

# Chip tantalum capacitors

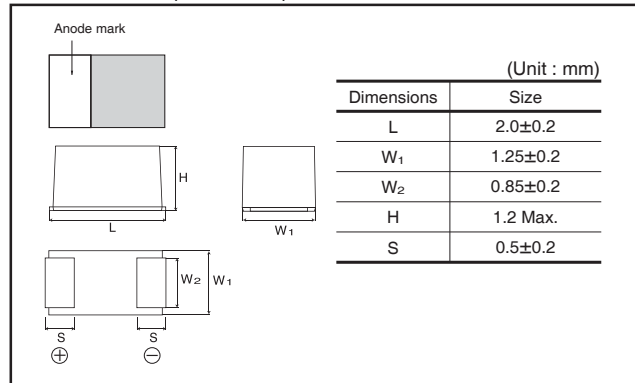
## (Bottom surface electrode type : Large capacitance)

### TCT Series P Case

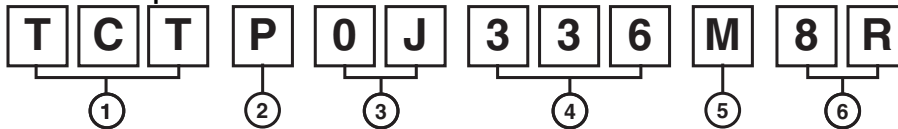
#### ●Features (P)

- 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
j̄	220

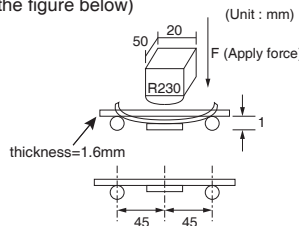
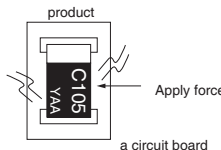
[P case]      note 1)       $\frac{j}{(1)} \quad \frac{n}{(2)}$



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															
	L.C.	Less than initial limit										Dip in the solder bath Solder temp : 260±5°C															
	ΔC / C	Within ±20% of initial value										Duration : 5±0.5s Repetition : 1															
	Df (tan δ)	Less than 200% of initial limit										After the specimens, leave it at room temperature for over 24h and then measure the sample.															
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															
	L.C.	Less than 200% of initial limit										Repetition : 5 cycles (1 cycle : steps 1 to 4) without discontinuation.															
	ΔC / C	Within ±20% of initial value										<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>125±2°C</td><td>30±3min.</td></tr><tr><td>4</td><td>Room temp.</td><td>3min. or less</td></tr></table>		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																									
Df (tan δ)	Less than 200%of initial limit										After the specimens, leave it at room temperature for over 24h and then measure the sample.																
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															
	L.C.	Less than 200% of initial limit										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															
	ΔC / C	Within ±20% of initial value										leave it at room temperature for over 24h and then measure the sample.															
	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	
	Df (tan δ)	Shall be satisfied the voltage on " Standard list "	
	L.C.	Less than 1250% of initial limit.	
Surge voltage	Appearance	There should be no significant abnormality.	As per 4.26JIS C 5101-1 As per 4.14JIS 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.	
			<div><p>(Unit : mm)</p></div>
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.
			<div></div>
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

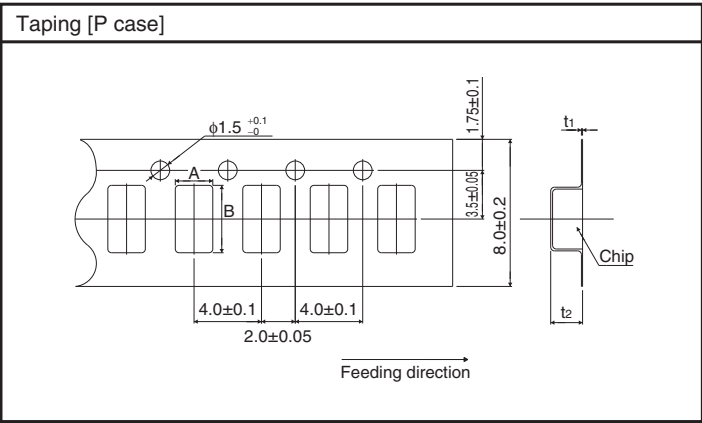
Part No.	Rated voltage 85°C (V)	Category voltage 125°C (V)	Surge voltage 85°C (V)	Cap. 120Hz (μF)	Tolerance (%)	Leakage current 25°C 1WV.60s (μA)	Df 120Hz (%)			Impedance 100kHz (Ω)
							-55°C	25°C 85°C	125°C	
TCT P 0E 107M8R	2.5	1.6	3.2	100	±20	12.5	60	30	40	4.0
* TCT P 0E 157M8R	2.5	1.6	3.2	150	±20	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

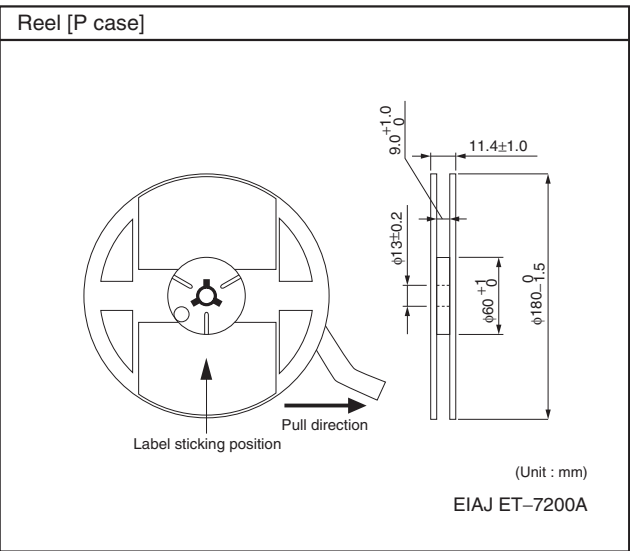
(Unit : mm)

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	$\phi 180$ mm Reel	R



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