

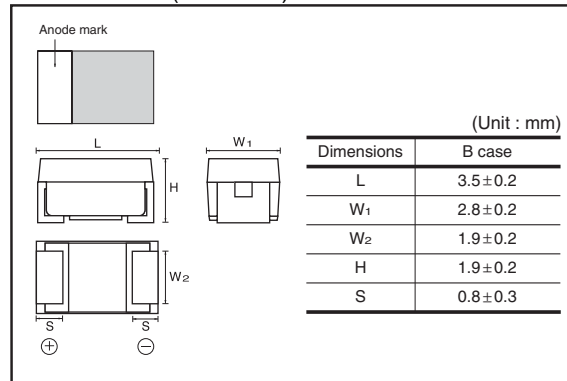
Conductive polymer chip capacitors (Standard)

TCO Series B Case

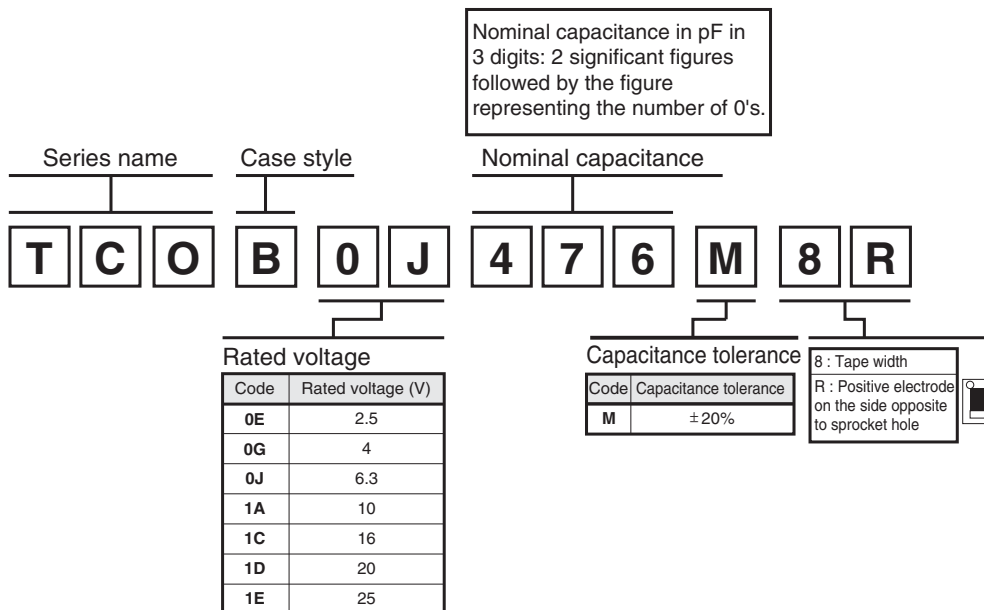
●Features (B)

- 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

(ESR : mΩ)

(μF)	Rated voltage (V.DC)						
	2.5	4	6.3	10	16	20	25
1.0 (105)							
1.5 (155)							
2.2 (225)							
3.3 (335)							
4.7 (475)							*150
6.8 (685)						*150	
10 (106)					*150		
15 (156)							
22 (226)							
33 (336)			150	70/150			
47 (476)			150	70/150			
68 (686)			150				
100 (107)			150				
150 (157)		150	150				
220 (227)	150	150	*150				
330 (337)	150						

* Under development

※ 35mΩ/70mΩ : Up to 6.3V products are under development.

●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
C	16
D	20
E	25

Capacitance Code	Nominal Capacitance (μF)
S	4.7
W	6.8
a	10
e	15
j	22
n	33
s	47
w	68
\overline{a}	100
\overline{e}	150
\overline{j}	220
\overline{n}	330

[B case] note 1)

$$\begin{array}{cc} \overline{j} & \overline{s} \\ (1) & (2) \end{array}$$

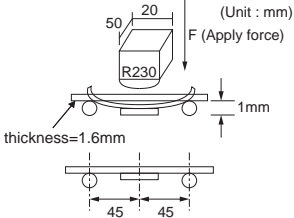

manufacture code

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	16	20	25		at 85°C	
Category voltage (VDC)		2	3.2	5	8	10	16	22		at 105°C	
Surge voltage (VDC)		3.2	5	8	13	20	26	32		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.								Dip in the solder bath Solder temp : 240±5°C Duration : 10±0.5s Repetition : 1	
	L.C.	Less than 150% of initial limit								After the specimens, leave it at room temperature for over 24h and then measure the sample.	
	ΔC / C	Within±20% of initial value									
	tan δ	Less than 150% of initial limit									

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><tr><td></td><td>Temp.</td><td>Time</td></tr><tr><td>1</td><td>-55±3℃</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℃</td><td>30±3min</td></tr><tr><td>4</td><td>Room temp.</td><td>3min.or less</td></tr></table> After the specimens, leave it at room temperature for over 24h and then measure the sample.		Temp.	Time	1	-55±3℃	30±3min	2	Room temp.	3min.or less	3	105±2℃	30±3min	4	Room temp.	3min.or less
		Temp.		Time														
	1	-55±3℃		30±3min														
	2	Room temp.		3min.or less														
	3	105±2℃		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℃ 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℃																
ΔC / C	Within 0/-20% of initial value																	
Df (tan δ)	Shall be satisfied the voltage on " Standard list "																	
L.C	-																	
Temp.	+105℃																	
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℃. 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.	<p>Apply force of 5N in the two directions shown in the figure below for 10±1s after mounting the terminal on a circuit board.</p> 
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.	<p>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%</p>
Vibration	Capacitance	Measure value should not fluctuate during the measurement.	<p>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.</p>
	Appearance	There should no significant abnormality.	

●Standard list, TCO series B case

Part No.	Rated Voltage 85°C	Category Voltage 105°C	Surge Voltage 85°C	Cap. 120Hz	Tolerance	Leakage Current 25°C 1WV 5min (μA)	Df 120Hz (%)			ESR 100kHz
	(V)	(V)	(V)	(μF)	(%)		-55°C	25°C 85°C	105°C	(mΩ)
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
*TCO B 1C 106 □	16	12.8	20	10	±20	16	8	8	12	150
*TCO B 1D 685 □	20	—	—	6.8	±20	13.6	8	8	12	150
*TCO B 1E 475 □	25	—	—	4.7	±20	11.8	8	8	12	150

□ = Tolerance (M : ± 20%)

* = Under development

●Packaging specifications

Tape [B case]

Technical drawing of a tape [B case] showing dimensions and pull-out direction. The drawing includes a side view and a cross-sectional view. The side view shows a series of rectangular chips mounted on a carrier tape. The dimensions are as follows:

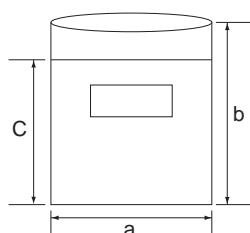
- Chip width: 4.0 ± 0.1 mm
- Chip pitch: 2.0 ± 0.05 mm
- Carrier tape width: 8.0 ± 0.2 mm
- Carrier tape thickness: 1.75 ± 0.1 mm
- Carrier tape hole diameter: $\phi 1.5 \begin{smallmatrix} +0.1 \\ -0 \end{smallmatrix}$ mm
- Carrier tape hole position: $A \pm 0.1$ mm
- Carrier tape hole position: $B \pm 0.1$ mm
- Carrier tape hole position: 3.5 ± 0.05 mm
- Carrier tape hole position: 4.0 ± 0.1 mm
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●Packaging style

Case code	package	Packaging style		Symbol	Basic ordering units
B	Taping	plastic taping	φ180mmReel	8R	2,000pcs

●Damp proof package

- 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.
- A desiccant is packed with a reel.
- The aluminum bag is heat-sealed.
- The label of the same as the label on the reel is placed on the aluminum bag.



Notes

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