

## Overview

The T496 Series of tantalum chip capacitors offers a "fail safe" design. The built-in fuse element offers excellent protection from damaging short circuit conditions in applications where damaging high fault currents exist. Protection from costly circuit damage due to reversed installation is offered with this device.

## Benefits

- Meets or exceeds EIA standard 535BAAC
- Approved to DSCC drawing 04053
- Patented fuse assembly
- Optional gold-plated terminations
- Built-in fuse protects against short circuit mode
- 100% surge current test on C, D, and X sizes
- Halogen-free epoxy
- Capacitance values of 0.15 $\mu$ F to 330 $\mu$ F
- Tolerances of  $\pm 10\%$  and  $\pm 20\%$
- Voltage rating of 4-50 VDC
- Fuse activation, 25°C: within 1 second at fault currents of 4 amps and higher
- Continuous current capability: 0.75 amps
- Post actuation resistance, 25°C: 10 M $\Omega$ , minimum
- Test tabs on side of case bypass the capacitor element to allow direct testing of the fuse assembly
- RoHS compliance and lead-free terminations
- Operating temperature range of -55°C to +125°C

## Applications

Typical applications include decoupling and filtering in computing and telecommunications end applications, such as high-end servers requiring built-in fuse capability.



## Environmental Compliance

RoHS Compliant (6/6)\* according to Directive 2002/95/EC

\*When ordered with 100% Sn Solder

## SPICE

For a detailed analysis of specific part numbers, please visit [kemet.com](http://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	496	X	227	M	010	A	T	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Voltage	Failure Rate/Design	Lead Material	Packaging (C-Spec)
T = Tantalum	Fail Safe	B = 3528-21 C = 6032-28 D = 7343-31 X = 7343-43	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	004 = 4V 006 = 6.3V 010 = 10V 016 = 16V	A = N/A	T = 100% Matte Tin (Sn) Plated H = Standard Solder Coated (SnPb 5% Pb minimum)	Blank = 7" Reel 7280 = 13" Reel

## Performance Characteristics

Item	Performance Characteristics
Operating Temperature	-55°C to 125°C
Rated Capacitance Range	.15μF - 477μF @ 120 Hz/25°C
Capacitance Tolerance	K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	4V - 50V
DF(120Hz)	Refer to Part Number Electrical Specification Table
ESR (100kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01CV (μA) at Rated Voltage after 5 minutes

## Qualification

Test	Condition	Characteristics					
Endurance	85°C @ Rated Voltage, 2000 Hrs. 125°C @ 2/3 Rated Voltage, 2000 Hrs.	ΔC/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, 2000 Hrs.	ΔC/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, 1000 cycles	ΔC/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		
		ΔC/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 1000 cycles (125°C, 1.2 x Rated Voltage)	ΔC/C	Within ±5% of initial value		
				DF	Within initial limits		
DCL	Within initial limits						
ESR	Within initial limits						
Mechanical Shock/Vibration	Mil-Std-202, Meth. 213, Cond. I, 100G Peak Mil-Std-202, Meth. 204, Cond. D, 10Hz to 2000Hz, 20G Peak	ΔC/C	Within ±10 of initial value				
		DF	Within initial limits				
		DCL	Within initial limits				

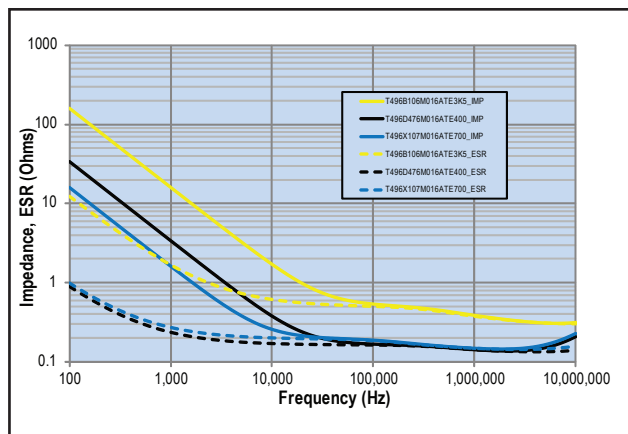
\*IL = Initial Limit

## Certification

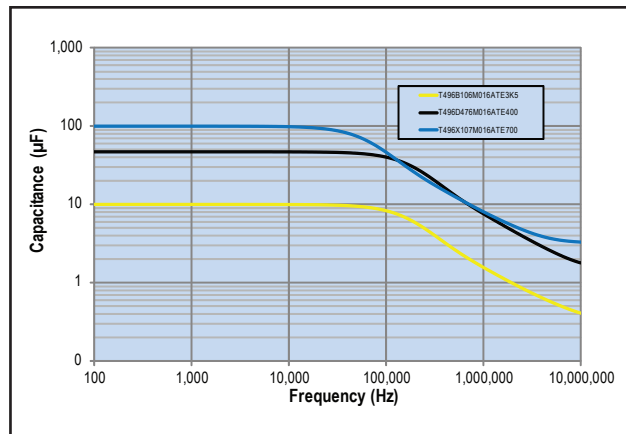
DSCC Drawing 04053

## Electrical Characteristics

ESR vs. Frequency

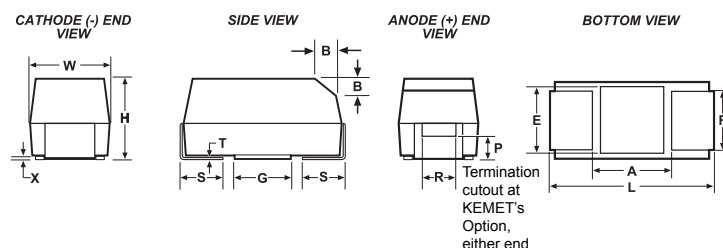


Capacitance vs. Frequency



## 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)
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)	2.1 (.083)	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)	3.1 (.122)	2.8 (.110)	2.4 (.094)
D	7343-31	7.3 ± 0.3 (.287 ± .012)	4.3 ± 0.3 (.169 ± .012)	2.8 ± 0.3 (.098 ± .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)

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-C-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
							+20°C 120Hz	+20°C 100kHz	+25°C 100kHz	
85°C VDC	120Hz μF	KEMET/EIA	(See below for part options)	μAmps +20°C max/5min	% Max	mOhms	mAmps	mAmps	mAmps	Temp≤260°C J-STD-020D
4	68	C/6032-28	T496C686(1)004A(2)E1K6	2.7	6.0	1600	262	236	105	1.0
4	68	C/6032-28	T496C686(1)004A(2)E400	2.7	6.0	400	524	472	210	1.0
4	100	C/6032-28	T496C107(1)004A(2)E1K2	4.0	8.0	1200	303	273	121	1.0
4	150	D/7343-31	T496D157(1)004A(2)E800	6.0	8.0	800	433	390	173	1.0
4	150	C/6032-28	T496C157(1)004A(2)E1K2	6.0	8.0	1200	303	273	121	1.0
4	220	D/7343-31	T496D227(1)004A(2)E700	8.8	8.0	700	463	417	185	1.0
4	220	D/7343-31	T496D227(1)004A(2)E400	8.8	8.0	400	612	551	245	1.0
4	330	D/7343-31	T496D337(1)004A(2)E700	13.2	8.0	700	463	417	185	1.0
4	330	D/7343-31	T496D337(1)004A(2)E400	13.2	8.0	400	612	551	245	1.0
4	330	X/7343-43	T496X337(1)004A(2)E700	13.2	8.0	700	486	437	194	1.0
4	470	X/7343-43	T496X477(1)004A(2)E500	18.8	8.0	500	574	517	230	1.0
6.3	4.7	B/3528-21	T496B475(1)006A(2)E3K5	0.3	6.0	3500	156	140	62	1.0
6.3	6.8	B/3528-21	T496B685(1)006A(2)E3K5	0.4	6.0	3500	156	140	62	1.0
6.3	10	B/3528-21	T496B106(1)006A(2)E3K5	0.6	6.0	3500	156	140	62	1.0
6.3	15	C/6032-28	T496C156(1)006A(2)E2K0	0.9	6.0	2000	235	212	94	1.0
6.3	22	B/3528-21	T496B226(1)006A(2)E3K5	1.4	6.0	3500	156	140	62	1.0
6.3	22	B/3528-21	T496B226(1)006A(2)E1K5	1.4	6.0	1500	238	214	95	1.0
6.3	22	C/6032-28	T496C226(1)006A(2)E2K0	1.4	6.0	2000	235	212	94	1.0
6.3	33	C/6032-28	T496C336(1)006A(2)E2K0	2.1	6.0	2000	235	212	94	1.0
6.3	33	C/6032-28	T496C336(1)006A(2)E600	2.1	6.0	600	428	385	171	1.0
6.3	47	C/6032-28	T496C476(1)006A(2)E1K6	3.0	6.0	1600	262	236	105	1.0
6.3	47	C/6032-28	T496C476(1)006A(2)E600	3.0	6.0	600	428	385	171	1.0
6.3	47	D/7343-31	T496D476(1)006A(2)E1K0	3.0	6.0	1000	387	348	155	1.0
6.3	68	C/6032-28	T496C686(1)006A(2)E1K2	4.3	6.0	1200	303	273	121	1.0
6.3	68	D/7343-31	T496D686(1)006A(2)E1K0	4.3	6.0	1000	387	348	155	1.0
6.3	100	X/7343-43	T496X107(1)006A(2)E900	6.3	8.0	900	428	385	171	1.0
6.3	100	X/7343-43	T496X107(1)006A(2)E300	6.3	8.0	300	742	668	297	1.0
6.3	100	D/7343-31	T496D107(1)006A(2)E800	6.3	8.0	800	433	390	173	1.0
6.3	100	D/7343-31	T496D107(1)006A(2)E400	6.3	8.0	400	612	551	245	1.0
6.3	100	C/6032-28	T496C107(1)006A(2)E400	6.3	8.0	400	524	472	210	1.0
6.3	150	X/7343-43	T496X157(1)006A(2)E300	9.5	8.0	300	742	668	297	1.0
6.3	150	D/7343-31	T496D157(1)006A(2)E700	9.5	8.0	700	463	417	185	1.0
6.3	150	D/7343-31	T496D157(1)006A(2)E300	9.5	8.0	300	707	636	283	1.0
6.3	220	X/7343-43	T496X227(1)006A(2)E700	13.9	8.0	700	486	437	194	1.0
6.3	220	X/7343-43	T496X227(1)006A(2)E300	13.9	8.0	300	742	668	297	1.0
6.3	220	D/7343-31	T496D227(1)006A(2)E700	13.9	8.0	700	463	417	185	1.0
6.3	220	D/7343-31	T496D227(1)006A(2)E300	13.9	8.0	300	707	636	283	1.0
6.3	330	X/7343-43	T496X337(1)006A(2)E500	20.8	8.0	500	574	517	230	1.0
6.3	330	X/7343-43	T496X337(1)006A(2)E300	20.8	8.0	300	742	668	297	1.0
10	3.3	B/3528-21	T496B335(1)010A(2)E3K5	0.3	6.0	3500	156	140	62	1.0
10	4.7	B/3528-21	T496B475(1)010A(2)E3K5	0.5	6.0	3500	156	140	62	1.0
10	6.8	B/3528-21	T496B685(1)010A(2)E3K5	0.7	6.0	3500	156	140	62	1.0
10	10	C/6032-28	T496C106(1)010A(2)E2K0	1.0	6.0	2000	235	212	94	1.0
10	15	B/3528-21	T496B156(1)010A(2)E3K5	1.5	6.0	3500	156	140	62	1.0
10	15	C/6032-28	T496C156(1)010A(2)E2K0	1.5	6.0	2000	235	212	94	1.0
10	15	C/6032-28	T496C156(1)010A(2)E600	1.5	6.0	600	428	385	171	1.0
VDC	μF	KEMET/EIA	(See below for part options)	max/5min	% Max	mOhms	mAmps	mAmps	mAmps	J-STD-020A
85°C	120Hz			μAmps +20°C	+20°C 120Hz	+20°C 100kHz	+25°C 100kHz	+85°C 100kHz	+125°C 100kHz	Temp≤260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum allowable ripple current			Moisture Sensitivity

Other part number options:

Where the 10th character equal to K (10% tolerance) is also available in M (20% tolerance).

Where the 10th character equal to M (20% tolerance) is only available in M (20% tolerance).

Standard with tin terminations (14th character = T). Tin/lead terminations is also available (14th character = H)

Also available on large (13 inch) reels. Add 7280 to the end of the part number.

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

**Table 1 – Ratings & Part Number Reference con't**

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current			Moisture Sensitivity
							+20°C 120Hz	+20°C 100kHz	+25°C 100kHz	
85°C VDC	120Hz μF	KEMET/EIA	(See below for part options)	μAmps +20°C max/5min	% Max	mOhms	mAmps	mAmps	mAmps	Temp≤260°C J-STD-020D
10	22	C/6032-28	T496C226(1)010A(2)E2K0	2.2	6.0	2000	235	212	94	1.0
10	22	C/6032-28	T496C226(1)010A(2)E500	2.2	6.0	500	469	422	188	1.0
10	33	D/7343-31	T496D336(1)010A(2)E1K0	3.3	6.0	1000	387	348	155	1.0
10	33	D/7343-31	T496D336(1)010A(2)E400	3.3	6.0	400	612	551	245	1.0
10	33	C/6032-28	T496C336(1)010A(2)E1K6	3.3	6.0	1600	262	236	105	1.0
10	33	C/6032-28	T496C336(1)010A(2)E400	3.3	6.0	400	524	472	210	1.0
10	47	D/7343-31	T496D476(1)010A(2)E1K0	4.7	6.0	1000	387	348	155	1.0
10	47	D/7343-31	T496D476(1)010A(2)E400	4.7	6.0	400	612	551	245	1.0
10	47	C/6032-28	T496C476(1)010A(2)E1K2	4.7	6.0	1200	303	273	121	1.0
10	47	C/6032-28	T496C476(1)010A(2)E400	4.7	6.0	400	524	472	210	1.0
10	68	X/7343-43	T496X686(1)010A(2)E900	6.8	6.0	900	428	385	171	1.0
10	68	D/7343-31	T496D686(1)010A(2)E800	6.8	6.0	800	433	390	173	1.0
10	68	D/7343-31	T496D686(1)010A(2)E400	6.8	6.0	400	612	551	245	1.0
10	100	X/7343-43	T496X107(1)010A(2)E400	10.0	8.0	400	642	578	257	1.0
10	100	D/7343-31	T496D107(1)010A(2)E700	10.0	8.0	700	463	417	185	1.0
10	100	D/7343-31	T496D107(1)010A(2)E400	10.0	8.0	400	612	551	245	1.0
10	150	X/7343-43	T496X157(1)010A(2)E700	15.0	8.0	700	486	437	194	1.0
10	150	X/7343-43	T496X157(1)010A(2)E400	15.0	8.0	400	642	578	257	1.0
10	150	D/7343-31	T496D157(1)010A(2)E700	15.0	8.0	700	463	417	185	1.0
10	150	D/7343-31	T496D157(1)010A(2)E400	15.0	8.0	400	612	551	245	1.0
10	220	X/7343-43	T496X227(1)010A(2)E500	22.0	8.0	500	574	517	230	1.0
10	220	X/7343-43	T496X227(1)010A(2)E300	22.0	8.0	300	742	668	297	1.0
10	220	D/7343-31	T496D227(1)010A(2)E300	22.0	8.0	300	707	636	283	1.0
16	2.2	B/3528-21	T496B225(1)016A(2)E3K5	0.4	6.0	3500	156	140	62	1.0
16	3.3	B/3528-21	T496B335(1)016A(2)E3K5	0.5	6.0	3500	156	140	62	1.0
16	3.3	B/3528-21	T496B335(1)016A(2)E2K1	0.5	6.0	2100	201	181	80	1.0
16	4.7	B/3528-21	T496B475(1)016A(2)E3K5	0.8	6.0	3500	156	140	62	1.0
16	4.7	B/3528-21	T496B475(1)016A(2)E1K6	0.8	6.0	1600	230	207	92	1.0
16	6.8	C/6032-28	T496C685(1)016A(2)E2K0	1.1	6.0	2000	235	212	94	1.0
16	6.8	C/6032-28	T496C685(1)016A(2)E600	1.1	6.0	600	428	385	171	1.0
16	10	B/3528-21	T496B106(1)016A(2)E3K5	1.6	6.0	3500	156	140	62	1.0
16	10	C/6032-28	T496C106(1)016A(2)E2K0	1.6	6.0	2000	235	212	94	1.0
16	10	C/6032-28	T496C106(1)016A(2)E700	1.6	6.0	700	396	356	158	1.0
16	15	C/6032-28	T496C156(1)016A(2)E2K0	2.4	6.0	2000	235	212	94	1.0
16	15	C/6032-28	T496C156(1)016A(2)E600	2.4	6.0	600	428	385	171	1.0
16	22	D/7343-31	T496D226(1)016A(2)E1K0	3.5	6.0	1000	387	348	155	1.0
16	22	D/7343-31	T496D226(1)016A(2)E500	3.5	6.0	500	548	493	219	1.0
16	22	C/6032-28	T496C226(1)016A(2)E1K6	3.5	6.0	1600	262	236	105	1.0
16	22	C/6032-28	T496C226(1)016A(2)E1K0	3.5	6.0	1000	332	299	133	1.0
16	33	D/7343-31	T496D336(1)016A(2)E1K0	5.3	6.0	1000	387	348	155	1.0
16	33	D/7343-31	T496D336(1)016A(2)E400	5.3	6.0	400	612	551	245	1.0
16	47	X/7343-43	T496X476(1)016A(2)E900	7.5	6.0	900	428	385	171	1.0
16	47	X/7343-43	T496X476(1)016A(2)E400	7.5	6.0	400	642	578	257	1.0
16	47	D/7343-31	T496D476(1)016A(2)E800	7.5	6.0	800	433	390	173	1.0
16	47	D/7343-31	T496D476(1)016A(2)E400	7.5	6.0	400	612	551	245	1.0
16	68	D/7343-31	T496D686(1)016A(2)E400	10.9	8.0	400	612	551	245	1.0
16	100	X/7343-43	T496X107(1)016A(2)E700	16.0	8.0	700	486	437	194	1.0
VDC	μF	KEMET/EIA	(See below for part options)	max/5min	% Max	mOhms	mAmps	mAmps	mAmps	J-STD-020A
85°C	120Hz			μAmps +20°C	+20°C 120Hz	+20°C 100kHz	+25°C 100kHz	+85°C 100kHz	+125°C 100kHz	Temp≤260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum allowable ripple current			Moisture Sensitivity

Other part number options:

Where the 10th character equal to K (10% tolerance) is also available in M (20% tolerance).

Where the 10th character equal to M (20% tolerance) is only available in M (20% tolerance).

Standard with tin terminations (14th character = T). Tin/lead terminations is also available (14th character = H)

Also available on large (13 inch) reels. Add 7280 to the end of the part number.

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

**Table 1 – Ratings & Part Number Reference con't**

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current			Moisture Sensitivity
				μAmps +20°C max/5min	+20°C 120Hz % Max	+20°C 100kHz mOhms	+25°C 100kHz mAmps	+85°C 100kHz mAmps	+125°C 100kHz mAmps	Temp≤260°C J-STD-020D
85°C VDC	120Hz μF	KEMET/EIA	(See below for part options)							
20	1.5	B/3528-21	T496B155(1)020A(2)E5K0	0.3	6.0	5000	130	117	52	1.0
20	2.2	B/3528-21	T496B225(1)020A(2)E3K5	0.4	6.0	3500	156	140	62	1.0
20	2.2	B/3528-21	T496B225(1)020A(2)E1K6	0.4	6.0	1600	230	207	92	1.0
20	3.3	B/3528-21	T496B335(1)020A(2)E3K5	0.7	6.0	3500	156	140	62	1.0
20	4.7	C/6032-28	T496C475(1)020A(2)E2K0	0.9	6.0	2000	235	212	94	1.0
20	6.8	C/6032-28	T496C685(1)020A(2)E2K0	1.4	6.0	2000	235	212	94	1.0
20	6.8	C/6032-28	T496C685(1)020A(2)E600	1.4	6.0	600	428	385	171	1.0
20	10	C/6032-28	T496C106(1)020A(2)E2K0	2.0	6.0	2000	235	212	94	1.0
20	10	C/6032-28	T496C106(1)020A(2)E800	2.0	6.0	800	371	334	148	1.0
20	15	D/7343-31	T496D156(1)020A(2)E1K0	3.0	6.0	1000	387	348	155	1.0
20	15	D/7343-31	T496D156(1)020A(2)E500	3.0	6.0	500	548	493	219	1.0
20	15	C/6032-28	T496C156(1)020A(2)E500	3.0	6.0	500	469	422	188	1.0
20	22	D/7343-31	T496D226(1)020A(2)E1K0	4.4	6.0	1000	387	348	155	1.0
20	22	D/7343-31	T496D226(1)020A(2)E500	4.4	6.0	500	548	493	219	1.0
20	33	X/7343-43	T496X336(1)020A(2)E900	6.6	6.0	900	428	385	171	1.0
20	33	X/7343-43	T496X336(1)020A(2)E400	6.6	6.0	400	642	578	257	1.0
20	33	D/7343-31	T496D336(1)020A(2)E400	6.6	6.0	400	612	551	245	1.0
20	47	X/7343-43	T496X476(1)020A(2)E300	9.4	6.0	300	742	668	297	1.0
20	47	D/7343-31	T496D476(1)020A(2)E300	9.4	6.0	300	707	636	283	1.0
25	0.68	B/3528-21	T496B684(1)025A(2)E6K5	0.2	4.0	6500	114	103	46	1.0
25	1	B/3528-21	T496B105(1)025A(2)E5K0	0.3	4.0	5000	130	117	52	1.0
25	1	B/3528-21	T496B105(1)025A(2)E3K5	0.3	4.0	3500	156	140	62	1.0
25	1.5	B/3528-21	T496B155(1)025A(2)E5K0	0.4	6.0	5000	130	117	52	1.0
25	1.5	B/3528-21	T496B155(1)025A(2)E1K6	0.4	6.0	1600	230	207	92	1.0
25	2.2	C/6032-28	T496C225(1)025A(2)E3K5	0.6	6.0	3500	177	159	71	1.0
25	3.3	C/6032-28	T496C335(1)025A(2)E2K5	0.8	6.0	2500	210	189	84	1.0
25	3.3	C/6032-28	T496C335(1)025A(2)E2K1	0.8	6.0	2100	229	206	92	1.0
25	4.7	B/3528-21	T496B475(1)025A(2)E4K0	1.2	6.0	4000	146	131	58	1.0
25	4.7	C/6032-28	T496C475(1)025A(2)E2K5	1.2	6.0	2500	210	189	84	1.0
25	4.7	C/6032-28	T496C475(1)025A(2)E1K3	1.2	6.0	1300	291	262	116	1.0
25	6.8	C/6032-28	T496C685(1)025A(2)E2K0	1.7	6.0	2000	235	212	94	1.0
25	6.8	C/6032-28	T496C685(1)025A(2)E600	1.7	6.0	600	428	385	171	1.0
25	10	C/6032-28	T496C106(1)025A(2)E600	2.5	6.0	600	428	385	171	1.0
25	10	D/7343-31	T496D106(1)025A(2)E1K2	2.5	6.0	1200	354	319	142	1.0
25	10	D/7343-31	T496D106(1)025A(2)E600	2.5	6.0	600	500	450	200	1.0
25	15	C/6032-28	T496C156(1)025A(2)E750	3.8	6.0	750	383	345	153	1.0
25	15	D/7343-31	T496D156(1)025A(2)E1K0	3.8	6.0	1000	387	348	155	1.0
25	15	D/7343-31	T496D156(1)025A(2)E500	3.8	6.0	500	548	493	219	1.0
25	22	X/7343-43	T496X226(1)025A(2)E900	5.5	6.0	900	428	385	171	1.0
25	22	X/7343-43	T496X226(1)025A(2)E400	5.5	6.0	400	642	578	257	1.0
25	22	D/7343-31	T496D226(1)025A(2)E800	5.5	6.0	800	433	390	173	1.0
25	22	D/7343-31	T496D226(1)025A(2)E400	5.5	6.0	400	612	551	245	1.0
35	0.47	B/3528-21	T496B474(1)035A(2)E8K0	0.2	4.0	8000	103	93	41	1.0
35	0.47	B/3528-21	T496B474(1)035A(2)E2K6	0.2	4.0	2600	181	163	72	1.0
35	0.68	B/3528-21	T496B684(1)035A(2)E6K5	0.2	4.0	6500	114	103	46	1.0
VDC	μF	KEMET/EIA	(See below for part options)	max/5min	% Max	mOhms	mAmps	mAmps	mAmps	J-STD-020A
85°C	120Hz			μAmps +20°C	+20°C 120Hz	+20°C 100kHz	+25°C 100kHz	+85°C 100kHz	+125°C 100kHz	Temp≤260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum allowable ripple current			Moisture Sensitivity

Other part number options:

Where the 10th character equal to K (10% tolerance) is also available in M (20% tolerance).

Where the 10th character equal to M (20% tolerance) is only available in M (20% tolerance).

Standard with tin terminations (14th character = T). Tin/lead terminations is also available (14th character = H)

Also available on large (13 inch) reels. Add 7280 to the end of the part number.

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

**Table 1 – Ratings & Part Number Reference con't**

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current			Moisture Sensitivity
				μAmps +20°C max/5min	+20°C 120Hz % Max	+20°C 100kHz mOhms	+25°C 100kHz mAmps	+85°C 100kHz mAmps	+125°C 100kHz mAmps	Temp≤260°C J-STD-020D
85°C VDC	120Hz μF	KEMET/EIA	(See below for part options)							
35	1	B/3528-21	T496B105(1)035A(2)E5K0	0.4	4.0	5000	130	117	52	1.0
35	1	B/3528-21	T496B105(1)035A(2)E3K1	0.4	4.0	3100	166	149	66	1.0
35	1.5	C/6032-28	T496C155(1)035A(2)E4K5	0.5	6.0	4500	156	140	62	1.0
35	1.5	C/6032-28	T496C155(1)035A(2)E2K6	0.5	6.0	2600	206	185	82	1.0
35	2.2	C/6032-28	T496C225(1)035A(2)E3K5	0.8	6.0	3500	177	159	71	1.0
35	2.2	C/6032-28	T496C225(1)035A(2)E1K6	0.8	6.0	1600	262	236	105	1.0
35	3.3	C/6032-28	T496C335(1)035A(2)E2K5	1.2	6.0	2500	210	189	84	1.0
35	3.3	C/6032-28	T496C335(1)035A(2)E900	1.2	6.0	900	350	315	140	1.0
35	4.7	D/7343-31	T496D475(1)035A(2)E1K5	1.6	6.0	1500	316	284	126	1.0
35	4.7	D/7343-31	T496D475(1)035A(2)E700	1.6	6.0	700	463	417	185	1.0
35	6.8	D/7343-31	T496D685(1)035A(2)E1K3	2.4	6.0	1300	340	306	136	1.0
35	6.8	D/7343-31	T496D685(1)035A(2)E750	2.4	6.0	750	447	402	179	1.0
35	10	X/7343-43	T496X106(1)035A(2)E1K0	3.5	6.0	1000	406	365	162	1.0
35	10	X/7343-43	T496X106(1)035A(2)E500	3.5	6.0	500	574	517	230	1.0
35	10	D/7343-31	T496D106(1)035A(2)E400	3.5	6.0	400	612	551	245	1.0
35	15	X/7343-43	T496X156(1)035A(2)E900	5.3	6.0	900	428	385	171	1.0
35	15	X/7343-43	T496X156(1)035A(2)E500	5.3	6.0	500	574	517	230	1.0
35	15	D/7343-31	T496D156(1)035A(2)E500	5.3	6.0	500	548	493	219	1.0
35	22	X/7343-43	T496X226(1)035A(2)E300	7.7	6.0	300	742	668	297	1.0
50	0.15	B/3528-21	T496B154(1)050A(2)E16K	0.1	4.0	16000	73	66	29	1.0
50	0.22	B/3528-21	T496B224(1)050A(2)E14K	0.1	4.0	14000	78	70	31	1.0
50	0.22	B/3528-21	T496B224(1)050A(2)E10K	0.1	4.0	10000	92	83	37	1.0
50	0.33	B/3528-21	T496B334(1)050A(2)E10K	0.2	4.0	10000	92	83	37	1.0
50	0.33	B/3528-21	T496B334(1)050A(2)E2K6	0.2	4.0	2600	181	163	72	1.0
50	0.47	C/6032-28	T496C474(1)050A(2)E8K0	0.2	4.0	8000	117	105	47	1.0
50	0.47	C/6032-28	T496C474(1)050A(2)E1K9	0.2	4.0	1900	241	217	96	1.0
50	0.68	C/6032-28	T496C684(1)050A(2)E7K0	0.3	4.0	7000	125	113	50	1.0
50	0.68	C/6032-28	T496C684(1)050A(2)E1K7	0.3	4.0	1700	254	229	102	1.0
50	1	C/6032-28	T496C105(1)050A(2)E5K5	0.5	4.0	5500	141	127	56	1.0
50	1	C/6032-28	T496C105(1)050A(2)E2K7	0.5	4.0	2700	202	182	81	1.0
50	1.5	C/6032-28	T496C155(1)050A(2)E5K0	0.8	6.0	5000	148	133	59	1.0
50	1.5	C/6032-28	T496C155(1)050A(2)E2K0	0.8	6.0	2000	235	212	94	1.0
50	2.2	D/7343-31	T496D225(1)050A(2)E2K5	1.1	6.0	2500	245	221	98	1.0
50	2.2	D/7343-31	T496D225(1)050A(2)E900	1.1	6.0	900	408	367	163	1.0
50	3.3	D/7343-31	T496D335(1)050A(2)E2K0	1.7	6.0	2000	274	247	110	1.0
50	3.3	D/7343-31	T496D335(1)050A(2)E1K0	1.7	6.0	1000	387	348	155	1.0
50	4.7	X/7343-43	T496X475(1)050A(2)E1K5	2.4	6.0	1500	332	299	133	1.0
50	4.7	X/7343-43	T496X475(1)050A(2)E400	2.4	6.0	400	642	578	257	1.0
50	4.7	D/7343-31	T496D475(1)050A(2)E400	2.4	6.0	400	612	551	245	1.0
VDC	μF	KEMET/EIA	(See below for part options)	max/5min	% Max	mOhms	mAmps	mAmps	mAmps	J-STD-020A
85°C	120Hz			μAmps +20°C	+20°C 120Hz	+20°C 100kHz	+25°C 100kHz	+85°C 100kHz	+125°C 100kHz	Temp≤260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum allowable ripple current			Moisture Sensitivity

Other part number options:

Where the 10th character equal to K (10% tolerance) is also available in M (20% tolerance).

Where the 10th character equal to M (20% tolerance) is only available in M (20% tolerance).

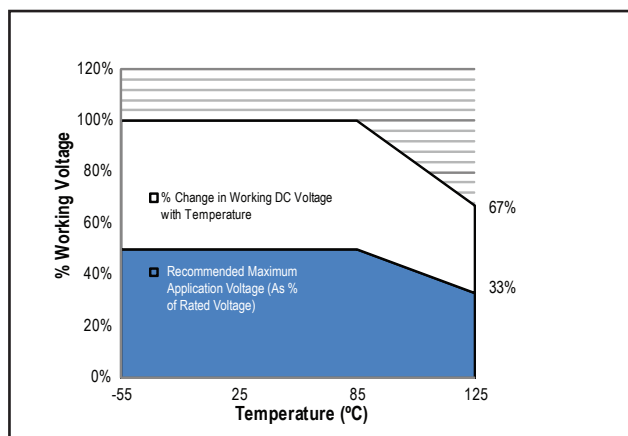
Standard with tin terminations (14th character = T). Tin/lead terminations is also available (14th character = H)

Also available on large (13 inch) reels. Add 7280 to the end of the part number.

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



## Recommended Voltage Derating Guidelines



## Ripple Current/Ripple Voltage

Case Code		Maximum Power Dissipation (Pmax) mWatts @ 25°C w/+20°C Rise
KEMET	EIA	
A	3216-18	75
B	3528-21	85
C	6032-28	110
D	7343-31	150
X	7343-43	165
E	7260-38	200
R	2012-12	25
S	3216-12	60
T	3528-12	70
U	6032-15	90
V	7343-20	125
T510X	7343-43	270
T510E	7260-38	285

Temperature Compensation Multipliers for Maximum Power Dissipation		
≤25°C	85°C	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.

$$I(max) = \sqrt{P_{max}/R}$$

$$E(max) = \sqrt{P_{max} \cdot R}$$

I = rms ripple current (amperes)

E = rms ripple voltage (volts)

Pmax = maximum power dissipation (watts)

R = ESR 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	X	Y	C	V1	V2	X	Y	C	V1	V2	X	Y	C	V1	V2
		B	3528-21	2.35	2.15	1.45	6.10	4.00	2.25	1.75	1.35	5.00	3.50	2.15	1.35	1.25	4.10	3.20
		C	6032-28	2.35	2.65	2.60	8.90	4.40	2.25	2.25	2.50	7.80	3.90	2.15	1.85	2.40	6.90	3.60
		D	7343-31	2.55	3.75	2.70	10.20	5.50	2.45	3.35	2.60	9.10	5.00	2.35	2.95	2.50	8.20	4.70
		X <sup>1</sup>	7343-43	2.55	3.75	2.70	10.20	5.50	2.45	3.35	2.60	9.10	5.00	2.35	2.95	2.50	8.20	4.70

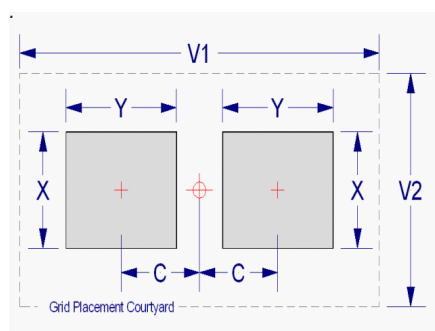
**Density Level A:** For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.

**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).

<sup>1</sup> Height of these chips may create problems in wave soldering.

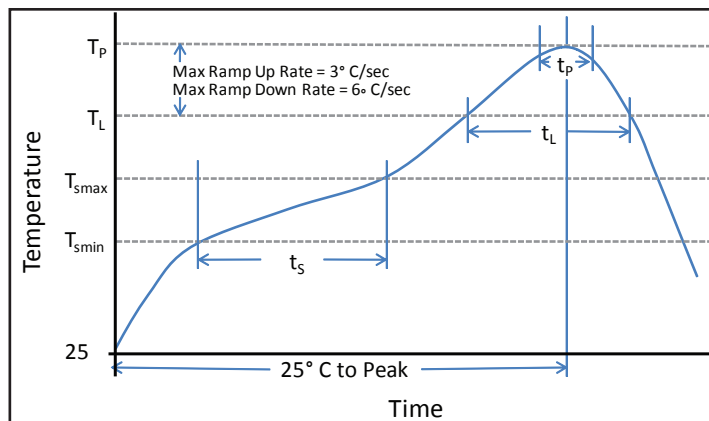
<sup>2</sup> Land pattern geometry is too small for silkscreen outline



## Soldering Process

KEMET's families of surface mount tantalum 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.

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



Time/Temperature Soldering Profile

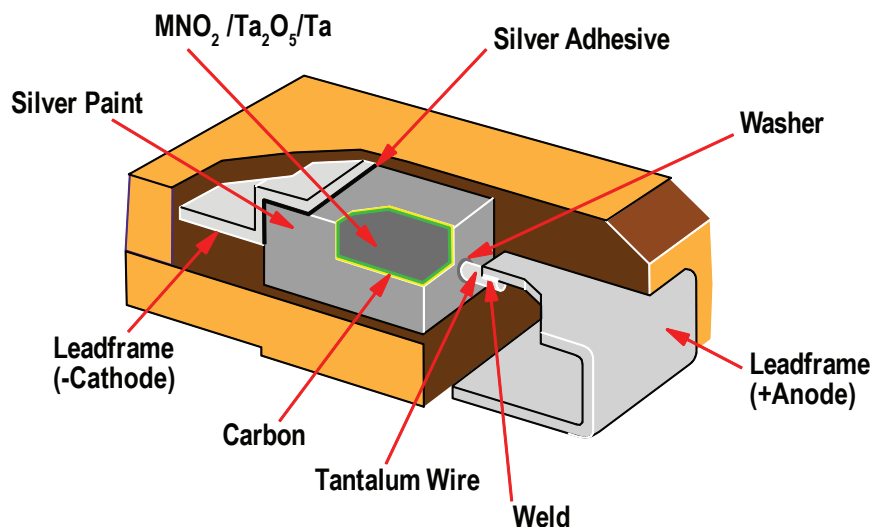
Profile Feature	Sn-Pb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Min (T <sub>smin</sub> )	100°C	150°C
Temperature Max (T <sub>smax</sub> )	150°C	200°C
Time (t <sub>s</sub> ) from T <sub>smin</sub> to T <sub>smax</sub>	60-120 sec	60-120 sec
Ramp-up rate (T <sub>L</sub> to T <sub>p</sub> )	3°C/sec max	3°C/sec max
Liquidous temperature (T <sub>L</sub> )	183°C	217°C
Time above liquidous (t <sub>L</sub> )	60-150 sec	60-150 sec
Peak Temperature (T <sub>p</sub> )	220°C* 235°C**	250°C* 260°C**
Time within 5°C of max peak temperature (t <sub>p</sub> )	20 sec max	30 sec max
Ramp-down rate (T <sub>p</sub> to T <sub>L</sub> )	6°C/sec max	6°C/sec max
Time 25°C to peak temperature	6 minutes max	8 minutes max

Note 1: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.

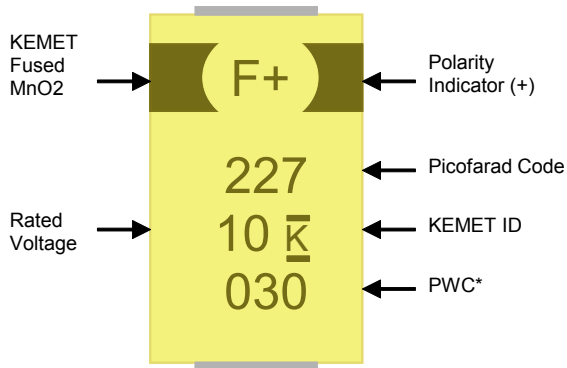
\* Case Size D, E, P, Y and X

\*\*Case Size A, B, C, H, I, K, M, R, S, T, U, V, W and Z

## Construction



## Capacitor Marking



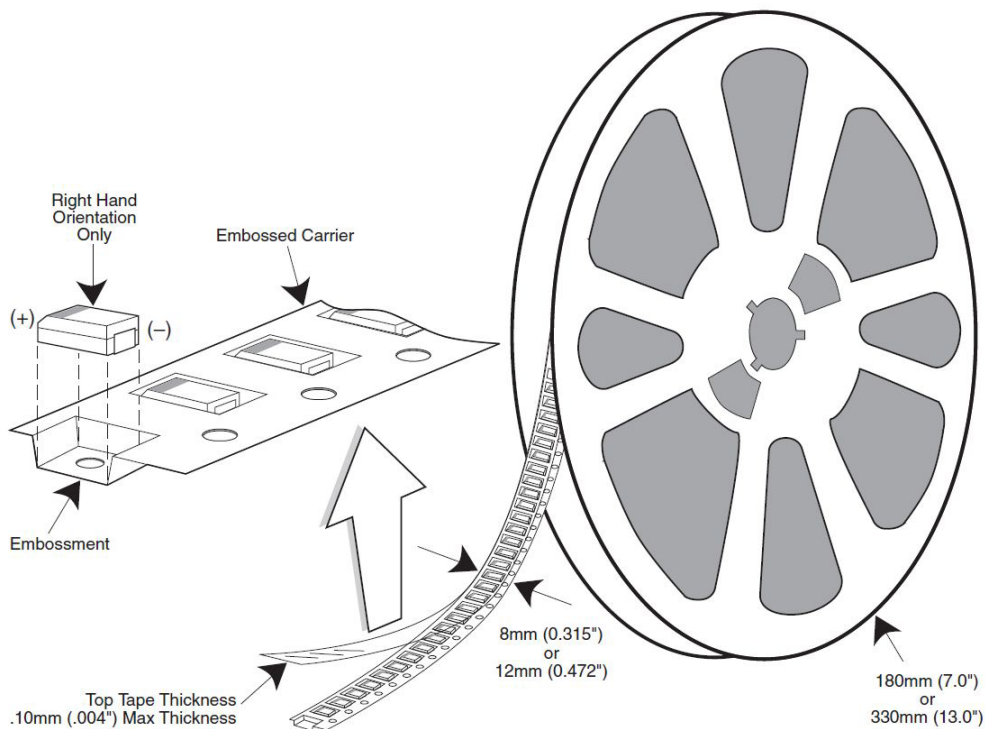
\* 030 = 30<sup>th</sup> week of 2010

## 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 degrees C, and maximum storage humidity not exceed 60% relative humidity. In addition, temperature fluctuations should be minimized to avoid condensation on the parts, and atmospheres should be free of chlorine and 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 mm and 12 mm plastic tape on 7" and 13" reels, in accordance with EIA Standard 481-1: Taping of Surface Mount Components for Automatic Handling. This packaging system is compatible with all tape fed automatic pick and place systems.

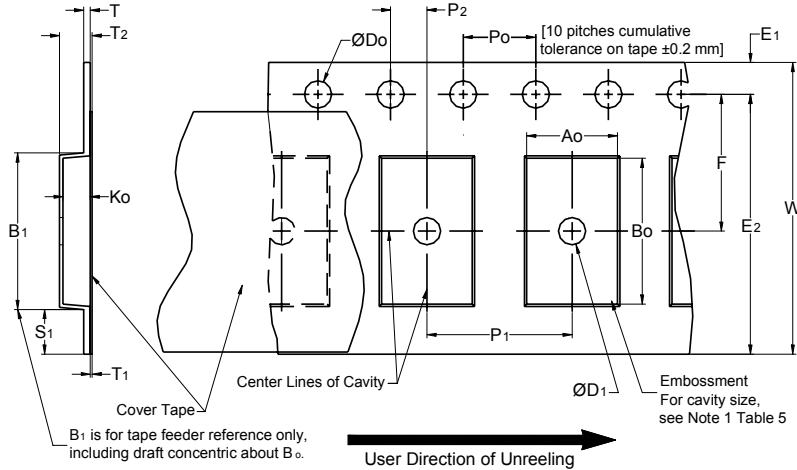


**Table 4 – Packaging Quantity**

Case Code		Tape Width-mm	7" Reel*	13" Reel*
KEMET	EIA			
R	2012-12	8	2,500	10,000
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	7260-38	12	500	2,000

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

**Figure 1 – Embossed (Plastic) Carrier Tape Dimensions**



**Table 5 – Embossed (Plastic) Carrier Tape Dimensions**

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D <sub>0</sub>	D <sub>1</sub> Min. Note 1	E <sub>1</sub>	P <sub>0</sub>	P <sub>2</sub>	R Ref. Note 2	S <sub>1</sub> Min. Note 3	T Max.	T <sub>1</sub> Max.
8mm	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)
12mm		1.5 (0.059)				30 (1.181)			
16mm									
Variable Dimensions — Millimeters (Inches)									
Tape Size	Pitch	B <sub>1</sub> Max. Note 4	E <sub>2</sub> Min.	F	P <sub>1</sub>	T <sub>2</sub> Max	W Max	A <sub>0</sub> , B <sub>0</sub> & K <sub>0</sub>	
8mm	Single (4mm)	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	
12mm	Single (4mm) & Double (8mm)	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)		
16mm	Triple (12mm)	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)		

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 5).
3. If S<sub>1</sub> < 1.0 mm, there may not be enough area for cover tape to be properly applied (see EIA Document 481 paragraph 4.3 (b)).
4. B<sub>1</sub> dimension is a reference dimension for tape feeder clearance only.
5. The cavity defined by A<sub>0</sub>, B<sub>0</sub> and K<sub>0</sub> 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 12mm tapes and 10° maximum for 16mm tapes (see Figure 3).
  - (d) lateral movement of the component is restricted to 0.5 mm maximum for 8mm and 12mm wide tape and to 1.0mm maximum for 16mm tape (see Figure 4).
  - (e) for KPS Series product A<sub>0</sub> and B<sub>0</sub> are measured on a plane 0.3mm above the bottom of the pocket.
  - (f) see Addendum in EIA Document 481 for standards relating to more precise taping requirements.

## Packaging Information Performance Notes

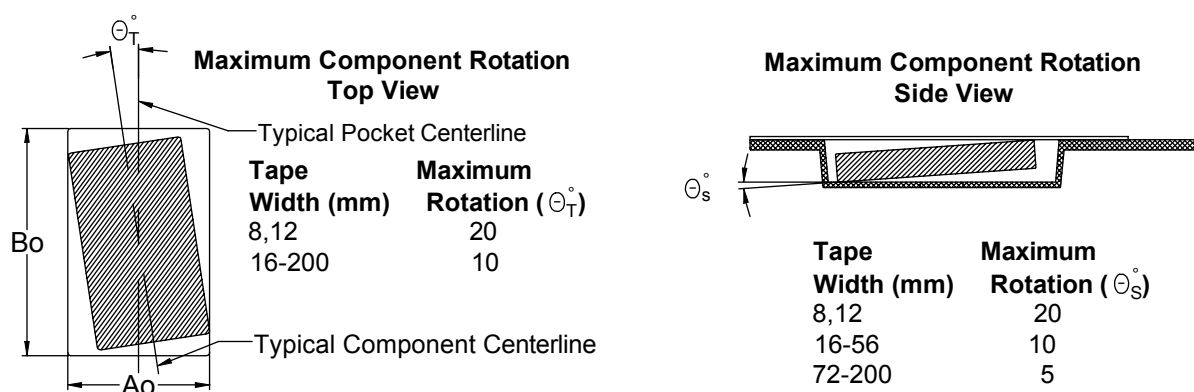
1. **Cover Tape Break Force:** 1.0 Kg Minimum.
2. **Cover Tape Peel Strength:** The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8mm	0.1 Newton to 1.0 Newton (10gf to 100gf)
12mm & 16mm	0.1 Newton to 1.3 Newton (10gf to 130gf)

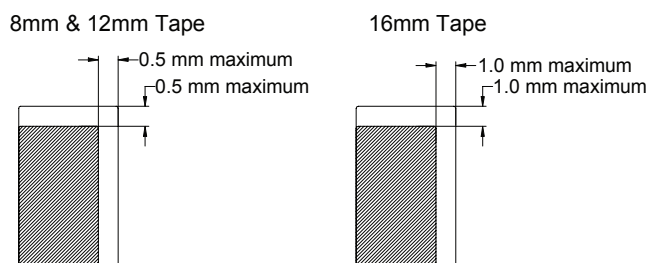
The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300±10 mm/minute.

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

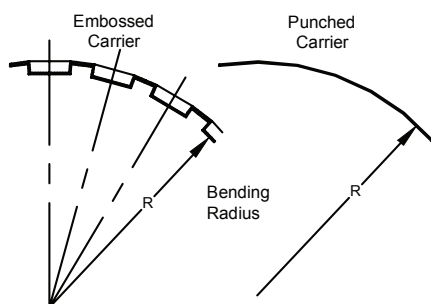
## Figure 3 – Maximum Component Rotation



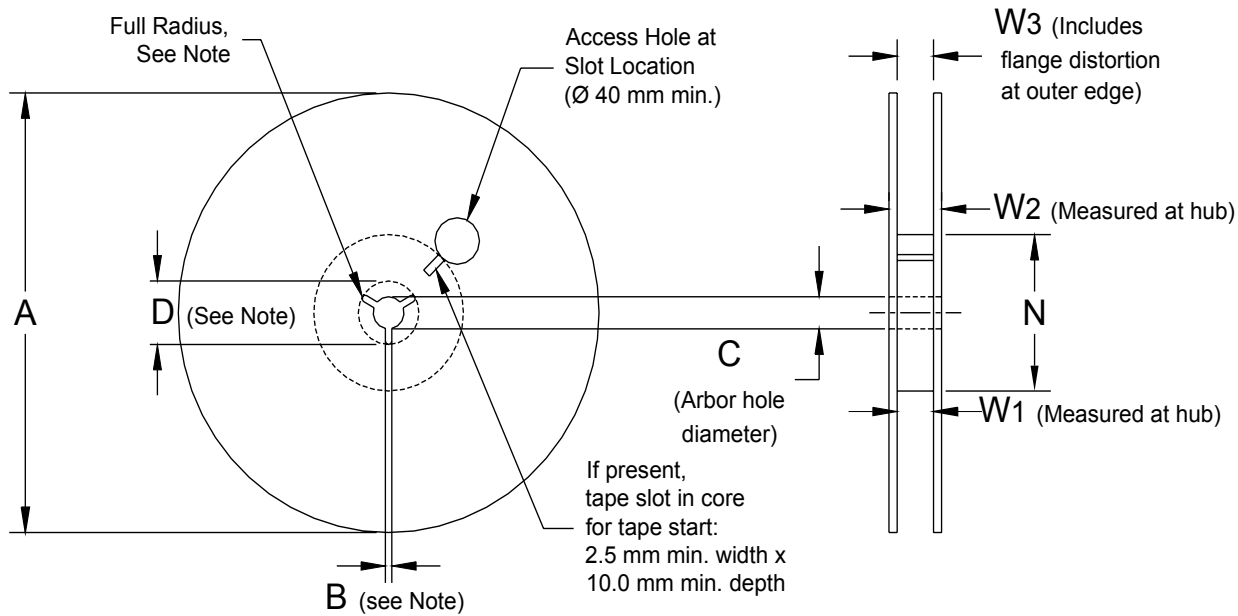
## Figure 4 – Maximum Lateral Movement



## Figure 5 – Bending Radius



**Figure 6 – Reel Dimensions**



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

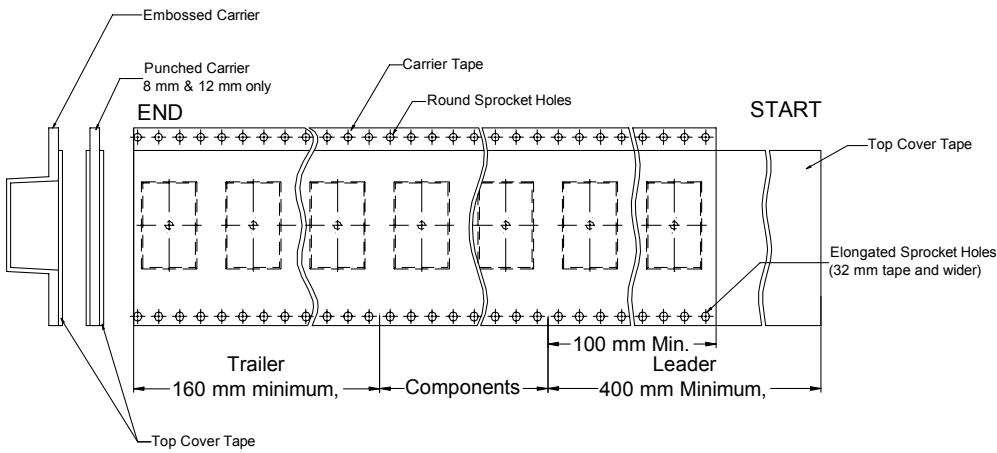
**Table 7 – Reel Dimensions**

Metric will govern

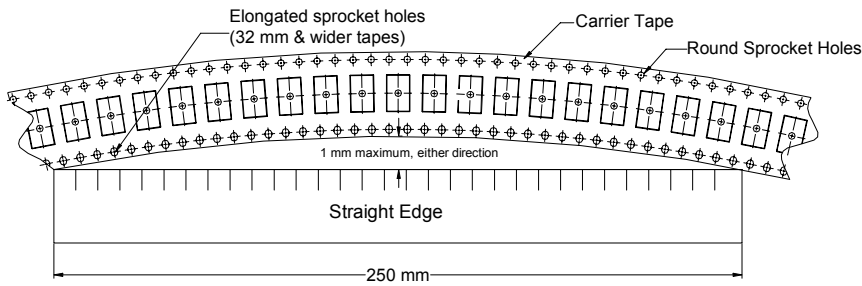
Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Min	C	D Min
8mm	178 ± 0.20 (7.008 ± 0.008)	1.5 (0.059)	13.0 +0.5/-0.2 (0.521 +0.02/-0.008)	20.2 (0.795)
12mm	or			
16mm	330 ± 0.20 (13.000 ± 0.008)			
Variable Dimensions — Millimeters (Inches)				
Tape Size	N Min	W <sub>1</sub>	W <sub>2</sub> Max	W <sub>3</sub>
8mm	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
12mm		12.4 +2.0/-0.0 (0.488 +0.078/-0.0)	18.4 (0.724)	
16mm		16.4 +2.0/-0.0 (0.646 +0.078/-0.0)	22.4 (0.882)	



**Figure 7 – Tape Leader & Trailer Dimensions**



**Figure 8 – Maximum Camber**



## Other KEMET Resources

Tools	
Resource	Location
Configure A Part: CapEdge	<a href="http://capacitoredge.kemet.com">http://capacitoredge.kemet.com</a>
SPICE & FIT Software	<a href="http://www.kemet.com/spice">http://www.kemet.com/spice</a>
Search Our FAQs: KnowledgeEdge	<a href="http://www.kemet.com/keask">http://www.kemet.com/keask</a>

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

Product Request	
Resource	Location
Sample Request	<a href="http://www.kemet.com/sample">http://www.kemet.com/sample</a>
Engineering Kit Request	<a href="http://www.kemet.com/kits">http://www.kemet.com/kits</a>

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

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Although we design and manufacture our 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.

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