



**THE DATASHEET OF  
F951A476MTAAQ2**



# SOLID TANTALUM ELECTROLYTIC CAPACITORS

# F95

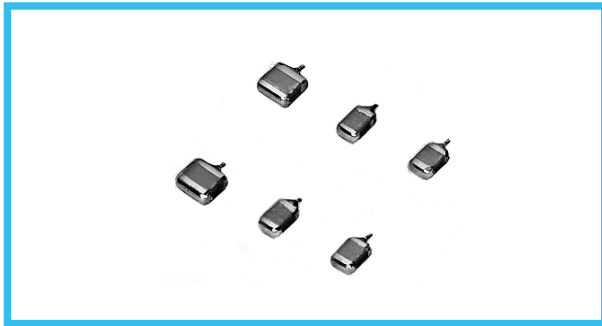
Conformal coated  
Chip

FRAMELESS™



Upgrade

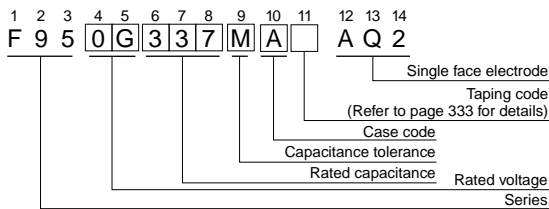
- Compliant to the RoHS directive (2002/95/EC).



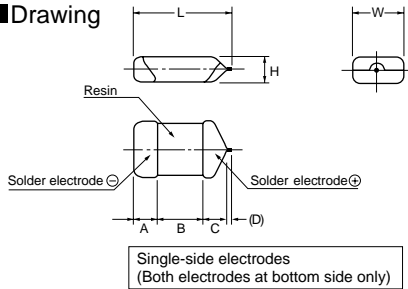
### Applications

- Smartphone
- Tablet PC
- Wireless module
- e-book

### Type numbering system (Example : 4V 330µF)



### Drawing



### Dimensions

| Case code | L         | W          | H         | A         | B         | C         | (D)   |
|-----------|-----------|------------|-----------|-----------|-----------|-----------|-------|
| R         | 2.2 ± 0.3 | 1.25 ± 0.3 | 0.65MAX.  | 0.6 ± 0.3 | 0.8 ± 0.3 | 0.5MIN    | (0.2) |
| P         | 2.2 ± 0.3 | 1.25 ± 0.3 | 1.0 ± 0.2 | 0.6 ± 0.3 | 0.8 ± 0.3 | 0.8 ± 0.3 | (0.2) |
| Q         | 3.2 ± 0.2 | 1.6 ± 0.2  | 0.8 ± 0.2 | 0.8 ± 0.2 | 1.2 ± 0.2 | 0.8 ± 0.2 | (0.2) |
| S         | 3.2 ± 0.3 | 1.6 ± 0.3  | 1.0 ± 0.2 | 0.8 ± 0.3 | 1.2 ± 0.3 | 0.8 ± 0.3 | (0.2) |
| A         | 3.2 ± 0.3 | 1.7 ± 0.3  | 1.4 ± 0.2 | 0.8 ± 0.3 | 1.2 ± 0.3 | 0.8 ± 0.3 | (0.2) |
| T         | 3.5 ± 0.2 | 2.7 ± 0.2  | 1.0 ± 0.2 | 0.8 ± 0.2 | 1.2 ± 0.2 | 1.1 ± 0.2 | (0.2) |
| B         | 3.5 ± 0.2 | 2.8 ± 0.2  | 1.8 ± 0.2 | 0.8 ± 0.3 | 1.2 ± 0.3 | 1.1 ± 0.3 | (0.2) |

D dimension only for reference

### Standard Ratings

| Cap. (µF) | V    | 4                       | 6.3                   | 10                      | 16                | 20        | 25            | 35    |
|-----------|------|-------------------------|-----------------------|-------------------------|-------------------|-----------|---------------|-------|
| 1         | Code | 0G                      | 0J                    | 1A                      | 1C                | 1D        | 1E            | 1V    |
| 1.5       | 105  |                         |                       |                         |                   |           |               | P · S |
| 2.2       | 155  |                         |                       |                         |                   |           |               |       |
| 3.3       | 225  |                         |                       |                         |                   |           |               |       |
| 4.7       | 335  |                         |                       |                         |                   |           |               |       |
| 6.8       | 475  |                         |                       |                         | R · P             | S · A     | P · Q · S · A | B     |
| 10        | 685  |                         |                       |                         |                   |           | (Q) · (S)     |       |
| 10        | 106  |                         |                       | R · P                   | P · Q · S · A     | S · A · B | A · (T) · B   |       |
| 15        | 156  |                         |                       | P                       | S · A             |           |               |       |
| 22        | 226  |                         | R                     | P · Q · S · A           | Q · S · A · T · B | B         |               |       |
| 33        | 336  |                         | (R) · P               | P · Q · S · A           | (A) · T · B       |           |               |       |
| 47        | 476  | (R)                     | P                     | P · (Q) · S · A · T · B | B                 |           |               |       |
| 68        | 686  |                         | P                     | B                       |                   |           |               |       |
| 100       | 107  | P · S · A               | P · Q · S · A · T · B | (S) · A · T · B         |                   |           |               |       |
| 150       | 157  | P · B                   | B                     |                         |                   |           |               |       |
| 220       | 227  | (P) · Q · S · A · T · B | (S) · (A) · (T) · B   |                         |                   |           |               |       |
| 330       | 337  | (P) · (S) · A · T · B   | B                     |                         |                   |           |               |       |
| 470       | 477  | (P) · (A) · (T) · B     | (B)                   |                         |                   |           |               |       |
| 680       | 687  | (T)                     |                       |                         |                   |           |               |       |

( ) The series in parentheses are being developed.  
Please contact to your local Nichicon sales office when these series are being designed in your application.

### Specifications

| Item                              | Performance Characteristics   |
|-----------------------------------|---|
| Category                          |   |
| Temperature Range                 | -55 to +125°C (Rated temperature : +85°C)   |
| Capacitance Tolerance             | ±20%, ±10% (at 120Hz) (However R · P Case ±20%)   |
| Dissipation Factor (at 120Hz)     | Refer to next page  |
| ESR(100kHz)                       | Refer to next page  |
| Leakage Current                   | Refer to next page<br>Provided that<br>• After 1 minute's application of rated voltage, leakage current at 85°C, 10 times or less than 20°C specified value.<br>• After 1 minute's application of rated voltage, leakage current at 125°C, 12.5 times or less than 20°C specified value.  |
| Capacitance Change by Temperature | +15% Max. (at +125°C)<br>+10% Max. (at +85°C)<br>-10% Max. (at -55°C)   |
| Damp Heat (Steady State)          | At 40°C, 90 to 95% R.H., For 500 hours (No voltage applied)<br>Capacitance Change ..... Refer to next page (*1)<br>Dissipation Factor ..... Initial specified value or less<br>Leakage Current ..... Initial specified value or less  |
| Temperature Cycles                | At -55°C / +125°C, 30 minutes each, For 5 cycles,<br>Capacitance Change ..... Refer to next page (*1)<br>Dissipation Factor ..... Initial specified value or less<br>Leakage Current ..... Initial specified value or less  |
| Resistance to Soldering Heat      | 10 seconds reflow at 260°C, 10 seconds immersion at 260°C<br>Capacitance Change ..... Refer to next page (*1)<br>Dissipation Factor ..... Initial specified value or less<br>Leakage Current ..... Initial specified value or less  |
| Surge*                            | After application of surge voltage in series with a 33Ω resistor at the rate of 30 seconds ON, 30 seconds OFF, for 1000 successive test cycles at 85°C, capacitors shall meet the characteristic requirements table below.<br>Capacitance Change ..... Refer to next page (*1)<br>Dissipation Factor ..... Initial specified value or less<br>Leakage Current ..... Initial specified value or less                         |
| Endurance*                        | After 2000 hours' application of rated voltage at 85°C, capacitors shall meet the characteristic requirements table below.<br>Capacitance Change ..... Refer to next page (*1)<br>Dissipation Factor ..... Initial specified value or less<br>Leakage Current ..... Initial specified value or less   |
| Shear Test                        | After applying the pressure load of 5N for 10 ± 1 seconds horizontally to the center of capacitor side body which has no electrode and has been soldered beforehand on a substrate, there shall be found neither exfoliation nor its sign at the terminal electrode.<br><br>5N (0.51kg · f)<br>For 10 ± 1 seconds   |
| Terminal Strength                 | Keeping a capacitor surface-mounted on a substrate upside down and supporting the substrate at both of the opposite bottom points 45mm apart from the center of capacitor, the pressure strength is applied with a specified jig at the center of substrate so that the substrate may bend by 1mm as illustrated. Then, there shall be found no remarkable abnormality on the capacitor terminals.<br><br>R230<br>45 45 1mm |

\* As for the surge voltage, refer to page 332 for details.

## F95

### Standard Ratings

| Rated Volt | Rated Capacitance (μF) | Case code | Part Number    | *2 Leakage Current (μA) | Dissipation Factor (%@120Hz) | ESR (Ω@100kHz) | *1 ΔC/C (%) |
|------------|------------------------|-----------|----------------|-------------------------|------------------------------|----------------|-------------|
| 4V         | 100                    | P         | F950G107MPAAQ2 | 4.0                     | 30                           | 1.2            | ±15         |
|            | 100                    | S         | F950G107MSAAQ2 | 4.0                     | 14                           | 0.8            | *           |
|            | 100                    | A         | F950G107MAAAQ2 | 4.0                     | 12                           | 0.5            | *           |
|            | 150                    | P         | F950G157MPAAQ2 | 12.0                    | 31                           | 1.1            | ±20         |
|            | 150                    | B         | F950G157MBAAQ2 | 6.0                     | 14                           | 0.4            | *           |
|            | 220                    | Q         | F950G227MQAAQ2 | 8.8                     | 30                           | 1.5            | ±20         |
|            | 220                    | S         | F950G227MSAAQ2 | 8.8                     | 30                           | 0.8            | ±15         |
|            | 220                    | A         | F950G227MAAAQ2 | 8.8                     | 25                           | 0.8            | ±15         |
|            | 220                    | T         | F950G227MTAAQ2 | 8.8                     | 25                           | 0.6            | *           |
|            | 220                    | B         | F950G227MBAAQ2 | 8.8                     | 16                           | 0.4            | *           |
|            | 330                    | A         | F950G337MAAAQ2 | 13.2                    | 40                           | 0.8            | ±20         |
|            | 330                    | T         | F950G337MTAAQ2 | 13.2                    | 40                           | 0.8            | ±20         |
|            | 330                    | B         | F950G337MBAAQ2 | 13.2                    | 30                           | 0.6            | ±15         |
|            | 470                    | B         | F950G477MBAAQ2 | 18.8                    | 40                           | 0.4            | ±20         |
| 6.3V       | 22                     | R         | F950J226MRAAQ2 | 1.4                     | 20                           | 2.0            | ±20         |
|            | 33                     | P         | F950J336MPAAQ2 | 2.1                     | 14                           | 1.1            | *           |
|            | 47                     | P         | F950J476MPAAQ2 | 3.0                     | 20                           | 1.1            | ±15         |
|            | 68                     | P         | F950J686MPAAQ2 | 4.3                     | 25                           | 1.2            | ±15         |
|            | 100                    | P         | F950J107MPAAQ2 | 12.6                    | 35                           | 1.2            | ±20         |
|            | 100                    | Q         | F950J107MQAAQ2 | 6.3                     | 30                           | 1.1            | ±20         |
|            | 100                    | S         | F950J107MSAAQ2 | 6.3                     | 20                           | 0.9            | ±15         |
|            | 100                    | A         | F950J107MAAAQ2 | 6.3                     | 14                           | 0.5            | *           |
|            | 100                    | T         | F950J107MTAAQ2 | 6.3                     | 14                           | 0.6            | *           |
|            | 100                    | B         | F950J107MBAAQ2 | 6.3                     | 14                           | 0.4            | *           |
|            | 150                    | B         | F950J157MBAAQ2 | 9.5                     | 18                           | 0.4            | *           |
|            | 220                    | B         | F950J227MBAAQ2 | 13.9                    | 30                           | 0.4            | *           |
|            | 330                    | B         | F950J337MBAAQ2 | 20.8                    | 35                           | 0.6            | ±20         |
|            | 10V                    | 10        | R              | F951A106MRAAQ2          | 1.0                          | 18             | 3.0         |
| 10         |                        | P         | F951A106MPAAQ2 | 1.0                     | 8                            | 3.0            | *           |
| 15         |                        | P         | F951A156MPAAQ2 | 1.5                     | 10                           | 3.0            | *           |
| 22         |                        | P         | F951A226MPAAQ2 | 2.2                     | 14                           | 3.0            | *           |
| 22         |                        | Q         | F951A226MQAAQ2 | 2.2                     | 10                           | 2.0            | *           |
| 22         |                        | S         | F951A226MSAAQ2 | 2.2                     | 10                           | 1.1            | *           |
| 22         |                        | A         | F951A226MAAAQ2 | 2.2                     | 6                            | 0.9            | *           |
| 33         |                        | P         | F951A336MPAAQ2 | 3.3                     | 20                           | 3.0            | ±15         |
| 33         |                        | Q         | F951A336MQAAQ2 | 3.3                     | 18                           | 3.0            | ±15         |
| 33         |                        | S         | F951A336MSAAQ2 | 3.3                     | 10                           | 1.1            | *           |
| 33         |                        | A         | F951A336MAAAQ2 | 3.3                     | 10                           | 0.8            | *           |
| 47         |                        | P         | F951A476MPAAQ2 | 4.7                     | 30                           | 3.0            | ±20         |
| 47         |                        | S         | F951A476MSAAQ2 | 4.7                     | 14                           | 1.1            | ±15         |
| 47         |                        | A         | F951A476MAAAQ2 | 4.7                     | 10                           | 0.8            | *           |
| 47         |                        | T         | F951A476MTAAQ2 | 4.7                     | 12                           | 0.8            | *           |
| 47         |                        | B         | F951A476MBAAQ2 | 4.7                     | 8                            | 0.4            | *           |
| 68         |                        | B         | F951A686MBAAQ2 | 6.8                     | 12                           | 0.4            | *           |
| 100        |                        | A         | F951A107MAAAQ2 | 10.0                    | 35                           | 1.0            | ±15         |
| 100        |                        | T         | F951A107MTAAQ2 | 10.0                    | 20                           | 0.6            | ±15         |
| 100        |                        | B         | F951A107MBAAQ2 | 10.0                    | 14                           | 0.4            | *           |

| Rated Volt | Rated Capacitance (μF) | Case code      | Part Number    | *2 Leakage Current (μA) | Dissipation Factor (%@120Hz) | ESR (Ω@100kHz) | *1 ΔC/C (%) |
|------------|------------------------|----------------|----------------|-------------------------|------------------------------|----------------|-------------|
| 16V        | 4.7                    | R              | F951C475MRAAQ2 | 0.8                     | 12                           | 6.0            | ±20         |
|            | 4.7                    | P              | F951C475MPAAQ2 | 0.8                     | 10                           | 4.0            | *           |
|            | 10                     | P              | F951C106MPAAQ2 | 1.6                     | 10                           | 4.0            | *           |
|            | 10                     | Q              | F951C106MQAAQ2 | 1.6                     | 8                            | 3.0            | *           |
|            | 10                     | S              | F951C106MSAAQ2 | 1.6                     | 8                            | 2.0            | *           |
|            | 10                     | A              | F951C106MAAAQ2 | 1.6                     | 6                            | 1.4            | *           |
|            | 15                     | S              | F951C156MSAAQ2 | 2.4                     | 8                            | 2.0            | *           |
|            | 15                     | A              | F951C156MAAAQ2 | 2.4                     | 8                            | 1.4            | *           |
|            | 22                     | Q              | F951C226MQAAQ2 | 3.5                     | 12                           | 3.0            | *           |
|            | 22                     | S              | F951C226MSAAQ2 | 3.5                     | 10                           | 2.0            | ±15         |
|            | 22                     | A              | F951C226MAAAQ2 | 3.5                     | 8                            | 1.4            | *           |
|            | 22                     | T              | F951C226MTAAQ2 | 3.5                     | 8                            | 1.4            | *           |
|            | 22                     | B              | F951C226MBAAQ2 | 3.5                     | 6                            | 0.5            | *           |
|            | 33                     | T              | F951C336MTAAQ2 | 5.3                     | 11                           | 1.5            | ±10         |
| 33         | B                      | F951C336MBAAQ2 | 5.3            | 8                       | 0.5                          | *              |             |
| 47         | B                      | F951C476MBAAQ2 | 7.5            | 10                      | 0.6                          | *              |             |
| 20V        | 2.2                    | P              | F951D225MPAAQ2 | 0.5                     | 6                            | 6.0            | *           |
|            | 4.7                    | S              | F951D475MSAAQ2 | 0.9                     | 8                            | 4.0            | *           |
|            | 4.7                    | A              | F951D475MAAAQ2 | 0.9                     | 6                            | 1.5            | *           |
|            | 10                     | S              | F951D106MSAAQ2 | 2.0                     | 10                           | 4.0            | ±10         |
|            | 10                     | A              | F951D106MAAAQ2 | 2.0                     | 8                            | 1.5            | *           |
|            | 10                     | B              | F951D106MBAAQ2 | 2.0                     | 6                            | 0.8            | *           |
|            | 22                     | B              | F951D226MBAAQ2 | 4.4                     | 8                            | 0.8            | *           |
|            | 25V                    | 1              | R              | F951E105MRAAQ2          | 0.5                          | 10             | 10.0        |
| 2.2        |                        | R              | F951E225MRAAQ2 | 0.6                     | 15                           | 15.0           | ±20         |
| 2.2        |                        | P              | F951E225MPAAQ2 | 0.6                     | 8                            | 6.0            | ±15         |
| 4.7        |                        | P              | F951E475MPAAQ2 | 1.2                     | 10                           | 8.0            | ±15         |
| 4.7        |                        | Q              | F951E475MQAAQ2 | 1.2                     | 10                           | 4.0            | ±15         |
| 4.7        |                        | S              | F951E475MSAAQ2 | 1.2                     | 8                            | 4.0            | *           |
| 4.7        |                        | A              | F951E475MAAAQ2 | 1.2                     | 8                            | 2.0            | *           |
| 10         |                        | A              | F951E106MAAAQ2 | 2.5                     | 12                           | 2.0            | ±15         |
| 10         | B                      | F951E106MBAAQ2 | 2.5            | 6                       | 0.9                          | *              |             |
| 35V        | 1                      | P              | F951V105MPAAQ2 | 0.5                     | 8                            | 10.0           | ±10         |
|            | 1                      | S              | F951V105MSAAQ2 | 0.5                     | 6                            | 8.0            | *           |
|            | 2.2                    | A              | F951V225MAAAQ2 | 0.8                     | 6                            | 4.4            | *           |
|            | 4.7                    | B              | F951V475MBAAQ2 | 1.7                     | 6                            | 1.6            | *           |

※ In case of capacitance tolerance ±10% type, **[K]** will be put at 9th digit of type numbering system.



\*1 : ΔC/C Marked \*\*

| Item                      | P·Q·S·A·T·B Case (%) |
|---------------------------|----------------------|
| Damp Heat                 | ±10                  |
| Temperature cycles        | ±5                   |
| Resistance soldering heat | ±5                   |
| Surge                     | ±5                   |
| Endurance                 | ±10                  |






\*2 : Leakage Current After 1 minute's application of rated voltage, leakage current at 20°C.

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