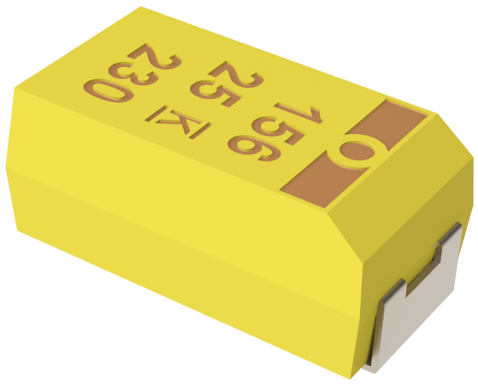
T494 Industrial Grade Low ESR MnO_2 Series

Overview

The KEMET T494 Series is a lower ESR version of the popular T491 Series, designed specifically for today's highly automated surface mount processes and equipment. The T494 combines KEMET's proven solid tantalum technology, acclaimed and respected throughout the world, with the latest in materials, processes and automation, resulting in unsurpassed total performance and value. This product meets or exceeds the requirements of EIA standard 535BAAC. This series is classified as MSL (Mositure Sensitivity Level) 1 under J STD 020: unlimited floor life time at ≤30°C / 85% RH. The T494 standard terminations are available in 100% matte tin and provide excellent wetting characteristics and compatibility with today's surface mount solder systems. Tin/lead (Sn/Pb) terminations are available upon request for any part number. Gold-plated terminations are also available for use with conductive epoxy attachment processes. Standard packaging of these devices is tape and reel in accordance with EIA 481. This system provides perfect compatibility with all tape-fed placement units.

Benefits

- Meets or exceeds EIA Standard 535BAAC
- Taped and reeled per EIA 481
- 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 values of 0.1 µF to 1,000 µF
- Tolerances of ±10% and ±20%
- Voltage rating of 2.5 – 50 VDC
- Extended range values
- Low profile case sizes
- RoHS Compliant and lead-free terminations
- Operating temperature range of -55˚C to +125˚C



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Environmental Compliance

RoHS Compliant (6/6) according to Directive 2002/95/EC when ordered with 100% Sn Solder

RoHS Compliant

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SPICE

For a detailed analysis of specific part numbers, please visit www.kemet.com for a free download of KEMET's SPICE software. The KEMET SPICE program is freeware intended to aid design engineers in analyzing the performance of these capacitors over frequency, temperature, ripple, and DC bias conditions.

Applications

Typical applications include decoupling and filtering in industrial and automotive end applications, such as DC/DC converters, portable electronics, telecommunications, and control units.

Ordering Information

T	494	T	336	M	004	A	T	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Voltage	Failure Rate/ Design	Lead Material	Packaging (C-Spec)
T = Tantalum	Industrial - Low ESR	A, B, C, D, E, S, T, U, V, X	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	2R5 = 2.5 V 003 = 3 V 004 = 4 V 006 = 6.3 V 010 = 10 V 016 = 16 V 020 = 20 V 025 = 25 V 035 = 35 V 050 = 50 V	A = N/A	T = 100% Matte Tin (Sn) Plated H = Standard Solder Coated (SnPb 5% Pb minimum) G = Gold Plated (A, B, C, D, X only)	Blank = 7" Reel 7280 = 13" Reel

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	-55°C to 125°C
Rated Capacitance Range	0.1 – 1,000 µF @ 120 Hz/25°C
Capacitance Tolerance	K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	2.5 – 50 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

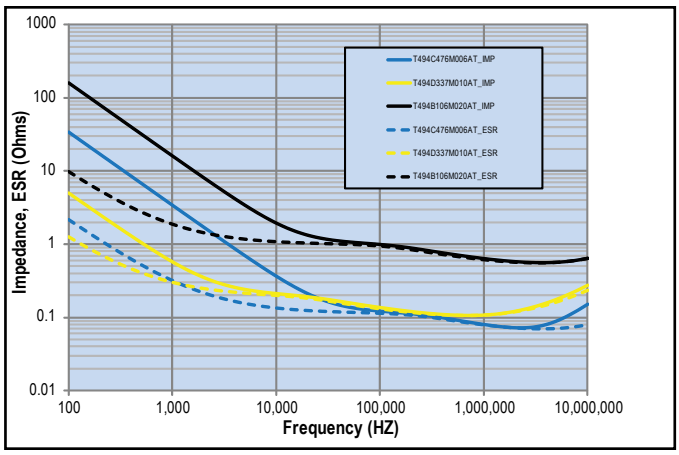
Qualification

Test	Condition		Characteristics			
Endurance	85°C @ rated voltage, 2,000 hours 125°C @ 2/3 rated voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Storage Life	125°C @ 0 volts, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Thermal Shock	MIL–STD–202, Method 107, Condition B, mounted, -55°C to 125°C, 1,000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, -55°C, +25°C, +85°C, +125°C, +25°C.		+25°C	-55°C	+85°C	+125°C
		Δ C/C	IL*	±10%	±10%	±20%
		DF	IL	IL	1.5 x IL	1.5 x IL
		DCL	IL	n/a	10 x IL	12 x IL
Surge Voltage	25°C and 85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage).		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		

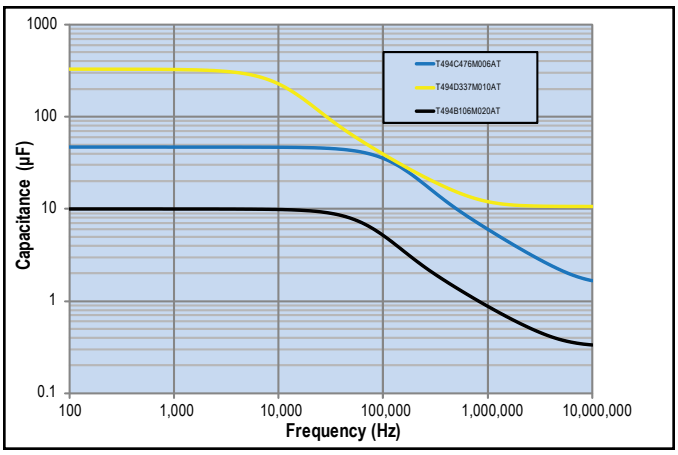
**IL = Initial limit*

Electrical Characteristics

ESR vs. Frequency



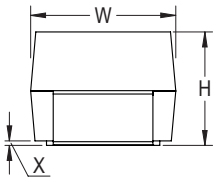
Capacitance vs. Frequency



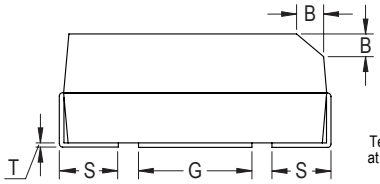
Dimensions – Millimeters (Inches)

Metric will govern

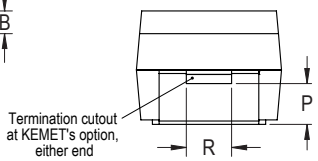
CATHODE (-) END VIEW



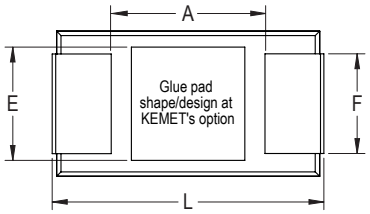
SIDE VIEW



ANODE (+) END VIEW



BOTTOM VIEW



Case Size		Component											
KEMET	EIA	L*	W*	H*	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 (0.126 ±0.008)	1.6 ±0.2 (0.063 ±0.008)	1.6 ±0.2 (0.063 ±0.008)	1.2 (.047)	0.8 (.031)	0.4 (.016)	0.10 ±0.10 (0.004 ±0.004)	0.4 (.016)	0.4 (.016)	0.13 (.005)	0.8 (.31)	1.1 (.043)	1.3 (.051)
B	3528–21	3.5 ±0.2 (0.138 ±0.008)	2.8 ±0.2 (0.110 ±0.008)	1.9 ±0.2 (0.075 ±0.008)	2.2 (.087)	0.8 (.031)	0.4 (.016)	0.10 ±0.10 (0.004 ±0.004)	0.5 (.020)	1.0 (.039)	0.13 (.005)	1.1 (0.043)	1.8 (.071)	2.2 (.087)
C	6032–28	6.0 ±0.3 (0.236 ±0.03)	3.2 ±0.3 (0.126 ±0.012)	2.5 ±0.3 (0.098 ±0.012)	2.2 (.087)	1.3 (.051)	0.5 (.020)	0.10 ±0.10 (0.004 ±0.004)	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 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	2.8 ±0.3 (0.110 ±0.012)	2.4 (.094)	1.3 (.051)	0.5 (.020)	0.10 ±0.10 (0.004 ±0.004)	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 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	4.0 ±0.3 (0.157 ±0.012)	2.4 (.094)	1.3 (.051)	0.5 (.020)	0.10 ±0.10 (0.004 ±0.004)	1.7 (.067)	1.0 (.039)	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)
E	7360-38	7.3 ±0.3 (0.287 ±0.012)	6.0± 0.3 (0.236 ±0.012)	3.6 ± 0.2 (0.142 ±0.008)	4.1 (.161)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	n/a	n/a	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)
S	3216–12	3.2 ±0.2 (0.126 ±0.008)	1.6 ±0.2 (0.063 ±0.008)	1.2 (.047)	1.2 (.047)	0.8 (.031)	n/a	0.05 (.002)	n/a	n/a	0.13 (.005)	0.8 (.031)	1.1 (.043)	1.3 (.051)
T	3528–12	3.5 ±0.2 (0.138 ±0.008)	2.8 ±0.2 (0.110 ±0.008)	1.2 (.047)	2.2 (.087)	0.8 (.031)	n/a	0.05 (.002)	n/a	n/a	0.13 (.005)	1.1 (.043)	1.8 (.071)	2.2 (.087)
U	6032–15	6.0 ±0.3 (0.236 ±0.012)	3.2 ±0.2 (0.110 ±0.008)	1.5 (.059)	2.2 (.087)	1.3 (.051)	n/a	0.05 (.002)	n/a	n/a	0.13 (.005)	2.5(.098)	2.8 (.110)	2.4 (.094)
V	7343–20	7.3 ±0.3 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	2.0 (.079)	2.4 (.094)	1.3 (.051)	n/a	0.05 (.002)	n/a	n/a	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)

Notes: (Ref) – Dimensions provided for reference only. No dimensions provided for B, P or R because low profile cases do not have a bevel or a notch.
** MIL–PRF–55365/8 specified dimensions*

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current			Moisture Sensitivity
VDC	µF	KEMET/EIA	(See below for part options)	µA @ 20°C Max/5 Min	% @ 20°C 120 Hz Max	Ω @ 20°C 100 kHz Max	(mA) 100 kHz 25°C	(mA) 100 kHz 85°C	(mA) 100 kHz 125°C	Reflow Temp ≤ 260°C
2.5	100	T/3528-12	T494T107(1)2R5A(2)	2.5	24.0	3.5	141	127	56	1
2.5	220	D/7343-31	T494D227(1)2R5A(2)	5.5	8.0	0.2	866	779	346	1
3	33	A/3216-18	T494A336(1)003A(2)	1.0	6.0	2.0	194	175	78	1
4	3.3	A/3216-18	T494A335(1)004A(2)	0.5	6.0	4.0	137	123	55	1
4	4.7	A/3216-18	T494A475(1)004A(2)	0.5	6.0	3.5	146	131	58	1
4	6.8	A/3216-18	T494A685(1)004A(2)	0.5	6.0	3.0	158	142	63	1
4	6.8	S/3216-12	T494S685(1)004A(2)	0.5	6.0	7.0	93	84	37	1
4	10	B/3528-21	T494B106(1)004A(2)	0.5	6.0	1.2	266	239	106	1
4	10	A/3216-18	T494A106(1)004A(2)	0.5	6.0	2.0	194	175	78	1
4	10	S/3216-12	T494S106(1)004A(2)	0.5	6.0	9.0	82	74	33	1
4	15	B/3528-21	T494B156(1)004A(2)	0.6	6.0	1.2	266	239	106	1
4	15	A/3216-18	T494A156(1)004A(2)	0.6	6.0	1.5	224	202	90	1
4	15	T/3528-12	T494T156(1)004A(2)	0.6	6.0	2.0	187	168	75	1
4	15	S/3216-12	T494S156(M)004A(2)	0.6	10.0	9.0	82	74	33	1
4	22	C/6032-28	T494C226(1)004A(2)	0.9	6.0	0.5	469	422	188	1
4	22	B/3528-21	T494B226(1)004A(2)	0.9	6.0	0.6	376	338	150	1
4	22	A/3216-18	T494A226(1)004A(2)	0.9	6.0	1.5	224	202	90	1
4	22	S/3216-12	T494S226(M)004A(2)	0.9	10.0	8.0	87	78	35	1
4	22	T/3528-12	T494T226(1)004A(2)	0.9	6.0	2.5	167	150	67	1
4	33	C/6032-28	T494C336(1)004A(2)	1.3	6.0	0.5	469	422	188	1
4	33	U/6032-15	T494U336(1)004A(2)	1.3	6.0	0.6	387	348	155	1
4	33	B/3528-21	T494B336(1)004A(2)	1.3	6.0	0.5	412	371	165	1
4	33	A/3216-18	T494A336(1)004A(2)	1.3	6.0	3.0	158	142	63	1
4	33	T/3528-12	T494T336(M)004A(2)	1.3	8.0	3.5	141	127	56	1
4	47	C/6032-28	T494C476(1)004A(2)	1.9	6.0	0.5	469	422	188	1
4	47	U/6032-15	T494U476(1)004A(2)	1.9	6.0	0.6	387	348	155	1
4	47	B/3528-21	T494B476(1)004A(2)	1.9	6.0	0.5	412	371	165	1
4	47	A/3216-18	T494A476(M)004A(2)	1.9	12.0	2.0	194	175	78	1
4	47	T/3528-12	T494T476(M)004A(2)	1.9	12.0	4.0	132	119	53	1
4	68	D/7343-31	T494D686(1)004A(2)	2.7	6.0	0.20	866	779	346	1
4	68	C/6032-28	T494C686(1)004A(2)	2.7	6.0	0.25	663	597	265	1
4	68	U/6032-15	T494U686(1)004A(2)	2.7	6.0	0.60	387	348	155	1
4	68	B/3528-21	T494B686(1)004A(2)	2.7	6.0	2.00	206	185	82	1
4	68	A/3216-18	T494A686(1)004A(2)	2.7	30.0	3.00	158	142	63	1
4	100	D/7343-31	T494D107(1)004A(2)	4.0	8.0	0.20	866	779	346	1
4	100	C/6032-28	T494C107(1)004A(2)	4.0	8.0	0.20	742	668	297	1
4	100	U/6032-15	T494U107(1)004A(2)	4.0	10.0	1.00	300	270	120	1
4	100	B/3528-21	T494B107(M)004A(2)	4.0	8.0	0.65	362	326	145	1
4	100	A/3216-18	T494A107(M)004A(2)	4.0	30.0	3.00	158	142	63	1
4	100	T/3528-12	T494T107(M)004A(2)	4.0	30.0	4.50	125	113	50	1
4	150	D/7343-31	T494D157(1)004A(2)	6.0	8.0	0.15	1000	900	400	1
4	150	V/7343-20	T494V157(1)004A(2)	6.0	8.0	0.20	791	712	316	1
4	150	C/6032-28	T494C157(1)004A(2)	6.0	8.0	0.30	606	545	242	1
4	150	B/3528-21	T494B157(M)004A(2)	6.0	12.0	1.00	292	263	117	1
4	220	V/7343-20	T494V227(1)004A(2)	8.8	8.0	0.30	645	581	258	1
4	220	B/3528-21	T494B227(M)004A(2)	8.8	8.0	0.40	461	415	184	1
4	330	D/7343-31	T494D337(1)004A(2)	13.2	8.0	0.15	1000	900	400	1
4	330	C/6032-28	T494C337(1)004A(2)	13.2	10.0	0.09	1106	995	442	1
4	330	V/7343-20	T494V337(1)004A(2)	13.2	12.0	0.30	645	581	258	1
4	470	X/7343-43	T494X477(1)004A(2)	18.8	8.0	0.15	1049	944	420	1
4	470	D/7343-31	T494D477(1)004A(2)	18.8	8.0	0.15	1000	900	400	1
VDC	µF	KEMET/EIA	(See below for part options)	µA @ 20°C Max/5 Min	% @ 20°C 120 Hz Max	Ω @ 20°C 100 kHz Max	(mA) 100 kHz 25°C	(mA) 100 kHz 85°C	(mA) 100 kHz 125°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current			Moisture Sensitivity

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.

(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates termination finish.

Refer to Ordering Information for additional detail.

Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont'd

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current			Moisture Sensitivity
VDC	µF	KEMET/EIA	(See below for part options)	µA @ 20°C Max/5 Min	% @ 20°C 120 Hz Max	Ω @ 20°C 100 kHz Max	(mA) 100 kHz 25°C	(mA) 100 kHz 85°C	(mA) 100 kHz 125°C	Reflow Temp ≤ 260°C
4	680	X/7343-43	T494X687(M)004A(2)	27.2	12.0	0.10	1285	1157	514	1
4	680	D/7343-31	T494D687(M)004A(2)	27.2	12.0	0.15	1000	900	400	1
4	1000	X/7343-43	T494X108(1)004A(2)	40.0	12.0	0.10	1285	1157	514	1
4	1000	E/7360-38	T494E108(M)004A(2)	40.0	15.0	0.08	1581	1423	632	1
6.3	2.2	A/3216-18	T494A225(1)006A(2)	0.5	6.0	6.0	112	101	45	1
6.3	3.3	A/3216-18	T494A335(1)006A(2)	0.5	6.0	6.0	112	101	45	1
6.3	4.7	A/3216-18	T494A475(1)006A(2)	0.5	6.0	3.5	146	131	58	1
6.3	4.7	S/3216-12	T494S475(1)006A(2)	0.5	6.0	8.0	87	78	35	1
6.3	6.8	B/3528-21	T494B685(1)006A(2)	0.5	6.0	1.2	266	239	106	1
6.3	6.8	A/3216-18	T494A685(1)006A(2)	0.5	6.0	2.0	194	175	78	1
6.3	6.8	S/3216-12	T494S685(1)006A(2)	0.5	6.0	9.0	82	74	33	1
6.3	10	B/3528-21	T494B106(1)006A(2)	0.6	6.0	1.0	292	263	117	1
6.3	10	A/3216-18	T494A106(1)006A(2)	0.6	6.0	2.0	194	175	78	1
6.3	10	T/3528-12	T494T106(1)006A(2)	0.6	6.0	1.2	242	218	97	1
6.3	10	S/3216-12	T494S106(M)006A(2)	0.6	10.0	9.0	82	74	33	1
6.3	15	C/6032-28	T494C156(1)006A(2)	0.9	6.0	0.6	428	385	171	1
6.3	15	B/3528-21	T494B156(1)006A(2)	0.9	6.0	0.7	348	313	139	1
6.3	15	A/3216-18	T494A156(1)006A(2)	0.9	6.0	2.0	194	175	78	1
6.3	15	T/3528-12	T494T156(1)006A(2)	0.9	6.0	2.5	167	150	67	1
6.3	15	S/3216-12	T494S156(M)006A(2)	0.9	10.0	10.0	77	69	31	1
6.3	22	C/6032-28	T494C226(1)006A(2)	1.4	6.0	0.5	469	422	188	1
6.3	22	U/6032-15	T494U226(1)006A(2)	1.4	6.0	0.8	335	302	134	1
6.3	22	B/3528-21	T494B226(1)006A(2)	1.4	6.0	0.6	376	338	150	1
6.3	22	A/3216-18	T494A226(1)006A(2)	1.4	6.0	3.0	158	142	63	1
6.3	22	T/3528-12	T494T226(M)006A(2)	1.4	8.0	3.5	141	127	56	1
6.3	33	C/6032-28	T494C336(1)006A(2)	2.1	6.0	0.3	606	545	242	1
6.3	33	U/6032-15	T494U336(1)006A(2)	2.1	6.0	0.6	387	348	155	1
6.3	33	B/3528-21	T494B336(1)006A(2)	2.1	6.0	0.6	376	338	150	1
6.3	33	A/3216-18	T494A336(1)006A(2)	2.1	12.0	2.0	194	175	78	1
6.3	33	T/3528-12	T494T336(M)006A(2)	2.1	12.0	4.0	132	119	53	1
6.3	47	D/7343-31	T494D476(1)006A(2)	3.0	6.0	0.22	826	743	330	1
6.3	47	C/6032-28	T494C476(1)006A(2)	3.0	6.0	0.25	663	597	265	1
6.3	47	U/6032-15	T494U476(1)006A(2)	3.0	6.0	0.60	387	348	155	1
6.3	47	B/3528-21	T494B476(1)006A(2)	3.0	6.0	0.50	412	371	165	1
6.3	47	A/3216-18	T494A476(M)006A(2)	3.0	12.0	2.50	173	156	69	1
6.3	47	T/3528-12	T494T476(1)006A(2)	3.0	24.0	4.00	132	119	53	1
6.3	68	D/7343-31	T494D686(1)006A(2)	4.3	6.0	0.20	866	779	346	1
6.3	68	C/6032-28	T494C686(1)006A(2)	4.3	6.0	0.20	742	668	297	1
6.3	68	U/6032-15	T494U686(1)006A(2)	4.3	10.0	1.00	300	270	120	1
6.3	68	B/3528-21	T494B686(M)006A(2)	4.3	8.0	0.65	362	326	145	1
6.3	68	A/3216-18	T494A686(1)006A(2)	4.3	30.0	3.00	158	142	63	1
6.3	100	D/7343-31	T494D107(1)006A(2)	6.3	8.0	0.15	1000	900	400	1
6.3	100	V/7343-20	T494V107(1)006A(2)	6.3	8.0	0.20	791	712	316	1
6.3	100	C/6032-28	T494C107(1)006A(2)	6.3	8.0	0.30	606	545	242	1
6.3	100	U/6032-15	T494U107(M)006A(2)	6.3	10.0	1.20	274	247	110	1
6.3	100	B/3528-21	T494B107(1)006A(2)	6.3	15.0	1.50	238	214	95	1
6.3	150	B/3528-21	T494B157M006A(2)	9.5	15.0	2.25	194	175	78	1
6.3	150	D/7343-31	T494D157(1)006A(2)	9.5	8.0	0.15	1000	900	400	1
6.3	150	C/6032-28	T494C157(M)006A(2)	9.5	8.0	0.30	606	545	242	1
6.3	150	V/7343-20	T494V157(1)006A(2)	9.5	8.0	0.30	645	581	258	1
6.3	220	X/7343-43	T494X227(1)006A(2)	13.9	8.0	0.15	1049	944	420	1
VDC	µF	KEMET/EIA	(See below for part options)	µA @ 20°C Max/5 Min	% @ 20°C 120 Hz Max	Ω @ 20°C 100 kHz Max	(mA) 100 kHz 25°C	(mA) 100 kHz 85°C	(mA) 100 kHz 125°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current			Moisture Sensitivity

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.

(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates termination finish.

Refer to Ordering Information for additional detail.

Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont'd

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current			Moisture Sensitivity
VDC	µF	KEMET/EIA	(See below for part options)	µA @ 20°C Max/5 Min	% @ 20°C 120 Hz Max	Ω @ 20°C 100 kHz Max	(mA) 100 kHz 25°C	(mA) 100 kHz 85°C	(mA) 100 kHz 125°C	Reflow Temp ≤ 260°C
6.3	220	D/7343-31	T494D227(1)006A(2)	13.9	8.0	0.15	1000	900	400	1
6.3	220	C/6032-28	T494C227(M)006A(2)	13.9	10.0	0.30	606	545	242	1
6.3	220	V/7343-20	T494V227(M)006A(2)	13.9	12.0	0.30	645	581	258	1
6.3	330	X/7343-43	T494X337(1)006A(2)	20.8	8.0	0.15	1049	944	420	1
6.3	330	D/7343-31	T494D337(1)006A(2)	20.8	8.0	0.15	1000	900	400	1
6.3	330	E/7360-38	T494E337(1)006A(2)	20.8	8.0	0.25	894	805	358	1
6.3	470	X/7343-43	T494X477(1)006A(2)	29.6	10.0	0.10	1285	1157	514	1
6.3	470	D/7343-31	T494D477(M)006A(2)	29.6	12.0	0.15	1000	900	400	1
6.3	470	E/7360-38	T494E477(1)006A(2)	29.6	10.0	0.20	1000	900	400	1
6.3	680	E/7360-38	T494E687(M)006A(2)	42.8	12.0	0.10	1414	1273	566	1
6.3	680	X/7343-43	T494X687(1)006A(2)	42.8	12.0	0.10	1285	1157	514	1
10	1.5	A/3216-18	T494A155(1)010A(2)	0.5	6.0	6.0	112	101	45	1
10	2.2	B/3528-21	T494B225(1)010A(2)	0.5	6.0	1.5	238	214	95	1
10	2.2	A/3216-18	T494A225(1)010A(2)	0.5	6.0	6.0	112	101	45	1
10	3.3	A/3216-18	T494A335(1)010A(2)	0.5	6.0	4.0	137	123	55	1
10	3.3	S/3216-12	T494S335(1)010A(2)	0.5	6.0	9.0	82	74	33	1
10	4.7	B/3528-21	T494B475(1)010A(2)	0.5	6.0	1.5	238	214	95	1
10	4.7	A/3216-18	T494A475(1)010A(2)	0.5	6.0	3.0	158	142	63	1
10	4.7	S/3216-12	T494S475(1)010A(2)	0.5	6.0	9.0	82	74	33	1
10	6.8	B/3528-21	T494B685(1)010A(2)	0.7	6.0	1.2	266	239	106	1
10	6.8	A/3216-18	T494A685(1)010A(2)	0.7	6.0	3.0	158	142	63	1
10	6.8	T/3528-12	T494T685(1)010A(2)	0.7	6.0	2.0	187	168	75	1
10	6.8	S/3216-12	T494S685(M)010A(2)	0.7	10.0	9.0	82	74	33	1
10	10	C/6032-28	T494C106(1)010A(2)	1.0	6.0	0.6	428	385	171	1
10	10	B/3528-21	T494B106(1)010A(2)	1.0	6.0	0.8	326	293	130	1
10	10	A/3216-18	T494A106(1)010A(2)	1.0	6.0	1.8	204	184	82	1
10	10	T/3528-12	T494T106(1)010A(2)	1.0	6.0	3.5	141	127	56	1
10	10	S/3216-12	T494S106(M)010A(2)	1.0	10.0	12.0	71	64	28	1
10	15	C/6032-28	T494C156(1)010A(2)	1.5	6.0	0.5	469	422	188	1
10	15	U/6032-15	T494U156(1)010A(2)	1.5	6.0	0.8	335	302	134	1
10	15	B/3528-21	T494B156(1)010A(2)	1.5	6.0	0.7	348	313	139	1
10	15	A/3216-18	T494A156(1)010A(2)	1.5	6.0	3.2	153	138	61	1
10	15	T/3528-12	T494T156(M)010A(2)	1.5	8.0	3.5	141	127	56	1
10	22	C/6032-28	T494C226(1)010A(2)	2.2	6.0	0.4	524	472	210	1
10	22	U/6032-15	T494U226(1)010A(2)	2.2	6.0	0.8	335	302	134	1
10	22	B/3528-21	T494B226(1)010A(2)	2.2	6.0	0.7	348	313	139	1
10	22	A/3216-18	T494A226(M)010A(2)	2.2	10.0	4.5	129	116	52	1
10	22	T/3528-12	T494T226(M)010A(2)	2.2	12.0	6.0	108	97	43	1
10	33	D/7343-31	T494D336(1)010A(2)	3.3	6.0	0.25	775	698	310	1
10	33	V/7343-20	T494V336(1)010A(2)	3.3	6.0	0.30	645	581	258	1
10	33	C/6032-28	T494C336(1)010A(2)	3.3	6.0	0.30	606	545	242	1
10	33	U/6032-15	T494U336(1)010A(2)	3.3	6.0	0.60	387	348	155	1
10	33	T/3528-12	T494T336(1)010A(2)	3.3	24.0	3.75	137	123	55	1
10	33	B/3528-21	T494B336(1)010A(2)	3.3	6.0	1.40	246	221	98	1
10	33	A/3216-18	T494A336(1)010A(2)	3.3	15.0	4.00	137	123	55	1
10	47	D/7343-31	T494D476(1)010A(2)	4.7	6.0	0.22	826	743	330	1
10	47	V/7343-20	T494V476(1)010A(2)	4.7	6.0	0.30	645	581	258	1
10	47	C/6032-28	T494C476(1)010A(2)	4.7	6.0	0.30	606	545	242	1
10	47	U/6032-15	T494U476(1)010A(2)	4.7	10.0	1.20	274	247	110	1
10	47	B/3528-21	T494B476(M)010A(2)	4.7	8.0	0.65	362	326	145	1
10	68	D/7343-31	T494D686(1)010A(2)	6.8	6.0	0.20	866	779	346	1
VDC	µF	KEMET/EIA	(See below for part options)	µA @ 20°C Max/5 Min	% @ 20°C 120 Hz Max	Ω @ 20°C 100 kHz Max	(mA) 100 kHz 25°C	(mA) 100 kHz 85°C	(mA) 100 kHz 125°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current			Moisture Sensitivity

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.

(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates termination finish.

Refer to Ordering Information for additional detail.

Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont'd

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current			Moisture Sensitivity
VDC	µF	KEMET/EIA	(See below for part options)	µA @ 20°C Max/5 Min	% @ 20°C 120 Hz Max	Ω @ 20°C 100 kHz Max	(mA) 100 kHz 25°C	(mA) 100 kHz 85°C	(mA) 100 kHz 125°C	Reflow Temp ≤ 260°C
10	68	C/6032-28	T494C686(1)010A(2)	6.8	6.0	0.30	606	545	242	1
10	68	V/7343-20	T494V686(1)010A(2)	6.8	6.0	0.30	645	581	258	1
10	68	U/6032-15	T494U686(M)010A(2)	6.8	10.0	1.20	274	247	110	1
10	68	B/3528-21	T494B686(M)010A(2)	6.8	10.0	1.50	238	214	95	1
10	100	D/7343-31	T494D107(1)010A(2)	10.0	8.0	0.15	1000	900	400	1
10	100	C/6032-28	T494C107(1)010A(2)	10.0	8.0	0.20	742	668	297	1
10	100	V/7343-20	T494V107(1)010A(2)	10.0	8.0	0.40	559	503	224	1
10	150	X/7343-43	T494X157(1)010A(2)	15.0	8.0	0.15	1049	944	420	1
10	150	D/7343-31	T494D157(1)010A(2)	15.0	8.0	0.15	1000	900	400	1
10	150	C/6032-28	T494C157(1)010A(2)	15.0	10.0	0.70	396	356	158	1
10	150	V/7343-20	T494V157(M)010A(2)	15.0	8.0	0.30	645	581	258	1
10	220	X/7343-43	T494X227(1)010A(2)	22.0	8.0	0.15	1049	944	420	1
10	220	D/7343-31	T494D227(1)010A(2)	22.0	8.0	0.15	1000	900	400	1
10	330	X/7343-43	T494X337(1)010A(2)	33.0	10.0	0.10	1285	1157	514	1
10	330	D/7343-31	T494D337(1)010A(2)	33.0	10.0	0.15	1000	900	400	1
10	330	E/7360-38	T494E337(1)010A(2)	33.0	10.0	0.25	894	805	358	1
10	470	X/7343-43	T494X477(1)010A(2)	47.0	10.0	0.10	1285	1157	514	1
10	470	E/7360-38	T494E477(M)010A(2)	47.0	12.0	0.10	1414	1273	566	1
16	1	A/3216-18	T494A105(1)016A(2)	0.5	4.0	6.0	112	101	45	1
16	1.5	A/3216-18	T494A155(1)016A(2)	0.5	6.0	6.0	112	101	45	1
16	2.2	A/3216-18	T494A225(1)016A(2)	0.5	6.0	4.0	137	123	55	1
16	2.2	S/3216-12	T494S225(1)016A(2)	0.5	6.0	10.0	77	69	31	1
16	3.3	B/3528-21	T494B335(1)016A(2)	0.5	6.0	2.0	206	185	82	1
16	3.3	A/3216-18	T494A335(1)016A(2)	0.5	6.0	4.0	137	123	55	1
16	4.7	B/3528-21	T494B475(1)016A(2)	0.8	6.0	1.5	238	214	95	1
16	4.7	A/3216-18	T494A475(1)016A(2)	0.8	6.0	3.0	158	142	63	1
16	4.7	T/3528-12	T494T475(1)016A(2)	0.8	6.0	3.0	153	138	61	1
16	6.8	C/6032-28	T494C685(1)016A(2)	1.1	6.0	0.8	371	334	148	1
16	6.8	B/3528-21	T494B685(1)016A(2)	1.1	6.0	1.2	266	239	106	1
16	6.8	A/3216-18	T494A685(1)016A(2)	1.1	6.0	3.0	158	142	63	1
16	10	C/6032-28	T494C106(1)016A(2)	1.6	6.0	0.6	428	385	171	1
16	10	U/6032-15	T494U106(1)016A(2)	1.6	6.0	1.0	300	270	120	1
16	10	B/3528-21	T494B106(1)016A(2)	1.6	6.0	0.8	326	293	130	1
16	10	A/3216-18	T494A106(1)016A(2)	1.6	8.0	3.0	158	142	63	1
16	10	T/3528-12	T494T106(1)016A(2)	1.6	8.0	6.0	108	97	43	1
16	15	C/6032-28	T494C156(1)016A(2)	2.4	6.0	0.4	524	472	210	1
16	15	U/6032-15	T494U156(1)016A(2)	2.4	6.0	0.8	335	302	134	1
16	15	B/3528-21	T494B156(1)016A(2)	2.4	6.0	0.8	326	293	130	1
16	22	D/7343-31	T494D226(1)016A(2)	3.5	6.0	0.25	775	698	310	1
16	22	C/6032-28	T494C226(1)016A(2)	3.5	6.0	0.35	561	505	224	1
16	22	U/6032-15	T494U226(1)016A(2)	3.5	10.0	1.80	224	202	90	1
16	22	B/3528-21	T494B226(1)016A(2)	3.5	6.0	1.00	292	263	117	1
16	33	D/7343-31	T494D336(1)016A(2)	5.3	6.0	0.25	775	698	310	1
16	33	C/6032-28	T494C336(1)016A(2)	5.3	6.0	0.30	606	545	242	1
16	33	U/6032-15	T494U336(1)016A(2)	5.3	12.0	2.20	202	182	81	1
16	33	B/3528-21	T494B336(1)016A(2)	5.3	8.0	1.20	266	239	106	1
16	47	D/7343-31	T494D476(1)016A(2)	7.5	6.0	0.2	866	779	346	1
16	47	V/7343-20	T494V476(1)016A(2)	7.5	6.0	0.3	645	581	258	1
16	47	C/6032-28	T494C476(1)016A(2)	7.5	6.0	0.5	469	422	188	1
16	68	D/7343-31	T494D686(1)016A(2)	10.9	6.0	0.15	1000	900	400	1
16	68	V/7343-20	T494V686(1)016A(2)	10.9	6.0	0.5	500	450	200	1
VDC	µF	KEMET/EIA	(See below for part options)	µA @ 20°C Max/5 Min	% @ 20°C 120 Hz Max	Ω @ 20°C 100 kHz Max	(mA) 100 kHz 25°C	(mA) 100 kHz 85°C	(mA) 100 kHz 125°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current			Moisture Sensitivity

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.

(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates termination finish.

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Table 1 – Ratings & Part Number Reference cont'd

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current			Moisture Sensitivity
VDC	µF	KEMET/EIA	(See below for part options)	µA @ 20°C Max/5 Min	% @ 20°C 120 Hz Max	Ω @ 20°C 100 kHz Max	(mA) 100 kHz 25°C	(mA) 100 kHz 85°C	(mA) 100 kHz 125°C	Reflow Temp ≤ 260°C
16	68	C/6032-28	T494C686(1)016A(2)	10.9	12.0	1.0	332	299	133	1
16	100	X/7343-43	T494X107(1)016A(2)	16.0	8.0	0.15	1049	944	420	1
16	100	D/7343-31	T494D107(1)016A(2)	16.0	8.0	0.15	1000	900	400	1
16	100	V/7343-20	T494V107(1)016A(2)	16.0	12.0	0.5	500	450	200	1
16	150	X/7343-43	T494X157(1)016A(2)	24.0	8.0	0.15	1049	944	420	1
16	150	D/7343-31	T494D157(1)016A(2)	24.0	12.0	0.4	612	551	245	1
16	220	X/7343-43	T494X227(1)016A(2)	35.2	10.0	0.4	642	578	257	1
16	220	E/7360-38	T494E227(1)016A(2)	35.2	7.2	0.5	632	569	253	1
20	0.68	A/3216-18	T494A684(1)020A(2)	0.5	4.0	8.0	97	87	39	1
20	1	A/3216-18	T494A105(1)020A(2)	0.5	4.0	5.5	117	105	47	1
20	1	S/3216-12	T494S105(1)020A(2)	0.5	6.0	10.0	77	69	31	1
20	1.5	A/3216-18	T494A155(1)020AS(2)	0.5	6.0	4.5	129	116	52	1
20	1.5	S/3216-12	T494S155(1)020A(2)	0.5	6.0	9.0	82	74	33	1
20	2.2	B/3528-21	T494B225(1)020A(2)	0.5	6.0	1.5	238	214	95	1
20	2.2	A/3216-18	T494A225(1)020A(2)	0.5	6.0	4.0	137	123	55	1
20	3.3	B/3528-21	T494B335(1)020A(2)	0.7	6.0	1.3	256	230	102	1
20	3.3	A/3216-18	T494A335(1)020A(2)	0.7	6.0	4.0	137	123	55	1
20	3.3	T/3528-12	T494T335(1)020A(2)	0.7	6.0	4.0	132	119	53	1
20	4.7	C/6032-28	T494C475(1)020A(2)	0.9	6.0	0.6	428	385	171	1
20	4.7	B/3528-21	T494B475(1)020A(2)	0.9	6.0	1.0	292	263	117	1
20	4.7	A/3216-18	T494A475(1)020A(2)	0.9	6.0	3.0	158	142	63	1
20	6.8	C/6032-28	T494C685(1)020A(2)	1.4	6.0	0.6	428	385	171	1
20	6.8	U/6032-15	T494U685(1)020A(2)	1.4	6.0	1.4	254	229	102	1
20	6.8	B/3528-21	T494B685(1)020A(2)	1.4	6.0	1.0	292	263	117	1
20	6.8	A/3216-18	T494A685(M)020A(2)	1.4	8.0	3.0	158	142	63	1
20	10	C/6032-28	T494C106(1)020A(2)	2.0	6.0	0.5	469	422	188	1
20	10	U/6032-15	T494U106(1)020A(2)	2.0	6.0	0.8	335	302	134	1
20	10	B/3528-21	T494B106(1)020A(2)	2.0	6.0	1.0	292	263	117	1
20	10	A/3216-18	T494A106(M)020A(2)	2.0	10.0	3.0	158	142	63	1
20	15	D/7343-31	T494D156(1)020A(2)	3.0	6.0	0.35	655	590	262	1
20	15	C/6032-28	T494C156(1)020A(2)	3.0	6.0	0.40	524	472	210	1
20	22	D/7343-31	T494D226(1)020A(2)	4.4	6.0	0.3	707	636	283	1
20	22	V/7343-20	T494V226(1)020A(2)	4.4	6.0	0.4	559	503	224	1
20	22	C/6032-28	T494C226(1)020A(2)	4.4	6.0	0.4	524	472	210	1
20	22	B/3528-21	T494B226(1)020A(2)	4.4	8.0	3.0	168	151	67	1
20	33	D/7343-31	T494D336(1)020A(2)	6.6	6.0	0.25	775	698	310	1
20	33	C/6032-28	T494C336(M)020A(2)	6.6	6.0	0.40	524	472	210	1
20	33	V/7343-20	T494V336(1)020A(2)	6.6	8.0	0.40	559	503	224	1
20	33	B/3528-21	T494B336(M)020A(2)	6.6	10.0	3.00	168	151	67	1
20	47	C/6032-28	T494C476(M)020A(2)	9.4	10.0	0.80	371	334	148	1
20	47	D/7343-31	T494D476(1)020A(2)	9.4	6.0	0.20	866	779	346	1
20	68	X/7343-43	T494X686(1)020A(2)	13.6	6.0	0.20	908	817	363	1
20	68	D/7343-31	T494D686(1)020A(2)	13.6	8.0	0.20	866	779	346	1
20	100	D/7343-31	T494D107(1)020A(2)	20.0	6.0	0.68	471	424	188	1
20	100	X/7343-43	T494X107(1)020A(2)	20.0	8.0	0.15	1049	944	420	1
20	100	E/7360-38	T494E107(1)020A(2)	20.0	8.0	0.30	816	734	326	1
20	150	X/7343-43	T494X157(1)020A(2)	30.0	10.0	0.30	742	668	297	1
25	0.33	A/3216-18	T494A334(1)025A(2)	0.5	4.0	10.0	87	78	35	1
25	0.47	A/3216-18	T494A474(1)025A(2)	0.5	4.0	9.0	91	82	36	1
25	0.68	A/3216-18	T494A684(1)025A(2)	0.5	4.0	6.0	112	101	45	1
25	1	B/3528-21	T494B105(1)025A(2)	0.5	4.0	2.0	206	185	82	1
VDC	µF	KEMET/EIA	(See below for part options)	µA @ 20°C Max/5 Min	% @ 20°C 120 Hz Max	Ω @ 20°C 100 kHz Max	(mA) 100 kHz 25°C	(mA) 100 kHz 85°C	(mA) 100 kHz 125°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current			Moisture Sensitivity

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates termination finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Table 1 – Ratings & Part Number Reference cont'd

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current			Moisture Sensitivity
VDC	µF	KEMET/EIA	(See below for part options)	µA @ 20°C Max/5 Min	% @ 20°C 120 Hz Max	Ω @ 20°C 100 kHz Max	(mA) 100 kHz 25°C	(mA) 100 kHz 85°C	(mA) 100 kHz 125°C	Reflow Temp ≤ 260°C
25	1	A/3216-18	T494A105(1)025A(2)	0.5	4.0	4.0	137	123	55	1
25	1.5	B/3528-21	T494B155(1)025A(2)	0.5	6.0	1.5	238	214	95	1
25	1.5	A/3216-18	T494A155(1)025A(2)	0.5	6.0	3.0	158	142	63	1
25	2.2	C/6032-28	T494C225(1)025A(2)	0.6	6.0	2.2	224	202	90	1
25	2.2	B/3528-21	T494B225(1)025A(2)	0.6	6.0	1.2	266	239	106	1
25	2.2	A/3216-18	T494A225(1)025A(2)	0.6	6.0	3.0	158	142	63	1
25	3.3	C/6032-28	T494C335(1)025A(2)	0.8	6.0	1.2	303	273	121	1
25	3.3	B/3528-21	T494B335(1)025A(2)	0.8	6.0	2.0	206	185	82	1
25	3.3	A/3216-18	T494A335(1)025A(2)	0.8	6.0	3.0	158	142	63	1
25	4.7	C/6032-28	T494C475(1)025A(2)	1.2	6.0	0.6	428	385	171	1
25	4.7	B/3528-21	T494B475(1)025A(2)	1.2	6.0	1.0	292	263	117	1
25	4.7	A/3216-18	T494A475(M)025A(2)	1.2	8.0	3.0	158	142	63	1
25	6.8	C/6032-28	T494C685(1)025A(2)	1.7	6.0	0.6	428	385	171	1
25	6.8	B/3528-21	T494B685(1)025A(2)	1.7	8.0	2.0	206	185	82	1
25	10	D/7343-31	T494D106(1)025A(2)	2.5	6.0	0.4	612	551	245	1
25	10	C/6032-28	T494C106(1)025A(2)	2.5	6.0	0.6	428	385	171	1
25	10	B/3528-21	T494B106(1)025A(2)	2.5	8.0	3.0	168	151	67	1
25	15	D/7343-31	T494D156(1)025A(2)	3.8	6.0	0.35	655	590	262	1
25	15	C/6032-28	T494C156(1)025A(2)	3.8	6.0	0.90	350	315	140	1
25	15	B/3528-21	T494B156(1)025A(2)	3.8	8.0	3.00	168	151	67	1
25	22	D/7343-31	T494D226(1)025A(2)	5.5	6.0	0.3	707	636	283	1
25	22	C/6032-28	T494C226(1)025A(2)	5.5	6.0	1.0	332	299	133	1
25	22	V/7343-20	T494V226(1)025A(2)	5.5	6.0	0.5	500	450	200	1
25	33	X/7343-43	T494X336(1)025A(2)	8.3	6.0	0.3	742	668	297	1
25	33	D/7343-31	T494D336(1)025A(2)	8.3	6.0	0.4	612	551	245	1
25	33	C/6032-28	T494C336(1)025A(2)	8.3	10.0	1.0	332	299	133	1
25	47	X/7343-43	T494X476(1)025A(2)	11.8	6.0	0.3	742	668	297	1
25	47	D/7343-31	T494D476(1)025A(2)	11.8	10.0	0.2	866	779	346	1
25	68	X/7343-43	T494X686(M)025A(2)	17.0	8.0	0.3	742	668	297	1
25	68	D/7343-31	T494D686(M)025A(2)	17.0	10.0	0.5	548	493	219	1
25	100	X/7343-43	T494X107(M)025A(2)	25.0	8.0	0.25	812	731	325	1
35	0.1	A/3216-18	T494A104(1)035A(2)	0.5	4.0	10.0	87	78	35	1
35	0.15	A/3216-18	T494A154(1)035A(2)	0.5	4.0	6.0	112	101	45	1
35	0.22	A/3216-18	T494A224(1)035A(2)	0.5	4.0	6.0	112	101	45	1
35	0.33	A/3216-18	T494A334(1)035A(2)	0.5	4.0	6.0	112	101	45	1
35	0.47	B/3528-21	T494B474(1)035A(2)	0.5	4.0	2.5	184	166	74	1
35	0.47	A/3216-18	T494A474(1)035A(2)	0.5	4.0	4.0	137	123	55	1
35	0.68	B/3528-21	T494B684(1)035A(2)	0.5	4.0	2.5	184	166	74	1
35	0.68	A/3216-18	T494A684(1)035A(2)	0.5	4.0	6.0	112	101	45	1
35	1	B/3528-21	T494B105(1)035A(2)	0.5	4.0	2.0	206	185	82	1
35	1	A/3216-18	T494A105(1)035A(2)	0.5	4.0	6.0	112	101	45	1
35	1.5	A/3216-18	T494A155(1)035A(2)	0.5	6.0	4.0	137	123	55	1
35	1.5	C/6032-28	T494C155(1)035A(2)	0.5	6.0	2.5	210	189	84	1
35	1.5	B/3528-21	T494B155(1)035A(2)	0.5	6.0	3.0	168	151	67	1
35	2.2	A/3216-18	T494A225(1)035A(2)	0.8	6.0	3.0	158	142	63	1
35	2.2	C/6032-28	T494C225(1)035A(2)	0.8	6.0	1.5	271	244	108	1
35	2.2	B/3528-21	T494B225(1)035A(2)	0.8	6.0	2.5	184	166	74	1
35	3.3	C/6032-28	T494C335(1)035A(2)	1.2	6.0	0.8	371	334	148	1
35	3.3	B/3528-21	T494B335(1)035A(2)	1.2	6.0	1.3	256	230	102	1
35	4.7	B/3528-21	T494B475(1)035A(2)	1.6	6.0	1.5	238	214	95	1
35	4.7	D/7343-31	T494D475(1)035A(2)	1.6	6.0	0.7	463	417	185	1
VDC	µF	KEMET/EIA	(See below for part options)	µA @ 20°C Max/5 Min	% @ 20°C 120 Hz Max	Ω @ 20°C 100 kHz Max	(mA) 100 kHz 25°C	(mA) 100 kHz 85°C	(mA) 100 kHz 125°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current			Moisture Sensitivity

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.

(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates termination finish.

Refer to Ordering Information for additional detail.

Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

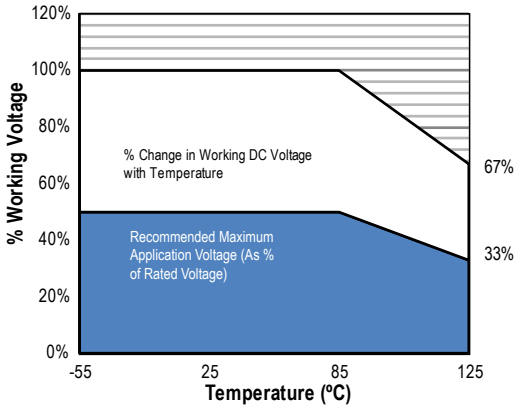
Table 1 – Ratings & Part Number Reference cont'd

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current			Moisture Sensitivity
VDC	µF	KEMET/EIA	(See below for part options)	µA @ 20°C Max/5 Min	% @ 20°C 120 Hz Max	Ω @ 20°C 100 kHz Max	(mA) 100 kHz 25°C	(mA) 100 kHz 85°C	(mA) 100 kHz 125°C	Reflow Temp ≤ 260°C
35	4.7	C/6032-28	T494C475(1)035A(2)	1.6	6.0	0.7	396	356	158	1
35	6.8	D/7343-31	T494D685(1)035A(2)	2.4	6.0	0.5	548	493	219	1
35	6.8	C/6032-28	T494C685(1)035A(2)	2.4	6.0	0.9	350	315	140	1
35	10	D/7343-31	T494D106(1)035A(2)	3.5	6.0	0.4	612	551	245	1
35	10	C/6032-28	T494C106(1)035A(2)	3.5	6.0	1.2	303	273	121	1
35	10	V/7343-20	T494V106(1)035A(2)	3.5	6.0	0.8	395	356	158	1
35	15	X/7343-43	T494X156(1)035A(2)	5.3	6.0	0.30	742	668	297	1
35	15	D/7343-31	T494D156(1)035A(2)	5.3	6.0	0.35	655	590	262	1
35	22	X/7343-43	T494X226(1)035A(2)	7.7	6.0	0.3	742	668	297	1
35	22	D/7343-31	T494D226(1)035A(2)	7.7	6.0	0.4	612	551	245	1
35	33	D/7343-31	T494D336(1)035A(2)	11.6	6.0	0.6	500	450	200	1
35	33	X/7343-43	T494X336(1)035A(2)	11.6	6.0	0.6	524	472	210	1
35	47	X/7343-43	T494X476(1)035A(2)	16.5	8.0	0.5	574	517	230	1
35	47	E/7360-38	T494E476(1)035A(2)	16.5	10.0	0.3	816	734	326	1
50	0.1	A/3216-18	T494A104(1)050A(2)	0.5	4.0	10.0	87	78	35	1
50	0.15	A/3216-18	T494A154(1)050A(2)	0.5	4.0	10.0	87	78	35	1
50	0.22	A/3216-18	T494A224(1)050A(2)	0.5	4.0	12.0	79	71	32	1
50	0.22	B/3528-21	T494B224(1)050A(2)	0.5	4.0	10.0	92	83	37	1
50	0.33	A/3216-18	T494A334(1)050A(2)	0.5	4.0	9.0	91	82	36	1
50	0.33	B/3528-21	T494B334(1)050A(2)	0.5	4.0	2.5	184	166	74	1
50	0.47	A/3216-18	T494A474(1)050A(2)	0.5	4.0	6.0	112	101	45	1
50	0.47	C/6032-28	T494C474(1)050A(2)	0.5	4.0	1.8	247	222	99	1
50	0.47	B/3528-21	T494B474(1)050A(2)	0.5	4.0	2.0	206	185	82	1
50	0.68	A/3216-18	T494A684(1)050A(2)	0.5	4.0	5.0	122	110	49	1
50	0.68	C/6032-28	T494C684(1)050A(2)	0.5	4.0	1.6	262	236	105	1
50	0.68	B/3528-21	T494B684(1)050A(2)	0.5	4.0	3.0	168	151	67	1
50	1	A/3216-18	T494A105(1)050A(2)	0.5	4.0	5.0	122	110	49	1
50	1	C/6032-28	T494C105(1)050A(2)	0.5	4.0	1.6	262	236	105	1
50	1	B/3528-21	T494B105(1)050A(2)	0.5	6.0	4.0	146	131	58	1
50	1	V/7343-20	T494V105(M)050A(2)	0.5	4.0	4.0	177	159	71	1
50	1.5	D/7343-31	T494D155(1)050A(2)	0.8	6.0	1.0	387	348	155	1
50	1.5	C/6032-28	T494C155(1)050A(2)	0.8	6.0	1.5	271	244	108	1
50	2.2	D/7343-31	T494D225(1)050A(2)	1.1	6.0	0.8	433	390	173	1
50	2.2	C/6032-28	T494C225(1)050A(2)	1.1	6.0	1.5	271	244	108	1
50	3.3	D/7343-31	T494D335(1)050A(2)	1.7	6.0	0.8	433	390	173	1
50	4.7	D/7343-31	T494D475(1)050A(2)	2.4	6.0	0.6	500	450	200	1
50	6.8	X/7343-43	T494X685(1)050A(2)	3.4	6.0	0.5	574	517	230	1
50	6.8	D/7343-31	T494D685(1)050A(2)	3.4	6.0	0.7	463	417	185	1
50	10	X/7343-43	T494X106(1)050A(2)	5.0	6.0	0.4	642	578	257	1
50	10	D/7343-31	T494D106(1)050A(2)	5.0	6.0	0.7	463	417	185	1
50	15	X/7343-43	T494X156(1)050A(2)	7.5	6.0	0.4	642	578	257	1
50	22	X/7343-43	T494X226(1)050A(2)	11.0	10.0	0.5	574	517	230	1
VDC	µF	KEMET/EIA	(See below for part options)	µA @ 20°C Max/5 Min	% @ 20°C 120 Hz Max	Ω @ 20°C 100 kHz Max	(mA) 100 kHz 25°C	(mA) 100 kHz 85°C	(mA) 100 kHz 125°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current			Moisture Sensitivity

(1) To complete KEMET part number, insert M for ±20% or K for ±10%. Designates capacitance tolerance.
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates termination finish.
Refer to Ordering Information for additional detail.
Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitution will be marked with the higher voltage rating. Substitutions can include better than series.

Recommended Voltage Derating Guidelines

	-55°C to 85°C	85°C to 125°C
% Change in Working DC Voltage with Temperature	V_R	67% of V_R
Recommended Maximum Application Voltage	50% of V_R	33% of V_R



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to equivalent series resistance (ESR) and the power dissipation capabilities of the device. Permissible AC ripple voltage which may be applied is limited by two criteria:

1. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the capacitor.
2. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage. See the Reverse Voltage section for allowable limits.

The maximum power dissipation by case size can be determined using the table at right. The maximum power dissipation rating stated in the table must be reduced with increasing environmental operating temperatures. Refer to the table below for temperature compensation requirements.

KEMET Case Code	EIA Case Code	Maximum Power Dissipation (P max) mWatts @ 25°C w/+20°C Rise
A	3216–18	75
B	3528–21	85
C	6032–28	110
D	7343–31	150
X	7343–43	165
E	7360–38	200
S	3216–12	60
T	3528–12	70
U	6032–15	90
V	7343–20	125
T510X	7343–43	270
T510E	7360–38	285

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

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

I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Reverse Voltage

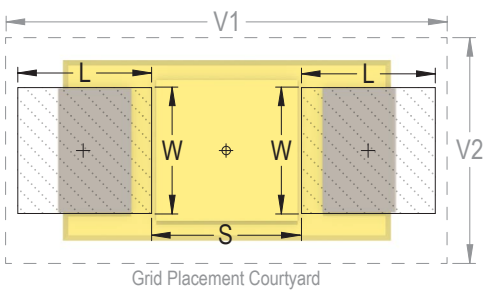
Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the table. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
85°C	5% of Rated Voltage
125°C	1% of Rated Voltage

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
A	3216–18	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
B	3528–21	2.35	2.21	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
C	6032–25	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
D	7343–31	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
E[1]	7360–38	4.25	2.77	3.67	10.22	7.30	4.13	2.37	3.87	9.12	6.80	4.03	1.99	4.03	8.26	6.54
S[2]	3216–12	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
T	3528–12	2.35	2.20	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
U	6032–15	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
V	7343–20	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
X[1]	7343–43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

Density Level A: *For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*
Density Level B: *For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*
Density Level C: *For high component desity product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC–7351).*
[1] Height of these chips may create problems in wave soldering.
[2] Land pattern geometry is too small for silkscreen outline.



Grid Placement Courtyard

Soldering Process

KEMET's families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

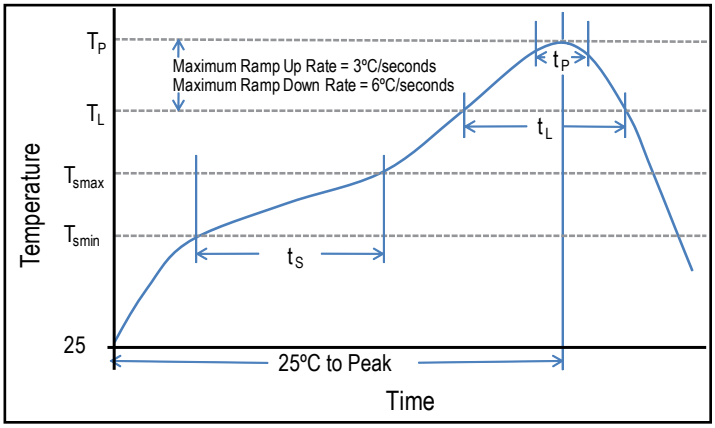
Please note that although the X/7343–43 case size can withstand wave soldering, the tall profile (4.3 mm maximum) dictates care in wave process development.

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. Once reflow occurs, the iron should be removed immediately. "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 not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax})	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/seconds maximum	3°C/seconds maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_P)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/seconds maximum	6°C/seconds maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

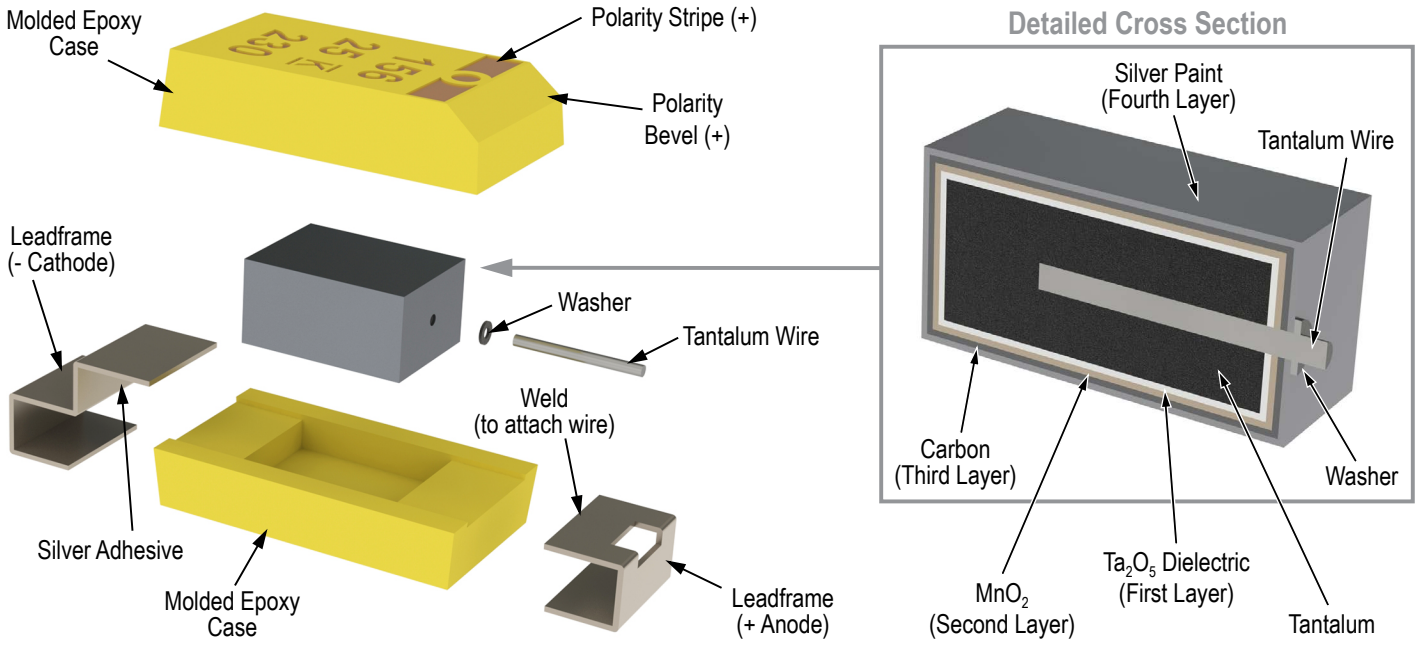
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.
**Case Size D, E, P, Y, and X*
***Case Size A, B, C, H, I, K, M, R, S, T, U, V, W, and Z*



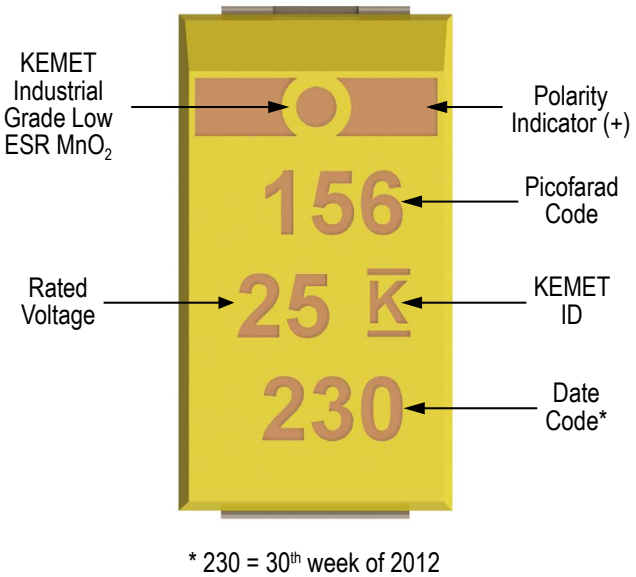
Storage

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 40ºC and maximum storage humidity not exceed 60% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability chip stock should be used promptly, preferably within three years of receipt.

Construction



Capacitor Marking



* 230 = 30th week of 2012

Date Code *	
1st digit = Last number of Year	9 = 2009 0 = 2010 1 = 2011 2 = 2012 3 = 2013 4 = 2014
2nd and 3rd digit = Week of the Year	01 = 1st week of the Year to 52 = 52nd week of the Year

Tape & Reel Packaging Information

KEMET's molded tantalum and aluminum chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481*: Embossed Carrier Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

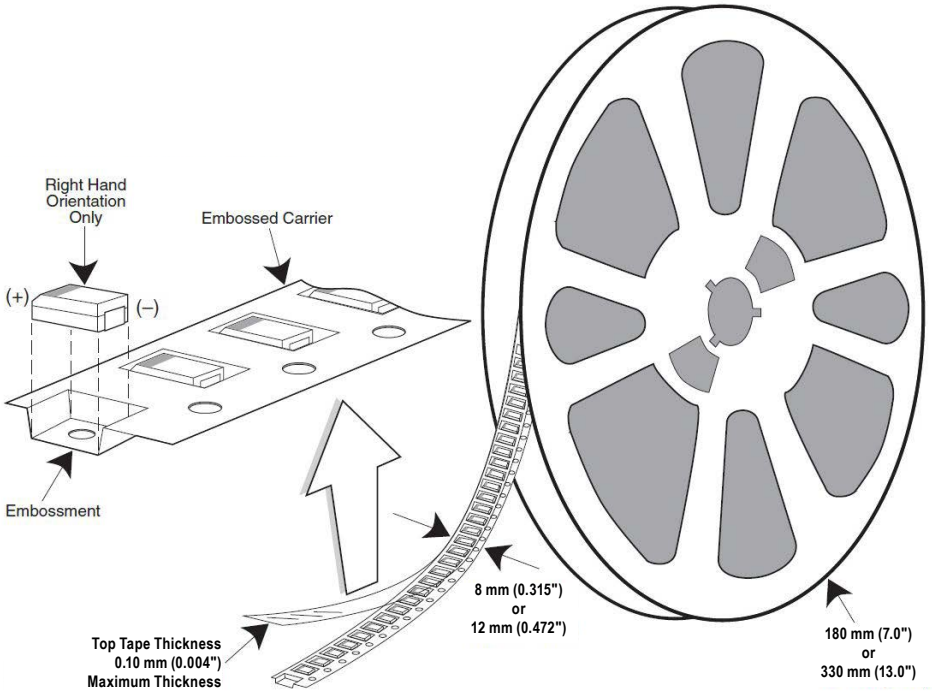


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*	13" Reel*
KEMET	EIA			
S	3216-12	8	2,500	10,000
T	3528-12	8	2,500	10,000
M	3528-15	8	2,000	8,000
U	6032-15	12	1,000	5,000
L	6032-19	12	1,000	5,000
W	7343-15	12	1,000	3,000
Z	7343-17	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
Q	7343-12	12	1,000	3,000
Y	7343-40	12	500	2,000
X	7343-43	12	500	2,000
E/T428P	7360-38	12	500	2,000
H	7360-20	12	1,000	2,500

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

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

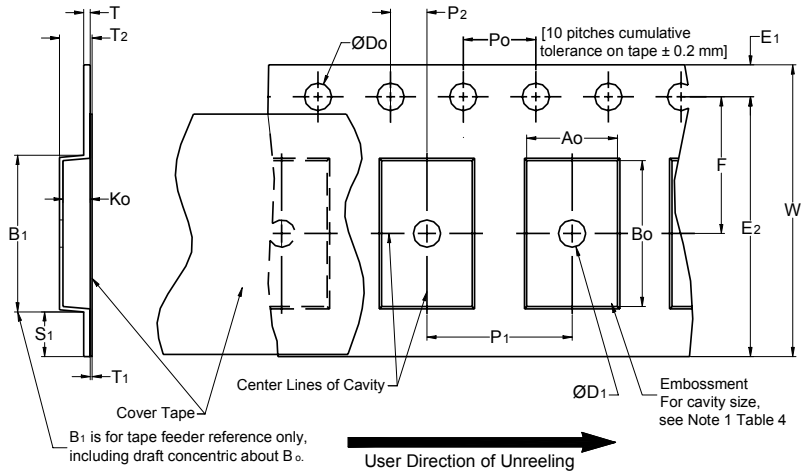


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/-0.0 (0.059 +0.004/-0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			
16 mm					2.0 ±0.1 (0.079 ±0.059)				

Variable Dimensions — Millimeters (Inches)								
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5
12 mm	Single (4 mm) & Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)	
16 mm	Triple (12 mm)	12.1 (0.476)	14.25 (0.561)	7.5±0.10 (0.295 ±0.004)	4.0 ±0.10 (0.157 ±0.004) to 12.0 ±0.10 (0.472 ±0.004)	8.0 (0.315)	16.3 (0.642)	

1. 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.

2. The tape, with or without components, shall pass around R without damage (see Figure 4).

3. If S_1 < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).

4. B_1 dimension is a reference dimension for tape feeder clearance only.

5. The cavity defined by A_0, B_0 and K_0 shall surround the component with sufficient clearance that:

(a) the component does not protrude above the top surface of the carrier tape.

(b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.

(c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes and 10° maximum for 16 mm tapes (see Figure 2).

(d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape and to 1.0 mm maximum for 16 mm tape (see Figure 3).

(e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

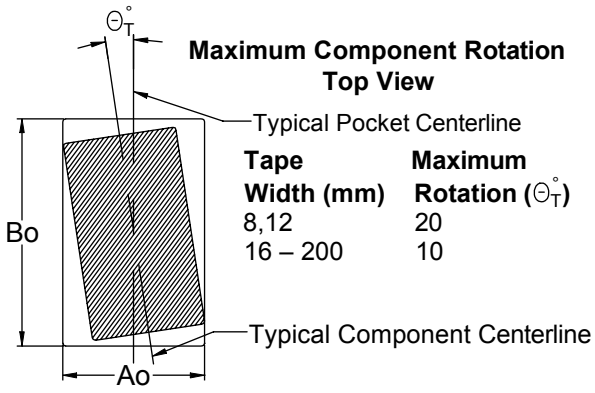
Packaging Information Performance Notes

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 to 1.0 Newton (10 to 100 gf)
12 and 16 mm	0.1 to 1.3 Newton (10 to 130 gf)

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. Labeling: Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. *Refer to EIA Standards 556 and 624.*

Figure 2 – Maximum Component Rotation



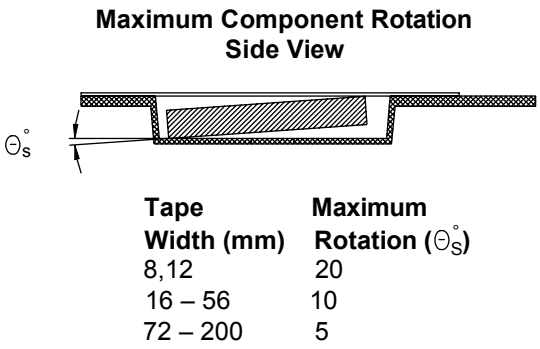


Figure 3 – Maximum Lateral Movement

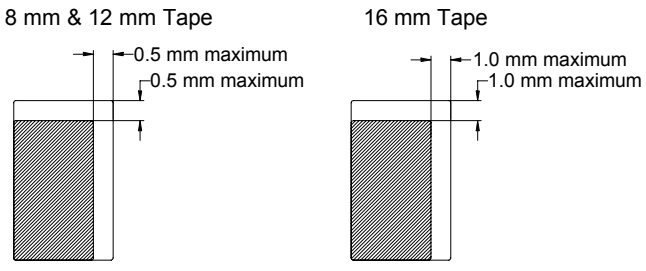


Figure 4 – Bending Radius

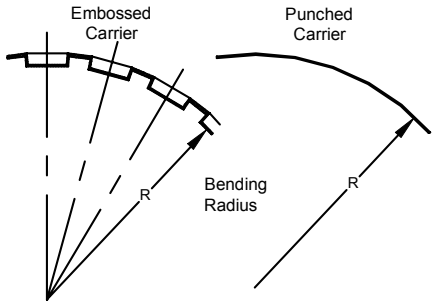
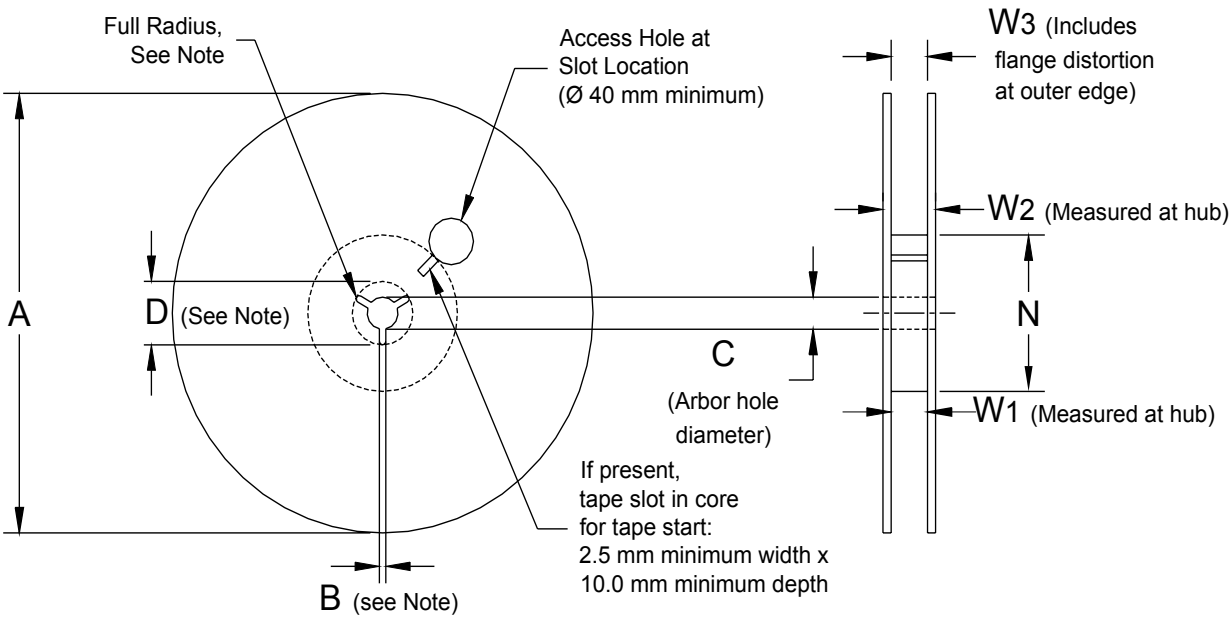


Figure 5 – Reel Dimensions



Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/-0.2 (0.521 +0.02/-0.008)	20.2 (0.795)
12 mm				
16 mm				

Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W_1	W_2 Maximum	W_3
8 mm	50 (1.969)	8.4 +1.5/-0.0 (0.331 +0.059/-0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/-0.0 (0.488 +0.078/-0.0)	18.4 (0.724)	
16 mm		16.4 +2.0/-0.0 (0.646 +0.078/-0.0)	22.4 (0.882)	

Figure 6 – Tape Leader & Trailer Dimensions

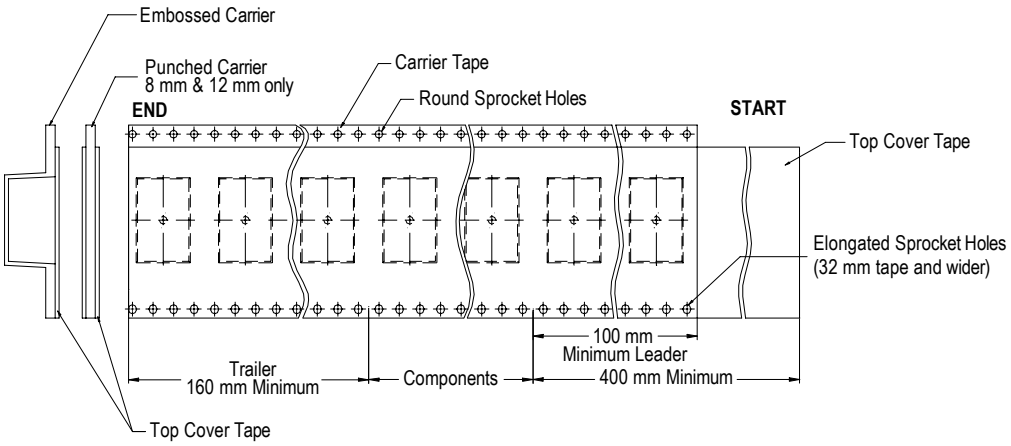
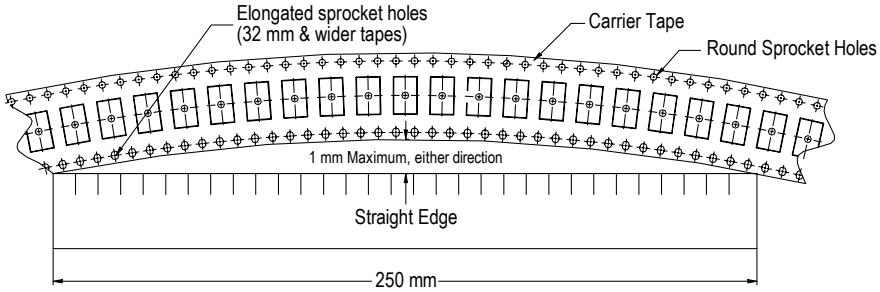


Figure 7 – Maximum Camber



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