

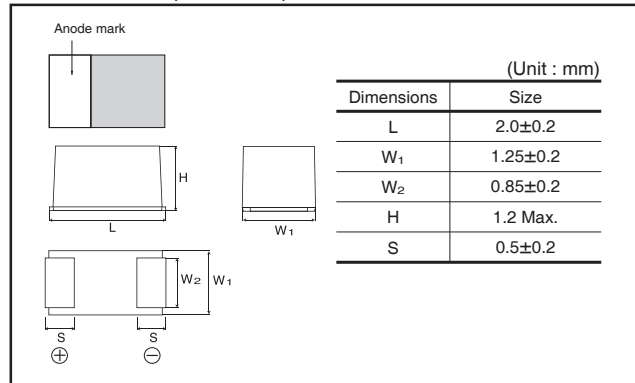
# Chip tantalum capacitors (Bottom surface electrode type : Large capacitance)

## TCT Series P Case

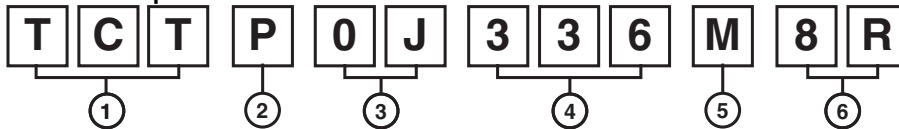
### ●Features (P)

- 1) Vital for all hybrid integrated circuits board application.
- 2) Wide capacitance range.
- 3) Screening by thermal shock.

### ●Dimensions (Unit : mm)



### ●Part No. Explanation



① Series name  
TCT

② Case style  
P

③ Rated voltage

Rated voltage (V)	2.5	4	6.3	10	16	20	25	35
CODE	0E	0G	0J	1A	1C	1D	1E	1V

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 : Reel : 8mm  
R : Positive electrode on the side opposite to sprocket hole

● **Rated table**

(μF)	Rated voltage (V,DC)							
	2.5	4	6.3	10	16	20	25	35
1.0 (105)								*P
1.5 (155)								*P
2.2 (225)							P	
3.3 (335)							*P	
4.7 (475)						*P		
6.8 (685)						*P		
10 (106)					P			
15 (156)				P				
22 (226)			P	P				
33 (336)		P	P	P				
47 (476)		P	P	P				
68 (686)		P	P					
100 (107)	P	P						
150 (157)	*P	*P						
220 (227)	*P							

Remark) Case size codes (P) in the above show products line-up.  
 \* Under developmen

● **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 P 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
V	35

Capacitance Code	Nominal Capacitance (μF)
A	1.0
E	1.5
J	2.2
N	3.3
S	4.7
W	6.8
a	10
e	15
j	22
n	33
s	47
w	68
ā	100
ē	150
ī	220

[P case] note 1)  $\frac{j}{(1)} \frac{n}{(2)}$



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 +125°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	35	at 85°C															
Category voltage (VDC)	1.6	2.5	4	6.3	10	13	16	22	at 125°C															
Surge voltage (VDC)	3.2	5.2	8	13	20	26	32	44	at 85°C															
DC Leakage current	Shown in " 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 +1.5 to 2V.DC Measuring circuit : DC Equivalent series circuit															
Tangent of loss angle (Df, tan δ)	Shall be satisfied the voltage on " Standard list "								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 +1.5 to 2V.DC Measuring circuit : DC Equivalent series circuit															
Impedance	Shall be satisfied the voltage 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 : 260±5°C Duration : 5±0.5s Repetition : 1 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 200% 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 border="1" style="margin-left: 20px;"> <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>125±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	125±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	125±2°C	30±3min.																						
4	Room temp.	3min. or less																						
L.C.	Less than 200% of initial limit																							
ΔC / C	Within ±20% of initial value																							
Df (tan δ)	Less than 200% 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 60±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 200% of initial limit																						
	ΔC / C	Within ±20% of initial value																						
	Df (tan δ)	Less than 200% 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
	ΔC / C	Within 0/-15% of initial value	
	Df (tan δ)	Shall be satisfied the voltage on " Standard list "	
	L.C.	-	
	Temp.	+85°C	
	ΔC / C	Within +15/0% of initial value	
	Df (tan δ)	Shall be satisfied the voltage on " Standard list "	
	L.C.	Less than 1000% of initial limit	
	Temp.	+125°C	
	ΔC / C	Within +20/0% of initial value	
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 1kΩ every 5±0.5 min. for 30±5 s. each time in the atmospheric condition of 85±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	
	ΔC / C	Within ±20% of initial value	
	Df (tan δ)	Less than 200% of initial limit	
Loading at High temperature	Appearance	There should be no significant abnormality.	As per 4.23 JIS C 5101-1 As per 4.15 JIS C 5101-3 After applying the rated voltage for 1000+36/0 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)	Less than 200% 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>thickness=1.6mm</p> <p>45 45</p>
Adhesiveness	The terminal should not come off.		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±1s after mounting the terminal on a circuit board.
			<p>product</p> <p>C105</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±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±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 : 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, TCT series P case

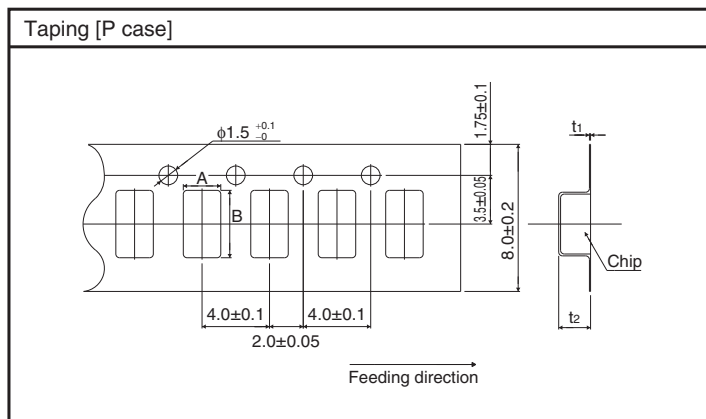
Part No.	Rated voltage 85°C (V)	Category voltage 125°C (V)	Surge voltage 85°C (V)	Cap. 120Hz (μF)	Tolerance (%)	Leakage current 25°C 1WV.60s (μA)	Df 120Hz (%)			Impedance 100kHz (Ω)
							-55°C	25°C 85°C	125°C	
TCT P 0E 107M8R	2.5	1.6	3.2	100	±20	12.5	60	30	40	4.0
* TCT P 0E 157M8R	2.5	1.6	3.2	150	±20	18.8	60	30	40	4.0
TCT P 0G 336M8R	4	2.5	5	33	±20	1.3	30	20	30	4.0
TCT P 0G 476M8R	4	2.5	5	47	±20	1.9	30	20	30	4.0
TCT P 0G 686M8R	4	2.5	5	68	±20	13.6	60	30	40	4.0
TCT P 0G 107M8R	4	2.5	5	100	±20	20.0	60	30	40	4.0
TCT P 0J 226M8R	6.3	4	8	22	±20	1.4	30	20	30	5.0
TCT P 0J 336M8R	6.3	4	8	33	±20	2.1	30	20	30	4.0
TCT P 0J 476M8R	6.3	4	8	47	±20	14.8	60	30	40	4.0
TCT P 0J 686M8R	6.3	4	8	68	±20	21.4	60	30	40	4.0
TCT P 1A 156M8R	10	6.3	13	15	±20	1.5	30	20	30	6.0
TCT P 1A 226M8R	10	6.3	13	22	±20	2.2	30	20	30	5.0
TCT P 1A 336M8R	10	6.3	13	33	±20	16.5	60	30	40	4.0
TCT P 1A 476M8R	10	6.3	13	47	±20	23.5	60	30	40	4.0
TCT P 1C 106M8R	16	10	20	10	±20	1.6	30	20	30	6.0
* TCT P 1D 475M8R	20	13	26	4.7	±20	1.0	30	20	30	6.0
* TCT P 1D 685M8R	20	13	26	6.8	±20	1.4	30	20	30	6.0
TCT P 1E 225M8R	25	16	32	2.2	±20	0.6	30	20	30	8.0
* TCT P 1E 335M8R	25	16	32	3.3	±20	0.9	30	20	30	8.0
* TCT P 1V 105M8R	35	22	44	1.0	±20	0.5	30	20	30	8.0
* TCT P 1V 155M8R	35	22	44	1.5	±20	0.6	30	20	30	8.0

\* Under development

● Packaging specifications

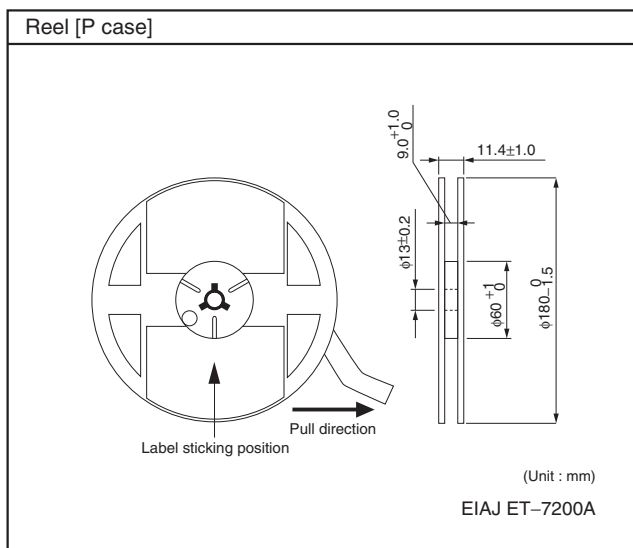
(Unit : mm)

Case code	A±0.1	B±0.1	t1± 0.05	t2±0.1
P	1.55	2.3	0.25	1.5



● Packaging style

Case code	Packaging	Packaging style	Symbol	Basic ordering units
P case	Taping	plastic taping φ180mm Reel	R	3,000pcs



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