Chip tantalum capacitors

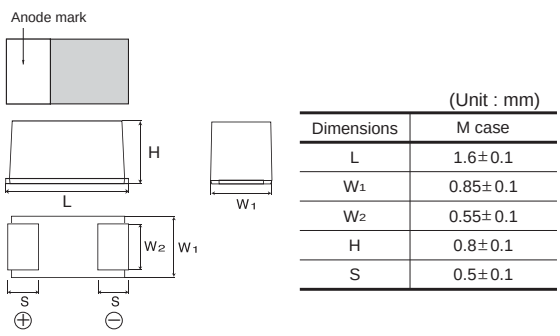
(Bottom surface electrode type)

TC Series M Case

●Features (M)

With an original bottom surface electrode structure.
1) Excellent adhesion.
2) Easy visual recognition of fillets.
3) Large capacitance, low ESR.

●Dimensions (Unit : mm)



(Unit : mm)

Dimensions	M case
L	1.6±0.1
W1	0.85±0.1
W2	0.55±0.1
H	0.8±0.1
S	0.5±0.1

●Part No. Explanation

T	C	M	1	A	4	7	5	M	8	R
①		②	③		④			⑤	⑥	

① Series name
TC

② Case style
TC····· M

③ Rated voltage

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

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

● Rated table

(μF)	Rated voltage (V)					
	2.5 0E	4 0G	6.3 0J	10 1A	16 1C	20 1D
0.47 (474)			M*	M*		
0.68 (684)						
1.0 (105)				M	M	
1.5 (155)						
2.2 (225)				M	M	
3.3 (335)						
4.7 (475)		M	M	M		
6.8 (685)						
10 (106)		M	M	M		
15 (156)						
22 (226)		M	M*			
33 (336)		M				
47 (476)	M*					
68 (686)						

Remark) Case size codes (M) 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 M 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

Capacitance Code	Nominal Capacitance (μF)
S	0.47
W	0.68
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

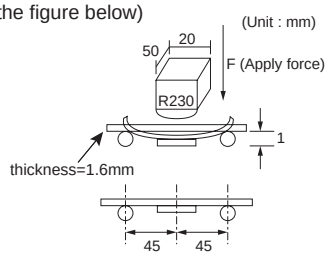
[M case] note 1) A (1) s (2)

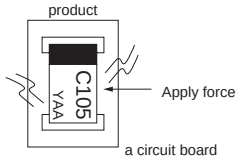
note 2) voltage code and capacitance code are variable with parts number

● 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	at 85°C
Category voltage (VDC)		1.6 2.5 4 6.3 10	at 125°C
Surge voltage (VDC)		3.2 5.2 8 13 20	at 85°C
DC Leakage current		Shall be satisfied the voltage 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 +1.5.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.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 200% of 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. 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	
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.	Less than 200% of initial limit	
	ΔC / C	Within ±20% of initial value	
	Df (tan δ)	Less than 200% of initial limit	

	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

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	TCM0G336□ : Within 0/–30% of initial value Others : Within 0/–15% of initial value	
	Df (tan δ)	Shall be satisfied the voltage on " Standard list "	
	L.C.	–	
	Temp.	+85°C	
	ΔC / C	TCM0G336□ : Within +15/-5% of initial value Others : Within +15/0% of initial value	
	Df (tan δ)	Shall be satisfied the voltage on " Standard list "	
	L.C.	TCM0G336□ : Less than 1.0CV Others : 5μA or 0.1CV whichever is greater	
	Temp.	+125°C	
	ΔC / C	TCM0G336□ : Within +20/-5% of initial value Others : Within +20/0% of initial value	
	Df (tan δ)	Shall be satisfied the voltage on " Standard list "	
	L.C.	TCM0G336□ : Less than 1.25CV Others : 6.3μA or 0.125CV whichever is greater	
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 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	TCM0G336□ : Within ±30% of initial value Others : 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.	

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 M case**

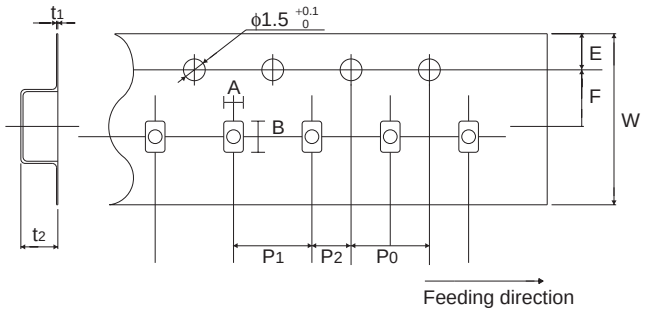
Part No.	Rated voltage 85°C (V)	Category voltage 125°C (V)	Surge voltage 85°C (V)	Cap. 120Hz (μF)	Tolerance (%)	Leakage current 25°C 1WV.300s (μA)	Df 120Hz (%)			Impedance 100kHz
							–55°C	25°C 85°C	125°C	(Ω)
TC M 0G 475☐	4	2.5	5.2	4.7	±20	0.5	30	20	30	9.0
TC M 0G 106☐	4	2.5	5.2	10	±20	0.5	30	20	30	9.0
TC M 0G 226☐	4	2.5	5.2	22	±20	0.9	30	20	30	9.0
TC M 0G 336☐	4	2.5	5.2	33	+20	13.0	60	30	40	9.0
TC M 0J 474☐	6.3	4	8	0.47	±20	0.5	15	10	15	15.0
TC M 0J 475☐	6.3	4	8	4.7	±20	0.5	30	20	30	9.0
TC M 0J 106☐	6.3	4	8	10	±20	0.6	30	20	30	9.0
TC M 0J 226☐	6.3	4	8	22	±20	13.0	60	30	40	9.0
TC M 1A 474☐	10	6.3	13	0.47	±20	0.5	15	10	15	15.0
TC M 1A 105☐	10	6.3	13	1.0	±20	0.5	15	10	15	15.0
TC M 1A 225☐	10	6.3	13	2.2	±20	0.5	30	20	30	13.5
TC M 1A 475☐	10	6.3	13	4.7	±20	0.5	30	20	30	9.0
TC M 1A 106☐	10	6.3	13	10	±20	10.0	30	20	30	9.0
TC M 1C 105☐	16	10	20	1.0	±20	0.5	15	10	15	15.0
TC M 1C 225☐	16	10	20	2.2	±20	0.5	30	20	30	13.5

☐=Tolerance (M : ±20%)

● Packaging specifications

Case code	A±0.1	B±0.1	W±0.2	E±0.1	F±0.05	P_1±0.1	P_2±0.05	P_0±0.1	t_1±0.05	t_2±0.1
M	1.0	1.8	8.0	1.75	3.5	4.0	2.0	4.0	0.20	1.0

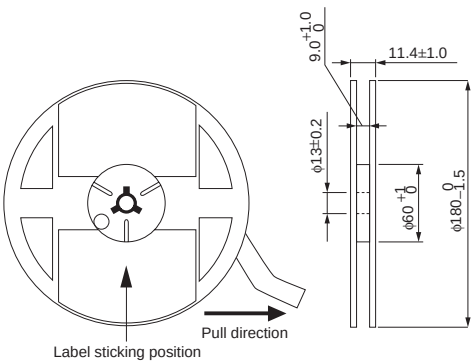
Taping [M case]



● Packaging style

Case code	Packaging	Packaging style		Symbol	Basic ordering units
M case	Taping	plastic taping	ϕ180mm Reel	R	4,000pcs

Reel [M case]



EIAJ ET−7200B compatible

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