



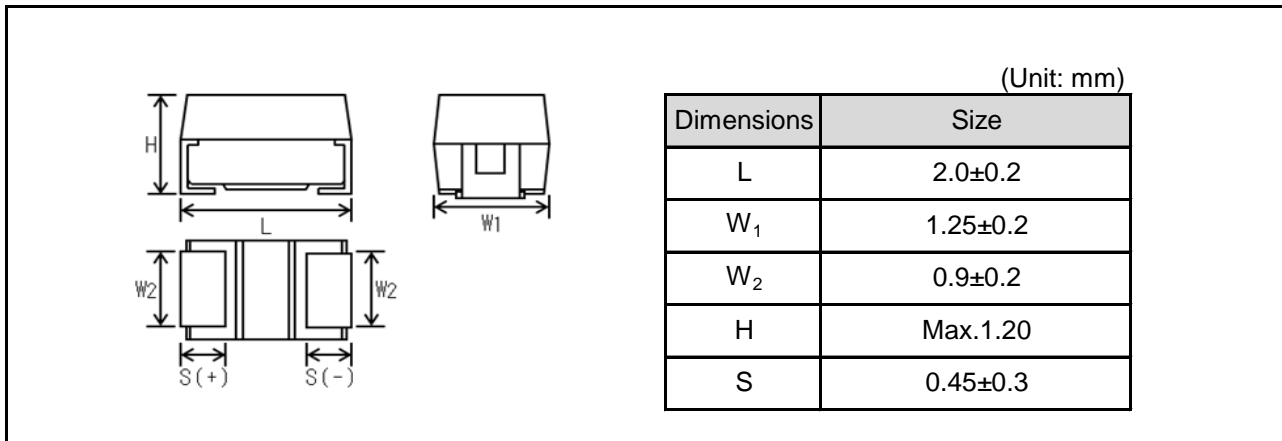
**THE DATASHEET OF
TCP0J475M8R**



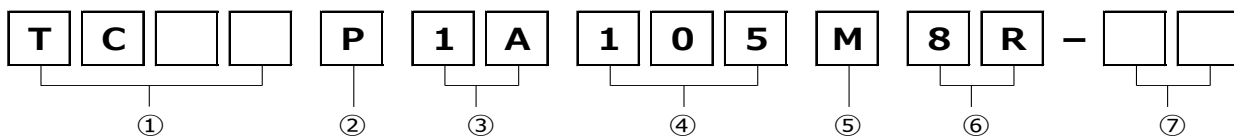
● Features

- 1) Small package, large capacitance chip tantalum capacitor.
- 2) Low impedance capacitors.
- 3) Screening by thermal shock.

● Dimensions



● Part No. Explanation



① Series name
TC

② Case style
P : 2012-2012(12)size

③ Rated voltage

CODE	Rated voltage(V)
0E	2.5
0G	4
0J	6.3
1A	10
1C	16
1D	20
1E	25
1V	35
1H	50

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

Capacitance (μF)	Rated voltage (V.DC)								
	2.5	4	6.3	10	16	20	25	35	50
1.0 (105)				17.5	16.1		9.3		
1.5 (155)			17.5	16.1					
2.2 (225)		17.5	17.5	14.4					
3.3 (335)		17.5	14.4	11.8	9.3				
4.7 (475)		14.4	11.8	9.3					
6.8 (685)			9.3						
10 (106)		9.3	8.3	7.7					
15 (156)		8.3	7.7						
22 (226)		7.7	5						
33 (336)									

● 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: A capacitance code is shown as below table.

Voltage Code	Rated DC Voltage (V)
e	2.5
g	4
j	6.3
A	10
C	16
D	20
E	25
V	35
H	50

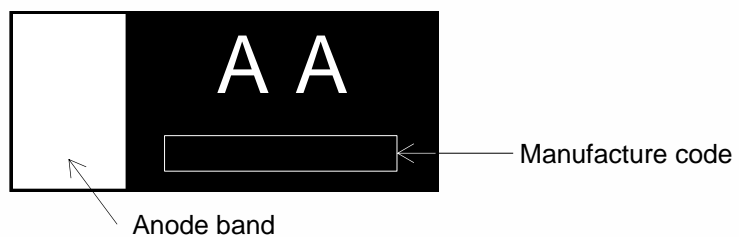
Capacitance Code	Nominal Capacitance (μF)	Capacitance Code	Nominal Capacitance (μF)
<u>E</u>	0.15	e	15
<u>N</u>	0.33	j	22
<u>S</u>	0.47	n	33
A	1.0	s	47
E	1.5	<u>w</u>	68
J	2.2	<u>a</u>	100
N	3.3	<u>e</u>	150
S	4.7	<u>j</u>	220
W	6.8	<u>n</u>	330
a	10	<u>s</u>	470

Visual typical example
voltage code and capacitance code are variable with parts number.

[TC series P case]

EX.) $\frac{A}{(1)}$ $\frac{A}{(2)}$

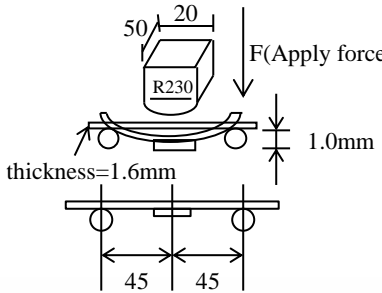
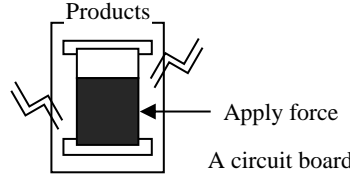
- (1) voltage code
- (2) capacitance code



● Characteristics

Item	Performance		Test conditions (based on JIS C 5101-1 and JIS C 5101-3)															
Operating Temperature	-55°C~+125°C		Voltage reduction when temperature exceeds +85°C															
Maximum operating temperature with no voltage derating	+85°C																	
Rated voltage (V.DC)	Refer to " Standard list ".		at 85°C															
Category voltage (V.DC)	Refer to " Standard list ".		at 125°C															
Surge voltage (V.DC)	Refer to " Standard list ".		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 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 + 1.5V.DC Measuring circuit :DC Equivalent series circuit															
Tangent of loss angle (Df,tanδ)	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															
Impedance	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 :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 200% of initial limit.																
	ΔC/C	Within ±20% of initial value.																
	DF (tanδ)	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" data-bbox="922 1686 1393 1865"> <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. Initial value for ΔC/C shall be the value after mounted.		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 (tanδ)	Less than 200% of initial limit.																	

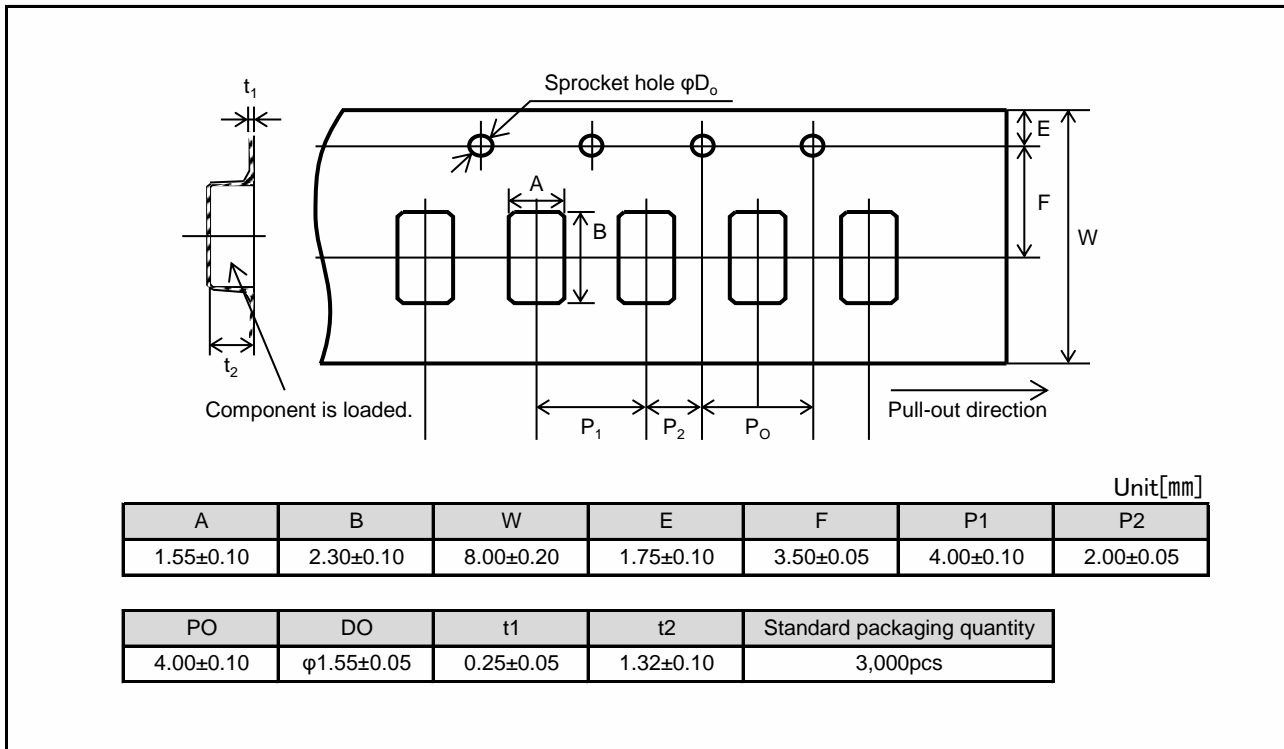
Item		Performance	Test conditions (based on JIS C 5101-1 and JIS C 5101-3)
Moisture resistance	Appearance	There should be no significant abnormality. The indications should be clear.	As per 4.22 JIS C 5101-1 As per 4.12 JIS C 5101-3 After leaving the sample under such atmospheric condition that the temperature and humidity are 60±2°C and 90 to 95% RH, respectively, for 500+12/0h leave it at room temperature for over 24h and then measure the sample. Initial value for $\Delta C/C$ shall be the value after mounted.
	L.C.	Less than 200% of initial limit.	
	$\Delta C/C$	Within ±20% of initial value.	
	DF (tanδ)	Less than 200% of initial limit.	
Temperature Stability	Temp. : -55°C		As per 4.29 JIS C 5101-1 As per 4.13 JIS C 5101-3 Initial value for $\Delta C/C$ shall be the value after mounted.
	$\Delta C/C$	Within 0/-15% of initial value.	
	DF (tanδ)	Shall be satisfied the value on " Standard list "	
	L.C.	—	
	Temp. : +85°C		
	$\Delta C/C$	Within +15/0% of initial value.	
	DF (tanδ)	Shall be satisfied the value on " Standard list "	
	L.C.	Less than 1000% of initial limit.	
	Temp. : +125°C		
	$\Delta C/C$	Within +20/0% of initial value.	
	DF (tanδ)	Shall be satisfied the value on " Standard list "	
	L.C.	Less than 1250% of initial limit.	
Surge voltage	Appearance	There should be no significant abnormality. The indications should be clear.	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 ever 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. Initial value for $\Delta C/C$ shall be the value after mounted.
	L.C.	Less than 200% of initial limit.	
	$\Delta C/C$	Within ±20% of initial value.	
	DF (tanδ)	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 3Ω or less at a temperature of 85±2°C, leave the sample at room temperature / humidity for over 24h and measure the value. Initial value for $\Delta C/C$ shall be the value after mounted.
	L.C.	Less than 200% of initial limit.	
	$\Delta C/C$	Within ±20% of initial value.	
	DF (tanδ)	Less than 200% of initial limit.	

Item		Performance	Test conditions (based on JIS C 5101-1 and JIS C 5101-3)
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
	Appearance	There should be no significant abnormality.	A force is applied to the terminal until it bends to 1mm and by a prescribed tool maintains the condition for 5s. (See the figure below) 
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 2N 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 1h. 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.
	Appearance	There should be no significant abnormality.	Amplitude : 1.5mm Time : 2h each in X and Y directions Mounting : The terminal is soldered on a print circuit board.

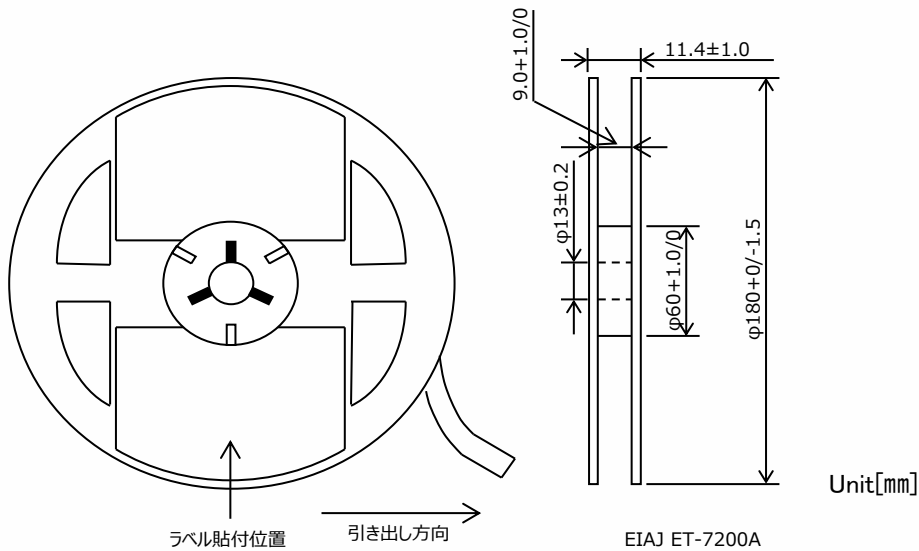
● Standard products list

Part No.	Rated voltage 85°C (V)	Category voltage 125°C (V)	Surge voltage 85°C (V)	Cap. 120Hz (μ F)	Tolerance (%)	Leakage current 25°C 1WV 1min (μ A)	tan δ 120Hz			Impedance 100kHz (Ω)
							-55°C (%)	25°C (%)	125°C (%)	
TCP0G225M8R	4	2.5	5	2.2	\pm 20	0.5	15	10	15	17.5
TCP0G335M8R	4	2.5	5	3.3	\pm 20	0.5	30	20	30	17.5
TCP0G475M8R	4	2.5	5	4.7	\pm 20	0.5	30	20	30	14.4
TCP0G106M8R	4	2.5	5	10	\pm 20	0.5	30	20	30	9.3
TCP0G156M8R	4	2.5	5	15	\pm 20	0.6	30	20	30	8.3
TCP0G226M8R	4	2.5	5	22	\pm 20	0.9	30	20	30	7.7
TCP0J155M8R	6.3	4	8	1.5	\pm 20	0.5	15	10	15	17.5
TCP0J225M8R	6.3	4	8	2.2	\pm 20	0.5	30	20	30	17.5
TCP0J335M8R	6.3	4	8	3.3	\pm 20	0.5	30	20	30	14.4
TCP0J475M8R	6.3	4	8	4.7	\pm 20	0.5	30	20	30	11.8
TCP0J685M8R	6.3	4	8	6.8	\pm 20	0.5	30	20	30	9.3
TCP0J106M8R	6.3	4	8	10	\pm 20	0.6	30	20	30	8.3
TCP0J156M8R	6.3	4	8	15	\pm 20	0.9	30	20	30	7.7
TCP0J226M8R	6.3	4	8	22	\pm 20	1.4	38	25	38	5
TCP1A105M8R	10	6.3	13	1	\pm 20	0.5	15	10	15	17.5
TCP1A155M8R	10	6.3	13	1.5	\pm 20	0.5	30	20	30	16.1
TCP1A225M8R	10	6.3	13	2.2	\pm 20	0.5	30	20	30	14.4
TCP1A335M8R	10	6.3	13	3.3	\pm 20	0.5	30	20	30	11.8
TCP1A475M8R	10	6.3	13	4.7	\pm 20	0.5	30	20	30	9.3
TCP1A106M8R	10	6.3	13	10	\pm 20	1.0	30	20	30	7.7
TCP1C105M8R	16	10	20	1	\pm 20	0.5	15	10	15	16.1
TCP1C335M8R	16	10	20	3.3	\pm 20	0.6	30	20	30	9.3
TCP1E105M8R	25	16	32	1	\pm 20	0.6	30	20	30	9.3

●Packaging specifications



●Reel dimensions



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