

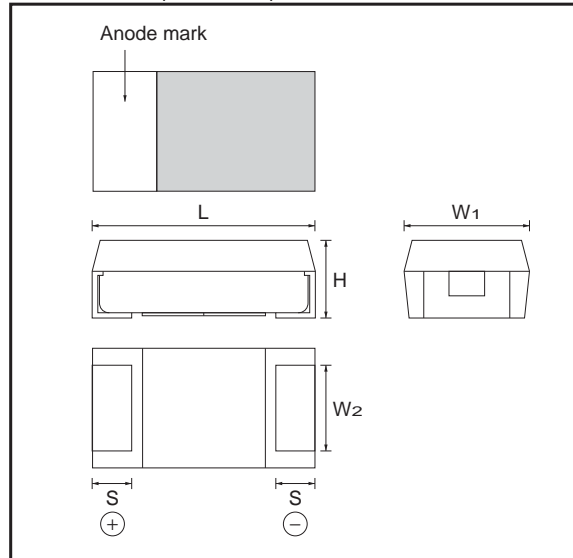
# Chip tantalum capacitors with (Fail-safe open structure type)

## TCFG series D Case

### ●Features

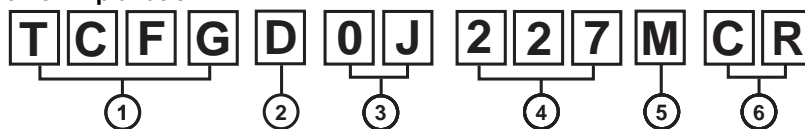
- 1) Safety design by open function built - in.
- 2) Wide capacitance range
- 3) Screening by thermal shock.

### ●Dimensions (Unit : mm)



Case code	L	W <sub>1</sub>	W <sub>2</sub>	H	S
D 7343-30(2917)	7.3±0.2	4.3±0.2	2.4±0.1	2.8±0.2	1.3±0.2

### ●Part No. Explanation



① Series name  
TCFG

② Case code  
TCFG ..... D

③ Rated Voltage

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

④ Capacitance

Nominal capacitance in pF 3 digits : 2 significant figure representing the number of 0's.

⑤ Capacitance tolerance

M : ±20%

⑥ Taping

C : Reel width (12mm)

R : Positive electrode on the side opposite to sprocket hole

●Capacitance range

TCFG series D Case

(μF)	Rated voltage (V)					
	4 0G	6.3 0J	10 1A	16 1C	20 1D	25 1E
47 (476)						D
68 (686)					D*	
100 (107)				D		
150 (157)			D			
220 (127)		D				
330 (337)	D*					

Remark) Case size codes (D) in the above shown each size products line-up.

\* : Under development

●Marking

The indication 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
- ③ Nominal capacitance

[D Case] note 1) Visual typical example (1) capacitance code (2) voltage code

(1) 220μF

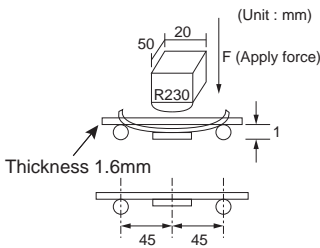
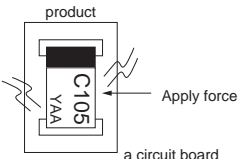
(2) 6.3V



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

## ●Characteristics

Item	Performance						Test conditions (based on JIS C5101-1 and JIS C5101-3)															
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 (V.DC)	4	6.3	10	16	20	25	at 85°C															
Category Voltage (V.DC)	2.5	4	6.3	10	13	16	at 125°C															
Surge Voltage	5.0	8	13	20	26	32	at 85°C															
DC leakage current	0.5μA 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 1 min															
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, tanδ)	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	TCFGD1E476 □ : Less than 150% of initial limit Others : Less than initial limit																				
	ΔC / C	Within ±12% of initial value																				
	tanδ	Less than 150% of initial limit																				
Fail-Safe open unit actuation	Within 330°C – 20s						Dip in the solder bath Solder temp : 330±5°C															
Temperature cycle	Appearance	There should be no significant abnormality.					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="868 1375 1195 1534"> <thead> <tr> <th>Step</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.	Step	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
	Step	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	TCFGD1E476 □ : Less than 150% of initial limit Others : Less than initial limit																					
ΔC / C	Within ±20% of initial value																					
tanδ	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, respectively, for 500±12h level it at room temperature for over 24h and then measure the sample.															
	L.C	TCFGD1E476 □ : Less than 150% of initial limit Others : Less than initial limit																				
	ΔC / C	Within ±20% of initial value																				
	tanδ	Less than 150% of initial limit																				

Item		Performance	Test conditions (based on JIS C5101-1 and JIS C5101-3)
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/-20%of initial value	
	tanδ	Shall be satisfied the voltage on "Standard list"	
	L.C	-	
	Temp.	+85°C	
	ΔC / C	Within +12/0%of initial value	
	tanδ	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	
	tanδ	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 4.26 JIS C 5101-1 As per 4.14 JIS C 5101-3 Apply the specified surge voltage via the serial resistance of 1kΩ every 5±0.5min. 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	TCFGD1E476□ : Less than 150% of initial limit Others : Less than initial limit	
	ΔC / C	Within ±10%of initial value	
	tanδ	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 2000+72/0h 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	TCFGD1E476□ : Less than 150% of initial limit Others : Less than 125% of initial limit	
	ΔC / C	Within ±10%of initial value	
	tanδ	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.	
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.  	

Item		Performance	Test conditions (based on JIS C5101-1 and JIS C5101-3)
Dimensions		Be based on "External dimensions"	Measure using a caliper of JIS B 7505 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. 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.	

●Table 1 standard list, TCFG series D Case

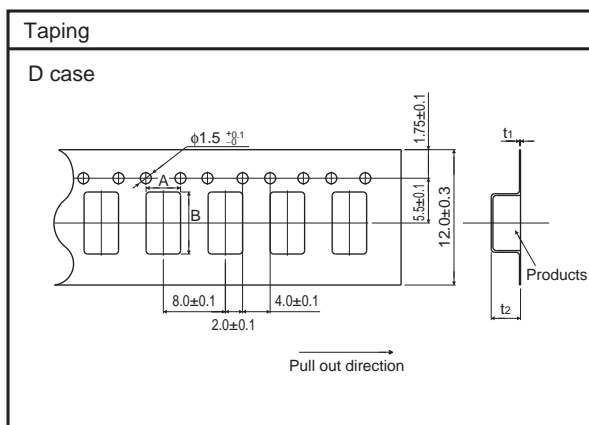
(D : 7343)

Part No.	Rated Voltage @85°C (V)	Derated Voltage @125°C (V)	Surge Voltage @85°C (V)	Capacitance 120Hz (μF)	Tolerance (%)	Leakage current 25°C 1WV.60s (mA)	DF120Hz (%)			Impedance 100kHz (Ω)	Case code
							-55°C	25°C 85°C	125°C		
TCFG D 0J 227 M8R	6.3	4	8	220	±20	13.8	30	12	16	0.70	D
TCFG D 1A 157 M8R	10	6.3	13	150	±20	15.0	14	10	12	0.70	D
TCFG D 1C 107 M8R	16	10	20	100	±20	16	14	10	12	0.70	D
TCFG D 1E 476 M8R	25	16	32	47	±20	11.8	14	10	12	0.70	D

●Packaging specifications

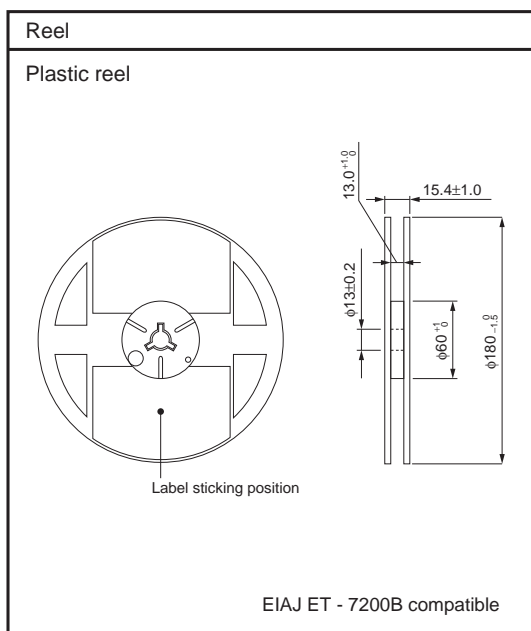
Taping

Case code	A±0.2	B±0.2	t <sub>1</sub> ±0.1	t <sub>2</sub> ±0.2
D (7343)	4.8	7.7	0.3	3.3



●Packaging style

Case size	Packaging	Packaging style		Symbol	Basic ordering unit
D Case	Taping	Plastic taping	φ180mm reel	R	500



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