

Conductive polymer chip capacitors

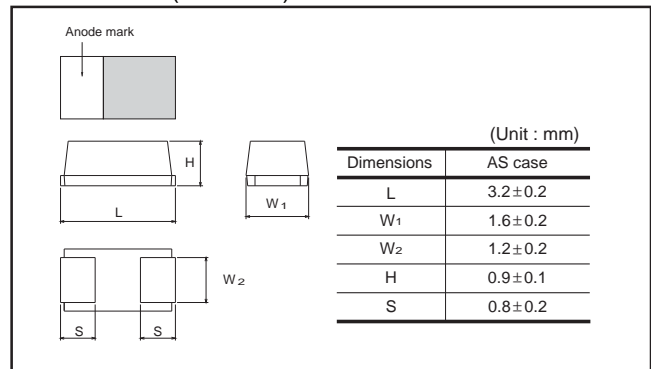
(Bottom surface electrode type : Large capacitance)

TCTO Series AS Case

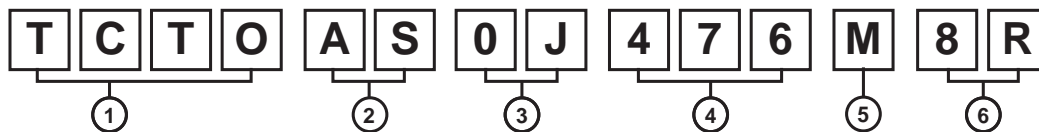
●Features (AS)

- 1) Conductive polymer used for the cathode material.
- 2) Ultra low ESR
- 3) Small package, but big capacitance
- 4) Screening by thermal shock

●Dimensions (Unit : mm)



●Part No. Explanation



① Series name
TCTO

② Case style
AS

③ Rated voltage

Rated voltage (V)	2.5	4	6.3	10
CODE	0E	0G	0J	1A

④ Nominal capacitance
Nominal capacitance in pF in 3 digits:
2 significant figures followed by the figure
representing the number of 0's.

⑤ Capacitance tolerance
M : ±20%

⑥ Taping
8 : Tape width
R : Positive electrode on the side opposite to sprocket hole

* This specification has possibility of charge, due to underdevelopment product.
Please ask for latest specification to our sales.

● Rated table

(ESR : mΩ)

(μF)	Rated voltage (V.DC)			
	2.5	4	6.3	10
3.3 (335)				*300
4.7 (475)				*300
6.8 (685)				*300
10 (106)				*300
15 (156)				*200
22 (226)				*200
33 (336)			*200	
47 (476)		*200	200	
68 (686)	*200	*200		
100 (107)	*200			

*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 : A voltage code is shown as below table.
- (3) Capacitance value : A capacitance code is shown as below table.

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

Capacitance Code	Capacitance Value (μF)
N	3.3
S	4.7
W	6.8
a	10
e	15
j	22
n	33
s	47
w	68
ā	100

Visual typical example (1) voltage code (2) capacitance code

[AS case] note 1)

j s
(1) (2)

manufacture code

j s

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 (V.DC)		2.5	4	6.3	10			at 85°C															
Category voltage (V.DC)		2	3.2	5	8			at 105°C															
Surge voltage (V.DC)		3.2	5	8	13			at 85°C															
DC leakage current		Shall be satisfied the value on " Standard list "					As per 4.9 JIS C 5101-1 As per 4.5.1 JIS C 5101-3 Voltage : Rated voltage for 5min																
Capacitance tolerance		Shall be satisfied allowance range. ±20%					As per 4.7 JIS C 5101-1 As per 4.5.2 JIS C 5101-3 Measuring frequency : 120±12Hz Measuring voltage : 0.5Vrms +1.5V.DC Measuring circuit : DC Equivalent series circuit																
Tangent of loss angle (Df, tan δ)		Shall be satisfied the value on " Standard list "					As per 4.8 JIS C 5101-1 As per 4.5.3 JIS C 5101-3 Measuring frequency : 120±12Hz Measuring voltage : 0.5Vrms +1.5V.DC Measuring circuit : DC Equivalent series circuit																
ESR		Shall be satisfied the value on " Standard list "					As per 4.10 JIS C 5101-1 As per 4.5.4 JIS C 5101-3 Measuring frequency : 100±10kHz Measuring voltage : 0.5Vrms or less Measuring circuit : DC Equivalent series circuit																
Resistance to Soldering heat	Appearance	There should be no significant abnormality. The indications should be clear.					As per 4.14 JIS C 5101-1 As per 4.6 JIS C 5101-3 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.																
	L.C.	Less than 300% of initial limit																					
	ΔC / C	Within ±20% of initial value																					
	Df (tan δ)	Less than 300% of initial limit																					
Temperature cycle	Appearance	There should be no significant abnormality. The indications should be clear.					As per 4.16 JIS C 5101-1 As per 4.10 JIS C 5101-3 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°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></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 1000% of initial limit																						
ΔC / C	Within ±20% of initial value																						
Df (tan δ)	Less than 300% of initial limit																						
Moisture resistance	Appearance	There should be no significant abnormality. The indications should be clear.					As per 4.22 JIS C 5101-1 As per 4.12 JIS C 5101-3 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±12h leave it at room temperature for over 24h and then measure the sample.																
	L.C.	Less than 300% of initial limit																					
	ΔC / C	Within +30/-20% of initial value																					
	Df (tan δ)	Less than 300% of initial limit																					

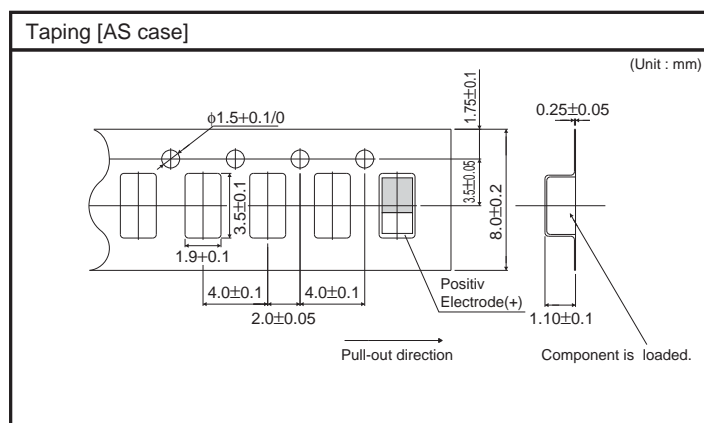
Item		Performance	Test conditions (based on JIS C 5101-1 and JIS C 5101-3)
Temperature Stability	Temp.	-55°C	As per 4.29 JIS C 5101-1 As per 4.13 JIS C 5101-3
	$\Delta C / C$	Within 0/-20% of initial value	
	Df (tan δ)	Shall be satisfied the value on "Standard list"	
	L.C.	—	
	Temp.	+105°C	
	$\Delta C / C$	Within +50/0% of initial value	
	Df (tan δ)	Shall be satisfied the value on "Standard list"	
	L.C.	Less than 1,000% of initial limit	
Surge voltage	Appearance	There should be no significant abnormality.	As per 4.26 JIS C 5101-1 As per 4.14 JIS C 5101-3 Apply the specified surge voltage via the serial resistance of 1k Ω ever 5 \pm 0.5 min. for 30 \pm 5 s. each time in the atmospheric condition of 85 \pm 2°C. Repeat this procedure 1,000 times. After the specimens, leave it at room temperature for over 24h and then measure the sample.
	L.C.	Less than 200% of initial limit	
	$\Delta C / C$	Within \pm 20% of initial value	
	Df (tan δ)	Less than 200% of initial limit	
Loading at High temperature	Appearance	There should be no significant abnormality. The indications should be clear.	As per 4.23 JIS C 5101-1 As per 4.15 JIS C 5101-3 After applying the rated voltage for 1000+72/0 h without discontinuation via the serial resistance of 3 Ω or less at a temperature of 85 \pm 2°C, leave the sample at room temperature / humidity for over 24h and measure the value.
	L.C.	Less than 400% of initial limit	
	$\Delta C / C$	Within \pm 20% of initial value	
	Df (tan δ)	Less than 300% of initial limit	
Terminal strength	Capacitance	The measured value should be stable.	As per 4.35 JIS C 5101-1 As per 4.9 JIS C 5101-3 A force is applied to the terminal until it bends to 1mm and by a prescribed tool maintain the condition for 5s. (See the figure below)
	Appearance	There should be no significant abnormality.	
			<p>(Unit : mm)</p> <p>50 20</p> <p>R230</p> <p>F (Apply force)</p> <p>thickness=1.6mm</p> <p>45 45 1</p>
Adhesiveness		The terminal should not come off.	<p>As per 4.34 JIS C 5101-1 As per 4.8 JIS C 5101-3 Apply force of 5N in the two directions shown in the figure below for 10\pm1s after mounting the terminal on a circuit board.</p> <p>product</p> <p>Apply force</p> <p>a circuit board</p>
Dimensions		Refer to "External dimensions"	Measure using a caliper of JIS B 7507 Class 2 or higher grade.
Resistance to solvents		The indication should be clear.	As per 4.32 JIS C 5101-1 As per 4.18 JIS C 5101-3 Dip in the isopropyl alcohol for 30 \pm 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.	As per 4.15.2 JIS C 5101-1 As per 4.7 JIS C 5101-3 Dip speed=25 \pm 2.5mm / s Pre-treatment (accelerated aging): Leave the sample on the boiling distilled water for 1 h. Solder temp. : 245 \pm 5°C Duration : 3 \pm 0.5s Solder : M705 Flux : Rosin 25% IPA 75%
Vibration	Capacitance	Measure value should not fluctuate during the measurement.	As per 4.17 JIS C 5101-1 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 be no significant abnormality.	

● Standard products list, TCTO series AS case

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	
* TCTO AS 0E 686 M8R	2.5	2.0	3.2	68	± 20	17.0	10	10	15	200
* TCTO AS 0E 107 M8R	2.5	2.0	3.2	100	± 20	25.0	10	10	15	200
* TCTO AS 0G 476 M8R	4	3.2	5	47	± 20	18.8	10	10	15	200
* TCTO AS 0G 686 M8R	4	3.2	5	68	± 20	27.2	10	10	15	200
* TCTO AS 0J 336 M8R	6.3	5	8	33	± 20	20.8	10	10	15	200
TCTO AS 0J 476 M8R	6.3	5	8	47	± 20	29.7	10	10	15	200
* TCTO AS 1A 335 M8R	10	8	13	3.3	± 20	3.3	6	6	9	300
* TCTO AS 1A 475 M8R	10	8	13	4.7	± 20	4.7	6	6	9	300
* TCTO AS 1A 685 M8R	10	8	13	6.8	± 20	6.8	6	6	9	300
* TCTO AS 1A 106 M8R	10	8	13	10	± 20	10.0	6	6	9	200
* TCTO AS 1A 156 M8R	10	8	13	15	± 20	15.0	6	6	9	200
* TCTO AS 1A 226 M8R	10	8	13	22	± 20	22.0	6	6	9	200

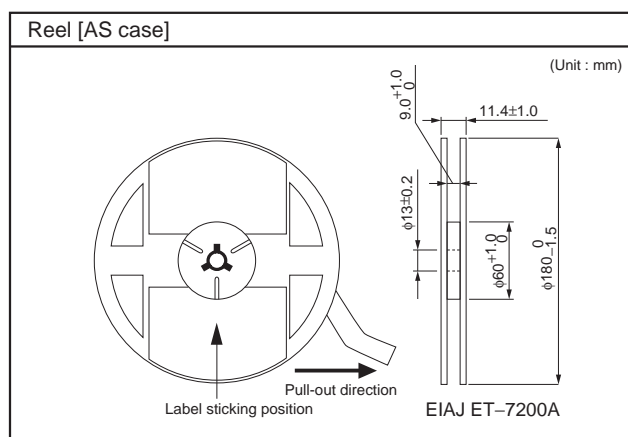
* = Under development

● Packaging specifications



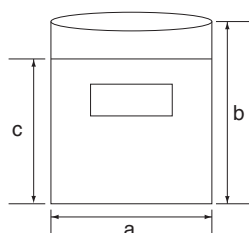
● Packaging style

Case code	Packaging	Packaging style		Symbol	Basic ordering units
AS case	Taping	plastic taping	$\phi 180$ mm Reel	R	3,000pcs



● 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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