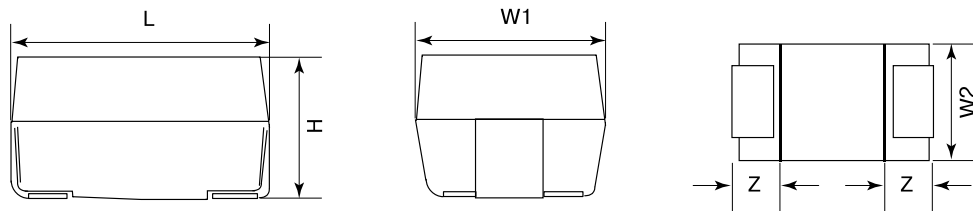


Chip Tantalum Capacitors

Appearance And Dimension

Code	EIA Code	Dimension (mm)				
		L	W1	W2	H	Z
P	2012	2012	2.0±0.2	1.25±0.2	0.9±0.1	1.2 MAX
A	3216	3.2±0.2	1.6±0.2	1.2±0.1	1.6±0.2	0.8±0.3
B	3528	3.5±0.2	2.8±0.2	2.2±0.1	1.9±0.2	0.8±0.3
C	6032	6.0±0.3	3.2±0.3	2.2±0.1	2.5±0.3	1.3±0.3
D	7343	7.3±0.3	4.3±0.3	2.4±0.1	2.8±0.3	1.3±0.3
E	7343H	7.3±0.3	4.3±0.3	2.4±0.1	4.1±0.3	1.3±0.3



Capacitance Code

Symbol	Capacitance	Pico Farad	Symbol	Capacitance	Pico Farad
105	1.0	10*10 ⁵	685	6.8	68*10 ⁵
106	10.0	10*10 ⁶	476	47	47*10 ⁶
107	100.0	10*10 ⁷	477	470	47*10 ⁷

Capacitance tolerance Code

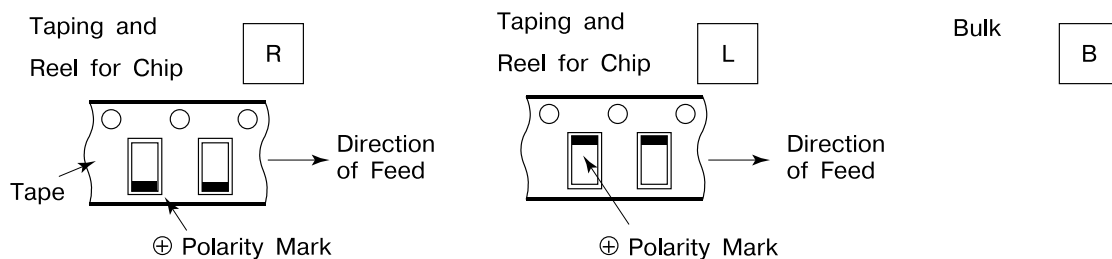
Symbol	Tolerance (%)
K	±10
M	±20

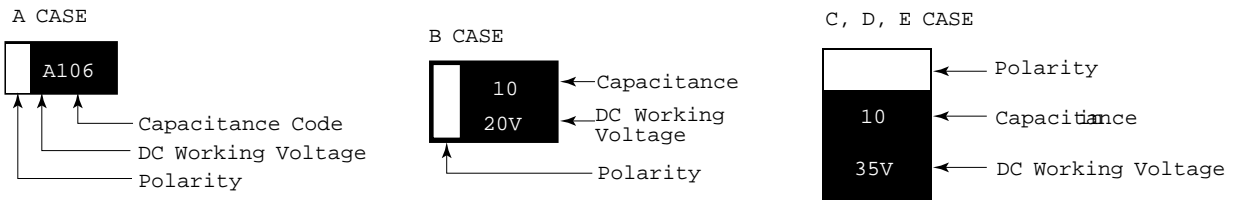
Case size Code

Case	P	A	B	C	D	E
EIA Code	2012	3216	3528	6032	7343	7343H

Packing Code (A = 7 inches, C = 13 inches)

Packing polarity Code

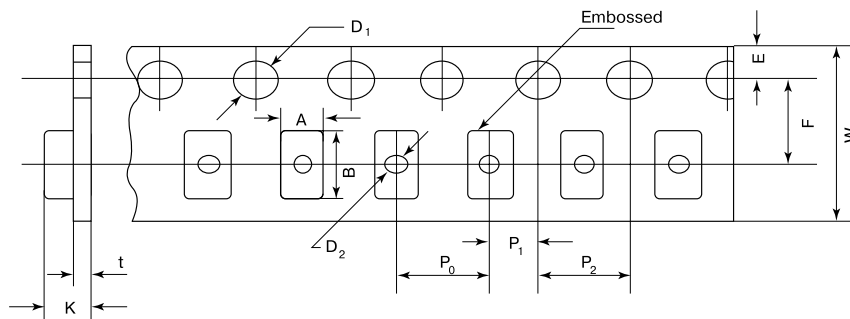
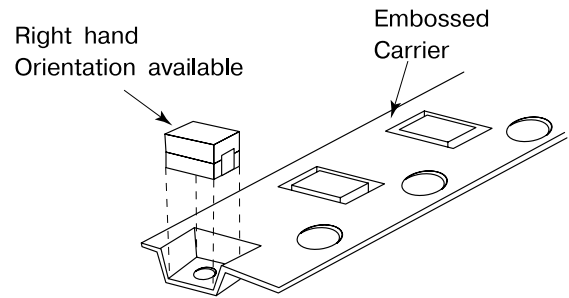




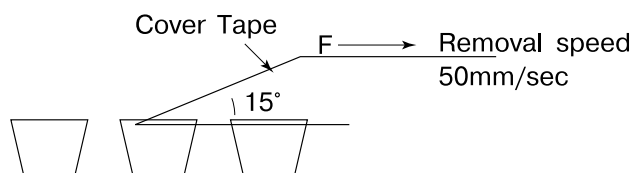
Embossed Plastic Type

The tantalum chip capacitors shall be packaged in tape and reel form for effective use.

- Tape: Semitransparent embossed plastic
- Cover tape: Attached with press, polyester
- The tension of removing the cover tape, $F = 10 - 70g$



Case Code	W 0.3 (±0.12)	F 0.1 (±0.004)	E 0.1 (±0.004)	P ₀ 0.1 (±0.004)	P ₁ 0.1 (±0.004)	P ₂ 0.1 (±0.004)	D ₁ +0.1 (±0.004)	D ₂ Min	t	A 0.2 (±0.008)	B 0.2 (±0.008)	K 0.2 (±0.008)
P				4 (0.157)				1.0 (0.039)	0.2 (0.008)	1.0 (0.055)	2.3 (0.091)	1.4 (0.055)
A	8 (0.315)	3.5 (0.138)								1.9 (0.075)	3.5 (0.138)	1.9 (0.075)
B			1.75 (0.069)		2 (0.079)	4 (0.157)	1.5 (0.059)		0.3 (0.012)	3.3 (0.130)	3.8 (0.150)	2.1 (0.083)
C					8 (0.315)					3.7 (0.146)	6.4 (0.252)	3.0 (0.118)
D	12 (0.472)	5.5 (0.217)						1.5 (0.059)		4.8 (0.189)	7.7 (0.303)	3.3 (0.130)
E												4.2 (0.167)

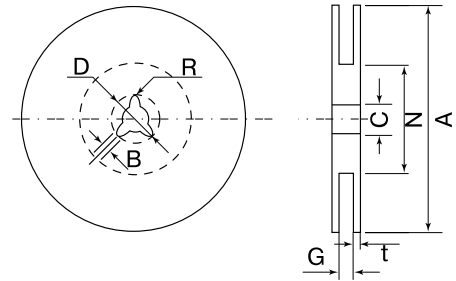


Standard value and case size

Cap. (*)		W.V	4V (0G)	6.3V (0J)	10V (1A)	16V (1C)	20V (1D)	25V (1E)	35V (1V)
0.15	154								
0.22	224						P		
0.33	334								
0.47	474						P		A
0.68	684							A	A
1.0	105	P	P	P	P	P,A	A	A	A
1.5	155					A	A	A	A,B
2.2	225	P	P	P,A	A	A	A,B	B	B
3.3	335		A	A	A	A,B	B	B	B
4.7	475	P,A	P,A	P,A	A,B	A,B	B	B,C	B,C
6.8	685	A	A	A,B	A,B	B	B,C	C	C
10	106	P,A	P,A,B	P,A,B	A,B	B,C	C	C,D	C,D
15	156	A,B	A,B	A,B	B,C	B,C	C,D	C,D,E	C,D,E
22	226	P,A,B	A,B	A,B,C	A,B,C	B,C,D	C,D,E	D,E	D,E
33	336	A,B	A,B,C	B,C	C,D	C,D	D,E	D,E	D,E
47	476	A,B,C	A,B,C	B,C,D	C,D	D,E	D,E		
68	686	B,C	B,C,D	C,D	C,D	D,E			
100	107	B,C,D	B,C,D	C,D,E	D,E				
150	157	C,D	C,D	D,E	D,E				
220	227	C,D	C,D,E	D,E	E				
330	330	C,D,E	C,D,E	D,E					
470	477	D,E	D,E	E					
680	687	E	D,E						
1000	108	E							

Reel Dimension

Case Size reference	180 mm (7") reel	330 mm (13") reel
P	3,000 pcs	-
A, B	2,000 pcs	8,000 pcs
C, D	500 pcs	2,500 pcs
E	400 pcs	2,000 pcs



Tape Width	A 2 (±0.079)	N Min.	C 0.5 (±0.020)	D 0.5 (±0.020)	B 051 (±0.020)		t+0.5 (±0.020)	R
8 mm	178 (7)	50 (1.969)	13 (0.512)	21 (0.827)	2 (0.079)	10 (0.394)	2 (0.079)	0.99 (0.039)
12 mm						14 (0.551)		
8 mm	330 (13)	80 (3.150)	13 (0.512)	21 (0.827)	2 (0.079)	10 (0.394)	2 (0.079)	0.99 (0.039)
12 mm						14 (0.551)		

Ripple

The maximum permissible ripple voltage and current are related to the ratings case size. Please consult us detail informations.

Ripple Current

The maximum permissible ripple current, I_{MAX}, is calculated as follows:

$$I_{MAX} = \sqrt{\frac{P_{MAX}}{ESR(f)}}$$

where:

I_{MAX} : Maximum permissible capacitor ripple current (Arms).

P_{MAX}: Maximum permissible capacitor power loss (W).

Varies with the ambient temperature and case size.

Calculate according to Table 1.

ESR(f): Capacitor equivalent series resistance.

Since the ESR(f) value varies with the ripple frequency, however, the following correction must be made in accordance with the operating frequency (see Fig. 4)

$$ESR(f) = K \cdot ESR(120)$$

K: Coefficient for the operating frequency (Fig. 4)

$$ESR(120) = \tan \delta \cdot X_C = \frac{\tan \delta}{2 \cdot f \cdot C}$$

where:

ESR(120): Equivalent series resistance at 120 Hz

X_c: Capacitive reactance at 120 Hz

C: Electrostatic capacitance at 120 Hz

f: Operating frequency (Hz)

Table. 1. Maximum permissible power loss values (P_{MAX}) by case size

Ambient temperature	P _{MAX} (W)				
	P	A	B	C	D
25	0.015	0.030	0.030	0.030	0.050
55	0.010	0.019	0.019	0.019	0.032
85	0.005	0.010	0.010	0.010	0.018