

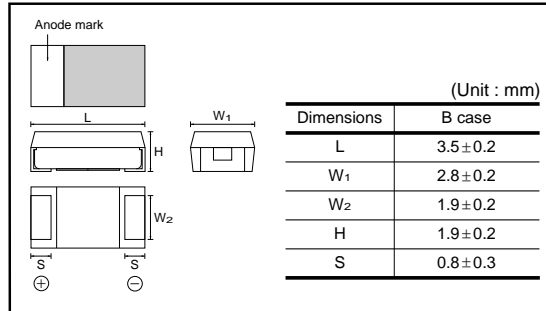
Chip tantalum capacitors

TCO Series B Case

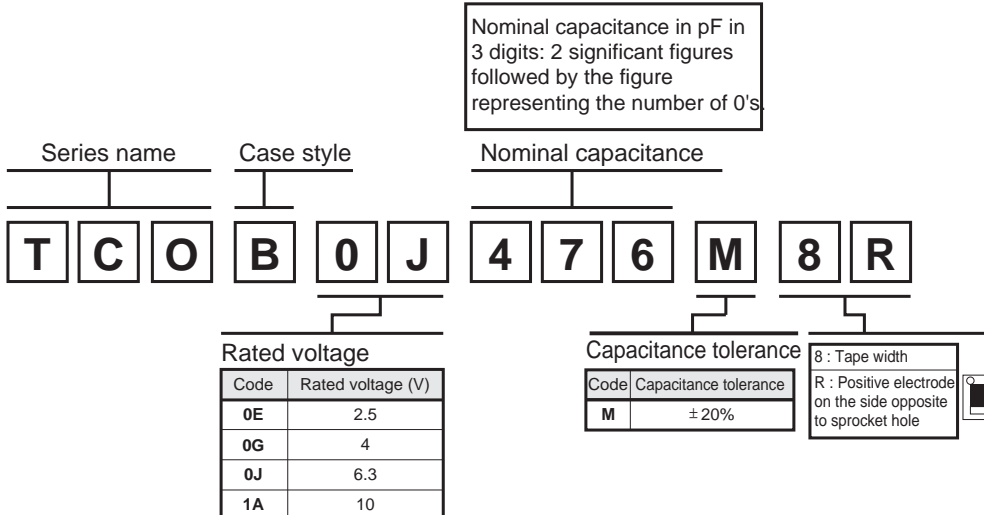
●Features (B)

- 1) Conductive polymer used for the cathode material.
- 2) Ultra-low ESR.
(1/10 compared with the conventional type)
- 3) Screening by thermal shock.

●Dimensions (Unit : mm)



●Part No. Explanation



●Rated Table

| μF | Rated voltage (V.DC) | | | |
|-------|----------------------|---------|-----------|--------------|
| | 2.5 0E | 4 0G | 6.3 0J | 10 1A |
| j 22 | | | | |
| n 33 | | | B | B |
| s 47 | | | B | New B |
| w 68 | | | *B | |
| ā 100 | | | B | |
| ē 150 | | B | B | |
| ī 220 | *B | *B | | |
| ñ 330 | *B | | | |

* Under development

New indicates new product

●Marking

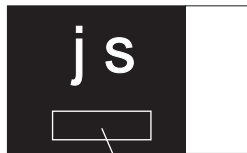
The indications listed below should be given on the surface of a capacitor.

- (1) Polarity : The polarity should be shown by □ bar. (on the anode side)
- (2) Rated DC voltage : Due to the small size of B case, a voltage code is used as shown below.
- (3) Visual typical example (1) voltage code (2) capacitance code

| Voltage Code | Rated DC Voltage (V) |
|--------------|----------------------|
| e | 2.5 |
| g | 4 |
| j | 6.3 |
| A | 10 |

| Capacitance Code | Nominal Capacitance (μF) |
|------------------|--------------------------|
| a | 10 |
| e | 15 |
| j | 22 |
| n | 33 |
| s | 47 |
| w | 68 |
| ā | 100 |
| ē | 150 |
| ī | 220 |
| ñ | 330 |

[B case] note 1) $\frac{j}{(1)} \frac{s}{(2)}$



manufacture code

note 2) voltage code and capacitance code are variable with parts number

●Characteristics

| Item | Performance | Test conditions (based on JIS C 5101-1 and JIS C 5101-3) |
|--|---|--|
| Operating Temperature | -55°C to +105°C | Voltage reduction when temperature exceeds+85°C |
| Maximum operating temperature with no voltage derating | +85°C | |
| Rated voltage (VDC) | 2.5 4 6.3 10 | at 85°C |
| Category voltage (VDC) | 2 3.2 5 8 | at 105°C |
| Surge voltage (VDC) | 3.2 5 8 13 | at 85°C |
| DC Leakage current | 3μA or 0.1CV whichever is greater Shown in " Standard list " | Rated voltage for 5min |
| Capacitance tolerance | ±20% Shall be satisfied allowance range. | Measuring frequency : 120±12Hz Measuring voltage : 0.5Vrms +1.5 to 2V.DC Measuring circuit : DC Equivalent series circuit |
| Tangent of loss angle (Df, tan δ) | Shall be satisfied the voltage on " Standard list " | Measuring frequency : 120±12Hz Measuring voltage : 0.5Vrms +1.5 to 2V.DC Measuring circuit : DC Equivalent series circuit |
| ESR | Shall be satisfied the voltage on " Standard list " | Measuring frequency : 100±10kHz Measuring voltage : 0.5Vrms or less |
| Resistance to Soldering heat | Appearance | There should be no significant abnormality. The indications should be clear. |
| | L.C. | Less than 150% of initial limit |
| | ΔC / C | Within±20% of initial value |
| | tan δ | Less than 150% of initial limit |
| | | Dip in the solder bath Solder temp : 240±5°C Duration : 10±0.5s Repetition : 1 After the specimens, leave it at room temperature for over 24h and then measure the sample. |

| Item | | Performance | Test conditions (based on JIS C 5101-1 and JIS C 5101-3) | | | | | | | | | | | | | | | |
|-----------------------|---------------------------------|--|--|--------------|-------|------|---|---------|---------|---|------------|--------------|---|---------|---------|---|------------|--------------|
| Temperature cycle | Appearance | There should be no significant abnormality. | Repetition : 5 cycles (1 cycle : steps 1 to 4) without discontinuation. <table border="1" style="margin-top: 10px;"> <thead> <tr> <th></th> <th>Temp.</th> <th>Time</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-55±3°C</td> <td>30±3min</td> </tr> <tr> <td>2</td> <td>Room temp.</td> <td>3min.or less</td> </tr> <tr> <td>3</td> <td>105±2°C</td> <td>30±3min</td> </tr> <tr> <td>4</td> <td>Room temp.</td> <td>3min.or less</td> </tr> </tbody> </table> After the specimens, leave it at room temperature for over 24h and then measure the sample. | | Temp. | Time | 1 | -55±3°C | 30±3min | 2 | Room temp. | 3min.or less | 3 | 105±2°C | 30±3min | 4 | Room temp. | 3min.or less |
| | | Temp. | | Time | | | | | | | | | | | | | | |
| | 1 | -55±3°C | | 30±3min | | | | | | | | | | | | | | |
| | 2 | Room temp. | | 3min.or less | | | | | | | | | | | | | | |
| 3 | 105±2°C | 30±3min | | | | | | | | | | | | | | | | |
| 4 | Room temp. | 3min.or less | | | | | | | | | | | | | | | | |
| L.C | Less than 500% of initial limit | | | | | | | | | | | | | | | | | |
| ΔC / C | Within±20% of intial value | | | | | | | | | | | | | | | | | |
| Df (tan δ) | Less than 150% of initial limit | | | | | | | | | | | | | | | | | |
| Moisture resistance | Appearance | There should be no significant abnormality. The indications should be | After leaving the sample under such atmospheric condition that the temperature and humidity are 40±2°C and 90 to 95% RH, respectively, for 500±24h leave it at room temperature for over 24h and then measure the sample. | | | | | | | | | | | | | | | |
| | L.C | Less than 150% of initial limit | | | | | | | | | | | | | | | | |
| | ΔC / C | +30% / -20% | | | | | | | | | | | | | | | | |
| | Df (tan δ) | Less than 150% of initial limit | | | | | | | | | | | | | | | | |
| Temperature Stebility | Temp. | -55°C | | | | | | | | | | | | | | | | |
| | ΔC / C | Within 0/-20% of initial value | | | | | | | | | | | | | | | | |
| | Df (tan δ) | Shall be satisfied the voltage on " Standard list " | | | | | | | | | | | | | | | | |
| | L.C | - | | | | | | | | | | | | | | | | |
| | Temp. | +105°C | | | | | | | | | | | | | | | | |
| | ΔC / C | Within +50/0% of initial value | | | | | | | | | | | | | | | | |
| | Df (tan δ) | Shall be satisfied the voltage on " Standard list " | | | | | | | | | | | | | | | | |
| | L.C | Less than 1CV | | | | | | | | | | | | | | | | |
| Surge voltage | Appearance | There should be no significant abnormality. | Apply the specified serge voltage every 5± 0.5 min. for 30±5 s. each time in the atmospheric condition of 85±2°C. Repeat this rocedure 1,000 times. After the specimens, leave it at room temperature for over 24h and then measure the sample. | | | | | | | | | | | | | | | |
| | L.C | Less than initial limit | | | | | | | | | | | | | | | | |
| | ΔC / C | Within±20% of initial value | | | | | | | | | | | | | | | | |
| | Df (tan δ) | Less than initial limit | | | | | | | | | | | | | | | | |

| Item | | Performance | Test conditions (based on JIS C 5101-1 and JIS C 5101-3) |
|-----------------------------|-------------|--|--|
| Loading at High temperature | Appearance | There should be nonsignificant abnormality. | After applying the rated voltage for 1000 ⁺⁷² h without discontinuation via the serial resistance of 3Ω or less at a temperature of 85±2°C, leave the sample at room temperature / humidity for over 24h and measure the value. |
| | L.C | Less than 200% of initial limit | |
| | ΔC / C | Within ±20% of initial value | |
| | Df (tan δ) | 150% of initial limit less than | |
| Terminal strength | Capacitance | The measured value should be stable. | A force is applied to the terminal until it bends to 1mm and by a perscribed tool maintain the condition for 5s. (See the figure below) |
| | Appearance | There should nonsignificant abnormality. | |
| | | | |
| Adhesiveness | | The terminal should not come off. | Apply force of 5N in the two directions shown in the figure below for 10 ± 1s after mounting the terminal on a circuit board. |
| | | | |
| Dimensions | | Refer to "External dimensions" | Measure using a caliper of JISB 7507 Class 2 or higher grade. |
| Resistance to solvents | | The indication should be clear | Dip in the isopropyl alcohol for 30±5s, at room temperature. |
| Solderability | | 3/4 or more surface area of the solder coated terminal dipped in the soldering bath should be covered with the new solder. | Dip speed=25±2.5mm / s Pre-treatment(accelerated aging): Leave the sample on the boiling distilled water for 1 h. Solder temp.: 245±5°C Duration : 3±0.5s Solder : M705 Flux : Rosin25% IPA75% |
| Vibration | Capacitance | Measure value should not fluctuate during the measurement. | Frequency : 10 to 55 to 10Hz/min. Amplitude : 1.5mm Time : 2h each in X and Y directions Mounting : The terminal is soldered on a print circuit board. |
| | Appearance | There should no significant abnormality. | |

●Standard list, TCO series

< B case : 3528 size >

| Part No. | Rated Voltage 85°C (V) | Category Voltage 105°C (V) | Surge Voltage 85°C (V) | Cap. 120Hz (μF) | Tolerance (%) | Leakage Current 25°C 1WV 5min (μA) | Df 120Hz (%) | | | ESR 100kHz (mΩ) |
|-----------------|------------------------------|----------------------------------|------------------------------|-----------------------|------------------|---|--------------------|--------------|-------|-----------------------|
| | | | | | | | -55°C | 25°C 85°C | 105°C | |
| *TCO B 0E 227 □ | 2.5 | 2 | 3.2 | 220 | ±20 | 55 | 8 | 8 | 12 | 150 |
| *TCO B 0E 337 □ | 2.5 | 2 | 3.2 | 330 | ±20 | 82.5 | 30 | 15 | 20 | 150 |
| TCO B 0G 157 □ | 4 | 3.2 | 5 | 150 | ±20 | 60 | 8 | 8 | 12 | 150 |
| *TCO B 0G 227 □ | 4 | 3.2 | 5 | 220 | ±20 | 88 | 30 | 15 | 20 | 150 |
| TCO B 0J 336 □ | 6.3 | 5 | 8 | 33 | ±20 | 21 | 8 | 8 | 12 | 150 |
| TCO B 0J 476 □ | 6.3 | 5 | 8 | 47 | ±20 | 30 | 8 | 8 | 12 | 150 |
| *TCO B 0J 686 □ | 6.3 | 5 | 8 | 68 | ±20 | 42.9 | 8 | 8 | 12 | 150 |
| TCO B 0J 107 □ | 6.3 | 5 | 8 | 100 | ±20 | 63 | 8 | 8 | 12 | 150 |
| TCO B 0J 157 □ | 6.3 | 5 | 8 | 150 | ±20 | 94.5 | 30 | 15 | 20 | 150 |
| TCO B 1A 336 □ | 10 | 8 | 13 | 33 | ±20 | 33 | 8 | 8 | 12 | 150 |
| TCO B 1A 476 □ | 10 | 8 | 13 | 47 | ±20 | 47 | 8 | 8 | 12 | 150 |

□=Tolerance(M : ± 20%)

*=Under development

●Packaging specifications

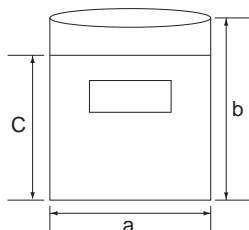
| Tape [B case] | Reel [B case] | | | | | | | | | | |
|--|-----------------|-------|---------|---------|--------|---|-----|-----|------|-----|--|
| <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>Case</th> <th>A±0.1</th> <th>B±0.1</th> <th>t1±0.05</th> <th>t2±0.1</th> </tr> </thead> <tbody> <tr> <td>B</td> <td>3.3</td> <td>3.8</td> <td>0.25</td> <td>2.2</td> </tr> </tbody> </table> | Case | A±0.1 | B±0.1 | t1±0.05 | t2±0.1 | B | 3.3 | 3.8 | 0.25 | 2.2 | |
| Case | A±0.1 | B±0.1 | t1±0.05 | t2±0.1 | | | | | | | |
| B | 3.3 | 3.8 | 0.25 | 2.2 | | | | | | | |

●Packaging style

| Case code | package | Packaging style | | Symbol | Basic ordering units |
|-----------|---------|-----------------|------------|--------|----------------------|
| B | Taping | plastic taping | φ180mmReel | R | 2,000pcs |

●Damp proof package

- ① One reel is packed in aluminum bag.
The size of aluminum bag is 240(a) x 250(b)mm.
The size up to 230(c)mm is to zipper.
- ② A desiccant is packed with a reel.
- ③ The aluminum bag is heat-sealed.
- ④ The label of the same as the label on the reel is placed on the aluminum bag.



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