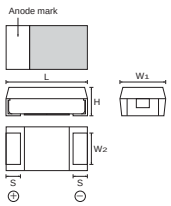
Chip tantalum capacitors

TC 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)



(Unit : mm)

Dimensions	P case
L	2.0±0.2
W1	1.25±0.2
W2	0.9±0.2
H	1.1±0.1
S	0.45±0.3

●Part No. Explanation

T	C	P	1	A	1	0	5	M	8	R
①		②	③		④			⑤	⑥	

① Series name
TC

② Case style
TC····· P

③ Rated voltage

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

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

● Rated table

(μF)	Rated voltage (V)					
	4 0G	6.3 0J	10 1A	16 1C	20 1D	25 1E
1 (105)			P	P	P	P
1.5 (155)		P	P	P		
2.2 (225)	P	P	P	P		
3.3 (335)	P	P	P	P		
4.7 (475)	P	P	P			
6.8 (685)	P	P	P			
10 (106)	P	P	P			
15 (156)	P	P				
22 (226)	P	P				
33 (336)	*P					
47 (476)						
68 (686)						

Remark) Case size codes (P) in the above show products line-up.
* 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 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)
g	4
j	6.3
A	10
C	16
D	20
E	25

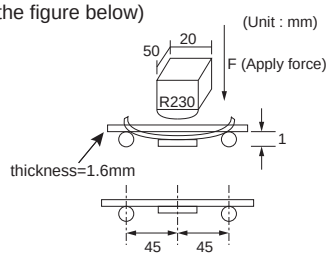
Capacitance Code	Nominal Capacitance (μF)
A	1.0
E	1.5
J	2.2
N	3.3
S	4.7
W	6.8
a	10
e	15
j	22

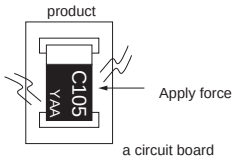
[P case] note 1) $\frac{j}{(1)}$ $\frac{J}{(2)}$

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)		4 | 6.3 | 10 | 16 | 20 | 25	at 85°C
Category voltage (VDC)		2.5 | 4 | 6.3 | 10 | 13 | 16	at 125°C
Surge voltage (VDC)		5.0 | 8 | 13 | 20 | 26 | 32	at 85°C
DC Leakage current		0.5 μA or 0.01CV whichever is greater 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 1min
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±10°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	TCP0G336M8R : Within ±20% of initial value TCP0J226M8R : Within ±20% of initial value TCP1A106M8R : Within ±20% of initial value Others : Within ±10% of initial value	
	Df (tan δ)	Less than 150% 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. | | 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 | After the specimens, leave it at room temperature for over 24h and then measure the sample.
	L.C.	TCP0G336M8R : Less than 150% of initial limit TCP0J226M8R : Less than 150% of initial limit Others : Less than initial limit	
	ΔC / C	1 to 10μF : Within ±10% of initial value 15 to 33μF : Within ±20% of initial value TCP1A106M8R : Within ±20% of initial value	
	Df (tan δ)	Less than 150% 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,respectiveiy, for 500±12h leave it at room temperature for over 24h and then measure the sample.
	L.C.	TCP0J226M8R : Less than 150% of initial limit TCP0G336M8R : Less than 150% of initial limit Others : Less than initial limit	
	ΔC / C	Within ±20% of initial value	
	Df (tan δ)	Less than 150% 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.	Shall be satisfied the voltage on " Standard list "	
	ΔC / C	TCP0G336M8R : Within ±20% of initial value TCP0J226M8R : Within ±20% of initial value Others : Within ±10% of initial value	
	Df (tan δ)	Less than 150% 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.	TCP0G336M8R : Less than 150% of initial limit TCP0J226M8R : Less than 150% of initial limit Others : Less than initial limit	
	ΔC / C	TCP0G336M8R : Within ±20% of initial value TCP0J226M8R : Within ±20% of initial value Others : Within ±10% of initial value	
	Df (tan δ)	Less than 150% 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.	

Item		Performance	Test conditions (JIS C 5101–1 and JIS C 5101– 3)
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. 
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, TC series A case**

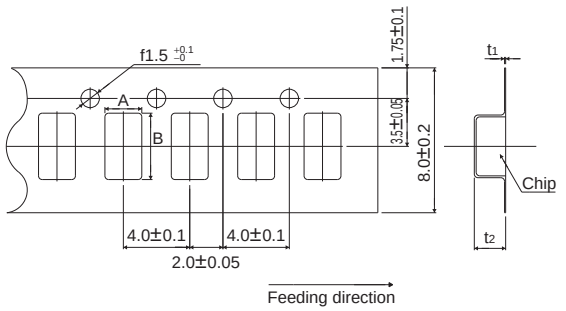
Part No.	Rated voltage 85°C (V)	Category voltage 125°C (V)	Surge voltage 85°C (V)	Cap. 120Hz (μF)	Tolerance (%)	Leakage current 25°C 1WV.60s (μA)	Df 120Hz (%)			Impedance 100kHz
							–55°C	25°C 85°C	125°C	(Ω)
TC P 0G 225 M8R	4	2.5	5	2.2	±20	0.5	15	10	15	17.5
TC P 0G 335 M8R	4	2.5	5	3.3	±20	0.5	30	20	30	17.5
TC P 0G 475 M8R	4	2.5	5	4.7	±20	0.5	30	20	30	14.4
TC P 0G 685 M8R	4	2.5	5	6.8	±20	0.5	30	20	30	11.8
TC P 0G 106 M8R	4	2.5	5	10	±20	0.5	30	20	30	9.3
TC P 0G 156 M8R	4	2.5	5	15	±20	0.6	30	20	30	8.3
TC P 0G 226 M8R	4	2.5	5	22	±20	0.9	30	20	30	7.7
＊TC P 0G 336 M8R	4	2.5	5	33	±20	1.4	38	25	38	5.0
TC P 0J 155 M8R	6.3	4	8	1.5	±20	0.5	15	10	15	17.5
TC P 0J 225 M8R	6.3	4	8	2.2	±20	0.5	30	20	30	17.5
TC P 0J 335 M8R	6.3	4	8	3.3	±20	0.5	30	20	30	14.4
TC P 0J 475 M8R	6.3	4	8	4.7	±20	0.5	30	20	30	11.8
TC P 0J 685 M8R	6.3	4	8	6.8	±20	0.5	30	20	30	9.3
TC P 0J 106 M8R	6.3	4	8	10	±20	0.6	30	20	30	8.3
TC P 0J 156 M8R	6.3	4	8	15	±20	0.9	30	20	30	7.7
TC P 0J 226 M8R	6.3	4	8	22	±20	1.4	38	25	38	5.0
TC P 1A 105 M8R	10	6.3	13	1.0	±20	0.5	15	10	15	17.5
TC P 1A 155 M8R	10	6.3	13	1.5	±20	0.5	30	20	30	16.1
TC P 1A 225 M8R	10	6.3	13	2.2	±20	0.5	30	20	30	14.4
TC P 1A 335 M8R	10	6.3	13	3.3	±20	0.5	30	20	30	11.8
TC P 1A 475 M8R	10	6.3	13	4.7	±20	0.5	30	20	30	9.3
TC P 1A 685 M8R	10	6.3	13	6.8	±20	0.7	30	20	30	9.3
TC P 1A 106 M8R	10	6.3	13	10	±20	1.0	30	20	30	7.7
TC P 1C 105 M8R	16	10	20	1.0	±20	0.5	15	10	15	16.1
TC P 1C 155 M8R	16	10	20	1.5	±20	0.5	30	20	30	14.4
TC P 1C 225 M8R	16	10	20	2.2	±20	0.5	30	20	30	11.8
TC P 1C 335 M8R	16	10	20	3.3	±20	0.6	30	20	30	9.3
TC P 1D 105 M8R	20	13	26	1.0	±20	0.5	15	10	15	16.1
TC P 1E 105 M8R	25	16	32	1.0	±20	0.6	30	20	30	9.3

＊=Under development

● Packaging specifications

Case code	A±0.1	B±0.1	t_1 ± 0.05	t_2±0.1
P	1.55	2.3	0.25	1.5

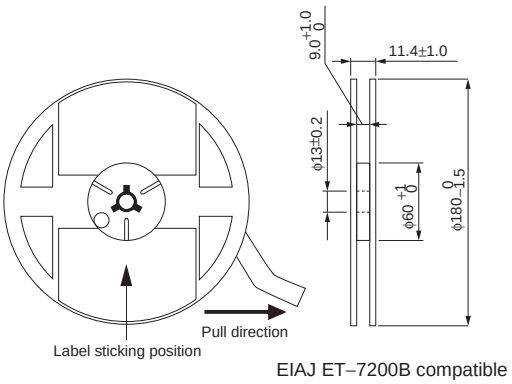
Taping [P case]



● Packaging style

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

Reel [P case]



EIAJ ET−7200B compatible

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