



**THE DATASHEET OF
HC0603CG101G201**



Multilayer Ceramic Chip Capacitors Mid Voltage Type 100VDC – 630VDC

HC Series

MERITEK

FEATURE

- High voltage rating in a given case size.
- High reliability and thermal stability.
- Application: DC to DC converter, High Voltage Coupling/DC blocking, Back-lighting inverters, LAN/WLAN interface, Power supplies, Snubbers in HF power convertors.



PART NUMBERING SYSTEM

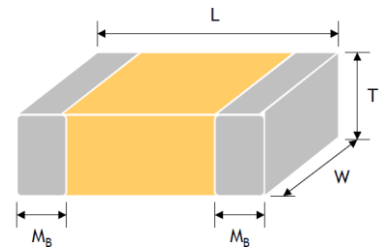


HC (1) 0805 (2) XR (3) 104 (4) K (5) 251 (6)

| No | Item | Digit | Description | Reference |
|-----|----------------|-------|--|--|
| (1) | Meritek Series | HC | High-Voltage Ceramic Chip Capacitor | High voltage application with 100VDC – 630VDC |
| (2) | Size | 0805 | 0805 inch (2012 mm) | 1206,1210,1808,1812,1825,2211,2220,2225 |
| (3) | Dielectric | XR | X7R | CG: C0G(NP0), XR: X7R, XF: X5R, YV: Y5V |
| (4) | Capacitance | 104 | 104: $10 \times 10^4 \text{pF} = 100\text{nF}$ | 103: $10 \times 10^3 \text{pF}$, 4R7: 4.7pF |
| (5) | Tolerance | K | (K): $\pm 10\%$ | F: $\pm 1\%$, G: $\pm 2\%$, J: $\pm 5\%$, K: $\pm 10\%$, M: $\pm 20\%$ |
| (6) | Rated Voltage | 251 | Working Voltage: 250VDC | 101: 100VDC, 501: 500VDC, 631: 630VDC |

DIMENSIONS

| Size Inch (mm) | L (mm) | W (mm) | Thickness | $M_B \text{ min (mm)}$ |
|----------------|------------------------|-------------------------|---|-------------------------|
| | | | T (mm) code | |
| 0402 (1005) | $1.00 \pm 0.15 / -1.0$ | $0.50 \pm 0.15 / -1.0$ | See Thickness Specification Reference Table below | $0.25 \pm 0.05 / -0.10$ |
| 0603 (1608) | 1.60 ± 0.20 | 0.80 ± 0.15 | | 0.40 ± 0.15 |
| 0805 (2012) | 2.10 ± 0.20 | 1.25 ± 0.20 | | 0.50 ± 0.20 |
| 1206 (3216) | 3.30 ± 0.30 | $1.60 \pm 0.30 / -0.10$ | | 0.60 ± 0.20 |
| 1210 (3225) | 3.30 ± 0.40 | 2.50 ± 0.30 | | 0.75 ± 0.35 |
| 1808 (4520) | 4.60 ± 0.50 | 2.00 ± 0.20 | | 0.75 ± 0.35 |
| 1812 (4532) | 4.60 ± 0.50 | 3.20 ± 0.30 | | 0.75 ± 0.35 |
| 1825 (4563) | 4.60 ± 0.50 | 6.30 ± 0.40 | | 0.75 ± 0.35 |
| 2220 (5750) | 5.70 ± 0.50 | 5.00 ± 0.40 | | 0.85 ± 0.35 |
| 2225 (5763) | 5.70 ± 0.50 | 6.30 ± 0.40 | | 0.85 ± 0.35 |



THICKNESS SPECIFICATION REFERENCE

| Code | Thickness (mm) | Code | Thickness (mm) | Code | Thickness (mm) |
|------|----------------------|------|----------------------|------|-----------------------|
| A | 0.60 ± 0.10 | I | 1.25 ± 0.20 | Q | $0.50 + 0.02 / -0.05$ |
| B | $0.8 + 0.15 / -0.10$ | J | 1.15 ± 0.15 | R | 3.10 ± 0.30 |
| C | 1.25 ± 0.10 | K | 0.50 ± 0.20 | S | 0.80 ± 0.07 |
| D | 1.40 ± 0.15 | L | 0.30 ± 0.03 | T | 0.85 ± 0.10 |
| E | 1.60 ± 0.20 | M | 0.95 ± 0.10 | U | 0.50 ± 0.10 |
| F | 2.00 ± 0.20 | N | 0.50 ± 0.05 | V | 0.20 ± 0.02 |
| G | 2.50 ± 0.30 | O | 3.50 ± 0.20 | X | 0.80 ± 0.10 |
| H | 2.80 ± 0.30 | P | $1.60 + 0.3 / -0.10$ | Z | 0.25 ± 0.03 |

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ELECTRICAL CHARACTERISTICS

| Properties | Characteristics | | |
|--|--|--|---|
| Dielectric | C0G(NP0) | X7R | Y5V |
| Chip Size | 0402, 0603, 0805, 1206, 1210, 1808, 1812, 1825, 2220, 2225 | 0603, 0805, 1206, 1210, 1808, 1812, 1825, 2220, 2225 | 0805, 1206, 1210, 1812 |
| Rated Voltage | 100V, 200V, 250V, 500V, 630V | 100V, 200V, 250V, 500V, 630V | 100V, 200V, 250V |
| Capacitance Range | 0.5pF ~ 180nF | 100pF ~ 820nF | 10nF to 820nF |
| Capacitance Tolerance | See Capacitance Tolerance Reference Table Below | | |
| Dissipation Factor | Cap. Range | Q Spec. | Measured at the condition of 30~70% related humidity. |
| | Cap < 30pF | Q ≥ 400+20C | |
| | Cap ≥ 30pF | Q ≥ 1000 | |
| Cap. & D.F. Test Condition (30~70% related humidity) | For 25°C at ambient temperature | | * Preconditioning : Perform a heat treatment at 150±10°C for an hour, then leave in ambient condition for 24±2 hours before measurement |
| | Cap. Range | Test Condition | 1.0±0.2Vrms, 1.0KHz±10%, at 25°C ambient temperature |
| | Cap≤1000pF | 1.0±0.2Vrms, 1.0MHz±10% | |
| | Cap>1000pF | 1.0±0.2Vrms, 1.0KHz±10% | |
| Insulation Resistance | ≥100GΩ or R•C≥5000Ω-F Whichever is smaller | ≥10GΩ or R•C≥100Ω-F Whichever is smaller | |
| Operation Temperature | -55°C ~ +125°C | | -25 to +85°C |
| Temperature Coefficient | ±30ppm/°C | ±15% | +30/-80% |
| Termination | Cu (or Ag)/Ni/Sn (lead-free) | | |

CAPACITANCE TOLERANCE REFERENCE

| Code | Description | Code | Description | Code | Description | Code | Description |
|------|-------------|------|-------------|------|-------------|------|-------------|
| A | ±0.05 pF | F | ±1 % | J | ±5 % | N | -5%~10% |
| B | ±0.10 pF | G | ±2 % | K | ±10 % | P | ±0.02 pF |
| C | ±0.25 pF | H | ±3 % | L | 0%~10% | Q | ±0.03 pF |
| D | ±0.50 pF | I | -10%~0% | M | ±20 % | Z | -20%~80% |

Multilayer Ceramic Chip Capacitors

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RELIABILITY TEST CONDITIONS AND REQUIREMENTS

| Item | Test Condition | Requirements | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------------|---|--|--|-------------------|-------------------|----------------------------|--|-----------------------------|------------------|--|-----------------|----------------------------|-----------------|---|-------------|--------------|--|--|----------------|---|-------------|--------------|-----------------------------|--|--------------------------------|--------------|-----------------------------------|---------------|-----------------------------|--------------|-----------------------------------|---------------|-------------|
| Visual and Dimensions | - | * No remarkable defect. * Dimensions to confirm to individual specification sheet. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Capacitance | | * Shall not exceed the limits given in the detailed spec. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Q/ D.F. (Dissipation Factor) | Class I: C0G(NP0) Cap≤1000pF, 1.0±0.2Vrms, 1MHz±10% Cap>1000pF, 1.0±0.2Vrms, 1KHz±10% Class II: (X7R, Y5V) 1.0±0.2Vrms, 1kHz±10% | <table border="1"> <thead> <tr> <th>Dielectric</th> <th>Rated Voltage (V)</th> <th>Q/D.F.</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Class I (NP0)</td> <td rowspan="2">All</td> <td>Q≥1000</td> <td>Cap≥30pF</td> </tr> <tr> <td>Q≥400+20C</td> <td>Cap<30pF</td> </tr> <tr> <td rowspan="2">Class II (X7R)</td> <td rowspan="2">≥ 100</td> <td>D.F. < 2.5%</td> <td></td> </tr> <tr> <td>D.F. < 3.0%</td> <td>0603≥0.047μF; 0805≥0.18μF, 1206≥0.47μF</td> </tr> <tr> <td>Class II (Y5V)</td> <td>≥ 100</td> <td>D.F. < 5.0%</td> <td></td> </tr> </tbody> </table> | Dielectric | Rated Voltage (V) | Q/D.F. | Remark | Class I (NP0) | All | Q≥1000 | Cap≥30pF | Q≥400+20C | Cap<30pF | Class II (X7R) | ≥ 100 | D.F. < 2.5% | | D.F. < 3.0% | 0603≥0.047μF; 0805≥0.18μF, 1206≥0.47μF | Class II (Y5V) | ≥ 100 | D.F. < 5.0% | | | | | | | | | | | | |
| Dielectric | Rated Voltage (V) | Q/D.F. | Remark | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Class I (NP0) | All | Q≥1000 | Cap≥30pF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Q≥400+20C | Cap<30pF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Class II (X7R) | ≥ 100 | D.F. < 2.5% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | D.F. < 3.0% | 0603≥0.047μF; 0805≥0.18μF, 1206≥0.47μF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Class II (Y5V) | ≥ 100 | D.F. < 5.0% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Temperature Coefficient | With no electrical load. <table border="1"> <thead> <tr> <th>T.C.</th> <th>Operation Temp.</th> </tr> </thead> <tbody> <tr> <td>C0G(NP0)</td> <td>-55~125°C at 25°C</td> </tr> <tr> <td>X7R</td> <td>-55~125°C at 25°C</td> </tr> <tr> <td>Y5V</td> <td>-25~85°C at 20°C</td> </tr> </tbody> </table> | T.C. | Operation Temp. | C0G(NP0) | -55~125°C at 25°C | X7R | -55~125°C at 25°C | Y5V | -25~85°C at 20°C | <table border="1"> <thead> <tr> <th>T.C.</th> <th>Capacitance Change</th> </tr> </thead> <tbody> <tr> <td>C0G(NP0)</td> <td>Within ±30ppm/°C</td> </tr> <tr> <td>X7R</td> <td>Within ±15%</td> </tr> <tr> <td>Y5V</td> <td>Within +30%/-80%</td> </tr> </tbody> </table> | T.C. | Capacitance Change | C0G(NP0) | Within ±30ppm/°C | X7R | Within ±15% | Y5V | Within +30%/-80% | | | | | | | | | | | | | | | |
| T.C. | Operation Temp. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C0G(NP0) | -55~125°C at 25°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| X7R | -55~125°C at 25°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Y5V | -25~85°C at 20°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| T.C. | Capacitance Change | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C0G(NP0) | Within ±30ppm/°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| X7R | Within ±15% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Y5V | Within +30%/-80% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Insulation Resistance | <table border="1"> <thead> <tr> <th>Rated Vol. (V)</th> <th>Apply Voltage</th> <th>Test Condition</th> </tr> </thead> <tbody> <tr> <td>= 100</td> <td>1 times of UR</td> <td>Max. 120 sec</td> </tr> <tr> <td>< 100</td> <td>1 times of UR</td> <td>60 sec</td> </tr> <tr> <td>> 500</td> <td>500VDC</td> <td>60 sec</td> </tr> </tbody> </table> | Rated Vol. (V) | Apply Voltage | Test Condition | = 100 | 1 times of UR | Max. 120 sec | < 100 | 1 times of UR | 60 sec | > 500 | 500VDC | 60 sec | <table border="1"> <thead> <tr> <th>Dielectric</th> <th>Requirements</th> </tr> </thead> <tbody> <tr> <td>Class I</td> <td>≥100GΩ or Rx≥ 500Ω-F whichever is smaller</td> </tr> <tr> <td>Class II</td> <td>≥10GΩ or Rx≥ 100Ω-F whichever is smaller.</td> </tr> </tbody> </table> | Dielectric | Requirements | Class I | ≥100GΩ or Rx≥ 500Ω-F whichever is smaller | Class II | ≥10GΩ or Rx≥ 100Ω-F whichever is smaller. | | | | | | | | | | | | | |
| Rated Vol. (V) | Apply Voltage | Test Condition | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| = 100 | 1 times of UR | Max. 120 sec | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| < 100 | 1 times of UR | 60 sec | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| > 500 | 500VDC | 60 sec | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dielectric | Requirements | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Class I | ≥100GΩ or Rx≥ 500Ω-F whichever is smaller | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Class II | ≥10GΩ or Rx≥ 100Ω-F whichever is smaller. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Solderability | * Solder temperature: 235±5°C for (1206~1210) * Solder temperature: 245±5°C for (1808~2225) * Dipping time: 2±0.5 sec. | 75% min. coverage of all metalized area. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dielectric Strength | <table border="1"> <thead> <tr> <th>Rated Voltage</th> <th>Condition</th> </tr> </thead> <tbody> <tr> <td>≤ 250</td> <td>2 times of UR</td> </tr> <tr> <td>250<V≤500</td> <td>1.5 times of UR</td> </tr> <tr> <td>630≤V≤3000V</td> <td>1.2 times of UR</td> </tr> <tr> <td>3000<V≤5000V</td> <td>1.1 times of UR</td> </tr> <tr> <td>>5000V</td> <td>1.0 times of UR</td> </tr> </tbody> </table> <p>* Duration: 1 to 5 sec. * Charge and discharge current less than 50mA.</p> | Rated Voltage | Condition | ≤ 250 | 2 times of UR | 250<V≤500 | 1.5 times of UR | 630≤V≤3000V | 1.2 times of UR | 3000<V≤5000V | 1.1 times of UR | >5000V | 1.0 times of UR | * No evidence of damage or flashover during test. | | | | | | | | | | | | | | | | | | | |
| Rated Voltage | Condition | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≤ 250 | 2 times of UR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 250<V≤500 | 1.5 times of UR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 630≤V≤3000V | 1.2 times of UR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3000<V≤5000V | 1.1 times of UR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| >5000V | 1.0 times of UR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Resistance to Soldering Heat | * Solder temperature: 260±5°C * Dipping time: 10±1 sec * Preheating: 120 to 150°C for 1 minute before immerse the capacitor in a eutectic solder. * Before initial measurement (Class II only): Perform 150+0/-10°C for 1 hr. and then set for 48±4 hrs. at room temp. * Measurement to be made after keeping at room temp. for 24±2 hrs (Class I) or 48±4 hrs (Class II). | <p>* No remarkable damage.</p> <table border="1"> <thead> <tr> <th>Dielectric</th> <th>Cap Change</th> <th>Q/D.F. & IR</th> </tr> </thead> <tbody> <tr> <td>Class I (NP0)</td> <td>Within ±2.5% or ±0.25pF whichever is larger.</td> <td rowspan="3">To meet Initial requirement</td> </tr> <tr> <td>Class II (X7R)</td> <td>within ±7.5%</td> </tr> <tr> <td>Class II (Y5V)</td> <td>within ±20%</td> </tr> </tbody> </table> <p>* 25% max. leaching on each edge.</p> | Dielectric | Cap Change | Q/D.F. & IR | Class I (NP0) | Within ±2.5% or ±0.25pF whichever is larger. | To meet Initial requirement | Class II (X7R) | within ±7.5% | Class II (Y5V) | within ±20% | | | | | | | | | | | | | | | | | | | | | |
| Dielectric | Cap Change | Q/D.F. & IR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Class II (X7R) | within ±7.5% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Class II (Y5V) | within ±20% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Temperature Cycle | * Conduct the five cycles according to the temperatures and time. <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>2~3</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>2~3</td> </tr> </tbody> </table> <p>* Before initial measurement (Class II only): Perform 150+0/-10°C for 1 hr and then set for 48±4 hrs at room temp. * Measurement to be made after keeping at room temp. for 24±2 hrs (Class I) or 48±4 hrs (Class II).</p> | Step | Temp. (°C) | Time (min.) | 1 | Min. operating temp. +0/-3 | 30±3 | 2 | Room temp. | 2~3 | 3 | Max. Operating temp. +3/-0 | 30±3 | 4 | Room temp. | 2~3 | <p>* No remarkable damage.</p> <table border="1"> <thead> <tr> <th>Dielectric</th> <th>I.R</th> <th>Cap Change</th> <th>Q/D.F</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Class I(NP0)</td> <td rowspan="2">To meet Initial requirement</td> <td>Within ±2.5% or ±0.25pF whichever is larger.</td> <td>≤ 1.0(Q) × Initial requirement</td> </tr> <tr> <td>within ±7.5%</td> <td>≤ 1.5(D.F.) × Initial requirement</td> </tr> <tr> <td>Class II(X7R)</td> <td rowspan="2">To meet Initial requirement</td> <td>within ±7.5%</td> <td rowspan="2">≤ 1.5(D.F.) × Initial requirement</td> </tr> <tr> <td>Class II(Y5V)</td> <td>within ±20%</td> </tr> </tbody> </table> | Dielectric | I.R | Cap Change | Q/D.F | Class I(NP0) | To meet Initial requirement | Within ±2.5% or ±0.25pF whichever is larger. | ≤ 1.0(Q) × Initial requirement | within ±7.5% | ≤ 1.5(D.F.) × Initial requirement | Class II(X7R) | To meet Initial requirement | within ±7.5% | ≤ 1.5(D.F.) × Initial requirement | Class II(Y5V) | within ±20% |
| Step | Temp. (°C) | Time (min.) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Min. operating temp. +0/-3 | 30±3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Room temp. | 2~3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Max. Operating temp. +3/-0 | 30±3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Room temp. | 2~3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dielectric | I.R | Cap Change | Q/D.F | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Class I(NP0) | To meet Initial requirement | Within ±2.5% or ±0.25pF whichever is larger. | ≤ 1.0(Q) × Initial requirement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | within ±7.5% | ≤ 1.5(D.F.) × Initial requirement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Class II(X7R) | To meet Initial requirement | within ±7.5% | ≤ 1.5(D.F.) × Initial requirement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Class II(Y5V) | | within ±20% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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HC Series

MERITEK

RELIABILITY TEST CONDITIONS AND REQUIREMENTS (CONTINUED)

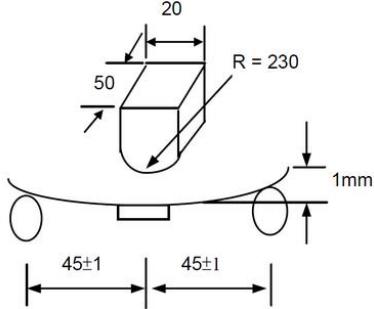
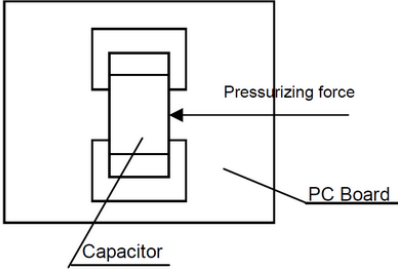
| Item | Test Condition | Requirements | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|---|-----------------------------------|---------------|---------------|-------|-----------------------------|---------------|--|---|-----------------------------|---|-------------------|------------|----------------|-------|---------------|--|--|-----------------------------------|----------------|-----------------------------------|----------------|-------------|------|-------|------|--|--|------|--|--|--|
| Humidity (Damp Heat) Steady State | <ul style="list-style-type: none"> * Test temp.: 40±2°C * Humidity: 90~95% RH * Test time: 500+24/-0hrs. * To apply voltage :rated voltage * Measurement to be made after keeping at room temp. for 24±2 hrs. (Class I) or 48±4 hrs. (Class II). | * No remarkable damage. <table border="1"> <thead> <tr> <th>Dielectric</th> <th>I.R</th> <th>Cap Change</th> <th colspan="2">Q/D.F</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Class I (NP0)</td> <td rowspan="2">≥1GΩ or RxC≥ 50Ω-F whichever is smaller.</td> <td rowspan="2">within ± 5.0% or±0.5pF whichever is larger</td> <td>Cap ≥30pF</td> <td>Q≥350</td> </tr> <tr> <td>10pF ≤ Cap < 30pF</td> <td>Q≥275+2.5C</td> </tr> <tr> <td>Class II (X7R)</td> <td rowspan="2"></td> <td>within ±12.5%</td> <td colspan="2">D.F. ≤ 200% × Initial requirement</td> </tr> <tr> <td>Class II (Y5V)</td> <td>within ±30%</td> <td colspan="2">D.F. ≤ 200% × Initial requirement</td> </tr> </tbody> </table> | Dielectric | I.R | Cap Change | Q/D.F | | Class I (NP0) | ≥1GΩ or RxC≥ 50Ω-F whichever is smaller. | within ± 5.0% or±0.5pF whichever is larger | Cap ≥30pF | Q≥350 | 10pF ≤ Cap < 30pF | Q≥275+2.5C | Class II (X7R) | | within ±12.5% | D.F. ≤ 200% × Initial requirement | | Class II (Y5V) | within ±30% | D.F. ≤ 200% × Initial requirement | | | | | | | | | | | |
| | | Dielectric | I.R | Cap Change | Q/D.F | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Class I (NP0) | ≥1GΩ or RxC≥ 50Ω-F whichever is smaller. | within ± 5.0% or±0.5pF whichever is larger | Cap ≥30pF | Q≥350 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 10pF ≤ Cap < 30pF | Q≥275+2.5C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Class II (X7R) | | within ±12.5% | D.F. ≤ 200% × Initial requirement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Class II (Y5V) | | within ±30% | D.F. ≤ 200% × Initial requirement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Humidity (Damp Heat) Load | <ul style="list-style-type: none"> * Test temp.: 40±2°C * Humidity: 90~95% RH * Test time: 500+24/-0hrs. * To apply voltage :rated voltage * Measurement to be made after keeping at room temp. for 24±2 hrs (Class I) or 48±4 hrs (Class II). | * No remarkable damage. <table border="1"> <thead> <tr> <th>Dielectric</th> <th>I.R</th> <th>Cap Change</th> <th colspan="2">Q/D.F</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Class I (NP0)</td> <td rowspan="2">≥1GΩ or RxC≥ 50Ω-F whichever is smaller.</td> <td rowspan="2">within ±7.5% or ±0.75pF whichever is larger</td> <td>Cap ≥30pF</td> <td>Q≥350;</td> </tr> <tr> <td>10pF ≤Cap < 30pF</td> <td>Q≥275+2.5C</td> </tr> <tr> <td>Class II (X7R)</td> <td rowspan="2"></td> <td>within ±12.5%</td> <td colspan="2">D.F. ≤ 200% × Initial requirement</td> </tr> <tr> <td>Class II (Y5V)</td> <td>within ±30%</td> <td colspan="2"></td> </tr> </tbody> </table> | Dielectric | I.R | Cap Change | Q/D.F | | Class I (NP0) | ≥1GΩ or RxC≥ 50Ω-F whichever is smaller. | within ±7.5% or ±0.75pF whichever is larger | Cap ≥30pF | Q≥350; | 10pF ≤Cap < 30pF | Q≥275+2.5C | Class II (X7R) | | within ±12.5% | D.F. ≤ 200% × Initial requirement | | Class II (Y5V) | within ±30% | | | | | | | | | | | | |
| | | Dielectric | I.R | Cap Change | Q/D.F | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Class I (NP0) | ≥1GΩ or RxC≥ 50Ω-F whichever is smaller. | within ±7.5% or ±0.75pF whichever is larger | Cap ≥30pF | Q≥350; | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 10pF ≤Cap < 30pF | Q≥275+2.5C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Class II (X7R) | | within ±12.5% | D.F. ≤ 200% × Initial requirement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Class II (Y5V) | | within ±30% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Temperature Load (Endurance) | * Test temp.:NP0, X7R: 125±3°C, Y5V: 85±3°C <table border="1"> <thead> <tr> <th>Dielectric</th> <th>Rated Voltage (V)</th> <th>Apply Voltage</th> </tr> </thead> <tbody> <tr> <td rowspan="3">NP0, X7R, Y5V</td> <td>≤ 250</td> <td>2.0 times of U_R</td> </tr> <tr> <td>250 <V ≤ 500</td> <td>1.5 times of U_R</td> </tr> <tr> <td>= 630</td> <td>1.2 times of U_R</td> </tr> </tbody> </table> | Dielectric | Rated Voltage (V) | Apply Voltage | NP0, X7R, Y5V | ≤ 250 | 2.0 times of U _R | 250 <V ≤ 500 | 1.5 times of U _R | = 630 | 1.2 times of U _R | * No remarkable damage. <table border="1"> <thead> <tr> <th>Dielectric</th> <th>I.R</th> <th>Cap Change</th> <th>Q/D.F</th> </tr> </thead> <tbody> <tr> <td>Class I (NP0)</td> <td rowspan="3">≥1GΩ or RxC≥ 50Ω-F whichever is smaller.</td> <td>within ±3.0% or ±0.3pF whichever is larger</td> <td rowspan="3">D.F. ≤ 200% × Initial requirement</td> </tr> <tr> <td>Class II (X7R)</td> <td>within ±12.5%</td> </tr> <tr> <td>Class II (Y5V)</td> <td>within ±30%</td> </tr> </tbody> </table> | Dielectric | I.R | Cap Change | Q/D.F | Class I (NP0) | ≥1GΩ or RxC≥ 50Ω-F whichever is smaller. | within ±3.0% or ±0.3pF whichever is larger | D.F. ≤ 200% × Initial requirement | Class II (X7R) | within ±12.5% | Class II (Y5V) | within ±30% | | | | | | | | | |
| | Dielectric | Rated Voltage (V) | Apply Voltage | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NP0, X7R, Y5V | ≤ 250 | 2.0 times of U _R | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 250 <V ≤ 500 | 1.5 times of U _R | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | = 630 | 1.2 times of U _R | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dielectric | I.R | Cap Change | Q/D.F | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Class I (NP0) | ≥1GΩ or RxC≥ 50Ω-F whichever is smaller. | within ±3.0% or ±0.3pF whichever is larger | D.F. ≤ 200% × Initial requirement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Class II (X7R) | | within ±12.5% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Class II (Y5V) | | within ±30% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Exception item (X7R only): <table border="1"> <thead> <tr> <th>Rated Vol. (V)</th> <th>Size</th> <th>Cap. Range</th> <th>Apply Voltage</th> </tr> </thead> <tbody> <tr> <td rowspan="5">100</td> <td>0805</td> <td>≥ 124</td> <td rowspan="6">1.5 times of U_R</td> </tr> <tr> <td>1206</td> <td>≥ 105</td> </tr> <tr> <td>1210</td> <td></td> </tr> <tr> <td>1825</td> <td></td> </tr> <tr> <td>2220</td> <td></td> </tr> <tr> <td>2225</td> <td></td> </tr> <tr> <td rowspan="4">200 & 250</td> <td>1210</td> <td>> 224</td> </tr> <tr> <td>1812</td> <td>> 474</td> </tr> <tr> <td>1825</td> <td>≥ 105</td> </tr> <tr> <td>2220</td> <td></td> </tr> <tr> <td></td> <td>2225</td> <td></td> <td></td> </tr> </tbody> </table> | Rated Vol. (V) | Size | Cap. Range | Apply Voltage | 100 | 0805 | ≥ 124 | 1.5 times of U _R | 1206 | ≥ 105 | 1210 | | 1825 | | 2220 | | 2225 | | 200 & 250 | 1210 | > 224 | 1812 | > 474 | 1825 | ≥ 105 | 2220 | | | 2225 | | | |
| Rated Vol. (V) | Size | Cap. Range | Apply Voltage | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100 | 0805 | ≥ 124 | 1.5 times of U _R | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1206 | ≥ 105 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1210 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1825 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 2220 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2225 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200 & 250 | 1210 | > 224 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1812 | > 474 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1825 | ≥ 105 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 2220 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 2225 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <ul style="list-style-type: none"> * Test time: 1000+24/-0 hrs. * Measurement to be made after keeping at room temp. for 48±4 hrs. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**Multilayer Ceramic Chip Capacitors
Mid Voltage Type 100VDC – 630VDC**

HC Series

MERITEK

RELIABILITY TEST CONDITIONS AND REQUIREMENTS (CONTINUED)

| <p>Resistance to Flexure of Substrate</p> | <p>* The middle part of substrate shall be pressurized by means of the pressurizing rod at a rate of about 1 mm per second until the deflection becomes 1 mm.</p>  | <p>* No remarkable damage.</p> <table border="1" data-bbox="815 409 1517 546"> <thead> <tr> <th>Dielectric</th> <th>Cap Change</th> </tr> </thead> <tbody> <tr> <td>Class I (NP0)</td> <td>within $\pm 3.0\%$ or $\pm 0.3\text{pF}$ whichever is larger</td> </tr> <tr> <td>Class II (X7R)</td> <td>within $\pm 12.5\%$</td> </tr> <tr> <td>Class II (Y5V)</td> <td>within $\pm 30\%$</td> </tr> </tbody> </table> <p>(This capacitance change means the change of capacitance under specified flexure of substrate from the capacitance measured before the test.)</p> | Dielectric | Cap Change | Class I (NP0) | within $\pm 3.0\%$ or $\pm 0.3\text{pF}$ whichever is larger | Class II (X7R) | within $\pm 12.5\%$ | Class II (Y5V) | within $\pm 30\%$ |
|--|--|---|------------|------------|---------------|--|----------------|---------------------|----------------|-------------------|
| Dielectric | Cap Change | | | | | | | | | |
| Class I (NP0) | within $\pm 3.0\%$ or $\pm 0.3\text{pF}$ whichever is larger | | | | | | | | | |
| Class II (X7R) | within $\pm 12.5\%$ | | | | | | | | | |
| Class II (Y5V) | within $\pm 30\%$ | | | | | | | | | |
| <p>Adhesive Strength of Termination</p> | <p>* Capacitors mounted on a substrate. A force of 10N applied perpendicular to the place of substrate and parallel the line joining the center of terminations for 10 ± 1 sec.</p>  | <p>* No remarkable damage or removal of the terminations.</p> | | | | | | | | |
| <p>Vibration Resistance</p> | <p>* Vibration frequency: 10~55 Hz/min. * Total amplitude: 1.5mm * Test time: 6 hrs. (Two hrs. each in three mutually perpendicular directions.)</p> | <p>* No remarkable damage. * Cap change and Q/D.F.: To meet initial spec.</p> | | | | | | | | |

Multilayer Ceramic Chip Capacitors Mid Voltage Type 100VDC – 630VDC

HC Series

MERITEK

CAPACITANCE RANGE

X7R Dielectric

| Dimension | | 0603 | | | 0805 | | | | | 1206 | | | | |
|-----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Cap(pF) | Code | 100V | 200V | 250V | 100V | 200V | 250V | 500V | 630V | 100V | 200V | 250V | 500V | 630V |
| 100 | 101 | S | B | B | X | X | X | X | X | X | C | C | C | C |
| 120 | 121 | S | B | B | X | X | X | X | X | X | C | C | C | C |
| 150 | 151 | S | B | B | X | X | X | X | X | X | C | C | C | C |
| 180 | 181 | S | B | B | X | X | X | X | X | X | C | C | C | C |
| 220 | 221 | S | B | B | X | X | X | X | X | X | C | C | C | C |
| 270 | 271 | S | B | B | X | X | X | X | X | X | C | C | C | C |
| 330 | 331 | S | B | B | X | X | X | X | X | X | C | C | C | C |
| 390 | 391 | S | B | B | X | X | X | X | X | X | C | C | C | C |
| 470 | 471 | S | B | B | X | X | X | X | X | X | C | C | C | C |
| 560 | 561 | S | B | B | X | X | X | X | X | X | C | C | C | C |
| 680 | 681 | S | B | B | X | X | X | X | X | X | C | C | C | C |
| 820 | 821 | S | B | B | X | X | X | X | X | X | C | C | C | C |
| 1000 | 102 | S | B | B | X | X | X | X | X | X | C | C | C | C |
| 1200 | 122 | S | B | B | X | X | X | X | X | X | C | C | C | C |
| 1500 | 152 | S | B | B | X | X | X | X | X | X | C | C | C | C |
| 1800 | 182 | S | B | B | X | X | X | X | X | X | C | C | C | C |
| 2200 | 222 | S | B | B | X | X | X | X | X | X | C | C | C | C |
| 2700 | 272 | S | B | B | X | X | X | X | X | X | C | C | C | C |
| 3300 | 332 | S | B | B | X | X | X | X | X | X | C | C | C | C |
| 3900 | 392 | S | B | B | X | X | X | X | X | X | C | C | C | C |
| 4700 | 472 | S | B | B | X | X | X | C | C | X | C | C | C | C |
| 5600 | 562 | S | B | B | X | X | X | C | C | X | C | C | C | C |
| 6800 | 682 | S | B | B | X | X | X | C | C | X | C | C | C | C |
| 8200 | 822 | S | B | B | X | C | C | C | C | X | C | C | C | C |
| 10000 | 103 | S | B | B | X | C | C | C | C | X | C | C | C | C |
| 12000 | 123 | B | B | B | X | C | C | C | C | X | C | C | C | C |
| 15000 | 153 | B | B | B | X | C | C | C | C | X | C | C | C | C |
| 18000 | 183 | B | | | X | C | C | C | C | X | C | C | C | C |
| 22000 | 223 | B | | | X | C | C | C | C | X | C | C | E | E |
| 27000 | 273 | B | | | C | C | C | | | X | C | C | E | E |
| 33000 | 333 | B | | | C | C | C | | | X | E | E | E | E |
| 39000 | 393 | B | | | C | C | C | | | X | E | E | E | E |
| 47000 | 473 | B | | | C | C | C | | | X | E | E | E | E |
| 56000 | 563 | B | | | C | C | C | | | X | E | E | E | E |
| 68000 | 683 | B | | | C | C | C | | | X | E | E | | |
| 82000 | 823 | B | | | C | C | C | | | C | E | E | | |
| 100000 | 104 | B | | | C | C | C | | | C | E | E | | |
| 120000 | 124 | | | | C | | | | | C | | | | |
| 150000 | 154 | | | | C | | | | | E | | | | |
| 180000 | 184 | | | | C | | | | | E | | | | |
| 220000 | 224 | | | | C | | | | | E | | | | |
| 270000 | 274 | | | | | | | | | E | | | | |
| 330000 | 334 | | | | | | | | | E | | | | |
| 390000 | 394 | | | | | | | | | E | | | | |
| 470000 | 474 | | | | I | | | | | E | | | | |
| 560000 | 564 | | | | | | | | | P | | | | |
| 680000 | 684 | | | | | | | | | P | | | | |
| 820000 | 824 | | | | | | | | | P | | | | |

Multilayer Ceramic Chip Capacitors Mid Voltage Type 100VDC – 630VDC

HC Series

MERITEK

CAPACITANCE RANGE (CONTINUED)

X7R Dielectric

| Dimension | | 1210 | | | | | 1808 | | | | | 1812 | | | | |
|-----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Cap(pF) | Code | 100V | 200V | 250V | 500V | 630V | 100V | 200V | 250V | 500V | 630V | 100V | 200V | 250V | 500V | 630V |
| 150 | 151 | | | | | | C | C | C | C | C | | | | | |
| 180 | 181 | | | | | | C | C | C | C | C | | | | | |
| 220 | 221 | M | M | M | C | C | C | C | C | C | C | | | | | |
| 270 | 271 | M | M | M | C | C | C | C | C | C | C | C | C | C | C | C |
| 330 | 331 | M | M | M | C | C | C | C | C | C | C | C | C | C | C | C |
| 390 | 391 | M | M | M | C | C | C | C | C | C | C | C | C | C | C | C |
| 470 | 471 | M | M | M | C | C | C | C | C | C | C | C | C | C | C | C |
| 560 | 561 | M | M | M | C | C | C | C | C | C | C | C | C | C | C | C |
| 680 | 681 | M | M | M | C | C | C | C | C | C | C | C | C | C | C | C |
| 820 | 821 | M | M | M | C | C | C | C | C | C | C | C | C | C | C | C |
| 1000 | 102 | M | M | M | C | C | C | C | C | C | C | C | C | C | C | C |
| 1200 | 122 | M | M | M | C | C | C | C | C | C | C | C | C | C | C | C |
| 1500 | 152 | M | M | M | C | C | C | C | C | C | C | C | C | C | C | C |
| 1800 | 182 | M | M | M | C | C | C | C | C | C | C | C | C | C | C | C |
| 2200 | 222 | M | M | M | C | C | C | C | C | C | C | C | C | C | C | C |
| 2700 | 272 | M | M | M | C | C | C | C | C | C | C | C | C | C | C | C |
| 3300 | 332 | M | M | M | C | C | C | C | C | C | C | C | C | C | C | C |
| 3900 | 392 | M | M | M | C | C | C | C | C | C | C | C | C | C | C | C |
| 4700 | 472 | M | M | M | C | C | C | C | C | C | C | C | C | C | C | C |
| 5600 | 562 | M | M | M | C | C | E | E | E | F | F | C | C | C | C | C |
| 6800 | 682 | M | M | M | C | C | E | E | E | F | F | C | C | C | C | C |
| 8200 | 822 | M | M | M | C | C | E | E | E | F | F | C | C | C | C | C |
| 10000 | 103 | M | M | M | C | C | E | E | E | F | F | C | C | C | C | C |
| 12000 | 123 | M | M | M | C | C | E | E | E | F | F | C | C | C | C | C |
| 15000 | 153 | M | M | M | C | C | E | E | E | F | F | C | C | C | C | C |
| 18000 | 183 | M | M | M | C | C | E | E | E | F | F | C | C | C | C | C |
| 22000 | 223 | M | M | M | C | C | E | E | E | F | F | C | C | C | C | C |
| 27000 | 273 | M | M | M | E | E | E | E | E | F | F | C | C | C | C | C |
| 33000 | 333 | M | M | M | E | E | E | E | E | F | F | C | C | C | C | C |
| 39000 | 393 | M | M | M | E | E | E | E | E | F | F | C | C | C | C | C |
| 47000 | 473 | M | C | C | E | E | E | E | E | F | F | C | C | C | C | C |
| 56000 | 563 | M | C | C | E | E | E | E | E | F | F | C | C | C | F | F |
| 68000 | 683 | M | E | E | F | F | E | E | E | F | F | C | C | C | F | F |
| 82000 | 823 | M | E | E | G | G | E | E | E | F | F | C | C | C | F | F |
| 100000 | 104 | M | E | E | G | G | E | E | E | F | F | E | C | C | F | F |
| 120000 | 124 | M | E | E | G | G | E | E | E | | | E | C | C | G | G |
| 150000 | 154 | C | G | G | G | G | E | E | E | | | E | F | F | G | G |
| 180000 | 184 | C | G | G | | | E | F | F | | | E | F | F | G | G |
| 220000 | 224 | C | G | G | | | E | F | F | | | E | F | F | G | G |
| 270000 | 274 | E | G | G | | | F | F | F | | | E | F | F | G | |
| 330000 | 334 | E | G | G | | | F | F | F | | | E | F | F | G | |
| 390000 | 394 | G | G | G | | | F | F | F | | | E | F | F | G | |
| 470000 | 474 | G | G | G | | | F | F | F | | | E | F | F | G | |
| 560000 | 564 | G | G | G | | | F | F | F | | | F | G | G | | |
| 680000 | 684 | F | G | G | | | F | | | | | F | G | G | | |
| 820000 | 824 | F | | | | | F | | | | | F | G | G | | |

Multilayer Ceramic Chip Capacitors Mid Voltage Type 100VDC – 630VDC

HC Series

MERITEK

CAPACITANCE RANGE (CONTINUED)

X7R Dielectric

| Dimension | | 1825 | | | | | 2220 | | | | | 2225 | | | | |
|-----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Cap(pF) | Code | 100V | 200V | 250V | 500V | 630V | 100V | 200V | 250V | 500V | 630V | 100V | 200V | 250V | 500V | 630V |
| 150 | 151 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 180 | 181 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 220 | 221 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 270 | 271 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 330 | 331 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 390 | 391 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 470 | 471 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 560 | 561 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 680 | 681 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 820 | 821 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 1000 | 102 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 1200 | 122 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 1500 | 152 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 1800 | 182 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 2200 | 222 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 2700 | 272 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 3300 | 332 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 3900 | 392 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 4700 | 472 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 5600 | 562 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 6800 | 682 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 8200 | 822 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 10000 | 103 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 12000 | 123 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 15000 | 153 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 18000 | 183 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 22000 | 223 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 27000 | 273 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 33000 | 333 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 39000 | 393 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 47000 | 473 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 56000 | 563 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 68000 | 683 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 82000 | 823 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 100000 | 104 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 120000 | 124 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 150000 | 154 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 180000 | 184 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 220000 | 224 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 270000 | 274 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 330000 | 334 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 390000 | 394 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 470000 | 474 | F | F | F | F | F | F | F | F | F | F | F | F | F | F | F |
| 560000 | 564 | F | F | F | G | G | F | F | F | G | G | F | F | F | F | F |
| 680000 | 684 | F | F | F | G | G | F | F | F | G | G | F | F | F | F | F |
| 820000 | 824 | F | F | F | H | H | F | F | F | H | H | F | F | F | G | G |

Multilayer Ceramic Chip Capacitors

Mid Voltage Type 100VDC – 630VDC

HC Series

MERITEK

CAPACITANCE RANGE

C0G (NP0) Dielectric

| Dimension | | 0402 | 0603 | | | 0805 | | | | | 1206 | | | | | 1210 | | | | |
|-----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Cap(pF) | Code | 100V | 100V | 200V | 250V | 100V | 200V | 250V | 500V | 630V | 100V | 200V | 250V | 500V | 630V | 100V | 200V | 250V | 500V | 630V |
| 0.5 | 0R5 | N | S | S | S | A | A | A | A | A | | | | | | | | | | |
| 1.0 | 1R0 | N | S | S | S | A | A | A | A | A | | | | | | | | | | |
| 1.2 | 1R2 | N | S | S | S | A | A | A | A | A | X | | | X | | | | | | |
| 1.5 | 1R5 | N | S | S | S | A | A | A | A | A | X | X | X | X | X | | | | | |
| 1.8 | 1R8 | N | S | S | S | A | A | A | A | A | X | X | X | X | X | | | | | |
| 2.2 | 2R2 | N | S | S | S | A | A | A | A | A | X | X | X | X | X | | | | | |
| 2.7 | 2R7 | N | S | S | S | A | A | A | A | A | X | X | X | X | X | | | | | |
| 3.3 | 3R3 | N | S | S | S | A | A | A | A | A | X | X | X | X | X | | | | | |
| 3.9 | 3R9 | N | S | S | S | A | A | A | A | A | X | X | X | X | X | | | | | |
| 4.7 | 4R7 | N | S | S | S | A | A | A | A | A | X | X | X | X | X | | | | | |
| 5.6 | 5R6 | N | S | S | S | A | A | A | A | A | X | X | X | X | X | | | | | |
| 6.8 | 6R8 | N | S | S | S | A | A | A | A | A | X | X | X | X | X | | | | | |
| 8.2 | 8R2 | N | S | S | S | A | A | A | A | A | X | X | X | X | X | M | M | M | M | M |
| 10 | 100 | N | S | S | S | A | A | A | A | A | X | X | X | X | X | M | M | M | M | M |
| 12 | 120 | N | S | S | S | A | A | A | A | A | X | X | X | X | X | M | M | M | M | M |
| 15 | 150 | N | S | S | S | A | A | A | A | A | X | X | X | X | X | M | M | M | M | M |
| 18 | 180 | N | S | S | S | A | A | A | A | A | X | X | X | X | X | M | M | M | M | M |
| 22 | 220 | N | S | S | S | A | A | A | A | A | X | X | X | X | X | M | M | M | M | M |
| 27 | 270 | N | S | S | S | A | A | A | A | A | X | X | X | X | X | M | M | M | M | M |
| 33 | 330 | N | S | S | S | A | A | A | A | A | X | X | X | X | X | M | M | M | M | M |
| 39 | 390 | N | S | S | S | A | A | A | A | A | X | X | X | X | X | M | M | M | M | M |
| 47 | 470 | N | S | S | S | A | A | A | A | A | X | X | X | X | X | M | M | M | M | M |
| 56 | 560 | N | S | S | S | A | A | A | A | A | X | X | X | X | X | M | M | M | M | M |
| 68 | 680 | N | S | S | S | A | A | A | A | A | X | X | X | X | X | M | M | M | M | M |
| 82 | 820 | N | S | S | S | A | A | A | X | X | X | X | X | X | X | M | M | M | M | M |
| 100 | 101 | N | S | S | S | A | A | X | X | X | X | X | X | X | X | M | M | M | M | M |
| 120 | 121 | N | S | S | S | A | A | X | C | C | X | X | X | X | X | M | M | M | M | M |
| 150 | 151 | N | S | S | S | A | X | X | C | C | X | X | X | X | X | M | M | M | M | M |
| 180 | 181 | N | S | S | S | A | X | C | C | C | X | X | X | X | X | M | M | M | M | M |
| 220 | 221 | N | S | S | S | A | C | C | C | C | X | X | X | X | X | M | M | M | M | M |
| 270 | 271 | | S | B | B | A | C | C | C | C | X | X | M | M | M | M | M | M | M | M |
| 330 | 331 | | S | B | B | X | C | C | C | C | X | X | M | M | M | M | M | M | M | M |
| 390 | 391 | | S | B | B | X | C | C | C | C | X | X | M | M | M | M | M | M | M | M |
| 470 | 471 | | S | B | B | X | C | C | C | C | X | M | M | M | M | M | M | M | M | M |
| 560 | 561 | | S | B | B | X | C | C | C | C | X | M | C | C | C | M | M | M | M | M |
| 680 | 681 | | S | B | B | X | C | C | C | C | X | M | C | C | C | M | M | M | M | M |
| 820 | 821 | | S | B | B | X | C | C | C | C | X | M | E | E | E | M | M | M | M | M |
| 1000 | 102 | | S | | | X | C | C | C | C | X | M | E | E | E | M | C | C | C | C |
| 1200 | 122 | | B | | | X | C | C | C | C | X | M | E | E | E | M | C | C | C | C |
| 1500 | 152 | | B | | | X | C | C | C | C | X | C | E | E | E | M | C | C | C | C |
| 1800 | 182 | | | | | X | C | C | C | C | X | C | E | E | E | M | C | C | C | C |
| 2200 | 222 | | | | | X | C | C | C | C | X | C | E | E | E | M | C | C | C | C |
| 2700 | 272 | | | | | X | C | C | C | C | X | C | E | E | E | M | C | C | C | C |
| 3300 | 332 | | | | | C | | | | | X | C | E | E | E | M | C | C | C | C |
| 3900 | 392 | | | | | C | | | | | X | E | E | E | E | M | C | C | C | C |
| 4700 | 472 | | | | | C | | | | | X | E | E | E | E | C | C | C | C | C |
| 5600 | 562 | | | | | C | | | | | X | E | E | E | E | C | C | C | C | C |
| 6800 | 682 | | | | | C | | | | | M | E | E | | | E | E | E | E | E |
| 8200 | 822 | | | | | | | | | | C | E | E | | | E | E | E | E | E |
| 10000 | 103 | | | | | | | | | | C | | | | | E | F | F | F | F |
| 12000 | 123 | | | | | | | | | | T | | | | | E | F | F | F | F |
| 15000 | 153 | | | | | | | | | | T | | | | | F | G | G | G | G |
| 18000 | 183 | | | | | | | | | | T | | | | | G | G | G | | |
| 22000 | 223 | | | | | | | | | | T | | | | | G | G | G | | |
| 27000 | 273 | | | | | | | | | | | | | | | G | | | | |
| 33000 | 333 | | | | | | | | | | | | | | | G | | | | |
| 39000 | 393 | | | | | | | | | | | | | | | | | | | |

Multilayer Ceramic Chip Capacitors Mid Voltage Type 100VDC – 630VDC

HC Series

MERITEK

CAPACITANCE RANGE (CONTINUED)

C0G (NP0) Dielectric

| Dimension | | 1808 | | | | | 1812 | | | | | 1825 | | | | | 2220 | | | | |
|-----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Cap(pF) | Code | 100V | 200V | 250V | 500V | 630V | 100V | 200V | 250V | 500V | 630V | 100V | 200V | 250V | 500V | 630V | 100V | 200V | 250V | 500V | 630V |
| 2.2 | 2R2 | C | C | C | C | C | | | | | | | | | | | | | | | |
| 2.7 | 2R7 | C | C | C | C | C | | | | | | | | | | | | | | | |
| 3.3 | 3R3 | C | C | C | C | C | | | | | | | | | | | | | | | |
| 3.9 | 3R9 | C | C | C | C | C | | | | | | | | | | | | | | | |
| 4.7 | 4R7 | C | C | C | C | C | | | | | | | | | | | | | | | |
| 5.6 | 5R6 | C | C | C | C | C | | | | | | | | | | | | | | | |
| 6.8 | 6R8 | C | C | C | C | C | | | | | | | | | | | | | | | |
| 8.2 | 8R2 | C | C | C | C | C | | | | | | | | | | | | | | | |
| 10 | 100 | C | C | C | C | C | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 12 | 120 | C | C | C | C | C | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 15 | 150 | C | C | C | C | C | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 18 | 180 | C | C | C | C | C | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 22 | 220 | C | C | C | C | C | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 27 | 270 | C | C | C | C | C | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 33 | 330 | C | C | C | C | C | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 39 | 390 | C | C | C | C | C | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 47 | 470 | C | C | C | C | C | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 56 | 560 | C | C | C | C | C | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 68 | 680 | C | C | C | C | C | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 82 | 820 | C | C | C | C | C | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 100 | 101 | C | C | C | C | C | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 120 | 121 | C | C | C | C | C | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 150 | 151 | C | C | C | C | C | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 180 | 181 | C | C | C | C | C | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 220 | 221 | C | C | C | C | C | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 270 | 271 | C | C | C | F | F | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 330 | 331 | C | C | C | F | F | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 390 | 391 | C | C | C | F | F | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 470 | 471 | C | C | C | F | F | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 560 | 561 | C | C | C | F | F | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 680 | 681 | C | C | C | F | F | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 820 | 821 | C | C | C | F | F | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 1000 | 102 | C | C | C | F | F | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 1200 | 122 | C | C | C | F | F | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 1500 | 152 | C | C | C | F | F | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 1800 | 182 | C | C | C | F | F | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 2200 | 222 | C | C | C | F | F | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 2700 | 272 | C | C | C | F | F | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 3300 | 332 | C | C | C | F | F | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 3900 | 392 | C | C | C | F | F | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 4700 | 472 | C | E | E | F | F | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 5600 | 562 | C | E | E | F | F | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 6800 | 682 | E | F | F | F | F | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 8200 | 822 | E | F | F | F | F | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 10000 | 103 | F | F | F | F | F | C | C | C | C | C | E | E | E | E | E | E | E | E | E | E |
| 12000 | 123 | F | F | F | | | C | E | E | E | E | E | E | E | E | E | E | E | E | E | E |
| 15000 | 153 | F | | | | | C | E | E | E | E | E | E | E | E | E | E | E | E | E | E |
| 18000 | 183 | F | | | | | E | F | F | F | F | E | E | E | E | E | E | E | E | E | E |
| 22000 | 223 | | | | | | E | F | F | F | F | E | E | E | E | E | E | E | E | E | E |
| 27000 | 273 | | | | | | F | G | G | G | G | E | E | E | F | F | E | E | E | F | F |
| 33000 | 333 | | | | | | F | G | G | G | G | E | E | E | F | F | E | F | F | F | F |
| 39000 | 393 | | | | | | G | G | G | | | E | F | F | G | G | E | F | F | G | G |
| 47000 | 473 | | | | | | G | G | G | | | E | F | F | G | G | E | G | G | G | G |
| 56000 | 563 | | | | | | G | | | | | F | G | G | G | G | F | G | G | G | G |
| 68000 | 683 | | | | | | G | | | | | F | G | G | G | G | F | G | G | | |
| 82000 | 823 | | | | | | | | | | | G | G | G | | | G | G | G | | |
| 100000 | 104 | | | | | | | | | | | G | | | | | G | | | | |
| 120000 | 124 | | | | | | | | | | | | | | | | G | | | | |

Multilayer Ceramic Chip Capacitors Mid Voltage Type 100VDC – 630VDC

HC Series

MERITEK

CAPACITANCE RANGE (CONTINUED)

C0G (NP0) Dielectric

Y5V Dielectric

| Dimension | | 2225 | | | | |
|-----------|------|------|------|------|------|------|
| Cap(pF) | Code | 100V | 200V | 250V | 500V | 630V |
| 10 | 100 | E | E | E | E | E |
| 12 | 120 | E | E | E | E | E |
| 15 | 150 | E | E | E | E | E |
| 18 | 180 | E | E | E | E | E |
| 22 | 220 | E | E | E | E | E |
| 27 | 270 | E | E | E | E | E |
| 33 | 330 | E | E | E | E | E |
| 39 | 390 | E | E | E | E | E |
| 47 | 470 | E | E | E | E | E |
| 56 | 560 | E | E | E | E | E |
| 68 | 680 | E | E | E | E | E |
| 82 | 820 | E | E | E | E | E |
| 100 | 101 | E | E | E | E | E |
| 120 | 121 | E | E | E | E | E |
| 150 | 151 | E | E | E | E | E |
| 180 | 181 | E | E | E | E | E |
| 220 | 221 | E | E | E | E | E |
| 270 | 271 | E | E | E | E | E |
| 330 | 331 | E | E | E | E | E |
| 390 | 391 | E | E | E | E | E |
| 470 | 471 | E | E | E | E | E |
| 560 | 561 | E | E | E | E | E |
| 680 | 681 | E | E | E | E | E |
| 820 | 821 | E | E | E | E | E |
| 1000 | 102 | E | E | E | E | E |
| 1200 | 122 | E | E | E | E | E |
| 1500 | 152 | E | E | E | E | E |
| 1800 | 182 | E | E | E | E | E |
| 2200 | 222 | E | E | E | E | E |
| 2700 | 272 | E | E | E | E | E |
| 3300 | 332 | E | E | E | E | E |
| 3900 | 392 | E | E | E | E | E |
| 4700 | 472 | E | E | E | E | E |
| 5600 | 562 | E | E | E | E | E |
| 6800 | 682 | E | E | E | E | E |
| 8200 | 822 | E | E | E | E | E |
| 10000 | 103 | E | E | E | E | E |
| 12000 | 123 | E | E | E | E | E |
| 15000 | 153 | E | E | E | E | E |
| 18000 | 183 | E | E | E | E | E |
| 22000 | 223 | E | E | E | E | E |
| 27000 | 273 | E | E | E | E | E |
| 33000 | 333 | E | E | E | E | E |
| 39000 | 393 | F | F | F | F | F |
| 47000 | 473 | F | F | F | F | F |
| 56000 | 563 | G | G | G | G | G |
| 68000 | 683 | G | G | G | G | G |
| 82000 | 823 | G | G | G | G | G |
| 100000 | 104 | G | G | | | |
| 120000 | 124 | G | G | | | |
| 150000 | 154 | | | | | |
| 180000 | 184 | | | | | |

| Dimension | | 0805 | | | 1206 | | |
|-----------|------|------|------|------|------|------|------|
| Cap(pF) | Code | 100V | 200V | 250V | 100V | 200V | 250V |
| 10 | 103 | X | X | X | X | X | X |
| 15 | 153 | X | X | X | X | X | X |
| 22 | 223 | X | X | X | X | X | X |
| 33 | 333 | X | X | X | X | X | X |
| 47 | 473 | X | X | X | X | X | X |
| 68 | 683 | X | X | X | X | X | X |
| 100 | 104 | X | | | X | X | X |
| 150 | 154 | | | | M | M | M |
| 220 | 224 | | | | M | | |
| 330 | 334 | | | | | | |
| 470 | 474 | | | | | | |
| 680 | 684 | | | | | | |
| Dimension | | 1210 | | | 1812 | | |
| Cap(pF) | Code | 100V | 200V | 250V | 100V | 200V | 250V |
| 10 | 103 | M | M | M | C | C | C |
| 15 | 153 | M | M | M | C | C | C |
| 22 | 223 | M | M | M | C | C | C |
| 33 | 333 | M | M | M | C | C | C |
| 47 | 473 | M | M | M | C | C | C |
| 68 | 683 | M | M | M | C | C | C |
| 100 | 104 | M | M | M | C | C | C |
| 150 | 154 | M | M | M | C | C | C |
| 220 | 224 | M | | | C | C | C |
| 330 | 334 | M | | | C | C | C |
| 470 | 474 | | | | C | C | C |
| 680 | 684 | | | | C | C | C |

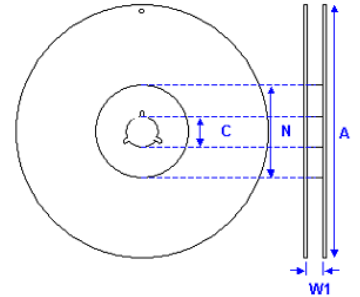
Multilayer Ceramic Chip Capacitors Mid Voltage Type 100VDC – 630VDC

HC Series

MERITEK

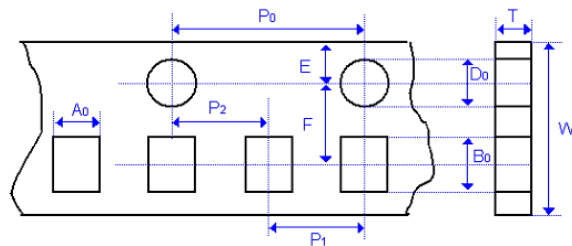
PACKAGE DIMENSION

| Size | 0805, 1206, 1210, 1812 | | | 1808, 1812, 1825, 2220, 2225 | 2211 |
|-----------|------------------------|---------------|---------------|------------------------------|---------------|
| Reel Size | 7" | 10" | 7" | 7" | 7" |
| C | 13.0+0.5/-0.2 | 13.0+0.5/-0.2 | 13.0+0.5/-0.2 | 13.0+0.5/-0.2 | 13.0+0.5/-0.2 |
| W1 | 8.4+1.5/-0 | 8.4+1.5/-0 | 12.4+2.0/-0 | 12.4+2.0/-0 | 12.4+2.0/-0 |
| A | 178.0±0.10 | 250.0±1.0 | 178.0±0.10 | 178.0±0.10 | 178.0±0.10 |
| N | 65.0±1.0 | 100.0±1.0 | 80.0± | 60.5±1.0 | 80.0±1.0 |

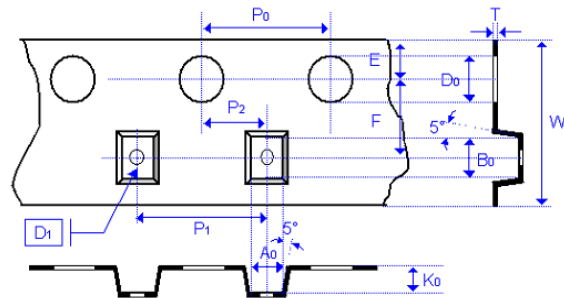


| Size | 0402 | 0603 | |
|-------------------|------------|------------------|------------------|
| Chip Size | 0.50 ±0.05 | 0.80 ±0.07 | 0.80±0.15 /-0.10 |
| A ₀ | 0.62±0.05 | 1.00+0.05 /-0.10 | 1.02+0.05 /-0.10 |
| B ₀ | 1.12±0.05 | 1.80±0.10 | 1.80±0.10 |
| T | 0.60±0.05 | 0.95±0.05 | 0.97±0.05 |
| K ₀ | - | - | - |
| W | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 |
| P ₀ | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 |
| 10xP ₀ | 40.00±0.20 | 40.0±0.20 | 40.00±0.20 |
| P ₁ | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 |
| P ₂ | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 |
| D ₀ | 1.55±0.05 | 1.55±0.05 | 1.55±0.1/-0 |
| D ₁ | - | - | - |
| E | 1.75±0.05 | 1.75±0.10 | 1.75±0.10 |
| F | 3.50±0.05 | 3.50±0.05 | 3.50±0.05 |

Paper Tape:



Plastic Tape:



| Size | 0805 | | 1206 | | | 1210 | | 1808 | |
|-------------------|------------|-------------|------------|------------------------|----------------------------|--|-------------|-------------------------------------|-------------|
| Chip Size | 0.80 ±0.10 | 1.25 ±0.10 | 0.80 ±0.10 | 0.95±0.10 1.25±0.10 | 1.60±0.20 1.60+0.3/-0.1 | 0.95±0.10 1.25±0.10 1.60±0.20 2.00±0.20 | 2.50±0.30 | 1.25±0.10 1.40±0.15 1.60±0.20 | 2.00±0.20 |
| A ₀ | 1.50±0.10 | <1.65 | 2.00±0.10 | <2.00 | <2.00 | <3.05 | <3.10 | <2.50 | <2.50 |
| B ₀ | 2.30±0.10 | <2.40 | 3.50±0.10 | <3.60 | <3.70 | <3.80 | <4.00 | <5.30 | <5.30 |
| T | 0.95±0.05 | 0.23±0.05 | 0.95±0.05 | 0.23±0.05 | 0.23±0.05 | 0.23±0.05 | 0.23±0.05 | 0.25±0.05 | 0.25±0.05 |
| K ₀ | - | <2.50 | - | <2.50 | <2.50 | <2.50 | <3.50 | <2.50 | <2.50 |
| W | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 12.0±0.20 | 12.0±0.20 |
| P ₀ | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.100 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 |
| 10xP ₀ | 40.00±0.20 | 40.00±0.20 | 40.0±0.20 | 40.00±0.20 | 40.00±0.20 | 40.00±0.20 | 40.0±0.20 | 40.0±0.20 | 40.0±0.20 |
| P ₁ | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 |
| P ₂ | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 |
| D ₀ | 1.55±0.05 | 1.50±0.1/-0 | 1.50±0.05 | 1.50±0.1/-0 | 1.50±0.1/-0 | 1.50±0.1/-0 | 1.50±0.1/-0 | 1.50±0.1/-0 | 1.50±0.1/-0 |
| D ₁ | - | 1.00±0.10 | - | 1.00±0.10 | 1.00±0.10 | 1.00±0.10 | 1.00±0.10 | 1.50±0.10 | 1.50±0.10 |
| E | 1.75±0.05 | 1.75±0.10 | 1.75±0.10 | 1.75±0.10 | 1.75±0.10 | 1.75±0.10 | 1.75±0.10 | 1.75±0.10 | 1.75±0.10 |
| F | 3.50±0.05 | 3.50±0.05 | 3.50±0.05 | 3.50±0.05 | 3.50±0.05 | 3.50±0.05 | 3.50±0.05 | 5.50±0.05 | 5.50±0.05 |

Multilayer Ceramic Chip Capacitors Mid Voltage Type 100VDC – 630VDC

HC Series

MERITEK

PACKAGE DIMENSION (CONTINUED)

| Size | 2211 | | | 1812 | | 1825 | | 2220 | | 2225 | |
|-------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|-------------------------------------|------------------|------------------|------------------|
| Chip Size | 1.60 ±0.20 | 2.00 ±0.20 | 2.50 ±0.20 | 2.00 ±0.20 | 2.50 ±0.30 | 2.00 ±0.20 | 2.50 ±0.30 | 1.40±0.15 1.60±0.20 2.00±0.20 | 2.50 ±0.30 | 2.00 ±0.20 | 2.50 ±0.30 |
| A ₀ | < 3.30 | < 3.30 | < 3.30 | <3.90 | <3.90 | <6.80 | <6.80 | <5.80 | <5.80 | <6.80 | <6.80 |
| B ₀ | < 6.50 | < 6.50 | < 6.50 | <5.30 | <5.30 | <5.30 | <5.30 | <6.50 | <6.50 | <6.50 | <6.50 |
| T | 0.30±0.10 | 0.30±0.10 | 0.30±0.10 | 0.25±0.05 | 0.25±0.05 | 0.30±0.10 | 0.30±0.10 | 0.30±0.10 | 0.30±0.10 | 0.30±0.10 | 0.30±0.10 |
| K ₀ | < 2.50 | < 3.10 | <2.50 | <3.0 | <2.50 | <3.10 | <2.50 | <3.10 | <2.50 | <3.10 | <3.10 |
| W | 12.0±0.20 | 12.0±0.20 | 12.0±0.20 | 12.0±0.20 | 12.0±0.20 | 12.0±0.20 | 12.0±0.20 | 12.0±0.20 | 12.0±0.20 | 12.0±0.20 | 12.0±0.20 |
| P ₀ | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 | 4.00±0.10 |
| 10xP ₀ | 40.00±0.2 | 40.00±0.2 | 40.00±0.2 | 40.0±0.20 | 40.00±0.2 | 40.00±0.2 | 40.00±0.2 | 40.0±0.20 | 40.0±0.20 | 40.0±0.20 | 40.0±0.20 |
| P ₁ | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 | 8.00±0.10 |
| P ₂ | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 | 2.00±0.05 |
| D ₀ | 1.50 +0.10/-0 | 1.50 +0.10/-0 | 1.50 +0.10/-0 | 1.50 +0.10/-0 | 1.50 +0.10/-0 | 1.50 +0.10/-0 | 1.50 +0.10/-0 | 1.50 +0.10/-0 | 1.50 +0.10/-0 | 1.50 +0.10/-0 | 1.50 +0.10/-0 |
| D ₁ | 1.50±0.10 | 1.50±0.10 | 1.50±0.10 | 1.50±0.10 | 1.50+/-0.1 | 1.50±0.10 | 1.50±0.10 | 1.50±0.10 | 1.50±0.10 | 1.50±0.10 | 1.50±0.10 |
| E | 1.75±0.1 | 1.75±0.1 | 1.75±0.1 | 1.75±0.10 | 1.75+/-0.1 | 1.75±0.1 | 1.75±0.10 | 1.75±0.1 | 1.75±0.10 | 1.75±0.10 | 1.75±0.10 |
| F | 5.50±0.05 | 5.50±0.05 | 5.50±0.05 | 5.50±0.05 | 5.50+/-0.05 | 5.50±0.05 | 5.50±0.05 | 5.50±0.05 | 5.50±0.05 | 5.50±0.05 | 5.50±0.05 |

REEL DIMENSION AND QUANTITY

| Size | Thickness (mm) | Paper Tape- | | Plastic Tape | |
|-------------|----------------|-------------|----------|--------------|----------|
| | | 7" reel | 13" reel | 7" reel | 13" reel |
| 0402 (1005) | 0.50±0.05 | 10K | 50K | - | - |
| 0603 (1608) | 0.80±0.07 | 4K | 15K | - | - |
| | 0.80±0.15 | 4k | 15K | - | - |
| 0805 (2012) | 0.60±0.10 | 4K | 15K | - | - |
| | 0.80±0.10 | 4K | 15K | - | - |
| | 0.95±0.10 | - | - | 3K | 10K |
| | 1.25±0.10 | - | - | 3K | - |
| 1206 (3216) | 0.80±0.10 | 4K | 15K | - | - |
| | 0.95±0.10 | - | - | 3K | 10K |
| | 1.25±0.10 | - | - | 3K | 10K |
| | 1.60±0.20 | - | - | 2K | - |
| 1210 (3225) | 0.95±0.10 | - | - | 3K | 10K |
| | 1.25±0.10 | - | - | 3K | 10K |
| | 1.60±0.20 | - | - | 2K | - |
| | 2.00±0.20 | - | - | 1K | - |
| | 2.50±0.30 | - | - | 1K | - |
| 1808 (4520) | 1.25±0.10 | - | - | 2K | - |
| | 1.60±0.20 | - | - | 2K | - |
| | 2.00±0.20 | - | - | 1K | - |
| 1812 (4532) | 1.25±0.10 | - | - | 1k | - |
| | 1.60±0.20 | - | - | 1K | - |
| | 2.00±0.20 | - | - | 1K | - |
| | 2.50±0.30 | - | - | 0.5K | 3k |
| 1825 (4563) | 1.60±0.20 | - | - | 1K | - |
| | 2.00±0.20 | - | - | 1K | - |
| | 2.50±0.30 | - | - | 0.5K | - |
| 2220 (5750) | 1.60±0.20 | - | - | 1K | - |
| | 2.00±0.20 | - | - | 1K | - |
| | 2.50±0.30 | - | - | 0.5K | - |
| 2225 (5763) | 2.00±0.20 | - | - | 1K | - |
| | 2.50±0.30 | - | - | 0.5K | - |

Unit: pieces

APPLICATION NOTES

STORAGE

To prevent the damage of solderability of terminations, the following storage conditions are recommended:

1. Indoors under 5°C~ 40°C and 20% ~ 70% RH.

2. No harmful gases containing sulfuric acid, ammonia, hydrogen sulfide or chlorine.

Packaging should not be opened until the capacitors are required for use. If opened, the pack should be re-sealed as soon as is practicable. Taped product should be stored out of direct sunlight, which might promote deterioration in tape or adhesion performance. The product is recommended to be used within 6 months and checked the solderability before use.

HANDLING

Chip capacitors are dense, hard, brittle, and abrasive materials. They are liable to suffer mechanical damage, in the form of cracks or chips. Chip Capacitors should be handled with care to avoid contamination or damage. To use vacuum or plastic tweezers to pick up or plastic tweezers is recommended for manual placement. Tape and reeled packages are suitable for automatic pick and placement machine.

PREHEAT

In order to minimize the risk of thermal shock during soldering, a carefully controlled preheat is required. The rate of preheat should not exceed 4°C per second. and the final preheat temperature should be within 100°C of the soldering temperature for small chips such as 0805,1206, within 50°C of the soldering temperature for bigger chips such as 1210, 1808, 1812, 1825, 2211, 2220 and 2225, etc.

SOLDERING

Use mildly activated rosin RA and RMA fluxes do not use activated flux. The amount of solder in each solder joint should be controlled to prevent the damage of chip capacitors caused by the stress between solder, chips, and substrate.

Hand soldering with temperature-controlled iron not exceeding 30 watts and diameter of tip less than 1.2 mm is recommended, tip of iron should not contact the ceramic body directly, and the temperature of iron should be set to not more than 260°C.

For bigger chips such as 1210, 1808, 1812, 2211, 2220 and 2225, etc. wave soldering and hand soldering are not recommended.

Refer IPC/JEDEC J-STD-020D Method recommended soldering profiles:

Reflow not sooner than 15 minutes and not longer than 4 hrs after removal from the temperature/humidity chamber, subject the sample to 3 cycle of the appropriate reflow conditions as the table description below.

| Profile Feature | | Pb-Free Assembly |
|--|---|---|
| Preheat/Soak | Temperature MIN (T_{smin}) | 150°C |
| | Temperature MAX. (T_{sMAX}) | 200°C |
| | Time(t_s) from (T_{smin} to T_{smax}) | 60~120 seconds |
| Ramp-up rate (T_L to T_P) | | 3°C/second max. |
| Liquidous Temperature (T_L) | | 217°C |
| Time(T_L) maintained above T_L | | 60~150 seconds |
| Pek package body temperature(T_P) | | For user T_P must not exceed the classification temp 260°C For supplier T_P must equal or exceed the classification temp 260°C |
| Time(T_P)* within 5°C of the specified classification temperature(T_C) | | 30 seconds |
| Ramp-down rate (T_P to T_L) | | 6°C/second MAX. |
| Time 25°C to peak temperature 260°C | | 8 minutes MAX. |

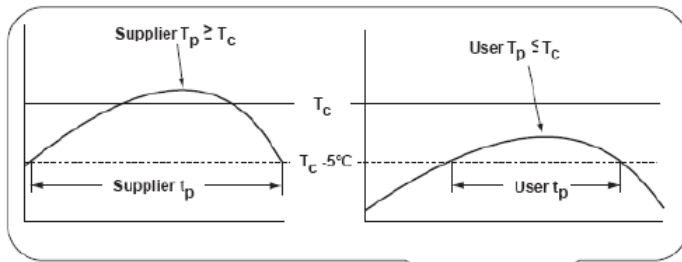
* Lead-free: Soldering temperature = 235 to 260°C, depending on product.

* Maximum temperature = Minimum temperature (235°C) + ΔT + Tolerance for oven process and measurement (5 ~ 7°C)

* Time at peak temperature = 10sec, Dwell above 217°C = 90sec, Ramping rate = 3°C/sec (heating) and 6°C/sec (heating).

APPLICATION NOTES (CONTINUED)

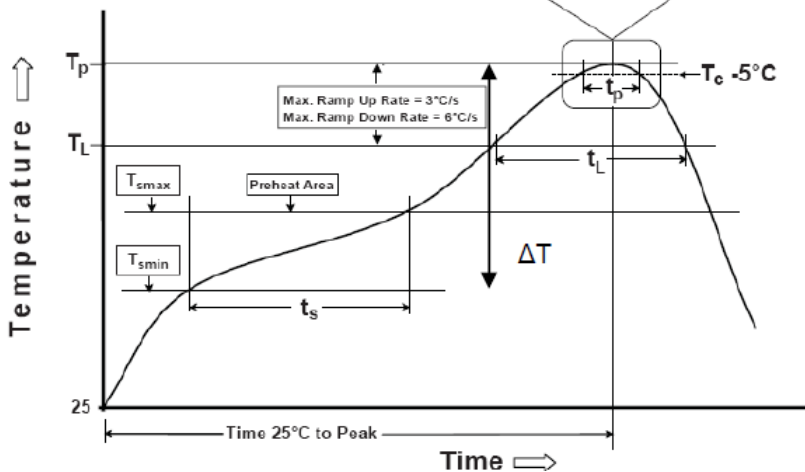
CLASSIFICATION REFLOW PROFILES



| Chip Size | ΔT |
|--|------------|
| 0805, 1206 | 100°C |
| 1210, 1808, 1812, 1825, 2211, 2220, 2225 | 50°C |

| Soldering | Solder Temp. (T_c) | Soldering Time (t_p) |
|-----------|------------------------|--------------------------|
| Reflow | 235~260°C | < 15sec. |

Note:
For example: T_c is 260°C and time t_p is 15sec.
For user: The peak temperature must not exceed 260°C. The time above 255°C must not exceed 15 seconds.



COOLING

After soldering, cool the chips and the substrate gradually to room temperature. Natural cooling in air is recommended to minimize stress in the solder joint. A cooling rate not exceeding 4 per second should °C be used when forced cooling is necessary.

CLEANING

All flux residues must be removed by using suitable electronic-grade vapor-cleaning solvents to eliminate contamination that could cause electrolytic surface corrosion. Good results can be obtained by using ultrasonic cleaning of the solvent. The choice of the proper system is depends upon many factors such as component mix, flux, and solder paste and assembly method. The ability of the cleaning system to remove flux residues and contamination from under the chips is very important.

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