

Overview

The low ESR, surge-robust T495 Series is designed for demanding applications that require high surge current and high ripple current capability. This series builds upon the proven capabilities of our industrial grade tantalum chip capacitors to offer several advantages such as low ESR, high ripple current capability, excellent capacitance stability, and improved

resistance to high in-rush currents. These benefits are achieved through a combination of proprietary design, materials, and process parameters as well as high-stress, low impedance electrical conditioning performed prior to screening. This series is classified as MSL (Moisture Sensitivity Level) 1 under J STD 020: unlimited floor life time at ≤30°C / 85% RH.

Benefits

- Meets or exceeds EIA Standard 535BAAC
- Taped and reeled per EIA 481-1
- High surge current capability
- Optional gold-plated terminations
- High ripple current capability
- 100% surge current test on C, D, E, U, V, X sizes
- 100% steady-state accelerated aging
- 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
- Available tested to DSCC 95158
- RoHS Compliant and lead-free terminations
- Operating temperature range of -55°C to +125°C

Applications

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



Environmental Compliance

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



RoHS Compliant

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.

Ordering Information

T	495	X	107	M	010	A	T	E045	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Voltage	Failure Rate/Design	Lead Material	ESR	Packaging (C-Spec)
T = Tantalum	Surge Robust Low ESR	A, B, C, D, E, T, V, X	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	2R5 = 2.5 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)	Last three digits specify ESR in mΩ. (45 = 45 mΩ)	Blank = 7" Reel 7280 = 13" Reel

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	-55°C to 125°C
Rated Capacitance Range	0.47 – 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

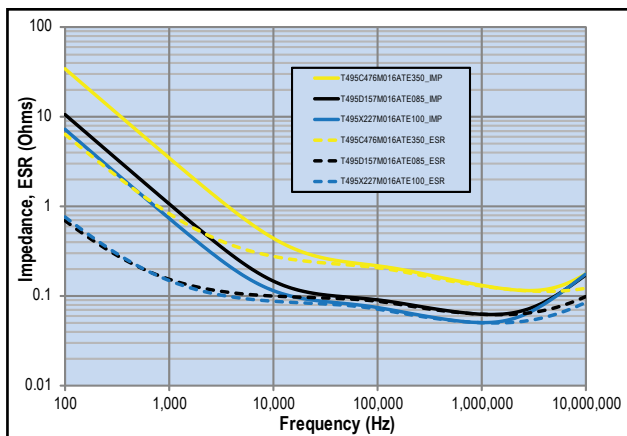
Qualification

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
Surge Voltage	25°C and 85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage).	DCL	10 x IL			
		ESR	12 x IL			
		IL	n/a			
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			
		ESR	Within initial limits			

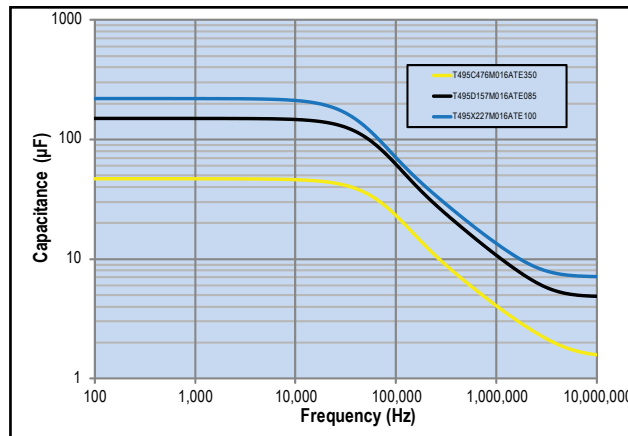
*IL = Initial limit

Electrical Characteristics

ESR vs. Frequency

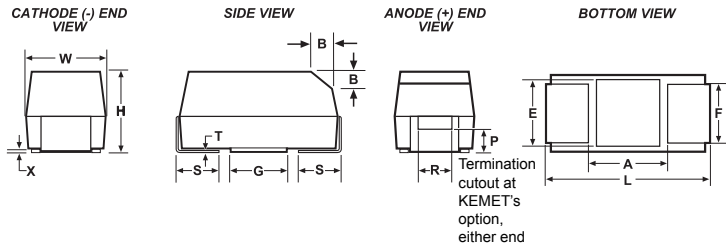


Capacitance vs. Frequency



Dimensions – Millimeters (Inches)

Metric will govern



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 (.126 ± .008)	1.6 ± 0.2 (.063 ± .008)	1.6 ± 0.2 (.063 ± .008)	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 (.31)	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)	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 (0.043)	1.8 (.071)	2.2 (.087)
C	6032-28	6.0 ± 0.3 (.236 ± .03)	3.2 ± 0.3 (.126 ± .012)	2.5 ± 0.3 (.098 ± .012)	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)	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)	2.4 (.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	7360-38	7.3 ± 0.3 (.287 ± .012)	6.0 ± 0.3 (.236 ± .012)	3.6 ± 0.2 (.142 ± .008)	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)
T	3528-12	3.5 ± 0.2 (.138 ± .008)	2.8 ± 0.2 (.110 ± .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)
V	7343-20	7.3 ± 0.3 (.287 ± .012)	4.3 ± 0.3 (.169 ± .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)	µAmps +20°C Max/5 Min	% @ +20°C 120 Hz Max	mΩ @ 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	T495T107(M)2R5A(2)E3K0	2.5	24.0	3000	153	138	61	1
2.5	220	D/7343-31	T495D227(1)2R5A(2)E045	5.5	8.0	45	1826	1643	730	1
2.5	470	D/7343-31	T495D477(1)2R5A(2)E035	11.8	8.0	35	2070	1863	828	1
2.5	1000	X/7343-43	T495X108(1)2R5A(2)E030	25.0	15.0	30	2345	2111	938	1
2.5	1000	X/7343-43	T495X108(1)2R5A(2)E040	25.0	15.0	40	2031	1828	812	1
4	6.8	A/3216-18	T495A685(1)004A(2)E2K0	0.5	6.0	2000	194	175	78	1
4	22	C/6032-28	T495C226(1)004A(2)E380	0.9	6.0	380	538	484	215	1
4	68	T/3528-12	T495T686(1)004A(2)E1K5	2.7	20.0	1500	216	194	86	1
4	68	V/7343-20	T495V686(1)004A(2)E150	2.7	6.0	150	913	822	365	1
4	100	B/3528-21	T495B107(1)004A(2)E500	4.0	8.0	500	412	371	165	1
4	100	D/7343-31	T495D107(1)004A(2)E800	4.0	6.0	800	433	390	173	1
4	150	B/3528-21	T495B157(M)004A(2)E900	6.0	12.0	900	307	276	123	1
4	150	C/6032-28	T495C157(1)004A(2)E070	6.0	12.0	70	1254	1129	502	1
4	150	C/6032-28	T495C157(1)004A(2)E250	6.0	8.0	250	663	597	265	1
4	220	D/7343-31	T495D227(1)004A(2)E040	8.8	8.0	40	1936	1742	774	1
4	220	D/7343-31	T495D227(1)004A(2)E050	8.8	8.0	50	1732	1559	693	1
4	220	D/7343-31	T495D227(1)004A(2)E100	8.8	8.0	100	1225	1103	490	1
4	330	C/6032-28	T495C337(1)004A(2)E300	13.2	10.0	300	606	545	242	1
4	330	C/6032-28	T495C337(1)004A(2)E700	13.2	12.0	700	396	356	158	1
4	330	D/7343-31	T495D337(1)004A(2)E030	13.2	8.0	30	2236	2012	894	1
4	330	D/7343-31	T495D337(1)004A(2)E045	13.2	8.0	45	1826	1643	730	1
4	330	D/7343-31	T495D337(1)004A(2)E100	13.2	8.0	100	1225	1103	490	1
4	470	D/7343-31	T495D477(1)004A(2)E045	18.8	12.0	45	1826	1643	730	1
4	470	D/7343-31	T495D477(1)004A(2)E100	18.8	12.0	100	1225	1103	490	1
4	470	X/7343-43	T495X477(1)004A(2)E030	18.8	8.0	30	2345	2111	938	1
4	470	X/7343-43	T495X477(1)004A(2)E045	18.8	8.0	45	1915	1724	766	1
4	470	X/7343-43	T495X477(1)004A(2)E060	18.8	10.0	60	1658	1492	663	1
4	470	X/7343-43	T495X477(1)004A(2)E100	18.8	8.0	100	1285	1157	514	1
4	680	X/7343-43	T495X687(1)004A(2)E040	27.2	10.0	40	2031	1828	812	1
4	680	X/7343-43	T495X687(1)004A(2)E060	27.2	10.0	60	1658	1492	663	1
4	680	X/7343-43	T495X687(1)004A(2)E100	27.2	10.0	100	1285	1157	514	1
4	1000	X/7343-43	T495X108(1)004A(2)E030	40.0	10.0	30	2345	2111	938	1
4	1000	X/7343-43	T495X108(1)004A(2)E040	40.0	10.0	40	2031	1828	812	1
4	1000	X/7343-43	T495X108(1)004A(2)E060	40.0	10.0	60	1658	1492	663	1
4	1000	X/7343-43	T495X108(1)004A(2)E070	40.0	10.0	70	1535	1382	614	1
4	1000	X/7343-43	T495X108(1)004A(2)E090	40.0	10.0	90	1354	1219	542	1
4	1000	X/7343-43	T495X108(1)004A(2)E100	40.0	10.0	100	1285	1157	514	1
4	1000	E/7360-38	T495E108(1)004A(2)E035	40.0	15.0	35	2390	2151	956	1
4	1000	E/7360-38	T495E108(1)004A(2)E050	40.0	15.0	50	2000	1800	800	1
6.3	6.8	A/3216-18	T495A685(1)006ATE1K8	0.5	6.0	1800	204	184	82	1
6.3	6.8	A/3216-18	T495A685(1)006ATE2K0	0.5	6.0	2000	194	175	78	1
6.3	6.8	A/3216-18	T495A685(1)006A(2)E4K5	0.5	6.0	4500	129	116	52	1
6.3	6.8	C/6032-28	T495C685(1)006A(2)E480	0.5	6.0	480	479	431	192	1
6.3	10	A/3216-18	T495A106(1)006A(2)E800	0.6	6.0	800	306	275	122	1
6.3	10	A/3216-18	T495A106(1)006A(2)E1K0	0.6	6.0	1000	274	247	110	1
6.3	10	A/3216-18	T495A106(1)006A(2)E1K5	0.6	6.0	1500	224	202	90	1
6.3	10	A/3216-18	T495A106(1)006A(2)E2K0	0.6	6.0	2000	194	175	78	1
6.3	22	A/3216-18	T495A226(1)006A(2)E500	1.4	6.0	500	387	348	155	1
6.3	22	A/3216-18	T495A226(1)006A(2)E900	1.4	8.0	900	289	260	116	1
6.3	22	A/3216-18	T495A226(1)006A(2)E1K5	1.4	8.0	1500	224	202	90	1
6.3	22	C/6032-28	T495C226(1)006A(2)E380	1.4	6.0	380	538	484	215	1
VDC	µF	KEMET/EIA	(See below for part options)	µAmps +20°C Max/5 Min	% @ +20°C 120 Hz Max	mΩ @ 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)	µAmps +20°C Max/5 Min	% @ +20°C 120 Hz Max	mΩ @ 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	33	A/3216-18	T495A336(1)006A(2)E600	2.1	12.0	600	354	319	142	1
6.3	33	T/3528-12	T495T336(1)006A(2)E800	2.1	6.0	800	296	266	118	1
6.3	47	B/3528-21	T495B476(1)006A(2)E250	3.0	6.0	250	583	525	233	1
6.3	47	B/3528-22	T495B476(1)006A(2)E500	3.0	6.0	500	583	525	233	1
6.3	47	B/3528-21	T495B476(1)006A(2)E450	3.0	6.0	450	435	392	174	1
6.3	47	B/3528-21	T495B476(1)006A(2)E400	3.0	6.0	400	461	415	184	1
6.3	47	C/6032-28	T495C476(1)006A(2)E250	3.0	6.0	250	663	597	265	1
6.3	47	C/6032-28	T495C476(1)006A(2)E300	3.0	6.0	300	606	545	242	1
6.3	47	C/6032-28	T495C476(1)006A(2)E330	3.0	6.0	330	577	519	231	1
6.3	47	V/7343-20	T495V476(1)006A(2)E150	3.0	6.0	150	913	822	365	1
6.3	68	B/3528-21	T495B686(1)006A(2)E500	4.3	8.0	500	412	371	165	1
6.3	68	D/7343-31	T495D686(1)006A(2)E175	4.3	4.0	175	926	833	370	1
6.3	68	D/7343-31	T495D686(1)006A(2)E180	4.3	4.0	180	913	822	365	1
6.3	68	D/7343-31	T495D686(1)006A(2)4095	4.3	4.0	175	926	833	370	1
6.3	100	B/3528-21	T495B107(1)006A(2)E400	6.3	15.0	400	461	415	184	1
6.3	100	B/3528-21	T495B107(M)006A(2)E700	6.3	15.0	700	348	313	139	1
6.3	100	C/6032-28	T495C107(1)006A(2)E075	6.3	8.0	75	1211	1090	484	1
6.3	100	C/6032-28	T495C107(1)006A(2)E150	6.3	8.0	150	856	770	342	1
6.3	100	D/7343-31	T495D107(1)006A(2)E050	6.3	6.0	50	1732	1559	693	1
6.3	100	D/7343-31	T495D107(1)006A(2)E130	6.3	6.0	130	1074	967	430	1
6.3	100	D/7343-31	T495D107(1)006A(2)E150	6.3	8.0	150	1000	900	400	1
6.3	100	D/7343-31	T495D107(1)006A(2)E800	6.3	6.0	800	433	390	173	1
6.3	100	V/7343-20	T495V107(1)006A(2)E090	6.3	8.0	90	1179	1061	472	1
6.3	100	V/7343-20	T495V107(1)006A(2)E150	6.3	8.0	150	913	822	365	1
6.3	150	C/6032-28	T495C157(1)006A(2)E050	9.5	8.0	50	1483	1335	593	1
6.3	150	C/6032-28	T495C157(M)006A(2)E200	9.5	8.0	200	742	668	297	1
6.3	150	V/7343-20	T495V157(1)006A(2)E040	9.5	8.0	40	1768	1591	707	1
6.3	150	V/7343-20	T495V157(1)006A(2)E070	9.5	8.0	70	1336	1202	534	1
6.3	150	V/7343-20	T495V157(1)006A(2)E150	9.5	8.0	150	913	822	365	1
6.3	150	D/7343-31	T495D157(1)006A(2)E050	9.5	6.0	50	1732	1559	693	1
6.3	150	D/7343-31	T495D157(1)006A(2)E065	9.5	6.0	65	1519	1367	608	1
6.3	150	D/7343-31	T495D157(1)006A(2)E080	9.5	6.0	80	1369	1232	548	1
6.3	150	D/7343-31	T495D157(1)006A(2)E100	9.5	6.0	100	1225	1103	490	1
6.3	150	D/7343-31	T495D157(1)006A(2)E125	9.5	6.0	125	1095	986	438	1
6.3	150	X/7343-43	T495X157(1)006A(2)E100	9.5	6.0	100	1285	1157	514	1
6.3	150	X/7343-43	T495X157(1)006A(2)4095	9.5	6.0	125	1149	1034	460	1
6.3	220	C/6032-28	T495C227(1)006A(2)E225	13.9	10.0	225	699	629	280	1
6.3	220	D/7343-31	T495D227(1)006A(2)E045	13.9	8.0	45	1826	1643	730	1
6.3	220	D/7343-31	T495D227(1)006A(2)E050	13.9	8.0	50	1732	1559	693	1
6.3	220	D/7343-31	T495D227(1)006A(2)E100	13.9	8.0	100	1225	1103	490	1
6.3	220	D/7343-31	T495D227(1)006A(2)4095	13.9	8.0	100	1225	1103	490	1
6.3	220	X/7343-43	T495X227(1)006A(2)E070	13.9	8.0	70	1535	1382	614	1
6.3	220	X/7343-43	T495X227(1)006A(2)E080	13.9	8.0	80	1436	1292	574	1
6.3	220	X/7343-43	T495X227(1)006A(2)E100	13.9	8.0	100	1285	1157	514	1
6.3	220	V/7343-20	T495V227(1)006ATE150	13.9	8.0	150	913	822	365	1
6.3	220	X/7343-43	T495X227(1)006A(2)4095	13.9	8.0	100	1285	1157	514	1
6.3	330	D/7343-31	T495D337(1)006A(2)E040	20.8	8.0	40	1936	1742	774	1
6.3	330	D/7343-31	T495D337(1)006A(2)E045	20.8	8.0	45	1826	1643	730	1
6.3	330	D/7343-31	T495D337(1)006A(2)E050	20.8	8.0	50	1732	1559	693	1
6.3	330	D/7343-31	T495D337(1)006A(2)E070	20.8	8.0	70	1464	1318	586	1
6.3	330	D/7343-31	T495D337(1)006A(2)E100	20.8	8.0	100	1225	1103	490	1
VDC	µF	KEMET/EIA	(See below for part options)	µAmps +20°C Max/5 Min	% @ +20°C 120 Hz Max	mΩ @ 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)	μAmps +20°C Max/5 Min	% @ +20°C 120 Hz Max	mΩ @ 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	330	X/7343-43	T495X337(1)006A(2)E045	20.8	8.0	45	1915	1724	766	1
6.3	330	X/7343-43	T495X337(1)006A(2)E050	20.8	8.0	50	1817	1635	727	1
6.3	330	X/7343-43	T495X337(1)006A(2)E065	20.8	8.0	65	1593	1434	637	1
6.3	330	X/7343-43	T495X337(1)006A(2)E080	20.8	8.0	80	1436	1292	574	1
6.3	330	X/7343-43	T495X337(1)006A(2)E100	20.8	8.0	100	1285	1157	514	1
6.3	330	E/7360-38	T495E337(1)006A(2)E060	20.8	8.0	60	1826	1643	730	1
6.3	330	E/7360-38	T495E337(1)006A(2)E100	20.8	8.0	100	1414	1273	566	1
6.3	470	D/7343-31	T495D477(1)006A(2)E045	29.6	12.0	45	1826	1643	730	1
6.3	470	D/7343-31	T495D477(1)006A(2)E100	29.6	12.0	100	1225	1103	490	1
6.3	470	D/7343-31	T495D477(1)006A(2)E125	29.6	12.0	125	1095	986	438	1
6.3	470	D/7343-31	T495D477(1)006A(2)E150	29.6	12.0	150	1000	900	400	1
6.3	470	X/7343-43	T495X477(1)006A(2)E030	29.6	10.0	30	2345	2111	938	1
6.3	470	X/7343-43	T495X477(1)006A(2)E045	29.6	10.0	45	1915	1724	766	1
6.3	470	X/7343-43	T495X477(1)006A(2)E050	29.6	10.0	50	1817	1635	727	1
6.3	470	X/7343-43	T495X477(1)006A(2)E060	29.6	10.0	60	1658	1492	663	1
6.3	470	X/7343-43	T495X477(1)006A(2)E065	29.6	10.0	65	1593	1434	637	1
6.3	470	X/7343-43	T495X477(1)006A(2)E100	29.6	10.0	100	1285	1157	514	1
6.3	470	X/7343-43	T495X477(1)006A(2)E125	29.6	10.0	125	1149	1034	460	1
6.3	470	E/7360-38	T495E477(1)006A(2)E040	29.6	12.0	40	2236	2012	894	1
6.3	470	E/7360-38	T495E477(1)006A(2)E055	29.6	10.0	55	1907	1716	763	1
6.3	470	E/7360-38	T495E477(1)006A(2)E100	29.6	10.0	100	1414	1273	566	1
6.3	680	X/7343-43	T495X687(1)006A(2)E100	42.8	12.0	100	1285	1157	514	1
6.3	680	X/7343-43	T495X687(1)006A(2)E060	42.8	12.0	60	1658	1492	663	1
6.3	680	X/7343-43	T495X687(1)006A(2)E045	42.8	12.0	45	1915	1724	766	1
6.3	1000	E/7360-38	T495E108(1)006A(2)E050	63.0	15.0	50	2000	1800	800	1
10	2.2	A/3216-18	T495A225(1)010A(2)E1K8	0.5	6.0	1800	204	184	82	1
10	4.7	A/3216-18	T495A475(1)010A(2)E1K2	0.5	6.0	1200	250	225	100	1
10	4.7	A/3216-18	T495A475(1)010A(2)E1K3	0.5	6.0	1300	240	216	96	1
10	4.7	A/3216-18	T495A475(1)010A(2)E1K4	0.5	6.0	1400	231	208	92	1
10	4.7	A/3216-18	T495A475(1)010A(2)E1K8	0.5	6.0	1800	204	184	82	1
10	4.7	A/3216-18	T495A475(1)010A(2)E2K0	0.5	6.0	2000	194	175	78	1
10	4.7	B/3528-21	T495B475(1)010A(2)E1K3	0.5	15.0	1300	256	230	102	1
10	4.7	B/3528-21	T495B475(1)010A(2)E1K5	0.5	6.0	1500	238	214	95	1
10	6.8	A/3216-18	T495A685(1)010A(2)E1K8	0.7	6.0	1800	204	184	82	1
10	6.8	B/3528-21	T495B685(1)010A(2)E900	0.7	6.0	900	307	276	123	1
10	6.8	B/3528-21	T495B685(1)010A(2)E1K1	0.7	6.0	1100	278	250	111	1
10	6.8	B/3528-21	T495B685(1)010A(2)E1K2	0.7	6.0	1200	266	239	106	1
10	10	A/3216-18	T495A106(1)010A(2)E1K8	1.0	6.0	1800	204	184	82	1
10	10	A/3216-18	T495A106(1)010A(2)E2K0	1.0	6.0	2000	194	175	78	1
10	10	A/3216-18	T495A106(1)010A(2)E2K5	1.0	6.0	2500	173	156	69	1
10	10	A/3216-18	T495A106(1)010A(2)E3K8	1.0	6.0	3800	140	126	56	1
10	10	B/3528-21	T495B106(1)010A(2)E600	1.0	6.0	600	376	338	150	1
10	10	B/3528-21	T495B106(1)010A(2)E750	1.0	6.0	750	337	303	135	1
10	10	B/3528-21	T495B106(1)010A(2)E1K2	1.0	6.0	1200	266	239	106	1
10	10	B/3528-21	T495B106(1)010A(2)E3K0	1.0	6.0	3000	168	151	67	1
10	10	C/6032-28	T495C106(1)010AT E400	1.0	6.0	400	524	472	210	1
10	10	T/3528-12	T495T106(1)010AT E1K5	1.0	6.0	1500	216	194	86	1
10	15	A/3216-18	T495A156(1)010AT E1K0	1.5	6.0	1000	274	247	110	1
10	15	A/3216-18	T495A156(1)010AT E1K8	1.5	6.0	1800	204	184	82	1
10	15	B/3528-21	T495B156(1)010AT E600	1.5	6.0	600	376	338	150	1
10	15	B/3528-21	T495B156(1)010AT E900	1.5	6.0	900	307	276	123	1
VDC	μF	KEMET/EIA	(See below for part options)	μAmps +20°C Max/5 Min	% @ +20°C 120 Hz Max	mΩ @ 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)	µAmps +20°C Max/5 Min	% @ +20°C 120 Hz Max	mΩ @ 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	15	T/3528-12	T495T156(1)010AT E1K2	1.5	6.0	1200	242	218	97	1
10	15	B/3528-21	T495B156(1)010A(2)E500	1.5	6.0	500	412	371	165	1
10	15	C/6032-28	T495C156(1)010A(2)E375	1.5	6.0	375	542	488	217	1
10	15	C/6032-28	T495C156(1)010A(2)E400	1.5	6.0	400	524	472	210	1
10	15	C/6032-28	T495C156(1)010A(2)E475	1.5	6.0	475	481	433	192	1
10	22	A/3216-18	T495A226(1)010AT E1K2	2.2	8.0	1200	250	225	100	1
10	22	A/3216-18	T495A226(1)010AT E1K5	2.2	8.0	1500	224	202	90	1
10	22	B/3528-21	T495B226(1)010AT E400	2.2	6.0	400	461	415	184	1
10	22	B/3528-21	T495B226(1)010AT E500	2.2	6.0	500	412	371	165	1
10	22	B/3528-21	T495B226(1)010AT E700	2.2	6.0	700	348	313	139	1
10	22	B/3528-21	T495B226(1)010AT E800	2.2	6.0	800	326	293	130	1
10	22	B/3528-21	T495B226(1)010A(2)E2K3	2.2	6.0	2300	192	173	77	1
10	22	C/6032-28	T495C226(1)010A(2)E200	2.2	6.0	200	742	668	297	1
10	22	C/6032-28	T495C226(1)010A(2)E245	2.2	6.0	245	670	603	268	1
10	22	C/6032-28	T495C226(1)010A(2)E290	2.2	6.0	290	616	554	246	1
10	22	C/6032-28	T495C226(1)010A(2)E300	2.2	6.0	300	606	545	242	1
10	22	C/6032-28	T495C226(1)010A(2)E345	2.2	6.0	345	565	509	226	1
10	22	C/6032-28	T495C226(1)010A(2)E350	2.2	6.0	350	561	505	224	1
10	22	C/6032-28	T495C226(1)010A(2)E380	2.2	6.0	380	538	484	215	1
10	33	B/3528-21	T495B336(1)010A(2)E450	3.3	6.0	450	435	392	174	1
10	33	B/3528-21	T495B336(1)010A(2)E550	3.3	6.0	550	393	354	157	1
10	33	B/3528-21	T495B336(1)010A(2)E650	3.3	6.0	650	362	326	145	1
10	33	V/7343-20	T495V336(1)010A(2)E100	3.3	6.0	100	1118	1006	447	1
10	33	V/7343-20	T495V336(1)010A(2)E150	3.3	6.0	150	913	822	365	1
10	47	B/3528-21	T495B476(1)010A(2)E500	4.7	6.0	500	412	371	165	1
10	47	B/3528-21	T495B476(1)010A(2)E650	4.7	6.0	650	362	326	145	1
10	47	C/6032-28	T495C476(1)010A(2)E300	4.7	6.0	300	606	545	242	1
10	47	D/7343-31	T495D476(1)010A(2)E080	4.7	4.0	80	1369	1232	548	1
10	47	D/7343-31	T495D476(1)010A(2)E090	4.7	6.0	90	1291	1162	516	1
10	47	D/7343-31	T495D476(1)010A(2)E100	4.7	6.0	100	1225	1103	490	1
10	47	D/7343-31	T495D476(1)010A(2)E200	4.7	4.0	200	866	779	346	1
10	47	D/7343-31	T495D476(1)010A(2)4095	4.7	4.0	200	866	779	346	1
10	68	B/3528-21	T495B686(1)010A(2)E600	6.8	8.0	600	376	338	150	1
10	68	B/3528-21	T495B686(1)010A(2)E750	6.8	8.0	750	337	303	135	1
10	68	B/3528-21	T495B686(M)010A(2)E900	6.8	8.0	900	307	276	123	1
10	68	C/6032-28	T495C686(1)010A(2)E080	6.8	6.0	80	1173	1056	469	1
10	68	C/6032-28	T495C686(1)010A(2)E200	6.8	6.0	200	742	668	297	1
10	68	C/6032-28	T495C686(1)010A(2)E225	6.8	6.0	225	699	629	280	1
10	68	C/6032-28	T495C686(1)010A(2)E250	6.8	6.0	250	663	597	265	1
10	68	V/7343-20	T495V686(1)010A(2)E070	6.8	6.0	70	1336	1202	534	1
10	68	V/7343-20	T495V686(1)010A(2)E100	6.8	6.0	100	1118	1006	447	1
10	68	V/7343-20	T495V686(1)010A(2)E140	6.8	6.0	140	945	851	378	1
10	68	V/7343-20	T495V686(1)010A(2)E200	6.8	6.0	200	791	712	316	1
10	68	D/7343-31	T495D686(1)010A(2)E070	6.8	6.0	70	1464	1318	586	1
10	68	D/7343-31	T495D686(1)010A(2)E090	6.8	6.0	90	1291	1162	516	1
10	68	D/7343-31	T495D686(1)010A(2)E100	6.8	6.0	100	1225	1103	490	1
10	68	D/7343-31	T495D686(1)010A(2)E150	6.8	6.0	150	1000	900	400	1
10	68	X/7343-43	T495X686(1)010A(2)E150	6.8	4.0	150	1049	944	420	1
10	68	X/7343-43	T495X686(1)010A(2)4095	6.8	4.0	150	1049	944	420	1
10	100	B/3528-21	T495B107(M)010A(2)E350	10.0	12.0	350	493	444	197	1
10	100	B/3528-21	T495B107(M)010A(2)E500	10.0	30.0	500	412	371	165	1
VDC	µF	KEMET/EIA	(See below for part options)	µAmps +20°C Max/5 Min	% @ +20°C 120 Hz Max	mΩ @ 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)	µAmps +20°C Max/5 Min	% @ +20°C 120 Hz Max	mΩ @ 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	22	X/7343-43	T495X226(1)035A(2)E260	7.7	6.0	260	797	717	319	1
35	22	X/7343-43	T495X226(1)035A(2)E275	7.7	6.0	275	775	698	310	1
35	22	X/7343-43	T495X226(1)035A(2)E300	7.7	6.0	300	742	668	297	1
35	22	X/7343-43	T495X226(1)035A(2)4095	7.7	6.0	300	742	668	297	1
35	33	D/7343-31	T495D336(1)035A(2)E200	11.6	6.0	200	866	779	346	1
35	33	D/7343-31	T495D336(1)035A(2)E300	11.6	6.0	300	707	636	283	1
35	33	X/7343-43	T495X336(1)035A(2)E100	11.6	6.0	100	1285	1157	514	1
35	33	X/7343-43	T495X336(1)035A(2)E175	11.6	6.0	175	971	874	388	1
35	33	X/7343-43	T495X336(1)035A(2)E250	11.6	6.0	250	812	731	325	1
35	33	X/7343-43	T495X336(1)035A(2)E260	11.6	6.0	260	797	717	319	1
35	33	E/7360-38	T495E336(1)035A(2)E200	11.6	6.0	200	1000	900	400	1
35	47	X/7343-43	T495X476(1)035A(2)E185	16.5	8.0	185	944	850	378	1
35	47	X/7343-43	T495X476(1)035A(2)E200	16.5	8.0	200	908	817	363	1
35	47	X/7343-43	T495X476(1)035A(2)E230	16.5	8.0	230	847	762	339	1
35	47	X/7343-43	T495X476(1)035A(2)E300	16.5	8.0	300	742	668	297	1
50	1	C/6032-28	T495C105(1)050A(2)E1K3	0.5	4.0	1300	291	262	116	1
50	1	C/6032-28	T495C105(1)050A(2)E1K6	0.5	4.0	1600	262	236	105	1
50	2.2	D/7343-31	T495D225(1)050A(2)E600	1.1	6.0	600	500	450	200	1
50	3.3	D/7343-31	T495D335(1)050A(2)E700	1.7	6.0	700	463	417	185	1
50	4.7	D/7343-31	T495D475(1)050A(2)E275	2.4	6.0	275	739	665	296	1
50	4.7	D/7343-31	T495D475(1)050A(2)E300	2.4	6.0	300	707	636	283	1
50	4.7	X/7343-43	T495X475(1)050A(2)E300	2.4	4.0	300	742	668	297	1
50	4.7	X/7343-43	T495X475(1)050A(2)4095	2.4	4.0	300	742	668	297	1
50	6.8	D/7343-31	T495D685(1)050A(2)E190	3.4	6.0	190	889	800	356	1
50	6.8	D/7343-31	T495D685(1)050A(2)E200	3.4	6.0	200	866	779	346	1
50	6.8	D/7343-31	T495D685(1)050A(2)E275	3.4	6.0	275	739	665	296	1
50	6.8	D/7343-31	T495D685(1)050A(2)E300	3.4	6.0	300	707	636	283	1
50	6.8	D/7343-31	T495D685(1)050A(2)E400	3.4	6.0	400	612	551	245	1
50	10	X/7343-43	T495X106(1)050A(2)E250	5.0	8.0	250	812	731	325	1
50	10	X/7343-43	T495X106(1)050A(2)E260	5.0	6.0	260	797	717	319	1
50	10	X/7343-43	T495X106(1)050A(2)E300	5.0	6.0	300	742	668	297	1
50	15	X/7343-43	T495X156(1)050A(2)E200	7.5	6.0	200	908	817	363	1
50	15	X/7343-43	T495X156(1)050A(2)E250	7.5	6.0	250	812	731	325	1
50	15	X/7343-43	T495X156(1)050A(2)E300	7.5	6.0	300	742	668	297	1
VDC	µF	KEMET/EIA	(See below for part options)	µAmps +20°C Max/5 Min	% @ +20°C 120 Hz Max	mΩ @ 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.

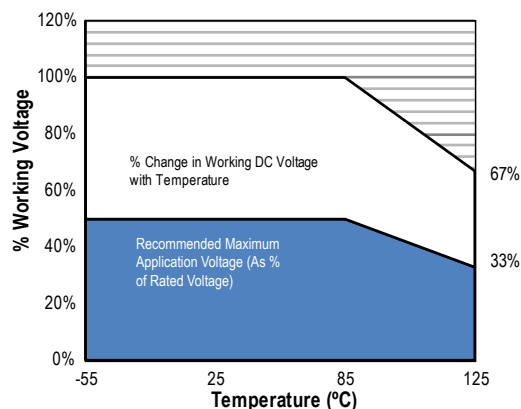
(2) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, G = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates termination finish.

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 Power Dissipation		
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
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
L	6032-19	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
M	3528-15	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
H	7360-20	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
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
Q	7343-12	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
R ²	2012-12	1.05	1.83	0.15	4.82	2.50	0.93	1.50	0.22	3.72	2.00	0.83	1.12	0.38	2.86	1.74
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
W	7343-15	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
Y ¹	7343-40	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

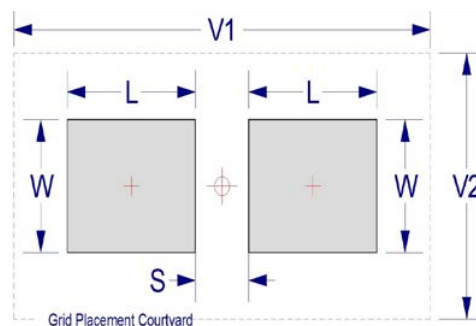
Density Level A: For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.

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 density 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.



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.

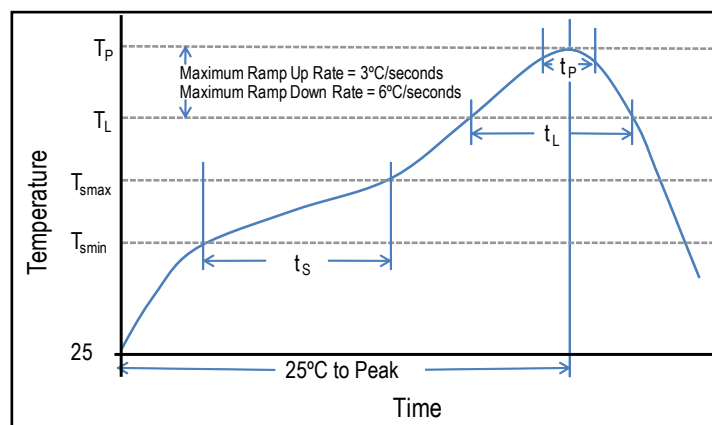
During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

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	6 minutes maximum	8 minutes maximum

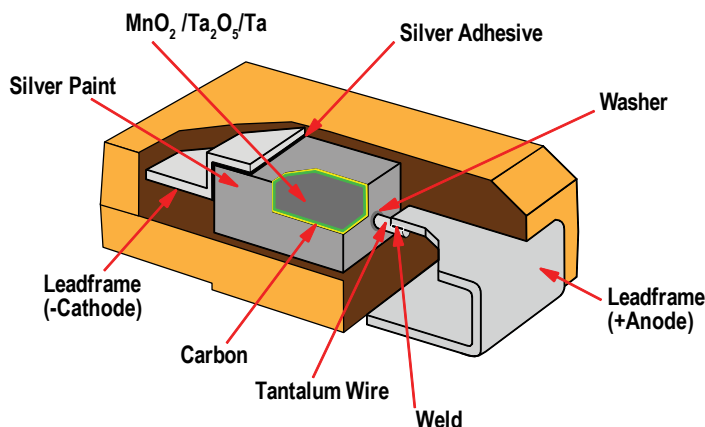
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.

*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

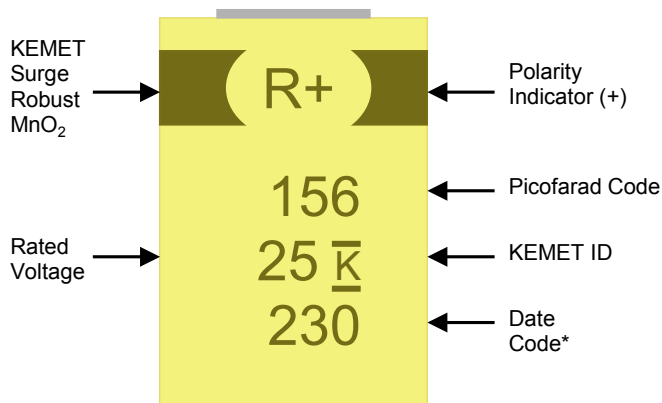


Construction

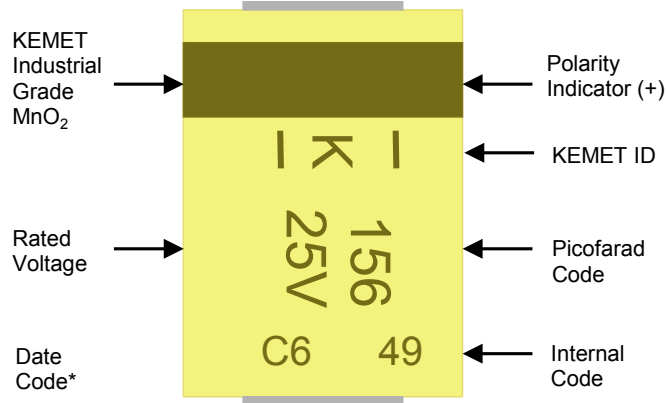


Capacitor Marking

C, D, X Case Sizes



* 230 = 30th week of 2012



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

Date Code*		
Year	Month	
X = 2009	1 = Jan	7 = Jul
A = 2010	2 = Feb	8 = Aug
B = 2011	3 = Mar	9 = Spt
C = 2012	4 = Apr	O = Oct
D = 2013	5 = May	N = Nov
E = 2014	6 = Jun	D = Dec

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 40°C 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.

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 481-1: Embossed Carrier Taping of Surface Mount Components for Automatic Handling*. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

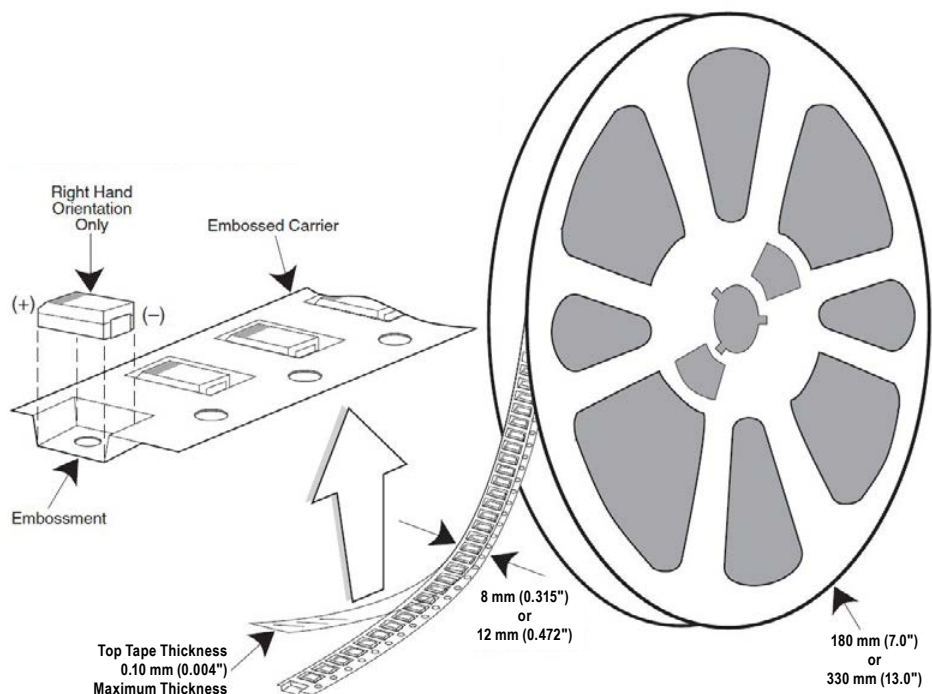


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*	13" Reel*
KEMET	EIA			
I	3216-10	8	3,000	12,000
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
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

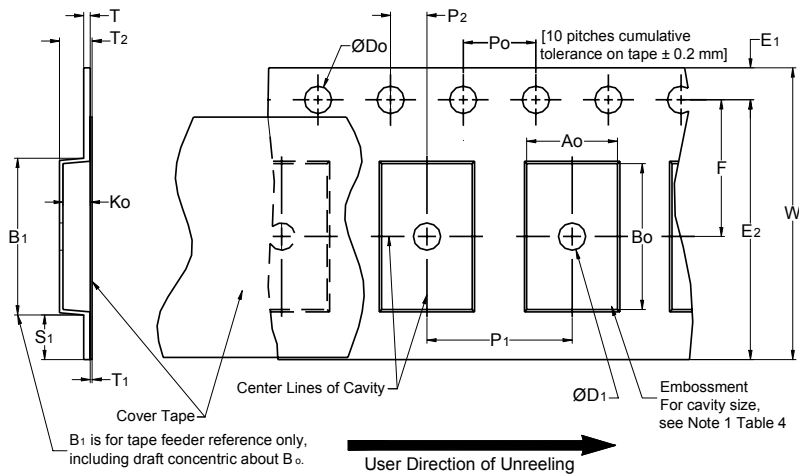


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

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									
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)	4.0 ±0.10 (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)	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)	5.5 ±0.05 (0.217 ±0.002)	8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	16.3 (0.642)		

- 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.
- The tape, with or without components, shall pass around R without damage (see Figure 5).
- If S₁ < 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).
- B₁ dimension is a reference dimension for tape feeder clearance only.
- The cavity defined by A₀, B₀ and K₀ shall surround the component with sufficient clearance that:
 - the component does not protrude above the top surface of the carrier tape.
 - the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.
 - 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).
 - 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).
 - 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

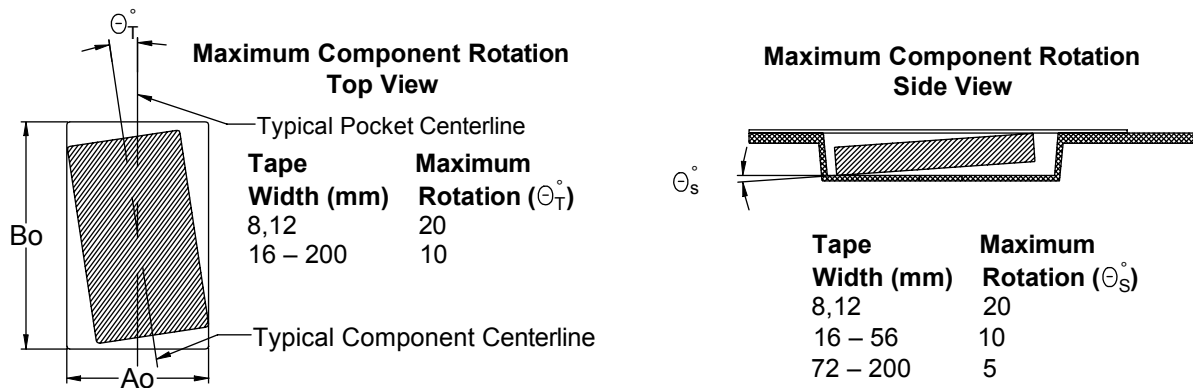


Figure 3 – Maximum Lateral Movement

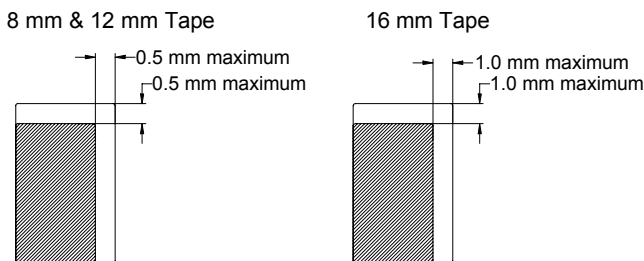


Figure 4 – Bending Radius

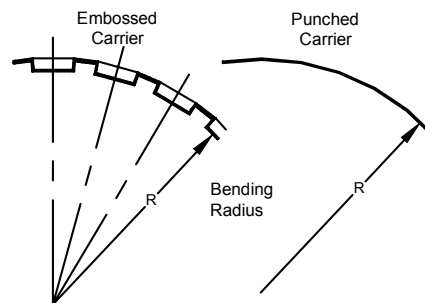


Figure 5 – Reel Dimensions

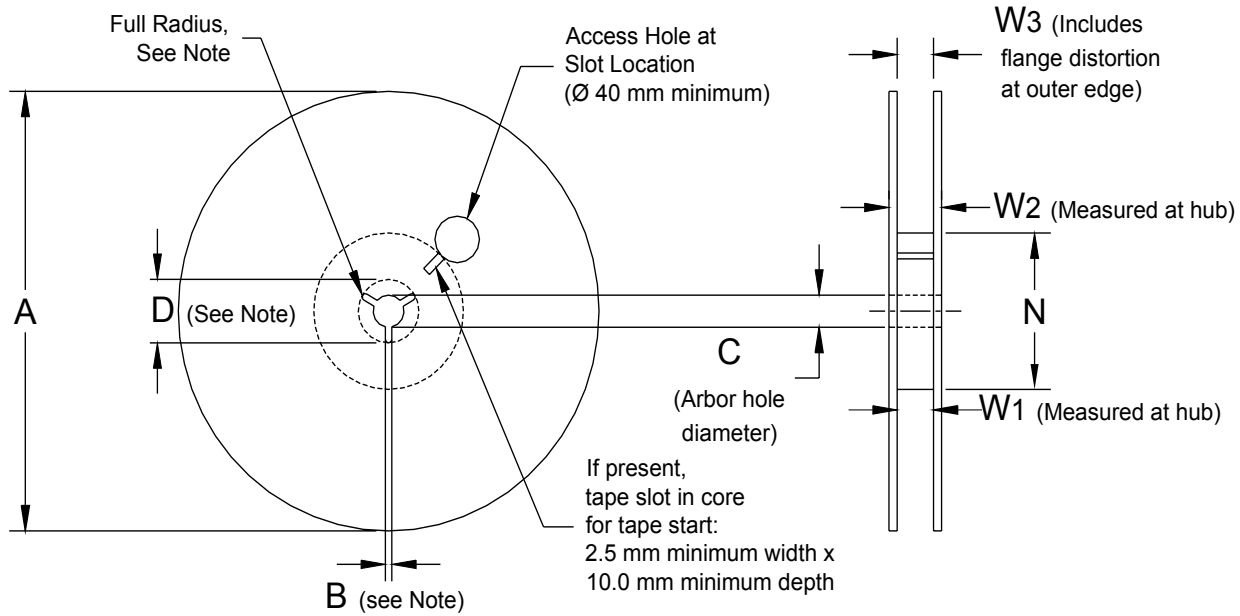


Table 5 – Reel Dimensions

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

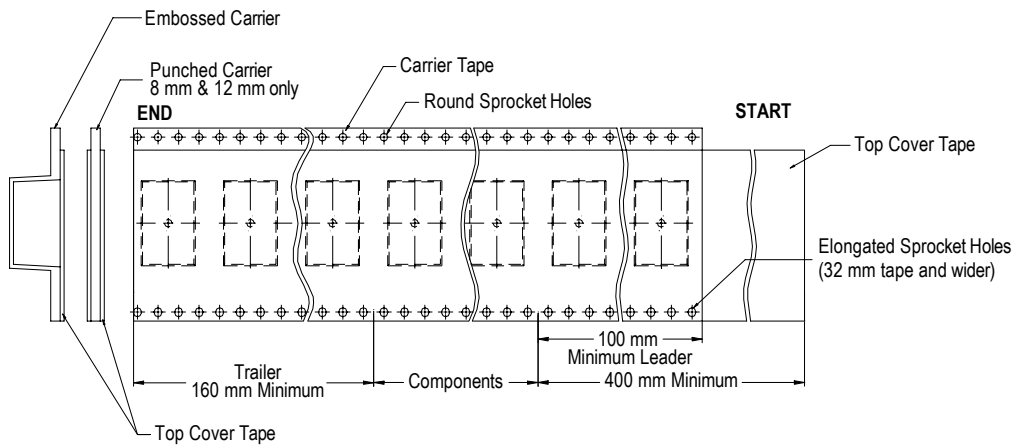
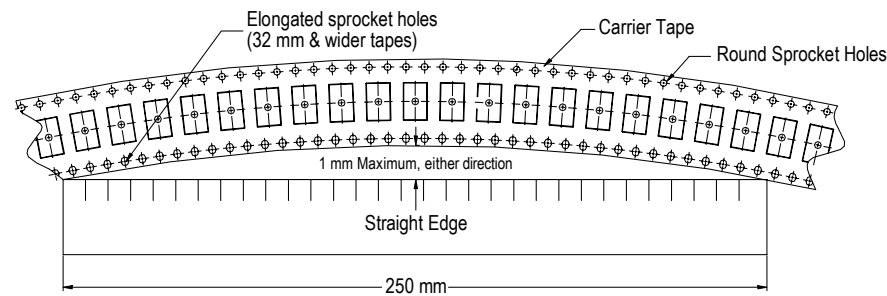


Figure 7 – Maximum Camber



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Central
Novi, MI
Tel: 248-306-9353

West
Milpitas, CA
Tel: 408-433-9950

Mexico
Guadalajara, Jalisco
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Europe

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Tel: 33-1-4646-1006

Sasso Marconi, Italy
Tel: 39-051-939111

Central Europe
Landsberg, Germany
Tel: 49-8191-3350800

Kamen, Germany
Tel: 49-2307-438110

Northern Europe
Bishop's Stortford, United Kingdom
Tel: 44-1279-460122

Espoo, Finland
Tel: 358-9-5406-5000

Asia

Northeast Asia
Hong Kong
Tel: 852-2305-1168

Shenzhen, China
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Beijing, China
Tel: 86-10-5829-1711

Shanghai, China
Tel: 86-21-6447-0707

Taipei, Taiwan
Tel: 886-2-27528585

Southeast Asia
Singapore
Tel: 65-6586-1900

Penang, Malaysia
Tel: 60-4-6430200

Bangalore, India
Tel: 91-806-53-76817

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Other KEMET Resources

Tools	
Resource	Location
Configure A Part: CapEdge	http://capacitoredge.kemet.com
SPICE & FIT Software	http://www.kemet.com/spice
Search Our FAQs: KnowledgeEdge	http://www.kemet.com/keask
Electrolytic LifeCalculator	http://www.kemet.com:8080/elc

Product Information	
Resource	Location
Products	http://www.kemet.com/products
Technical Resources (Including Soldering Techniques)	http://www.kemet.com/technicalpapers
RoHS Statement	http://www.kemet.com/rohs
Quality Documents	http://www.kemet.com/qualitydocuments

Product Request	
Resource	Location
Sample Request	http://www.kemet.com/sample
Engineering Kit Request	http://www.kemet.com/kits

Contact	
Resource	Location
Website	www.kemet.com
Contact Us	http://www.kemet.com/contact
Investor Relations	http://www.kemet.com/ir
Call Us	1-877-MyKEMET
Twitter	http://twitter.com/kemetcapacitors

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Although KEMET designs and manufactures its products to the most stringent quality and safety standards, given the current state of the art, isolated component failures may still occur. Accordingly, customer applications which require a high degree of reliability or safety should employ suitable designs or other safeguards (such as installation of protective circuitry or redundancies) in order to ensure that the failure of an electrical component does not result in a risk of personal injury or property damage.

Although all product-related warnings, cautions and notes must be observed, the customer should not assume that all safety measures are indicated or that other measures may not be required.