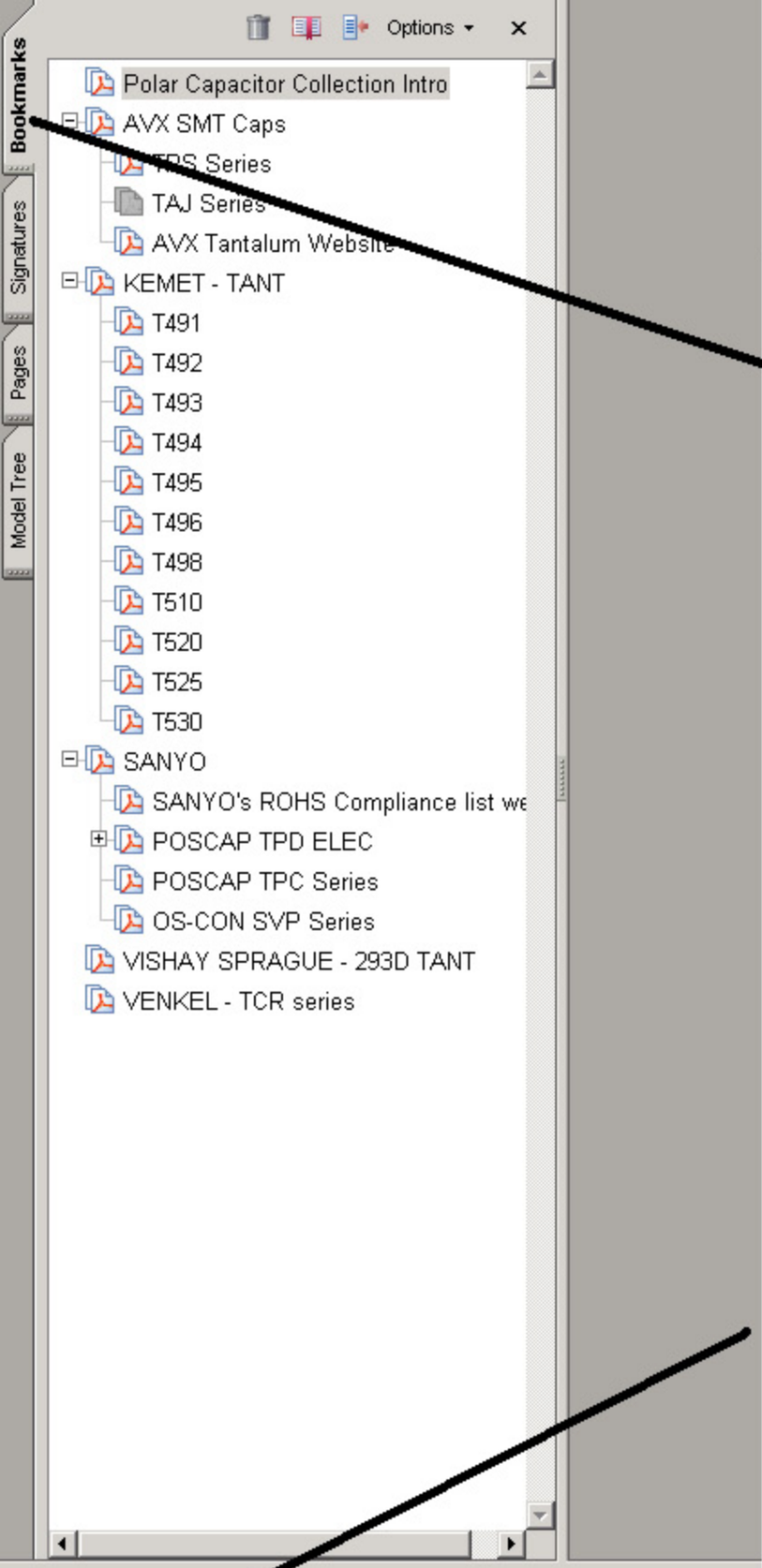
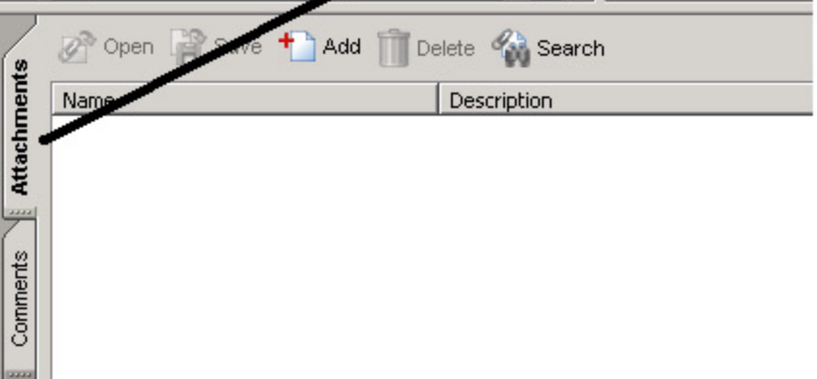


Polar Capacitor Collection

A collection of commonly used capacitors that have polarity.

To navigate, use the Bookmarks Tab to the right



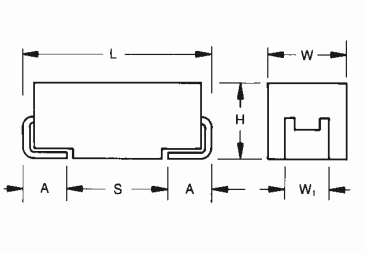
Files that are write-protected by the manufacturer have been added as attachments. To view these files open the Attachments window by clicking on the lower right tab.

TAJ Series

Standard Tantalum

The TAJ standard series encompasses the five key sizes recognized by major OEMs throughout the world. The V case size has been added to the TAJ range to allow high CVs to be offered. The operational temperature is -55°C to +85°C rated voltage and up to +125°C with voltage derating in applications utilizing recommended series resistance.

CASE DIMENSIONS: millimeters (inches)



For part marking see page 157

Code	EIA Code	L±0.20 (0.008)	W+0.20 (0.008) -0.10 (0.004)	H+0.20 (0.008) -0.10 (0.004)	W_1±0.20 (0.008)	A+0.30 (0.012) -0.20 (0.008)	S Min.
A	3216-18	3.20 (0.126)	1.60 (0.063)	1.60 (0.063)	1.20 (0.047)	0.80 (0.031)	1.80 (0.071)
B	3528-21	3.50 (0.138)	2.80 (0.110)	1.90 (0.075)	2.20 (0.087)	0.80 (0.031)	1.40 (0.055)
C	6032-28	6.00 (0.236)	3.20 (0.126)	2.60 (0.102)	2.20 (0.087)	1.30 (0.051)	2.90 (0.114)
D	7343-31	7.30 (0.287)	4.30 (0.169)	2.90 (0.114)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)
E	7343-43	7.30 (0.287)	4.30 (0.169)	4.10 (0.162)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)
V	7361-38	7.30 (0.287)	6.10 (0.240)	3.45±0.30 (0.136±0.012)	3.10 (0.120)	1.40 (0.055)	4.40 (0.173)

W_1 dimension applies to the termination width for A dimensional area only.

HOW TO ORDER

TAJ	C	106	M	035	R	**
Type	**Case Size** See table above	**Capacitance Code** pF code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow)	**Tolerance** K=±10% M=±20%	**Rated DC Voltage** 002=2.5Vdc 004=4Vdc 006=6.3Vdc 010=10Vdc 016=16Vdc 020=20Vdc 025=25Vdc 035=35Vdc 050=50Vdc	**Packaging** R = 7" T/R (Lead Free since production date 1/1/04) S = 13" T/R (Lead Free since production date 1/1/04) A = Gold Plating 7" Reel B = Gold Plating 13" Reel	**Additional characters may be added for special requirements**

TECHNICAL SPECIFICATIONS

Technical Data:	All technical data relate to an ambient temperature of +25°C									
Capacitance Range:	0.1 µF to 2200 µF									
Capacitance Tolerance:	±10%; ±20%									
Rated Voltage (V_R)	≦ +85°C:	2.5	4	6.3	10	16	20	25	35	50
Category Voltage (V_C)	≦ +125°C:	1.7	2.7	4	7	10	13	17	23	33
Surge Voltage (V_S)	≦ +85°C:	3.3	5.2	8	13	20	26	32	46	65
Surge Voltage (V_S)	≦ +125°C:	2.2	3.4	5	8	13	16	20	28	40
Temperature Range:	-55°C to +125°C									
Reliability:	1% per 1000 hours at 85°C, V_R with 0.1Ω/V_R series impedance, 60% confidence level									
Qualification:	CECC 30801 - 005 issue 2 EIA 535BAAC									
	Meets requirements of AEC-Q200									

CAPACITANCE AND RATED VOLTAGE, V_R (VOLTAGE CODE) RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Rated voltage DC (V_R) to 85°C								
µF	Code	2.5V (e)	4V (G)	6.3V (J)	10V (A)	16V (C)	20V (D)	25V (E)	35V (V)	50V (T)
0.10	104								A	A
0.15	154								A	A/B
0.22	224								A	A/B
0.33	334								A	B
0.47	474							A	A/B	B/C
0.68	684						A	A	A/B	B/C
1.0	105					A	A	A	A/B	B/C
1.5	155				A	A	A	A/B	A/B/C	C/D
2.2	225			A	A	A/B	A/B	A/B	A/B/C	C/D
3.3	335			A	A	A/B	A/B	A/B/C	B/C	C/D
4.7	475		A	A	A/B	A/B	A/B/C	B/C	B/C/D	D
6.8	685		A	A/B	A/B	A/B/C	A/B/C	B/C	C/D	D
10	106		A	A/B	A/B/C	A/B/C	B/C	C/D	C/D/E	D/E
15	156		A/B	A/B	A/B/C	A(M)/B/C	B/C/D	C/D	C/D	E
22	226		A	A/B/C	A/B/C	B/C/D	B/C/D	C/D	D/E	V
33	336		A/B	A/B/C	A/B/C/D	B/C/D	C/D	D/E	D/E/V	
47	476	A	A/B	A/B/C/D	B/C/D	C/D	C/D/E	D/E	E/V	
68	686	A	B/C	B/C/D	B/C/D	C/D	D/E	E/V	V(M)	
100	107	B	B/C	B/C/D	B(M)/C/D/E	D/E	D/E/V	V		
150	157	B	B/C	C/D	C/D/E	D/E/V	E/V			
220	227	B/D	B(M)/C/D	C/D/E	D/E	D/E/V				
330	337	D	C/D/E	C/D/E	D/E/V	E/V				
470	477	C/D	D/E	D/E/V	E/V					
680	687	D/E	D/E	E/V	V					
1000	108	D(M)/E	D/E/V	V(M)						
1500	158	D/E/V	E/V(M)							
2200	228	V								

Non preferred Ratings - not recommended for new designs, higher voltage or smaller case size substitution are offered.

Developmental Ratings - subject to change.

Released codes (M tolerance only)

Note: Voltage ratings are minimum values. AVX reserves the right to supply higher ratings in the same case size, to the same reliability standards.

TAJ Series

Standard Tantalum

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	DCL (µA) Max.	DF % Max.	ESR Max. (Ω) @100kHz
TAJA476*002#	A	47	2.5	0.9	6	3
TAJA686*002#	A	68	2.5	1.4	8	1.5
TAJB107*002#	B	100	2.5	2.5	8	1.4
TAJB157*002#	B	150	2.5	3	10	1.6
TAJB227*002#	B	220	2.5	4.4	16	1.6
TAJD227*002#	D	220	2.5	5.5	8	0.3
TAJD337*002#	D	330	2.5	8.2	8	0.3
TAJC477*002#	C	470	2.5	9.4	12	0.2
TAJD477*002#	D	470	2.5	11.6	8	0.2
TAJD687*002#	D	680	2.5	17	16	0.2
TAJE687*002#	E	680	2.5	17	10	0.2
TAJD108M002#	D	1000	2.5	25	20	0.2
TAJE108*002#	E	1000	2.5	20	14	0.4
TAJD158*002#	D	1500	2.5	37.5	60	0.2
TAJE158*002#	E	1500	2.5	37	20	0.2
TAJV158*002#	V	1500	2.5	30	20	0.2
TAJV228*002#	V	2200	2.5	55	50	0.2
TAJA336*004#	A	33	4	1.3	6	3
TAJA476*004#	A	47	4	1.9	8	2.6
TAJB686*004#	B	68	4	2.7	6	1.8
TAJB107*004#	B	100	4	4	8	0.9
TAJB157*004#	B	150	4	6	8	1.5
TAJC157*004#	C	150	4	6	6	0.3
TAJB227M004#	B	220	4	8.8	12	1.1
TAJC227*004#	C	220	4	8.8	8	1.2
TAJD227*004#	D	220	4	8.8	8	0.9
TAJC337*004#	C	330	4	13.2	8	0.9
TAJD337*004#	D	330	4	13.2	8	0.9
TAJD477*004#	D	470	4	18.8	12	0.9
TAJE477*004#	E	470	4	18.8	10	0.5
TAJD687*004#	D	680	4	27.2	14	0.5
TAJE687*004#	E	680	4	27.2	14	0.9
TAJD108*004#	D	1000	4	40	60	0.2
TAJE108*004#	E	1000	4	40	14	0.4
TAJV108*004#	V	1000	4	40	16	0.4
TAJE158*004#	E	1500	4	60	30	0.2
TAJV158M004#	V	1500	4	60	30	0.2
TAJA106*006#	A	10	6.3	0.6	6	4
TAJA156*006#	A	15	6.3	0.9	6	3.5
TAJA226*006#	A	22	6.3	1.4	6	3
TAJA336*006#	A	33	6.3	2.1	8	2.5
TAJA476*006#	A	47	6.3	2.8	10	1.6
TAJB476*006#	B	47	6.3	3	6	2
TAJC476*006#	C	47	6.3	3	6	1.6
TAJB686*006#	B	68	6.3	4	8	0.9
TAJC686*006#	C	68	6.3	4.3	6	1.5
TAJB107*006#	B	100	6.3	6.3	10	1.7
TAJC107*006#	C	100	6.3	6.3	6	0.9
TAJC157*006#	C	150	6.3	9.5	6	1.3
TAJD157*006#	D	150	6.3	9.5	6	0.9
TAJC227*006#	C	220	6.3	13.9	8	1.2
TAJD227*006#	D	220	6.3	13.9	8	0.9
TAJE227*006#	E	220	6.3	13.9	8	0.9
TAJD337*006#	D	330	6.3	20.8	8	0.4
TAJE337*006#	E	330	6.3	20.8	8	0.4
TAJD477*006#	D	470	6.3	28	12	0.4
TAJE477*006#	E	470	6.3	28	10	0.4

AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	DCL (µA) Max.	DF % Max.	ESR Max. (Ω) @100kHz
TAJV477*006#	V	470	6.3	28	10	0.4
TAJE687*006#	E	680	6.3	42.8	10	0.5
TAJV687*006#	V	680	6.3	42.8	10	0.5
TAJV108M006#	V	1000	6.3	63	16	0.4
TAJA475*010#	A	4.7	10	0.5	6	5
TAJA685*010#	A	6.8	10	0.7	6	4
TAJA106*010#	A	10	10	1	6	3
TAJA156*010#	A	15	10	1.5	6	3.2
TAJB156*010#	B	15	10	1.5	6	2.8
TAJA226*010#	A	22	10	2.2	8	3
TAJB226*010#	B	22	10	2.2	6	2.4
TAJA336*010#	A	33	10	3.3	8	1.7
TAJB336*010#	B	33	10	3.3	6	1.8
TAJC336*010#	C	33	10	3.3	6	1.6
TAJB476*010#	B	47	10	4.7	8	1
TAJC476*010#	C	47	10	4.7	6	1.2
TAJB686*010#	B	68	10	6.8	6	1.4
TAJC686*010#	C	68	10	6.8	6	1.3
TAJB107M010#	B	100	10	10	8	1.4
TAJC107*010#	C	100	10	10	8	1.2
TAJD107*010#	D	100	10	10	6	0.9
TAJC157*010#	C	150	10	15	8	0.9
TAJD157*010#	D	150	10	15	6	0.9
TAJE157*010#	E	150	10	15	8	0.9
TAJD227*010#	D	220	10	22	8	0.5
TAJE227*010#	E	220	10	22	8	0.5
TAJD337*010#	D	330	10	33	8	0.9
TAJE337*010#	E	330	10	33	8	0.9
TAJV337*010#	V	330	10	33	10	0.9
TAJE477*010#	E	470	10	47	10	0.5
TAJV477*010#	V	470	10	47	10	0.5
TAJA225*016#	A	2.2	16	0.5	6	6.5
TAJA335*016#	A	3.3	16	0.5	6	5
TAJB335*016#	B	3.3	16	0.5	6	4.5
TAJA475*016#	A	4.7	16	0.8	6	4
TAJB475*016#	B	4.7	16	0.8	6	3.5
TAJA685*016#	A	6.8	16	1.1	6	3.5
TAJB685*016#	B	6.8	16	1.1	6	2.5
TAJA106*016#	A	10	16	1.6	8	3
TAJB106*016#	B	10	16	1.6	6	2.8
TAJC106*016#	C	10	16	1.6	6	2
TAJA156M016#	A	15	16	2.4	6	2
TAJB156*016#	B	15	16	2.4	6	2.5
TAJC156*016#	C	15	16	2.4	6	1.8
TAJB226*016#	B	22	16	3.5	6	2.3
TAJC226*016#	C	22	16	3.5	6	1.6
TAJD226*016#	D	22	16	3.5	6	1.1
TAJB336*016#	B	33	16	5.3	8	2.1
TAJC336*016#	C	33	16	5.3	6	1.5
TAJD336*016#	D	33	16	5.3	6	0.9
TAJC476*016#	C	47	16	7.5	6	1.4
TAJD476*016#	D	47	16	7.5	6	0.9
TAJC686*016#	C	68	16	10.9	6	1.3
TAJD686*016#	D	68	16	10.9	6	0.9
TAJD107*016#	D	100	16	16	6	0.9
TAJE107*016#	E	100	16	16	6	0.9
TAJD157*016#	D	150	16	24	6	0.9

All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.

* Insert K for ±10% and M for ±20% Capacitance Tolerance

\# **Standard Plating** – Insert R for 7" reel and S for 13" reel

\# **Gold Plating** – Insert A for 7" reel and B for 13" reel

NOTE: AVX reserves the right to supply a higher voltage rating or tighter tolerance part in the same case size, to the same reliability standards.

TAJ Series

Standard Tantalum

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	DCL (µA) Max.	DF % Max.	ESR Max. (Ω) @100kHz
TAJE157*016#	E	150	16	24	8	0.3
TAJV157*016#	V	150	16	24	8	0.5
TAJE227*016#	E	220	16	35.2	10	0.5
TAJV227*016#	V	220	16	35.2	8	0.9
TAJA105*020#	A	1	20	0.5	4	9
TAJA155*020#	A	1.5	20	0.5	6	6.5
TAJA225*020#	A	2.2	20	0.5	6	5.3
TAJB225*020#	B	2.2	20	0.5	6	3.5
TAJA335*020#	A	3.3	20	0.7	6	4.5
TAJB335*020#	B	3.3	20	0.7	6	3
TAJA475*020#	A	4.7	20	0.9	6	4
TAJB475*020#	B	4.7	20	0.9	6	3
TAJA685*020#	A	6.8	20	1.4	6	2.5
TAJB685*020#	B	6.8	20	1.4	6	2.5
TAJC685*020#	C	6.8	20	1.4	6	2
TAJB106*020#	B	10	20	2	6	2.1
TAJC106*020#	C	10	20	2	6	1.9
TAJB156*020#	B	15	20	3	6	2
TAJC156*020#	C	15	20	3	6	1.7
TAJB226*020#	B	22	20	4.4	6	1.8
TAJC226*020#	C	22	20	4.4	6	1.6
TAJD226*020#	D	22	20	4.4	6	0.9
TAJC336*020#	C	33	20	6.6	6	1.5
TAJD336*020#	D	33	20	6.6	6	0.9
TAJC476*020#	C	47	20	9.4	6	0.9
TAJD476*020#	D	47	20	9.4	6	0.9
TAJE476*020#	E	47	20	9.4	6	0.9
TAJD686*020#	D	68	20	13.6	6	0.9
TAJE686*020#	E	68	20	13.6	6	0.9
TAJD107*020#	D	100	20	20	6	0.9
TAJE107*020#	E	100	20	20	6	0.9
TAJV107*020#	V	100	20	20	8	0.9
TAJE157*020#	E	150	20	30	8	0.3
TAJV157*020#	V	150	20	30	8	0.5
TAJA474*025#	A	0.47	25	0.5	4	14
TAJA684*025#	A	0.68	25	0.5	4	10
TAJA105*025#	A	1	25	0.5	4	8
TAJA155*025#	A	1.5	25	0.5	6	7.5
TAJB155*025#	B	1.5	25	0.5	6	5
TAJA225*025#	A	2.2	25	0.6	6	7
TAJB225*025#	B	2.2	25	0.6	6	4.5
TAJA335*025#	A	3.3	25	0.8	6	3.7
TAJB335*025#	B	3.3	25	0.8	6	3.5
TAJB475*025#	B	4.7	25	1.2	6	2.8
TAJB685*025#	B	6.8	25	1.7	6	2.8
TAJC685*025#	C	6.8	25	1.7	6	2
TAJC106*025#	C	10	25	2.5	6	1.8
TAJD106*025#	D	10	25	2.5	6	1.2
TAJC156*025#	C	15	25	3.8	6	1.6
TAJD156*025#	D	15	25	3.8	6	1
TAJC226*025#	C	22	25	5.5	6	1.4
TAJD226*025#	D	22	25	5.5	6	0.9
TAJD336*025#	D	33	25	8.3	6	0.9
TAJE336*025#	E	33	25	8.3	6	0.9
TAJD476*025#	D	47	25	11.8	6	0.9
TAJE476*025#	E	47	25	11.8	6	0.9
TAJE686*025#	E	68	25	17	6	0.9
TAJV686*025#	V	68	25	17	6	0.9
TAJV107*025#	V	100	25	25	8	0.4
TAJA104*035#	A	0.1	35	0.5	4	24

AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	DCL (µA) Max.	DF % Max.	ESR Max. (Ω) @100kHz
TAJA154*035#	A	0.15	35	0.5	4	21
TAJA224*035#	A	0.22	35	0.5	4	18
TAJA334*035#	A	0.33	35	0.5	4	15
TAJA474*035#	A	0.47	35	0.5	4	12
TAJB474*035#	B	0.47	35	0.5	4	10
TAJA684*035#	A	0.68	35	0.5	4	8
TAJB684*035#	B	0.68	35	0.5	4	8
TAJA105*035#	A	1	35	0.5	4	7.5
TAJB105*035#	B	1	35	0.5	4	6.5
TAJA155*035#	A	1.5	35	0.5	6	7.5
TAJB155*035#	B	1.5	35	0.5	6	5.2
TAJC155*035#	C	1.5	35	0.5	6	4.5
TAJA225*035#	A	2.2	35	0.8	6	4.5
TAJB225*035#	B	2.2	35	0.8	6	4.2
TAJC225*035#	C	2.2	35	0.8	6	3.5
TAJB335*035#	B	3.3	35	1.2	6	3.5
TAJC335*035#	C	3.3	35	1.2	6	2.5
TAJB475*035#	B	4.7	35	1.2	6	3.1
TAJC475*035#	C	4.7	35	1.6	6	2.2
TAJD475*035#	D	4.7	35	1.6	6	1.5
TAJC685*035#	C	6.8	35	2.4	6	1.8
TAJD685*035#	D	6.8	35	2.4	6	1.3
TAJC106*035#	C	10	35	3.5	6	1.6
TAJD106*035#	D	10	35	3.5	6	1
TAJE106*035#	E	10	35	3.5	6	0.9
TAJC156*035#	C	15	35	5.3	6	1.4
TAJD156*035#	D	15	35	5.3	6	0.9
TAJD226*035#	D	22	35	7.7	6	0.9
TAJE226*035#	E	22	35	7.7	6	0.9
TAJD336*035#	D	33	35	11.6	6	0.9
TAJE336*035#	E	33	35	11.6	6	0.9
TAJV336*035#	V	33	35	11.6	6	500
TAJE476*035#	E	47	35	16.5	6	0.9
TAJV476*035#	V	47	35	16.5	6	0.4
TAJV686M035#	V	68	35	23.8	6	0.5
TAJA104*050#	A	0.1	50	0.5	4	22
TAJA154*050#	A	0.15	50	0.5	4	15
TAJB154*050#	B	0.15	50	0.5	4	17
TAJA224*050#	A	0.22	50	0.5	4	18
TAJB224*050#	B	0.22	50	0.5	4	14
TAJB334*050#	B	0.33	50	0.5	4	12
TAJB474*050#	B	0.47	50	0.7	4	9.5
TAJC474*050#	C	0.47	50	0.5	4	8
TAJB684*050#	B	0.68	50	0.5	4	8
TAJC684*050#	C	0.68	50	0.5	4	7
TAJB105*050#	B	1	50	0.5	4	7
TAJC105*050#	C	1	50	0.5	4	5.5
TAJC155*050#	C	1.5	50	0.8	6	4.5
TAJD155*050#	D	1.5	50	0.8	6	4
TAJC225*050#	C	2.2	50	1.1	6	3
TAJD225*050#	D	2.2	50	1.1	6	2.5
TAJC335*050#	C	3.3	50	1.7	6	2.5
TAJD335*050#	D	3.3	50	1.7	6	2
TAJD475*050#	D	4.7	50	2.4	6	1.4
TAJD685*050#	D	6.8	50	3.4	6	1
TAJD106*050#	D	10	50	5	6	0.8
TAJE106*050#	E	10	50	5	6	1
TAJE156*050#	E	15	50	7.5	6	0.6
TAJV226*050#	V	22	50	11	8	0.6

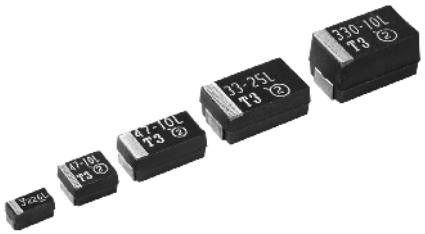
All technical data relates to an ambient temperature of +25°C. Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.

* Insert K for ±10% and M for ±20% Capacitance Tolerance

Standard Plating – Insert R for 7" reel and S for 13" reel
Gold Plating – Insert A for 7" reel and B for 13" reel

NOTE: AVX reserves the right to supply a higher voltage rating or tighter tolerance part in the same case size, to the same reliability standards.

Solid Tantalum Chip Capacitors
TANTAMOUNT®, Commercial, Surface Mount



FEATURES

- Terminations: 100 % Tin, standard SnPb available
- Compliant Terminations
- Molded case available in six case codes
- Compatible with "High Volume" automatic pick and place equipment
- Optical character recognition qualified
- Meets IEC Specification QC300801/US0001 and EIA 535BAAC

Pb-free Available

RoHS* COMPLIANT

PERFORMANCE/ELECTRICAL CHARACTERISTICS

Operating Temperature: - 55 °C to + 85 °C
(To + 125 °C with voltage derating)

Capacitance Range: 0.10 µF to 680 µF

Capacitance Tolerance: ± 20 %, ± 10 % standard
(20 % only for P case code)

100 % Surge Current Tested (D & E Case Codes)

Voltage Rating: 4 WVDC to 50 WVDC

OTHER SPECIFICATIONS

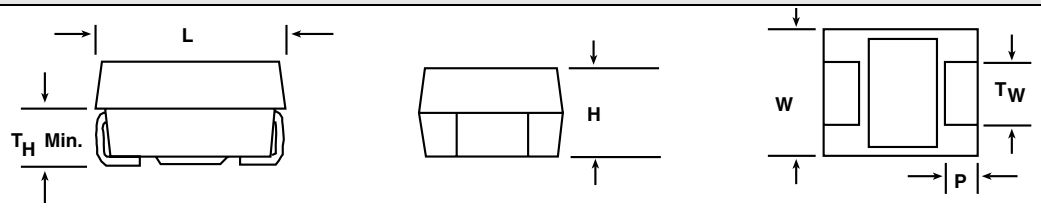
CECC		IECQ	
30801-005	793DX	PQC32/GB003	793DX
30801-009	CTC3	300801/FR001	CTC3
30801-011	CTC4		
30801-801	793DE		

ORDERING INFORMATION

293D	107	X9	010	D	2WE3
TYPE	CAPACITANCE	CAPACITANCE TOLERANCE	DC VOLTAGE RATING AT + 85 °C	CASE CODE	TERMINATION AND PACKAGING
	This is expressed in picofarads. The first two digits are the significant figures. The third is the number of zeros to follow.	X0 = ± 20 % X9 = ± 10 % X5 = ± 5 % (Special Order)	This is expressed in volts. To complete the three-digit block, zeros precede the voltage rating. A decimal point is indicated by an "R" (6R3 = 6.3 volts).	See Ratings and Case Codes Table.	2TE3: 100 % tin terminations, 7" (178 mm) reel 2WE3: 100 % tin terminations, 13" (330 mm) reel 8T: 90/10 SnPb Solder Plate terminations, 7" (178 mm) reel 8W: 90/10 SnPb Solder Plate terminations, 13" (330 mm) reel 2T: Solderable coating, non-preferred 2W: Solderable coating, non-preferred

Note: We reserve the right to supply higher voltage ratings, tighter capacitance tolerance and higher grade capacitors in the same case size. Voltage substitutions will be marked with the higher voltage rating.

DIMENSIONS in inches [millimeters]



CASE CODE	EIA SIZE	L	W	H	P	TW	T_H (Min.)
A	3216-18	0.126 ± 0.008 [3.2 ± 0.20]	0.063 ± 0.008 [1.6 ± 0.20]	0.063 ± 0.008 [1.6 ± 0.20]	0.031 ± 0.012 [0.80 ± 0.30]	0.047 ± 0.004 [1.2 ± 0.10]	0.028 [0.70]
B	3528-21	0.138 ± 0.008 [3.5 ± 0.20]	0.110 ± 0.008 [2.8 ± 0.20]	0.075 ± 0.008 [1.9 ± 0.20]	0.031 ± 0.012 [0.80 ± 0.30]	0.087 ± 0.004 [2.2 ± 0.10]	0.028 [0.70]
C	6032-28	0.236 ± 0.012 [6.0 ± 0.30]	0.126 ± 0.012 [3.2 ± 0.30]	0.098 ± 0.012 [2.5 ± 0.30]	0.051 ± 0.012 [1.3 ± 0.30]	0.087 ± 0.004 [2.2 ± 0.10]	0.039 [1.0]
D	7343-31	0.287 ± 0.012 [7.3 ± 0.30]	0.170 ± 0.012 [4.3 ± 0.30]	0.110 ± 0.012 [2.8 ± 0.30]	0.051 ± 0.012 [1.3 ± 0.30]	0.095 ± 0.004 [2.4 ± 0.10]	0.039 [1.0]
E	7343-43	0.287 ± 0.012 [7.3 ± 0.30]	0.170 ± 0.012 [4.3 ± 0.30	0.158 ± 0.012 [4.0 ± 0.30]	0.051 ± 0.012 [1.3 ± 0.30]	0.095 ± 0.004 [2.4 ± 0.10]	0.039 [1.0]
P	2012-12	0.079 ± 0.20 [2.0 ± 0.008]	0.049 ± 0.008 [1.25 ± 0.2]	0.047 Max. [1.2 Max.]	0.020 ± 0.008 [0.52 ± 0.20]	0.047 ± 0.004 [1.2 ± 0.10]	0.012 [0.3]

* Pb containing terminations are not RoHS compliant, exemptions may apply

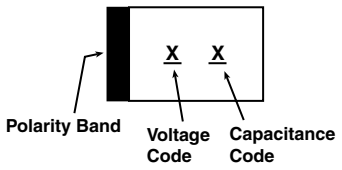
RATINGS AND CASE CODES

µF	4 V		6.3 V		10 V		16 V		20 V		25 V		35 V		50 V	
	Std.	Ext.	Std.	Ext.	Std.	Ext.	Std.	Ext.	Std.	Ext.	Std.	Ext.	Std.	Ext.	Std.	Ext.
0.10													A		A	
0.15													A		B	A
0.22													A		B	A
0.33													A		B	A
0.47											A		B	A	B/C	A
0.68									A		A		B	A	C	B
1.0			P		P		A		A		B	A	B	A	C	B
1.5			P		A		A		A		B	A	C	B		B/C
2.2	P		A/P		A/P		A/B		B	A	B	A	C	B	D	C
3.3	A/P		A/P		A/P		A/B		B	A	C	A*/B	C	B	D	C
4.7	A/P		A/B/P		A/B/P		B	A	B/C	A	C	A/B	D	C	D	
6.8	A/P		A/B/P		B	A/P	B/C	A	C	A/B	C	B	D	C		D/E
10	A/B/P		B/C/P	A	B/C	A	C	A/B	C	B	D	B/C	D	C		D/E
15	B	A	B/C	A	C	A/B	C	B	D	B/C	D	C		D/E		
22	B/C	A	C	A/B	C	A/B	D	B/C	D	B/C		D		D/E		
33	C	A/B	C	A/B	D	B/C	D	B/C	D	C		D/E				
47	C	A/B	D	B/C	D	B/C	D	C		D/E		E				
68	D	B/C	D	B/C	D	B*/C		D		D/E						
100	D	B/C	D	B/C		C/D		D/E		E						
150	D	B/C	E	C/D		D/E		D*/E								
220	E	C/D		C/D/E		D/E										
330		D/E		D/E		E										
470		D/E		E												
680		E														

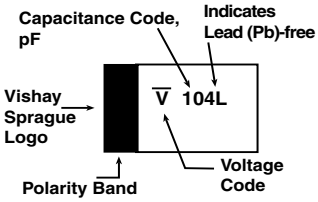
* Preliminary values, contact factory for availability.

MARKING

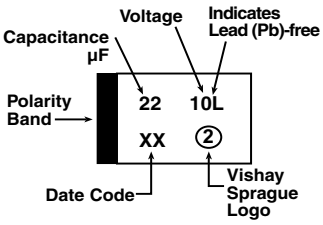
MARKING



"P" Case Size



"A" Case Size



"B, C, D, E" Case Sizes

STANDARD/EXTENDED RATINGS

CAPACITANCE (µF)	CASE CODE	PART NUMBER	MAX. DC LEAKAGE AT + 25 °C (µA)	Max. DF AT + 25 °C 120 Hz (%)	Max. ESR AT + 25 °C 100 kHz (Ohms)	Max. RIPPLE 100 kHz Irms (Amps)
4 WVDC AT + 85 °C, SURGE = 5.2 V . . . 2.7 WVDC AT + 125 °C, SURGE = 3.4 V						
2.2	P	293D225X_004P2T_E3	0.5	8	12	0.02
3.3	A	293D335X_004A2_E3	0.5	6	7.6	0.10
3.3	P	293D335X_004P2_E3	0.5	8	12	0.02
4.7	A	293D475X_004A2_E3	0.5	6	6.3	0.11
4.7	P	293D475X_004P2_E3	0.5	8	6.0	0.06
6.8	A	293D685X_004A2_E3	0.5	6	5.5	0.12
6.8	P	293D685X_004P2_E3	0.5	10	6.0	0.06
10	A	293D106X_004A2_E3	0.5	6	5.1	0.12
10	B	293D106X_004B2_E3	0.5	6	3.5	0.16
10	P	293D106X_004P2_E3	0.5	10	6.0	0.06
15	**A**	**293D156X_004A2_E3**	**0.6**	**6**	**3.4**	**0.15**
15	B	293D156X_004B2_E3	0.6	6	2.9	0.17
15	P	293D156X_004P2_E3	0.6	6	N/A	N/A
22	**A**	**293D226X_004A2_E3**	**0.9**	**6**	**2.9**	**0.16**
22	B	293D226X_004B2_E3	0.9	6	2.5	0.18
22	C	293D226X_004C2_E3	0.9	6	1.8	0.25
33	**A**	**293D336X_004A2_E3**	**1.3**	**6**	**2.9**	**0.16**
33	**B**	**293D336X_004B2_E3**	**1.3**	**6**	**2.0**	**0.21**
33	C	293D336X_004C2_E3	1.3	6	1.8	0.25
47	**A**	**293D476X_004A2_E3**	**1.9**	**14**	**2.5**	**0.17**
47	**B**	**293D476X_004B2_E3**	**1.9**	**6**	**1.9**	**0.21**
47	C	293D476X_004C2_E3	1.9	6	1.8	0.25
68	**B**	**293D686X_004B2_E3**	**2.7**	**6**	**1.9**	**0.21**
68	**C**	**293D686X_004C2_E3**	**2.7**	**6**	**1.4**	**0.28**
68	D	293D686X_004D2_E3	2.7	6	0.8	0.43
100	**B**	**293D107X_004B2_E3**	**4.0**	**8**	**1.8**	**0.22**
100	**C**	**293D107X_004C2_E3**	**4.0**	**6**	**0.8**	**0.37**
100	D	293D107X_004D2_E3	4.0	6	0.7	0.46
150	**B**	**293D157X_004B2_E3**	**6.0**	**14**	**1.6**	**0.23**
150	**C**	**293D157X_004C2_E3**	**6.0**	**12**	**0.7**	**0.40**
150	D	293D157X_004D2_E3	6.0	8	0.6	0.50
220	**C**	**293D227X_004C2_E3**	**8.8**	**8**	**0.7**	**0.40**
220	**D**	**293D227X_004D2_E3**	**8.8**	**8**	**0.6**	**0.50**
220	E	293D227X_004E2_E3	8.8	8	0.5	0.57
330	**D**	**293D337X_004D2_E3**	**13.2**	**8**	**0.6**	**0.50**
330	**E**	**293D337X_004E2_E3**	**13.2**	**8**	**0.5**	**0.57**
470	**D**	**293D477X_004D2_E3**	**18.8**	**10**	**0.6**	**0.50**
470	**E**	**293D477X_004E2_E3**	**18.8**	**10**	**0.5**	**0.57**
680	**E**	**293D687X_004E2_E3**	**27.2**	**12**	**0.5**	**0.57**
6.3 WVDC AT + 85 °C, SURGE = 8 V . . . 4 WVDC AT + 125 °C, SURGE = 5 V						
1.0	P	293D225X_6R3P2_E3	0.5	8	12	0.02
1.5	P	293D225X_6R3P2_E3	0.5	8	12	0.02
2.2	A	293D225X_6R3A2_E3	0.5	6	7.6	0.10
2.2	P	293D225X_6R3P2_E3	0.5	8	12	0.02
3.3	A	293D335X_6R3A2_E3	0.5	6	6.3	0.11
3.3	P	293D335X_6R3P2_E3	0.5	8	12	0.02
4.7	A	293D475X_6R3A2_E3	0.5	6	5.5	0.12
4.7	P	293D475X_6R3P2_E3	0.5	8	6.0	0.06
6.8	A	293D685X_6R3A2_E3	0.5	6	5.0	0.12
6.8	B	293D685X_6R3B2_E3	0.5	6	3.4	0.16
6.8	P	293D685X_6R3P2_E3	0.5	10	6.0	0.06
10	**A**	**293D106X_6R3A2_E3**	**0.6**	**6**	**3.4**	**0.15**
10	B	293D106X_6R3B2_E3	0.6	6	2.9	0.17
10	P	293D106X_6R3P2_E3	0.6	10	6.0	0.06
15	**A**	**293D156X_6R3A2_E3**	**0.9**	**6**	**2.9**	**0.16**
15	B	293D156X_6R3B2_E3	0.9	6	2.5	0.18
15	C	293D156X_6R3C2_E3	0.9	6	1.8	0.25
22	**A**	**293D226X_6R3A2_E3**	**1.3**	**6**	**2.9**	**0.16**
22	**B**	**293D226X_6R3B2_E3**	**1.3**	**6**	**2.0**	**0.21**
22	C	293D226X_6R3C2_E3	1.3	6	1.8	0.25
33	**A**	**293D336X_6R3A2_E3**	**2.0**	**14**	**2.5**	**0.17**
33	**B**	**293D336X_6R3B2_E3**	**2.0**	**6**	**1.9**	**0.21**
33	C	293D336X_6R3C2_E3	2.0	6	1.5	0.27
47	**B**	**293D476X_6R3B2_E3**	**2.8**	**6**	**1.9**	**0.21**
47	**C**	**293D476X_6R3C2_E3**	**2.8**	**6**	**1.4**	**0.28**

* For 10 % tolerance, specify “9”; for 20 % tolerance, change to “0”. **Extended Range ratings in bold print.**

STANDARD/EXTENDED RATINGS

CAPACITANCE (µF)	CASE CODE	PART NUMBER	MAX. DC LEAKAGE AT + 25 °C (µA)	MAX. DF AT + 25 °C 120 Hz (%)	MAX. ESR AT + 25 °C 100 kHz (Ohms)	MAX. RIPPLE 100 kHz Irms (Amps)
6.3 WVDC AT + 85 °C, SURGE = 8 V . . . 4 WVDC AT + 125 °C, SURGE = 5 V						
47	D	293D476X_6R3D2_E3	2.8	6	0.8	0.43
68	**B**	**293D686X_6R3B2_E3**	**4.1**	**6**	**1.8**	**0.22**
68	**C**	**293D686X_6R3C2_E3**	**4.1**	**6**	**0.8**	**0.37**
68	D	293D686X_6R3D2_E3	4.1	6	0.7	0.46
100	**B**	**293D107X_6R3B2_E3**	**6.0**	**15**	**1.7**	**0.22**
100	**C**	**293D107X_6R3C2_E3**	**6.0**	**6**	**0.8**	**0.37**
100	D	293D107X_6R3D2_E3	6.0	6	0.7	0.46
150	**C**	**293D157X_6R3C2_E3**	**9.0**	**8**	**0.7**	**0.40**
150	**D**	**293D157X_6R3D2_E3**	**9.0**	**8**	**0.6**	**0.50**
150	E	293D157X_6R3E2_E3	9.0	8	0.5	0.57
220	**C**	**293D227X_6R3C2_E3**	**13.9**	**14**	**0.7**	**0.39**
220	**D**	**293D227X_6R3D2_E3**	**13.2**	**8**	**0.6**	**0.50**
220	**E**	**293D227X_6R3E2_E3**	**13.2**	**8**	**0.5**	**0.57**
330	**D**	**293D337X_6R3D2_E3**	**19.8**	**8**	**0.6**	**0.50**
330	**E**	**293D337X_6R3E2_E3**	**19.8**	**8**	**0.5**	**0.57**
470	**E**	**293D477X_6R3E2_E3**	**28.2**	**10**	**0.5**	**0.57**
10 WVDC AT + 85 °C, SURGE = 13 V . . . 7 WVDC AT + 125 °C, SURGE = 8 V						
1.0	P	293D105X_010P2_E3	0.5	8	12	0.02
1.5	A	293D155X_010A2_E3	0.5	6	8.0	0.10
1.5	P	293D155X_010P2_E3	0.5	8	12	0.02
2.2	A	293D225X_010A2_E3	0.5	6	6.3	0.11
2.2	P	293D225X_010A2_E3	0.5	8	12	0.07
3.3	A	293D335X_010A2_E3	0.5	6	5.5	0.12
3.3	P	293D335X_010P2_E3	0.5	8	12	0.02
4.7	A	293D475X_010A2_E3	0.5	6	5.0	0.12
4.7	B	293D475X_010B2_E3	0.5	6	3.4	0.16
4.7	P	293D475X_010P2_E3	0.5	8	6.0	0.06
6.8	**A**	**293D685X_010A2_E3**	**0.7**	**6**	**4.2**	**0.13**
6.8	B	293D685X_010B2_E3	0.7	6	2.9	0.17
6.8	**P**	**293D685X_010P2_E3**	**0.5**	**8**	**6.0**	**0.06**
10	**A**	**293D106X_010A2_E3**	**1.0**	**6**	**3.4**	**0.15**
10	B	293D106X_010B2_E3	1.0	6	2.5	0.18
10	C	293D106X_010C2_E3	1.0	6	1.8	0.25
15	**A**	**293D156X_010A2_E3**	**1.5**	**6**	**2.9**	**0.16**
15	**B**	**293D156X_010B2_E3**	**1.5**	**6**	**2.0**	**0.21**
15	C	293D156X_010C2_E3	1.5	6	1.8	0.25
22	**A**	**293D226X_010A2_E3**	**2.2**	**8**	**2.5**	**0.17**
22	**B**	**293D226X_010B2_E3**	**2.2**	**6**	**1.9**	**0.21**
22	C	293D226X_010C2_E3	2.2	6	1.5	0.27
33	**B**	**293D336X_010B2_E3**	**3.3**	**6**	**1.9**	**0.21**
33	**C**	**293D336X_010C2_E3**	**3.3**	**6**	**1.4**	**0.28**
33	D	293D336X_010D2_E3	3.3	6	0.8	0.43
47	**B**	**293D476X_010B2_E3**	**4.7**	**6**	**1.8**	**0.22**
47	**C**	**293D476X_010C2_E3**	**4.7**	**6**	**1.1**	**0.32**
47	D	293D476X_010D2_E3	4.7	6	0.7	0.46
68	**C**	**293D686X_010C2_E3**	**6.8**	**6**	**1.0**	**0.33**
68	D	293D686X_010D2_E3	6.8	6	0.7	0.46
100	**C**	**293D107X_010C2_E3**	**10**	**8**	**0.9**	**0.35**
100	**D**	**293D107X_010D2_E3**	**10**	**8**	**0.6**	**0.50**
150	**D**	**293D157X_010D2_E3**	**15**	**8**	**0.6**	**0.50**
150	**E**	**293D157X_010E2_E3**	**15**	**8**	**0.5**	**0.57**
220	**D**	**293D227X_010D2_E3**	**22**	**8**	**0.6**	**0.50**
220	**E**	**293D227X_010E2_E3**	**22**	**8**	**0.5**	**0.57**
330	**E**	**293D337X_010E2_E3**	**33**	**10**	**0.5**	**0.57**
16 WVDC AT + 85 °C, SURGE = 20 V . . . 10 WVDC AT + 125 °C, SURGE = 12 V						
1.0	A	293D105X_016A2_E3	0.5	4	9.3	0.09
1.5	A	293D155X_016A2_E3	0.5	6	6.7	0.11
2.2	A	293D225X_016A2_E3	0.5	6	5.9	0.11
2.2	B	293D225X_016B2_E3	0.5	6	4.6	0.14
3.3	A	293D335X_016A2_E3	0.5	6	5.0	0.12
3.3	B	293D335X_016B2_E3	0.5	6	3.5	0.16
4.7	**A**	**293D475X_016A2_E3**	**0.8**	**6**	**5.0**	**0.12**
4.7	B	293D475X_016B2_E3	0.8	6	2.9	0.17

* For 10 % tolerance, specify "9"; for 20 % tolerance, change to "0". **Extended Range ratings in bold print.**

STANDARD/EXTENDED RATINGS

CAPACITANCE (µF)	CASE CODE	PART NUMBER	MAX. DC LEAKAGE AT + 25 °C (µA)	MAX. DF AT + 25 °C 120 Hz (%)	MAX. ESR AT + 25 °C 100 kHz (Ohms)	MAX. RIPPLE 100 kHz Irms (Amps)
16 WVDC AT + 85 °C, SURGE = 20 V . . . 10 WVDC AT + 125 °C, SURGE = 12 V						
6.8	**A**	**293D685X_016A2_E3**	**1.1**	**6**	**4.2**	**0.13**
6.8	B	293D685X_016B2_E3	1.1	6	2.5	0.18
6.8	C	293D685X_016C2_E3	1.1	6	1.9	0.24
10	**A**	**293D106X_016A2_E3**	**1.6**	**6**	**3.0**	**0.16**
10	**B**	**293D106X_016B2_E3**	**1.6**	**6**	**2.0**	**0.21**
10	C	293D106X_016C2_E3	1.6	6	1.8	0.25
15	**B**	**293D156X_016B2_E3**	**2.4**	**6**	**2.0**	**0.21**
15	C	293D156X_016C2_E3	2.4	6	1.5	0.27
22	**B**	**293D226X0016B2_E3**	**3.5**	**6**	**1.9**	**0.21**
22	**C**	**293D226X_016C2_E3**	**3.5**	**6**	**1.4**	**0.28**
22	D	293D226X_016D2_E3	3.5	6	0.8	0.43
33	**B**	**293D336X0016B2_E3**	**5.3**	**6**	**1.8**	**0.22**
33	**C**	**293D336X_016C2_E3**	**5.3**	**6**	**1.1**	**0.32**
33	D	293D336X_016D2_E3	5.3	6	0.7	0.46
47	**C**	**293D476X_016C2_E3**	**7.5**	**6**	**1.0**	**0.33**
47	D	293D476X_016D2_E3	7.5	6	0.7	0.46
68	**D**	**293D686X_016D2_E3**	**10.9**	**6**	**0.6**	**0.50**
100	**D**	**293D107X_016D2_E3**	**16**	**8**	**0.6**	**0.50**
100	**E**	**293D107X_016E2_E3**	**16**	**8**	**0.6**	**0.52**
150	**E**	**293D157X_016E2_E3**	**24**	**8**	**0.5**	**0.57**
20 WVDC AT + 85 °C, SURGE = 26 V . . . 13 WVDC AT + 125 °C, SURGE = 16 V						
0.68	A	293D684X_020A2_E3	0.5	4	10	0.09
1.0	A	293D105X_020A2_E3	0.5	4	8.4	0.09
1.5	A	293D155X_020A2_E3	0.5	6	6.3	0.11
2.2	**A**	**293D225X_020A2_E3**	**0.5**	**6**	**5.9**	**0.11**
2.2	B	293D225X_020B2_E3	0.5	6	3.5	0.16
3.3	**A**	**293D335X_020A2_E3**	**0.7**	**6**	**5.9**	**0.11**
3.3	B	293D335X_020B2_E3	0.7	6	3.0	0.17
4.7	**A**	**293D475X_020A2_E3**	**0.9**	**6**	**5.0**	**0.12**
4.7	B	293D475X_020B2_E3	0.9	6	2.9	0.17
4.7	C	293D475X_020C2_E3	0.9	6	2.3	0.22
6.8	**A**	**293D685X_020A2_E3**	**1.4**	**6**	**4.5**	**0.13**
6.8	**B**	**293D685X_020B2_E3**	**1.4**	**6**	**2.5**	**0.18**
6.8	C	293D685X_020C2_E3	1.4	6	1.9	0.24
10	**B**	**293D106X_020B2_E3**	**2.0**	**6**	**2.5**	**0.18**
10	C	293D106X_020C2_E3	2.0	6	1.7	0.25
15	**B**	**293D156X_020B2_E3**	**3.0**	**6**	**2.3**	**0.19**
15	**C**	**293D156X_020C2_E3**	**3.0**	**6**	**1.5**	**0.27**
15	D	293D156X_020D2_E3	3.0	6	0.9	0.41
22	**B**	**293D226X_020B2_E3**	**4.4**	**6**	**2.1**	**0.20**
22	**C**	**293D226X_020C2_E3**	**4.4**	**6**	**1.1**	**0.32**
22	D	293D226X_020D2_E3	4.4	6	0.7	0.46
33	**C**	**293D336X_020C2_E3**	**6.6**	**6**	**1.0**	**0.33**
33	D	293D336X_020D2_E3	6.6	6	0.7	0.46
47	**D**	**293D476X_020D2_E3**	**9.4**	**6**	**0.7**	**0.46**
47	**E**	**293D476X_020E2_E3**	**9.4**	**6**	**0.6**	**0.52**
68	**D**	**293D686X_020D2_E3**	**13.6**	**6**	**0.7**	**0.46**
68	**E**	**293D686X_020E2_E3**	**13.6**	**6**	**0.6**	**0.52**
100	**E**	**293D107X_020E2_E3**	**20.0**	**8**	**0.5**	**0.57**
25 WVDC AT + 85 °C, SURGE = 32 V . . . 17 WVDC AT + 125 °C, SURGE = 20 V						
0.47	A	293D474X_025A2_E3	0.5	4	12	0.08
0.68	A	293D684X_025A2_E3	0.5	4	8.4	0.09
1.0	**A**	**293D105X_025A2_E3**	**0.5**	**4**	**7.6**	**0.10**
1.0	B	293D105X_025B2_E3	0.5	4	5.0	0.13
1.5	**A**	**293D155X_025A2_E3**	**0.5**	**6**	**6.7**	**0.11**
1.5	B	293D155X_025B2_E3	0.5	6	4.6	0.14
2.2	**A**	**293D225X_025A2_E3**	**0.6**	**6**	**6.3**	**0.11**
2.2	B	293D225X_025B2_E3	0.6	6	3.8	0.15
3.3	**B**	**293D335X_025B2_E3**	**0.8**	**6**	**3.1**	**0.17**
3.3	C	293D335X_025C2_E3	0.8	6	2.3	0.22
4.7	**A**	**293D475X_025A2_E3**	**1.2**	**6**	**5.5**	**0.12**
4.7	**B**	**293D475X_025B2_E3**	**1.2**	**6**	**2.8**	**0.17**
4.7	C	293D475X_025C2_E3	1.2	6	2.0	0.24

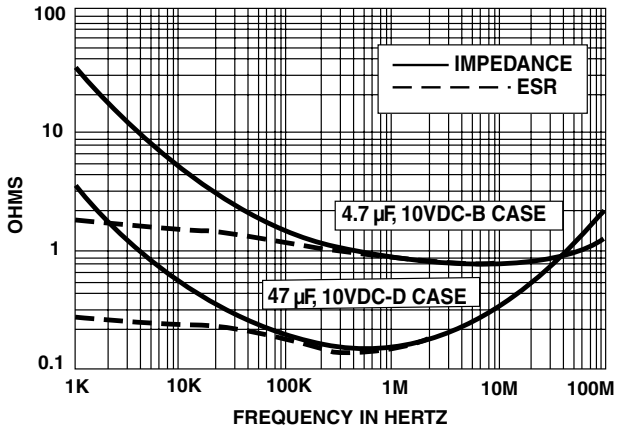
* For 10 % tolerance, specify "9"; for 20 % tolerance, change to "0". **Extended Range ratings in bold print.**

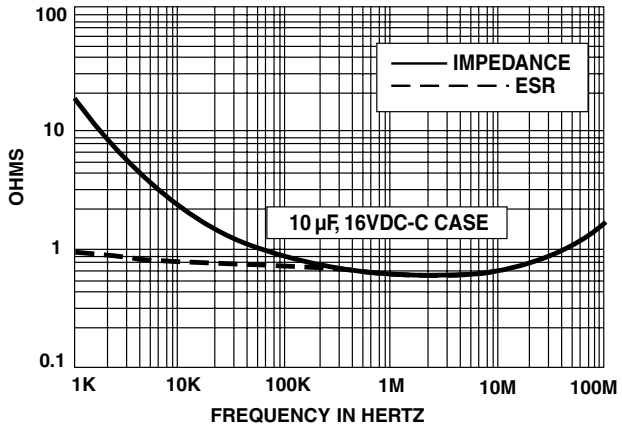
STANDARD/EXTENDED RATINGS

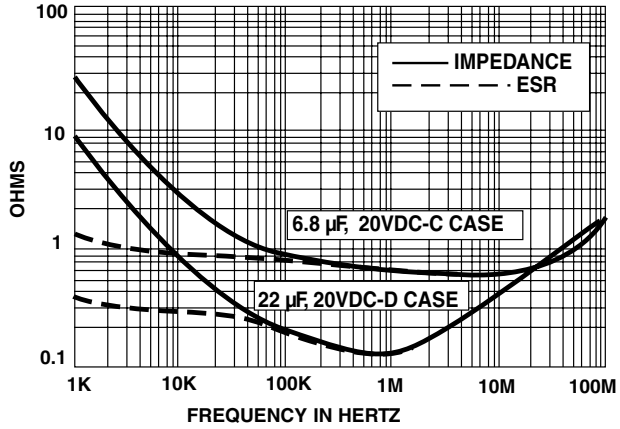
CAPACITANCE (µF)	CASE CODE	PART NUMBER	MAX. DC LEAKAGE AT + 25 °C (µA)	MAX. DF AT + 25 °C 120 Hz (%)	MAX. ESR AT + 25 °C 100 kHz (Ohms)	MAX. RIPPLE 100 kHz Irms (Amps)
25 WVDC AT + 85 °C, SURGE = 32 V . . . 17 WVDC AT + 125 °C, SURGE = 20 V						
6.8	**B**	**293D685X_025B2_E3**	**1.7**	**6**	**2.4**	**0.19**
6.8	C	293D685X_025C2_E3	1.7	6	1.7	0.25
10	**B**	**293D106X_025B2_E3**	**2.5**	**6**	**2.3**	**0.19**
10	**C**	**293D106X_025C2_E3**	**2.5**	**6**	**1.5**	**0.27**
10	D	293D106X_025D2_E3	2.5	6	1.0	0.39
15	**C**	**293D156X_025C2_E3**	**3.8**	**6**	**1.2**	**0.30**
15	D	293D156X_025D2_E3	3.8	6	0.8	0.43
22	**D**	**293D226X_025D2_E3**	**5.5**	**6**	**0.7**	**0.46**
33	**D**	**293D336X_025D2_E3**	**8.3**	**6**	**0.7**	**0.46**
33	**E**	**293D336X_025E2_E3**	**8.3**	**6**	**0.6**	**0.52**
47	**E**	**293D476X_025E2_E3**	**11.8**	**6**	**0.6**	**0.52**
35 WVDC AT + 85 °C, SURGE = 46 V . . . 23 WVDC AT + 125 °C, SURGE = 28 V						
0.10	A	293D104X_035A2_E3	0.5	4	20	0.06
0.15	A	293D154X_035A2_E3	0.5	4	18	0.07
0.22	A	293D224X_035A2_E3	0.5	4	15	0.07
0.33	A	293D334X_035A2_E3	0.5	4	13	0.08
0.47	**A**	**293D474X_035A2_E3**	**0.5**	**4**	**10**	**0.09**
0.47	B	293D474X_035B2_E3	0.5	4	8	0.10
0.68	**A**	**293D684X_035A2_E3**	**0.5**	**4**	**7.6**	**0.10**
0.68	B	293D684X_035B2_E3	0.5	4	6.5	0.11
1.0	**A**	**293D105X_035A2_E3**	**0.5**	**4**	**7.5**	**0.10**
1.0	B	293D105X_035B2_E3	0.5	4	5.0	0.13
1.5	**B**	**293D155X_035B2_E3**	**0.5**	**6**	**4.2**	**0.14**
1.5	C	293D155X_035C2_E3	0.5	6	3.8	0.17
2.2	**B**	**293D225X_035B2_E3**	**0.8**	**6**	**3.8**	**0.15**
2.2	C	293D225X_035C2_E3	0.8	6	2.9	0.20
3.3	**B**	**293D335X_035B2_E3**	**1.2**	**6**	**3.5**	**0.16**
3.3	C	293D335X_035C2_E3	1.2	6	2.1	0.23
4.7	**C**	**293D475X_035C2_E3**	**1.6**	**6**	**1.9**	**0.24**
4.7	D	293D475X_035D2_E3	1.6	6	1.3	0.34
6.8	**C**	**293D685X_035C2_E3**	**2.4**	**6**	**1.8**	**0.25**
6.8	D	293D685X_035D2_E3	2.4	6	1.1	0.37
10	**C**	**293D106X_035C2_E3**	**3.5**	**6**	**1.6**	**0.26**
10	D	293D106X_035D2_E3	3.5	6	0.8	0.43
15	**D**	**293D156X_035D2_E3**	**5.3**	**6**	**0.7**	**0.46**
15	**E**	**293D156X_035E2_E3**	**5.3**	**6**	**0.7**	**0.49**
22	**D**	**293D226X_035D2_E3**	**7.7**	**6**	**0.6**	**0.52**
22	**E**	**293D226X_035E2_E3**	**7.7**	**6**	**0.6**	**0.52**
50 WVDC AT + 85 °C, SURGE = 65 V . . . 33 WVDC AT + 125 °C, SURGE = 40 V						
0.10	A	293D104X_050A2_E3	0.5	4	19	0.06
0.15	**A**	**293D154X_050A2_E3**	**0.5**	**4**	**17**	**0.07**
0.15	B	293D154X_050B2_E3	0.5	4	14	0.08
0.22	**A**	**293D224X_050A2_E3**	**0.5**	**4**	**15**	**0.07**
0.22	B	293D224X_050B2_E3	0.5	4	12	0.08
0.33	**A**	**293D334X_050A2_E3**	**0.5**	**4**	**14**	**0.07**
0.33	B	293D334X_050B2_E3	0.5	4	10	0.09
0.47	**A**	**293D474X_050A2_E3**	**0.5**	**4**	**12**	**0.08**
0.47	B	293D474X_050B2_E3	0.5	4	8.4	0.10
0.47	C	293D474X_050C2_E3	0.5	4	6.7	0.13
0.68	**B**	**293D684X_050B2_E3**	**0.5**	**4**	**7.6**	**0.11**
0.68	C	293D684X_050C2_E3	0.5	4	5.9	0.14
1.0	**B**	**293D105X_050B2_E3**	**0.5**	**4**	**6.7**	**0.11**
1.0	C	293D105X_050C2_E3	0.5	4	4.6	0.16
1.5	**B**	**293D155X_050B2_E3**	**0.8**	**6**	**6.0**	**0.12**
1.5	**C**	**293D155X_050C2_E3**	**0.8**	**6**	**3.4**	**0.18**
2.2	**C**	**293D225X_050C2_E3**	**1.1**	**6**	**2.9**	**0.20**
2.2	D	293D225X_050D2_E3	1.1	6	2.1	0.27
3.3	**C**	**293D335X_050C2_E3**	**1.7**	**6**	**2.5**	**0.21**
3.3	D	293D335X_050D2_E3	1.7	6	1.7	0.30
4.7	D	293D475X_050D2_E3	2.4	6	1.2	0.37
6.8	**D**	**293D685X_050D2_E3**	**3.4**	**6**	**0.9**	**0.41**
6.8	**E**	**293D685X_050E2_E3**	**3.4**	**6**	**0.9**	**0.43**
10	**D**	**293D106X_050D2_E3**	**5.0**	**6**	**0.8**	**0.43**
10	**E**	**293D106X_050E2_E3**	**5.0**	**6**	**0.8**	**0.45**

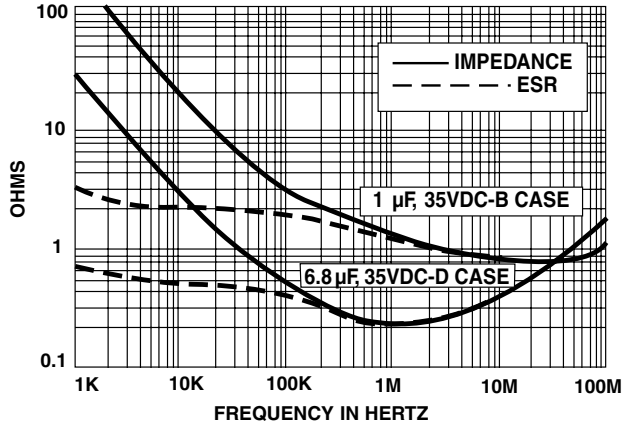
* For 10 % tolerance, specify "9"; for 20 % tolerance, change to "0". **Extended Range ratings in bold print.**

TYPICAL CURVES AT + 25 °C, IMPEDANCE AND ESR VS. FREQUENCY









PERFORMANCE CHARACTERISTICS

1 **Operating Temperature:** Capacitors are designed to operate over the temperature range - 55 °C to + 85 °C.

1.1 Capacitors may be operated to + 125 °C with voltage derating to two-thirds the + 85 °C rating.

+ 85 °C Rating		+ 125 °C Rating	
Working Voltage (V)	Surge Voltage (V)	Working Voltage (V)	Surge Voltage (V)
4.0	5.2	2.7	3.4
6.3	8.0	4.0	5.0
10	13	7.0	8.0
16	20	10	12
20	26	13	16
25	32	17	20
35	46	23	28
50	65	33	40

2. **DC Working Voltage:** The DC working voltage is the maximum operating voltage for continuous duty at the rated temperature.

3 **Surge Voltage:** The surge DC rating is the maximum voltage to which the capacitors may be subjected under any conditions, including transients and peak ripple at the highest line voltage.

3.1 **Surge Voltage Test:** Capacitors shall withstand the surge voltage applied in series with a 33 ohm ± 5 % resistor at the rate of one-half minute on, one-half minute off, at + 85 °C, for 1000 successive test cycles.

3.2 Following the surge voltage test, the dissipation factor and the leakage current shall meet the initial requirements; the capacitance shall not have changed more than ± 10 %.

4. **Capacitance Tolerance:** The capacitance of all capacitors shall be within the specified tolerance limits of the normal rating.

4.1 Capacitance measurements shall be made by means of polarized capacitance bridge. The polarizing voltage shall be of such magnitude that there shall be no reversal of polarity due to the AC component. The maximum voltage applied to capacitors during measurement shall be 2 volts rms at 120 Hz at + 25 °C. If the AC voltage applied is less than one-half volt rms, no DC bias is required. Accuracy of the bridge shall be within ± 2 %.

5. **Capacitance Change With Temperature:** The capacitance change with temperature shall not exceed the following percentage of the capacitance measured at + 25 °C:

- 55 °C	+ 85 °C	+ 125 °C
- 10 %	+ 10 %	+ 12 %

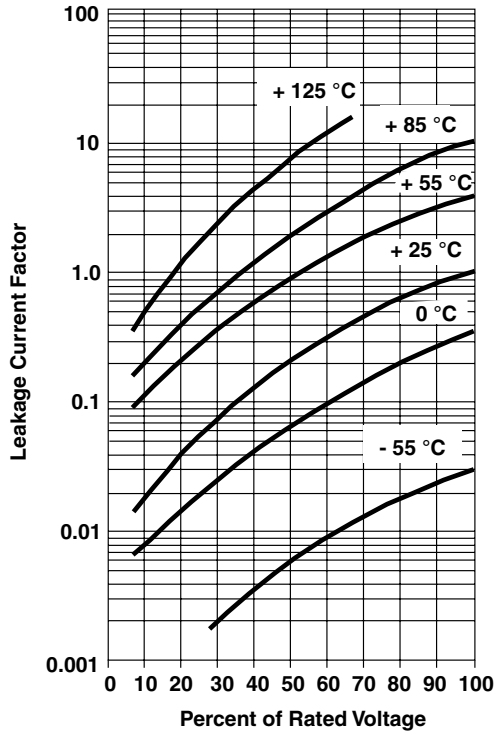
6 Dissipation Factor: The dissipation factor, determined from the expression 2pfRC, shall not exceed values listed in the Standard Ratings Table.

6.1 Measurements shall be made by the bridge method at, or referred to, a frequency of 120 Hz and a temperature of + 25 °C.

6.1 Leakage Current: Capacitors shall be stabilized at the rated temperature for 30 minutes. Rated voltage shall be applied to capacitors for 5 minutes using a steady source of power (such as a regulated power supply) with 1000 ohm resistor connected in series with the capacitor under test to limit the charging current. Leakage current shall then be measured.

Note that the leakage current varies with temperature and applied voltage. See graph below for the appropriate adjustment factor.

TYPICAL LEAKAGE CURRENT FACTOR



7.1 **At + 25 °C**, the leakage current shall not exceed the value listed in the Standard Ratings Table.

7.2 **At + 85 °C,** the leakage current shall not exceed 10 times the value listed in the Standard Ratings Table.

7.3 **At + 125 °C,** the leakage current shall not exceed 12 times the value listed in the Standard Ratings Table.

PERFORMANCE CHARACTERISTICS (Continued)

8. **ESR**

8.1 **ESR (Equivalent Series Resistance)** shall not exceed the values listed in the Ratings Table. Measurement shall be made by the bridge method at a frequency of 100 kHz and a temperature of + 25 °C.

9. **Life Test:** Capacitors shall withstand rated DC voltage applied at + 85 °C or two-thirds rated voltage applied at + 125 °C for 1000 hours.

9.1 Following the life test, the dissipation factor shall meet the initial requirement; the capacitance change shall not exceed ± 10 %; the leakage current shall not exceed 125 % of the initial requirement.

10. **Vibration Tests:** Capacitors shall be subjected to vibration tests in accordance with the following criteria.

10.1 Capacitors shall be secured for test by means of a rigid mounting using suitable brackets.

10.2 **Low Frequency Vibration:** Vibration shall consist of simple harmonic motion having an amplitude of 0.03" [0.76 mm] and a maximum total excursion of 0.06" [1.52 mm], in a direction perpendicular to the major axis of the capacitors.

10.2.1 Vibration frequency shall be varied uniformly between the approximate limits of 10 Hz to 55 Hz during a period of approximately one minute, continuously for 1.5 hours.

10.2.2 An oscilloscope or other comparable means shall be used in determining electrical intermittency during the final 30 minutes of the test. The AC voltage applied shall not exceed 2 volts rms.

10.2.3 Electrical tests shall show no evidence of intermittent contacts, open circuits or short circuits during these tests.

10.2.4 Following the low frequency vibration test, capacitors shall meet the original requirements for capacitance, dissipation factor and leakage current.

10.3 **High Frequency Vibration:** Vibration shall consist of a simple harmonic motion having an amplitude of 0.06" [1.52] ± 10 % maximum total excursion or 20 g peak whichever is less.

10.3.1 Vibration frequency shall be varied logarithmically from 50 Hz to 2000 Hz and return to 50 Hz during a cycle period of 20 minutes.

10.3.2 The vibration shall be applied for 4 hours in each of 2 directions, parallel and perpendicular to the major axis of the capacitors.

10.3.3 Rated DC voltage shall be applied during the vibration cycling.

10.3.4 An oscilloscope or other comparable means shall be used in determining electrical intermittency during the last cycle. The AC voltage applied shall not exceed 2 volts rms.

10.3.5 Electrical tests shall show no evidence of intermittent contacts, open circuits or short circuits during these tests.

10.3.6 There shall be no mechanical damage to these capacitors as a result of these tests.

10.3.7 Following the high frequency vibration test, capacitors shall meet the original limits for capacitance, dissipation factor and leakage current.

11. **Acceleration Test:**

11.1 Capacitors shall be rigidly mounted by means of suitable brackets.

11.2 Capacitors shall be subjected to a constant acceleration of 100 g for a period of 10 seconds in each of 2 mutually perpendicular planes.

11.2.1 The direction of motion shall be parallel to and per-pendicular to the longitudinal axis of the capacitors.

11.3 Rated DC voltage shall be applied during acceleration test.

11.3.1 An oscilloscope or other comparable means shall be used in determining electrical intermittency during test. The AC voltage applied shall not exceed 2 volts rms.

11.4 Electrical tests shall show no evidence of intermittent contacts, open circuits or short circuits during these tests.

11.5 There shall be no mechancial damage to these capacitors as a result of these tests.

11.6 Following the acceleration test, capacitors shall meet the original limits for capacitance, dissipation factor and leakage current.

12. **Shock Test:**

12.1 Capacitors shall be rigidly mounted by means of suitable brackets. The test load shall be distributed uniformly on the test platform to minimize the effects of unbalanced loads.

12.1.1 Test equipment shall be adjusted to produce a shock of 100 g peak with the duration of 6 mS and sawtooth waveform at a velocity change of 9.7 ft./sec.

12.2 Capacitors shall be subjected to 3 shocks applied in each of 3 directions corresponding to the 3 mutually perpendicular axes of the capacitors.

12.3 Rated DC voltage shall be applied during test.

12.3.1 An oscilloscope or other comparable means shall be used in determining electrical intermittency during tests. The replacement voltage applied shall not exceed 2 volts rms.

PERFORMANCE CHARACTERISTICS (Continued)

12.4 Electrical tests shall show no evidence of intermittent contacts, open circuits or short circuits during these tests.

12.5 There shall be no mechanical damage to these capacitors as a result of these tests.

12.6 Following the shock test, capacitors shall meet the original limits for capacitance, dissipation factor and leakage current.

13. **Moisture Resistance:**

13.1 Capacitors shall be subjected to temperature cycling at 90 % to 95 % relative humidity, from + 25 °C to + 65 °C to + 25 °C (+ 10 °C, - 2 °C) over a period of 8 hours per cycle for 1000 hours.

13.2 Following the moisture resistance test, the leakage current and dissipation factor shall meet the initial requirements, and the change in capacitance shall not exceed ±10%.

14. **Thermal Shock:**

14.1 Capacitors shall be conditioned prior to temperature cycling for 15 minutes at + 25 °C, at less than 50 % relative humidity and a barometric pressure at 28 to 31".

14.2 Capacitors shall be subjected to thermal shock in a cycle of exposure to ambient air at :
- 55 °C (+ 0 °C,- 5 °C) for 30 minutes, then
+ 25 °C (+ 10 °C, - 5 °C) for 5 minutes, then
+ 125 °C (+ 3 °C, - 0 °C) for 30 minutes, then
+ 25 °C (+ 10 °C, - 5 °C) for 5 minutes for 5 cycles.

14.3 Capacitors shall show no evidence of harmful or extensive corrosion, obliteration of marking or other visible damage.

14.4 Following the thermal shock test, capacitors shall meet the original requirements for leakage current and dissipation factor. Capacitance change shall not exceed ± 5 % of the original measured value.

15. **Soldering Compatibility:**

15.1 **Resistance to Solder Heat:** Capacitors will withstand exposure to + 260 °C + 5 °C for 10 seconds.

15.1.1 Following the resistance to soldering heat test, capacitance, dissipation factor and DC leakage current shall meet the initial requirement.

15.2 **Solderability:** Capacitors will meet the solderability requirements of ANSI/J-STD-002, Test B, Category 3.

16. **Terminal Strength:** Per UEC-384-3, minimum of 5N shear force.

17. **Environmental:** Mercury, CFC and ODS materials are not used in the manufacture of these capacitors.

18. **Flammability:** Encapsulant materials meet UL94 V0 with an oxygen index of 32 %.

19. **Capacitor Failure Mode:** The predominant failure mode for solid tantalum capacitors is increased leakage current resulting in a shorted circuit. Capacitor failure may result from excess forward or reverse DC voltage, surge current, ripple current, thermal shock or excessive temperature.

The increase in leakage is caused by a breakdown of the Ta_2O_5 dielectric. For additional information on leakage failure of solid tantalum chip capacitors, refer to Vishay Sprague Technical Paper, "Leakage Failure Mode in Solid Tantalum Chip Capacitors."

20. **Surge Current:** All D and E case code 293D capacitors are 100 % surge current tested at + 25 °C and rated voltage. The total series circuit resistance is 0.5 ohms. Each charge cycle of 0.10 seconds is followed by a discharge cycle of 0.10 seconds. Three surge cycles are applied. Each capacitor is tested individually to maximize the peak charging current.

GUIDE TO APPLICATION

1. **Recommended rated working voltage guidelines:** (- 55 °C to + 85 °C)

Standard Conditions, for example; output filters

Capacitor Voltage Rating (V)	Operating Voltage (V)
4.0	2.5
6.3	3.6
10	6.0
16	10
20	12
25	15
35	24
50	28

Severe Conditions, for example; input filters

Capacitor Voltage Rating (V)	Operating Voltage (V)
4.0	2.5
6.3	3.3
10	5.0
16	8.0
20	10
25	12
35	15
50	24

2. **A-C Ripple Current:** The maximum allowable ripple current shall be determined from the formula:

$$I_{rms} = \sqrt{\frac{P}{R_{ESR}}}$$

where,

P = Power Dissipation in Watts at + 25 °C as given in the table in Paragraph Number 5 (Power Dissipation)

R_{ESR} = The capacitor Equivalent Series Resistance at the specified frequency.

GUIDE TO APPLICATION (Continued)

3. **A-C Ripple Voltage:** The maximum allowable ripple voltage shall be determined from the formula:

$$V_{rms} = Z\sqrt{\frac{P}{R_{ESR}}}$$

or, from the formula:

$$V_{rms} = I_{rms} \times Z$$

where,

P = Power Dissipation in Watts at + 25 °C as given in the table in Paragraph Number 5 (Power Dissipation).

R_{ESR} = The capacitor Equivalent Series Resistance at the specified frequency.

Z = The capacitor impedance at the specified frequency.

3.1 The sum of the peak AC voltage plus the applied DC voltage shall not exceed the DC voltage rating of the capacitor.

3.2 The sum of the negative peak AC voltage plus the applied DC voltage shall not allow a voltage reversal exceeding 10 % of the DC working voltage at + 25 °C.

4. **Reverse Voltage:** These capacitors are capable of withstanding peak voltages in the reverse direction equal to 10 % of the DC rating at + 25 °C, 5 % of the DC rating at + 85 °C and 1 % of the DC rating at + 125 °C.

5. **Temperature Derating:** If these capacitors are to be operated at temperatures above + 25 °C, the permissible rms ripple current or voltage shall be calculated using the derating factors as shown:

Temperature	Derating Factor
+ 25 °C	1.0
+ 85 °C	0.9
+ 125 °C	0.4

6. **Power Dissipation:** Power dissipation will be affected by the heat sinking capability of the mounting surface. Non-sinusoidal ripple current may produce heating effects which differ from those shown. It is important that the equivalent Irms value be established when calculating permissible operating levels. (Power Dissipation calculated using + 25 °C temperature rise.)

Case Code	Maximum Permissible Power Dissipation at + 25 °C (Watts) in free air
A	0.075
B	0.085
C	0.110
D	0.150
E	0.165

7. **Printed Circuit Board Materials:** Type 293D capacitors are compatible with commonly used printed circuit board materials (alumina substrates, FR4, FR5, G10, PTFE-fluorocarbon and porcelanized steel).

8. **Attachment:**

8.1 **Solder Paste:** The recommended thickness of the solder paste after application is 0.007" ± 0.001" [0.178 mm ± 0.025 mm]. Care should be exercised in selecting the solder paste. The metal purity should be as high as practical. The flux (in the paste) must be active enough to remove the oxides formed on the metallization prior to the exposure to soldering heat. In practice this can be aided by extending the solder preheat time at temperatures below the liquidous state of the solder.

8.2 **Soldering:** Capacitors can be attached by conventional soldering techniques; vapor phase, convection reflow, infrared reflow, wave soldering and hot plate methods. The Soldering Profile charts show recommended time/temperature conditions for soldering. Preheating is recommended. The recommended maximum ramp rate is 2 °C per second. Attachment with a soldering iron is not recommended due to the difficulty of controlling temperature and time at temperature. The soldering iron must never come in contact with the capacitor.

8.2.1 **Backward and Forward Compatibility:** Capacitors with SnPb or 100 % tin termination finishes can be soldered using SnPb or lead (Pb)-free soldering processes.

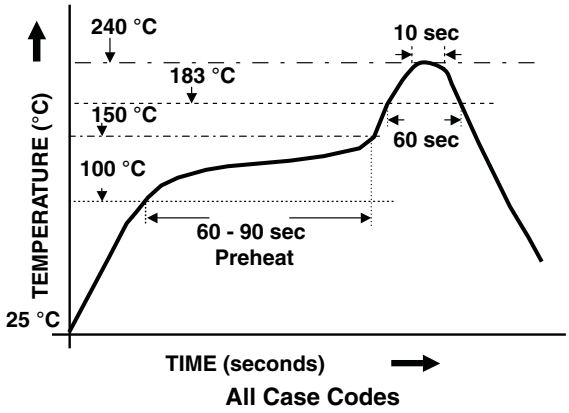
9. **Cleaning (Flux Removal) After Soldering:** The 293D is compatible with all commonly used solvents such as TES, TMS, Prelete, Chlorethane, Terpene and aqueous cleaning media. However, CFC/ODS products are not used in the production of these devices and are not recommended. Solvents containing methylene chloride or other epoxy solvents should be avoided since these will attack the epoxy encapsulation material.

9.1 When using ultrasonic cleaning, the board may resonate if the output power is too high. This vibration can cause cracking or a decrease in the adherence of the termination. DO NOT EXCEED 9W/l at 40 kHz for 2 minutes.

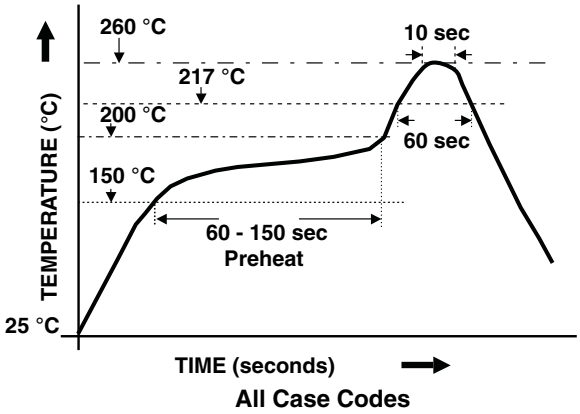
GUIDE TO APPLICATION (Continued)

SOLDERING PROFILE

Recommended SnPb Reflow Soldering Profile



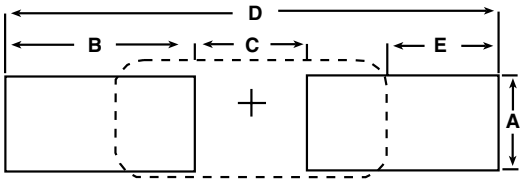
Recommended Pb Free Reflow Soldering Profile



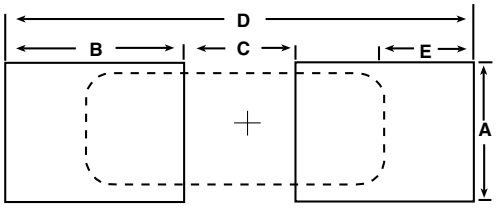
10. Recommended Mounting Pad Geometries: Proper mounting pad geometries are essential for successful solder connections. These dimensions are highly process sensitive and should be designed to minimize component rework due to unacceptable solder joints. The dimensional configurations shown are the recommended pad geometries for both wave and reflow soldering techniques. These dimensions are intended to be a starting point for circuit board designers and may be fine tuned if necessary based upon the peculiarities of the soldering process and/or circuit board design.

RECOMMENDED MOUNTING PAD GEOMETRIES in inches [millimeters]

Wave Solder Pads

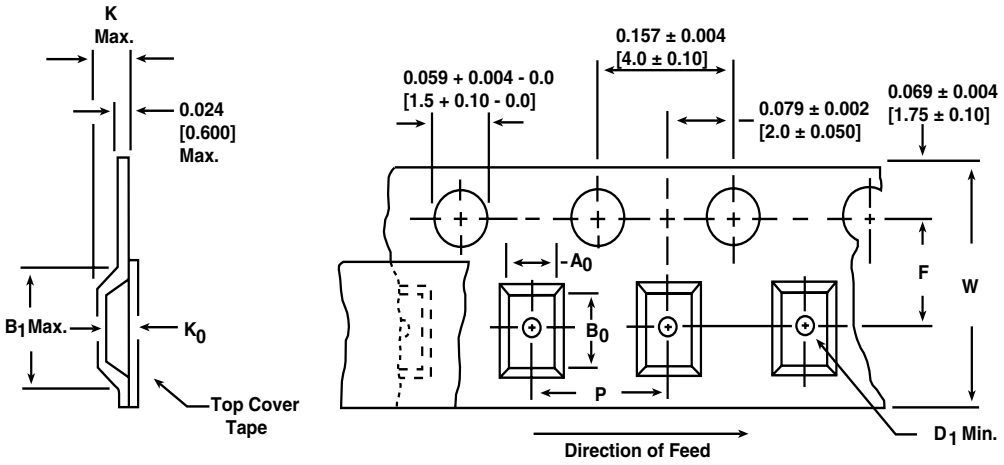


Reflow Solder Pads

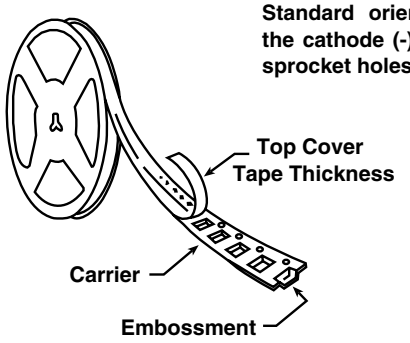


Pad Dimensions						Pad Dimensions					
Case Code	A (Min.)	B (Nom.)	C (Nom.)	D (Nom.)	E (Nom.)	Case Code	A (Min.)	B (Nom.)	C (Nom.)	D (Nom.)	E (Nom.)
A	0.034 [0.87]	0.085 [2.15]	0.053 [1.35]	0.222 [5.65]	0.048 [1.23]	A	0.071 [1.80]	0.085 [2.15]	0.053 [1.35]	0.222 [5.65]	0.048 [1.23]
B	0.061 [1.54]	0.085 [2.15]	0.065 [1.65]	0.234 [5.95]	0.048 [1.23]	B	0.110 [2.80]	0.085 [2.15]	0.065 [1.65]	0.234 [5.95]	0.048 [1.23]
C	0.061 [1.54]	0.106 [2.70]	0.124 [3.15]	0.337 [8.55]	0.050 [1.28]	C	0.110 [2.80]	0.106 [2.70]	0.124 [3.15]	0.337 [8.55]	0.050 [1.28]
D	0.066 [1.68]	0.106 [2.70]	0.175 [4.45]	0.388 [9.85]	0.050 [1.28]	D	0.118 [3.00]	0.106 [2.70]	0.175 [4.45]	0.388 [9.85]	0.050 [1.28]
E	0.066 [1.68]	0.106 [2.70]	0.175 [4.45]	0.388 [9.85]	0.050 [1.28]	E	0.118 [3.00]	0.106 [2.70]	0.175 [4.45]	0.388 [9.85]	0.050 [1.28]
P	0.034 [0.87]	0.085 [2.15]	0.053 [1.35]	0.222 [5.65]	0.048 [1.23]	P	0.071 [1.80]	0.085 [2.15]	0.053 [1.35]	0.222 [5.65]	0.048 [1.23]

TAPE AND REEL PACKAGING in inches [millimeters]



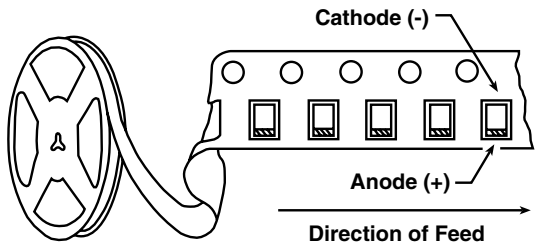
TAPE SIZE	B_1 (Max.)	D_1 (Min.)	F	K (Max.)	P	W	$A_0B_0K_0$
8 mm	0.165 [4.2]	0.039 [1.0]	0.138 ± 0.002 [3.5 ± 0.05]	0.094 [2.4]	0.157 ± 0.004 [4.0 ± 1.0]	0.315 ± 0.012 [8.0 ± 0.30]	**Notes:** $A_0B_0K_0$ are determined by component size. The clearance between the component and the cavity must be within 0.002" [0.05 mm] minimum to 0.020" [0.50 mm] maximum for 8 mm tape and 0.002" [0.05 mm] minimum to 0.026" [0.65 mm] maximum for 12 mm tape.
12 mm	0.323 [8.2]	0.059 [1.5]	0.217 ± 0.002 [5.5 ± 0.05]	0.177 [4.5]	0.315 ± 0.004 [8.0 ± 1.0]	0.472 ± 0.012 [12.0 ± 0.30]	



Standard orientation is with the cathode (-) nearest to the sprocket holes per EIA-481-1.

Tape and Reel Specifications: All case codes are available on plastic embossed tape per EIA-481-1. Standard reel diameter is 13" [330 mm]. 7" [178 mm] reels are available.

The most efficient packaging quantities are full reel increments on a given reel diameter. The quantities shown allow for the sealed empty pockets required to be in conformance with EIA-481-1. Reel size must be specified in the Vishay Sprague part number.

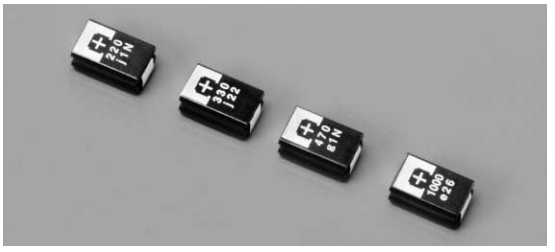


Case Code	Tape Width	Component Pitch	Units Per Reel	
			7" [178 mm] Reel	13" [330 mm] Reel
A	8 mm	4 mm	2000	9000
B	8 mm	4 mm	2000	8000
C	12 mm	8 mm	500	3000
D	12 mm	8 mm	500	2500
E	12 mm	8 mm	400	1500
P	8 mm	4 mm	3000	10000

TPD Series

Low ESR High Capacitance Products

TPD series has low ESR and high capacitance.
It is the most suitable for the high frequency and high current switching power supply applications.

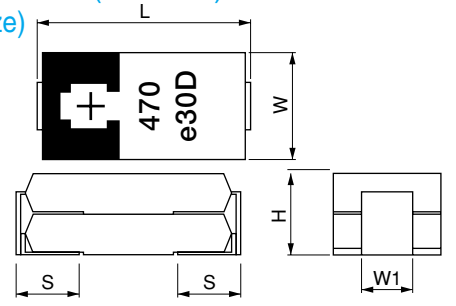


Specifications

Items	Condition	Characteristics		
Operating Temperature range	–	−55 to +105 (℃)		
Rated capacitance range	120Hz/20℃	150 to 1000 (μF)		
Capacitance tolerance	120Hz/20℃	M:±20%		
Rated voltage	–	2.5 to 10 (V.DC)		
Dissipation Factor (D.F.)	120Hz/20℃	≦10.0 (%)		
Leakage current	Rated voltage applied, after 5 minutes	≦ 0.1CV (μA)		
Equivalent series resistance ESR (mΩmax.)	100kHz/20℃	Please see the attached characteristics list		
Temperature characteristics of Impedance ratio	100kHz/+20℃	−55℃	Z/Z20℃	1.0 to 2.0
		+105℃	Z/Z20℃	0.6 to 1.0
Endurance	105℃,2000h, rated voltage applied	△C/C		Within±20% of the initial value
		D.F.		≦1.5 times the initial limit
		L.C.		≦The initial limit
Damp heat (Steady state)	60℃,90 to 95%RH,500h, No voltage applied	△C/C		Within+40%, −20% of the initial value
		D.F.		≦1.5 times the initial limit
		L.C.		≦3 times the initial limit
Surge	105℃,1000 cycles, 1kΩdischarge resistance, surge voltage applied	△C/C		Within±5% of the initial value
		D.F.		≦The initial limit
		L.C.		≦3 times the initial limit

Dimensions (unit: mm)

(D4D size)



Size code	L (±0.3)	W (±0.2)	H (±0.2)	S (±0.2)	W1 (±0.1)
D4D	7.3	4.3	3.6	1.3	2.4

Size List

μF \ RV (SV)	2.5 (3.2)	4.0 (5.0)	6.3 (8.0)	10.0 (13.0)
150				D4D
220			D4D	
330		D4D	D4D	
470	D4D	D4D	D4D	
680	D4D	D4D		
1000	D4D			

Characteristics List

Size code	SANYO Part number	Rated Voltage (V)	Rated Capacitance (μF)	D.F. (%max.)	L.C. (μA) max./5min.	E.S.R. (mΩmax) 100kHz/20℃	Maximum allowable ripple current (mArms) 100kHz※1	MSL Reflow Temp. ≦260℃	MSL Reflow Temp. ≦250℃
D4D	10TPD150M	10.0	150	10.0	150.0	15	3600	3	2a
	6TPD220M	6.3	220	10.0	138.6	12	4000		
	6TPD330M	6.3	330	10.0	207.9	10	4400		
	6TPD470M	6.3	470	10.0	296.1	10	4400		
	4TPD330M	4.0	330	10.0	132.0	12	4000		
	4TPD470M	4.0	470	10.0	188.0	10	4400		
	4TPD680M	4.0	680	10.0	272.0	10	4400		
	2R5TPD470M	2.5	470	10.0	117.5	10	4400		
	2R5TPD470M8					8	4900		
	2R5TPD470M6					6	5600		
	2R5TPD470M5					5	6100		
	2R5TPD680M	2.5	680	10.0	170.0	10	4400		
	2R5TPD680M8					8	4900		
	2R5TPD680M6					6	5600		
	2R5TPD680M5					5	6100		
	2R5TPD1000M	2.5	1000	10.0	250.0	10	4400		
	2R5TPD1000M8					8	4900		
	2R5TPD1000M6					6	5600		
	2R5TPD1000M5					5	6100		

※1:100k to 500kHz, 45℃

PRODUCT DESCRIPTION

KEMET's family of solid tantalum chip capacitors is designed and manufactured with the demanding requirements of surface mount technology in mind.

These devices extend the advantages of solid tantalum technology to today's surface mount circuit applications. Complementing multilayer ceramic chip convenience with capacitance ratings through 1500 µF, tantalum chip capacitors permit circuit designers to take full advantage of the benefits of surface mount technology.

T491 Series — Industrial

The leading choice in today's surface mount designs is the KEMET T491 Series. This product meets or exceeds the requirements of EIA standard 535BAAC. The physical outline and dimensions of this series conform to this global standard.

Five low profile case sizes are available in the T491 family. The R/2012-12, S/3216-12 and T/3528-12 case sizes have a maximum height of 1.2 mm. The U/6032-15 size has a maximum height of 1.5 mm, and the V/7343-20 has a maximum height of 2.0 mm.

This product was designed specifically for today's highly automated surface mount processes and equipment. This series uses the same proven solid tantalum KEMET technology acclaimed and respected throughout the world. Added to this is the latest in materials, processes and automation which result in a component unsurpassed worldwide in total performance and value.

The standard terminations are 100% matte tin and provide excellent wetting characteristics and compatibility with today's surface mount solder systems. Tin-Lead (SnPb) terminations are available upon request for any part number. Gold-plated terminations are also available for use with conductive epoxy attachment processes. The symmetrical terminations offer total compliancy to provide the thermal and mechanical stress relief required in today's technology. Lead frame attachments to the tantalum pellet are made via a microprocessor-controlled welding operation, and a high temperature silver epoxy adhesive system.

Standard packaging of these devices is tape and reel in accordance with EIA 481-1. This system provides perfect compatibility with all tape-fed placement units.

T492 Series — Military

KEMET is approved to MIL-PRF-55365/8 (CWR11), Weibull failure rate "B" level or 0.1% failures per 1,000 hours, "C" level or 0.01% failures per 1,000 hours, and "D" level or 0.001% failures per 1,000 hours. This CWR11 product — designated as KEMET's T492 Series — is a precision-molded device, with compliant leadframe terminations and indelible laser marking. This is the military version of the global IEC/EIA standard represented by KEMET's T491 Series. Tape and reeling per EIA 481-1 is standard.

T493 Series — Military - COTS

The T493 series is designed for the COTS (Commercial-Off-The-Shelf) requirements of military/aerospace applications. This series is a surface mount tantalum product offering various leadframe surface finishes, Weibull grading and surge current testing options. The full part number includes a code defining the terminations, the Weibull reliability, surge test conditions, and the ESR range. The possible terminations include gold plated, hot solder dipped, solder plated, and solder fused. Reliability grading of B level (0.1%/kHours) and C level (0.01%/kHours) are available. Surge current testing options include: 10 cycles at 25ºC, or 10-cycles at -55ºC and +85ºC. Both standard and low ESR options are available. All lots of this series are conditioned with MIL-PRF-55365 Group A testing.

T494 Series — Low ESR, Industrial Grade

The T494 is a low ESR series that is available in all the same case sizes and CV ratings as the popular T491 series. The T494 offers low ESR performance with the economy of an industrial grade device. This series is targeted for output filtering and other applications that may benefit from improved efficiency due to low ESR.

T495 Series — Low ESR, Surge Robust

The low ESR, surge robust T495 series is an important member of KEMET's tantalum chip family. Designed primarily for output filtering in switch-mode power supplies and DC-to-DC converters, the standard CV T495 values are also an excellent choice for battery-to-ground input filter applications.

This series builds upon proven technology used for industrial grade tantalum chip capacitors to offer several important advantages: very low ESR, high ripple current capability, excellent capacitance stability, plus improved ability to withstand high inrush currents. These benefits are achieved through a combination of proprietary design, material, and process parameters, as well as high-stress, low impedance electrical conditioning performed prior to screening. Capacitance values range from 4.7µF to 1000µF, in voltage ratings from 2.5 to 50 volts.

T496 Series — Fused

KEMET also offers a "fail-safe" fused solid tantalum chip capacitor. The built-in fuse element provides excellent protection from damaging short circuit conditions in applications where high fault currents exist. Protection from costly circuit damage due to reversed installation is offered with this device. Package sizes include the EIA standard 3528-12, 6032-15, 7343-31, and 7343-43 case size. Capacitance values range from 0.15 µF to 470.0 µF, in voltage ratings from 4 to 50. Standard capacitance tolerances include ±20% and ±10%. Tape and reeling per EIA 481-1 is standard.

PRODUCT DESCRIPTION

T498 SERIES - High Temperature (150° C)

The T498 Series is a high temperature version of KEMET's solid tantalum chip family that offers optimal performance in applications with operating temperatures of up to 150° C. Advancements in materials and testing have allowed for the introduction of this series which delivers a reliability level of 0.5% per 1000 hours at rated voltage at rated temperature. This series is available in five standard EIA case sizes with RoHS-Compliant/100% matte tin finish lead terminations as standard. Other termination options include 90Sn/10Pb finishes and gold for conductive adhesive attachment processes. Capacitance values range from .47µF to 220µF, in voltage ratings from 4 to 50 volts.

T510 Series — High Capacitance – Low ESR

The ultra-low ESR T510 Series is a breakthrough in solid tantalum capacitor technology. KEMET's T510 Series offers low ESR in the popular EIA 7343-43 and 7360-38 case sizes. The ultra-low ESR and high ripple current capability make the T510 an ideal choice for SMPS filtering and power decoupling of today's high speed microprocessors.

KEMET has developed an innovative construction platform that incorporates multiple capacitor elements, in parallel, inside a single package. This unique assembly, combined with KEMET's superior processing technology, provides the best combination of high CV, low ESR, and small size in a user friendly, molded, surface mount package.

T520 SERIES — Conductive Polymer

The Kemet Organic Capacitor (KO-CAP) is a Tantalum capacitor, with a Ta anode and Ta_2O_5 dielectric. However, a conductive, organic, polymer replaces the MnO2 as the cathode plate of the capacitor. This results in very low ESR and improved cap retention at high frequency. The KO-CAP also exhibits a benign failure mode, which eliminates the ignition failures that can occur in standard MnO2 Tantalum types. Note also that KO-CAPs may be operated at voltages up to 90% of rated voltage for part types with rated voltage ≤ 10 volts and up to 80% of rated voltage for part types > 10 volts with equivalent or better reliability than standard tantalums operated at 50% of rated voltage.

The T520 series captures the best features of multilayer ceramic caps (low ESR and high frequency cap retention), aluminum electrolytics (benign failure mode), and proven solid tantalum technology (volumetric efficiency, surface mount capability, and no wearout mechanism). The KO-CAP can reduce component counts, eliminate through-hole assembly by replacing cumbersome leaded aluminum capacitors, and offer a more cost effective solution to high-cost high-cap ceramic capacitors. These benefits allow the designer to save both board space and money. See pages 42-52 for complete details.

T525 SERIES — High Temperature Conductive Polymer

The T525 Series is a version of KEMET's Tantalum Polymer Capacitor rated up to 125ºC. This part type was introduced as Lead (Pb) Free and offers the same advantages as the T520 KO-CAP. This includes low ESR, high frequency capacitance retention and benign failure mode.

T530 SERIES — Conductive Polymer High Capacitance — Ultra Low ESR

KEMET is offering a multiple anode tantalum chip capacitor with a polymer material replacing the MnO2 offering non-ignition, self-healing, 125°C performance capability with higher conductivity material that lowers the ESR. Packaged as multiple anodes to reduce the depth that the signal must penetrate, this parallel arrangement reduces the ESR further still to achieve the highest capacitance and lowest ESR of any other type of SMT capacitor with typical ESR values as low as 5 milliohms. With the reduced ESR, the enhanced capacitance retention in higher frequencies results in the lowest total capacitance solution and provides for the most economical solution in high power applications.

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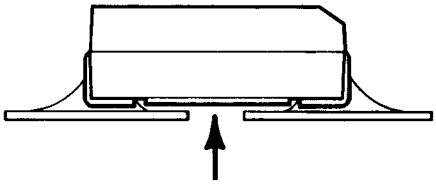
TANTALUM MnO_2 COMPONENT PERFORMANCE CHARACTERISTICS (con't.)

- **Tensile Force**
  - ***Four Pounds (1.8 kilograms), 60 Seconds***

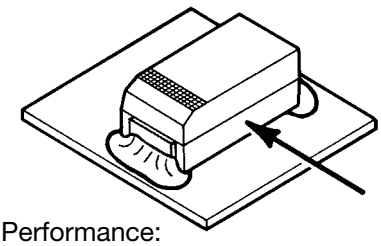


4 lb. (1.8 Kg)

- **Shear Force**

Table 8 Maximum Shear Loads

Case Code		Maximum Shear Loads	
KEMET	EIA	Kilograms	Pounds
R	2012-12	2.4	5.3
S	3216-12	3.2	7.0
T	3528-12	3.6	8.0
U	6032-15	4.5	10.0
V	7343-20	5.0	11.0
A	3216-18	3.2	7.0
B	3528-21	3.6	8.0
C	6032-28	4.5	10.0
D	7343-31	5.0	11.0
X	7343-43	5.0	11.0
E	7260-38	5.0	11.0



Post Test Performance:

a. Capacitance — within ±5% of initial value
b. DC Leakage — within initial limit
c. Dissipation Factor — within initial limit

APPLICATIONS

32. Handling

Automatic handling of encapsulated components is enhanced by the molded case which provides compatibility with all types of high speed pick and place equipment. Manual handling of these devices presents no unique problems. Care should be taken with your fingers, however, to avoid touching the solder-coated terminations as body oils, acids and salts will degrade the solderability of these terminations. Finger cots should be used whenever manually handling all solderable surfaces.

33. Termination Coating

KEMET's standard termination finish is 100% Sn (Excluding the T492/3 series. Refer to specific lead frame options available on T493 Series). Standard terminations can be ordered with a "T" suffix in the lead material designator of the KEMET part number. Components ordered with the "T" suffix are Pb-Free/RoHS compliant and are backward and forward compatible with SnPb and Pb-Free soldering processes.

90Sn/10Pb terminations are also available and can be ordered with an "H" suffix.

KEMET's "S" suffix remains an active termination designator for current designs but is not recommended for new designs. Parts ordered with an "S" suffix are not guaranteed to be Pb-Free or RoHS compliant. Refer to www.kemet.com for information on Pb-Free transition.

For conductive adhesive attachment processes, a gold termination finish is available for most series and case sizes. Refer to the specific series for details.

34. Recommended Mounting Pad Geometries

Proper mounting pad geometries are essential for successful solder connections. These dimensions are highly process sensitive and should be designed to maximize the integrity of the solder joint, and to minimize component rework due to unacceptable solder joints.

Figure 12 illustrates pad geometry. Tables 9 & 10 provide recommended pad dimensions for both wave and reflow soldering techniques. These dimensions are intended to be a starting point for circuit board designers, to be fine tuned, if necessary, based upon the peculiarities of the soldering process and/or circuit board design.

Contact KEMET for Engineering Bulletin Number F-2100 entitled "Surface Mount Mounting Pad Dimensions and Considerations" for further details on this subject.

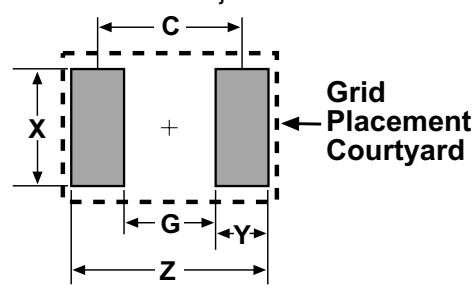


Figure 12

Table 9 – Land Pattern Dimensions for Reflow Solder

KEMET/EIA Size Code	Pad Dimensions - mm				
	Z	G	X	Y (ref)	C (ref)
R/2012-12	3.90	0.80	1.80	1.55	2.35
A/3216-18, S/3216-12	4.70	0.80	1.50	1.95	2.75
B/3528-21, T/3528-12	5.00	1.10	2.50	1.95	3.05
C/6032-28, U/6032-15	7.60	2.50	2.50	2.55	5.05
D/7343-31, V/7343-20, X/7343-43	8.90	3.80	2.70	2.55	6.35
E/7260-38	8.90	3.80	4.40	2.55	6.35

Table 10 – Land Pattern Dimensions for Wave Solder

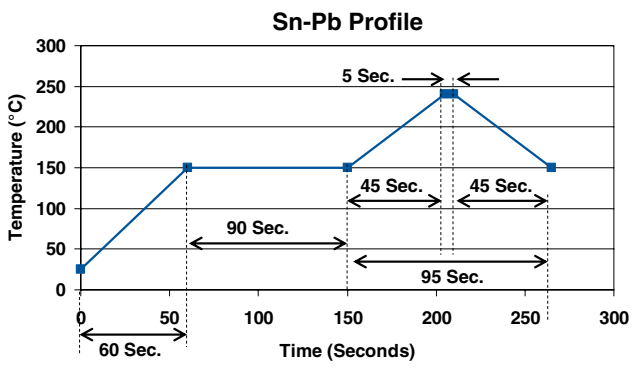
KEMET/EIA Size Code	Pad Dimensions - mm				
	Z	G	X	Y (ref)	C (ref)
R/2012-12	4.30	0.80	1.26	1.75	2.55
A/3216-18, S/3216-12	5.10	0.80	1.10	2.15	2.95
B/3528-21, T/3528-12	5.40	1.10	1.80	2.15	3.25
C/6032-28, U/6032-15	8.00	2.50	1.80	2.75	5.25
D/7343-31, V/7343-20, X/7343-43	9.70	3.80	2.70	2.95	6.75
E/7260-38	9.70	3.80	4.40	2.95	6.75

TANTALUM MnO_2 COMPONENT PERFORMANCE CHARACTERISTICS (con't.)

35. Soldering

KEMET's families of surface mount tantalum capacitors are compatible with wave (single or dual) soldering and IR or vapor phase reflow techniques. Solder-coated terminations have excellent wetting characteristics for high integrity solder fillets. Preheating of these components is recommended to avoid extreme thermal stress. Figure 13 represents recommended maximum solder temperature / time combinations for these devices.

Note that although the X/7343-43 case size can withstand wave soldering, the tall profile (4.3mm maximum) dictates care in wave process development.



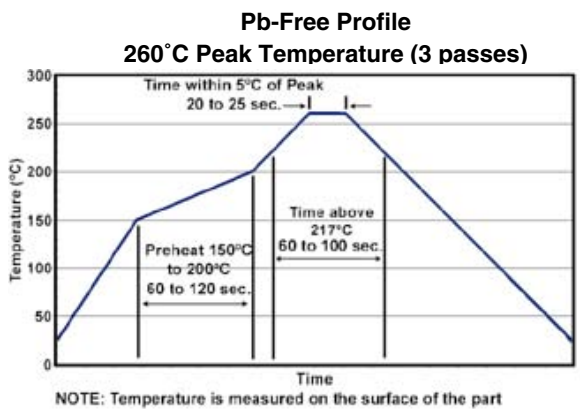


FIGURE 13 Time/Temperature Soldering Profile

Hand-soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. The iron should be removed. "Wiping" the edges of a chip and heating the top surface is not recommended.

During typical reflow operations a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and is not harmful to the product. Marking permanency is not affected by this change.

36. Washing

Standard washing techniques and solvents are compatible with all KEMET surface mount tantalum capacitors. Solvents such as Freon TMC and TMS, Trichlorethane, methylene chloride, prelete, and isopropyl alcohol are not harmful to these components.

If ultrasonic agitation is utilized in the cleaning process, care should be taken to minimize energy levels and exposure times to avoid damage to the terminations.

KEMET tantalum chips are also compatible with newer aqueous and semi-aqueous processes. Please follow the recommendations for cleaning as defined by the solder vendor.

37. Encapsulations

Under normal circumstances, potting or encapsulation of KEMET tantalum chips is not required.

38. Storage Environment

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature – reels may soften or warp, and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40 degrees C, and maximum storage humidity not exceed 60% relative humidity. In addition, temperature fluctuations should be minimized to avoid condensation on the parts, and atmospheres should be free of chlorine and sulfur bearing compounds. For optimized solderability, chip stock should be used promptly, preferably within 3 years of receipt.

39. Component Weights

- ***T49x, T510 Series***

Series	*Case Size*	*Typical Weight (mg)*
T49x	A/3216-18	32
T49x	B/3528-21	60
T49x	C/6032-28	130
T49x	D/7343-31	320
T49x	X/7343-43	500
T49x	E/7360-38	600
T49x	R/2012-12	10
T49x	S/3216-12	21
T49x	T/3528-12	34
T49x	U/6032-15	70
T49x	V/7343-20	206
T510	D/7343-31	338
T510	X/7343-43	510
T510	E/7360-38	645

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SOLID TANTALUM CHIP CAPACITORS

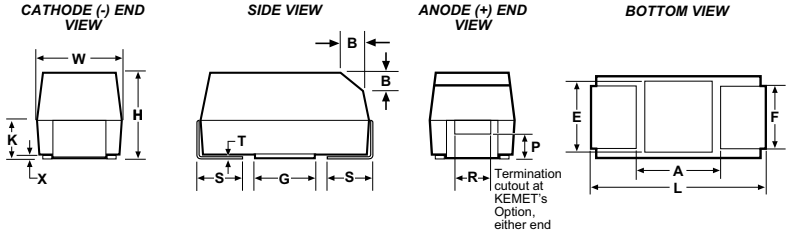
T491 SERIES - Precision Molded Chip

KEMET

FEATURES

- Meets or Exceeds EIA Standard 535BAAC
- Taped and Reeled per EIA 481-1
- Symmetrical, Compliant Terminations
- Optional Gold-plated Terminations
- Laser-marked Case
- 100% Surge current test on C, D, E, U, V, X sizes
- Halogen Free Epoxy
- Capacitance: 0.1 µF to 1000 µF
- Tolerance: ±10%, ±20%
- Voltage: 2.5-50 VDC
- Extended Range Values
- Low Profile Case Sizes
- RoHS Compliance & Lead Free Terminations (See www.kemet.com for transition information)
- Operating Temperature: -55°C to +125°C

CAPACITOR OUTLINE DRAWING



STANDARD T491 DIMENSIONS

Millimeters (inches)

CASE SIZE		COMPONENT													
KEMET	EIA	L*	W*	H*	K* ± 0.20 ± (.008)	F* ± 0.1 ± (.004)	S* ± 0.3 ± (.012)	B ± 0.15 (Ref) ± (.006)	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)
A	3216-18	3.2 ± 0.2 (.126 ± .008)	1.6 ±0.2 (.063 ± .008)	1.6 ± 0.2 (.063 ± .008)	0.9 (.035)	1.2 (.047)	0.8 (.031)	0.4 (.016)	0.10 ± 0.10 (.004 ± .004)	0.4 (.016)	0.4 (.016)	0.13 (.005)	1.4 (.055)	1.1 (.043)	1.3 (.051)
B	3528-21	3.5 ± 0.2 (.138 ± .008)	2.8 ± 0.2 (.110 ± .008)	1.9 ± 0.2 (.075 ± .008)	1.1 (.043)	2.2 (.087)	0.8 (.031)	0.4 (.016)	0.10 ± 0.10 (.004 ± .004)	0.5 (.020)	1.0 (.039)	0.13 (.005)	2.1 (.083)	1.8 (.071)	2.2 (.087)
C	6032-28	6.0 ± 0.3 (.236 ± .012)	3.2 ± 0.3 (.126 ± .012)	2.5 ± 0.3 (.098 ± .012)	1.4 (.055)	2.2 (.087)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	0.9 (.035)	1.0 (.039)	0.13 (.005)	3.1 (.122)	2.8 (.110)	2.4 (.094)
D	7343-31	7.3 ± 0.3 (.287 ± .012)	4.3 ± 0.3 (.169 ± .012)	2.8 ± 0.3 (.110 ± .012)	1.5 (.059)	2.4 (.094)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	0.9 (.035)	1.0 (.039)	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)
X	7343-43	7.3 ± 0.3 (.287 ± .012)	4.3 ± 0.3 (.169 ± .012)	4.0 ± 0.3 (.157 ± .012)	2.3 (.091)	2.4 (.094)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	1.7 (.067)	1.0 (.039)	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)
E	7260-38	7.3 ± 0.3 (.287 ± .012)	6.0 ± 0.3 (.236 ± .012)	3.6 ± 0.2 (.142 ± .008)	2.3 (.091)	4.1 (.161)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	0.9 (.035)	1.0 (.039)	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)

Notes: 1. Metric dimensions govern.
2. (Ref) - Dimensions provided for reference only.
* Mil-C-55365/8 Specified Dimensions

LOW PROFILE T491 DIMENSIONS

Millimeters (inches)

CASE SIZE		COMPONENT										
KEMET	EIA	L	W	H Max.	K Min.	F ± 0.1	S ± 0.3	X (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)
R	2012-12	2.0 ± 0.2 (.079 ± .008)	1.3 ± 0.2 (.051 ± .008)	1.2 (.047)	0.3 (.012)	0.9 (.035)	0.5 (.020)	0.05 (.002)	0.13 (.005)	0.8 (.031)	0.5 (.020)	0.8 (.031)
S	3216-12	3.2 ± 0.2 (.126 ± .008)	1.6 ± 0.2 (.063 ± .008)	1.2 (.047)	0.3 (.012)	1.2 (.047)	0.8 (.031)	0.05 (.002)	0.13 (.005)	1.4 (.055)	1.1 (.043)	1.3 (.051)
T	3528-12	3.5 ± 0.2 (.138 ± .008)	2.8 ± 0.2 (.110 ± .008)	1.2 (.047)	0.3 (.012)	2.2 (.087)	0.8 (.031)	0.05 (.002)	0.13 (.005)	2.1 (.083)	1.8 (.071)	2.2 (.087)
U	6032-15	6.0 ± 0.3 (.236 ± .012)	3.2 ± 0.3) (.126 ± .012)	1.5 (.059)	0.5 (.020)	2.2 (.087)	1.3 (.051)	0.05 (.002)	0.13 (.005)	3.1 (.122)	2.8 (.110)	2.4 (.094)
V	7343-20	7.3 ± 0.3 (.287 ± .012)	4.3 ± 0.3 (.169 ± .012)	2.0 (.079)	0.9 (.035)	2.4 (.094)	1.3 (.051)	0.05 (.002)	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)

Notes: 1. Metric dimensions govern.
2. (Ref) - Dimensions provided for reference only.
3. No dimensions provided for B, P or R because low profile cases do not have a bevel or a notch.

T491 ORDERING INFORMATION

T 491 B 105 M 035 A S*

Tantalum — T

Series — 491
T491 - Precision Molded

Case Size — B
A,B,C,D,E,R,S,T,U,V,X

Capacitance Picofarad Code — 105
First two digits represent significant figures.
Third digit specifies number of zeros to follow.

Capacitance Tolerance — M
M = ±20%; K = ±10%

Voltage — 035
As shown

Failure Rate — A
A = Not Applicable

Lead Material — S*
T = 100% Tin (Sn) Plated
H = Tin/Lead (SnPb 5% Pb minimum)
G = Gold Plated (A,B,C,D,X only)
**S = Not recommended for new designs

***Part number example: T491B105M035AT (14 digits - no spaces). See www.kemet.com for Pb Free transition.**
**** "S" Termination codes are converting from 90Sn/10 Pb to 100% tin finishes. Orders including "S" suffix termination codes do not guarantee Pb-free product.**

T491 TANTALUM CHIP CAPACITANCE VALUES
Case Size by Capacitance and Voltage

Capacitance		Rated Voltage @ +85°C									
µF	Code	2.5	3	4	6	10	16	20	25	35	50
0.10	104									A	A
0.15	154									A	A/B
0.22	224									A	B
0.33	334								A	A	B
0.47	474								A	A/B	B/C
0.68	684							A	A	A/B	B/C
1.0	105						A	R/S/A	A/B	A/B	V/C
1.5	155					A	A	S/A	A/B	B/C	C/D
2.2	225				R/A	A/B	R/S/A	A/B	B/C	B/C	C/D
3.3	335			A	A	R/S/A	A/B	T/A/B	B/C	B/C	D
4.7	475			A	S/A	A/B R/S	A/B/T	A/B/C	A/B/C	C/D	D
6.8	685			S/A	R/S A/B	S/T A/B	A/B/C	U/A/B/C	B/C	C/D	D/X
10.0	106			R/S A/B	R/S/T A/B	S/T/A B/C	B/C/U T/A	U/B/C	C/D	V/C/D	D/X
15.0	156			S/T A/B	S/T A/B/C	T/U A/B/C	U/B/C	C/D	C/D	D/X	X
22.0	226			S/T A/B/C	U/T A/B/C	T/U A/B/C	U/B C/D	V/C/D	V/C/D	D/X	
33.0	336		A	T/U A/B/C	T/U A/B/C	U/V B/C/D	U/C/D	V/C/D	D/X	X	
47.0	476			T/U A/B/C	T/U/A B/C/D	U/V B/C/D	V/C/D	D	D/X	X/E	
68.0	686			U/A B/C/D	U/B C/D	U/V B/C/D	V/D	D/X	X		
100.0	107	T		T/U/A B/C/D	U/V B/C/D	V/C/D	V/D/X	X/E			
150.0	157			V/B C/D	V/C/D	V/C D/X	D/X				
220.0	227			V/B	V/C D/X	V/D/X	X				
330.0	337			V/C/D	D/X	D/X/E					
470.0	477			D/X	D/X/E	X/E					
680.0	687			D/X	E						
1000.0	108			X/E							

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T491 RATINGS & PART NUMBER REFERENCE

Capacitance µF	Case Size	KEMET Part Number	DC Leakage µA @ 25ºC Max	DF % @ +25ºC 120 Hz Max	ESR Ω @ +25ºC 100 kHz Max
2.5 Volt Rating at +85ºC (1.7 Volt Rating at +125ºC)					
100.0	T	T491T107(1)2R5A(2)	2.5	24.0	3.9
220.0	D	T491D227(1)2R5A(2)	5.5	8.0	0.3
3 Volt Rating at +85ºC (2 Volt Rating at +125ºC)					
#33.0	*A	T491A336(1)003A(2)	1.0	6.0	4.0
4 Volt Rating at +85ºC (2.7 Volt Rating at +125ºC)					
3.3	A	T491A335(1)004A(2)	0.5	6.0	8.0
4.7	A	T491A475(1)004A(2)	0.5	6.0	8.0
6.8	A	T491A685(1)004A(2)	0.5	6.0	6.0
6.8	S	T491S685(1)004A(2)	0.5	6.0	15.0
10.0	B	T491B106(1)004A(2)	0.5	6.0	3.5
10.0	A	T491A106(1)004A(2)	0.5	6.0	6.0
#10.0	*S	T491S106(1)004A(2)	0.5	6.0	15.0
#10.0	*R	T491R106(1)004A(2)	0.5	8.0	10.0
15.0	B	T491B156(1)004A(2)	0.6	6.0	3.5
15.0	A	T491A156(1)004A(2)	0.6	6.0	4.0
15.0	T	T491T156(1)004A(2)	0.6	6.0	5.0
#15.0	*S	T491S156(1)004A(2)	0.6	10.0	15.0
22.0	C	T491C226(1)004A(2)	0.9	6.0	1.8
22.0	B	T491B226(1)004A(2)	0.9	6.0	3.5
#22.0	A	T491A226(1)004A(2)	0.9	6.0	4.0
#22.0	*T	T491T226(1)004A(2)	0.9	6.0	5.0
22.0	*S	T491S226(1)004A(2)	0.9	10.0	10.0
33.0	C	T491C336(1)004A(2)	1.3	6.0	1.8
33.0	U	T491U336(1)004A(2)	1.3	6.0	1.8
33.0	B	T491B336(1)004A(2)	1.3	6.0	3.5
#33.0	A	T491A336(1)004A(2)	1.3	6.0	4.0
#33.0	*T	T491T336(1)004A(2)	1.3	8.0	5.0
47.0	C	T491C476(1)004A(2)	1.9	6.0	1.8
47.0	U	T491U476(1)004A(2)	1.9	6.0	1.8
#47.0	B	T491B476(1)004A(2)	1.9	6.0	3.0
#47.0	A	T491A476M004A(2)	1.9	12.0	2.5
#47.0	*T	T491T476M004A(2)	1.9	12.0	6.0
68.0	D	T491D686(1)004A(2)	2.7	6.0	0.8
68.0	C	T491C686(1)004A(2)	2.7	6.0	1.6
#68.0	*U	T491U686(1)004A(2)	2.7	6.0	1.8
#68.0	B	T491B686(1)004A(2)	2.7	6.0	3.5
#68.0	*A	T491A686(1)004A(2)	2.8	30.0	4.0
100.0	D	T491D107(1)004A(2)	4.0	8.0	0.8
#100.0	C	T491C107(1)004A(2)	4.0	8.0	1.2
#100.0	*U	T491U107(1)004A(2)	4.0	10.0	1.8
#100.0	*B	T491B107M004A(2)	4.0	8.0	0.9
†100.0	*A	T491A107M004A(2)	4.0	30.0	4.0
†100.0	*T	T491T107M004A(2)	4.0	30.0	5.0
150.0	D	T491D157(1)004A(2)	6.0	8.0	0.8
150.0	V	T491V157(1)004A(2)	6.0	8.0	0.7
#150.0	*C	T491C157(1)004A(2)	6.0	8.0	1.2
†150.0	*B	T491B157M004A(2)	6.0	12.0	2.0
#220.0	*V	T491V227(1)004A(2)	8.8	8.0	0.7
#220.0	*B	T491B227M004A(2)	8.8	18.0	0.5
330.0	D	T491D337(1)004A(2)	13.2	8.0	0.7
†330.0	*V	T491V337(1)004A(2)	13.2	12.0	0.7
#330.0	*C	T491C337(1)004A(2)	13.2	10.0	0.9
#470.0	X	T491X477(1)004A(2)	18.8	8.0	0.5
#470.0	*D	T491D477(1)004A(2)	18.8	8.0	0.8
#680.0	*X	T491X687M004A(2)	27.2	12.0	0.5
#680.0	*D	T491D687M004A(2)	27.2	12.0	0.5
#1000.0	*X	T491X108(1)004A(2)	40.0	12.0	0.5
#1000.0	*E	T491E108M004A(2)	40.0	15.0	0.2
****6 Volt Rating at +85ºC (4 Volt Rating at +125ºC)**					
2.2	R	T491R225(1)006A(2)	0.5	6.0	25.0
2.2	A	T491A225(1)006A(2)	0.5	6.0	8.0
3.3	A	T491A335(1)006A(2)	0.5	6.0	8.0
4.7	A	T491A475(1)006A(2)	0.5	6.0	6.0
4.7	S	T491S475(1)006A(2)	0.5	6.0	15.0
6.8	B	T491B685(1)006A(2)	0.5	6.0	3.5
6.8	A	T491A685(1)006A(2)	0.5	6.0	6.0
#6.8	S	T491S685(1)006A(2)	0.5	6.0	15.0
#6.8	*R	T491R685(1)006A(2)	0.5	8.0	15.0
10.0	B	T491B106(1)006A(2)	0.6	6.0	3.5
10.0	A	T491A106(1)006A(2)	0.6	6.0	4.0
10.0	T	T491T106(1)006A(2)	0.6	6.0	5.0
#10.0	*S	T491S106(1)006A(2)	0.6	10.0	15.0
#10.0	*R	T491R106(1)006A(2)	0.6	8.0	10.0

Capacitance µF	Case Size	KEMET Part Number	DC Leakage µA @ 25ºC Max	DF % @ +25ºC 120 Hz Max	ESR Ω @ +25ºC 100 kHz Max
****6 Volt Rating at +85ºC (4 Volt Rating at +125ºC)**					
15.0	C	T491C156(1)006A(2)	0.9	6.0	1.8
15.0	B	T491B156(1)006A(2)	0.9	6.0	3.5
#15.0	A	T491A156(1)006A(2)	0.9	6.0	3.5
#15.0	T	T491T156(1)006A(2)	0.9	6.0	5.0
#15.0	*S	T491S156(1)006A(2)	0.9	15.0	10.0
22.0	C	T491C226(1)006A(2)	1.4	6.0	1.8
22.0	U	T491U226(1)006A(2)	1.4	6.0	1.8
22.0	B	T491B226(1)006A(2)	1.4	6.0	3.5
#22.0	A	T491A226(1)006A(2)	1.4	6.0	4.0
#22.0	T	T491T226(1)006A(2)	1.4	8.0	5.0
33.0	C	T491C336(1)006A(2)	2.0	6.0	1.8
33.0	U	T491U336(1)006A(2)	2.0	6.0	1.8
#33.0	B	T491B336(1)006A(2)	2.0	6.0	3.0
#33.0	A	T491A336(1)006A(2)	2.0	12.0	2.5
#33.0	*T	T491T336(1)006A(2)	2.0	12.0	6.0
47.0	D	T491D476(1)006A(2)	2.9	6.0	0.8
47.0	C	T491C476(1)006A(2)	2.9	6.0	1.6
#47.0	U	T491U476(1)006A(2)	2.9	6.0	1.8
#47.0	B	T491B476(1)006A(2)	2.9	6.0	2.0
†47.0	*A	T491A476M006A(2)	3.0	12.0	3.5
*47.0	*T	T491T476(1)006A(2)	3.0	24.0	4.4
68.0	D	T491D686(1)006A(2)	4.1	6.0	0.8
#68.0	C	T491C686(1)006A(2)	4.1	6.0	1.2
#68.0	*U	T491U686(1)006A(2)	4.1	10.0	1.8
#68.0	*B	T491B686(1)006A(2)	4.1	8.0	0.9
#68.0	*A	T491A686(1)006A(2)	5.0	30.0	4.0
100.0	D	T491D107(1)006A(2)	6.0	8.0	0.8
100.0	V	T491V107(1)006A(2)	6.0	8.0	0.7
#100.0	C	T491C107(1)006A(2)	6.0	8.0	0.9
#100.0	*U	T491U107(1)006A(2)	6.0	10.0	1.8
#100.0	*B	T491B107M006A(2)	6.3	15.0	3.0
150.0	D	T491D157(1)006A(2)	9.0	8.0	0.7
#150.0	*C	T491C157(1)006A(2)	9.0	8.0	1.2
#150.0	*V	T491V157(1)006A(2)	9.0	8.0	0.7
220.0	X	T491X227(1)006A(2)	13.2	8.0	0.7
#220.0	D	T491D227(1)006A(2)	13.2	8.0	0.7
#220.0	*C	T491C227M006A(2)	13.2	10.0	1.2
#220.0	*V	T491V227(1)006A(2)	13.2	12.0	0.7
330.0	*X	T491X337(1)006A(2)	19.8	8.0	0.4
330.0	*D	T491D337(1)006A(2)	19.8	8.0	0.4
470.0	*X	T491X477(1)006A(2)	28.2	10.0	0.4
470.0	*D	T491D477M006A(2)	28.2	12.0	0.4
470.0	*E	T491E477(1)006A(2)	29.6	10.0	0.4
680.0	*E	T491E687M006A(2)	40.8	12.0	0.5
10 Volt Rating at +85ºC (7 Volt Rating at +125ºC)					
1.5	A	T491A155(1)010A(2)	0.5	6.0	8.0
2.2	B	T491B225(1)010A(2)	0.5	6.0	3.5
2.2	A	T491A225(1)010A(2)	0.5	6.0	8.0
3.3	A	T491A335(1)010A(2)	0.5	6.0	6.0
3.3	S	T491S335(1)010A(2)	0.5	6.0	15.0
#3.3	*R	T491R335(1)010A(2)	0.3	8.0	15.0
4.7	B	T491B475(1)010A(2)	0.5	15.0	3.5
4.7	A	T491A475(1)010A(2)	0.5	6.0	5.0
#4.7	S	T491S475(1)010A(2)	0.5	6.0	15.0
#4.7	*R	T491R475(1)010A(2)	0.5	8.0	10.0
6.8	B	T491B685(1)010A(2)	0.7	6.0	3.5
6.8	A	T491A685(1)010A(2)	0.7	6.0	4.0
6.8	T	T491T685(1)010A(2)	0.7	6.0	5.0
#6.8	*S	T491S685(1)010A(2)	0.7	10.0	15.0
10.0	C	T491C106(1)010A(2)	1.0	6.0	1.8
10.0	B	T491B106(1)010A(2)	1.0	6.0	3.5
#10.0	A	T491A106(1)010A(2)	1.0	6.0	4.0
#10.0	T	T491T106(1)010A(2)	1.0	6.0	5.0
#10.0	*S	T491S106(1)010A(2)	1.0	10.0	15.0
15.0	C	T491C156(1)010A(2)	1.5	6.0	1.8
15.0	U	T491U156(1)010A(2)	1.5	6.0	1.8
15.0	B	T491B156(1)010A(2)	1.5	6.0	2.8
#15.0	*A	T491A156(1)010A(2)	1.5	8.0	6.0
#15.0	*T	T491T156(1)010A(2)	1.5	8.0	5.0

(1) To complete KEMET Part Number, insert M for ±20% tolerance or K for ±10% tolerance.
(2) To complete KEMET Part Number, insert T, H, G, or S lead material designation as shown on page 15.
*Extended Values
**6 Volt product equivalent to 6.3 volt product.
#Maximum Capacitance Change @ 125ºC=+15%.
†Maximum Capacitance Change @ 125ºC=+20%.
Higher voltage ratings and tighter tolerance product may be substituted within the same size at KEMET's option.
Voltage substitutions will be marked with the higher voltage rating.

T491 RATINGS & PART NUMBER REFERENCE

Capacitance µF	Case Size	KEMET Part Number	DC Leakage µA @ 25ºC Max	DF % @ +25ºC 120 Hz Max	ESR Ω @ +25ºC 100 kHz Max
10 Volt Rating at +85ºC (7 Volt Rating at +125ºC)					
22.0	C	T491C226(1)010A(2)	2.2	6.0	1.8
22.0	U	T491U226(1)010A(2)	2.2	6.0	1.8
#22.0	B	T491B226(1)010A(2)	2.2	6.0	2.4
#22.0	*A	T491A226M010A(2)	2.2	10.0	6.0
#22.0	*T	T491T226(1)010A(2)	2.2	12.0	8.0
33.0	D	T491D336(1)010A(2)	3.3	6.0	0.8
33.0	V	T491V336(1)010A(2)	3.3	6.0	0.7
33.0	C	T491C336(1)010A(2)	3.3	6.0	1.6
#33.0	U	T491U336(1)010A(2)	3.3	6.0	1.8
#33.0	B	T491B336(1)010A(2)	3.3	6.0	1.8
47.0	D	T491D476(1)010A(2)	4.7	6.0	0.8
47.0	V	T491V476(1)010A(2)	4.7	6.0	0.7
#47.0	C	T491C476(1)010A(2)	4.7	6.0	1.2
#47.0	*U	T491U476(1)010A(2)	4.7	10.0	2.2
#47.0	*B	T491B476(1)010A(2)	4.7	8.0	1.0
68.0	D	T491D686(1)010A(2)	6.8	6.0	0.8
68.0	V	T491V686(1)010A(2)	6.8	6.0	0.7
#68.0	C	T491C686(1)010A(2)	6.8	6.0	1.2
#68.0	*U	T491U686(1)010A(2)	6.8	10.0	1.8
#68.0	*B	T491B686M010A(2)	6.8	10.0	3.0
100.0	D	T491D107(1)010A(2)	10.0	8.0	0.7
#100.0	*C	T491C107(1)010A(2)	10.0	8.0	1.2
#100.0	V	T491V107(1)010A(2)	10.0	8.0	0.7
150.0	X	T491X157(1)010A(2)	15.0	8.0	0.7
#150.0	D	T491D157(1)010A(2)	15.0	8.0	0.7
#150.0	*C	T491C157(1)010A(2)	15.0	10.0	0.9
#150.0	*V	T491V157(1)010A(2)	15.0	8.0	0.7
#220.0	X	T491X227(1)010A(2)	22.0	8.0	0.5
#220.0	*D	T491D227(1)010A(2)	22.0	8.0	0.5
#220.0	*V	T491V227(1)010A(2)	22.0	12.0	0.7
#330.0	*D	T491D337M010A(2)	33.0	10.0	0.5
#330.0	*X	T491X337(1)010A(2)	33.0	10.0	0.5
#330.0	*E	T491E337(1)010A(2)	33.0	10.0	0.5
#470.0	*X	T491X477(1)010A(2)	47.0	10.0	0.2
#470.0	*E	T491E477M010A(2)	47.0	12.0	0.5
16 Volt Rating at +85ºC (10 Volt Rating at +125ºC)					
1.0	A	T491A105(1)016A(2)	0.5	4.0	10.0
1.5	A	T491A155(1)016A(2)	0.5	6.0	8.0
2.2	A	T491A225(1)016A(2)	0.5	6.0	6.0
2.2	*S	T491S225(1)016A(2)	0.5	6.0	15.0
#2.2	*R	T491R225(1)016A(2)	0.5	8.0	25.0
3.3	B	T491B335(1)016A(2)	0.5	6.0	3.5
3.3	A	T491A335(1)016A(2)	0.5	6.0	5.0
4.7	B	T491B475(1)016A(2)	0.8	6.0	3.5
4.7	A	T491A475(1)016A(2)	0.8	6.0	4.0
4.7	T	T491T475(1)016A(2)	0.8	6.0	5.0
6.8	C	T491C685(1)016A(2)	1.1	6.0	1.9
6.8	B	T491B685(1)016A(2)	1.1	6.0	2.5
#6.8	*A	T491A685(1)016A(2)	1.1	6.0	3.5
10.0	C	T491C106(1)016A(2)	1.6	6.0	1.8
10.0	U	T491U106(1)016A(2)	1.6	6.0	1.8
10.0	B	T491B106(1)016A(2)	1.6	6.0	2.8
#10.0	*A	T491A106(1)016A(2)	1.6	8.0	7.0
#10.0	*T	T491T106(1)016A(2)	1.6	8.0	8.0
15.0	C	T491C156(1)016A(2)	2.4	6.0	1.8
15.0	U	T491U156(1)016A(2)	2.4	6.0	1.8
#15.0	*B	T491B156(1)016A(2)	2.4	6.0	2.5
22.0	D	T491D226(1)016A(2)	3.6	6.0	0.8
22.0	C	T491C226(1)016A(2)	3.6	6.0	1.6
#22.0	*U	T491U226(1)016A(2)	3.6	10.0	3.0
#22.0	*B	T491B226(1)016A(2)	3.6	6.0	2.2
33.0	D	T491D336(1)016A(2)	5.3	6.0	0.8
#33.0	*C	T491C336(1)016A(2)	5.3	6.0	1.2
#33.0	*U	T491U336(1)016A(2)	5.3	12.0	3.0
47.0	D	T491D476(1)016A(2)	7.5	6.0	0.8
47.0	V	T491V476(1)016A(2)	7.5	6.0	0.7
#47.0	*C	T491C476(1)016A(2)	7.5	6.0	1.2
68.0	*V	T491V686(1)016A(2)	10.9	6.0	0.7
68.0	D	T491D686(1)016A(2)	10.9	6.0	0.7

Capacitance µF	Case Size	KEMET Part Number	DC Leakage µA @ 25ºC Max	DF % @ +25ºC 120 Hz Max	ESR Ω @ +25ºC 100 kHz Max
16 Volt Rating at +85ºC (10 Volt Rating at +125ºC)					
100.0	X	T491X107(1)016A(2)	16.0	8.0	0.7
†100.0	*V	T491V107(1)016A(2)	16.0	12.0	0.7
#100.0	*D	T491D107(1)016A(2)	16.0	8.0	0.7
#150.0	*X	T491X157(1)016A(2)	24.0	8.0	0.5
#150.0	*D	T491D157(1)016A(2)	24.0	12.0	0.7
#220.0	*X	T491X227(1)016A(2)	35.2	10.0	0.5
#220.0	*E	T491E227(1)016A(2)	35.2	7.2	0.9
20 Volt Rating at +85ºC (13 Volt Rating at + 125ºC)					
0.68	A	T491A684(1)020A(2)	0.5	4.0	12.0
1.0	A	T491A105(1)020A(2)	0.5	4.0	9.0
1.0	S	T491S105(1)020A(2)	0.5	6.0	18.0
#1.0	R	T491R105(1)020A(2)	0.5	6.0	20.0
1.5	A	T491A155(1)020A(2)	0.5	6.0	6.5
1.5	S	T491S155(1)020A(2)	0.5	6.0	15.0
2.2	B	T491B225(1)020A(2)	0.5	6.0	3.5
2.2	A	T491A225(1)020A(2)	0.5	6.0	7.0
3.3	B	T491B335(1)020A(2)	0.7	6.0	3.0
#3.3	*A	T491A335(1)020A(2)	0.7	6.0	4.5
3.3	*T	T491T335(1)020A(2)	0.7	6.0	5.0
4.7	C	T491C475(1)020A(2)	1.0	6.0	2.4
4.7	B	T491B475(1)020A(2)	1.0	6.0	3.0
#4.7	*A	T491A475(1)020A(2)	1.0	6.0	4.0
6.8	C	T491C685(1)020A(2)	1.4	6.0	1.9
6.8	U	T491U685(1)020A(2)	1.4	6.0	1.9
#6.8	*B	T491B685(1)020A(2)	1.4	6.0	2.5
#6.8	*A	T491A685M020A(2)	1.4	8.0	6.0
10.0	C	T491C106(1)020A(2)	2.0	6.0	1.8
10.0	U	T491U106(1)020A(2)	2.0	6.0	1.8
#10.0	*B	T491B106(1)020A(2)	2.0	6.0	2.1
15.0	D	T491D156(1)020A(2)	3.0	6.0	1.0
15.0	C	T491C156(1)020A(2)	3.0	6.0	1.7
22.0	D	T491D226(1)020A(2)	4.4	6.0	0.8
22.0	V	T491V226(1)020A(2)	4.4	6.0	0.7
#22.0	*C	T491C226(1)020A(2)	4.4	6.0	1.2
33.0	D	T491D336(1)020A(2)	6.6	6.0	0.8
#33.0	*C	T491C336M020A(2)	6.6	6.0	1.2
†33.0	*V	T491V336(1)020A(2)	6.6	8.0	0.7
47.0	*D	T491D476(1)020A(2)	9.4	6.0	0.7
68.0	X	T491X686(1)020A(2)	13.6	6.0	0.7
#68.0	*D	T491D686(1)020A(2)	13.6	8.0	0.7
#100.0	*X	T491X107(1)020A(2)	20.0	8.0	0.5
#100.0	*E	T491E107(1)020A(2)	20.0	8.0	0.5
#150.0	*X	T491X157(1)020A(2)	30.0	10.0	0.5
25 Volt Rating at +85ºC (17 Volt Rating at +125ºC)					
0.33	A	T491A334(1)025A(2)	0.5	4.0	15.0
0.47	A	T491A474(1)025A(2)	0.5	4.0	14.0
0.68	A	T491A684(1)025A(2)	0.5	4.0	10.0
1.0	B	T491B105(1)025A(2)	0.5	4.0	5.0
1.0	*A	T491A105(1)025A(2)	0.5	4.0	8.0
1.5	B	T491B155(1)025A(2)	0.5	6.0	5.0
1.5	*A	T491A155(1)025A(2)	0.5	6.0	7.5
2.2	C	T491C225(1)025A(2)	0.6	6.0	3.5
2.2	B	T491B225(1)025A(2)	0.6	6.0	4.5
3.3	C	T491C335(1)025A(2)	0.9	6.0	2.5
3.3	B	T491B335(1)025A(2)	0.9	6.0	3.5
4.7	C	T491C475(1)025A(2)	1.2	6.0	2.4
#4.7	*B	T491B475(1)025A(2)	1.2	6.0	1.5
#4.7	*A	T491A475M025A(2)	1.2	8.0	6.0
6.8	C	T491C685(1)025A(2)	1.7	6.0	1.9
6.8	*B	T491B685(1)025A(2)	1.7	8.0	2.8
10.0	D	T491D106(1)025A(2)	2.5	6.0	1.0
10.0	C	T491C106(1)025A(2)	2.5	6.0	1.5
15.0	D	T491D156(1)025A(2)	3.8	6.0	1.0
#15.0	*C	T491C156(1)025A(2)	3.8	6.0	1.5
22.0	D	T491D226(1)025A(2)	5.5	6.0	0.8
22.0	*C	T491C226(1)025A(2)	5.5	6.0	1.4
22.0	*V	T491V226(1)025A(2)	5.5	6.0	0.7
33.0	X	T491X336(1)025A(2)	8.3	6.0	0.7
#33.0	*D	T491D336(1)025A(2)	8.3	6.0	0.7
#47.0	*X	T491X476(1)025A(2)	11.8	6.0	0.7
†47.0	*D	T491D476(1)025A(2)	11.8	10.0	0.7
†68.0	*X	T491X686M025A(2)	17.0	8.0	0.7

(1) To complete KEMET Part Number, insert M for ±20% tolerance or K for ±10% tolerance.
(2) To complete KEMET Part Number, insert T, H, G, or S lead material designation as shown on page 15.
*Extended Values
**6 Volt product equivalent to 6.3 volt product.
#Maximum Capacitance Change @ 125ºC=+15%.
†Maximum Capacitance Change @ 125ºC=+20%.
Higher voltage ratings and tighter tolerance product may be substituted within the same size at KEMET's option.
Voltage substitutions will be marked with the higher voltage rating.

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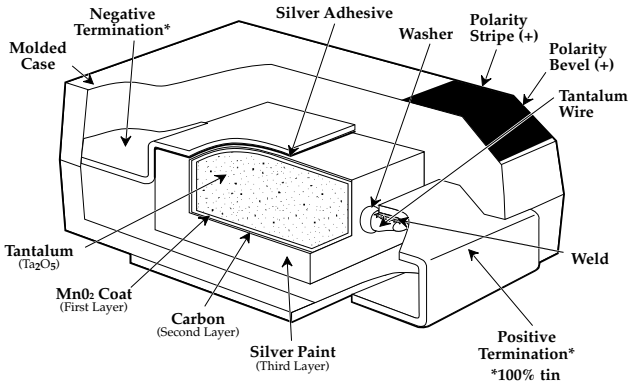
T491 RATINGS & PART NUMBER REFERENCE

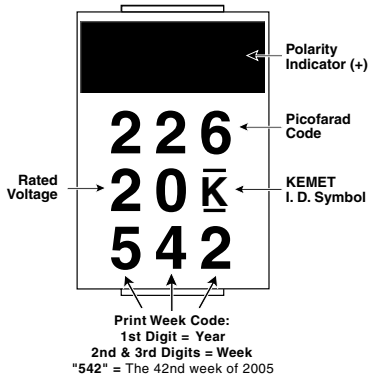
Capacitance µF	Case Size	KEMET Part Number	DC Leakage µA @ 25°C Max	DF % @ +25°C 120 Hz Max	ESR Ω @ +25°C 100 kHz Max
35 Volt Rating at +85°C (23 Volt Rating at +125°C)					
0.10	A	T491A104(1)035A(2)	0.5	4.0	20.0
0.15	A	T491A154(1)035A(2)	0.5	4.0	19.0
0.22	A	T491A224(1)035A(2)	0.5	4.0	18.0
0.33	A	T491A334(1)035A(2)	0.5	4.0	15.0
0.47	B	T491B474(1)035A(2)	0.5	4.0	8.0
0.47	A	T491A474(1)035A(2)	0.5	4.0	12.0
0.68	B	T491B684(1)035A(2)	0.5	4.0	6.5
0.68	*A	T491A684(1)035A(2)	0.5	4.0	8.0
1.0	B	T491B105(1)035A(2)	0.5	4.0	5.0
1.0	*A	T491A105(1)035A(2)	0.5	4.0	7.5
1.5	C	T491C155(1)035A(2)	0.5	6.0	4.5
1.5	B	T491B155(1)035A(2)	0.5	6.0	5.0
2.2	C	T491C225(1)035A(2)	0.8	6.0	3.5
2.2	*B	T491B225(1)035A(2)	0.8	6.0	4.0
3.3	C	T491C335(1)035A(2)	1.2	6.0	2.5
#3.3	*B	T491B335(1)035A(2)	1.2	6.0	3.5
4.7	D	T491D475(1)035A(2)	1.7	6.0	1.5
4.7	C	T491C475(1)035A(2)	1.7	6.0	2.2
6.8	D	T491D685(1)035A(2)	2.4	6.0	1.3
6.8	*C	T491C685(1)035A(2)	2.4	6.0	1.8
10.0	D	T491D106(1)035A(2)	3.5	6.0	1.0
#10.0	*C	T491C106M035A(2)	3.5	6.0	1.6
#10.0	*V	T491V106(1)035A(2)	3.5	6.0	2.0
15.0	X	T491X156(1)035A(2)	5.3	6.0	0.9
15.0	D	T491D156(1)035A(2)	5.3	6.0	0.8
22.0	X	T491X226(1)035A(2)	7.7	6.0	0.7
#22.0	*D	T491D226(1)035A(2)	7.7	6.0	0.7
#33.0	*X	T491X336(1)035A(2)	11.6	6.0	0.6
†47.0	*X	T491X476(1)035A(2)	16.5	8.0	0.6
#47.0	*E	T491E476(1)035A(2)	16.5	10.0	0.5
50 Volt Rating at +85°C (33 Volt Rating at + 125°C)					
0.10	A	T491A104(1)050A(2)	0.5	4.0	20.0
0.15	B	T491B154(1)050A(2)	0.5	4.0	16.0
0.15	*A	T491A154(1)050A(2)	0.5	4.0	15.0
0.22	B	T491B224(1)050A(2)	0.5	4.0	14.0
0.33	B	T491B334(1)050A(2)	0.5	4.0	10.0
0.47	C	T491C474(1)050A(2)	0.5	4.0	8.0
0.47	*B	T491B474(1)050A(2)	0.5	4.0	9.0
0.68	C	T491C684(1)050A(2)	0.5	4.0	7.0
0.68	*B	T491B684(1)050A(2)	0.5	4.0	8.0
1.0	C	T491C105(1)050A(2)	0.5	4.0	5.5
1.0	*V	T491V105(1)050A(2)	0.5	4.0	6.0
1.5	D	T491D155(1)050A(2)	0.8	6.0	3.5
1.5	*C	T491C155(1)050A(2)	0.8	6.0	4.5
2.2	D	T491D225(1)050A(2)	1.1	6.0	2.5
2.2	*C	T491C225(1)050A(2)	1.1	6.0	3.0
3.3	D	T491D335(1)050A(2)	1.7	6.0	2.0
4.7	D	T491D475(1)050A(2)	2.4	6.0	1.4
6.8	X	T491X685(1)050A(2)	3.5	6.0	1.0
#6.8	*D	T491D685(1)050A(2)	3.4	6.0	1.0
#10.0	*X	T491X106M050A(2)	5.0	6.0	0.7
#10.0	*D	T491D106(1)050A(2)	5.0	6.0	0.8
†15.0	*X	T491X156(1)050A(2)	7.5	8.0	0.7

(1) To complete KEMET Part Number, insert M for ±20% tolerance or K for ±10% tolerance.
(2) To complete KEMET Part Number, insert T, H, G, or S lead material designation as shown on page 15.
*Extended Values
**6 Volt product equivalent to 6.3 volt product.
#Maximum Capacitance Change @ 125°C=+15%.
†Maximum Capacitance Change @ 125°C=+20%.
Higher voltage ratings and tighter tolerance product may be substituted within the same size at KEMET's option.
Voltage substitutions will be marked with the higher voltage rating.

CONSTRUCTION



CAPACITOR MARKINGS
T491 Series — All Case Sizes

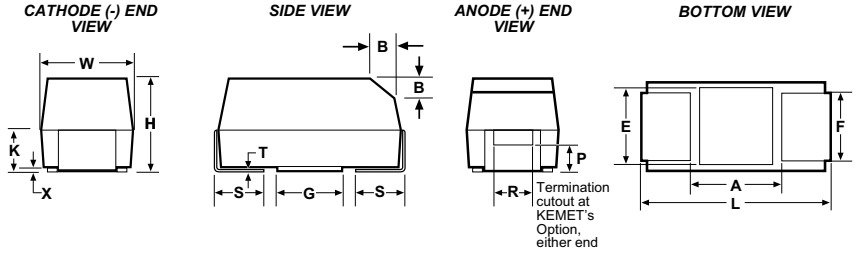


SOLID TANTALUM CHIP CAPACITORS

T492 SERIES—Style CWR11 Per Mil-PRF-55365/8

- Established reliability military version of Industrial Grade T491 series
- Taped and reeled per EIA 481-1
- Precision-molded, laser-marked case
- Symmetrical, compliant terminations
- 100% Surge Current test available for all case sizes
- Operating Temperature: -55°C to + 125°C
- Qualified to MIL-PRF-55365/8, Style CWR11:
  - Termination Code H, solder-plated
  - Weibull failure rate codes B, C and D
  - Capacitance values and voltages as shown in following part number table. (Contact KEMET for latest qualification status)

T492 OUTLINE DRAWINGS



DIMENSIONS – Millimeters (Inches)

CASE SIZE		COMPONENT													
KEMET	EIA	L*	W*	H*	K* ±0.20 ±(.008)	F* ±-0.1 ±(.004)	S* ±0.3 ±(.012)	B ±0.15 (Ref)± (.006)	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)
A	3216-18	3.2 ± 0.2 (.126 ± .008)	1.6 ± 0.2 (.063 ± .008)	1.6 ± 0.2 (.063 ± .008)	0.9 (.035)	1.2 (.047)	0.8 (.031)	0.4 (.016)	0.10 ± 0.10 (.004 ± .004)	0.4 (.016)	0.4 (.016)	0.13 (.005)	0.8 (.031)	1.1 (.043)	1.3 (.051)
B	3528-21	3.5 ± 0.2 (.138 ± .008)	2.8 ± 0.2 (.110 ± .008)	1.9 ± 0.2 (.075 ± .008)	1.1 (.043)	2.2 (.087)	0.8 (.031)	0.4 (.016)	0.10 ± 0.10 (.004 ± .004)	0.5 (.020)	1.0 (.039)	0.13 (.005)	1.1 (.043)	1.8 (.071)	2.2 (.087)
C	6032-28	6.0 ± 0.3 (.236 ± .012)	3.2 ± 0.3 (.126 ± .012)	2.5 ± 0.3 (.098 ± .012)	1.4 (.055)	2.2 (.087)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	0.9 (.035)	1.0 (.039)	0.13 (.005)	2.5 (.098)	2.8 (.110)	2.4 (.094)
D	7343-31	7.3 ± 0.3 (.287 ± .012)	4.3± 0.3 (.169 ± .012)	2.8 ± 0.3 (.110 ± .012)	1.5 (.059)	2.4 (.094)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	0.9 (.035)	1.0 (.039)	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)

Notes: 1. Metric dimensions govern.
2. (Ref) - Dimensions provided for reference only.

* Mil-C-55365/8 Specified Dimensions

ORDERING INFORMATION — MIL-PRF-55365 Part Number

CWR11 M H 105 K B A

Style
Capacitors, Chip, Fixed Tantalum
Established Reliability, (encapsulated)

Voltage
D = 6V J = 20V
F = 10V K = 25V
H = 15V M - 35V

Termination Finish Code
H = Solder Plated

Capacitance Picofarad Code
First two digits represent significant figures.
Third digit specifies number of zeros to follow.

Capacitance Tolerance
M = ±20%
K = ±10%
J = ±5%

Failure Rate Symbol*
(*See Note Below)
B = (0.1%/1000 hrs.
C = (0.01%/1000 hrs.
D = (0.001%/1000 hrs.

Surge Current Option
A = +25°C after Weibull
B = -55° +85° after Weibull
C = -55°, & +85°C before Weibull

T492 SERIES ORDERING INFORMATION — KEMET Part Number

T 492 B 105 K 035 B S 4250

Tantalum

Series
T492 - Precision Molded, Style CWR11

Case Size
A, B, C, D

Capacitance Picofarad Code
First two digits represent significant figures.
Third digit specifies number of zeros to follow.

Capacitance Tolerances
M = ±10%; K = ±10%; J = ±5%

Voltage
As shown

Failure Rate Symbol
(* See note below)
B (0.1%/1000 hrs.); **C** (0.01%/1000 hrs.); **D** (0.001%/1000 hrs.)

Lead Material
S = Tin-Lead (Sn/Pb) Coated
(5% Pb minimum)
Contact KEMET Sales Rep for additional lead material options.

Surge Current Option
4250 = +25°C after Weibull
4251 = -55° +85°C after Weibull
4252 = -55, & +85°C before Weibull

*** Part Number Example: T492B105K035BS (14 digits - no spaces)**
*** See www.kemet.com for Pb Free transition.**

*Note on Failure Rates: Exponential failure rate levels M, P, R and S are inactive for new design per Mil-C-55365. Parts qualified to Weibull failure rate levels are substitutable for exponential failure rate levels.

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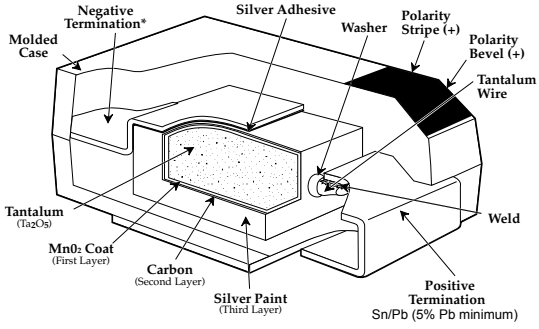
T492 (CWR11) RATINGS AND PART NUMBER REFERENCE

Capacitance µF	Case Size	KEMET Part Number	Mil-C-55365/8 Part Number	DC Leakage µA @ +25°C Max	DF % @ +25°C 120 Hz Max	ESR Ω @ +25°C 100kHz Max
6 Volt Rating at +85°C (4 Volt Rating at +125°C)						
1.5	A	T492A155(1)006(2)S	CWR11DH155(1)(2)	0.5	6.0	8.0
2.2	A	T492A225(1)006(2)S	CWR11DH225(1)(2)	0.5	6.0	8.0
3.3	A	T492A335(1)006(2)S	CWR11DH335(1)(2)	0.5	6.0	8.0
4.7	B	T492B475(1)006(2)S	CWR11DH475(1)(2)	0.5	6.0	5.5
6.8	B	T492B685(1)006(2)S	CWR11DH685(1)(2)	0.5	6.0	4.5
10.0	B	T492B106(1)006(2)S	CWR11DH106(1)(2)	0.6	6.0	3.5
15.0	C	T492C156(1)006(2)S	CWR11DH156(1)(2)	0.9	6.0	3.0
22.0	C	T492C226(1)006(2)S	CWR11DH226(1)(2)	1.4	6.0	2.2
47.0	D	T492D476(1)006(2)S	CWR11DH476(1)(2)	2.8	6.0	1.1
10 Volt Rating at +85°C (7 Volt Rating at 125°C)						
1.0	A	T492A105(1)010(2)S	CWR11FH105(1)(2)	0.5	4.0	10.0
1.5	A	T492A155(1)010(2)S	CWR11FH155(1)(2)	0.5	6.0	8.0
2.2	A	T492A225(1)010(2)S	CWR11FH225(1)(2)	0.5	6.0	8.0
3.3	B	T492B335(1)010(2)S	CWR11FH335(1)(2)	0.5	6.0	5.5
4.7	B	T492B475(1)010(2)S	CWR11FH475(1)(2)	0.5	6.0	4.5
6.8	B	T492B685(1)010(2)S	CWR11FH685(1)(2)	0.7	6.0	3.5
15.0	C	T492C156(1)010(2)S	CWR11FH156(1)(2)	1.5	6.0	2.5
33.0	D	T492D336(1)010(2)S	CWR11FH336(1)(2)	3.3	6.0	1.1
15 Volt Rating at +85°C (10 Volt Rating at +125°C)						
0.68	A	T492A684(1)015(2)S	CWR11HH684(1)(2)	0.5	4.0	12.0
1.0	A	T492A105(1)015(2)S	CWR11HH105(1)(2)	0.5	4.0	10.0
1.5	A	T492A155(1)015(2)S	CWR11HH155(1)(2)	0.5	6.0	8.0
2.2	B	T492B225(1)015(2)S	CWR11HH225(1)(2)	0.5	6.0	5.5
3.3	B	T492B335(1)015(2)S	CWR11HH335(1)(2)	0.5	6.0	5.0
4.7	B	T492B475(1)015(2)S	CWR11HH475(1)(2)	0.7	6.0	4.0
10.0	C	T492C106(1)015(2)S	CWR11HH106(1)(2)	1.6	6.0	2.5
22.0	D	T492D226(1)015(2)S	CWR11HH226(1)(2)	3.3	6.0	1.1
20 Volt Rating at +85°C (13 Volt Rating at +125°C)						
0.47	A	T492A474(1)020(2)S	CWR11JH474(1)(2)	0.5	4.0	14.0
0.68	A	T492A684(1)020(2)S	CWR11JH684(1)(2)	0.5	4.0	12.0
1.0	A	T492A105(1)020(2)S	CWR11JH105(1)(2)	0.5	4.0	10.0
1.5	B	T492B155(1)020(2)S	CWR11JH155(1)(2)	0.5	6.0	6.0
2.2	B	T492B225(1)020(2)S	CWR11JH225(1)(2)	0.5	6.0	5.0
3.3	B	T492B335(1)020(2)S	CWR11JH335(1)(2)	0.7	6.0	4.0
4.7	C	T492C475(1)020(2)S	CWR11JH475(1)(2)	1.0	6.0	3.0
6.8	C	T492C685(1)020(2)S	CWR11JH685(1)(2)	1.4	6.0	2.4
15.0	D	T492D156(1)020(2)S	CWR11JH156(1)(2)	3.0	6.0	1.1
25 Volt Rating at +85°C (17 Volt Rating at +125°C)						
0.33	A	T492A334(1)025(2)S	CWR11KH334(1)(2)	0.5	4.0	15.0
0.47	A	T492A474(1)025(2)S	CWR11KH474(1)(2)	0.5	4.0	14.0
0.68	B	T492B684(1)025(2)S	CWR11KH684(1)(2)	0.5	4.0	7.5
1.0	B	T492B105(1)025(2)S	CWR11KH105(1)(2)	0.5	4.0	6.5
1.5	B	T492B155(1)025(2)S	CWR11KH155(1)(2)	0.5	6.0	6.5
2.2	C	T492C225(1)025(2)S	CWR11KH225(1)(2)	0.6	6.0	3.5
3.3	C	T492C335(1)025(2)S	CWR11KH335(1)(2)	0.9	6.0	3.5
4.7	C	T492C475(1)025(2)S	CWR11KH475(1)(2)	1.2	6.0	2.5
6.8	D	T492D685(1)025(2)S	CWR11KH685(1)(2)	1.7	6.0	1.4
10.0	D	T492D106(1)025(2)S	CWR11KH106(1)(2)	2.5	6.0	1.2
35 Volt Rating at +85°C (23 Volt Rating at +125°C)						
0.10	A	T492A104(1)035(2)S	CWR11MH104(1)(2)	0.5	4.0	24.0
0.15	A	T492A154(1)035(2)S	CWR11MH154(1)(2)	0.5	4.0	21.0
0.22	A	T492A224(1)035(2)S	CWR11MH224(1)(2)	0.5	4.0	18.0
0.33	A	T492A334(1)035(2)S	CWR11MH334(1)(2)	0.5	4.0	15.0
0.47	B	T492B474(1)035(2)S	CWR11MH474(1)(2)	0.5	4.0	10.0
0.68	B	T492B684(1)035(2)S	CWR11MH684(1)(2)	0.5	4.0	8.0
1.0	B	T492B105(1)035(2)S	CWR11MH105(1)(2)	0.5	4.0	6.5
1.5	C	T492C155(1)035(2)S	CWR11MH155(1)(2)	0.5	6.0	4.5
2.2	C	T492C225(1)035(2)S	CWR11MH225(1)(2)	0.8	6.0	3.5
3.3	C	T492C335(1)035(2)S	CWR11MH335(1)(2)	1.2	6.0	2.5
4.7	D	T492D475(1)035(2)S	CWR11MH475(1)(2)	1.7	6.0	1.5

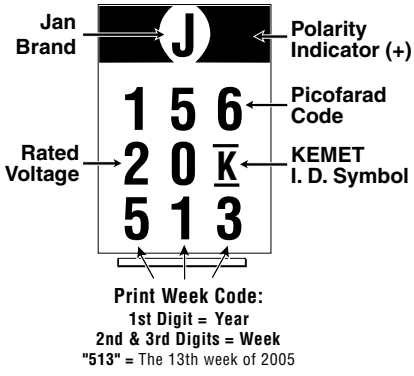
To complete Part Numbers:
(1) Insert "M" for ±20% tolerance, "K" for ±10% tolerance or "J" for ±5% tolerance.
(2) Insert Failure Rate Symbol: B (0.1%/1000 hours), C (0.01%/1000 hours) or D (0.001%/1000 hours).

CONSTRUCTION



CAPACITOR MARKINGS

T492 Series — All Case Sizes

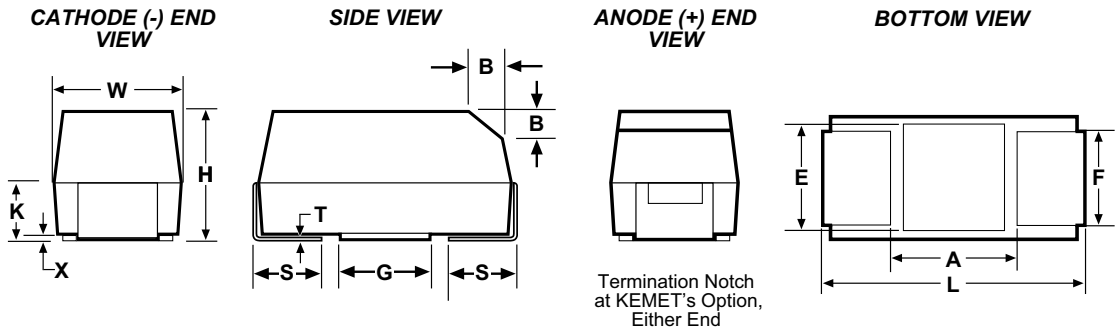


Note on Failure Rates: *Exponential failure rate levels M, P, R and S are inactive for new design per MIL-C-55365. Parts qualified to Weibull failure rate levels are substitutable for exponential failure rate levels.*
Note: ESR limits are per Mil-C-55365/8

FEATURES

- Standard Cases Sizes A - X per EIA535BAAC
- Termination Finishes offered per MIL-PRF-55365: Gold Plated, Hot Solder Dipped, Solder Plated, Solder Fused
- Weibull Grading Available: B (0.1%/1000hrs) and C (0.01%/1000hrs)
- Surge Current Testing Available per MIL-PRF-55365: 10 cycles @ +25°C; 10 cycles @ -55°C and +85°C
- Standard and Low ESR Options
- Operating Temperature Range: -55°C to +125°C
- Capacitance: 0.1 to 330µF
- Voltage: 4 to 50 Volts

OUTLINE DRAWING

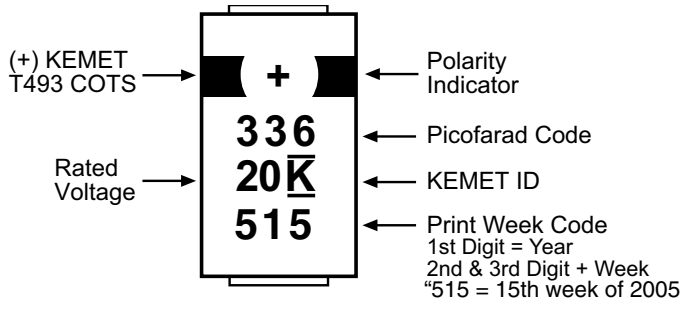


DIMENSIONS- MILLIMETERS (INCHES)

Case Size KEMET	Case Size EIA/IECQ	L	W	H	±0.20 K ±(.008)	±0.1 F ±(.004)	±0.3 S ±(.012)	B ±0.15 (Ref) ±.006	X(Ref)	T(Ref)	A(Min)	G(ref)	E(ref)
A	3216-18	3.2 ± 0.2 (.126 ± .008)	1.6 ± 0.2 (.063 ± .008)	1.6 ± 0.2 (.063 ± .008)	0.9 (.035)	1.2 (.047)	0.8 (.031)	0.4 (.016)	0.10 ± 0.10 (.004 ± .004)	0.13 (.005)	1.4 (.055)	1.1 (.043)	1.3 (.051)
B	3528-21	3.5 ± 0.2 (.138 ± .008)	2.8 ± 0.2 (.110 ± .008)	1.9 ± 0.2 (.075 ± .008)	1.1 (.043)	2.2 (.087)	0.8 (.031)	0.4 (.016)	0.10 ± 0.10 (.004 ± .004)	0.13 (.005)	2.1 (.083)	1.8 (.071)	2.2 (.087)
C	6032-28	6.0 ± 0.3 (.236 ± .012)	3.2 ± 0.3 (.126 ± .012)	2.5 ± 0.3 (.098 ± .012)	1.4 (.055)	2.2 (.087)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	0.13 (.005)	3.1 (.122)	2.8 (.110)	2.4 (.094)
D	7343-31	7.3 ± 0.3 (.287 ± .012)	4.3 ± 0.3 (.169 ± .012)	2.8 ± 0.3 (.110 ± .012)	1.5 (.059)	2.4 (.094)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)
X	7343-43	7.3 ± 0.3 (.287 ± .012)	4.3 ± 0.3 (.169 ± .012)	4.0 ± 0.3 (.157 ± .012)	2.3 (.091)	2.4 (.094)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)

Notes: 1. Metric dimensions govern.
2. (ref) - Dimensions provided for reference only.

COMPONENT MARKING



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SOLID TANTALUM CHIP CAPACITORS

T493 SERIES—Military COTS

ORDERING INFORMATION

T 493 D 227 K 006 C H 6XXX

Tantalum

Series
T493 Military Commercial Off-The-Shelf

Case Size
A, B, C, D, X

Capacitance Picofarad Code
First two digits represent significant figures.
Third digit specifies number of zeros to follow.

Capacitance Tolerances
M = ±20%
K = ±10%
J = ±5% (For 5% tolerance contact KEMET sales rep.)

Voltage
As shown

Reliability Level
A - Non-ER
B - 0.1%/K hrs.
C - 0.01%/K hrs.

ESR/Surge Designator
6110 Surge = None
ESR = Standard
6120 Surge = None
ESR = Low
6210 Surge = 10 Cycles, +25ºC
ESR = Standard
6220 Surge = 10 Cycles, +25ºC
ESR = Low
6410 Surge = 10 Cycles, -55ºC and +85ºC
ESR = Standard
6420 Surge = 10 Cycles, -55ºC and +85ºC
ESR = Low
Note: For order entry purposes the last 4-digits of the part number will be entered in the KEMET Customer Specification (C-Spec)Field.

Termination Finish

T493 RATINGS AND PART NUMBER REFERENCE

Capacitance µF	Case Size	KEMET Part Number	DCL µA @ 25ºC Max	DF % @ +25ºC 120 Hz Max	Std. ESR Ohms @+25°C 100 kHz Max	Low ESR Ohms @+25°C 100 kHz Max
4 Volt Rating at +85ºC (2.7 Volt Rating at +125ºC)						
2.2	A	T493A225(1)004(2)(3)(4)(5)	0.5	6.0	8.0	6.0
3.3	A	T493A335(1)004(2)(3)(4)(5)	0.5	6.0	8.0	4.0
4.7	A	T493A475(1)004(2)(3)(4)(5)	0.5	6.0	8.0	3.5
6.8	A	T493A685(1)004(2)(3)(4)(5)	0.5	6.0	6.0	3.0
6.8	B	T493B685(1)004(2)(3)(4)(5)	0.5	6.0	5.5	2.0
10.0	A	T493A106(1)004(2)(3)(4)(5)	0.5	6.0	6.0	2.0
10.0	B	T493B106(1)004(2)(3)(4)(5)	0.5	6.0	3.5	1.2
15.0	A	T493A156(1)004(2)(3)(4)(5)	0.6	6.0	4.0	1.5
15.0	B	T493B156(1)004(2)(3)(4)(5)	0.6	6.0	3.5	1.2
22.0	A	T493A226(1)004(2)(3)(4)(5)	0.9	6.0	4.0	1.5
22.0	B	T493B226(1)004(2)(3)(4)(5)	0.9	6.0	3.5	0.6
22.0	C	T493C226(1)004(2)(3)(4)(5)	0.9	6.0	1.8	0.5
33.0	A	T493A336(1)004(2)(3)(4)(5)	1.3	6.0	4.0	3.0
33.0	B	T493B336(1)004(2)(3)(4)(5)	1.3	6.0	3.5	0.5
33.0	C	T493C336(1)004(2)(3)(4)(5)	1.3	6.0	1.8	0.5
47.0	B	T493B476(1)004(2)(3)(4)(5)	1.9	6.0	3.0	0.5
47.0	C	T493C476(1)004(2)(3)(4)(5)	1.9	6.0	1.8	0.5
68.0	B	T493B686(1)004(2)(3)(4)(5)	2.7	6.0	3.5	2.0
68.0	C	T493C686(1)004(2)(3)(4)(5)	2.7	6.0	1.6	0.25
68.0	D	T493D686(1)004(2)(3)(4)(5)	2.7	6.0	0.8	0.2
#100.0	*B	T493B107(1)004(2)(3)(4)(5)	4.0	8.0	1.0	0.7
100.0	C	T493C107(1)004(2)(3)(4)(5)	4.0	8.0	1.2	0.2
100.0	D	T493D107(1)004(2)(3)(4)(5)	4.0	8.0	0.8	0.2
#150.0	*C	T493C157(1)004(2)(3)(4)(5)	6.0	8.0	1.2	0.3
150.0	D	T493D157(1)004(2)(3)(4)(5)	6.0	8.0	0.8	0.15
220.0	D	T493D227(1)004(2)(3)(4)(5)	8.8	8.0	0.9	0.7
330.0	D	T493D337(1)004(2)(3)(4)(5)	13.2	8.0	0.7	0.15
330.0	X	T493X337(1)004(2)(3)(4)(5)	13.2	8.0	0.5	0.2
6 Volt Rating at +85ºC (4 Volt Rating at +125ºC)						
1.5	A	T493A155(1)006(2)(3)(4(5)	0.5	6.0	8.0	6.0
2.2	A	T493A225(1)006(2)(3)(4)(5)	0.5	6.0	8.0	6.0
3.3	A	T493A335(1)006(2)(3)(4)(5)	0.5	6.0	8.0	6.0
4.7	A	T493A475(1)006(2)(3)(4)(5)	0.5	6.0	6.0	3.5
4.7	B	T493B475(1)006(2)(3)(4)(5)	0.5	6.0	5.5	3.5
6.8	A	T493A685(1)006(2)(3)(4)(5)	0.5	6.0	6.0	2.0
6.8	B	T493B685(1)006(2)(3)(4)(5)	0.5	6.0	3.5	1.2
10.0	A	T493A106(1)006(2)(3)(4)(5)	0.6	6.0	4.0	2.0
10.0	B	T493B106(1)006(2)(3)(4)(5)	0.6	6.0	3.5	1.0
15.0	A	T493A156(1)006(2)(3)(4)(5)	0.9	6.0	4.0	1.5
15.0	B	T493B156(1)006(2)(3)(4)(5)	0.9	6.0	3.5	0.7
15.0	C	T493C156(1)006(2)(3)(4)(5)	0.9	6.0	1.8	0.6
22.0	A	T493A226(1)006(2)(3)(4)(5)	1.4	6.0	4.0	3.0
22.0	B	T493B226(1)006(2)(3)(4)(5)	1.4	6.0	3.5	0.6
22.0	C	T493C226(1)006(2)(3)(4)(5)	1.4	6.0	1.8	0.5

(1) To complete KEMET part number, insert M for ±20% or K for ±10% capacitance tolerance. To request ±5% tolerance,contact KEMET sales representative.
(2) To complete KEMET part number, insert A for Non-ER; B for 0.1%/1000 Hrs.; or C for 0.01%/1000 Hrs. Reliability Level.
(3) To complete KEMET part number, insert B for Gold Plated (50 µ inch minimum); C for Hot Solder Dipped (60 µ inch minimum); H for Solder Plated (100 µ inch minimum); or K for Solder Fused (60 µ inch minimum Termination Finish.
(4) To complete KEMET part number for Surge Current testing, insert 61 for none; 62 for 10 cycles +25°C; or 64 for 10 cycles, -55°C & +85°C.
(5) To complete KEMET part number, insert 10 for Standard ESR; or 20 for Low ESR Option.

T493 RATINGS AND PART NUMBER REFERENCE

Capacitance µF	Case Size	KEMET Part Number	DCL µA @ 25ºC Max	DF % @ +25ºC 120 Hz Max	Std. ESR Ohms @+25°C 100 kHz Max	Low ESR Ohms @+25°C 100 kHz Max
6 Volt Rating at +85ºC (4 Volt Rating at +125ºC)						
33.0	B	T493B336(1)006(2)(3)(4)(5)	2.0	6.0	3.0	0.6
33.0	C	T493C336(1)006(2)(3)(4)(5)	2.0	6.0	1.8	0.3
47.0	B	T493B476(1)006(2)(3)(4)(5)	2.9	6.0	3.5	2.0
47.0	C	T493C476(1)006(2)(3)(4)(5)	2.9	6.0	1.6	0.25
47.0	D	T493D476(1)006(2)(3)(4)(5)	2.9	6.0	0.8	0.22
68.0	B	T493B686(1)006(2)(3)(4)(5)	4.1	8.0	1.0	0.65
68.0	C	T493C686(1)006(2)(3)(4)(5)	4.1	6.0	1.2	0.2
68.0	D	T493D686(1)006(2)(3)(4)(5)	4.1	6.0	0.8	0.2
#100.0	*B	T493B107(1)006(2)(3)(4)(5)	6.3	15.0	10.0	8.0
100.0	C	T493C107(1)006(2)(3)(4)(5)	6.0	8.0	1.2	0.15
100.0	D	T493D107(1)006(2)(3)(4)(5)	6.0	8.0	0.8	0.15
#150.0	*C	T493C157(1)006(2)(3)(4)(5)	9.0	8.0	1.2	0.3
150.0	D	T493D157(1)006(2)(3)(4)(5)	9.0	8.0	0.7	0.15
#220.0	*C	T493C227(1)006(2)(3)(4)(5)	13.2	10.0	1.2	0.3
220.0	D	T493D227(1)006(2)(3)(4)(5)	13.2	8.0	0.7	0.1
220.0	X	T493X227(1)006(2)(3)(4)(5)	13.2	8.0	0.7	0.15
330.0	D	T493D337(1)006(2)(3)(4)(5)	19.8	8.0	0.5	0.15
330.0	X	T493X337(1)006(2)(3)(4)(5)	19.8	8.0	0.5	0.1
10 Volt Rating at +85ºC (7 Volt Rating at +125ºC)						
1.0	A	T493A105(1)010(2)(3)(4)(5)	0.5	4.0	10.0	6.0
1.5	A	T493A155(1)010(2)(3)(4)(5)	0.5	6.0	8.0	6.0
2.2	A	T493A225(1)010(2)(3)(4)(5)	0.5	6.0	8.0	6.0
3.3	A	T493A335(1)010(2)(3)(4)(5)	0.5	6.0	6.0	4.0
3.3	B	T493B335(1)010(2)(3)(4)(5)	0.5	6.0	5.5	3.5
4.7	A	T493A475(1)010(2)(3)(4)(5)	0.5	6.0	6.0	3.0
4.7	B	T493B475(1)010(2)(3)(4)(5)	0.5	6.0	3.5	1.5
6.8	A	T493A685(1)010(2)(3)(4)(5)	0.7	6.0	6.0	3.0
6.8	B	T493B685(1)010(2)(3)(4)(5)	0.7	6.0	3.5	1.2
10.0	A	T493A106(1)010(2)(3)(4)(5)	1.0	6.0	4.0	1.8
10.0	B	T493B106(1)010(2)(3)(4)(5)	1.0	6.0	3.5	0.8
10.0	C	T493C106(1)010(2)(3)(4)(5)	1.0	6.0	1.8	0.6
#15.0	*A	T493A156(1)010(2)(3)(4)(5)	1.5	8.0	6.0	4.0
15.0	B	T493B156(1)010(2)(3)(4)(5)	1.5	6.0	3.5	0.7
15.0	C	T493C156(1)010(2)(3)(4)(5)	1.5	6.0	1.8	0.5
22.0	B	T493B226(1)010(2)(3)(4)(5)	2.2	6.0	3.0	0.7
22.0	C	T493C226(1)010(2)(3)(4)(5)	2.2	6.0	1.8	0.4
33.0	B	T493B336(1)010(2)(3)(4)(5)	3.3	6.0	3.5	2.0
33.0	C	T493C336(1)010(2)(3)(4)(5)	3.3	6.0	1.6	0.3
33.0	D	T493D336(1)010(2)(3)(4)(5)	3.3	6.0	0.8	0.3
47.0	C	T493C476(1)010(2)(3)(4)(5)	4.7	6.0	1.2	0.3
47.0	D	T493D476(1)010(2)(3)(4)(5)	4.7	6.0	0.8	0.2
68.0	C	T493C686(1)010(2)(3)(4)(5)	6.8	6.0	1.2	0.3
68.0	D	T493D686(1)010(2)(3)(4)(5)	6.8	6.0	0.8	0.2
68.0	X	T493X686(1)010(2)(3)(4)(5)	5.4	4.0	0.5	0.15
#100.0	*C	T493C107(1)010(2)(3)(4)(5)	10.0	8.0	1.2	0.3
100.0	D	T493D107(1)010(2)(3)(4)(5)	10.0	8.0	0.7	0.1
150.0	D	T493D157(1)010(2)(3)(4)(5)	15.0	8.0	0.7	0.1
150.0	X	T493X157(1)010(2)(3)(4)(5)	15.0	8.0	0.7	0.2
#220.0	*D	T493D227(1)010(2)(3)(4)(5)	22.0	8.0	0.5	0.2
220.0	X	T493X227(1)010(2)(3)(4)(5)	22.0	8.0	0.5	0.1
330.0	X	T493X337(1)010(2)(3)(4)(5)	33.0	10.0	0.5	0.1
16 Volt Rating at +85ºC (10 Volt Rating at +125ºC)						
0.68	A	T493A684(1)016(2)(3)(4)(5)	1.1	6.0	12.0	8.0
1.0	A	T493A105(1)016(2)(3)(4)(5)	0.5	4.0	10.0	6.0
1.5	A	T493A155(1)016(2)(3)(4)(5)	0.5	6.0	8.0	6.0
2.2	A	T493A225(1)016(2)(3)(4)(5)	0.5	6.0	6.0	4.0
3.3	A	T493A335(1)016(2)(3)(4)(5)	0.5	6.0	6.0	3.5
3.3	B	T493B335(1)016(2)(3)(4)(5)	0.5	6.0	3.5	2.0
4.7	A	T493A475(1)016(2)(3)(4)(5)	0.8	6.0	6.0	3.0
4.7	B	T493B475(1)016(2)(3)(4)(5)	0.8	6.0	3.5	1.5
#6.8	*A	T493A685(1)016(2)(3)(4)(5)	1.1	6.0	7.0	3.0
6.8	B	T493B685(1)016(2)(3)(4)(5)	1.1	6.0	3.5	1.2
6.8	C	T493C685(1)016(2)(3)(4)(5)	1.1	6.0	1.9	0.8
10.0	B	T493B106(1)016(2)(3)(4)(5)	1.6	6.0	3.5	0.8
10.0	C	T493C106(1)016(2)(3)(4)(5)	1.6	6.0	1.8	0.6
#15.0	*B	T493B156(1)016(2)(3)(4)(5)	2.4	6.0	3.0	0.8
15.0	C	T493C156(1)016(2)(3)(4)(5)	2.4	6.0	1.8	0.4
#22.0	*B	T493B226(1)016(2)(3)(4)(5)	3.5	6.0	2.2	0.8
22.0	C	T493C226(1)016(2)(3)(4)(5)	3.6	6.0	1.6	0.4
22.0	D	T493D226(1)016(2)(3)(4)(5)	3.6	6.0	0.8	0.3

(1) To complete KEMET part number, insert M for ±20% or K for ±10% capacitance tolerance. To request ±5% tolerance,contact KEMET sales representative.
(2) To complete KEMET part number, insert A for Non-ER; B for 0.1%/1000 Hrs.; or C for 0.01%/1000 Hrs. Reliability Level.
(3) To complete KEMET part number, insert B for Gold Plated (50 µ inch minimum); C for Hot Solder Dipped (60 µ inch minimum); H for Solder Plated (100 µ inch minimum); or K for Solder Fused (60 µ inch minimum Termination Finish.
(4) To complete KEMET part number for Surge Current testing, insert 61 for none; 62 for 10 cycles +25°C; or 64 for 10 cycles, -55°C & +85°C.
(5) To complete KEMET part number, insert 10 for Standard ESR; or 20 for Low ESR Option.
* Extended Values # Maximum Capacitance Change @ 125°C = +15%.

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T493 RATINGS AND PART NUMBER REFERENCE

Capacitance µF	Case Size	KEMET Part Number	DCL µA @ 25ºC Max	DF % @ +25ºC 120 Hz Max	Std. ESR Ohms @+25°C 100 kHz Max	Low ESR Ohms @+25°C 100 kHz Max
16 Volt Rating at +85ºC (10 Volt Rating at +125ºC)						
33.0	C	T493C336(1)016(2)(3)(4)(5)	5.3	6.0	1.2	0.3
33.0	D	T493D336(1)016(2)(3)(4)(5)	5.3	6.0	0.8	0.25
#47.0	*C	T493C476(1)016(2)(3)(4)(5)	7.5	6.0	1.2	0.5
47.0	D	T493D476(1)016(2)(3)(4)(5)	7.5	6.0	0.8	0.2
68.0	D	T493D686(1)016(2)(3)(4)(5)	10.9	6.0	0.7	0.2
#100.0	*D	T493D107(1)016(2)(3)(4)(5)	16.0	8.0	0.7	0.125
100.0	X	T493X107(1)016(2)(3)(4)(5)	16.0	8.0	0.7	0.1
#150.0	*X	T493X157(1)016(2)(3)(4)(5)	24.0	8.0	0.5	0.2
20 Volt Rating at +85ºC (13 Volt Rating at +125ºC)						
0.47	A	T493A474(1)020(2)(3)(4)(5)	0.5	4.0	14.0	9.0
0.68	A	T493A684(1)020(2)(3)(4)(5)	0.5	4.0	12.0	8.0
1.0	A	T493A105(1)020(2)(3)(4)(5)	0.5	4.0	10.0	5.5
1.5	A	T493A155(1)020(2)(3)(4)(5)	0.5	6.0	8.0	4.5
1.5	B	T493B155(1)020(2)(3)(4)(5)	0.5	6.0	6.0	4.0
2.2	A	T493A225(1)020(2)(3)(4)(5)	0.5	6.0	7.0	4.0
2.2	B	T493B225(1)020(2)(3)(4)(5)	0.5	6.0	3.5	1.5
#3.3	*A	T493A335(1)020(2)(3)(4)(5)	0.7	6.0	7.0	4.0
3.3	B	T493B335(1)020(2)(3)(4)(5)	0.7	6.0	3.5	1.3
#4.7	*A	T493A475(1)020(2)(3)(4)(5)	1.0	8.0	6.0	1.8
4.7	B	T493B475(1)020(2)(3)(4)(5)	1.0	6.0	3.5	1.0
4.7	C	T493C475(1)020(2)(3)(4)(5)	1.0	6.0	2.4	0.6
#6.8	*B	T493B685(1)020(2)(3)(4)(5)	1.4	6.0	3.5	1.0
6.8	C	T493C685(1)020(2)(3)(4)(5)	1.4	6.0	1.9	0.6
#10.0	*B	T493B106(1)020(2)(3)(4)(5)	2.0	6.0	3.0	1.0
10.0	C	T493C106(1)020(2)(3)(4)(5)	2.0	6.0	1.8	0.5
15.0	C	T493C156(1)020(2)(3)(4)(5)	3.0	6.0	1.7	0.4
15.0	D	T493D156(1)020(2)(3)(4)(5)	3.0	6.0	1.0	0.35
#22.0	*C	T493C226(1)020(2)(3)(4)(5)	4.4	6.0	1.2	0.4
22.0	D	T493D226(1)020(2)(3)(4)(5)	4.4	6.0	0.8	0.3
33.0	D	T493D336(1)020(2)(3)(4)(5)	6.6	6.0	0.8	0.2
47.0	*D	T493D476(1)020(2)(3)(4)(5)	9.4	6.0	0.7	0.2
47.0	X	T493X476(1)020(2)(3)(4)(5)	7.5	4.0	0.7	0.15
#68.0	*D	T493D686(1)020(2)(3)(4)(5)	13.6	8.0	0.7	0.2
68.0	X	T493X686(1)020(2)(3)(4)(5)	13.6	6.0	0.7	0.15
25 Volt Rating at +85ºC (17 Volt Rating at +125ºC)						
0.33	A	T493A334(1)025(2)(3)(4)(5)	0.5	4.0	15.0	10.0
0.47	A	T493A474(1)025(2)(3)(4)(5)	0.5	4.0	14.0	9.0
0.68	A	T493A684(1)025(2)(3)(4)(5)	0.5	4.0	10.0	6.0
0.68	B	T493B684(1)025(2)(3)(4)(5)	0.5	4.0	7.5	5.5
1.0	*A	T493A105(1)025(2)(3)(4)(5)	0.5	4.0	8.0	4.0
1.0	B	T493B105(1)025(2)(3)(4)(5)	0.5	4.0	5.0	2.0
1.5	*A	T493A155(1)025(2)(3)(4)(5)	0.5	6.0	10.0	3.0
1.5	B	T493B155(1)025(2)(3)(4)(5)	0.5	6.0	5.0	1.5
2.2	B	T493B225(1)025(2)(3)(4)(5)	0.6	6.0	4.5	1.2
2.2	C	T493C225(1)025(2)(3)(4)(5)	0.6	6.0	3.5	2.2
3.3	B	T493B335(1)025(2)(3)(4)(5)	0.9	6.0	3.5	2.0
3.3	C	T493C335(1)025(2)(3)(4)(5)	0.9	6.0	2.5	1.2
#4.7	*B	T493B475(1)025(2)(3)(4)(5)	1.2	6.0	1.5	1.0
4.7	C	T493C475(1)025(2)(3)(4)(5)	1.2	6.0	2.4	0.6
6.8	C	T493C685(1)025(2)(3)(4)(5)	1.7	6.0	1.9	0.6
6.8	D	T493D685(1)025(2)(3)(4)(5)	1.7	6.0	1.4	1.0
10.0	C	T493C106(1)025(2)(3)(4)(5)	2.5	6.0	1.5	0.5
10.0	D	T493D106(1)025(2)(3)(4)(5)	2.5	6.0	1.0	0.4
#15.0	*C	T493C156(1)025(2)(3)(4)(5)	3.8	6.0	1.5	0.9
15.0	D	T493D156(1)025(2)(3)(4)(5)	3.8	6.0	1.0	0.35
15.0	X	T493X156(1)025(2)(3)(4)(5)	3.0	6.0	0.7	0.2
22.0	D	T493D226(1)025(2)(3)(4)(5)	5.5	6.0	0.8	0.2
22.0	X	T493X226(1)025(2)(3)(4)(5)	4.4	4.0	0.7	0.23
33.0	D	T493D336(1)025(2)(3)(4)(5)	8.3	6.0	0.7	0.4
33.0	X	T493X336(1)025(2)(3)(4)(5)	8.3	6.0	0.7	0.3
†47.0	*D	T493D476(1)025(2)(3)(4)(5)	11.8	10.0	0.7	0.2
†47.0	*X	T493X476(1)025(2)(3)(4)(5)	11.8	6.0	0.7	0.3

(1) To complete KEMET part number, insert M for ±20% or K for ±10% capacitance tolerance. To request ±5% tolerance,contact KEMET sales representative.
(2) To complete KEMET part number, insert A for Non-ER; B for 0.1%/1000 Hrs.; or C for 0.01%/1000 Hrs. Reliability Level.
(3) To complete KEMET part number, insert B for Gold Plated (50 µ inch minimum); C for Hot Solder Dipped (60 µ inch minimum); H for Solder Plated (100 µ inch minimum); or K for Solder Fused (60 µ inch minimum Termination Finish.
(4) To complete KEMET part number for Surge Current testing, insert 61 for none; 62 for 10 cycles +25°C; or 64 for 10 cycles, -55°C & +85°C.
(5) To complete KEMET part number, insert 10 for Standard ESR; or 20 for Low ESR Option.

* Extended Values # Maximum Capacitance Change @ 125°C = +15%. † Maximum Capacitance Change @ 125°C = +20%.

T493 RATINGS AND PART NUMBER REFERENCE

Capacitance µF	Case Size	KEMET Part Number	DCL µA @ 25ºC Max	DF % @ +25ºC 120 Hz Max	Std. ESR Ohms @+25°C 100 kHz Max	Low ESR Ohms @+25°C 100 kHz Max
35 Volt Rating at +85ºC (23 Volt Rating at +125ºC)						
0.10	A	T493A104(1)035(2)(3)(4)(5)	0.5	4.0	20.0	10.0
0.15	A	T493A154(1)035(2)(3)(4)(5)	0.5	4.0	19.0	6.0
0.22	A	T493A224(1)035(2)(3)(4)(5)	0.5	4.0	18.0	6.0
0.33	A	T493A334(1)035(2)(3)(4)(5)	0.5	4.0	15.0	6.0
0.47	A	T493A474(1)035(2)(3)(4)(5)	0.5	4.0	14.0	4.0
0.47	B	T493B474(1)035(2)(3)(4)(5)	0.5	4.0	8.0	2.5
0.68	*A	T493A684(1)035(2)(3)(4)(5)	0.5	4.0	10.0	6.0
0.68	B	T493B684(1)035(2)(3)(4)(5)	0.5	4.0	6.5	2.5
1.0	*A	T493A105(1)035(2)(3)(4)(5)	0.5	4.0	10.0	6.0
1.0	B	T493B105(1)035(2)(3)(4)(5)	0.5	4.0	5.0	2.0
1.5	B	T493B155(1)035(2)(3)(4)(5)	0.5	6.0	5.0	3.0
1.5	C	T493C155(1)035(2)(3)(4)(5)	0.5	6.0	4.5	2.5
2.2	*B	T493B225(1)035(2)(3)(4)(5)	0.8	6.0	4.0	2.5
2.2	C	T493C225(1)035(2)(3)(4)(5)	0.8	6.0	3.5	1.5
#3.3	*B	T493B335(1)035(2)(3)(4)(5)	1.2	6.0	3.5	1.3
3.3	C	T493C335(1)035(2)(3)(4)(5)	1.2	6.0	2.5	0.8
4.7	C	T493C475(1)035(2)(3)(4)(5)	1.7	6.0	2.5	0.6
4.7	D	T493D475(1)035(2)(3)(4)(5)	1.7	6.0	1.5	0.7
6.8	C	T493C685(1)035(2)(3)(4)(5)	2.4	6.0	2.0	0.9
6.8	D	T493D685(1)035(2)(3)(4)(5)	2.4	6.0	1.3	0.5
#10.0	*C	T493C106(1)035(2)(3)(4)(5)	3.5	6.0	2.0	1.2
10.0	D	T493D106(1)035(2)(3)(4)(5)	3.5	6.0	1.0	0.3
10.0	X	T493X106(1)035(2)(3)(4)(5)	2.8	4.0	0.9	0.25
15.0	D	T493D156(1)035(2)(3)(4)(5)	5.3	6.0	0.8	0.3
15.0	X	T493X156(1)035(2)(3)(4)(5)	5.3	6.0	0.9	0.3
#22.0	*D	T493D226(1)035(2)(3)(4)(5)	7.7	6.0	0.7	0.4
22.0	X	T493X226(1)035(2)(3)(4)(5)	7.7	6.0	0.7	0.3
#33.0	*X	T493X336(1)035(2)(3)(4)(5)	11.6	6.0	0.6	0.3
50 Volt Rating at +85ºC (33 Volt Rating at +125ºC)						
0.10	A	T493A104(1)050(2)(3)(4)(5)	0.5	4.0	20.0	10.0
0.15	*A	T493A154(1)050(2)(3)(4)(5)	0.5	4.0	19.0	10.0
0.15	B	T493B154(1)050(2)(3)(4)(5)	0.5	4.0	16.0	10.0
0.22	B	T493B224(1)050(2)(3)(4)(5)	0.5	4.0	14.0	10.0
0.33	B	T493B334(1)050(2)(3)(4)(5)	0.5	4.0	10.0	2.5
0.47	*B	T493B474(1)050(2)(3)(4)(5)	0.5	4.0	9.0	2.0
0.47	C	T493C474(1)050(2)(3)(4)(5)	0.5	4.0	8.0	1.8
0.68	C	T493C684(1)050(2)(3)(4)(5)	0.5	4.0	7.0	1.6
1.0	C	T493C105(1)050(2)(3)(4)(5)	0.5	4.0	5.5	1.6
1.5	*C	T493C155(1)050(2)(3)(4)(5)	0.8	6.0	4.5	1.5
1.5	D	T493D155(1)050(2)(3)(4)(5)	0.8	6.0	3.5	1.0
2.2	*C	T493C225(1)050(2)(3)(4)(5)	1.1	6.0	3.5	1.5
2.2	D	T493D225(1)050(2)(3)(4)(5)	1.1	6.0	2.5	0.8
3.3	D	T493D335(1)050(2)(3)(4)(5)	1.7	6.0	2.0	0.8
4.7	D	T493D475(1)050(2)(3)(4)(5)	2.4	6.0	1.5	0.6
4.7	X	T493X475(1)050(2)(3)(4)(5)	1.9	4.0	0.9	0.3
6.8	X	T493X685(1)050(2)(3)(4)(5)	3.5	6.0	1.0	0.5
10.0	X	T493X106(1)050(2)(3)(4)(5)	5.0	6.0	0.7	0.4

(1) To complete KEMET part number, insert M for ±20% or K for ±10% capacitance tolerance. To request ±5% tolerance,contact KEMET sales representative
(2) To complete KEMET part number, insert A for Non-ER; B for 0.1%/1000 Hrs.; or C for 0.01%/1000 Hrs. Reliability Level.
(3) To complete KEMET part number, insert B for Gold Plated (50 µ inch minimum); C for Hot Solder Dipped (60 µ inch minimum); H for Solder Plated (100 µ inch minimum); or K for Solder Fused (60 µ inch minimum Termination Finish."
(4) To complete KEMET part number, insert 61 for none; 62 for 10 cycles +25°C; or 64 for 10 cycles, -55°C & +85°C
(5) To complete KEMET part number, insert 10 for Standard ESR (T491); or 20 for Low ESR (T494) Option.
* Extended Values # Maximum Capacitance Change @ 125°C = +15%. † Maximum Capacitance Change @ 125°C = +20%.

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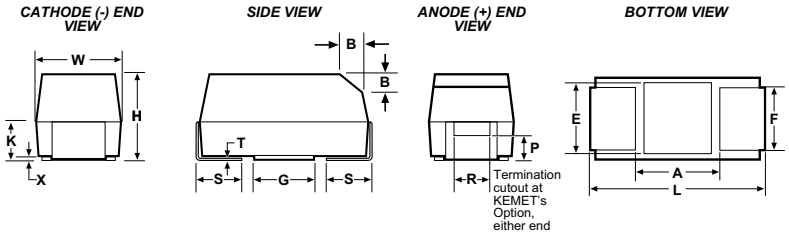
SOLID TANTALUM CHIP CAPACITORS

T494 SERIES — Low ESR, Industrial Grade

FEATURES

- Low ESR values in EIA 535BAAC sizes
- Taped and Reeled per EIA 481-1
- Symmetrical, Compliant Terminations
- Optional Gold-plated Terminations
- Laser-marked Case
- 100% Surge Current test on C, D, E, U, V, X sizes
- Capacitance: 0.1 µF to 1000 µF
- Tolerance: ±10%, ±20%
- Voltage: 3-50 VDC
- Extended Range Values
- Low Profile Case Sizes
- RoHS Compliant & Leadfree Terminations (See www.kemet.com for lead transition)
- Operating Temperature: -55°C to +125°C

CAPACITOR OUTLINE DRAWING



STANDARD T494 DIMENSIONS

Millimeters (inches)

CASE SIZE		COMPONENT													
KEMET	EIA	L*	W*	H*	K* ± 0.20 ± (.008)	F* ± 0.1 ± (.004)	S* ± 0.3 ± (.012)	B ± 0.15 (Ref) ± (.006)	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)
A	3216-18	3.2 ± 0.2 (.126 ± .008)	1.6 ±0.2 (.063 ± .008)	1.6 ± 0.2 (.063 ± .008)	0.9 (.035)	1.2 (.047)	0.8 (.031)	0.4 (.016)	0.10 ± 0.10 (.004 ± .004)	0.4 (.016)	0.4 (.016)	0.13 (.005)	1.4 (.055)	1.1 (.043)	1.3 (.051)
B	3528-21	3.5 ± 0.2 (.138 ± .008)	2.8 ± 0.2 (.110 ± .008)	1.9 ± 0.2 (.075 ± .008)	1.1 (.043)	2.2 (.087)	0.8 (.031)	0.4 (.016)	0.10 ± 0.10 (.004 ± .004)	0.5 (.020)	1.0 (.039)	0.13 (.005)	2.1 (.083)	1.8 (.071)	2.2 (.087)
C	6032-28	6.0 ± 0.3 (.236 ± .012)	3.2 ± 0.3 (.126 ± .012)	2.5 ± 0.3 (.098 ± .012)	1.4 (.055)	2.2 (.087)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	0.9 (.035)	1.0 (.039)	0.13 (.005)	3.1 (.122)	2.8 (.110)	2.4 (.094)
D	7343-31	7.3 ± 0.3 (.287 ± .012)	4.3 ± 0.3 (.169 ± .012)	2.8 ± 0.3 (.110 ± .012)	1.5 (.059)	2.4 (.094)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	0.9 (.035)	1.0 (.039)	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)
X	7343-43	7.3 ± 0.3 (.287 ± .012)	4.3 ± 0.3 (.169 ± .012)	4.0 ± 0.3 (.157 ± .012)	2.3 (.091)	2.4 (.094)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	1.7 (.067)	1.0 (.039)	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)
E	7260-38	7.3 ± 0.3 (.287 ± .012)	6.0 ± 0.3 (.236 ± .012)	3.6 ± 0.2 (.142 ± .008)	2.3 (.091)	4.1 (.161)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	0.9 (.035)	1.0 (.039)	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)

Notes: 1. Metric dimensions govern.
2. (Ref) - Dimensions provided for reference only.
* Mil-C-55365/8 Specified Dimensions

LOW PROFILE T494 DIMENSIONS

Millimeters (inches)

CASE SIZE		COMPONENT										
KEMET	EIA	L	W	H Max.	K Min.	F ± 0.1	S ± 0.3	X (Ref	T (Ref)	A (Min)	G (Ref)	E (Ref)
R	2012-12	2.0 ± 0.2 (.079 ± .008)	1.3 ± 0.2 (.051 ± .008)	1.2 (.047)	0.3 (.012)	0.9 (.035)	0.5 (.020)	0.05 (.002)	0.13 (.005)	0.8 (.031)	0.5 (.020)	0.8 (.031)
S	3216-12	3.2 ± 0.2 (.126 ± .008)	1.6 ± 0.2 (.063 ± .008)	1.2 (.047)	0.3 (.012)	1.2 (.047)	0.8 (.031)	0.05 (.002)	0.13 (.005)	1.4 (.055)	1.1 (.043)	1.3 (.051)
T	3528-12	3.5 ± 0.2 (.138 ± .008)	2.8 ± 0.2 (.110 ± .008)	1.2 (.047)	0.3 (.012)	2.2 (.087)	0.8 (.031)	0.05 (.002)	0.13 (.005)	2.1 (.083)	1.8 (.071)	2.2 (.087)
U	6032-15	6.0 ± 0.3 (.236 ± .012)	3.2 ± 0.3) (.126 ± .012)	1.5 (.059)	0.5 (.020)	2.2 (.087)	1.3 (.051)	0.05 (.002)	0.13 (.005)	3.1 (.122)	2.8 (.110)	2.4 (.094)
V	7343-20	7.3 ± 0.3 (.287 ± .012)	4.3 ± 0.3 (.169 ± .012)	2.0 (.079)	0.9 (.035)	2.4 (.094)	1.3 (.051)	0.05 (.002)	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)

Notes: 1. Metric dimensions govern.
2. (Ref) - Dimensions provided for reference only.
3. No dimensions provided for B, P or R because low profile cases do not have a bevel or a notch.

T494 ORDERING INFORMATION

T 494 B 105 M 035 A S*

Tantalum — T

Series — 494
T494 - Low ESR, Industrial Grade

Case Size — B
A, B, C, D, E, R, S, T, U, V, X

Capacitance Picofarad Code — 105
First two digits represent significant figures.
Third digit specifies number of zeros to follow.

Capacitance Tolerance — M
M - ± 20%
K - ± 10%

Voltage — 035

Failure Rate — A
A - Not Applicable

Lead Material — S*
T - 100% Tin (Sn) Plated
H - Tin/Lead (SnPb 5% Pb minimum)
G - Gold Plated (A, B, C, D, X only)
****S** - Not recommended for new designs

***Part number example: T49 B105M035AT (14 digits - no spaces). See www.kemet.com for Pb Free transition.**
**** "S" Termination codes are converting from 90Sn/10 Pb to 100% tin finishes. Orders including "S" suffix termination codes do not quarantee Pb-free product.**

T494 RATINGS & PART NUMBER REFERENCE

Capacitance µF	Case Size	KEMET Part Number	DC Leakage µA @ 25°C Max	DF % @ +25°C 120 Hz Max	ESR Ω @ +25°C 100 kHz Max
2.5 Volt Rating at +85°C (1.7 Volt Rating at +125°C)					
100.0	*T	T494T107(1)2R5A(2)	2.5	24.0	3.5
220.0	D	T494D227(1)2R5A(2)	5.5	8.0	0.2
3 Volt Rating at +85°C (2 Volt Rating at +125°C)					
#33.0	*A	T494A336(1)003A(2)	1.0	6.0	2.0
4 Volt Rating at +85°C (2.7 Volt Rating at +125°C)					
3.3	A	T494A335(1)004A(2)	0.5	6.0	4.0
4.7	A	T494A475(1)004A(2)	0.5	6.0	3.5
6.8	A	T494A685(1)004A(2)	0.5	6.0	3.0
6.8	S	T494S685(1)004A(2)	0.5	6.0	7.0
10.0	B	T494B106(1)004A(2)	0.5	6.0	1.2
10.0	A	T494A106(1)004A(2)	0.5	6.0	2.0
#10.0	*S	T494S106(1)004A(2)	0.5	6.0	9.0
#10.0	*R	T494R106M004A(2)	0.5	8.0	6.0
15.0	B	T494B156(1)004A(2)	0.6	6.0	1.2
15.0	A	T494A156(1)004A(2)	0.6	6.0	1.5
15.0	T	T494T156(1)004A(2)	0.6	6.0	2.0
#15.0	*S	T494S156M004A(2)	0.6	10.0	9.0
22.0	C	T494C226(1)004A(2)	0.9	6.0	0.5
22.0	B	T494B226(1)004A(2)	0.9	6.0	0.6
#22.0	*A	T494A226(1)004A(2)	0.9	6.0	1.5
#22.0	*S	T494S226M004A(2)	0.9	10.0	8.0
#22.0	*T	T494T226(1)004A(2)	0.9	6.0	2.5
33.0	C	T494C336(1)004A(2)	1.3	6.0	0.5
33.0	U	T494U336(1)004A(2)	1.3	6.0	0.6
33.0	B	T494B336(1)004A(2)	1.3	6.0	0.5
#33.0	*A	T494A336(1)004A(2)	1.3	6.0	3.0
#33.0	*T	T494T336M004A(2)	1.3	8.0	3.5
47.0	C	T494C476(1)004A(2)	1.9	6.0	0.5
47.0	U	T494U476(1)004A(2)	1.9	6.0	0.6
#47.0	*B	T494B476(1)004A(2)	1.9	6.0	0.5
#47.0	*A	T494A476M004A(2)	1.9	12.0	2.0
#47.0	T	T494T476M004A(2)	1.9	12.0	4.0
68.0	D	T494D686(1)004A(2)	2.7	6.0	0.20
68.0	C	T494C686(1)004A(2)	2.7	6.0	0.25
#68.0	*U	T494U686(1)004A(2)	2.7	6.0	0.60
#68.0	*B	T494B686(1)004A(2)	2.7	6.0	2.00
#68.0	A	T494A686(1)004A(2)	2.8	30.0	3.00
100.0	D	T494D107(1)004A(2)	4.0	8.0	0.20
#100.0	*C	T494C107(1)004A(2)	4.0	8.0	0.20
#100.0	*U	T494U107(1)004A(2)	4.0	10.0	1.00
#100.0	*B	T494B107M004A(2)	4.0	8.0	0.65
†100.0	*A	T494A107M004A(2)	4.0	30.0	3.00
†100.0	*T	T494T107M004A(2)	4.0	30.0	4.50
150.0	D	T494D157(1)004A(2)	6.0	8.0	0.15
150.0	V	T494V157(1)004A(2)	6.0	8.0	0.20
#150.0	*C	T494C157(1)004A(2)	6.0	8.0	0.30
†150.0	*B	T494B157M004A(2)	6.0	12.0	1.00
#220.0	*V	T494V227(1)004A(2)	8.8	8.0	0.30
#220.0	*B	T494B227M004A(2)	8.8	8.0	0.40
#330.0	*D	T494D337(1)004A(2)	13.2	8.0	0.15
#330.0	*C	T494C337(1)004A(2)	13.2	10.0	0.09
†330.0	*V	T494V337(1)004A(2)	13.2	12.0	0.30
#470.0	*X	T494X477(1)004A(2)	18.8	8.0	0.15
#470.0	*D	T494D477(1)004A(2)	18.8	8.0	0.15
#680.0	*X	T494X687M004A(2)	27.2	12.0	0.10
#680.0	D	T494D687M004A(2)	27.2	12.0	0.15
#1000.0	*X	T494X108(1)004A(2)	40.0	12.0	0.10
#1000.0	*E	T494E108M004A(2)	40.0	15.0	0.08
****6 Volt Rating at +85°C (4 Volt Rating at +125°C)**					
2.2	R	T494R225(1)006A(2)	0.5	6.0	20.0
2.2	A	T494A225(1)006A(2)	0.5	6.0	6.0
3.3	A	T494A335(1)006A(2)	0.5	6.0	6.0
4.7	A	T494A475(1)006A(2)	0.5	6.0	3.5
4.7	S	T494S475(1)006A(2)	0.5	6.0	8.0
6.8	B	T494B685(1)006A(2)	0.5	6.0	1.2
6.8	A	T494A685(1)006A(2)	0.5	6.0	2.0
#6.8	*S	T494S685(1)006A(2)	0.5	6.0	9.0
#6.8	*R	T494R685(1)006A(2)	0.5	8.0	10.0
10.0	B	T494B106(1)006A(2)	0.6	6.0	1.0
10.0	A	T494A106(1)006A(2)	0.6	6.0	2.0
10.0	T	T494T106(1)006A(2)	0.6	6.0	1.2
#10.0	*S	T494S106M006A(2)	0.6	10.0	9.0
#10.0	*R	T494R106M006A(2)	0.6	8.0	6.0
****6 Volt Rating at +85°C (4 Volt Rating at +125°C)**					
15.0	C	T494C156(1)006A(2)	0.9	6.0	0.6
15.0	B	T494B156(1)006A(2)	0.9	6.0	0.7
#15.0	*A	T494A156(1)006A(2)	0.9	6.0	2.0
#15.0	*T	T494T156(1)006A(2)	0.9	6.0	2.5
#15.0	S	T494S156M006A(2)	0.9	10.0	10.0
22.0	C	T494C226(1)006A(2)	1.4	6.0	0.5
22.0	U	T494U226(1)006A(2)	1.4	6.0	0.8
22.0	B	T494B226(1)006A(2)	1.4	6.0	0.6
#22.0	*A	T494A226(1)006A(2)	1.4	6.0	3.0
#22.0	*T	T494T226M006A(2)	1.4	8.0	3.5
33.0	C	T494C336(1)006A(2)	2.0	6.0	0.3
33.0	U	T494U336(1)006A(2)	2.0	6.0	0.6
#33.0	*B	T494B336(1)006A(2)	2.0	6.0	0.6
#33.0	*A	T494A336(1)006A(2)	2.0	12.0	2.0
#33.0	T	T494T336M006A(2)	2.0	12.0	4.0
47.0	D	T494D476(1)006A(2)	2.9	6.0	0.22
47.0	C	T494C476(1)006A(2)	2.9	6.0	0.25
#47.0	*U	T494U476(1)006A(2)	2.9	6.0	0.60
#47.0	*B	T494B476(1)006A(2)	2.9	6.0	0.50
†47.0	*A	T494A476M006A(2)	3.0	12.0	2.50
47.0	*T	T494T476(1)006A(2)	3.0	24.0	4.00
68.0	D	T494D686(1)006A(2)	4.1	6.0	0.20
#68.0	*C	T494C686(1)006A(2)	4.1	6.0	0.20
#68.0	*U	T494U686(1)006A(2)	4.1	10.0	1.00
#68.0	*B	T494B686M006A(2)	4.1	8.0	0.65
#68.0	*A	T494A686M006A(2)	5.0	30.0	3.00
100.0	D	T494D107(1)006A(2)	6.0	8.0	0.15
100.0	V	T494V107(1)006A(2)	6.0	8.0	0.20
#100.0	*C	T494C107(1)006A(2)	6.0	8.0	0.30
#100.0	U	T494U107M006A(2)	6.0	10.0	1.20
#100.0	*B	T494B107M006A(2)	6.0	15.0	1.50
150.0	D	T494D157(1)006A(2)	9.0	8.0	0.15
#150.0	*C	T494C157M006A(2)	9.0	8.0	0.30
#150.0	*V	T494V157(1)006A(2)	9.0	8.0	0.30
220.0	X	T494X227(1)006A(2)	13.2	8.0	0.15
#220.0	*D	T494D227(1)006A(2)	13.2	8.0	0.15
#220.0	*C	T494C227M006A(2)	13.2	10.0	0.30
#220.0	*V	T494V227M006A(2)	13.2	12.0	0.30
#330.0	*X	T494X337(1)006A(2)	19.8	8.0	0.15
#330.0	*D	T494D337(1)006A(2)	19.8	8.0	0.15
#470.0	*X	T494X477(1)006A(2)	28.2	10.0	0.10
#470.0	*D	T494D477M006A(2)	28.2	12.0	0.15
#470.0	*E	T494E477(1)006A(2)	29.6	10.0	0.20
#680.0	E	T494E687M006A(2)	40.8	12.0	0.10
10 Volt Rating at +85°C (7 Volt Rating at +125°C)					
1.5	A	T494A155(1)010A(2)	0.5	6.0	6.0
2.2	B	T494B225(1)010A(2)	0.5	6.0	1.5
2.2	A	T494A225(1)010A(2)	0.5	6.0	6.0
3.3	A	T494A335(1)010A(2)	0.5	6.0	4.0
3.3	S	T494S335(1)010A(2)	0.5	6.0	9.0
#3.3	*R	T494R335(1)010A(2)	0.3	8.0	10.0
4.7	B	T494B475(1)010A(2)	0.5	6.0	1.5
4.7	A	T494A475(1)010A(2)	0.5	6.0	3.0
#4.7	*S	T494S475(1)010A(2)	0.5	6.0	9.0
#4.7	*R	T494R475M010A(2)	0.5	8.0	8.0
6.8	B	T494B685(1)010A(2)	0.7	6.0	1.2
6.8	A	T494A685(1)010A(2)	0.7	6.0	3.0
6.8	T	T494T685(1)010A(2)	0.7	6.0	2.0
#6.8	*S	T494S685M010A(2)	0.7	10.0	9.0
10.0	C	T494C106(1)010A(2)	1.0	6.0	0.6
10.0	B	T494B106(1)010A(2)	1.0	6.0	0.8
#10.0	*A	T494A106(1)010A(2)	1.0	6.0	1.8
#10.0	*T	T494T106(1)010A(2)	1.0	6.0	3.5
#10.0	S	T494S106M010A(2)	1.0	10.0	12.0
15.0	C	T494C156(1)010A(2)	1.5	6.0	0.5
15.0	U	T494U156(1)010A(2)	1.5	6.0	0.8
15.0	B	T494B156(1)010A(2)	1.5	6.0	0.7
#15.0	*A	T494A156(1)010A(2)	1.5	8.0	4.0
#15.0	*T	T494T156M010A(2)	1.5	8.0	3.5

(1) To complete KEMET Part Number, insert M for ±20% tolerance or K for ±10% tolerance.
(2) To complete KEMET Part Number, insert S, H, G, or T lead material designation as shown on page 27.
*Extended Values
**6 Volt product equivalent to 6.3 volt product.
#Maximum Capacitance Change @ 125°C=+15%.
†Maximum Capacitance Change @ 125°C=+20%.
Higher voltage ratings and tighter tolerance product may be substituted within the same size at KEMET's option.
Voltage substitutions will be marked with the higher voltage rating.

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T494 RATINGS & PART NUMBER REFERENCE

Capacitance µF	Case Size	KEMET Part Number	DC Leakage µA @ 25°C Max	DF % @ +25ºC 120 Hz Max	ESR Ω @ +25ºC 100 kHz Max
10 Volt Rating at +85ºC (7 Volt Rating at +125ºC)					
22.0	C	T494C226(1)010A(2)	2.2	6.0	0.4
22.0	U	T494U226(1)010A(2)	2.2	6.0	0.8
#22.0	*B	T494B226(1)010A(2)	2.2	6.0	0.7
#22.0	*A	T494A226M010A(2)	2.2	10.0	4.5
#22.0	T	T494T226M010A(2)	2.2	12.0	6.0
33.0	D	T494D336(1)010A(2)	3.3	6.0	0.25
33.0	V	T494V336(1)010A(2)	3.3	6.0	0.30
33.0	C	T494C336(1)010A(2)	3.3	6.0	0.30
#33.0	*U	T494U336(1)010A(2)	3.3	6.0	0.60
#33.0	*B	T494B336(1)010A(2)	3.3	6.0	1.40
47.0	D	T494D476(1)010A(2)	4.7	6.0	0.22
47.0	V	T494V476(1)010A(2)	4.7	6.0	0.30
#47.0	*C	T494C476(1)010A(2)	4.7	6.0	0.30
#47.0	*U	T494U476(1)010A(2)	4.7	10.0	1.20
#47.0	*B	T494B476M010A(2)	4.7	8.0	0.65
68.0	D	T494D686(1)010A(2)	6.8	6.0	0.20
#68.0	*C	T494C686(1)010A(2)	6.8	6.0	0.30
68.0	V	T494V686(1)010A(2)	6.8	6.0	0.30
#68.0	U	T494U686M010A(2)	6.8	10.0	1.20
#68.0	*B	T494B686M010A(2)	6.8	10.0	1.50
100.0	D	T494D107(1)010A(2)	10.0	8.0	0.15
#100.0	*C	T494C107(1)010A(2)	10.0	8.0	0.20
#100.0	*V	T494V107(1)010A(2)	10.0	8.0	0.40
150.0	X	T494X157(1)010A(2)	15.0	8.0	0.15
#150.0	*D	T494D157(1)010A(2)	15.0	8.0	0.15
#150.0	*C	T494C157(1)010A(2)	15.0	10.0	0.70
#150.0	V	T494V157M010A(2)	15.0	8.0	0.30
#220.0	*X	T494X227(1)010A(2)	22.0	8.0	0.15
#220.0	*D	T494D227(1)010A(2)	22.0	8.0	0.15
#220.0	*V	T494V227(1)010A(2)	22.0	12.0	0.50
#330.0	X	T494X337(1)010A(2)	33.0	10.0	0.10
#330.0	*D	T494D337M010A(2)	33.0	10.0	0.15
#330.0	*E	T494E337(1)010A(2)	33.0	10.0	0.25
#470.0	*X	T494X477(1)010A(2)	47.0	10.0	0.10
#470.0	E	T494E477M010A(2)	47.0	12.0	0.10
16 Volt Rating at +85ºC (10 Volt Rating at + 125ºC)					
1.0	A	T494A105(1)016A(2)	0.5	4.0	6.0
1.5	A	T494A155(1)016A(2)	0.5	6.0	6.0
2.2	A	T494A225(1)016A(2)	0.5	6.0	4.0
2.2	*S	T494S225(1)016A(2)	0.5	6.0	10.0
#2.2	*R	T494R225(1)016A(2)	0.5	8.0	20.0
3.3	B	T494B335(1)016A(2)	0.5	6.0	2.0
3.3	A	T494A335(1)016A(2)	0.5	6.0	4.0
4.7	B	T494B475(1)016A(2)	0.8	6.0	1.5
4.7	A	T494A475(1)016A(2)	0.8	6.0	3.0
4.7	T	T494T475(1)016A(2)	0.8	6.0	3.0
6.8	C	T494C685(1)016A(2)	1.1	6.0	0.8
6.8	B	T494B685(1)016A(2)	1.1	6.0	1.2
#6.8	*A	T494A685(1)016A(2)	1.1	6.0	3.0
10.0	C	T494C106(1)016A(2)	1.6	6.0	0.6
10.0	U	T494U106(1)016A(2)	1.6	6.0	1.0
10.0	B	T494B106(1)016A(2)	1.6	6.0	0.8
#10.0	*A	T494A106(1)016A(2)	1.6	8.0	3.0
#10.0	*T	T494T106(1)016A(2)	1.6	8.0	6.0
15.0	C	T494C156(1)016A(2)	2.4	6.0	0.4
15.0	U	T494U156(1)016A(2)	2.4	6.0	0.8
#15.0	*B	T494B156(1)016A(2)	2.4	6.0	0.8
22.0	D	T494D226(1)016A(2)	3.6	6.0	0.25
22.0	C	T494C226(1)016A(2)	3.6	6.0	0.35
#22.0	*U	T494U226(1)016A(2)	3.6	10.0	1.80
#22.0	*B	T494B226(1)016A(2)	3.6	6.0	1.00
33.0	D	T494D336(1)016A(2)	5.3	6.0	0.25
#33.0	*C	T494C336(1)016A(2)	5.3	6.0	0.30
#33.0	*U	T494U336(1)016A(2)	5.3	12.0	2.20
47.0	D	T494D476(1)016A(2)	7.5	6.0	0.2
47.0	V	T494V476(1)016A(2)	7.5	6.0	0.3
#47.0	*C	T494C476(1)016A(2)	7.5	6.0	0.5
68.0	*D	T494D686(1)016A(2)	10.9	6.0	0.15
#68.0	*V	T494V686(1)016A(2)	10.9	6.0	0.5

Capacitance µF	Case Size	KEMET Part Number	DC Leakage µA @ 25°C Max	DF % @ +25ºC 120 Hz Max	ESR Ω @ +25ºC 100 kHz Max
16 Volt Rating at +85ºC (10 Volt Rating at + 125ºC)					
100.0	X	T494X107(1)016A(2)	16.0	8.0	0.15
#100.0	*D	T494D107(1)016A(2)	16.0	8.0	0.15
†100.0	*V	T494V107(1)016A(2)	16.0	12.0	0.5
#150.0	*X	T494X157(1)016A(2)	24.0	8.0	0.15
#150.0	*D	T494D157(1)016A(2)	24.0	12.0	0.4
#220.0	*X	T494X227(1)016A(2)	35.2	10.0	0.4
#220.0	*E	T494E227(1)016A(2)	35.2	7.2	0.5
20 Volt Rating at +85ºC (13 Volt Rating at +125ºC)					
0.68	A	T494A684(1)020A(2)	0.5	4.0	8.0
1.0	A	T494A105(1)020A(2)	0.5	4.0	5.5
1.0	S	T494S105(1)020A(2)	0.5	6.0	10.0
†1.0	R	T494R105(1)020A(2)	0.2	6.0	15.0
1.5	A	T494A155(1)020AS(2)	0.5	6.0	4.5
1.5	S	T494S155(1)020A(2)	0.5	6.0	9.0
2.2	B	T494B225(1)020A(2)	0.5	6.0	1.5
2.2	A	T494A225(1)020A(2)	0.5	6.0	4.0
3.3	B	T494B335(1)020A(2)	0.7	6.0	1.3
#3.3	*A	T494A335(1)020A(2)	0.7	6.0	4.0
3.3	*T	T494T335(1)020A(2)	0.7	6.0	4.0
4.7	C	T494C475(1)020A(2)	1.0	6.0	0.6
4.7	B	T494B475(1)020A(2)	1.0	6.0	1.0
#4.7	*A	T494A475(1)020A(2)	1.0	6.0	3.0
6.8	C	T494C685(1)020A(2)	1.4	6.0	0.6
6.8	U	T494U685(1)020A(2)	1.4	6.0	1.4
#6.8	*B	T494B685(1)020A(2)	1.4	6.0	1.0
#6.8	*A	T494A685M020A(2)	1.4	8.0	3.0
10.0	C	T494C106(1)020A(2)	2.0	6.0	0.5
10.0	U	T494U106(1)020A(2)	2.0	6.0	0.8
#10.0	*B	T494B106(1)020A(2)	2.0	6.0	1.0
15.0	D	T494D156(1)020A(2)	3.0	6.0	0.35
15.0	*C	T494C156(1)020A(2)	3.0	6.0	0.40
22.0	D	T494D226(1)020A(2)	4.4	6.0	0.3
22.0	V	T494V226(1)020A(2)	4.4	6.0	0.4
#22.0	*C	T494C226(1)020A(2)	4.4	6.0	0.4
33.0	D	T494D336(1)020A(2)	6.6	6.0	0.25
#33.0	*C	T494C336M020A(2)	6.6	6.0	0.40
†33.0	V	T494V336(1)020A(2)	6.6	8.0	0.40
47.0	*D	T494D476(1)020A(2)	9.4	6.0	0.20
68.0	X	T494X686(1)020A(2)	13.6	6.0	0.20
#68.0	*D	T494D686(1)020A(2)	13.6	8.0	0.20
#100.0	*X	T494X107(1)020A(2)	20.0	8.0	0.15
#100.0	*E	T494E107(1)020A(2)	20.0	8.0	0.30
#150.0	*X	T494X157(1)020A(2)	30.0	10.0	0.30
25 Volt Rating at +85ºC (17 Volt Rating at +125ºC)					
0.33	A	T494A334(1)025A(2)	0.5	4.0	10.0
0.47	A	T494A474(1)025A(2)	0.5	4.0	9.0
0.68	A	T494A684(1)025A(2)	0.5	4.0	6.0
1.0	B	T494B105(1)025A(2)	0.5	4.0	2.0
1.0	*A	T494A105(1)025A(2)	0.5	4.0	4.0
1.5	B	T494B155(1)025A(2)	0.5	6.0	1.5
1.5	*A	T494A155(1)025A(2)	0.5	6.0	3.0
2.2	C	T494C225(1)025A(2)	0.6	6.0	2.2
2.2	B	T494B225(1)025A(2)	0.6	6.0	1.2
3.3	C	T494C335(1)025A(2)	0.9	6.0	1.2
3.3	*B	T494B335(1)025A(2)	0.9	6.0	2.0
4.7	C	T494C475(1)025A(2)	1.2	6.0	0.6
#4.7	*B	T494B475(1)025A(2)	1.2	6.0	1.0
#4.7	*A	T494A475M025A(2)	1.2	8.0	3.0
6.8	C	T494C685(1)025A(2)	1.7	6.0	0.6
6.8	*B	T494B685(1)025A(2)	1.7	8.0	2.0
10.0	D	T494D106(1)025A(2)	2.5	6.0	0.4
10.0	*C	T494C106(1)025A(2)	2.5	6.0	0.6
15.0	D	T494D156(1)025A(2)	3.8	6.0	0.35
#15.0	*C	T494C156(1)025A(2)	3.8	6.0	0.90
22.0	D	T494D226(1)025A(2)	5.5	6.0	0.3
22.0	*C	T494C226(1)025A(2)	5.5	6.0	1.0
22.0	*V	T494V226(1)025A(2)	5.5	6.0	0.5
33.0	X	T494X336(1)025A(2)	8.3	6.0	0.3
#33.0	*D	T494D336(1)025A(2)	8.3	6.0	0.4
#47.0	*X	T494X476(1)025A(2)	11.8	6.0	0.3
†47.0	*D	T494D476(1)025A(2)	11.8	10.0	0.2
†68.0	*X	T494X686M025A(2)	17.0	8.0	0.3

(1) To complete KEMET Part Number, insert M for ±20% tolerance or K for ±10% tolerance.
(2) To complete KEMET Part Number, insert S, H, G, or T lead material designation as shown on page 27.
*Extended Values
**6 Volt product equivalent to 6.3 volt product.
#Maximum Capacitance Change @ 125ºC=+15%.
†Maximum Capacitance Change @ 125ºC=+20%.
Higher voltage ratings and tighter tolerance product may be substituted within the same size at KEMET's option.
Voltage substitutions will be marked with the higher voltage rating.

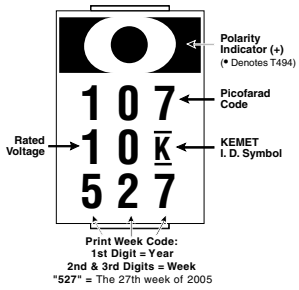
T494 RATINGS & PART NUMBER REFERENCE

Capacitance µF	Case Size	KEMET Part Number	DC Leakage µA @ 25°C Max	DF % @ +25°C 120 Hz Max	ESR Ω @ +25°C 100 kHz Max
35 Volt Rating at +85°C (23 Volt Rating at +125°C)					
0.10	A	T494A104(1)035A(2)	0.5	4.0	10.0
0.15	A	T494A154(1)035A(2)	0.5	4.0	6.0
0.22	A	T494A224(1)035A(2)	0.5	4.0	6.0
0.33	A	T494A334(1)035A(2)	0.5	4.0	6.0
0.47	B	T494B474(1)035A(2)	0.5	4.0	2.5
0.47	A	T494A474(1)035A(2)	0.5	4.0	4.0
0.68	B	T494B684(1)035A(2)	0.5	4.0	2.5
0.68	*A	T494A684(1)035A(2)	0.5	4.0	6.0
1.0	B	T494B105(1)035A(2)	0.5	4.0	2.0
1.0	*A	T494A105(1)035A(2)	0.5	4.0	6.0
1.5	C	T494C155(1)035A(2)	0.5	6.0	2.5
1.5	B	T494B155(1)035A(2)	0.5	6.0	3.0
2.2	C	T494C225(1)035A(2)	0.8	6.0	1.5
2.2	*B	T494B225(1)035A(2)	0.8	6.0	2.5
3.3	C	T494C335(1)035A(2)	1.2	6.0	0.8
#3.3	*B	T494B335(1)035A(2)	1.2	6.0	1.3
4.7	D	T494D475(1)035A(2)	1.7	6.0	0.7
4.7	C	T494C475(1)035A(2)	1.7	6.0	0.7
6.8	D	T494D685(1)035A(2)	2.4	6.0	0.5
6.8	*C	T494C685(1)035A(2)	2.4	6.0	0.9
10.0	D	T494D106(1)035A(2)	3.5	6.0	0.4
#10.0	*C	T494C106M035A(2)	3.5	6.0	1.2
#10.0	*V	T494V106(1)035A(2)	3.5	6.0	0.8
15.0	X	T494X156(1)035A(2)	5.3	6.0	0.30
15.0	*D	T494D156(1)035A(2)	5.3	6.0	0.35
#22.0	X	T494X226(1)035A(2)	7.7	6.0	0.3
#22.0	*D	T494D226(1)035A(2)	7.7	6.0	0.4
#33.0	*X	T494X336(1)035A(2)	11.6	6.0	0.3
†47.0	*X	T494X476(1)035A(2)	16.5	8.0	0.5
†47.0	*E	T494E476(1)035A(2)	16.5	10.0	0.3
50 Volt Rating at +85°C (33 Volt Rating at +125°C)					
0.10	A	T494A104(1)050A(2)	0.5	4.0	10.0
0.15	B	T494B154(1)050A(2)	0.5	4.0	10.0
0.15	*A	T494A154(1)050A(2)	0.5	4.0	10.0
0.22	B	T494B224(1)050A(2)	0.5	4.0	10.0
0.33	B	T494B334(1)050A(2)	0.5	4.0	2.5
0.47	C	T494C474(1)050A(2)	0.5	4.0	1.8
0.47	*B	T494B474(1)050A(2)	0.5	4.0	2.0
0.68	C	T494C684(1)050A(2)	0.5	4.0	1.6
0.68	*B	T494B684(1)050A(2)	0.5	4.0	3.0
1.0	C	T494C105(1)050A(2)	0.5	4.0	1.6
#1.0	*V	T494V105M050A(2)	0.5	4.0	4.0
1.5	D	T494D155(1)050A(2)	0.8	6.0	1.0
1.5	*C	T494C155(1)050A(2)	0.8	6.0	1.5
2.2	D	T494D225(1)050A(2)	1.1	6.0	0.8
2.2	*C	T494C225(1)050A(2)	1.1	6.0	1.5
3.3	D	T494D335(1)050A(2)	1.7	6.0	0.8
4.7	D	T494D475(1)050A(2)	2.4	6.0	0.6
6.8	X	T494X685(1)050A(2)	3.5	6.0	0.5
#6.8	D	T494D685(1)050A(2)	3.4	6.0	0.7
#10.0	X	T494X106M050A(2)	5.0	6.0	0.4
#10.0	*D	T494D106(1)050A(2)	5.0	6.0	0.7
†15.0	*X	T494X156(1)050A(2)	7.5	6.0	0.4

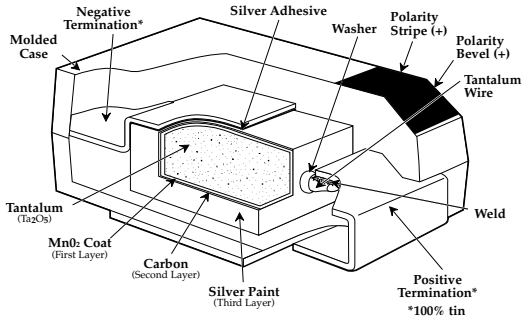
(1) To complete KEMET Part Number, insert M for ±20% tolerance or K for ±10% tolerance.
(2) To complete KEMET Part Number, insert S, H, G, or T lead material designation as shown on page 27.
*Extended Values
**6 Volt product equivalent to 6.3 volt product.
#Maximum Capacitance Change @ 125°C=+15%.
†Maximum Capacitance Change @ 125°C=+20%.
Higher voltage ratings and tighter tolerance product may be substituted within the same size at KEMET's option.
Voltage substitutions will be marked with the higher voltage rating.

CAPACITOR MARKINGS

T494 Series — All Case Sizes



CONSTRUCTION



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SOLID TANTALUM CHIP CAPACITORS

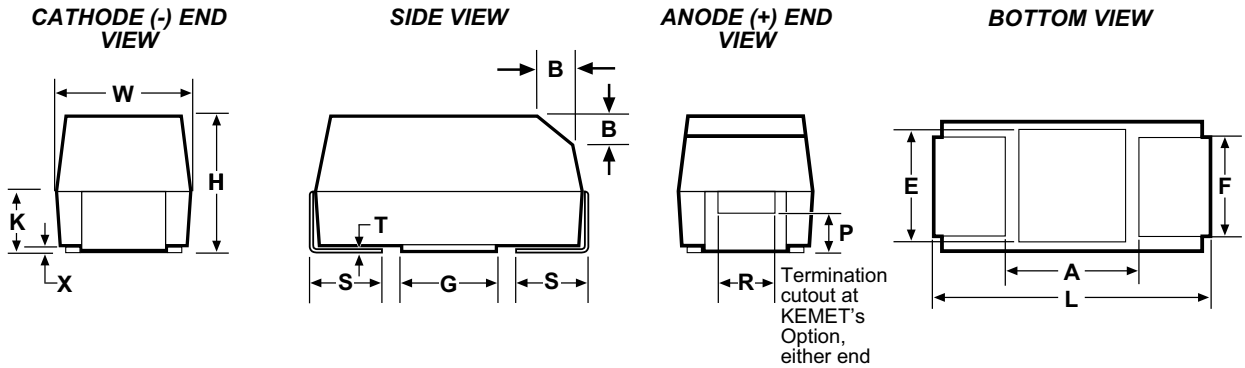
T495 SERIES—Low ESR, Surge Robust

KEMET

FEATURES

- Designed for very low ESR
- High ripple current capability
- High surge current capability
- 100% accelerated steady-state aging
- 100% Surge Current test
- Meets or Exceeds EIA Standard 535BAAC
- Available tested per DSCC Dwg. 95158
- Operating Temperature: -55˚C to +125˚C
- New Extended Values for Low ESR
- Low Equivalent Series Inductance (<2.5nH ESL)
- Precision-molded, laser-marked case
- Symmetrical, compliant terminations
- Taped and reeled per EIA 481-1
- RoHS Compliant & Leadfree Terminations (see www.kemet.com for lead transition)

OUTLINE DRAWING



STANDARD T495 DIMENSIONS

Millimeters (Inches)

Case Size KEMET	Case Size EIA	L	W	H	K ±0.20	F ±0.1	S ±0.3	B ±0.15 (Ref) ±(.006)	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)
B	3528-21	3.5 ± 0.2 (.138 ± .008)	2.8 ± 0.2 (.110 ± .008)	1.9 ± 0.1 (.075 ± .008)	1.1 (.043)	2.2 (.087)	0.8 (.031)	0.4 (.016)	0.10 ± 0.10 (.004 ± .004)	0.5 (.020)	1.0 (.039)	0.13 (.005)	2.1 (.083)	1.8 (.071)	2.2 (.087)
C	6032-28	6.0 ± 0.3 (.236 ± .012)	3.2 ± 0.3 (.126 ± .12)	2.5 ± 0.3 .098 ± .012)	1.4 (.055)	2.2 (.087)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	0.9 (.0235)	1.0 (.039)	0.13 (.005)	3.1 (.122)	2.8 (.110)	2.4 (.094)
D	7343-31	7.3 ± 0.3 (.287 ± .012)	4.3 ± 0.3 (.169 ± .012)	2.8 ± 0.3 (.110 ± .012)	1.5 (.059)	2.4 (.094)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	0.9 (.0235)	1.0 (.039)	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)
X	7343-43	7.3 ± 0.3 (.287 ± .012)	4.3 ± 0.3 (.169 ± .012)	4.0 ± 0.3 (.157 ± .012)	2.3 (.091)	2.4 (.094)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	1.7 (.067)	1.0 (.039)	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)
E	7260-38	7.3 ± 0.3 (.287 ± .012)	6.0 ± 0.3 (.236± .012)	3.6 ± 0.2 (.142 ± .008)	2.3 (.091)	4.1 (.161)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	0.9 (.035)	1.0 (.039)	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)

Notes: 1. Metric dimensions govern.
2. (Ref) - Dimensions provided for reference only.

LOW PROFILE T495 DIMENSIONS

Millimeters (Inches)

CASE SIZE KEMET	CASE SIZE EIA	COMPONENT L	W	H Max.	K Min.	F ± 0.1	S ± 0.3	X (Ref	T (Ref)	A (Min)	G (Ref)	E (Ref)
T	3528-12	3.5 ± 0.2 (.138 ± .008)	2.8 ± 0.2 (.110 ± .008)	1.2 (.047)	0.3 (.012)	2.2 (.087)	0.8 (.031)	0.05 (.002)	0.13 (.005)	2.1 (.083)	1.8 (.071)	2.2 (.087)
V	7343-20	7.3 ± 0.3 (.287 ± .012)	4.3 ± 0.3 (.169 ± .012)	2.0 (0.079)	0.9 (.035)	2.4 (.094)	1.3 (.051)	0.05 (.002)	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)

Notes: 1. Metric dimensions govern.
2. (Ref) - Dimensions provided for reference only.
3. No dimensions provided for B, P or R because low profile cases do not have a bevel or a notch.

T495 Series – ORDERING INFORMATION

T 495 X 107 M 010 A S E100

Tantalum — T

Series — 495
T495 - Low ESR, Surge Robust

Case Size — X
B, C, D, T, V, X

Capacitance Picofarad Code — 107
First two digits represent significant figures. Third digit specifies number of zeros to follow.

Capacitance Tolerance — M
M = ±20%, K = ±10%

Voltage — 010

Failure Rate — A
A = Not Applicable

Lead Material — S
T = 100% Tin (Sn) Plated
H = Tin/Lead (SnPb 5% Pb minimum)
G = Gold Plated
S = Not Recommended for new design

ESR — E100
E100 = ESR in Milliohmns = 100 mOhms
E1K5 = ESR in Ohms = 1.5 Ohms
4095 = DSCC Dwg. 95158 Designator

See www.kemet.com for Pb Free transition information.

T495 RATINGS & PART NUMBER REFERENCE

Capacitance µF	Case Size	KEMET Part Number	DSCC Dwg. No. 95158 Part Number	DC Leakage µA @ 25°C Max	DF% @ 25°C 120 Hz Max	ESR mΩ @ 25°C 100 kHz Max	Ripple Current mA rms @ 25°C, 100 kHz Max		
							25°C	85°C	125°C
2.5 Volt Rating @ +85°C (1.7 Volt Rating at +125°C)									
100.0	T	T495T107M2R5A(2)E3K0		2.5	24.0	3000	153	137	61
220.0	D	T495D227(1)2R5A(2)E045		5.5	8.0	45	1826	1643	730
1000.0	X	T495X108(1)2R5A(2)E040		25.0	15.0	40	2031	1828	812
4 Volt Rating @ +85°C (2.7 Volt Rating at +125°C)									
100.0	B	T495B107(1)004A(2)E500		4.0	8.0	500	412	371	165
150.0	B	T495B157M004A(2) E900		6.0	12.0	900	307	277	123
150.0	C	T495C157(1)004A(2)E250		6.0	8.0	250	663	597	265
330.0	C	T495C337(1)004A(2)E300		13.2	10.0	300	606	545	242
330.0	C	T495C337(1)004A(2)E700		13.2	12.0	700	396	357	159
330.0	D	T495D337(1)004A(2)E030		13.2	8.0	30	2236	2012	894
330.0	D	T495D337(1)004A(2)E045		13.2	8.0	45	1826	1643	730
470.0	X	T495X477(1)004A(2)E030		18.8	8.0	30	2345	2111	938
470.0	X	T495X477(1)004A(2)E045		18.8	8.0	45	1915	1723	766
470.0	X	T495X477(1)004A(2)E100		18.8	8.0	100	1285	1156	514
1000.0	X	T495X108(1)004A(2)E070		40.0	12.0	70	1535	1381	614
1000.0	E	T495E108(1)004A(2)E050		40.0	15.0	50	2000	1800	800
6/6.3 Volt Rating @ +85°C (4 Volt Rating at +125°C)									
47.0	C	T495C476(1)006A(2)E250		2.9	6.0	250	663	597	265
68.0	D	T495D686(1)006A(2)E175		3.3	4.0	175	926	833	370
68.0	D	T495D686(1)006A(2)4095	95158-01(1)(2)	3.3	4.0	175	926	833	370
100.0	*B	T495B107M006A(2)E700		6.3	15.0	700	348	313	139
100.0	C	T495C107(1)006A(2)E150		6.0	8.0	150	856	770	342
100.0	D	T495D107(1)006A(2)E150		6.0	8.0	150	1000	900	400
100.0	V	T495V107(1)006A(2)E090		6.0	8.0	90	1179	1061	471
100.0	V	T495V107(1)006A(2)E150		6.0	8.0	150	913	822	365
150.0	*C	T495C157M006A(2)E200		9.0	8.0	200	742	668	297
150.0	V	T495V157(1)006A(2)E070		9.0	8.0	70	1336	1203	535
150.0	X	T495X157(1)006A(2)E100		7.2	6.0	100	1285	1156	514
150.0	X	T495X157(1)006A(2)4095	95158-02(1)(2)	7.2	6.0	125	1150	1040	460
220.0	*C	T495C227(1)006A(2)E225		13.9	10.0	225	700	600	300
220.0	D	T495D227(1)006A(2)E100		13.9	8.0	100	1225	1102	490
220.0	D	T495D227(1)006A(2)4095	95158-25(1)(2)	13.2	8.0	100	1225	1102	490
220.0	X	T495X227(1)006A(2)E070		13.2	8.0	70	1535	1381	614
220.0	X	T495X227(1)006A(2)E100		13.2	8.0	100	1285	1156	514
220.0	X	T495X227(1)006A(2)4095	95158-03(1)(2)	13.2	8.0	100	1285	1156	514
330.0	D	T495D337(1)006A(2)E040		20.8	8.0	40	1936	1743	775
330.0	D	T495D337(1)006A(2)E050		20.8	8.0	50	1732	1559	693
330.0	D	T495D337(1)006A(2)E070		20.8	8.0	70	1464	1317	586
330.0	D	T495D337(1)006A(2)E100		20.8	8.0	100	1225	1102	490
330.0	X	T495X337(1)006A(2)E065		19.8	8.0	65	1593	1434	637
330.0	*X	T495X337(1)006A(2)E045		19.8	8.0	45	1915	1723	766
330.0	*X	T495X337(1)006A(2)E100		19.8	8.0	100	1285	1156	514
470.0	*D	T495D477(1)006A(2)E100		29.6	12.0	100	1225	1102	490
470.0	*D	T495D477(1)006A(2)E125		29.6	12.0	125	1095	986	438
470.0	X	T495X477(1)006A(2)E030		28.2	10.0	30	2345	2111	938
470.0	X	T495X477(1)006A(2)E045		28.2	10.0	45	1915	1723	766
470.0	*X	T495X477(1)006A(2)E050		28.2	10.0	50	1816	1634	726
470.0	*X	T495X477(1)006A(2)E065		28.2	10.0	65	1593	1434	637
470.0	*E	T495E477(1)006A(2)E055		29.6	10.0	55	1907	1716	763
470.0	*E	T495E477(1)006A(2)E100		29.6	10.0	100	1414	1273	566
10 Volt Rating @ +85°C (7 Volt Rating at +125°C)									
4.7	B	T495B475(1)010A(2)E1K3		0.5	15.0	1300	256	230	102
6.8	B	T495B685(1)010A(2)E900		0.7	6.0	900	307	277	123
10.0	B	T495B106(1)010A(2)E750		1.0	6.0	750	337	303	135
15.0	C	T495C156(1)010A(2)E475		1.5	6.0	475	481	433	192
22.0	C	T495C226(1)010A(2)E290		2.2	6.0	290	616	554	246
22.0	C	T495C226(1)010A(2)E345		2.2	6.0	345	565	508	226
47.0	D	T495D476(1)010A(2)E080		3.8	4.0	80	1369	1232	548
47.0	D	T495D476(1)010A(2)E090		4.7	6.0	90	1291	1162	516
47.0	D	T495D476(1)010A(2)E200		3.8	4.0	200	866	780	346
47.0	D	T495D476(1)010A(2)4095	95158-04(1)(2)	3.8	4.0	200	866	780	346
68.0	B	T495B686(1)010A(2)E600		6.8	10.0	600	376	339	151
68.0	B	T495B686(1)010A(2)E750		1.5	10.0	750	337	303	135
68.0	*B	T495B686M010A(2)E900		6.8	10.0	900	307	276	123
68.0	C	T495C686(1)010A(2)E225		6.8	6.0	225	700	630	280
68.0	V	T495V686(1)010A(2)E070		6.8	6.0	70	1336	1203	535
68.0	V	T495V686(1)010A(2)E100		6.8	6.0	100	1118	1006	447
68.0	V	T495V686(1)010A(2)E140		6.8	6.0	140	945	850	378
68.0	D	T495D686(1)010A(2)E090		6.8	6.0	90	1291	1162	516
68.0	D	T495D686(1)010A(2)E150		6.8	6.0	150	1000	900	400
68.0	X	T495X686(1)010A(2)E150		5.4	4.0	150	1049	944	420
68.0	X	T495X686(1)010A(2)4095	95158-05(1)(2)	5.4	4.0	150	1049	944	420
100.0	V	T495V107(1)010A(2)E150		10.0	8.0	150	913	822	365
100.0	*D	T495D107(1)010A(2)E080		10.0	8.0	80	1369	1232	548
100.0	D	T495D107(1)010A(2)E100		10.0	8.0	100	1220	1100	490
100.0	D	T495D107(1)010A(2)4095	95158-06(1)(2)	10.0	8.0	100	1220	1100	490
100.0	X	T495X107(1)010A(2)E100		8.0	6.0	100	1285	1156	514
100.0	X	T495X107(1)010A(2)4095	95158-07(1)(2)	8.0	6.0	100	1285	1156	514
150.0	V	T495V157(1)010A(2)E100		15.0	8.0	100	1118	1006	447
150.0	*V	T495V157M010A(2)E150		15.0	8.0	150	913	822	365
150.0	D	T495D157(1)010A(2)E080		15.0	8.0	80	1369	1232	548
150.0	D	T495D157(1)010A(2)E100		15.0	8.0	100	1225	1102	490
150.0	D	T495D157(1)010A(2)4095	95158-26(1)(2)	15.0	8.0	100	1225	1102	490
150.0	X	T495X157(1)010A(2)E085		15.0	8.0	85	1393	1254	557
150.0	X	T495X157(1)010A(2)E100		15.0	8.0	100	1285	1156	514
150.0	X	T495X157(1)010A(2)4095	95158-08(1)(2)	15.0	8.0	100	1285	1156	514
220.0	*V	T495V227(1)010A(2)E150		22.0	12.0	150	913	822	365
220.0	D	T495D227(1)010A(2)E045		22.0	8.0	45	1826	1643	730
220.0	D	T495D227(1)010A(2)E075		22.0	8.0	75	1414	1273	566
220.0	D	T495D227(1)010A(2)E100		22.0	8.0	100	1225	1102	490
220.0	D	T495D227(1)010A(2)E125		22.0	8.0	125	1095	986	438
220.0	X	T495X227(1)010A(2)E045		22.0	8.0	45	1915	1723	766
220.0	X	T495X227(1)010A(2)E050		22.0	8.0	50	1817	1635	727
220.0	X	T495X227(1)010A(2)E060		22.0	8.0	60	1658	1492	663
220.0	X	T495X227(1)010A(2)E070		22.0	8.0	70	1535	1382	614
220.0	X	T495X227(1)010A(2)E100		22.0	8.0	100	1285	1156	514
220.0	X	T495X227(1)010A(2)4095	95158-28(1)(2)	15.0	8.0	100	1285	1156	514

(1) To complete KEMET part number, insert "K" for ±10% or "M" for ±20% capacitance tolerance.
(2) To complete KEMET part number, insert lead material designations per Ordering Information on page 31.
***Extended Values**

Higher voltage ratings and tighter capacitance tolerance product may be substituted within the same size at KEMET's option.Voltage substitutions will be marked with the higher voltage rating.

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T495 RATINGS & PART NUMBER REFERENCE

Capacitance µF	Case Size	KEMET Part Number	DSCC Dwg. No. 95158 Part Number	DC Leakage µA @ 25°C Max	DF% @ 25°C 120 Hz Max	ESR mΩ @ 25°C 100 kHz Max	Ripple Current mA rms @ 25°C, 100 kHz Max		
							25°C	85°C	125°C
10 Volt Rating @ +85°C (7 Volt Rating at +125°C) cont.									
330.0	*X	T495X337(1)010A(2)E050		33.0	10.0	50	1817	1635	727
330.0	*X	T495X337(1)010A(2)E060		33.0	10.0	60	1658	1492	663
330.0	E	T495E337(1)010A(2)E040		33.0	8.0	40	2236	2012	894
330.0	*E	T495E337(1)010A(2)E060		33.0	10.0	60	1826	1643	730
330.0	*E	T495E337(1)010A(2)E100		33.0	10.0	100	1414	1273	566
16 Volt Rating @ +85°C (10 Volt Rating at +125°C)									
6.8	C	T495C685(1)016A(2)E750		1.1	6.0	750	383	345	153
10.0	*T	T495T106M016A(2)E4K0		1.6	8.0	4000	132	119	53
15.0	B	T495B156(1)016A(2)E800		2.4	6.0	800	326	293	130
33.0	C	T495C336(1)016A(2)E225		5.3	6.0	225	699	629	280
33.0	*C	T495C336(1)016A(2)E275		5.3	6.0	275	632	569	253
33.0	D	T495D336(1)016A(2)E150		6.6	6.0	150	1000	900	400
33.0	D	T495D336(1)016A(2)E175		5.3	6.0	175	926	833	370
33.0	D	T495D336(1)016A(2)E225		4.2	4.0	225	816	735	327
33.0	D	T495D336(1)016A(2)4095	95158-09(1)(2)	4.2	4.0	250	770	700	310
	C	T495C476(1)016A(2)E350		7.5	6.0	350	561	505	224
47.0	D	T495D476(1)016A(2)E100		7.5	6.0	100	1225	1102	490
47.0	D	T495D476(1)016A(2)E150		7.5	6.0	150	1000	900	400
47.0	D	T495D476(1)016A(2)4095	95158-10(1)(2)	7.5	6.0	200	870	780	345
68.0	*V	T495V686(1)016A(2)E180		10.9	6.0	180	833	750	333
68.0	*V	T495V686(1)016A(2)E300		10.9	6.0	300	645	581	258
68.0	D	T495D686(1)016A(2)E150		10.9	6.0	150	1000	900	400
100.0	*D	T495D107(1)016(2)E100		16.0	8.0	100	1225	1102	490
100.0	*D	T495D107(1)016A(2)E125		16.0	8.0	125	1095	986	438
100.0	X	T495X107(1)016A(2)E080		16.0	8.0	80	1436	1293	574
100.0	X	T495X107(1)016A(2)E100		16.0	8.0	100	1285	1156	514
100.0	X	T495X107(1)016A(2)4095	95158-11(1)(2)	16.0	8.0	125	1149	1034	460
150.0	*X	T495X157(1)016A(2)E100		24.0	8.0	100	1285	1156	514
220.0	*E	T495E227(1)016A(2)E100		35.2	7.2	100	1414	1273	566
220.0	*E	T495E227(1)016A(2)E150		35.2	7.2	150	1155	1039	462
20 Volt Rating @ +85°C (13 Volt Rating at +125°C)									
10.0	B	T495B106(1)020A(2)E1K0		2.0	6.0	1000	292	262	117
10.0	C	T495C106(1)020A(2)E475		2.0	6.0	475	481	433	192
15.0	C	T495C156(1)020A(2)E375		3.0	6.0	375	542	487	217
15.0	D	T495D156(1)020A(2)E275		2.4	4.0	275	738	665	295
15.0	D	T495D156(1)020A(2)4095	95158-12(1)(2)	2.4	4.0	275	738	665	295
22.0	D	T495D226(1)020A(2)E180		3.5	4.0	180	913	822	365
22.0	D	T495D226(1)020A(2)E225		3.5	4.0	225	816	735	326
22.0	D	T495D226(1)020A(2)4095	95158-13(1)(2)	3.5	4.0	275	739	665	295
33.0	D	T495D336(1)020A(2)E150		6.6	6.0	150	1000	900	400
33.0	D	T495D336(1)020A(2)E200		6.6	6.0	200	866	780	346
47.0	D	T495D476(1)020A(2)E100		9.4	6.0	100	1225	1102	490
47.0	D	T495D476(1)020A(2)E175		9.4	6.0	175	926	833	370
47.0	X	T495X476(1)020A(2)E065		9.4	8.0	65	1593	1434	637
47.0	X	T495X476(1)020A(2)E100		9.4	6.0	100	1285	1156	514
47.0	X	T495X476(1)020A(2)E125		9.4	6.0	125	1149	1034	460
47.0	X	T495X476(1)020A(2)E150		7.5	4.0	150	1049	944	420
47.0	X	T495X476(1)020A(2)4095	95158-14(1)(2)	7.5	4.0	150	1049	944	420
68.0	*D	T495D686(1)020A(2)E150		13.6	8.0	150	1000	900	400
68.0	X	T495X686(1)020A(2)E120		13.6	6.0	120	1173	1055	469
68.0	X	T495X686(1)020A(2)E150		13.6	6.0	150	1049	944	420
68.0	X	T495X686(1)020A(2)4095	95158-15(1)(2)	13.6	6.0	150	1049	944	420
100.0	E	T495E107(1)020A(2)E085		20.0	8.0	85	1534	1381	614
100.0	E	T495E107(1)020A(2)E100		20.0	8.0	100	1414	1273	566
100.0	E	T495E107(1)020A(2)E200		20.0	8.0	200	1000	900	400
25 Volt Rating @ +85°C (17 Volt Rating at +125°C)									
2.2	C	T495C225(1)025A(2)E1K3		0.6	6.0	1300	291	262	116
3.3	C	T495C335(1)025A(2)E750		0.9	6.0	750	383	345	153
4.7	C	T495C475(1)025A(2)E575		1.2	6.0	575	437	394	175
6.8	*B	T495B685(1)025A(2)E1K5		1.7	6.0	1500	238	214	95
6.8	C	T495C685(1)025A(2)E490		1.7	6.0	490	474	426	190
6.8	C	T495C685(1)025A(2)E500		1.7	6.0	500	469	422	188
10.0	C	T495C106(1)025A(2)E450		2.5	6.0	450	494	445	198
15.0	D	T495D156(1)025A(2)E275		3.8	6.0	275	738	665	295
15.0	D	T495D156(1)025A(2)4095	95158-16(1)(2)	3.8	6.0	275	738	665	295
15.0	X	T495X156(1)025A(2)E200		3.0	4.0	200	908	817	363
15.0	X	T495X156(1)025A(2)4095	95158-17(1)(2)	3.0	4.0	200	908	817	363
22.0	*C	T495C226(1)025A(2)E300		5.5	8.0	300	606	545	242
22.0	*C	T495C226(1)025A(2)E900		5.5	6.0	900	350	315	140
22.0	D	T495D226(1)025A(2)E200		5.5	6.0	200	866	780	346
22.0	X	T495X226(1)025A(2)E225		4.4	4.0	225	856	771	343
22.0	X	T495X226(1)025A(2)4095	95158-18(1)(2)	4.4	4.0	225	856	771	343
33.0	D	T495D336(1)025A(2)E090		8.3	6.0	90	1291	1162	516
33.0	D	T495D336(1)025A(2)E100		8.3	6.0	100	1225	1102	490
33.0	D	T495D336(1)025A(2)E225		8.3	6.0	225	816	735	327
33.0	*D	T495D336(1)025A(2)E300		8.3	6.0	300	707	636	283
33.0	X	T495X336(1)025A(2)E175		6.6	4.0	175	971	874	388
33.0	X	T495X336(1)025A(2)4095	95158-19(1)(2)	6.6	4.0	175	971	874	388
47.0	*X	T495X476M025A(2)E150		11.8	6.0	150	1049	944	420
47.0	*X	T495X476M025A(2)E185		16.5	8.0	185	944	850	378
47.0	*X	T495X476M025A(2)E200		11.8	6.0	200	908	817	363
47.0	*D	T495D476M025(2)E120		11.8	10.0	120	1118	1006	447
47.0	*D	T495D476(1)025(2)E250		11.8	10.0	250	775	697	310
68.0	*X	T495X686(1)025A(2)E125		17.0	8.0	125	1149	1034	460
68.0	*X	T495X686(1)025A(2)E150		17.0	8.0	150	1049	944	420
68.0	*X	T495X686(1)025A(2)E200		17.0	8.0	200	908	817	363

(1) To complete KEMET part number, insert "K" for ±10% or "M" for ±20% capacitance tolerance.
(2) To complete KEMET part number, insert lead material designations per Ordering Information on page 31.
***Extended Values**

Higher voltage ratings and tighter capacitance tolerance product may be substituted within the same size at KEMET's option.Voltage substitutions will be marked with the higher voltage rating.

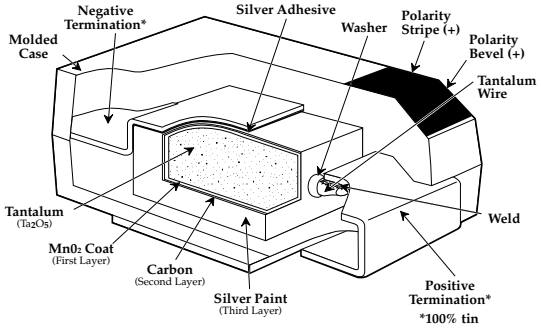
T495 RATINGS & PART NUMBER REFERENCE

Capacitance µF	Case Size	KEMET Part Number	DSCC Dwg. No. 95158 Part Number	DC Leakage µA @ 25°C Max	DF% @ 25°C 120 Hz Max	ESR mΩ @ 25°C 100 kHz Max	Ripple Current mA rms @ 25°C, 100 kHz Max		
							25°C	85°C	125°C
35 Volt Rating @ +85°C (23 Volt Rating at +125°C)									
0.47	B	T495B474(1)035A(2)E1K5		0.5	4.0	1500	238	214	95
0.47	B	T495B474(1)035A(2)E2K2		0.5	4.0	2200	197	177	79
1.0	B	T495B105(1)035A(2)E1K5		0.5	4.0	1500	238	214	95
1.0	B	T495B105(1)035A(2)E1K7		0.5	4.0	1700	224	201	89
2.2	B	T495B225(1)035A(2)E1K5		0.8	6.0	1500	238	214	95
2.2	C	T495C225(1)035A(2)E750		0.8	6.0	750	383	345	153
3.3	C	T495C335(1)035A(2)E600		1.2	6.0	600	428	385	171
4.7	C	T495C475(1)035A(2)E450		1.7	6.0	450	494	445	198
4.7	C	T495C475(1)035A(2)E500		1.7	6.0	500	469	422	188
4.7	*C	T495C475(1)035A(2)E600		1.7	6.0	600	428	385	171
4.7	*C	T495C475(1)035A(2)4095	95158-29(1)(2)	1.7	6.0	600	428	385	171
6.8	D	T495D685(1)035A(2)E400		2.4	6.0	400	612	551	245
6.8	X	T495X685(1)035A(2)E300		1.9	4.0	300	742	667	297
6.8	X	T495X685(1)035A(2)4095	95158-20(1)(2)	1.9	4.0	300	742	667	297
10.0	D	T495D106(1)035A(2)E250		3.5	6.0	250	775	697	310
10.0	D	T495D106(1)035A(2)E300		3.5	6.0	300	707	636	283
10.0	D	T495D106(1)035A(2)4095	95158-27(1)(2)	3.5	4.0	300	707	636	283
10.0	X	T495X106(1)035A(2)E175		3.5	6.0	175	971	874	388
10.0	X	T495X106(1)035A(2)E200		3.5	6.0	200	908	817	363
10.0	X	T495X106(1)035A(2)E250		2.8	4.0	250	812	731	325
10.0	X	T495X106(1)035A(2)4095	95158-21(1)(2)	2.8	4.0	250	812	731	325
15.0	D	T495D156(1)035A(2)E225		5.3	6.0	225	816	735	327
15.0	*D	T495D156(1)035A(2)E300		5.3	6.0	300	707	636	283
15.0	*X	T495X156(1)035A(2)E200		5.3	6.0	200	908	817	363
15.0	*X	T495X156(1)035A(2)E225		5.3	6.0	225	856	771	343
15.0	*X	T495X156(1)035A(2)4095	95158-22(1)(2)	5.3	6.0	225	856	771	343
22.0	D	T495D226(1)035A(2)E200		7.7	6.0	200	866	779	346
22.0	D	T495D226(1)035A(2)E250		7.7	6.0	250	775	697	310
22.0	*D	T495D226(1)035A(2)E300		7.7	6.0	300	707	636	283
22.0	X	T495X226(1)035A(2)E200		7.7	6.0	200	908	817	363
22.0	*X	T495X226(1)035A(2)E275		7.7	6.0	275	775	697	410
22.0	*X	T495X226(1)035A(2)4095	95158-23(1)(2)	7.7	6.0	300	742	667	297
33.0	X	T495X336(1)035A(2)E175		11.6	6.0	175	971	874	388
33.0	*X	T495X336(1)035A(2)E250		11.6	6.0	250	812	731	325
47.0	X	T495X476(1)035A(2)E185		16.5	8.0	185	944	850	378
47.0	X	T495X476(1)035A(2)E200		16.5	8.0	200	908	817	363
47.0	*X	T495X476(1)035A(2)E300		16.5	8.0	300	742	667	297
50 Volt Rating @ +85°C (33 Volt Rating at +125°C)									
1.0	C	T495C105(1)050A(2)E1K3		0.5	4.0	1300	291	262	116
2.2	D	T495D225(1)050A(2)E600		1.1	6.0	600	500	450	200
3.3	D	T495D335(1)050A(2)E700		1.7	6.0	700	463	417	185
4.7	D	T495D475(1)050A(2)E275		2.4	6.0	275	739	665	295
4.7	D	T495D475(1)050A(2)E300		2.4	6.0	300	707	636	283
4.7	X	T495X475(1)050A(2)E300		1.9	4.0	300	742	667	297
4.7	X	T495X475(1)050A(2)4095	95158-24(1)(2)	1.9	4.0	300	742	667	297
6.8	D	T495D685(1)050A(2)E275		3.4	6.0	275	739	665	295
6.8	*D	T495D685(1)050A(2)E300		3.4	8.0	300	700	600	300
10.0	*X	T495X106(1)050A(2)E300		5.0	6.0	300	741	667	297
15.0	*X	T495X156(1)050A(2)E300		7.5	8.0	300	742	667	297

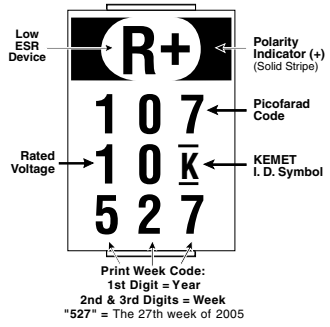
(1) To complete KEMET part number, insert "K" for ±10% or "M" for ±20% capacitance tolerance.
(2) To complete KEMET part number, insert lead material designations per Ordering Information on page 31.
***Extended Values**

Higher voltage ratings and tighter capacitance tolerance product may be substituted within the same size at KEMET's option.Voltage substitutions will be marked with the higher voltage rating.

CONSTRUCTION



CAPACITOR MARKINGS



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T495 TANTALUM CHIP CAPACITANCE VALUES

Case Size and Max. ESR (mΩ) by Capacitance & Voltage

Standard Capacitance Values

Capacitance		Rated Voltage @ +85°C								
µF	Code	2.5	4	6	10	16	20	25	35	50
0.47	474								B,1500 B,2200	
1.0	105								B,1500 B,1700	C,1500
2.2	225							C,1300	B,1500 C,750	D,600
3.3	335							C,750	C,600	D,700
4.7	475				B,1300			C,575	C,450,500 C,600	D,275,300 X,300
6.8	685				B,900	C,750		B,1500 C,490,500	D,400 X,300	D,275,300
10.0	106				B,750	T,4000	B,1000 C,475	C,450	D,250,300 X,175,200 X,250	X,300
15.0	156					B,800	C,375 D,275	D,275 X,200	D,225,300 X,200,225	X,300
22.0	226				V,70 C,290,345		D,180,225 D,275	C, 300,900 D,200 X,225	D,200,250 D300 X,200,275, 300	
33.0	336					C,225,275 D,150,175, D,225,250	D,150,200	D,90,100,225 D,300 X,175	X,175,250	
47.0	476			C,250	D,80,90,200	C,350 D,100,150, 200	D,100,175 X,65,100,125 X,150	D,120,250 X,150,185,200	X,185,200, 300	
68.0	686			D,175	V,100,140 B,600,750 B,900 C,225 D,90,150 X,150	V,180,300 D,150	D,150 X,120,150	X,125,150,200		
100.0	107	T, 3000	B,500	V,90,150 B,700 C,150 D,150	V,150 D, 80,100 X,100	D,100,125 X,80,100, 125	E,85,100,200			
150.0	157		B,900 C.250	V,70 C,200 X,100,125	D,80,100 X,85,100 V,100,150	X,100				
220.0	227	D,45		C,225 D,100 X,50, 60,70, 100	V,150 D,45,75,100 D,125 X, 45,70,100	E,100,150				
330.0	337		C,300,700 D,30,45	X,35,45,65, X,100 D,40,50,70, D,100 E,40	D,125 X,50,60 E,60,100					
470.0	477			X,30,45,50, X,65 D,100,125 E,55,100						
680.0	687									
1000.0	108	X,40	X,70 E,50							

Note that standard values are preferred, especially where high surge currents are possible. Extended values are available to increase capacitance and reduce ESR. Note that standard CV values demonstrate inherently lower failure rates than extended CV values, especially in low impedance applications.

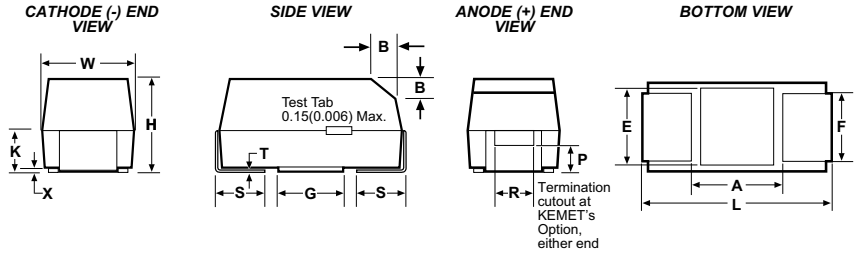
SOLID TANTALUM CHIP CAPACITORS

T496 SERIES—Fail-Safe Fused

FEATURES

- Built-in fuse protects against damaging short circuit failure mode
- Precision-molded, laser-marked case
- Symmetrical, compliant terminations
- Taped and reeled per EIA 481-1
- Case geometry and footprints equivalent to Industrial Grade T491 Series. (Case sizes B, C, D and X only)
- 100% Surge Current test on C, D, X sizes
- Patented fuse assembly
- Operating Temperature: -55°C to +125°C
- Fuse actuation, 25°C: within 1 second at fault currents of 4 amps and higher.
- Continuous current capability: 0.75 amps
- Post-actuation resistance, 25°C: 10 megohms minimum
- Test tabs on the sides of the case bypass the capacitor element to allow direct testing of the fuse assembly.
- RoHS Compliant & Leadfree Terminations (See www.kemet.com for lead transition)

OUTLINE DRAWINGS



DIMENSIONS — Millimeters (Inches)

CASE SIZE		COMPONENT													
KEMET	EIA	L	W	H	K ± 0.20 ± (.008)	F ± 0.1 ± (.004)	S ± 0.3 ± (.012)	B (Ref) ± (.006)	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)
B	3528-21	3.5 ± 0.2 (.138 ± .008)	2.8 ± 0.2 (.110 ± .008)	1.9 ± 0.2 (.075 ± .008)	1.1 (.043)	2.2 (.087)	0.8 (.031)	0.4 (.016)	0.10 ± 0.10 (.004 ± .004)	0.5 (.020)	1.0 (.039)	0.13 (.005)	2.1 (.083)	1.8 (.071)	2.2 (.087)
C	6032-28	6.0 ± 0.3 (.236 ± .012)	3.2 ± 0.3 (.126 ± .012)	2.5 ± 0.3 (.098 ± .012)	1.4 (.055)	2.2 (.087)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	0.9 (.035)	1.0 (.039)	0.13 (.005)	3.1 (.122)	2.8 (.110)	2.4 (.094)
D	7343-31	7.3 ± 0.3 (.287 ± .012)	4.3 ± 0.3 (.169 ± .012)	2.8 ± 0.3 (.110 ± .012)	1.5 (.059)	2.4 (.094)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	0.9 (.035)	1.0 (.039)	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)
X	7343-43	7.3 ± 0.3 (.287 ± .012)	4.3 ± 0.3 (.169 ± .012)	4.0 ± 0.3 (.157 ± .012)	2.3 (.091)	2.4 (.094)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	1.7 (.067)	1.0 (.039)	0.13 (.005)	3.8 (.150)	3.5* (.138)	3.5* (.138)

Notes: 1. Metric dimensions govern.
2. (Ref) - Dimensions provided for reference only.
* Round glue pad: 2.9 ± 0.1mm (.114" ± .004") in diameter at KEMET's option.

T496 Series – ORDERING INFORMATION

T 496 B 105 M 025 A S

Tantalum — T

Series — 496
T496 - Precision Molded, Fail-safe

Case Size — B
B, C, D, X

Capacitance Picofarad Code — 105
First two digits represent significant figures.
Third digit specifies number of zeros to follow.

Capacitance Tolerance — M
M - ± 20%
K - ± 10%

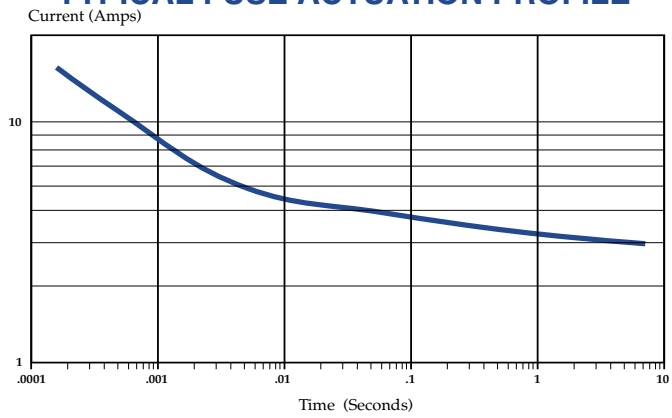
Voltage — 025

Failure Rate — A
A - Not Applicable

Lead Material — S
T - 100% Sn (Tin) Plated
H - Tin/Lead (SnPb - 5% Pb minimum)
****S** - Not recommended for new designs

***Part number example: T49 M A (1 digits - no spaces). See www.kemet.com for Pb Free transition.**
**** "S" Termination codes are converting from 90Sn/10 Pb to 100% tin finishes. Orders including "S" suffix termination codes do not guarantee Pb-free product.**

TYPICAL FUSE ACTUATION PROFILE



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T496 RATINGS & PART NUMBER REFERENCE

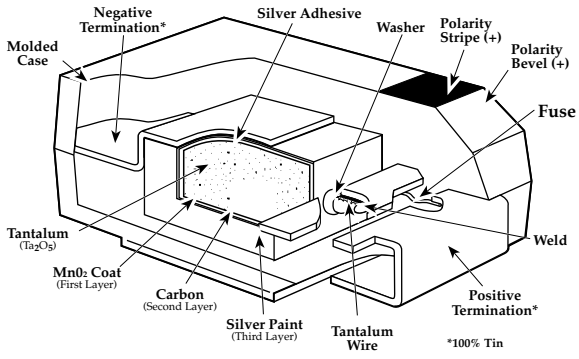
Capacitance µF	Case Size	KEMET Part Number	DCL µA @ 25°C Max.	DF % @ +25°C 120 Hz. Max.	ESR Ω@ +25°C 100 kHz Max.
4 Volt Rating at +85°C (2.7 Volt Rating at +125°C)					
68.0	*C	T496C686(1)004A(2)	2.7	6.0	1.6
100.0	*C	T496C107(1)004A(2)	4.0	8.0	1.2
150.0	D	T496D157(1)004A(2)	6.0	8.0	0.8
220.0	*D	T496D227(1)004A(2)	8.8	8.0	0.7
#330.0	*D	T496D337(1)004A(2)	13.2	8.0	0.7
330.0	*X	T496X337(1)004A(2)	13.2	8.0	0.7
#470.0	*X	T496X477(1)004A(2)	18.8	8.0	0.5
****6 Volt Rating at +85°C (4 Volt Rating at +125°C)**					
4.7	B	T496B475(1)006A(2)	0.5	6.0	3.5
6.8	B	T496B685(1)006A(2)	0.5	6.0	3.5
10.0	B	T496B106(1)006A(2)	0.6	6.0	3.5
22.0	B	T496B226(1)006A(2)	1.3	6.0	3.5
15.0	C	T496C156(1)006A(2)	0.9	6.0	2.0
22.0	C	T496C226(1)006A(2)	1.4	6.0	2.0
33.0	C	T496C336(1)006A(2)	2.0	6.0	2.0
47.0	D	T496D476(1)006A(2)	2.9	6.0	1.0
47.0	*C	T496C476(1)006A(2)	2.9	6.0	1.6
68.0	D	T496D686(1)006A(2)	4.1	6.0	1.0
#68.0	*C	T496C686(1)006A(2)	4.1	6.0	1.2
100.0	X	T496X107(1)006A(2)	6.0	8.0	0.9
100.0	D	T496D107(1)006A(2)	6.0	8.0	0.8
150.0	*D	T496D157(1)006A(2)	9.0	8.0	0.7
#220.0	*D	T496D227(1)006A(2)	13.2	8.0	0.7
220.0	*X	T496X227(1)006A(2)	13.2	8.0	0.7
#330.0	*X	T496X337(1)006A(2)	19.8	8.0	0.5
10 Volt Rating at +85°C (7 Volt Rating at + 125°C)					
3.3	B	T496B335(1)010A(2)	0.5	6.0	3.5
4.7	B	T496B475(1)010A(2)	0.5	6.0	3.5
6.8	B	T496B685(1)010A(2)	0.7	6.0	3.5
10.0	C	T496C106(1)010A(2)	1.0	6.0	2.0
15.0	B	T496B156(1)010A(2)	1.5	6.0	3.5
15.0	C	T496C156(1)010A(2)	1.5	6.0	2.0
22.0	C	T496C226(1)010A(2)	2.2	6.0	2.0
33.0	D	T496D336(1)010A(2)	3.3	6.0	1.0
33.0	*C	T496C336(1)010A(2)	3.3	6.0	1.6
47.0	D	T496D476(1)010A(2)	4.7	6.0	1.0
#47.0	*C	T496C476(1)010A(2)	4.7	6.0	1.2
68.0	X	T496X686(1)010A(2)	6.8	6.0	0.9
68.0	D	T496D686(1)010A(2)	6.8	6.0	0.8
100.0	D	T496D107(1)010A(2)	10.0	8.0	0.7
150.0	*X	T496X157(1)010A92)	15.0	8.0	0.7
#150.0	*D	T496D157(1)010A(2)	15.0	8.0	0.7
#220.0	*X	T496X227(1)010A(2)	22.0	8.0	0.5
16 Volt Rating at +85°C (10 Volt Rating at +125°C)					
2.2	B	T496B225(1)016A(2)	0.5	6.0	3.5
3.3	B	T496B335(1)016A(2)	0.5	6.0	3.5
4.7	B	T496B475(1)016A(2)	0.8	6.0	3.5
6.8	C	T496C685(1)016A(2)	1.1	6.0	2.0
10.0	B	T496B106(1)016A(2)	1.6	6.0	3.5
10.0	C	T496C106(1)016A(2)	1.6	6.0	2.0
15.0	C	T496C156(1)016A(2)	2.4	6.0	2.0
22.0	D	T496D226(1)016A(2)	3.6	6.0	1.0
22.0	*C	T496C226(1)016A(2)	3.6	6.0	1.6
33.0	D	T496D336(1)016A(2)	5.3	6.0	1.0
47.0	X	T496X476(1)016A(2)	7.5	6.0	0.9
47.0	D	T496D476(1)016A(2)	7.5	6.0	0.8
100.0	*X	T496X107(1)016A(2)	16.0	8.0	0.7

Capacitance µF	Case Size	KEMET Part Number	DCL µA @ 25°C Max.	DF % @ +25°C 120 Hz. Max.	ESR Ω@ +25°C 100 kHz Max.
20 Volt Rating at +85°C (13 Volt Rating at +125°C)					
1.5	B	T496B155(1)020A(2)	0.5	6.0	5.0
2.2	B	T496B225(1)020A(2)	0.5	6.0	3.5
3.3	B	T496B335(1)020A(2)	0.7	6.0	3.5
4.7	C	T496C475(1)020A(2)	1.0	6.0	2.0
6.8	C	T496C685(1)020A(2)	1.4	6.0	2.0
10.0	C	T496C106(1)020A(2)	2.0	6.0	2.0
15.0	D	T496D156(1)020A(2)	3.0	6.0	1.0
22.0	D	T496D226(1)020A(2)	4.4	6.0	1.0
33.0	X	T496X336(1)020A(2)	6.6	6.0	0.9
47.0	X	T496X476(1)020A(2)	9.4	6.0	0.3
25 Volt Rating at +85°C (17 Volt Rating at +125°C)					
0.68	B	T496B684(1)025A(2)	0.5	4.0	6.5
1.0	B	T496B105(1)025A(2)	0.5	4.0	5.0
1.5	B	T496B155(1)025A(2)	0.5	6.0	5.0
2.2	C	T496C225(1)025A(2)	0.6	6.0	3.5
3.3	C	T496C335(1)025A(2)	0.9	6.0	2.5
4.7	C	T496C475(1)025A(2)	1.2	6.0	2.5
6.8	C	T496C685(1)025A(2)	1.7	6.0	2.0
10.0	C	T496C106(1)025A(2)	2.5	6.0	0.6
10.0	D	T496D106(1)025A(2)	2.5	6.0	1.2
15.0	D	T496D156(1)025A(2)	3.8	6.0	1.0
22.0	X	T496X226(1)025A(2)	5.5	6.0	0.9
22.0	D	T496D226(1)025A(2)	5.5	6.0	0.8
35 Volt Rating at +85°C (23 Volt Rating at +125°C)					
0.47	B	T496B474(1)035A(2)	0.5	4.0	8.0
0.68	B	T496B684(1)035A(2)	0.5	4.0	6.5
1.0	B	T496B105(1)035A(2)	0.5	4.0	5.0
1.5	C	T496C155(1)035A(2)	0.5	6.0	4.5
2.2	C	T496C225(1)035A(2)	0.8	6.0	3.5
3.3	C	T496C335(1)035A(2)	1.2	6.0	2.5
4.7	D	T496D475(1)035A(2)	1.7	6.0	1.5
6.8	D	T496D685(1)035A(2)	2.4	6.0	1.3
10.0	X	T496X106(1)035A(2)	3.5	6.0	1.0
15.0	*X	T496X156(1)035A(2)	5.3	6.0	0.9
22.0	X	T496X226(1)035A(2)	7.7	6.0	0.3
50 Volt Rating at +85°C (33 Volt Rating at +125°C)					
0.15	B	T496B154(1)050A(2)	0.5	4.0	16.0
0.22	B	T496B224(1)050A(2)	0.5	4.0	14.0
0.33	B	T496B334(1)050A(2)	0.5	4.0	10.0
0.47	C	T496C474(1)050A(2)	0.5	4.0	8.0
0.68	C	T496C684(1)050A(2)	0.5	4.0	7.0
1.0	C	T496C105(1)050A(2)	0.5	4.0	5.5
1.5	C	T496C155(1)050A(2)	0.8	6.0	5.0
2.2	D	T496D225(1)050A(2)	1.1	6.0	2.5
3.3	D	T496D335(1)050A(2)	1.7	6.0	2.0

(1) To complete KEMET Part Number, insert M for ±20% tolerance or K for ±10% tolerance.
(2) To complete KEMET Part Number, insert lead material designation for Ordering Information on page 36.

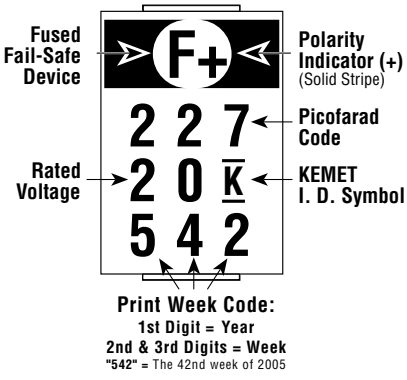
Higher voltage ratings and tighter capacitance tolerance product may be substituted within the same size at KEMET's option. Voltage substitutions will be marked with the higher voltage rating.

T496 SERIES CONSTRUCTION



CAPACITOR MARKINGS

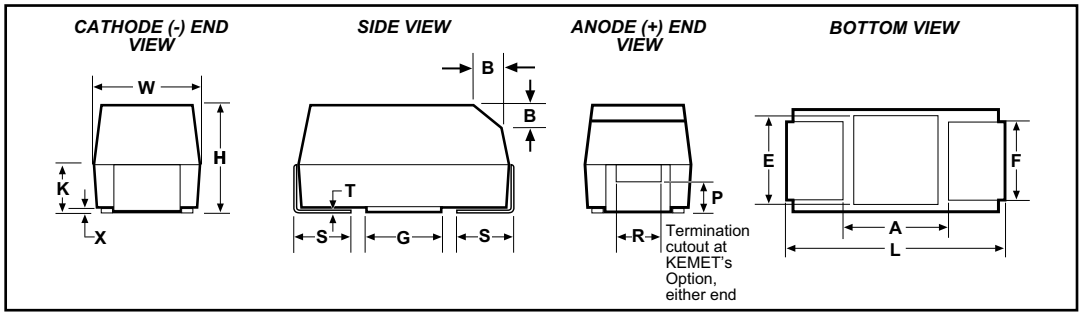
T496 Series — All Case Sizes



Features

- 150°C Maximum temperature capability
- Temperature/Voltage derating: 2/3 at 150°C
- Self-healing mechanism
- Capacitance: 0.47 to 220µF
- Reliability: 0.5%/1000 Hrs. @ rated voltage @ rated temperature
- 100% Accelerated steady state aging
- 100% Surge current testing
- EIA standard case size
- Voltage: 6 to 50 VDC
- RoHS Compliant versions available
- Various termination options

Outline Drawings



Dimensions - Millimeters (Inches)

Case Size		Component													
KEMET	EIA	L*	W*	H*	K* ± 0.20 ± (.008)	F* ±0.1 ± (.004)	S* ± 0.3 ± (.012)	B (Ref) ± 0.15 ± (.004)	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)
A	3216-18	3.2 ± 0.2 (.126 ± .008)	1.6 ± 0.2 (.063 ± .008)	1.6 ± 0.2 (.063 ± .008)	0.9 (.035)	1.2 (.047)	0.8 (.031)	0.4 (.016)	0.10 ± 0.10 (.004 ± .004)	0.4 (.016)	0.4 (.016)	0.13 (.005)	1.4 (.055)	1.1 (.043)	1.3 (.051)
B	3528-21	3.5 ± 0.2 (.138 ± .008)	2.8 ± 0.2 (.110 ± .008)	1.9 ± 0.2 (.075 ± .008)	1.1 (.043)	2.2 (.087)	0.8 (.031)	0.4 (.016)	0.10 ± 0.10 (.004 ± .004)	0.5 (.020)	1.0 (.039)	0.13 (.005)	2.1 (.083)	1.8 (.071)	2.2 (.087)
C	6032-28	6.0 ± 0.3 (.236 ± .012)	3.2 ± 0.3 (.126 ± .012)	2.5 ± 0.3 .098 ± .012	1.4 (.055)	2.2 (.087)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	0.9 (.035)	1.0 (.039)	0.13 (.005)	3.1 (.122)	2.8 (.110)	2.4 (.094)
D	7343-31	7.3 ± 0.3 (.287 ± .012)	4.3 ± 0.3 (.169 ± .012)	2.8 ± 0.3 (.110 ± .012)	1.5 (.059)	2.4 (.094)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	0.9 (.035)	1.0 (.039)	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)
X	7343-43	7.3 ± 0.3 (.287 ± .012)	4.3 ± 0.3 (.169 ± .012)	4.0 ± 0.3 (.157 ± .012)	2.3 (.091)	2.4 (.094)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	1.7 (.067)	1.0 (.039)	0.13 (.005)	3.8 (.150)	3.5** (.138)	3.5** (.138)

T498 Ordering Information

T 498 X 227 M 010 A T E500

Tantalum

Series
498 – High Temp (150°C)

Case Size
A,B,C,D,X

Capacitance Picofarad Code
First two digits represent significant figures.
Third digit specifies number of zeros.

Capacitance Tolerance
M = ±20%
K = ±10%

ESR
Note: in mOhm
K designates "thousand"
E1K5 = 1.5 Ohm
E500 = 0.5 Ohm

Lead Material
T = 100% Tin
G = Gold
H = Sn/Pb

Failure Rate
A = Not Applicable

Voltage
Note: 006 = 6.3

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SOLID TANTALUM CHIP CAPACITORS

T498 SERIES—HIGH TEMPERATURE (150°)

KEMET

T498 RATINGS & PART NUMBER REFERENCE

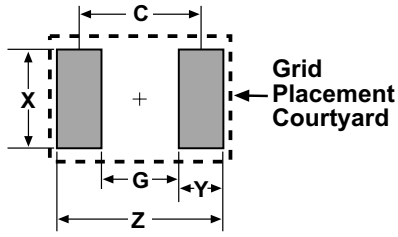
Capacitance µF	Case Size	KEMET Part Number	DC Leakage µA @ 25ºC Max	DF % @ +25ºC 120 Hz Max	ESR Ω @ +25°C 100 kHz Max
**6 Volt Rating at +85ºC (4 Volt Rating at +150ºC)					
10.0	B	T498B106(1)006A(2)E2K1	0.7	6	2.1
15.0	B	T498B156(1)006A(2)E1K8	1.0	6	1.8
22.0	C	T498C226(1)006A(2)E1K3	1.4	6	1.3
33.0	B	T498B336(1)006A(2)E1K7	2.1	6	1.7
47.0	C	T498C476(1)006A(2)E800	3.0	6	0.8
100.0	D	T498D107(1)006A(2)E600	6.3	8	0.6
10 Volt Rating at +85ºC (7 Volt Rating at +150ºC)					
2.2	A	T498A225(1)010A(2)E4K6	0.5	6	4.6
3.3	A	T498A335(1)010A(2)E3K6	0.5	6	3.6
4.7	A	T498A475(1)010A(2)E2K9	0.5	6	2.9
4.7	B	T498B475(1)010A(2)E2K7	0.5	6	2.7
10.0	B	T498B106(1)010A(2)E1K8	1.0	6	1.8
15.0	B	T498B156(1)010A(2)E1K5	1.5	6	1.5
15.0	C	T498C156(1)010A(2)E1K8	1.5	6	1.8
22.0	B	T498B226(1)010A(2)E1K5	2.2	6	1.5
22.0	C	T498C226(1)010A(2)E1K1	2.2	6	1.1
47.0	D	T498D476(1)010A(2)E600	4.7	6	0.6
100.0	D	T498D107(1)010A(2)E600	10.0	8	0.6
220.0	X	T498X227(1)010A(2)E500	22.0	8	0.5
16 Volt Rating at +85ºC (11 Volt Rating at +150ºC)					
1.0	A	T498A105(1)016A(2)E6K5	0.5	4	6.5
3.3	A	T498A335(1)016A(2)E3K4	0.5	6	3.4
4.7	B	T498B475(1)016A(2)E2K1	0.8	6	2.1
6.8	A	T498A685(1)016A(2)E2K6	1.1	6	2.6
6.8	B	T498B685(1)016A(2)E1K8	1.1	6	1.8
10.0	B	T498B106(1)016A(2)E2K8	1.6	6	2.8
10.0	C	T498C106(1)016A(2)E1K4	1.6	6	1.4
15.0	C	T498C156(1)016A(2)E1K1	2.4	6	1.1
22.0	C	T498C226(1)016A(2)E1K0	3.6	6	1.0
33.0	D	T498D336(1)016A(2)E600	5.3	6	0.6
47.0	D	T498D476(1)016A(2)E600	7.5	6	0.6
20 Volt Rating at +85ºC (13 Volt Rating at +150ºC)					
1.0	A	T498A105(1)020A(2)E5K9	0.5	4	5.9
10.0	C	T498C106(1)020A(2)E1K1	2.0	6	1.1
25 Volt Rating at +85ºC (17 Volt Rating at +150ºC)					
0.47	A	T498A474(1)025A(2)E8K5	0.5	4	8.5
2.2	B	T498B225(1)025A(2)E3K0	0.6	6	3.0
10.0	C	T498C106(1)025A(2)E1K1	2.5	6	1.1
15.0	D	T498D156(1)025A(2)E700	3.8	6	0.7
22.0	D	T498D226(1)025A(2)E600	5.5	6	0.6
33.0	D	T498D336(1)025A(2)E600	8.3	6	0.6
35 Volt Rating at +85ºC (24 Volt Rating at +150ºC)					
0.33	A	T498A334(1)035A(2)E11K	0.5	4	11.0
1.0	A	T498A105(1)035A(2)E10K	0.5	4	10.0
1.5	C	T498C155(1)035A(2)E3K3	0.5	6	3.3
3.3	C	T498C335(1)035A(2)E1K7	1.2	6	1.7
10.0	D	T498D106(1)035A(20E700	3.5	6	0.7
22.0	X	T498X226(1)035A(2)E500	7.7	6	0.5
33.0	X	T498X336(1)035A(2)E500	11.6	6	0.5
50 Volt Rating at +85ºC (34 Volt Rating at +150ºC)					
3.3	D	T498D335(1)050A(2)E1K1	1.7	6	1.1
10.0	D	T498D106(1)050A(2)E1K0	5.0	6	1.0

(1) To complete KEMET part number, insert K - ± 10% or M - ±20% capacitance tolerance.
(2) To complete KEMET part number, insert T for 100% tin, H for Sn/Pb or G for gold.
** 6 volt product equivalent to 6.3 volt product.

Note: Higher voltage ratings, lower ESR and tighter capacitance tolerance product may be substituted within the same size at KEMET's option. Voltage substitutions will be marked with the higher voltage rating.

LAND PATTERN DIMENSIONS FOR REFLOW SOLDER

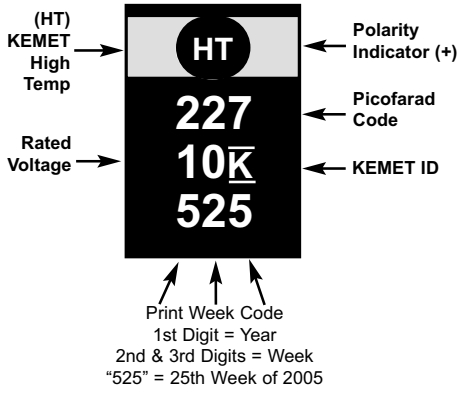
KEMET/ EIA Size Code	Pad Dimensions				
	Z	G	X	Y (Ref)	C (Ref)
A/3216-18	4.70	0.80	1.50	1.95	2.75
B/3528-21	5.00	1.10	2.50	1.95	3.05
C/6032-28	7.60	2.50	2.50	2.55	5.05
D/7343-31	8.90	3.80	2.70	2.55	6.35
X/7343-43	8.90	3.80	4.40	2.55	6.35



PACKAGING SPECIFICATIONS

Case Codes		Tape & Reel Dimensions				
KEMET	EIA	Tape Width (mm)	Pitch mm ± 0.1		Reel Quantity	
			Part	Sprocket	180mm (7")	330mm (13")
A	3216-18	8 ± 0.3	8	4	2000	9000
B	3528-21	8 ± 0.3	8	4	2000	8000
C	6032-28	12 ± 0.3	8	4	500	3000
D	7343-31	12 ± 0.3	8	4	500	2500
X	7343-43	12 ± 0.3	8	4	500	2000

COMPONENT MARKING



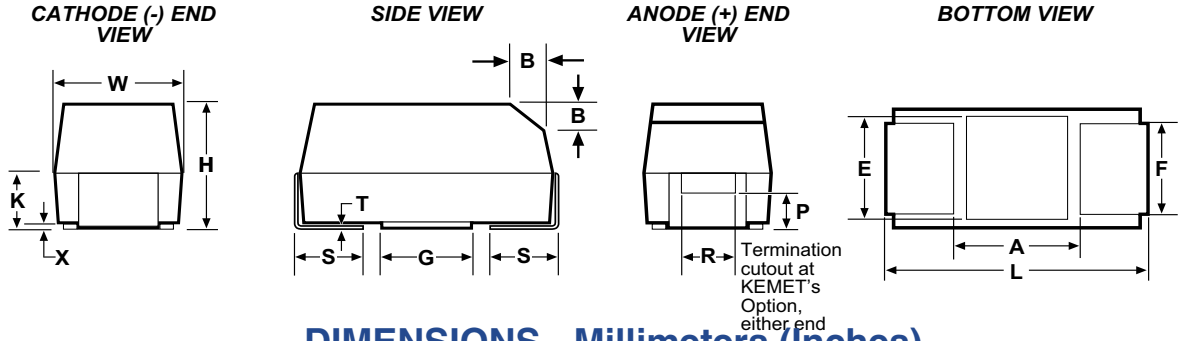
SOLID TANTALUM CHIP CAPACITORS

T510 SERIES—High Capacitance-Low ESR

FEATURES

- Ultra Low ESR < 30 mΩ
- New E/7260 Case with ESR < 18 mΩ
- Up to 5 Amps ripple current
- RoHS Compliant & Leadfree Termination (see www. kemet.com for lead transitions)
- Operating Temperature: -55˚C to +125˚C
- 100% accelerated steady-state aging
- 100% Surge current test
- Precision - molded, laser-marked case
- Symmetrical compliant terminations
- Taped and reeled per EIA 481-1

OUTLINE DRAWING



DIMENSIONS - Millimeters (Inches)

CASE SIZE		COMPONENT													
KEMET	EIA	L	W	H	K ± 0.20 ± (.008)	F ± 0.1 ± (.004)	S ± 0.3 ± (.012)	B (Ref) ± 0.15 ± (.006)	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)
X	7343-43	7.3 ± 0.3 (.287 ± .012)	4.3 ± 0.3 (.169 ± .012)	4.0 ± 0.3 (.157 ± .012)	2.3 (.091)	2.4 (.094)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	0.9 (.035)	1.0 (.039)	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)
E	7260-38	7.3 ± 0.3 (.287 ± .012)	6.0 ± 0.3 (.236 ± .012)	3.6 ± 0.2 (.142 ± .008)	2.3 (.091)	4.1 (.161	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	0.9 (.035)	1.0 (.039)	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)

Notes: Metric Dimensions govern
(Ref) - Dimensions provided for reference only.

T510 RATINGS & PART NUMBER REFERENCE

Capacitance µF	Case Size	KEMET Part Number	DC Leakage µA @ 25°C Max	DF % @ 25°C Max	ESR m Ω @ 25°C 100 kHz Max	Ripple Current A rms @ 25°C 100 kHz, max		
						25°C	85°C	125°C
4 Volt Rating at +85°C (2.7 Volt Rating at 125°C)								
680.0	X	T510X687(1)004A(2)	27.2	6.0	30.0	3.0	2.7	1.2
1000.0	X	T510X108(1)004A(2)	40.0	6.0	18.0	3.9	3.5	1.5
1000.0	E	T510E108(1)004A(2)	40.0	6.0	18.0	4.0	3.6	1.6
1000.0	E	T510E108(1)004A(2)4115	40.0	6.0	10.0	5.3	4.8	2.1
6/6.3 Volt Rating at +85°C (4 Volt Rating at 125°C)								
470.0	X	T510X477(1)006A(2)	28.2	6.0	30.0	3.0	2.7	1.2
680.0	E	T510E687(1)006A(2)	40.8	6.0	23.0	3.5	3.2	1.4
680.0	E	T510E687(1)006A(2)4115	40.8	6.0	12.0	4.8	4.3	1.9
10 Volt Rating at +85°C (7 Volt Rating at 125°C)								
330.0	X	T510X337(1)010A(2)	33.0	6.0	35.0	2.8	2.5	1.1
16 Volt Rating at +85°C (11 Volt Rating at 125°C)								
150.0	X	T510X157(1)016A(2)	24.0	6.0	40.0	2.6	2.3	1.0
220.0	X	T510X227(1)016A(2)	35.2	10.0	40.0	2.6	2.3	1.0
20 Volt Rating at +85°C (13.4 Volt Rating at 125°C)								
100.0	X	T510X107(1)020A(2)	20.0	6.0	40.0	2.6	2.3	1.0
25 Volt Rating at +85°C (17 Volt Rating at 125°C)								
100.0	E	T510E107(1)025A(2)	25.0	8.0	50.0	2.4	2.1	1.0
35 Volt Rating at +85°C (23 Volt Rating at 125°C)								
22.0	X	T510X226(1)035A(2)	7.7	6.0	80.0	1.8	1.7	0.7
47.0	E	T510E476(1)035A(2)	16.5	8.0	50.0	2.4	2.1	1.0
50 Volt Rating at +85°C (33 Volt Rating at 125°C)								
10.0	X	T510X106(1)050A(2)	5.0	8.0	120.0	1.5	1.3	0.6
10.0	X	T510X106(1)050A(2)	5.0	8.0	90.0	1.7	1.6	0.7

(1) To complete KEMET part number insert "K" - ±10% or "M" - ±20% capacitance tolerance. (2) To complete KEMET part number, insert H (SnPb) or T 100% tin.

T510 ORDERING INFORMATION

T 510 X 477 M 006 A S

Tantalum

Series
T510 - Ultra-Low ESR

Case Size
X, E

Capacitance Picofarad Code
First two digits represent significant figures.
Third digit specifies number of zeros to follow.

Lead Material
**S - Not recommended for new designs
H - Tin/Lead (SnPb 5% PB minimum)
T - 100% Tin (Sn) Plated

Failure Rate
A - Not Applicable

Voltage

Capacitance Tolerance
M - ± 20%
K - ± 10%

***Part number example: T X M0 AT (14 digits - no spaces). See www.kemet.com for Pb Free transition.**
**** "S" Termination codes are converting from 90 Sn/10 Pb to 100% tin finishes. Orders including "S" suffix termination codes do not quarantee Pb-free product.**

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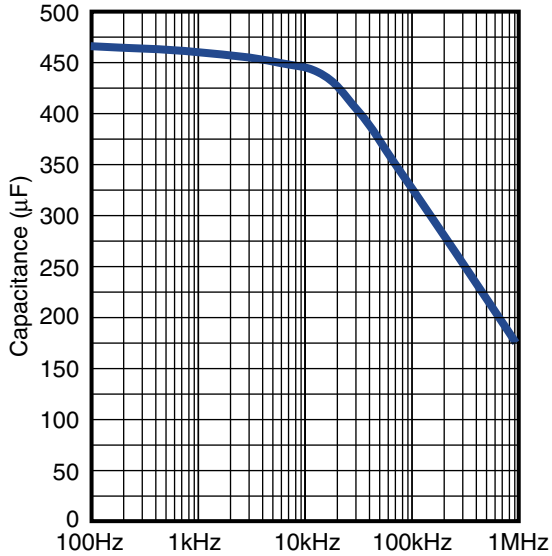
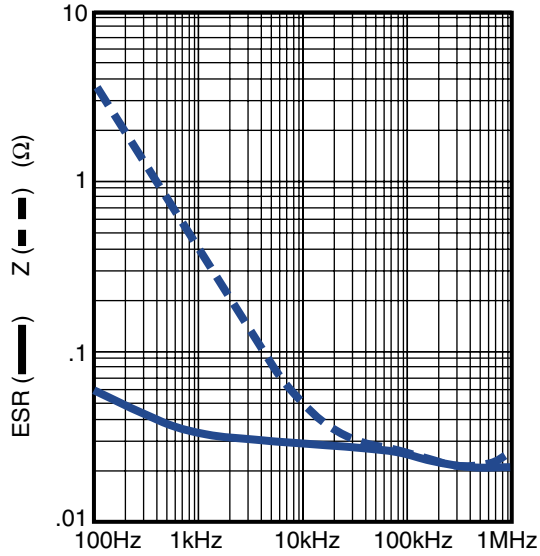
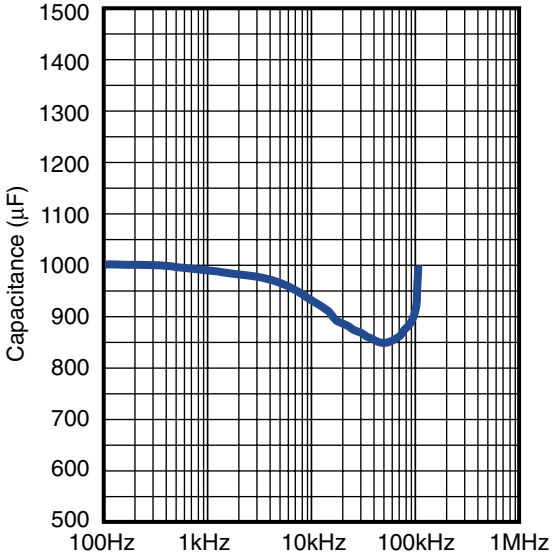
TYPICAL CAP FREQUENCY SCAN @25˚C T510X477M006AS



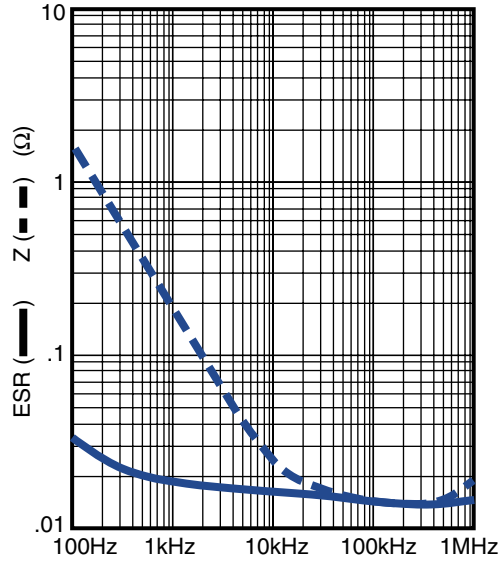
TYPICAL ESR/Z FREQUENCY SCAN @25˚C T510X477M006AS



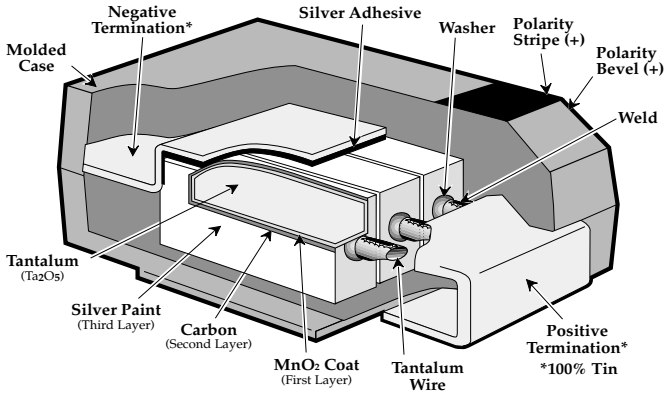
TYPICAL CAP FREQUENCY SCAN @ 25°C T510E108M004AS



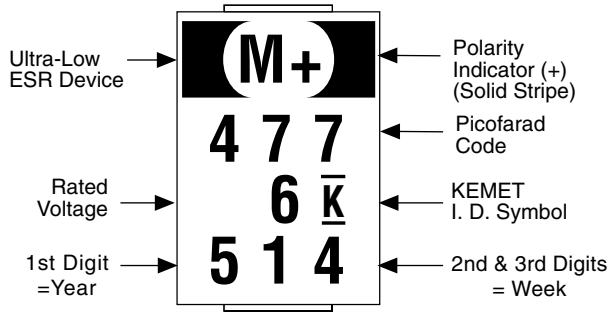
TYPICAL ESR/Z FREQUENCY SCAN @ 25°C T510E108M004AS



T510X SERIES CONSTRUCTION



T510 CAPACITOR MARKINGS



"514" = The 14th week of 2005.

COMPONENT PERFORMANCE CHARACTERISTICS

Introduction

KEMET has developed a new type of tantalum capacitor that replaces the solid manganese dioxide electrode with a solid conductive polymer. This product is named the KO-CAP for ***K***EMET ***O***rganic ***Cap***acitor. The basic families are the T520, T525 and T530 series. A separate detail of performance characteristics is presented here as there are some differences between the polymer tantalums and the standard MnO2 types. Like all KEMET tantalum chips, these series are 100% screened for all electrical parameters: Capacitance @ 120 Hz, Dissipation Factor (DF) @ 120 Hz, ESR @ 100 kHZ and DC Leakage. It is also 100% surge current tested at full rated voltage through a low impedance circuit. The advantages of the polymer include very low ESR and elimination of the potentially catastrophic failure mode that may occur with standard tantalum capacitors in a high current application. Although the natural KO-CAP series failure mechanism is a short circuit, it does not exhibit an explosive failure mode.

ELECTRICAL

1. Operating Temperature Range

- ***-55ºC to +105ºC for T520; -55ºC to +125ºC for T525 and T530***

For T525 and T530 Series above 105°C, the voltage rating is reduced linearly from 1.0 x rated voltage to 0.8 x rated voltage at 125ºC.

2. Non-Operating Temperature Range

- ***-55ºC to +105ºC for T520***
- ***-55ºC to +125ºC for T525 and T530***

3. Capacitance and Tolerance

- ***15µF to 1500µF***
- ***±20% Tolerance***

Capacitance is measured at 120 Hz, up to 1.0 volt rms maximum and up to 2.5V DC maximum. DC bias causes only a small reduction in capacitance, up to about 2% when full rated voltage is applied. DC bias is not commonly used for room temperature measurements but is more commonly used when measuring at temperature extremes.

Capacitance does decrease with increasing frequency, but not nearly as much or as quickly as standard tantalums. Figure 1 compares the frequency induced cap roll-off between the KO-CAP and traditional MnO2 types. Capacitance also increases with increasing temperature. See section 12 for temperature coefficients.

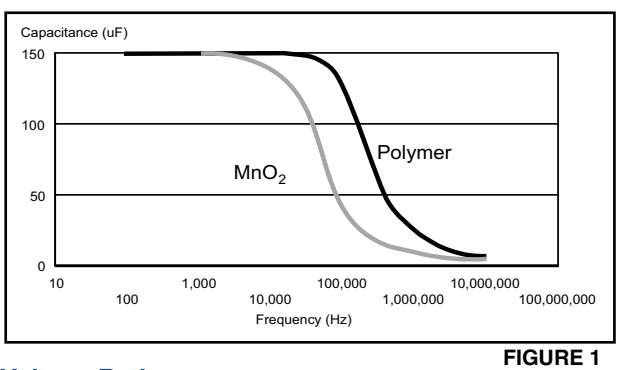
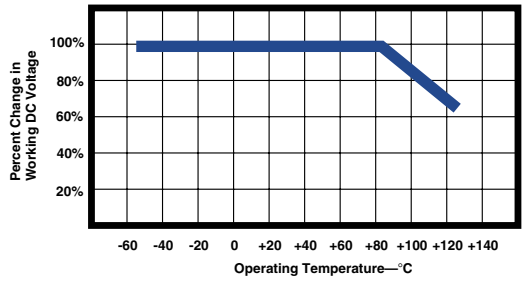


FIGURE 1

4. Voltage Ratings

- ***2V-25V DC Rated Voltage***

This is the maximum peak DC operating voltage from -55ºC to +105ºC for continuous duty. Above 105ºC, this voltage is derated linearly to 2/3 the rated voltage for operation at 125ºC for T525 and T530 Series.



- ***Surge Voltage Ratings***

Surge voltage capability is demonstrated by application of 1000 cycles of the relevant voltage, at 25ºC, 85ºC or 105ºC. The parts are charged through a 33 ohm resistor for 30 seconds and then discharged through a 33 ohm resistor for 30 seconds for each cycle.

• Voltage Ratings • Table 1

Rated Voltage	Surge Voltage	Derated Voltage	Derated Surge Voltage
-55ºC to +105ºC		+125ºC	
2V	2.6V	1.6V	2.1V
2.5V	3.3V	2.0V	2.6V
3V	3.9V	2.4V	3.1V
4V	5.2V	3.2V	4.2V
6.3V	8.2V	5V	6.5V
8V	10.4V	6.4V	8.3V
10V	13V	8V	10.4V
16V	20.8V	12.8V	16.6V
25V	32.5V	20V	26V

5. Reverse Voltage Rating & Polarity

Polymer capacitors are polar devices and may be permanently damaged or destroyed if connected in the wrong polarity. The positive terminal is identified by a laser-marked stripe and may also include a beveled edge. These capacitors will withstand a small degree of transient voltage reversal for short periods as shown in the following table. Please note that these parts may not be operated continuously in reverse, even within these limits.

Table 2

Temperature	Permissible Transient Reverse Voltage
25ºC	15% of Rated Voltage
55ºC	10% of Rated Voltage
85ºC	5% of Rated Voltage
85ºC	5% of Rated Voltage
105ºC	3% of Rated Voltage
125ºC	1% of Rated Voltage

6. DC Leakage Current

Because of the high conductivity of the polymer, the KO-CAP family has higher leakage currents than traditional MnO2 type Tantalum caps. The DC Leakage limits at 25ºC are calculated as 0.1 x C x V, where C is cap in µF and V is rated voltage in Volts. Limits for all part numbers are listed in the ratings tables.

DC Leakage current is the current that flows through the capacitor dielectric after a five minute charging period at rated voltage. Leakage is measured at 25ºC with full rated voltage applied to the capacitor through a 1000 ohm resistor in series with the capacitor.

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COMPONENT PERFORMANCE CHARACTERISTICS

DC Leakage current does increase with temperature. The limits for 85°C @ Rated Voltage and 105°C @ 0.8 x Rated Voltage are both 10 times the 25°C limit.

7. Surge Current Capability

Certain applications may induce heavy surge currents when circuit impedance is very low (<0.1 ohm per volt). Driving inductance may also cause voltage ringing. Surge currents may appear as transients during turn-on of equipment.

The KO-CAP has a very high tolerance for surge current. And although the failure mechanism is a short circuit, they do not ignite as may occur with standard tantalums in such applications.

The KO-CAP series receives 100% screening for surge current in our production process. Capacitors are surged 4 times at full rated voltage applied through a total circuit resistance of <0.5 ohms. Failures are removed during subsequent electrical testing.

8. Dissipation Factor (DF)

Refer to part number tables for maximum DF limits.

Dissipation factor is measured at 120 Hz, up to 1.0 volt rms maximum, and up to 2.5 volts DC maximum at +25°C. The application of DC bias causes a small reduction in DF, about 0.2% when full rated voltage is applied. DF increases with increasing frequency.

Dissipation factor is the ratio of the equivalent series resistance (ESR) to the capacitive reactance, (X_C) and is usually expressed as a percentage. It is directly proportional to both capacitance and frequency. Dissipation factor loses its importance at higher frequencies, (above about 1 kHz), where impedance (Z) and equivalent series resistance (ESR) are the normal parameters of concern.

$$DF = \frac{R}{X_C} = 2\pi f CR$$

DF= Dissipation Factor
R= Equivalent Series Resistance (Ohms)
X_C= Capacitive Reactance (Ohms)
f= Frequency (Hertz)
C= Series Capacitance (Farads)

DF is also referred to as tan δ or "loss tangent." The "Quality Factor," "Q," is the reciprocal of DF.

9. Equivalent Series Resistance (ESR) and Impedance (Z)

The Equivalent Series Resistance (ESR) of the KO-CAP is much lower than standard Tantalum caps because the polymer cathode has much higher conductivity. ESR is not a pure resistance, and it decreases with increasing frequency.

Total impedance of the capacitor is the vector sum of capacitive reactance (X_C) and ESR, below resonance; above resonance total impedance is the vector sum of inductive reactance (X_L) and ESR.

$$X_C = \frac{1 \text{ ohm}}{2\pi fC}$$

where:
f = frequency, Hertz
C = capacitance, Farad

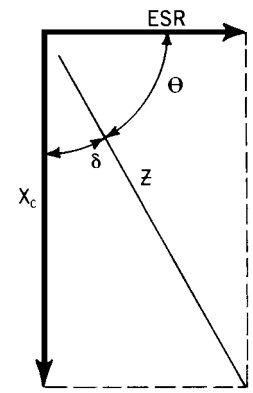

FIGURE 2a Total Impedance of the Capacitor Below Resonance

$$X_L = 2\pi fL$$

where:
f = frequency, Hertz
L = inductance, Henries

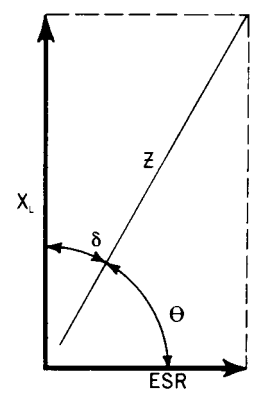

FIGURE 2b Total Impedance of the Capacitor Above Resonance

To understand the many elements of a capacitor, see Figure 3.

COMPONENT PERFORMANCE CHARACTERISTICS

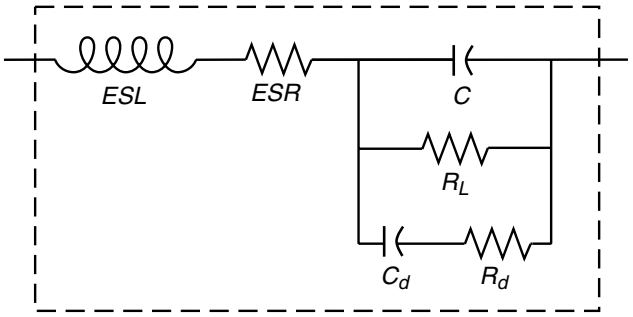

FIGURE 3 The Real Capacitor

A capacitor is a complex impedance consisting of many series and parallel elements, each adding to the complexity of the measurement system.

ESL — Represents lead wire and construction inductance. In most instances (especially in solid tantalum and monolithic ceramic capacitors) it is insignificant at the basic measurement frequencies of 120 and 1000 Hz.

ESR— Represents the actual ohmic series resistance in series with the capacitance. Lead wires and capacitor electrodes are contributing sources.

R_L — Capacitor Leakage Resistance. Typically it can reach 50,000 megohms in a tantalum capacitor. It can exceed 10^{12} ohms in monolithic ceramics and in film capacitors.

R_d — The dielectric loss contributed by dielectric absorption and molecular polarization. It becomes very significant in high frequency measurements and applications. Its value varies with frequency.

C_d — The inherent dielectric absorption of the solid tantalum capacitor which typically equates to 1-2% of the applied voltage.

As frequency increases, X_C continues to decrease according to its equation above. There is unavoidable inductance as well as resistance in all capacitors, and at some point in frequency, the reactance ceases to be capacitive and becomes inductive. This frequency is called the self-resonant point. In solid tantalum capacitors, the resonance is damped by the ESR, and a smooth, rather than abrupt, transition from capacitive to inductive reactance follows.

Figure 4 compares the frequency response of a KO-CAP to a standard Tantalum chip. Maximum limits for 100 kHz ESR are listed in the part number tables for each series.

The T530 Capacitance, Impedance and ESR vs. Frequency Comparisions are located on page 56. Maximum limits for 100 kHz are listed in the part number table on page 55.

ESR and Impedance

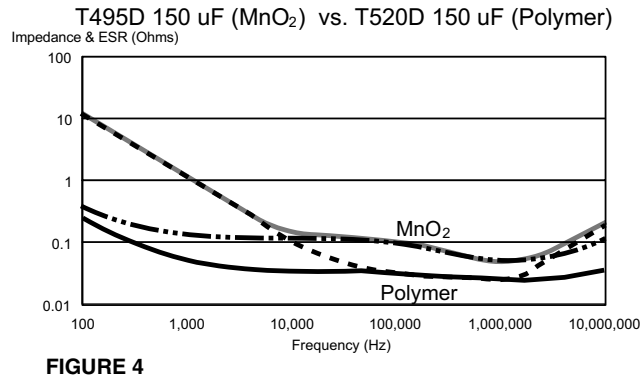

FIGURE 4

10. AC Power Dissipation

Power dissipation is a function of capacitor size and materials. Maximum power ratings have been established for all case sizes to prevent overheating. In actual use, the capacitor's ability to dissipate the heat generated at any given power level may be affected by a variety of circuit factors. These include board density, pad size, heat sinks and air circulation.

Table 3
Power Dissipation Ratings

Case Code		Maximum Power Dissipation
KEMET	EIA	mWatts @ +25°C w/+20°C Rise
T520/T	3528-12	70
T520/A	3216-18	75
T52x/B	3528-21	85
T520/U	6032-15	90
T520/C	6032-28	110
T520/W	7343-15	120
T520/V	7343-20	125
T52x/D	7343-31	150
T520/Y	7343-40	161
T520/X	7343-43	165
T530/D	7343-31	255
T530/Y	7343-40	263
T530/X	7343-43	270
T530/E	7260-38	285

11. Ripple Current/ Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and power dissipation capability.

Permissible AC ripple voltage which may be applied is limited by three criteria:

a. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.

b. The negative peak AC voltage, in combination with bias voltage, if any, must not exceed the permissible reverse voltage ratings presented in Section 5.

c. The power dissipated in the ESR of the capacitor must not exceed the appropriate value specified in Section 10.

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COMPONENT PERFORMANCE CHARACTERISTICS

Actual power dissipated may be calculated from the following:

$P = I^2R$

Substituting $I = \frac{E}{Z}$, $P = \frac{E^2R}{Z^2}$

where:

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P = power (watts)
Z = impedance at specified frequency (ohms)
R = equivalent series resistance at specified frequency (ohms)

Using P max from Table 3, maximum allowable rms ripple current or voltage may be determined as follows:

$I(max) = \sqrt{P\ max/R}$ $E(max) = Z\sqrt{P\ max/R}$

ENVIRONMENTAL

12. Temperature Stability

Mounted capacitors withstand extreme temperature testing at a succession of continuous steps at +25ºC, -55ºC, +25ºC, +85ºC, +105ºC, +25ºC in that order*. Capacitors are allowed to stabilize at each temperature before measurement. Cap, DF, and DCL are measured at each temperature except DC Leakage is not measured at -55ºC.

*Maximum temperature 125ºC for T525 and T530 series.

Table 4

Acceptable limits are as follows:

Step	Temp.	ΔCap	DCL	DF
1	+25ºC	Specified Tolerance	Catalog Limit	Catalog Limit
2	-55ºC	±20% of initial value	N/A	Catalog Limit
3	+25ºC	±10% of initial value	Catalog Limit	Catalog Limit
4	+85ºC	±20% of initial value	10x Catalog Limit	1.2x Catalog Limit
5	+105ºC (125ºC for T525, T530)	±30% of initial value	10x Catalog Limit	1.5x Catalog Limit
6	+25ºC	±10% of initial value	Catalog Limit	Catalog Limit

13. Standard Life Test

- ***85ºC, Rated Voltage, 2000 Hours***

Post Test Performance:

a. Capacitance: within -20%/+10% of initial value
b. DF: within initial limit
c. DC Leakage: within initial limit
d. ESR: within initial limit

14. High Temperature Life Test

- ***105ºC, 0.8 x Rated Voltage, 2000 hours, 125ºC for T525, T530 Series***

Post Test Performance:

a. Capacitance: within -20%/+10% of initial value
b. DF: within initial limit
c. DC Leakage: within 1.25 initial limits for T520; 2 x initial limit for T525, T530
d. ESR: within 2 x initial limit for T520, T530
ESR: within initial limit for T525

15. Storage Life Test

- ***105ºC, 0VDC, 2000 Hours for T520; 125ºC for T525, T530***

Post Test Perfomance:

a. Capacitance: within -20%/+10% of initial value
b. DF: within initial limit
c. DC Leakage: within 1.25 initial limits for T520; 2 x initial limit for T525, T530
d. ESR: within 2 x initial limit for T520, T530
ESR: within initial limit for T525

16. Thermal Shock

- ***Mil-Std-202, Method 107, Condition B***

Minimum temperature is -55ºC
Maximum temperature is +105ºC for T520; 125ºC for T525, T530
500 Cycles

Post Test Performance:

a. Capacitance: within +10%/-20% of initial value
b. DF: within initial limit
c. DC Leakage: within initial limit
d. ESR: within 2 x initial limit

17. Moisture Resistance *Testing*

- ***J-Std-020***

Steps 7a and 7b excluded, 0V, 21 cycles

Post Test Performance:

a. Capacitance: within ±30% of initial value
b. DF: within initial limit
c. DC Leakage: within initial limit
d. ESR: within initial limit
e. JEDEC J-STD-020C Meets MSL Level 3

18. Load Humidity

- ***85ºC, 85% RH, Rated Voltage, 500 Hours***

Post Test Performance:

a. Capacitance: within +35%/-5% of initial value
b. DF: within initial limit
c. DC Leakage: within 5 x initial limit
d. ESR: within 2 x initial limit

19. ESD

- **Polymer tantalum capacitors are not sensitive to Electro-Static Discharge (ESD).**

20. Failure Mechanism and Reliability

The normal failure mechanism is dielectric breakdown. Dielectric failure can result in high DC Leakage current and may proceed to the level of a short circuit. With sufficient time to charge, healing may occur by one of two potential mechanisms. The polymer adjacent to the dielectric fault site may overheat and vaporize, disconnecting the fault site from the circuit. The polymer may also

COMPONENT PERFORMANCE CHARACTERISTICS

oxidize into a more resistive material that eliminates the defect site in the dielectric and reduces the flow of current.

Capacitor failure may be induced by exceeding the rated conditions of forward DC voltage, reverse DC voltage, surge current, power dissipation or temperature. Excessive environmental stress, such as prolonged or high temperature reflow processes may also trigger dielectric failure.

Failure rates may be improved in application by derating the voltage applied to the capacitor. KEMET recommends that KO-CAPs be derated to 90% or less of the rated voltage in application for part types ≤ 10V. Parts > 10V should be derated to 80% or less of the rated voltage.

KO-CAPs exhibit a benign failure mode in that they do not fail catastophically even under typical fault conditions. If a shorted capacitor is allowed to pass unlimited current, it may overheat and the case may discolor. But this is distinctly different from the "ignition" that may occur with standard MnO2 cathode tantalums. Replacement of the MnO2 by the polymer removes the oxygen that fuels ignition during a failure event.

MECHANICAL

21. Resistance to Solvents
- ***Mil-Std-202, Method 215***

Post Test Performance:
a. Capacitance — within ±10% of initial value
b. DC Leakage — within initial limit
c. Dissipation Factor — within initial limit
d. ESR — within initial limit
e. Physical — no degradation of case, terminals or marking

22. Fungus
- ***Mil-Std-810, Method 508***

23. Flammability
- ***UL94 VO Classification***

Encapsulant materials meet this classifaction

24. Resistance to Soldering Heat
- ***Maximum Reflow***
  +240 ±5°C, 10 seconds
- ***Typical Reflow***
  +230 ±5°C, 30 seconds

Post Test Performance:
a. Capacitance — within ±10% of initial value
b. DC Leakage — within initial limit
c. Dissipation Factor — within initial limit
d. ESR — within initial limit

25. Solderability
- ***Mil-Std-202, Method 208***
- ***ANSI/J-STD-002, Test B***

Applies to Solder Coated terminations only.

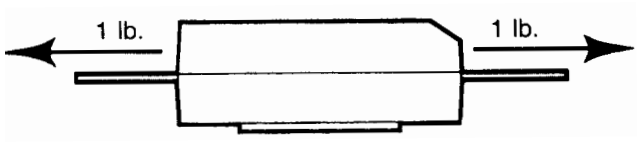
26. Vibration
- ***Mil-Std-202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20G Peak***

Post Test Performance:
a. Capacitance — within ±10% of initial value
b. DC Leakage — within initial limit
c. Dissipation Factor — within initial limit
d. ESR — within initial limit

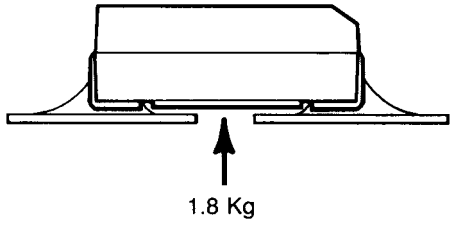
27. Shock
- ***Mil-Std-202, Method 213, Condition I, 100 G Peak***

Post Test Performance:
a. Capacitance — within ±10% of initial value
b. DC Leakage — within initial limit
c. Dissipation Factor — within initial limit
d. ESR - within initial limit

28. Terminal Strength
- **Pull Force**
  - ***One Pound (454 grams), 30 Seconds***



- **Tensile Force**
  - ***Four Pounds (1.8 kilograms), 60 Seconds***



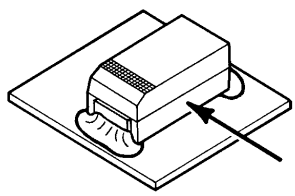
4 lb. (1.8 Kg)

- **Shear Force**

Table 5 Maximum Shear Loads

Case Code		Maximum Shear Loads	
KEMET	EIA	Kilograms	Pounds
A	3216-18	3.2	7.0
T	3528-12	3.6	8.0
B	3528-21	3.6	8.0
C	6032-28	4.5	10.0
V	7343-20	5.0	11.0
W	7343-15	5.0	11.0
D	7343-31	5.0	11.0
Y	7343-40	5.0	11.0
X	7343-43	5.0	11.0

Post Test Performance:
a. Capacitance — within ±5% of initial value
b. DC Leakage — within initial limit
c. Dissipation Factor — within initial limit
d. ESR - within initial limit



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COMPONENT PERFORMANCE CHARACTERISTICS

APPLICATIONS

29. Handling

Automatic handling of encapsulated components is enhanced by the molded case which provides compatibility with all types of high speed pick and place equipment. Manual handling of these devices presents no unique problems. Care should be taken with your fingers, however, to avoid touching the solder-coated terminations as body oils, acids and salts will degrade the solderability of these terminations. Finger cots should be used whenever manually handling all solderable surfaces.

30. Termination Coating

KEMET's standard termination finish is 100% Sn. Standard terminations can be ordered with a "T" suffix in the lead material designator of the KEMET part number. Components ordered with the "T" suffix are Pb-Free/RoHS compliant and are backward and forward compatible with SnPb and Pb-Free soldering processes.

90Sn/10Pb terminations are also available and can be ordered with an "H" suffix.

KEMET's "S" suffix remains an active termination designator for current designs but is not recommended for new designs. Parts ordered with an "S" suffix are not guaranteed to be Pb-Free or RoHS compliant. Refer to www.kemet.com for information on Pb-Free transition.

31. Recommended Mounting Pad Geometries

Proper mounting pad geometries are essential for successful solder connections. These dimensions are highly process sensitive and should be designed to maximize the intergrity of the solder joint, and to minimize component rework due to unacceptable solder joints.

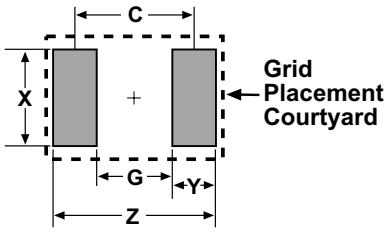


Table 6 - Land Pattern Dimensions for Reflow Solder

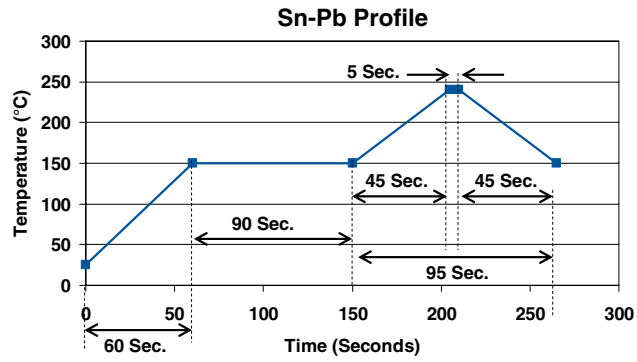
KEMET/EIA Size Code	Pad Dimensions				
	Z	G	X	Y (ref)	C (ref)
B/3528-21, T/3528-12	5.00	1.10	2.50	1.95	3.05
C/6032-28	7.60	2.50	2.50	2.55	5.05
D/7343-31, V/7343-20, W/7343-15, X/7343-43, Y/7343-40	8.90	3.80	2.70	2.55	6.35

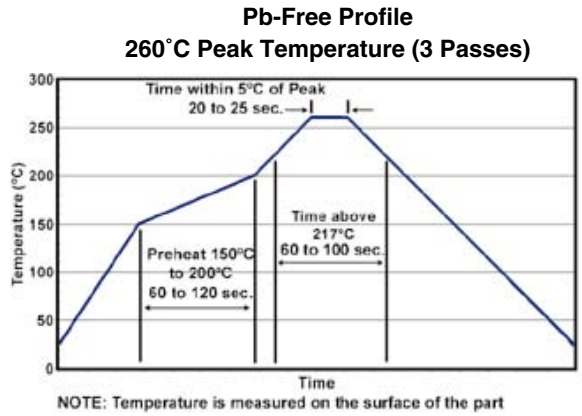
Figure 5 illustrates pad geometry. The table provides recommended pad dimensions for reflow soldering techniques. These dimensions are intended to be a starting point for circuit board designers, to be fine tuned, if necessary, based upon the peculiarities of the soldering process and/or circuit board design.

Visit KEMET.com for Engineering Bulletin Number F-2100 entitled "Surface Mount Mounting Pad Dimensions and Considerations" for further details on this subject.

32. Soldering

The T52X KO-CAP family has been designed for reflow solder processes. Solder-coated terminations have excellent wetting characteristics for high integrity solder fillets. Preheating of these components is recommended to avoid extreme thermal stress. Pb (lead) Free peak temperature is 260˚C (with up to 3x reflow capabilities).





Time/Temperature Soldering Profile

Hand-soldering should be avoided. If necessary, it should be performed with care due to the difficulty in process control. Care should be taken to avoid contact of the soldering iron to the molded case.

The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. The iron should be removed. “Wiping” the edges of a chip and heating the top surface is not recommended.

During typical reflow operations a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and is not harmful to the product. Marking permanency is not affected by this change.

The EIA standards for conductive polymer capacitors allows an ESR movement to 1.1 times (or 3 milliohms, whichever is greater) the catalog limit past mounting.

33. Washing

Standard washing techniques and solvents are compatible with all KEMET surface mount tantalum capacitors. Solvents such as Freon TMC and TMS, Trichlorethane, methylene chloride, prelete, and isopropyl alcohol are not harmful to these components. Please note that we are not endorsing the use of banned or restricted solvents. We are simply stating that they would not be harmful to the components.

If ultrasonic agitation is utilized in the cleaning process, care should be taken to minimize energy levels and exposure times to avoid damage to the terminations.

KEMET tantalum chips are also compatible with newer aqueous and semi-aqueous processes.

34. Encapsulations

Under normal circumstances, potting or encapsulation of KEMET tantalum chips is not required.

35. Storage Environment

Conductive polymer series (T520, T525, T530) are shipped in moisture barrier bags with a desiccant and moisture indicator card. These series are classified as MSL (Moisture Sensitivity Level 3). Upon opening the moisture barrier bag, parts should be mounted within 7 days to prevent moisture absorption and outgassing. If the 7 day window is exceeded, the parts can be baked per the instructions on the bag (168 hours at 40±5°C).

Polymer chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature - reels may soften or warp, and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40 degrees C, and the maximum storage humidity not exceed 60% relative humidity. In addition, temperature fluctuations should be minimized to avoid condensation on the parts, and atmospheres should be free of chlorine and sulfur bearing compounds. For optimized solderability, chip stock should be used promptly, preferably within 1.5 years of receipt.

COMPONENT WEIGHTS

Series	Case Size	Typical Weight (mg)
T52x	A/3216-18	35
T52x	B/3528-21	65
T52x	C/6032-28	130
T52x	D/7343-31	325
T52x	X/7343-43	500
T52x	T/3528-12	38
T52x	W/7343-15	172
T52x	V/7343-20	210
T530	D/7343-31	342
T530	Y/7343-40	480
T530	X/7343-43	515
T530	E/7360-38	650

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CONDUCTIVE POLYMER CHIP CAPACITORS

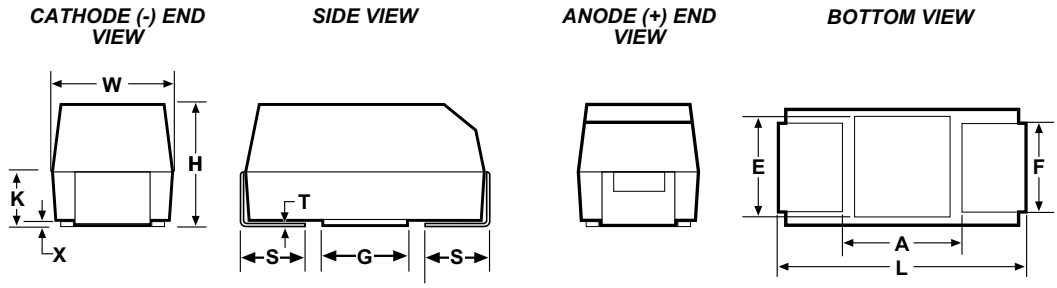
KEMET

T520 Series - KO Cap

FEATURES

- Polymer Cathode Technology
- Low ESR
- High Frequency Cap Retention
- No-Ignition Failure Mode
- Use Up to 90% of Rated Voltage (10% Derating) for part types ≤ 10 Volts
- Halogen Free Epoxy
- 100% Accelerated Steady State Aging
- Volumetrically Efficient
- Use Up to 80% of Rated Voltage (20% Derating) for part types > 10 Volts
- Capacitance 15 to 1000µF (±20%)
- Voltage 2V to 25V
- EIA Standard Case Sizes
- 100% Surge Current Tested
- Operating Temperature -55°C to +105°C
- Self Healing Mechanism
- RoHS Compiant & Leadfree Terminations (see www.kemet.com for lead transition)

OUTLINE DRAWING



DIMENSIONS - MILLIMETERS

Case Size KEMET	Case Size EIA	L	W	H	K ± 0.20	F ± 0.1	S ± 0.3	X(Ref)	T(Ref)	A(Min)	G(ref)	E(ref)
A	3216-18	3.2 ± 0.2	1.6 ± 0.2	1.6 ± 0.2	0.9	1.2	0.8	0.10 ± 0.10	0.13	0.8	1.1	1.3
T	3528-12	3.5 ± 0.2	2.8 ± 0.2	1.2 max	0.3	2.2	0.8	0.05	0.13	1.1	1.8	2.2
B	3528-21	3.5 ± 0.2	2.8 ± 0.2	1.9 ± 0.2	0.9	2.2	0.8	0.10 ± 0.10	0.13	1.1	1.8	2.2
C	6032-28	6.0 ± 0.3	3.2 ± 0.3	2.5 ± 0.3	1.4	2.2	1.3	0.10 ± 0.10	0.13	2.5	2.8	2.4
U	6032-15	6.0 ± 0.3	3.2 ± 0.3	1.5 max	0.5	2.2	1.3	0.05	0.13	3.1	2.8	2.4
W	7343-15	7.3 ± 0.3	4.3 ± 0.3	1.5 max	0.6	2.4	1.3	0.05	0.13	3.8	3.5	3.5
V	7343-20	7.3 ± 0.3	4.3 ± 0.3	1.9 max	0.9	2.4	1.3	0.05	0.13	3.8	3.5	3.5
D	7343-31	7.3 ± 0.3	4.3 ± 0.3	2.8 ± 0.3	1.5	2.4	1.3	0.10 ± 0.10	0.13	3.8	3.5	3.5
Y	7343-40	7.3 ± 0.3	4.3 ± 0.3	4.0 max	1.9	2.4	1.3	0.10 ± 0.10	0.13	3.8	3.5	3.5
X	7343-43	7.3 ± 0.3	4.3 ± 0.3	4.0 ± 0.3	2.3	2.4	1.3	0.10 ± 0.10	0.13	3.8	3.5	3.5

T520 ORDERING INFORMATION

T 520 V 157 M 006 A S E015

Tantalum

Series
T520 - Low ESR Polymer

Case Size
A, T, B, C, V, W, D, Y, X

Capacitance Picofarad Code
First two digits represent significant figures.
Third digit specifies number of zeros to follow.

ESR

Lead Material
T - 100% Tin (Sn) Plated
H - Tin/Lead (SnPb 5% Pb minimum)
*S - Not recommended for new design

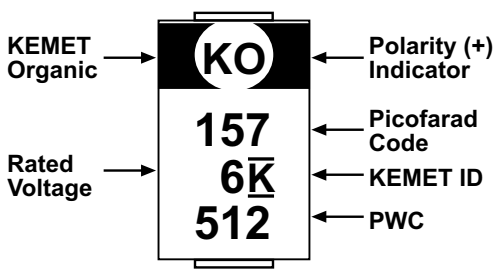
Failure Rate
A - Not Applicable

Voltage

Capacitance Tolerance
M = ± 20%

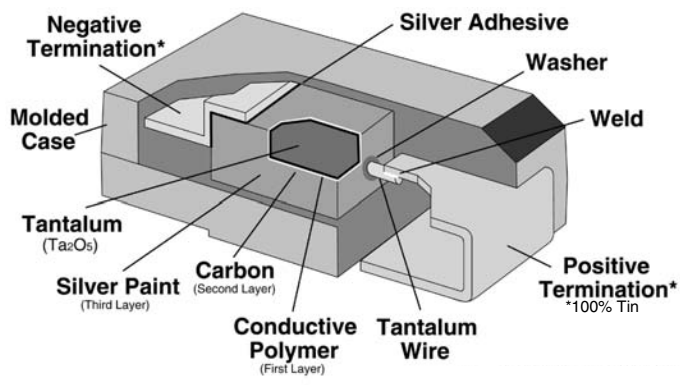
***See www.kemet.com for Pb Free transition information.**

COMPONENT MARKING



512 = 12th week of 2005

T520 SERIES CONSTRUCTION



T520 RATINGS & PART NUMBER REFERENCE

Capacitance µF	Case Size	KEMET Part Number	DC Leakage µA @ 25°C Max	DF% @ 25°C 120 Hz Max	ESR mΩ @ 25°C 100 kHz Max	Ripple Current Arms @ 100 kHz Max	
						w/ΔT=20°C @ -55°C to 85°C	w/ΔT= 2°C @ 105°C
2 Volt Rating @ 105°C							
470.0	V	T520V477M002A(1)E040	94	10	40	1.8	0.6
2.5 Volt Rating @ 105°C							
47.0	A	T520A476M2R5A(1)E090	12	8	90	0.9	0.3
56.0	T	T520T566M2R5A(1)E070	14	8	70	1.0	0.3
68.0	A	T520A686M2R5A(1)E070	17	8	70	1.0	0.3
68.0	A	T520A686M2R5A(1)E080	17	8	80	1.0	0.3
100.0	T	T520T107M2R5A(1)E070	25	8	70	1.0	0.3
100.0	B	T520B107M2R5A(1)E040	25	8	40	1.5	0.5
100.0	B	T520B107M2R5A(1)E070	25	8	70	1.1	0.3
220.0	B	T520B227M2R5A(1)E030	55	8	30	1.7	0.5
220.0	B	T520B227M2R5A(1)E035	55	8	35	1.6	0.5
220.0	B	T520B227M2R5A(1)E070	55	8	70	1.1	0.3
220.0	C	T520C227M2R5A(1)E025	55	8	25	2.1	0.7
220.0	C	T520C227M2R5A(1)E045	55	8	45	1.6	0.5
220.0	V	T520V227M2R5A(1)E007	55	10	7	4.2	1.3
220.0	V	T520V227M2R5A(1)E009	55	10	9	3.7	1.2
220.0	V	T520V227M2R5A(1)E012	55	10	12	3.2	1.0
220.0	V	T520V227M2R5A(1)E015	55	10	15	2.9	0.9
220.0	V	T520V227M2R5A(1)E025	55	10	25	2.2	0.7
220.0	V	T520V227M2R5A(1)E045	55	10	45	1.7	0.5
220.0	D	T520D227M2R5A(1)E007	55	10	7	4.6	1.5
330.0	B	T520B337M2R5A(1)E045	83	8	45	1.4	0.4
330.0	B	T520B337M2R5A(1)E070	83	8	70	1.1	0.3
330.0	C	T520C337M2R5A(1)E025	83	8	25	2.1	0.7
330.0	C	T520C337M2R5A(1)E045	83	8	45	1.6	0.5
330.0	W	T520W337M2R5A(1)E040	83	10	40	1.7	0.5
330.0	V	T520V337M2R5A(1)E007	83	10	7	4.2	1.3
330.0	V	T520V337M2R5A(1)E009	83	10	9	3.7	1.2
330.0	V	T520V337M2R5A(1)E015	83	10	15	2.9	0.9
330.0	V	T520V337M2R5A(1)E025	83	10	25	2.2	0.7
330.0	V	T520V337M2R5A(1)E040	83	10	40	1.8	0.6
330.0	D	T520D337M2R5A(1)E007	83	10	7	4.6	1.5
470.0	V	T520V477M2R5A(1)E007	118	10	7	4.2	1.3
470.0	V	T520V477M2R5A(1)E009	118	10	9	3.7	1.2
470.0	V	T520V477M2R5A(1)E012	118	10	12	3.2	1.0
470.0	V	T520V477M2R5A(1)E015	118	10	15	2.9	0.9
470.0	D	T520D477M2R5A(1)E007	118	10	7	4.6	1.5
470.0	D	T520D477M2R5A(1)E009	118	10	9	4.1	1.3
680.0	D	T520D687M2R5A(1)E010	170	10	10	3.9	1.2
680.0	D	T520D687M2R5A(1)E015	170	10	15	3.2	1.0
680.0	D	T520D687M2R5A(1)E040	170	10	40	1.9	0.6
680.0	Y	T520Y687M2R5A(1)E015	170	10	15	3.3	1.0
680.0	Y	T520Y687M2R5A(1)E025	170	10	25	2.5	0.8
1000.0	D	T520D108M2R5A(1)E030	250	10	30	2.2	0.7
1000.0	Y	T520Y108M2R5A(1)E010	250	10	10	4.0	1.3
1000.0	Y	T520Y108M2R5A(1)E015	250	10	15	3.3	1.0
1000.0	Y	T520Y108M2R5A(1)E025	250	10	25	2.5	0.8
1000.0	X	T520X108M2R5A(1)E010	250	10	10	4.1	1.3
3 Volt Rating @ 105°C							
100.0	B	T520B107M003A(1)E040	30	8	40	1.5	0.5
100.0	B	T520B107M003A(1)E070	30	8	70	1.1	0.3
150.0	B	T520B157M003A(1)E040	45	8	40	1.5	0.5
150.0	B	T520B157M003A(1)E070	45	8	70	1.1	0.3
330.0	V	T520V337M003A(1)E009	99	10	9	3.7	1.2
330.0	V	T520V337M003A(1)E012	99	10	12	3.2	1.0
330.0	V	T520V337M003A(1)E015	99	10	15	2.9	0.9
330.0	V	T520V337M003A(1)E025	99	10	25	2.2	0.7
680.0	D	T520D687M003A(1)E015	204	10	15	3.2	1.0
680.0	D	T520D687M003A(1)E040	204	10	40	1.9	0.6
1000.0	X	T520X108M003A(1)E015	300	10	15	3.3	1.0
1000.0	X	T520X108M003A(1)E030	300	10	30	2.3	0.7
4 Volt Rating @ 105°C							
15.0	T	T520T156M004A(1)E100	6	8	100	0.8	0.3
33.0	A	T520A336M004A(1)E070	13	8	70	1.0	0.3
33.0	A	T520A336M004A(1)E080	13	8	80	1.0	0.3
47.0	A	T520A476M004A(1)E070	19	8	70	1.0	0.3
47.0	A	T520A476M004A(1)E080	19	8	80	1.0	0.3
47.0	T	T520T476M004A(1)E070	19	8	70	1.0	0.3
68.0	T	T520T686M004A(1)E070	27	8	70	1.0	0.3
68.0	B	T520B686M004A(1)E040	27	8	40	1.5	0.5
68.0	B	T520B686M004A(1)E070	27	8	70	1.1	0.3
100.0	B	T520B107M004A(1)E035	40	8	35	1.6	0.5
100.0	B	T520B107M004A(1)E040	40	8	40	1.5	0.5
100.0	B	T520B107M004A(1)E070	40	8	70	1.1	0.3
100.0	U	T520U107M004A(1)E055	40	8	55	1.3	0.4
150.0	B	T520B157M004A(1)E030	60	8	30	1.7	0.5
150.0	B	T520B157M004A(1)E035	60	8	35	1.6	0.5
150.0	B	T520B157M004A(1)E040	60	8	40	1.5	0.5
150.0	B	T520B157M004A(1)E070	60	8	70	1.1	0.3
150.0	C	T520C157M004A(1)E025	60	8	25	2.1	0.7
150.0	C	T520C157M004A(1)E045	60	8	45	1.6	0.5
150.0	V	T520V157M004A(1)E007	60	10	7	4.2	1.3
150.0	V	T520V157M004A(1)E009	60	10	9	3.7	1.2
150.0	V	T520V157M004A(1)E012	60	10	12	3.2	1.0
150.0	V	T520V157M004A(1)E015	60	10	15	2.9	0.9
150.0	V	T520V157M004A(1)E025	60	10	25	2.2	0.7
150.0	D	T520D157M004A(1)E007	60	10	7	4.6	1.5

(1) To complete KEMET Part Number, insert letter designation for lead material from page 49. Higher voltage ratings and tighter tolerance product may be substituted within the same size at KEMET'S option. Voltage substitutions will be marked with the higher voltage rating.

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T520 RATINGS & PART NUMBER REFERENCE

Capacitance µF	Case Size	KEMET Part Number	DC Leakage µA @ 25°C Max	DF% @ 25°C 120 Hz Max	ESR mΩ @ 25°C 100 kHz Max	Ripple Current Arms @ 100 kHz Max	
						w/ΔT=20°C @ -55°C to 85°C	w/ΔT= 2°C @ 105°C
4 Volt Rating @ 105°C							
220.0	B	T520B227M004A(1)E045	88	8	45	1.4	0.4
220.0	B	T520B227M004A(1)E070	88	8	70	1.1	0.3
220.0	C	T520C227M004A(1)E025	88	8	25	2.1	0.7
220.0	C	T520C227M004A(1)E045	88	8	45	1.6	0.5
220.0	W	T520W227M004A(1)E040	88	10	40	1.7	0.5
220.0	V	T520V227M004A(1)E007	88	10	7	4.2	1.3
220.0	V	T520V227M004A(1)E009	88	10	9	3.7	1.2
220.0	V	T520V227M004A(1)E012	88	10	12	3.2	1.0
220.0	V	T520V227M004A(1)E015	88	10	15	2.9	0.9
220.0	V	T520V227M004A(1)E025	88	10	25	2.2	0.7
220.0	V	T520V227M004A(1)E040	88	10	40	1.8	0.6
220.0	V	T520V227M004A(1)E045	88	10	45	1.7	0.5
220.0	D	T520D227M004A(1)E007	88	10	7	4.6	1.5
220.0	D	T520D227M004A(1)E012	88	10	12	3.5	1.1
220.0	D	T520D227M004A(1)E065	88	10	65	1.5	0.5
330.0	V	T520V337M004A(1)E007	132	10	7	4.2	1.3
330.0	V	T520V337M004A(1)E009	132	10	9	3.7	1.2
330.0	V	T520V337M004A(1)E012	132	10	12	3.2	1.0
330.0	V	T520V337M004A(1)E025	132	10	25	2.2	0.7
330.0	V	T520V337M004A(1)E040	132	10	40	1.8	0.6
330.0	D	T520D337M004A(1)E007	132	10	7	4.6	1.5
330.0	D	T520D337M004A(1)E009	132	10	9	4.1	1.3
330.0	D	T520D337M004A(1)E015	132	10	15	3.2	1.0
330.0	D	T520D337M004A(1)E040	132	10	40	1.9	0.6
330.0	D	T520D337M004A(1)E045	132	10	45	1.8	0.6
470.0	D	T520D477M004A(1)E010	188	10	10	3.9	1.2
470.0	D	T520D477M004A(1)E012	188	10	12	3.5	1.1
470.0	D	T520D477M004A(1)E015	188	10	15	3.2	1.0
470.0	D	T520D477M004A(1)E018	188	10	18	2.9	0.9
470.0	D	T520D477M004A(1)E025	188	10	25	2.4	0.8
470.0	D	T520D477M004A(1)E040	188	10	40	1.9	0.6
680.0	D	T520D687M004A(1)E025	272	10	25	2.4	0.8
680.0	Y	T520Y687M004A(1)E010	272	10	10	4.0	1.3
680.0	Y	T520Y687M004A(1)E015	272	10	15	3.3	1.0
680.0	Y	T520Y687M004A(1)E025	272	10	25	2.5	0.8
680.0	X	T520X687M004A(1)E010	272	10	10	4.1	1.3
680.0	X	T520X687M004A(1)E015	272	10	15	3.3	1.0
680.0	X	T520X687M004A(1)E035	272	10	35	2.2	0.7
6.3 Volt Rating @ 105°C							
15.0	T	T520T156M006A(1)E100	9.5	8	100	0.8	0.3
22.0	A	T520A226M006A(1)E090	14	8	90	0.9	0.3
22.0	A	T520A226M006A(1)E100	14	8	100	0.9	0.3
33.0	A	T520A336M006A(1)E070	21	8	70	1.0	0.3
33.0	A	T520A336M006A(1)E080	21	8	80	1.0	0.3
33.0	T	T520T336M006A(1)E070	21	8	70	0.9	0.4
33.0	B	T520B336M006A(1)E040	21	8	40	1.5	0.5
33.0	B	T520B336M006A(1)E070	21	8	70	1.1	0.3
47.0	T	T520T476M006A(1)E070	30	8	70	1.0	0.3
47.0	B	T520B476M006A(1)E040	30	8	40	1.5	0.5
47.0	B	T520B476M006A(1)E070	30	8	70	1.1	0.3
68.0	B	T520B686M006A(1)E040	43	8	40	1.5	0.5
68.0	B	T520B686M006A(1)E070	43	8	40	1.5	0.5
68.0	U	T520U686M006A(1)E070	43	8	55	1.3	0.4
100.0	B	T520B107M006A(1)E040	63	8	40	1.5	0.5
100.0	B	T520B107M006A(1)E070	63	8	70	1.1	0.3
100.0	W	T520W107M006A(1)E040	63	10	40	1.7	0.5
100.0	V	T520V107M006A(1)E007	63	10	7	4.2	1.3
100.0	V	T520V107M006A(1)E009	63	10	9	3.7	1.2
100.0	V	T520V107M006A(1)E012	63	10	12	3.2	1.0
100.0	C	T520C107M006A(1)E025	63	8	25	2.1	0.7
100.0	C	T520C107M006A(1)E045	63	8	45	1.6	0.5
100.0	D	T520D107M006A(1)E007	63	10	7	4.6	1.5
150.0	B	T520B157M006A(1)E045	95	8	45	1.4	0.4
150.0	B	T520B157M006A(1)E070	95	8	70	1.1	0.3
150.0	C	T520C157M006A(1)E025	95	8	25	2.1	0.7
150.0	C	T520C157M006A(1)E045	95	8	45	1.6	0.5
150.0	W	T520W157M006A(1)E040	95	10	40	1.7	0.5
150.0	V	T520V157M006A(1)E007	95	10	7	4.2	1.3
150.0	V	T520V157M006A(1)E009	95	10	9	3.7	1.2
150.0	V	T520V157M006A(1)E012	95	10	12	3.2	1.0
150.0	V	T520V157M006A(1)E015	95	10	15	2.9	0.9
150.0	V	T520V157M006A(1)E025	95	10	25	2.2	0.7
150.0	V	T520V157M006A(1)E040	95	10	40	1.8	0.6
150.0	V	T520V157M006A(1)E045	95	10	45	1.7	0.5
150.0	D	T520D157M006A(1)E007	95	10	7	4.6	1.5
150.0	D	T520D157M006A(1)E015	95	10	15	3.2	1.0
150.0	D	T520D157M006A(1)E025	95	10	25	2.4	0.8
150.0	D	T520D157M006A(1)E055	95	10	55	1.7	0.5
220.0	V	T520V227M006A(1)E007	139	10	7	4.2	1.3
220.0	V	T520V227M006A(1)E009	139	10	9	3.7	1.2
220.0	V	T520V227M006A(1)E012	139	10	12	3.2	1.0
220.0	V	T520V227M006A(1)E015	139	10	15	2.9	0.9
220.0	V	T520V227M006A(1)E025	139	10	25	2.2	0.7
220.0	V	T520V227M006A(1)E040	139	10	40	1.8	0.6
220.0	D	T520D227M006A(1)E007	139	10	7	4.6	1.5
220.0	D	T520D227M006A(1)E009	139	10	9	4.1	1.3
220.0	D	T520D227M006A(1)E015	139	10	15	3.2	1.0
220.0	D	T520D227M006A(1)E040	139	10	40	1.9	0.6
220.0	D	T520D227M006A(1)E050	139	10	50	1.7	0.5

(1) To complete KEMET Part Number, insert letter designation for lead material from page 49. Higher voltage ratings and tighter tolerance product may be substituted within the same size at KEMET'S option. Voltage substitutions will be marked with the higher voltage rating.

A N S A N M N

Capacitance µF	Case Size	KEMET Part Number	DC Leakage µA @ 25°C Max	DF% @ 25°C 120 Hz Max	ESR mΩ @ 25°C 100 kHz Max	Ripple Current Arms @ 100 kHz Max	
						w/ΔT=20°C @ -55°C to 85°C	w/ΔT= 2°C @ 105°C
6.3 Volt Rating @ 105°C							
330.0	V	T520V337M006A(1)E025	208	10	25	2.2	0.7
330.0	V	T520V337M006A(1)E040	208	10	40	1.8	0.6
330.0	D	T520D337M006A(1)E010	208	10	10	3.9	1.2
330.0	D	T520D337M006A(1)E015	208	10	15	3.2	1.0
330.0	D	T520D337M006A(1)E025	208	10	25	2.4	0.8
330.0	D	T520D337M006A(1)E040	208	10	40	1.9	0.6
330.0	D	T520D337M006A(1)E045	208	10	45	1.8	0.6
330.0	Y	T520Y337M006A(1)E015	208	10	15	3.3	1.0
330.0	Y	T520Y337M006A(1)E025	208	10	25	2.5	0.8
470.0	Y	T520Y477M006A(1)E010	296	10	10	4.0	1.3
470.0	Y	T520Y477M006A(1)E015	296	10	15	3.3	1.0
470.0	Y	T520Y477M006A(1)E018	296	10	18	3.0	0.9
470.0	Y	T520Y477M006A(1)E025	296	10	25	2.5	0.8
470.0	D	T520D477M006A(1)E030	296	10	30	2.2	0.7
470.0	X	T520X477M006A(1)E010	296	10	10	4.1	1.3
470.0	X	T520X477M006A(1)E018	296	10	18	3.0	1.0
470.0	X	T520X477M006A(1)E035	296	10	35	2.2	0.7
470.0	X	T520X477M006A(1)E040	296	10	40	2.0	0.6
8 Volt Rating @ 105°C							
33.0	T	T520T336M008A(1)E070	26	8	70	1.0	0.3
33.0	T	T520T336M008A(1)E080	26	8	80	0.9	0.3
33.0	B	T520B336M008A(1)E040	26	8	40	1.5	0.5
33.0	B	T520B336M008A(1)E070	26	8	70	1.1	0.3
33.0	U	T520U336M008A(1)E070	26	8	70	1.1	0.4
150.0	D	T520D157M008A(1)E025	120	10	25	2.4	0.8
150.0	D	T520D157M008A(1)E040	120	10	40	1.9	0.6
150.0	D	T520D157M008A(1)E055	120	10	55	1.7	0.5
10 Volt Rating @ 105°C							
10.0	A	T520A106M010A(1)E080	10	8	80	1.0	0.3
15.0	A	T520A156M010A(1)E080	15	8	80	1.0	0.3
33.0	T	T520T336M010A(1)E070	33	8	70	1.0	0.3
33.0	T	T520T336M010A(1)E080	33	8	80	0.9	0.3
33.0	B	T520B336M010A(1)E040	33	8	40	1.5	0.5
33.0	B	T520B336M010A(1)E070	33	8	70	1.1	0.3
33.0	U	T520U336M010A(1)E070	33	8	70	1.1	0.4
68.0	W	T520W686M010A(1)E025	68	10	25	2.2	0.7
68.0	W	T520W686M010A(1)E040	68	10	40	1.7	0.5
68.0	C	T520C686M010A(1)E045	68	8	45	1.6	0.5
68.0	V	T520V686M010A(1)E025	68	10	25	2.2	0.7
68.0	V	T520V686M010A(1)E040	68	10	40	1.8	0.6
68.0	V	T520V686M010A(1)E045	68	10	45	1.7	0.5
68.0	V	T520V686M010A(1)E060	68	10	60	1.4	0.5
100.0	V	T520V107M010A(1)E018	100	10	18	2.6	0.8
100.0	V	T520V107M010A(1)E025	100	10	25	2.2	0.7
100.0	V	T520V107M010A(1)E045	100	10	45	1.7	0.5
100.0	V	T520V107M010A(1)E050	100	10	50	1.6	0.5
100.0	D	T520D107M010A(1)E018	100	10	18	2.9	0.9
100.0	D	T520D107M010A(1)E055	100	10	55	1.7	0.5
100.0	D	T520D107M010A(1)E080	100	10	80	1.4	0.4
150.0	D	T520D157M010A(1)E025	150	10	25	2.4	0.8
150.0	D	T520D157M010A(1)E040	150	10	40	1.9	0.6
150.0	D	T520D157M010A(1)E055	150	10	55	1.7	0.5
220.0	D	T520D227M010A(1)E018	220	10	18	2.9	0.9
220.0	D	T520D227M010A(1)E025	220	10	25	2.4	0.8
220.0	D	T520D227M010A(1)E040	220	10	40	1.9	0.6
330.0	Y	T520Y337M010A(1)E015	330	10	15	3.3	1.0
330.0	X	T520X337M010A(1)E010	330	10	10	4.1	1.3
330.0	X	T520X337M010A(1)E025	330	10	25	2.6	0.8
330.0	X	T520X337M010A(1)E040	330	10	40	2.0	0.6
16 Volt Rating @ 105°C							
33.0	W	T520W336M016A(1)E045	53	10	60	1.6	0.5
33.0	V	T520V336M016A(1)E045	53	10	45	1.7	0.5
33.0	V	T520V336M016A(1)E060	53	10	60	1.4	0.5
47.0	W	T520W476M016A(1)E045	75	10	45	1.6	0.5
47.0	V	T520V476M016A(1)E045	75	10	45	1.7	0.5
47.0	V	T520V476M016A(1)E070	76	10	70	1.3	0.4
47.0	D	T520D476M016A(1)E035	75	10	35	2.1	0.7
47.0	D	T520D476M016A(1)E070	75	10	70	1.5	0.5
20 Volt Rating @ 105°C							
22.0	V	T520V226M020A(1)E040	44	10	40	1.8	0.6
22.0	V	T520V226M020A(1)E090	44	10	90	1.2	0.4
25 Volt Rating @ 105°C							
15.0	V	T520V156M025A(1)E090	38	10	90	1.2	0.4
15.0	D	T520D156M025A(1)E060	38	10	60	1.6	0.5
15.0	D	T520D156M025A(1)E080	38	10	80	1.4	0.4

(1) To complete KEMET Part Number, insert letter designation for lead material from page 49. Higher voltage ratings and tighter tolerance product may be substituted within the same size at KEMET'S option. Voltage substitutions will be marked with the higher voltage rating.

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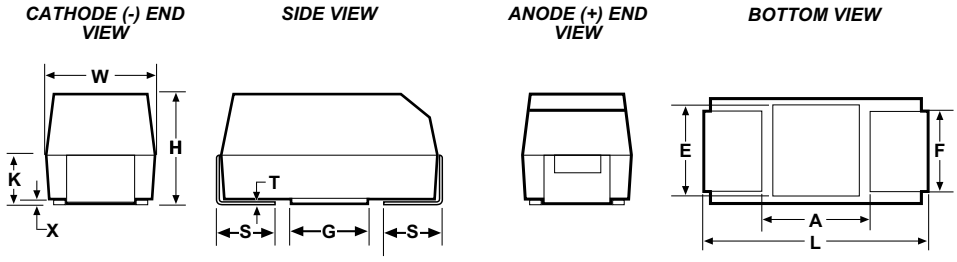
FEATURES

- Polymer Cathode Technology
- 125ºC Maximum Temperature Capability
- High Frequency Capacitance Retention
- Non-Ignition Failure Mode
- Capacitance: 33 - 680µF
- Voltage: 2.5 to 16 volts
- Use up to 90% of Rated Voltage (10% Derating) for part types ≤ 10 Volts
- Use up to 80% of Rated Voltage (20% Derating) for part types >10 Volts
- Operating Temperature -55ºC to +125ºC
- 100% Accelerated Steady State Aging
- 100% Surge Current Testing
- Self-Healing Mechanism
- Volumetrically Efficient
- Extremely Stable ESR at 125ºC
- EIA Standard Case Size
- RoHS Compliant / Leadfree Termination (See www.kemet.com for lead transition)

OUTLINE DRAWING

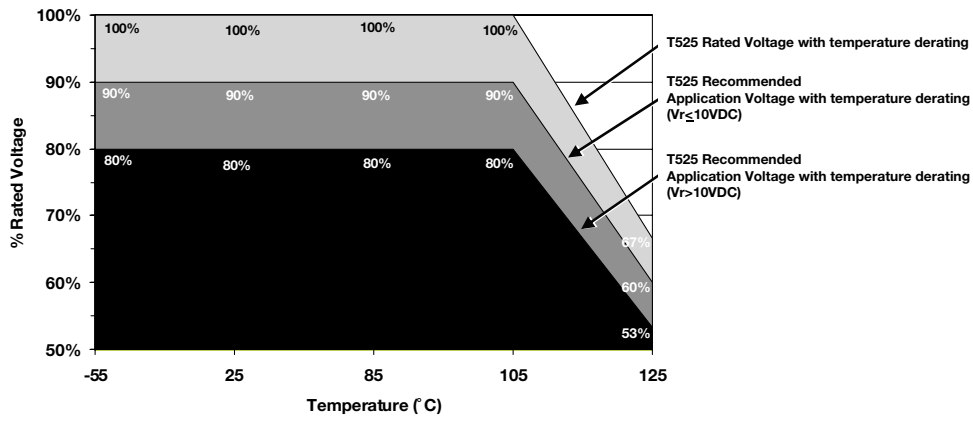


DIMENSIONS - MILLIMETERS

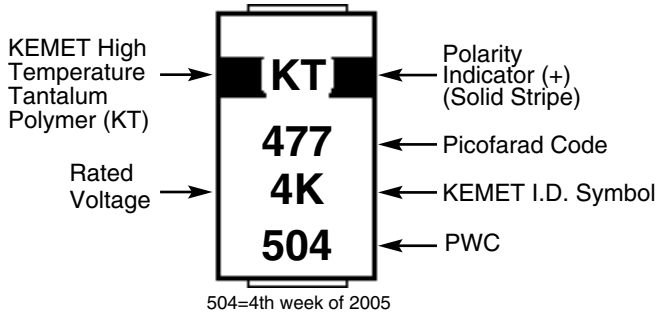
Case Size		L	W	H	K ±0.20	F ±0.1	S ±0.3	X (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)
KEMET	EIA											
T	3528-12	3.5 ± 0.2	2.8 ± 0.2	1.2 max.	0.3	2.2	0.8	0.05	0.13	1.1	1.8	2.2
B	3528-21	3.5 ± 0.2	2.8 ± 0.2	1.9 ± 0.1	0.9	2.2	0.8	0.10 ± 0.10	0.13	1.1	1.8	2.2
D	7343-31	7.3 ± 0.3	4.3 ± 0.3	2.8 ± 0.3	1.5	2.4	1.3	0.10 ± 0.10	0.13	3.8	3.5	3.5

RECOMMENDED TEMPERATURE/VOLTAGE DERATING

T525 Temperature/Application Recommended Voltage Derating



COMPONENT MARKING



504=4th week of 2005

T525 RATINGS & PART NUMBER REFERENCE

Capacitance µF	Case Size	KEMET Part Number	DC Leakage µA @ 25°C Max	DF% @ 25°C 120 Hz Max	ESR mΩ @ 25°C 100 kHz Max	Ripple Current (Arms) 100 kHz Max	
						w/ΔT= 20°C @ -55°C to 105°C	w/ΔT= 2°C @ 125°C
2.5 Volt Rating at 105°C (1.7 Volt Rating at 125°C)							
100.0	T	T525T107M2R5A(1)E080	25	8.0	80	0.9	0.3
330.0	D	T525D337M2R5A(1)E025	83	10.0	25	2.4	0.8
470.0	D	T525D477M2R5A(1)E025	118	10.0	25	2.4	0.8
680.0	D	T525D687M2R5A(1)E025	170	10.0	25	2.4	0.8
3 Volt Rating at 105°C (2 Volt Rating at 125°C)							
100.0	B	T525B107M003A(1)E080	30	8.0	80	1.0	0.3
150.0	B	T525B157M003A(1)E080	45	8.0	80	1.0	0.3
330.0	D	T525D337M003A(1)E025	99	10.0	25	2.4	0.8
470.0	D	T525D477M003A(1)E025	141	10.0	25	2.4	0.8
680.0	D	T525D687M003A(1)E025	204	10.0	25	2.4	0.8
4 Volt Rating at 105°C (2.7 Volt Rating at 125°C)							
68.0	T	T525T686M004A(1)E080	27	8.0	80	0.9	0.3
68.0	B	T525B686M004A(1)E080	28	8.0	80	1.0	0.3
100.0	B	T525B107M004A(1)E080	40	8.0	80	1.0	0.3
220.0	D	T525D227M004A(1)E025	88	10.0	25	2.4	0.8
330.0	D	T525D337M004A(1)E025	132	10.0	25	2.4	0.8
470.0	D	T525D477M004A(1)E025	188	10.0	25	2.4	0.8
470.0	D	T525D477M004A(1)E040	188	10.0	40	1.9	0.6
6.3 Volt Rating at 105°C (4.2 Volt Rating at 125°C)							
33.0	B	T525B336M006A(1)E080	21	8.0	80	1.0	0.3
47.0	T	T525T476M006A(1)E080	30	8.0	80	0.9	0.3
47.0	B	T525B476M006A(1)E080	30	8.0	80	1.0	0.3
68.0	B	T525B686M006A(1)E080	43	8.0	80	1.0	0.3
150.0	D	T525D157M006A(1)E025	95	10.0	25	2.4	0.8
220.0	D	T525D227M006A(1)E025	139	10.0	25	2.4	0.8
330.0	D	T525D337M006A(1)E025	208	10.0	25	2.4	0.8
330.0	D	T525D337M006A(1)E040	208	10.0	40	1.9	0.6
8 Volt Rating at 105°C (5.3 Volt Rating at 125°C)							
33.0	T	T525T336M008A(1)E080	26	8.0	80	0.9	0.3
10 Volt Rating at 105°C (6.6 Volt Rating at 125°C)							
22.0	B	T525B226M010A(1)E080	22	8.0	80	1.0	0.3
33.0	T	T525T336M010A(1)E080	33	8.0	80	0.9	0.3
33.0	B	T525B336M010A(1)E080	33	8.0	80	1.0	0.3
100.0	D	T525D107M010A(1)E025	100	10.0	25	2.4	0.8
100.0	D	T525D107M010A(1)E055	100	10.0	55	1.7	0.5
150.0	D	T525D157M010A(1)E025	150	10.0	25	2.4	0.8
150.0	D	T525D157M010A(1)E055	150	10.0	55	1.7	0.5
220.0	D	T525D227M010A(1)E025	220	10.0	25	2.4	0.8
16 Volt Rating at 105°C (10.6 Volt Rating at 125°C)							
47.0	D	T525D476M016A(1)E035	76	10.0	35	2.1	0.7
47.0	D	T525D476M016A(1)E065	76	10.0	65	1.5	0.5

(1) To complete KEMET Part Number, insert lead material designation for ordering information below. Higher voltage ratings and tighter tolerance product may be substituted within the same size at KEMET'S option. Voltage substitutions will be marked with the higher voltage rating.

T525 ORDERING INFORMATION

T 525 D 337 M 006 A T E040

Tantalum

Series
T525 - High Temperature
Tantalum Polymer (KT)

Case Size
B, D, T

Capacitance Picofarad Code
First two digits represent significant figures.
Third digit specifies number of zeros to follow.

ESR
Expressed in milliohms

Lead Material
T - 100% Tin
H - Tin/Lead (SnPb 5% Pb minimum)

Failure Rate
A - Not Applicable

Voltage
Note: 006 - 6.3

Capacitance Tolerance
M = ± 20%

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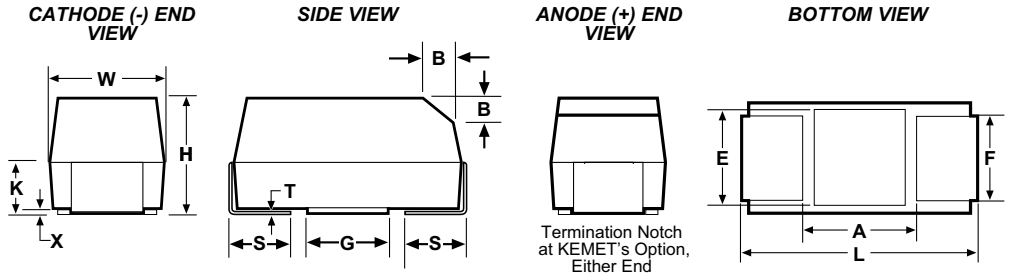
CONDUCTIVE POLYMER CHIP CAPACITORS

T530 SERIES - High Capacitance/Ultra-Low ESR

FEATURES

- Highest CV in Standard EIA Size
- Extremely Low ESR
- Operating Temperature: -55˚C to 125˚C
- Polymer Cathode Technology
- High Frequency Capacitance Retention
- Non-Ignition Failure Mode
- Capacitance: 150 to 1500 µF
- Voltage: 2.5V to 10V
- Molded Case (pick-and-place precision)
- 100% Accelerated Steady State Aging
- 100% Surge Current Testing
- Utilizes Multiple Tantalum Anode Technology
- Volumetric Efficiency
- Use Up to 90% of Rated Voltage (10% Derating)
- Self-Healing Mechanism
- True SMT Capability
- RoHS Compliant/Lead Free

OUTLINE DRAWINGS



DIMENSIONS - MILLIMETERS (INCHES)

Case Size KEMET	Case Size EIA	L	W	H	K ±0.20	F ±0.1	S ±0.3	X(Ref)	T(Ref)	A(Min)	G(ref)	E(ref)
D	7343-31	7.3 ± 0.3	4.3 ± 0.3	2.8 ± 0.3	1.5	2.4	1.3	0.10 ± 0.10	0.13	3.8	3.5	3.5
Y	7343-40	7.3 ± 0.3	4.3 ± 0.3	4.0 max	1.9	2.4	1.3	0.10 ± 0.10	0.13	3.8	3.5	3.5
X	7343-43	7.3 ± 0.3	4.3 ± 0.3	4.0 ± 0.3	2.3	2.4	1.3	0.10 ± 0.10	0.13	3.8	3.5	3.5

T530 RATINGS & PART NUMBER REFERENCE

Capacitance µF	Case Size	KEMET Part Number	DCL V_R	DF % 120Hz	ESR mΩ @100 kHz 25°C Max	Ripple Current (Arms) @ 100 kHz w/ΔT= 20°C @ -55°C to 105°C	Ripple Current (Arms) @ 100 kHz w/ΔT= 2°C @ 125°C
2.5 Volt Rating at 105°C (1.7 Volt Rating at 125°C)							
470.0	D	T530D477M2R5A(1)E005	118µA	8.0	5.0	7.1	2.3
470.0	D	T530D477M2R5A(1)E006	118µA	8.0	6.0	6.5	2.1
470.0	D	T530D477M2R5A(1)E010	118µA	10.0	10.0	5.0	1.6
560.0	D	T530D567M2R5A(1)E005	140µA	8.0	5.0	7.1	2.3
680.0	Y	T530Y687M2R5A(1)E005	170µA	8.0	5.0	7.2	2.3
680.0	Y	T530Y687M2R5A(1)E006	170µA	8.0	6.0	6.6	2.1
680.0	D	T530D687M2R5A(1)E006	170µA	8.0	6.0	6.5	2.1
680.0	D	T530D687M2R5A(1)E010	170µA	8.0	10.0	5.0	1.6
1000.0	Y	T530Y108M2R5A(1)E005	250µA	8.0	5.0	7.2	2.3
1000.0	Y	T530Y108M2R5A(1)E006	250µA	8.0	6.0	6.6	2.1
1000.0	X	T530X108M2R5A(1)E004	250µA	8.0	4.0	8.2	2.6
1000.0	X	T530X108M2R5A(1)E005	250µA	8.0	5.0	7.3	2.3
1000.0	X	T530X108M2R5A(1)E006	250µA	8.0	6.0	6.7	2.1
1500.0	X	T530X158M2R5A(1)E005	375µA	8.0	5.0	7.3	2.3
3 Volt Rating at 105°C (2 Volt Rating at 125°C)							
470.0	D	T530D477M003A(1)E010	141µA	8.0	10.0	5.0	1.6
680.0	D	T530D687M003A(1)E010	204µA	8.0	10.0	5.0	1.6
1000.0	X	T530X108M003A(1)E010	300µA	8.0	10.0	5.2	1.6
1500.0	X	T530X158M003A(1)E008	450µA	8.0	8.0	5.8	1.8
4 Volt Rating at 105°C (2.7 Volt Rating at 125°C)							
330.0	D	T530D337M004A(1)E005	132µA	8.0	5.0	7.1	2.3
330.0	D	T530D337M004A(1)E006	132µA	8.0	6.0	6.5	2.1
470.0	D	T530D477M004A(1)E010	188µA	8.0	10.0	5.0	1.6
470.0	Y	T530Y477M004A(1)E005	188µA	8.0	5.0	7.2	2.3
470.0	Y	T530Y477M004A(1)E006	188µA	8.0	6.0	6.6	2.1
680.0	Y	T530Y687M004A(1)E005	272µA	8.0	5.0	7.2	2.3
680.0	X	T530X687M004A(1)E004	272µA	8.0	4.0	8.2	2.6
680.0	X	T530X687M004A(1)E005	272µA	8.0	5.0	7.3	2.3
680.0	X	T530X687M004A(1)E006	272µA	8.0	6.0	6.7	2.1
680.0	X	T530X687M004A(1)E010	272µA	8.0	10.0	5.2	1.6
1000.0	X	T530X108M004A(1)E006	400µA	8.0	6.0	6.7	2.1

Capacitance µF	Case Size	KEMET Part Number	DCL V_R	DF % 120Hz	ESR mΩ @100 kHz 25°C Max	Ripple Current (Arms) @ 100 kHz w/ΔT= 20°C @ -55°C to 105°C	Ripple Current (Arms) @ 100 kHz w/ΔT= 2°C @ 125°C
6.3 Volt Rating at 105°C (4.2 Volt Rating at 125°C)							
220.0	D	T530D227M006A(1)E005	139µA	8.0	5.0	7.1	2.3
220.0	D	T530D227M006A(1)E006	139µA	8.0	6.0	6.5	2.1
330.0	D	T530D337M006A(1)E006	208µA	8.0	6.0	6.5	2.1
330.0	D	T530D337M006A(1)E010	208µA	8.0	10.0	5.0	1.6
330.0	Y	T530Y337M006A(1)E005	208µA	8.0	5.0	7.2	2.3
330.0	Y	T530Y337M006A(1)E006	208µA	8.0	6.0	6.6	2.1
330.0	Y	T530Y337M006A(1)E010	208µA	8.0	10.0	5.1	1.6
470.0	Y	T530Y477M006A(1)E005	296µA	8.0	5.0	7.2	2.3
470.0	X	T530X477M006A(1)E004	296µA	8.0	4.0	8.2	2.6
470.0	X	T530X477M006A(1)E005	296µA	8.0	5.0	7.3	2.3
470.0	X	T530X477M006A(1)E006	296µA	8.0	6.0	6.7	2.1
470.0	X	T530X477M006A(1)E010	296µA	8.0	10.0	5.2	1.6
10 Volt Rating at 105°C (6.6 Volt Rating at 125°C)							
150.0	D	T530D157M010A(1)E005	150µA	8.0	5.0	7.1	2.3
150.0	D	T530D157M010A(1)E006	150µA	8.0	6.0	6.5	2.1
150.0	D	T530D157M010A(1)E010	150µA	8.0	10.0	5.0	1.6
220.0	D	T530D227M010A(1)E006	220µA	8.0	6.0	6.5	2.1
220.0	D	T530D227M010A(1)E010	220µA	8.0	10.0	5.0	1.6
220.0	Y	T530Y227M010A(1)E006	220µA	8.0	6.0	6.6	2.1
330.0	X	T530X337M010A(1)E004	330µA	8.0	4.0	8.2	2.6
330.0	X	T530X337M010A(1)E005	330µA	8.0	5.0	7.3	2.3
330.0	X	T530X337M010A(1)E006	330µA	8.0	6.0	6.7	2.1
330.0	X	T530X337M010A(1)E010	330µA	8.0	10.0	5.2	1.6
16 Volt Rating at 105°C (10.6 Volt Rating at 125°C)							
150.0	X	T530X157M016A(1)E015	240µA	8.0	15.0	4.2	1.3
150.0	X	T530X157M016A(1)E025	240µA	8.0	25.0	3.3	1.0
150.0	X	T530X157M016A(1)E040	240µA	8.0	40.0	2.6	0.8

(1) To complete KEMET Part Number, insert lead material designation from ordering information on page 58. Higher voltage ratings and tighter tolerance product may be substituted within the same size at KEMET's option. Voltage substitutions willl be marked with the higher voltage rating.

T530 ORDERING INFORMATION

T 530 X 158 M 003 A S E008

Tantalum — T

Series — 530
T530 - Multiple Anode Polymer

Case Size — X
D, X, Y

Capacitance Picofarad Code — 158

Capacitance Tolerance — M
M - ± 20%

Voltage — 003
Note: 006 = 6.3

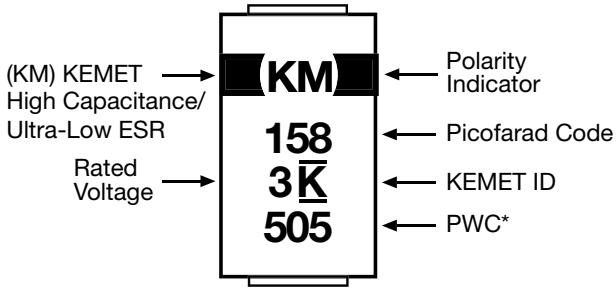
Failure Rate — A
A - Not Applicable

Lead Material — S
T - 100% Tin
H - Tin/Lead (SnPb 5% Pb minimum)
* S - Not recommended for new design

ESR — E008
Expressed in Milliohms

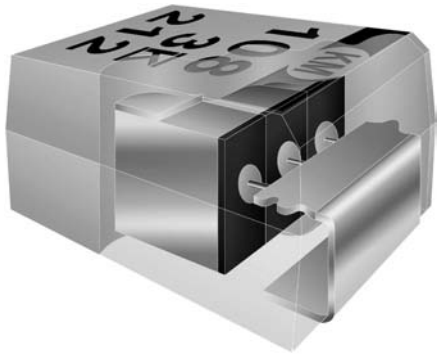
***Refer to www.kemet.com for Pb Free transition information**

COMPONENT MARKING

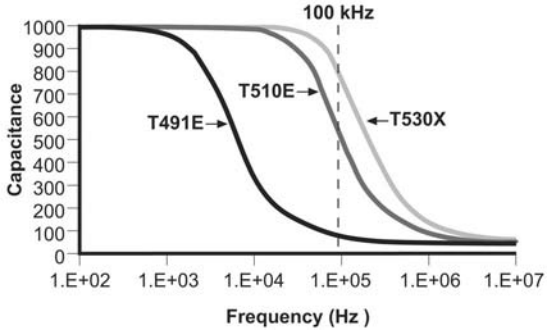


"505" = The 5th week of 2005.

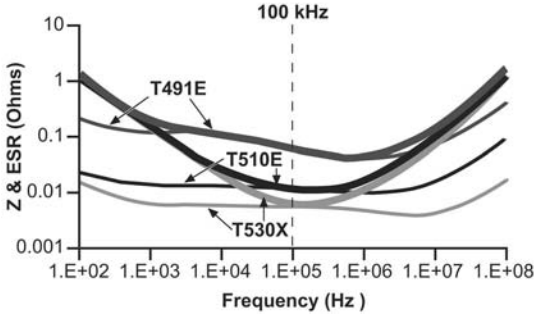
T530 SERIES CONSTRUCTION



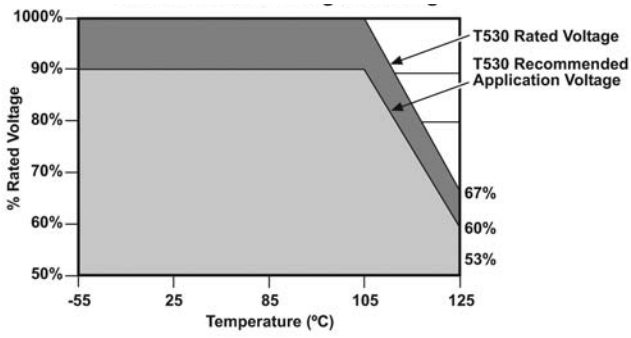
T530X/T510E/T491E 1,000µF Capacitance vs. Frequency



T530X/T510E/T491E 1,000µF Impedance & ESR vs. Frequency



RECOMMENDED TEMPERATURE/VOLTAGE DERATING



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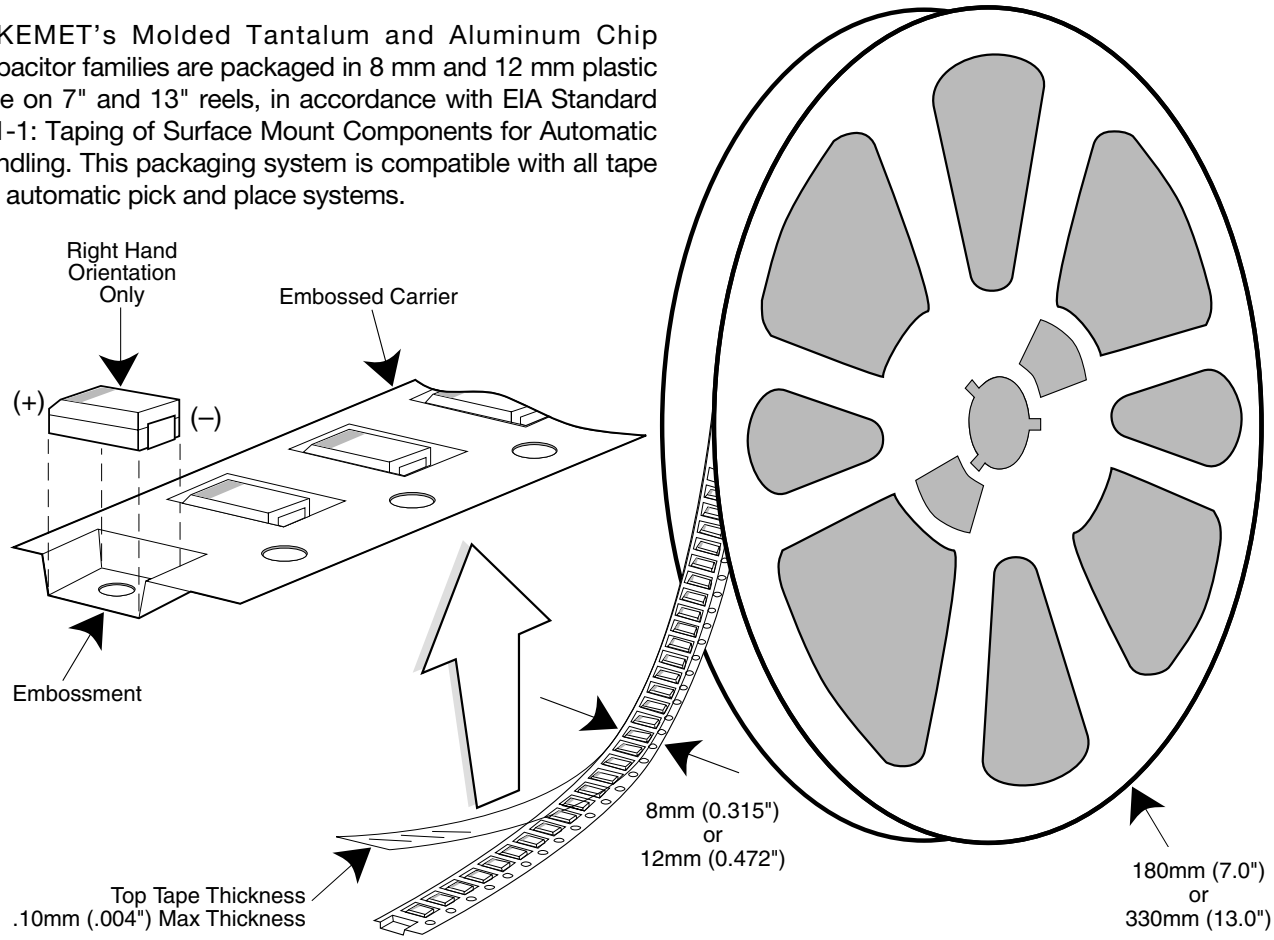
Tape & Reel Packaging

KEMET's Molded Tantalum and Aluminum Chip Capacitor families are packaged in 8 mm and 12 mm plastic tape on 7" and 13" reels, in accordance with EIA Standard 481-1: Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape fed automatic pick and place systems.



Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. Refer to EIA-556.

QUANTITIES PACKAGED PER REEL

Case Code		Tape Width-mm	7" Reel*	13" Reel*
KEMET	EIA			
R	2012-12	8	2,500	10,000
S	3216-12	8	2,500	10,000
T	3528-12	8	2,500	10,000
U	6032-15	12	1,000	5,000
W	7343-15	12	1,000	3,000
V	7343-20	12	1,000	3,000
A	3216-18	8	2,000	9,000
B	3528-21	8	2,000	8,000
C	6032-28	12	500	3,000
D	7343-31	12	500	2,500
Y	7343-40	12	500	2,000
X	7343-43	12	500	2,000
E	7260-38	12	500	2,000

* No c-spec required for 7" reel packaging. C-7280 required for 13" reel packaging.

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Performance Notes

1. **Cover Tape Break Force:** 1.0 Kg Minimum.
2. **Cover Tape Peel Strength:** The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 Newton to 1.0 Newton (10g to 100g)
12 mm	0.1 Newton to 1.3 Newton (10g to 130g)

   The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.
3. **Reel Sizes:** Molded tantalum capacitors are available on either 180 mm (7") reels (standard) or 330 mm (13") reels (with C-7280). Note that 13" reels are preferred.
4. **Labeling:** Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. Refer to EIA-556.

Embossed Carrier Tape Configuration: Figure 1

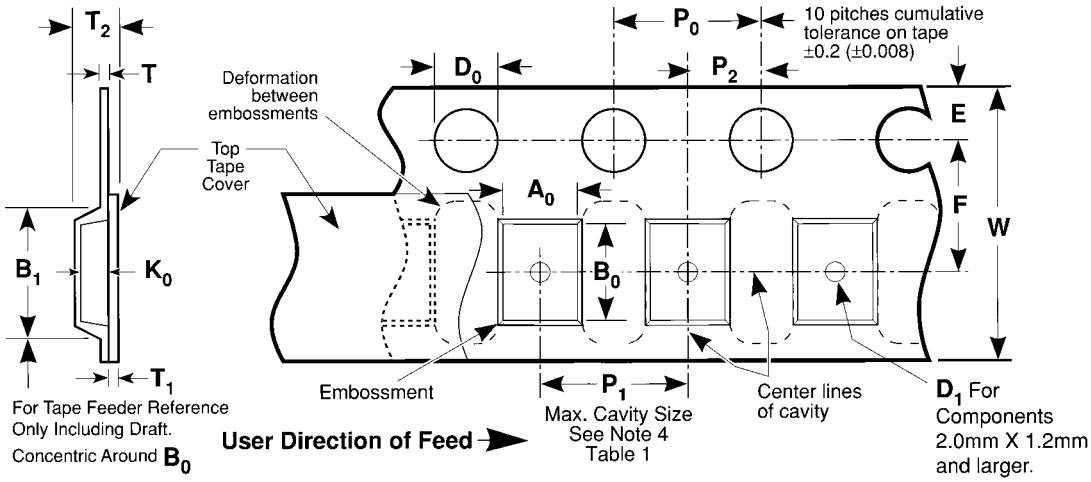


Table 1 — EMBOSSED TAPE DIMENSIONS (Metric will govern)

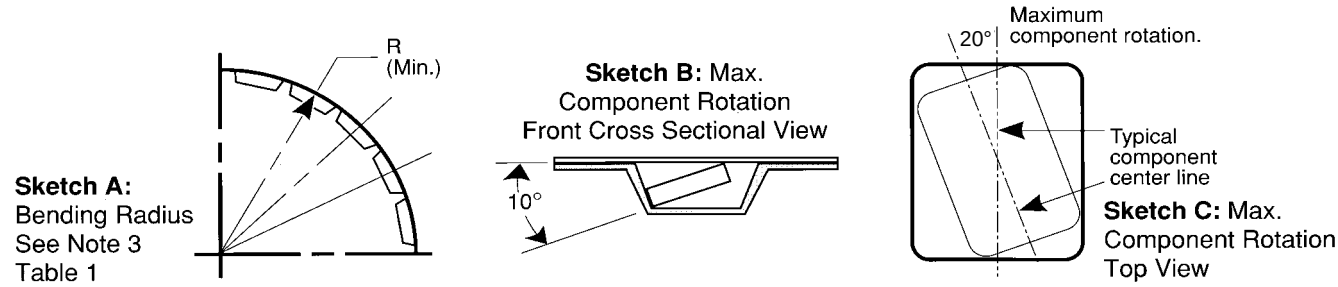
Constant Dimensions — Millimeters (Inches)							
Tape Size	**D_0**	**E**	**P_0**	**P_2**	**T Max**	**T_1 Max**	
8 mm and 12 mm	1.5 +0.10 -0.0 (0.059 +0.004, -0.0)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	0.600 (0.024)	0.100 (0.004)	

Variable Dimensions — Millimeters (Inches)									
Tape Size	**Pitch**	**B_1 Max. Note 1**	**D_1 Min. Note 2**	**F**	**P_1**	**R Min. Note 3**	**T_2 Max**	**W**	**$A_0B_0K_0$ Note 4**
8 mm	Single (4 mm)	4.4 (0.173)	1.0 (0.039)	3.5 ±0.05 (0.138 ±0.002)	4.0 ±0.10 (0.157 ±0.004)	25.0 (0.984)	2.5 (0.098)	8.0 ±0.30 (.315 ±0.012)	
12 mm	Double (8 mm)	8.2 (0.323)	1.5 (0.059)	5.5 ±0.05 (0.217 ±0.002)	8.0 ±0.10 (0.315 ±0.004)	30.0 (1.181)	4.6 (0.181)	12.0 ±0.30 (0.472 ±0.012)	

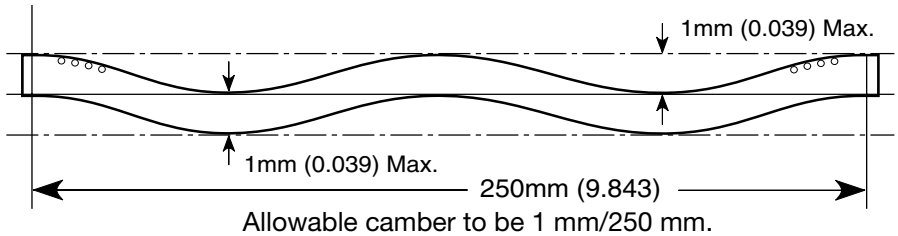
NOTES

1. B1 dimension is a reference dimension for tape feeder clearance only.
2. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.
3. Tape with components shall pass around radius "R" without damage (see sketch A). The minimum trailer length (Fig. 2) may require additional length to provide R min. for 12 mm embossed tape for reels with hub diameters approaching N min. (Table 2)
4. The cavity defined by A_0, B_0, and K_0 shall be configured to surround the part with sufficient clearance such that the chip does not protrude beyond the sealing plane of the cover tape, the chip can be removed from the cavity in a vertical direction without mechanical restriction, rotation of the chip is limited to 20 degrees maximum in all 3 planes, and lateral movement of the chip is restricted to 0.5 mm maximum in the pocket (not applicable to vertical clearance.)

Embossed Carrier Tape Configuration (cont.)



Sketch D: Tape Camber (Top View)



Allowable camber to be 1 mm/250 mm.

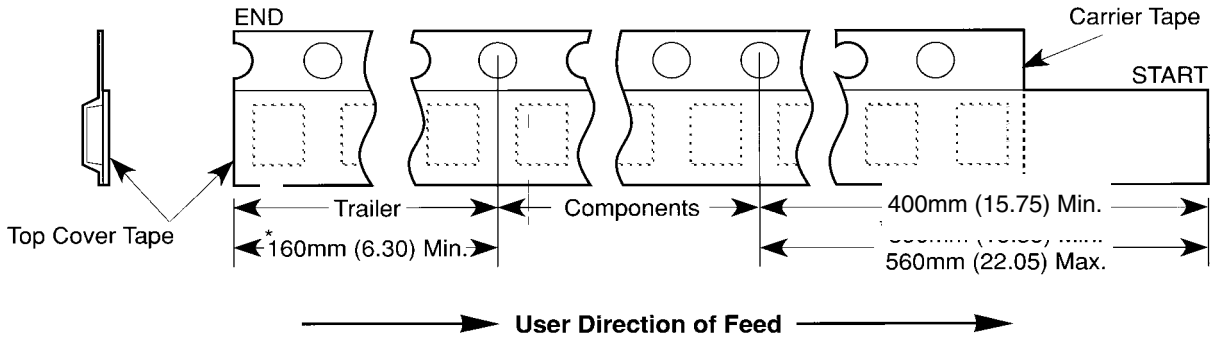


Figure 2: Tape Leader & Trailer Dimensions (Metric Dimensions Will Govern)

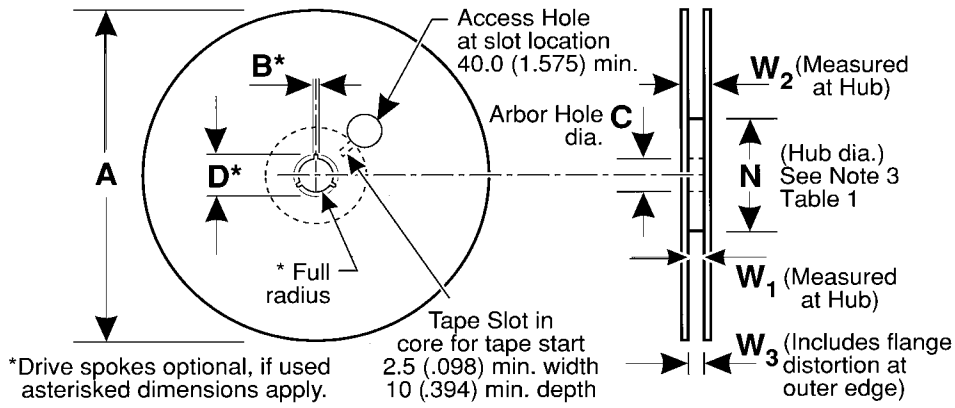


Figure 3: Reel Dimensions (Metric Dimensions will govern)

Table 2 – REEL DIMENSIONS (Metric will govern)

Tape Size	A Max	B* Min	C	D* Min	N Min	W_1	W_2 Max	W_3
8 mm	330.0 (12.992)	1.5 (0.059)	13.0 ± 0.20 (0.512 ± 0.008)	20.2 (0.795)	50.0 (1.969) See Note 3 Table 1	8.4 +1.5, -0.0 (0.331 +0.059, -0.0)	14.4 (0.567)	7.9 Min (0.311) 10.9 Max (0.429)
12 mm	330.0 (12.992)	1.5 (0.059)	13.0 ± 0.20 (0.512 ± 0.008)	20.2 (0.795)		12.4 +2.0, -0.0 (0.488 +0.078, -0.0)	18.4 (0.724)	11.9 Min (0.469) 15.4 Max (0.606)

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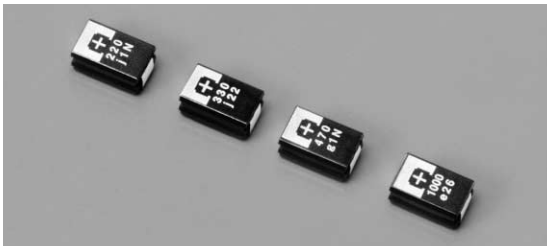
TPD Series

Low ESR High Capacitance Products

TPD series has low ESR and high capacitance.
It is the most suitable for the high frequency and high current switching power supply applications.

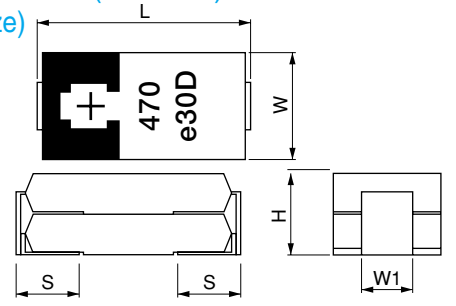


Specifications

Items	Condition	Characteristics		
Operating Temperature range	–	−55 to +105 (℃)		
Rated capacitance range	120Hz/20℃	150 to 1000 (μF)		
Capacitance tolerance	120Hz/20℃	M:±20%		
Rated voltage	–	2.5 to 10 (V.DC)		
Dissipation Factor (D.F.)	120Hz/20℃	≦10.0 (%)		
Leakage current	Rated voltage applied, after 5 minutes	≦ 0.1CV (μA)		
Equivalent series resistance ESR (mΩmax.)	100kHz/20℃	Please see the attached characteristics list		
Temperature characteristics of Impedance ratio	100kHz/+20℃	−55℃	Z/Z20℃	1.0 to 2.0
		+105℃	Z/Z20℃	0.6 to 1.0
Endurance	105℃,2000h, rated voltage applied	△C/C		Within±20% of the initial value
		D.F.		≦1.5 times the initial limit
		L.C.		≦The initial limit
Damp heat (Steady state)	60℃,90 to 95%RH,500h, No voltage applied	△C/C		Within+40%, −20% of the initial value
		D.F.		≦1.5 times the initial limit
		L.C.		≦3 times the initial limit
Surge	105℃,1000 cycles, 1kΩdischarge resistance, surge voltage applied	△C/C		Within±5% of the initial value
		D.F.		≦The initial limit
		L.C.		≦3 times the initial limit

Dimensions (unit: mm)

(D4D size)



Size code	L (±0.3)	W (±0.2)	H (±0.2)	S (±0.2)	W1 (±0.1)
D4D	7.3	4.3	3.6	1.3	2.4

Size List

μF \ RV (SV)	2.5 (3.2)	4.0 (5.0)	6.3 (8.0)	10.0 (13.0)
150				D4D
220			D4D	
330		D4D	D4D	
470	D4D	D4D	D4D	
680	D4D	D4D		
1000	D4D			

Characteristics List

Size code	SANYO Part number	Rated Voltage (V)	Rated Capacitance (μF)	D.F. (%max.)	L.C. (μA) max./5min.	E.S.R. (mΩmax) 100kHz/20℃	Maximum allowable ripple current (mArms) 100kHz※1	MSL Reflow Temp. ≦260℃	MSL Reflow Temp. ≦250℃
D4D	10TPD150M	10.0	150	10.0	150.0	15	3600	3	2a
	6TPD220M	6.3	220	10.0	138.6	12	4000		
	6TPD330M	6.3	330	10.0	207.9	10	4400		
	6TPD470M	6.3	470	10.0	296.1	10	4400		
	4TPD330M	4.0	330	10.0	132.0	12	4000		
	4TPD470M	4.0	470	10.0	188.0	10	4400		
	4TPD680M	4.0	680	10.0	272.0	10	4400		
	2R5TPD470M	2.5	470	10.0	117.5	10	4400		
	2R5TPD470M8					8	4900		
	2R5TPD470M6					6	5600		
	2R5TPD470M5					5	6100		
	2R5TPD680M	2.5	680	10.0	170.0	10	4400		
	2R5TPD680M8					8	4900		
	2R5TPD680M6					6	5600		
	2R5TPD680M5					5	6100		
	2R5TPD1000M	2.5	1000	10.0	250.0	10	4400		
	2R5TPD1000M8					8	4900		
	2R5TPD1000M6					6	5600		
	2R5TPD1000M5					5	6100		

※1:100k to 500kHz, 45℃

TPF Series Low ESR · High Capacitance Products

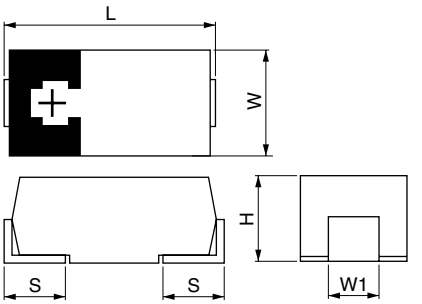
Feature

TPF series has low ESR and high capacitance at standard form.

Specifications

Items	Condition	Characteristics		
Operating Temperature range	—	–55 to +105 (°C)		
Rated capacitance range	120Hz/20°C	150 to 680 (μF)		
Capacitance tolerance	120Hz/20°C	M:±20%		
Rated voltage	—	2.0 to 10.0 (V.DC)		
Dissipation Factor (D.F.)	120Hz/20°C	10.0 (%)		
Leakage current	Rated voltage applied, after 5 minutes	≤ 0.1CV (μA)		
Equivalent series resistance (E.S.R. mΩmax.)	100kHz/20°C	Please see the attached characteristics list		
Temperature characteristics of Impedance ratio	100kHz/+20°C	–55°C	$Z/Z_{20°C}$	1.0 to 2.0
		+105°C	$Z/Z_{20°C}$	0.6 to 1.0
Endurance	105°C,2000h, rated voltage applied	ΔC/C		Within±20% of the initial value
		D.F.		≤ 1.5 times the initial limit
		L.C.		≤ The initial limit
Damp heat (Steady state)	60°C,90 to 95%RH,500h, No voltage applied	ΔC/C		Within+40%, –20% of the initial value
		D.F.		≤ 1.5 times the initial limit
		L.C.		≤ 3 times the initial limit
Surge	105°C,1000 cycles, 1kΩdischarge resistance, surge voltage applied	ΔC/C		Within±5% of the initial value
		D.F.		≤ The initial limit
		L.C.		≤ 3 times the initial limit

Dimensions



(unit: mm)

Size code	L (±0.3)	W (±0.1)	H*1 (±0.1)	S (±0.1)	W1 (±0.1)
D3L	7.3	4.3	2.8	1.3	2.4
D2E	7.3	4.3	1.8	1.3	2.4

*1 ±0.1:D2E

Size List

μF \ RV (SV)	2.0 (2.6)	2.5 (3.2)	4.0 (5.0)	6.3 (8.0)	10.0 (13.0)
150					D3L
220	D2E			D3L	
330	D2E	D3L	D3L	D3L	
470	D2E	D3L	D3L		
680		D3L			

Characteristics List

Size code	SANYO Part number	Rated Voltage (V)	Rated Temperature (°C)	Rated Capacitance (μF)	D.F. (%max.)	L.C. (μA) max./5min.	E.S.R. (mΩmax.) 100kHz/20°C	Maximum allowable ripple current (mArms) 100kHz*1	MSL Reflow Temp. ≤ 260°C	MSL Reflow Temp. ≤ 250°C
D3L	10TPF150ML※2	10.0	105	150	10.0	150.0	15	3600	3	2a
	6TPF330M9L	6.3	105	330	10.0	207.9	9	3900		
	6TPF220ML	6.3	105	220	10.0	138.6	12	4000		
	4TPF470ML	4.0	105	470	10.0	188.0	10	4400		
	4TPF330ML	4.0	105	330	10.0	132.0	12	4000		
	2R5TPF680ML	2.5	105	680	10.0	170.0	10	4400		
	2R5TPF680M7L	2.5	105	680	10.0	170.0	7	4400		
	2R5TPF470ML	2.5	105	470	10.0	117.5	10	4400		
	2R5TPF470M7L	2.5	105	470	10.0	117.5	7	4400		
	2R5TPF330M7L	2.5	105	330	10.0	82.5	7	4400		
D2E	2TPF470M7※2	2.0	105	470	10.0	94.0	7	4400		
	2TPF330M7	2.0	105	330	10.0	66.0	7	4400		
	2TPF220M7	2.0	105	220	10.0	44.0	7	4400		

*1 100k to 500kHz,45°C *2 Under development

Explanation of Part Numbers

Use the following example to define POSCAP part numbers.

2R5	TPB	330	M	L
Rated voltage 1 to 3 figures	Series name 3 figures	Rated capacitance 2 to 4 figures	Capacitance tolerance 1 figure	Special code 0 to 3 figures

Rated voltage	Code
2.5	2R5
4.0	4
6.3	6
8.0	8
10	10
12.5	12
16	16
20	20
25	25

Series	Code
APC series	APC
APD series	APD
TPB series	TPB
TPC series	TPC
TPD series	TPD
TPE series	TPE
TQC series	TQC
THB series	THB
THC series	THC
THD series	THD
THE series	THE
TPU series	TPU
TPL series	TPL
TPF series	TPF
TAB series	TAB
TAC series	TAC
TAD series	TAD
TAE series	TAE

Rated capacitance	Code
5.6	5R6
8.2	8R2
10	10
15	15
22	22
33	33
47	47
56	56
68	68
82	82
100	100
150	150
220	220
330	330
470	470
680	680
1000	1000

Capacitance tolerance	Code
±20%	M

Tantalum Chip Capacitors

TCR series

Low ESR & High Ripple Current

Low ESR & High Ripple Current. High Resistance against Rush current.
Lower failure even at low impedance Circuits. Failure Rate: 0.5% or less/1000 hrs.
Capacitance up to 1000µF in E case.

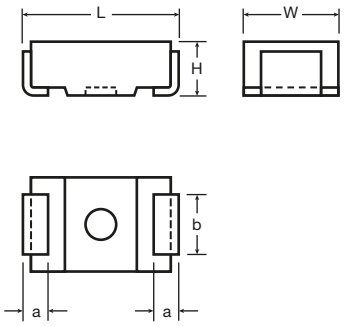
Specifications

Operating Temperature Range	-55°~+125°C
Maximum Operating Temperature at Rated Voltage	+85°C
Capacitance Tolerance	±20% (M), ±10% (K) at 120Hz
Dissipation Factor (Tan)	As per the following table
ESR & Maximum Ripple Current	As per the following table
DC Leakage Current	As per the following table
Resistance to Rush Current	Rated Voltage applied, 5A/ON • OFF 10,000 cycle
Solderability	260°C 10 Sec. (Dip or Reflow) Within 5% of recorded value before test.
Humidity Test	60°C, 90 – 95%RH 5000 hrs.
High Temp Load Test	85°C, Rated Voltage Applied for 2,000 hrs. or 125°C, Derated Voltage Applied for 2,000 hrs.
Failure Rate	0.5% or less/1,000 hrs after solder (60% CL)
Conformity	JIS-C-5143 Performance HB, EIA-535BAAC etc.

Standard Ratings and Case Codes

W.V. / Cap. (µF)	4	6.3	10	16	20	25	35
	0G	0J	1A	1C	1D	1E	1V
0.68							A
1.0						A	A
1.5					A	A	B
2.2				A	A	A	B
3.3			A	A	A	B	C
4.7		A	A	A	B	B	C
6.8	A	A	A	B	B	C	C
10	A	A	A,B	B	C	C	D
15	A	B	B	B	C	D	D
22	B	B	B	C	C	D	E
33	B	B	C	C	D	E	
47	B	B,C	B,C,D	C,D	E		
68	C	C	C,D	D	E		
100	C	C,D	D	D			
150	C	D	D	E			
220	D	D	E				
330	D	E	E				
470	E	E					
680	E						
1000	E						

Dimensions



Unit: mm (inch)

Case Code	L	W	H	a	b
A	3.2 ± 0.2 (0.126 ± 0.008)	1.6 ± 0.2 (0.063 ± 0.008)	1.6 ± 0.2 (0.063 ± 0.008)	0.8 ± 0.2 (0.031 ± 0.008)	1.2 ± 0.2 (0.047 ± 0.008)
B	3.5 ± 0.2 (0.138 ± 0.008)	2.8 ± 0.2 (0.110 ± 0.008)	1.9 ± 0.2 (0.075 ± 0.008)	0.8 ± 0.3 (0.031 ± 0.012)	2.2 ± 0.2 (0.087 ± 0.008)
C	6.0 ± 0.2 (0.236 ± 0.008)	3.2 ± 0.2 (0.126 ± 0.008)	2.5 ± 0.2 (0.098 ± 0.008)	1.3 ± 0.3 (0.051 ± 0.012)	2.2 ± 0.2 (0.087 ± 0.008)
D	7.3 ± 0.2 (0.287 ± 0.008)	4.3 ± 0.2 (0.169 ± 0.008)	2.8 ± 0.2 (0.110 ± 0.008)	1.3 ± 0.3 (0.051 ± 0.012)	2.4 ± 0.2 (0.094 ± 0.008)
E	7.3 ± 0.2 (0.287 ± 0.008)	4.3 ± 0.2 (0.169 ± 0.008)	4.1 ± 0.2 (0.162 ± 0.008)	1.3 ± 0.3 (0.051 ± 0.012)	2.4 ± 0.2 (0.094 ± 0.008)

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Tantalum Chip Capacitors

TCR SERIES DATA TABLE (Low ESR)
Standard Part Numbers & Data

Cap. µF	Case Code	Catalogue P/N					Max. DCL @ +25°C (µA)	Max. DF @ +25°C 120 Hz (%)	Max. ESR 100 kHz (Ω)	Max. Ripple Current (mA@25°C)
4.0V DC										
6.8	A	TA 4R0	TCR 685	M	A	R	0.5	8	2.50	220
10	A	TA 4R0	TCR 106	M	A	R	0.5	8	2.50	220
15	A	TA 4R0	TCR 156	M	A	R	0.6	8	2.50	220
22	B	TA 4R0	TCR 226	M	B	R	0.88	8	0.80	410
33	B	TA 4R0	TCR 336	M	B	R	1.32	8	0.80	410
47	B	TA 4R0	TCR 476	M	B	R	1.88	8	0.80	410
68	C	TA 4R0	TCR 686	M	C	R	2.72	8	0.30	660
100	C	TA 4R0	TCR 107	M	C	R	4	8	0.27	690
150	C	TA 4R0	TCR 157	M	C	R	6	8	0.24	740
220	D	TA 4R0	TCR 227	M	D	R	8.8	8	0.22	830
330	D	TA 4R0	TCR 337	M	D	R	13.2	8	0.17	940
470	E	TA 4R0	TCR 477	M	E	R	18.8	8	0.15	1060
680	E	TA 4R0	TCR 687	M	E	R	27.4	15	0.10	1285
1000	E	TA 4R0	TCR 108	M	E	R	40.0	15	0.10	1410
6.3V DC										
4.7	A	TA 6R3	TCR 475	M	A	R	0.5	8	2.50	220
6.8	A	TA 6R3	TCR 685	M	A	R	0.5	8	2.50	220
10	A	TA 6R3	TCR 106	M	A	R	0.63	8	2.50	220
15	B	TA 6R3	TCR 156	M	B	R	0.95	8	0.80	410
22	B	TA 6R3	TCR 226	M	B	R	1.39	8	0.80	410
33	B	TA 6R3	TCR 336	M	B	R	2.08	8	0.80	410
47	B	TA 6R3	TCR 476	M	B	R	3.0	8	0.40	410
47	C	TA 6R3	TCR 476	M	C	R	2.96	8	0.30	660
68	C	TA 6R3	TCR 686	M	C	R	4.28	8	0.27	690
100	C	TA 6R3	TCR 107	M	C	R	6.3	8	0.24	740
100	D	TA 6R3	TCR 107	M	D	R	6.3	8	0.20	870
150	D	TA 6R3	TCR 157	M	D	R	9.45	8	0.20	870
220	D	TA 6R3	TCR 227	M	D	R	13.86	8	0.16	970
330	E	TA 6R3	TCR 337	M	E	R	20.79	8	0.15	1060
470	E	TA 6R3	TCR 477	M	E	R	28.2	8	0.10	1280

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TCR SERIES DATA TABLE (Low ESR)
Standard Part Numbers & Data

Cap. µF	Case Code	Catalogue P/N					Max. DCL @ +25°C (µA)	Max. DF @ +25°C 120 Hz (%)	Max. ESR 100 kHz (Ω)	Max. Ripple Current (mA@25°C)
10V DC										
3.3	A	TA 010	TCR 335	M	A	R	0.5	8	2.50	220
4.7	A	TA 010	TCR 475	M	A	R	0.47	8	2.50	220
6.8	A	TA 010	TCR 685	M	A	R	0.68	8	2.50	220
10	A	TA 010	TCR 106	M	A	R	1.0	8	2.00	220
10	B	TA 010	TCR 106	M	B	R	1.0	8	1.00	320
15	B	TA 010	TCR 156	M	B	R	1.5	8	0.80	410
22	B	TA 010	TCR 226	M	B	R	2.2	8	0.80	410
33	C	TA 010	TCR 336	M	C	R	3.3	8	0.30	660
47	B	TA 010	TCR 476	M	B	R	4.7	8	0.50	450
47	C	TA 010	TCR 476	M	C	R	4.7	8	0.25	720
47	D	TA 010	TCR 476	M	D	R	4.7	8	0.25	720
68	C	TA 010	TCR 686	M	C	R	6.8	8	0.25	720
68	D	TA 010	TCR 686	M	D	R	6.8	8	0.22	780
100	D	TA 010	TCR 107	M	D	R	10	8	0.10	870
150	D	TA 010	TCR 157	M	D	R	15	8	0.10	970
220	E	TA 010	TCR 227	M	E	R	22	8	0.10	1060
330	E	TA 010	TCR 337	M	E	R	33	8	0.10	1280
16V DC										
2.2	A	TA 016	TCR 225	M	A	R	0.5	8	2.50	220
3.3	A	TA 016	TCR 335	M	A	R	0.53	8	2.50	220
4.7	A	TA 016	TCR 475	M	A	R	0.75	8	2.50	220
6.8	B	TA 016	TCR 685	M	B	R	1.09	8	0.80	410
10	B	TA 016	TCR 106	M	B	R	1.6	8	0.80	410
15	B	TA 016	TCR 156	M	B	R	2.4	8	0.80	410
22	C	TA 016	TCR 226	M	C	R	3.52	8	0.30	660
33	C	TA 016	TCR 336	M	C	R	5.28	8	0.25	720
47	C	TA 016	TCR 476	M	C	R	7.52	8	0.25	720
47	D	TA 016	TCR 476	M	D	R	7.85	8	0.22	780
68	D	TA 016	TCR 686	M	D	R	10.88	8	0.20	870
100	D	TA 016	TCR 107	M	D	R	16	8	0.16	970
150	E	TA 016	TCR 157	M	E	R	24	8	0.15	1060

Tantalum Chip Capacitors

TCR SERIES DATA TABLE (Low ESR)
Standard Part Numbers & Data

Cap. µF	Case Code	Catalogue P/N					Max. DCL @ +25°C (µA)	Max. DF @ +25°C 120 Hz (%)	Max. ESR 100 kHz (Ω)	Max. Ripple Current (mA@25°C)
20V DC										
1.5	A	TA 020	TCR 155	M	A	R	0.5	8	3.30	160
2.2	A	TA 020	TCR 225	M	A	R	0.5	8	3.30	160
3.3	A	TA 020	TCR 335	M	A	R	0.66	8	3.30	160
4.7	B	TA 020	TCR 475	M	B	R	0.94	8	1.60	250
6.8	B	TA 020	TCR 685	M	B	R	1.36	8	1.60	250
10	C	TA 020	TCR 106	M	C	R	2	8	0.50	510
15	C	TA 020	TCR 156	M	C	R	3	8	0.50	510
22	C	TA 020	TCR 226	M	C	R	4.4	8	0.50	510
33	D	TA 020	TCR 336	M	D	R	6.6	8	0.30	710
47	E	TA 020	TCR 476	M	E	R	9.4	8	0.30	750
68	E	TA 020	TCR 686	M	E	R	13.6	8	0.25	820
25V DC										
1.0	A	TA 025	TCR 105	M	A	R	0.5	8	3.30	160
1.5	A	TA 025	TCR 155	M	A	R	0.5	8	3.30	160
2.2	A	TA 025	TCR 225	M	A	R	0.63	8	3.30	160
3.3	B	TA 025	TCR 335	M	B	R	0.95	8	1.60	250
4.7	B	TA 025	TCR 475	M	B	R	1.39	8	1.60	250
6.8	C	TA 025	TCR 685	M	C	R	2.08	8	0.50	510
10	C	TA 025	TCR 106	M	C	R	2.96	8	0.50	510
15	D	TA 025	TCR 156	M	D	R	4.28	8	0.30	710
22	D	TA 025	TCR 226	M	D	R	6.3	8	0.30	710
33	E	TA 025	TCR 336	M	E	R	9.45	8	0.25	820
35V DC										
0.68	A	TA 035	TCR 684	M	A	R	0.5	8	4.00	160
1.0	A	TA 035	TCR 105	M	A	R	0.47	8	3.30	160
1.5	B	TA 035	TCR 155	M	B	R	0.68	8	1.60	250
2.2	B	TA 035	TCR 225	M	B	R	1	8	1.60	250
3.3	C	TA 035	TCR 335	M	C	R	1.5	8	0.70	430
4.7	C	TA 035	TCR 475	M	C	R	2.2	8	0.60	470
6.8	C	TA 035	TCR 685	M	C	R	3.3	8	0.60	470
10	D	TA 035	TCR 106	M	D	R	4.7	8	0.30	710
15	D	TA 035	TCR 156	M	D	R	6.8	8	0.30	710
22	E	TA 035	TCR 226	M	E	R	10	8	0.25	820

All components in this section are RoHS compliant per the EU directives and definitions.

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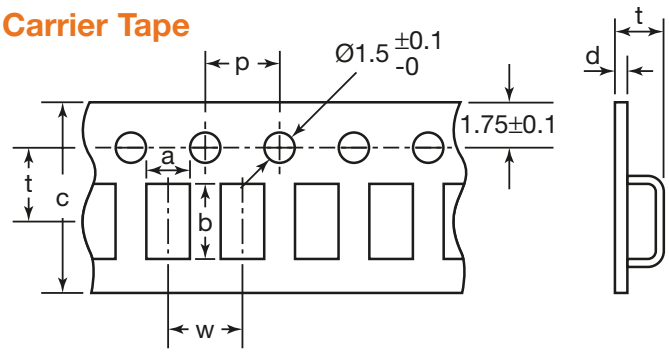
Taping Specifications

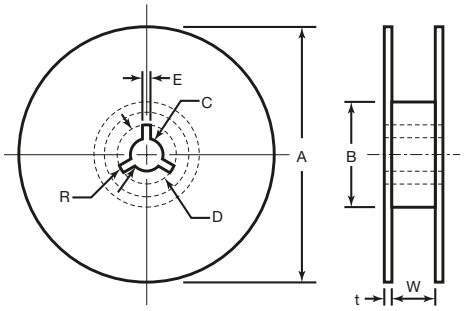
Carrier Tape



Quantity per reel

Case Size	Reel Size	
	7"	13"
A	2,000 pcs	10,000 pcs
B	2,000 pcs	7,500 pcs
C, D, E	500 pcs	2,500 pcs
E	400 pcs	2,000 pcs

Reel



Carrier Tape Dimensions

(Unit: mm)

CASE	a ± 0.1	b ± 0.1	c ± 0.2	t ± 0.1	p ± 0.1	w ± 0.1	d
A	1.9	3.9	8.0	2.0	4.0	4.0	0.2
B	3.1	3.9	8.0	2.3	4.0	4.0	0.2
C	3.9	6.3	12.0	2.7	4.0	8.0	0.3
D	4.6	7.7	12.0	3.3	4.0	8.0	0.3
E	4.6	7.7	12.0	4.2	4.0	8.0	0.3

Reel Dimensions

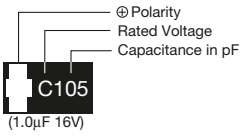
Case Size	A +0 -3.0	B -0	C ± 0.2	D ± 0.8	E ± 0.5	W ± 0.3	t ± 0.5	R
A, B,	180	60	13.0	21.0	2.0	9.0	2.0	1.0
C, D, E	330	60	13.0	21.0	2.0	13.0	2.0	1.0

How To Order

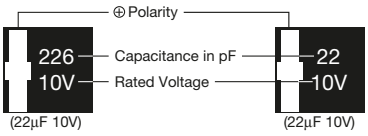
TA	035	TCM	105	M	B	R	-13
Tantalum	Rated Voltage 6.3V–006 (TCM series) 6.3V–6R3 (TCR series) 35V–035	Series TCM TCR	Capacitance in picofarads First two figures are significant. Third is the number of zeros to follow. 1.0 µF - 105 22 µF - 226 100 µF - 107	Capacitance Tolerance ±20%: M ±10%: K	Case Code A, B, C, D, E	Packaging Tape R: See below.	For 13 inch reels add -13, leave blank for standard 7 inch reels

Marking*

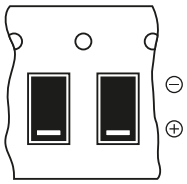
(1) A Case



(2) B, C, D, E Case



White bar indicates positive terminal.



"R"

CODE	G	J	A	C	D	E	V	T
Rated Voltage	4V	6.3V	10V	16V	20V	25V	35V	50V

Standard termination finish for this product is 100% matte Tin (Sn)

* Marking codes can be either way depending on customer needs and what is available in stock. All 6.3V rated Tantalums will typically be marked as 6 or 6V.

All components in this section are RoHS compliant per the EUdirectives and definitions.

Please Note: Venkel offers Engineering Kits for this product. See page 117 for details.

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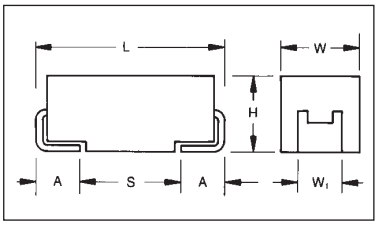
TPS Series

Low ESR

TPS surface mount products have inherently low ESR (equivalent series resistance) and are capable of higher ripple current handling, producing lower ripple voltages, less power and heat dissipation than standard product for the most efficient use of circuit power. TPS has been designed, manufactured, and preconditioned for optimum performance in typical power supply applications. By combining the latest improvements in tantalum powder technology, improved manufacturing processes, and application specific preconditioning tests, AVX is able to provide a technologically superior alternative to the standard range.



For part marking see page 163

CASE DIMENSIONS: millimeters (inches)

Code	EIA Code	Dimension Low Profile	L±0.20 (0.008)	W+0.20 (0.008) -0.10 (0.004)	H+0.20 (0.008) -0.10 (0.004)	W_1±0.20 (0.008)	A+0.30 (0.012) -0.20 (0.008)	S Min.
A	3216-18	–	3.20 (0.126)	1.60 (0.063)	1.60 (0.063)	1.20 (0.047)	0.80 (0.031)	1.80 (0.071)
B	3528-21	–	3.50 (0.138)	2.80 (0.110)	1.90 (0.075)	2.20 (0.087)	0.80 (0.031)	1.40 (0.055)
C	6032-28	–	6.00 (0.236)	3.20 (0.126)	2.6 (0.102)	2.20 (0.087)	1.30 (0.051)	2.90 (0.114)
D	7343-31	–	7.30 (0.287)	4.30 (0.169)	2.90 (0.114)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)
E	7343-43	–	7.30 (0.287)	4.30 (0.169)	4.10 (0.162)	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)
P*	2012-15	-	2.05 (0.081)	1.35 (0.053)	1.50 (0.059) max.	1.0 ±0.1 (0.039 ±0.004)	0.50 (0.020)	0.85 (0.033)
R*	2012-12	R Case (1.20)	2.05 (0.081)	1.30 (0.051)	1.20 (0.047) max.	1.0 ±0.1 (0.039 ±0.004)	0.50 (0.020)	0.70 (0.028)
S**	3216-12	A Case (1.20)	3.20 (0.126)	1.60 (0.063)	1.20 (0.047) max.	1.20 (0.047)	0.80 (0.031)	1.10 (0.043)
T**	3528-12	B Case (1.20)	3.50 (0.138)	2.80 (0.110)	1.20 (0.047) max.	2.20 (0.087)	0.80 (0.031)	2.00 (0.079)
V	7361-38	–	7.30 (0.287)	6.10 (0.240)	3.45 ±0.30 (0.136 ±0.012)	3.10 (0.120)	1.40 (0.055)	1.80 (0.071)
W**	6032-15	C Case (1.50)	6.00 (0.236)	3.20 (0.126)	1.50 (0.059) max.	2.20 (0.087)	1.30 (0.051)	2.90 (0.114)
X**	7343-15	D Case (1.50)	7.30 (0.287)	4.30 (0.169)	1.50 (0.059) max.	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)
Y**	7343-20	D Case (2.00)	7.30 (0.287)	4.30 (0.169)	2.00 (0.079) max.	2.40 (0.094)	1.30 (0.051)	4.40 (0.173)

W_1 dimension applies to the termination width for A dimensional area only.

*** 0805 Footprint Compatible ** Low Profile Versions of A & B & C & D Case**

HOW TO ORDER

TPS	C	107	M	010	R	0100
Type	**Case Size** See table above	**Capacitor Code** pF code: 1st two digits represent significant figures, 3rd digit represents multiplier (number of zeros to follow)	**Tolerance** K = ±10% M = ±20%	**Rated DC Voltage** 002 = 2.5Vdc 004 = 4Vdc 006 = 6.3Vdc 010 = 10Vdc 016 = 16Vdc 020 = 20Vdc 025 = 25Vdc 035 = 35Vdc 050 = 50Vdc	**Packaging** R = 7" T/R (Lead Free since production date 1/1/04) S = 13" T/R (Lead Free since production date 1/1/04) A = Gold Plating 7" Reel B = Gold Plating 13" Reel	**Maximum ESR in Milliohms** See note below

NOTE: The EIA & CECC standards for low ESR Solid Tantalum Capacitors allow an ESR movement to 1.25 times catalog limit post mounting.

TECHNICAL SPECIFICATIONS

Technical Data:	All technical data relate to an ambient temperature of +25°C									
Capacitance Range:	0.15 µF to 1500 µF									
Capacitance Tolerance:	±10%; ±20%									
Rated Voltage (V_R)	≤ +85°C:	2.5	4	6.3	10	16	20	25	35	50
Category Voltage (V_C)	≤ +125°C:	1.7	2.7	4	7	10	13	17	23	33
Surge Voltage (V_S)	≤ +85°C:	3.3	5.2	8	13	20	26	32	46	65
Surge Voltage (V_S)	≤ +125°C:	2.2	3.4	5	8	13	16	20	28	40
Temperature Range:	-55°C to +125°C									
Environmental Classification:	55/125/56 (IEC 68-2)									
Reliability:	1% per 1000 hours at 85°C, V_R with 0.1Ω/V series impedance, 60% confidence level									
	Meets requirements of AEC-Q200									

CAPACITANCE AND RATED VOLTAGE, V_R (VOLTAGE CODE) RANGE (LETTER DENOTES CASE SIZE)

Capacitance		Rated Voltage DC (V_R) to 85°C								
µF	Code	2.5V (e)	4V (G)	6.3V (J)	10V (A)	16V (C)	20V (D)	25V (E)	35V (V)	50V (T)
0.15	154									A(9000)
0.22	224								A(6000)	A(7000)
0.33	334								A(6000)	
0.47	474							A(7000)	A(6000) B(4000)	
0.68	684							A(6000)	A(6000)	
1	105				R(9000)		A(3000), R(6000) S(6000), T(2000)	R(2500,4000)	A(3000) B(2000)	C(2500)
1.5	155							A(3000) B(1800)	B(2500)	C(1500,2000)
2.2	225			R(7000)	A(1800)	A(1800,3500) T(2000)	A(3000)	B(900,1200,2500)	A(1500), B(750, 1500,2000), C(1000)	D(1200)
3.3	335				T(1500)	A(3500)	A(2500) B(1300)	A(1000,1500) B(750,1500,2000)	B(1000) C(700)	D(800)
4.7	475			S(4000)	A(1400) R(3000,5000)	A(2000) B(800,1500)	A(1800) B(750,1000)	B(700,900,1500)	B(700,1500) C(600)	D(300,500,700)
6.8	685			A(1800)	A(1800) T(1800)	A(1500) B(600,1200)	A(1000) B(600,1000) C(700)	B(700) C(500,600,700)	C(350) D(150,400,500)	D(200, 300, 500,600)
10	106		R(3000)	A(1500) R(1000,1500,3000)	A(900,1800) P(2000)(M) T(1000,2000)	B(500,800), C(500) T(800,1000) W(500,600)	B(500,1000) C(500,700)	C(300,500)	D(125,300) E(200)	E(400,500)
15	156			A(700,1500)	A(1000) B(450,600)	B(500,800)	B(500) C(400,450)	C(220,300) D(100,300)	C(350,450) D(100,300) Y(250)	E(250)
22	226			A(500,900) B(375,600) S(900)	B(400,500,700) C(300) T(800)	B(400,600) C(150,250,300,375) W(500)	B(400,600) C(100,150,400) D(200,300)	C(275,400) D(100,200,300)	D(125,200,300,400) E(125,200,300) Y(200)	
33	336			A(600) B(250,350,450,600) T(800)	A(700) B(250,425,500,650) C(150,375,500) W(350)	B(350,500) C(100,150,225,300) D(200), W(140,175, 250,400,500) Y(300,400)	C(300) D(100,200)	D(100,200,300) E(100,175, 200,300) Y(200)	D(200,300) E(100,250,300) V(200)	
47	476		A(500)	A(800) B(250,350,500) C(300)	B(250,350,500,650) C(200,350) D(100) W(125,150,250)	C(110,350) D(80,100, 150,200) W(200) Y(250), X(180)	D(75,100,200) E(70,125,150, 200,250)	D(125,150,250) E(80,100,125)	E(200,250) V(150,200)	
68	686			B(250,350,500) C(150,200) W(110,125,250)	B(600) C(80,100,200,300) D(100,150), Y(100,200) W(100,150)	F(200) C(125,200) D(70,100,150) Y(150,200,250), X(150)	D(70,150, 200,300) E(125,150,200)	E(125,200) V(80,95,150,200)	V(150,200)(M)	
100	107	B(200)	B(200,250, 350,500) W(100)	B(250,400) C(75,150) Y(100) W(100)	B(400)(M) C(75,100,150,200) D(50,65,80,100,125, 150) E(125) W(150) X(85,150,200) Y(100,150,200)	F(150,200)(M) D(60,100,125,150) E(55,100,125,150) Y(100,150,200)	D(85,100,150) E(100,150,200) V(60,85,100,200)	V(100)		
150	157	B(150)	B(250) C(70,80)	C(50,90,150,200,250) D(50,125), Y(40)	F(200), D(50,85,100) E(100), X(100)(M) Y(100,150,200)	D(60,85,100,125,150) E(100), V(45,75) Y(200)(M)	V(80)			
220	227	B(150, 200,600) D(45)	D(40,50,100) Y(40)	F(200) C(70,100,125,250) D(50,100,125) E(100), Y(100,150)	D(50,100,150) E(50,60,70,100, 125,150) Y(150,200)	E(100,150) V(50,75, 100,150)				
330	337	Y(40)	F(200), C(100) D(35,45,100) X(100)	D(45,50,70,100) E(50,100,125,150) V(100), Y(150)	D(50,65,100,150) E(40,50,60,100) V(40,60,100)					
470	477	F(200) D(35) Y(100)	D(45,100) E(35,45,100)	D(45,60,100,200) E(45,50,60,100,200) V(40,55,100)	E(45,50,60,100,200) V(40,60,100)					
680	687	D(35,50) E(35,50) Y(100)	D(45,60,100) E(40,60,100)	E(45,60,100) V(35,40,50)						
1000	108	E(30,40) Y(100)(M)	E(60) V(25,35,40,50)	V(40,50)(M)						
1500	158	D(100) E(50) V(30,40)	E(50,75) V(50,75)(M)							

For C, D and E case ratings in TPS Series, ESR ratings are printed on capacitor side in the following format:
T x x x -where x x x is ESR limit in milliohms i.e. T100 represents max. ESR of 100 milliohms.

Released codes (M tolerance only)

ESR limits quoted in brackets (milliohms)

NOTE: The EIA & CECC standards for low ESR Solid Tantalum Capacitors allow an ESR movement to 1.25 times catalog limit post mounting.

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	DCL (µA) Max.	DF % Max.	ESR Max. (mΩ) @100kHz	100kHz Ripple Current Ratings (A)			100kHz Ripple Voltage Ratings (V)		
							25ºC	85ºC	125ºC	25ºC	85ºC	125ºC
TPSB107*002#0200	B	100	2.5	5	6	200	0.652	0.587	0.261	0.130	0.117	0.052
TPSB157*002#0150	B	150	2.5	3	10	150	0.753	0.677	0.301	0.113	0.102	0.045
TPSB227*002#0150	B	220	2.5	4.4	16	150	0.753	0.677	0.301	0.113	0.102	0.045
TPSB227*002#0200	B	220	2.5	4.4	16	200	0.652	0.587	0.261	0.130	0.117	0.052
TPSB227*002#0600	B	220	2.5	4.4	16	600	0.376	0.339	0.151	0.226	0.203	0.090
TPSD227*002#0045	D	220	2.5	4.4	8	45	1.826	1.643	0.730	0.082	0.074	0.033
TPSY337*002#0040	Y	330	2.5	8.2	8	40	1.768	1.591	0.707	0.071	0.064	0.028
TPSD477*002#0035	D	470	2.5	11.6	8	35	2.070	1.863	0.828	0.072	0.065	0.029
TPSF477*002#0200	F	470	2.5	11.8	12	200	0.707	0.636	0.283	0.141	0.127	0.057
TPSY477*002#0100	Y	470	2.5	11	12	100	1.118	1.006	0.447	0.112	0.101	0.045
TPSD687*002#0035	D	680	2.5	17	16	35	2.070	1.863	0.828	0.072	0.065	0.029
TPSD687*002#0050	D	680	2.5	17	16	50	1.732	1.559	0.693	0.087	0.078	0.035
TPSE687*002#0035	E	680	2.5	17	10	35	2.171	1.954	0.868	0.076	0.068	0.030
TPSE687*002#0050	E	680	2.5	17	10	50	1.817	1.635	0.727	0.091	0.082	0.036
TPSY687*002#0100	Y	680	2.5	17	12	100	1.118	1.006	0.447	0.112	0.101	0.045
TPSE108*002#0030	E	1000	2.5	20	14	30	2.345	2.111	0.938	0.070	0.063	0.028
TPSE108*002#0040	E	1000	2.5	20	14	40	2.031	1.828	0.812	0.081	0.073	0.032
TPSY108M002#0100	Y	1000	2.5	25	30	100	1.118	1.006	0.447	0.112	0.101	0.045
TPSE158*002#0050	E	1500	2.5	37.5	20	50	1.817	1.635	0.727	0.001	0.082	0.036
TPSD158*002#0100	D	1500	2.5	37.5	60	100	1.125	1.102	0.490	0.122	0.110	0.049
TPSV158*002#0030	V	1500	2.5	30	20	30	2.887	2.598	1.155	0.087	0.078	0.035
TPSV158*002#0040	V	1500	2.5	30	20	40	2.500	2.250	1.000	0.100	0.090	0.040
TPSR106*004#3000	R	10	4	0.5	6	3000	0.135	0.122	0.054	0.406	0.366	0.162
TPSA476*004#0500	A	47	4	1.9	8	500	0.387	0.349	0.155	0.194	0.174	0.077
TPSB107*004#0200	B	100	4	4	8	200	0.652	0.587	0.261	0.130	0.117	0.052
TPSB107*004#0250	B	100	4	4	8	250	0.583	0.525	0.233	0.146	0.131	0.058
TPSB107*004#0350	B	100	4	4	8	350	0.493	0.444	0.197	0.172	0.155	0.069
TPSB107*004#0500	B	100	4	4	8	500	0.412	0.371	0.165	0.206	0.186	0.082
TPSW107*004#0100	W	100	4	4	6	100	0.949	0.854	0.379	0.095	0.085	0.038
TPSB157*004#0250	B	150	4	6	10	250	0.583	0.525	0.233	0.146	0.131	0.058
TPSC157*004#0070	C	150	4	6	6	70	1.254	1.128	0.501	0.088	0.079	0.035
TPSC157*004#0080	C	150	4	6	6	80	1.173	1.055	0.469	0.094	0.084	0.038
TPSD227*004#0040	D	220	4	8.8	8	40	1.936	1.743	0.775	0.077	0.070	0.031
TPSD227*004#0050	D	220	4	8.8	8	50	1.732	1.559	0.693	0.087	0.078	0.035
TPSD227*004#0100	D	220	4	8.8	8	100	1.225	1.102	0.490	0.122	0.110	0.049
TPSY227*004#0040	Y	220	4	8.8	8	40	1.768	1.591	0.707	0.071	0.064	0.028
TPSC337*004#0100	C	330	4	13.2	8	100	1.049	0.944	0.420	0.105	0.094	0.042
TPSD337*004#0035	D	330	4	13.2	8	35	2.070	1.863	0.828	0.072	0.065	0.029
TPSD337*004#0045	D	330	4	13.2	8	45	1.826	1.643	0.730	0.082	0.074	0.033
TPSD337*004#0100	D	330	4	13.2	8	100	1.225	1.102	0.490	0.122	0.110	0.049
TPSF337*004#0200	F	330	4	13.2	10	200	0.707	0.636	0.283	0.141	0.127	0.057
TPSX337*004#0100	X	330	4	13.2	8	100	1.000	0.900	0.400	0.100	0.090	0.040
TPSD477*004#0045	D	470	4	18.8	12	45	1.826	1.643	0.730	0.082	0.074	0.033
TPSD477*004#0100	D	470	4	18.8	12	100	1.225	1.102	0.490	0.122	0.110	0.049
TPSE477*004#0035	E	470	4	18.8	12	35	2.171	1.954	0.868	0.076	0.068	0.030
TPSE477*004#0045	E	470	4	18.8	12	45	1.915	1.723	0.766	0.086	0.078	0.034
TPSE477*004#0100	E	470	4	18.8	12	100	1.285	1.156	0.514	0.128	0.116	0.051
TPSD687*004#0045	D	680	4	27.2	14	45	1.915	1.643	0.730	0.082	0.074	0.033
TPSD687*004#0060	D	680	4	27.2	14	60	1.581	1.423	0.632	0.095	0.085	0.038
TPSD687*004#0100	D	680	4	27.2	14	100	1.225	1.102	0.490	0.122	0.110	0.049
TPSE687*004#0040	E	680	4	27.2	10	40	2.031	1.828	0.812	0.081	0.073	0.032
TPSE687*004#0060	E	680	4	27.2	10	60	1.658	1.492	0.663	0.099	0.090	0.040
TPSE687*004#0100	E	680	4	27.2	10	100	1.285	1.156	0.514	0.128	0.116	0.051
TPSE108*004#0060	E	1000	4	40	14	60	1.658	1.492	0.663	0.099	0.090	0.040
TPSV108*004#0025	V	1000	4	40	16	25	3.162	2.846	1.265	0.079	0.071	0.032
TPSV108*004#0035	V	1000	4	40	16	35	2.673	2.405	1.069	0.094	0.084	0.037
TPSV108*004#0040	V	1000	4	40	16	40	2.500	2.250	1.000	0.100	0.090	0.040
TPSV108*004#0050	V	1000	4	40	16	50	2.236	2.012	0.894	0.112	0.101	0.045
TPSE158*004#0050	E	1500	4	60	30	50	1.817	1.635	0.727	0.091	0.082	0.036
TPSE158*004#0075	E	1500	4	60	30	75	1.483	1.335	0.593	0.111	0.100	0.044
TPSV158M004#0050	V	1500	4	60	30	50	2.236	2.012	0.894	0.112	0.101	0.045
TPSV158M004#0075	V	1500	4	60	30	75	1.826	1.643	0.730	0.137	0.123	0.055
TPSR225*006#7000	R	2.2	6.3	0.5	6	7000	0.089	0.080	0.035	0.620	0.558	0.248
TPSS475*006#4000	S	4.7	6.3	0.5	6	4000	0.127	0.115	0.051	0.510	0.459	0.204
TPSA685*006#1800	A	6.8	6.3	0.5	6	1800	0.204	0.184	0.082	0.367	0.331	0.147
TPSA106*006#1500	A	10	6.3	0.6	6	1500	0.224	0.201	0.089	0.335	0.302	0.134
TPSR106*006#1000	R	10	6.3	0.6	8	1000	0.235	0.211	0.094	0.235	0.211	0.094
TPSR106*006#1500	R	10	6.3	0.6	8	1500	0.191	0.172	0.077	0.287	0.259	0.115
TPSR106*006#3000	R	10	6.3	0.6	8	3000	0.135	0.122	0.054	0.406	0.366	0.162
TPSA156*006#0700	A	15	6.3	0.9	6	700	0.327	0.295	0.131	0.229	0.206	0.092

All technical data relates to an ambient temperature of +25°C.
Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.
* Insert K for ±10% and M for ±20% Capacitance Tolerance

 # Standard Plating – Insert R for 7" reel and S for 13" reel
 # Gold Plating – Insert A for 7" reel and B for 13" reel

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	DCL (µA) Max.	DF % Max.	ESR Max. (mΩ) @100kHz	100kHz Ripple Current Ratings (A)			100kHz Ripple Voltage Ratings (V)		
							25ºC	85ºC	125ºC	25ºC	85ºC	125ºC
TPSA156*006#1500	A	15	6.3	0.9	6	1500	0.224	0.201	0.089	0.335	0.302	0.134
TPSA226*006#0500	A	22	6.3	1.4	6	500	0.387	0.349	0.155	0.194	0.174	0.077
TPSA226*006#0900	A	22	6.3	1.4	6	900	0.289	0.260	0.115	0.260	0.234	0.104
TPSB226*006#0375	B	22	6.3	1.4	6	375	0.476	0.428	0.190	0.179	0.161	0.071
TPSB226*006#0600	B	22	6.3	1.4	6	600	0.376	0.339	0.151	0.226	0.203	0.090
TPSS226*006#0900	S	22	6.3	1.4	8	900	0.269	0.242	0.107	0.242	0.218	0.097
TPSA336*006#0600	A	33	6.3	2.1	8	600	0.354	0.318	0.141	0.212	0.191	0.085
TPSB336*006#0250	B	33	6.3	2.1	6	250	0.583	0.525	0.233	0.146	0.131	0.058
TPSB336*006#0350	B	33	6.3	2.1	6	350	0.493	0.444	0.197	0.172	0.155	0.069
TPSB336*006#0450	B	33	6.3	2.1	6	450	0.435	0.391	0.174	0.196	0.176	0.078
TPSB336*006#0600	B	33	6.3	2.1	6	600	0.376	0.339	0.151	0.226	0.203	0.090
TPST336*006#0800	T	33	6.3	2.1	10	800	0.316	0.285	0.126	0.253	0.228	0.101
TPSA476*006#0800	A	47	6.3	2.8	10	800	0.306	0.276	0.122	0.245	0.220	0.098
TPSB476*006#0250	B	47	6.3	3	6	250	0.583	0.525	0.233	0.146	0.131	0.058
TPSB476*006#0350	B	47	6.3	3	6	350	0.493	0.444	0.197	0.172	0.155	0.069
TPSB476*006#0500	B	47	6.3	3	6	500	0.412	0.371	0.165	0.206	0.186	0.082
TPSC476*006#0300	C	47	6.3	3	6	300	0.606	0.545	0.242	0.182	0.163	0.073
TPSB686*006#0250	B	68	6.3	4.3	8	250	0.583	0.525	0.233	0.146	0.131	0.058
TPSB686*006#0350	B	68	6.3	4.3	8	350	0.493	0.444	0.197	0.172	0.155	0.069
TPSB686*006#0500	B	68	6.3	4.3	8	500	0.412	0.371	0.165	0.206	0.186	0.082
TPSC686*006#0150	C	68	6.3	4.3	6	150	0.856	0.771	0.343	0.128	0.116	0.051
TPSC686*006#0200	C	68	6.3	4.3	6	200	0.742	0.667	0.297	0.148	0.133	0.059
TPSW686*006#0110	W	68	6.3	4.3	6	110	0.905	0.814	0.362	0.099	0.090	0.040
TPSW686*006#0125	W	68	6.3	4.3	6	125	0.849	0.764	0.339	0.106	0.095	0.042
TPSW686*006#0250	W	68	6.3	4.3	6	250	0.600	0.540	0.240	0.150	0.135	0.060
TPSB107*006#0250	B	100	6.3	6.3	10	250	0.583	0.525	0.233	0.146	0.131	0.058
TPSB107*006#0400	B	100	6.3	6.3	10	400	0.461	0.415	0.184	0.184	0.166	0.074
TPSC107*006#0075	C	100	6.3	6.3	6	75	1.211	1.090	0.484	0.091	0.082	0.036
TPSC107*006#0150	C	100	6.3	6.3	6	150	0.856	0.771	0.343	0.128	0.116	0.051
TPSY107*006#0100	Y	100	6.3	6.3	6	100	1.118	1.006	0.447	0.112	0.101	0.045
TPSW107*006#0100	W	100	6.3	6.3	6	100	0.949	0.854	0.379	0.095	0.085	0.038
TPSC157*006#0050	C	150	6.3	9.5	6	50	1.483	1.335	0.593	0.074	0.067	0.030
TPSC157*006#0090	C	150	6.3	9.5	6	90	1.106	0.995	0.442	0.099	0.090	0.040
TPSC157*006#0150	C	150	6.3	9.5	6	150	0.856	0.771	0.343	0.128	0.116	0.051
TPSC157*006#0200	C	150	6.3	9.5	6	200	0.742	0.667	0.297	0.148	0.133	0.059
TPSC157*006#0250	C	150	6.3	9.5	6	250	0.663	0.597	0.265	0.166	0.149	0.066
TPSD157*006#0050	D	150	6.3	9.5	6	50	1.732	1.559	0.693	0.087	0.078	0.035
TPSD157*006#0125	D	150	6.3	9.5	6	125	1.095	0.986	0.438	0.137	0.123	0.055
TPSY157*006#0040	Y	150	6.3	9.5	6	40	1.768	1.591	0.707	0.071	0.064	0.028
TPSC227*006#0070	C	220	6.3	13.9	8	70	1.254	1.128	0.501	0.088	0.079	0.035
TPSC227*006#0100	C	220	6.3	13.9	8	100	1.049	0.944	0.420	0.105	0.094	0.042
TPSC227*006#0125	C	220	6.3	13.9	8	125	0.938	0.844	0.375	0.117	0.106	0.047
TPSC227*006#0250	C	220	6.3	13.9	8	250	0.663	0.597	0.265	0.166	0.149	0.066
TPSD227*006#0050	D	220	6.3	13.9	8	50	1.732	1.559	0.693	0.087	0.078	0.035
TPSD227*006#0100	D	220	6.3	13.2	8	100	1.225	1.102	0.490	0.122	0.110	0.049
TPSD227*006#0125	D	220	6.3	13.9	8	125	1.095	0.986	0.438	0.137	0.123	0.055
TPSE227*006#0100	E	220	6.3	13.2	8	100	1.285	1.156	0.514	0.128	0.116	0.051
TPSF227*006#0200	F	220	6.3	13.2	10	200	0.707	0.636	0.283	0.141	0.127	0.057
TPSY227*006#0100	Y	220	6.3	13.9	10	100	1.118	1.006	0.447	0.112	0.101	0.045
TPSY227*006#0150	Y	220	6.3	13.9	10	150	0.913	0.822	0.365	0.137	0.123	0.055
TPSD337*006#0045	D	330	6.3	20.8	8	45	1.826	1.643	0.730	0.082	0.074	0.033
TPSD337*006#0050	D	330	6.3	20.8	8	50	1.732	1.559	0.693	0.087	0.078	0.035
TPSD337*006#0070	D	330	6.3	20.8	8	70	1.464	1.317	0.586	0.102	0.092	0.041
TPSD337*006#0100	D	330	6.3	20.8	8	100	1.225	1.102	0.490	0.122	0.110	0.049
TPSE337*006#0050	E	330	6.3	20.8	8	50	1.817	1.635	0.727	0.091	0.082	0.036
TPSE337*006#0100	E	330	6.3	20.8	8	100	1.285	1.156	0.514	0.128	0.116	0.051
TPSE337*006#0125	E	330	6.3	20.8	8	125	1.149	1.034	0.460	0.144	0.129	0.057
TPSE337*006#0150	E	330	6.3	20.8	8	150	1.049	0.944	0.420	0.157	0.142	0.063
TPSV337*006#0100	V	330	6.3	20.8	8	100	1.581	1.423	0.632	0.158	0.142	0.063
TPSY337*006#0150	Y	330	6.3	20.8	12	150	0.913	0.822	0.365	0.137	0.123	0.055
TPSD477*006#0045	D	470	6.3	29.6	12	45	1.826	1.643	0.730	0.082	0.074	0.033
TPSD477*006#0060	D	470	6.3	29.6	12	60	1.581	1.423	0.632	0.095	0.085	0.038
TPSD477*006#0100	D	470	6.3	29.6	12	100	1.225	1.102	0.490	0.122	0.110	0.049
TPSD477*006#0200	D	470	6.3	29.6	12	200	0.866	0.779	0.346	0.173	0.156	0.069
TPSE477*006#0045	E	470	6.3	29.6	10	45	1.915	1.723	0.766	0.086	0.078	0.034
TPSE477*006#0050	E	470	6.3	29.6	10	50	1.817	1.635	0.727	0.091	0.082	0.036
TPSE477*006#0060	E	470	6.3	29.6	10	60	1.658	1.492	0.663	0.099	0.090	0.040
TPSE477*006#0100	E	470	6.3	29.6	10	100	1.285	1.156	0.514	0.128	0.116	0.051

All technical data relates to an ambient temperature of +25°C.
Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.
* Insert K for ±10% and M for ±20% Capacitance Tolerance

Standard Plating – Insert R for 7" reel and S for 13" reel
Gold Plating – Insert A for 7" reel and B for 13" reel

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	DCL (µA) Max.	DF % Max.	ESR Max. (mΩ) @100kHz	100kHz Ripple Current Ratings (A)			100kHz Ripple Voltage Ratings (V)		
							25ºC	85ºC	125ºC	25ºC	85ºC	125ºC
TPSE477*006#0200	E	470	6.3	29.6	10	200	0.908	0.817	0.363	0.182	0.163	0.073
TPSV477*006#0040	V	470	6.3	29.6	10	40	2.500	2.250	1.000	0.100	0.090	0.040
TPSV477*006#0055	V	470	6.3	29.6	10	55	2.132	1.919	0.853	0.117	0.106	0.047
TPSV477*006#0100	V	470	6.3	29.6	10	100	1.581	1.423	0.632	0.158	0.142	0.063
TPSE687*006#0045	E	680	6.3	42.8	10	45	1.915	1.723	0.766	0.086	0.078	0.034
TPSE687*006#0060	E	680	6.3	42.8	10	60	1.658	1.492	0.663	0.099	0.090	0.040
TPSE687*006#0100	E	680	6.3	42.8	10	100	1.285	1.156	0.514	0.128	0.116	0.051
TPSV687*006#0035	V	680	6.3	42.8	14	35	2.673	2.405	1.069	0.094	0.084	0.037
TPSV687*006#0040	V	680	6.3	42.8	10	40	2.500	2.250	1.000	0.100	0.090	0.040
TPSV687*006#0050	V	680	6.3	42.8	10	50	2.236	2.012	0.894	0.112	0.101	0.045
TPSV108M006#0040	V	1000	6.3	60	16	40	2.500	2.250	1.000	0.100	0.090	0.040
TPSV108M006#0050	V	1000	6.3	60	16	50	2.236	2.012	0.894	0.112	0.101	0.045
TPSR105*010#9000	R	1	10	0.5	4	9000	0.078	0.070	0.031	0.704	0.633	0.281
TPSA225*010#1800	A	2.2	10	0.5	6	1800	0.204	0.184	0.082	0.367	0.331	0.147
TPST335*010#1500	T	3.3	10	0.5	6	1500	0.231	0.208	0.092	0.346	0.312	0.139
TPSA475*010#1400	A	4.7	10	0.5	6	1400	0.231	0.208	0.093	0.324	0.292	0.130
TPSR475*010#3000	R	4.7	10	0.5	6	3000	0.135	0.122	0.054	0.406	0.366	0.162
TPSR475*010#5000	R	4.7	10	0.5	6	5000	0.105	0.094	0.042	0.524	0.472	0.210
TPSA685*010#1800	A	6.8	10	0.7	6	1800	0.204	0.184	0.082	0.367	0.331	0.147
TPST685*010#1800	T	6.8	10	0.7	6	1800	0.211	0.190	0.084	0.379	0.342	0.152
TPSA106*010#0900	A	10	10	1	6	900	0.289	0.260	0.115	0.260	0.234	0.104
TPSA106*010#1800	A	10	10	1	6	1800	0.204	0.184	0.082	0.367	0.331	0.147
TPSP106M010#2000	P	10	10	1	8	2000	0.173	0.156	0.069	0.346	0.312	0.139
TPST106*010#1000	T	10	10	1	6	1000	0.283	0.255	0.113	0.283	0.255	0.113
TPST106*010#2000	T	10	10	1	6	2000	0.200	0.180	0.080	0.400	0.360	0.160
TPSA156*010#1000	A	15	10	1.5	6	1000	0.274	0.246	0.110	0.274	0.246	0.110
TPSB156*010#0450	B	15	10	1.5	6	450	0.435	0.391	0.174	0.196	0.176	0.078
TPSB156*010#0600	B	15	10	1.5	6	600	0.376	0.339	0.151	0.226	0.203	0.090
TPSB226*010#0400	B	22	10	2.2	6	400	0.461	0.415	0.184	0.184	0.166	0.074
TPSB226*010#0500	B	22	10	2.2	6	500	0.412	0.371	0.165	0.206	0.186	0.082
TPSB226*010#0700	B	22	10	2.2	6	700	0.348	0.314	0.139	0.244	0.220	0.098
TPSC226*010#0300	C	22	10	2.2	6	300	0.606	0.545	0.242	0.182	0.163	0.073
TPST226*010#0800	T	22	10	2.2	8	800	0.316	0.285	0.126	0.253	0.228	0.101
TPSA336*010#0700	A	33	10	3.3	8	700	0.327	0.295	0.131	0.229	0.206	0.092
TPSB336*010#0250	B	33	10	3.3	6	250	0.583	0.525	0.233	0.146	0.131	0.058
TPSB336*010#0425	B	33	10	3.3	6	425	0.447	0.402	0.179	0.190	0.171	0.076
TPSB336*010#0500	B	33	10	3.3	6	500	0.412	0.371	0.165	0.206	0.186	0.082
TPSB336*010#0650	B	33	10	3.3	6	650	0.362	0.325	0.145	0.235	0.212	0.094
TPSC336*010#0150	C	33	10	3.3	6	150	0.856	0.771	0.343	0.128	0.116	0.051
TPSC336*010#0375	C	33	10	3.3	6	375	0.542	0.487	0.217	0.203	0.183	0.081
TPSC336*010#0500	C	33	10	3.3	6	500	0.469	0.422	0.188	0.235	0.211	0.094
TPSW336*010#0350	W	33	10	3.3	6	350	0.507	0.456	0.203	0.177	0.160	0.071
TPSB476*010#0250	B	47	10	4.7	8	250	0.583	0.525	0.233	0.146	0.131	0.058
TPSB476*010#0350	B	47	10	4.7	8	350	0.493	0.444	0.197	0.172	0.155	0.069
TPSB476*010#0500	B	47	10	4.7	8	500	0.412	0.371	0.165	0.206	0.186	0.082
TPSB476*010#0650	B	47	10	4.7	8	650	0.362	0.325	0.145	0.235	0.212	0.094
TPSC476*010#0200	C	47	10	4.7	6	200	0.742	0.667	0.297	0.148	0.133	0.059
TPSC476*010#0350	C	47	10	4.7	6	350	0.561	0.505	0.224	0.196	0.177	0.078
TPSD476*010#0100	D	47	10	4.7	6	100	1.225	1.102	0.490	0.122	0.110	0.049
TPSW476*010#0125	W	47	10	4.7	6	125	0.849	0.764	0.339	0.106	0.095	0.042
TPSW476*010#0150	W	47	10	4.7	6	150	0.775	0.697	0.310	0.116	0.105	0.046
TPSW476*010#0250	W	47	10	4.7	6	250	0.600	0.540	0.240	0.150	0.135	0.060
TPSB686*010#0600	B	68	10	6.8	8	600	0.376	0.339	0.151	0.226	0.203	0.090
TPSC686*010#0080	C	68	10	6.8	6	80	1.173	1.055	0.469	0.094	0.084	0.038
TPSC686*010#0100	C	68	10	6.8	6	100	1.049	0.944	0.420	0.105	0.094	0.042
TPSC686*010#0200	C	68	10	6.8	6	200	0.742	0.667	0.297	0.148	0.133	0.059
TPSC686*010#0300	C	68	10	6.8	6	300	0.606	0.545	0.242	0.182	0.163	0.073
TPSD686*010#0100	D	68	10	6.8	6	100	1.225	1.102	0.490	0.122	0.110	0.049
TPSD686*010#0150	D	68	10	6.8	6	150	1.000	0.900	0.400	0.150	0.135	0.060
TPSY686*010#0100	Y	68	10	6.8	6	100	1.118	1.006	0.447	0.112	0.101	0.045
TPSY686*010#0200	Y	68	10	6.8	6	200	0.791	0.712	0.316	0.158	0.142	0.063
TPSW686*010#0100	W	68	10	6.8	6	100	0.949	0.854	0.379	0.095	0.085	0.038
TPSW686*010#0150	W	68	10	6.8	6	150	0.775	0.697	0.310	0.116	0.105	0.046
TPSB107M010#0400	B	100	10	10	8	400	0.461	0.415	0.184	0.184	0.166	0.074
TPSC107*010#0075	C	100	10	10	8	75	1.211	1.090	0.484	0.091	0.082	0.036
TPSC107*010#0100	C	100	10	10	8	100	1.049	0.944	0.420	0.105	0.094	0.042
TPSC107*010#0150	C	100	10	10	8	150	0.856	0.771	0.343	0.128	0.116	0.051
TPSC107*010#0200	C	100	10	10	8	200	0.742	0.667	0.297	0.148	0.133	0.059

All technical data relates to an ambient temperature of +25°C.
Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.
* Insert K for ±10% and M for ±20% Capacitance Tolerance

Standard Plating – Insert R for 7" reel and S for 13" reel
Gold Plating – Insert A for 7" reel and B for 13" reel

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	DCL (µA) Max.	DF % Max.	ESR Max. (mΩ) @100kHz	100kHz Ripple Current Ratings (A)			100kHz Ripple Voltage Ratings (V)		
							25ºC	85ºC	125ºC	25ºC	85ºC	125ºC
TPSD107*010#0050	D	100	10	10	6	50	1.732	1.559	0.693	0.087	0.078	0.035
TPSD107*010#0065	D	100	10	10	6	65	1.519	1.367	0.608	0.099	0.089	0.039
TPSD107*010#0080	D	100	10	10	6	80	1.369	1.232	0.548	0.110	0.099	0.044
TPSD107*010#0100	D	100	10	10	6	100	1.225	1.102	0.490	0.122	0.110	0.049
TPSD107*010#0125	D	100	10	10	6	125	1.095	0.986	0.438	0.137	0.123	0.055
TPSD107*010#0150	D	100	10	10	6	150	1.000	0.900	0.400	0.150	0.135	0.060
TPSE107*010#0125	E	100	10	10	6	125	1.149	1.034	0.460	0.144	0.129	0.057
TPSY107*010#0100	Y	100	10	10	6	100	1.118	1.006	0.447	0.112	0.101	0.045
TPSY107*010#0150	Y	100	10	10	6	150	0.913	0.822	0.365	0.137	0.123	0.055
TPSY107*010#0200	Y	100	10	10	6	200	0.791	0.712	0.316	0.158	0.142	0.063
TPSX107*010#0085	X	100	10	10	8	85	1.085	0.976	0.434	0.092	0.083	0.037
TPSX107*010#0150	X	100	10	10	8	150	0.816	0.735	0.327	0.122	0.110	0.049
TPSX107*010#0200	X	100	10	10	8	200	0.707	0.636	0.283	0.141	0.127	0.057
TPSW107*010#0150	W	100	10	10	6	150	0.775	0.697	0.310	0.116	0.105	0.046
TPSD157*010#0050	D	150	10	15	6	50	1.732	1.559	0.693	0.087	0.078	0.035
TPSD157*010#0085	D	150	10	15	8	85	1.328	1.196	0.531	0.113	0.102	0.045
TPSD157*010#0100	D	150	10	15	8	100	1.225	1.102	0.490	0.122	0.110	0.049
TPSE157*010#0100	E	150	10	15	8	100	1.285	1.156	0.514	0.128	0.116	0.051
TPSF157*010#0200	F	150	10	15	10	200	0.707	0.636	0.283	0.141	0.127	0.057
TPSX157M010#0100	X	150	10	15	6	100	1.000	0.900	0.400	0.100	0.090	0.040
TPSY157*010#0100	Y	150	10	15	6	100	1.118	1.006	0.447	0.112	0.101	0.045
TPSY157*010#0150	Y	150	10	15	6	150	0.913	0.822	0.365	0.137	0.123	0.055
TPSY157*010#0200	Y	150	10	15	6	200	0.791	0.712	0.316	0.158	0.142	0.063
TPSD227*010#0050	D	220	10	22	8	50	1.732	1.559	0.693	0.087	0.078	0.035
TPSD227*010#0100	D	220	10	22	8	100	1.225	1.102	0.490	0.122	0.110	0.049
TPSD227*010#0150	D	220	10	22	8	150	1.000	0.900	0.400	0.150	0.135	0.060
TPSE227*010#0050	E	220	10	22	8	50	1.817	1.635	0.727	0.091	0.082	0.036
TPSE227*010#0060	E	220	10	22	8	60	1.658	1.492	0.663	0.099	0.090	0.040
TPSE227*010#0070	E	220	10	22	8	70	1.535	1.382	0.614	0.107	0.097	0.043
TPSE227*010#0100	E	220	10	22	8	100	1.285	1.156	0.514	0.128	0.116	0.051
TPSE227*010#0125	E	220	10	22	8	125	1.149	1.034	0.460	0.144	0.129	0.057
TPSE227*010#0150	E	220	10	22	8	150	1.049	0.944	0.420	0.157	0.142	0.063
TPSY227*010#0150	Y	220	10	22	10	150	0.913	0.822	0.365	0.137	0.123	0.055
TPSY227*010#0200	Y	220	10	22	10	200	0.791	0.712	0.316	0.158	0.142	0.063
TPSD337*010#0050	D	330	10	33	8	50	1.732	1.559	0.693	0.087	0.078	0.035
TPSD337*010#0065	D	330	10	33	8	65	1.519	1.367	0.608	0.099	0.089	0.039
TPSD337*010#0100	D	330	10	33	8	100	1.225	1.102	0.490	0.122	0.110	0.049
TPSD337*010#0150	D	330	10	33	8	150	1.000	0.900	0.400	0.150	0.135	0.060
TPSE337*010#0040	E	330	10	33	8	40	2.031	1.828	0.812	0.081	0.073	0.032
TPSE337*010#0050	E	330	10	33	8	50	1.817	1.635	0.727	0.091	0.082	0.036
TPSE337*010#0060	E	330	10	33	8	60	1.658	1.492	0.663	0.099	0.090	0.040
TPSE337*010#0100	E	330	10	33	8	100	1.285	1.156	0.514	0.128	0.116	0.051
TPSV337*010#0040	V	330	10	33	10	40	2.500	2.250	1.000	0.100	0.090	0.040
TPSV337*010#0060	V	330	10	33	10	60	2.041	1.837	0.816	0.122	0.110	0.049
TPSV337*010#0100	V	330	10	33	10	100	1.581	1.423	0.632	0.158	0.142	0.063
TPSE477*010#0045	E	470	10	47	10	45	1.915	1.723	0.766	0.086	0.078	0.034
TPSE477*010#0050	E	470	10	47	10	50	1.817	1.635	0.727	0.091	0.082	0.036
TPSE477*010#0060	E	470	10	47	10	60	1.658	1.492	0.663	0.099	0.090	0.040
TPSE477*010#0100	E	470	10	47	10	100	1.285	1.156	0.514	0.128	0.116	0.051
TPSE477*010#0200	E	470	10	47	10	200	0.908	0.817	0.363	0.182	0.163	0.073
TPSV477*010#0040	V	470	10	47	10	40	2.500	2.250	1.000	0.100	0.090	0.040
TPSV477*010#0060	V	470	10	47	10	60	2.041	1.837	0.816	0.122	0.110	0.049
TPSV477*010#0100	V	470	10	47	10	100	1.581	1.423	0.632	0.158	0.142	0.063
TPSA225*016#1800	A	2.2	16	0.5	6	1800	0.204	0.184	0.082	0.367	0.331	0.147
TPSA225*016#3500	A	2.2	16	0.5	6	3500	0.146	0.132	0.059	0.512	0.461	0.205
TPST225*016#2000	T	2.2	16	0.5	6	2000	0.200	0.180	0.080	0.400	0.360	0.160
TPSA335*016#3500	A	3.3	16	0.5	6	3500	0.146	0.132	0.059	0.512	0.461	0.205
TPSA475*016#2000	A	4.7	16	0.8	6	2000	0.194	0.174	0.077	0.387	0.349	0.155
TPSB475*016#0800	B	4.7	16	0.8	6	800	0.326	0.293	0.130	0.261	0.235	0.104
TPSB475*016#1500	B	4.7	16	0.8	6	1500	0.238	0.214	0.095	0.357	0.321	0.143
TPSA685*016#1500	A	6.8	16	1.1	6	1500	0.224	0.201	0.089	0.335	0.302	0.134
TPSB685*016#0600	B	6.8	16	1.1	6	600	0.376	0.339	0.151	0.226	0.203	0.090
TPSB685*016#1200	B	6.8	16	1.1	6	1200	0.266	0.240	0.106	0.319	0.287	0.128
TPSB106*016#0500	B	10	16	1.6	6	500	0.412	0.371	0.165	0.206	0.186	0.082
TPSB106*016#0800	B	10	16	1.6	6	800	0.326	0.293	0.130	0.261	0.235	0.104
TPSC106*016#0500	C	10	16	1.6	6	500	0.469	0.422	0.188	0.235	0.211	0.094
TPST106*016#0800	T	10	16	1.6	8	800	0.316	0.285	0.126	0.253	0.228	0.101
TPST106*016#1000	T	10	16	1.6	8	1000	0.283	0.255	0.113	0.283	0.255	0.113

All technical data relates to an ambient temperature of +25°C.
Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.
* Insert K for ±10% and M for ±20% Capacitance Tolerance

Standard Plating – Insert R for 7" reel and S for 13" reel
Gold Plating – Insert A for 7" reel and B for 13" reel

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	DCL (µA) Max.	DF % Max.	ESR Max. (mΩ) @100kHz	100kHz Ripple Current Ratings (A)			100kHz Ripple Voltage Ratings (V)		
							25ºC	85ºC	125ºC	25ºC	85ºC	125ºC
TPSW106*016#0500	W	10	16	1.6	6	500	0.424	0.382	0.170	0.212	0.191	0.085
TPSW106*016#0600	W	10	16	1.6	6	600	0.387	0.349	0.155	0.232	0.209	0.093
TPSB156*016#0500	B	15	16	2.4	6	500	0.412	0.371	0.165	0.206	0.186	0.082
TPSB156*016#0800	B	15	16	2.4	6	800	0.326	0.293	0.130	0.261	0.235	0.104
TPSB226*016#0400	B	22	16	3.5	6	400	0.461	0.415	0.184	0.184	0.166	0.074
TPSB226*016#0600	B	22	16	3.5	6	600	0.376	0.339	0.151	0.226	0.203	0.090
TPSC226*016#0150	C	22	16	3.5	6	150	0.856	0.771	0.343	0.128	0.116	0.051
TPSC226*016#0250	C	22	16	3.5	6	250	0.663	0.597	0.265	0.166	0.149	0.066
TPSC226*016#0300	C	22	16	3.5	6	300	0.606	0.545	0.242	0.182	0.163	0.073
TPSC226*016#0375	C	22	16	3.5	6	375	0.542	0.487	0.217	0.203	0.183	0.081
TPSW226*016#0500	W	22	16	3.5	6	500	0.424	0.382	0.170	0.212	0.191	0.085
TPSB336*016#0350	B	33	16	5.3	8	350	0.493	0.444	0.197	0.172	0.155	0.069
TPSB336*016#0500	B	33	16	5.3	8	500	0.412	0.371	0.165	0.206	0.186	0.082
TPSC336*016#0100	C	33	16	5.3	6	100	1.049	0.944	0.420	0.105	0.094	0.042
TPSC336*016#0150	C	33	16	5.3	6	150	0.856	0.771	0.343	0.128	0.116	0.051
TPSC336*016#0225	C	33	16	5.3	6	225	0.699	0.629	0.280	0.157	0.142	0.063
TPSC336*016#0300	C	33	16	5.3	6	300	0.606	0.545	0.242	0.182	0.163	0.073
TPSD336*016#0200	D	33	16	5.3	6	200	0.866	0.779	0.346	0.173	0.156	0.069
TPSW336*016#0140	W	33	16	5.3	6	140	0.802	0.722	0.321	0.112	0.101	0.045
TPSW336*016#0175	W	33	16	5.3	6	175	0.717	0.645	0.287	0.125	0.113	0.050
TPSW336*016#0250	W	33	16	5.3	6	250	0.600	0.540	0.240	0.150	0.135	0.060
TPSW336*016#0400	W	33	16	5.3	6	400	0.474	0.427	0.190	0.190	0.171	0.076
TPSW336*016#0500	W	33	16	5.3	6	500	0.424	0.382	0.170	0.212	0.191	0.085
TPSY336*016#0300	Y	33	16	5.3	6	300	0.645	0.581	0.258	0.194	0.174	0.077
TPSY336*016#0400	Y	33	16	5.3	6	400	0.559	0.503	0.224	0.224	0.201	0.089
TPSC476*016#0110	C	47	16	7.5	6	110	1.000	0.900	0.400	0.110	0.099	0.044
TPSC476*016#0350	C	47	16	7.5	6	350	0.561	0.505	0.224	0.196	0.177	0.078
TPSD476*016#0080	D	47	16	7.5	6	80	1.369	1.232	0.548	0.110	0.099	0.044
TPSD476*016#0100	D	47	16	7.5	6	100	1.225	1.102	0.490	0.122	0.110	0.049
TPSD476*016#0150	D	47	16	7.5	6	150	1.000	0.900	0.400	0.150	0.135	0.060
TPSD476*016#0200	D	47	16	7.5	6	200	0.866	0.779	0.346	0.173	0.156	0.069
TPSW476*016#0200	W	47	16	7.5	6	200	0.671	0.604	0.268	0.134	0.121	0.054
TPSY476*016#0250	Y	47	16	7.5	6	250	0.707	0.636	0.283	0.176	0.159	0.071
TPSX476*016#0180	X	47	16	7.5	6	180	0.745	0.671	0.298	0.134	0.121	0.054
TPSC686*016#0125	C	68	16	10.9	6	125	0.938	0.844	0.375	0.117	0.106	0.047
TPSC686*016#0200	C	68	16	10.9	6	200	0.742	0.667	0.297	0.148	0.133	0.059
TPSD686*016#0070	D	68	16	10.8	6	70	1.464	1.317	0.586	0.102	0.092	0.041
TPSD686*016#0100	D	68	16	10.9	6	100	1.225	1.102	0.490	0.122	0.110	0.049
TPSD686*016#0150	D	68	16	10.9	6	150	1.000	0.900	0.400	0.150	0.135	0.060
TPSF686*016#0200	F	68	16	10.9	10	200	0.707	0.636	0.283	0.141	0.127	0.057
TPSY686*016#0150	Y	68	16	10.9	6	150	0.913	0.822	0.365	0.137	0.123	0.055
TPSY686*016#0200	Y	68	16	10.9	6	200	0.791	0.712	0.316	0.158	0.142	0.063
TPSY686*016#0250	Y	68	16	10.9	6	250	0.707	0.636	0.283	0.177	0.159	0.071
TPSX686*016#0150	X	68	16	10.9	8	150	0.816	0.735	0.327	0.122	0.110	0.049
TPSD107*016#0060	D	100	16	16	6	60	1.581	1.423	0.632	0.095	0.085	0.038
TPSD107*016#0100	D	100	16	16	6	100	1.225	1.102	0.490	0.122	0.110	0.049
TPSD107*016#0125	D	100	16	16	6	125	1.095	0.986	0.438	0.137	0.123	0.055
TPSD107*016#0150	D	100	16	16	6	150	1.000	0.900	0.400	0.150	0.135	0.060
TPSE107*016#0055	E	100	16	16	6	55	1.732	1.559	0.693	0.095	0.086	0.038
TPSE107*016#0100	E	100	16	16	6	100	1.285	1.156	0.514	0.128	0.116	0.051
TPSE107*016#0125	E	100	16	16	6	125	1.149	1.034	0.460	0.144	0.129	0.057
TPSE107*016#0150	E	100	16	16	6	150	1.049	0.944	0.420	0.157	0.142	0.063
TPSF107M016#0150	F	100	16	16	10	150	0.816	0.735	0.327	0.122	0.110	0.049
TPSF107M016#0200	F	100	16	16	10	200	0.707	0.636	0.283	0.141	0.127	0.057
TPSY107*016#0100	Y	100	16	24	6	100	1.118	1.006	0.447	0.112	0.101	0.045
TPSY107*016#0150	Y	100	16	16	8	150	0.913	0.822	0.365	0.137	0.123	0.055
TPSY107*016#0200	Y	100	16	16	8	200	0.791	0.712	0.316	0.158	0.142	0.063
TPSD157*016#0060	D	150	16	24	6	60	1.581	1.423	0.632	0.095	0.085	0.038
TPSD157*016#0085	D	150	16	24	6	85	1.328	1.196	0.531	0.113	0.102	0.045
TPSD157*016#0100	D	150	16	24	6	100	1.225	1.102	0.490	0.122	0.110	0.049
TPSD157*016#0125	D	150	16	24	6	125	1.095	0.986	0.438	0.137	0.123	0.055
TPSD157*016#0150	D	150	16	24	6	150	1.000	0.900	0.400	0.150	0.135	0.060
TPSE157*016#0100	E	150	16	24	6	100	1.285	1.156	0.514	0.128	0.116	0.051
TPSV157*016#0045	V	150	16	24	8	45	2.357	2.121	0.943	0.106	0.095	0.042
TPSV157*016#0075	V	150	16	24	8	75	1.826	1.643	0.730	0.137	0.123	0.055
TPSY157M016#0200	Y	150	16	24	15	200	0.791	0.712	0.316	0.158	0.142	0.063
TPSE227*016#0100	E	220	16	35.2	10	100	1.285	1.156	0.514	0.128	0.116	0.051
TPSE227*016#0150	E	220	16	35.2	10	150	1.049	0.944	0.420	0.157	0.142	0.063

All technical data relates to an ambient temperature of +25°C.
Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.
* Insert K for ±10% and M for ±20% Capacitance Tolerance

Standard Plating – Insert R for 7" reel and S for 13" reel
Gold Plating – Insert A for 7" reel and B for 13" reel

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	DCL (µA) Max.	DF % Max.	ESR Max. (mΩ) @100kHz	100kHz Ripple Current Ratings (A)			100kHz Ripple Voltage Ratings (V)		
							25ºC	85ºC	125ºC	25ºC	85ºC	125ºC
TPSV227*016#0050	V	220	16	35.2	8	50	2.236	2.012	0.894	0.112	0.101	0.045
TPSV227*016#0075	V	220	16	35.2	8	75	1.826	1.643	0.730	0.137	0.123	0.055
TPSV227*016#0100	V	220	16	35.2	8	100	1.581	1.423	0.632	0.158	0.142	0.063
TPSV227*016#0150	V	220	16	35.2	8	150	1.291	1.162	0.516	0.194	0.174	0.077
TPSA105*020#3000	A	1	20	0.5	4	3000	0.158	0.142	0.063	0.474	0.427	0.190
TPSS105*020#6000	S	1	20	0.5	4	6000	0.104	0.094	0.042	0.624	0.562	0.250
TPSR105*020#6000	R	1	20	0.5	4	6000	0.096	0.086	0.038	0.574	0.517	0.230
TPST105*020#2000	T	1	20	0.5	4	2000	0.200	0.180	0.080	0.400	0.360	0.160
TPSA225*020#3000	A	2.2	20	0.5	6	3000	0.158	0.142	0.063	0.474	0.427	0.190
TPSA335*020#2500	A	3.3	20	0.7	6	2500	0.173	0.156	0.069	0.433	0.390	0.173
TPSB335*020#1300	B	3.3	20	0.7	6	1300	0.256	0.230	0.102	0.332	0.299	0.133
TPSA475*020#1800	A	4.7	20	0.9	6	1800	0.204	0.184	0.082	0.367	0.331	0.147
TPSB475*020#0750	B	4.7	20	0.9	6	750	0.337	0.303	0.135	0.252	0.227	0.101
TPSB475*020#1000	B	4.7	20	0.9	6	1000	0.292	0.262	0.117	0.292	0.262	0.117
TPSA685*020#1000	A	6.8	20	1.4	6	1000	0.274	0.246	0.110	0.274	0.246	0.110
TPSB685*020#0600	B	6.8	20	1.4	6	600	0.376	0.339	0.151	0.226	0.203	0.090
TPSB685*020#1000	B	6.8	20	1.4	6	1000	0.292	0.262	0.117	0.292	0.262	0.117
TPSC685*020#0700	C	6.8	20	1.4	6	700	0.396	0.357	0.159	0.277	0.250	0.111
TPSB106*020#0500	B	10	20	2	6	500	0.412	0.371	0.165	0.206	0.186	0.082
TPSB106*020#1000	B	10	20	2	6	1000	0.292	0.262	0.117	0.292	0.262	0.117
TPSC106*020#0500	C	10	20	2	6	500	0.469	0.422	0.188	0.235	0.211	0.094
TPSC106*020#0700	C	10	20	2	6	700	0.396	0.357	0.159	0.277	0.250	0.111
TPSB156*020#0500	B	15	20	3	6	500	0.412	0.371	0.165	0.206	0.186	0.082
TPSC156*020#0400	C	15	20	3	6	400	0.524	0.472	0.210	0.210	0.189	0.084
TPSC156*020#0450	C	15	20	3	6	450	0.494	0.445	0.198	0.222	0.200	0.089
TPSB226*020#0400	B	22	20	4.4	6	400	0.461	0.415	0.184	0.184	0.166	0.074
TPSB226*020#0600	B	22	20	4.4	6	600	0.376	0.339	0.151	0.226	0.203	0.090
TPSC226*020#0100	C	22	20	4.4	6	100	1.049	0.944	0.420	0.105	0.094	0.042
TPSC226*020#0150	C	22	20	4.4	6	150	0.856	0.771	0.343	0.128	0.116	0.051
TPSC226*020#0400	C	22	20	4.4	6	400	0.524	0.472	0.210	0.210	0.189	0.084
TPSD226*020#0200	D	22	20	4.4	6	200	0.866	0.779	0.346	0.173	0.156	0.069
TPSD226*020#0300	D	22	20	4.4	6	300	0.707	0.636	0.283	0.212	0.191	0.085
TPSC336*020#0300	C	33	20	6.6	6	300	0.606	0.545	0.242	0.182	0.163	0.073
TPSD336*020#0100	D	33	20	6.6	6	100	1.225	1.102	0.490	0.122	0.110	0.049
TPSD336*020#0200	D	33	20	6.6	6	200	0.866	0.779	0.346	0.173	0.155	0.069
TPSD476*020#0075	D	47	20	9.4	6	75	1.414	1.273	0.566	0.106	0.095	0.042
TPSD476*020#0100	D	47	20	9.4	6	100	1.225	1.102	0.490	0.122	0.110	0.049
TPSD476*020#0200	D	47	20	9.4	6	200	0.866	0.779	0.346	0.173	0.156	0.069
TPSE476*020#0070	E	47	20	9.4	6	70	1.535	1.382	0.614	0.107	0.097	0.043
TPSE476*020#0125	E	47	20	9.4	6	125	1.149	1.034	0.460	0.144	0.129	0.057
TPSE476*020#0150	E	47	20	9.4	6	150	1.049	0.944	0.420	0.157	0.142	0.063
TPSE476*020#0200	E	47	20	9.4	6	200	0.908	0.817	0.363	0.182	0.163	0.073
TPSE476*020#0250	E	47	20	9.4	6	250	0.812	0.731	0.325	0.203	0.183	0.081
TPSD686*020#0070	D	68	20	13.6	6	70	1.464	1.317	0.586	0.102	0.092	0.041
TPSD686*020#0150	D	68	20	13.6	6	150	1.000	0.900	0.400	0.150	0.135	0.060
TPSD686*020#0200	D	68	20	13.6	6	200	0.866	0.779	0.346	0.173	0.156	0.069
TPSD686*020#0300	D	68	20	13.6	6	300	0.707	0.636	0.283	0.212	0.191	0.085
TPSE686*020#0125	E	68	20	13.6	6	125	1.149	1.034	0.460	0.144	0.129	0.057
TPSE686*020#0150	E	68	20	13.6	6	150	1.049	0.944	0.420	0.157	0.142	0.063
TPSE686*020#0200	E	68	20	13.6	6	200	0.908	0.817	0.363	0.182	0.163	0.073
TPSD107*020#0085	D	100	20	20	6	85	1.328	1.196	0.531	0.113	0.102	0.045
TPSD107*020#0100	D	100	20	20	6	100	1.225	1.102	0.490	0.122	0.110	0.049
TPSD107*020#0150	D	100	20	20	6	150	1.000	0.900	0.400	0.150	0.135	0.060
TPSE107*020#0100	E	100	20	20	6	100	1.285	1.156	0.514	0.128	0.116	0.051
TPSE107*020#0150	E	100	20	20	6	150	1.049	0.944	0.420	0.157	0.142	0.063
TPSE107*020#0200	E	100	20	20	6	200	0.908	0.817	0.363	0.182	0.163	0.073
TPSV107*020#0060	V	100	20	20	8	60	2.041	1.837	0.816	0.122	0.110	0.049
TPSV107*020#0085	V	100	20	20	8	85	1.715	1.543	0.686	0.146	0.131	0.058
TPSV107*020#0100	V	100	20	20	8	100	1.581	1.423	0.632	0.158	0.142	0.063
TPSV107*020#0200	V	100	20	20	8	200	1.118	1.006	0.447	0.224	0.201	0.089
TPSV157*020#0080	V	150	20	30	8	80	1.768	1.591	0.707	0.141	0.127	0.057
TPSA474*025#7000	A	0.47	25	0.5	4	7000	0.104	0.093	0.041	0.725	0.652	0.290
TPSA684*025#6000	A	0.68	25	0.5	4	6000	0.112	0.101	0.045	0.671	0.604	0.268
TPSR105*025#2500	R	1	25	0.5	4	2500	0.148	0.133	0.059	0.371	0.334	0.148
TPSR105*025#4000	R	1	25	0.5	4	4000	0.117	0.106	0.047	0.469	0.422	0.188
TPSA155*025#3000	A	1.5	25	0.5	6	3000	0.158	0.142	0.063	0.474	0.427	0.190
TPSB155*025#1800	B	1.5	25	0.5	6	1800	0.217	0.196	0.087	0.391	0.352	0.156
TPSB225*025#0900	B	2.2	25	0.6	6	900	0.307	0.277	0.123	0.277	0.249	0.111

All technical data relates to an ambient temperature of +25°C.
Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.
* Insert K for ±10% and M for ±20% Capacitance Tolerance

 # Standard Plating – Insert R for 7" reel and S for 13" reel
 # Gold Plating – Insert A for 7" reel and B for 13" reel

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	DCL (µA) Max.	DF % Max.	ESR Max. (mΩ) @100kHz	100kHz Ripple Current Ratings (A)			100kHz Ripple Voltage Ratings (V)		
							25ºC	85ºC	125ºC	25ºC	85ºC	125ºC
TPSB225*025#1200	B	2.2	25	0.6	6	1200	0.266	0.240	0.106	0.319	0.287	0.128
TPSB225*025#2500	B	2.2	25	0.6	6	2500	0.184	0.166	0.074	0.461	0.415	0.184
TPSA335*025#1000	A	3.3	25	0.8	6	1000	0.274	0.246	0.110	0.274	0.246	0.110
TPSA335*025#1500	A	3.3	25	0.8	6	1500	0.224	0.201	0.089	0.335	0.302	0.134
TPSB335*025#0750	B	3.3	25	0.8	6	750	0.337	0.303	0.135	0.252	0.227	0.101
TPSB335*025#1500	B	3.3	25	0.8	6	1500	0.238	0.214	0.095	0.357	0.321	0.143
TPSB335*025#2000	B	3.3	25	0.8	6	2000	0.206	0.186	0.082	0.412	0.371	0.165
TPSB475*025#0700	B	4.7	25	1.2	6	700	0.348	0.314	0.139	0.244	0.220	0.098
TPSB475*025#0900	B	4.7	25	1.2	6	900	0.307	0.277	0.123	0.277	0.249	0.111
TPSB475*025#1500	B	4.7	25	1.2	6	1500	0.238	0.214	0.095	0.357	0.321	0.143
TPSB685*025#0700	B	6.8	25	1.7	6	700	0.348	0.314	0.139	0.244	0.220	0.098
TPSC685*025#0500	C	6.8	25	1.7	6	500	0.469	0.422	0.188	0.235	0.211	0.094
TPSC685*025#0600	C	6.8	25	1.7	6	600	0.428	0.385	0.171	0.257	0.231	0.103
TPSC685*025#0700	C	6.8	25	1.7	6	700	0.396	0.357	0.159	0.277	0.250	0.111
TPSC106*025#0300	C	10	25	2.5	6	300	0.606	0.545	0.242	0.182	0.163	0.073
TPSC106*025#0500	C	10	25	2.5	6	500	0.469	0.422	0.188	0.235	0.211	0.094
TPSC156*025#0220	C	15	25	3.8	6	220	0.707	0.636	0.283	0.156	0.140	0.062
TPSC156*025#0300	C	15	25	3.8	6	300	0.606	0.545	0.242	0.182	0.163	0.073
TPSD156*025#0100	D	15	25	3.8	6	100	1.225	1.102	0.490	0.122	0.110	0.049
TPSD156*025#0300	D	15	25	3.8	6	300	0.707	0.636	0.283	0.212	0.191	0.085
TPSC226*025#0275	C	22	25	5.5	6	275	0.632	0.569	0.253	0.174	0.157	0.070
TPSC226*025#0400	C	22	25	5.5	6	400	0.524	0.472	0.210	0.210	0.189	0.084
TPSD226*025#0100	D	22	25	5.5	6	100	1.225	1.102	0.490	0.122	0.110	0.049
TPSD226*025#0200	D	22	25	5.5	6	200	0.866	0.779	0.346	0.173	0.156	0.069
TPSD226*025#0300	D	22	25	5.5	6	300	0.707	0.636	0.283	0.212	0.191	0.085
TPSD336*025#0100	D	33	25	8.3	6	100	1.225	1.102	0.490	0.122	0.110	0.049
TPSD336*025#0200	D	33	25	8.3	6	200	0.866	0.779	0.346	0.173	0.156	0.069
TPSD336*025#0300	D	33	25	8.3	6	300	0.707	0.636	0.283	0.212	0.191	0.085
TPSE336*025#0100	E	33	25	8.3	6	100	1.285	1.156	0.514	0.128	0.116	0.051
TPSE336*025#0175	E	33	25	8.3	6	175	0.971	0.874	0.388	0.170	0.153	0.068
TPSE336*025#0200	E	33	25	8.3	6	200	0.908	0.817	0.363	0.182	0.163	0.073
TPSE336*025#0300	E	33	25	8.3	6	300	0.742	0.667	0.297	0.222	0.200	0.089
TPSY336*025#0200	Y	33	25	8.3	6	200	0.791	0.712	0.316	0.158	0.142	0.063
TPSD476*025#0125	D	47	25	11.8	6	125	1.095	0.986	0.438	0.137	0.123	0.055
TPSD476*025#0150	D	47	25	11.8	6	150	1.000	0.900	0.400	0.150	0.135	0.060
TPSD476*025#0250	D	47	25	11.8	6	250	0.775	0.697	0.310	0.194	0.174	0.077
TPSE476*025#0080	E	47	25	8.3	6	80	1.436	1.293	0.574	0.115	0.103	0.046
TPSE476*025#0100	E	47	25	8.3	6	100	1.285	1.156	0.514	0.128	0.116	0.051
TPSE476*025#0125	E	47	25	8.3	6	125	1.149	1.034	0.460	0.144	0.129	0.057
TPSE686*025#0125	E	68	25	17	6	125	1.149	1.034	0.460	0.144	0.129	0.057
TPSE686*025#0200	E	68	25	17	6	200	0.908	0.817	0.363	0.182	0.163	0.073
TPSV686*025#0080	V	68	25	17	6	80	1.768	1.591	0.707	0.141	0.127	0.057
TPSV686*025#0095	V	68	25	17	6	95	1.622	1.460	0.649	0.154	0.139	0.062
TPSV686*025#0150	V	68	25	17	6	150	1.291	1.162	0.516	0.194	0.174	0.077
TPSV686*025#0200	V	68	25	17	6	200	1.118	1.006	0.447	0.224	0.201	0.089
TPSV107*025#0100	V	100	25	25	8	100	1.581	1.423	0.632	0.158	0.142	0.063
TPSA224*035#6000	A	0.22	35	0.5	4	6000	0.112	0.101	0.045	0.671	0.604	0.268
TPSA334*035#6000	A	0.33	35	0.5	4	6000	0.112	0.101	0.045	0.671	0.604	0.268
TPSA474*035#6000	A	0.47	35	0.5	4	6000	0.112	0.101	0.045	0.671	0.604	0.268
TPSB474*035#4000	B	0.47	35	0.5	4	4000	0.146	0.131	0.058	0.583	0.525	0.233
TPSA684*035#6000	A	0.68	35	0.5	4	6000	0.112	0.101	0.045	0.671	0.604	0.268
TPSA105*035#3000	A	1	35	0.5	4	3000	0.158	0.142	0.063	0.474	0.427	0.190
TPSB105*035#2000	B	1	35	0.5	4	2000	0.206	0.186	0.082	0.412	0.371	0.165
TPSB155*035#2500	B	1.5	35	0.5	6	2500	0.184	0.166	0.074	0.461	0.415	0.184
TPSA225*035#1500	A	2.2	35	0.8	6	1500	0.224	0.201	0.089	0.335	0.302	0.134
TPSB225*035#0750	B	2.2	35	0.8	6	750	0.337	0.303	0.135	0.252	0.227	0.101
TPSB225*035#1500	B	2.2	35	0.8	6	1500	0.238	0.214	0.095	0.357	0.321	0.143
TPSB225*035#2000	B	2.2	35	0.8	6	2000	0.206	0.186	0.082	0.412	0.371	0.165
TPSC225*035#1000	C	2.2	35	0.8	6	1000	0.332	0.298	0.133	0.332	0.298	0.133
TPSB335*035#1000	B	3.3	35	1.2	6	1000	0.292	0.262	0.117	0.292	0.262	0.117
TPSC335*035#0700	C	3.3	35	1.2	6	700	0.396	0.357	0.159	0.277	0.250	0.111
TPSB475*035#0700	B	4.7	35	1.2	6	700	0.348	0.314	0.139	0.244	0.220	0.098
TPSB475*035#1500	B	4.7	35	1.2	6	1500	0.238	0.214	0.095	0.357	0.321	0.143
TPSC475*035#0600	C	4.7	35	1.6	6	600	0.428	0.385	0.171	0.257	0.231	0.103
TPSC685*035#0350	C	6.8	35	2.4	6	350	0.561	0.505	0.224	0.196	0.177	0.078
TPSD685*035#0150	D	6.8	35	2.4	6	150	1.000	0.900	0.400	0.150	0.135	0.060
TPSD685*035#0400	D	6.8	35	2.4	6	400	0.612	0.551	0.245	0.245	0.220	0.098
TPSD685*035#0500	D	6.8	35	2.4	6	500	0.548	0.493	0.219	0.274	0.246	0.110

All technical data relates to an ambient temperature of +25°C.
Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.
* Insert K for ±10% and M for ±20% Capacitance Tolerance

Standard Plating – Insert R for 7" reel and S for 13" reel
Gold Plating – Insert A for 7" reel and B for 13" reel

RATINGS & PART NUMBER REFERENCE

AVX Part No.	Case Size	Capacitance (µF)	Rated Voltage (V)	DCL (µA) Max.	DF % Max.	ESR Max. (mΩ) @100kHz	100kHz Ripple Current Ratings (A)			100kHz Ripple Voltage Ratings (V)		
							25ºC	85ºC	125ºC	25ºC	85ºC	125ºC
TPSD106*035#0125	D	10	35	3.5	6	125	1.095	0.986	0.438	0.137	0.123	0.055
TPSD106*035#0300	D	10	35	3.5	6	300	0.707	0.636	0.283	0.212	0.191	0.085
TPSE106*035#0200	E	10	35	3.5	6	200	0.908	0.817	0.363	0.182	0.163	0.073
TPSC156*035#0350	C	15	35	5.3	6	350	0.561	0.505	0.224	0.196	0.177	0.078
TPSC156*035#0450	C	15	35	5.3	6	450	0.494	0.445	0.198	0.222	0.200	0.089
TPSD156*035#0100	D	15	35	5.3	6	100	1.225	1.102	0.490	0.122	0.110	0.049
TPSD156*035#0300	D	15	35	5.3	6	300	0.707	0.636	0.283	0.212	0.191	0.085
TPSY156*035#0250	Y	15	35	5.3	6	250	0.707	0.636	0.283	0.177	0.159	0.071
TPSD226*035#0125	D	22	35	7.7	6	125	1.095	0.986	0.438	0.137	0.123	0.055
TPSD226*035#0200	D	22	35	7.7	6	200	0.866	0.779	0.346	0.173	0.156	0.069
TPSD226*035#0300	D	22	35	7.7	6	300	0.707	0.636	0.283	0.212	0.191	0.085
TPSD226*035#0400	D	22	35	7.7	6	400	0.612	0.551	0.245	0.245	0.220	0.098
TPSE226*035#0125	E	22	35	7.7	6	125	1.149	1.034	0.460	0.144	0.129	0.057
TPSE226*035#0200	E	22	35	7.7	6	200	0.908	0.817	0.363	0.182	0.163	0.073
TPSE226*035#0300	E	22	35	7.7	6	300	0.742	0.667	0.297	0.222	0.200	0.089
TPSY226*035#0200	Y	22	35	7.7	6	200	0.791	0.712	0.316	0.158	0.142	0.063
TPSD336*035#0200	D	33	35	11.6	6	200	0.866	0.779	0.346	0.173	0.156	0.069
TPSD336*035#0300	D	33	35	11.6	6	300	0.707	0.636	0.283	0.212	0.191	0.085
TPSE336*035#0100	E	33	35	11.6	6	100	1.285	1.156	0.514	0.128	0.116	0.051
TPSE336*035#0250	E	33	35	11.6	6	250	0.812	0.731	0.325	0.203	0.183	0.081
TPSE336*035#0300	E	33	35	11.6	6	300	0.742	0.667	0.297	0.222	0.200	0.089
TPSV336*035#0200	V	33	35	11.6	6	200	1.118	1.006	0.447	0.224	0.201	0.089
TPSE476*035#0200	E	47	35	16.5	6	200	0.908	0.817	0.363	0.182	0.163	0.073
TPSE476*035#0250	E	47	35	16.5	6	250	0.812	0.731	0.325	0.203	0.183	0.081
TPSV476*035#0150	V	47	35	16.5	6	150	1.291	1.162	0.516	0.194	0.174	0.077
TPSV476*035#0200	V	47	35	16.5	6	200	1.118	1.006	0.447	0.224	0.201	0.089
TPSV686M035#0150	V	68	35	23.8	6	150	1.291	1.162	0.516	0.194	0.174	0.077
TPSV686M035#0200	V	68	35	23.8	6	200	1.118	1.006	0.447	0.224	0.201	0.089
TPSA154*050#9000	A	0.15	50	0.5	4	9000	0.091	0.082	0.037	0.822	0.739	0.329
TPSA224*050#7000	A	0.22	50	0.5	4	7000	0.104	0.093	0.041	0.725	0.652	0.290
TPSC105*050#2500	C	1	50	0.5	4	2500	0.210	0.189	0.084	0.524	0.472	0.210
TPSC155*050#1500	C	1.5	50	0.8	6	1500	0.271	0.244	0.108	0.406	0.366	0.162
TPSC155*050#2000	C	1.5	50	0.8	6	2000	0.235	0.211	0.094	0.469	0.422	0.188
TPSD225*050#1200	D	2.2	50	1.1	6	1200	0.354	0.318	0.141	0.424	0.382	0.170
TPSD335*050#0800	D	3.3	50	1.7	6	800	0.433	0.390	0.173	0.346	0.312	0.139
TPSD475*050#0300	D	4.7	50	2.4	6	300	0.707	0.636	0.283	0.212	0.191	0.085
TPSD475*050#0500	D	4.7	50	2.4	6	500	0.548	0.493	0.219	0.274	0.246	0.110
TPSD475*050#0700	D	4.7	50	2.4	6	700	0.463	0.417	0.185	0.324	0.292	0.130
TPSD685*050#0200	D	6.8	50	3.4	6	200	0.866	0.779	0.346	0.173	0.156	0.069
TPSD685*050#0300	D	6.8	50	3.4	6	300	0.707	0.636	0.283	0.212	0.191	0.085
TPSD685*050#0500	D	6.8	50	3.4	6	500	0.548	0.493	0.219	0.274	0.246	0.110
TPSD685*050#0600	D	6.8	50	3.4	6	600	0.500	0.450	0.200	0.300	0.270	0.120
TPSE106*050#0400	E	10	50	5	6	400	0.642	0.578	0.257	0.257	0.231	0.103
TPSE106*050#0500	E	10	50	5	6	500	0.574	0.517	0.230	0.287	0.259	0.115
TPSE156*050#0250	E	15	50	5	6	250	0.812	0.731	0.325	0.203	0.183	0.081

All technical data relates to an ambient temperature of +25°C.
Capacitance and DF are measured at 120Hz, 0.5V RMS with a maximum DC bias of 2.2 volts. DCL is measured at rated voltage after 5 minutes.
* Insert K for ±10% and M for ±20% Capacitance Tolerance

 # Standard Plating – Insert R for 7" reel and S for 13" reel
 # Gold Plating – Insert A for 7" reel and B for 13" reel

Conductive polymer type

SVPB Series Low profile

This is a low profile series based on the SVPA series. Suitable for miniaturizing devices and circuits.
This product can support lead free-reflow (※2).

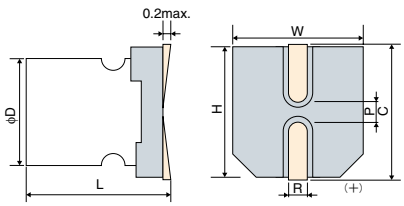
■Specifications

Marking : Polarity(⊖), Rated voltage, (Purple) PB Rated capacitance, Lot.No.

Items	Conditions	Characteristics		
Category temperature range	—	-55°C to +105°C		
Tolerance on rated capacitance	120Hz	M :±20%		
Tangent of loss angle	120Hz	Less than or equal to the value of Table4		
Leakage current ※1	After 2 minutes	Less than or equal to the value of Table4		
ESR	—	Less than or equal to the value of Table4		
Characteristics of impedance ratio at high temp. and low temp.	Based the value at 100KHz, +20°C	-55°C	Z / Z 20°C	0.75 to 1.25
		+105°C	Z / Z 20°C	0.75 to 1.25
Endurance	105°C, 1,000h, Rated voltage applied	ΔC/C	Within ±20% (±30% for C5 size)	
		tanδ	1.5 times or less than an initial standard	
		ESR	1.5 times or less than an initial standard	
		Leakage current	Below an initial standard	
Damp heat (Steady state)	60°C, 90 to 95% RH, 1,000h, No-applied voltage	ΔC/C	Within ±20%	
		tanδ	1.5 times or less than an initial standard	
		ESR	1.5 times or less than an initial standard	
		Leakage current	Below an initial standard (after voltage processing)	
Resistance to soldering heat ※2	(VPS) (230°C X 75s)	ΔC/C	Within ±10% (±20% for C5 size)	
		tanδ	1.3 times or less than an initial standard	
		ESR	1.3 times or less than an initial standard	
		Leakage current	Below an initial standard (after voltage processing)	

※1 In case of some problems for measured values, measure after applying rated voltage for 120 minutes at 105°C .
※2 Refer to Page 56 for reflow soldering conditions.

■Dimensions



(unit : mm)

Size Code	φD±0.5	L +0.1 -0.4	W±0.2	H±0.2	C±0.2	R	P±0.2
C5	6.3	4.9	6.6	6.6	7.3	0.6 to 0.8	2.1
C55	6.3	5.4	6.6	6.6	7.3	0.6 to 0.8	2.1

■Size List

RV : Rated voltage (SV) : Surge (room temperature)

μF \ RV (SV)	2.5 (3.3)	4.0 (5.2)	6.3 (8.2)	10.0 (11.5)	16.0 (18.4)	20.0 (23.0)
15						C5
22						C55
33					C5	
56				C5		
82			C5			
100		C5				
120	C5					

※For the minimum packing quantity, please refer to page 55.

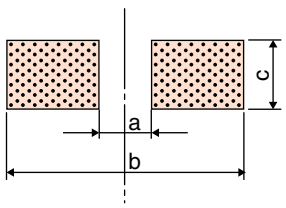
■Table4 SVPB Series Characteristics List

Size Code	Part Number ※1	Rated Voltage (V)	Rated Capacitance (μF)	ESR 100kHz to 300kHz (mΩ) (max.)	Rated ripple current 100kHz (mArms) at 105°C	Tangent of loss angle (max.)	Leakage current (μA) (max.)※2
C5	20SVPB15M	20	15	45	2000	0.12	120
	16SVPB33M	16	33	40	1670	0.12	211
	10SVPB56M	10	56	40	1670	0.12	224
	6SVPB82M	6.3	82	40	1670	0.12	207
	4SVPB100M	4	100	40	1670	0.12	160
	2R5SVPB120M	2.5	120	40	1670	0.12	120
C55	20SVPB22M	20	22	35	2000	0.12	88

※1 Capacitance tolerance : M ±20%
※2 After 2 minutes

●The C5 size is also available upon request as a radial lead type. Please contact us if this type is required. Maximum height for radial lead types is 4.5 mm.
●The C55 size is also available upon request as 4V and 6.3V products.

■Recommended land pattern dimension of PWB



(unit : mm)

Size Code	a	b	c
C5	2.1	9.1	1.6
C55	2.1	9.1	1.6

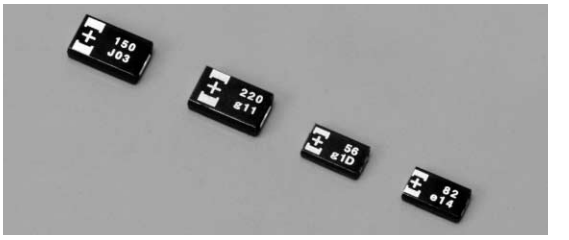
Frequency coefficient for ripple current

Frequency	120Hz≦ f ＜1kHz	1kHz≦ f ＜10kHz	10kHz≦ f ＜100kHz	100kHz≦ f ≦500kHz
Coefficient	0.05	0.3	0.7	1

TPC Series

Low Profile Products

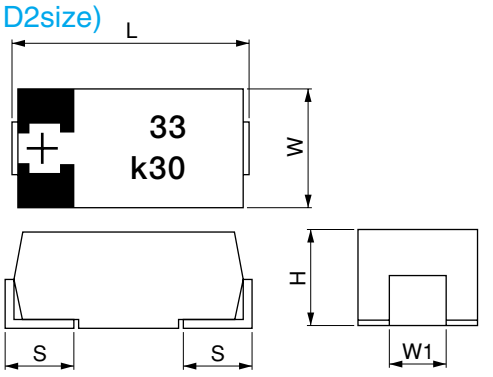
TPC series has low profile and low ESR. TPC series aids in the miniaturization of any products.



Specifications

Items	Condition	Characteristics		
Operating Temperature range	–	−55 to +105 (℃)		
Rated capacitance range	120Hz/20℃	33 to 330 (μF)		
Capacitance tolerance	120Hz/20℃	M:±20%		
Rated voltage	–	2.5 to 10 (V.DC)		
Dissipation Factor (D.F.)	120Hz/20℃	≦10.0 (%)		
Leakage current	Rated voltage applied, after 5 minutes	≦0.1CV (μA)		
Equivalent series resistance ESR (mΩmax.)	100kHz/20℃	Please see the attached characteristics list		
Temperature characteristics of Impedance ratio	100kHz/+20℃	−55℃	Z/Z20℃	1.0 to 2.0
		+105℃	Z/Z20℃	0.6 to 1.0
Endurance	105℃,2000h, rated voltage applied C1 size:1000h	△C/C		Within±20% of the initial value
		D.F.		≦1.5 times the initial limit
		L.C.		≦The initial limit
Damp heat (Steady state)	60℃,90 to 95%RH,500h, No voltage applied	△C/C		Within+40%, −20% of the initial value
		D.F.		≦1.5 times the initial limit
		L.C.		≦3 times the initial limit
Surge	105℃,1000 cycles, 1kΩdischarge resistance, surge voltage applied	△C/C		Within±5% of the initial value
		D.F.		≦The initial limit
		L.C.		≦3 times the initial limit

Dimensions (unit: mm) (C1, D2size)



Size code	L (±0.2)	W (±0.2)	H (±0.1)	S (±0.2)	W1 (±0.1)
C1	6.0	3.2	1.4	1.3	1.8
D2	7.3	4.3	1.9	1.3	2.4

Size List

μF \ RV (SV)	2.5 (3.2)	4.0 (5.0)	6.3 (8.0)	8.0 (10.0)	10.0 (13.0)
33				C1	
56		C1			
68			C1		D2
82	C1				
100		C1	D2,C1		D2
150		D2	D2	D2	
220	D2	D2			
330	D2				

TPC Series

Characteristics List

Size code	SANYO Part number	Rated Voltage (V)	Rated Capacitance (μF)	D.F. (%max.)	L.C. (μA) max./5min.	E.S.R. (mΩmax) 100kHz/20℃	Maximum allowable ripple current (mArms) 100kHz※1	MSL Reflow Temp. ≦260℃	MSL Reflow Temp. ≦250℃
C1	8TPC33M	8.0	33	10.0	26.4	70	1200	3	3
	6TPC68M	6.3	68	10.0	42.8	55	1300		
	6TPC100MC	6.3	100	10.0	63.0	55	1300		
	4TPC56M	4.0	56	10.0	22.4	70	1200		
	4TPC100M	4.0	100	10.0	40.0	55	1300		
	2R5TPC82M	2.5	82	10.0	20.5	70	1200		
D2	10TPC68M	10.0	68	10.0	68.0	45	1700	3	2a
	10TPC100M	10.0	100	10.0	100.0	45	1700		
	8TPC150M	8.0	150	10.0	120.0	40	1900		
	6TPC100M	6.3	100	10.0	63.0	45	1700		
	6TPC150M	6.3	150	10.0	94.5	40	1900		
	4TPC150M	4.0	150	10.0	60.0	45	1700		
	4TPC220M	4.0	220	10.0	88.0	40	1900		
	2R5TPC220M	2.5	220	10.0	55.0	45	1700		
	2R5TPC330M	2.5	330	10.0	82.5	40	1900		

※1:100k to 500kHz,45 ℃

SVP Series

Standard SMD type

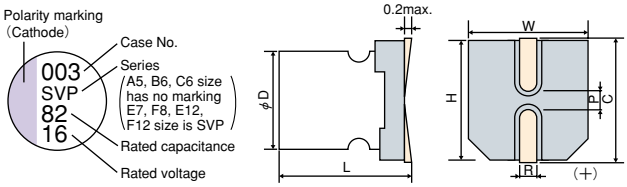
Standard SMD type product
Use for surface mounted type switching power supplies.
This product can support lead free-reflow.(※2).

■Specifications

Items	Conditions	Characteristics		
Category temperature range	—	-55°C to +105°C		
Tolerance on rated capacitance	120Hz	M: ±20%		
Tangent of loss angle	120Hz	Less than or equal to the value of Table7		
Leakage current ※1	After 2 minutes	Less than or equal to the value of Table7		
ESR	—	Less than or equal to the value of Table7		
Characteristics of impedance ratio at high temp. and low temp.	Based the value at 100KHz, +20°C	-55°C	Z / Z 20°C	0.75 to 1.25
		+105°C	Z / Z 20°C	0.75 to 1.25
Endurance	105°C, 2,000h, Rated voltage applied (25V→20V applied)	ΔC/C	Within ±20%	
		tanδ	1.5 times or less than an initial standard	
		ESR	1.5 times or less than an initial standard	
		Leakage current	Below an initial standard	
Damp heat (Steady state)	60°C, 90 to 95%RH, 1,000h, No-applied voltage	ΔC/C	Within ±20%	
		tanδ	1.5 times or less than an initial standard	
		ESR	1.5 times or less than an initial standard	
		Leakage current	Below an initial standard (after voltage processing)	
Resistance to soldering heat ※2	(VPS) (230°C X 75s)	ΔC/C	Within ±10%	
		tanδ	1.3 times or less than an initial standard	
		ESR	1.3 times or less than an initial standard	
		Leakage current	Below an initial standard (after voltage processing)	

※1 In case of some problems for measured values, measure after applying rated voltage for 2.5 to 20V products or 20V for 25V products for 120 minutes at 105°C .
※2 Refer to Page 14-15 for reflow soldering conditions.

■Marking and dimensions



(unit : mm)

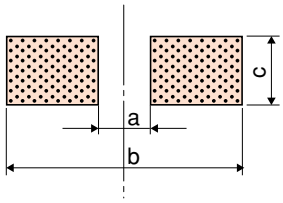
Size Code	φD±0.5	L +0.1 -0.4	W±0.2	H±0.2	C±0.2	R	P±0.2
A5	4.0	5.4	4.3	4.3	5.0	0.6 to 0.8	1.0
B6	5.0	5.9	5.3	5.3	6.0	0.6 to 0.8	1.4
C6	6.3	5.9	6.6	6.6	7.3	0.6 to 0.8	2.1
E7	8.0	6.9	8.3	8.3	9.0	0.6 to 0.8	3.2
F8	10.0	7.9	10.3	10.3	11.0	0.6 to 0.8	4.6
E12	8.0	11.9	8.3	8.3	9.0	0.8 to 1.1	3.2
F12	10.0	12.6	10.3	10.3	11.0	0.8 to 1.1	4.6

■Size List RV : Rated voltage (SV) : Surge (room temperature)

μF \ RV (SV)	2.5 (3.3)	4 (5.2)	6.3 (8.2)	10 (11.5)	16 (18.4)	20 (23.0)	25 (25.0)
3.3					A5		
4.7				A5			
6.8				A5			C6
10				A5		B6	E7
15				A5	B6		
22			A5		B6	C6	F8
27						C6	
33		A5		B6		E7	E12
39		B6			C6		
47			B6	C6		E7	
56				C6	E7	F8	F12
68		B6				F8	
82			C6		E7		
100			C6		F8	E12	
120			C6	E7			
150		C6,E7		E7,F8	F8	F12	
180					F8,E12		
220	C6		E7,F8				
270				F8			
330		E7	F8	F8,E12	F12		
470			F8,E12				
560		E12		F12			
680	E12	F8					
820			F12				
1200		F12					
1500	F12						

※For the minimum packing quantity, please refer to page 55.

■Recommended land pattern dimension of PWB



(unit : mm)

Size Code	a	b	c
A5	1.0	6.2	1.6
B6	1.4	7.4	1.6
C6	2.1	9.1	1.6
E7	2.8	11.1	1.9
F8	4.3	13.1	1.9
E12	2.8	11.1	1.9
F12	4.3	13.1	1.9

■Table7 SVP Series Characteristics List

Size Code	Part Number ※1	Rated Voltage (V)	Rated Capacitance (μF)	ESR 100kHz to 300kHz (mΩ) (max.)	Rated ripple current (mArms)	Tangent of loss angle (max.)	Leakage current (μA) (max.)※2
A5	16SVP3R3M	16	3.3	260	660	0.07	26.4
	10SVP4R7M	10	4.7	240	670	0.08	23.5
	10SVP6R8M	10	6.8	240	670	0.09	34.0
	10SVP10M	10	10	220	700	0.10	50.0
	10SVP15M	10	15	200	740	0.10	75.0
	6SVP22M	6.3	22	200	740	0.12	69.3
	4SVP33M	4	33	200	740	0.15	66.0
B6	20SVP10M	20	10	120	1020	0.10	100
	16SVP15M	16	15	120	1020	0.10	120
	16SVP22M	16	22	90	1060	0.10	176
	10SVP33M	10	33	70	1100	0.12	165
	6SVP47M	6.3	47	70	1100	0.12	148
	4SVP39M	4	39	70	1100	0.12	78
	4SVP68M	4	68	60	1400	0.12	136
C6	25SVP6R8M ※3	25	6.8	80	1200	0.10	85
	20SVP22M	20	22	60	1450	0.10	88
	20SVP27M	20	27	60	1450	0.10	108
	16SVP39M	16	39	50	1620	0.10	125
	10SVP47M	10	47	50	1620	0.12	94
	10SVP56M	10	56	45	1700	0.12	112
	6SVP82M	6.3	82	45	1700	0.12	103
	6SVP100M	6.3	100	40	1810	0.12	126
	6SVP120MV	6.3	120	17	2780	0.12	151
	4SVP150MX	4	150	40	1810	0.12	120
	2R5SVP220M	2.5	220	23	2390	0.12	110
E7	25SVP10M ※3	25	10	60	1500	0.10	125
	20SVP33M	20	33	45	1890	0.12	132
	20SVP47M	20	47	45	1890	0.12	188
	16SVP56M	16	56	45	1890	0.12	179
	16SVP82M	16	82	40	2120	0.12	262
	10SVP120M	10	120	35	2560	0.12	240
	10SVP150MX	10	150	35	2560	0.12	300
	6SVP220MX	6.3	220	35	2560	0.12	277
	4SVP150M	4	150	35	2560	0.12	120
	4SVP330M	4	330	35	2560	0.12	264
F8	25SVP22M ※3	25	22	50	2000	0.10	275
	20SVP56M	20	56	40	2400	0.12	224
	20SVP68M	20	68	40	2400	0.12	272
	16SVP100M	16	100	35	2670	0.12	320
	16SVP150M	16	150	30	3020	0.12	480
	16SVP180MX	16	180	30	3020	0.12	576
	10SVP150M	10	150	30	3020	0.12	300
	10SVP270M	10	270	25	3700	0.12	540
	10SVP330MX	10	330	25	3700	0.12	660
	6SVP220M	6.3	220	25	3700	0.12	277
	6SVP330M	6.3	330	25	3700	0.12	416
	6SVP470MX	6.3	470	25	3700	0.12	592
	4SVP680M	4	680	25	3700	0.12	544
E12	25SVP33M ※3	25	33	30	2980	0.12	413
	20SVP100M	20	100	24	3320	0.15	400
	16SVP180M	16	180	20	3640	0.15	576
	10SVP330M	10	330	17	3950	0.15	660
	6SVP470M	6.3	470	15	4210	0.15	592
	4SVP560M	4	560	13	4520	0.15	448
	2R5SVP680M	2.5	680	13	4520	0.15	340
F12	25SVP56M ※3	25	56	28	3800	0.12	700
	20SVP150M	20	150	20	4320	0.15	600
	16SVP330M	16	330	16	4720	0.15	792
	10SVP560M	10	560	13	5230	0.15	840
	6SVP820M	6.3	820	12	5440	0.15	775
	4SVP1200M	4	1200	12	5440	0.18	960
	2R5SVP1500M	2.5	1500	12	5440	0.18	750

※1 Capacitance tolerance : M ±20%
※2 After 2 minutes
※3 The surge voltage of 25V products is 25V. Please consider SVPD series 25V products (whose surge voltage is 29V) in placing a new order.

Frequency coefficient for ripple current

Frequency	120Hz≦ f ＜1kHz	1kHz≦ f ＜10kHz	10kHz≦ f ＜100kHz	100kHz≦ f ≦500kHz
Coefficient	0.05	0.3	0.7	1

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SAMXON®

CUSTOMER: Intel	**DATE: March 14, 2006**
(客户) :	（日期）:

PRODUCT SPECIFICATION

規格書

CATEGORY(品名)**:** ALUMINUM ELECTROLYTIC CAPACITOR

DESCRIPTION(型号)**:** IPN: A46887-048

Samxon PN: GD 16V680μF(Φ10x12.5)

VERSION(版本)：00

MAN YUE	
PREPARED （拟定）	**CHECKED** （审核）
钟春梅	刘渭清

CUSTOMER	
APPROVAL （批准）	**SIGNATURE** （签名）

SPECIFICATION GD SERIES					ALTERNATION HISTORY RECORDS		
Rev.	Date	Mark	Page	Contents	Purpose	Disgn	Cnfm

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1. Application

This specification applies to polar Aluminum electrolytic capacitor (foil type) used in electronic equipment.

Designed capacitor's quality meets IEC60384.

2. Part Number System

E GD 687 M 1C G 1B RR R L P

- E — E-CAP
- GD — Series
- 687 — Capacitance (2.1)
- M — Tolerance (2.4)
- 1C — Voltage (2.2)
- G — Diameter (2.5)
- 1B — Case Length (2.6)
- RR — Type (2.3)
- R — (2.7)
- L — (2.8)
- P — (2.9)

2.1 Capacitance code

Code	**687**
Capacitance (μF)	680

2.2 Rated voltage code

Code	**1C**
Voltage (W.V.)	16

2.3 Type

Code	**RR**
Reference	Bulk

2.4 Capacitance tolerance

"M" stands for -20% ~ +20%

2.5 Diameter

Code	**G**
Diameter	10

2.6 Case length

1B=12.5mm

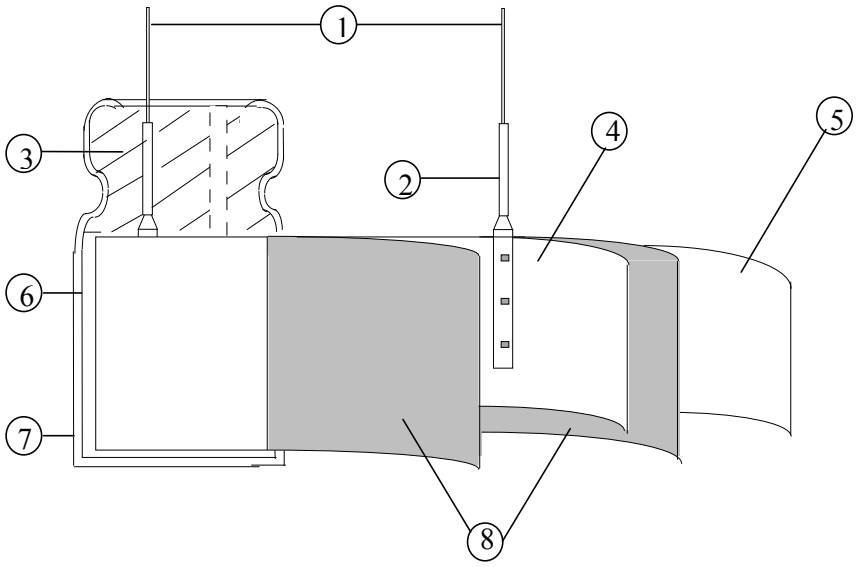
2.7 "R" on the 15th digit of the P/N indicates RoHs compliance part.

2.8 "L" is for internal use.

2.9 "P" indicates PET sleeving.

3. Construction

Single ended type to be produced to fix the terminals to anode and cathode foil, and wind together with paper, and then wound element to be impregnated with electrolyte will be enclosed in an aluminum case. Finally sealed up tightly with end seal rubber, then finished by putting on the vinyl sleeve.



No	Component	Material	SUPPLIER
1	Lead line	Tinned CP wire (Pb Free)	Kohoku, Genenic
2	Terminal	Aluminum wire	Kohoku, Genenic
3	Rubber seal	IIR / EPT	Qiang An, Lian Ming
4	Al-Foil (+)	Formed aluminum foil	Matsushita, JCC.
5	Al-Foil (-)	Etched aluminum foil or formed aluminum foil	Guan Ye, JCC, Lun Yang
6	Case	Aluminum case	Oakley, Ao Xing
7	Sleeve	PET	Qi Yuan, Yun Lin, Moodeung
8	Separator	Electrolyte paper	Da Fu, NKK

4. Characteristics

Standard atmospheric conditions

Unless otherwise specified, the standard range of atmospheric conditions for making measurements and tests is as follows:

Ambient temperature :15°C to 35°C
Relative humidity : 45% to 85%
Air Pressure : 86kPa to 106kPa

If there is any doubt about the results, measurement shall be made within the following conditions:

Ambient temperature : 20°C ± 2°C
Relative humidity : 60% to 70%
Air Pressure : 86kPa to 106kPa

Operating temperature range

The ambient temperature range at which the capacitor can be operated continuously at rated voltage is -40°C to 105°C.

As to the detailed information, please refer to table 1

Table 1

ITEM		PERFORMANCE
4.1	Rated voltage (WV) Surge voltage (SV)	WV (V.DC): 16 SV (V.DC): 20
4.2	Nominal capacitance (Tolerance)	**<Condition>** Measuring Frequency : 120Hz±12Hz Measuring Voltage : Not more than 0.5Vrms +1.5~2.0V.DC Measuring Temperature : 20±2℃ **<Criteria>** Shall be within the specified capacitance tolerance.
4.3	Leakage current	**<Condition>** Connecting the capacitor with a protective resistor (1kΩ ±10Ω) in series for 2 minutes, and then, measure Leakage Current. **<Criteria>** I (μA)≤0.03CV (μA) I: Leakage current (μA) C: Capacitance (μF) V: Rated DC Working Voltage (V)
4.4	Dissipation factor	**<Condition>** See 4.2, Norm Capacitance, for measuring frequency, voltage and temperature. **<Criteria>** Working voltage (v): 16 tan δ (max.): 0.16
4.5	Impedance	**<Condition>** Measuring frequency:100kHz; Measuring temperature:20±2℃ Measuring point: 2mm max. from the surface of a sealing rubber on the lead wire. **<Criteria>** (20℃)Less than the initial limit(See page 14).

4.6	Terminal strength	**<Condition>** Tensile Strength of Terminals Fixed the capacitor, applied force to the terminal in lead out direction for 10±1 seconds. Bending Strength of Terminals. Fixed the capacitor, applied force to bent the terminal (1~4 mm from the rubber) for 90° within 2~3 seconds, and then bent it for 90° to its original position within 2~3 seconds. **<Criteria>** No noticeable changes shall be found, no breakage or looseness at the terminal.

Diameter of lead wire	Tensile force N (kgf)	Bending force N (kgf)
Over 0.5mm to 0.8mm	10 (1.0)	5 (0.51)

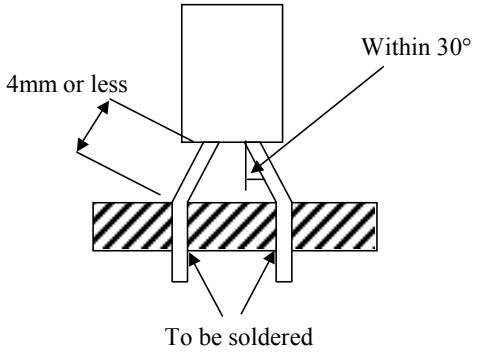
4.7	Temperature characteristics	**<Condition>** Capacitance, D.F., and impedance shall be measured at 120Hz. **<Criteria>** a. At +105℃, capacitance measured at +20℃ shall be within±25% of its original value. Dissipation Factor shall be within the limit of Item 4.4 The leakage current measured shall not more than 10 times of its specified value. b. In step 5, capacitance measured at +20℃ shall be within ±10% of its original value. Dissipation Factor shall be within the limit of Item 4.4 The leakage current shall not more than the specified value.

STEP	Testing Temperature(℃)	Time
1	20±2	Time to reach thermal equilibrium
2	-25±3	Time to reach thermal equilibrium
3	20±2	Time to reach thermal equilibrium
4	105±2	Time to reach thermal equilibrium
5	20±2	Time to reach thermal equilibrium

<table>
<tr><td>4.7</td><td></td><td>c. At-25℃, Impedance (Z) ratio shall not exceed the value of the following table.
<table>
<tr><td>Working Voltage (V)</td><td>16</td></tr>
<tr><td>Z-25℃/Z+20℃</td><td>3</td></tr>
</table></td></tr>
<tr><td>4.8</td><td>Load life test</td><td><Condition>
According to JIS –C-5141No. 5.3.16 methods, The capacitor is stored at a temperature of 105 ±2°C with DC bias voltage plus the rated ripple current for 4000 +48/0 hours. (The sum of DC and ripple peak voltage shall not exceed the rated working voltage) Then the product should be tested after 4~8 hours recovering time at atmospheric conditions. The result should meet the following table:

<Criteria>
The characteristic shall meet the following requirements.
<table>
<tr><td>Leakage current</td><td>Value in 4.3 shall be satisfied</td></tr>
<tr><td>Capacitance Change</td><td>Within ±25% of initial value.</td></tr>
<tr><td>Dissipation Factor</td><td>Not more than 200%of the specified value.</td></tr>
<tr><td>Appearance</td><td>There shall be no leakage of electrolyte.</td></tr>
</table></td></tr>
<tr><td>4.9</td><td>Shelf life test</td><td><Condition>
Capacitor shall be stored at +105±2℃ with no voltage applied for 1000 +48/0 hours. After the test and returned in standard condition for 4~8hours, and the capacitor shall meet subjected to voltage following requirements. (If any doubt arises on the judgment, capacitors shall be subjected to voltage treatment specified in JIS C 5141,5.2)

<Criteria>
The characteristic shall meet the following requirements.
<table>
<tr><td>Leakage current</td><td>Value in 4.3 shall be satisfied</td></tr>
<tr><td>Capacitance Change</td><td>Within ±25% of initial value.</td></tr>
<tr><td>Dissipation Factor</td><td>Not more than 200%of the specified value.</td></tr>
<tr><td>Appearance</td><td>There shall be no leakage of electrolyte.</td></tr>
</table></td></tr>
</table>

4.10	Surge test	**<Condition>** Applied a surge voltage to the capacitor connected with a (100±50)/C_R (kΩ) resistor in series for 30±5 seconds in every 6±0.5 minutes at 15~35℃. Procedure shall be repeated 1000 times. Then the capacitors shall be left under normal humidity for 1-2hours before measurement **C_R** :Nominal Capacitance (μF) **<Criteria>** Leakage current: Not more than the specified value. Capacitance Change: Within ±15% of initial value. Dissipation Factor: Not more than the specified value. Appearance: There shall be no leakage of electrolyte. Attention: This test simulates over voltage at abnormal situation only. It is not applicable to such over voltage as often applied.
4.11	Vibration test	**<Condition>** The following conditions shall be applied for 2 hours in each 3 mutually perpendicular directions. During the last 30 minutes of each direction, 3 to 5 measurements shall be taken. Frequency : 10Hz ~ 55Hz ~ 10Hz in 1 minute Total excursion amplitude : 1.5mm Amplitude tolerance : ±15% Mounting method: The capacitor with diameter greater than 12.5mm or longer than 25mm must be fixed in place with a bracket. 

		<Criteria> After the test, the following items shall be tested: Inner construction: No intermittent contacts, open or short circuiting. No damage of tab terminals or electrodes. Appearance: No mechanical damage in terminal. No leakage of electrolyte or swelling of the case. The markings shall be legible.
4.12	Solderability test	**<Condition>** The capacitor shall be tested under the following conditions: Soldering temperature : 245±5°C Dipping depth : 2mm Dipping speed : 25±2.5mm/s Dipping time : 2±0.5s **<Criteria>** Soldering wetting time: Less than 3s Coating quality: A minimum of 95% of the surface being immersed
4.13	Resistance to solder heat test	**<Condition>** Terminals of the capacitor shall be immersed into solder bath at 260 ± 5 ℃ for10 ± 1seconds or 400 ± 10 ℃ for3 $^{+1}_{-0}$ seconds to 1.5~2.0mm from the body of capacitor. Then the capacitor shall be left under the normal temperature and normal humidity for 1~2 hours before measurement. **<Criteria>** Leakage current: Not more than the specified value. Capacitance Change: Within ±10% of initial value. Dissipation Factor: Not more than the specified value. Appearance: There shall be no leakage of electrolyte.

4.14	Change of temperature test	**<Condition>** Temperature Cycle: According to JIS –C-5141 No. 5.3.13 methods, capacitor shall be placed in an oven, the condition according as below: (1)+20℃ — ⩽3 Minutes (2)Rated low temperature (-25℃) — 30±2 Minutes (3)+20℃ — ⩽3 Minutes (4)Rated high temperature (+105℃) — 30±2 Minutes (1) to (4)=1 cycle, total 5 cycle **<Criteria>** The characteristic shall meet the following requirement Leakage current — Not more than the specified value. Capacitance Change — Within ±10% of initial value. Dissipation Factor — Not more than the specified value. Appearance — There shall be no leakage of electrolyte.
4.15	Damp heat test	**<Condition>** Humidity Test: According to JIS –C-5141 No. 5.3.14 methods, capacitor shall be exposed for 500±8 hours in an atmosphere of 90~95%R H .at 40±2℃, the characteristic change shall meet the following requirement. **<Criteria>** Leakage current — Not more than the specified value. Capacitance Change — Within ±10% of initial value. Dissipation Factor — Not more than 120% of the specified value. Appearance — There shall be no leakage of electrolyte.

4.16	Vent test	**<Condition>** The following tests only apply to those products with vent products at diameter ≥∅6.3 with vent. I. A.C. test Voltage applied: A.C. voltage not exceeding 0.7 times the rated voltage or 250 VAC whichever is lower Frequency: 50 Hz or 60 Hz Series resistor: Refer to table 2 <Table 2> Capacitance: 100μF < C≤ 1000μF — Series resistor (Ω): 1 II. D.C. test The capacitor is connected with its polarity reversed to a DC power source. Then a current selected from Table 3 is applied. <Table 3> Diameter (mm): 22.4 or less — DC Current (A): 1 **<Criteria>** For both tests, the vent shall operate with no dangerous conditions such as flames or dispersion of pieces of the capacitor and/or case.
4.17	Maximum permissible (ripple current, temperature coefficient)	**<Condition>** The maximum permissible ripple current is the maximum A.C current at 100kHz and can be applied at maximum operating temperature Table-4 The combined value of D.C voltage and the peak A.C voltage shall not exceed the rated voltage and shall not reverse voltage. Frequency Multipliers: Cap. (μF) \ Freq (Hz): 120 — 1k — 10k — 100k 220~3300: 0.50 — 0.80 — 0.90 — 1.00 Temperature Coefficient: Temperature (℃): ≤65 — 85 — 105 Factor: 2.10 — 1.70 — 1.00

5. Product Marking

Marking Details
Capacitor shall be marked the following items:

1) Nominal capacitance
   Rated voltage
   Series symbol (GD)
   Tolerance: -20% ~ +20% (M)

2) Polarity: Cathode shall be marked with a black stripe and indicate "-" symbol on it.

3) Trademark (SAMXON)

4) Maximum operating temperature: 105°C

5) Date code numbering system

V 1 B
- B: Manufactured week: see Table -C
- 1: Manufactured month: see Table -B
- V: Manufactured year: see Table -A

Table-A

Code	S	T	U	V
Year	2003	2004	2005	2006

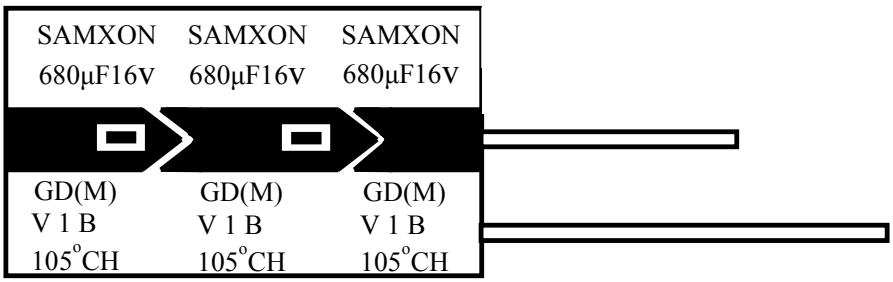
Table-B

Month	1	2	3	4	5	6	7	8	9	10	11	12
Code	1	2	3	4	5	6	7	8	9	O	N	D

Table-C

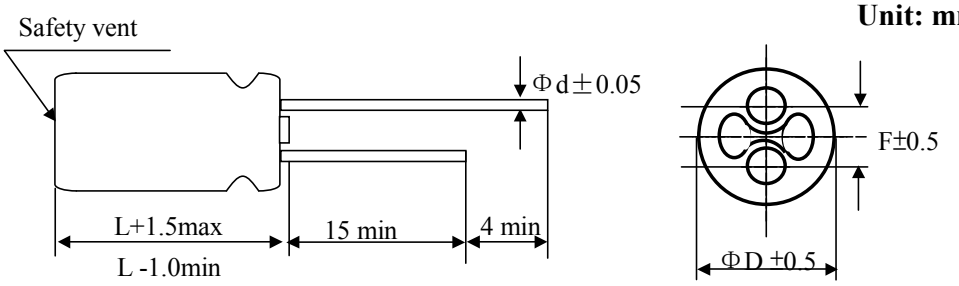
Week	1	2	3	4	5
Code	A	B	C	D	E

6) Marking Sample:



6. Product Dimensions, Impedance & Maximum Permissible Ripple Current

Unit: mm



Φ D	10
L	12.5
F	5.0
Φ d	0.6

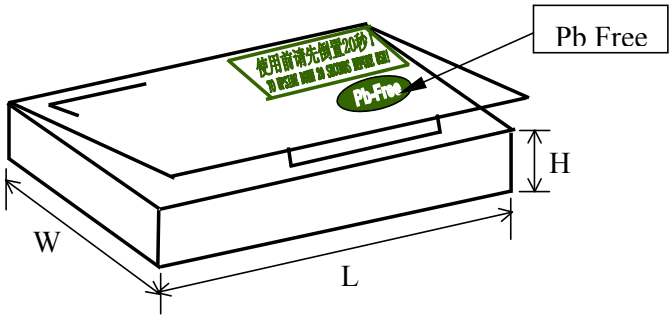
Table-4

Working Voltage (V)	Capacitance (μF)	Dimension (D×L, mm)	Maximum Permissible Ripple Current at 105℃ 100kHz (mA rms)	Impedance at 20℃ 100kHz (mΩ)
16	680	10x12.5	1540	26

7. Packing Information

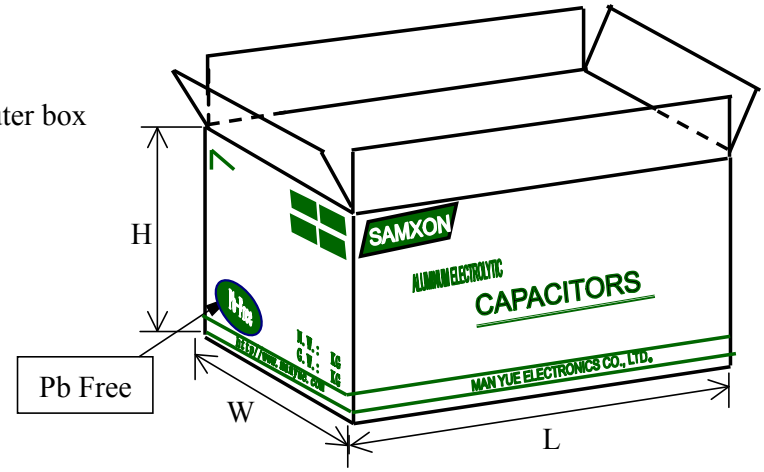
Long Lead

Inner box



Φ D(mm)	L (mm)	W (mm)	H (mm)	Quantity (pcs)
Φ 10x12.5	305	195	138	2400

Outer box



Φ D(mm)	L (mm)	W (mm)	H (mm)	Quantity (pcs)
Φ 10x12.5	415	320	290	9600

8. Prohibition to Use Environment- related Substances

We are hereby to certify the followings:

Our company hereby warrants and guarantees that all of or part of products, including, but not limited to, the peripherals, accessories or package, delivered to your company (including your subsidiaries and affiliated companies) directly or indirectly by our company (including our subsidiaries or affiliated companies) are free from any of the substances listed below.

The latest version of<Substances Prohibited as per Sony-SS-00259>

Accord with heavy metal	Cadmium and cadmium compounds
	Lead and lead compounds
	Mercury and mercury compounds
	Hexavalent chromium compounds
Organic chlorin compounds	Polychlorinated biphenyls (PCB)
	Polychlorinated naphthalenes (PCN)
	Polychlorinated terphenyls (PCT)
	Chlorinated paraffins (CP)
	Other chlorinated organic compounds
Organic bromine compounds	Polybrominated biphenyls (PBB)
	Polybrominated diphenylethers (PBDE)
	Other brominated organic compounds
Tributyltin compounds Triphenyltin compounds	
Asbestos	
Specific azo compounds	
Formaldehyde	
Polyvinyl chloride (PVC) and PVC blends	

Remark: The Parts are RoHs (Restriction of Hazard Substances) compliance.

Surface Mount Type

Series: **FK** Type: **V**

FK High temperature Lead-Free reflow(suffix:A✻)

Country of Origin

Japan

■ Features

- Endurance: 2000 to 5000 h at 105 °C
- Low impedance (40 to 60 % less than FC series)
  Miniaturized (30 to 50 % less than FC series)
- Vibration-proof product is available upon request.(φ8<)
- RoHS directive compliant (Parts No φ4 to φ10 : EEE✻, φ12.5 to : EEV✻)

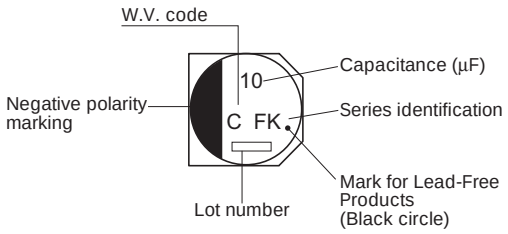
■ Specifications

Category Temp. Range	–55 to +105 °C										
Rated W.V.Range	6.3 to 100 V.DC										
Nominal Cap.Range	3.3 to 6800 µF										
Capacitance Tolerance	±20 % (120 Hz/+20 °C)										
DC Leakage Current	I < 0.01 CV or 3 (µA) After 2 minutes application of rated working voltage at +20 % (Whichever is greater)										
tan δ	Please see the attached standard products list										
Characteristics at Low Temperature	W.V. (V)	6.3	10	16	25	35	50	63	80	100	(Impedance ratio at 120 Hz)
	Z(–25 °C)/Z(+20 °C)	2	2	2	2	2	2	2	2	2	
	Z(–40 °C)/Z(+20 °C)	3	3	3	3	3	3	3	3	3	
	Z(–55 °C)/Z(+20 °C)	4	4	4	3	3	3	3	3	3	
Endurance	After applying rated working voltage at +105±2 °C for 2000 hours (>dia.12.5 and suffix "G" in dia.8 dia.10×10.2 are 5000 hours) the capacitors shall meet the limits specified below. Post-test requirement at +20 °C.										
	Capacitance change	±30 % of initial measured value (Suffix "G" is 35 %)									
	tan δ	<200 % of initial specified value (Suffix "G" is 300 %)									
	DC leakage current	<initial specified value									
Shelf Life	After storage for 1000 hours at +105±2 °C with no voltage applied and then being stabilized at +20°C, capacitors shall meet the limits specified in Endurance (With voltage treatment)										
Resistance to Soldering Heat	After reflow soldering and then being stabilized at +20 °C, capacitor shall meet the following limits.										
	Capacitance change	±10 % of initial measured value									
	tan δ	<initial specified value									
	DC leakage current	<initial specified value									

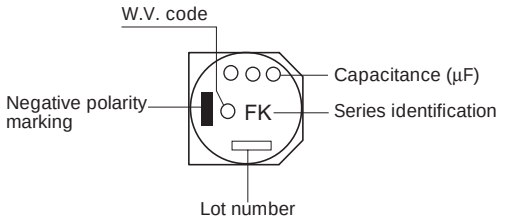
■ Marking

Example:16 V 10 µF Marking color : BLACK

Lead-Free products (<φ10)



(>φ12.5)

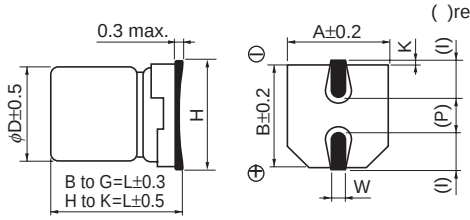


W.V. code

V	6.3	10	16	25	35	50	63	80	100
Code	j	A	C	E	V	H	J	K	2A

■ Dimensions in mm(not to scale)

( )reference size



(mm)

Size code	D	L	A,B	H max.	I	W	P	K
B	4.0	5.4	4.3	5.5	1.8	0.65±0.1	1.0	0.35–0.20 to +0.15
C	5.0	5.4	5.3	6.5	2.2	0.65±0.1	1.5	0.35–0.20 to +0.15
D	6.3	5.4	6.6	7.8	2.6	0.65±0.1	1.8	0.35–0.20 to +0.15
D8	6.3	7.7	6.6	7.8	2.6	0.65±0.1	1.8	0.35–0.20 to +0.15
E	8.0	6.2	8.3	9.5	3.4	0.65±0.1	2.2	0.35–0.20 to +0.15
F	8.0	10.2	8.3	10.0	3.4	0.90±0.2	3.1	0.70±0.2
G	10.0	10.2	10.3	12.0	3.5	0.90±0.2	4.6	0.70±0.2
H13	12.5	13.5	13.5	15.0	4.7	0.90±0.3	4.4	0.70±0.3
J16	16.0	16.5	17.0	19.0	5.5	1.20±0.3	6.7	0.70±0.3
K16	18.0	16.5	19.0	21.0	6.7	1.20±0.3	6.7	0.70±0.3

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

■ Case size VS Capacitance, Impedance and Ripple current

Impedance ; (Ω/100 kHz, +20 °C),
Ripple current ; (mA r.m.s./100 kHz+105 °C) ( ) : Miniaturization type

W.V.(V)	6.3			10			16		
Capacitance (μF)	Size	Impedance	Ripple current	Size	Impedance	Ripple current	Size	Impedance	Ripple current
10							B	1.35	90
22	B	1.35	90	B	1.35	90	C(B)	0.70(1.35)	160(90)
33				C(B)	0.70(1.35)	160(90)			
47	C(B)	0.70(1.35)	160(90)				D(C)	0.36(0.70)	240(160)
68							D	0.36	240
100	D(C)	0.36(0.70)	240(160)				D	0.36	240
150				D	0.36	240	D8	0.34	280
220	D	0.36	240	D8	0.34	280	D8	0.34	280
				E	0.26	300	E	0.26	300
330	D8	0.34	280	F	0.16	600	F	0.16	600
	E	0.26	300						
470	F	0.16	600	F	0.16	600	F	0.16	600
680				F	0.16	600	G	0.08	850
1000	F	0.16	600	G	0.08	850			
1500	G	0.08	850				H13	0.06	1100
2200				H13	0.06	1100			
3300	H13	0.06	1100				J16	0.035	1800
4700				J16	0.035	1800	K16	0.033	2060
6800	J16	0.035	1800	K16	0.033	2060			

W.V.(V)	25			35			50		
Capacitance (μF)	Size	Impedance	Ripple current	Size	Impedance	Ripple current	Size	Impedance	Ripple current
4.7				B	1.35	90	B	2.90	60
10	B	1.35	90	C(B)	0.70(1.35)	160(90)	D(C)	0.88(1.52)	165(85)
22	C	0.70	160	C	0.70	160	D	0.88	165
33	D(C)	0.36(0.70)	240(160)	D	0.36	240	D8	0.68	195
							E	0.68	195
47	D	0.36	240	D	0.36	240	E(D8)	0.68	195
68	D	0.36	240	D8	0.34	280			
100	D8	0.34	280	D8	0.34	280	F	0.34	350
	E	0.26	300	F	0.16	600			
150	F	0.16	600	F	0.16	600	G	0.18	670
220	F	0.16	600	F	0.16	600	G	0.18	670
330	F	0.16	600	G	0.08	850	H13	0.12	900
390							H13	0.12	900
470	G	0.08	850	H13	0.06	1100	J16	0.073	1610
560							J16	0.073	1610
680				H13	0.06	1100	J16	0.073	1610
1000	H13	0.06	1100	J16	0.035	1800	J16	0.073	1610
1500	J16	0.035	1800	J16	0.035	1800			
2200	J16	0.035	1800						
3300	K16	0.033	2060						

W.V.(V)	63			80			100		
Capacitance (μF)	Size	Impedance	Ripple current	Size	Impedance	Ripple current	Size	Impedance	Ripple current
3.3				C	5.00	25			
4.7	C	3.00	50	D	3.00	40			
10	D	1.50	80	D8	2.40	60			
				E	2.40	60			
22	D8	1.20	120	F	1.30	130	F	1.30	130
	E	1.20	120						
33	F	0.65	250	F	1.30	130	G	0.70	200
47	F	0.65	250	G	0.70	200	H13	0.32	500
68	F	0.65	250	H13	0.32	500	H13	0.32	500
100	G	0.35	400	H13	0.32	500	J16	0.17	793
150	H13	0.16	800	H13	0.32	500	J16	0.17	793
220	H13	0.16	800				K16	0.153	917
330				J16	0.17	793	K16	0.153	917
470	J16	0.082	1410	K16	0.153	917			
680	K16	0.080	1690						

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

■ Standard Products

Endurance : 105 °C 2000 h, (>dia12.5 : 5000 h)

W.V. (V)	Cap. (±20 %) (µF)	Case size Dia. (mm)	Case size Length (mm)	Case size Size Code	Specification Ripple Current (100kHz) (+105°C) (mA)	Specification Impedance (100kHz) (+20 °C) (Ω)	Specification tan δ (120 Hz) (+20 °C)	Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty Taping (pcs.)
6.3	22	4	5.8	B	90	1.35	0.26	EEEFK0J220R	(1)	2000
	47	4	5.8	B	90	1.35	0.26	EEEFK0J470UR	(1)	2000
		5	5.8	C	160	0.70	0.26	EEEFK0J470R	(1)	1000
	100	5	5.8	C	160	0.70	0.26	EEEFK0J101UR	(1)	1000
		6.3	5.8	D	240	0.36	0.26	EEEFK0J101P	(1)	1000
	220	6.3	5.8	D	240	0.36	0.26	EEEFK0J221P	(1)	1000
	330	6.3	7.7	D8	280	0.34	0.26	EEEFK0J331XP	(1)	900
		8	6.2	E	300	0.26	0.26	EEEFK0J331P	(2)	1000
	470	8	10.2	F	600	0.16	0.26	EEEFK0J471P	(2)	500
	1000	8	10.2	F	600	0.16	0.26	EEEFK0J102P	(2)	500
	1500	10	10.2	G	850	0.08	0.26	EEEFK0J152P	(2)	500
	3300	12.5	13.5	H13	1100	0.06	0.30	EEVFK0J332Q	(3)	200
	6800	16	16.5	J16	1800	0.035	0.36	EEVFK0J682M	(3)	125
10	22	4	5.8	B	90	1.35	0.19	EEEFK1A220R	(1)	2000
	33	4	5.8	B	90	1.35	0.19	EEEFK1A330UR	(1)	2000
		5	5.8	C	160	0.70	0.19	EEEFK1A330R	(1)	1000
	150	6.3	5.8	D	240	0.36	0.19	EEEFK1A151P	(1)	1000
	220	6.3	7.7	D8	280	0.34	0.19	EEEFK1A221XP	(1)	900
		8	6.2	E	300	0.26	0.19	EEEFK1A221P	(2)	1000
	330	8	10.2	F	600	0.16	0.19	EEEFK1A331P	(2)	500
	470	8	10.2	F	600	0.16	0.19	EEEFK1A471P	(2)	500
	680	8	10.2	F	600	0.16	0.19	EEEFK1A681P	(2)	500
	1000	10	10.2	G	850	0.08	0.19	EEEFK1A102P	(2)	500
	2200	12.5	13.5	H13	1100	0.06	0.21	EEVFK1A222Q	(3)	200
	4700	16	16.5	J16	1800	0.035	0.25	EEVFK1A472M	(3)	125
	6800	18	16.5	K16	2060	0.033	0.29	EEVFK1A682M	(3)	125
16	10	4	5.8	B	90	1.35	0.16	EEEFK1C100R	(1)	2000
	22	4	5.8	B	90	1.35	0.16	EEEFK1C220UR	(1)	2000
		5	5.8	C	160	0.70	0.16	EEEFK1C220R	(1)	1000
	47	5	5.8	C	160	0.70	0.16	EEEFK1C470UR	(1)	1000
		6.3	5.8	D	240	0.36	0.16	EEEFK1C470P	(1)	1000
	68	6.3	5.8	D	240	0.36	0.16	EEEFK1C680P	(1)	1000
	100	6.3	5.8	D	240	0.36	0.16	EEEFK1C101P	(1)	1000
	150	6.3	7.7	D8	280	0.34	0.16	EEEFK1C151XP	(1)	900
	220	6.3	7.7	D8	280	0.34	0.16	EEEFK1C221XP	(1)	900
		8	6.2	E	300	0.26	0.16	EEEFK1C221P	(2)	1000
	330	8	10.2	F	600	0.16	0.16	EEEFK1C331P	(2)	500
	470	8	10.2	F	600	0.16	0.16	EEEFK1C471P	(2)	500
	680	10	10.2	G	850	0.08	0.16	EEEFK1C681P	(2)	500
	1500	12.5	13.5	H13	1100	0.06	0.16	EEVFK1C152Q	(3)	200
	3300	16	16.5	J16	1800	0.035	0.20	EEVFK1C332M	(3)	125
	4700	18	16.5	K16	2060	0.033	0.22	EEVFK1C472M	(3)	125
25	10	4	5.8	B	90	1.35	0.14	EEEFK1E100R	(1)	2000
	22	5	5.8	C	160	0.70	0.14	EEEFK1E220R	(1)	1000

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Reflow Profile(Fig-1 to Fig-6) listed on p.193 of our Catalog.

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■ Standard Products

Endurance : 105 °C 2000 h, (>dia12.5 : 5000 h)

W.V. (V)	Cap. (±20 %) (μF)	Case size Dia. (mm)	Case size Length (mm)	Case size Size Code	Specification Ripple Current (100kHz) (+105°C) (mA)	Specification Impedance (100kHz) (+20 °C) (Ω)	Specification tan δ (120 Hz) (+20 °C)	Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty Taping (pcs.)
25	33	5	5.8	C	160	0.70	0.14	EEEFK1E330UR	(1)	1000
		6.3	5.8	D	240	0.36	0.14	EEEFK1E330P	(1)	1000
	47	6.3	5.8	D	240	0.36	0.14	EEEFK1E470P	(1)	1000
	68	6.3	5.8	D	240	0.36	0.14	EEEFK1E680P	(1)	1000
	100	6.3	7.7	D8	280	0.34	0.14	EEEFK1E101XP	(1)	900
		8	6.2	E	300	0.26	0.14	EEEFK1E101P	(2)	1000
	150	8	10.2	F	600	0.16	0.14	EEEFK1E151P	(2)	500
	220	8	10.2	F	600	0.16	0.14	EEEFK1E221P	(2)	500
	330	8	10.2	F	600	0.16	0.14	EEEFK1E331P	(2)	500
	470	10	10.2	G	850	0.08	0.14	EEEFK1E471P	(2)	500
	1000	12.5	13.5	H13	1100	0.06	0.14	EEVFK1E102Q	(3)	200
	1500	16	16.5	J16	1800	0.035	0.14	EEVFK1E152M	(3)	125
	2200	16	16.5	J16	1800	0.035	0.16	EEVFK1E222M	(3)	125
	3300	18	16.5	K16	2060	0.033	0.18	EEVFK1E332M	(3)	125
35	4.7	4	5.8	B	90	1.35	0.12	EEEFK1V4R7R	(1)	2000
	10	4	5.8	B	90	1.35	0.12	EEEFK1V100UR	(1)	2000
		5	5.8	C	160	0.70	0.12	EEEFK1V100R	(1)	1000
	22	5	5.8	C	160	0.70	0.12	EEEFK1V220R	(1)	1000
	33	6.3	5.8	D	240	0.36	0.12	EEEFK1V330P	(1)	1000
	47	6.3	5.8	D	240	0.36	0.12	EEEFK1V470P	(1)	1000
	68	6.3	7.7	D8	280	0.34	0.12	EEEFK1V680XP	(1)	900
	100	6.3	7.7	D8	280	0.34	0.12	EEEFK1V101XP	(1)	900
		8	10.2	F	600	0.16	0.12	EEEFK1V101P	(2)	500
	150	8	10.2	F	600	0.16	0.12	EEEFK1V151P	(2)	500
	220	8	10.2	F	600	0.16	0.12	EEEFK1V221P	(2)	500
	330	10	10.2	G	850	0.08	0.12	EEEFK1V331P	(2)	500
	470	12.5	13.5	H13	1100	0.06	0.12	EEVFK1V471Q	(3)	200
	680	12.5	13.5	H13	1100	0.06	0.12	EEVFK1V681Q	(3)	200
	1000	16	16.5	J16	1800	0.035	0.12	EEVFK1V102M	(3)	125
	1500	16	16.5	J16	1800	0.035	0.12	EEVFK1V152M	(3)	125
50	4.7	4	5.8	B	60	2.90	0.10	EEEFK1H4R7R	(1)	2000
	10	5	5.8	C	85	1.52	0.10	EEEFK1H100UR	(1)	1000
		6.3	5.8	D	165	0.88	0.10	EEEFK1H100P	(1)	1000
	22	6.3	5.8	D	165	0.88	0.10	EEEFK1H220P	(1)	1000
	33	6.3	7.7	D8	195	0.68	0.10	EEEFK1H330XP	(1)	900
		8	6.2	E	195	0.68	0.10	EEEFK1H330P	(2)	1000
	47	6.3	7.7	D8	195	0.68	0.10	EEEFK1H470XP	(1)	900
		8	6.2	E	195	0.68	0.10	EEEFK1H470P	(2)	1000
	100	8	10.2	F	350	0.34	0.10	EEEFK1H101P	(2)	500
	150	10	10.2	G	670	0.18	0.10	EEEFK1H151P	(2)	500
	220	10	10.2	G	670	0.18	0.10	EEEFK1H221P	(2)	500
	330	12.5	13.5	H13	900	0.12	0.10	EEVFK1H331Q	(3)	200
	390	12.5	13.5	H13	900	0.12	0.10	EEVFK1H391Q	(3)	200
	470	16	16.5	J16	1610	0.073	0.10	EEVFK1H471M	(3)	125
	560	16	16.5	J16	1610	0.073	0.10	EEVFK1H561M	(3)	125

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■ Standard Products

Endurance : 105 °C 2000 h, (>dia12.5 : 5000 h)

W.V. (V)	Cap. (±20 %) (µF)	Case size Dia. (mm)	Length (mm)	Size Code	Specification Ripple Current (100kHz) (+105°C) (mA)	Impedance (100kHz) (+20 °C) (Ω)	tan δ (120 Hz) (+20 °C)	Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty Taping (pcs.)
50	680	16	16.5	J16	1610	0.073	0.10	EEVFK1H681M	(3)	125
	1000	16	16.5	J16	1610	0.073	0.10	EEVFK1H102M	(3)	125
63	4.7	5	5.8	C	50	3.00	0.08	EEEFK1J4R7R	(1)	1000
	10	6.3	5.8	D	80	1.50	0.08	EEEFK1J100P	(1)	1000
	22	6.3	7.7	D8	120	1.20	0.08	EEEFK1J220XP	(1)	900
		8	6.2	E	120	1.20	0.08	EEEFK1J220P	(2)	1000
	33	8	10.2	F	250	0.65	0.08	EEEFK1J330P	(2)	500
	47	8	10.2	F	250	0.65	0.08	EEEFK1J470P	(2)	500
	68	8	10.2	F	250	0.65	0.08	EEEFK1J680UP	(2)	500
	100	10	10.2	G	400	0.35	0.08	EEEFK1J101P	(2)	500
	150	12.5	13.5	H13	800	0.16	0.08	EEVFK1J151Q	(3)	200
	220	12.5	13.5	H13	800	0.16	0.08	EEVFK1J221Q	(3)	200
	470	16	16.5	J16	1410	0.082	0.08	EEVFK1J471M	(3)	125
	680	18	16.5	K16	1690	0.08	0.08	EEVFK1J681M	(3)	125
80	3.3	5	5.8	C	25	5.00	0.08	EEEFK1K3R3R	(1)	1000
	4.7	6.3	5.8	D	40	3.00	0.08	EEEFK1K4R7P	(1)	1000
	10	6.3	7.7	D8	60	2.40	0.08	EEEFK1K100XP	(1)	900
		8	6.2	E	60	2.40	0.08	EEEFK1K100P	(2)	1000
	22	8	10.2	F	130	1.30	0.08	EEEFK1K220P	(2)	500
	33	8	10.2	F	130	1.30	0.08	EEEFK1K330P	(2)	500
	47	10	10.2	G	200	0.70	0.08	EEEFK1K470P	(2)	500
	68	12.5	13.5	H13	500	0.32	0.08	EEVFK1K680Q	(3)	200
	100	12.5	13.5	H13	500	0.32	0.08	EEVFK1K101Q	(3)	200
	150	12.5	13.5	H13	500	0.32	0.08	EEVFK1K151Q	(3)	200
	330	16	16.5	J16	793	0.17	0.08	EEVFK1K331M	(3)	125
	470	18	16.5	K16	917	0.153	0.08	EEVFK1K471M	(3)	125
100	22	8.0	10.2	F	130	1.30	0.07	EEEFK2A220P	(2)	500
	33	10	10.2	G	200	0.70	0.07	EEEFK2A330P	(2)	500
	47	12.5	13.5	H13	500	0.32	0.07	EEVFK2A470Q	(3)	200
	68	12.5	13.5	H13	500	0.32	0.07	EEVFK2A680Q	(3)	200
	100	16	16.5	J16	793	0.17	0.07	EEVFK2A101M	(3)	125
	150	16	16.5	J16	793	0.17	0.07	EEVFK2A151M	(3)	125
	220	18	16.5	K16	917	0.153	0.07	EEVFK2A221M	(3)	125
	330	18	16.5	K16	917	0.153	0.07	EEVFK2A331M	(3)	125

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■ Endurace 5000 h Products

Endurance : 105 °C 5000 h

W.V. (V)	Cap. (±20 %) (μF)	Case size Dia. (mm)	Case size Length (mm)	Case size Size Code	Specification Ripple Current (100kHz) (+105°C) (mA)	Specification Impedance (100kHz) (+20 °C) (Ω)	Specification tan δ (120 Hz) (+20 °C)	Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty Taping (pcs.)
6.3	470	8	10.2	F	600	0.16	0.26	EEEFK0J471GP	(2)	500
	1000	8	10.2	F	600	0.16	0.26	EEEFK0J102GP	(2)	500
	1500	10	10.2	G	850	0.08	0.26	EEEFK0J152GP	(2)	500
10	330	8	10.2	F	600	0.16	0.19	EEEFK1A331GP	(2)	500
	470	8	10.2	F	600	0.16	0.19	EEEFK1A471GP	(2)	500
	680	8	10.2	F	600	0.16	0.19	EEEFK1A681GP	(2)	500
	1000	10	10.2	G	850	0.08	0.19	EEEFK1A102GP	(2)	500
16	330	8	10.2	F	600	0.16	0.16	EEEFK1C331GP	(2)	500
	470	8	10.2	F	600	0.16	0.16	EEEFK1V471GP	(2)	500
	680	10	10.2	G	850	0.08	0.16	EEEFK1C681GP	(2)	500
25	150	8	10.2	F	600	0.16	0.14	EEEFK1E151GP	(2)	500
	220	8	10.2	F	600	0.16	0.14	EEEFK1E221GP	(2)	500
	330	8	10.2	F	600	0.16	0.14	EEEFK1E331GP	(2)	500
	470	10	10.2	G	850	0.08	0.14	EEEFK1E471GP	(2)	500
35	100	8	10.2	F	600	0.16	0.12	EEEFK1V101GP	(2)	500
	150	8	10.2	F	600	0.16	0.12	EEEFK1V151GP	(2)	500
	220	8	10.2	F	600	0.16	0.12	EEEFK1V221GP	(2)	500
	330	10	10.2	G	850	0.08	0.12	EEEFK1V331GP	(2)	500
50	100	8	10.2	F	350	0.34	0.10	EEEFK1H101GP	(2)	500
	150	10	10.2	G	670	0.18	0.10	EEEFK1H151GP	(2)	500
	220	10	10.2	G	670	0.18	0.10	EEEFK1H221GP	(2)	500

■ High temperature Lead-Free reflow Products

Endurance : 105 °C 2000 h

W.V. (V)	Cap. (±20 %) (μF)	Case size Dia. (mm)	Case size Length (mm)	Case size Size Code	Specification Ripple Current (100kHz) (+105°C) (mA)	Specification Impedance (100kHz) (+20 °C) (Ω)	Specification tan δ (120 Hz) (+20 °C)	Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty Taping (pcs.)
6.3	22	4	5.8	B	90	1.35	0.26	EEEFK0J220AR	(5)	2000
	47	4	5.8	B	90	1.35	0.26	EEEFKJ470UAR	(5)	2000
		5	5.8	C	160	0.70	0.26	EEEFK0J470AR	(5)	1000
	100	5	5.8	C	160	0.70	0.26	EEEFKJ101UAR	(5)	1000
		6.3	5.8	D	240	0.36	0.26	EEEFK0J101AP	(5)	1000
	220	6.3	5.8	D	240	0.36	0.26	EEEFK0J221AP	(5)	1000
	330	6.3	7.7	D8	280	0.34	0.26	EEEFKJ331XAP	(5)	900
		8	6.2	E	300	0.26	0.26	EEEFK0J331AP	(6)	1000
	470	8	10.2	F	600	0.16	0.26	EEEFK0J471AP	(6)	500
	1000	8	10.2	F	600	0.16	0.26	EEEFK0J102AP	(6)	500
	1500	10	10.2	G	850	0.08	0.26	EEEFK0J152AP	(6)	500
10	22	4	5.8	B	90	1.35	0.19	EEEFK1A220AR	(5)	2000
	33	4	5.8	B	90	1.35	0.19	EEEFKA330UAR	(5)	2000
		5	5.8	C	160	0.70	0.19	EEEFK1A330AR	(5)	1000
	150	6.3	5.8	D	240	0.36	0.19	EEEFK1A151AP	(5)	1000
	220	6.3	7.7	D8	280	0.34	0.19	EEEFKA221XAP	(5)	900
		8	6.2	E	300	0.26	0.19	EEEFK1A221AP	(6)	1000

If part number exceeds 12 digits, voltage code is abbreviated as follows ; 0J→J, 1A→A, 1C→C, 1E→E, 1V→V
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■ High temperature Lead-Free reflow Products

Endurance : 105 °C 2000 h

W.V. (V)	Cap. (±20 %) (μF)	Case size Dia. (mm)	Case size Length (mm)	Case size Size Code	Specification Ripple Current (100kHz) (+105°C) (mA)	Specification Impedance (100kHz) (+20 °C) (Ω)	Specification tan δ (120 Hz) (+20 °C)	Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty Taping (pcs.)
10	330	8	10.2	F	600	0.16	0.19	EEEFK1A331AP	(6)	500
	470	8	10.2	F	600	0.16	0.19	EEEFK1A471AP	(6)	500
	680	8	10.2	F	600	0.16	0.19	EEEFK1A681AP	(6)	500
	1000	10	10.2	G	850	0.08	0.19	EEEFK1A102AP	(6)	500
16	10	4	5.8	B	90	1.35	0.16	EEEFK1C100AR	(5)	2000
	22	4	5.8	B	90	1.35	0.16	EEEFKC220UAR	(5)	2000
		5	5.8	C	160	0.70	0.16	EEEFK1C220AR	(5)	1000
	47	5	5.8	C	160	0.70	0.16	EEEFKC470UAR	(5)	1000
		6.3	5.8	D	240	0.36	0.16	EEEFK1C470AP	(5)	1000
	68	6.3	5.8	D	240	0.36	0.16	EEEFK1C680AP	(5)	1000
	100	6.3	5.8	D	240	0.36	0.16	EEEFK1C101AP	(5)	1000
	150	6.3	7.7	D8	280	0.34	0.16	EEEFKC151XAP	(5)	900
	220	6.3	7.7	D8	280	0.34	0.16	EEEFKC221XAP	(5)	900
		8	6.2	E	300	0.26	0.16	EEEFK1C221AP	(6)	1000
	330	8	10.2	F	600	0.16	0.16	EEEFK1C331AP	(6)	500
	470	8	10.2	F	600	0.16	0.16	EEEFK1C471AP	(6)	500
	680	10	10.2	G	850	0.08	0.16	EEEFK1C681AP	(6)	500
25	10	4	5.8	B	90	1.35	0.14	EEEFK1E100AR	(5)	2000
	22	5	5.8	C	160	0.70	0.14	EEEFK1E220AR	(5)	1000
	33	5	5.8	C	160	0.70	0.14	EEEFKE330UAR	(5)	1000
		6.3	5.8	D	240	0.36	0.14	EEEFK1E330AP	(5)	1000
	47	6.3	5.8	D	240	0.36	0.14	EEEFK1E470AP	(5)	1000
	68	6.3	5.8	D	240	0.36	0.14	EEEFK1E680AP	(5)	1000
	100	6.3	7.7	D8	280	0.34	0.14	EEEFKE101XAP	(5)	900
		8	6.2	E	300	0.26	0.14	EEEFK1E101AP	(6)	1000
	150	8	10.2	F	600	0.16	0.14	EEEFK1E151AP	(6)	500
	220	8	10.2	F	600	0.16	0.14	EEEFK1E221AP	(6)	500
	330	8	10.2	F	600	0.16	0.14	EEEFK1E331AP	(6)	500
	470	10	10.2	G	850	0.08	0.14	EEEFK1E471AP	(6)	500
35	4.7	4	5.8	B	90	1.35	0.12	EEEFK1V4R7AR	(5)	2000
	10	4	5.8	B	90	1.35	0.12	EEEFKV100UAR	(5)	2000
		5	5.8	C	160	0.70	0.12	EEEFK1V100AR	(5)	1000
	22	5	5.8	C	160	0.70	0.12	EEEFK1V220AR	(5)	1000
	33	6.3	5.8	D	240	0.36	0.12	EEEFK1V330AP	(5)	1000
	47	6.3	5.8	D	240	0.36	0.12	EEEFK1V470AP	(5)	1000
	68	6.3	7.7	D8	280	0.34	0.12	EEEFKV680XAP	(5)	900
	100	8	10.2	F	600	0.16	0.12	EEEFK1V101AP	(6)	500
	150	8	10.2	F	600	0.16	0.12	EEEFK1V151AP	(6)	500
	220	8	10.2	F	600	0.16	0.12	EEEFK1V221AP	(6)	500
	330	10	10.2	G	850	0.08	0.12	EEEFK1V331AP	(6)	500

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Surface Mount Type SP-Cap

Series: FD,CD,CX,UD,UE

■ Features

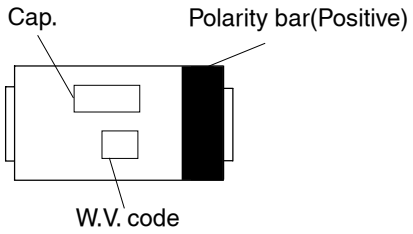
Low ESR
Excellent Noise-absorbent Characteristics
RoHS directive compliant
Reflow 260°C and 240°C. Please see specific P/N details.

Country of Origin
Japan
Singapore

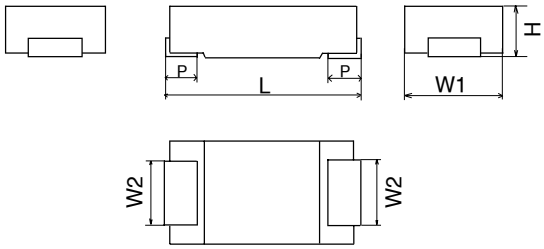
■ Specification

Series & Size Code	FD	CD	CX	UD	UE
Category Temp.Range	-40 to 105°C				
Rated W.V.Range	2 to 12.5V.DC	2 to 16V.DC	2 to 6.3V.DC	2 to 8V.DC	2 to 8V.DC
Nominal Cap.Range	15 to 68μF	2.2 to 220μF	100 to 330μF	68 to 470μF	100 to 560μF
Capacitance Tolerance	±20 %				
DC Leakage Current	Reflow 240°C : I ≦ 0.06 CV 2minutes(2 to 4V.DC) I ≦ 0.04CV or 3μA 2minutes(6.3 to 16V.DC) (Whichever is greater) Reflow 260°C : I ≦ 0.1CV 2minutes				
tan δ	≦ 0.06(120Hz/ +20°C)			≦ 0.10(120Hz/ +20°C)	
Surge Voltage	Rated Working Voltage × 1.25 (15 to 35°C)				
Endurance	After applying rated working voltage for 1000 hours at 105±2°C, and then being stabilized at +20°C, capacitor shall meet the following limits.				
	Capacitance change	±10% of initial measured value			
	tan δ	≦ Initial specified value			
	DC leakage current	≦ Initial specified value			
Moisture resistance	After storing for 500 hours at 60°C,90%				
	Capacitance change of initial measurd value	2, 2.5V.DC	4 V.DC	6.3V.DC	8 to 16V.DC
		+70, -20%	+60, -20%	+50, -20%	+40, -20%
	tan δ	≦ 200% of initial specified value			
	DC leakage current	≦ Initial specified value			

■ Marking



■ Dimensions in mm(not to scale)



(mm)

Series & Size Code	L±0.2	W1±0.2	W2±0.1	H	P±0.3
FD	7.3	4.3	2.4	1.1±0.1	1.3
CD	7.3	4.3	2.4	1.8±0.1	1.3
CX	7.3	4.3	2.4	1.9±0.2	1.3
UD	7.3	4.3	2.4	2.8±0.2	1.3
UE	7.3	4.3	2.4	4.2±0.1	1.3

Design, and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and / or use. Should a safety concern arise regarding this product,please be sure to contact us immediately. Mar.2006

■ Standard Products

Series & Size Code	Rated W.V. (V.DC)	Capacitance (±20%) (μF)	Case Size L (mm)	W (mm)	H (mm)	Specification ✻1 Ripple current (Ar.m.s.)	✻2 ESR (Ω)	Reflow 240°C Part number	Reflow 260°C Part number	Min. Packaging Q'ty (pcs)
FD	2	68	7.3	4.3	1.1	2.0	0.028	EEFFD0D680R	–	3500
	2.5	56	7.3	4.3	1.1	2.0	0.028	EEFFD0E560R	–	3500
	4	39	7.3	4.3	1.1	2.0	0.028	EEFFD0G390R	–	3500
		47	7.3	4.3	1.1	2.0	0.028	EEFFD0G470R	–	3500
	6.3	33	7.3	4.3	1.1	2.0	0.028	EEFFD0J330R	–	3500
	8	22	7.3	4.3	1.1	2.0	0.028	EEFFD0K220R	–	3500
	12.5	15	7.3	4.3	1.1	1.4	0.040	EEFFD1B150R	–	3500
CD	2	100	7.3	4.3	1.8	2.5	0.018	EEFCD0D101R	EEFCD0D101ER	3500
			7.3	4.3	1.8	2.7	0.015	EEFCD0D101XR	EEFCD0D101XE	3500
		120	7.3	4.3	1.8	2.5	0.018	EEFCD0D121R	EEFCD0D121ER	3500
			7.3	4.3	1.8	2.7	0.015	EEFCD0D121XR	EEFCD0D121XE	3500
		150	7.3	4.3	1.8	2.5	0.018	EEFCD0D151R	EEFCD0D151ER	3500
		180	7.3	4.3	1.8	2.5	0.018	EEFCD0D181R	EEFCD0D181ER	3500
		220	7.3	4.3	1.8	2.5	0.018	EEFCD0D221R	EEFCD0D221ER	3500
	2.5	82	7.3	4.3	1.8	2.5	0.018	EEFCD0E820R	EEFCD0E820ER	3500
			7.3	4.3	1.8	2.7	0.015	EEFCD0E820XR	EEFCD0E820XE	3500
		100	7.3	4.3	1.8	2.5	0.018	EEFCD0E101R	EEFCD0E101ER	3500
			7.3	4.3	1.8	2.7	0.015	EEFCD0E101XR	EEFCD0E101XE	3500
		120	7.3	4.3	1.8	2.5	0.018	EEFCD0E121R	EEFCD0E121ER	3500
		150	7.3	4.3	1.8	2.5	0.018	EEFCD0E151R	EEFCD0E151ER	3500
	4	56	7.3	4.3	1.8	2.5	0.018	EEFCD0G560R	EEFCD0G560ER	3500
			7.3	4.3	1.8	2.7	0.015	EEFCD0G560XR	EEFCD0G560XE	3500
		68	7.3	4.3	1.8	2.5	0.018	EEFCD0G680R	EEFCD0G680ER	3500
			7.3	4.3	1.8	2.7	0.015	EEFCD0G680XR	EEFCD0G680XE	3500
		82	7.3	4.3	1.8	2.5	0.018	EEFCD0G820R	EEFCD0G820ER	3500
			7.3	4.3	1.8	2.7	0.015	EEFCD0G820XR	EEFCD0G820XE	3500
		100	7.3	4.3	1.8	1.8	0.025	EEFCD0G101R	EEFCD0G101ER	3500
	6.3	10	7.3	4.3	1.8	1.4	0.055	EEFCD0J100R	EEFCD0J100ER	3500
		22	7.3	4.3	1.8	1.6	0.040	EEFCD0J220R	EEFCD0J220ER	3500
		33	7.3	4.3	1.8	2.0	0.028	EEFCD0J330R	EEFCD0J330ER	3500
		47	7.3	4.3	1.8	2.5	0.018	EEFCD0J470R	EEFCD0J470ER	3500
			7.3	4.3	1.8	2.7	0.015	EEFCD0J470XR	EEFCD0J470XE	3500
		68	7.3	4.3	1.8	2.5	0.018	EEFCD0J680R	EEFCD0J680ER	3500
			7.3	4.3	1.8	2.7	0.015	EEFCD0J680XR	EEFCD0J680XE	3500
	8	8.2	7.3	4.3	1.8	1.4	0.055	EEFCD0K8R2R	EEFCD0K8R2ER	3500
		15	7.3	4.3	1.8	1.6	0.040	EEFCD0K150R	EEFCD0K150ER	3500
		22	7.3	4.3	1.8	2.0	0.028	EEFCD0K220R	EEFCD0K220ER	3500
		33	7.3	4.3	1.8	2.5	0.018	EEFCD0K330R	EEFCD0K330ER	3500
		47	7.3	4.3	1.8	1.8	0.025	EEFCD0K470R	EEFCD0K470ER	3500
	12.5	4.7	7.3	4.3	1.8	1.0	0.080	EEFCD1B4R7R	–	3500
		10	7.3	4.3	1.8	1.0	0.060	EEFCD1B100R	–	3500
		15	7.3	4.3	1.8	1.3	0.050	EEFCD1B150R	–	3500
		22	7.3	4.3	1.8	1.6	0.030	EEFCD1B220R	–	3500
	16	2.2	7.3	4.3	1.8	1.0	0.110	EEFCD1C2R2R	–	3500
		4.7	7.3	4.3	1.8	1.0	0.080	EEFCD1C4R7R	–	3500
		6.8	7.3	4.3	1.8	1.0	0.070	EEFCD1C6R8R	–	3500
		8.2	7.3	4.3	1.8	1.3	0.045	EEFCD1C8R2R	–	3500
UD	2	180	7.3	4.3	2.8	3.0	0.015	EEFUD0D181R	EEFUD0D181ER	2000
			7.3	4.3	2.8	3.3	0.012	EEFUD0D181XR	EEFUD0D181XE	2000
		220	7.3	4.3	2.8	3.0	0.015	EEFUD0D221R	EEFUD0D221ER	2000
			7.3	4.3	2.8	3.3	0.012	EEFUD0D221XR	EEFUD0D221XE	2000

✻1: Ripple current (100kHz/ +20 to +105°C), ✻2: ESR (100kHz/+20°C)

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■ Standard Products

Series & Size Code	Rated W.V. (V.DC)	Capacitance (±20%) (μF)	Case Size L (mm)	W (mm)	H (mm)	Specificatuion ✻1 Ripple current (Ar.m.s.)	✻2 ESR (Ω)	Reflow 240°C Part number	Reflow 260°C Part number	Min. Packaging Q'ty (pcs)
UD	2	270	7.3	4.3	2.8	3.0	0.015	EEFUD0D271R	EEFUD0D271ER	2000
			7.3	4.3	2.8	3.3	0.012	EEFUD0D271XR	EEFUD0D271XE	2000
			7.3	4.3	2.8	3.4	0.009	EEFUD0D271LR	EEFUD0D271LE	2000
		330	7.3	4.3	2.8	3.0	0.015	EEFUD0D331R	EEFUD0D331ER	2000
			7.3	4.3	2.8	3.3	0.012	EEFUD0D331XR	EEFUD0D331XE	2000
			7.3	4.3	2.8	3.4	0.009	EEFUD0D331LR	EEFUD0D331LE	2000
		390	7.3	4.3	2.8	3.0	0.015	EEFUD0D391R	EEFUD0D391ER	2000
			7.3	4.3	2.8	3.4	0.009	EEFUD0D391LR	EEFUD0D391LE	2000
		470	7.3	4.3	2.8	3.3	0.009	EEFUD0D471LR	EEFUD0D471LE	2000
	2.5	150	7.3	4.3	2.8	3.0	0.015	EEFUD0E151R	EEFUD0E151ER	2000
			7.3	4.3	2.8	3.3	0.012	EEFUD0E151XR	EEFUD0E151XE	2000
		180	7.3	4.3	2.8	3.0	0.015	EEFUD0E181R	EEFUD0E181ER	2000
			7.3	4.3	2.8	3.3	0.012	EEFUD0E181XR	EEFUD0E181XE	2000
		220	7.3	4.3	2.8	3.0	0.015	EEFUD0E221R	EEFUD0E221ER	2000
			7.3	4.3	2.8	3.3	0.012	EEFUD0E221XR	EEFUD0E221XE	2000
			7.3	4.3	2.8	3.4	0.009	EEFUD0E221LR	EEFUD0E221LE	2000
		270	7.3	4.3	2.8	3.0	0.015	EEFUD0E271R	EEFUD0E271ER	2000
			7.3	4.3	2.8	3.4	0.009	EEFUD0E271LR	EEFUD0E271LE	2000
	4	120	7.3	4.3	2.8	3.0	0.015	EEFUD0G121R	EEFUD0G121ER	2000
			7.3	4.3	2.8	3.3	0.012	EEFUD0G121XR	EEFUD0G121XE	2000
		150	7.3	4.3	2.8	3.0	0.015	EEFUD0G151R	EEFUD0G151ER	2000
			7.3	4.3	2.8	3.3	0.012	EEFUD0G151XR	EEFUD0G151XE	2000
			7.3	4.3	2.8	3.4	0.009	EEFUD0G151LR	EEFUD0G151LE	2000
		180	7.3	4.3	2.8	2.5	0.018	EEFUD0G181R	EEFUD0G181ER	2000
			7.3	4.3	2.8	3.4	0.009	EEFUD0G181LR	EEFUD0G181LE	2000
	6.3	100	7.3	4.3	2.8	3.0	0.015	EEFUD0J101R	EEFUD0J101ER	2000
			7.3	4.3	2.8	3.3	0.012	EEFUD0J101XR	EEFUD0J101XE	2000
		120	7.3	4.3	2.8	3.0	0.015	EEFUD0J121R	EEFUD0J121ER	2000
			7.3	4.3	2.8	3.3	0.012	EEFUD0J121XR	EEFUD0J121XE	2000
			7.3	4.3	2.8	3.4	0.009	EEFUD0J121LR	–	2000
		150	7.3	4.3	2.8	2.5	0.018	EEFUD0J151R	EEFUD0J151ER	2000
			7.3	4.3	2.8	3.4	0.009	EEFUD0J151LR	–	2000
	8	68	7.3	4.3	2.8	3.0	0.015	EEFUD0K680R	EEFUD0K680ER	2000
		100	7.3	4.3	2.8	2.5	0.018	EEFUD0K101R	EEFUD0K101ER	2000
UE	2	270	7.3	4.3	4.2	3.3	0.012	EEFUE0D271R	EEFUE0D271ER	2000
			7.3	4.3	4.2	3.5	0.010	EEFUE0D271XR	EEFUE0D271XE	2000
		330	7.3	4.3	4.2	3.3	0.012	EEFUE0D331R	EEFUE0D331ER	2000
			7.3	4.3	4.2	3.5	0.010	EEFUE0D331XR	EEFUE0D331XE	2000
		390	7.3	4.3	4.2	3.3	0.012	EEFUE0D391R	EEFUE0D391ER	2000
			7.3	4.3	4.2	3.5	0.010	EEFUE0D391XR	EEFUE0D391XE	2000
			7.3	4.3	4.2	3.7	0.007	EEFUE0D391LR	EEFUE0D391LE	2000
		470	7.3	4.3	4.2	3.3	0.012	EEFUE0D471R	EEFUE0D471ER	2000
			7.3	4.3	4.2	3.5	0.010	EEFUE0D471XR	EEFUE0D471XE	2000
			7.3	4.3	4.2	3.7	0.007	EEFUE0D471LR	EEFUE0D471LE	2000
		560	7.3	4.3	4.2	3.3	0.012	EEFUE0D561R	EEFUE0D561ER	2000
			7.3	4.3	4.2	3.7	0.007	EEFUE0D561LR	EEFUE0D561LE	2000
	2.5	220	7.3	4.3	4.2	3.3	0.012	EEFUE0E221R	EEFUE0E221ER	2000
			7.3	4.3	4.2	3.5	0.010	EEFUE0E221XR	EEFUE0E221XE	2000

✻1: Ripple current (100kHz/ +20 to +105°C), ✻2: ESR (100kHz/+20°C)

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■ Standard Products

Series & Size Code	Rated W.V. (V.DC)	Capacitance (±20%) (μF)	Case Size L (mm)	W (mm)	H (mm)	Specification ❊1 Ripple current (Ar.m.s.)	❊2 ESR (Ω)	Reflow 240°C Part number	Reflow 260°C Part number	Min. Packaging Q'ty (pcs)
UE	2.5	270	7.3	4.3	4.2	3.3	0.012	EEFUE0E271R	EEFUE0E271ER	2000
			7.3	4.3	4.2	3.5	0.010	EEFUE0E271XR	EEFUE0E271XE	2000
		330	7.3	4.3	4.2	3.3	0.012	EEFUE0E331R	EEFUE0E331ER	2000
			7.3	4.3	4.2	3.5	0.010	EEFUE0E331XR	EEFUE0E331XE	2000
			7.3	4.3	4.2	3.7	0.007	EEFUE0E331LR	EEFUE0E331LE	2000
		390	7.3	4.3	4.2	3.3	0.012	EEFUE0E391R	EEFUE0E391ER	2000
			7.3	4.3	4.2	3.7	0.007	EEFUE0E391LR	EEFUE0E391LE	2000
		470	7.3	4.3	4.2	3.3	0.012	EEFUE0E471R	EEFUE0E471ER	2000
			7.3	4.3	4.2	3.7	0.007	EEFUE0E471LR	EEFUE0E471LE	2000
	4	180	7.3	4.3	4.2	3.3	0.012	EEFUE0G181R	EEFUE0G181ER	2000
			7.3	4.3	4.2	3.5	0.010	EEFUE0G181XR	EEFUE0G181XE	2000
		220	7.3	4.3	4.2	3.3	0.012	EEFUE0G221R	EEFUE0G221ER	2000
			7.3	4.3	4.2	3.5	0.010	EEFUE0G221XR	EEFUE0G221XE	2000
			7.3	4.3	4.2	3.7	0.007	EEFUE0G221LR	EEFUE0G221LE	2000
		270	7.3	4.3	4.2	3.3	0.012	EEFUE0G271R	EEFUE0G271ER	2000
			7.3	4.3	4.2	3.7	0.007	EEFUE0G271LR	EEFUE0G271LE	2000
		330	7.3	4.3	4.2	3.3	0.012	EEFUE0G331R	EEFUE0G331ER	2000
	6.3	150	7.3	4.3	4.2	3.3	0.012	EEFUE0J151R	EEFUE0J151ER	2000
			7.3	4.3	4.2	3.5	0.010	EEFUE0J151XR	EEFUE0J151XE	2000
		180	7.3	4.3	4.2	3.3	0.012	EEFUE0J181R	EEFUE0J181ER	2000
			7.3	4.3	4.2	3.5	0.010	EEFUE0J181XR	EEFUE0J181XE	2000
			7.3	4.3	4.2	3.7	0.007	EEFUE0J181LR	–	2000
		220	7.3	4.3	4.2	3.0	0.015	EEFUE0J221R	EEFUE0J221ER	2000
			7.3	4.3	4.2	3.7	0.007	EEFUE0J221LR	–	2000
	8	100	7.3	4.3	4.2	3.3	0.012	EEFUE0K101R	EEFUE0K101ER	2000
		150	7.3	4.3	4.2	3.0	0.015	EEFUE0K151R	EEFUE0K151ER	2000
CX	2	220	7.3	4.3	1.9	2.7	0.015	-	EEFCX0D221R	3500
		330	7.3	4.3	1.9	2.7	0.015	-	EEFCX0D331R	3500
		390	7.3	4.3	1.9	2.7	0.015	-	EEFCX0D391R	3500
		470	7.3	4.3	1.9	2.7	0.015	-	EEFCX0D471R	3500
	2.5	220	7.3	4.3	1.9	2.7	0.015	-	EEFCX0E221R	3500
		330	7.3	4.3	1.9	2.7	0.015	-	EEFCX0E331R	3500
		390	7.3	4.3	1.9	2.7	0.015	-	EEFCX0E391R	3500
	4	150	7.3	4.3	1.9	2.7	0.015	-	EEFCX0G151R	3500
		180	7.3	4.3	1.9	2.7	0.015	-	EEFCX0G181R	3500
		220	7.3	4.3	1.9	2.7	0.015	-	EEFCX0G221R	3500
	6.3	100	7.3	4.3	1.9	2.7	0.015	-	EEFCX0J101R	3500
		120	7.3	4.3	1.9	2.7	0.015	-	EEFCX0J121R	3500

❊1: Ripple current (100kHz/ +20 to +105°C), ❊2: ESR (100kHz/+20°C)

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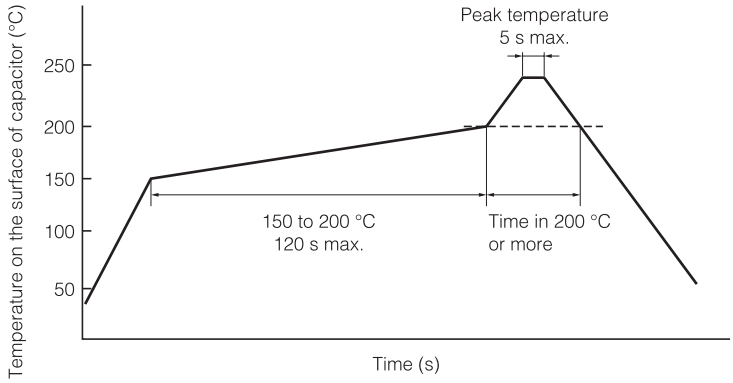
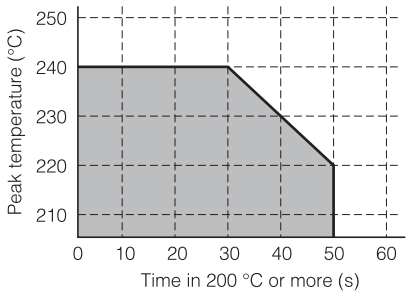
■ Mounting Specifications.

● Recommendable reflow soldering temperature 240°C

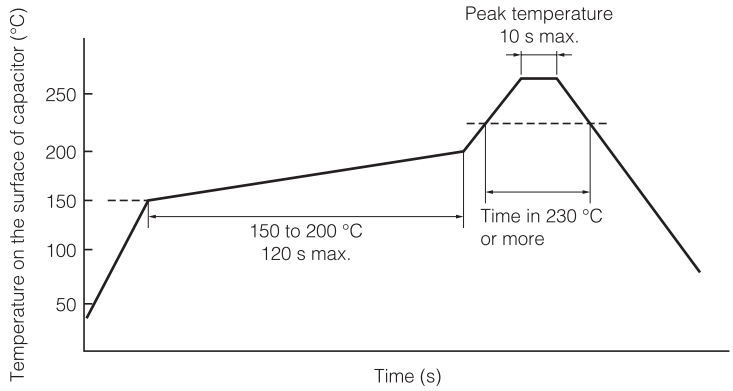


EX.)

Peak temperature	Time in 200°C or more
240°C, 5s max.	30s max.
230°C, 5s max.	40s max.

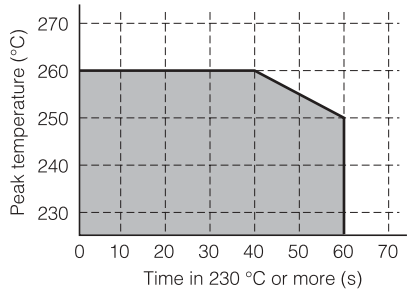


● Recommendable reflow soldering temperature 260°C



EX.)

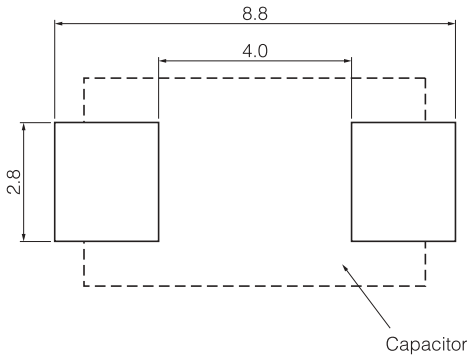
Peak temperature	Time in 230°C or more
260°C, 10s max.	40s max.
250°C, 10s max.	60s max.



● Typical land pattern (mm)

For standard terminal

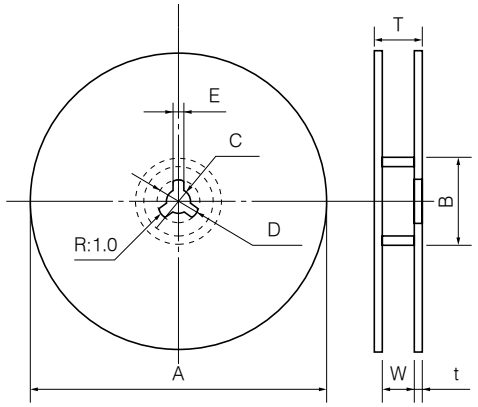
(FD, CD, CX, UD, UE, S, H series)



Design, and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and / or use. Should a safety concern arise regarding this product,please be sure to contact us immediately. Mar.2006

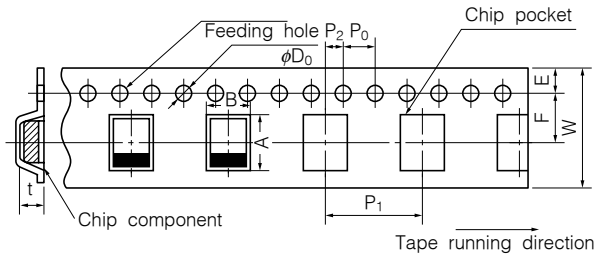
■ Packaging Specifications

● Reel Dimensions (mm)



A	B	C	D	E	W	T	t
330±2	50min.	13.0±0.5	21.0±0.8	2.0±0.5	14±1	20±1	3.0

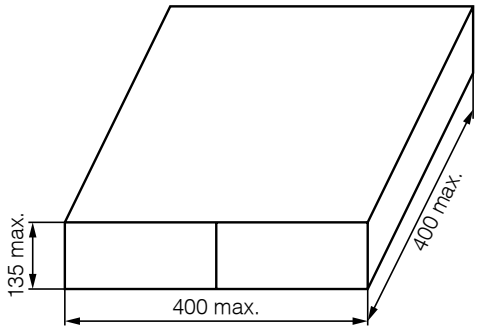
● Embossed Taping (mm)



A±0.2	B±0.2	W±0.3	F±0.1	E±0.1	P_1±0.1
7.7	4.6	12.0	5.5	1.75	8.0

P_2±0.1	P_0±0.1	ϕD_0	t±0.2 / Series			
			FD	CD/CX/SL SX/HL/LL	UD/SD/ HD	UE/SE/ HE
2.0	4.0	$1.5^{+0.1}_{0}$	1.5	2.1	3.4	4.5

■ Packaging Box Dimensions (mm)



Design, and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and / or use. Should a safety concern arise regarding this product,please be sure to contact us immediately. Mar.2006

Surface Mount Type SP-Cap

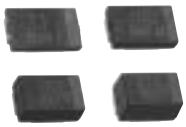
Series: S

■ Features

Super Low-ESR(5 to 9mΩ)
Lower ESR and Higher Capacitance
at the same case size as conventional products.
Excellent Noise-absorbent Characteristics
High Ripple Current
RoHS directive compliant
Reflow 260°C and 240°C. Please see specific P/N details.

Country of Origin

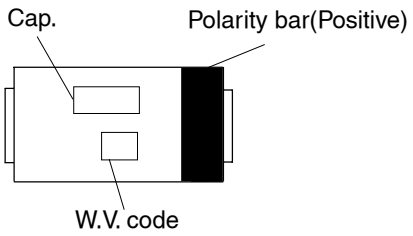
Japan
Singapore



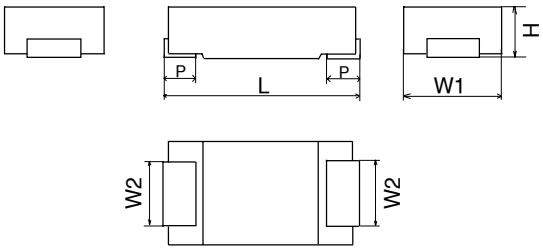
■ Specification

Series & Size Code	SL	SX	SD	SE
Category Temp.Range	-40 to +105°C			
Rated W.V.Range	2 to 6.3V.DC			
Nominal Cap.Range	56 to 220μF	68 to 330μF	120 to 390μF	180 to 560μF
Capacitance Tolerance	±20 %			
DC Leakage Current	Reflow 240°C: I ≦ 0.06 CV 2minutes(2 to 4V.DC) I ≦ 0.04CV 2minutes(6.3V.DC) Reflow 260°C: I ≦ 0.1CV 2minutes			
tan δ	≦ 0.06(120Hz/ +20°C)		≦ 0.10(120Hz/ +20°C)	
Surge Voltage	Rated Working Voltage × 1.25 (15 to 35°C)			
Endurance	After applying rated working voltage for 1000 hours at 105±2°C, and then being stabilized at +20°C, capacitor shall meet the following limits.			
	Capacitance change	±10% of initial measured value		
	tan δ	≦ Initial specified value		
	DC leakage current	≦ Initial specified value		
Moisture resistance	After storing for 500 hours at 60°C,90%			
	Capacitance change of initial measurd value	2, 2.5V.DC: +70, -20%	4 V.DC: +60, -20%	6.3V.DC: +50, -20%
	tan δ	≦ 200% of initial specified value		
	DC leakage current	≦ Initial specified value		

■ Marking



■ Dimensions in mm(not to scale)



(mm)

Series & Size Code	L±0.2	W1±0.2	W2±0.1	H	P±0.3
SL	7.3	4.3	2.4	1.8±0.1	1.3
SX	7.3	4.3	2.4	1.9±0.2	1.3
SD	7.3	4.3	2.4	2.8±0.2	1.3
SE	7.3	4.3	2.4	4.2±0.1	1.3

Design, and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and / or use. Should a safety concern arise regarding this product,please be sure to contact us immediately. Mar.2006

■ Low ESR Products

Series & Size Code	Rated W.V. (V.DC)	Capacitance (±20%) (μF)	Case Size L (mm)	W (mm)	H (mm)	Specification ❊1 Ripple current (Ar.m.s.)	❊2 ESR (Ω)	Reflow 240°C Part number	Reflow 260°C Part number	Min. Packaging Q'ty (pcs)
SL	2	100	7.3	4.3	1.8	3.0	0.009	EEFSL0D101R	EEFSL0D101ER	3500
		120	7.3	4.3	1.8	3.0	0.009	EEFSL0D121R	EEFSL0D121ER	3500
		150	7.3	4.3	1.8	3.0	0.009	EEFSL0D151R	EEFSL0D151ER	3500
		180	7.3	4.3	1.8	3.0	0.009	EEFSL0D181R	EEFSL0D181ER	3500
		220	7.3	4.3	1.8	3.0	0.009	EEFSL0D221R	EEFSL0D221ER	3500
	2.5	100	7.3	4.3	1.8	3.0	0.009	EEFSL0E101R	EEFSL0E101ER	3500
		120	7.3	4.3	1.8	3.0	0.009	EEFSL0E121R	EEFSL0E121ER	3500
		150	7.3	4.3	1.8	3.0	0.009	EEFSL0E151R	EEFSL0E151ER	3500
	4	82	7.3	4.3	1.8	3.0	0.009	EEFSL0G820R	EEFSL0G820ER	3500
	6.3	56	7.3	4.3	1.8	3.0	0.009	EEFSL0J560R	–	3500
SD	2	270	7.3	4.3	2.8	3.5	0.007	EEFSD0D271R	EEFSD0D271ER	2000
		330	7.3	4.3	2.8	3.5	0.007	EEFSD0D331R	EEFSD0D331ER	2000
		390	7.3	4.3	2.8	3.5	0.007	EEFSD0D391R	EEFSD0D391ER	2000
	2.5	220	7.3	4.3	2.8	3.5	0.007	EEFSD0E221R	EEFSD0E221ER	2000
		270	7.3	4.3	2.8	3.5	0.007	EEFSD0E271R	EEFSD0E271ER	2000
	4	150	7.3	4.3	2.8	3.5	0.007	EEFSD0G151R	EEFSD0G151ER	2000
	6.3	120	7.3	4.3	2.8	3.5	0.007	EEFSD0J121R	–	2000
SE	2	390	7.3	4.3	4.2	4.0	0.005	EEFSE0D391R	EEFSE0D391ER	2000
		470	7.3	4.3	4.2	4.0	0.005	EEFSE0D471R	EEFSE0D471ER	2000
		560	7.3	4.3	4.2	4.0	0.005	EEFSE0D561R	EEFSE0D561ER	2000
	2.5	330	7.3	4.3	4.2	4.0	0.005	EEFSE0E331R	EEFSE0E331ER	2000
		390	7.3	4.3	4.2	4.0	0.005	EEFSE0E391R	EEFSE0E391ER	2000
	4	220	7.3	4.3	4.2	4.0	0.005	EEFSE0G221R	EEFSE0G221ER	2000
	6.3	180	7.3	4.3	4.2	4.0	0.005	EEFSE0J181R	–	2000
SX	2	180	7.3	4.3	1.9	3.0	0.009	EEFSX0D181R	EEFSX0D181ER	3500
		220	7.3	4.3	1.9	3.0	0.009	EEFSX0D221R	EEFSX0D221ER	3500
		270	7.3	4.3	1.9	3.0	0.009	EEFSX0D271R	EEFSX0D271ER	3500
		330	7.3	4.3	1.9	3.0	0.009	EEFSX0D331R	EEFSX0D331ER	3500
		330	7.3	4.3	1.9	3.5	0.006	EEFSX0D331XR	EEFSX0D331XE	3500
		390	7.3	4.3	1.9	3.0	0.009	EEFSX0D391R	EEFSX0D391ER	3500
		470	7.3	4.3	1.9	3.0	0.009	EEFSX0D471R	EEFSX0D471ER	3500
		470	7.3	4.3	1.9	3.5	0.006	EEFSX0D471XR	EEFSX0D471XE	3500
	2.5	150	7.3	4.3	1.9	3.0	0.009	EEFSX0E151R	EEFSX0E151ER	3500
		180	7.3	4.3	1.9	3.0	0.009	EEFSX0E181R	EEFSX0E181ER	3500
		220	7.3	4.3	1.9	3.0	0.009	EEFSX0E221R	EEFSX0E221ER	3500
		330	7.3	4.3	1.9	3.0	0.009	EEFSX0E331R	EEFSX0E331ER	3500
		330	7.3	4.3	1.9	3.5	0.006	EEFSX0E331XR	EEFSX0E331XE	3500
		390	7.3	4.3	1.9	3.0	0.009	EEFSX0E391R	EEFSX0E391ER	3500
		390	7.3	4.3	1.9	3.5	0.006	EEFSX0E391XR	EEFSX0E391XE	3500
	4	82	7.3	4.3	1.9	3.0	0.009	EEFSX0G820R	EEFSX0G820ER	3500
		100	7.3	4.3	1.9	3.0	0.009	EEFSX0G101R	EEFSX0G101ER	3500
		150	7.3	4.3	1.9	3.0	0.009	EEFSX0G151R	EEFSX0G151ER	3500
	6.3	68	7.3	4.3	1.9	3.0	0.009	EEFSX0J680R	–	3500

❊1: Ripple current (100kHz/ +20 to +105°C), ❊2: ESR (100kHz/+20°C)

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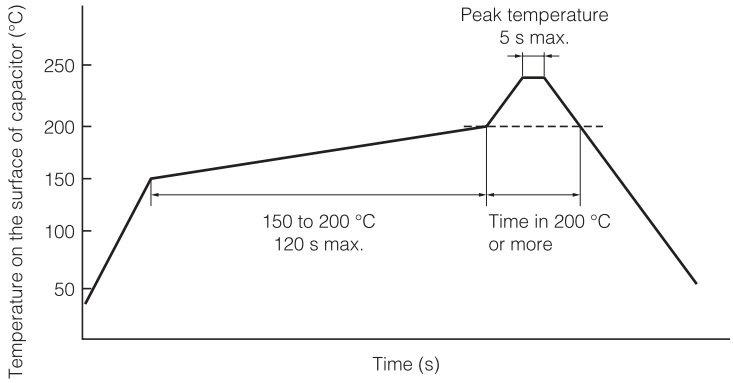
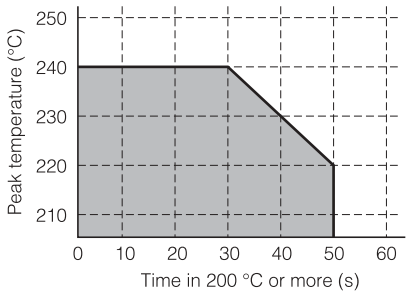
■ Mounting Specifications.

● Recommendable reflow soldering temperature 240°C

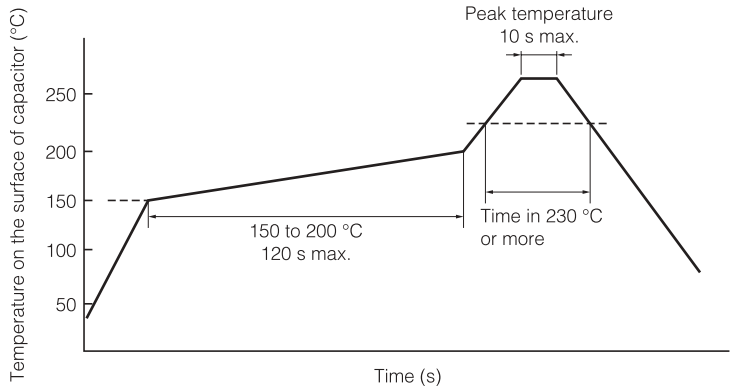


EX.)

Peak temperature	Time in 200°C or more
240°C, 5s max.	30s max.
230°C, 5s max.	40s max.

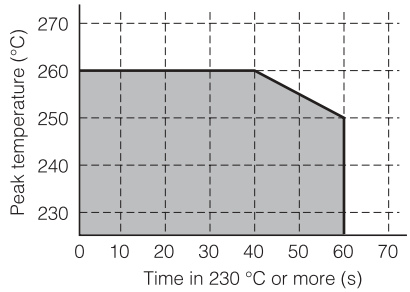


● Recommendable reflow soldering temperature 260°C



EX.)

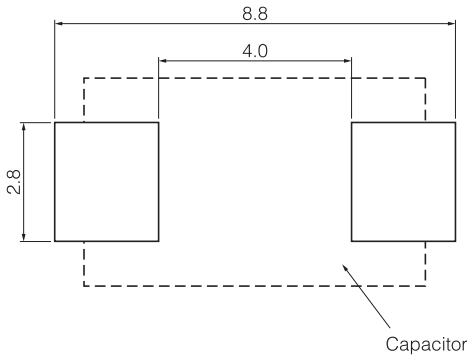
Peak temperature	Time in 230°C or more
260°C, 10s max.	40s max.
250°C, 10s max.	60s max.



● Typical land pattern (mm)

For standard terminal

(FD, CD, CX, UD, UE, S, H series)



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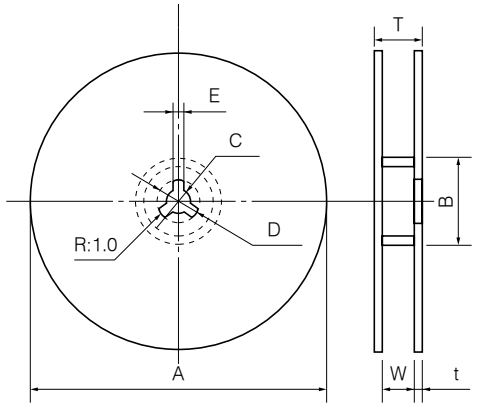
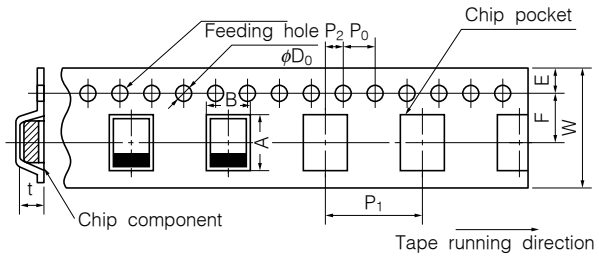
■ Packaging Specifications

● Reel Dimensions (mm)



A	B	C	D	E	W	T	t
330±2	50min.	13.0±0.5	21.0±0.8	2.0±0.5	14±1	20±1	3.0

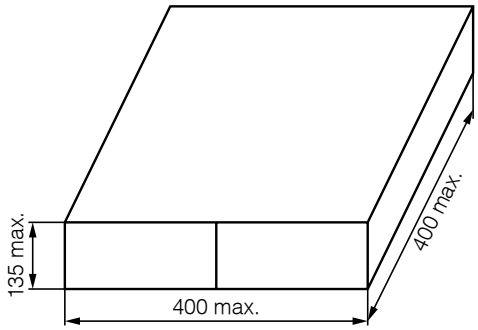
● Embossed Taping (mm)



A±0.2	B±0.2	W±0.3	F±0.1	E±0.1	P_1±0.1
7.7	4.6	12.0	5.5	1.75	8.0

P_2±0.1	P_0±0.1	ϕD_0	t±0.2 / Series			
			FD	CD/CX/SL SX/HL/LL	UD/SD/ HD	UE/SE/ HE
2.0	4.0	$1.5^{+0.1}_{0}$	1.5	2.1	3.4	4.5

■ Packaging Box Dimensions (mm)



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ALUMINUM ELECTROLYTIC CAPACITORS

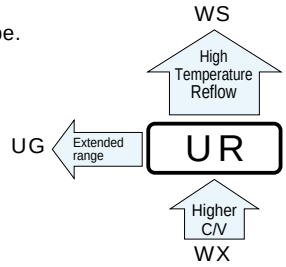
nichicon

UR series

Chip Type, High CV

For SMD | Smaller | Anti-Solvent Feature

- Chip type, higher capacitance in larger case sizes.
- Designed for surface mounting on high density PC board.
- Applicable to automatic mounting machine using carrier tape.
- Adapted to the RoHS directive (2002/95/EC).



■Specifications

Item	Performance Characteristics
Category Temperature Range	–40 ~ +85°C
Rated Voltage Range	4 ~ 100V
Rated Capacitance Range	3.3 ~ 1500μF
Capacitance Tolerance	±20% at 120Hz, 20°C
Leakage Current	After 1 minute's application of rated voltage, leakage current is not more than 0.03CV (μA) .
tan δ	Measurement frequency : 120Hz, Temperature : 20°C

Rated voltage (V)	4	6.3	10	16	25	35	50	63	100
tan δ (MAX.)	0.35	0.28	0.24	0.20	0.16	0.14	0.12	0.12	0.12

Stability at Low Temperature — Measurement frequency: 120Hz

Rated voltage (V)		4	6.3	10	16	25	35	50	63	100
Impedance ratio ZT / Z20 (MAX.)	Z–25°C / Z+20°C	7	5	4	3	2	2	2	2	2
	Z–40°C / Z+20°C	15	10	8	6	4	3	3	3	3

Endurance — After 2000 hours' application of rated voltage at 85°C, capacitors meet the characteristic requirements listed at right.

Capacitance change	Within ±20% of initial value
tan δ	200% or less of initial specified value
Leakage current	Initial specified value or less

Shelf Life — After storing the capacitors under no load at 85°C for 1000 hours, and after performing voltage treatment based on JIS C 5101-4 clause 4.1 at 20°C, they will meet the specified value for endurance characteristics listed above.

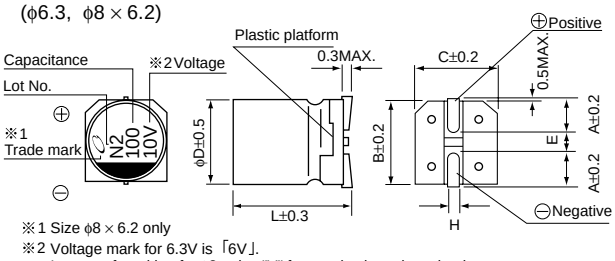
Resistance to soldering heat — The capacitors shall be kept on the hot plate maintained at 250°C, for 30 seconds. After removing from the hot plate and restored at room temperature, they meet the characteristic requirements listed at right.

Capacitance change	Within ±10% of initial value
tan δ	Initial specified value or less
Leakage current	Initial specified value or less

Marking — Black print on the case top.

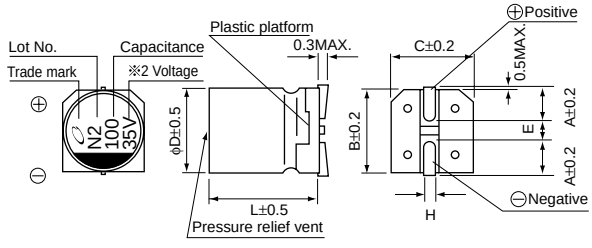
■Chip Type

(φ6.3, φ8 × 6.2)

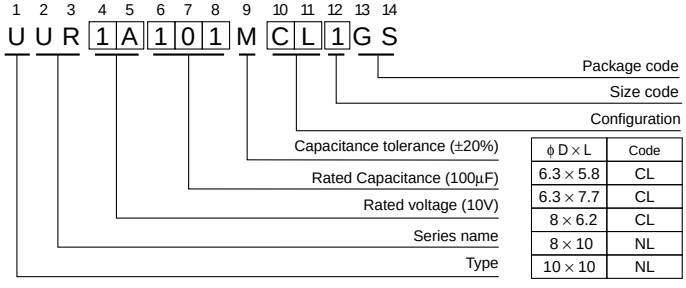


※1 Size φ8 × 6.2 only
※2 Voltage mark for 6.3V is 「6V」.
In case of marking for φ3 units, "V" for rated voltage is omitted.

(φ8 × 10, φ10 × 10)



Type numbering system (Example : 10V 100μF)



φD × L	Code
6.3 × 5.8	CL
6.3 × 7.7	CL
8 × 6.2	CL
8 × 10	NL
10 × 10	NL

(mm)

φD × L	6.3 × 5.8	6.3 × 7.7	8 × 6.2	8 × 10	10 × 10
A	2.4	2.4	3.3	2.9	3.2
B	6.6	6.6	8.3	8.3	10.3
C	6.6	6.6	8.3	8.3	10.3
E	2.2	2.2	2.3	3.1	4.5
L	5.8	7.7	6.2	10	10
H	0.5 ~ 0.8	0.5 ~ 0.8	0.5 ~ 0.8	0.8 ~ 1.1	0.8 ~ 1.1

● Dimension table in next page.

UR series

■Dimensions

Cap.(F) \ V	Code	4		6.3		10		16		25		35		50		63		100	
		0G		0J		1A		1C		1E		1V		1H		1J		2A	
3.3	3R3																	6.3×5.8	29
4.7	4R7															6.3×5.8	31	● 8×6.2	40 (35)
10	100															8×6.2	46	8×10	77
22	220													6.3×5.8	45	8×10	96	8×10	100
33	330											6.3×5.8	55	○ 8×6.2	95 (94)	8×10	117	10×10	130
47	470									6.3×5.8	65	● 8×6.2	105 (94)	○ 8×10	140 (105)	8×10	140	10×10	155
100	101					6.3×5.8	70	8×6.2	125	○ 8×6.2	145 (143)	○ 8×10	175 (132)	■ 10×10	195 (181)	10×10	232		
150	151					6.3×5.8	85	6.3×7.7	151	8×10	192	8×10	214	10×10	238				
220	221			● 8×6.2	160 (143)	○ 8×6.2	175 (173)	○ 8×10	215 (162)	■ 10×10	250 (232)	■ 10×10	265 (246)	10×10	289				
330	331	6.3×5.8	152	○ 8×6.2	190 (188)	8×10	240	8×10	270	■ 10×10	305 (284)	10×10	324						
470	471	6.3×7.7	200	8×10	265	8×10	290	■ 10×10	330 (307)	10×10	393								
680	681	8×10	284	8×10	318	10×10	374	10×10	396										
1000	102	8×10	344	■ 10×10	400 (372)	10×10	454											Case size φD × L (mm)	Rated ripple
1500	152	10×10	347	10×10	489														

Size φ6.3 × 5.8 is available for capacitors marked. "●"
Size φ6.3 × 7.7 is available for capacitors marked. "○"
Size φ8 × 10 is available for capacitors marked. "■"
※ In this case, 6 will be put at 12th digit of type numbering system.

Rated Ripple (mArms) at 85°C 120Hz

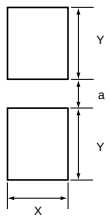
●Frequency coefficient of rated ripple current

Cap.(μF) \ Frequency	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz~
~ 47	0.80	1.00	1.15	1.40	1.67
100 ~ 1500	0.85	1.00	1.08	1.20	1.30

- Taping specifications are given in page 24.
- Recommended land size, soldering by reflow are given in page 25, 26.
- Please select UG(p.75) series if high CV products are required.
- Please refer to page 3 for the minimum order quantity.

Surface Mount Type

Recommended Land Size



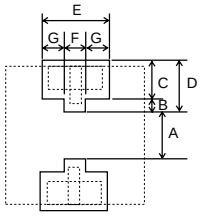
Size	X	Y	a
φ3	1.6	2.2	0.8
φ4	1.6	2.6	1.0
φ5	1.6	3.0	1.4
φ6.3	1.6	3.5	2.1
φ8×5.5L, φ8×6.2L	2.5	4.0	2.1
φ8 × 10L φ8 × 12L	2.5	3.5	3.0
φ10 × 10L	2.5	4.0	4.0
φ12.5	4.0	7.5	7.0
φ16	6.0	8.5	9.5
φ18	6.0	9.5	10.5
φ20	6.0	9.5	12.5

● Vibration Resistance Type
(UE, BC series)

① φ8 to 10

Size	X	Y	a
8 × 10	4.3	5.3	2.0
10 × 10	4.3	5.6	3.3

② φ12.5 to 20



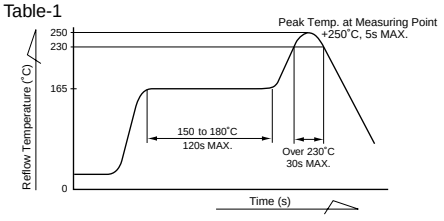
Size	A	B	C	D	E	F	G
φ12.5	3.0	2.3	5.0	7.3	7.0	2.0	2.5
φ16	5.3	2.9	5.0	7.9	7.0	2.0	2.5
φ18	5.3	3.1	5.8	8.9	11.0	2.0	4.5
φ20	7.8	2.9	5.8	8.7	12.0	2.4	4.8

Soldering by Reflow

● Chip Type Aluminum Electrolytic Capacitors Less than φ10

(ZS, ZP, ZT, WX, WP, WT, WF, WG, UP, UT, UA, UL, CB, CW, CD*, UD, UB, CJ, UR, UX, UQ, UE*, BC*) *φ12.5 or more : Refer to the table-2

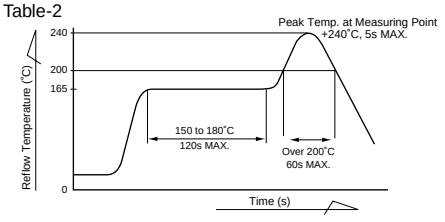
Table-1



- Pre - heating shall be done at +150˚C to 180˚C and for 120 seconds.
- The temperature at capacitor Top shall not exceed +250˚C.
- The duration for over +230˚C temperature at capacitor surface shall not exceed 30 seconds.
- Reflow shall be done within 2 cycles. please make sure the parts have enough cooling down time between the first and second soldering process.
- The standard temperature profile differs by every reflow method.
- Please contact us if capacitors are subject to the conditions other than the allowable range of reflow.
- Please contact us for the ZD,ZR,ZE,ZG series.
- Please contact us for the φ8×5.4L size products : WX,WP,WT

● Chip Type Aluminum Electrolytic Capacitors φ12.5 or more (CD, UG, UJ, UN, UH, UE, BC)

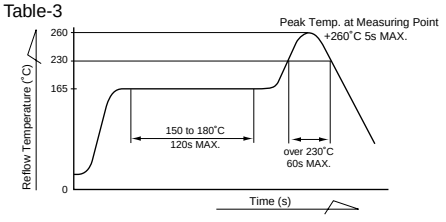
Table-2



- Pre - heating shall be done at +150˚C to 180˚C and for 120 seconds.
- The temperature at capacitor Top shall not exceed +240˚C.
- The standard temperature profile differs by every reflow method.
- Reflow shall be done within 2 cycles. please make sure the parts have enough cooling down time between the first and second soldering process.
- Please contact us it capacitors are subject to the conditions other than the allowable range at reflow.

● Chip Type Aluminum Electrolytic Capacitors (For High Temp. Reflow) WJ, WZ, WD, WH, WS

Table-3



- Pre - heating shall be done at +150˚C to 180˚C and for 120 seconds.
- The temperature at capacitor surface shall not exceed +260˚C.
- The duration for over +230˚C temperature at capacitor surface shall not exceed 60 seconds.
- Reflow shall be done within 2 cycles. please make sure the parts have enough cooling down time between the first and second soldering process.
  (φ8 × 6.2 and φ10 × 10 : 1 cycle only)
- The standard temperature profile differs by every reflow method.
- Please contact us if capacitors are subject to the conditions other than the allowable range of reflow.

ESR, Impedance Measuring Point

Radial lead type
ESR measurements should be made at a point on the terminal nearest the end seal of the capacitor.

Chip type
ESR measurements should be made at a point on the terminal nearest where the ternimals protrude through the plastic platform.