

# SOLID TANTALUM ELECTROLYTIC CAPACITORS

nichicon

# F95

Conformal coated  
Chip

FRAMELESS™



For SMD



Smaller



For High Frequency

Upgrade

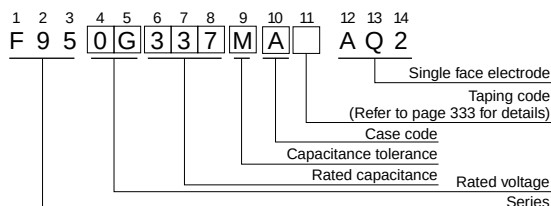
- Compliant to the RoHS directive (2002/95/EC).



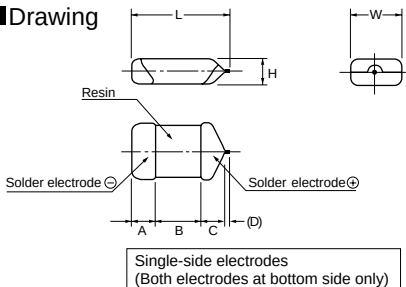
## Applications

- 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.<br>(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  |                         |                       |                 |                         | P         | R · P         | A     |
| 4.7          | 335  |                         |                       |                 |                         |           |               |       |
| 6.8          | 475  |                         |                       |                 | R · P                   | S · A     | P · Q · S · A | B     |
| 10           | 685  |                         |                       |                 |                         |           | (Q) · (S)     |       |
| 15           | 106  |                         |                       | R · P           | P · Q · S · A           | S · A · B | A · (T) · B   |       |
| 22           | 156  |                         |                       | P               | S · A                   |           |               |       |
| 33           | 226  |                         | R                     | P · Q · S · A   | Q · S · A · T · B       | B         |               |       |
| 47           | 336  |                         | (R) · P               | P · Q · S · A   | (A) · T · B             |           |               |       |
| 68           | 476  |                         | (R)                   | P               | P · (Q) · S · A · T · B | B         |               |       |
| 100          | 686  |                         | P                     | B               |                         |           |               |       |
| 150          | 107  | P · S · A               | P · Q · S · A · T · B | (S) · A · T · B |                         |           |               |       |
| 220          | 157  | P · B                   | B                     |                 |                         |           |               |       |
| 330          | 227  | (P) · Q · S · A · T · B | (S) · (A) · (T) · B   |                 |                         |           |               |       |
| 470          | 337  | (P) · (S) · A · T · B   | B                     |                 |                         |           |               |       |
| 680          | 477  | (P) · (A) · (T) · B     | (B)                   |                 |                         |           |               |       |
|              | 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.

CAT.8100B

## Specifications

| Item                              | Performance Characteristics                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Category                          | –55 to +125°C (Rated temperature : +85°C)                                                                                                                                                                                                                                                                                                                                                              |
| Temperature Range                 |                                                                                                                                                                                                                                                                                                                                                                                                        |
| 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>                                                                                                                               |
| 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> |

\* 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            | ±20         |
|            | 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         |
| 20V        | 33                     | B         | F951C336MBAAQ2 | 5.3                     | 8                            | 0.5            | *           |
|            | 47                     | B         | F951C476MBAAQ2 | 7.5                     | 10                           | 0.6            | *           |
|            | 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           | ±10         |
|            | 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.



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

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Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

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#### Как с нами связаться

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