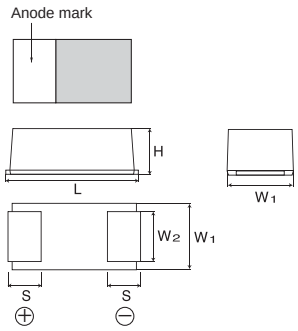
Chip tantalum capacitors

TCT Series AL Case

●Features (AL)

1) Vital for all hybrid integrated circuits board application.
2) Wide capacitance range.
3) Screening by thermal shock.

●Dimensions (Unit : mm)



(Unit : mm)

Dimensions	AL case
L	3.2±0.2
W1	1.6±0.2
W2	1.2±0.2
H	1.1±0.1
S	0.8±0.2

●Part No. Explanation

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

① Series name
TCT

② Case style
AL

③ Rated voltage

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

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

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● **Rated table**

(μF)	Rated voltage (V)							
	2.5 0E	4 0G	6.3 0J	10 1A	16 1C	20 1D	25 1E	35 1V
1.0 (105)								AL
1.5 (155)								AL
2.2 (225)								AL
3.3 (335)								AL
4.7 (475)							AL	
6.8 (685)							AL	
10 (106)						AL		
15 (156)					AL	*AL		
22 (226)					AL			
33 (336)				AL				
47 (476)				AL				
68 (686)			AL	*AL				
100 (107)		AL	AL	*AL				
150 (157)		AL	AL					
220 (227)	AL	AL						
330 (337)	AL							

Remark) Case size codes (AL) 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 AL 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
D	20
E	25
V	35

Capacitance Code	Nominal Capacitance (μF)
A	1.0
J	2.2
N	3.3
S	4.7
W	6.8
a	10
e	15
j	22
n	33
s	47
w	68
$\bar{a}$	100
$\bar{e}$	150
$\bar{j}$	220
$\bar{n}$	330

[AL case] note 1) $\frac{A}{(1)}$ $\frac{s}{(2)}$

manufacture code

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

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● **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 | 20 | 25 | 35	at 85°C
Category voltage (VDC)		1.6 | 2.5 | 4 | 6.3 | 10 | 13 | 16 | 22	at 125°C
Surge voltage (VDC)		3.2 | 5.0 | 8 | 13 | 20 | 26 | 32 | 44	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 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±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 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

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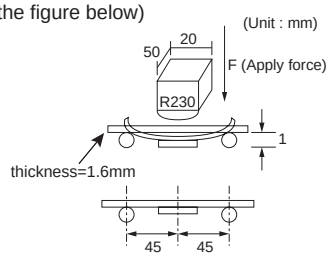
Item		Performance	Test conditions (based on JIS C 5101–1 and JIS C 5101– 3)
Temperature Stability	Temp.	–55°C	As per 4.29 JIS C 5101-1 As per 4.13 JIS C 5101-3
	ΔC / C	Within 0/–15% of initial value	
	Df (tan δ)	Shall be satisfied the voltage on " Standard list "	
	L.C.	–	
	Temp.	+85°C	
	ΔC / C	Within +15/0% of initial value	
	Df (tan δ)	Shall be satisfied the voltage on " Standard list "	
	L.C.	5μA or 0.1CV whichever is greater	
	Temp.	+125°C	
	ΔC / C	Within +20/0% of initial value	
	Df (tan δ)	Shall be satisfied the voltage on " Standard list "	
	L.C.	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 value	
	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 2000+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.
	L.C.	Less than 200% of initial limit	
	ΔC / C	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.	

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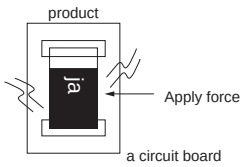
Item		Performance	Test conditions (JIS C 5101−1 and JIS C 5101− 3)
Adhesiveness		The terminal should not come off.	As per 4.34 JIS C 5101-1 As per 4.8 JIS C 5101-3 Apply force of 5N in the two directions shown in the figure below for 10±1s after mounting the terminal on a circuit board. 
Dimensions		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.	

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● **Standard products list, TCT series**

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.5min (μA)	Df 120Hz (%)			Impedance 100kHz
							–55°C	25°C 85°C	125°C	(Ω)
TCT AL 0E 227 □	2.5	1.6	3.3	220	±20	5.5	35	20	25	2.5
TCT AL 0E 337 □	2.5	1.6	3.3	330	±20	16.5	80	30	40	2.5
TCT AL 0G 107 □	4	2.5	5.2	100	±20	4	35	20	25	3
TCT AL 0G 157 □	4	2.5	5.2	150	±20	6	35	20	25	2.7
TCT AL 0G 227 □	4	2.5	5.2	220	±20	8.8	35	20	25	2.5
TCT AL 0J 686 □	6.3	4	8	68	±20	4.3	35	20	25	4
TCT AL 0J 107 □	6.3	4	8	100	±20	6.3	34	18	24	3
TCT AL 0J 157 □	6.3	4	8	150	±20	94.5	80	30	40	2.7
TCT AL 1A 336 □	10	6.3	13	33	±20	3.3	30	15	20	4
TCT AL 1A 476 □	10	6.3	13	47	±20	4.7	35	20	25	4
*TCT AL 1A 686 □	10	6.3	13	68	±20	6.8	35	20	25	4
*TCT AL 1A 107 □	10	6.3	13	100	±20	50	80	30	40	2.5
TCT AL 1C 156 □	16	10	20	15	±20	2.4	30	15	20	4
TCT AL 1C 226 □	16	10	20	22	±20	3.6	35	20	25	4
TCT AL 1D 106 □	20	13	26	10	±20	2	30	15	20	8
*TCT AL 1D 156 □	20	13	26	15	±20	3	30	15	20	4
TCT AL 1E 475 □	25	16	33	4.7	±20	1.2	30	15	20	8
TCT AL 1E 685 □	25	16	33	6.8	±20	1.7	30	15	20	8
TCT AL 1V 105 □	35	22	45	1	±20	0.5	30	15	20	8
TCT AL 1V 155 □	35	22	45	1.5	±20	0.5	30	15	20	8
TCT AL 1V 225 □	35	22	45	2.2	±20	0.8	30	15	20	8
TCT AL 1V 335 □	35	22	45	3.3	±20	1.2	30	15	20	8

□=Tolerance (M : ±20%)
* : Under development

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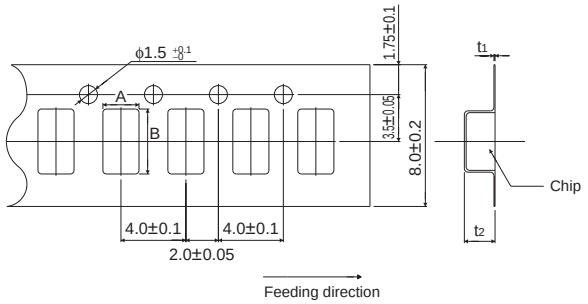
● **Packaging specifications**

Case code	A±0.1	B±0.1	t_1±0.05	t_2±0.1
AL	1.9	3.5	0.25	1.3

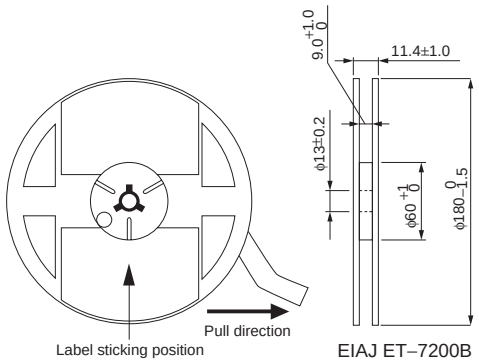
Taping [AL case]



● **Packaging style**

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

Reel [AL case]



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- Консультации по применению компонента;
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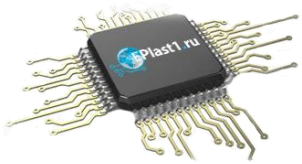

Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)
Факс: 8 (812) 320-02-42
Электронная почта: org@eplast1.ru
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.