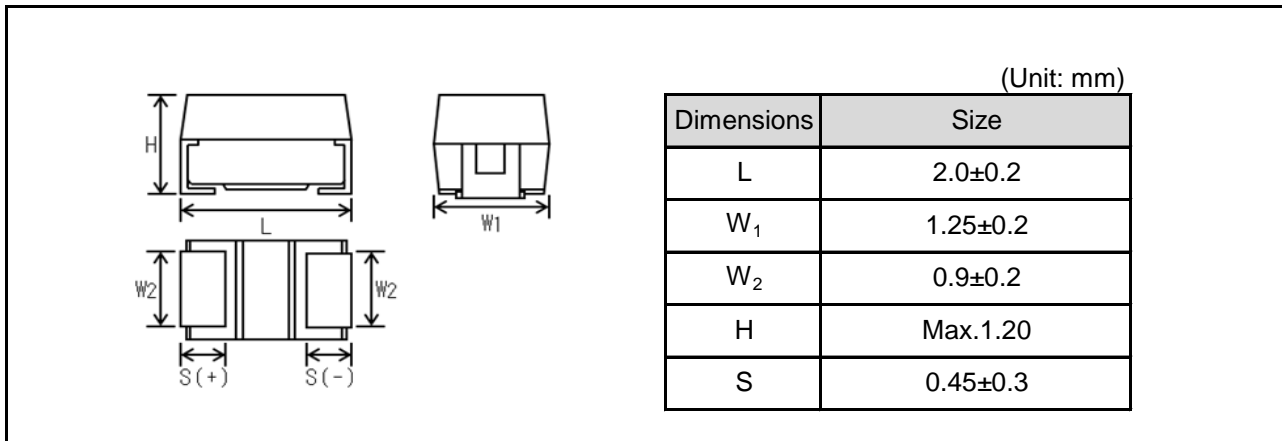


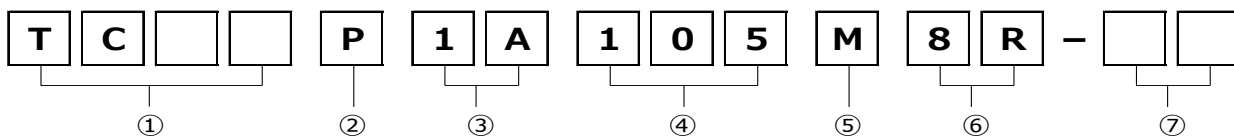
### ● Features

- 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 ( $\mu\text{F}$ )	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

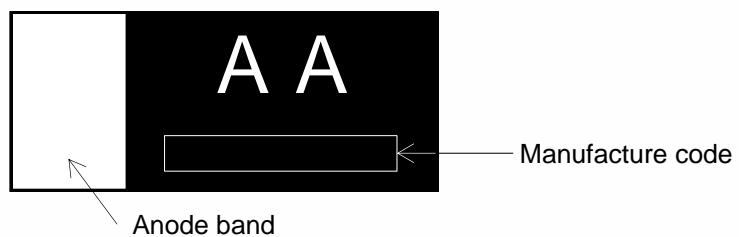
Capacitance Code	Nominal Capacitance ( $\mu\text{F}$ )	Capacitance Code	Nominal Capacitance ( $\mu\text{F}$ )
<u>E</u>	0.15	e	15
<u>N</u>	0.33	j	22
<u>S</u>	0.47	n	33
A	1.0	s	47
E	1.5	<u>w</u>	68
J	2.2	<u>a</u>	100
N	3.3	<u>e</u>	150
S	4.7	<u>j</u>	220
W	6.8	<u>n</u>	330
a	10	<u>s</u>	470

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

[TC series P case]

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

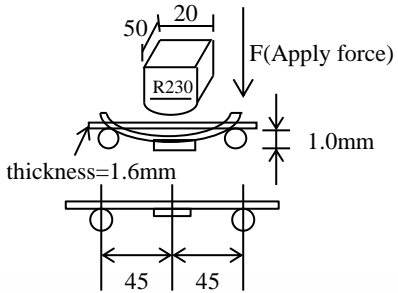
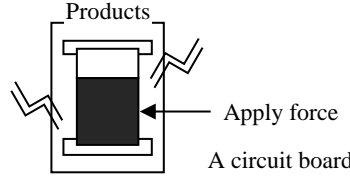
- (1) voltage code
- (2) capacitance code



● 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" style="margin-left: auto; margin-right: auto;"> <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.																	

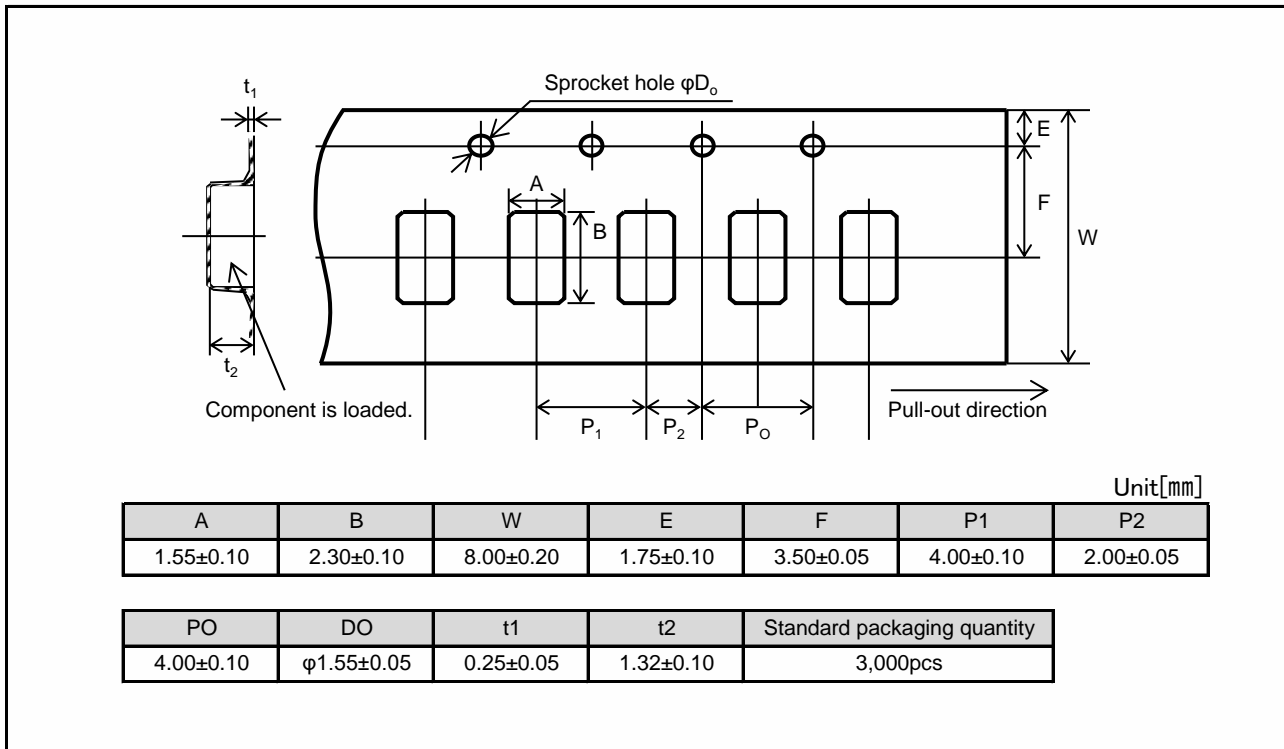
Item		Performance	Test conditions (based on JIS C 5101-1 and JIS C 5101-3)
Moisture resistance	Appearance	There should be no significant abnormality. The indications should be clear.	As per 4.22 JIS C 5101-1 As per 4.12 JIS C 5101-3 After leaving the sample under such atmospheric condition that the temperature 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.

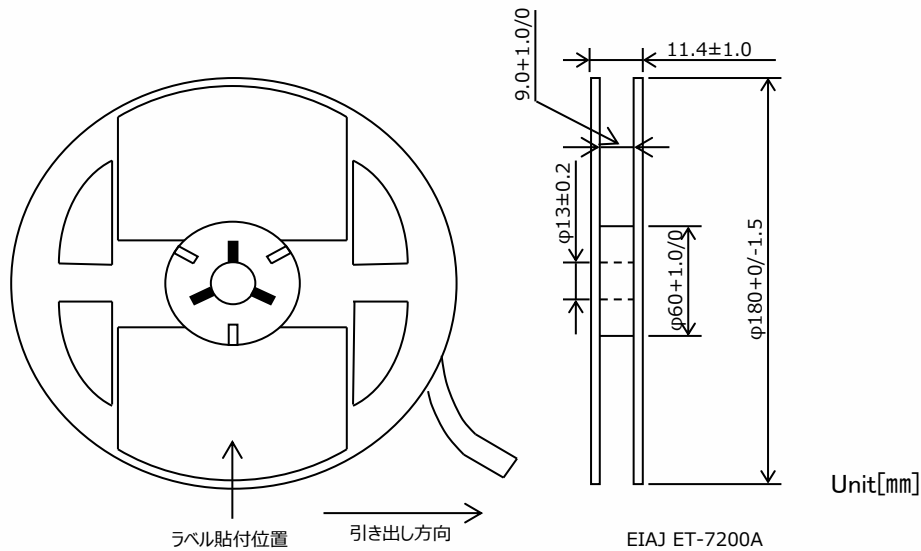
## ● Standard products list

Part No.	Rated voltage 85°C (V)	Category voltage 125°C (V)	Surge voltage 85°C (V)	Cap. 120Hz ( $\mu$ F)	Tolerance (%)	Leakage current 25°C 1WV 1min ( $\mu$ A)	tan $\delta$ 120Hz			Impedance 100kHz ( $\Omega$ )
							-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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