

Chip Tantalum Capacitors

A-05-21-07

B

RGA manufactures chip tantalum capacitors to meet and exceed EIA standards.

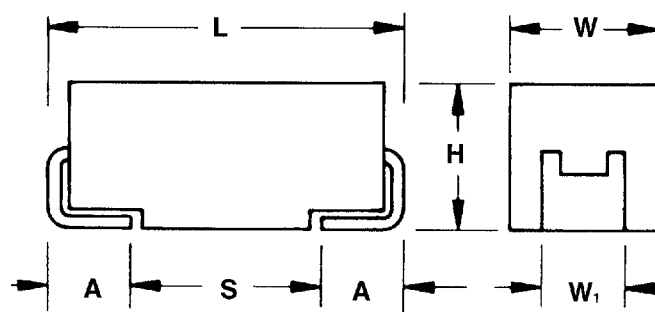
Standard tolerances are $\pm 10\%$ and $\pm 20\%$. (5% available upon request)

Operational temperature -55°C to $+85^{\circ}\text{C}$ at rated voltage and up to $+125^{\circ}\text{C}$ with voltage derating.

For Sizes: A, B, C, D - EIA standard EIA-535BAAC

E - Extended range (high profile D case)

M, N - EIA-J standard

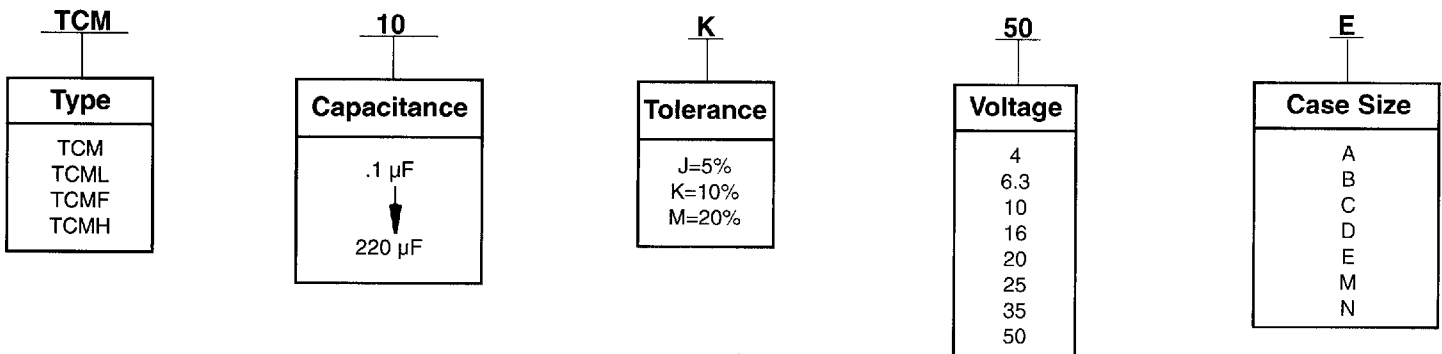


Case Dimensions inches (millimeters)

Code	L $\pm 0.008(0.2)$	W $+0.008(0.2)$ $-0.004(0.1)$	H $+0.008(0.2)$ $-0.004(0.1)$	W' $\pm 0.008(0.2)$	A $+0.012(0.3)$ $-0.008(0.2)$	S Min.
A	0.126(3.2)	0.063(1.6)	0.063(1.6)	0.047(1.2)	0.031(0.8)	0.043(1.1)
B	0.138(3.5)	0.110(2.8)	0.075(1.9)	0.087(2.2)	0.031(0.8)	0.055(1.4)
C	0.236(6.0)	0.126(3.2)	0.102(2.6)	0.087(2.2)	0.051(1.3)	0.114(2.9)
D	0.287(7.3)	0.169(4.3)	0.114(2.9)	0.094(2.4)	0.051(1.3)	0.173(4.4)
E	0.287(7.3)	0.169(4.3)	0.162(4.1)	0.094(2.4)	0.051(1.3)	0.173(4.4)
M	0.185(4.7)	0.102(2.6)	0.083(2.1)	0.055(1.4)	0.031(0.8)	0.106(2.7)
N	0.228(5.8)	0.181(4.6)	0.126(3.2)	0.094(2.4)	0.051(1.3)	0.110(2.8)

W₁ dimension applies to the termination width for "A" dimensional area only.

Part Numbering System



Chip Tantalum Capacitors



Ratings and Part Number Reference

Case Size	Capacitance μF	DCL (μA) Max.	DF % Max.	ESR max. (Ω) @100 KHz
4 volt @ 85°C (2.5 volt @ 125°C)				
A	3.3	0.5	6	20.0
A	4.7	0.5	6	8.0
M	6.8	0.5	6	6.0
B	10	0.5	6	4.5
M	10	0.5	6	4.5
B	15	0.6	6	3.5
M	15	0.6	6	3.5
C	22	0.9	6	3.0
M	22	0.9	6	3.0
C	33	1.4	6	2.5
C	47	1.9	6	2.2
D	47	1.9	6	2.0
N	47	1.9	6	2.0
D	68	2.7	6	1.8
N	68	2.7	6	1.8
D	100	4.0	6	1.5
N	100	4.0	6	1.5
D	150	6.0	6	1.5
E	220	8.8	8	1.0
6.3 volt @ 85°C (4 volt @ 125°C)				
A	2.2	0.5	6	15.0
A	3.3	0.5	6	7.0
M	4.7	0.5	6	5.5
B	6.8	0.5	6	4.5
M	6.8	0.5	6	4.5
B	10	0.6	6	3.5
M	10	0.6	6	3.5
C	15	1.0	6	3.0
C	22	1.4	6	2.5
D	22	1.4	6	2.5
D	33	2.1	6	2.2
N	33	2.1	6	2.0
D	47	3.0	6	1.8
N	47	3.0	6	1.8
D	68	4.3	6	1.5
N	68	4.3	6	1.5
D	100	6.3	6	1.5
E	150	9.5	8	1.0
E	220	14.0	8	1.0
10 volt @ 85°C (6.3 volt @ 125°C)				
A	1.5	0.5	6	15.0
A	2.2	0.5	6	7.0
M	3.3	0.5	6	5.5
B	4.7	0.5	6	4.5
M	4.7	0.5	6	4.5
B	6.8	0.7	6	3.5
M	6.8	0.7	6	3.5
C	10	1.0	6	3.0
C	15	1.5	6	2.5

Case Size	Capacitance μF	DCL (μA) Max.	DF % Max.	ESR max. (Ω) @100 KHz
10 volt @ 85°C (6.3 volt @ 125°C) (cont'd.)				
D	15	1.5	6	2.5
C	22	2.2	6	2.2
N	22	2.2	6	2.0
D	33	3.3	6	1.8
N	33	3.3	6	1.8
D	47	4.7	6	1.5
N	47	4.7	6	1.5
D	68	6.8	6	1.5
E	100	10	8	1.0
16 volt @ 85°C (10 volt @ 125°C)				
A	1.0	0.5	4	15.0
A	1.5	0.5	6	8.0
B	2.2	0.5	6	6.5
M	2.2	0.5	6	6.5
B	3.3	0.5	6	5.0
M	3.3	0.5	6	5.0
B	4.7	0.5	6	4.5
C	4.7	0.5	6	3.5
M	4.7	0.5	6	3.5
C	6.8	1.1	6	3.0
C	10	1.6	6	2.5
D	10	1.6	6	2.5
C	15	2.4	6	2.2
N	15	2.4	6	2.0
D	22	3.5	6	1.8
N	22	3.5	6	1.8
D	33	5.3	6	1.5
N	33	5.3	6	1.5
D	47	7.5	6	1.5
E	68	11	6	1.0
20 volt @ 85°C (13 volt @ 125°C)				
A	0.68	0.5	4	15.0
A	1.0	0.5	4	9.0
B	2.2	0.5	6	6.0
M	2.2	0.5	6	6.0
B	3.3	0.7	6	4.5
B	4.7	1.0	6	4.5
C	4.7	1.0	6	3.0
C	6.8	1.4	6	2.5
D	6.8	1.4	6	2.5
C	10	2.0	6	2.2
N	10	2.0	6	2.0
D	15	3.0	6	1.8
N	15	3.0	6	1.8
D	22	4.4	6	1.5
N	22	4.4	6	1.5
D	33	6.6	6	1.5
E	47	9.4	6	1.0

B



Chip Tantalum Capacitors

Ratings and Part Number Reference (cont'd.)

B

Case Size	Capacitance μF	DCL (μA) Max.	DF % Max.	ESR max. (Ω) @100 KHz
25 volt @ 85°C (16 volt @ 125°C)				
A	0.47	0.5	4	18.0
A	0.68	0.5	4	10.0
M	1.0	0.5	4	8.0
B	1.5	0.5	6	7.0
M	1.5	0.5	6	7.0
B	2.2	0.6	6	5.0
C	3.3	0.9	6	4.0
C	4.7	1.2	6	3.0
D	4.7	1.2	6	3.0
C	6.8	1.7	6	3.0
D	6.8	1.7	6	2.5
N	6.8	1.7	6	2.5
C	10	2.5	6	2.2
D	10	2.5	6	2.0
N	10	2.5	6	2.0
D	15	3.8	6	1.5
N	15	3.8	6	1.5
D	22	5.5	6	1.5
E	33	8.3	6	1.0
35 volt @ 85°C (23 volt @ 125°C)				
A	0.1	0.5	4	24.0
A	0.15	0.5	4	21.0
A	0.22	0.5	4	19.0
A	0.33	0.5	4	18.0
A	0.47	0.5	4	16.0
B	0.47	0.5	4	11.0
M	0.47	0.5	4	11.0
B	0.68	0.5	4	8.0
M	0.68	0.5	4	8.0
B	1.0	0.5	4	7.0
M	1.0	0.5	4	7.0
B	1.5	0.5	4	7.0

Case Size	Capacitance μF	DCL (μA) Max.	DF % Max.	ESR max. (Ω) @100 KHz
35 volt @ 85°C (23 volt @ 125°C) (cont'd.)				
C	1.5	0.5	6	6.0
C	2.2	0.8	6	4.0
C	3.3	1.2	6	3.0
D	3.3	1.2	6	3.0
C	4.7	1.6	6	3.0
D	4.7	1.6	6	2.5
N	4.7	1.6	6	2.5
D	6.8	2.4	6	2.0
N	6.8	2.4	6	2.0
D	10	3.5	6	1.5
N	10	3.5	6	1.5
D	15	5.3	6	1.5
E	22	7.7	6	1.0
50 volt @ 85°C (33 volt @ 125°C)				
A	0.1	0.5	4	22.0
A	0.15	0.5	4	21.0
B	0.15	0.5	4	19.0
A	0.22	0.5	4	18.0
B	0.22	0.5	4	16.0
B	0.33	0.5	4	13.0
C	0.47	0.5	4	9.0
C	0.68	0.5	4	7.0
C	1.0	0.5	4	6.0
D	1.5	0.8	6	5.0
D	2.2	1.1	6	3.5
D	3.3	1.7	6	2.0
N	3.3	1.7	6	2.0
D	4.7	2.4	6	1.5
E	6.8	3.4	6	1.0
E	10	5.0	6	1.0

Note: Voltage ratings are minimum values. We reserve the right to supply higher voltage ratings in the same case size.



Chip Tantalum Capacitors

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Technical Data:		All technical data relate to an ambient temperature of +25°C							
Capacitance Range:		0.1µF to 220µF							
Capacitance Tolerance:		±20%; ±10% (+5% special order)							
Rated Voltage DC (V _R)	≤+85°C:	4	6.3	10	16	20	25	35	50
Category Voltage (V _C)	≤+125°C:	2.5	4	6.3	10	13	16	23	33
Surge Voltage (V _S)	≤+85°C:	5.2	8	13	20	26	33	46	65
	≤+125°C:	3.5	5	9	12	16	21	28	40
Temperature Range:		-55°C to +125°C							
Environmental Classification:		55/125/56 (IEC 68-2)							
Dissipation Factor:		≤0.04 for C _R ≤1.0µF							
		≤0.06 for C _R >1.0µF							
		≤0.08 for E case with C _R ≥100µF							

Standard Range (EIA and EIA-J sizes)

Capacitance Range (letter denotes case code)								
Capacitance Rated voltage DC (V _R)								
µF	4V	6.3V	10V	16V	20V	25V	35V	50V
0.1							A	A
0.15							A	B
0.22							A	B
0.33							A	B
0.47							A	B
0.68							A	B
1.0							A	B
1.5							A	B
2.2							A	B
3.3							A	B
4.7							A	B
6.8							A	B
10							A	B
15							A	B
22							A	B
33							A	B
47							A	B
68							A	B
100							A	B

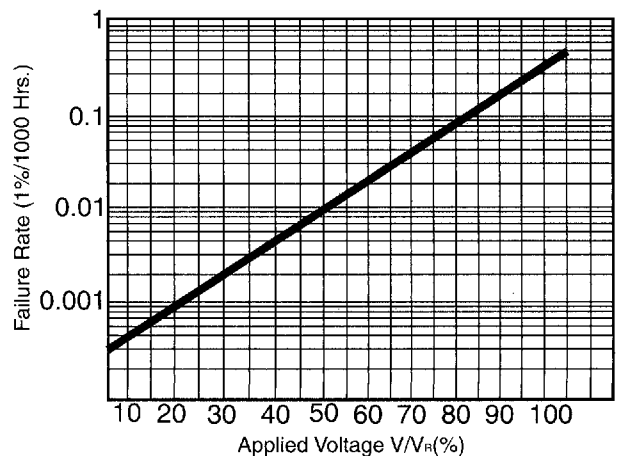
Effect of applied voltage on basic failure rate for a typical component (60% con. level)

Operating Voltage/Voltage Derating

For applications where less than 0.1 ohm per volt series resistance is employed, a 70% derating factor is recommended. The graph at right shows the relationship between voltage derating (the ratio between applied and rated voltage) and failure rate. The graph gives the correction factor F(V) for any operating voltage.

Consult factory for further information under these conditions. Consult factory for complete specifications for the following:

- TCML - Low Profile
- TCMF - Fusible
- TCMH - High Reliability



Chip Tantalum Capacitors

Tape and reel packaging for automatic component placement.

Loose products supplied on request.

B

Case size reference	Tape width mm	P mm	7"(178mm) reel	13"(330mm) reel
			Qty.	Qty.
A	8	4	2000	9000
B	8	4	2000	8000
C	12	8	500	3000
D	12	8	500	2500
E	12	8	400	1500
M	12	4	1500	5000
N	12	8	500	2500

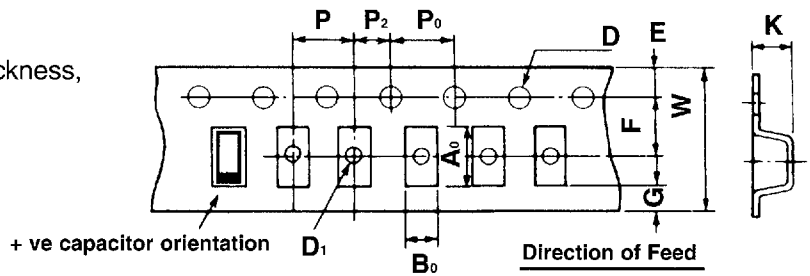
Tape Specification

Tape dimensions comply to EIA RS 481 A

Dimensions A_0 and B_0 of the pocket and the tape thickness, K, are dependent on the component size.

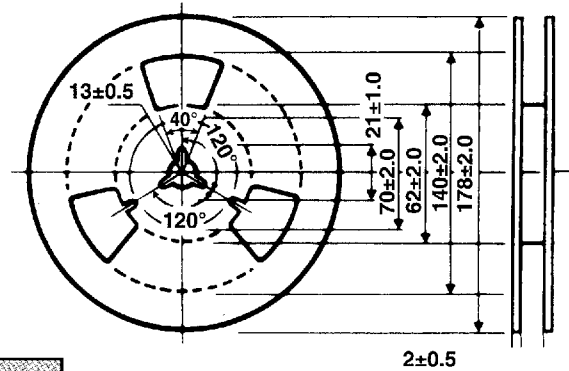
Tape materials do not affect component solderability during storage.

Carrier Tape Thickness $<0.4\text{mm}$



Total Tape Thickness—K max	
Case size reference	Dims.
A	0.090(2.3)
B	0.102(2.6)
C	0.130(3.3)
D	0.142(3.6)
E	0.189(4.8)
M	0.110(2.8)
N	0.157(4.0)

Plastic Tape Reel Dimensions



Code	8mm Tape		12mm Tape	
P*	0.157±0.004 or 0.315±0.004	(4±0.1) (8±0.1)	0.157±0.004 (4±0.1) or	
G	0.03 min.	1.75 min.	0.315±0.004	
F	0.138±0.002	3.5±0.05	(8±0.1)	
E	0.069±0.004	1.75±0.1	0.03 min.	1.75 min.
W	0.315±0.012	8±0.3	0.22±0.002	5.5±0.05
P ₂	0.079±0.002	2±0.05	0.069±0.004	1.75±0.1
P ₀	0.157±0.004	4±0.1	0.315±0.012	12±0.3
D	0.059±0.004 -0	1.5±0.1 -0	0.079±0.002	2±0.05
D ₁	0.039 min.	1.0 min.	4±0.1	

Standard Dimensions mm

A: 9.5mm (8mm tape)
13.0mm (12mm tape)

Cover Tape Dimensions

Thickness: $75\pm 25\mu$
Width of tape:
5.5mm+0.2mm (8mm tape)
9.5mm+0.2mm (12mm tape)

*See taping suffix tables for actual P dimension (component pitch).