

## Brief Introduction

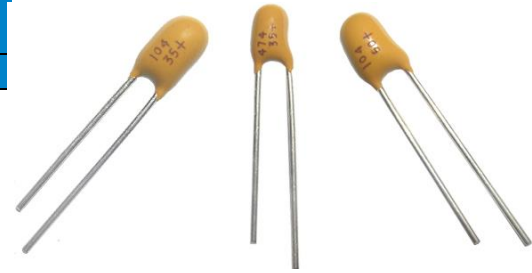
VE series sinter-anode, epoxy-coated solid electrolyte tantalum capacitors are encapsulated with flame Retardant yellow epoxy powder, marked with laser. TE Series applications such as TV sets, camcorders, computers, telephones, instruments and meters, such electrical equipments with high-reliable SMT DC & Impulse high-density assembled printed circuit for military use.

## SPECIFICATIONS

|   |  |     |     |     |    |    |    |    |    |    |
|---|--|-----|-----|-----|----|----|----|----|----|----|
| <b>TECHNICAL DATA</b>                   | All technical data relate to an ambient temperature of +25°C |     |     |     |    |    |    |    |    |    |
| <b>CAPACITANCE RANGE</b>                | 0.47μF to 680μF  |     |     |     |    |    |    |    |    |    |
| <b>CAPACITANCE TOLERANCE</b>            | ±20%(M), ±10%(K), ±5%(J) (For special order)                 |     |     |     |    |    |    |    |    |    |
| <b>RATED VOLTAGE DC (V<sub>R</sub>)</b> | ≤+85°C   | 4   | 6.3 | 10  | 16 | 20 | 25 | 35 | 40 | 50 |
| <b>CATEGORY VOLTAGE (V<sub>C</sub>)</b> | ≤+125°C  | 2.5 | 4   | 6.3 | 10 | 13 | 16 | 20 | 25 | 32 |
| <b>SURGE VOLTAGE (V<sub>S</sub>)</b>    | ≤+85°C   | 5   | 8   | 13  | 20 | 26 | 32 | 46 | 52 | 65 |
| <b>SURGE VOLTAGE (V<sub>S</sub>)</b>    | ≤+125°C  | 3   | 5   | 8   | 12 | 16 | 19 | 28 | 31 | 39 |
| <b>TEMPERATURE RANGE</b>                | -55°C to +125°C  |     |     |     |    |    |    |    |    |    |

## TEMPERATURE STABILITY

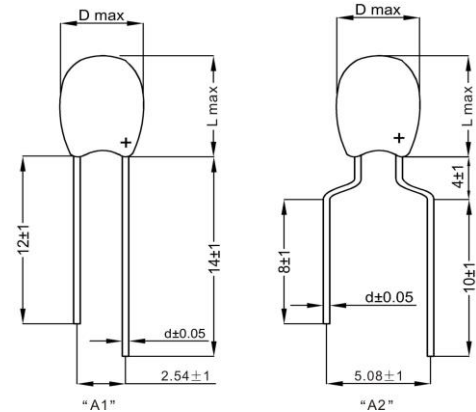
| Capacitance Range (μF) | Capacitance Change ΔC/C (%) |       |        | Dissipation Factor (%) |       |       |        | DC Leakage                      |                   |
|------------------------|-----------------------------|-------|--------|------------------------|-------|-------|--------|---------------------------------|-------------------|
|                        | -55°C                       | +85°C | +125°C | -55°C                  | +25°C | +85°C | +125°C | +85°C                           | +125°C            |
| 0.47~1.0               | ±10                         | ±10   | ±15    | 6                      | 4     | 6     | 6      | 8 I <sub>0</sub> <sup>(1)</sup> | 10 I <sub>0</sub> |
| 1.5~6.8                |                             |       |        | 8                      | 6     | 8     | 8      |                                 |                   |
| 10~68                  |                             |       |        | 10                     | 8     | 10    | 10     |                                 |                   |
| 100~330                |                             |       |        | 12                     | 10    | 12    | 12     |                                 |                   |
| 470~680                |                             |       |        | 14                     | 12    | 14    | 14     |                                 |                   |
| >680                   |                             |       |        | 16                     | 14    | 16    | 16     |                                 |                   |



(1) I<sub>0</sub> refer to initial value of DC leakage current

## Capacitance and Rated Voltage Range

| Rate Voltage U <sub>R</sub> (V)     |     |          |          | 4                      | 6.3 | 10  | 16   | 20   | 25   | 35   | 40   | 50   |
|-------------------------------------|-----|----------|----------|------------------------|-----|-----|------|------|------|------|------|------|
| Category Voltage U <sub>C</sub> (V) |     |          |          | 2.5                    | 4   | 6.3 | 10   | 13   | 16   | 20   | 25   | 32   |
| Dimensions (mm)                     |     |          |          | Rated Capacitance (μF) |     |     |      |      |      |      |      |      |
| DxL                                 | d   | Pitch A1 | Pitch A2 |                        |     |     |      |      |      |      |      |      |
| 4.4x7.0 (A case)                    | 0.5 | 2.54     | 5.08     | 3.3                    | 1.5 | 1   | 0.68 | 0.33 | 0.33 | 0.1  | 0.1  | 0.1  |
|                                     |     |          |          | 4.7                    | 2.2 | 1.5 | 1    | 0.47 | 0.47 | 0.15 | 0.15 | 0.15 |
|                                     |     |          |          | 6.8                    | 3.3 | 2.2 | 1.5  | 0.68 | 0.68 | 0.22 | 0.22 | 0.22 |
|                                     |     |          |          | 10                     | 4.7 | 3.3 | 2.2  | 1    | 1    | 0.33 | 0.33 | 0.33 |
|                                     |     |          |          | 15                     | 6.8 | 6.8 | 3.3  | 1.5  | 1.5  | 0.47 | 0.47 | 0.47 |
|                                     |     |          |          | 22                     | 10  | 10  | 4.7  | 2.2  | 2.2  | 0.68 | 0.68 | --   |
|                                     |     |          |          | 33                     | 15  | 15  | 6.8  | 3.3  | 3.3  | 1    | --   | --   |
| 5.0x7.5 (B case)                    | 0.5 | 2.54     | 5.08     | 47                     | 33  | 22  | 15   | 4.7  | 4.7  | 2.2  | 1    | 0.68 |
|                                     |     |          |          | 68                     | 47  | 33  | 22   | 6.8  | 6.8  | 3.3  | 1.5  | 1    |
|                                     |     |          |          | --                     | --  | --  | --   | 10   | 10   | 4.7  | 2.2  | 1.5  |
| 5.5x9.0 (C case)                    | 0.5 | 2.54     | 5.08     | 100                    | 68  | 47  | 33   | 15   | 15   | 6.8  | 3.3  | 2.2  |
|                                     |     |          |          | 150                    | 100 | 68  | 47   | 22   | 22   | 10   | 4.7  | 3.3  |
|                                     |     |          |          | --                     | --  | 100 | --   | --   | --   | --   | --   | --   |
| 6.3x10.5 (D case)                   | 0.5 | 2.54     | 5.08     | 220                    | 150 | 150 | 68   | 33   | 33   | 15   | 6.8  | 4.7  |
|                                     |     |          |          | 330                    | 220 | --  | 100  | 47   | 47   | 22   | 10   | 6.8  |
| 7.2x12 (E case)                     | 0.5 | 2.54     | 5.08     | 470                    | 330 | 220 | 150  | 68   | 68   | 33   | 15   | 10   |
|                                     |     |          |          | 680                    | 470 | 330 | 220  | 100  | 100  | 47   | 22   | 15   |
| 8.5x13 (F case)                     | 0.5 | 2.54     | 5.08     | --                     | 680 | 470 | 330  | 150  | 150  | 68   | 33   | 22   |



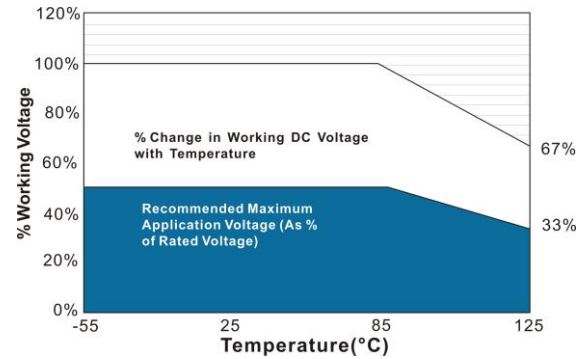
P.S:

- Please do not use multimeter through the measuring procedures.
- Capacitance and DF measured at: 100Hz U<sub>-</sub>=2.2~1.0V, U<sub>~</sub>=1.0~0.5V, Frequency=100Hz. Test only applied in series equivalent circuit.
- Voltage derating is applied at +125°C. (The DCL parameter should be read after 5 minutes when it connected to the circuit).

\* Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at option. Voltage substitutions will be marked with the higher voltage rating. Substitutions can include better than series.

## Operating Voltage

|   | -55 °C to 85 °C | 85 °C to 125 °C |
|---|-----------------|-----------------|
| % Change in Working DC Voltage with Temperature | VR              | 67% of VR       |
| Recommended Max Application Voltage             | 50% of VR       | 33% of VR       |



## Reverse Voltage

Since tantalum capacitor has polarity, do not apply a reverse voltage to it. Do not apply capacitor to a circuit which only has alternating current.

- If there is no alternation, applying a low reverse voltage which is listed below to capacitor in a short time is approved.
- In principle, testing a circuit with tantalum capacitor or capacitor itself by using a resistor gear of millimeters in ignorance of polarity is forbidden.
- During measurement and application, if the tantalum capacitor is subjected to an undesirable reverse voltage due to carelessness, please dispose it, even if its electrical characteristics are still qualified.

| Temp. | Max. Reverse voltage in a short time                        |
|-------|---|
| 25°C  | 10% UR (rated voltage), working voltage to maximum of 1.0V. |
| 85°C  | 3% UR (rated voltage), working voltage to maximum of 0.5V.  |
| 125°C | 1% UR (rated voltage), working voltage to maximum of 0.1V.  |

## Ripple Voltage

Please use the capacitor within permissible ripple voltage.

- The sum of DC bias voltage and the maximum AC branch voltage should not exceed rated voltage during operation.
- The sum of negative peak AC value and DC bias voltage should not exceed the specified reverse voltage.
- Ripple current applied to capacitor will generate active power loss, which will raise the rate of the failure caused by heat due to self-heat generation of capacitor. Therefore, ripple current and permissible power loss must be in control.

## Soldering Process

Kingtronics tantalum capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. Kingtronics recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J-STD-020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. "Wiping" the edges of a chip and heating the top surface is not recommended.

During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

## Soldering Process

| Profile Feature       | Pb-free Assembly | SnPb Assembly  |
|-----------------------|------------------|----------------|
| Pre-heating           | 50~165°C         | 50~165°C       |
|                       | 90~120 sec.      | 90~120 sec.    |
| Max. Peak Temperature | 250~260°C        | 240~250°C      |
| Time of wave          | 3~5 sec.         | 3~5 sec.       |
|                       | (max. 10 sec.)   | (max. 10 sec.) |

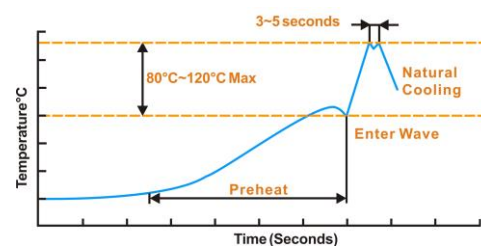


Figure Recommended wave profile

The upper side temperature of the board should not exceed +150°C .

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