ±3</td></tr><tr><td>3</td><td>Reference Temp. ±2</td></tr><tr><td>4</td><td>Max. Operating Temp. ±3</td></tr><tr><td>5</td><td>Reference Temp. ±2</td></tr></table> <p>However, the capacitance shall be measured at even 85°C between step 3 and step 4.</p> | Step | Temperature (°C) | 1 | Reference Temp. ±2 | 2 | Min. Operating Temp. ±3 | 3 | Reference Temp. ±2 | 4 | Max. Operating Temp. ±3 | 5 | Reference Temp. ±2 |
| Step | Temperature (°C)                           |                    |                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 1    | Reference Temp. ±2                         |                    |                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 2    | Min. Operating Temp. ±3                    |                    |                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 3    | Reference Temp. ±2                         |                    |                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 4    | Max. Operating Temp. ±3                    |                    |                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 5    | Reference Temp. ±2                         |                    |                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 9    | Vibration                                  | Appearance         | No defects or abnormalities.                                                       | Solder the capacitor on the test substrate A shown in “Complement of Test Method”.<br>Kind of Vibration: A simple harmonic motion<br>10Hz to 55Hz to 10Hz (1min)<br>Total amplitude: 1.5mm<br>This motion should be applied for a period of 2h in each 3 mutually perpendicular directions (total of 6h).                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | Capacitance        | Within the specified initial value.                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | Q                  | Within the specified initial value.                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 10   | Solderability                              |                    | 95% of the terminations is to be soldered evenly and continuously.                 | Test Method: Solder bath method<br>Flux: Solution of rosin ethanol 25 (wt)%<br>Preheat: 80 to 120°C for 10 to 30s<br>Solder: Sn-3.0Ag-0.5Cu (Lead Free Solder)<br>Solder Temp.: 245±5°C<br>Immersion time: 2±0.5s<br>Immersing in speed: 25±2.5mm/s.                                                                                                                                                                                                                                                                                                                  |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 11   | Resistance to Soldering Heat               | Appearance         | No defects or abnormalities.                                                       | Test Method: Solder bath method<br>Solder: Sn-3.0Ag-0.5Cu (Lead Free Solder)<br>Solder Temp.: 260±5°C<br>Immersion time: 10±1s<br>Immersing in speed: 25±2.5mm/s.<br>Exposure Time: 24±2h at room condition*.<br>Preheat: GA342 size: 100 to 120°C for 1min and 170 to 200°C for 1min                                                                                                                                                                                                                                                                                 |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | Capacitance Change | Within±2.5% or ±0.25pF (Whichever is larger)                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | I.R.               | 1000MΩ or more                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | Voltage Proof      | No defects.                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 12   | Adhesive Strength of Termination           |                    | No removal of the terminations or other defect should occur.                       | <p>Solder the capacitor on the test substrate A shown in “Complement of Test Method”.</p>  <p>Applied Direction: In parallel with the test substrate and vertical with the capacitor side.</p>                                                                                                                                                                                                                                                                                    |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 13   | Substrate Bending Test                     |                    | No defects or abnormalities.                                                       | Solder the capacitor on the test substrate B shown in “Complement of Test Method”.<br>Then apply the force in the direction shown in “Test Method of Substrate Bending Test” of “Complement of Test Method”.<br>Flexure: 1mm<br>Holding Time: 5±1s<br>Soldering Method: Reflow soldering                                                                                                                                                                                                                                                                              |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |

\* Room Condition: Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. ➤

## GA3 Series Type GD Specifications and Test Methods (1)

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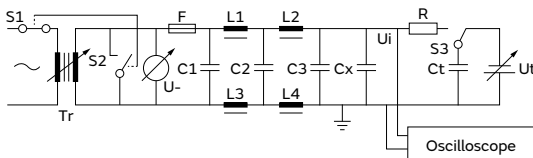
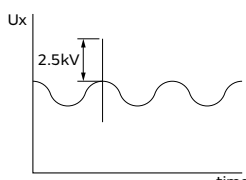
| No                 | Item                                          |                                                                                            | Specification                                                                      | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|--------------------|-----------------------------------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|------------|---|----------------------------|------|---|------------|--------|---|----------------------------|------|---|------------|--------|
| 14                 | Temperature Sudden Change                     | Appearance                                                                                 | No defects or abnormalities.                                                       | <div>Fix the capacitor to the supporting test substrate A (glass epoxy board) shown in "Complement of Test Method"</div> <div>Perform the 5 cycles according to the four heat treatments shown in the following table.</div> <table><tr><th>Step</th><th>Temp. (°C)</th><th>Time (min)</th></tr><tr><td>1</td><td>Min. Operating Temp. +0/-3</td><td>30±3</td></tr><tr><td>2</td><td>Room Temp.</td><td>2 to 3</td></tr><tr><td>3</td><td>Max. Operating Temp. +3/-0</td><td>30±3</td></tr><tr><td>4</td><td>Room Temp.</td><td>2 to 3</td></tr></table> <div>Exposure Time: 24±2h at room condition*.</div>                                                                                                                                                                                                                                                                                                                                                                             | Step       | Temp. (°C) | Time (min) | 1 | Min. Operating Temp. +0/-3 | 30±3 | 2 | Room Temp. | 2 to 3 | 3 | Max. Operating Temp. +3/-0 | 30±3 | 4 | Room Temp. | 2 to 3 |
|                    |                                               | Step                                                                                       | Temp. (°C)                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Time (min) |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | 1                                                                                          | Min. Operating Temp. +0/-3                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 30±3       |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | 2                                                                                          | Room Temp.                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2 to 3     |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | 3                                                                                          | Max. Operating Temp. +3/-0                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 30±3       |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 4                  | Room Temp.                                    | 2 to 3                                                                                     |                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Capacitance Change | Within ±2.5% or ±0.25pF (Whichever is larger) |                                                                                            |                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Q                  | Within the specified initial value.           |                                                                                            |                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| I.R.               | 3000MΩ or more                                |                                                                                            |                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Voltage Proof      | No defects.                                   |                                                                                            |                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 15                 | High Temperature High Humidity (Steady)       | Appearance                                                                                 | No defects or abnormalities.                                                       | <div>Fix the capacitor to the supporting test substrate B (glass epoxy board) shown in "Complement of Test Method".</div> <div>Before this test, the test shown in the following is performed.</div> <div>• No.12 Adhesive Strength of Termination (apply force: 5N)</div> <div>• No.13 Substrate Bending Test</div> <div>Test Temperature: 40±2°C</div> <div>Test Humidity: 90 to 95%RH</div> <div>Test Time: 500+24/-0h.</div> <div>Applied Voltage: Rated voltage</div> <div>Exposure Time:24±2h at room condition*.</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Capacitance Change                                                                         | Within ±5.0% or ±0.5pF (Whichever is larger)                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Q                                                                                          | C ≥ 30pF: 350 or more<br>C < 30pF: 275+5/2C or more<br>C: Nominal Capacitance (pF) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | I.R.                                                                                       | 3000MΩ or more                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Voltage Proof                                                                              | No defects.                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 16                 | Durability                                    | Appearance                                                                                 | No defects or abnormalities.                                                       | <div>Fix the capacitor to the supporting test substrate B (glass epoxy board) shown in "Complement of Test Method".</div> <div>Before this test, the test shown in the following is performed.</div> <div>• No.12 Adhesive Strength of Termination (apply force: 5N)</div> <div>• No.13 Substrate Bending Test</div> <div>Next, Impulse Voltage test is performed.</div> <div>Each individual capacitor shall be subjected to a 2.5kV Impulse (the voltage value means zero to peak) for 3 times.</div> <div>Then the capacitors are applied to life test.</div> <div><div>100 (%)<br/>90<br/>50<br/>30<br/>0</div><div>Front time (T1) = 1.2μs=1.67T<br/>Time to half-value (T2) = 50μs</div></div> <div>Apply voltage as Table for 1000h at 125+2/-0°C , relative humidity 50% max.</div> <div>Applied voltage</div> <div>AC425V (r.m.s.), except that once each hour the voltage is increased to AC1000V (r.m.s.) for 0.1s.</div> <div>Exposure Time: 24±2h at room condition*.</div> |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Capacitance Change                                                                         | Within ±3.0% or ±0.3pF (Whichever is larger)                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Q                                                                                          | C ≥ 30pF: 350 or more<br>C < 30pF: 275+5/2C or more<br>C: Nominal Capacitance (pF) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | I.R.                                                                                       | 3000MΩ or more                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Voltage Proof                                                                              | No defects.                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 17                 | Passive Flammability                          | The burning time shall not be exceeded the time 30s.<br>The tissue paper shall not ignite. |                                                                                    | <div>The capacitor under test shall be held in the flame in the position which best promotes burning.</div> <div>Each specimen shall only be exposed once to the flame.</div> <div>Time of exposure to flame: 30s</div> <div>Length of flame: 12±1mm</div> <div>Gas burner: Length 35mm min.</div> <div>Inside dia: 0.5±0.1mm</div> <div>Outside dia: 0.9mm max.</div> <div>Gas: Butane gas purity 95% min.</div> <div><div>Approximately 8mm<br/>Buner<br/>Flame<br/>45°<br/>200±5mm<br/>Tissue Paper<br/>Wood Board of Approximately 10mm in Thickness</div></div>                                                                                                                                                                                                                                                                                                                                                                                                                     |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |

\* Room Condition: Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. ↗

## GA3 Series Type GD Specifications and Test Methods (1)

Continued from the preceding page. ↘

| No | Item                | Specification                         | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----|---------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 18 | Active Flammability | The cheesecloth shall not be on fire. | <p>The specimens shall be individually wrapped in at least one but more than two complete layers of cheesecloth.<br/>The specimens shall be subjected to 20 discharges.<br/>The interval between successive discharges shall be 5s.<br/>The UAC shall be maintained for 2min after the last discharge.</p>  <p>C1, C2: Filter capacitor <math>1\mu\text{F}\pm 10\%</math><br/>C3: Capacitor <math>0.033\mu\text{F}\pm 5\%</math><br/>L1 to L4: Rod coa choke <math>1.5\text{mH}\pm 20\%</math>, 16A<br/>R: Resistor <math>100\Omega\pm 2\%</math> <math>C_x &lt; 0.068\mu\text{F}</math><br/>Ct: Tank capacitor <math>3\mu\text{F}\pm 5\%</math> 10kV <math>C_x \leq 1\mu\text{F}</math><br/>U-: <math>U_R\pm 5\%</math><br/>UR: Rated voltage<br/>Cx: Capacitor under test<br/>F: Slow-blow fuse, rated 16A<br/>Ut: Voltage to which the tank capacitor Ct is charged</p>  |

## GA3 Series Type GD Specifications and Test Methods (1)

Continued from the preceding page. ↘

### Complement of Test Method

#### 1. Test Substrate

The test substrate should be Substrate A or Substrate B as described in "Specifications and Test Methods".

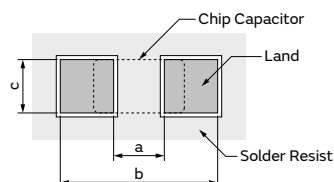
The specimen should be soldered by the conditions as described below.

Soldering Method: Reflow soldering

Solder: Sn-3.0Ag-0.5Cu

##### (1) Test Substrate A

###### • Land Dimensions



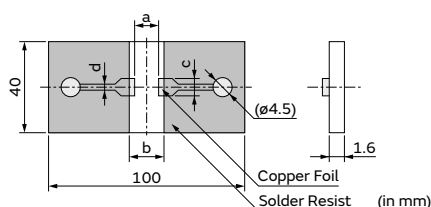
• Material: Glass Epoxy Board

• Thickness: 1.6mm

• Thickness of Copper Foil: 0.035mm

| Part Number  | Dimension (mm) |     |     |
|--------------|----------------|-----|-----|
|              | a              | b   | c   |
| <b>GA342</b> | 3.5            | 7.0 | 2.4 |

##### (2) Test Substrate B



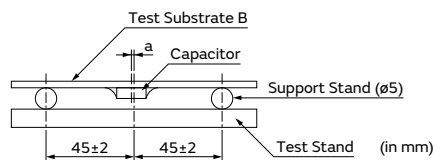
• Material: Glass Epoxy Board

• Thickness of Copper Foil: 0.035mm

| Part Number  | Dimension of Pattern (mm) |     |     |     |
|--------------|---------------------------|-----|-----|-----|
|              | a                         | b   | c   | d   |
| <b>GA342</b> | 3.5                       | 7.0 | 2.4 | 1.0 |

#### 2. Test Method of Substrate Bending Test

##### (a) Support State



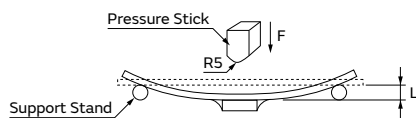
a: ±2 gap between support stand center and test stand

• Material of Test Stand and Pressure Stick

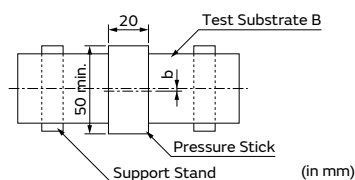
The material should be a metal where a remarkable transformation and the distortion are not caused even if it is pressurized.

• Pressurizing Speed

The pressurizing speed is pressurized at the speed of about 1mm/s until the flexure reaches a regulated value.



##### (b) Test State



b: ±5 gap between support stand center and test stand center

2

## GA3 Series Type GD Specifications and Test Methods (2)

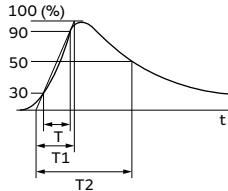
| No   | Item                                       |                    | Specification                                                                 | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|------|--------------------------------------------|--------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------|---|--------------------|---|-------------------------|---|--------------------|---|-------------------------|---|--------------------|
| 1    | Appearance                                 |                    | No defects or abnormalities.                                                  | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 2    | Dimension                                  |                    | Within the specified dimensions.                                              | Using calipers and micrometers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 3    | Voltage Proof                              |                    | No defects or abnormalities.                                                  | Measurement Point: Between the terminations<br>Test Voltage: AC1500V (r.m.s.)<br>Applied Time: 60±1s<br>Charge/discharge current: 50mA max.                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 4    | Impulse Voltage                            |                    | No self healing break downs or flash-overs have taken place in the capacitor. | 10 impulse of alternating polarity is subjected. (5 impulse for each polarity)<br>The interval between impulse is 60s.<br>Applied Voltage: 2.5kVo-p                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 5    | Insulation Resistance (I.R.)               |                    | 6000MΩ or more                                                                | Measurement Point: Between the terminations<br>Measurement Voltage: DC500±50V<br>Charging Time: 60±5s<br>Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 6    | Capacitance                                |                    | Shown in Rated value.                                                         | Measurement Temperature: Room Temperature<br>Measurement Frequency: 1.0±0.1kHz<br>Measurement Voltage: AC1.0±0.2V (r.m.s.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 7    | Dissipation Factor (D.F.)                  |                    | 0.025 max.                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 8    | Temperature Characteristics of Capacitance |                    | R7: Within ±15% (-55 to +125°C)                                               | <p>The capacitance change should be measured after 5 minutes at each specified temp. stage.<br/>Capacitance value as a reference is the value in step 3.</p> <table><tr><th>Step</th><th>Temperature (°C)</th></tr><tr><td>1</td><td>Reference Temp. ±2</td></tr><tr><td>2</td><td>Min. Operating Temp. ±3</td></tr><tr><td>3</td><td>Reference Temp. ±2</td></tr><tr><td>4</td><td>Max. Operating Temp. ±3</td></tr><tr><td>5</td><td>Reference Temp. ±2</td></tr></table> <p>• Pretreatment<br/>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h at room condition*.</p> | Step | Temperature (°C) | 1 | Reference Temp. ±2 | 2 | Min. Operating Temp. ±3 | 3 | Reference Temp. ±2 | 4 | Max. Operating Temp. ±3 | 5 | Reference Temp. ±2 |
| Step | Temperature (°C)                           |                    |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 1    | Reference Temp. ±2                         |                    |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 2    | Min. Operating Temp. ±3                    |                    |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 3    | Reference Temp. ±2                         |                    |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 4    | Max. Operating Temp. ±3                    |                    |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 5    | Reference Temp. ±2                         |                    |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 9    | Vibration                                  | Appearance         | No defects or abnormalities.                                                  | Solder the capacitor on the test substrate A shown in “Complement of Test Method”.<br>Kind of Vibration: A simple harmonic motion<br>10Hz to 55Hz to 10Hz (1min)<br>Total amplitude: 1.5mm<br>This motion should be applied for a period of 2h in each 3 mutually perpendicular directions (total of 6h).                                                                                                                                                                                                                                                                                                |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | Capacitance        | Within the specified initial value.                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | D.F.               | Within the specified initial value.                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 10   | Solderability                              |                    | 95% of the terminations is to be soldered evenly and continuously.            | Test Method: Solder bath method<br>Flux: Solution of rosin ethanol 25 (wt)%<br>Preheat: 80 to 120°C for 10 to 30s<br>Solder: Sn-3.0Ag-0.5Cu (Lead Free Solder)<br>Solder Temp.: 245±5°C<br>Immersion time: 2±0.5s<br>Immersing in speed: 25±2.5mm/s.                                                                                                                                                                                                                                                                                                                                                     |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 11   | Resistance to Soldering Heat               | Appearance         | No defects or abnormalities.                                                  | Test Method: Solder bath method<br>Solder: Sn-3.0Ag-0.5Cu (Lead Free Solder)<br>Solder Temp.: 260±5°C<br>Immersion time: 10±1s<br>Immersing in speed: 25±2.5mm/s.<br>Exposure Time: 24±2h at room condition*.<br>Preheat: GA342/43 size: 100 to 120°C for 1min and 170 to 200°C for 1min<br><br>• Pretreatment<br>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h at room condition*.                                                                                                                                                                                     |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | Capacitance Change | Within ±10%                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | I.R.               | 1000MΩ or more                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | Voltage Proof      | No defects.                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 12   | Adhesive Strength of Termination           |                    | No removal of the terminations or other defect should occur.                  | <p>Solder the capacitor on the test substrate A shown in “Complement of Test Method”.</p>  <p>10N, 10±1s</p> <p>Applied Direction: In parallel with the test substrate and vertical with the capacitor side.</p>                                                                                                                                                                                                                                                                                                     |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |

\* Room Condition: Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. ↗

## GA3 Series Type GD Specifications and Test Methods (2)

Continued from the preceding page. ↘

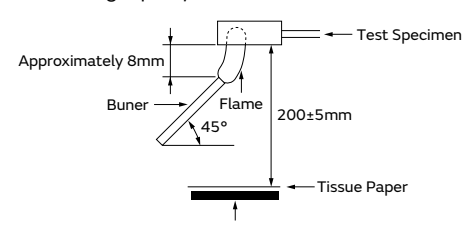
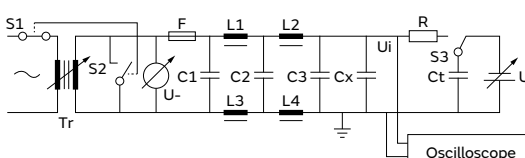
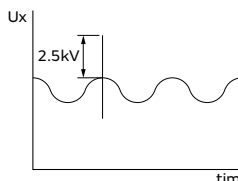
| No                 | Item                                    |                                                                                                    | Specification                | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|--------------------|-----------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------------------------------------------------------------------------------------|------------|---|----------------------------|------|---|------------|--------|---|----------------------------|------|---|------------|--------|
| 13                 | Substrate Bending Test                  |                                                                                                    | No defects or abnormalities. | Solder the capacitor on the test substrate B shown in “Complement of Test Method”.<br>Then apply the force in the direction shown in “Test Method of Substrate Bending Test” of “Complement of Test Method”<br>Flexure: 1mm<br>Holding Time: 5±1s<br>Soldering Method: Reflow soldering                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 14                 | Temperature Sudden Change               | Appearance                                                                                         | No defects or abnormalities. | Fix the capacitor to the supporting test substrate A (glass epoxy board) shown in “Complement of Test Method”.<br>Perform the 5 cycles according to the four heat treatments shown in the following table.<br><table><tr><th>Step</th><th>Temp. (°C)</th><th>Time (min)</th></tr><tr><td>1</td><td>Min. Operating Temp. +0/-3</td><td>30±3</td></tr><tr><td>2</td><td>Room Temp.</td><td>2 to 3</td></tr><tr><td>3</td><td>Max. Operating Temp. +3/-0</td><td>30±3</td></tr><tr><td>4</td><td>Room Temp.</td><td>2 to 3</td></tr></table><br>Exposure Time: 24±2h at room condition*.<br>• Pretreatment<br>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h at room condition*.                                                                                                                                                                                                                                                                                                                                                                                   | Step            | Temp. (°C)                                                                                         | Time (min) | 1 | Min. Operating Temp. +0/-3 | 30±3 | 2 | Room Temp. | 2 to 3 | 3 | Max. Operating Temp. +3/-0 | 30±3 | 4 | Room Temp. | 2 to 3 |
|                    |                                         | Step                                                                                               | Temp. (°C)                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Time (min)      |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | 1                                                                                                  | Min. Operating Temp. +0/-3   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 30±3            |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | 2                                                                                                  | Room Temp.                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2 to 3          |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | 3                                                                                                  | Max. Operating Temp. +3/-0   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 30±3            |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 4                  | Room Temp.                              | 2 to 3                                                                                             |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Capacitance Change | Within±15%                              |                                                                                                    |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| D.F.               | 0.05 max.                               |                                                                                                    |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| I.R.               | 3000MΩ or more                          |                                                                                                    |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Voltage Proof      | No defects.                             |                                                                                                    |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 15                 | High Temperature High Humidity (Steady) | Appearance                                                                                         | No defects or abnormalities. | Fix the capacitor to the supporting test substrate B (glass epoxy board) shown in “Complement of Test Method”.<br>Before this test, the test shown in the following is performed.<br>• No.12 Adhesive Strength of Termination (apply force: 5N)<br>• No.13 Substrate Bending Test<br>Test Temperature: 40±2°C<br>Test Humidity: 90 to 95%RH<br>Test Time: 500+24/-0h<br>Applied Voltage: Rated voltage<br>Exposure Time: 24±2h at room condition*.<br>• Pretreatment<br>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h at room condition*.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | Capacitance Change                                                                                 | Within±15%                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | D.F.                                                                                               | 0.05 max.                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | I.R.                                                                                               | 3000MΩ or more               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | Voltage Proof                                                                                      | No defects.                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 16                 | Durability                              | Appearance                                                                                         | No defects or abnormalities. | Fix the capacitor to the supporting test substrate B (glass epoxy board) shown in “Complement of Test Method”.<br>Before this test, the test shown in the following is performed.<br>• No.12 Adhesive Strength of Termination (apply force: 5N)<br>• No.13 Substrate Bending Test<br>Next, Impulse Voltage test is performed.<br>Each individual capacitor shall be subjected to a 2.5kV Impulse (the voltage value means zero to peak) for 3 times.<br>Then the capacitors are applied to life test.<br><br>Front time (T1) = 1.2μs=1.67T<br>Time to half-value (T2) = 50μs<br><br>Apply voltage as Table for 1000h at 125+2/-0°C , relative humidity 50% max.<br><table><tr><th>Applied Voltage</th></tr><tr><td>AC425V (r.m.s.), except that once each hour the voltage is increased to AC1000V (r.m.s.) for 0.1s.</td></tr></table><br>Exposure Time: 24±2h at room condition*.<br>• Pretreatment<br>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h at room condition*. | Applied Voltage | AC425V (r.m.s.), except that once each hour the voltage is increased to AC1000V (r.m.s.) for 0.1s. |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | Applied Voltage                                                                                    |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | AC425V (r.m.s.), except that once each hour the voltage is increased to AC1000V (r.m.s.) for 0.1s. |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | Capacitance Change                                                                                 | Within ±20%                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | D.F.                                                                                               | 0.05 max.                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| I.R.               | 3000MΩ or more                          |                                                                                                    |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Voltage Proof      | No defects.                             |                                                                                                    |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |

\* Room Condition: Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. ↗

## GA3 Series Type GD Specifications and Test Methods (2)

Continued from the preceding page. ↘

| No | Item                 | Specification                                                                              | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----|----------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 17 | Passive Flammability | The burning time shall not be exceeded the time 30s.<br>The tissue paper shall not ignite. | <p>The capacitor under test shall be held in the flame in the position which best promotes burning.<br/>Each specimen shall only be exposed once to the flame.<br/>Time of exposure to flame: 30s<br/>Length of flame: <math>12 \pm 1\text{mm}</math><br/>Gas burner: Length 35mm min.<br/>Inside dia: <math>0.5 \pm 0.1\text{mm}</math><br/>Outside dia: 0.9mm max.<br/>Gas: Butane gas purity 95% min.</p>  <p>Approximately 8mm<br/>Burner<br/>Flame<br/>45°<br/>200±5mm<br/>Test Specimen<br/>Tissue Paper<br/>Wood Board of Approximately 10mm in Thickness</p>                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 18 | Active Flammability  | The cheesecloth shall not be on fire.                                                      | <p>The specimens shall be individually wrapped in at least one but more than two complete layers of cheesecloth.<br/>The specimens shall be subjected to 20 discharges.<br/>The interval between successive discharges shall be 5s.<br/>The UAC shall be maintained for 2min after the last discharge.</p>  <p>C1, C2: Filter capacitor <math>1\mu\text{F} \pm 10\%</math><br/>C3: Capacitor <math>0.033\mu\text{F} \pm 5\%</math><br/>L1 to L4: Rod coa choke <math>1.5\text{mH} \pm 20\%</math>, 16A<br/>R: Resistor <math>100\Omega \pm 2\%</math> <math>C_x &lt; 0.068\mu\text{F}</math><br/>Ct: Tank capacitor <math>3\mu\text{F} \pm 5\%</math> 10kV <math>C_x \leq 1\mu\text{F}</math><br/>U-: <math>UR \pm 5\%</math><br/>UR: Rated voltage<br/>Cx: Capacitor under test<br/>F: Slow-blow fuse, rated 16A<br/>Ut: Voltage to which the tank capacitor Ct is charged</p>  <p>Ux<br/>2.5kV<br/>time</p> |

## GA3 Series Type GD Specifications and Test Methods (2)

Continued from the preceding page. ↘

### Complement of Test Method

#### 1. Test Substrate

The test substrate should be Substrate A or Substrate B as described in "Specifications and Test Methods".

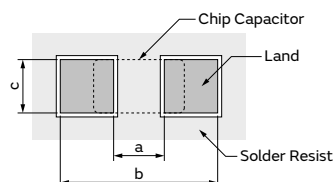
The specimen should be soldered by the conditions as described below.

Soldering Method: Reflow soldering

Solder: Sn-3.0Ag-0.5Cu

##### (1) Test Substrate A

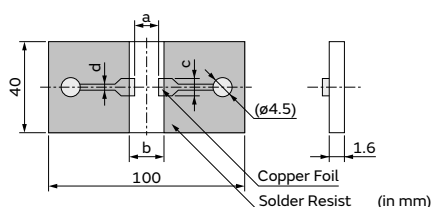
###### • Land Dimensions



- Material: Glass Epoxy Board
- Thickness: 1.6mm
- Thickness of Copper Foil: 0.035mm

| Part Number  | Dimension (mm) |     |     |
|--------------|----------------|-----|-----|
|              | a              | b   | c   |
| <b>GA342</b> | 3.5            | 7.0 | 2.4 |
| <b>GA343</b> | 3.5            | 7.0 | 3.7 |

##### (2) Test Substrate B

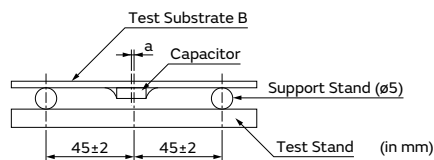


- Material: Glass Epoxy Board
- Thickness of Copper Foil: 0.035mm

| Part Number  | Dimension of Pattern (mm) |     |     |     |
|--------------|---------------------------|-----|-----|-----|
|              | a                         | b   | c   | d   |
| <b>GA342</b> | 3.5                       | 7.0 | 2.4 | 1.0 |
| <b>GA343</b> | 3.5                       | 7.0 | 3.7 | 1.0 |

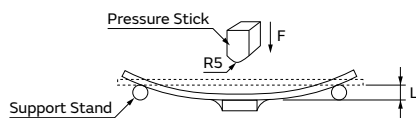
#### 2. Test Method of Substrate Bending Test

##### (a) Support State

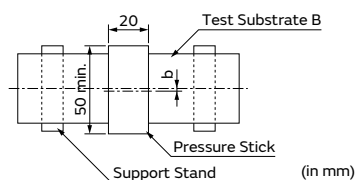


a:  $\pm 2$  gap between support stand center and test stand

- Material of Test Stand and Pressure Stick  
The material should be a metal where a remarkable transformation and the distortion are not caused even if it is pressurized.
- Pressurizing Speed  
The pressurizing speed is pressurized at the speed of about 1mm/s until the flexure reaches a regulated value.



##### (b) Test State



b:  $\pm 5$  gap between support stand center and test stand center

Safety Standard Certified Chip Multilayer Ceramic Capacitors for General Purpose / Acquired certifications of IEC60384-14 Class X1/Y2 and UL60950-1

## GA3 Series Type GF



**Size 4.5x2.0mm:** This product is applicable only for the instruments certified by EN/IEC60950-1

**Size 5.7x2.8mm or 5.7x5.0mm:** This product is applicable as X or Y capacitor

### Features

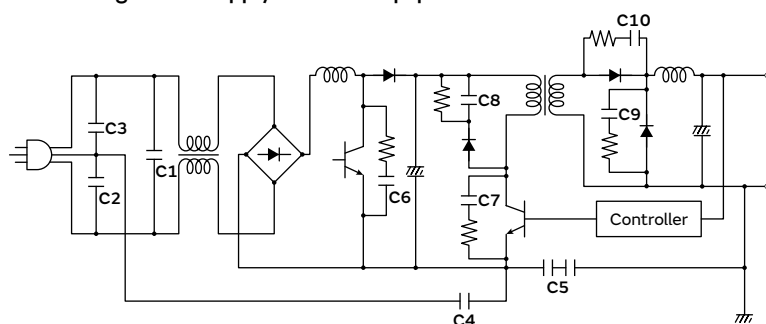
#### ① International Standard (IEC60384-14) certified product.

Please down load Safety Standard Certification (Type GF: X1/Y2) from here.



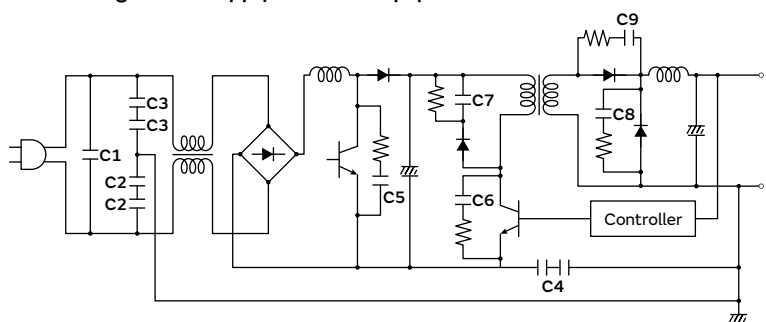
#### ② Can be used as a Class Y2 capacitor.

##### ● Switching Power Supply - Class 1 Equipment



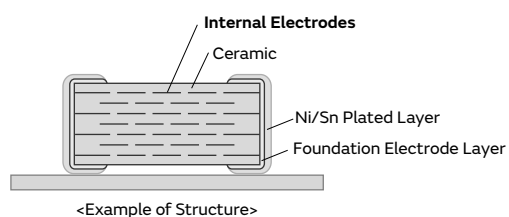
| No. | Application                  | Recommend MLCC Type |
|-----|------------------------------|---------------------|
| C1  | X Cap                        | Type: GB            |
| C2  | Y Cap                        | Type: GF            |
| C3  |                              |                     |
| C4  |                              |                     |
| C5  | Primary - Secondary Coupling | Type: GF×2          |

##### ● Switching Power Supply - Class 2 Equipment



| No. | Application                  | Recommend MLCC Type |
|-----|------------------------------|---------------------|
| C1  | X Cap                        | Type: GB            |
| C2  | Y Cap                        | Type: GF×2          |
| C3  |                              |                     |
| C4  | Primary - Secondary Coupling |                     |

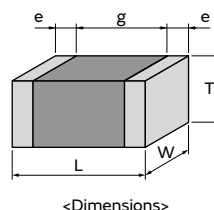
- ③ Realized large capacitance value and small size while maintaining high withstand voltages by the multilayer structure.



- ④ This product is only for reflow soldering.

## Specifications

|                   |                        |
|-------------------|------------------------|
| Size (mm)         | 4.5×2.0mm to 5.7×5.0mm |
| Rated Voltage     | 250Vac                 |
| Capacitance       | 10pF to 4700pF         |
| Main Applications | AC-DC power supply     |



This catalog contains only a portion of the product lineup.  
 Please refer to the capacitor search tool on the Murata Web site for details.

## GA3 Series Type GF Temperature Compensating Type Part Number List

4.5×2.0mm

| T max. | Rated Voltage | TC Code | Cap. | Tol. | Part Number        | p*   |
|--------|---------------|---------|------|------|--------------------|------|
| 1.0mm  | 250Vac        | SL      | 10pF | ±5%  | GA342A1XGF100JW31# | p211 |
|        |               |         | 12pF | ±5%  | GA342A1XGF120JW31# | p211 |
|        |               |         | 15pF | ±5%  | GA342A1XGF150JW31# | p211 |
|        |               |         | 18pF | ±5%  | GA342A1XGF180JW31# | p211 |
|        |               |         | 22pF | ±5%  | GA342A1XGF220JW31# | p211 |
|        |               |         | 27pF | ±5%  | GA342A1XGF270JW31# | p211 |
|        |               |         | 33pF | ±5%  | GA342A1XGF330JW31# | p211 |
|        |               |         | 39pF | ±5%  | GA342A1XGF390JW31# | p211 |
|        |               |         | 47pF | ±5%  | GA342A1XGF470JW31# | p211 |
|        |               |         | 56pF | ±5%  | GA342A1XGF560JW31# | p211 |
|        |               |         | 68pF | ±5%  | GA342A1XGF680JW31# | p211 |
|        |               |         | 82pF | ±5%  | GA342A1XGF820JW31# | p211 |

\*: Refers to the page of the “Specifications and Test Methods”.

Part number # indicates the package specification code.

## GA3 Series Type GF High Dielectric Constant Type Part Number List

### 4.5×2.0mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number               | p*   |
|--------|---------------|---------|--------|------|---------------------------|------|
| 1.5mm  | 250Vac        | X7R     | 100pF  | ±10% | <b>GA342QR7GF101KW01#</b> | p215 |
|        |               |         | 150pF  | ±10% | <b>GA342QR7GF151KW01#</b> | p215 |
|        |               |         | 470pF  | ±10% | <b>GA342QR7GF471KW01#</b> | p215 |
|        |               |         | 680pF  | ±10% | <b>GA342QR7GF681KW01#</b> | p215 |
| 2.2mm  | 250Vac        | X7R     | 220pF  | ±10% | <b>GA342DR7GF221KW02#</b> | p215 |
|        |               |         | 330pF  | ±10% | <b>GA342DR7GF331KW02#</b> | p215 |
|        |               |         | 1000pF | ±10% | <b>GA342DR7GF102KW02#</b> | p215 |

### 5.7×2.8mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number               | p*   |
|--------|---------------|---------|--------|------|---------------------------|------|
| 1.5mm  | 250Vac        | X7R     | 100pF  | ±10% | <b>GA352QR7GF101KW31#</b> | p215 |
|        |               |         | 150pF  | ±10% | <b>GA352QR7GF151KW31#</b> | p215 |
|        |               |         | 220pF  | ±10% | <b>GA352QR7GF221KW31#</b> | p215 |
|        |               |         | 330pF  | ±10% | <b>GA352QR7GF331KW31#</b> | p215 |
|        |               |         | 470pF  | ±10% | <b>GA352QR7GF471KW01#</b> | p215 |
|        |               |         | 680pF  | ±10% | <b>GA352QR7GF681KW01#</b> | p215 |
|        |               |         | 1000pF | ±10% | <b>GA352QR7GF102KW01#</b> | p215 |
|        |               |         | 1500pF | ±10% | <b>GA352QR7GF152KW01#</b> | p215 |

### 5.7×5.0mm

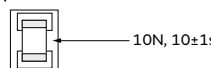
| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number               | p*   |
|--------|---------------|---------|--------|------|---------------------------|------|
| 1.5mm  | 250Vac        | X7R     | 1800pF | ±10% | <b>GA355QR7GF182KW01#</b> | p215 |
|        |               |         | 2200pF | ±10% | <b>GA355QR7GF222KW01#</b> | p215 |
|        |               |         | 3300pF | ±10% | <b>GA355QR7GF332KW01#</b> | p215 |
| 2.0mm  | 250Vac        | X7R     | 4700pF | ±10% | <b>GA355DR7GF472KW01#</b> | p215 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

# 1

## GA3 Series Type GF Specifications and Test Methods (1)

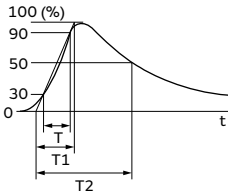
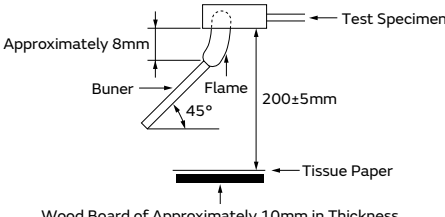
| No   | Item                                       |                    | Specification                                                                      | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|------|--------------------------------------------|--------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------|---|--------------------|---|-------------------------|---|--------------------|---|-------------------------|---|--------------------|
| 1    | Appearance                                 |                    | No defects or abnormalities.                                                       | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 2    | Dimension                                  |                    | Within the specified dimensions.                                                   | Using calipers and micrometers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 3    | Voltage Proof                              |                    | No defects or abnormalities.                                                       | Measurement Point: Between the terminations<br>Test Voltage: AC2000V (r.m.s.)<br>Applied Time: 60±1s<br>Charge/discharge current: 50mA max.                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 4    | Impulse Voltage                            |                    | No self healing break downs or flash-overs have taken place in the capacitor.      | 10 impulse of alternating polarity is subjected. (5 impulse for each polarity)<br>The interval between impulse is 60s.<br>Applied Voltage: 2.5kVo-p                                                                                                                                                                                                                                                                                                                                                                                                                   |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 5    | Insulation Resistance (I.R.)               |                    | 6000MΩ or more                                                                     | Measurement Point: Between the terminations<br>Measurement Voltage: DC500±50V<br>Charging Time: 60±5s<br>Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 6    | Capacitance                                |                    | Shown in Rated value.                                                              | Measurement Temperature: Room Temperature<br>Measurement Frequency: 1.0±0.1MHz<br>Measurement Voltage: AC1.0±0.2V (r.m.s.)                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 7    | Q                                          |                    | C ≥ 30pF: 1000 or more<br>C < 30pF: 400+20C or more<br>C: Nominal Capacitance (pF) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 8    | Temperature Characteristics of Capacitance |                    | 1X: +350 to -1000 ppm/°C<br>(Temp.Range:+20 to +85°C)                              | <p>The capacitance change should be measured after 5 minutes at each specified temp. stage.<br/>Capacitance value as a reference is the value in step 3.</p> <table><tr><th>Step</th><th>Temperature (°C)</th></tr><tr><td>1</td><td>Reference Temp. ±2</td></tr><tr><td>2</td><td>Min. Operating Temp. ±3</td></tr><tr><td>3</td><td>Reference Temp. ±2</td></tr><tr><td>4</td><td>Max. Operating Temp. ±3</td></tr><tr><td>5</td><td>Reference Temp. ±2</td></tr></table> <p>However, the capacitance shall be measured at even 85°C between step 3 and step 4.</p> | Step | Temperature (°C) | 1 | Reference Temp. ±2 | 2 | Min. Operating Temp. ±3 | 3 | Reference Temp. ±2 | 4 | Max. Operating Temp. ±3 | 5 | Reference Temp. ±2 |
| Step | Temperature (°C)                           |                    |                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 1    | Reference Temp. ±2                         |                    |                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 2    | Min. Operating Temp. ±3                    |                    |                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 3    | Reference Temp. ±2                         |                    |                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 4    | Max. Operating Temp. ±3                    |                    |                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 5    | Reference Temp. ±2                         |                    |                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 9    | Vibration                                  | Appearance         | No defects or abnormalities.                                                       | Solder the capacitor on the test substrate A shown in “Complement of Test Method”.<br>Kind of Vibration: A simple harmonic motion<br>10Hz to 55Hz to 10Hz (1min)<br>Total amplitude: 1.5mm<br>This motion should be applied for a period of 2h in each 3 mutually perpendicular directions (total of 6h).                                                                                                                                                                                                                                                             |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | Capacitance        | Within the specified initial value.                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | Q                  | Within the specified initial value.                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 10   | Solderability                              |                    | 95% of the terminations is to be soldered evenly and continuously.                 | Test Method: Solder bath method<br>Flux: Solution of rosin ethanol 25 (wt)%<br>Preheat: 80 to 120°C for 10 to 30s<br>Solder: Sn-3.0Ag-0.5Cu (Lead Free Solder)<br>Solder Temp.: 245±5°C<br>Immersion time: 2±0.5s<br>Immersing in speed: 25±2.5mm/s.                                                                                                                                                                                                                                                                                                                  |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 11   | Resistance to Soldering Heat               | Appearance         | No defects or abnormalities.                                                       | Test Method: Solder bath method<br>Solder: Sn-3.0Ag-0.5Cu (Lead Free Solder)<br>Solder Temp.: 260±5°C<br>Immersion time: 10±1s<br>Immersing in speed: 25±2.5mm/s.<br>Exposure Time: 24±2h at room condition*.<br>Preheat: GA342 size: 100 to 120°C for 1min and 170 to 200°C for 1min                                                                                                                                                                                                                                                                                 |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | Capacitance Change | Within±2.5% or ±0.25pF (Whichever is larger)                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | I.R.               | 1000MΩ or more                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | Voltage Proof      | No defects.                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 12   | Adhesive Strength of Termination           |                    | No removal of the terminations or other defect should occur.                       | <p>Solder the capacitor on the test substrate A shown in “Complement of Test Method”.</p>  <p>Applied Direction: In parallel with the test substrate and vertical with the capacitor side.</p>                                                                                                                                                                                                                                                                                    |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 13   | Substrate Bending Test                     |                    | No defects or abnormalities.                                                       | Solder the capacitor on the test substrate B shown in “Complement of Test Method”.<br>Then apply the force in the direction shown in “Test Method of Substrate Bending Test” of “Complement of Test Method”.<br>Flexure: 1mm<br>Holding Time: 5±1s<br>Soldering Method: Reflow soldering                                                                                                                                                                                                                                                                              |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |

\* Room Condition: Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. ➤

## GA3 Series Type GF Specifications and Test Methods (1)

Continued from the preceding page. ↘

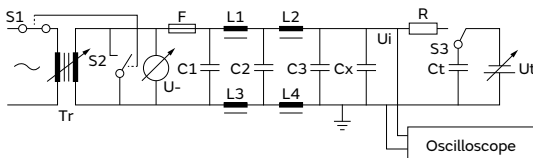
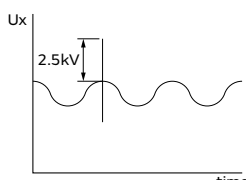
| No                 | Item                                          |                                                                                            | Specification                                                                      | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|--------------------|-----------------------------------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|------------|---|----------------------------|------|---|------------|--------|---|----------------------------|------|---|------------|--------|
| 14                 | Temperature Sudden Change                     | Appearance                                                                                 | No defects or abnormalities.                                                       | <p>Fix the capacitor to the supporting test substrate A (glass epoxy board) shown in "Complement of Test Method".<br/>Perform the 5 cycles according to the four heat treatments shown in the following table.</p> <table><tr><th>Step</th><th>Temp. (°C)</th><th>Time (min)</th></tr><tr><td>1</td><td>Min. Operating Temp. +0/-3</td><td>30±3</td></tr><tr><td>2</td><td>Room Temp.</td><td>2 to 3</td></tr><tr><td>3</td><td>Max. Operating Temp. +3/-0</td><td>30±3</td></tr><tr><td>4</td><td>Room Temp.</td><td>2 to 3</td></tr></table> <p>Exposure Time: 24±2h at room condition*.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Step       | Temp. (°C) | Time (min) | 1 | Min. Operating Temp. +0/-3 | 30±3 | 2 | Room Temp. | 2 to 3 | 3 | Max. Operating Temp. +3/-0 | 30±3 | 4 | Room Temp. | 2 to 3 |
|                    |                                               | Step                                                                                       | Temp. (°C)                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Time (min) |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | 1                                                                                          | Min. Operating Temp. +0/-3                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 30±3       |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | 2                                                                                          | Room Temp.                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2 to 3     |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | 3                                                                                          | Max. Operating Temp. +3/-0                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 30±3       |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 4                  | Room Temp.                                    | 2 to 3                                                                                     |                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Capacitance Change | Within ±2.5% or ±0.25pF (Whichever is larger) |                                                                                            |                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Q                  | Within the specified initial value.           |                                                                                            |                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| I.R.               | 3000MΩ or more                                |                                                                                            |                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Voltage Proof      | No defects.                                   |                                                                                            |                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 15                 | High Temperature High Humidity (Steady)       | Appearance                                                                                 | No defects or abnormalities.                                                       | <p>Fix the capacitor to the supporting test substrate B (glass epoxy board) shown in "Complement of Test Method".<br/>Before this test, the test shown in the following is performed.</p> <ul style="list-style-type: none"><li>• No.12 Adhesive Strength of Termination (apply force: 5N)</li><li>• No.13 Substrate Bending test</li></ul> <p>Test Temperature: 40±2°C<br/>Test Humidity: 90 to 95%RH<br/>Test Time: 500+24/-0h<br/>Applied Voltage: Rated voltage<br/>Exposure Time: 24±2h at room condition*.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Capacitance Change                                                                         | Within ±5.0% or ±0.5pF (Whichever is larger)                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Q                                                                                          | C ≥ 30pF: 350 or more<br>C < 30pF: 275+5/2C or more<br>C: Nominal Capacitance (pF) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | I.R.                                                                                       | 3000MΩ or more                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Voltage Proof                                                                              | No defects.                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 16                 | Durability                                    | Appearance                                                                                 | No defects or abnormalities.                                                       | <p>Fix the capacitor to the supporting test substrate B (glass epoxy board) shown in "Complement of Test Method".<br/>Before this test, the test shown in the following is performed.</p> <ul style="list-style-type: none"><li>• No.12 Adhesive Strength of Termination (apply force: 5N)</li><li>• No.13 Substrate Bending test</li></ul> <p>Next, Impulse Voltage test is performed.<br/>Each individual capacitor shall be subjected to a 5kV Impulse (the voltage value means zero to peak) for 3 times.<br/>Then the capacitors are applied to life test.</p> <div><p>100 (%)<br/>90<br/>50<br/>30<br/>0</p><p>Front time (T1) = 1.2μs=1.67T<br/>Time to half-value (T2) = 50μs</p></div> <p>Apply voltage as Table for 1000h at 125+2/-0°C , relative humidity 50% max.</p> <div><p>Applied voltage</p><p>AC425V (r.m.s.), except that once each hour the voltage is increased to AC1000V (r.m.s.) for 0.1s.</p></div> <p>Exposure Time: 24±2h at room condition*.</p> |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Capacitance Change                                                                         | Within ±3.0% or ±0.3pF (Whichever is larger)                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Q                                                                                          | C ≥ 30pF: 350 or more<br>C < 30pF: 275+5/2C or more<br>C: Nominal Capacitance (pF) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | I.R.                                                                                       | 3000MΩ or more                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               | Voltage Proof                                                                              | No defects.                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 17                 | Passive Flammability                          | The burning time shall not be exceeded the time 30s.<br>The tissue paper shall not ignite. |                                                                                    | <p>The capacitor under test shall be held in the flame in the position which best promotes burning.<br/>Each specimen shall only be exposed once to the flame.<br/>Time of exposure to flame: 30s<br/>Length of flame: 12±1mm<br/>Gas burner: Length 35mm min.<br/>Inside dia: 0.5±0.1mm<br/>Outside dia: 0.9mm max.<br/>Gas: Butane gas purity 95% min.</p> <div><p>Approximately 8mm<br/>Buner<br/>Flame<br/>45°<br/>200±5mm<br/>Tissue Paper<br/>Wood Board of Approximately 10mm in Thickness</p></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               |                                                                                            |                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               |                                                                                            |                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                               |                                                                                            |                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |            |            |   |                            |      |   |            |        |   |                            |      |   |            |        |

\* Room Condition: Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. ↗

## GA3 Series Type GF Specifications and Test Methods (1)

Continued from the preceding page. ↘

| No | Item                | Specification                         | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----|---------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 18 | Active Flammability | The cheesecloth shall not be on fire. | <p>The specimens shall be individually wrapped in at least one but more than two complete layers of cheesecloth.<br/>           The specimens shall be subjected to 20 discharges.<br/>           The interval between successive discharges shall be 5s.<br/>           The UAC shall be maintained for 2min after the last discharge.</p>  <p>             C1, C2: Filter capacitor <math>1\mu\text{F}\pm 10\%</math><br/>             C3: Capacitor <math>0.033\mu\text{F}\pm 5\%</math><br/>             L1 to L4: Rod coa choke <math>1.5\text{mH}\pm 20\%</math>, 16A<br/>             R: Resistor <math>100\Omega\pm 2\%</math> <math>C_x &lt; 0.068\mu\text{F}</math><br/>             Ct: Tank capacitor <math>3\mu\text{F}\pm 5\%</math> 10kV <math>C_x \leq 1\mu\text{F}</math><br/>             U-: <math>U_R\pm 5\%</math><br/>             UR: Rated voltage<br/>             Cx: Capacitor under test<br/>             F: Slow-blow fuse, rated 16A<br/>             Ut: Voltage to which the tank capacitor Ct is charged           </p>  |

## GA3 Series Type GF Specifications and Test Methods (1)

Continued from the preceding page. ↘

### Complement of Test Method

#### 1. Test Substrate

The test substrate should be Substrate A or Substrate B as described in "Specifications and Test Methods".

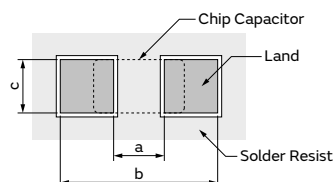
The specimen should be soldered by the conditions as described below.

Soldering Method: Reflow soldering

Solder: Sn-3.0Ag-0.5Cu

##### (1) Test Substrate A

###### • Land Dimensions



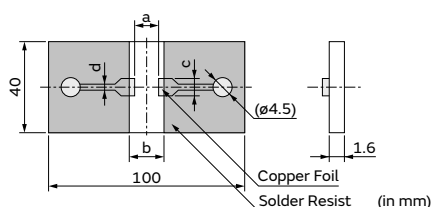
• Material: Glass Epoxy Board

• Thickness: 1.6mm

• Thickness of Copper Foil: 0.035mm

| Part Number  | Dimension (mm) |     |     |
|--------------|----------------|-----|-----|
|              | a              | b   | c   |
| <b>GA342</b> | 3.5            | 7.0 | 2.4 |

##### (2) Test Substrate B



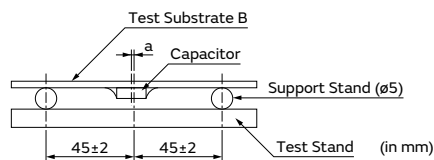
• Material: Glass Epoxy Board

• Thickness of Copper Foil: 0.035mm

| Part Number  | Dimension of Pattern (mm) |     |     |     |
|--------------|---------------------------|-----|-----|-----|
|              | a                         | b   | c   | d   |
| <b>GA342</b> | 3.5                       | 7.0 | 2.4 | 1.0 |

#### 2. Test Method of Substrate Bending Test

##### (a) Support State



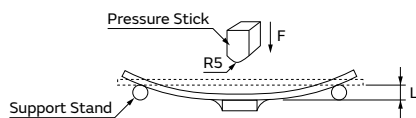
a:  $\pm 2$  gap between support stand center and test stand

• Material of Test Stand and Pressure Stick

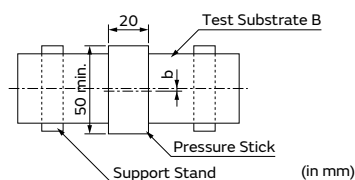
The material should be a metal where a remarkable transformation and the distortion are not caused even if it is pressurized.

• Pressurizing Speed

The pressurizing speed is pressurized at the speed of about 1mm/s until the flexure reaches a regulated value.



##### (b) Test State



b:  $\pm 5$  gap between support stand center and test stand center

2

## GA3 Series Type GF Specifications and Test Methods (2)

| No   | Item                                       |                    | Specification                                                                 | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|------|--------------------------------------------|--------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------|---|--------------------|---|-------------------------|---|--------------------|---|-------------------------|---|--------------------|
| 1    | Appearance                                 |                    | No defects or abnormalities.                                                  | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 2    | Dimension                                  |                    | Within the specified dimensions.                                              | Using calipers and micrometers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 3    | Voltage Proof                              |                    | No defects or abnormalities.                                                  | Measurement Point: Between the terminations<br>Test Voltage: AC2000V (r.m.s.)<br>Applied Time: 60±1s<br>Charge/discharge current: 50mA max.                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 4    | Impulse Voltage                            |                    | No self healing break downs or flash-overs have taken place in the capacitor. | 10 impulse of alternating polarity is subjected. (5 impulse for each polarity)<br>The interval between impulse is 60s.<br>Applied Voltage: 2.5kVo-p                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 5    | Insulation Resistance (I.R.)               |                    | 6000MΩ or more                                                                | Measurement Point: Between the terminations<br>Measurement Voltage: DC500±50V<br>Charging Time: 60±5s<br>Charge/discharge current: 50mA max.<br>Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 6    | Capacitance                                |                    | Shown in Rated value.                                                         | Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 7    | Dissipation Factor (D.F.)                  |                    | 0.025 max.                                                                    | Measurement Frequency: 1.0±0.1kHz<br>Measurement Voltage: AC1.0±0.2V (r.m.s.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 8    | Temperature Characteristics of Capacitance |                    | R7: Within ±15% (-55 to +125°C)                                               | <p>The capacitance change should be measured after 5 minutes at each specified temp. stage.<br/>Capacitance value as a reference is the value in step 3.</p> <table><tr><th>Step</th><th>Temperature (°C)</th></tr><tr><td>1</td><td>Reference Temp. ±2</td></tr><tr><td>2</td><td>Min. Operating Temp. ±3</td></tr><tr><td>3</td><td>Reference Temp. ±2</td></tr><tr><td>4</td><td>Max. Operating Temp. ±3</td></tr><tr><td>5</td><td>Reference Temp. ±2</td></tr></table> <p>• Pretreatment<br/>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h at room condition*.</p> | Step | Temperature (°C) | 1 | Reference Temp. ±2 | 2 | Min. Operating Temp. ±3 | 3 | Reference Temp. ±2 | 4 | Max. Operating Temp. ±3 | 5 | Reference Temp. ±2 |
| Step | Temperature (°C)                           |                    |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 1    | Reference Temp. ±2                         |                    |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 2    | Min. Operating Temp. ±3                    |                    |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 3    | Reference Temp. ±2                         |                    |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 4    | Max. Operating Temp. ±3                    |                    |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 5    | Reference Temp. ±2                         |                    |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 9    | Vibration                                  | Appearance         | No defects or abnormalities.                                                  | <p>Solder the capacitor on the test substrate A shown in “Complement of Test Method”.</p> <p>Kind of Vibration: A simple harmonic motion<br/>10Hz to 55Hz to 10Hz (1min)</p> <p>Total amplitude: 1.5mm<br/>This motion should be applied for a period of 2h in each 3 mutually perpendicular directions (total of 6h).</p>                                                                                                                                                                                                                                                                               |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | Capacitance        | Within the specified initial value.                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | D.F.               | Within the specified initial value.                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 10   | Solderability                              |                    | 95% of the terminations is to be soldered evenly and continuously.            | <p>Test Method: Solder bath method<br/>Flux: Solution of rosin ethanol 25 (wt)%<br/>Preheat: 80 to 120°C for 10 to 30s<br/>Solder: Sn-3.0Ag-0.5Cu (Lead Free Solder)<br/>Solder Temp.: 245±5°C<br/>Immersion time: 2±0.5s<br/>Immersing in speed: 25±2.5mm/s.</p>                                                                                                                                                                                                                                                                                                                                        |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 11   | Resistance to Soldering Heat               | Appearance         | No defects or abnormalities.                                                  | <p>Test Method: Solder bath method<br/>Solder: Sn-3.0Ag-0.5Cu (Lead Free Solder)<br/>Solder Temp.: 260±5°C<br/>Immersion time: 10±1s<br/>Immersing in speed: 25±2.5mm/s.<br/>Exposure Time: 24±2h at room condition*.<br/>Preheat: GA342/52/55 size: 100 to 120°C for 1min and 170 to 200°C for 1min</p> <p>• Pretreatment<br/>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h at room condition*.</p>                                                                                                                                                                    |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | Capacitance Change | Within ±10%                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | I.R.               | 1000MΩ or more                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
|      |                                            | Voltage Proof      | No defects.                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |
| 12   | Adhesive Strength of Termination           |                    | No removal of the terminations or other defect should occur.                  | <p>Solder the capacitor on the test substrate A shown in “Complement of Test Method”.</p> <div>10N, 10±1s</div> <p>Applied Direction: In parallel with the test substrate and vertical with the capacitor side.</p>                                                                                                                                                                                                                                                                                                  |      |                  |   |                    |   |                         |   |                    |   |                         |   |                    |

\* Room Condition: Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. ➤

GRM

GR3

GRJ

GR4

GR7

GJM

GQM

GA2

GA3

GA3

GA3

GA3

LLL

LLA

LLM

LLR

NFM

KRM

KR3

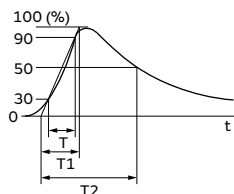
GMA

GMD

⚠Caution / Notice

## GA3 Series Type GF Specifications and Test Methods (2)

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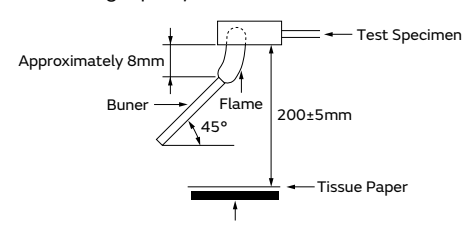
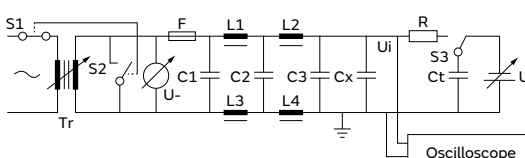
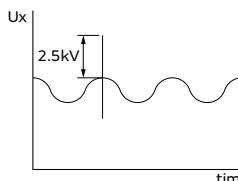
| No                 | Item                                    |                                                                                                    | Specification                | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|--------------------|-----------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------------------------------------------------------------------------------------------------|------------|---|----------------------------|------|---|------------|--------|---|----------------------------|------|---|------------|--------|
| 13                 | Substrate Bending Test                  |                                                                                                    | No defects or abnormalities. | Solder the capacitor on the test substrate B shown in “Complement of Test Method”.<br>Then apply the force in the direction shown in “Test Method of Substrate Bending Test” of “Complement of Test Method”.<br>Flexure: 1mm<br>Holding Time: 5±1s<br>Soldering Method: Reflow soldering                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 14                 | Temperature Sudden Change               | Appearance                                                                                         | No defects or abnormalities. | Fix the capacitor to the supporting test substrate A (glass epoxy board) shown in “Complement of Test Method”.<br>Perform the 5 cycles according to the four heat treatments shown in the following table.<br><table><tr><th>Step</th><th>Temp. (°C)</th><th>Time (min)</th></tr><tr><td>1</td><td>Min. Operating Temp. +0/-3</td><td>30±3</td></tr><tr><td>2</td><td>Room Temp.</td><td>2 to 3</td></tr><tr><td>3</td><td>Max. Operating Temp. +3/-0</td><td>30±3</td></tr><tr><td>4</td><td>Room Temp.</td><td>2 to 3</td></tr></table><br>Exposure Time: 24±2h at room condition*.<br>• Pretreatment<br>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h at room condition*.                                                                                                                                                                                                                                                                                                                                                                                | Step            | Temp. (°C)                                                                                         | Time (min) | 1 | Min. Operating Temp. +0/-3 | 30±3 | 2 | Room Temp. | 2 to 3 | 3 | Max. Operating Temp. +3/-0 | 30±3 | 4 | Room Temp. | 2 to 3 |
|                    |                                         | Step                                                                                               | Temp. (°C)                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Time (min)      |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | 1                                                                                                  | Min. Operating Temp. +0/-3   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 30±3            |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | 2                                                                                                  | Room Temp.                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2 to 3          |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | 3                                                                                                  | Max. Operating Temp. +3/-0   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 30±3            |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 4                  | Room Temp.                              | 2 to 3                                                                                             |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Capacitance Change | Within±15%                              |                                                                                                    |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| D.F.               | 0.05 max.                               |                                                                                                    |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| I.R.               | 3000MΩ or more                          |                                                                                                    |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Voltage Proof      | No defects.                             |                                                                                                    |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 15                 | High Temperature High Humidity (Steady) | Appearance                                                                                         | No defects or abnormalities. | Fix the capacitor to the supporting test substrate B (glass epoxy board) shown in “Complement of Test Method”.<br>Before this test, the test shown in the following is performed.<br>• No.12 Adhesive Strength of Termination (apply force: 5N)<br>• No.13 Substrate Bending Test<br>Test Temperature: 40±2°C<br>Test Humidity: 90 to 95%RH<br>Test Time: 500+24/-0h<br>Applied Voltage: Rated voltage<br>Exposure Time: 24±2h at room condition*.<br>• Pretreatment<br>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h at room condition*.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | Capacitance Change                                                                                 | Within±15%                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | D.F.                                                                                               | 0.05 max.                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | I.R.                                                                                               | 3000MΩ or more               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | Voltage Proof                                                                                      | No defects.                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| 16                 | Durability                              | Appearance                                                                                         | No defects or abnormalities. | Fix the capacitor to the supporting test substrate B (glass epoxy board) shown in “Complement of Test Method”.<br>Before this test, the test shown in the following is performed.<br>• No.12 Adhesive Strength of Termination (apply force: 5N)<br>• No.13 Substrate Bending Test<br>Next, Impulse Voltage test is performed.<br>Each individual capacitor shall be subjected to a 5kV Impulse (the voltage value means zero to peak) for 3 times.<br>Then the capacitors are applied to life test.<br><br>Front time (T1) = 1.2μs=1.67T<br>Time to half-value (T2) = 50μs<br><br>Apply voltage as Table for 1000h at 125+2/-0°C, relative humidity 50% max.<br><table><tr><th>Applied Voltage</th></tr><tr><td>AC425V (r.m.s.), except that once each hour the voltage is increased to AC1000V (r.m.s.) for 0.1s.</td></tr></table><br>Exposure Time: 24±2h at room condition*.<br>• Pretreatment<br>Perform a heat treatment at 150+0/-10°C for 1h±5min and then let sit for 24±2h at room condition*. | Applied Voltage | AC425V (r.m.s.), except that once each hour the voltage is increased to AC1000V (r.m.s.) for 0.1s. |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | Applied Voltage                                                                                    |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | AC425V (r.m.s.), except that once each hour the voltage is increased to AC1000V (r.m.s.) for 0.1s. |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | Capacitance Change                                                                                 | Within ±20%                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
|                    |                                         | D.F.                                                                                               | 0.05 max.                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| I.R.               | 3000MΩ or more                          |                                                                                                    |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |
| Voltage Proof      | No defects.                             |                                                                                                    |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                 |                                                                                                    |            |   |                            |      |   |            |        |   |                            |      |   |            |        |

\* Room Condition: Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. ↗

## GA3 Series Type GF Specifications and Test Methods (2)

Continued from the preceding page. ↘

| No | Item                 | Specification                                                                              | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----|----------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 17 | Passive Flammability | The burning time shall not be exceeded the time 30s.<br>The tissue paper shall not ignite. | <p>The capacitor under test shall be held in the flame in the position which best promotes burning.<br/>Each specimen shall only be exposed once to the flame.<br/>Time of exposure to flame: 30s<br/>Length of flame: <math>12 \pm 1</math>mm<br/>Gas burner: Length 35mm min.<br/>Inside dia: <math>0.5 \pm 0.1</math>mm<br/>Outside dia: 0.9mm max.<br/>Gas: Butane gas purity 95% min.</p>  <p>Approximately 8mm<br/>Buner<br/>Flame<br/>45°<br/>200±5mm<br/>Tissue Paper<br/>Wood Board of Approximately 10mm in Thickness</p>                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 18 | Active Flammability  | The cheesecloth shall not be on fire.                                                      | <p>The specimens shall be individually wrapped in at least one but more than two complete layers of cheesecloth.<br/>The specimens shall be subjected to 20 discharges.<br/>The interval between successive discharges shall be 5s.<br/>The UAC shall be maintained for 2min after the last discharge.</p>  <p>C1, C2: Filter capacitor <math>1\mu\text{F} \pm 10\%</math><br/>C3: Capacitor <math>0.033\mu\text{F} \pm 5\%</math><br/>L1 to L4: Rod coa choke <math>1.5\text{mH} \pm 20\%</math>, 16A<br/>R: Resistor <math>100\Omega \pm 2\%</math> <math>C_x &lt; 0.068\mu\text{F}</math><br/>Ct: Tank capacitor <math>3\mu\text{F} \pm 5\%</math> 10kV <math>C_x \leq 1\mu\text{F}</math><br/>U-: UR±5%<br/>UR: Rated voltage<br/>Cx: Capacitor under test<br/>F: Slow-blow fuse, rated 16A<br/>Ut: Voltage to which the tank capacitor Ct is charged</p>  <p>Ux<br/>2.5kV<br/>time</p> |

GRM

GR3

GRJ

GR4

GR7

GJM

GQM

GA2

GA3

GA3

GA3

GA3

LLL

LLA

LLM

LLR

NFM

KRM

KR3

GMA

GMD

Caution

/Notice

## GA3 Series Type GF Specifications and Test Methods (2)

Continued from the preceding page. ↘

### Complement of Test Method

#### 1. Test Substrate

The test substrate should be Substrate A or Substrate B as described in "Specifications and Test Methods".

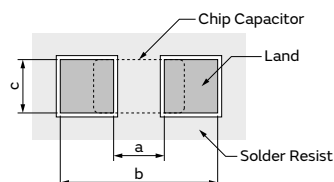
The specimen should be soldered by the conditions as described below.

Soldering Method: Reflow soldering

Solder: Sn-3.0Ag-0.5Cu

##### (1) Test Substrate A

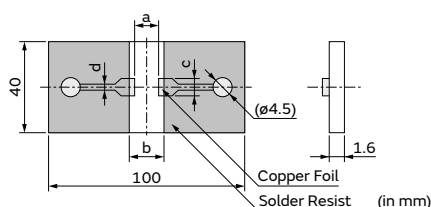
###### • Land Dimensions



- Material: Glass Epoxy Board
- Thickness: 1.6mm
- Thickness of Copper Foil: 0.035mm

| Part Number  | Dimension (mm) |     |     |
|--------------|----------------|-----|-----|
|              | a              | b   | c   |
| <b>GA342</b> | 3.5            | 7.0 | 2.4 |
| <b>GA352</b> | 4.5            | 8.0 | 3.2 |
| <b>GA355</b> | 4.5            | 8.0 | 5.6 |

##### (2) Test Substrate B

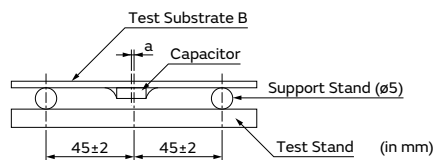


- Material: Glass Epoxy Board
- Thickness of Copper Foil: 0.035mm

| Part Number  | Dimension of Pattern (mm) |     |     |     |
|--------------|---------------------------|-----|-----|-----|
|              | a                         | b   | c   | d   |
| <b>GA342</b> | 3.5                       | 7.0 | 2.4 | 1.0 |
| <b>GA352</b> | 4.5                       | 8.0 | 3.2 | 1.0 |
| <b>GA355</b> | 4.5                       | 8.0 | 5.6 | 1.0 |

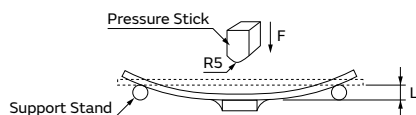
#### 2. Test Method of Substrate Bending Test

##### (a) Support State

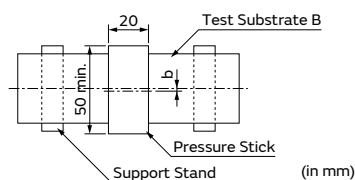


a: ±2 gap between support stand center and test stand

- Material of Test Stand and Pressure Stick  
The material should be a metal where a remarkable transformation and the distortion are not caused even if it is pressurized.
- Pressurizing Speed  
The pressurizing speed is pressurized at the speed of about 1mm/s until the flexure reaches a regulated value.



##### (b) Test State



b: ±5 gap between support stand center and test stand center

## LW Reversed Low ESL Chip Multilayer Ceramic Capacitors for General Purpose

# LLL Series

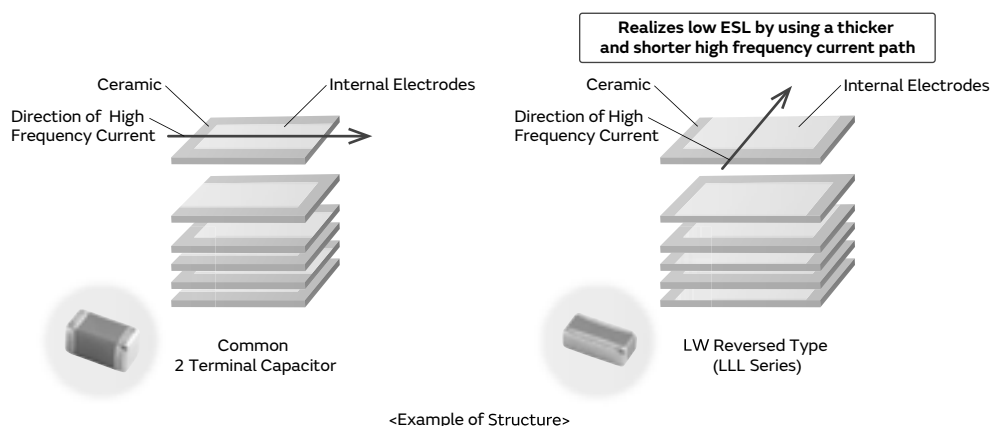


This low ESL capacitor is ideal for power supply decoupling of high-speed operation electronic equipment.

### Features

#### ① Low ESL

Since the equivalent series inductance (ESL) is low and excellent in high frequency characteristics, this capacitor is suitable for power supply decoupling of high-speed operation electronic equipment.

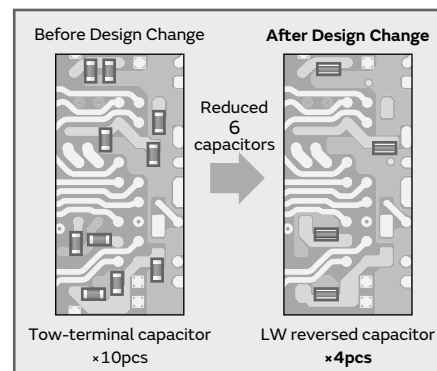


#### ② Contributes to a reduction in the number of components.

The number of components can be reduced by using low ESL capacitors, while maintaining functions equivalent to general purpose capacitors (GRM Series).

Murata proposes the use of the LLL series to reduce the number of components and high costs. Simulation is also possible.

Proposal for Cost Reductions

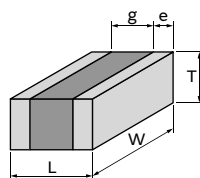


#### ③ A maximum operating temperature up to 125°C

We also offer an abundant lineup of X7\* characteristics that can be used in high temperature locations, such as IC packages.

### Specifications

|                   |                               |
|-------------------|-------------------------------|
| Size (mm)         | 0.5×1.0mm to 1.6×3.2mm        |
| Rated Voltage     | 2.5Vdc to 50Vdc               |
| Capacitance       | 2200pF to 10μF                |
| Main Applications | Application processor/CPU/GPU |



This catalog contains only a portion of the product lineup.  
Please refer to the capacitor search tool on the Murata Web site for details.

# LLL Series High Dielectric Constant Type Part Number List

## 0.5×1.0mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number        |  |
|--------|---------------|---------|--------|------|--------------------|--|
| 0.35mm | 6.3Vdc        | X6S     | 0.10μF | ±20% | LLL153C80J104ME01# |  |
|        |               |         | 0.22μF | ±20% | LLL153C80J224ME14# |  |
|        | 4Vdc          | X7S     | 0.47μF | ±20% | LLL153C70G474ME17# |  |
|        |               | X6S     | 1.0μF  | ±20% | LLL153C80G105ME21# |  |

## 0.6×1.0mm

| T max. | Rated Voltage | TC Code | Cap.  | Tol. | Part Number        |           |
|--------|---------------|---------|-------|------|--------------------|-----------|
| 0.45mm | 4Vdc          | X5R     | 4.3μF | ±20% | LLL1U4R60G435ME22# | <b>D1</b> |

## 0.8×1.6mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |  |
|--------|---------------|---------|---------|------|--------------------|--|
| 0.5mm  | 25Vdc         | X7R     | 10000pF | ±20% | LLL185R71E103MA11# |  |
|        | 16Vdc         | X7R     | 22000pF | ±20% | LLL185R71C223MA11# |  |
|        |               |         | 47000pF | ±20% | LLL185R71C473MA11# |  |
|        | 10Vdc         | X7R     | 0.10μF  | ±20% | LLL185R71A104MA11# |  |
|        | 4Vdc          | X7S     | 0.22μF  | ±20% | LLL185C70G224MA11# |  |
| 0.55mm | 4Vdc          | X7S     | 2.2μF   | ±20% | LLL185C70G225ME01# |  |
| 0.6mm  | 50Vdc         | X7R     | 2200pF  | ±20% | LLL185R71H222MA01# |  |
|        |               |         | 4700pF  | ±20% | LLL185R71H472MA01# |  |
|        | 25Vdc         | X7R     | 10000pF | ±20% | LLL185R71E103MA01# |  |
|        |               |         | 22000pF | ±20% | LLL185R71E223MA01# |  |
|        | 16Vdc         | X7R     | 47000pF | ±20% | LLL185R71C473MA01# |  |
|        | 10Vdc         | X7R     | 0.10μF  | ±20% | LLL185R71A104MA01# |  |
|        |               |         | 0.22μF  | ±20% | LLL185R71A224MA01# |  |
|        | 4Vdc          | X7S     | 0.47μF  | ±20% | LLL185C70G474MA01# |  |

## 1.25×2.0mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |  |
|--------|---------------|---------|---------|------|--------------------|--|
| 0.5mm  | 50Vdc         | X7R     | 10000pF | ±20% | LLL215R71H103MA11# |  |
|        | 25Vdc         | X7R     | 22000pF | ±20% | LLL215R71E223MA11# |  |
|        | 16Vdc         | X7R     | 47000pF | ±20% | LLL215R71C473MA11# |  |
|        |               |         | 0.10μF  | ±20% | LLL215R71C104MA11# |  |
|        | 10Vdc         | X7R     | 0.22μF  | ±20% | LLL215R71A224MA11# |  |
|        | 6.3Vdc        | X7R     | 0.47μF  | ±20% | LLL215R70J474MA11# |  |
|        | 4Vdc          | X7S     | 1.0μF   | ±20% | LLL215C70G105MA11# |  |
| 0.7mm  | 50Vdc         | X7R     | 10000pF | ±20% | LLL216R71H103MA01# |  |
|        |               |         | 22000pF | ±20% | LLL216R71H223MA01# |  |
|        | 25Vdc         | X7R     | 47000pF | ±20% | LLL216R71E473MA01# |  |
|        |               |         | 0.10μF  | ±20% | LLL216R71E104MA01# |  |
|        | 10Vdc         | X7R     | 0.22μF  | ±20% | LLL216R71A224MA01# |  |
| 0.95mm | 16Vdc         | X7R     | 0.22μF  | ±20% | LLL219R71C224MA01# |  |
|        | 10Vdc         | X7R     | 0.47μF  | ±20% | LLL219R71A474MA01# |  |
|        |               |         | 1.0μF   | ±20% | LLL219R71A105MA01# |  |
|        | 4Vdc          | X7S     | 2.2μF   | ±20% | LLL219C70G225MA01# |  |

## 1.6×3.2mm

| T max. | Rated Voltage | TC Code | Cap.     | Tol. | Part Number        |  |
|--------|---------------|---------|----------|------|--------------------|--|
| 0.5mm  | 50Vdc         | X7R     | 10000pF  | ±20% | LLL315R71H103MA11# |  |
|        |               |         | 22000pF  | ±20% | LLL315R71H223MA11# |  |
|        | 25Vdc         | X7R     | 47000pF  | ±20% | LLL315R71E473MA11# |  |
|        |               |         | 0.10μF   | ±20% | LLL315R71E104MA11# |  |
|        | 16Vdc         | X7R     | 0.22μF   | ±20% | LLL315R71C224MA11# |  |
| 0.8mm  | 10Vdc         | X7R     | 0.47μF   | ±20% | LLL315R71A474MA11# |  |
|        | 50Vdc         | X7R     | 10000pF  | ±20% | LLL317R71H103MA01# |  |
|        |               |         | 22000pF  | ±20% | LLL317R71H223MA01# |  |
|        |               |         | 47000pF  | ±20% | LLL317R71H473MA01# |  |
|        | 25Vdc         | X7R     | 0.10μF   | ±20% | LLL317R71E104MA01# |  |
|        | 16Vdc         | X7R     | 0.22μF   | ±20% | LLL317R71C224MA01# |  |
|        |               |         | 0.47μF   | ±20% | LLL317R71C474MA01# |  |
| 1.25mm | 10Vdc         | X7R     | 1.0μF    | ±20% | LLL317R71A105MA01# |  |
|        | 6.3Vdc        | X7R     | 2.2μF    | ±20% | LLL317R70J225MA01# |  |
|        | 50Vdc         | X7R     | 0.10μF   | ±20% | LLL31MR71H104MA01# |  |
|        |               |         | 0.22μF   | ±20% | LLL31MR71E224MA01# |  |
|        |               |         | 0.47μF   | ±20% | LLL31MR71E474MA01# |  |
|        | 16Vdc         | X7R     | 1.0μF    | ±20% | LLL31MR71C105MA01# |  |
|        | 10Vdc         | X7R     | 2.2μF    | ±20% | LLL31MR71A225MA01# |  |
|        | 6.3Vdc        | X7R     | 4.7μF    | ±20% | LLL31MR70J475MA01# |  |
|        |               |         | X5R 10μF | ±20% | LLL31MR60J106ME01# |  |

## LLL Series Specifications and Test Methods

Specifications and Test Methods, please refer to the search web page.  
<https://www.murata.com/en-global/products/capacitor>

### LLL Series High Dielectric Constant Type

0.5×1.0mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number        |
|--------|---------------|---------|--------|------|--------------------|
| 0.35mm | 6.3Vdc        | X6S     | 0.10μF | ±20% | LLL153C80J104ME01# |
|        |               |         | 0.22μF | ±20% | LLL153C0J224ME14#  |
|        | 4Vdc          | X7S     | 0.47μF | ±20% | LLL153C70G474ME17# |
|        |               | X6S     | 1.0μF  | ±20% | LLL153C60J105ME21# |

0.6×1.0mm

| T max. | Rated Voltage | TC Code | Cap. | Tol. | Part Number |
|--------|---------------|---------|------|------|-------------|
|--------|---------------|---------|------|------|-------------|

Links are provided to the product detail pages on the web, and are shown below in the product number table from the PDF version of the catalog which is available on the web.

### Detailed Specifications Sheet

- Rated value
- Specifications and Test Methods
- Package
- Caution, Notice

### Specifications and Test Methods

# Specifications and Test Methods

| No                 | Item                                       | Specification                                                                                                                                                                                                      | Test Method<br>(Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |                 |                       |                   |                      |               |                    |                           |               |                      |            |               |
|--------------------|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------------|-----------------------|-------------------|----------------------|---------------|--------------------|---------------------------|---------------|----------------------|------------|---------------|
| 1                  | Rated Voltage                              | Shown in Rated value.                                                                                                                                                                                              | The rated voltage is defined as the maximum voltage which may be applied continuously to the capacitor.<br>When AC voltage is superimposed on DC voltage, $V^P$ or $V^D$ , whichever is larger, should be maintained within the rated voltage range.                                                                                                                                                                                                                                                                                                                                                                                                  |             |                 |                       |                   |                      |               |                    |                           |               |                      |            |               |
| 2                  | Appearance                                 | No defects or abnormalities.                                                                                                                                                                                       | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |             |                 |                       |                   |                      |               |                    |                           |               |                      |            |               |
| 3                  | Dimension                                  | Within the specified dimensions.                                                                                                                                                                                   | Using Measuring instrument of dimension.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |                 |                       |                   |                      |               |                    |                           |               |                      |            |               |
| 4                  | Voltage proof                              | No defects or abnormalities.                                                                                                                                                                                       | Measurement Point : Between the terminations<br>Test Voltage : 250% of the rated voltage<br>Applied Time : 1 to 5 s<br>Charge/discharge current : 50mA max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                 |                       |                   |                      |               |                    |                           |               |                      |            |               |
| 5                  | Insulation Resistance(I.R.)                | More than 2000MΩ or 500 · F (Whichever is smaller)                                                                                                                                                                 | Measurement Point : Between the terminations<br>Measurement Voltage : DC Rated Voltage<br>Charging Time : 1 min (LLL153C70E474M only 2 min)<br>Charge/discharge current : 50mA max.<br>Measurement Temperature Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                 |                       |                   |                      |               |                    |                           |               |                      |            |               |
| 6                  | Capacitance                                | Shown in Rated value.                                                                                                                                                                                              | Measurement Temperature Room Temperature <div> <table> <tr> <th>Capacitance</th> <th>Frequency</th> <th>Voltage</th> </tr> <tr> <td>C≤10μF (10V min.)</td> <td>1.0+/-0.1kHz</td> <td>1.0+/-0.2Vrms</td> </tr> <tr> <td>C≤10μF (6.3V max.)</td> <td>1.0+/-0.1kHz</td> <td>0.5+/-0.1Vrms</td> </tr> <tr> <td>C&gt;10μF</td> <td>120+/-24Hz</td> <td>0.5+/-0.1Vrms</td> </tr> </table> </div>                                                                                                                                                                                                                                                            | Capacitance | Frequency       | Voltage               | C≤10μF (10V min.) | 1.0+/-0.1kHz         | 1.0+/-0.2Vrms | C≤10μF (6.3V max.) | 1.0+/-0.1kHz              | 0.5+/-0.1Vrms | C>10μF               | 120+/-24Hz | 0.5+/-0.1Vrms |
| Capacitance        | Frequency                                  | Voltage                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                 |                       |                   |                      |               |                    |                           |               |                      |            |               |
| C≤10μF (10V min.)  | 1.0+/-0.1kHz                               | 1.0+/-0.2Vrms                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                 |                       |                   |                      |               |                    |                           |               |                      |            |               |
| C≤10μF (6.3V max.) | 1.0+/-0.1kHz                               | 0.5+/-0.1Vrms                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                 |                       |                   |                      |               |                    |                           |               |                      |            |               |
| C>10μF             | 120+/-24Hz                                 | 0.5+/-0.1Vrms                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                 |                       |                   |                      |               |                    |                           |               |                      |            |               |
| 7                  | Dissipation Factor (D.F.)                  | 0.120 max.                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                 |                       |                   |                      |               |                    |                           |               |                      |            |               |
| 8                  | Temperature Characteristics of Capacitance | No bias<br>R6 : Within +/-15% (-55°C to +85°C)<br>C7 : Within +/-22% (-55°C to +125°C)<br>C8 : Within +/-22% (-55°C to +105°C)<br>D7 : Within +22/-33% (-55°C to +125°C)<br>D8 : Within +22/-33% (-55°C to +105°C) | The capacitance change should be measured after 5 min. at each specified temp. stage.<br>Capacitance value as a reference is the value in step 3.<br><br>· Measurement Voltage :<br>LLL153 D7 0E/0G 224M only : 0.25+/-0.05Vrms<br>LLL153 C7 0E/0G 104M only : 0.30+/-0.05Vrms<br>LLL152R60G105M , LLL152D80E105M only : 0.10+/-0.03Vrms <div> <table> <tr> <th>Step</th> <th>Temperature(°C)</th> <th>Applying Voltage(VDC)</th> </tr> <tr> <td>1</td> <td>Reference Temp. +/-2</td> <td rowspan="3">No bias</td> </tr> <tr> <td>2</td> <td>Min. Operating Temp. +/-3</td> </tr> <tr> <td>3</td> <td>Reference Temp. +/-2</td> </tr> </table> </div> | Step        | Temperature(°C) | Applying Voltage(VDC) | 1                 | Reference Temp. +/-2 | No bias       | 2                  | Min. Operating Temp. +/-3 | 3             | Reference Temp. +/-2 |            |               |
| Step               | Temperature(°C)                            | Applying Voltage(VDC)                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                 |                       |                   |                      |               |                    |                           |               |                      |            |               |
| 1                  | Reference Temp. +/-2                       | No bias                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                 |                       |                   |                      |               |                    |                           |               |                      |            |               |
| 2                  | Min. Operating Temp. +/-3                  |                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                 |                       |                   |                      |               |                    |                           |               |                      |            |               |
| 3                  | Reference Temp. +/-2                       |                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                 |                       |                   |                      |               |                    |                           |               |                      |            |               |

## 8 Terminals Low ESL Chip Multilayer Ceramic Capacitors for General Purpose

# LLA Series

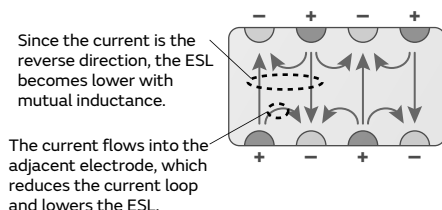
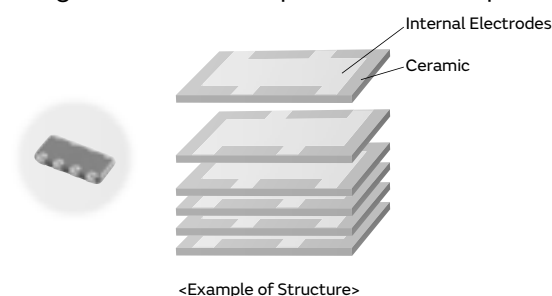


## 8-Terminal Type Low ESL Capacitor Ideal for Power Supply Decoupling of High-speed Operation IC

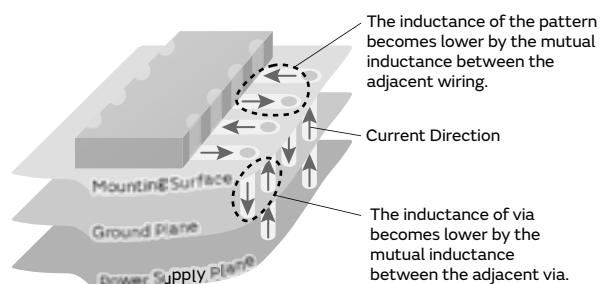
### Features

#### ① Ultra-low ESL

Since the equivalent series inductance (ESL) is very low with excellent high frequency characteristics due to the design structure, this capacitor is ideal for power supply decoupling of high-speed operation IC.



<Effectiveness of Cancelling Out Inductance by Mutual Inductance>



<Effectiveness of Suppressing Inductance when Mounting a Multi-terminal Capacitor>

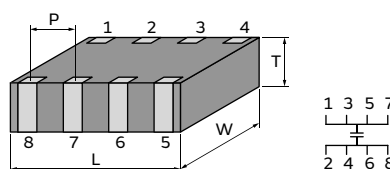
The inductance for the boards also becomes lower, not only the capacitor.

#### ② A maximum operating temperature up to 125°C

This product is applicable to high temperatures (X7\* characteristics); however, Murata also offers numerous thin type products, which are ideal as decoupling capacitors on IC package.

### Specifications

|                   |                               |
|-------------------|-------------------------------|
| Size (mm)         | 1.6×0.8mm to 2.0×1.25mm       |
| Rated Voltage     | 4Vdc to 25Vdc                 |
| Capacitance       | 10000pF to 4.7μF              |
| Main Applications | Application processor/CPU/GPU |



<Dimensions>

This catalog contains only a portion of the product lineup.  
Please refer to the capacitor search tool on the Murata Web site for details.

## LLA Series High Dielectric Constant Type Part Number List

### 1.6×0.8mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number        | p*   |
|--------|---------------|---------|--------|------|--------------------|------|
| 0.55mm | 4Vdc          | X7S     | 0.10μF | ±20% | LLA185C70G104MA01# | p224 |
|        |               |         | 0.22μF | ±20% | LLA185C70G224MA01# | p224 |
|        |               |         | 0.47μF | ±20% | LLA185C70G474MA01# | p224 |
|        |               |         | 2.2μF  | ±20% | LLA185C70G225ME16# | p226 |

### 2.0×1.25mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        | p*   |
|--------|---------------|---------|---------|------|--------------------|------|
| 0.55mm | 25Vdc         | X7R     | 10000pF | ±20% | LLA215R71E103MA14# | p224 |
|        |               |         | 22000pF | ±20% | LLA215R71E223MA14# | p224 |
|        | 16Vdc         | X7R     | 47000pF | ±20% | LLA215R71C473MA14# | p224 |
|        |               |         | 0.10μF  | ±20% | LLA215R71C104MA14# | p224 |
|        | 10Vdc         | X7R     | 0.22μF  | ±20% | LLA215R71A224MA14# | p224 |
|        | 6.3Vdc        | X7R     | 0.47μF  | ±20% | LLA215R70J474MA14# | p224 |
|        | 4Vdc          | X7S     | 1.0μF   | ±20% | LLA215C70G105MA14# | p224 |
|        |               |         | 4.7μF   | ±20% | LLA215C70G475ME19# | p226 |
| 0.95mm | 25Vdc         | X7R     | 10000pF | ±20% | LLA219R71E103MA01# | p224 |
|        |               |         | 22000pF | ±20% | LLA219R71E223MA01# | p224 |
|        |               |         | 47000pF | ±20% | LLA219R71E473MA01# | p224 |
|        | 16Vdc         | X7R     | 0.10μF  | ±20% | LLA219R71C104MA01# | p224 |
|        |               |         | 0.22μF  | ±20% | LLA219R71C224MA01# | p224 |
|        | 10Vdc         | X7R     | 0.47μF  | ±20% | LLA219R71A474MA01# | p224 |
|        | 6.3Vdc        | X7R     | 1.0μF   | ±20% | LLA219R70J105MA01# | p224 |
|        | 4Vdc          | X7S     | 2.2μF   | ±20% | LLA219C70G225MA01# | p224 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

# 1

## LLA Series Specifications and Test Methods (1)

| No                     | Item                                       |                              | Specification                                                                                                                                                             | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
|------------------------|--------------------------------------------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------------------------|-----------------------|------------------------|------------------------------|------------------------------|---|------------------------------|--------|-------------------------|------------------------------|------------------------------|---|-------------------------|--------|
| 1                      | Rated Voltage                              |                              | Shown in Rated value.                                                                                                                                                     | The rated voltage is defined as the maximum voltage which may be applied continuously to the capacitor.<br>When AC voltage is superimposed on DC voltage, $V^{P-P}$ or $V^{O-P}$ , whichever is larger, should be maintained within the rated voltage range.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
| 2                      | Appearance                                 |                              | No defects or abnormalities.                                                                                                                                              | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
| 3                      | Dimension                                  |                              | Within the specified dimensions.                                                                                                                                          | Using Measuring instrument of dimension.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
| 4                      | Voltage Proof                              |                              | No defects or abnormalities.                                                                                                                                              | Measurement Point: Between the terminations<br>Test Voltage: 250% of the rated voltage<br>Applied Time: 1 to 5s<br>Charge/discharge current: 50mA max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
| 5                      | Insulation Resistance (I.R.)               |                              | $C \leq 0.047\mu\text{F}$ :More than 10000MΩ<br>$C > 0.047\mu\text{F}$ :More than $500\Omega \cdot \text{F}$<br>C: Nominal Capacitance                                    | Measurement Point: Between the terminations<br>Measurement Voltage: DC Rated Voltage<br>Charging Time: 2min<br>Charge/discharge current: 50mA max.<br>Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
| 6                      | Capacitance                                |                              | Shown in Rated value.                                                                                                                                                     | Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
| 7                      | Dissipation Factor (D.F.)                  |                              | W.V.:25Vdc min.: 0.025max.<br>W.V.:16/10Vdc: 0.035max.<br>W.V.:6.3Vdc max.: 0.05max.                                                                                      | <table><tr><th>Capacitance</th><th>Frequency</th><th>Voltage</th></tr><tr><td><math>C \leq 10\mu\text{F}</math></td><td><math>1.0\pm 0.1\text{kHz}</math></td><td><math>1.0\pm 0.2V_{\text{rms}}</math> *</td></tr></table><br>* For item LLA185 C7 0G 274 to 474, the capacitance should be measured using a voltage of $0.5\pm 0.1V_{\text{rms}}$ .<br>For item LLA185/215 C7 0G 473, the capacitance should be measured using a voltage of $0.5\pm 0.2V_{\text{rms}}$ .                                                                                                                                                                                                                                                                                                                                            | Capacitance | Frequency                          | Voltage               | $C \leq 10\mu\text{F}$ | $1.0\pm 0.1\text{kHz}$       | $1.0\pm 0.2V_{\text{rms}}$ * |   |                              |        |                         |                              |                              |   |                         |        |
| Capacitance            | Frequency                                  | Voltage                      |                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
| $C \leq 10\mu\text{F}$ | $1.0\pm 0.1\text{kHz}$                     | $1.0\pm 0.2V_{\text{rms}}$ * |                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
| 8                      | Temperature Characteristics of Capacitance | No Bias                      | R7: Within $\pm 15\%$ (-55 to $+125^{\circ}\text{C}$ )<br>R6: Within $\pm 15\%$ (-55 to $+85^{\circ}\text{C}$ )<br>C7: Within $\pm 22\%$ (-55 to $+125^{\circ}\text{C}$ ) | <p>The capacitance change should be measured after 5 minutes at each specified temp. stage.<br/>Capacitance value as a reference is the value in step 3.</p> <table><tr><th>Step</th><th>Temperature (<math>^{\circ}\text{C}</math>)</th><th>Applying Voltage(VDC)</th></tr><tr><td>1</td><td>Reference Temp. <math>\pm 2</math></td><td rowspan="5">No bias</td></tr><tr><td>2</td><td>Min. Operating Temp. <math>\pm 3</math></td></tr><tr><td>3</td><td>Reference Temp. <math>\pm 2</math></td></tr><tr><td>4</td><td>Max. Operating Temp. <math>\pm 3</math></td></tr><tr><td>5</td><td>Reference Temp. <math>\pm 2</math></td></tr></table><br>• Initial measurement<br>Perform a heat treatment at $150+0/-10^{\circ}\text{C}$ for 1h and then let sit for $24\pm 2\text{h}$ at room temperature, then measure. | Step        | Temperature ( $^{\circ}\text{C}$ ) | Applying Voltage(VDC) | 1                      | Reference Temp. $\pm 2$      | No bias                      | 2 | Min. Operating Temp. $\pm 3$ | 3      | Reference Temp. $\pm 2$ | 4                            | Max. Operating Temp. $\pm 3$ | 5 | Reference Temp. $\pm 2$ |        |
| Step                   | Temperature ( $^{\circ}\text{C}$ )         | Applying Voltage(VDC)        |                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
| 1                      | Reference Temp. $\pm 2$                    | No bias                      |                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
| 2                      | Min. Operating Temp. $\pm 3$               |                              |                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
| 3                      | Reference Temp. $\pm 2$                    |                              |                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
| 4                      | Max. Operating Temp. $\pm 3$               |                              |                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
| 5                      | Reference Temp. $\pm 2$                    |                              |                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
| 9                      | Adhesive Strength of Termination           |                              | No removal of the terminations or other defect should occur.                                                                                                              | Solder the capacitor on the test substrate (glass epoxy board).<br>Applied Force: 5N<br>Holding Time: $10\pm 1\text{s}$<br>Applied Direction: In parallel with the test substrate and vertical with the capacitor side.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
| 10                     | Vibration                                  | Appearance                   | No defects or abnormalities.                                                                                                                                              | Solder the capacitor on the test substrate (glass epoxy board).<br>Kind of Vibration: A simple harmonic motion<br>$10\text{Hz}$ to $55\text{Hz}$ to $10\text{Hz}$ (1min)<br>Total amplitude: 1.5mm<br>This motion should be applied for a period of 2h in each 3 mutually perpendicular directions (total of 6h).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
|                        |                                            | Capacitance                  | Within the specified initial value.                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
|                        |                                            | D.F.                         | Within the specified initial value.                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
| 11                     | Solderability                              |                              | 75% of the terminations is to be soldered evenly and continuously.                                                                                                        | Test Method: Solder bath method<br>Flux: Solution of rosin ethanol 25 (mass)%<br>Preheat: 80 to $120^{\circ}\text{C}$ for 10 to 30s<br>Solder: Sn-3.0Ag-0.5Cu<br>Solder Temp.: $245\pm 5^{\circ}\text{C}$<br>Immersion time: $2\pm 0.5\text{s}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
| 12                     | Temperature Sudden Change                  | Appearance                   | No defects or abnormalities.                                                                                                                                              | Solder the capacitor on the test substrate (glass epoxy board).<br>Perform the 5 cycles according to the four heat treatments shown in the following table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
|                        |                                            | Capacitance Change           | Within $\pm 7.5\%$                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
|                        |                                            | D.F.                         | Within the specified initial value.                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
|                        |                                            | I.R.                         | Within the specified initial value.                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
|                        |                                            | Voltage Proof                | No defects.                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
|                        |                                            |                              |                                                                                                                                                                           | <table><tr><th>Step</th><th>Temp. (<math>^{\circ}\text{C}</math>)</th><th>Time (min)</th></tr><tr><td>1</td><td>Min. Operating Temp. <math>+0/-3</math></td><td><math>30\pm 3</math></td></tr><tr><td>2</td><td>Room Temp.</td><td>2 to 3</td></tr><tr><td>3</td><td>Max. Operating Temp. <math>+3/-0</math></td><td><math>30\pm 3</math></td></tr><tr><td>4</td><td>Room Temp.</td><td>2 to 3</td></tr></table><br>Exposure Time: $24\pm 2\text{h}$<br>• Initial measurement<br>Perform a heat treatment at $150+0/-10^{\circ}\text{C}$ for 1h and then let sit for $24\pm 2\text{h}$ at room temperature, then measure.                                                                                                                                                                                             | Step        | Temp. ( $^{\circ}\text{C}$ )       | Time (min)            | 1                      | Min. Operating Temp. $+0/-3$ | $30\pm 3$                    | 2 | Room Temp.                   | 2 to 3 | 3                       | Max. Operating Temp. $+3/-0$ | $30\pm 3$                    | 4 | Room Temp.              | 2 to 3 |
| Step                   | Temp. ( $^{\circ}\text{C}$ )               | Time (min)                   |                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
| 1                      | Min. Operating Temp. $+0/-3$               | $30\pm 3$                    |                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
| 2                      | Room Temp.                                 | 2 to 3                       |                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
| 3                      | Max. Operating Temp. $+3/-0$               | $30\pm 3$                    |                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |
| 4                      | Room Temp.                                 | 2 to 3                       |                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                                    |                       |                        |                              |                              |   |                              |        |                         |                              |                              |   |                         |        |

Continued on the following page. ↗

## LLA Series Specifications and Test Methods (1)

Continued from the preceding page. ↘

| No | Item                                    |                    | Specification                                              | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                           |
|----|-----------------------------------------|--------------------|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 13 | High Temperature High Humidity (Steady) | Appearance         | No defects or abnormalities.                               | Solder the capacitor on the test substrate (glass epoxy board).<br>Test Temperature: 40±2°C<br>Test Humidity: 90 to 95%RH<br>Test Time: 500±12h<br>Applied Voltage: DC Rated Voltage<br>Charge/discharge current: 50mA max.<br>Exposure Time: 24±2h                                                                                                                                                                                         |
|    |                                         | Capacitance Change | Within ±12.5%                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|    |                                         | D.F.               | W.V.: 10Vdc min.: 0.05max.<br>W.V.: 6.3Vdc max.: 0.075max. |                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|    |                                         | I.R.               | More than 500MΩ or 25Ω • F (Whichever is smaller)          |                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 14 | Durability                              | Appearance         | No defects or abnormalities.                               | Solder the capacitor on the test substrate (glass epoxy board).<br>Test Temperature: Max. Operating Temp. ±3°C<br>Test Time: 1000±12h<br>Applied Voltage: 200% of the rated voltage<br>Charge/discharge current: 50mA max.<br>Exposure Time: 24±2h<br>• Initial measurement<br>Apply 200% of the rated DC voltage at the max. operating temp. ±3°C for 1h.<br>Remove and set for 24±2h at room temperature.<br>Perform initial measurement. |
|    |                                         | Capacitance Change | Within ±12.5%                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|    |                                         | D.F.               | W.V.:10Vdc min.: 0.05max.<br>W.V.:6.3Vdc max.: 0.075max.   |                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|    |                                         | I.R.               | More than 1000MΩ or 50Ω • F (Whichever is smaller)         |                                                                                                                                                                                                                                                                                                                                                                                                                                             |

GRM

GR3

GRJ

GR4

GR7

GJM

GQM

GA2

GA3 GB

GA3 GD

GA3 GF

LLL

LLA

LLM

LLR

NFM

KRM

KR3

GMA

GMD

⚠Caution /Notice

## 2

## LLA Series Specifications and Test Methods (2)

| No                      | Item                                       |                       | Specification                                                      | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
|-------------------------|--------------------------------------------|-----------------------|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------|-----------------------|------------------------|----------------------------|-------------|-------------------------|-------------------------|-------------|--------------------|----------------------------|-------------------------|---|--------------------|--------|
| 1                       | Rated Voltage                              |                       | Shown in Rated value.                                              | The rated voltage is defined as the maximum voltage which may be applied continuously to the capacitor.<br>When AC voltage is superimposed on DC voltage, $V^{P-P}$ or $V^{O-P}$ , whichever is larger, should be maintained within the rated voltage range.                                                                                                                                                                                                                                                                                                                                                                                                                        |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
| 2                       | Appearance                                 |                       | No defects or abnormalities.                                       | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
| 3                       | Dimension                                  |                       | Within the specified dimensions.                                   | Using Measuring instrument of dimension.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
| 4                       | Voltage Proof                              |                       | No defects or abnormalities.                                       | Measurement Point: Between the terminations<br>Test Voltage: 250% of the rated voltage<br>Applied Time: 1 to 5s<br>Charge/discharge current: 50mA max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
| 5                       | Insulation Resistance (I.R.)               |                       | More than 2000MΩ or 50Ω • F (Whichever is smaller)                 | Measurement Point: Between the terminations<br>Measurement Voltage: DC Rated Voltage<br>Charging Time: 1min<br>Charge/discharge current: 50mA max.<br>Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
| 6                       | Capacitance                                |                       | Shown in Rated value.                                              | Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
| 7                       | Dissipation Factor (D.F.)                  |                       | 0.120max.                                                          | <table><tr><th>Capacitance</th><th>Frequency</th><th>Voltage</th></tr><tr><td>C ≤ 10μF<br/>(10V min.)</td><td>1.0±0.1kHz</td><td>1.0±0.2Vrms</td></tr><tr><td>C ≤ 10μF<br/>(6.3V max.)</td><td>1.0±0.1kHz</td><td>0.5±0.1Vrms</td></tr><tr><td>C &gt; 10μF</td><td>120±24Hz</td><td>0.5±0.1Vrms</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                   | Capacitance | Frequency        | Voltage               | C ≤ 10μF<br>(10V min.) | 1.0±0.1kHz                 | 1.0±0.2Vrms | C ≤ 10μF<br>(6.3V max.) | 1.0±0.1kHz              | 0.5±0.1Vrms | C > 10μF           | 120±24Hz                   | 0.5±0.1Vrms             |   |                    |        |
| Capacitance             | Frequency                                  | Voltage               |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
| C ≤ 10μF<br>(10V min.)  | 1.0±0.1kHz                                 | 1.0±0.2Vrms           |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
| C ≤ 10μF<br>(6.3V max.) | 1.0±0.1kHz                                 | 0.5±0.1Vrms           |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
| C > 10μF                | 120±24Hz                                   | 0.5±0.1Vrms           |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
| 8                       | Temperature Characteristics of Capacitance | No Bias               | C7: Within ±22% (-55 to +125°C)                                    | <p>The capacitance change should be measured after 5 minutes at each specified temp. stage.<br/>Capacitance value as a reference is the value in step 3.</p> <table><tr><th>Step</th><th>Temperature (°C)</th><th>Applying Voltage(VDC)</th></tr><tr><td>1</td><td>Reference Temp. ±2</td><td rowspan="5">No bias</td></tr><tr><td>2</td><td>Min. Operating Temp. ±3</td></tr><tr><td>3</td><td>Reference Temp. ±2</td></tr><tr><td>4</td><td>Max. Operating Temp. ±3</td></tr><tr><td>5</td><td>Reference Temp. ±2</td></tr></table> <p>• Initial measurement<br/>Perform a heat treatment at 150+0/-10°C for 1h and then let sit for 24±2h at room temperature, then measure.</p> | Step        | Temperature (°C) | Applying Voltage(VDC) | 1                      | Reference Temp. ±2         | No bias     | 2                       | Min. Operating Temp. ±3 | 3           | Reference Temp. ±2 | 4                          | Max. Operating Temp. ±3 | 5 | Reference Temp. ±2 |        |
| Step                    | Temperature (°C)                           | Applying Voltage(VDC) |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
| 1                       | Reference Temp. ±2                         | No bias               |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
| 2                       | Min. Operating Temp. ±3                    |                       |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
| 3                       | Reference Temp. ±2                         |                       |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
| 4                       | Max. Operating Temp. ±3                    |                       |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
| 5                       | Reference Temp. ±2                         |                       |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
| 9                       | Adhesive Strength of Termination           |                       | No removal of the terminations or other defect should occur.       | Solder the capacitor on the test substrate (glass epoxy board).<br>Applied Force: 5N<br>Holding Time: 10±1s<br>Applied Direction: In parallel with the test substrate and vertical with the capacitor side.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
| 10                      | Vibration                                  | Appearance            | No defects or abnormalities.                                       | Solder the capacitor on the test substrate (glass epoxy board).<br>Kind of Vibration: A simple harmonic motion<br>10Hz to 55Hz to 10Hz (1min)<br>Total amplitude: 1.5mm<br>This motion should be applied for a period of 2h in each 3 mutually perpendicular directions (total of 6h).                                                                                                                                                                                                                                                                                                                                                                                              |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
|                         |                                            | Capacitance           | Within the specified initial value.                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
|                         |                                            | D.F.                  | Within the specified initial value.                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
| 11                      | Solderability                              |                       | 75% of the terminations is to be soldered evenly and continuously. | Test Method: Solder bath method<br>Flux: Solution of rosin ethanol 25 (mass)%<br>Preheat: 80 to 120°C for 10 to 30s<br>Solder: Sn-3.0Ag-0.5Cu<br>Solder Temp.: 245±5°C<br>Immersion time: 2±0.5s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
| 12                      | Temperature Sudden Change                  | Appearance            | No defects or abnormalities.                                       | Solder the capacitor on the test substrate (glass epoxy board).<br>Perform the 5 cycles according to the four heat treatments shown in the following table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
|                         |                                            | Capacitance Change    | Within ±12.5%                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
|                         |                                            | D.F.                  | Within the specified initial value.                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
|                         |                                            | I.R.                  | Within the specified initial value.                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
|                         |                                            | Voltage Proof         | No defects.                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
|                         |                                            |                       |                                                                    | <table><tr><th>Step</th><th>Temp. (°C)</th><th>Time (min)</th></tr><tr><td>1</td><td>Min. Operating Temp. +0/-3</td><td>30±3</td></tr><tr><td>2</td><td>Room Temp.</td><td>2 to 3</td></tr><tr><td>3</td><td>Max. Operating Temp. +3/-0</td><td>30±3</td></tr><tr><td>4</td><td>Room Temp.</td><td>2 to 3</td></tr></table> <p>EExposure Time: 24±2h<br/>• Initial measurement<br/>Perform a heat treatment at 150+0/-10°C for 1h and then let sit for 24±2h at room temperature, then measure.</p>                                                                                                                                                                                 | Step        | Temp. (°C)       | Time (min)            | 1                      | Min. Operating Temp. +0/-3 | 30±3        | 2                       | Room Temp.              | 2 to 3      | 3                  | Max. Operating Temp. +3/-0 | 30±3                    | 4 | Room Temp.         | 2 to 3 |
| Step                    | Temp. (°C)                                 | Time (min)            |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
| 1                       | Min. Operating Temp. +0/-3                 | 30±3                  |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
| 2                       | Room Temp.                                 | 2 to 3                |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
| 3                       | Max. Operating Temp. +3/-0                 | 30±3                  |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |
| 4                       | Room Temp.                                 | 2 to 3                |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                        |                            |             |                         |                         |             |                    |                            |                         |   |                    |        |

Continued on the following page. ↗

## LLA Series Specifications and Test Methods (2)

Continued from the preceding page. ↘

| No | Item                                          |                    | Specification                                       | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                               |
|----|-----------------------------------------------|--------------------|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| 13 | High Temperature<br>High Humidity<br>(Steady) | Appearance         | No defects or abnormalities.                        | Solder the capacitor on the test substrate (glass epoxy board).<br>Test Temperature: 40±2°C<br>Test Humidity: 90 to 95%RH<br>Test Time: 500±12h |
|    |                                               | Capacitance Change | Within ±12.5%                                       | Applied Voltage: DC Rated Voltage<br>Charge/discharge current: 50mA max.                                                                        |
|    |                                               | D.F.               | 0.2 max.                                            | • Initial measurement<br>Perform a heat treatment at 150+0/-10°C for 1h and then let sit for 24±2h at room temperature, then measure.           |
|    |                                               | I.R.               | More than 500MΩ or 12.5Ω • F (Whichever is smaller) | • Measurement after test<br>Perform a heat treatment at 150+0/-10°C for 1h and then let sit for 24±2h at room temperature, then measure.        |
| 14 | Durability                                    | Appearance         | No defects or abnormalities.                        | Solder the capacitor on the test substrate (glass epoxy board).<br>Test Temperature: Max. Operating Temp. ±3°C<br>Test Time: 1000±12h           |
|    |                                               | Capacitance Change | Within ±12.5%                                       | Applied Voltage: 150% of the rated voltage<br>Charge/discharge current: 50mA max.                                                               |
|    |                                               | D.F.               | 0.2 max.                                            | • Initial measurement<br>Perform a heat treatment at 150+0/-10°C for 1h and then let sit for 24±2h at room temperature, then measure.           |
|    |                                               | I.R.               | More than 1000MΩ or 25Ω • F (Whichever is smaller)  | • Measurement after test<br>Perform a heat treatment at 150+0/-10°C for 1h and then let sit for 24±2h at room temperature, then measure.        |

GRM

GR3

GRJ

GR4

GR7

GJM

GQM

GA2

GA3  
GB

GA3  
GD

GA3  
GF

LLL

LLA

LLM

LLR

NFM

KRM

KR3

GMA

GMD

⚠Caution  
/Notice

## 10 Terminals Low ESL Chip Multilayer Ceramic Capacitors for General Purpose

# LLM Series



Low  
ESL

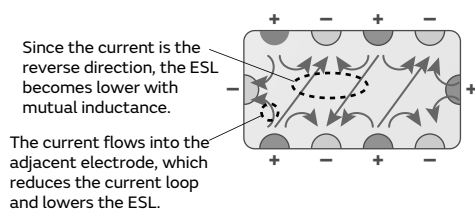
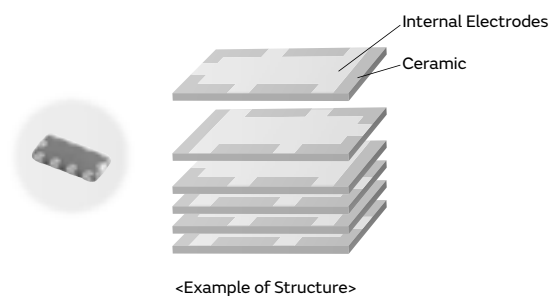
WEB

## 10-Terminal Type Low ESL Capacitor Ideal for Power Supply Decoupling of High-speed Operation IC

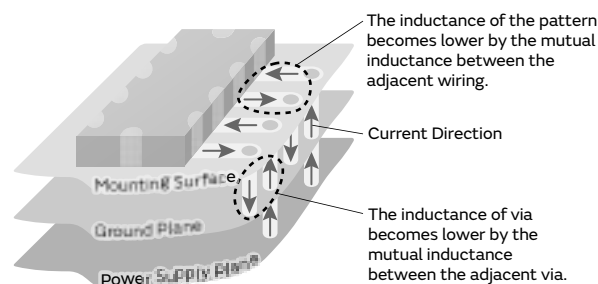
### Features

#### ① This is the lowest ESL LW reversed type capacitor.

Since the equivalent series inductance (ESL) of this product is even lower than the LLA series (8-terminal product) with excellent high frequency characteristics, this capacitor is ideal for power supply decoupling of high-speed operation IC.



<Effectiveness of Cancelling Out Inductance by Mutual Inductance>



<Effectiveness of Suppressing Inductance when Mounting a Multi-terminal Capacitor>

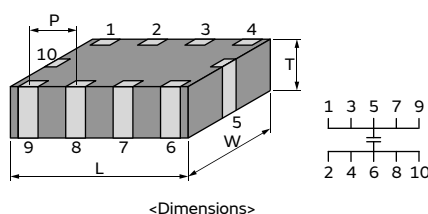
The inductance for the boards also becomes lower, not only the capacitor.

#### ② A maximum operating temperature up to 125°C

This product is applicable to high temperatures (X7\* characteristics); however, Murata also offers numerous thin type products, which are ideal as decoupling capacitors on IC package.

### Specifications

|                   |                               |
|-------------------|-------------------------------|
| Size (mm)         | 2.0×1.25mm                    |
| Rated Voltage     | 4Vdc to 25Vdc                 |
| Capacitance       | 0.22μF to 1.0μF               |
| Main Applications | Application processor/CPU/GPU |



This catalog contains only a portion of the product lineup.  
Please refer to the capacitor search tool on the Murata Web site for details.

## LLM Series High Dielectric Constant Type Part Number List

2.0×1.25mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number        | p*   |
|--------|---------------|---------|--------|------|--------------------|------|
| 0.55mm | 6.3Vdc        | X7R     | 0.22μF | ±20% | LLM215R70J224MA11# | p230 |
|        |               |         | 0.47μF | ±20% | LLM215R70J474MA11# | p230 |
|        | 4Vdc          | X7S     | 1.0μF  | ±20% | LLM215C70G105MA11# | p230 |

\*: Refers to the page of the “Specifications and Test Methods”.

Part number # indicates the package specification code.

# 1

## LLM Series Specifications and Test Methods (1)

| No                     | Item                                       |                           | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
|------------------------|--------------------------------------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------------------------------|-----------------------|------------------------------|-------------------------|---------------------------|------------|------------------------------|---|------------------------------|------------|------------------------------|------------|-------------------------|
| 1                      | Rated Voltage                              |                           | Shown in Rated value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | The rated voltage is defined as the maximum voltage which may be applied continuously to the capacitor.<br>When AC voltage is superimposed on DC voltage, $V^P$ -P or $V^O$ -P, whichever is larger, should be maintained within the rated voltage range.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
| 2                      | Appearance                                 |                           | No defects or abnormalities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
| 3                      | Dimension                                  |                           | Within the specified dimensions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Using Measuring instrument of dimension.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
| 4                      | Voltage Proof                              |                           | No defects or abnormalities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Measurement Point: Between the terminations<br>Test Voltage: 250% of the rated voltage<br>Applied Time: 1 to 5s<br>Charge/discharge current: 50mA max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
| 5                      | Insulation Resistance (I.R.)               |                           | $C \leq 0.047\mu\text{F}$ : More than 10000MΩ<br>$C > 0.047\mu\text{F}$ : More than $500\Omega \cdot \text{F}$<br>C: Nominal Capacitance                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Measurement Point: Between the terminations<br>Measurement Voltage: DC Rated Voltage<br>Charging Time: 2min<br>Charge/discharge current: 50mA max.<br>Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
| 6                      | Capacitance                                |                           | Shown in Rated value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
| 7                      | Dissipation Factor (D.F.)                  |                           | W.V.:25Vdc min.: 0.025max.<br>W.V.:16/10Vdc: 0.035max.<br>W.V.:6.3Vdc max.: 0.05max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <table><tr><th>Capacitance</th><th>Frequency</th><th>Voltage</th></tr><tr><td><math>C \leq 10\mu\text{F}</math></td><td><math>1.0\pm 0.1\text{kHz}</math></td><td><math>1.0\pm 0.2\text{Vrms}^*</math></td></tr></table><br>* For item LLA185 C7 0G 274 to 474, the capacitance should be measured using a voltage of $0.5\pm 0.1\text{Vrms}$ .<br>For item LLA185/215 C7 0G 473, the capacitance should be measured using a voltage of $0.5\pm 0.2\text{Vrms}$ .                                                                                                                                                                                                                                                                                                                                          | Capacitance                | Frequency                        | Voltage               | $C \leq 10\mu\text{F}$       | $1.0\pm 0.1\text{kHz}$  | $1.0\pm 0.2\text{Vrms}^*$ |            |                              |   |                              |            |                              |            |                         |
| Capacitance            | Frequency                                  | Voltage                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
| $C \leq 10\mu\text{F}$ | $1.0\pm 0.1\text{kHz}$                     | $1.0\pm 0.2\text{Vrms}^*$ |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
| 8                      | Temperature Characteristics of Capacitance | No Bias                   | R7: Within $\pm 15\%$ (-55 to $+125^\circ\text{C}$ )<br>R6: Within $\pm 15\%$ (-55 to $+85^\circ\text{C}$ )<br>C7: Within $\pm 22\%$ (-55 to $+125^\circ\text{C}$ )                                                                                                                                                                                                                                                                                                                                                                                                                                     | <p>The capacitance change should be measured after 5 minutes at each specified temp. stage.<br/>Capacitance value as a reference is the value in step 3.</p> <table><tr><th>Step</th><th>Temperature (<math>^\circ\text{C}</math>)</th><th>Applying Voltage(VDC)</th></tr><tr><td>1</td><td>Reference Temp. <math>\pm 2</math></td><td rowspan="5">No bias</td></tr><tr><td>2</td><td>Min. Operating Temp. <math>\pm 3</math></td></tr><tr><td>3</td><td>Reference Temp. <math>\pm 2</math></td></tr><tr><td>4</td><td>Max. Operating Temp. <math>\pm 3</math></td></tr><tr><td>5</td><td>Reference Temp. <math>\pm 2</math></td></tr></table><br>• Initial measurement<br>Perform a heat treatment at $150+0/-10^\circ\text{C}$ for 1h and then let sit for 24 $\pm$ 2h at room temperature,then measure. | Step                       | Temperature ( $^\circ\text{C}$ ) | Applying Voltage(VDC) | 1                            | Reference Temp. $\pm 2$ | No bias                   | 2          | Min. Operating Temp. $\pm 3$ | 3 | Reference Temp. $\pm 2$      | 4          | Max. Operating Temp. $\pm 3$ | 5          | Reference Temp. $\pm 2$ |
| Step                   | Temperature ( $^\circ\text{C}$ )           | Applying Voltage(VDC)     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
| 1                      | Reference Temp. $\pm 2$                    | No bias                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
| 2                      | Min. Operating Temp. $\pm 3$               |                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
| 3                      | Reference Temp. $\pm 2$                    |                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
| 4                      | Max. Operating Temp. $\pm 3$               |                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
| 5                      | Reference Temp. $\pm 2$                    |                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
| 9                      | Adhesive Strength of Termination           |                           | No removal of the terminations or other defect should occur.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Solder the capacitor on the test substrate (glass epoxy board).<br>Applied Force: 5N<br>Holding Time: 10 $\pm$ 1s<br>Applied Direction: In parallel with the test substrate and vertical with the capacitor side.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
| 10                     | Vibration                                  | Appearance                | No defects or abnormalities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Solder the capacitor on the test substrate (glass epoxy board).<br>Kind of Vibration: A simple harmonic motion<br>10Hz to 55Hz to 10Hz (1min)<br>Total amplitude: 1.5mm<br>This motion should be applied for a period of 2h in each 3 mutually perpendicular directions (total of 6h).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
|                        |                                            | Capacitance               | Within the specified initial value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
|                        |                                            | D.F.                      | Within the specified initial value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
| 11                     | Solderability                              |                           | 75% of the terminations is to be soldered evenly and continuously.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Test Method: Solder bath method<br>Flux: Solution of rosin ethanol 25 (mass)%<br>Preheat: 80 to $120^\circ\text{C}$ for 10 to 30s<br>Solder: Sn-3.0Ag-0.5Cu<br>Solder Temp.: $245\pm 5^\circ\text{C}$<br>Immersion time: $2\pm 0.5\text{s}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
| 12                     | Temperature Sudden Change                  | Appearance                | No defects or abnormalities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Solder the capacitor on the test substrate (glass epoxy board).<br>Perform the 5 cycles according to the four heat treatments shown in the following table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
|                        |                                            | Capacitance Change        | Within $\pm 7.5\%$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
|                        |                                            | D.F.                      | Within the specified initial value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
|                        |                                            | I.R.                      | Within the specified initial value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
|                        |                                            | Voltage Proof             | No defects.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
|                        |                                            |                           | <table><tr><th>Step</th><th>Temp. (<math>^\circ\text{C}</math>)</th><th>Time (min)</th></tr><tr><td>1</td><td>Min. Operating Temp. <math>+0/-3</math></td><td>30<math>\pm</math>3</td></tr><tr><td>2</td><td>Room Temp.</td><td>2 to 3</td></tr><tr><td>3</td><td>Max. Operating Temp. <math>+3/-0</math></td><td>30<math>\pm</math>3</td></tr><tr><td>4</td><td>Room Temp.</td><td>2 to 3</td></tr></table><br>Exposure Time: 24 $\pm$ 2h<br>• Initial measurement<br>Perform a heat treatment at $150+0/-10^\circ\text{C}$ for 1h and then let sit for 24 $\pm$ 2h at room temperature, then measure. | Step                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Temp. ( $^\circ\text{C}$ ) | Time (min)                       | 1                     | Min. Operating Temp. $+0/-3$ | 30 $\pm$ 3              | 2                         | Room Temp. | 2 to 3                       | 3 | Max. Operating Temp. $+3/-0$ | 30 $\pm$ 3 | 4                            | Room Temp. | 2 to 3                  |
| Step                   | Temp. ( $^\circ\text{C}$ )                 | Time (min)                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
| 1                      | Min. Operating Temp. $+0/-3$               | 30 $\pm$ 3                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
| 2                      | Room Temp.                                 | 2 to 3                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
| 3                      | Max. Operating Temp. $+3/-0$               | 30 $\pm$ 3                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |
| 4                      | Room Temp.                                 | 2 to 3                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |                                  |                       |                              |                         |                           |            |                              |   |                              |            |                              |            |                         |

Continued on the following page. ➤

## LLM Series Specifications and Test Methods (1)

Continued from the preceding page. ↘

| No | Item                                          |                    | Specification                                              | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                           |
|----|-----------------------------------------------|--------------------|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 13 | High Temperature<br>High Humidity<br>(Steady) | Appearance         | No defects or abnormalities.                               | Solder the capacitor on the test substrate (glass epoxy board).<br>Test Temperature: 40±2°C<br>Test Humidity: 90 to 95%RH<br>Test Time: 500±12h<br>Applied Voltage: DC Rated Voltage<br>Charge/discharge current: 50mA max.<br>Exposure Time: 24±2h                                                                                                                                                                                         |
|    |                                               | Capacitance Change | Within ±12.5%                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|    |                                               | D.F.               | W.V.: 10Vdc min.: 0.05max.<br>W.V.: 6.3Vdc max.: 0.075max. |                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|    |                                               | I.R.               | More than 500MΩ or 25Ω • F (Whichever is smaller)          |                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 14 | Durability                                    | Appearance         | No defects or abnormalities.                               | Solder the capacitor on the test substrate (glass epoxy board).<br>Test Temperature: Max. Operating Temp. ±3°C<br>Test Time: 1000±12h<br>Applied Voltage: 200% of the rated voltage<br>Charge/discharge current: 50mA max.<br>Exposure Time: 24±2h<br>• Initial measurement<br>Apply 200% of the rated DC voltage at the max. operating temp. ±3°C for 1h.<br>Remove and set for 24±2h at room temperature.<br>Perform initial measurement. |
|    |                                               | Capacitance Change | Within ±12.5%                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|    |                                               | D.F.               | W.V.:10Vdc min.: 0.05max.<br>W.V.:6.3Vdc max.: 0.075max.   |                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|    |                                               | I.R.               | More than 1000MΩ or 50Ω • F (Whichever is smaller)         |                                                                                                                                                                                                                                                                                                                                                                                                                                             |

GRM

GR3

GRJ

GR4

GR7

GJM

GQM

GA2

GA3 GB

GA3 GD

GA3 GF

LLL

LLA

LLM

LLR

NFM

KRM

KR3

GMA

GMD

⚠Caution /Notice

## LW Reversed Controlled ESR Low ESL Chip Multilayer Ceramic Capacitors for General Purpose

# LLR Series

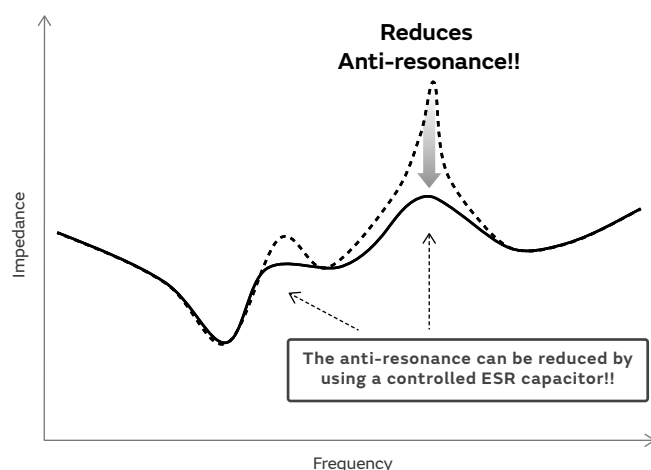


## ESR Controlled Type Low ESL Capacitors Equipped with Anti-resonance Control Function

### Features

#### ① Reduces Anti-resonance

This capacitor is controlled so that the equivalent series resistance (ESR) becomes slightly higher, and is effective in reducing the anti-resonance that occurs when capacitor arrays are used.



#### ② Lineup of capacitors with ESR values from 100-1,000mΩ.

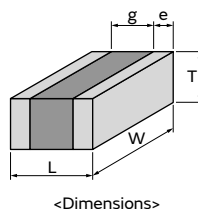
According to the conditions of the anti-resonance, the most suitable ESR value can be selected from 4 types.

#### ③ Low ESL

This ESR controlled type capacitor has excellent high frequency characteristics, with low equivalent series inductance (ESL). This is also ideal as a decoupling component.

### Specifications

|                   |                             |
|-------------------|-----------------------------|
| Size (mm)         | 0.8×1.6mm                   |
| Rated Voltage     | 4Vdc                        |
| Capacitance       | 1.0μF                       |
| Main Applications | Network processor/ASIC/PMIC |



This catalog contains only a portion of the product lineup.  
Please refer to the capacitor search tool on the Murata Web site for details.

## LLR Series High Dielectric Constant Type Part Number List

0.8×1.6mm

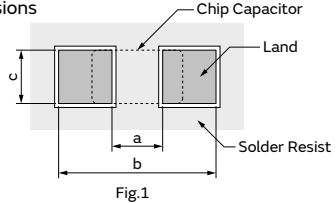
| T max. | Rated Voltage | TC Code | Cap.  | Tol. | Part Number        | p*   |
|--------|---------------|---------|-------|------|--------------------|------|
| 0.55mm | 4Vdc          | X7S     | 1.0μF | ±20% | LLR185C70G105ME01# | p234 |
|        |               |         |       | ±20% | LLR185C70G105ME03# | p234 |
|        |               |         |       | ±20% | LLR185C70G105ME05# | p234 |
|        |               |         |       | ±20% | LLR185C70G105ME07# | p234 |

\*: Refers to the page of the “Specifications and Test Methods”.

Part number # indicates the package specification code.

# 1

## LLR Series Specifications and Test Methods (1)

| No                              | Item                                       |                       | Specification                                                                                                                                                                               | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |
|---------------------------------|--------------------------------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------|-----------------------|--------------------------------|--------------------|-------------|---------------------------------|-------------------------|-------------|--------------------|-----|-------------------------|---|--------------------|
| 1                               | Rated Voltage                              |                       | Shown in Rated value.                                                                                                                                                                       | The rated voltage is defined as the maximum voltage which may be applied continuously to the capacitor.<br>When AC voltage is superimposed on DC voltage, $V^{P-P}$ or $V^{O-P}$ , whichever is larger, should be maintained within the rated voltage range.                                                                                                                                                                                                                                                                                                                                                                                                                        |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |
| 2                               | Appearance                                 |                       | No defects or abnormalities.                                                                                                                                                                | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |
| 3                               | Dimension                                  |                       | Within the specified dimensions.                                                                                                                                                            | Using Measuring instrument of dimension.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |
| 4                               | Voltage Proof                              |                       | No defects or abnormalities.                                                                                                                                                                | Measurement Point: Between the terminations<br>Test Voltage: 250% of the rated voltage<br>Applied Time: 1 to 5s<br>Charge/discharge current: 50mA max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |
| 5                               | Insulation Resistance (I.R.)               |                       | More than 2000MΩ or 50Ω • F (Whichever is smaller)                                                                                                                                          | Measurement Point: Between the terminations<br>Measurement Voltage: DC Rated Voltage<br>Charging Time: 1min<br>Charge/discharge current: 50mA max.<br>Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |
| 6                               | Capacitance                                |                       | Shown in Rated value.                                                                                                                                                                       | Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |
| 7                               | Dissipation Factor (D.F.)                  |                       | 0.120 max.                                                                                                                                                                                  | <table><tr><th>Capacitance</th><th>Frequency</th><th>Voltage</th></tr><tr><td><math>C \leq 10\mu F</math><br/>(10V min.)</td><td>1.0±0.1kHz</td><td>1.0±0.2Vrms</td></tr><tr><td><math>C \leq 10\mu F</math><br/>(6.3V max.)</td><td>1.0±0.1kHz</td><td>0.5±0.1Vrms</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                               | Capacitance | Frequency        | Voltage               | $C \leq 10\mu F$<br>(10V min.) | 1.0±0.1kHz         | 1.0±0.2Vrms | $C \leq 10\mu F$<br>(6.3V max.) | 1.0±0.1kHz              | 0.5±0.1Vrms |                    |     |                         |   |                    |
| Capacitance                     | Frequency                                  | Voltage               |                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |
| $C \leq 10\mu F$<br>(10V min.)  | 1.0±0.1kHz                                 | 1.0±0.2Vrms           |                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |
| $C \leq 10\mu F$<br>(6.3V max.) | 1.0±0.1kHz                                 | 0.5±0.1Vrms           |                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |
| 8                               | Temperature Characteristics of Capacitance | No Bias               | C7: Within ±22% (-55 to +125°C)                                                                                                                                                             | <p>The capacitance change should be measured after 5 minutes at each specified temp. stage.<br/>Capacitance value as a reference is the value in step 3.</p> <table><tr><th>Step</th><th>Temperature (°C)</th><th>Applying Voltage(VDC)</th></tr><tr><td>1</td><td>Reference Temp. ±2</td><td rowspan="5">No bias</td></tr><tr><td>2</td><td>Min. Operating Temp. ±3</td></tr><tr><td>3</td><td>Reference Temp. ±2</td></tr><tr><td>4</td><td>Max. Operating Temp. ±3</td></tr><tr><td>5</td><td>Reference Temp. ±2</td></tr></table> <p>• Initial measurement<br/>Perform a heat treatment at 150+0/-10°C for 1h and then let sit for 24±2h at room temperature, then measure.</p> | Step        | Temperature (°C) | Applying Voltage(VDC) | 1                              | Reference Temp. ±2 | No bias     | 2                               | Min. Operating Temp. ±3 | 3           | Reference Temp. ±2 | 4   | Max. Operating Temp. ±3 | 5 | Reference Temp. ±2 |
| Step                            | Temperature (°C)                           | Applying Voltage(VDC) |                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |
| 1                               | Reference Temp. ±2                         | No bias               |                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |
| 2                               | Min. Operating Temp. ±3                    |                       |                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |
| 3                               | Reference Temp. ±2                         |                       |                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |
| 4                               | Max. Operating Temp. ±3                    |                       |                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |
| 5                               | Reference Temp. ±2                         |                       |                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |
| 9                               | Adhesive Strength of Termination           |                       | <p>No removal of the terminations or other defect should occur.</p> <p>Land Dimensions</p>  <p>Fig.1</p> | <p>Solder the capacitor on the test substrate (glass epoxy board).<br/>Applied Force: 5N<br/>Holding Time: 10±1s<br/>Applied Direction: In parallel with the test substrate and vertical with the capacitor side.</p> <table><tr><th>Part Number</th><th colspan="3">Dimension (mm)</th></tr><tr><th></th><th>a</th><th>b</th><th>c</th></tr><tr><td>LLR18</td><td>0.3</td><td>1.2</td><td>2.0</td></tr></table>                                                                                                                                                                                                                                                                    | Part Number | Dimension (mm)   |                       |                                |                    | a           | b                               | c                       | LLR18       | 0.3                | 1.2 | 2.0                     |   |                    |
| Part Number                     | Dimension (mm)                             |                       |                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |
|                                 | a                                          | b                     | c                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |
| LLR18                           | 0.3                                        | 1.2                   | 2.0                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |
| 10                              | Vibration                                  | Appearance            | No defects or abnormalities.                                                                                                                                                                | <p>Solder the capacitor on the test substrate (glass epoxy board).<br/>(Refer to No.9)<br/>Kind of Vibration: A simple harmonic motion<br/>10Hz to 55Hz to 10Hz (1min)<br/>Total amplitude: 1.5mm<br/>This motion should be applied for a period of 2h in each 3 mutually perpendicular directions (total of 6h).</p>                                                                                                                                                                                                                                                                                                                                                               |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |
|                                 |                                            | Capacitance           | Within the specified initial value.                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |
|                                 |                                            | D.F.                  | Within the specified initial value.                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |
| 11                              | Solderability                              |                       | 75% of the terminations is to be soldered evenly and continuously.                                                                                                                          | <p>Test Method: Solder bath method<br/>Flux: Solution of rosin ethanol 25 (mass)%<br/>Preheat: 80 to 120°C for 10 to 30s<br/>Solder: Sn-3.0Ag-0.5Cu<br/>Solder Temp.: 245±5°C<br/>Immersion time: 2±0.5s</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |
| 12                              | Resistance to Soldering Heat               | Appearance            | No defects or abnormalities.                                                                                                                                                                | <p>Test Method: Solder bath Method<br/>Solder: Sn-3.0Ag-0.5Cu<br/>Solder Temp.: 270±5°C<br/>Immersion time: 10±0.5s<br/>Exposure Time: 24±2h<br/>Preheat: 120 to 150°C for 1min<br/>• Initial measurement<br/>Perform a heat treatment at 150+0/-10°C for 1h and then let sit for 24±2h at room temperature, then measure.</p>                                                                                                                                                                                                                                                                                                                                                      |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |
|                                 |                                            | Capacitance Change    | Within ±7.5%                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |
|                                 |                                            | D.F.                  | Within the specified initial value.                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |
|                                 |                                            | I.R.                  | Within the specified initial value.                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |
|                                 |                                            | Voltage Proof         | No defects.                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                       |                                |                    |             |                                 |                         |             |                    |     |                         |   |                    |

Continued on the following page. ➤

## LLR Series Specifications and Test Methods (1)

Continued from the preceding page. ↘

| No                 | Item                                    |                                                                                                                                                                                                                                           | Specification                                       | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |               |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
|--------------------|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------|------------|-----|----------------------------|------|-----------|------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------|---|------------|--------|
| 13                 | Temperature Sudden Change               | Appearance                                                                                                                                                                                                                                | No defects or abnormalities.                        | <div>Solder the capacitor on the test substrate (glass epoxy board). (Refer to No.9)</div> <div>Perform the 5 cycles according to the four heat treatments shown in the following table.</div> <table><tr><th>Step</th><th>Temp. (°C)</th><th>Time (min)</th></tr><tr><td>1</td><td>Min. Operating Temp. +0/-3</td><td>30±3</td></tr><tr><td>2</td><td>Room Temp.</td><td>2 to 3</td></tr><tr><td>3</td><td>Max. Operating Temp. +3/-0</td><td>30±3</td></tr><tr><td>4</td><td>Room Temp.</td><td>2 to 3</td></tr></table> <div>Exposure Time:24±2h</div> <div>• Initial measurement</div> <div>Perform a heat treatment at 150+0/-10°C for 1h and then let sit for 24±2h at room temperature,then measure.</div> | Step          | Temp. (°C) | Time (min) | 1   | Min. Operating Temp. +0/-3 | 30±3 | 2         | Room Temp. | 2 to 3     | 3                                                                                                                                           | Max. Operating Temp. +3/-0 | 30±3 | 4 | Room Temp. | 2 to 3 |
|                    |                                         | Step                                                                                                                                                                                                                                      | Temp. (°C)                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Time (min)    |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
|                    |                                         | 1                                                                                                                                                                                                                                         | Min. Operating Temp. +0/-3                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 30±3          |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
|                    |                                         | 2                                                                                                                                                                                                                                         | Room Temp.                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2 to 3        |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
|                    |                                         | 3                                                                                                                                                                                                                                         | Max. Operating Temp. +3/-0                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 30±3          |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
| 4                  | Room Temp.                              | 2 to 3                                                                                                                                                                                                                                    |                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
| Capacitance Change | Within ±12.5%                           |                                                                                                                                                                                                                                           |                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
| D.F.               | Within the specified initial value.     |                                                                                                                                                                                                                                           |                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
| I.R.               | Within the specified initial value.     |                                                                                                                                                                                                                                           |                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
| Voltage Proof      | No defects.                             |                                                                                                                                                                                                                                           |                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
| 14                 | High Temperature High Humidity (Steady) | Appearance                                                                                                                                                                                                                                | No defects or abnormalities.                        | <div>Solder the capacitor on the test substrate (glass epoxy board). (Refer to No.9)</div> <div>Test Temperature: 40±2°C</div> <div>Test Humidity: 90 to 95%RH</div> <div>Test Time: 500±12h</div> <div>Applied Voltage: DC Rated Voltage</div> <div>Charge/discharge current: 50mA max.</div> <div>• Initial measurement</div> <div>Perform a heat treatment at 150+0/-10°C for 1h and then let sit for 24±2h at room temperature, then measure.</div> <div>• Measurement after test</div> <div>Perform a heat treatment at 150+0/-10°C for 1h and then let sit for 24±2h at room temperature, then measure.</div>                                                                                               |               |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
|                    |                                         | Capacitance Change                                                                                                                                                                                                                        | Within ±12.5%                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
|                    |                                         | D.F.                                                                                                                                                                                                                                      | 0.2 max.                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
|                    |                                         | I.R.                                                                                                                                                                                                                                      | More than 500MΩ or 12.5Ω • F (Whichever is smaller) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
|                    |                                         |                                                                                                                                                                                                                                           |                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
| 15                 | Durability                              | Appearance                                                                                                                                                                                                                                | No defects or abnormalities.                        | <div>Solder the capacitor on the test substrate (glass epoxy board). (Refer to No.9)</div> <div>Test Temperature: Max. Operating Temp. ±3°C</div> <div>Test Time: 1000±12h</div> <div>Applied Voltage: 150% of the rated voltage</div> <div>Charge/discharge current: 50mA max.</div> <div>• Initial measurement</div> <div>Perform a heat treatment at 150+0/-10°C for 1h and then let sit for 24±2h at room temperature, then measure.</div> <div>• Measurement after test</div> <div>Perform a heat treatment at 150+0/-10°C for 1h and then let sit for 24±2h at room temperature, then measure.</div>                                                                                                        |               |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
|                    |                                         | Capacitance Change                                                                                                                                                                                                                        | Within ±12.5%                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
|                    |                                         | D.F.                                                                                                                                                                                                                                      | 0.2 max.                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
|                    |                                         | I.R.                                                                                                                                                                                                                                      | More than 1000MΩ or 25Ω • F (Whichever is smaller)  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
|                    |                                         |                                                                                                                                                                                                                                           |                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
| 16                 | ESR                                     | <table><tr><th>Murata's Control Code</th><th>Specification</th></tr><tr><td>E01</td><td>100mΩ±30%</td></tr><tr><td>E03</td><td>220mΩ±30%</td></tr><tr><td>E05</td><td>470mΩ±30%</td></tr><tr><td>E07</td><td>1000mΩ±30%</td></tr></table> |                                                     | Murata's Control Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Specification | E01        | 100mΩ±30%  | E03 | 220mΩ±30%                  | E05  | 470mΩ±30% | E07        | 1000mΩ±30% | <div>Measurement Frequency: 10±0.1MHz</div> <div>Measurement Temperature: Room Temperature</div> <div>Measurement Equivalent: HP4294A</div> |                            |      |   |            |        |
|                    |                                         | Murata's Control Code                                                                                                                                                                                                                     | Specification                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
|                    |                                         | E01                                                                                                                                                                                                                                       | 100mΩ±30%                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
|                    |                                         | E03                                                                                                                                                                                                                                       | 220mΩ±30%                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
|                    |                                         | E05                                                                                                                                                                                                                                       | 470mΩ±30%                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
|                    |                                         | E07                                                                                                                                                                                                                                       | 1000mΩ±30%                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
|                    |                                         |                                                                                                                                                                                                                                           |                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
|                    |                                         |                                                                                                                                                                                                                                           |                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
|                    |                                         |                                                                                                                                                                                                                                           |                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
|                    |                                         |                                                                                                                                                                                                                                           |                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |
|                    |                                         |                                                                                                                                                                                                                                           |                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |            |            |     |                            |      |           |            |            |                                                                                                                                             |                            |      |   |            |        |

GRM  
GR3  
GRJ  
GR4  
GR7  
GJM  
GQM  
GA2  
GA3 GB  
GA3 GD  
GA3 GF  
LLL  
LLA  
LLM  
LLR  
NFM  
KRM  
KR3  
GMA  
GMD  
⚠Caution /Notice

## 3 Terminals Low ESL Chip Multilayer Ceramic Capacitors for General Purpose

# NFM Series



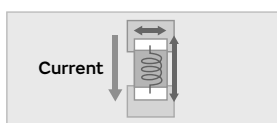
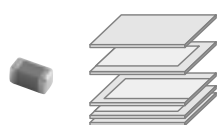
This is the most suitable Low ESL capacitors for noise measurement and power decoupling of highspeed electrical devices.

## Features

### 1 Low ESL

Since the equivalent series inductance (ESL) is low and excellent in high frequency characteristics, this capacitor is suitable for power supply decoupling of high-speed operation electronic equipment.

#### • 2-terminal Capacitor



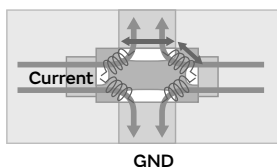
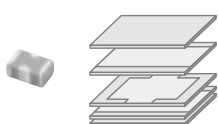
HOT

GND

- × long current distance
- × Narrow wiring width

Realizes Ultra low ESL by using a extremely shorter high frequency current path

#### • 3-terminal capacitor



HOT

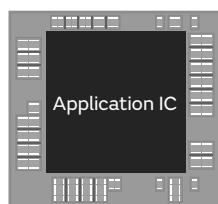
GND

- Short current distance
- Wide wiring width
- Four routes formed in parallel

### 2 Contributes to a reduction in the number of components.

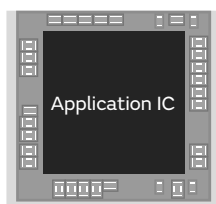
The number of components can be reduced by using low ESL capacitors, while maintaining functions equivalent to 2-terminal capacitor.

#### Before



2-terminal capacitor  
100pcs

#### After



3-terminal capacitor  
32pcs

Reduction of  
68 components

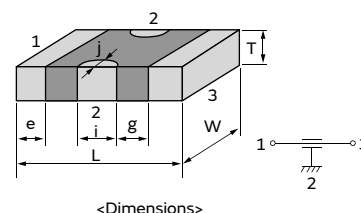
### 3 Contributes to noise suppression

Example of noise suppression effect



## Specifications

|                   |                                                              |
|-------------------|--------------------------------------------------------------|
| Size (mm)         | 1.0×0.5mm to 4.5×1.6mm                                       |
| Rated Voltage     | 2.5Vdc to 100Vdc                                             |
| Capacitance       | 100pF to 27μF                                                |
| Main Applications | For decoupling and smoothing circuits, For noise suppression |



## NFM Series Part Number List

### 1.0×0.5mm

| T max. | Rated Voltage | Cap.    | Tol. | Part Number     |  |
|--------|---------------|---------|------|-----------------|--|
| 0.35mm | 6.3Vdc        | 0.47μF  | ±20% | NFM15PC474R0J3# |  |
|        | 4Vdc          | 0.47μF  | ±20% | NFM15PC474D0G3# |  |
|        |               | 1.0μF   | ±20% | NFM15PC105R0G3# |  |
| 0.5mm  | 16Vdc         | 2200pF  | ±20% | NFM15CC222D1C3# |  |
|        |               | 22000pF | ±20% | NFM15CC223C1C3# |  |
|        |               | 47000pF | ±20% | NFM15PC473C1C3# |  |
|        | 10Vdc         | 2200pF  | ±20% | NFM15CC222D1A3# |  |
|        |               | 22000pF | ±20% | NFM15CC223C1A3# |  |
|        |               | 47000pF | ±20% | NFM15PC473C1A3# |  |
|        |               | 0.10μF  | ±20% | NFM15PC104R1A3# |  |
|        |               | 0.22μF  | ±20% | NFM15PC224R1A3# |  |
|        | 6.3Vdc        | 0.10μF  | ±20% | NFM15PC104D0J3# |  |
|        |               | 0.22μF  | ±20% | NFM15PC224D0J3# |  |
|        | 2.5Vdc        | 4.3μF   | ±20% | NFM15PC435R0E3# |  |
| 0.65mm | 2.5Vdc        | 7.5μF   | ±20% | NFM15PC755R0E3# |  |
| 0.7mm  | 2.5Vdc        | 9.1μF   | ±20% | NFM15PC915R0E3# |  |

### 1.6×0.8mm

| T max. | Rated Voltage | Cap.    | Tol. | Part Number     |  |
|--------|---------------|---------|------|-----------------|--|
| 0.7mm  | 16Vdc         | 100pF   | ±20% | NFM18CC101R1C3# |  |
|        |               | 220pF   | ±20% | NFM18CC221R1C3# |  |
|        |               | 470pF   | ±20% | NFM18CC471R1C3# |  |
|        |               | 1000pF  | ±20% | NFM18CC102R1C3# |  |
|        |               | 2200pF  | ±20% | NFM18CC222R1C3# |  |
|        |               | 22000pF | ±20% | NFM18CC223R1C3# |  |
|        |               | 0.10μF  | ±20% | NFM18PC104R1C3# |  |
|        | 6.3Vdc        | 0.22μF  | ±20% | NFM18PC224R0J3# |  |
|        |               | 0.47μF  | ±20% | NFM18PC474R0J3# |  |
|        |               |         | ±20% | NFM18PS474R0J3# |  |
|        |               | 1.0μF   | ±20% | NFM18PS105D0J3# |  |
| 0.9mm  | 10Vdc         | 2.2μF   | ±20% | NFM18PS105R0J3# |  |
|        |               |         | ±20% | NFM18PC225B0J3# |  |
|        | 6.3Vdc        | 1.0μF   | ±20% | NFM18PC225B1A3# |  |
|        |               |         | ±20% | NFM18PC105R0J3# |  |

### 2.0×1.25mm

| T max. | Rated Voltage | Cap.    | Tol. | Part Number     |  |
|--------|---------------|---------|------|-----------------|--|
| 0.95mm | 50Vdc         | 220pF   | ±20% | NFM21CC221R1H3# |  |
|        |               | 470pF   | ±20% | NFM21CC471R1H3# |  |
|        |               | 1000pF  | ±20% | NFM21CC102R1H3# |  |
|        |               | 2200pF  | ±20% | NFM21CC222R1H3# |  |
|        |               | 22000pF | ±20% | NFM21CC223R1H3# |  |
|        | 25Vdc         | 0.10μF  | ±20% | NFM21PC104R1E3# |  |
|        | 16Vdc         | 0.22μF  | ±20% | NFM21PC224R1C3# |  |
|        |               | 0.47μF  | ±20% | NFM21PC474R1C3# |  |
|        |               | 1.0μF   | ±20% | NFM21PC105B1C3# |  |
|        | 10Vdc         | 1.0μF   | ±20% | NFM21PC105B1A3# |  |
|        |               | 4.7μF   | ±20% | NFM21PC475B1A3# |  |

| T max. | Rated Voltage | Cap.  | Tol. | Part Number     |  |
|--------|---------------|-------|------|-----------------|--|
| 0.95mm | 6.3Vdc        | 2.2μF | ±20% | NFM21PC225B0J3# |  |
|        |               | 10μF  | ±20% | NFM21PS106B0J3# |  |

### 3.2×1.25mm

| T max. | Rated Voltage | Cap.    | Tol.     | Part Number     |    |
|--------|---------------|---------|----------|-----------------|----|
| 0.9mm  | 50Vdc         | 220pF   | +50/-20% | NFM3DCC221R1H3# |    |
|        |               | 470pF   | +50/-20% | NFM3DCC471R1H3# |    |
|        |               | 1000pF  | +50/-20% | NFM3DCC102R1H3# |    |
|        |               | 2200pF  | +50/-20% | NFM3DCC222R1H3# |    |
|        |               | 22000pF | +50/-20% | NFM3DCC223R1H3# |    |
|        |               |         | ±20%     | NFM3DPC223R1H3# | D3 |
|        |               |         |          |                 |    |

### 3.2×1.6mm

| T max. | Rated Voltage | Cap.    | Tol. | Part Number     |    |
|--------|---------------|---------|------|-----------------|----|
| 1.5mm  | 100Vdc        | 10000pF | ±20% | NFM31KC103R2A3# | D3 |
|        |               | 15000pF | ±20% | NFM31KC153R2A3# |    |
|        |               | 22000pF | ±20% | NFM31KC223R2A3# |    |
|        |               | 0.10μF  | ±20% | NFM31KC104R2A3# |    |
|        | 50Vdc         | 10000pF | ±20% | NFM31KC103R1H3# | D3 |
|        |               | 15000pF | ±20% | NFM31KC153R1H3# | D3 |
|        |               | 22000pF | ±20% | NFM31KC223R1H3# | D3 |
|        |               | 0.10μF  | ±20% | NFM31KC104R1H3# |    |
|        | 6.3Vdc        | 27μF    | ±20% | NFM31PC276B0J3# |    |
|        |               |         |      |                 |    |

### 4.5×1.6mm

| T max. | Rated Voltage | Cap.    | Tol.     | Part Number     |  |
|--------|---------------|---------|----------|-----------------|--|
| 1.2mm  | 100Vdc        | 470pF   | +50/-20% | NFM41CC471R2A3# |  |
|        |               | 1000pF  | +50/-20% | NFM41CC102R2A3# |  |
|        |               | 2200pF  | +50/-20% | NFM41CC222R2A3# |  |
|        |               | 22000pF | +50/-20% | NFM41CC223R2A3# |  |
|        | 50Vdc         | 1.5μF   | ±20%     | NFM41PC155B1H3# |  |
|        | 25Vdc         | 1.5μF   | ±20%     | NFM41PC155B1E3# |  |
|        |               |         |          |                 |  |

## NFM Series Specifications and Test Methods

Specifications and Test Methods, please refer to the search web page.  
<https://www.murata.com/en-global/products/capacitor>

**NFM Series** Low ESR EMI FILM **Part Number List**

1.0×0.5mm

| T max. | Rated Voltage | Cap.    | Tol. | Part Number     |
|--------|---------------|---------|------|-----------------|
| 0.35mm | 6.3Vdc        | 0.47μF  | ±20% | NFM15PC474RQJ3# |
|        | 4Vdc          | 0.47μF  | ±20% | NFM15PC474RQJ3# |
|        |               | 1.0μF   | ±20% | NFM15PC474RQJ3# |
| 0.5mm  | 16Vdc         | 2200pF  | ±20% | NFM15CC222D1A3# |
|        |               | 2200pF  | ±20% | NFM15CC222D1A3# |
|        |               | 47000pF | ±20% | NFM15PC473C1C3# |
|        |               | 2200pF  | ±20% | NFM15CC222D1A3# |
|        | 10Vdc         | 2200pF  | ±20% | NFM15CC222D1A3# |

Links are provided to the product detail pages on the web, and are shown below in the product number table from the PDF version of the catalog which is available on the web.

3 Terminals (Type EEL Chip Multilayer Ceramic Capacitors for General Purpose)

Please refer to the following table for the part number.

**NFM15CC222D1A3#** (The # indicates a package specification code.)

How to read part numbers

Series Information

Specifications

Detailed specifications sheet

Rated value

Specifications and Test methods

Package

Caution, Notice

Storage, Soldering and Mounting, etc.)

Shape

Dimensions

Specifications

Capacitance

Rated voltage

Operating temperature range

Rated current

DC Resistance (max.)

Reference

Mounting

Storage

Handling

Micro Part

1.0mm

0.5mm

0.35mm

0.25mm

0.15mm

0.1mm

0.05mm

0.025mm

0.015mm

0.0075mm

0.00375mm

0.001875mm

0.0009375mm

0.00046875mm

0.000234375mm

0.0001171875mm

0.00005859375mm

0.000029296875mm

0.0000146484375mm

0.00000732421875mm

0.000003662109375mm

0.0000018310546875mm

0.00000091552734375mm

0.000000457763671875mm

0.0000002288818359375mm

0.00000011444091796875mm

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## Metal Terminal Type Multilayer Ceramic Capacitors for General Purpose

# KRM Series



Anti-noise

Deflecting crack

Soldering crack

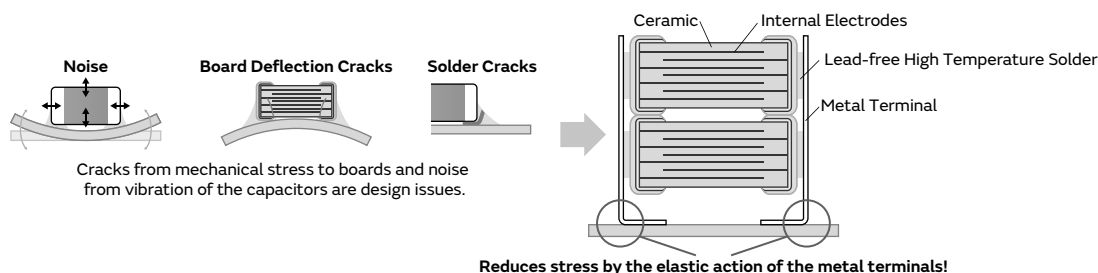
WEB

**Bonding the metal terminals to external electrodes solves design issues by mounting large size MLCC!**

## Features

### ① Bond metal terminals to the external electrodes of chips.

The stress applied to the chip is relieved by the elastic action of the metal terminal.

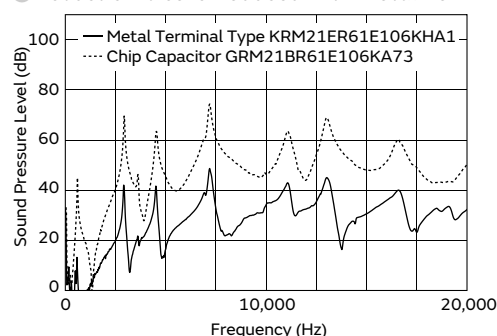


### ② Substantially reduces noise, board deflection cracks and soldering cracks.

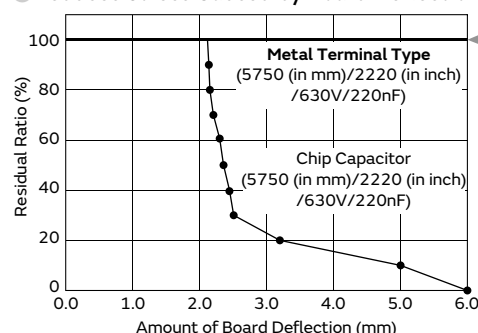
This product is not damaged even with a board deflection of 6 mm.

Solder cracks do not occur even with 2,000 cycles of heat stress.

#### ● Acoustic Noise is Reduced with Metal Terminals



#### ● Reduces Stress Caused by Board Deflection



No damage, even with 6 mm board deflection!!

#### ● Suppresses Solder Cracks Caused by Heat Stress

| Chip Size  | Chip Only<br>(5750 (in mm)/2220 (in inch) size) | Metal Terminal Type<br>(5750 (in mm)/2220 (in inch) size) |
|------------|-------------------------------------------------|-----------------------------------------------------------|
| 1000 Cycle | <br>↑Solder Crack                               |                                                           |
| 2000 Cycle | <br>↑Solder Crack                               |                                                           |

Compared with chips only, this product is excellent in solder cracking resistance.

Test Condition: -55 to +125°C, 5min.,(Liquid Phase)  
Board Used: Glass Epoxy Board (FR-4)

Demonstrates replacement value of low noise capacitors Experience the effectiveness of the KRM Series.

Examples of Noise Countermeasures

WEB

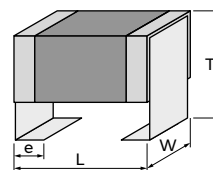
### ③ 2 chips can be stacked.

Realize large capacity by stacking 2 capacitors.

## Specifications

|                   |                                                         |
|-------------------|---------------------------------------------------------|
| Size (mm)         | 2.2×1.25mm to 6.1×5.3mm                                 |
| Rated Voltage     | 16Vdc to 1000Vdc                                        |
| Capacitance       | 68000pF to 100μF                                        |
| Main Applications | For smoothing and noise suppression of DC-DC converters |

This catalog contains only a portion of the product lineup.  
Please refer to the capacitor search tool on the Murata Web site for details.



<Dimensions>

## KRM Series High Dielectric Constant Type Anti-noise Deflecting crack Soldering crack Part Number List

### 2.2×1.25mm

| T max. | Rated Voltage | TC Code | Cap. | Tol. | Part Number        |           |
|--------|---------------|---------|------|------|--------------------|-----------|
| 1.9mm  | 25Vdc         | X5R     | 10μF | ±10% | KRM21ER61E106KFA1# |           |
|        | 16Vdc         | X5R     | 10μF | ±10% | KRM21ER61C106KFA1# |           |
| 2.0mm  | 25Vdc         | X7S     | 10μF | ±10% | KRM21FC71E106KFA1# | <b>D1</b> |
|        |               | X6S     | 10μF | ±10% | KRM21FC81E106KFA1# | <b>D1</b> |
|        |               | X5R     | 22μF | ±20% | KRM21FR61E226MFA1# |           |

### 3.5×1.7mm

| T max. | Rated Voltage | TC Code | Cap.  | Tol. | Part Number        |  |
|--------|---------------|---------|-------|------|--------------------|--|
| 2.0mm  | 25Vdc         | X5R     | 10μF  | ±10% | KRM31FR61E106KH01# |  |
| 2.9mm  | 100Vdc        | X7R     | 1.0μF | ±10% | KRM31KR72A105KH01# |  |
|        | 50Vdc         | X7R     | 4.7μF | ±10% | KRM31KR71H475KH01# |  |
|        | 35Vdc         | X6S     | 10μF  | ±10% | KRM31KC8YA106KH01# |  |
|        | 25Vdc         | X6S     | 10μF  | ±10% | KRM31KC81E106KH01# |  |

### 3.6×1.7mm

| T max. | Rated Voltage | TC Code | Cap.  | Tol. | Part Number        |  |
|--------|---------------|---------|-------|------|--------------------|--|
| 2.9mm  | 50Vdc         | X7R     | 2.2μF | ±10% | KRM31KR71H225KH01# |  |

### 3.7×1.85mm

| T max. | Rated Voltage | TC Code | Cap.  | Tol. | Part Number        |  |
|--------|---------------|---------|-------|------|--------------------|--|
| 2.9mm  | 100Vdc        | X7R     | 2.2μF | ±10% | KRM31KR72A225KH01# |  |

### 6.1×5.3mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        |  |
|--------|---------------|---------|---------|------|--------------------|--|
| 3.0mm  | 1000Vdc       | X7R     | 68000pF | ±10% | KRM55LR73A683KH01# |  |
|        |               |         | 0.10μF  | ±10% | KRM55LR73A104KH01# |  |
|        | 630Vdc        | X7R     | 0.15μF  | ±10% | KRM55LR72J154KH01# |  |
|        |               |         | 0.22μF  | ±10% | KRM55LR72J224KH01# |  |
|        | 450Vdc        | X7R     | 0.33μF  | ±10% | KRM55LR72W334KH01# |  |
|        |               |         | 0.47μF  | ±10% | KRM55LR72W474KH01# |  |
|        | 250Vdc        | X7R     | 0.68μF  | ±10% | KRM55LR72E684KH01# |  |
|        |               |         | 1.0μF   | ±10% | KRM55LR72E105KH01# |  |
|        | 100Vdc        | X7R     | 4.7μF   | ±10% | KRM55LR72A475KH01# |  |
|        | 63Vdc         | X7R     | 4.7μF   | ±10% | KRM55LR71J475KH01# |  |
|        | 50Vdc         | X7R     | 4.7μF   | ±10% | KRM55LR71H475KH01# |  |
|        |               |         | 10μF    | ±10% | KRM55LR71H106KH01# |  |
|        | 35Vdc         | X7R     | 10μF    | ±10% | KRM55LR7YA106KH01# |  |
|        |               |         | 15μF    | ±10% | KRM55LR7YA156KH01# |  |
|        | 25Vdc         | X7R     | 15μF    | ±10% | KRM55LR71E156KH01# |  |
| 3.9mm  | 100Vdc        | X7R     | 6.8μF   | ±10% | KRM55QR72A685KH01# |  |
|        |               |         | 10μF    | ±10% | KRM55QR72A106KH01# |  |
|        | 63Vdc         | X7R     | 10μF    | ±10% | KRM55QR71J106KH01# |  |
|        | 50Vdc         | X7R     | 17μF    | ±10% | KRM55QR71H176KH01# |  |
|        | 35Vdc         | X7R     | 17μF    | ±10% | KRM55QR7YA176KH01# |  |

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number        |  |
|--------|---------------|---------|--------|------|--------------------|--|
| 3.9mm  | 35Vdc         | X7R     | 22μF   | ±10% | KRM55QR7YA226KH01# |  |
|        | 25Vdc         | X7R     | 22μF   | ±10% | KRM55QR71E226KH01# |  |
|        |               |         | 33μF   | ±10% | KRM55QR71E336KH01# |  |
|        |               | X7S     | 47μF   | ±10% | KRM55QC71E476KH13# |  |
| 5.0mm  | 1000Vdc       | X7R     | 0.15μF | ±20% | KRM55TR73A154MH01# |  |
|        |               |         | 0.22μF | ±20% | KRM55TR73A224MH01# |  |
|        | 630Vdc        | X7R     | 0.33μF | ±20% | KRM55TR72J334MH01# |  |
|        |               |         | 0.47μF | ±20% | KRM55TR72J474MH01# |  |
|        | 450Vdc        | X7R     | 0.68μF | ±20% | KRM55TR72W684MH01# |  |
|        |               |         | 1μF    | ±20% | KRM55TR72W105MH01# |  |
|        | 250Vdc        | X7R     | 1.5μF  | ±20% | KRM55TR72E155MH01# |  |
|        |               |         | 2.2μF  | ±20% | KRM55TR72E225MH01# |  |
|        | 100Vdc        | X7R     | 10μF   | ±20% | KRM55TR72A106MH01# |  |
|        | 50Vdc         | X7R     | 22μF   | ±20% | KRM55TR71H226MH01# |  |
|        |               |         | 33μF   | ±20% | KRM55TR7YA226MH01# |  |
|        | 35Vdc         | X7R     | 33μF   | ±20% | KRM55TR7YA336MH01# |  |
| 6.7mm  | 100Vdc        | X7R     | 15μF   | ±20% | KRM55WR72A156MH01# |  |
|        |               |         | 22μF   | ±20% | KRM55WR72A226MH01# |  |
|        | 63Vdc         | X7R     | 22μF   | ±20% | KRM55WR71J226MH01# |  |
|        | 50Vdc         | X7R     | 33μF   | ±20% | KRM55WR71H336MH01# |  |
|        | 35Vdc         | X7R     | 47μF   | ±20% | KRM55WR7YA476MH01# |  |
|        | 25Vdc         | X7R     | 47μF   | ±20% | KRM55WR71E476MH01# |  |
|        |               |         | 68μF   | ±20% | KRM55WR71E686MH01# |  |
|        |               | X7S     | 100μF  | ±20% | KRM55WC71E107MH13# |  |

Part number # indicates the package specification code.

## KRM Series Specifications and Test Methods

Specifications and Test Methods, please refer to the search web page.  
<https://www.murata.com/en-global/products/capacitor>

KRM Series High Dielectric Constant Type

2.2×1.25mm

| T max. | Rated Voltage | TC Code | Cap. | Tol. | Part Number        |
|--------|---------------|---------|------|------|--------------------|
| 1.9mm  | 25Vdc         | X5R     | 10μF | ±10% | KRM21FR61E106KFA1# |
|        | 16Vdc         | X5R     | 10μF | ±10% | KRM21FR61E106KFA1# |
| 2.0mm  | 25Vdc         | X7S     | 10μF | ±10% | KRM21FR61E106KFA1# |
|        |               | X6S     | 10μF | ±10% | KRM21FR61E106KFA1# |
|        |               | X5R     | 22μF | ±20% | KRM21FR61E226MFA1# |

3.5×1.7mm

Links are provided to the product detail pages on the web, and are shown below in the product number table from the PDF version of the catalog which is available on the web.

The screenshot shows the Murata website interface for the product KRM31FR61E106KH01#. It includes a navigation menu on the left with categories like GRM, GR3, GRJ, GR4, GR7, GJM, GQM, GA2, GA3, GA3, GA3, LLL, LLA, LLM, LLR, NFM, KRM, KR3, GMA, GMD, and Caution/Notice. The main content area displays the product name, a list of specifications (Rated value, Specifications and Test Methods, Package, Caution, Notice, Storage, Soldering and Mounting, etc.), and a detailed specifications sheet. A dashed box highlights the 'Specifications and Test Methods' link, which is linked to the detailed specifications sheet shown in the next block.

### Detailed Specifications Sheet

- Rated value
- Specifications and Test Methods
- Package
- Caution, Notice

Reference only

| 4. Specifications and test methods |                                         |                         |                                                                                                                                                                                                                           |                         |                                                                                                                                                                                                            |      |               |                 |                     |                           |                                                                                                |                           |                                                                                                                                                                                                                                                                 |      |                         |                     |                         |            |          |                     |            |          |                     |
|------------------------------------|-----------------------------------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------|-----------------|---------------------|---------------------------|------------------------------------------------------------------------------------------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------------------|---------------------|-------------------------|------------|----------|---------------------|------------|----------|---------------------|
| No.                                | Item                                    |                         | Specifications                                                                                                                                                                                                            |                         | Test method                                                                                                                                                                                                |      |               |                 |                     |                           |                                                                                                |                           |                                                                                                                                                                                                                                                                 |      |                         |                     |                         |            |          |                     |            |          |                     |
| 1                                  | Operating temperature range             |                         | Char. X5R : -55 to +85°C<br>Char. X6S : -55 to +105°C<br>Char. X7R : -55 to +125°C                                                                                                                                        |                         |                                                                                                                                                                                                            |      |               |                 |                     |                           |                                                                                                |                           |                                                                                                                                                                                                                                                                 |      |                         |                     |                         |            |          |                     |            |          |                     |
| 2                                  | Appearance                              |                         | No defects or abnormalities                                                                                                                                                                                               |                         | Visual inspection.                                                                                                                                                                                         |      |               |                 |                     |                           |                                                                                                |                           |                                                                                                                                                                                                                                                                 |      |                         |                     |                         |            |          |                     |            |          |                     |
| 3                                  | Dimensions                              |                         | Within the specified dimension.                                                                                                                                                                                           |                         | Using calipers and micrometers.                                                                                                                                                                            |      |               |                 |                     |                           |                                                                                                |                           |                                                                                                                                                                                                                                                                 |      |                         |                     |                         |            |          |                     |            |          |                     |
| 4                                  | Dielectric strength                     |                         | No defects or abnormalities.                                                                                                                                                                                              |                         | No failure should be observed when voltage in the table is applied between the terminations for 1 to 5 s, provided the charge/discharge current is less than 50mA.                                         |      |               |                 |                     |                           |                                                                                                |                           |                                                                                                                                                                                                                                                                 |      |                         |                     |                         |            |          |                     |            |          |                     |
|                                    |                                         |                         |                                                                                                                                                                                                                           |                         | <table><tr><th>Rated Voltage</th><th>Test Voltage</th></tr><tr><td>DC25V, DC35V, DC50V</td><td>250% of the rated voltage</td></tr><tr><td>DC100V</td><td>200% of the rated voltage</td></tr></table>       |      | Rated Voltage | Test Voltage    | DC25V, DC35V, DC50V | 250% of the rated voltage | DC100V                                                                                         | 200% of the rated voltage |                                                                                                                                                                                                                                                                 |      |                         |                     |                         |            |          |                     |            |          |                     |
| Rated Voltage                      | Test Voltage                            |                         |                                                                                                                                                                                                                           |                         |                                                                                                                                                                                                            |      |               |                 |                     |                           |                                                                                                |                           |                                                                                                                                                                                                                                                                 |      |                         |                     |                         |            |          |                     |            |          |                     |
| DC25V, DC35V, DC50V                | 250% of the rated voltage               |                         |                                                                                                                                                                                                                           |                         |                                                                                                                                                                                                            |      |               |                 |                     |                           |                                                                                                |                           |                                                                                                                                                                                                                                                                 |      |                         |                     |                         |            |          |                     |            |          |                     |
| DC100V                             | 200% of the rated voltage               |                         |                                                                                                                                                                                                                           |                         |                                                                                                                                                                                                            |      |               |                 |                     |                           |                                                                                                |                           |                                                                                                                                                                                                                                                                 |      |                         |                     |                         |            |          |                     |            |          |                     |
| 5                                  | Insulation resistance(I.R.)             |                         | <table><tr><th>Rated Voltage</th><th>I.R.</th></tr><tr><td>DC25V, DC35V</td><td>50MΩ·μF or more</td></tr><tr><td>DC50V , DC100V</td><td>500MΩ·μF or more</td></tr></table>                                                |                         | Rated Voltage                                                                                                                                                                                              | I.R. | DC25V, DC35V  | 50MΩ·μF or more | DC50V , DC100V      | 500MΩ·μF or more          | The insulation resistance should be measured with rated voltage and within 60±5 s of charging. |                           |                                                                                                                                                                                                                                                                 |      |                         |                     |                         |            |          |                     |            |          |                     |
| Rated Voltage                      | I.R.                                    |                         |                                                                                                                                                                                                                           |                         |                                                                                                                                                                                                            |      |               |                 |                     |                           |                                                                                                |                           |                                                                                                                                                                                                                                                                 |      |                         |                     |                         |            |          |                     |            |          |                     |
| DC25V, DC35V                       | 50MΩ·μF or more                         |                         |                                                                                                                                                                                                                           |                         |                                                                                                                                                                                                            |      |               |                 |                     |                           |                                                                                                |                           |                                                                                                                                                                                                                                                                 |      |                         |                     |                         |            |          |                     |            |          |                     |
| DC50V , DC100V                     | 500MΩ·μF or more                        |                         |                                                                                                                                                                                                                           |                         |                                                                                                                                                                                                            |      |               |                 |                     |                           |                                                                                                |                           |                                                                                                                                                                                                                                                                 |      |                         |                     |                         |            |          |                     |            |          |                     |
| 6                                  | Capacitance                             |                         | Within the specified tolerance.                                                                                                                                                                                           |                         | The capacitance/D.F.should be measured at reference temperature at the meaning frequency and voltage shown in the table.                                                                                   |      |               |                 |                     |                           |                                                                                                |                           |                                                                                                                                                                                                                                                                 |      |                         |                     |                         |            |          |                     |            |          |                     |
| 7                                  | Dissipation Factor (D.F.)               |                         | <table><tr><th>Rated Voltage</th><th>D.F.</th></tr><tr><td>DC25V, DC35V</td><td>0.15 max.</td></tr><tr><td>DC50V</td><td>0.025 max.</td></tr><tr><td>DC100V</td><td>0.05 max.</td></tr></table>                           |                         | Rated Voltage                                                                                                                                                                                              | D.F. | DC25V, DC35V  | 0.15 max.       | DC50V               | 0.025 max.                | DC100V                                                                                         | 0.05 max.                 | <table><tr><th>Nominal capacitance</th><th>Measuring frequency</th><th>Measuring voltage</th></tr><tr><td>C &gt; 10 μ F</td><td>120±24Hz</td><td>AC0.5±0.1V (r.m.s.)</td></tr><tr><td>C ≤ 10 μ F</td><td>1±0.2kHz</td><td>AC1.0±0.2V (r.m.s.)</td></tr></table> |      | Nominal capacitance     | Measuring frequency | Measuring voltage       | C > 10 μ F | 120±24Hz | AC0.5±0.1V (r.m.s.) | C ≤ 10 μ F | 1±0.2kHz | AC1.0±0.2V (r.m.s.) |
| Rated Voltage                      | D.F.                                    |                         |                                                                                                                                                                                                                           |                         |                                                                                                                                                                                                            |      |               |                 |                     |                           |                                                                                                |                           |                                                                                                                                                                                                                                                                 |      |                         |                     |                         |            |          |                     |            |          |                     |
| DC25V, DC35V                       | 0.15 max.                               |                         |                                                                                                                                                                                                                           |                         |                                                                                                                                                                                                            |      |               |                 |                     |                           |                                                                                                |                           |                                                                                                                                                                                                                                                                 |      |                         |                     |                         |            |          |                     |            |          |                     |
| DC50V                              | 0.025 max.                              |                         |                                                                                                                                                                                                                           |                         |                                                                                                                                                                                                            |      |               |                 |                     |                           |                                                                                                |                           |                                                                                                                                                                                                                                                                 |      |                         |                     |                         |            |          |                     |            |          |                     |
| DC100V                             | 0.05 max.                               |                         |                                                                                                                                                                                                                           |                         |                                                                                                                                                                                                            |      |               |                 |                     |                           |                                                                                                |                           |                                                                                                                                                                                                                                                                 |      |                         |                     |                         |            |          |                     |            |          |                     |
| Nominal capacitance                | Measuring frequency                     | Measuring voltage       |                                                                                                                                                                                                                           |                         |                                                                                                                                                                                                            |      |               |                 |                     |                           |                                                                                                |                           |                                                                                                                                                                                                                                                                 |      |                         |                     |                         |            |          |                     |            |          |                     |
| C > 10 μ F                         | 120±24Hz                                | AC0.5±0.1V (r.m.s.)     |                                                                                                                                                                                                                           |                         |                                                                                                                                                                                                            |      |               |                 |                     |                           |                                                                                                |                           |                                                                                                                                                                                                                                                                 |      |                         |                     |                         |            |          |                     |            |          |                     |
| C ≤ 10 μ F                         | 1±0.2kHz                                | AC1.0±0.2V (r.m.s.)     |                                                                                                                                                                                                                           |                         |                                                                                                                                                                                                            |      |               |                 |                     |                           |                                                                                                |                           |                                                                                                                                                                                                                                                                 |      |                         |                     |                         |            |          |                     |            |          |                     |
| 8                                  | Capacitance Temperature Characteristics |                         | Char. X5R : within ±15% (Temp.Range:-55 to +85°C)<br>Char. X6S : within ±22% (Temp.Range:-55 to +105°C)<br>Char. X7R : within ±15% (Temp.Range:-55 to +125°C)                                                             |                         | The capacitance measurement should be made at each step specified in the table.<br>•Pretreatment<br>Perform the heat treatment at 150+0/-10°C for 60±5 min and then let sit for 24±2 h at room condition*. |      |               |                 |                     |                           |                                                                                                |                           |                                                                                                                                                                                                                                                                 |      |                         |                     |                         |            |          |                     |            |          |                     |
|                                    |                                         |                         | <table><tr><th>Step</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th></tr><tr><td>Temp.(°C)</td><td>25±2</td><td>Min. Operating Temp. ±3</td><td>25±2</td><td>Max. Operating Temp. ±2</td><td>25±2</td></tr></table> |                         |                                                                                                                                                                                                            |      | Step          | 1               | 2                   | 3                         | 4                                                                                              | 5                         | Temp.(°C)                                                                                                                                                                                                                                                       | 25±2 | Min. Operating Temp. ±3 | 25±2                | Max. Operating Temp. ±2 | 25±2       |          |                     |            |          |                     |
| Step                               | 1                                       | 2                       | 3                                                                                                                                                                                                                         | 4                       | 5                                                                                                                                                                                                          |      |               |                 |                     |                           |                                                                                                |                           |                                                                                                                                                                                                                                                                 |      |                         |                     |                         |            |          |                     |            |          |                     |
| Temp.(°C)                          | 25±2                                    | Min. Operating Temp. ±3 | 25±2                                                                                                                                                                                                                      | Max. Operating Temp. ±2 | 25±2                                                                                                                                                                                                       |      |               |                 |                     |                           |                                                                                                |                           |                                                                                                                                                                                                                                                                 |      |                         |                     |                         |            |          |                     |            |          |                     |
| 9                                  | Vibration resistance                    | Appearance Capacitance  | No defects or abnormalities.<br>Within the specified tolerance.                                                                                                                                                           |                         | Solder the capacitor to the Test Jig A (glass epoxy board) shown in "Complement of test                                                                                                                    |      |               |                 |                     |                           |                                                                                                |                           |                                                                                                                                                                                                                                                                 |      |                         |                     |                         |            |          |                     |            |          |                     |

High Effective Capacitance & High Allowable Ripple Current Metal Terminal Type Multilayer Ceramic Capacitors for General Purpose

# KR3 Series



Anti-noise

Deflecting crack

Soldering crack

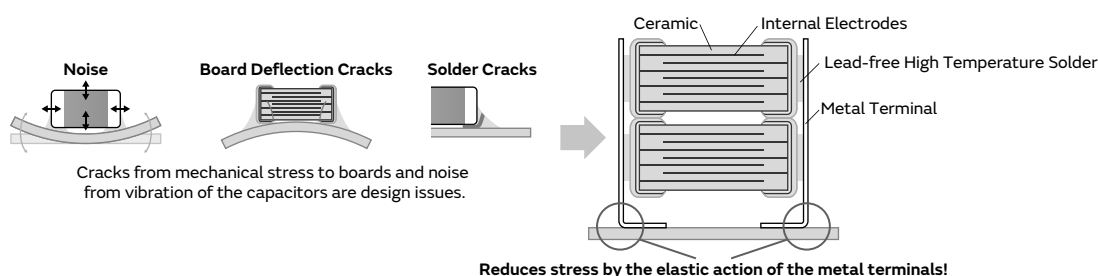
WEB

**Bonding the metal terminals to external electrodes solves design issues by mounting large size MLCC!**

## Features

### ① Bond Metal Terminals to External Electrodes of Chips

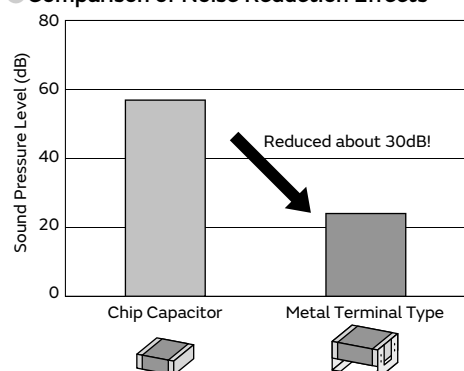
This product has high resistance to heat and mechanical impact and greatly reduces acoustic noise of boards by ceramics.



### ② Stacking of Chips

Achieve high capacity by stacking 2 capacitors.

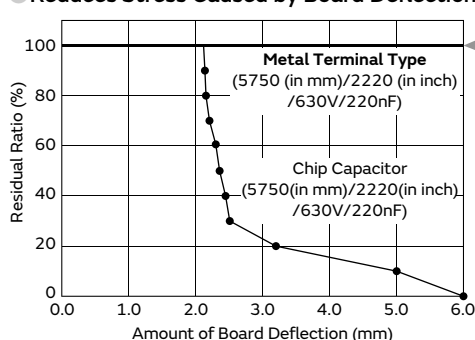
#### ● Comparison of Noise Reduction Effects



Evaluation Items: 5750 (in mm)/2220 (in inch) size/DC630V/220nF  
Test Method: DC50V, AC10Vp-p/3kHz  
Test Board: Glass Epoxy Board (T=1.6mm)  
Test Quantity: 3pc  
Distance Between Microphone and Board: 3mm

Note: Results Using Murata's Evaluation Board

#### ● Reduces Stress Caused by Board Deflection



No damage, even with 6 mm board deflection!!

#### ● Suppresses Solder Cracks Caused by Heat Stress

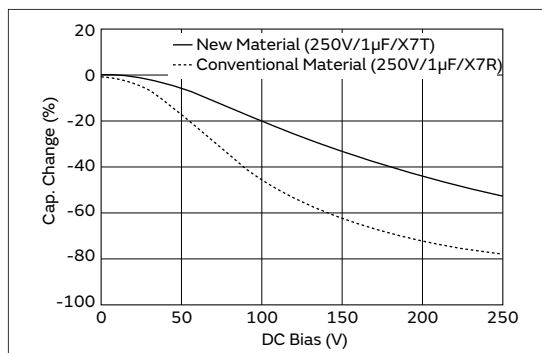
| Chip Size  | Chip Only<br>(5750 (in mm)/2220 (in inch) size) | Metal Terminal Type<br>(5750 (in mm)/2220 (in inch) size) |
|------------|-------------------------------------------------|-----------------------------------------------------------|
| 1000 Cycle |                                                 |                                                           |
| 2000 Cycle |                                                 |                                                           |

Compared with chips only, this product is excellent in solder cracking resistance.

Test Condition: -55 to +125°C, 5min., (Liquid Phase)  
Board Used: Glass Epoxy Board (FR-4)

### 3 Adopted Low Dielectric Constant Materials

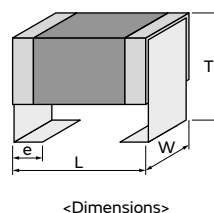
Improved effective capacity and ripple resistant performance, compared to conventional products (X7R characteristics).



### Specifications

|                   |                                                      |
|-------------------|------------------------------------------------------|
| Size (mm)         | 6.1×5.3mm                                            |
| Rated Voltage     | 250Vdc to 630Vdc                                     |
| Capacitance       | 0.10μF to 2.2μF                                      |
| Main Applications | For DC-DC converters of general electronic equipment |

This catalog contains only a portion of the product lineup.  
 Please refer to the capacitor search tool on the Murata Web site for details.



<Dimensions>

# KR3 Series High Dielectric Constant Type Anti-noise Deflecting crack Soldering crack Part Number List

6.1×5.3mm

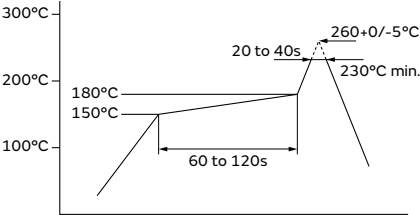
| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number               | p*   |
|--------|---------------|---------|--------|------|---------------------------|------|
| 3.0mm  | 630Vdc        | X7T     | 0.10μF | ±10% | <b>KR355LD72J104KH01#</b> | p246 |
|        |               |         | 0.15μF | ±10% | <b>KR355LD72J154KH01#</b> | p246 |
|        | 450Vdc        | X7T     | 0.22μF | ±10% | <b>KR355LD72W224KH01#</b> | p246 |
|        |               |         | 0.33μF | ±10% | <b>KR355LD72W334KH01#</b> | p246 |
|        |               |         | 0.47μF | ±10% | <b>KR355LD72W474KH01#</b> | p246 |
| 3.9mm  | 630Vdc        | X7T     | 0.47μF | ±10% | <b>KR355LD72E474KH01#</b> | p246 |
|        |               |         | 0.68μF | ±10% | <b>KR355LD72E684KH01#</b> | p246 |
|        | 450Vdc        | X7T     | 0.22μF | ±10% | <b>KR355QD72J224KH01#</b> | p246 |
|        |               |         | 0.27μF | ±10% | <b>KR355QD72J274KH01#</b> | p246 |
|        | 250Vdc        | X7T     | 0.56μF | ±10% | <b>KR355QD72W564KH01#</b> | p246 |
|        |               |         | 1.0μF  | ±10% | <b>KR355QD72E105KH01#</b> | p246 |
| 5.0mm  | 450Vdc        | X7T     | 0.68μF | ±20% | <b>KR355TD72W684MH01#</b> | p246 |
|        |               |         | 1.0μF  | ±20% | <b>KR355TD72W105MH01#</b> | p246 |
|        | 250Vdc        | X7T     | 1.5μF  | ±20% | <b>KR355TD72E155MH01#</b> | p246 |
|        |               |         |        |      |                           |      |
| 6.7mm  | 630Vdc        | X7T     | 0.47μF | ±20% | <b>KR355WD72J474MH01#</b> | p246 |
|        |               |         | 0.56μF | ±20% | <b>KR355WD72J564MH01#</b> | p246 |
|        | 450Vdc        | X7T     | 1.2μF  | ±20% | <b>KR355WD72W125MH01#</b> | p246 |
|        | 250Vdc        | X7T     | 2.2μF  | ±20% | <b>KR355WD72E225MH01#</b> | p246 |

\*: Refers to the page of the “Specifications and Test Methods”.

Part number # indicates the package specification code.

# 1

## KR3 Series Specifications and Test Methods (1)

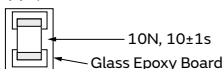
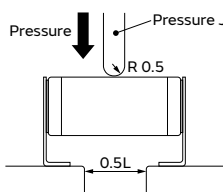
| No            | Item                                    |                     | Specification                                           | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |               |                  |        |                           |        |                           |        |                           |   |                         |   |      |
|---------------|-----------------------------------------|---------------------|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------|--------|---------------------------|--------|---------------------------|--------|---------------------------|---|-------------------------|---|------|
| 1             | Operating Temperature                   |                     | -55 to +125°C                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |               |                  |        |                           |        |                           |        |                           |   |                         |   |      |
| 2             | Appearance                              |                     | No defects or abnormalities                             | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |               |                  |        |                           |        |                           |        |                           |   |                         |   |      |
| 3             | Dimension                               |                     | Within the specified dimension.                         | Using calipers and micrometers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |               |                  |        |                           |        |                           |        |                           |   |                         |   |      |
| 4             | Dielectric Strength                     |                     | No defects or abnormalities.                            | No failure should be observed when voltage in the table is applied between the terminations for 1 to 5s, provided the charge/discharge current is less than 50mA. <table><tr><th>Rated Voltage</th><th>Test Voltage</th></tr><tr><td>DC250V</td><td>200% of the rated voltage</td></tr><tr><td>DC450V</td><td>150% of the rated voltage</td></tr><tr><td>DC630V</td><td>120% of the rated voltage</td></tr></table>                                                                                                | Rated Voltage | Test Voltage     | DC250V | 200% of the rated voltage | DC450V | 150% of the rated voltage | DC630V | 120% of the rated voltage |   |                         |   |      |
| Rated Voltage | Test Voltage                            |                     |                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |               |                  |        |                           |        |                           |        |                           |   |                         |   |      |
| DC250V        | 200% of the rated voltage               |                     |                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |               |                  |        |                           |        |                           |        |                           |   |                         |   |      |
| DC450V        | 150% of the rated voltage               |                     |                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |               |                  |        |                           |        |                           |        |                           |   |                         |   |      |
| DC630V        | 120% of the rated voltage               |                     |                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |               |                  |        |                           |        |                           |        |                           |   |                         |   |      |
| 5             | Insulation Resistance (I.R.)            |                     | More than 10000MΩ or 100MΩ・μF (Whichever is smaller)    | The insulation resistance should be measured with DC500±50V (DC250±25V in case of rated voltage: DC250V, DC450V) and within 60±5s of charging.                                                                                                                                                                                                                                                                                                                                                                     |               |                  |        |                           |        |                           |        |                           |   |                         |   |      |
| 6             | Capacitance                             |                     | Within the specified tolerance.                         | Capacitance should be measured at the frequency of 1±0.2kHz and a voltage of AC1.0±0.2V (r.m.s.).                                                                                                                                                                                                                                                                                                                                                                                                                  |               |                  |        |                           |        |                           |        |                           |   |                         |   |      |
| 7             | Dissipation Factor (D.F.)               |                     | 0.01 max.                                               | D.F. should be measured at the frequency of 1±0.2kHz and a voltage of AC1.0±0.2V (r.m.s.).                                                                                                                                                                                                                                                                                                                                                                                                                         |               |                  |        |                           |        |                           |        |                           |   |                         |   |      |
| 8             | Capacitance Temperature Characteristics |                     | Cap. change within +22/-33% (Temp.Range: -55 to +125°C) | The capacitance measurement should be made at each step specified in the table.<br>• Pretreatment<br>Perform the heat treatment at 150+0/-10°C for 60±5min and then let sit for 24±2h at room condition*. <table><tr><th>Step</th><th>Temperature (°C)</th></tr><tr><td>1</td><td>25±2</td></tr><tr><td>2</td><td>Min. Operating Temp. ±3</td></tr><tr><td>3</td><td>25±2</td></tr><tr><td>4</td><td>Max. Operating Temp. ±3</td></tr><tr><td>5</td><td>25±2</td></tr></table>                                     | Step          | Temperature (°C) | 1      | 25±2                      | 2      | Min. Operating Temp. ±3   | 3      | 25±2                      | 4 | Max. Operating Temp. ±3 | 5 | 25±2 |
| Step          | Temperature (°C)                        |                     |                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |               |                  |        |                           |        |                           |        |                           |   |                         |   |      |
| 1             | 25±2                                    |                     |                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |               |                  |        |                           |        |                           |        |                           |   |                         |   |      |
| 2             | Min. Operating Temp. ±3                 |                     |                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |               |                  |        |                           |        |                           |        |                           |   |                         |   |      |
| 3             | 25±2                                    |                     |                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |               |                  |        |                           |        |                           |        |                           |   |                         |   |      |
| 4             | Max. Operating Temp. ±3                 |                     |                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |               |                  |        |                           |        |                           |        |                           |   |                         |   |      |
| 5             | 25±2                                    |                     |                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |               |                  |        |                           |        |                           |        |                           |   |                         |   |      |
| 9             | Vibration Resistance                    | Appearance          | No defects or abnormalities.                            | Solder the capacitor to the Test Jig A (glass epoxy board) shown in “Complement of Test Method”.<br>The capacitor should be subjected to a simple harmonic motion having a total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 55Hz .<br>The frequency range, from 10 to 55Hz and return to 10Hz, should be traversed in approximately 1min.<br>This motion should be applied for a period of 2h in each of 3 mutually perpendicular directions (total of 6h). |               |                  |        |                           |        |                           |        |                           |   |                         |   |      |
|               |                                         | Capacitance         | Within the specified tolerance.                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |               |                  |        |                           |        |                           |        |                           |   |                         |   |      |
|               |                                         | D.F.                | Pass the item No.7.                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |               |                  |        |                           |        |                           |        |                           |   |                         |   |      |
| 10            | Solderability of Termination            |                     | The metal surface is soldered well.                     | Reflow Soldering: Peak 260+0/-5°C<br>The area of soldering 230°C min., 20 to 40s Let sit for 24±2h at room condition*, then measure.<br>• Pretreatment<br>Perform the heat treatment at 150+0/-10°C for 60±5min and then let sit for 24±2h at room condition*.                                                                                                                                                                 |               |                  |        |                           |        |                           |        |                           |   |                         |   |      |
| 11            | Resistance to Soldering Heat            | Appearance          | No marking defects.                                     | Reflow Soldering<br>• See Item 10 Solderability of termination<br>In a soldering iron case<br>Temp. of solder: 350±10°C<br>Solder time: 4+1/-0 s<br>Let sit for 24±2h at room condition*, then measure.<br>Please refer to “⚠Caution 4-3. Correction of Soldered Portion”                                                                                                                                                                                                                                          |               |                  |        |                           |        |                           |        |                           |   |                         |   |      |
|               |                                         | Capacitance Change  | Within ±10%                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |               |                  |        |                           |        |                           |        |                           |   |                         |   |      |
|               |                                         | D.F.                | Pass the item No.7.                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |               |                  |        |                           |        |                           |        |                           |   |                         |   |      |
|               |                                         | I.R.                | Pass the item No.5.                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |               |                  |        |                           |        |                           |        |                           |   |                         |   |      |
|               |                                         | Dielectric Strength | Pass the item No.4.                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |               |                  |        |                           |        |                           |        |                           |   |                         |   |      |

\* Room Condition: Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. ↗

## KR3 Series Specifications and Test Methods (1)

Continued from the preceding page. ↘

| No | Item                             | Specification                                                 | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                   |
|----|----------------------------------|---------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12 | Adhesive Strength of Termination | No removal of the terminations or other defects should occur. | Solder the capacitor to the Test Jig A (glass epoxy board) shown in "Complement of Test Method".<br>Then apply 10N force in the direction of the arrow.<br>       |
| 13 | Deflection                       | No marking defects.                                           | Solder the capacitor to the Test Jig B (glass epoxy board) shown in "Complement of Test Method".<br>Then apply the force in the direction shown in "Test Method of Deflection" of "Complement of Test Method".<br>• Flexure: 5mm<br>• Hold time: 5s |
| 14 | Strength of metal Terminal       | Termination not to be broken or loosened.                     | A static load of 10N using a pressure jig should be applied to the center in the direction of the arrow and held for 10s<br>                                      |
| 15 | Temperature Cycle                | Appearance                                                    | No marking defects.                                                                                                                                                                                                                                 |
|    |                                  | Capacitance Change                                            | Within $\pm 7.5\%$                                                                                                                                                                                                                                  |
|    |                                  | D.F.                                                          | Pass the item No.7.                                                                                                                                                                                                                                 |
|    |                                  | I.R.                                                          | Pass the item No.5.                                                                                                                                                                                                                                 |
|    |                                  | Dielectric Strength                                           | Pass the item No.4.                                                                                                                                                                                                                                 |
| 16 | Humidity (Steady State)          | Appearance                                                    | No marking defects.                                                                                                                                                                                                                                 |
|    |                                  | Capacitance Change                                            | Within $\pm 12.5\%$                                                                                                                                                                                                                                 |
|    |                                  | D.F.                                                          | 0.02 max.                                                                                                                                                                                                                                           |
|    |                                  | I.R.                                                          | More than 1000 M $\Omega$ or 10 M $\Omega$ • $\mu$ F (Whichever is smaller)                                                                                                                                                                         |
|    |                                  | Dielectric Strength                                           | Pass the item No.4.                                                                                                                                                                                                                                 |
| 17 | Life                             | Appearance                                                    | No marking defects.                                                                                                                                                                                                                                 |
|    |                                  | Capacitance Change                                            | Within $\pm 12.5\%$                                                                                                                                                                                                                                 |
|    |                                  | D.F.                                                          | 0.02 max.                                                                                                                                                                                                                                           |
|    |                                  | I.R.                                                          | More than 1000 M $\Omega$ or 10 M $\Omega$ • $\mu$ F (Whichever is smaller)                                                                                                                                                                         |
|    |                                  | Dielectric Strength                                           | Pass the item No.4.                                                                                                                                                                                                                                 |

| Step | Temp. (°C)                   | Time (min) |
|------|------------------------------|------------|
| 1    | Min. Operating Temp. $\pm 3$ | 30 $\pm 3$ |
| 2    | Room Temp.                   | 2 to 3     |
| 3    | Max. Operating Temp. $\pm 2$ | 30 $\pm 3$ |
| 4    | Room Temp.                   | 2 to 3     |

Let sit for 24 $\pm 2$ h at room condition\*, then measure.  
• Pretreatment  
Perform the heat treatment at 150+0/-10°C for 60 $\pm 5$ min and then let sit for 24 $\pm 2$ h at room condition\*.

Sit the capacitor at 40 $\pm 2$ °C and relative humidity 90 to 95% for 500+24/-0h.  
Remove and let sit for 24 $\pm 2$ h at room condition\*, then measure.  
• Pretreatment  
Perform the heat treatment at 150+0/-10°C for 60 $\pm 5$ min and then let sit for 24 $\pm 2$ h at room condition\*.

Apply voltage as in the table for 1000+48/-0h at maximum operating temperature $\pm 3$ °C.  
Remove and let sit for 24 $\pm 2$ h at room condition\*, then measure.

| Rated Voltage | Applied Voltage           |
|---------------|---------------------------|
| DC250V        | 150% of the rated voltage |
| DC450V        | 130% of the rated voltage |
| DC630V        | 120% of the rated voltage |

The charge/discharge current is less than 50mA.  
• Pretreatment  
Apply test voltage for 60 $\pm 5$ min at test temperature.

\* Room Condition: Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmosphere pressure: 86 to 106kPa

Continued on the following page. ↗

## KR3 Series Specifications and Test Methods (1)

Continued from the preceding page. ↘

### Complement of Test Method

#### Test Jig

The test jig should be Jig A or Jig B as described in "Specifications and Test Methods".

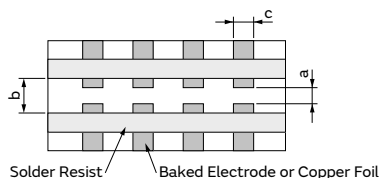
The specimen should be soldered by the conditions as described below.

Soldering Method: Reflow soldering

Thickness of Metal-mask: 200μm

Solder: Sn-3.0Ag-0.5Cu

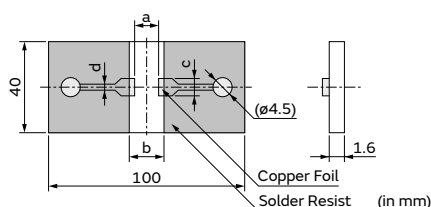
#### (1) Test Jig A



- Material: Glass Epoxy Board
- Thickness: 1.6mm
- Thickness of copper foil: 0.035mm

| Dimension (mm) |     |     |
|----------------|-----|-----|
| a              | b   | c   |
| 4.5            | 8.0 | 5.6 |

#### (2) Test Jig B



- Material: Glass Epoxy Board
- Thickness of copper foil: 0.035mm

| Dimension (mm) |     |     |     |
|----------------|-----|-----|-----|
| a              | b   | c   | d   |
| 4.5            | 8.0 | 5.6 | 1.0 |

## Wire Bonding Mount Multilayer Microchip Capacitors for General Purpose

# GMA Series

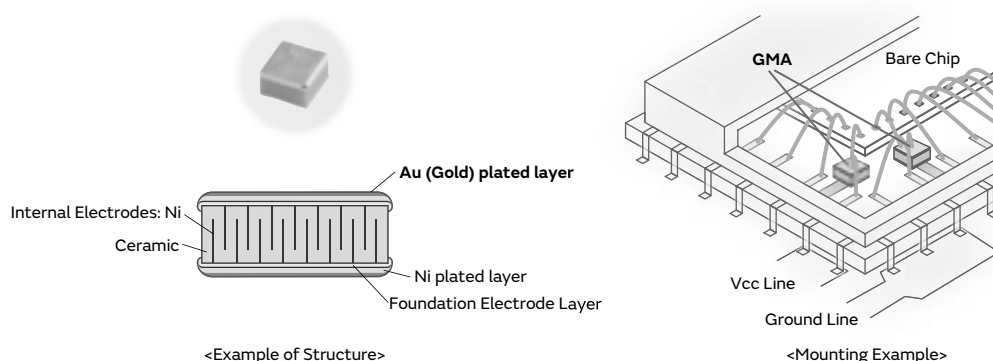


**These capacitors have gold-plated electrodes and are designed specifically for wire bonding.**

## Features

### ① Allows for high density mounting.

Noise can be reduced by eliminating the routing of the wire, and high efficiency can be achieved with a built-in capacitor in a package, such as IC. Miniaturization of the set is also possible.



### ② Achieved small size and high capacitance with a multilayer structure.

|                              |                                                             |
|------------------------------|-------------------------------------------------------------|
| Small size, high capacitance | Minimum 0.38mm×0.38mm<br>Achieved 0.1μF in 0.5mm×0.5mm size |
|------------------------------|-------------------------------------------------------------|

Lineup comparison table with competitor's is provided in my Murata Capacitor Site (need to sign in & approval from the site)

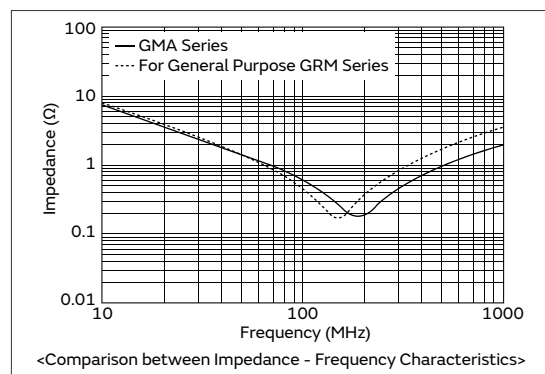


### ③ Ideal for bypass applications

Especially for optical communication related devices such as TOSA/ROSA.

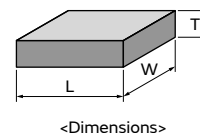
### ④ Excellent in high frequency characteristics.

Since the capacitor consists of an upper/lower electrode structure, the current path becomes shorter and lowers the ESL. Compared with the general purpose GRM series of the same capacity, the impedance of this product becomes lower at high frequencies.



## Specifications

|                   |                                                                                                                                                                                                 |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Size (mm)         | 0.38×0.38mm to 0.8×0.8mm                                                                                                                                                                        |
| Rated Voltage     | 6.3Vdc to 100Vdc                                                                                                                                                                                |
| Capacitance       | 100pF to 0.47μF                                                                                                                                                                                 |
| Main Applications | 1. Optical communication related devices such as TOSA/ROSA.<br>2. Various device related, such as GaAsIC (mounted in IC packages)<br>3. Measuring instruments, other ultra compact/thin devices |



This catalog contains only a portion of the product lineup.  
 Please refer to the capacitor search tool on the Murata Web site for details.

## GMA Series High Dielectric Constant Type Part Number List

### 0.38×0.38mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        | p*   |
|--------|---------------|---------|---------|------|--------------------|------|
| 0.35mm | 10Vdc         | X7R     | 1000pF  | ±20% | GMA0D3R71A102MA01# | p254 |
|        |               |         | 1500pF  | ±20% | GMA0D3R71A152MA01# | p254 |
|        |               |         | 1800pF  | ±20% | GMA0D3R71A182MA01# | p254 |
|        |               |         | 10000pF | ±20% | GMA0D3R71A103MA01# | p254 |
|        |               | R       | 1000pF  | ±20% | GMA0D3R11A102MA01# | p254 |
|        |               |         | 1500pF  | ±20% | GMA0D3R11A152MA01# | p254 |
|        |               |         | 1800pF  | ±20% | GMA0D3R11A182MA01# | p254 |
|        |               |         | 10000pF | ±20% | GMA0D3R11A103MA01# | p254 |
|        |               | B       | 1000pF  | ±20% | GMA0D3B11A102MA01# | p254 |
|        |               |         | 1500pF  | ±20% | GMA0D3B11A152MA01# | p254 |
|        |               |         | 1800pF  | ±20% | GMA0D3B11A182MA01# | p254 |
|        |               |         | 1800pF  | ±20% | GMA0D3B11A182MA01# | p254 |

### 0.5×0.5mm

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        | p*   |
|--------|---------------|---------|---------|------|--------------------|------|
| 0.4mm  | 100Vdc        | X7R     | 100pF   | ±20% | GMA05XR72A101MA01# | p254 |
|        |               |         | 150pF   | ±20% | GMA05XR72A151MA01# | p254 |
|        |               |         | 220pF   | ±20% | GMA05XR72A221MA01# | p254 |
|        |               |         | 330pF   | ±20% | GMA05XR72A331MA01# | p254 |
|        |               |         | 470pF   | ±20% | GMA05XR72A471MA01# | p254 |
|        |               |         | 680pF   | ±20% | GMA05XR72A681MA01# | p254 |
|        |               | X7R     | 1000pF  | ±20% | GMA05XR72A102MA01# | p254 |
|        |               |         | 1500pF  | ±20% | GMA05XR71E152MA11# | p254 |
|        |               |         | 2200pF  | ±20% | GMA05XR71E222MA11# | p254 |
|        |               |         | 3300pF  | ±20% | GMA05XR71E332MA11# | p254 |
|        |               |         | 4700pF  | ±20% | GMA05XR71E472MA11# | p254 |
|        |               | B       | 1500pF  | ±20% | GMA05XB31E152MA11# | p254 |
|        |               |         | 2200pF  | ±20% | GMA05XB31E222MA11# | p254 |
|        |               |         | 3300pF  | ±20% | GMA05XB31E332MA11# | p254 |
|        |               |         | 4700pF  | ±20% | GMA05XB31E472MA11# | p254 |
|        | 25Vdc         | X7R     | 1500pF  | ±20% | GMA05XR71E152MA11# | p254 |
|        |               |         | 2200pF  | ±20% | GMA05XR71E222MA11# | p254 |
|        |               |         | 3300pF  | ±20% | GMA05XR71E332MA11# | p254 |
|        |               |         | 4700pF  | ±20% | GMA05XR71E472MA11# | p254 |
|        |               | B       | 1500pF  | ±20% | GMA05XB31E152MA11# | p254 |
|        |               |         | 2200pF  | ±20% | GMA05XB31E222MA11# | p254 |
|        |               |         | 3300pF  | ±20% | GMA05XB31E332MA11# | p254 |
|        |               |         | 4700pF  | ±20% | GMA05XB31E472MA11# | p254 |
|        | 10Vdc         | X7R     | 6800pF  | ±20% | GMA05XR71A682MA01# | p254 |
|        |               |         | 10000pF | ±20% | GMA05XR71A103MA01# | p254 |
|        |               |         | 15000pF | ±20% | GMA05XR71A153MA01# | p254 |
|        |               |         | 22000pF | ±20% | GMA05XR71A223MA01# | p254 |
|        |               | R       | 6800pF  | ±20% | GMA05XR11A682MA01# | p254 |
|        |               |         | 10000pF | ±20% | GMA05XR11A103MA01# | p254 |
|        |               |         | 15000pF | ±20% | GMA05XR11A153MA01# | p254 |
|        |               |         | 22000pF | ±20% | GMA05XR11A223MA01# | p254 |
|        |               | B       | 6800pF  | ±20% | GMA05XB11A682MA01# | p254 |
|        |               |         | 10000pF | ±20% | GMA05XB11A103MA01# | p254 |
|        |               |         | 15000pF | ±20% | GMA05XB11A153MA01# | p254 |
|        |               |         | 22000pF | ±20% | GMA05XB11A223MA01# | p254 |
|        | 6.3Vdc        | X5R     | 0.10μF  | ±20% | GMA05XR60J104ME12# | p252 |
|        |               | B       | 0.10μF  | ±20% | GMA05XB30J104ME12# | p252 |

### 0.8×0.8mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number        | p*   |
|--------|---------------|---------|--------|------|--------------------|------|
| 0.6mm  | 100Vdc        | X7R     | 1500pF | ±20% | GMA085R72A152MA01# | p254 |
|        |               |         | 2200pF | ±20% | GMA085R72A222MA01# | p254 |

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        | p*   |
|--------|---------------|---------|---------|------|--------------------|------|
| 0.6mm  | 100Vdc        | X7R     | 3300pF  | ±20% | GMA085R72A332MA01# | p254 |
|        |               |         | 4700pF  | ±20% | GMA085R72A472MA01# | p254 |
|        |               |         | 6800pF  | ±20% | GMA085R72A682MA01# | p254 |
|        | 25Vdc         | X7R     | 10000pF | ±20% | GMA085R71E103MA11# | p254 |
|        |               |         | 15000pF | ±20% | GMA085R71E153MA11# | p254 |
|        |               |         | 22000pF | ±20% | GMA085R71E223MA11# | p254 |
|        |               | B       | 10000pF | ±20% | GMA085B31E103MA11# | p254 |
|        |               |         | 15000pF | ±20% | GMA085B31E153MA11# | p254 |
|        |               |         | 22000pF | ±20% | GMA085B31E223MA11# | p254 |
|        | 10Vdc         | X7R     | 33000pF | ±20% | GMA085R71A333MA01# | p254 |
|        |               |         | 47000pF | ±20% | GMA085R71A473MA01# | p254 |
|        |               |         | 68000pF | ±20% | GMA085R71A683MA01# | p254 |
|        |               |         | 0.10μF  | ±20% | GMA085R71A104MA01# | p254 |
|        |               |         | 0.10μF  | ±20% | GMA085R71A104MA01# | p254 |
|        |               | R       | 33000pF | ±20% | GMA085R11A333MA01# | p254 |
|        |               |         | 47000pF | ±20% | GMA085R11A473MA01# | p254 |
|        |               |         | 68000pF | ±20% | GMA085R11A683MA01# | p254 |
|        |               |         | 0.10μF  | ±20% | GMA085R11A104MA01# | p254 |
|        |               |         | 0.10μF  | ±20% | GMA085R11A104MA01# | p254 |
|        |               | B       | 33000pF | ±20% | GMA085B11A333MA01# | p254 |
|        |               |         | 47000pF | ±20% | GMA085B11A473MA01# | p254 |
|        |               |         | 68000pF | ±20% | GMA085B11A683MA01# | p254 |
|        |               |         | 0.10μF  | ±20% | GMA085B11A104MA01# | p254 |
|        |               |         | 0.10μF  | ±20% | GMA085B11A104MA01# | p254 |
|        | 6.3Vdc        | X5R     | 0.47μF  | ±20% | GMA085R60J474ME12# | p252 |
|        |               | B       | 0.47μF  | ±20% | GMA085B30J474ME12# | p252 |

\*: Refers to the page of the “Specifications and Test Methods”.

Part number # indicates the package specification code.

# 1

## GMA Series Specifications and Test Methods (1)

| No | Item                                       |                    | Specification                                                                                       | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                         |                            |                        |
|----|--------------------------------------------|--------------------|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------------|
| 1  | Rated Voltage                              |                    | Shown in Rated value.                                                                               | The rated voltage is defined as the maximum voltage which may be applied continuously to the capacitor.<br>When AC voltage is superimposed on DC voltage, $V^P$ -P or $V^O$ -P, whichever is larger, should be maintained within the rated voltage range. |                            |                        |
| 2  | Appearance                                 |                    | No defects or abnormalities.                                                                        | Visual inspection.                                                                                                                                                                                                                                        |                            |                        |
| 3  | Dimension                                  |                    | Within the specified dimensions.                                                                    | Using Measuring instrument of dimension.                                                                                                                                                                                                                  |                            |                        |
| 4  | Voltage Proof                              |                    | No defects or abnormalities.                                                                        | Measurement Point: Between the terminations<br>Test Voltage: 250% of the rated voltage<br>Applied Time: 1 to 5s<br>Charge/discharge current: 50mA max.                                                                                                    |                            |                        |
| 5  | Insulation Resistance (I.R.)               |                    | More than 2000MΩ or 50Ω • F (Whichever is smaller)                                                  | Measurement Point: Between the terminations<br>Measurement Voltage: DC Rated Voltage<br>Charging Time: 1min<br>Charge/discharge current: 50mA max.<br>Measurement Temperature: Room Temperature                                                           |                            |                        |
| 6  | Capacitance                                |                    | Shown in Rated value.                                                                               | Measurement Temperature: Room Temperature                                                                                                                                                                                                                 |                            |                        |
| 7  | Dissipation Factor (D.F.)                  |                    | 0.1 max.                                                                                            | Capacitance<br>C ≤ 10μF<br>(6.3V max.)                                                                                                                                                                                                                    | Frequency<br>1.0±0.1kHz    | Voltage<br>0.5±0.1Vrms |
| 8  | Temperature Characteristics of Capacitance | No Bias            | B3: Within ±10% (-25 to +85°C)<br>R6: Within ±15% (-55 to +85°C)<br>C8: Within ±22% (-55 to +105°C) | The capacitance change should be measured after 5 minutes at each specified temp. stage.<br>Capacitance value as a reference is the value in step 3.                                                                                                      |                            |                        |
|    |                                            |                    |                                                                                                     | Step                                                                                                                                                                                                                                                      | Temperature (°C)           | Applying Voltage (VDC) |
|    |                                            |                    |                                                                                                     | 1                                                                                                                                                                                                                                                         | Reference Temp. ±2         | No bias                |
|    |                                            |                    |                                                                                                     | 2                                                                                                                                                                                                                                                         | Min. Operating Temp. ±3    |                        |
|    |                                            |                    |                                                                                                     | 3                                                                                                                                                                                                                                                         | Reference Temp. ±2         |                        |
| 4  | Max. Operating Temp. ±3                    |                    |                                                                                                     |                                                                                                                                                                                                                                                           |                            |                        |
| 5  | Reference Temp. ±2                         |                    |                                                                                                     |                                                                                                                                                                                                                                                           |                            |                        |
|    |                                            |                    |                                                                                                     | • Initial measurement<br>Perform a heat treatment at 150+0/-10°C for 1h and then let sit for 24±2h at room temperature, then measure.                                                                                                                     |                            |                        |
| 9  | Adhesive Strength of Termination           | Bond Strength      | Pull force: 0.03N min.                                                                              | MIL-STD-883 Method 2011 Condition D<br>Mount the capacitor on a gold metalized alumina substrate with Au-20Sn and bond a ø25μm (ø0.001 inch) gold wire to the capacitor terminal using an ultrasonic ball bond. Then, pull wire.                          |                            |                        |
|    |                                            | Die Shear Strength | Die Shear force: 2N min.                                                                            | MIL-STD-883 Method 2019<br>Mount the capacitor on a gold metalized alumina substrate with Au-20Sn. Apply the force parallel to the substrate.                                                                                                             |                            |                        |
| 10 | Vibration *                                | Appearance         | No defects or abnormalities.                                                                        | Kind of Vibration: A simple harmonic motion<br>10Hz to 55Hz to 10Hz (1min)<br>Total amplitude: 1.5mm<br>This motion should be applied for a period of 2h in each 3 mutually perpendicular directions (total of 6h).                                       |                            |                        |
|    |                                            | Capacitance        | Within the specified initial value.                                                                 |                                                                                                                                                                                                                                                           |                            |                        |
|    |                                            | D.F.               | Within the specified initial value.                                                                 |                                                                                                                                                                                                                                                           |                            |                        |
| 11 | Temperature Sudden Change *                | Appearance         | No defects or abnormalities.                                                                        | Perform the five cycles according to the four heat treatments shown in the following table.                                                                                                                                                               |                            |                        |
|    |                                            | Capacitance Change | Within ±7.5%                                                                                        | Step                                                                                                                                                                                                                                                      | Temp. (°C)                 | Time (min)             |
|    |                                            | D.F.               | Within the specified initial value.                                                                 | 1                                                                                                                                                                                                                                                         | Min. Operating Temp. +0/-3 | 30±3                   |
|    |                                            | I.R.               | Within the specified initial value.                                                                 | 2                                                                                                                                                                                                                                                         | Room Temp.                 | 2 to 3                 |
|    |                                            |                    |                                                                                                     | 3                                                                                                                                                                                                                                                         | Max. Operating Temp. +3/-0 | 30±3                   |
|    |                                            | 4                  | Room Temp.                                                                                          | 2 to 3                                                                                                                                                                                                                                                    |                            |                        |
|    |                                            |                    |                                                                                                     | Exposure Time: 24±2h<br>• Initial measurement<br>Perform a heat treatment at 150+0/-10°C for 1h and then let sit for 24±2h at room temperature, then measure.                                                                                             |                            |                        |
|    |                                            | Voltage Proof      | No defects.                                                                                         |                                                                                                                                                                                                                                                           |                            |                        |

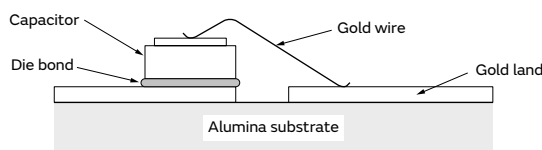
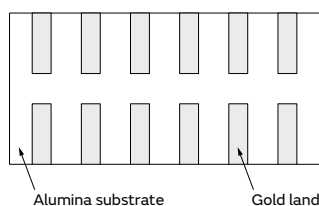
Continued on the following page. ➤

## GMA Series Specifications and Test Methods (1)

Continued from the preceding page. ↘

| No | Item                                               | Specification      | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----|----------------------------------------------------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12 | High Temperature<br>High Humidity<br>(Steady)<br>* | Appearance         | No defects or abnormalities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|    |                                                    | Capacitance Change | Within $\pm 12.5\%$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|    |                                                    | D.F.               | 0.2 max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|    |                                                    | I.R.               | More than 500M $\Omega$ or 12.5 $\Omega$ • F (Whichever is smaller)<br><br>Test Temperature: 40 $\pm 2^{\circ}\text{C}$<br>Test Humidity: 90 to 95%RH<br>Test Time: 500 $\pm 12$ h<br>Applied Voltage: DC Rated Voltage<br>Charge/discharge current: 50mA max.<br>• Initial measurement<br>Perform a heat treatment at 150+0/-10 $^{\circ}\text{C}$ for 1h and then let sit for 24 $\pm 2$ h at room temperature, then measure.<br>• Measurement after test<br>Perform a heat treatment at 150+0/-10 $^{\circ}\text{C}$ for 1h and then let sit for 24 $\pm 2$ h at room temperature, then measure. |
| 13 | Durability<br>*                                    | Appearance         | No defects or abnormalities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|    |                                                    | Capacitance Change | Within $\pm 12.5\%$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|    |                                                    | D.F.               | 0.2 max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|    |                                                    | I.R.               | More than 1000M $\Omega$ or 25 $\Omega$ • F (Whichever is smaller)<br><br>Test Temperature: Max. Operating Temp. $\pm 3^{\circ}\text{C}$<br>Test Time: 1000 $\pm 12$ h<br>Applied Voltage: 150% of the rated voltage<br>Charge/discharge current: 50mA max.<br>• Initial measurement<br>Perform a heat treatment at 150+0/-10 $^{\circ}\text{C}$ for 1h and then let sit for 24 $\pm 2$ h at room temperature, then measure.<br>• Measurement after test<br>Perform a heat treatment at 150+0/-10 $^{\circ}\text{C}$ for 1h and then let sit for 24 $\pm 2$ h at room temperature, then measure.    |

\* Mounting for testing: The capacitors should be mounted on the substrate as shown below using die bonding and wire bonding when tests No.10 to 13 are performed.



## 2

## GMA Series Specifications and Test Methods (2)

| No | Item                                       |                          | Specification                                                                                                                            | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                     |
|----|--------------------------------------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Rated Voltage                              |                          | Shown in Rated value.                                                                                                                    | The rated voltage is defined as the maximum voltage which may be applied continuously to the capacitor.<br>When AC voltage is superimposed on DC voltage, $V^P$ -P or $V^O$ -P, whichever is larger, should be maintained within the rated voltage range.                                             |
| 2  | Appearance                                 |                          | No defects or abnormalities.                                                                                                             | Visual inspection.                                                                                                                                                                                                                                                                                    |
| 3  | Dimension                                  |                          | Within the specified dimensions.                                                                                                         | Using Measuring instrument of dimension.                                                                                                                                                                                                                                                              |
| 4  | Voltage Proof                              |                          | No defects or abnormalities.                                                                                                             | Measurement Point: Between the terminations<br>Test Voltage: 250% of the rated voltage<br>Applied Time: 1 to 5s<br>Charge/discharge current: 50mA max.                                                                                                                                                |
| 5  | Insulation Resistance (I.R.)               |                          | $C \leq 0.047\mu\text{F}$ : More than 10000MΩ<br>$C > 0.047\mu\text{F}$ : More than $500\Omega \cdot \text{F}$<br>C: Nominal Capacitance | Measurement Point: Between the terminations<br>Measurement Voltage: DC Rated Voltage<br>Charging Time: 2min<br>Charge/discharge current: 50mA max.<br>Measurement Temperature: Room Temperature                                                                                                       |
| 6  | Capacitance                                |                          | Shown in Rated value.                                                                                                                    | Measurement Temperature: Room Temperature<br>Measurement Frequency: $1.0 \pm 0.1\text{kHz}$<br>Measurement Voltage: $1.0 \pm 0.2V_{rms}$                                                                                                                                                              |
| 7  | Dissipation Factor (D.F.)                  |                          | W.V.: 25Vdc min.: 0.025max.<br>W.V.: 16/10Vdc: 0.035max.<br>W.V.: 6.3Vdc: 0.05max.                                                       |                                                                                                                                                                                                                                                                                                       |
| 8  | Temperature Characteristics of Capacitance | No Bias                  | B1, B3: Within $\pm 10\%$ (-25 to +85°C)<br>R1, R7: Within $\pm 15\%$ (-55 to +125°C)                                                    | The capacitance change should be measured after 5 minutes at each specified temp. stage.<br>In case of applying voltage, the capacitance change should be measured after 1min with applying voltage in equilibration of each temp. stage.<br>Capacitance value as a reference is the value in step 3. |
|    |                                            | 50% of the Rated Voltage | B1: Within +10/-30%<br>R1: Within +15/-40%                                                                                               |                                                                                                                                                                                                                                                                                                       |
|    |                                            |                          |                                                                                                                                          |                                                                                                                                                                                                                                                                                                       |
|    |                                            |                          |                                                                                                                                          |                                                                                                                                                                                                                                                                                                       |
| 9  | Adhesive Strength of Termination           | Bond Strength            | Pull force: 0.03N min.                                                                                                                   | MIL-STD-883 Method 2011 Condition D<br>Mount the capacitor on a gold metalized alumina substrate with Au-20Sn and bond a $\phi 25\mu\text{m}$ ( $\phi 0.001$ inch) gold wire to the capacitor terminal using an ultrasonic ball bond. Then, pull wire.                                                |
|    |                                            | Die Shear Strength       | Die Shear force: 2N min.                                                                                                                 | MIL-STD-883 Method 2019<br>Mount the capacitor on a gold metalized alumina substrate with Au-20Sn. Apply the force parallel to the substrate.                                                                                                                                                         |
| 10 | Vibration *                                | Appearance               | No defects or abnormalities.                                                                                                             | Kind of Vibration: A simple harmonic motion<br>10Hz to 55Hz to 10Hz (1min)<br>Total amplitude: 1.5mm<br>This motion should be applied for a period of 2h in each 3 mutually perpendicular directions (total of 6h).                                                                                   |
|    |                                            | Capacitance              | Within the specified initial value.                                                                                                      |                                                                                                                                                                                                                                                                                                       |
|    |                                            | D.F.                     | Within the specified initial value.                                                                                                      |                                                                                                                                                                                                                                                                                                       |
| 11 | Temperature Sudden Change *                | Appearance               | No defects or abnormalities.                                                                                                             | Perform the five cycles according to the four heat treatments shown in the following table.                                                                                                                                                                                                           |
|    |                                            | Capacitance Change       | Within $\pm 7.5\%$                                                                                                                       |                                                                                                                                                                                                                                                                                                       |
|    |                                            | D.F.                     | Within the specified initial value.                                                                                                      |                                                                                                                                                                                                                                                                                                       |
|    |                                            | I.R.                     | Within the specified initial value.                                                                                                      |                                                                                                                                                                                                                                                                                                       |
|    |                                            | Voltage Proof            | No defects.                                                                                                                              |                                                                                                                                                                                                                                                                                                       |

| Step | Temperature (°C)             | Applying Voltage (VDC)                |
|------|------------------------------|---------------------------------------|
| 1    | Reference Temp. $\pm 2$      | No bias                               |
| 2    | Min. Operating Temp. $\pm 3$ |                                       |
| 3    | Reference Temp. $\pm 2$      |                                       |
| 4    | Max. Operating Temp. $\pm 3$ |                                       |
| 5    | Reference Temp. $\pm 2$      | 50% of the rated voltage (For B1, R1) |
| 6    | Min. Operating Temp. $\pm 3$ |                                       |
| 7    | Reference Temp. $\pm 2$      |                                       |
| 8    | Max. Operating Temp. $\pm 3$ |                                       |

• Initial measurement  
Perform a heat treatment at  $150 \pm 0/-10^\circ\text{C}$  for 1h and then let sit for  $24 \pm 2\text{h}$  at room temperature, then measure.

| Step | Temp. (°C)                   | Time (min) |
|------|------------------------------|------------|
| 1    | Min. Operating Temp. $+0/-3$ | $30 \pm 3$ |
| 2    | Room Temp.                   | 2 to 3     |
| 3    | Max. Operating Temp. $+3/-0$ | $30 \pm 3$ |
| 4    | Room Temp.                   | 2 to 3     |

Exposure Time:  $24 \pm 2\text{h}$   
• Initial measurement  
Perform a heat treatment at  $150 \pm 0/-10^\circ\text{C}$  for 1h and then let sit for  $24 \pm 2\text{h}$  at room temperature, then measure.

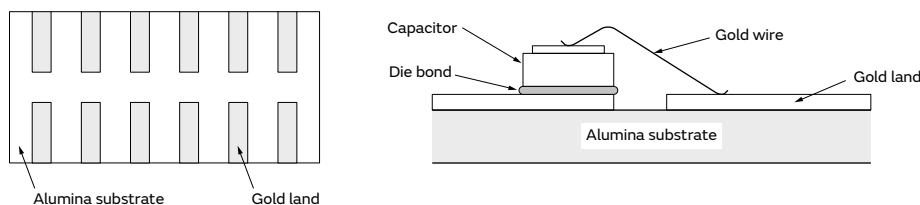
Continued on the following page. ↗

## GMA Series Specifications and Test Methods (2)

Continued from the preceding page. ↘

| No | Item                                               | Specification      | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                 |
|----|----------------------------------------------------|--------------------|-----------------------------------------------------------------------------------|
| 12 | High Temperature<br>High Humidity<br>(Steady)<br>* | Appearance         | No defects or abnormalities.                                                      |
|    |                                                    | Capacitance Change | Within $\pm 12.5\%$                                                               |
|    |                                                    | D.F.               | W.V.: 25Vdc min.: 0.05max.<br>W.V.: 16/10Vdc: 0.05max.<br>W.V.: 6.3Vdc: 0.075max. |
|    |                                                    | I.R.               | More than 500M $\Omega$ or 25 $\Omega$ • F (Whichever is smaller)                 |
| 13 | Durability<br>*                                    | Appearance         | No defects or abnormalities.                                                      |
|    |                                                    | Capacitance Change | Within $\pm 12.5\%$                                                               |
|    |                                                    | D.F.               | W.V.: 25Vdc min.: 0.05max.<br>W.V.: 16/10Vdc: 0.05max.<br>W.V.: 6.3Vdc: 0.075max. |
|    |                                                    | I.R.               | More than 1000M $\Omega$ or 50 $\Omega$ • F (Whichever is smaller)                |

\* Mounting for testing: The capacitors should be mounted on the substrate as shown below using die bonding and wire bonding when tests No.10 to 13 are performed.



## Wire Bonding/AuSn Soldering Mount Chip Multilayer Ceramic Capacitors for General Purpose

### GMD Series

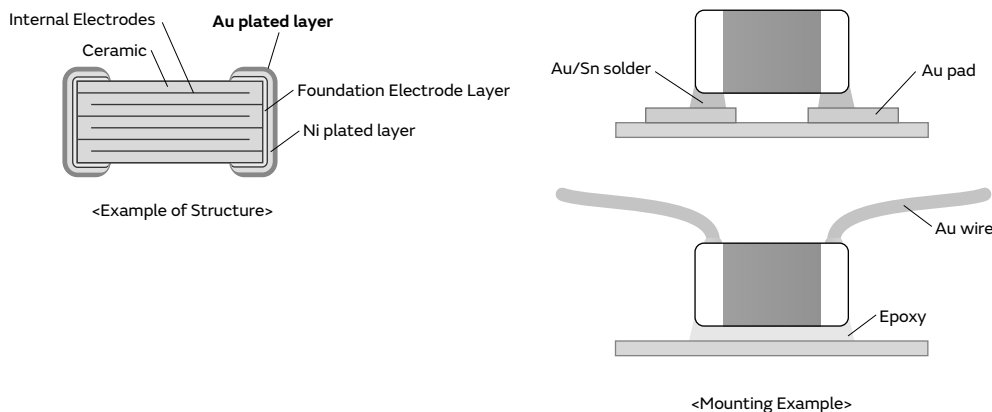


**These capacitors have gold-plated electrodes and are designed specifically for wire bonding and use of gold-tin (AuSn) solder.**

#### Features

#### ① Designed specifically for wire bonding and use of gold-tin (AuSn) solder.

The gold-plated external electrodes make these devices suitable for wire bonding or use of gold tin (AuSn) solder.



\*This product is suitable only for wire bonding or use of gold-tin (AuSn) solder. Other mounting methods should not be used.

#### ② Ideal for mounting in packages, such as optical communication related devices, IC and etc.

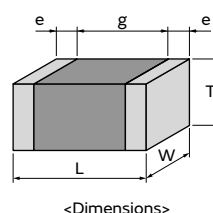
Noise can be reduced by eliminating the routing of the wire, and high efficiency can be achieved with a built-in capacitor in the package, such as TO-CAN, IC and etc. by wire bonding mounting.

#### ③ Contributes to the miniaturization of the set.

Murata offers a lineup of small size products, such as the 0603 (0201) and 1005 (0402) in mm (inch).

#### Specifications

|                   |                                                                 |
|-------------------|-----------------------------------------------------------------|
| Size (mm)         | 0.6×0.3mm to 1.0×0.5mm                                          |
| Rated Voltage     | 6.3Vdc to 50Vdc                                                 |
| Capacitance       | 100pF to 1.0μF                                                  |
| Main Applications | Various device related, such as GaAsIC (mounted in IC packages) |



<Dimensions>

This catalog contains only a portion of the product lineup.  
Please refer to the capacitor search tool on the Murata Web site for details.

## GMD Series High Dielectric Constant Type Part Number List

### 0.6×0.3mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number        | p*   |
|--------|---------------|---------|--------|------|--------------------|------|
| 0.33mm | 25Vdc         | X7R     | 100pF  | ±10% | GMD033R71E101KA01# | p259 |
|        |               |         | 120pF  | ±10% | GMD033R71E121KA01# | p259 |
|        |               |         | 150pF  | ±10% | GMD033R71E151KA01# | p259 |
|        |               |         | 180pF  | ±10% | GMD033R71E181KA01# | p259 |
|        |               |         | 220pF  | ±10% | GMD033R71E221KA01# | p259 |
|        |               |         | 270pF  | ±10% | GMD033R71E271KA01# | p259 |
|        |               |         | 330pF  | ±10% | GMD033R71E331KA01# | p259 |
|        |               |         | 390pF  | ±10% | GMD033R71E391KA01# | p259 |
|        |               |         | 470pF  | ±10% | GMD033R71E471KA01# | p259 |
|        |               |         | 560pF  | ±10% | GMD033R71E561KA01# | p259 |
|        |               |         | 680pF  | ±10% | GMD033R71E681KA01# | p259 |
|        |               |         | 820pF  | ±10% | GMD033R71E821KA01# | p259 |
|        |               |         | 1000pF | ±10% | GMD033R71E102KA01# | p259 |
|        |               |         | 1200pF | ±10% | GMD033R71E122KA01# | p259 |
|        |               |         | 1500pF | ±10% | GMD033R71E152KA01# | p259 |
|        |               | R       | 100pF  | ±10% | GMD033R11E101KA01# | p259 |
|        |               |         | 120pF  | ±10% | GMD033R11E121KA01# | p259 |
|        |               |         | 150pF  | ±10% | GMD033R11E151KA01# | p259 |
|        |               |         | 180pF  | ±10% | GMD033R11E181KA01# | p259 |
|        |               |         | 220pF  | ±10% | GMD033R11E221KA01# | p259 |
|        |               |         | 270pF  | ±10% | GMD033R11E271KA01# | p259 |
|        |               |         | 330pF  | ±10% | GMD033R11E331KA01# | p259 |
|        |               |         | 390pF  | ±10% | GMD033R11E391KA01# | p259 |
|        |               |         | 470pF  | ±10% | GMD033R11E471KA01# | p259 |
|        |               |         | 560pF  | ±10% | GMD033R11E561KA01# | p259 |
|        |               |         | 680pF  | ±10% | GMD033R11E681KA01# | p259 |
|        |               |         | 820pF  | ±10% | GMD033R11E821KA01# | p259 |
|        |               |         | 1000pF | ±10% | GMD033R11E102KA01# | p259 |
|        |               |         | 1200pF | ±10% | GMD033R11E122KA01# | p259 |
|        |               |         | 1500pF | ±10% | GMD033R11E152KA01# | p259 |
|        |               | B       | 100pF  | ±10% | GMD033B11E101KA01# | p259 |
|        |               |         | 120pF  | ±10% | GMD033B11E121KA01# | p259 |
|        |               |         | 150pF  | ±10% | GMD033B11E151KA01# | p259 |
|        |               |         | 180pF  | ±10% | GMD033B11E181KA01# | p259 |
|        |               |         | 220pF  | ±10% | GMD033B11E221KA01# | p259 |
|        |               |         | 270pF  | ±10% | GMD033B11E271KA01# | p259 |
|        |               |         | 330pF  | ±10% | GMD033B11E331KA01# | p259 |
|        |               |         | 390pF  | ±10% | GMD033B11E391KA01# | p259 |
|        |               |         | 470pF  | ±10% | GMD033B11E471KA01# | p259 |
|        |               |         | 560pF  | ±10% | GMD033B11E561KA01# | p259 |
|        |               |         | 680pF  | ±10% | GMD033B11E681KA01# | p259 |
|        |               |         | 820pF  | ±10% | GMD033B11E821KA01# | p259 |
|        |               |         | 1000pF | ±10% | GMD033B11E102KA01# | p259 |
|        |               |         | 1200pF | ±10% | GMD033B11E122KA01# | p259 |
|        |               |         | 1500pF | ±10% | GMD033B11E152KA01# | p259 |
|        | 16Vdc         | X7R     | 1800pF | ±10% | GMD033R71C182KA11# | p259 |
|        |               |         | 2200pF | ±10% | GMD033R71C222KA11# | p259 |
|        |               |         | 2700pF | ±10% | GMD033R71C272KA11# | p259 |
|        |               |         | 3300pF | ±10% | GMD033R71C332KA11# | p259 |
|        |               |         |        |      |                    |      |
|        |               | R       | 1800pF | ±10% | GMD033R11C182KA11# | p259 |
|        |               |         | 2200pF | ±10% | GMD033R11C222KA11# | p259 |
|        |               |         | 2700pF | ±10% | GMD033R11C272KA11# | p259 |
|        |               |         |        |      |                    |      |

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        | p*   |
|--------|---------------|---------|---------|------|--------------------|------|
| 0.33mm | 16Vdc         | R       | 3300pF  | ±10% | GMD033R11C332KA11# | p259 |
|        |               |         | 1800pF  | ±10% | GMD033B31C182KA11# | p259 |
|        |               |         | 2200pF  | ±10% | GMD033B31C222KA11# | p259 |
|        |               |         | 2700pF  | ±10% | GMD033B31C272KA11# | p259 |
|        |               | X7R     | 3300pF  | ±10% | GMD033B31C332KA11# | p259 |
|        |               |         | 3900pF  | ±10% | GMD033R71A392KA01# | p259 |
|        |               |         | 4700pF  | ±10% | GMD033R71A472KA01# | p259 |
|        |               |         | 5600pF  | ±10% | GMD033R71A562KA01# | p259 |
|        |               |         | 6800pF  | ±10% | GMD033R71A682KA01# | p259 |
|        |               |         | 8200pF  | ±10% | GMD033R71A822KA01# | p259 |
|        |               |         | 10000pF | ±10% | GMD033R71A103KA01# | p259 |
|        | 10Vdc         | R       | 3900pF  | ±10% | GMD033R11A392KA01# | p259 |
|        |               |         | 4700pF  | ±10% | GMD033R11A472KA01# | p259 |
|        |               |         | 5600pF  | ±10% | GMD033R11A562KA01# | p259 |
|        |               |         | 6800pF  | ±10% | GMD033R11A682KA01# | p259 |
|        |               |         | 8200pF  | ±10% | GMD033R11A822KA01# | p259 |
|        |               |         | 10000pF | ±10% | GMD033R11A103KA01# | p259 |
|        |               | B       | 3900pF  | ±10% | GMD033B11A392KA01# | p259 |
|        |               |         | 4700pF  | ±10% | GMD033B11A472KA01# | p259 |
|        |               |         | 5600pF  | ±10% | GMD033B11A562KA01# | p259 |
|        |               |         | 6800pF  | ±10% | GMD033B11A682KA01# | p259 |
|        |               |         | 8200pF  | ±10% | GMD033B11A822KA01# | p259 |
|        |               |         | 10000pF | ±10% | GMD033B11A103KA01# | p259 |
|        | 6.3Vdc        | X5R     | 56000pF | ±10% | GMD033R60J563KE11# | p261 |
|        |               |         | 68000pF | ±10% | GMD033R60J683KE11# | p261 |
|        |               |         | 82000pF | ±10% | GMD033R60J823KE11# | p261 |
|        |               |         | 0.10μF  | ±10% | GMD033R60J104KE11# | p261 |
|        |               |         |         |      |                    |      |
|        |               | B       | 56000pF | ±10% | GMD033B30J563KE11# | p261 |
|        |               |         | 68000pF | ±10% | GMD033B30J683KE11# | p261 |
|        |               |         | 82000pF | ±10% | GMD033B30J823KE11# | p261 |
|        |               |         | 0.10μF  | ±10% | GMD033B30J104KE11# | p261 |
|        |               |         |         |      |                    |      |

### 1.0×0.5mm

| T max. | Rated Voltage | TC Code | Cap.   | Tol. | Part Number        | p*   |
|--------|---------------|---------|--------|------|--------------------|------|
| 0.55mm | 50Vdc         | X7R     | 220pF  | ±10% | GMD155R71H221KA01# | p259 |
|        |               |         | 270pF  | ±10% | GMD155R71H271KA01# | p259 |
|        |               |         | 330pF  | ±10% | GMD155R71H331KA01# | p259 |
|        |               |         | 390pF  | ±10% | GMD155R71H391KA01# | p259 |
|        |               |         | 470pF  | ±10% | GMD155R71H471KA01# | p259 |
|        |               |         | 560pF  | ±10% | GMD155R71H561KA01# | p259 |
|        |               |         | 680pF  | ±10% | GMD155R71H681KA01# | p259 |
|        |               |         | 820pF  | ±10% | GMD155R71H821KA01# | p259 |
|        |               |         | 1000pF | ±10% | GMD155R71H102KA01# | p259 |
|        |               |         | 1200pF | ±10% | GMD155R71H122KA01# | p259 |
|        |               |         | 1500pF | ±10% | GMD155R71H152KA01# | p259 |
|        |               |         | 1800pF | ±10% | GMD155R71H182KA01# | p259 |
|        |               |         | 2200pF | ±10% | GMD155R71H222KA01# | p259 |
|        |               |         | 2700pF | ±10% | GMD155R71H272KA01# | p259 |
|        |               |         | 3300pF | ±10% | GMD155R71H332KA01# | p259 |
|        |               |         | 3900pF | ±10% | GMD155R71H392KA01# | p259 |
|        |               |         | 4700pF | ±10% | GMD155R71H472KA01# | p259 |
|        |               | R       | 220pF  | ±10% | GMD155R11H221KA01# | p259 |
|        |               |         |        |      |                    |      |
|        |               |         |        |      |                    |      |
|        |               |         |        |      |                    |      |
|        |               |         |        |      |                    |      |
|        |               |         |        |      |                    |      |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

## GMD Series High Dielectric Constant Type Part Number List

(→ 1.0×0.5mm)

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        | p*   |
|--------|---------------|---------|---------|------|--------------------|------|
| 0.55mm | 50Vdc         | R       | 270pF   | ±10% | GMD155R11H271KA01# | p259 |
|        |               |         | 330pF   | ±10% | GMD155R11H331KA01# | p259 |
|        |               |         | 390pF   | ±10% | GMD155R11H391KA01# | p259 |
|        |               |         | 470pF   | ±10% | GMD155R11H471KA01# | p259 |
|        |               |         | 560pF   | ±10% | GMD155R11H561KA01# | p259 |
|        |               |         | 680pF   | ±10% | GMD155R11H681KA01# | p259 |
|        |               |         | 820pF   | ±10% | GMD155R11H821KA01# | p259 |
|        |               |         | 1000pF  | ±10% | GMD155R11H102KA01# | p259 |
|        |               |         | 1200pF  | ±10% | GMD155R11H122KA01# | p259 |
|        |               |         | 1500pF  | ±10% | GMD155R11H152KA01# | p259 |
|        |               |         | 1800pF  | ±10% | GMD155R11H182KA01# | p259 |
|        |               |         | 2200pF  | ±10% | GMD155R11H222KA01# | p259 |
|        |               |         | 2700pF  | ±10% | GMD155R11H272KA01# | p259 |
|        |               |         | 3300pF  | ±10% | GMD155R11H332KA01# | p259 |
|        |               |         | 3900pF  | ±10% | GMD155R11H392KA01# | p259 |
|        |               |         | 4700pF  | ±10% | GMD155R11H472KA01# | p259 |
|        |               | B       | 220pF   | ±10% | GMD155B11H221KA01# | p259 |
|        |               |         | 270pF   | ±10% | GMD155B11H271KA01# | p259 |
|        |               |         | 330pF   | ±10% | GMD155B11H331KA01# | p259 |
|        |               |         | 390pF   | ±10% | GMD155B11H391KA01# | p259 |
|        |               |         | 470pF   | ±10% | GMD155B11H471KA01# | p259 |
|        |               |         | 560pF   | ±10% | GMD155B11H561KA01# | p259 |
|        |               |         | 680pF   | ±10% | GMD155B11H681KA01# | p259 |
|        |               |         | 820pF   | ±10% | GMD155B11H821KA01# | p259 |
|        |               |         | 1000pF  | ±10% | GMD155B11H102KA01# | p259 |
|        |               |         | 1200pF  | ±10% | GMD155B11H122KA01# | p259 |
|        |               |         | 1500pF  | ±10% | GMD155B11H152KA01# | p259 |
|        |               |         | 1800pF  | ±10% | GMD155B11H182KA01# | p259 |
|        |               |         | 2200pF  | ±10% | GMD155B11H222KA01# | p259 |
|        |               |         | 2700pF  | ±10% | GMD155B11H272KA01# | p259 |
|        |               |         | 3300pF  | ±10% | GMD155B11H332KA01# | p259 |
|        |               |         | 3900pF  | ±10% | GMD155B11H392KA01# | p259 |
|        |               |         | 4700pF  | ±10% | GMD155B11H472KA01# | p259 |
|        | 25Vdc         | X7R     | 5600pF  | ±10% | GMD155R71E562KA01# | p259 |
|        |               |         | 6800pF  | ±10% | GMD155R71E682KA01# | p259 |
|        |               |         | 8200pF  | ±10% | GMD155R71E822KA01# | p259 |
|        |               |         | 10000pF | ±10% | GMD155R71E103KA01# | p259 |
|        |               |         | 12000pF | ±10% | GMD155R71E123KA01# | p259 |
|        |               |         | 15000pF | ±10% | GMD155R71E153KA01# | p259 |
|        |               |         | 18000pF | ±10% | GMD155R71E183KA01# | p259 |
|        |               |         | 22000pF | ±10% | GMD155R71E223KA01# | p259 |
|        |               |         | 27000pF | ±10% | GMD155R71E273KA11# | p259 |
|        |               |         | 33000pF | ±10% | GMD155R71E333KA11# | p259 |
|        |               |         | 39000pF | ±10% | GMD155R71E393KA11# | p259 |
|        |               |         | 47000pF | ±10% | GMD155R71E473KA11# | p259 |
|        |               | R       | 5600pF  | ±10% | GMD155R11E562KA01# | p259 |
|        |               |         | 6800pF  | ±10% | GMD155R11E682KA01# | p259 |
|        |               |         | 8200pF  | ±10% | GMD155R11E822KA01# | p259 |
|        |               |         | 10000pF | ±10% | GMD155R11E103KA01# | p259 |
|        |               |         | 12000pF | ±10% | GMD155R11E123KA01# | p259 |
|        |               |         | 15000pF | ±10% | GMD155R11E153KA01# | p259 |
|        |               |         | 18000pF | ±10% | GMD155R11E183KA01# | p259 |
|        |               |         | 22000pF | ±10% | GMD155R11E223KA01# | p259 |
|        |               |         | 27000pF | ±10% | GMD155R11E273KA11# | p259 |

| T max. | Rated Voltage | TC Code | Cap.    | Tol. | Part Number        | p*   |
|--------|---------------|---------|---------|------|--------------------|------|
| 0.55mm | 25Vdc         | R       | 33000pF | ±10% | GMD155R11E333KA11# | p259 |
|        |               |         | 39000pF | ±10% | GMD155R11E393KA11# | p259 |
|        |               |         | 47000pF | ±10% | GMD155R11E473KA11# | p259 |
|        |               |         |         |      |                    |      |
|        |               | B       | 5600pF  | ±10% | GMD155B11E562KA01# | p259 |
|        |               |         | 6800pF  | ±10% | GMD155B11E682KA01# | p259 |
|        |               |         | 8200pF  | ±10% | GMD155B11E822KA01# | p259 |
|        |               |         | 10000pF | ±10% | GMD155B11E103KA01# | p259 |
|        |               |         | 12000pF | ±10% | GMD155B11E123KA01# | p259 |
|        |               |         | 15000pF | ±10% | GMD155B11E153KA01# | p259 |
|        |               |         | 18000pF | ±10% | GMD155B11E183KA01# | p259 |
|        |               |         | 22000pF | ±10% | GMD155B11E223KA01# | p259 |
|        |               |         | 27000pF | ±10% | GMD155B31E273KA11# | p259 |
|        |               |         | 33000pF | ±10% | GMD155B31E333KA11# | p259 |
|        |               |         | 39000pF | ±10% | GMD155B31E393KA11# | p259 |
|        |               |         | 47000pF | ±10% | GMD155B31E473KA11# | p259 |
|        | 16Vdc         | X7R     | 56000pF | ±10% | GMD155R71C563KA11# | p259 |
|        |               |         | 68000pF | ±10% | GMD155R71C683KA11# | p259 |
|        |               |         | 82000pF | ±10% | GMD155R71C823KA11# | p259 |
|        |               |         | 0.10μF  | ±10% | GMD155R71C104KA11# | p259 |
|        |               | R       | 56000pF | ±10% | GMD155R11C563KA11# | p259 |
|        |               |         | 68000pF | ±10% | GMD155R11C683KA11# | p259 |
|        |               |         | 82000pF | ±10% | GMD155R11C823KA11# | p259 |
|        |               |         | 0.10μF  | ±10% | GMD155R11C104KA11# | p259 |
|        |               | B       | 56000pF | ±10% | GMD155B31C563KA11# | p259 |
|        |               |         | 68000pF | ±10% | GMD155B31C683KA11# | p259 |
|        |               |         | 82000pF | ±10% | GMD155B31C823KA11# | p259 |
|        |               |         | 0.10μF  | ±10% | GMD155B31C104KA11# | p259 |
|        |               |         |         |      |                    |      |
|        |               |         |         |      |                    |      |
|        |               |         |         |      |                    |      |
|        |               |         |         |      |                    |      |
|        | 10Vdc         | X5R     | 0.12μF  | ±10% | GMD155R61A124KE12# | p261 |
|        |               |         | 0.15μF  | ±10% | GMD155R61A154KE12# | p261 |
|        |               |         | 0.18μF  | ±10% | GMD155R61A184KE12# | p261 |
|        |               |         | 0.22μF  | ±10% | GMD155R61A224KE12# | p261 |
|        |               |         | 0.27μF  | ±10% | GMD155R61A274KE11# | p263 |
|        |               |         | 0.33μF  | ±10% | GMD155R61A334KE11# | p263 |
|        |               |         | 0.39μF  | ±10% | GMD155R61A394KE11# | p263 |
|        |               |         | 0.47μF  | ±10% | GMD155R61A474KE11# | p263 |
|        |               | B       | 0.12μF  | ±10% | GMD155B31A124KE12# | p261 |
|        |               |         | 0.15μF  | ±10% | GMD155B31A154KE12# | p261 |
|        |               |         | 0.18μF  | ±10% | GMD155B31A184KE12# | p261 |
|        |               |         | 0.22μF  | ±10% | GMD155B31A224KE12# | p261 |
|        |               |         | 0.27μF  | ±10% | GMD155B31A274KE11# | p263 |
|        |               |         | 0.33μF  | ±10% | GMD155B31A334KE11# | p263 |
|        |               |         | 0.39μF  | ±10% | GMD155B31A394KE11# | p263 |
|        |               |         | 0.47μF  | ±10% | GMD155B31A474KE11# | p263 |

\*: Refers to the page of the "Specifications and Test Methods".

Part number # indicates the package specification code.

# 1

## GMD Series Specifications and Test Methods (1)

| No                 | Item                                       |                                                                                                                                                               | Specification                                                                                               | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                        |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
|--------------------|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------------------|------------------------|---|----------------------------|---------|---|------------------------|--------|--------------------|----------------------------|------------------------|---|--------------------|---------------------------------------|---|------------------------|---|--------------------|---|------------------------|
| 1                  | Rated Voltage                              |                                                                                                                                                               | Shown in Rated value.                                                                                       | The rated voltage is defined as the maximum voltage which may be applied continuously to the capacitor.<br>When AC voltage is superimposed on DC voltage, V <sup>P</sup> -P or V <sup>O</sup> -P, whichever is larger, should be maintained within the rated voltage range.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                        |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
| 2                  | Appearance                                 |                                                                                                                                                               | No defects or abnormalities.                                                                                | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                        |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
| 3                  | Dimension                                  |                                                                                                                                                               | Within the specified dimensions.                                                                            | Using Measuring instrument of dimension.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                        |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
| 4                  | Voltage Proof                              |                                                                                                                                                               | No defects or abnormalities.                                                                                | Measurement Point: Between the terminations<br>Test Voltage: 250% of the rated voltage<br>Applied Time: 1 to 5s<br>Charge/discharge current: 50mA max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                        |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
| 5                  | Insulation Resistance (I.R.)               |                                                                                                                                                               | C ≤ 0.047μF: More than 10000MΩ<br>C > 0.047μF: More than 500Ω・F<br>C: Nominal Capacitance                   | Measurement Point: Between the terminations<br>Measurement Voltage: DC Rated Voltage<br>Charging Time: 2min<br>Charge/discharge current: 50mA max.<br>Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
| 6                  | Capacitance                                |                                                                                                                                                               | Shown in Rated value.                                                                                       | Measurement Temperature: Room Temperature<br>Measurement Frequency: 1.0±0.1kHz<br>Measurement Voltage: 1.0±0.2Vrms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                        |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
| 7                  | Dissipation Factor (D.F.)                  |                                                                                                                                                               | W.V.: 25Vdc min.: 0.025max.<br>W.V.: 16/10Vdc: 0.035max.                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
| 8                  | Temperature Characteristics of Capacitance | No Bias                                                                                                                                                       | B1, B3: Within ±10% (-25 to +85°C)<br>R1, R7: Within ±15% (-55 to +125°C)<br>R6: Within ±15% (-55 to +85°C) | The capacitance change should be measured after 5 minutes at each specified temp. stage.<br>In case of applying voltage, the capacitance change should be measured after 1 minute with applying voltage in equilibration of each temp. stage.<br>Capacitance value as a reference is the value in step 3. <table><tr><th>Step</th><th>Temperature (°C)</th><th>Applying Voltage (VDC)</th></tr><tr><td>1</td><td>Reference Temp. ±2</td><td rowspan="4">No bias</td></tr><tr><td>2</td><td>Min.Operating Temp. ±3</td></tr><tr><td>3</td><td>Reference Temp. ±2</td></tr><tr><td>4</td><td>Max.Operating Temp. ±3</td></tr><tr><td>5</td><td>Reference Temp. ±2</td><td rowspan="4">50% of the rated voltage (For B1, R1)</td></tr><tr><td>6</td><td>Min.Operating Temp. ±3</td></tr><tr><td>7</td><td>Reference Temp. ±2</td></tr><tr><td>8</td><td>Max.Operating Temp. ±3</td></tr></table> | Step                   | Temperature (°C) | Applying Voltage (VDC) | 1 | Reference Temp. ±2         | No bias | 2 | Min.Operating Temp. ±3 | 3      | Reference Temp. ±2 | 4                          | Max.Operating Temp. ±3 | 5 | Reference Temp. ±2 | 50% of the rated voltage (For B1, R1) | 6 | Min.Operating Temp. ±3 | 7 | Reference Temp. ±2 | 8 | Max.Operating Temp. ±3 |
|                    |                                            | Step                                                                                                                                                          | Temperature (°C)                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Applying Voltage (VDC) |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
| 1                  | Reference Temp. ±2                         | No bias                                                                                                                                                       |                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
| 2                  | Min.Operating Temp. ±3                     |                                                                                                                                                               |                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
| 3                  | Reference Temp. ±2                         |                                                                                                                                                               |                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
| 4                  | Max.Operating Temp. ±3                     |                                                                                                                                                               |                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
| 5                  | Reference Temp. ±2                         | 50% of the rated voltage (For B1, R1)                                                                                                                         |                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
| 6                  | Min.Operating Temp. ±3                     |                                                                                                                                                               |                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
| 7                  | Reference Temp. ±2                         |                                                                                                                                                               |                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
| 8                  | Max.Operating Temp. ±3                     |                                                                                                                                                               |                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
|                    | 50% of the Rated Voltage                   | B1: Within +10/-30%<br>R1: Within +15/-40%                                                                                                                    |                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
| 9                  | Adhesive Strength of Termination           | Bond Strength                                                                                                                                                 | Pull force: 0.03N min.                                                                                      | MIL-STD-883 Method 2011 Condition D<br>Mount the capacitor on a gold metalized alumina substrate with Au-20Sn and bond a ø25μm (ø0.001 inch) gold wire to the capacitor terminal using an ultrasonic ball bond. Then, pull wire.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                        |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
|                    |                                            | Die Shear Strength                                                                                                                                            | Die Shear force: 2N min.                                                                                    | MIL-STD-883 Method 2019<br>Mount the capacitor on a gold metalized alumina substrate with Au-20Sn. Apply the force parallel to the substrate.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                        |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
| 10                 | Vibration *                                | Appearance                                                                                                                                                    | No defects or abnormalities.                                                                                | Kind of Vibration: A simple harmonic motion<br>10Hz to 55Hz to 10Hz (1min)<br>Total amplitude: 1.5mm<br>This motion should be applied for a period of 2h in each 3 mutually perpendicular directions (total of 6h).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                        |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
|                    |                                            | Capacitance                                                                                                                                                   | Within the specified initial value.                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
|                    |                                            | D.F.                                                                                                                                                          | Within the specified initial value.                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
| 11                 | Temperature Sudden Change *                | Appearance                                                                                                                                                    | No defects or abnormalities.                                                                                | Perform the five cycles according to the four heat treatments shown in the following table. <table><tr><th>Step</th><th>Temp. (°C)</th><th>Time (min)</th></tr><tr><td>1</td><td>Min. Operating Temp. +0/-3</td><td>30±3</td></tr><tr><td>2</td><td>Room Temp.</td><td>2 to 3</td></tr><tr><td>3</td><td>Max. Operating Temp. +3/-0</td><td>30±3</td></tr><tr><td>4</td><td>Room Temp.</td><td>2 to 3</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Step                   | Temp. (°C)       | Time (min)             | 1 | Min. Operating Temp. +0/-3 | 30±3    | 2 | Room Temp.             | 2 to 3 | 3                  | Max. Operating Temp. +3/-0 | 30±3                   | 4 | Room Temp.         | 2 to 3                                |   |                        |   |                    |   |                        |
|                    |                                            | Step                                                                                                                                                          | Temp. (°C)                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Time (min)             |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
|                    |                                            | 1                                                                                                                                                             | Min. Operating Temp. +0/-3                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 30±3                   |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
|                    |                                            | 2                                                                                                                                                             | Room Temp.                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2 to 3                 |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
|                    |                                            | 3                                                                                                                                                             | Max. Operating Temp. +3/-0                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 30±3                   |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
| 4                  | Room Temp.                                 | 2 to 3                                                                                                                                                        |                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
| Capacitance Change | Within ±7.5%                               |                                                                                                                                                               |                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
| D.F.               | Within the specified initial value.        |                                                                                                                                                               |                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
| I.R.               | Within the specified initial value.        |                                                                                                                                                               |                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |
| Voltage Proof      | No defects.                                | Exposure Time: 24±2h<br>• Initial measurement<br>Perform a heat treatment at 150+0/-10°C for 1h and then let sit for 24±2h at room temperature, then measure. |                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                        |                  |                        |   |                            |         |   |                        |        |                    |                            |                        |   |                    |                                       |   |                        |   |                    |   |                        |

Continued on the following page. ➡

GRM

GR3

GRJ

GR4

GR7

GJM

GQM

GA2

GA3

GA3

GA3

GA3

LL

LLA

LLM

LLR

NFM

KRM

KR3

GMA

GMD

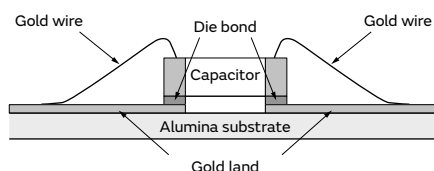
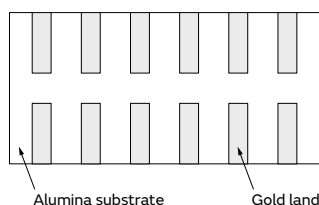
⚠Caution / Notice

## GMD Series Specifications and Test Methods (1)

Continued from the preceding page. ↘

| No | Item                                      |                    | Specification                                      | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                        |
|----|-------------------------------------------|--------------------|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12 | High Temperature High Humidity (Steady) * | Appearance         | No defects or abnormalities.                       | Test Temperature: 40±2°C<br>Test Humidity: 90 to 95%RH<br>Test Time: 500±12h<br>Applied Voltage: DC Rated Voltage<br>Charge/discharge current: 50mA max.<br>Exposure Time: 24±2h                                                                                                                                                                                         |
|    |                                           | Capacitance Change | Within ±12.5%                                      |                                                                                                                                                                                                                                                                                                                                                                          |
|    |                                           | D.F.               | 0.05max.                                           |                                                                                                                                                                                                                                                                                                                                                                          |
|    |                                           | I.R.               | More than 500MΩ or 25Ω • F (Whichever is smaller)  |                                                                                                                                                                                                                                                                                                                                                                          |
| 13 | Durability *                              | Appearance         | No defects or abnormalities.                       | Test Temperature: Max. Operating Temp. ±3°C<br>Test Time: 1000±12h<br>Applied Voltage: 200% of the rated voltage<br>Charge/discharge current: 50mA max.<br>Exposure Time: 24±2h<br>• Initial measurement<br>Apply 200% of the rated DC voltage at the max. operating temp. ±3°C for 1h.<br>Remove and set for 24±2h at room temperature.<br>Perform initial measurement. |
|    |                                           | Capacitance Change | Within ±12.5%                                      |                                                                                                                                                                                                                                                                                                                                                                          |
|    |                                           | D.F.               | 0.05max.                                           |                                                                                                                                                                                                                                                                                                                                                                          |
|    |                                           | I.R.               | More than 1000MΩ or 50Ω • F (Whichever is smaller) |                                                                                                                                                                                                                                                                                                                                                                          |

\* Mounting for testing: The capacitors should be mounted on the substrate as shown below using die bonding and wire bonding when tests No.10 to 13 are performed.



2

## GMD Series Specifications and Test Methods (2)

| No                     | Item                                       |                        | Specification                                                    | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
|------------------------|--------------------------------------------|------------------------|------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------|------------------------|------------------------|----------------------------|-------------|----------------------|-------------------------|-------------|--------------------|----------------------------|-------------------------|---|--------------------|--------|
| 1                      | Rated Voltage                              |                        | Shown in Rated value.                                            | The rated voltage is defined as the maximum voltage which may be applied continuously to the capacitor.<br>When AC voltage is superimposed on DC voltage, $V^{P-P}$ or $V^{O-P}$ , whichever is larger, should be maintained within the rated voltage range.                                                                                                                                                                                                                                                                                                                                                                                                              |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 2                      | Appearance                                 |                        | No defects or abnormalities.                                     | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 3                      | Dimension                                  |                        | Within the specified dimensions.                                 | Using Measuring instrument of dimension.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 4                      | Voltage Proof                              |                        | No defects or abnormalities.                                     | Measurement Point: Between the terminations<br>Test Voltage: 250% of the rated voltage<br>Applied Time: 1 to 5s<br>Charge/discharge current: 50mA max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 5                      | Insulation Resistance (I.R.)               |                        | More than 2000MΩ or 50Ω・F (Whichever is smaller)                 | Measurement Point: Between the terminations<br>Measurement Voltage: DC Rated Voltage<br>Charging Time: 1min<br>Charge/discharge current: 50mA max.<br>Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 6                      | Capacitance                                |                        | Shown in Rated value.                                            | Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 7                      | Dissipation Factor (D.F.)                  |                        | 0.1 max.                                                         | <table><tr><th>Capacitance</th><th>Frequency</th><th>Voltage</th></tr><tr><td>*1 C ≤ 10μF (10V min.)</td><td>1.0±0.1kHz</td><td>1.0±0.2Vrms</td></tr><tr><td>C ≤ 10μF (6.3V max.)</td><td>1.0±0.1kHz</td><td>0.5±0.1Vrms</td></tr></table><br>*1 GMD155 B3/R6 1A 124 to 224 are applied to 0.5±0.1Vrms                                                                                                                                                                                                                                                                                                                                                                    | Capacitance | Frequency        | Voltage                | *1 C ≤ 10μF (10V min.) | 1.0±0.1kHz                 | 1.0±0.2Vrms | C ≤ 10μF (6.3V max.) | 1.0±0.1kHz              | 0.5±0.1Vrms |                    |                            |                         |   |                    |        |
| Capacitance            | Frequency                                  | Voltage                |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| *1 C ≤ 10μF (10V min.) | 1.0±0.1kHz                                 | 1.0±0.2Vrms            |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| C ≤ 10μF (6.3V max.)   | 1.0±0.1kHz                                 | 0.5±0.1Vrms            |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 8                      | Temperature Characteristics of Capacitance | No Bias                | B3: Within ±10% (-25 to +85°C)<br>R6: Within ±15% (-55 to +85°C) | The capacitance change should be measured after 5 minutes at each specified temp. stage.<br>Capacitance value as a reference is the value in step 3.<br><table><tr><th>Step</th><th>Temperature (°C)</th><th>Applying Voltage (VDC)</th></tr><tr><td>1</td><td>Reference Temp. ±2</td><td rowspan="5">No bias</td></tr><tr><td>2</td><td>Min. Operating Temp. ±3</td></tr><tr><td>3</td><td>Reference Temp. ±2</td></tr><tr><td>4</td><td>Max. Operating Temp. ±3</td></tr><tr><td>5</td><td>Reference Temp. ±2</td></tr></table><br>• Initial measurement<br>Perform a heat treatment at 150+0/-10°C for 1h and then let sit for 24±2h at room temperature,then measure. | Step        | Temperature (°C) | Applying Voltage (VDC) | 1                      | Reference Temp. ±2         | No bias     | 2                    | Min. Operating Temp. ±3 | 3           | Reference Temp. ±2 | 4                          | Max. Operating Temp. ±3 | 5 | Reference Temp. ±2 |        |
| Step                   | Temperature (°C)                           | Applying Voltage (VDC) |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 1                      | Reference Temp. ±2                         | No bias                |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 2                      | Min. Operating Temp. ±3                    |                        |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 3                      | Reference Temp. ±2                         |                        |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 4                      | Max. Operating Temp. ±3                    |                        |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 5                      | Reference Temp. ±2                         |                        |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 9                      | Adhesive Strength of Termination           | Bond Strength          | Pull force: 0.03N min.                                           | MIL-STD-883 Method 2011 Condition D<br>Mount the capacitor on a gold metalized alumina substrate with Au-20Sn and bond a ø25μm (ø0.001 inch) gold wire to the capacitor terminal using an ultrasonic ball bond. Then, pull wire.                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
|                        |                                            | Die Shear Strength     | Die Shear force: 2N min.                                         | MIL-STD-883 Method 2019<br>Mount the capacitor on a gold metalized alumina substrate with Au-20Sn. Apply the force parallel to the substrate.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 10                     | Vibration *2                               | Appearance             | No defects or abnormalities.                                     | Kind of Vibration: A simple harmonic motion<br>10Hz to 55Hz to 10Hz (1min)<br>Total amplitude: 1.5mm<br>This motion should be applied for a period of 2h in each 3 mutually perpendicular directions (total of 6h).                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
|                        |                                            | Capacitance            | Within the specified initial value.                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
|                        |                                            | D.F.                   | Within the specified initial value.                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 11                     | Temperature Sudden Change *2               | Appearance             | No defects or abnormalities.                                     | Perform the five cycles according to the four heat treatments shown in the following table.<br><table><tr><th>Step</th><th>Temp. (°C)</th><th>Time (min)</th></tr><tr><td>1</td><td>Min. Operating Temp. +0/-3</td><td>30±3</td></tr><tr><td>2</td><td>Room Temp.</td><td>2 to 3</td></tr><tr><td>3</td><td>Max. Operating Temp. +3/-0</td><td>30±3</td></tr><tr><td>4</td><td>Room Temp.</td><td>2 to 3</td></tr></table><br>Exposure Time: 24±2h<br>• Initial measurement<br>Perform a heat treatment at 150+0/-10°C for 1h and then let sit for 24±2h at room temperature, then measure.                                                                               | Step        | Temp. (°C)       | Time (min)             | 1                      | Min. Operating Temp. +0/-3 | 30±3        | 2                    | Room Temp.              | 2 to 3      | 3                  | Max. Operating Temp. +3/-0 | 30±3                    | 4 | Room Temp.         | 2 to 3 |
| Step                   | Temp. (°C)                                 | Time (min)             |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 1                      | Min. Operating Temp. +0/-3                 | 30±3                   |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 2                      | Room Temp.                                 | 2 to 3                 |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 3                      | Max. Operating Temp. +3/-0                 | 30±3                   |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 4                      | Room Temp.                                 | 2 to 3                 |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
|                        |                                            | Capacitance Change     | Within ±7.5%                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
|                        |                                            | D.F.                   | Within the specified initial value.                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
|                        |                                            | I.R.                   | Within the specified initial value.                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
|                        |                                            | Voltage Proof          | No defects.                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |

Continued on the following page. ➤

GRM

GR3

GRJ

GR4

GR7

GJM

GQM

GA2

GA3

GA3

GA3

LL

LLA

LLM

LLR

NFM

KRM

KR3

GMA

GMD

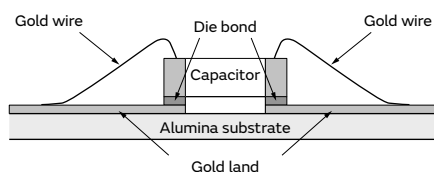
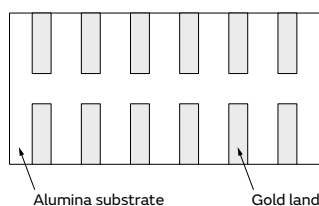
⚠Caution / Notice

## GMD Series Specifications and Test Methods (2)

Continued from the preceding page. ↘

| No | Item                                                | Specification      | Test Method (Ref. Standard: JIS C 5101, IEC60384)                   |
|----|-----------------------------------------------------|--------------------|---------------------------------------------------------------------|
| 12 | High Temperature<br>High Humidity<br>(Steady)<br>*2 | Appearance         | No defects or abnormalities.                                        |
|    |                                                     | Capacitance Change | Within $\pm 12.5\%$                                                 |
|    |                                                     | D.F.               | 0.2 max.                                                            |
|    |                                                     | I.R.               | More than 500M $\Omega$ or 12.5 $\Omega$ • F (Whichever is smaller) |
| 13 | Durability<br>*2                                    | Appearance         | No defects or abnormalities.                                        |
|    |                                                     | Capacitance Change | Within $\pm 12.5\%$                                                 |
|    |                                                     | D.F.               | 0.2 max.                                                            |
|    |                                                     | I.R.               | More than 1000M $\Omega$ or 25 $\Omega$ • F (Whichever is smaller)  |

\*2 Mounting for testing: The capacitors should be mounted on the substrate as shown below using die bonding and wire bonding when tests No.10 to 13 are performed.



3

## GMD Series Specifications and Test Methods (3)

| No                     | Item                                       |                        | Specification                                                    | Test Method (Ref. Standard: JIS C 5101, IEC60384)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
|------------------------|--------------------------------------------|------------------------|------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------|------------------------|------------------------|----------------------------|-------------|----------------------|-------------------------|-------------|--------------------|----------------------------|-------------------------|---|--------------------|--------|
| 1                      | Rated Voltage                              |                        | Shown in Rated value.                                            | The rated voltage is defined as the maximum voltage which may be applied continuously to the capacitor.<br>When AC voltage is superimposed on DC voltage, $V^{P-P}$ or $V^{O-P}$ , whichever is larger, should be maintained within the rated voltage range.                                                                                                                                                                                                                                                                                                                                                                                                               |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 2                      | Appearance                                 |                        | No defects or abnormalities.                                     | Visual inspection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 3                      | Dimension                                  |                        | Within the specified dimensions.                                 | Using Measuring instrument of dimension.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 4                      | Voltage Proof                              |                        | No defects or abnormalities.                                     | Measurement Point: Between the terminations<br>Test Voltage: 250% of the rated voltage<br>Applied Time: 1 to 5s<br>Charge/discharge current: 50mA max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 5                      | Insulation Resistance (I.R.)               |                        | More than 2000MΩ or 50Ω・F (Whichever is smaller)                 | Measurement Point: Between the terminations<br>Measurement Voltage: DC Rated Voltage<br>Charging Time: 1min<br>Charge/discharge current: 50mA max.<br>Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 6                      | Capacitance                                |                        | Shown in Rated value.                                            | Measurement Temperature: Room Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 7                      | Dissipation Factor (D.F.)                  |                        | 0.1 max.                                                         | <table><tr><th>Capacitance</th><th>Frequency</th><th>Voltage</th></tr><tr><td>*1 C ≤ 10μF (10V min.)</td><td>1.0±0.1kHz</td><td>1.0±0.2Vrms</td></tr><tr><td>C ≤ 10μF (6.3V max.)</td><td>1.0±0.1kHz</td><td>0.5±0.1Vrms</td></tr></table><br>*1 GMD155 B3/R6 1A 124 to 224 are applied to 0.5±0.1Vrms                                                                                                                                                                                                                                                                                                                                                                     | Capacitance | Frequency        | Voltage                | *1 C ≤ 10μF (10V min.) | 1.0±0.1kHz                 | 1.0±0.2Vrms | C ≤ 10μF (6.3V max.) | 1.0±0.1kHz              | 0.5±0.1Vrms |                    |                            |                         |   |                    |        |
| Capacitance            | Frequency                                  | Voltage                |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| *1 C ≤ 10μF (10V min.) | 1.0±0.1kHz                                 | 1.0±0.2Vrms            |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| C ≤ 10μF (6.3V max.)   | 1.0±0.1kHz                                 | 0.5±0.1Vrms            |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 8                      | Temperature Characteristics of Capacitance | No Bias                | B3: Within ±10% (-25 to +85°C)<br>R6: Within ±15% (-55 to +85°C) | The capacitance change should be measured after 5 minutes at each specified temp. stage.<br>Capacitance value as a reference is the value in step 3.<br><table><tr><th>Step</th><th>Temperature (°C)</th><th>Applying Voltage (VDC)</th></tr><tr><td>1</td><td>Reference Temp. ±2</td><td rowspan="5">No bias</td></tr><tr><td>2</td><td>Min. Operating Temp. ±3</td></tr><tr><td>3</td><td>Reference Temp. ±2</td></tr><tr><td>4</td><td>Max. Operating Temp. ±3</td></tr><tr><td>5</td><td>Reference Temp. ±2</td></tr></table><br>• Initial measurement<br>Perform a heat treatment at 150+0/-10°C for 1h and then let sit for 24±2h at room temperature, then measure. | Step        | Temperature (°C) | Applying Voltage (VDC) | 1                      | Reference Temp. ±2         | No bias     | 2                    | Min. Operating Temp. ±3 | 3           | Reference Temp. ±2 | 4                          | Max. Operating Temp. ±3 | 5 | Reference Temp. ±2 |        |
| Step                   | Temperature (°C)                           | Applying Voltage (VDC) |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 1                      | Reference Temp. ±2                         | No bias                |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 2                      | Min. Operating Temp. ±3                    |                        |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 3                      | Reference Temp. ±2                         |                        |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 4                      | Max. Operating Temp. ±3                    |                        |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 5                      | Reference Temp. ±2                         |                        |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 9                      | Adhesive Strength of Termination           | Bond Strength          | Pull force: 0.03N min.                                           | MIL-STD-883 Method 2011 Condition D<br>Mount the capacitor on a gold metalized alumina substrate with Au-20Sn and bond a ø25μm (ø0.001 inch) gold wire to the capacitor terminal using an ultrasonic ball bond. Then, pull wire.                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
|                        |                                            | Die Shear Strength     | Die Shear force: 2N min.                                         | MIL-STD-883 Method 2019<br>Mount the capacitor on a gold metalized alumina substrate with Au-20Sn. Apply the force parallel to the substrate.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 10                     | Vibration *2                               | Appearance             | No defects or abnormalities.                                     | Kind of Vibration: A simple harmonic motion<br>10Hz to 55Hz to 10Hz (1min)<br>Total amplitude: 1.5mm<br>This motion should be applied for a period of 2h in each 3 mutually perpendicular directions (total of 6h).                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
|                        |                                            | Capacitance            | Within the specified initial value.                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
|                        |                                            | D.F.                   | Within the specified initial value.                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 11                     | Temperature Sudden Change *2               | Appearance             | No defects or abnormalities.                                     | Perform the five cycles according to the four heat treatments shown in the following table.<br><table><tr><th>Step</th><th>Temp. (°C)</th><th>Time (min)</th></tr><tr><td>1</td><td>Min. Operating Temp. +0/-3</td><td>30±3</td></tr><tr><td>2</td><td>Room Temp.</td><td>2 to 3</td></tr><tr><td>3</td><td>Max. Operating Temp. +3/-0</td><td>30±3</td></tr><tr><td>4</td><td>Room Temp.</td><td>2 to 3</td></tr></table><br>Exposure Time: 24±2h<br>• Initial measurement<br>Perform a heat treatment at 150+0/-10°C for 1h and then let sit for 24±2h at room temperature, then measure.                                                                                | Step        | Temp. (°C)       | Time (min)             | 1                      | Min. Operating Temp. +0/-3 | 30±3        | 2                    | Room Temp.              | 2 to 3      | 3                  | Max. Operating Temp. +3/-0 | 30±3                    | 4 | Room Temp.         | 2 to 3 |
|                        |                                            | Step                   | Temp. (°C)                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Time (min)  |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
|                        |                                            | 1                      | Min. Operating Temp. +0/-3                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 30±3        |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
|                        |                                            | 2                      | Room Temp.                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2 to 3      |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
|                        |                                            | 3                      | Max. Operating Temp. +3/-0                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 30±3        |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| 4                      | Room Temp.                                 | 2 to 3                 |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| Capacitance Change     | Within ±7.5%                               |                        |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| D.F.                   | Within the specified initial value.        |                        |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| I.R.                   | Within the specified initial value.        |                        |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |
| Voltage Proof          | No defects.                                |                        |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |                  |                        |                        |                            |             |                      |                         |             |                    |                            |                         |   |                    |        |

Continued on the following page. ➡

GRM

GR3

GRJ

GR4

GR7

GJM

GQM

GA2

GA3 GB

GA3 GD

GA3 GF

LLL

LLA

LLM

LLR

NFM

KRM

KR3

GMA

GMD

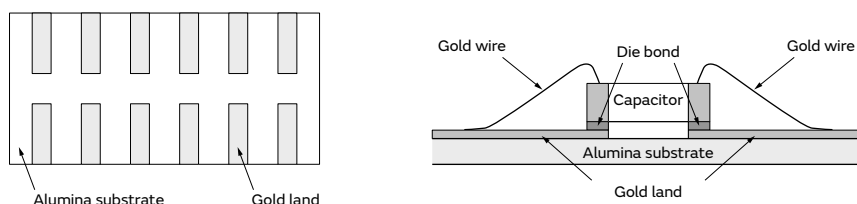
⚠Caution /Notice

## GMD Series Specifications and Test Methods (3)

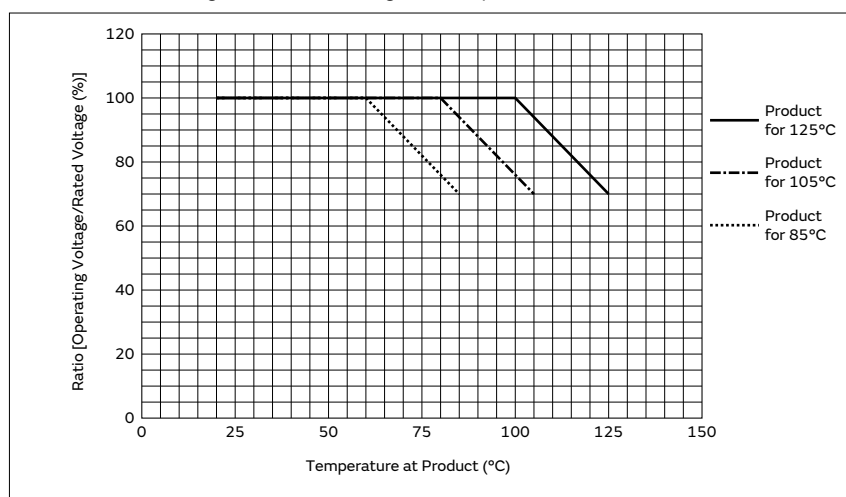
Continued from the preceding page. ↘

| No | Item                                                | Specification      | Test Method (Ref. Standard: JIS C 5101, IEC60384)                   |
|----|-----------------------------------------------------|--------------------|---------------------------------------------------------------------|
| 12 | High Temperature<br>High Humidity<br>(Steady)<br>*2 | Appearance         | No defects or abnormalities.                                        |
|    |                                                     | Capacitance Change | Within $\pm 12.5\%$                                                 |
|    |                                                     | D.F.               | 0.2 max.                                                            |
|    |                                                     | I.R.               | More than 500M $\Omega$ or 12.5 $\Omega$ • F (Whichever is smaller) |
| 13 | Durability<br>*2                                    | Appearance         | No defects or abnormalities.                                        |
|    |                                                     | Capacitance Change | Within $\pm 12.5\%$                                                 |
|    |                                                     | D.F.               | 0.2 max.                                                            |
|    |                                                     | I.R.               | More than 1000M $\Omega$ or 25 $\Omega$ • F (Whichever is smaller)  |

\*2 Mounting for testing: The capacitors should be mounted on the substrate as shown below using die bonding and wire bonding when tests No.10 to 13 are performed.



Recommended derating conditions on voltage and temperature



These Part Numbers are designed for use in the circuits where continuous applied voltage to the capacitor is derated than rated voltage, and guarantee Durability Test with 120% × rated voltage as testing voltage at the maximum operating temperature.

The voltage and temperature derating conditions on the upside are recommended for use to ensure the same reliability level as normal specification.

**GRM, GR3, GRJ, GR4, GR7, GJM,  
GQM, GA2, GA3, LLL, LLA, LLM,  
LLR, NFM, KRM, KR3, GMA, GMD**

**⚠Caution/Notice**

**WEB** 

**⚠Caution**

|                                                                  |     |
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**Notice**

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GRM

GR3

GRJ

GR4

GR7

GJM

GQM

GA2

GA3

GB

GA3

GD

GA3

GF

LLL

LLA

LLM

LLR

NFM

KRM

KR3

GMA

GMD

⚠Caution  
/Notice

## ⚠Caution

### Storage and Operation Conditions

1. The performance of chip multilayer ceramic capacitors and chip EMIFIL NFM series (henceforth just “capacitors”) may be affected by the storage conditions.

Please use them promptly after delivery.

- 1-1. Maintain appropriate storage for the capacitors using the following conditions: Room Temperature of +5 to +40°C and a Relative Humidity of 20 to 70%. High temperature and humidity conditions and/or prolonged storage may cause deterioration of the packaging materials. If more than six months have elapsed since delivery, check packaging, mounting, etc. before use.  
In addition, this may cause oxidation of the electrodes. If more than one year has elapsed since delivery, also check the solderability before use.

- 1-2. Corrosive gas can react with the termination (external) electrodes or lead wires of capacitors, and result in poor solderability. Do not store the capacitors in an atmosphere consisting of corrosive gas (e.g., hydrogen sulfide, sulfur dioxide, chlorine, ammonia gas, etc.).

- 1-3. Due to moisture condensation caused by rapid humidity changes, or the photochemical change caused by direct sunlight on the terminal electrodes and/or the resin/epoxy coatings, the solderability and electrical performance may deteriorate. Do not store capacitors under direct sunlight or in high humidity conditions.

### Rating

#### 1. Temperature Dependent Characteristics

1. The electrical characteristics of a capacitor can change with temperature.

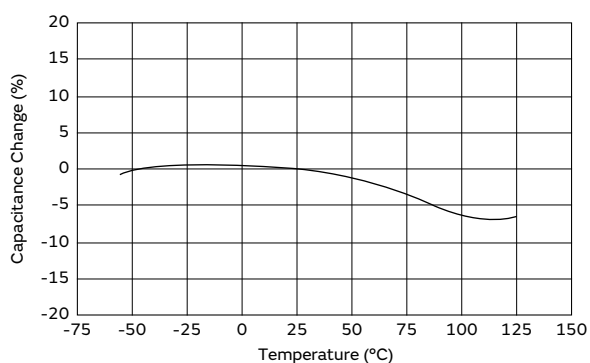
- 1-1. For capacitors having larger temperature dependency, the capacitance may change with temperature changes.  
The following actions are recommended in order to ensure suitable capacitance values.  
(1) Select a suitable capacitance for the operating temperature range.

- (2) The capacitance may change within the rated temperature.

When you use a high dielectric constant type capacitor in a circuit that needs a tight (narrow) capacitance tolerance (e.g., a time-constant circuit), please carefully consider the temperature characteristics, and carefully confirm the various characteristics in actual use conditions and the actual system.

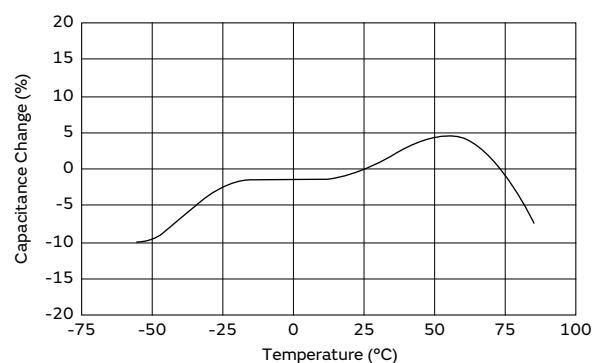
[Example of Temperature Characteristics X7R (R7)]

Sample: 0.1μF, Rated Voltage 50VDC



[Example of Temperature Characteristics X5R (R6)]

Sample: 22μF, Rated Voltage 4VDC



#### 2. Measurement of Capacitance

1. Measure capacitance with the voltage and frequency specified in the product specifications.

- 1-1. The output voltage of the measuring equipment may decrease occasionally when capacitance is high. Please confirm whether a prescribed measured voltage is impressed to the capacitor.

- 1-2. The capacitance values of high dielectric constant type capacitors change depending on the AC voltage applied. Please consider the AC voltage characteristics when selecting a capacitor to be used in an AC circuit.

Continued on the following page. ↗

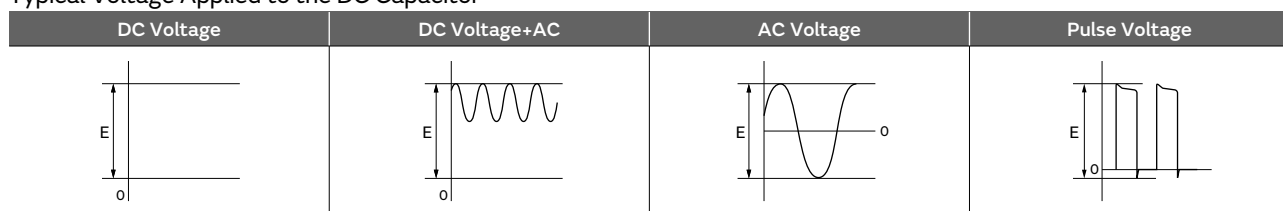
## ⚠Caution

Continued from the preceding page. ↩

### 3. Applied Voltage and Applied Current

1. Do not apply a voltage to the capacitor that exceeds the rated voltage as called out in the specifications.
  - 1-1. Applied voltage between the terminals of a capacitor shall be less than or equal to the rated voltage.
    - (1) When AC voltage is superimposed on DC voltage, the zero-to-peak voltage shall not exceed the rated DC voltage.  
When AC voltage or pulse voltage is applied, the peak-to-peak voltage shall not exceed the rated DC voltage.
    - (2) Abnormal voltages (surge voltage, static electricity, pulse voltage, etc.) shall not exceed the rated DC voltage.

Typical Voltage Applied to the DC Capacitor



(E: Maximum possible applied voltage.)

- 1-2. Influence of over voltage  
Over voltage that is applied to the capacitor may result in an electrical short circuit caused by the breakdown of the internal dielectric layers.  
The time duration until breakdown depends on the applied voltage and the ambient temperature.
2. Use a safety standard certified capacitor in a power supply input circuit (AC filter), as it is also necessary to consider the withstand voltage and impulse withstand voltage defined for each device.

#### <Applicable to NFM Series>

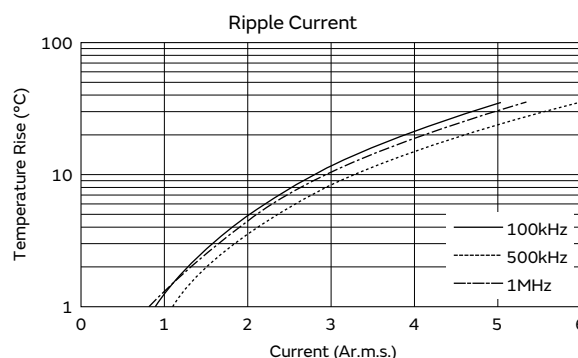
3. The capacitors also have rated currents.  
The current flowing between the terminals of a capacitor shall be less than or equal to the rated current. Using the capacitor beyond this range could lead to excessive heat.

### 4. Type of Applied Voltage and Self-heating Temperature

1. Confirm the operating conditions to make sure that no large current is flowing into the capacitor due to the continuous application of an AC voltage or pulse voltage.  
When a DC rated voltage product is used in an AC voltage circuit or a pulse voltage circuit, the AC current or pulse current will flow into the capacitor; therefore check the self-heating condition.  
Please confirm the surface temperature of the capacitor so that the temperature remains within the upper limits of the operating temperature, including the rise in temperature due to self-heating. When the capacitor is used with a high-frequency voltage or pulse voltage, heat may be generated by dielectric loss.  
<Applicable to Rated Voltage of less than 100VDC>
  - 1-1. The load should be contained so that the self-heating of the capacitor body remains below 20°C, when measuring at an ambient temperature of 25°C.

[Example of Temperature Rise (Heat Generation) in Chip Multilayer Ceramic Capacitors in Contrast to Ripple Current]

Sample: R (R1) characteristics 10μF,  
Rated voltage: DC10V



Continued on the following page. ↗

## ⚠Caution

Continued from the preceding page. ↘

### <Applicable to Temperature Characteristics X7R (R7), X7T (D7), X7T (W0) beyond Rated Voltage of 200VDC>

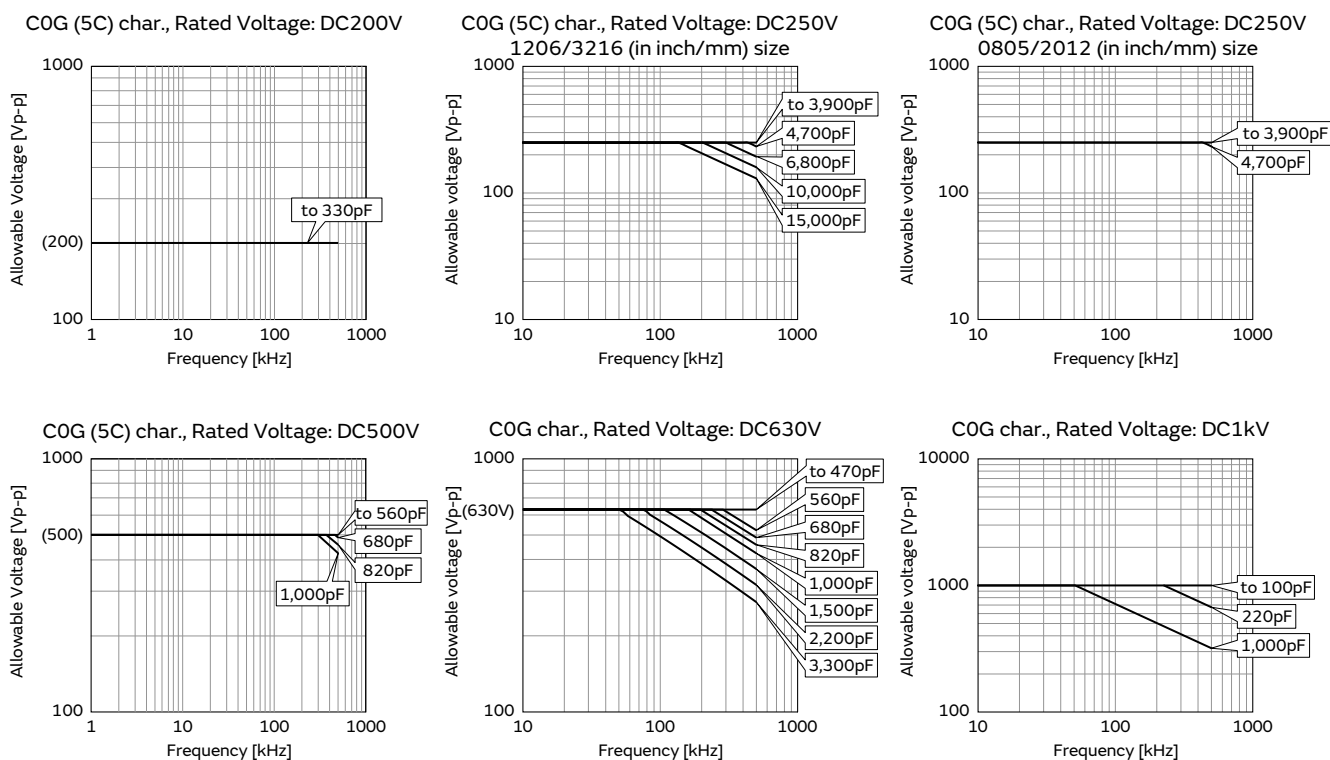
1-2. The load should be contained so that the self-heating of the capacitor body remains below 20°C, when measuring at an ambient temperature of 25°C. In addition, use a K thermocouple of  $\varnothing 0.1\text{mm}$  with less heat capacity when measuring, and measure in a condition where there is no effect from the radiant heat of other components or air flow caused by convection. Excessive generation of heat may cause deterioration of the characteristics and reliability of the capacitor. (Absolutely do not perform measurements while the cooling fan is operating, as an accurate measurement may not be performed.)

### <Applicable to Temperature Characteristics U2J (7U), C0G (5C) beyond Rated Voltage of 200VDC>

1-3. Since the self-heating is low in the low loss series, the allowable power becomes extremely high compared to the common X7R (R7) characteristics. However, when a load with self-heating of 20°C is applied at the rated voltage, the allowable power may be exceeded. When the capacitor is used in a high-frequency voltage circuit of 1kHz or more, the frequency of the applied voltage should be less than 500kHz sine wave (less than 100kHz for a product with rated voltage of DC3.15kV), to limit the voltage load so that the load remains within the derating shown in the following figure. In the case of non-sine wave, high-frequency components exceeding the fundamental frequency may be included. In such a case, please contact Murata. The excessive generation of heat may cause deterioration of the characteristics and reliability of the capacitor. (Absolutely do not perform measurements while the cooling fan is operating, as an accurate measurement may not be performed.)

#### [The sine-wave frequency VS allowable voltage]

The surface temperature of the capacitor: 125°C or less (including self-heating)



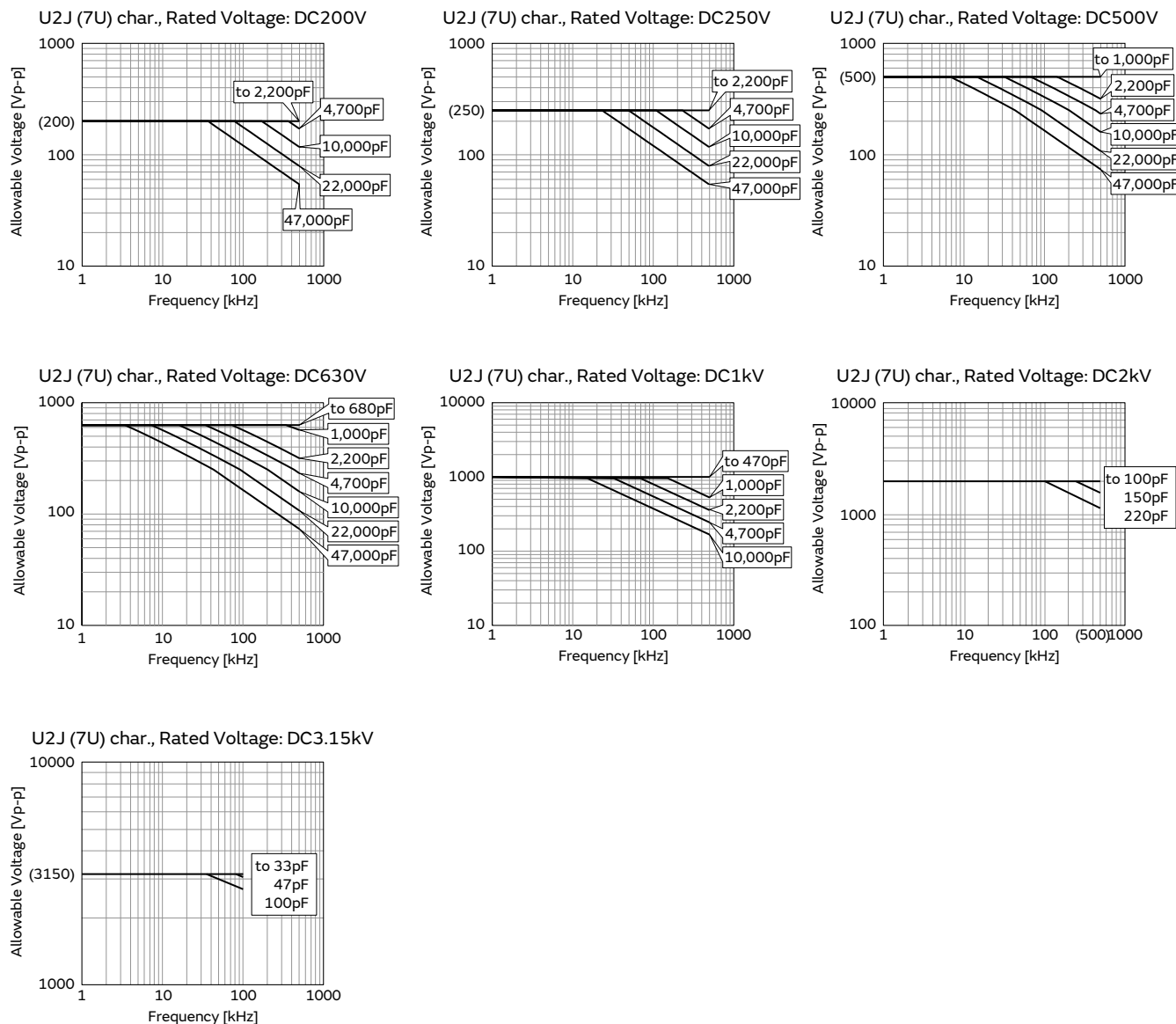
Continued on the following page. ↗

## ⚠Caution

Continued from the preceding page. ↘

### [The sine-wave frequency VS allowable voltage]

The surface temperature of the capacitor: 125°C or less  
(including self-heating)



Continued on the following page. ↗

## ⚠Caution

Continued from the preceding page. ↘

### 5. DC Voltage and AC Voltage Characteristics

1. The capacitance value of a high dielectric constant type capacitor changes depending on the DC voltage applied. Please consider the DC voltage characteristics when a capacitor is selected for use in a DC circuit.

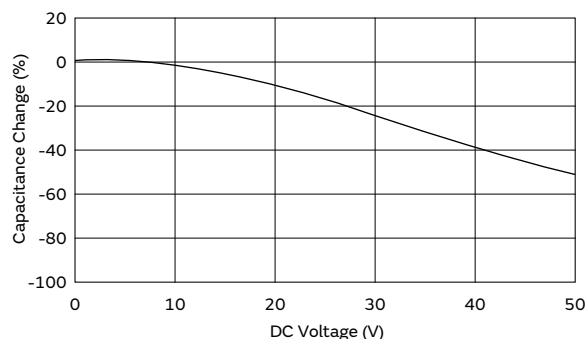
1-1. The capacitance of ceramic capacitors may change sharply depending on the applied voltage (see figure). Please confirm the following in order to secure the capacitance.

- (1) Determine whether the capacitance change caused by the applied voltage is within the allowed range.
- (2) In the DC voltage characteristics, the rate of capacitance change becomes larger as voltage increases, even if the applied voltage is below the rated voltage. When a high dielectric constant type capacitor is used in a circuit that requires a tight (narrow) capacitance tolerance (e.g., a time constant circuit), please carefully consider the voltage characteristics, and confirm the various characteristics in the actual operating conditions of the system.

2. The capacitance values of high dielectric constant type capacitors changes depending on the AC voltage applied. Please consider the AC voltage characteristics when selecting a capacitor to be used in an AC circuit.

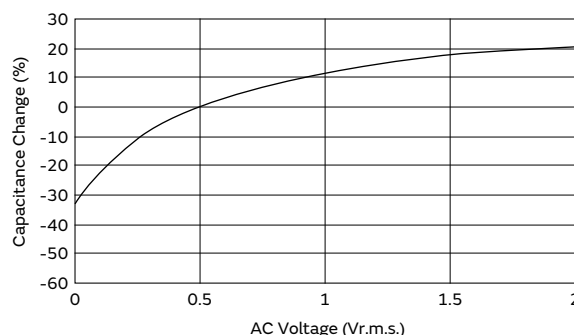
#### [Example of DC Voltage Characteristics]

Sample: X7R (R7) Characteristics 0.1 $\mu$ F,  
Rated Voltage 50VDC



#### [Example of AC Voltage Characteristics]

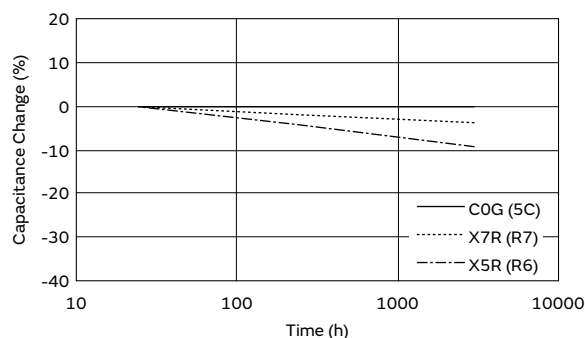
Sample: X7R (R7) Characteristics 10 $\mu$ F,  
Rated Voltage 6.3VDC



### 6. Capacitance Aging

1. The high dielectric constant type capacitors have an Aging characteristic in which the capacitance value decreases with the passage of time. When you use high dielectric constant type capacitors in a circuit that needs a tight (narrow) capacitance tolerance (e.g., a time-constant circuit), please carefully consider the characteristics of these capacitors, such as their aging, voltage, and temperature characteristics. In addition, check capacitors using your actual appliances at the intended environment and operating conditions.

#### [Example of Change Over Time (Aging Characteristics)]



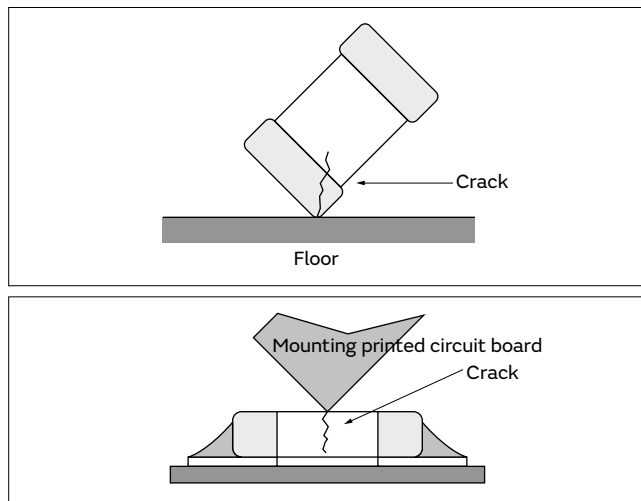
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## ⚠Caution

Continued from the preceding page. ↘

### 7. Vibration and Shock

1. Please confirm the kind of vibration and/or shock, its condition, and any generation of resonance.  
Please mount the capacitor so as not to generate resonance, and do not allow any impact on the terminals.
2. Mechanical shock due to being dropped may cause damage or a crack in the dielectric material of the capacitor.  
Do not use a dropped capacitor because the quality and reliability may be deteriorated.
3. When printed circuit boards are piled up or handled, the corner of another printed circuit board should not be allowed to hit the capacitor, in order to avoid a crack or other damage to the capacitor.



## Soldering and Mounting

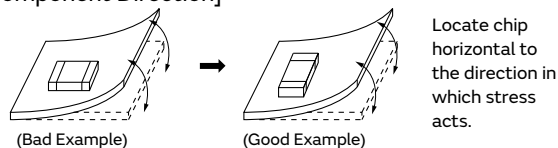
### 1. Mounting Position

1. Confirm the best mounting position and direction that minimizes the stress imposed on the capacitor during flexing or bending the printed circuit board.
- 1-1. Choose a mounting position that minimizes the stress imposed on the chip during flexing or bending of the board.

#### <Applicable to NFM Series>

2. If you mount the capacitor near components that generate heat, take note of the heat from the other components and carefully check the self-heating of the capacitor before using.  
If there is significant heat radiation from other components, it could lower the insulation resistance of the capacitor or produce excessive heat.

#### [Component Direction]

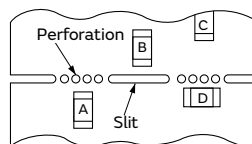


#### [Chip Mounting Close to Board Separation Point]

It is effective to implement the following measures, to reduce stress in separating the board.

It is best to implement all of the following three measures; however, implement as many measures as possible to reduce stress.

| Contents of Measures                                                                       | Stress Level |
|--------------------------------------------------------------------------------------------|--------------|
| (1) Turn the mounting direction of the component parallel to the board separation surface. | A > D *1     |
| (2) Add slits in the board separation part.                                                | A > B        |
| (3) Keep the mounting position of the component away from the board separation surface.    | A > C        |

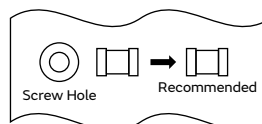


\*1 A > D is valid when stress is added vertically to the perforation as with Hand Separation.

If a Cutting Disc is used, stress will be diagonal to the PCB, therefore A > D is invalid.

#### [Mounting Capacitors Near Screw Holes]

When a capacitor is mounted near a screw hole, it may be affected by the board deflection that occurs during the tightening of the screw. Mount the capacitor in a position as far away from the screw holes as possible.



Continued on the following page. ↗

## ⚠Caution

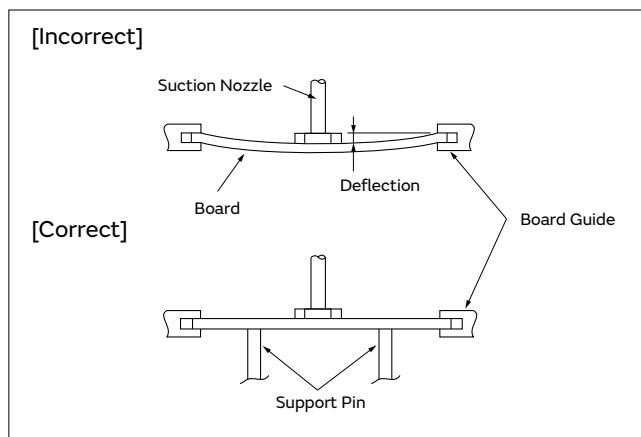
Continued from the preceding page. ↘

### 2. Information before Mounting

1. Do not re-use capacitors that were removed from the equipment.
2. Confirm capacitance characteristics under actual applied voltage.
3. Confirm the mechanical stress under actual process and equipment use.
4. Confirm the rated capacitance, rated voltage and other electrical characteristics before assembly.
5. Prior to use, confirm the solderability of capacitors that were in long-term storage.
6. Prior to measuring capacitance, carry out a heat treatment for capacitors that were in long-term storage.
7. The use of Sn-Zn based solder will deteriorate the reliability of the MLCC.  
Please contact our sales representative or product engineers on the use of Sn-Zn based solder in advance.
8. We have also produced a DVD which shows a summary of our recommendations, regarding the precautions for mounting. Please contact our sales representative to request the DVD.

### 3. Maintenance of the Mounting (pick and place) Machine

1. Make sure that the following excessive forces are not applied to the capacitors. Check the mounting in the actual device under actual use conditions ahead of time.
    - 1-1. In mounting the capacitors on the printed circuit board, any bending force against them shall be kept to a minimum to prevent them from any damage or cracking. Please take into account the following precautions and recommendations for use in your process.
      - (1) Adjust the lowest position of the pickup nozzle so as not to bend the printed circuit board.
  2. Dirt particles and dust accumulated in the suction nozzle and suction mechanism prevent the nozzle from moving smoothly. This creates excessive force on the capacitor during mounting, causing cracked chips. Also, the locating claw, when worn out, imposes uneven forces on the chip when positioning, causing cracked chips. The suction nozzle and the locating claw must be maintained, checked, and replaced periodically.
- <Applicable to ZRB Series>
3. To adjust the inspection tolerance for automated appearance sorting machine of mounting position, because ZRB series are easier to shift the mounting position than standard MLCC.
  4. To check the overturn and reverse of chip.
  5. To control mounting speed carefully, because ZRB series is heavier than standard MLCC.



Continued on the following page. ↗

## ⚠Caution

Continued from the preceding page. ↩

### 4-1. Reflow Soldering

- When sudden heat is applied to the components, the mechanical strength of the components will decrease because a sudden temperature change causes deformation inside the components. In order to prevent mechanical damage to the components, preheating is required for both the components and the PCB. Preheating conditions are shown in table 1. It is required to keep the temperature differential between the solder and the components surface ( $\Delta T$ ) as small as possible.
- When components are immersed in solvent after mounting, be sure to maintain the temperature difference ( $\Delta T$ ) between the component and the solvent within the range shown in table 1.

Table 1

| Series                              | Chip Dimension Code (L/W) | Temperature Differential          |
|-------------------------------------|---------------------------|-----------------------------------|
| GRM/GJM/GQM/GR3/GRJ/KRM/LLR/NFM/GR7 | 02/03/15/18/21/31         | $\Delta T \leq 190^\circ\text{C}$ |
| LLL                                 | 02/03/15/18/1U/21/31      |                                   |
| ZRB                                 | 15/18                     |                                   |
| GR3/GRJ/GRM/KR3/KRM GA2/GA3/GR4     | 32/42/43/52/55            | $\Delta T \leq 130^\circ\text{C}$ |
| LLA/LLM                             | 18/21/31                  |                                   |
| GQM                                 | 22                        |                                   |

#### Recommended Conditions

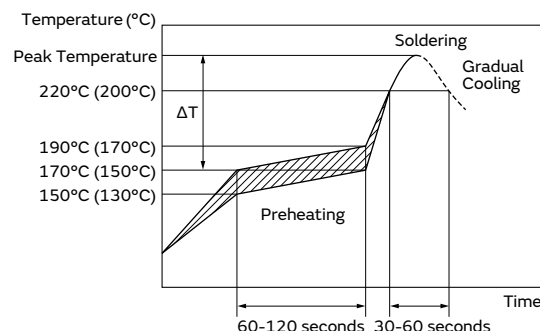
|                  | Pb-Sn Solder | Lead Free Solder      |
|------------------|--------------|-----------------------|
| Peak Temperature | 230 to 250°C | 240 to 260°C          |
| Atmosphere       | Air          | Air or N <sub>2</sub> |

Pb-Sn Solder: Sn-37Pb

Lead Free Solder: Sn-3.0Ag-0.5Cu

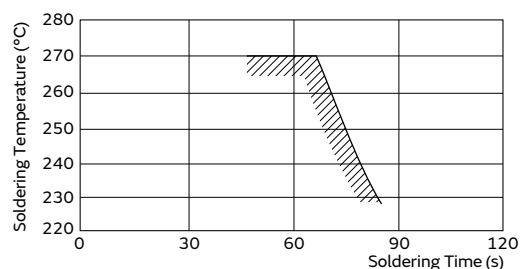
- When a capacitor is mounted at a temperature lower than the peak reflow temperature recommended by the solder manufacturer, the following quality problems can occur. Consider factors such as the placement of peripheral components and the reflow temperature setting to prevent the capacitor's reflow temperature from dropping below the peak temperature specified. Be sure to evaluate the mounting situation beforehand and verify that none of the following problems occur.
  - Drop in solder wettability
  - Solder voids
  - Possible occurrence of whiskering
  - Drop in bonding strength
  - Drop in self-alignment properties
  - Possible occurrence of tombstones and/or shifting on the land patterns of the circuit board

#### [Example of Temperature Conditions for Reflow Soldering]



Temperature  
In case of Lead Free Solder  
( ): In case of Pb-Sn Solder

#### [Allowable Reflow Soldering Temperature and Time]



In the case of repeated soldering, the accumulated soldering time must be within the range shown above.

Continued on the following page. ↗

## ⚠Caution

Continued from the preceding page. ↘

### 4. Optimum Solder Amount for Reflow Soldering

- 4-1. Overly thick application of solder paste results in a excessive solder fillet height.  
This makes the chip more susceptible to mechanical and thermal stress on the board and may cause the chips to crack.
- 4-2. Too little solder paste results in a lack of adhesive strength on the termination, which may result in chips breaking loose from the PCB.
- 4-3. Please confirm that solder has been applied smoothly to the termination.

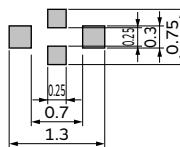
### <Applicable to NFM Series>

[Guideline of solder paste thickness]

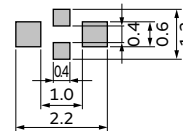
100-150μm: NFM15/18/21/3D/31

100-200μm: NFM41

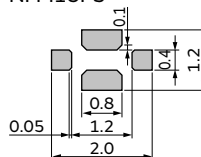
NFM15CC/15PC



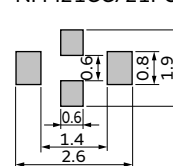
NFM18CC/18PC



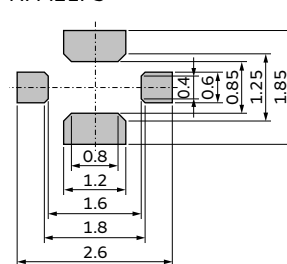
NFM18PS



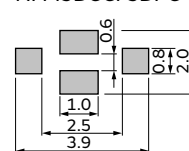
NFM21CC/21PC



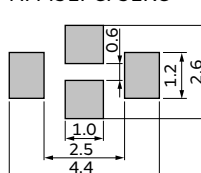
NFM21PS



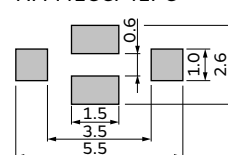
NFM3DCC/3DPC



NFM31PC/31KC



NFM41CC/41PC



### Inverting the PCB

Make sure not to impose any abnormal mechanical shocks to the PCB.

Continued on the following page. ↗

## ⚠Caution

Continued from the preceding page. ↘

### 4-2. Flow Soldering

1. Do not apply flow soldering to chips not listed in table 2.

Table 2

| Series  | Chip Dimension Code (L/W) | Temperature Differential          |
|---------|---------------------------|-----------------------------------|
| GR3/GRM | 18/21/31                  | $\Delta T \leq 150^\circ\text{C}$ |
| GQM     | 18/21                     |                                   |
| LLL     | 21/31                     |                                   |
| GRJ     | 18/21/31                  |                                   |
| NFM     | 3D/31/41                  |                                   |

- When sudden heat is applied to the components, the mechanical strength of the components will decrease because a sudden temperature change causes deformation inside the components. In order to prevent mechanical damage to the components, preheating is required for both of the components and the PCB. Preheating conditions are shown in table 2. It is required to keep the temperature differential between the solder and the components surface ( $\Delta T$ ) as low as possible.
- Excessively long soldering time or high soldering temperature can result in leaching of the terminations, causing poor adhesion or a reduction in capacitance value due to loss of contact between the inner electrodes and terminations.
- When components are immersed in solvent after mounting, be sure to maintain the temperature differential ( $\Delta T$ ) between the component and solvent within the range shown in the table 2.

#### Recommended Conditions

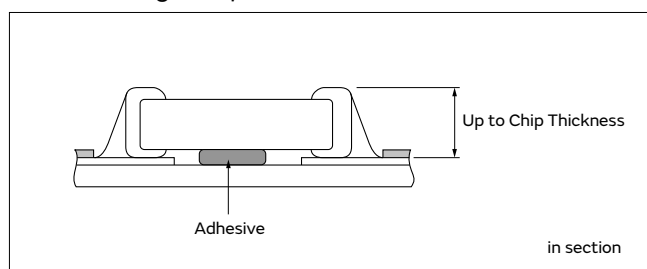
|                             | Pb-Sn Solder | Lead Free Solder                   |
|-----------------------------|--------------|------------------------------------|
| Preheating Peak Temperature | 90 to 110°C  | 100 to 120°C<br>140 to 160°C (NFM) |
| Soldering Peak Temperature  | 240 to 250°C | 250 to 260°C                       |
| Atmosphere                  | Air          | Air or N <sub>2</sub>              |

Pb-Sn Solder: Sn-37Pb

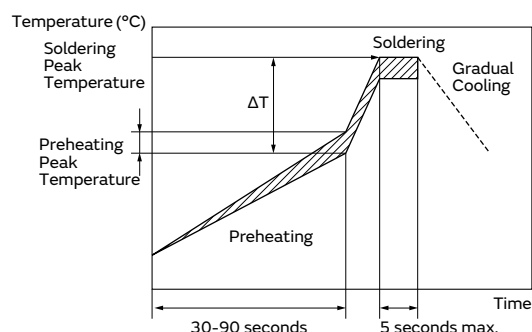
Lead Free Solder: Sn-3.0Ag-0.5Cu

#### 5. Optimum Solder Amount for Flow Soldering

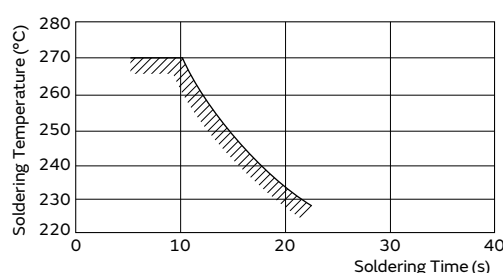
- The top of the solder fillet should be lower than the thickness of the components. If the solder amount is excessive, the risk of cracking is higher during board bending or any other stressful condition.



#### [Example of Temperature Conditions for Flow Soldering]



#### [Allowable Flow Soldering Temperature and Time]



In the case of repeated soldering, the accumulated soldering time must be within the range shown above.

Continued on the following page. ↗

## ⚠Caution

Continued from the preceding page. ↩

### 4-3. Correction of Soldered Portion

When sudden heat is applied to the capacitor, distortion caused by the large temperature difference occurs internally, and can be the cause of cracks. Capacitors also tend to be affected by mechanical and thermal stress depending on the board preheating temperature or the soldering fillet shape, and can be the cause of cracks. Please refer to "1. PCB Design" or "3. Optimum solder amount" for the solder amount and the fillet shapes.

Do not correct with a soldering iron for ZRB series.

Correction with a soldering iron for ZRB series may cause loss suppress acoustic noise, because the solder amount become excessive.

#### 1. Correction with a Soldering Iron

- 1-1. In order to reduce damage to the capacitor, be sure to preheat the capacitor and the mounting board. Preheat to the temperature range shown in Table 3. A hot plate, hot air type preheater, etc. can be used for preheating.
- 1-2. After soldering, do not allow the component/PCB to cool down rapidly.
- 1-3. Perform the corrections with a soldering iron as quickly as possible. If the soldering iron is applied too long, there is a possibility of causing solder leaching on the terminal electrodes, which will cause deterioration of the adhesive strength and other problems.

Table 3

| Series                  | Chip Dimension Code (L/W) | Temperature of Soldering Iron Tip | Preheating Temperature | Temperature Differential ( $\Delta T$ ) | Atmosphere |
|-------------------------|---------------------------|-----------------------------------|------------------------|-----------------------------------------|------------|
| GJM/GQM/GR3/GRJ/GRM/GR7 | 03/15/18/21/31            | 350°C max.                        | 150°C min.             | $\Delta T \leq 190^\circ\text{C}$       | Air        |
| GRJ/GRM/GR4/GA2/GA3     | 32/42/43/52/55            | 280°C max.                        | 150°C min.             | $\Delta T \leq 130^\circ\text{C}$       | Air        |
| GQM                     | 22                        |                                   |                        |                                         |            |
| NFM                     | 3D/41                     | 350°C max.                        | 150°C min.             | $\Delta T \leq 190^\circ\text{C}$       | Air        |
|                         | 15                        | 340°C max.                        |                        |                                         |            |

\*Applicable for both Pb-Sn and Lead Free Solder.

Pb-Sn Solder: Sn-37Pb

Lead Free Solder: Sn-3.0Ag-0.5Cu

\*Please manage  $\Delta T$  in the temperature of soldering iron and the preheating temperature.

#### 2. Correction with Spot Heater

Compared to local heating with a soldering iron, hot air heating by a spot heater heats the overall component and board, therefore, it tends to lessen the thermal shock. In the case of a high density mounted board, a spot heater can also prevent concerns of the soldering iron making direct contact with the component.

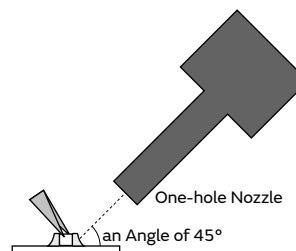
- 2-1. If the distance from the hot air outlet of the spot heater to the component is too close, cracks may occur due to thermal shock. To prevent this problem, follow the conditions shown in Table 4.

- 2-2. In order to create an appropriate solder fillet shape, it is recommended that hot air be applied at the angle shown in Figure 1.

Table 4

|                                   |                                                        |
|-----------------------------------|--------------------------------------------------------|
| Distance                          | 5mm or more                                            |
| Hot Air Application Angle         | 45° *Figure 1                                          |
| Hot Air Temperature Nozzle Outlet | 400°C max.                                             |
| Application Time                  | Less than 10 seconds<br>(1206 (3216M) size or smaller) |
|                                   | Less than 30 seconds<br>(1210 (3225M) size or larger)  |

[\*Figure 1]

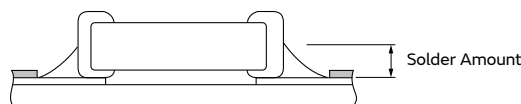


#### 3. Optimum solder amount when re-working with a soldering iron

- 3-1. If the solder amount is excessive, the risk of cracking is higher during board bending or any other stressful condition.

Too little solder amount results in a lack of adhesive strength on the termination, which may result in chips breaking loose from the PCB.

Please confirm that solder has been applied smoothly and rising to the end surface of the chip.



in section

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## ⚠Caution

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3-2. A soldering iron with a tip of  $\phi 3\text{mm}$  or smaller should be used. It is also necessary to keep the soldering iron from touching the components during the re-work.

3-3. Solder wire with  $\phi 0.5\text{mm}$  or smaller is required for soldering.

### <Applicable to KR3/KRM Series>

4. For the shape of the soldering iron tip, refer to the figure on the right.

Regarding the type of solder, use a wire diameter of  $\phi 0.5\text{mm}$  or less (rosin core wire solder).

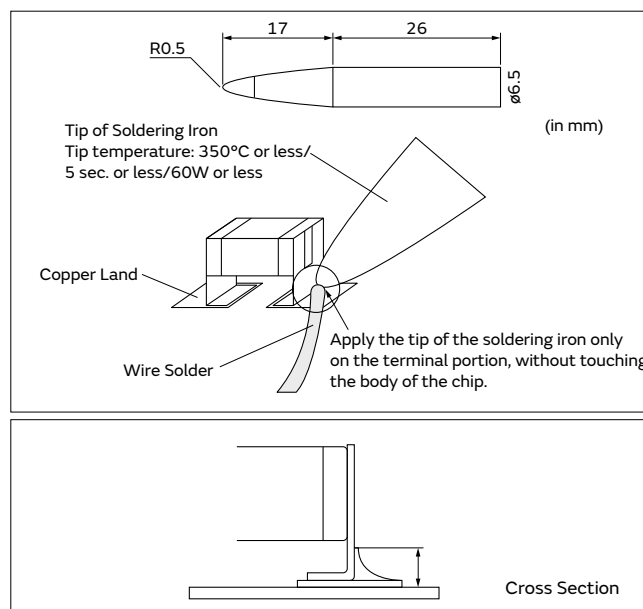
#### 4-1. How to Apply the Soldering Iron

Apply the tip of the soldering iron against the lower end of the metal terminal.

- 1) In order to prevent cracking caused by sudden heating of the ceramic device, do not touch the ceramic base directly.
- 2) In order to prevent deviations and dislocating of the chip, do not touch the junction of the chip and the metal terminal, and the metal portion on the outside directly.

#### 4-2. Appropriate Amount of Solder

The amount of solder for corrections by soldering iron, should be lower than the height of the lower side of the chip.



## 5. Washing

Excessive ultrasonic oscillation during cleaning can cause the PCBs to resonate, resulting in cracked chips or broken solder joints. Before starting your production process, test your cleaning equipment/process to insure it does not degrade the capacitors.

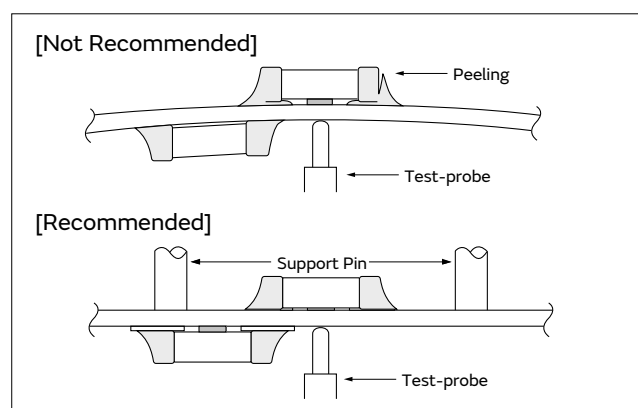
## 6. Electrical Test on Printed Circuit Board

1. Confirm position of the support pin or specific jig, when inspecting the electrical performance of a capacitor after mounting on the printed circuit board.

1-1. Avoid bending the printed circuit board by the pressure of a test-probe, etc.

The thrusting force of the test probe can flex the PCB, resulting in cracked chips or open solder joints. Provide support pins on the back side of the PCB to prevent warping or flexing. Install support pins as close to the test-probe as possible.

1-2. Avoid vibration of the board by shock when a test-probe contacts a printed circuit board.



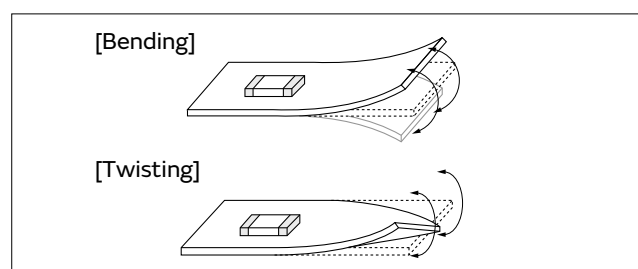
## 7. Printed Circuit Board Cropping

1. After mounting a capacitor on a printed circuit board, do not apply any stress to the capacitor that causes bending or twisting the board.

1-1. In cropping the board, the stress as shown at right may cause the capacitor to crack.

Cracked capacitors may cause deterioration of the insulation resistance, and result in a short.

Avoid this type of stress to a capacitor.



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## ⚠Caution

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### 2. Check the cropping method for the printed circuit board in advance.

2-1. Printed circuit board cropping shall be carried out by using a jig or an apparatus (Disc separator, router type separator, etc.) to prevent the mechanical stress that can occur to the board.

| Board Separation Method  | Hand Separation<br>Nipper Separation                                            | (1) Board Separation Jig                                                                                                        | Board Separation Apparatus                                                                                                                                                           |                           |
|--------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
|                          |                                                                                 |                                                                                                                                 | (2) Disc Separator                                                                                                                                                                   | (3) Router Type Separator |
| Level of stress on board | High                                                                            | Medium                                                                                                                          | Medium                                                                                                                                                                               | Low                       |
| Recommended              | ×                                                                               | △*                                                                                                                              | △*                                                                                                                                                                                   | ○                         |
| Notes                    | Hand and nipper separation apply a high level of stress.<br>Use another method. | <ul style="list-style-type: none"> <li>Board handling</li> <li>Board bending direction</li> <li>Layout of capacitors</li> </ul> | <ul style="list-style-type: none"> <li>Board handling</li> <li>Layout of slits</li> <li>Design of V groove</li> <li>Arrangement of blades</li> <li>Controlling blade life</li> </ul> | Board handling            |

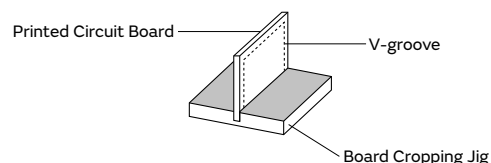
\* When a board separation jig or disc separator is used, if the following precautions are not observed, a large board deflection stress will occur and the capacitors may crack. Use router type separator if at all possible.

#### (1) Example of a suitable jig

[In the case of Single-side Mounting]

An outline of the board separation jig is shown as follows. Recommended example: Stress on the component mounting position can be minimized by holding the portion close to the jig, and bend in the direction towards the side where the capacitors are mounted. Not recommended example: The risk of cracks occurring in the capacitors increases due to large stress being applied to the component mounting position, if the portion away from the jig is held and bent in the direction opposite the side where the capacitors are mounted.

#### [Outline of Jig]



#### Hand Separation

| Recommended | Not Recommended |
|-------------|-----------------|
|             |                 |

#### [In the case of Double-sided Mounting]

Since components are mounted on both sides of the board, the risk of cracks occurring can not be avoided with the above method. Therefore, implement the following measures to prevent stress from being applied to the components.

#### (Measures)

- (1) Consider introducing a router type separator.  
If it is difficult to introduce a router type separator, implement the following measures. (Refer to item 1. Mounting Position)
- (2) Mount the components parallel to the board separation surface.
- (3) When mounting components near the board separation point, add slits in the separation position near the component.
- (4) Keep the mounting position of the components away from the board separation point.

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## ⚠Caution

Continued from the preceding page. ↘

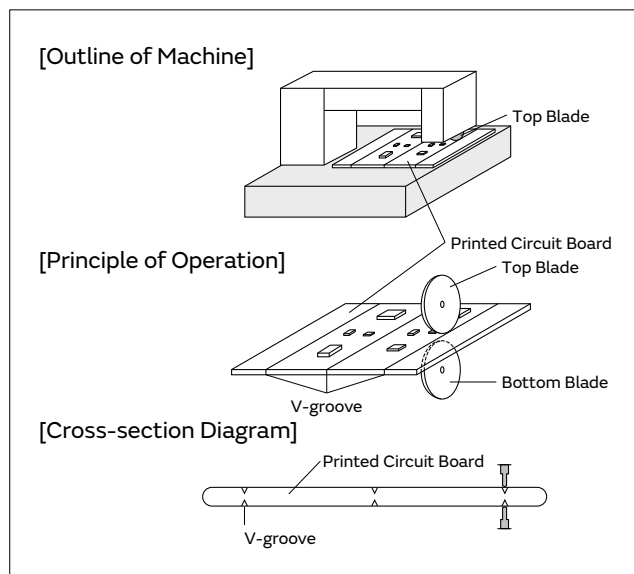
### (2) Example of a Disc Separator

An outline of a disc separator is shown as follows.  
As shown in the Principle of Operation, the top blade and bottom blade are aligned with the V-grooves on the printed circuit board to separate the board.

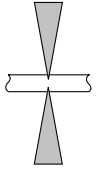
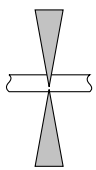
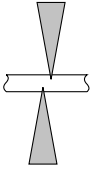
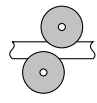
In the following case, board deflection stress will be applied and cause cracks in the capacitors.

- (1) When the adjustment of the top and bottom blades are misaligned, such as deviating in the top-bottom, left-right or front-rear directions
- (2) The angle of the V groove is too low, depth of the V groove is too shallow, or the V groove is misaligned top-bottom

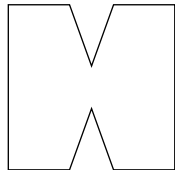
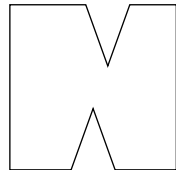
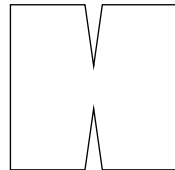
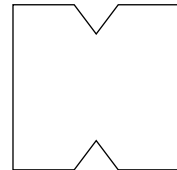
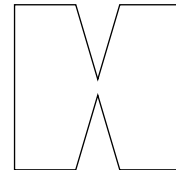
IF V groove is too deep, it is possible to brake when you handle and carry it. Carefully design depth of the V groove with consideration about strength of material of the printed circuit board.



### Disc Separator

| Recommended                                                                                                              | Not Recommended                                                                                                          |                                                                                                                           |                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                          | Top-bottom Misalignment                                                                                                  | Left-right Misalignment                                                                                                   | Front-rear Misalignment                                                                                                    |
|  <p>Top Blade</p> <p>Bottom Blade</p> |  <p>Top Blade</p> <p>Bottom Blade</p> |  <p>Top Blade</p> <p>Bottom Blade</p> |  <p>Top Blade</p> <p>Bottom Blade</p> |

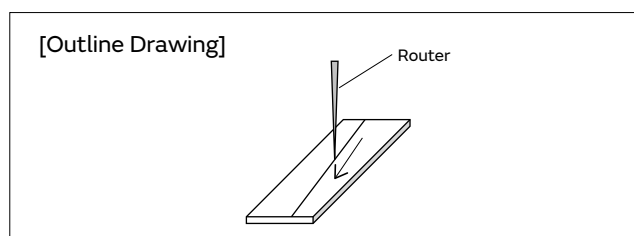
### V-groove Design

| Example of Recommended V-groove Design                                              | Not Recommended                                                                     |                                                                                     |                                                                                       |                                                                                       |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|                                                                                     | Left-right Misalignment                                                             | Low-Angle                                                                           | Depth too Shallow                                                                     | Depth too Deep                                                                        |
|  |  |  |  |  |

### (3) Example of Router Type Separator

The router type separator performs cutting by a router rotating at a high speed. Since the board does not bend in the cutting process, stress on the board can be suppressed during board separation.

When attaching or removing boards to/from the router type separator, carefully handle the boards to prevent bending.



Continued on the following page. ↗

## ⚠Caution

Continued from the preceding page. ↘

### 8. Assembly

#### 1. Handling

If a board mounted with capacitors is held with one hand, the board may bend. Firmly hold the edges of the board with both hands when handling.

If a board mounted with capacitors is dropped, cracks may occur in the capacitors.

Do not use dropped boards, as there is a possibility that the quality of the capacitors may be impaired.

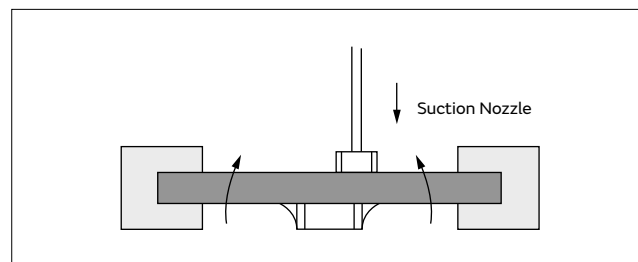
#### 2. Attachment of Other Components

##### 2-1. Mounting of Other Components

Pay attention to the following items, when mounting other components on the back side of the board after capacitors have been mounted on the opposite side.

When the bottom dead point of the suction nozzle is set too low, board deflection stress may be applied to the capacitors on the back side (bottom side), and cracks may occur in the capacitors.

- After the board is straightened, set the bottom dead point of the nozzle on the upper surface of the board.
- Periodically check and adjust the bottom dead point.

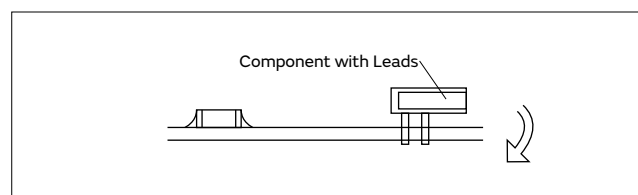


##### 2-2. Inserting Components with Leads into Boards

When inserting components (transformers, IC, etc.) into boards, bending the board may cause cracks in the capacitors or cracks in the solder.

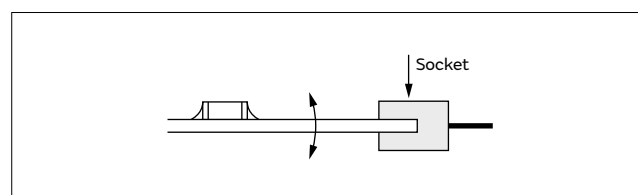
Pay attention to the following.

- Increase the size of the holes to insert the leads, to reduce the stress on the board during insertion.
- Fix the board with support pins or a dedicated jig before insertion.
- Support below the board so that the board does not bend. When using support pins on the board, periodically confirm that there is no difference in the height of each support pin.



##### 2-3. Attaching/Removing Sockets and/or Connectors

Insertion and removal of sockets and connectors, etc., might cause the board to bend. Please insure that the board does not warp during insertion and removal of sockets and connectors, etc., or the bending may damage mounted components on the board.

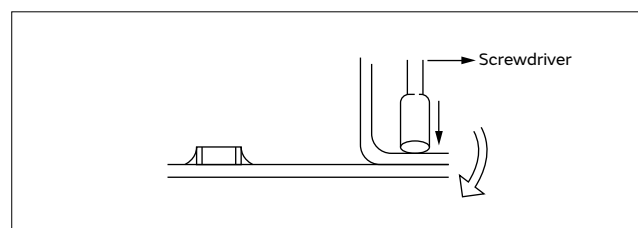


##### 2-4. Tightening Screws

The board may be bent, when tightening screws, etc. during the attachment of the board to a shield or chassis.

Pay attention to the following items before performing the work.

- Plan the work to prevent the board from bending.
- Use a torque screwdriver, to prevent over-tightening of the screws.
- The board may bend after mounting by reflow soldering, etc. Please note, as stress may be applied to the chips by forcibly flattening the board when tightening the screws.



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## ⚠Caution

Continued from the preceding page. ↘

### <Applicable to GMA or GMD Series>

#### 9. Die Bonding/Wire Bonding

##### 1. Die Bonding of Capacitors

1-1. Use the following materials for the Brazing alloys:

Au-Sn (80/20) 300 to 320 °C in N<sub>2</sub> atmosphere

1-2. Mounting

(1) Control the temperature of the substrate so it matches the temperature of the brazing alloy.

(2) Place the brazing alloy on the substrate and place the capacitor on the alloy. Hold the capacitor and gently apply the load. Be sure to complete the operation within 1 minute.

##### 2. Wire Bonding

2-1. Wire

Gold wire: 25 micro m (0.001 inch) diameter

2-2. Bonding

(1) Thermo compression, ultrasonic ball bonding.

(2) Required stage temperature: 150 to 200 °C

(3) Required wedge or capillary weight: 0.2N to 0.5N

(4) Bond the capacitor and base substrate or other devices with gold wire.

## Other

#### 1. Under Operation of Equipment

1-1. Do not touch a capacitor directly with bare hands during operation in order to avoid the danger of an electric shock.

1-2. Do not allow the terminals of a capacitor to come in contact with any conductive objects (short-circuit).  
Do not expose a capacitor to a conductive liquid, including any acid or alkali solutions.

1-3. Confirm the environment in which the equipment will operate is under the specified conditions.  
Do not use the equipment under the following environments.

(1) Being splattered with water or oil.

(2) Being exposed to direct sunlight.

(3) Being exposed to ozone, ultraviolet rays, or radiation.

(4) Being exposed to toxic gas (e.g., hydrogen sulfide, sulfur dioxide, chlorine, ammonia gas, etc.)

(5) Any vibrations or mechanical shocks exceeding the specified limits.

(6) Moisture condensing environments.

1-4. Use damp proof countermeasures if using under any conditions that can cause condensation.

Continued on the following page. ↗

GRM

GR3

GRJ

GR4

GR7

GJM

GQM

GA2

GA3

GB

GA3

GD

GA3

GF

LLL

LLA

LLM

LLR

NFM

KRM

KR3

GMA

GMD

⚠Caution

## ⚠Caution

Continued from the preceding page. ↘

### 2. Other

#### 2-1. In an Emergency

- (1) If the equipment should generate smoke, fire, or smell, immediately turn off or unplug the equipment.  
If the equipment is not turned off or unplugged, the hazards may be worsened by supplying continuous power.
- (2) In this type of situation, do not allow face and hands to come in contact with the capacitor or burns may be caused by the capacitor's high temperature.

#### 2-2. Disposal of Waste

When capacitors are disposed of, they must be burned or buried by an industrial waste vendor with the appropriate licenses.

#### 2-3. Circuit Design

##### (1) Addition of Fail Safe Function

Capacitors that are cracked by dropping or bending of the board may cause deterioration of the insulation resistance, and result in a short.

If the circuit being used may cause an electrical shock, smoke or fire when a capacitor is shorted, be sure to install fail-safe functions, such as a fuse, to prevent secondary accidents.

- (2) Capacitors used to prevent electromagnetic interference in the primary AC side circuit, or as a connection/insulation, must be a safety standard certified product, or satisfy the contents stipulated in the Electrical Appliance and Material Safety Law.  
Install a fuse for each line in case of a short.
- (3) The GJM, GMA, GMD, GQM, GR3, GRJ, GRM, KR3, KRM, LLA, LLL, LLM, LLR, NFM and ZRB series are not safety standard certified products.

#### 2-4. Test Condition for AC Withstanding Voltage

##### (1) Test Equipment

Test equipment for AC withstanding voltage should be made with equipment capable of creating a wave similar to a 50/60Hz sine wave.

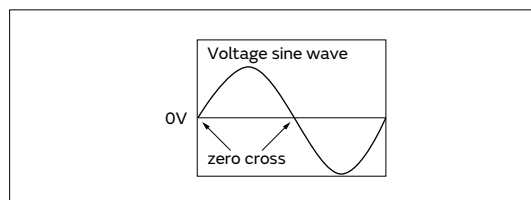
#### (2) Voltage Applied Method

The capacitor's lead or terminal should be firmly connected to the output of the withstanding voltage test equipment, and then the voltage should be raised from near zero to the test voltage.

If the test voltage is applied directly to the capacitor without raising it from near zero, it should be applied with the zero cross. \*At the end of the test time, the test voltage should be reduced to near zero, and then capacitor's lead or terminals should be taken off the output of the withstanding voltage test equipment.

If the test voltage applied directly to the capacitor without raising it from near zero, surge voltage may occur and cause a defect.

\*ZERO CROSS is the point where voltage sine wave passes 0V. - See the figure at right -



#### 2-5. Remarks

Failure to follow the cautions may result, worst case, in a short circuit and smoking when the product is used.

The above notices are for standard applications and conditions. Contact us when the products are used in special mounting conditions.

Select optimum conditions for operation as they determine the reliability of the product after assembly.

The data herein are given in typical values, not guaranteed ratings.

## Notice

### Rating

#### 1. Operating Temperature

##### 1. The operating temperature limit depends on the capacitor.

- 1-1. Do not apply temperatures exceeding the maximum operating temperature.

It is necessary to select a capacitor with a suitable rated temperature that will cover the operating temperature range.

It is also necessary to consider the temperature distribution in equipment and the seasonal temperature variable factor.

- 1-2. Consider the self-heating factor of the capacitor.

The surface temperature of the capacitor shall not exceed the maximum operating temperature including self-heating.

#### 2. Atmosphere Surroundings (gaseous and liquid)

##### 1. Restriction on the operating environment of capacitors.

- 1-1. Capacitors, when used in the above, unsuitable, operating environments may deteriorate due to the corrosion of the terminations and the penetration of moisture into the capacitor.

- 1-2. The same phenomenon as the above may occur when the electrodes or terminals of the capacitor are subject to moisture condensation.

- 1-3. The deterioration of characteristics and insulation resistance due to the oxidization or corrosion of terminal electrodes may result in breakdown when the capacitor is exposed to corrosive or volatile gases or solvents for long periods of time.

#### 3. Piezo-electric Phenomenon

1. When using high dielectric constant type capacitors in AC or pulse circuits, the capacitor itself vibrates at specific frequencies and noise may be generated.

Moreover, when the mechanical vibration or shock is added to the capacitor, noise may occur.

### Soldering and Mounting

#### 1. PCB Design

##### 1. Notice for Pattern Forms

- 1-1. Unlike leaded components, chip components are susceptible to flexing stresses since they are mounted directly on the substrate. They are also more sensitive to mechanical and thermal stresses than leaded components. Excess solder fillet height can multiply these stresses and cause chip cracking. When designing substrates, take land patterns and dimensions into consideration to eliminate the possibility of excess solder fillet height.

- 1-2. There is a possibility of chip cracking caused by PCB expansion/contraction with heat, because stress on a chip is different depending on PCB material and structure. When the thermal expansion coefficient greatly differs between the board used for mounting and the chip, it will cause cracking of the chip due to the thermal expansion and contraction.

When capacitors are mounted on a fluorine resin printed circuit board or on a single-layered glass epoxy board, it may also cause cracking of the chip for the same reason.

##### <Applicable to NFM Series>

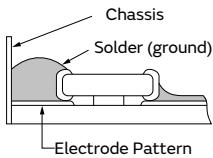
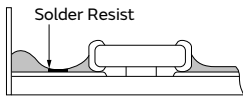
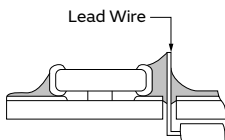
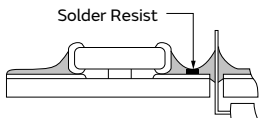
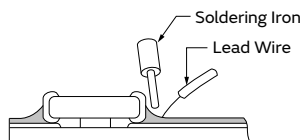
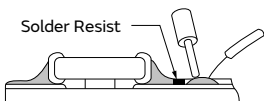
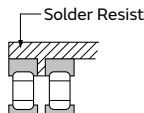
- 1-3. Because noise is suppressed by shunting unwanted high-frequency components to the ground, when designing a land for the NFM series, design the ground pattern to be as large as possible in order to better bring out this characteristic. As shown in the figure below, noise countermeasures can be made more effective by using a via to connect the ground pattern on the chip mounting surface to a larger ground pattern on the inner layer.

Continued on the following page. ↗

## Notice

Continued from the preceding page. ↘

### Pattern Forms

|                                                   | Prohibited                                                                                          | Correct                                                                                               |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| Placing Close to Chassis                          |  <p>in section</p> |  <p>in section</p> |
| Placing of Chip Components and Leaded Components  |  <p>in section</p> |  <p>in section</p> |
| Placing of Leaded Components after Chip Component |  <p>in section</p> |  <p>in section</p> |
| Lateral Mounting                                  |                   |                   |

## 2. Land Dimensions

2-1. Please refer to the land dimensions in table 1 for flow soldering, table 2 for reflow soldering, table 3 for reflow soldering for ZRB Series, table 4 for reflow soldering for LLA Series, table 5 for reflow soldering for LLM Series.

Please confirm the suitable land dimension by evaluating of the actual SET / PCB.

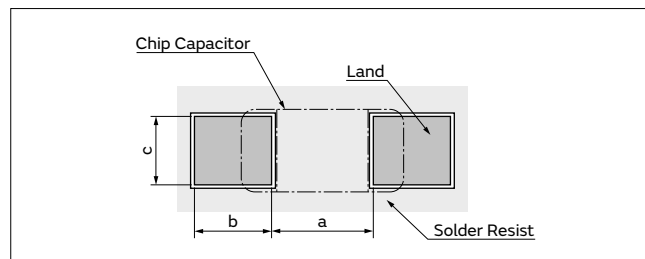


Table 1 Flow Soldering Method

| Series          | Chip Dimension Code (L/W) | Chip (L×W) | a          | b          | c          |
|-----------------|---------------------------|------------|------------|------------|------------|
| GQM/GR3/GRJ/GRM | 18                        | 1.6×0.8    | 0.6 to 1.0 | 0.8 to 0.9 | 0.6 to 0.8 |
| GQM/GR3/GRJ/GRM | 21                        | 2.0×1.25   | 1.0 to 1.2 | 0.9 to 1.0 | 0.8 to 1.1 |
| GR3/GRJ/GRM     | 31                        | 3.2×1.6    | 2.2 to 2.6 | 1.0 to 1.1 | 1.0 to 1.4 |
| LLL             | 21                        | 1.25×2.0   | 0.4 to 0.7 | 0.5 to 0.7 | 1.4 to 1.8 |
| LLL             | 31                        | 1.6×3.2    | 0.6 to 1.0 | 0.8 to 0.9 | 2.6 to 2.8 |

Flow soldering can only be used for products with a chip size from 1.6x0.8mm to 3.2x1.6mm.

(in mm)

Continued on the following page. ↗

## Notice

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**Table 2 Reflow Soldering Method**

| Series                  | Chip Dimension Code (L/W) | Chip (L×W)              | a            | b            | c            |
|-------------------------|---------------------------|-------------------------|--------------|--------------|--------------|
| GJM/GRM                 | 02                        | 0.4×0.2                 | 0.16 to 0.2  | 0.12 to 0.18 | 0.2 to 0.23  |
| GJM/GRM                 | 03                        | 0.6×0.3 (±0.03)         | 0.2 to 0.25  | 0.2 to 0.3   | 0.25 to 0.35 |
|                         |                           | 0.6×0.3 (±0.05)         | 0.2 to 0.25  | 0.25 to 0.35 | 0.3 to 0.4   |
|                         |                           | 0.6×0.3 (±0.09)         | 0.23 to 0.3  | 0.25 to 0.35 | 0.3 to 0.4   |
| GJM/GRM                 | 15                        | 1.0×0.5 (within ±0.10)  | 0.3 to 0.5   | 0.35 to 0.45 | 0.4 to 0.6   |
|                         |                           | 1.0×0.5 (±0.15/±0.20)   | 0.4 to 0.6   | 0.4 to 0.5   | 0.5 to 0.7   |
| GQM/GR3/GRJ/GRM         | 18                        | 1.6×0.8 (within ±0.10)  | 0.6 to 0.8   | 0.6 to 0.7   | 0.6 to 0.8   |
|                         |                           | 1.6×0.8 (±0.15/±0.20)   | 0.7 to 0.9   | 0.7 to 0.8   | 0.8 to 1.0   |
| GQM                     | 21                        | 2.0×1.25                | 1.0 to 1.2   | 0.6 to 0.7   | 0.8 to 1.1   |
| GR3/GRJ/GRM/GR7         | 21                        | 2.0×1.25 (within ±0.10) | 1.2          | 0.6          | 1.25         |
|                         |                           | 2.0×1.25 (±0.15)        | 1.2          | 0.6 to 0.8   | 1.2 to 1.4   |
|                         |                           | 2.0×1.25 (±0.20)        | 1.0 to 1.4   | 0.6 to 0.8   | 1.2 to 1.4   |
| GQM                     | 22                        | 2.8×2.8                 | 2.2 to 2.5   | 0.8 to 1.0   | 1.9 to 2.3   |
| GR3/GRJ/GRM/GR7         | 31                        | 3.2×1.6 (within ±0.20)  | 1.8 to 2.0   | 0.9 to 1.2   | 1.5 to 1.7   |
|                         |                           | 3.2×1.6 (±0.30)         | 1.9 to 2.1   | 1.0 to 1.3   | 1.7 to 1.9   |
| GR3/GRJ/GRM             | 32                        | 3.2×2.5                 | 2.0 to 2.4   | 1.0 to 1.2   | 1.8 to 2.3   |
| GA2/GA3/GR4             | 42                        | 4.5×2.0                 | 2.8 to 3.4   | 1.2 to 1.4   | 1.4 to 1.8   |
| GR3/GRJ/GRM/GA2/GA3/GR4 | 43                        | 4.5×3.2                 | 3.0 to 3.5   | 1.2 to 1.4   | 2.3 to 3.0   |
| GA2/GA3                 | 52                        | 5.7×2.8                 | 4.0 to 4.6   | 1.4 to 1.6   | 2.1 to 2.6   |
| GR3/GRJ/GRM/GA2/GA3/GR4 | 55                        | 5.7×5.0                 | 4.0 to 4.6   | 1.4 to 1.6   | 3.5 to 4.8   |
| LLL                     | 15                        | 0.5×1.0                 | 0.15 to 0.2  | 0.2 to 0.25  | 0.7 to 1.0   |
| LLL                     | 1U                        | 0.6×1.0                 | 0.20 to 0.25 | 0.25 to 0.35 | 0.7 to 1.0   |
| LLL/LLR                 | 18                        | 0.8×1.6                 | 0.2 to 0.3   | 0.3 to 0.4   | 1.4 to 1.6   |
| LLL                     | 21                        | 1.25×2.0                | 0.4 to 0.5   | 0.4 to 0.5   | 1.4 to 1.8   |
| LLL                     | 31                        | 1.6×3.2                 | 0.6 to 0.8   | 0.6 to 0.7   | 2.6 to 2.8   |

(in mm)

<Applicable to Part Number KR3/KRM>

| Series  | Chip Dimension Code (L/W) | Chip (L×W) | a          | b          | c          |
|---------|---------------------------|------------|------------|------------|------------|
| KRM     | 21                        | 2.0×1.25   | 1.0 to 1.2 | 0.6 to 0.7 | 0.8 to 1.1 |
| KRM     | 31                        | 3.2×1.6    | 2.2 to 2.4 | 0.8 to 0.9 | 1.0 to 1.4 |
| KR3/KRM | 55                        | 5.7×5.0    | 2.6        | 2.7        | 5.6        |

(in mm)

**Table 3 ZRB Series Reflow Soldering Method**

| Series | Chip Dimension Code (L/W) | Chip (L×W) | a          | b          | c          |
|--------|---------------------------|------------|------------|------------|------------|
| ZRB    | 15                        | 1.0×0.5    | 0.4 to 0.6 | 0.4 to 0.5 | 0.5 to 0.7 |
| ZRB    | 18*                       | 1.6×0.8    | 0.7 to 0.9 | 0.7 to 0.8 | 0.8 to 1.0 |

\*If distance between parts is too short, there is risk to cause electrical short. Please confirm the mounting pitch (distance between centers of parts) has 1.275mm or more. (ZRB18 only)

[Land for ZRB Series]

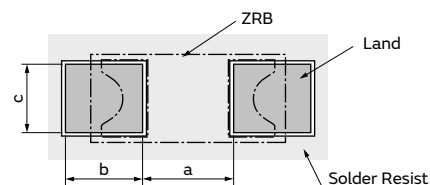


**Table 4 LLA Series Reflow Soldering Method**

| Series | Chip Dimension Code (L/W) | Chip (L×W) | a          | b            | c            | p   |
|--------|---------------------------|------------|------------|--------------|--------------|-----|
| LLA    | 18                        | 1.6×0.8    | 0.3 to 0.4 | 0.25 to 0.35 | 0.15 to 0.25 | 0.4 |
| LLA    | 21                        | 2.0×1.25   | 0.5 to 0.7 | 0.35 to 0.6  | 0.2 to 0.3   | 0.5 |

(in mm)

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## Notice

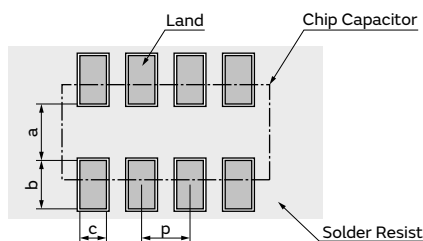
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**Table 5 LLM Series Reflow Soldering Method**

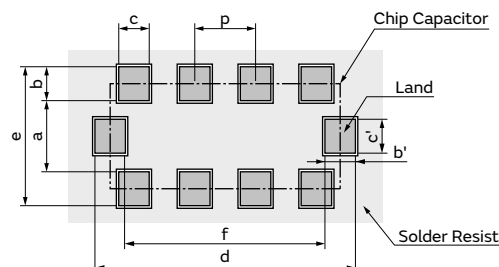
| Series | Chip Dimension Code (L/W) | Chip (L×W) | a          | b, b'        | c, c' | d          | e          | f          | p   |
|--------|---------------------------|------------|------------|--------------|-------|------------|------------|------------|-----|
| LLM    | 21                        | 2.0×1.25   | 0.6 to 0.8 | (0.3 to 0.5) | 0.3   | 2.0 to 2.6 | 1.3 to 1.8 | 1.4 to 1.6 | 0.5 |

$b=(c-e)/2$ ,  $b'=(d-f)/2$  (in mm)

[Land for LLA Series]



[Land for LLM Series]



### <Applicable to beyond Rated Voltage of 200VDC>

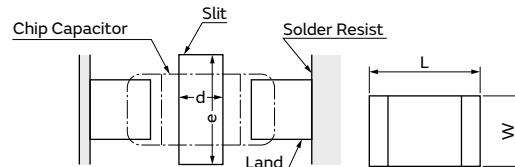
#### 2-2. Dimensions of Slit (Example)

Preparing the slit helps flux cleaning and resin coating on the back of the capacitor.

However, the length of the slit design should be as short as possible to prevent mechanical damage in the capacitor.

A longer slit design might receive more severe mechanical stress from the PCB.

Recommended slit design is shown in the Table.



| L×W      | d          | e          |
|----------|------------|------------|
| 1.6×0.8  | —          | —          |
| 2.0×1.25 | —          | —          |
| 3.2×1.6  | 1.0 to 2.0 | 3.2 to 3.7 |
| 3.2×2.5  | 1.0 to 2.0 | 4.1 to 4.6 |
| 4.5×2.0  | 1.0 to 2.8 | 3.6 to 4.1 |
| 4.5×3.2  | 1.0 to 2.8 | 4.8 to 5.3 |
| 5.7×2.8  | 1.0 to 4.0 | 4.4 to 4.9 |
| 5.7×5.0  | 1.0 to 4.0 | 6.6 to 7.1 |

(in mm)

Continued on the following page. ↗

## Notice

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### <Applicable to NFM Series>

Land Pattern + Solder Resist Land Pattern Solder Resist

(in mm)

| Series                                                                                                                            | Land Dimensions                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |           |     |     |     |  |  |  |   |   |   |   |   |   |   |                    |     |     |     |     |     |     |     |         |     |     |     |     |     |     |     |                    |     |     |     |     |     |     |     |
|-----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------|-----|-----|-----|--|--|--|---|---|---|---|---|---|---|--------------------|-----|-----|-----|-----|-----|-----|-----|---------|-----|-----|-----|-----|-----|-----|-----|--------------------|-----|-----|-----|-----|-----|-----|-----|
| ● Reflow Soldering<br>NFM15CC/NFM15PC<br>NFM18CC/NFM18PC<br>NFM18PS<br>NFM21CC/NFM21PC<br>NFM21PS                                 | <p>0.25<br/>0.3<br/>0.6<br/>0.75<br/>0.7<br/>1.3<br/>0.15<br/>Filled via ø0.15</p>                                                                                                                                 | <p>Small diameter thru hole ø0.2-ø0.3<br/>0.4<br/>0.6<br/>1.2<br/>1.5<br/>1.0<br/>2.2<br/>0.4<br/>0.6<br/>0.85<br/>1.25<br/>1.85<br/>2.35<br/>0.8<br/>1.2<br/>1.6<br/>1.8<br/>2.6</p>                                                                                                                                                                                                                                                                                                                                                |             |           |     |     |     |  |  |  |   |   |   |   |   |   |   |                    |     |     |     |     |     |     |     |         |     |     |     |     |     |     |     |                    |     |     |     |     |     |     |     |
|                                                                                                                                   | <p>Small diameter thru hole ø0.4<br/>0.6<br/>0.8<br/>1.9<br/>2.3<br/>1.4<br/>2.6</p>                                                                                                                               | <p>Small diameter thru hole ø0.2-ø0.3<br/>0.4<br/>0.6<br/>0.85<br/>1.25<br/>1.85<br/>2.35<br/>0.8<br/>1.2<br/>1.6<br/>1.8<br/>2.6</p>                                                                                                                                                                                                                                                                                                                                                                                                |             |           |     |     |     |  |  |  |   |   |   |   |   |   |   |                    |     |     |     |     |     |     |     |         |     |     |     |     |     |     |     |                    |     |     |     |     |     |     |     |
|                                                                                                                                   |                                                                                                                                                                                                                    | <p>Small diameter thru hole ø0.2<br/>0.05<br/>1.2<br/>2.0<br/>0.4<br/>0.1<br/>1.2<br/>1.5</p>                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |           |     |     |     |  |  |  |   |   |   |   |   |   |   |                    |     |     |     |     |     |     |     |         |     |     |     |     |     |     |     |                    |     |     |     |     |     |     |     |
|                                                                                                                                   |                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |           |     |     |     |  |  |  |   |   |   |   |   |   |   |                    |     |     |     |     |     |     |     |         |     |     |     |     |     |     |     |                    |     |     |     |     |     |     |     |
|                                                                                                                                   |                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |           |     |     |     |  |  |  |   |   |   |   |   |   |   |                    |     |     |     |     |     |     |     |         |     |     |     |     |     |     |     |                    |     |     |     |     |     |     |     |
|                                                                                                                                   |                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |           |     |     |     |  |  |  |   |   |   |   |   |   |   |                    |     |     |     |     |     |     |     |         |     |     |     |     |     |     |     |                    |     |     |     |     |     |     |     |
| ● Reflow Soldering Chip mounting side<br>NFM3DCC/NFM3DPC/NFM31PC/NFM41CC/NFM41PC                                                  | <p>Small diameter thru hole ø0.4<br/>0.4<br/>0.6<br/>1.0<br/>1.4<br/>2.5<br/>4.4<br/>1.0<br/>2.0<br/>2.4</p>                                                                                                       | <table><tr><th rowspan="2">Part Number</th><th colspan="7">Size (mm)</th></tr><tr><th>a</th><th>b</th><th>c</th><th>d</th><th>e</th><th>f</th><th>g</th></tr><tr><td>NFM3DCC<br/>NFM3DPC</td><td>1.0</td><td>1.4</td><td>2.5</td><td>4.4</td><td>1.0</td><td>2.0</td><td>2.4</td></tr><tr><td>NFM31PC</td><td>1.0</td><td>1.4</td><td>2.5</td><td>4.4</td><td>1.2</td><td>2.6</td><td>3.0</td></tr><tr><td>NFM41CC<br/>NFM41PC</td><td>1.5</td><td>2.0</td><td>3.5</td><td>6.0</td><td>1.2</td><td>2.6</td><td>3.0</td></tr></table> | Part Number | Size (mm) |     |     |     |  |  |  | a | b | c | d | e | f | g | NFM3DCC<br>NFM3DPC | 1.0 | 1.4 | 2.5 | 4.4 | 1.0 | 2.0 | 2.4 | NFM31PC | 1.0 | 1.4 | 2.5 | 4.4 | 1.2 | 2.6 | 3.0 | NFM41CC<br>NFM41PC | 1.5 | 2.0 | 3.5 | 6.0 | 1.2 | 2.6 | 3.0 |
|                                                                                                                                   | Part Number                                                                                                                                                                                                        | Size (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |           |     |     |     |  |  |  |   |   |   |   |   |   |   |                    |     |     |     |     |     |     |     |         |     |     |     |     |     |     |     |                    |     |     |     |     |     |     |     |
| a                                                                                                                                 |                                                                                                                                                                                                                    | b                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | c           | d         | e   | f   | g   |  |  |  |   |   |   |   |   |   |   |                    |     |     |     |     |     |     |     |         |     |     |     |     |     |     |     |                    |     |     |     |     |     |     |     |
| NFM3DCC<br>NFM3DPC                                                                                                                | 1.0                                                                                                                                                                                                                | 1.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2.5         | 4.4       | 1.0 | 2.0 | 2.4 |  |  |  |   |   |   |   |   |   |   |                    |     |     |     |     |     |     |     |         |     |     |     |     |     |     |     |                    |     |     |     |     |     |     |     |
| NFM31PC                                                                                                                           | 1.0                                                                                                                                                                                                                | 1.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2.5         | 4.4       | 1.2 | 2.6 | 3.0 |  |  |  |   |   |   |   |   |   |   |                    |     |     |     |     |     |     |     |         |     |     |     |     |     |     |     |                    |     |     |     |     |     |     |     |
| NFM41CC<br>NFM41PC                                                                                                                | 1.5                                                                                                                                                                                                                | 2.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3.5         | 6.0       | 1.2 | 2.6 | 3.0 |  |  |  |   |   |   |   |   |   |   |                    |     |     |     |     |     |     |     |         |     |     |     |     |     |     |     |                    |     |     |     |     |     |     |     |
| <p>Small diameter thru hole ø0.4<br/>1.0<br/>1.4<br/>2.5<br/>4.4<br/>1.0<br/>2.0<br/>2.4</p> <p>10mm or more (in case of 10A)</p> | <p>*1 For large current design, width of signal land pattern should be wider not less than 1mm per 1A (1mm/A). For example, in case of 10A, signal land pattern width should be 10mm or more. (1mm/A*10A=10mm)</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |           |     |     |     |  |  |  |   |   |   |   |   |   |   |                    |     |     |     |     |     |     |     |         |     |     |     |     |     |     |     |                    |     |     |     |     |     |     |     |
| ● Flow Soldering Chip mounting side<br>NFM3DCC/NFM3DPC/NFM31PC/NFM41CC/NFM41PC                                                    | <p>Small diameter thru hole ø0.4<br/>0.4<br/>0.6<br/>1.0<br/>1.4<br/>2.5<br/>4.4<br/>1.0<br/>2.0<br/>2.4</p>                                                                                                       | <table><tr><th rowspan="2">Part Number</th><th colspan="7">Size (mm)</th></tr><tr><th>a</th><th>b</th><th>c</th><th>d</th><th>e</th><th>f</th><th>g</th></tr><tr><td>NFM3DCC<br/>NFM3DPC</td><td>1.0</td><td>1.4</td><td>2.5</td><td>4.4</td><td>1.0</td><td>2.0</td><td>2.4</td></tr><tr><td>NFM31PC</td><td>1.0</td><td>1.4</td><td>2.5</td><td>4.4</td><td>1.2</td><td>2.6</td><td>3.0</td></tr><tr><td>NFM41CC<br/>NFM41PC</td><td>1.5</td><td>2.0</td><td>3.5</td><td>6.0</td><td>1.2</td><td>2.6</td><td>3.0</td></tr></table> | Part Number | Size (mm) |     |     |     |  |  |  | a | b | c | d | e | f | g | NFM3DCC<br>NFM3DPC | 1.0 | 1.4 | 2.5 | 4.4 | 1.0 | 2.0 | 2.4 | NFM31PC | 1.0 | 1.4 | 2.5 | 4.4 | 1.2 | 2.6 | 3.0 | NFM41CC<br>NFM41PC | 1.5 | 2.0 | 3.5 | 6.0 | 1.2 | 2.6 | 3.0 |
|                                                                                                                                   | Part Number                                                                                                                                                                                                        | Size (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |           |     |     |     |  |  |  |   |   |   |   |   |   |   |                    |     |     |     |     |     |     |     |         |     |     |     |     |     |     |     |                    |     |     |     |     |     |     |     |
| a                                                                                                                                 |                                                                                                                                                                                                                    | b                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | c           | d         | e   | f   | g   |  |  |  |   |   |   |   |   |   |   |                    |     |     |     |     |     |     |     |         |     |     |     |     |     |     |     |                    |     |     |     |     |     |     |     |
| NFM3DCC<br>NFM3DPC                                                                                                                | 1.0                                                                                                                                                                                                                | 1.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2.5         | 4.4       | 1.0 | 2.0 | 2.4 |  |  |  |   |   |   |   |   |   |   |                    |     |     |     |     |     |     |     |         |     |     |     |     |     |     |     |                    |     |     |     |     |     |     |     |
| NFM31PC                                                                                                                           | 1.0                                                                                                                                                                                                                | 1.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2.5         | 4.4       | 1.2 | 2.6 | 3.0 |  |  |  |   |   |   |   |   |   |   |                    |     |     |     |     |     |     |     |         |     |     |     |     |     |     |     |                    |     |     |     |     |     |     |     |
| NFM41CC<br>NFM41PC                                                                                                                | 1.5                                                                                                                                                                                                                | 2.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3.5         | 6.0       | 1.2 | 2.6 | 3.0 |  |  |  |   |   |   |   |   |   |   |                    |     |     |     |     |     |     |     |         |     |     |     |     |     |     |     |                    |     |     |     |     |     |     |     |
| <p>Small diameter thru hole ø0.4<br/>1.0<br/>1.4<br/>2.5<br/>4.4<br/>1.0<br/>2.0<br/>2.4</p> <p>10mm or more (in case of 10A)</p> | <p>*1 For large current design, width of signal land pattern should be wider not less than 1mm per 1A (1mm/A). For example, in case of 10A, signal land pattern width should be 10mm or more. (1mm/A*10A=10mm)</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |           |     |     |     |  |  |  |   |   |   |   |   |   |   |                    |     |     |     |     |     |     |     |         |     |     |     |     |     |     |     |                    |     |     |     |     |     |     |     |

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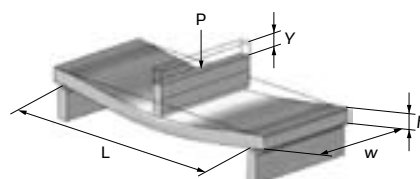
### 3. Board Design

When designing the board, keep in mind that the amount of strain which occurs will increase depending on the size and material of the board.

[Relationship with amount of strain to the board thickness, length, width, etc.]

$$\epsilon = \frac{3PL}{2Ewh^2} \quad \text{Relationship between load and strain}$$

$\epsilon$ : Strain on center of board ( $\mu\text{st}$ )  
 $L$ : Distance between supporting points (mm)  
 $w$ : Board width (mm)  
 $h$ : Board thickness (mm)  
 $E$ : Elastic modulus of board ( $\text{N/m}^2=\text{Pa}$ )  
 $Y$ : Deflection (mm)  
 $P$ : Load (N)



When the load is constant, the following relationship can be established.

- As the distance between the supporting points ( $L$ ) increases, the amount of strain also increases.  
→Reduce the distance between the supporting points.
  - As the elastic modulus ( $E$ ) decreases, the amount of strain increases.  
→Increase the elastic modulus.
  - As the board width ( $w$ ) decreases, the amount of strain increases.  
→Increase the width of the board.
  - As the board thickness ( $h$ ) decreases, the amount of strain increases.  
→Increase the thickness of the board.
- Since the board thickness is squared, the effect on the amount of strain becomes even greater.

## 2. Adhesive Application

If you want to temporarily attach the capacitor to the board using an adhesive agent before soldering the capacitor, first be sure that the conditions are appropriate for affixing the capacitor. If the dimensions of the land, the type of adhesive, the amount of coating, the contact surface area, the curing temperature, or other conditions are inappropriate, the characteristics of the capacitor may deteriorate.

### 1. Selection of Adhesive

1-1. Depending on the type of adhesive, there may be a decrease in insulation resistance. In addition, there is a chance that the capacitor might crack from contractile stress due to the difference in the contraction rate of the capacitor and the adhesive.

1-2. If there is not enough adhesive, the contact surface area is too small, or the curing temperature or curing time are inadequate, the adhesive strength will be insufficient and the capacitor may loosen or become disconnected during transportation or soldering. If there is too much adhesive, for example if it overflows onto the land, the result could be soldering defects, loss of electrical connection, insufficient curing, or slippage after the capacitor is mounted.

Furthermore, if the curing temperature is too high or the curing time is too long, not only will the adhesive

strength be reduced, but solderability may also suffer due to the effects of oxidation on the terminations (outer electrodes) of the capacitor and the land surface on the board.

#### (1) Selection of Adhesive

Epoxy resins are a typical class of adhesive.

To select the proper adhesive, consider the following points.

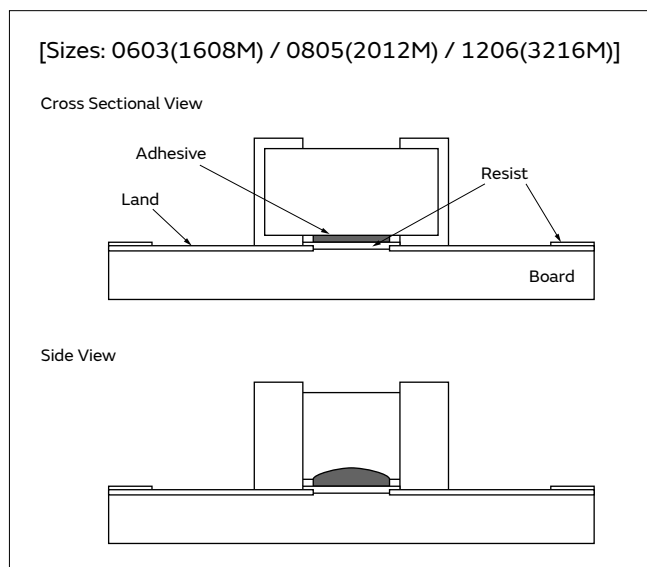
- 1) There must be enough adhesive strength to prevent the component from loosening or slipping during the mounting process.
- 2) The adhesive strength must not decrease when exposed to moisture during soldering.
- 3) The adhesive must have good coatability and shape retention properties.
- 4) The adhesive must have a long pot life.
- 5) The curing time must be short.
- 6) The adhesive must not be corrosive to the exterior of the capacitor or the board.
- 7) The adhesive must have good insulation properties.
- 8) The adhesive must not emit toxic gases or otherwise be harmful to health.
- 9) The adhesive must be free of halogenated compounds.

Continued on the following page. ↗

## Notice

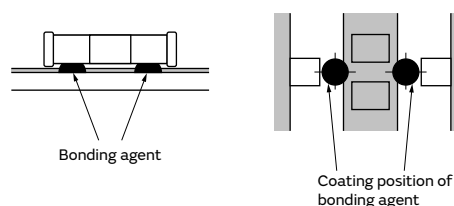
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(2) Use the following illustration as a guide to the amount of adhesive to apply.



### <Applicable to NFM Series>

[Sizes: 1205(3212M) / 1206(3216M) / 1806(4516M)]



### 3. Adhesive Curing

1. Insufficient curing of the adhesive can cause chips to disconnect during flow soldering and causes deterioration in the insulation resistance between the terminations due to moisture absorption.

Control curing temperature and time in order to prevent insufficient hardening.

### 4. Flux for Flow Soldering

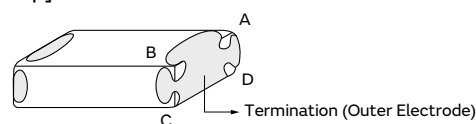
1. An excessive amount of flux generates a large quantity of flux gas, which can cause a deterioration of solderability, so apply flux thinly and evenly throughout. (A foaming system is generally used for flow soldering.)

2. Flux containing too high a percentage of halide may cause corrosion of the terminations unless there is sufficient cleaning. Use flux with a halide content of 0.1% max.
3. Strong acidic flux can corrode the capacitor and degrade its performance.  
Please check the quality of capacitor after mounting.

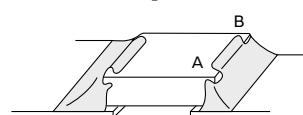
### 5. Flow Soldering

- Set temperature and time to ensure that leaching of the terminations does not exceed 25% of the chip end area as a single chip (full length of the edge A-B-C-D shown at right) and 25% of the length A-B shown as mounted on substrate.

[As a Single Chip]



[As Mounted on Substrate]



### 6. Reflow Soldering

The flux in the solder paste contains halogen-based substances and organic acids as activators. Strong acidic flux can corrode the capacitor and degrade its performance.

Please check the quality after mounting, please use.

Continued on the following page. ↗

## Notice

Continued from the preceding page. ↘

### 7. Washing

1. Please evaluate the capacitor using actual cleaning equipment and conditions to confirm the quality, and select the solvent for cleaning.

2. Unsuitable cleaning may leave residual flux or other foreign substances, causing deterioration of electrical characteristics and the reliability of the capacitors.

### 8. Coating

1. A crack may be caused in the capacitor due to the stress of the thermal contraction of the resin during curing process.  
The stress is affected by the amount of resin and curing contraction.  
Select a resin with low curing contraction.  
The difference in the thermal expansion coefficient between a coating resin or a molding resin and the capacitor may cause the destruction and deterioration of the capacitor such as a crack or peeling, and lead to the deterioration of insulation resistance or dielectric breakdown.  
Select a resin for which the thermal expansion coefficient is as close to that of the capacitor as possible.  
A silicone resin can be used as an under-coating to buffer against the stress.

2. Select a resin that is less hygroscopic.  
Using hygroscopic resins under high humidity conditions may cause the deterioration of the insulation resistance of a capacitor.  
An epoxy resin can be used as a less hygroscopic resin.
3. The halogen system substance and organic acid are included in coating material, and a chip corrodes by the kind of Coating material.  
Do not use strong acid type.

#### <Applicable to ZRB Series>

4. Loss suppress acoustic noise may be caused in ZRB series due to the resin during curing process. Please contact our sales representative or product engineers on the apply to resin during curing process.

### Other

#### 1. Transportation

1. The performance of a capacitor may be affected by the conditions during transportation.
  - 1-1. The capacitors shall be protected against excessive temperature, humidity, and mechanical force during transportation.
    - (1) Climatic condition
      - low air temperature: -40°C
      - change of temperature air/air: -25°C/+25°C
      - low air pressure: 30 kPa
      - change of air pressure: 6 kPa/min.
    - (2) Mechanical condition  
Transportation shall be done in such a way that the boxes are not deformed and forces are not directly passed on to the inner packaging.
  - 1-2. Do not apply excessive vibration, shock, or pressure to the capacitor.
    - (1) When excessive mechanical shock or pressure is applied to a capacitor, chipping or cracking may occur in the ceramic body of the capacitor.
    - (2) When the sharp edge of an air driver, a soldering iron, tweezers, a chassis, etc. impacts strongly on the surface of the capacitor, the capacitor may crack and short-circuit.
  - 1-3. Do not use a capacitor to which excessive shock was applied by dropping, etc.  
A capacitor dropped accidentally during processing may be damaged.

#### 2. Characteristics Evaluation in the Actual System

1. Evaluate the capacitor in the actual system, to confirm that there is no problem with the performance and specification values in a finished product before using.
2. Since a voltage dependency and temperature dependency exists in the capacitance of high dielectric type ceramic capacitors, the capacitance may change depending on the operating conditions in the actual system. Therefore, be sure to evaluate the various characteristics, such as the leakage current and noise absorptivity, which will affect the capacitance value of the capacitor.
3. In addition, voltages exceeding the predetermined surge may be applied to the capacitor by the inductance in the actual system. Evaluate the surge resistance in the actual system as required.

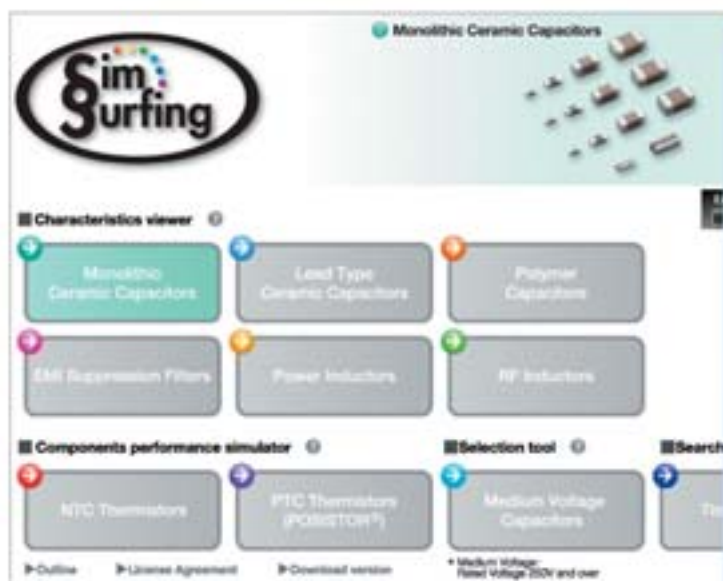
#### <Applicable to NFM Series>

4. The effects of noise suppression can vary depending on the usage conditions, including differences in the circuit or IC to be used, the type of noise, the shape of the pattern to be mounted, and the mounting location. Be sure to verify the effect on the actual device in advance.

# Design Support Tool "SimSurfing"

<https://www.murata.com/simsurfing/>

This is the latest tool to get the electrical characteristics for Capacitors, Inductors, and EMI Suppression Filters, and to simulate Thermistors' behavior !



## ■ Characteristics viewer

You can easily search and download the following data for Multilayer Ceramic Capacitors, Polymer Capacitors, EMI Suppression Filters (Three-terminal Capacitors, Ferrite Beads) and Power/RF Inductors.

## ■ Components performance simulator

You can search by the simulation on simple circuits for Thermistors.

## ■ Selection tool

You can select Medium voltage Capacitors and Power Inductors according to conditions of use.

\* Medium voltage: Rated Voltage 250V and over

## ■ Search tool

You can search the Murata timing device (CERALOCK® and crystal units) that is most suitable for your IC and access information about the recommended circuit constant setting.

If you register as a "my Murata" user

(<https://my.murata.com/en/web/mymurata/>), you can use Enhanced SimSurfing.

## ■ Usage example of "Multilayer Ceramic Capacitors"

### 1 Select the products

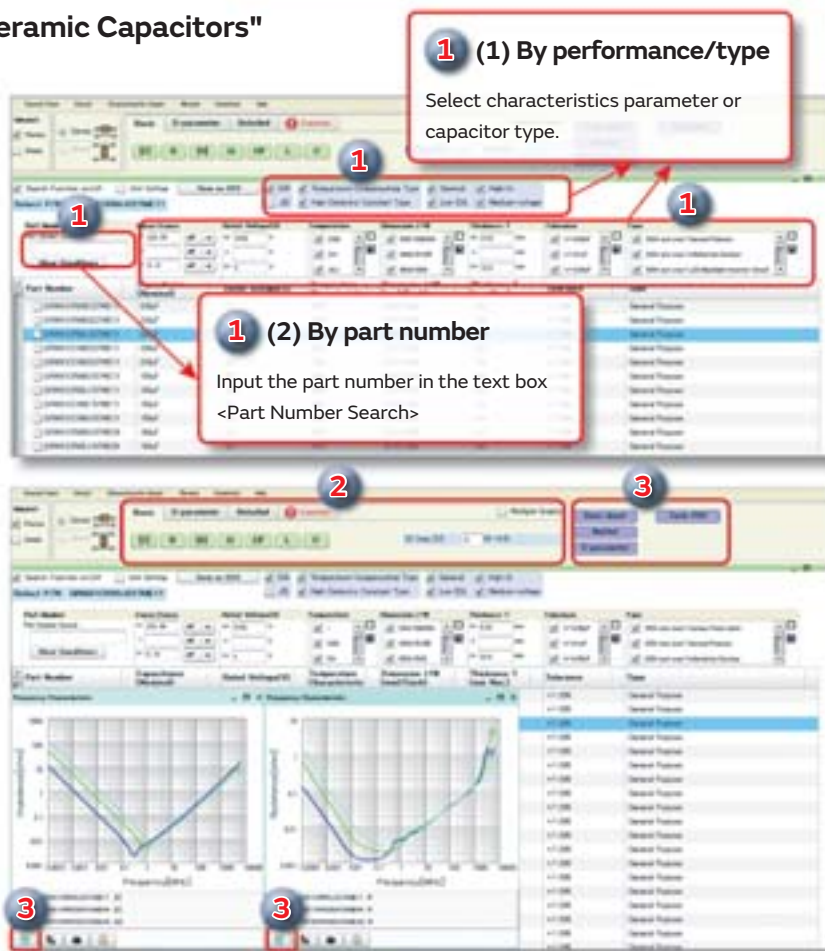
- (1) By performance/type
- (2) By part number

### 2 Show graph

Click each button on each tab of [Basic], [S-parameter] and [Detailed].

### 3 Data download

- Click each purple button in this area.
- Click "CSV output" button.



\* Images are as of October 2015. Be assured that this software will be updated frequently.

<https://www.murata.com/simsurfing/>

# Web page Introduction

**muRata** Product Search

Search by Part Number

Search by Specifications

Search in the Lineups

1

## Search by Part Number

<http://psearch.en.murata.com/capacitor/partnumber/>

You can search for capacitors by specifying the alphanumeric characters in the part number. The packing codes shown contain the substitute character "#". If you enter the official packing code, part numbers that contain that packing code will be matched.

2

## Search by Specifications

<http://psearch.en.murata.com/capacitor/spec/smd/>

You can search for SMD, lead type, or screw termination type capacitors by indicating specifications such as application, capacitance, rated voltage, or temperature characteristics.

You can narrow your search by entering values of ranges, and by specifying product characteristics.

The items for narrowing searches are linked, so specifying one condition causes selectable options for the other items to allow input only of conditions that match the relevant part numbers.

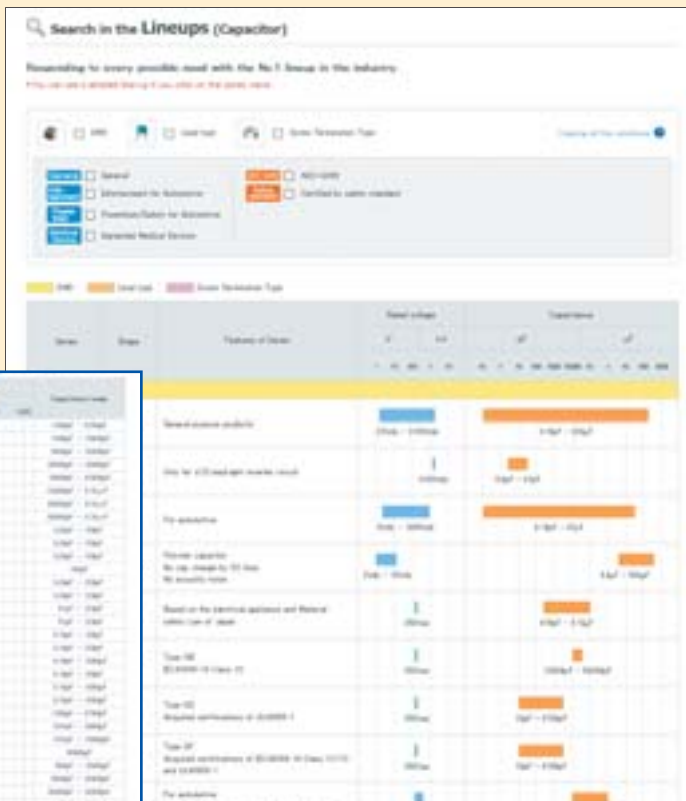


### Search in the Lineups

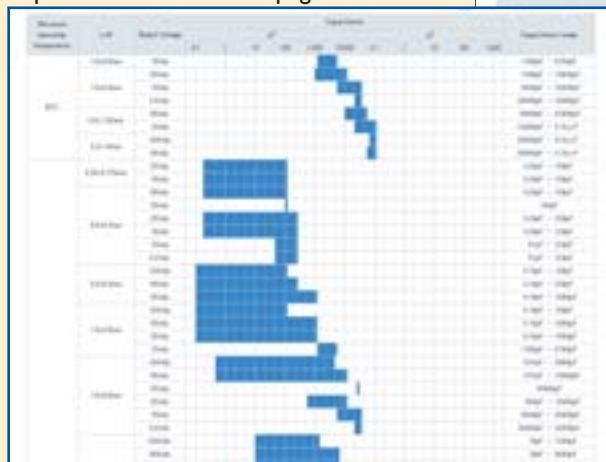
<http://psearch.en.murata.com/capacitor/lineup/>

You can search for capacitors by specifying the series lineup.

You can also confirm items such as characteristics and applications on each series page.



Capacitance chart in Series page.



### [Search result]

Compares the characteristics of the checked ☒ part numbers.

Displays the number of hits for the current search conditions in real time.

Clicking on each search condition button brings up a menu, allowing you to narrow the search results to match the selected condition in real time.

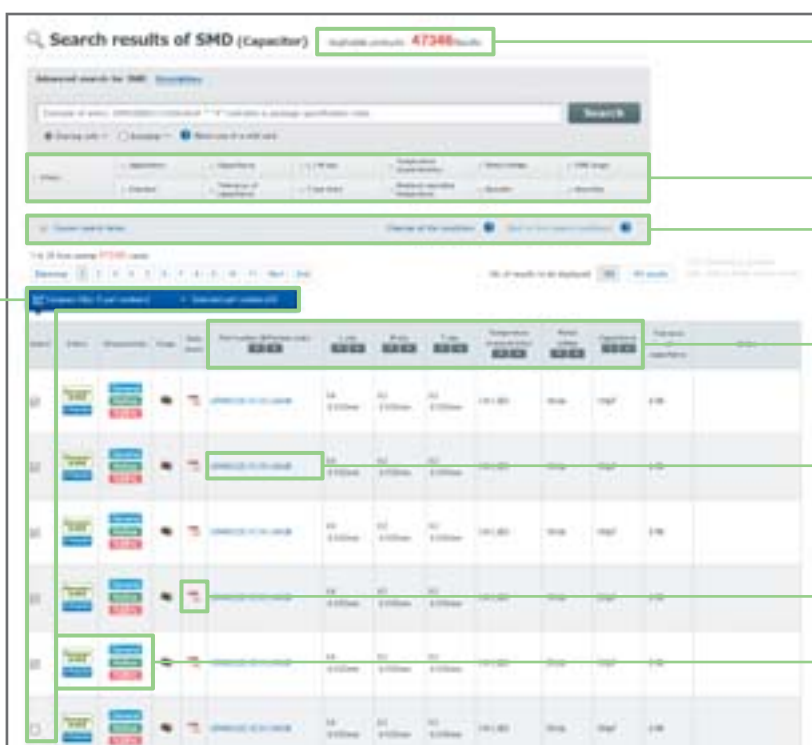
Click "Current search terms" to display a menu, from which you can confirm the current conditions for narrowing the search results.

Click the ▲ mark for each item to switch between ascending and descending display.

Click a product name to display a details page listing more in-depth information (→ P39).

You can download detailed spec sheets.

Icons enable you to check the status and characteristics of products at a glance.



# Global Locations

For details please visit [www.murata.com](http://www.murata.com)



## ⚠ Note

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- ③ Undersea equipment
- ④ Power plant equipment
- ⑤ Medical equipment
- ⑥ Transportation equipment (vehicles, trains, ships, etc.)
- ⑦ Traffic signal equipment
- ⑧ Disaster prevention / crime prevention equipment
- ⑨ Data-processing equipment
- ⑩ Application of similar complexity and/or reliability requirements to the applications listed above

3 Product specifications in this catalog are as of September 2017. They are subject to change or our products in it may be discontinued without advance notice. Please check with our sales representatives or product engineers before ordering. If there are any questions, please contact our sales representatives or product engineers.

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5 This catalog has only typical specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.

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