

Overview

The KEMET T493 Series is designed for the COTS (Commercial Off-The-Shelf) requirements of military and aerospace applications. This series is a surface mount product offering various lead-frame plating options, Weibull grading options, and surge current testing options. Standard, low, and ultra-low ESR options are available. All lots of this series are conditioned with MIL-PRF-55365 Group A testing. CECC testing options are available per CECC 30801-005 (please order with "CECC" in last four digits of part number). This series is also approved for DSCC Drawing 07016 (please see part number list specific to this drawing).

Benefits

- Established reliability options
- Taped and reeled per EIA 481-1
- Symmetrical, compliant terminations
- Laser-marked case
- 100% surge current test available on all case sizes
- Termination options B, C, H, K, T
- Weibull failure options B and C
- Voltage rating of 4-50 VDC
- Operating temperature range of -55°C to +125°C
- Capacitance values of 0.1µF to 330µF
- All parts tested per Group A of MIL-PRF-55365
- Approved for DSCC Drawing 07016 applications

Applications

Typical applications include decoupling and filtering in military and aerospace applications.



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 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	493	D	227	K	006	C	H	61	20
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Voltage	Failure Rate/ Design	Lead Material	Surge	ESR
T = Tantalum	Military COTS	A = 3216-18 B = 3528-21 C = 6032-28 D = 7343-31 E = 7260-38 X = 7343-43	First two digits represent significant figures. Third digit specifies number of zeros.	J = ±5% K = ±10% M = ±20%	004 = 4V 006 = 6.3V 010 = 10V 016 = 16V 020 = 20V 025 = 25V 035 = 35V 050 = 50V	A = N/A B = 0.1%/1000 hrs C = .01%/1000 hrs	C = Hot Solder Dipped H = Standard Solder Coated (SnPb 5% Pb minimum) B = Gold Plated K = Solder Fused T = 100% Tin	61 = None 62 = 10 Cycles 25°C After Weibull 63 = 10 cycles, -55°C and 85°C After Weibull 64 = 10 cycles, -55°C and 85°C Before Weibull Special CSPEC: CECC	10 = ESR - Standard 20 = ESR - Low 30 = ESR - Ultra low

Ordering Information DSCC 07016

07016-	001	K	B	H	A
Drawing Number	Dash Number	Capacitance Tolerance	Reliability Grade	Lead Material	Surge
	See p/n list	J = ±5% K = ±10% M = ±20%	B = 0.1%/1000 hours C = 0.01%/1000 hours	C = Hot Solder Dipped H = Standard Solder Coated (SnPb 5% Pb minimum) B = Gold Plated	A = + 25C after Weibull B = -55C and +85C after Weibull C = -55C and + 85C before Weibull Z or no option = No test required

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	-55°C to 125°C
Rated Capacitance Range	0.1 µF - 330 µF @ 120 Hz/25°C
Capacitance Tolerance	J Tolerance (5%), 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 (mA) at rated voltage after 5 minutes

Qualification

Test	Condition	Characteristics				
Endurance	85°C @ Rated Voltage, 2000 Hours 125°C @ 2/3 Rated Voltage, 2000 Hours	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 Hours	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			
Additional qualification tests per MIL-PRF-55365/8						

*IL = Initial Limit

Certification

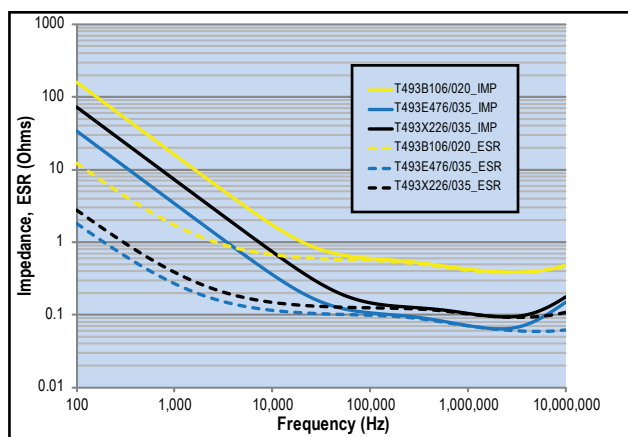
MIL-PRF-55365/8

CECC 30801-005

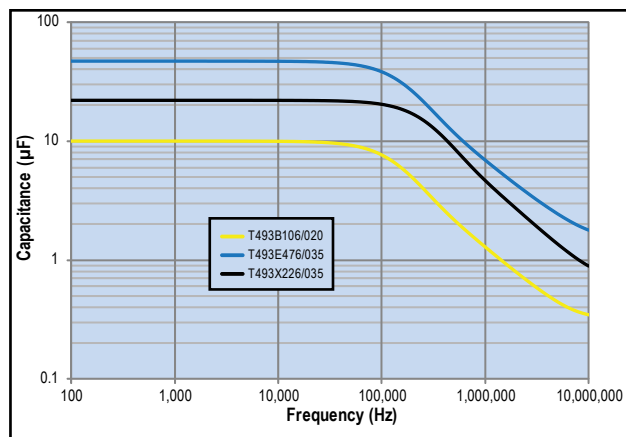
DSCC Drawing 07016

Electrical Characteristics

ESR vs. Frequency

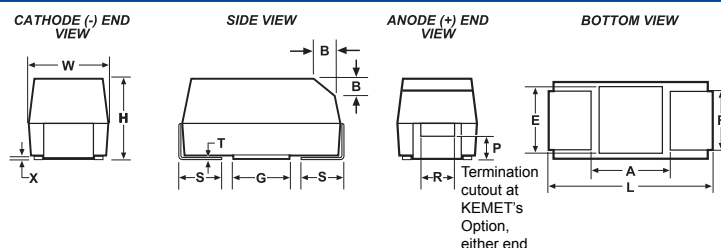


Capacitance vs. Frequency



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)	1.4 (.055)	1.1 (.043)	1.3 (.051)
B	3528-21	3.5 ± 0.2 (138 ± .008)	2.8 ± 0.2 (.110 ± .008)	1.9 ± 0.2 (.075 ± .008)	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 1A – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Moisture Sensitivity
85°C VDC	120Hz µF	KEMET/EIA	(See below for part options)	µAmps +20°C max/5min	+20°C 120Hz % Max	+20°C 100kHz Ohms	+20°C 100kHz Ohms	+20°C 100kHz Ohms	Temp≤260°C J-STD-020D
4	2.2	A/3216-18	T493A225(1)004(2)(3)(4)(5)	0.1	6.0	8.0	6.0	N/A	1
4	3.3	A/3216-18	T493A335(1)004(2)(3)(4)(5)	0.1	6.0	8.0	4.0	N/A	1
4	4.7	A/3216-18	T493A475(1)004(2)(3)(4)(5)	0.2	6.0	8.0	3.5	N/A	1
4	6.8	A/3216-18	T493A685(1)004(2)(3)(4)(5)	0.3	6.0	6.0	3.0	N/A	1
4	6.8	B/3528-21	T493B685(1)004(2)(3)(4)(5)	0.3	6.0	5.5	2.0	N/A	1
4	10	A/3216-18	T493A106(1)004(2)(3)(4)(5)	0.4	6.0	6.0	2.0	N/A	1
4	10	B/3528-21	T493B106(1)004(2)(3)(4)(5)	0.4	6.0	3.5	1.2	N/A	1
4	15	A/3216-18	T493A156(1)004(2)(3)(4)(5)	0.6	6.0	4.0	1.5	N/A	1
4	15	B/3528-21	T493B156(1)004(2)(3)(4)(5)	0.6	6.0	3.5	1.2	N/A	1
4	22	A/3216-18	T493A226(1)004(2)(3)(4)(5)	0.9	6.0	4.0	1.5	N/A	1
4	22	B/3528-21	T493B226(1)004(2)(3)(4)(5)	0.9	6.0	3.5	0.6	N/A	1
4	22	C/6032-28	T493C226(1)004(2)(3)(4)(5)	0.9	6.0	1.8	0.5	N/A	1
4	33	A/3216-18	T493A336(1)004(2)(3)(4)(5)	1.3	6.0	4.0	3.0	N/A	1
4	33	B/3528-21	T493B336(1)004(2)(3)(4)(5)	1.3	6.0	3.5	0.5	N/A	1
4	33	C/6032-28	T493C336(1)004(2)(3)(4)(5)	1.3	6.0	1.8	0.5	N/A	1
4	47	B/3528-21	T493B476(1)004(2)(3)(4)(5)	1.9	6.0	3.0	0.5	N/A	1
4	47	C/6032-28	T493C476(1)004(2)(3)(4)(5)	1.9	6.0	1.8	0.5	N/A	1
4	68	B/3528-21	T493B686(1)004(2)(3)(4)(5)	2.7	6.0	3.5	2.0	N/A	1
4	68	C/6032-28	T493C686(1)004(2)(3)(4)(5)	2.7	6.0	1.6	0.25	N/A	1
4	68	D/7343-31	T493D686(1)004(2)(3)(4)(5)	2.7	6.0	0.8	0.2	N/A	1
4	100	B/3528-21	T493B107(1)004(2)(3)(4)(5)	4.0	8.0	1.0	0.7	0.50	1
4	100	C/6032-28	T493C107(1)004(2)(3)(4)(5)	4.0	8.0	1.2	0.2	N/A	1
4	100	D/7343-31	T493D107(1)004(2)(3)(4)(5)	4.0	8.0	0.8	0.2	N/A	1
4	150	C/6032-28	T493C157(1)004(2)(3)(4)(5)	6.0	8.0	1.2	0.3	0.25	1
4	150	D/7343-31	T493D157(1)004(2)(3)(4)(5)	6.0	8.0	0.8	0.15	N/A	1
4	220	D/7343-31	T493D227(1)004(2)(3)(4)(5)	8.8	8.0	0.9	0.7	N/A	1
4	330	D/7343-31	T493D337(1)004(2)(3)(4)(5)	13.2	8.0	0.7	0.15	N/A	1
4	330	X/7343-43	T493X337(1)004(2)(3)(4)(5)	13.2	8.0	0.5	0.2	N/A	1
6.3	1.5	A/3216-18	T493A155(1)006(2)(3)(4)(5)	0.1	6.0	8.0	6.0	N/A	1
6.3	2.2	A/3216-18	T493A225(1)006(2)(3)(4)(5)	0.1	6.0	8.0	6.0	N/A	1
6.3	3.3	A/3216-18	T493A335(1)006(2)(3)(4)(5)	0.2	6.0	8.0	6.0	N/A	1
6.3	4.7	A/3216-18	T493A475(1)006(2)(3)(4)(5)	0.3	6.0	6.0	3.5	N/A	1
6.3	4.7	B/3528-21	T493B475(1)006(2)(3)(4)(5)	0.3	6.0	5.5	3.5	N/A	1
6.3	6.8	A/3216-18	T493A685(1)006(2)(3)(4)(5)	0.4	6.0	6.0	2.0	N/A	1
6.3	6.8	B/3528-21	T493B685(1)006(2)(3)(4)(5)	0.4	6.0	3.5	1.2	N/A	1
6.3	10	A/3216-18	T493A106(1)006(2)(3)(4)(5)	0.6	6.0	4.0	2.0	N/A	1
6.3	10	B/3528-21	T493B106(1)006(2)(3)(4)(5)	0.6	6.0	3.5	1.0	N/A	1
6.3	15	A/3216-18	T493A156(1)006(2)(3)(4)(5)	0.9	6.0	4.0	1.5	N/A	1
6.3	15	B/3528-21	T493B156(1)006(2)(3)(4)(5)	0.9	6.0	3.5	0.7	N/A	1
6.3	15	C/6032-28	T493C156(1)006(2)(3)(4)(5)	0.9	6.0	1.8	0.6	N/A	1
6.3	22	A/3216-18	T493A226(1)006(2)(3)(4)(5)	1.4	6.0	4.0	3.0	N/A	1
6.3	22	B/3528-21	T493B226(1)006(2)(3)(4)(5)	1.4	6.0	3.5	0.6	N/A	1
6.3	22	C/6032-28	T493C226(1)006(2)(3)(4)(5)	1.4	6.0	1.8	0.5	N/A	1
6.3	33	B/3528-21	T493B336(1)006(2)(3)(4)(5)	2.1	6.0	3.0	0.6	N/A	1
6.3	33	C/6032-28	T493C336(1)006(2)(3)(4)(5)	2.1	6.0	1.8	0.3	N/A	1
6.3	47	B/3528-21	T493B476(1)006(2)(3)(4)(5)	3.0	6.0	3.5	2.0	N/A	1
6.3	47	C/6032-28	T493C476(1)006(2)(3)(4)(5)	3.0	6.0	1.6	0.25	0.25	1
6.3	47	D/7343-31	T493D476(1)006(2)(3)(4)(5)	3.0	6.0	0.8	0.22	N/A	1
VDC	µF	KEMET/EIA	(See below for part options)	max/5min	% Max	Ohms	Ohms	Ohms	J-STD-020D
85°C	120Hz	KEMET/EIA	(See below for part options)	µAmps +20°C	+20°C 120Hz	+20°C 100kHz	+20°C 100kHz	+20°C 100kHz	Temp≤260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Moisture Sensitivity

Other part number options:

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 1A – Ratings & Part Number Reference con't

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Moisture Sensitivity
85°C	120Hz	KEMET/EIA	(See below for part options)	μAmps +20°C	+20°C 120Hz	+20°C 100kHz	+20°C 100kHz	+20°C 100kHz	Temp≤260°C
VDC	μF			max/5min	% Max	Ohms	Ohms	Ohms	J-STD-020D
6.3	68	B/3528-21	T493B686(1)006(2)(3)(4)(5)	4.3	8.0	1.0	0.65	N/A	1
6.3	68	C/6032-28	T493C686(1)006(2)(3)(4)(5)	4.3	6.0	1.2	0.2	N/A	1
6.3	68	D/7343-31	T493D686(1)006(2)(3)(4)(5)	4.3	6.0	0.8	0.2	0.18	1
6.3	100	B/3528-21	T493B107(1)006(2)(3)(4)(5)	6.3	15.0	10.0	8.0	0.70	1
6.3	100	C/6032-28	T493C107(1)006(2)(3)(4)(5)	6.3	8.0	1.2	0.3	0.15	1
6.3	100	D/7343-31	T493D107(1)006(2)(3)(4)(5)	6.3	8.0	0.8	0.15	N/A	1
6.3	150	C/6032-28	T493C157(1)006(2)(3)(4)(5)	9.5	8.0	1.2	0.3	0.20	1
6.3	150	D/7343-31	T493D157(1)006(2)(3)(4)(5)	9.5	8.0	0.7	0.15	N/A	1
6.3	220	C/6032-28	T493C227(1)006(2)(3)(4)(5)	13.9	10.0	1.2	0.3	0.23	1
6.3	220	D/7343-31	T493D227(1)006(2)(3)(4)(5)	13.9	8.0	0.7	0.1	0.10	1
6.3	220	X/7343-43	T493X227(1)006(2)(3)(4)(5)	13.9	8.0	0.7	0.15	0.07	1
6.3	330	D/7343-31	T493D337(1)006(2)(3)(4)(5)	20.8	8.0	0.5	0.15	0.10	1
6.3	330	X/7343-43	T493X337(1)006(2)(3)(4)(5)	20.8	8.0	0.5	0.1	0.07	1
6.3	470	X/7343-43	T493X477(1)006(2)(3)(4)(5)	29.6	10.0	0.2	0.1	0.05	1
10	1	A/3216-18	T493A105(1)010(2)(3)(4)(5)	0.1	4.0	10.0	6.0	N/A	1
10	1.5	A/3216-18	T493A155(1)010(2)(3)(4)(5)	0.2	6.0	8.0	6.0	N/A	1
10	2.2	A/3216-18	T493A225(1)010(2)(3)(4)(5)	0.2	6.0	8.0	6.0	N/A	1
10	3.3	A/3216-18	T493A335(1)010(2)(3)(4)(5)	0.3	6.0	6.0	4.0	N/A	1
10	3.3	B/3528-21	T493B335(1)010(2)(3)(4)(5)	0.3	6.0	5.5	3.5	N/A	1
10	4.7	A/3216-18	T493A475(1)010(2)(3)(4)(5)	0.5	6.0	6.0	3.0	N/A	1
10	4.7	B/3528-21	T493B475(1)010(2)(3)(4)(5)	0.5	6.0	3.5	1.5	1.3	1
10	6.8	A/3216-18	T493A685(1)010(2)(3)(4)(5)	0.7	6.0	6.0	3.0	N/A	1
10	6.8	B/3528-21	T493B685(1)010(2)(3)(4)(5)	0.7	6.0	3.5	1.2	0.90	1
10	10	A/3216-18	T493A106(1)010(2)(3)(4)(5)	1.0	6.0	4.0	1.8	N/A	1
10	10	B/3528-21	T493B106(1)010(2)(3)(4)(5)	1.0	6.0	3.5	0.8	0.75	1
10	10	C/6032-28	T493C106(1)010(2)(3)(4)(5)	1.0	6.0	1.8	0.6	N/A	1
10	15	A/3216-18	T493A156(1)010(2)(3)(4)(5)	1.5	8.0	6.0	4.0	3.2	1
10	15	B/3528-21	T493B156(1)010(2)(3)(4)(5)	1.5	6.0	3.5	0.7	N/A	1
10	15	C/6032-28	T493C156(1)010(2)(3)(4)(5)	1.5	6.0	1.8	0.5	0.48	1
10	22	B/3528-21	T493B226(1)010(2)(3)(4)(5)	2.2	6.0	3.0	0.7	N/A	1
10	22	C/6032-28	T493C226(1)010(2)(3)(4)(5)	2.2	6.0	1.8	0.4	0.29	1
10	33	B/3528-21	T493B336(1)010(2)(3)(4)(5)	3.3	6.0	3.5	2.0	N/A	1
10	33	C/6032-28	T493C336(1)010(2)(3)(4)(5)	3.3	6.0	1.6	0.3	N/A	1
10	33	D/7343-31	T493D336(1)010(2)(3)(4)(5)	3.3	6.0	0.8	0.3	N/A	1
10	47	C/6032-28	T493C476(1)010(2)(3)(4)(5)	4.7	6.0	1.2	0.3	N/A	1
10	47	D/7343-31	T493D476(1)010(2)(3)(4)(5)	4.7	6.0	0.8	0.2	0.08	1
10	68	C/6032-28	T493C686(1)010(2)(3)(4)(5)	6.8	6.0	1.2	0.3	0.23	1
10	68	D/7343-31	T493D686(1)010(2)(3)(4)(5)	6.8	6.0	0.8	0.2	0.09	1
10	68	X/7343-43	T493X686(1)010(2)(3)(4)(5)	6.8	4.0	0.5	0.15	0.15	1
10	100	C/6032-28	T493C107(1)010(2)(3)(4)(5)	10.0	8.0	1.2	0.3	N/A	1
10	100	D/7343-31	T493D107(1)010(2)(3)(4)(5)	10.0	8.0	0.7	0.1	0.08	1
10	150	D/7343-31	T493D157(1)010(2)(3)(4)(5)	15.0	8.0	0.7	0.1	0.08	1
10	150	X/7343-43	T493X157(1)010(2)(3)(4)(5)	15.0	8.0	0.7	0.2	0.09	1
10	220	D/7343-31	T493D227(1)010(2)(3)(4)(5)	22.0	8.0	0.5	0.2	0.08	1
10	220	X/7343-43	T493X227(1)010(2)(3)(4)(5)	22.0	8.0	0.5	0.1	0.05	1
10	330	X/7343-43	T493X337(1)010(2)(3)(4)(5)	33.0	10.0	0.5	0.1	0.05	1
16	0.68	A/3216-18	T493A684(1)016(2)(3)(4)(5)	0.1	6.0	12.0	8.0	N/A	1
VDC	μF	KEMET/EIA	(See below for part options)	max/5min	% Max	Ohms	Ohms	Ohms	J-STD-020D
85°C	120Hz			μAmps +20°C	+20°C 120Hz	+20°C 100kHz	+20°C 100kHz	+20°C 100kHz	Temp≤260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Moisture Sensitivity

Other part number options:

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 1A – Ratings & Part Number Reference con't

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Moisture Sensitivity
85°C	120Hz	KEMET/EIA	(See below for part options)	μAmps +20°C	+20°C 120Hz	+20°C 100kHz	+20°C 100kHz	+20°C 100kHz	Temp≤260°C
VDC	μF			max/5min	% Max	Ohms	Ohms	Ohms	J-STD-020D
16	1	A/3216-18	T493A105(1)016(2)(3)(4)(5)	0.2	4.0	10.0	6.0	N/A	1
16	1.5	A/3216-18	T493A155(1)016(2)(3)(4)(5)	0.2	6.0	8.0	6.0	N/A	1
16	2.2	A/3216-18	T493A225(1)016(2)(3)(4)(5)	0.4	6.0	6.0	4.0	N/A	1
16	3.3	A/3216-18	T493A335(1)016(2)(3)(4)(5)	0.5	6.0	6.0	3.5	N/A	1
16	3.3	B/3528-21	T493B335(1)016(2)(3)(4)(5)	0.5	6.0	3.5	2.0	N/A	1
16	4.7	A/3216-18	T493A475(1)016(2)(3)(4)(5)	0.8	6.0	6.0	3.0	N/A	1
16	4.7	B/3528-21	T493B475(1)016(2)(3)(4)(5)	0.8	6.0	3.5	1.5	N/A	1
16	6.8	A/3216-18	T493A685(1)016(2)(3)(4)(5)	1.1	6.0	7.0	3.0	N/A	1
16	6.8	B/3528-21	T493B685(1)016(2)(3)(4)(5)	1.1	6.0	3.5	1.2	N/A	1
16	6.8	C/6032-28	T493C685(1)016(2)(3)(4)(5)	1.1	6.0	1.9	0.8	0.75	1
16	10	B/3528-21	T493B106(1)016(2)(3)(4)(5)	1.6	6.0	3.5	0.8	N/A	1
16	10	C/6032-28	T493C106(1)016(2)(3)(4)(5)	1.6	6.0	1.8	0.6	N/A	1
16	15	B/3528-21	T493B156(1)016(2)(3)(4)(5)	2.4	6.0	3.0	0.8	0.80	1
16	15	C/6032-28	T493C156(1)016(2)(3)(4)(5)	2.4	6.0	1.8	0.4	N/A	1
16	22	B/3528-21	T493B226(1)016(2)(3)(4)(5)	3.5	6.0	2.2	0.8	N/A	1
16	22	C/6032-28	T493C226(1)016(2)(3)(4)(5)	3.5	6.0	1.6	0.4	N/A	1
16	22	D/7343-31	T493D226(1)016(2)(3)(4)(5)	3.5	6.0	0.8	0.3	N/A	1
16	33	C/6032-28	T493C336(1)016(2)(3)(4)(5)	5.3	6.0	1.2	0.3	0.23	1
16	33	D/7343-31	T493D336(1)016(2)(3)(4)(5)	5.3	6.0	0.8	0.25	0.15	1
16	47	C/6032-28	T493C476(1)016(2)(3)(4)(5)	7.5	6.0	1.2	0.5	0.35	1
16	47	D/7343-31	T493D476(1)016(2)(3)(4)(5)	7.5	6.0	0.8	0.2	0.10	1
16	68	D/7343-31	T493D686(1)016(2)(3)(4)(5)	10.9	6.0	0.7	0.2	0.15	1
16	100	D/7343-31	T493D107(1)016(2)(3)(4)(5)	16.0	8.0	0.7	0.125	0.10	1
16	100	X/7343-43	T493X107(1)016(2)(3)(4)(5)	16.0	8.0	0.7	0.1	0.08	1
16	150	D/7343-31	T493D157(1)016(2)(3)(4)(5)	24.0	8.0	0.7	0.4	0.15	1
16	150	X/7343-43	T493X157(1)016(2)(3)(4)(5)	24.0	8.0	0.5	0.2	0.10	1
16	220	X/7343-43	T493X227(1)016(2)(3)(4)(5)	35.2	12.0	0.5	0.2	0.10	1
20	0.47	A/3216-18	T493A474(1)020(2)(3)(4)(5)	0.1	4.0	14.0	9.0	N/A	1
20	0.68	A/3216-18	T493A684(1)020(2)(3)(4)(5)	0.1	4.0	12.0	8.0	N/A	1
20	1	A/3216-18	T493A105(1)020(2)(3)(4)(5)	0.2	4.0	10.0	5.5	N/A	1
20	1.5	A/3216-18	T493A155(1)020(2)(3)(4)(5)	0.3	6.0	8.0	4.5	N/A	1
20	1.5	B/3528-21	T493B155(1)020(2)(3)(4)(5)	0.3	6.0	6.0	4.0	N/A	1
20	2.2	A/3216-18	T493A225(1)020(2)(3)(4)(5)	0.4	6.0	7.0	4.0	N/A	1
20	2.2	B/3528-21	T493B225(1)020(2)(3)(4)(5)	0.4	6.0	3.5	1.5	N/A	1
20	3.3	A/3216-18	T493A335(1)020(2)(3)(4)(5)	0.7	6.0	7.0	4.0	N/A	1
20	3.3	B/3528-21	T493B335(1)020(2)(3)(4)(5)	0.7	6.0	3.5	1.3	N/A	1
20	4.7	A/3216-18	T493A475(1)020(2)(3)(4)(5)	0.9	8.0	6.0	1.8	N/A	1
20	4.7	B/3528-21	T493B475(1)020(2)(3)(4)(5)	0.9	6.0	3.5	1.0	N/A	1
20	4.7	C/6032-28	T493C475(1)020(2)(3)(4)(5)	0.9	6.0	2.4	0.6	N/A	1
20	6.8	B/3528-21	T493B685(1)020(2)(3)(4)(5)	1.4	6.0	3.5	1.0	N/A	1
20	6.8	C/6032-28	T493C685(1)020(2)(3)(4)(5)	1.4	6.0	1.9	0.6	N/A	1
20	10	B/3528-21	T493B106(1)020(2)(3)(4)(5)	2.0	6.0	3.0	1.0	1.0	1
20	10	C/6032-28	T493C106(1)020(2)(3)(4)(5)	2.0	6.0	1.8	0.5	0.48	1
20	15	C/6032-28	T493C156(1)020(2)(3)(4)(5)	3.0	6.0	1.7	0.4	0.38	1
20	15	D/7343-31	T493D156(1)020(2)(3)(4)(5)	3.0	6.0	1.0	0.35	0.28	1
20	22	C/6032-28	T493C226(1)020(2)(3)(4)(5)	4.4	6.0	1.2	0.4	N/A	1
20	22	D/7343-31	T493D226(1)020(2)(3)(4)(5)	4.4	6.0	0.8	0.3	0.18	1
20	33	D/7343-31	T493D336(1)020(2)(3)(4)(5)	6.6	6.0	0.8	0.2	0.15	1
VDC	μF	KEMET/EIA	(See below for part options)	max/5min	% Max	Ohms	Ohms	Ohms	J-STD-020D
85°C	120Hz			μAmps +20°C	+20°C 120Hz	+20°C 100kHz	+20°C 100kHz	+20°C 100kHz	Temp≤260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Moisture Sensitivity

Other part number options:

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 1A – Ratings & Part Number Reference con't

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Moisture Sensitivity
85°C	120Hz	KEMET/EIA	(See below for part options)	μAmps +20°C	+20°C 120Hz	+20°C 100kHz	+20°C 100kHz	+20°C 100kHz	Temp≤260°C
VDC	μF			max/5min	% Max	Ohms	Ohms	Ohms	J-STD-020D
20	47	D/7343-31	T493D476(1)020(2)(3)(4)(5)	9.4	6.0	0.7	0.2	0.10	1
20	47	X/7343-43	T493X476(1)020(2)(3)(4)(5)	9.4	4.0	0.7	0.15	0.10	1
20	68	D/7343-31	T493D686(1)020(2)(3)(4)(5)	13.6	8.0	0.7	0.2	0.15	1
20	68	X/7343-43	T493X686(1)020(2)(3)(4)(5)	13.6	6.0	0.7	0.15	0.12	1
25	0.33	A/3216-18	T493A334(1)025(2)(3)(4)(5)	0.1	4.0	15.0	10.0	N/A	1
25	0.47	A/3216-18	T493A474(1)025(2)(3)(4)(5)	0.1	4.0	14.0	9.0	N/A	1
25	0.68	A/3216-18	T493A684(1)025(2)(3)(4)(5)	0.2	4.0	10.0	6.0	N/A	1
25	0.68	B/3528-21	T493B684(1)025(2)(3)(4)(5)	0.2	4.0	7.5	5.5	N/A	1
25	1	A/3216-18	T493A105(1)025(2)(3)(4)(5)	0.3	4.0	8.0	4.0	N/A	1
25	1	B/3528-21	T493B105(1)025(2)(3)(4)(5)	0.3	4.0	5.0	2.0	N/A	1
25	1.5	A/3216-18	T493A155(1)025(2)(3)(4)(5)	0.4	6.0	10.0	3.0	N/A	1
25	1.5	B/3528-21	T493B155(1)025(2)(3)(4)(5)	0.4	6.0	5.0	1.5	N/A	1
25	2.2	B/3528-21	T493B225(1)025(2)(3)(4)(5)	0.6	6.0	4.5	1.2	N/A	1
25	2.2	C/6032-28	T493C225(1)025(2)(3)(4)(5)	0.6	6.0	3.5	2.2	1.30	1
25	3.3	B/3528-21	T493B335(1)025(2)(3)(4)(5)	0.8	6.0	3.5	2.0	N/A	1
25	3.3	C/6032-28	T493C335(1)025(2)(3)(4)(5)	0.8	6.0	2.5	1.2	0.75	1
25	4.7	B/3528-21	T493B475(1)025(2)(3)(4)(5)	1.2	6.0	1.5	1.0	N/A	1
25	4.7	C/6032-28	T493C475(1)025(2)(3)(4)(5)	1.2	6.0	2.4	0.6	0.58	1
25	6.8	C/6032-28	T493C685(1)025(2)(3)(4)(5)	1.7	6.0	1.9	0.6	0.49	1
25	6.8	D/7343-31	T493D685(1)025(2)(3)(4)(5)	1.7	6.0	1.4	1.0	N/A	1
25	10	C/6032-28	T493C106(1)025(2)(3)(4)(5)	2.5	6.0	1.5	0.5	0.45	1
25	10	D/7343-31	T493D106(1)025(2)(3)(4)(5)	2.5	6.0	1.0	0.4	N/A	1
25	15	C/6032-28	T493C156(1)025(2)(3)(4)(5)	3.8	6.0	1.5	0.9	N/A	1
25	15	D/7343-31	T493D156(1)025(2)(3)(4)(5)	3.8	6.0	1.0	0.35	0.28	1
25	15	X/7343-43	T493X156(1)025(2)(3)(4)(5)	3.8	6.0	0.7	0.2	0.20	1
25	22	D/7343-31	T493D226(1)025(2)(3)(4)(5)	5.5	6.0	0.8	0.2	0.20	1
25	22	X/7343-43	T493X226(1)025(2)(3)(4)(5)	5.5	4.0	0.7	0.23	0.23	1
25	33	D/7343-31	T493D336(1)025(2)(3)(4)(5)	8.3	6.0	0.7	0.4	0.09	1
25	33	X/7343-43	T493X336(1)025(2)(3)(4)(5)	8.3	6.0	0.7	0.3	0.18	1
25	47	D/7343-31	T493D476(1)025(2)(3)(4)(5)	11.8	10.0	0.7	0.2	0.12	1
25	47	X/7343-43	T493X476(1)025(2)(3)(4)(5)	11.8	6.0	0.7	0.3	0.15	1
35	0.1	A/3216-18	T493A104(1)035(2)(3)(4)(5)	0.0	4.0	20.0	10.0	N/A	1
35	0.15	A/3216-18	T493A154(1)035(2)(3)(4)(5)	0.1	4.0	19.0	6.0	N/A	1
35	0.22	A/3216-18	T493A224(1)035(2)(3)(4)(5)	0.1	4.0	18.0	6.0	N/A	1
35	0.33	A/3216-18	T493A334(1)035(2)(3)(4)(5)	0.1	4.0	15.0	6.0	N/A	1
35	0.47	A/3216-18	T493A474(1)035(2)(3)(4)(5)	0.2	4.0	14.0	4.0	N/A	1
35	0.47	B/3528-21	T493B474(1)035(2)(3)(4)(5)	0.2	4.0	8.0	2.5	1.5	1
35	0.68	A/3216-18	T493A684(1)035(2)(3)(4)(5)	0.2	4.0	10.0	6.0	N/A	1
35	0.68	B/3528-21	T493B684(1)035(2)(3)(4)(5)	0.2	4.0	6.5	2.5	N/A	1
35	1	A/3216-18	T493A105(1)035(2)(3)(4)(5)	0.4	4.0	10.0	6.0	N/A	1
35	1	B/3528-21	T493B105(1)035(2)(3)(4)(5)	0.4	4.0	5.0	2.0	1.5	1
35	1.5	B/3528-21	T493B155(1)035(2)(3)(4)(5)	0.5	6.0	5.0	3.0	N/A	1
35	1.5	C/6032-28	T493C155(1)035(2)(3)(4)(5)	0.5	6.0	4.5	2.5	N/A	1
35	2.2	B/3528-21	T493B225(1)035(2)(3)(4)(5)	0.8	6.0	4.0	2.5	1.5	1
35	2.2	C/6032-28	T493C225(1)035(2)(3)(4)(5)	0.8	6.0	3.5	1.5	0.75	1
35	3.3	B/3528-21	T493B335(1)035(2)(3)(4)(5)	1.2	6.0	3.5	1.3	N/A	1
35	3.3	C/6032-28	T493C335(1)035(2)(3)(4)(5)	1.2	6.0	2.5	0.8	0.60	1
VDC	μF	KEMET/EIA	(See below for part options)	max/5min	% Max	Ohms	Ohms	Ohms	J-STD-020D
85°C	120Hz			μAmps +20°C	+20°C 120Hz	+20°C 100kHz	+20°C 100kHz	+20°C 100kHz	Temp≤260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Moisture Sensitivity

Other part number options:

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 1A – Ratings & Part Number Reference con't

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Moisture Sensitivity
85°C VDC	120Hz µF	KEMET/EIA	(See below for part options)	µAmps +20°C max/5min	+20°C 120Hz % Max	+20°C 100kHz Ohms	+20°C 100kHz Ohms	+20°C 100kHz Ohms	Temp≤260°C J-STD-020D
35	4.7	C/6032-28	T493C475(1)035(2)(3)(4)(5)	1.6	6.0	2.5	0.6	0.45	1
35	4.7	D/7343-31	T493D475(1)035(2)(3)(4)(5)	1.6	6.0	1.5	0.7	N/A	1
35	6.8	C/6032-28	T493C685(1)035(2)(3)(4)(5)	2.4	6.0	2.0	0.9	N/A	1
35	6.8	D/7343-31	T493D685(1)035(2)(3)(4)(5)	2.4	6.0	1.3	0.5	0.40	1
35	10	C/6032-28	T493C106(1)035(2)(3)(4)(5)	3.5	6.0	2.0	1.2	N/A	1
35	10	D/7343-31	T493D106(1)035(2)(3)(4)(5)	3.5	6.0	1.0	0.3	0.25	1
35	10	X/7343-43	T493X106(1)035(2)(3)(4)(5)	3.5	4.0	0.9	0.25	0.18	1
35	15	D/7343-31	T493D156(1)035(2)(3)(4)(5)	5.3	6.0	0.8	0.3	0.23	1
35	15	X/7343-43	T493X156(1)035(2)(3)(4)(5)	5.3	6.0	0.9	0.3	0.20	1
35	22	D/7343-31	T493D226(1)035(2)(3)(4)(5)	7.7	6.0	0.7	0.4	0.20	1
35	22	X/7343-43	T493X226(1)035(2)(3)(4)(5)	7.7	6.0	0.7	0.3	0.20	1
35	33	X/7343-43	T493X336(1)035(2)(3)(4)(5)	11.6	6.0	0.6	0.3	0.18	1
35	47	E/7260-38	T493E476(1)035(2)(3)(4)(5)	16.5	10.0	0.5	0.3	N/A	1
50	0.1	A/3216-18	T493A104(1)050(2)(3)(4)(5)	0.1	4.0	20.0	10.0	N/A	1
50	0.15	A/3216-18	T493A154(1)050(2)(3)(4)(5)	0.1	4.0	19.0	10.0	N/A	1
50	0.15	B/3528-21	T493B154(1)050(2)(3)(4)(5)	0.1	4.0	16.0	10.0	N/A	1
50	0.22	B/3528-21	T493B224(1)050(2)(3)(4)(5)	0.1	4.0	14.0	10.0	N/A	1
50	0.33	B/3528-21	T493B334(1)050(2)(3)(4)(5)	0.2	4.0	10.0	2.5	N/A	1
50	0.47	B/3528-21	T493B474(1)050(2)(3)(4)(5)	0.2	4.0	9.0	2.0	N/A	1
50	0.47	C/6032-28	T493C474(1)050(2)(3)(4)(5)	0.2	4.0	8.0	1.8	N/A	1
50	0.68	C/6032-28	T493C684(1)050(2)(3)(4)(5)	0.3	4.0	7.0	1.6	N/A	1
50	1	C/6032-28	T493C105(1)050(2)(3)(4)(5)	0.5	4.0	5.5	1.6	1.3	1
50	1.5	C/6032-28	T493C155(1)050(2)(3)(4)(5)	0.8	6.0	4.5	1.5	N/A	1
50	1.5	D/7343-31	T493D155(1)050(2)(3)(4)(5)	0.8	6.0	3.5	1.0	N/A	1
50	2.2	C/6032-28	T493C225(1)050(2)(3)(4)(5)	1.1	6.0	3.5	1.5	N/A	1
50	2.2	D/7343-31	T493D225(1)050(2)(3)(4)(5)	1.1	6.0	2.5	0.8	0.60	1
50	3.3	D/7343-31	T493D335(1)050(2)(3)(4)(5)	1.7	6.0	2.0	0.8	0.70	1
50	4.7	D/7343-31	T493D475(1)050(2)(3)(4)(5)	2.4	6.0	1.5	0.6	0.28	1
50	4.7	X/7343-43	T493X475(1)050(2)(3)(4)(5)	2.4	4.0	0.9	0.3	0.30	1
50	6.8	X/7343-43	T493X685(1)050(2)(3)(4)(5)	3.4	6.0	1.0	0.5	N/A	1
50	10	X/7343-43	T493X106(1)050(2)(3)(4)(5)	5.0	6.0	0.7	0.4	N/A	1
VDC	µF	KEMET/EIA	(See below for part options)	max/5min	% Max	Ohms	Ohms	Ohms	J-STD-020D
85°C	120Hz	KEMET/EIA	(See below for part options)	µAmps +20°C	+20°C 120Hz	+20°C 100kHz	+20°C 100kHz	+20°C 100kHz	Temp≤260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Moisture Sensitivity

Other part number options:

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.

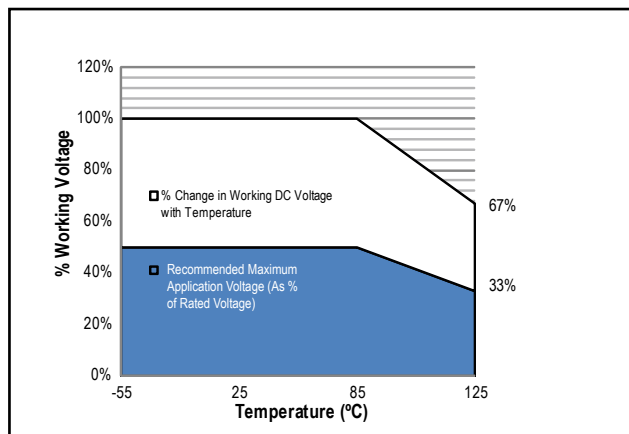
Table 1B – DSCC 07016, Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DSCC Dwg 07016 Part Number	DC Leakage	DF	Standard ESR	Moisture Sensitivity
85°C VDC	120Hz µF	KEMET/EIA			µAmps +20°C max/5min	+20°C 120Hz % Max	+20°C 100kHz Ohms	Temp≤260°C J-STD-020D
4	33				A/3216-18	T493A336(1)004(2)(3)(4)20	07016-001(1)(2)(3)(4)	1.4
4	100	B/3528-20	T493B107(1)004(2)(3)(4)20	07016-004(1)(2)(3)(4)	4.0	8.0	0.9	1
6.3	3.3	A/3216-18	T493A335(1)006(2)(3)(4)10	07016-006(1)(2)(3)(4)	0.5	6.0	8.0	1
6.3	4.7	A/3216-18	T493A475(1)006(2)(3)(4)10	07016-007(1)(2)(3)(4)	0.5	6.0	6.0	1
6.3	6.8	A/3216-18	T493A685(1)006(2)(3)(4)20	07016-008(1)(2)(3)(4)	0.5	6.0	5.0	1
6.3	10	A/3218-10	T493A106(1)006(2)(3)(4)10	07016-009(1)(2)(3)(4)	0.6	6.0	4.0	1
6.3	15	A/3216-18	T493A156(1)006(2)(3)(4)20	07016-010(1)(2)(3)(4)	0.9	6.0	3.5	1
6.3	22	A/3216-18	T493A226(1)006(2)(3)(4)20	07016-011(1)(2)(3)(4)	1.4	6.0	3.0	1
6.3	22	B/3528-20	T493B226(1)006(2)(3)(4)20	07016-012(1)(2)(3)(4)	1.4	6.0	0.6	1
6.3	33	B/3528-20	T493B336(1)006(2)(3)(4)20	07016-013(1)(2)(3)(4)	2.1	6.0	0.6	1
6.3	47	C/6032-28	T493C476(1)006(2)(3)(4)20	07016-014(1)(2)(3)(4)	3.0	6.0	0.3	1
6.3	68	C/6032-28	T493C686(1)006(2)(3)(4)20	07016-016(1)(2)(3)(4)	4.3	6.0	0.2	1
6.3	100	C/6032-28	T493C107(1)006(2)(3)(4)30	07016-017(1)(2)(3)(4)	6.3	6.0	0.15	1
6.3	220	D/7343-31	T493D227(1)006(2)(3)(4)20	07016-020(1)(2)(3)(4)	13.9	8.0	0.1	1
6.3	330	X/7343-43	T493X337(1)006(2)(3)(4)20	07016-021(1)(2)(3)(4)	20.8	8.0	0.1	
10	4.7	A/3216-18	T493A475(1)010(2)(3)(4)20	07016-026(1)(2)(3)(4)	0.5	6.0	5.0	1
10	6.8	A/3216-18	T493A685(1)010(2)(3)(4)20	07016-027(1)(2)(3)(4)	0.7	6.0	4.0	1
10	10	A/3216-18	T493A106(1)010(2)(3)(4)10	07016-028(1)(2)(3)(4)	1.0	6.0	3.0	1
10	10	A/3216-18	T493A106(1)010(2)(3)(4)20	07016-029(1)(2)(3)(4)	1.0	6.0	1.8	1
10	15	A/3216-18	T493A156(1)010(2)(3)(4)30	07016-030(1)(2)(3)(4)	1.6	6.0	3.2	1
10	15	B/3528-20	T493B156(1)010(2)(3)(4)20	07016-032(1)(2)(3)(4)	1.6	6.0	0.6	1
10	22	B/3528-20	T493B226(1)010(2)(3)(4)20	07016-033(1)(2)(3)(4)	2.2	6.0	0.7	1
10	22	C/6032-28	T493C226(1)010(2)(3)(4)30	07016-035(1)(2)(3)(4)	2.2	6.0	0.3	1
10	33	B/3528-20	T493B336(1)010(2)(3)(4)10	07016-037(1)(2)(3)(4)	3.3	6.0	0.6	1
10	33	C/6032-28	T493C336(1)010(2)(3)(4)20	07016-039(1)(2)(3)(4)	3.3	6.0	0.5	1
10	47	C/6032-28	T493C476(1)010(2)(3)(4)20	07016-040(1)(2)(3)(4)	4.7	6.0	0.3	1
10	68	C/6032-28	T493C686(1)010(2)(3)(4)20	07016-042(1)(2)(3)(4)	6.8	8.0	0.3	1
10	68	D/7343-31	T493D686(1)010(2)(3)(4)30	07016-044(1)(2)(3)(4)	6.8	6.0	0.15	1
10	220	D/7343-31	T493D227(1)010(2)(3)(4)30	07016-049(1)(2)(3)(4)	22.0	8.0	0.15	1
10	220	X/7343-43	T493X227(1)010(2)(3)(4)30	07016-051(1)(2)(3)(4)	22.0	8.0	0.05	1
10	330	X/7343-43	T493X337(1)010(2)(3)(4)20	07016-054(1)(2)(3)(4)	33.0	8.0	0.1	1
10	330	X/7343-43	T493X337(1)010(2)(3)(4)30	07016-055(1)(2)(3)(4)	33.0	8.0	0.05	1
16	2.2	A/3216-18	T493A225(1)016(2)(3)(4)30	07016-060(1)(2)(3)(4)	0.5	6.0	5.5	1
16	3.3	A/3216-18	T493A335(1)016(2)(3)(4)10	07016-061(1)(2)(3)(4)	0.5	6.0	5.0	1
16	3.3	A/3216-18	T493A335(1)016(2)(3)(4)20	07016-062(1)(2)(3)(4)	0.5	6.0	3.5	1
16	6.8	B/3528-20	T493B685(1)016(2)(3)(4)20	07016-065(1)(2)(3)(4)	1.1	6.0	1.2	1
16	10	B/3528-20	T493B106(1)016(2)(3)(4)20	07016-067(1)(2)(3)(4)	1.6	6.0	0.9	1
16	15	B/3528-20	T493B156(1)016(2)(3)(4)20	07016-068(1)(2)(3)(4)	2.4	6.0	0.8	1
16	22	C/6032-28	T493C226(1)016(2)(3)(4)20	07016-071(1)(2)(3)(4)	3.6	6.0	0.375	1
16	33	C/6032-28	T493C336(1)016(2)(3)(4)20	07016-074(1)(2)(3)(4)	5.3	6.0	0.3	1
16	47	C/6032-28	T493C476(1)016(2)(3)(4)30	07016-076(1)(2)(3)(4)	7.6	6.0	0.35	1
16	68	D/7343-31	T493D686(1)016(2)(3)(4)30	07016-079(1)(2)(3)(4)	10.9	6.0	0.15	1
16	100	D/7343-31	T493D107(1)016(2)(3)(4)20	07016-080(1)(2)(3)(4)	16.0	6.0	0.125	1
16	150	D/7343-31	T493D157(1)016(2)(3)(4)30	07016-082M(1)(2)(3)(4)	24.0	6.0	0.15	1
20	1.5	A/3216-18	T493A155(1)020(2)(3)(4)20	07016-086(1)(2)(3)(4)	0.5	6.0	6.5	1
VDC	µF	KEMET/EIA	See page 2 for Ordering Information	See page 2 for Ordering Information	max/5min	% Max	Ohms	J-STD-020D
85°C	120Hz				µAmps +20°C	+20°C 120Hz	+20°C 100kHz	Temp≤260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DSCC Dwg 07016 Part Number	DC Leakage	DF	Standard ESR	Moisture Sensitivity

Table 1B – DSCC 07016, Ratings & Part Number Reference con't

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DSCC Dwg 07016 Part Number	DC Leakage	DF	Standard ESR	Moisture Sensitivity
85°C VDC	120Hz µF	KEMET/EIA			µAmps +20°C max/5min	+20°C 120Hz % Max	+20°C 100kHz Ohms	Temp≤260°C J-STD-020D
20	4.7	A/3216-18	T493A475(1)020(2)(3)(4)10	07016-088(1)(2)(3)(4)	1.0	6.0	4.0	1
20	4.7	A/3216-18	T493A475(1)020(2)(3)(4)20	07016-089(1)(2)(3)(4)	1.0	6.0	1.8	1
20	4.7	B/3528-20	T493B475(1)020(2)(3)(4)20	07016-090(1)(2)(3)(4)	2.0	6.0	1.0	1
20	6.8	B/3528-20	T493B685(1)020(2)(3)(4)20	07016-091(1)(2)(3)(4)	1.4	6.0	1.0	1
20	10	B/3528-20	T493B106(1)020(2)(3)(4)20	07016-092(1)(2)(3)(4)	0.7	6.0	1.0	1
20	10	C/6032-28	T493C106(1)020(2)(3)(4)20	07016-094(1)(2)(3)(4)	1.4	6.0	0.7	1
20	15	C/6032-28	T493C156(1)020(2)(3)(4)20	07016-096(1)(2)(3)(4)	3.0	6.0	0.4	1
20	22	C/6032-28	T493C226(1)020(2)(3)(4)20	07016-098(1)(2)(3)(4)	4.4	6.0	0.4	1
20	33	D/7343-31	T493D336(1)020(2)(3)(4)20	07016-100(1)(2)(3)(4)	6.6	6.0	0.2	1
20	47	D/7343-31	T493D476(1)020(2)(3)(4)20	07016-102(1)(2)(3)(4)	9.4	6.0	0.2	1
20	68	D/7343-31	T493D686(1)020(2)(3)(4)20	07016-104(1)(2)(3)(4)	13.6	6.0	0.2	1
20	68	X/7343-43	T493X686(1)020(2)(3)(4)20	07016-106(1)(2)(3)(4)	13.6	6.0	0.2	1
25	0.68	A/3216-18	T493A684(1)025(2)(3)(4)10	07016-108M(1)(2)(3)(4)	0.5	4.0	10.0	1
25	1	A/3216-18	T493A105(1)025(2)(3)(4)10	07016-109(1)(2)(3)(4)	0.5	4.0	8.0	1
25	1.5	A/3216-18	T493A155(1)025(2)(3)(4)10	07016-110(1)(2)(3)(4)	0.5	6.0	7.5	1
25	1.5	A/3216-18	T493A155(1)025(2)(3)(4)20	07016-111(1)(2)(3)(4)	0.5	6.0	3.0	1
25	2.2	B/3528-20	T493B225(1)025(2)(3)(4)20	07016-113(1)(2)(3)(4)	0.5	6.0	2.0	1
25	3.3	B/3528-20	T493B335(1)025(2)(3)(4)20	07016-114(1)(2)(3)(4)	0.5	6.0	2.0	1
25	4.7	B/3528-20	T493B475(1)025(2)(3)(4)10	07016-116(1)(2)(3)(4)	1.2	6.0	1.5	1
25	4.7	B/3528-20	T493B475(1)025(2)(3)(4)20	07016-117(1)(2)(3)(4)	1.2	6.0	0.7	1
25	6.8	C/6032-28	T493C685(1)025(2)(3)(4)20	07016-120(1)(2)(3)(4)	1.7	6.0	0.7	1
25	10	C/6032-28	T493C106(1)025(2)(3)(4)10	07016-121(1)(2)(3)(4)	2.5	6.0	0.5	1
25	10	C/6032-28	T493C106(1)025(2)(3)(4)20	07016-122(1)(2)(3)(4)	2.5	6.0	0.3	1
25	22	D/7343-31	T493D226(1)025(2)(3)(4)20	07016-125(1)(2)(3)(4)	5.5	6.0	0.2	1
25	33	D/7343-31	T493D336(1)025(2)(3)(4)20	07016-127(1)(2)(3)(4)	8.3	6.0	0.3	1
25	33	D/7343-31	T493D336(1)025(2)(3)(4)30	07016-128(1)(2)(3)(4)	8.3	6.0	0.09	1
25	47	D/7343-31	T493D476(1)025(2)(3)(4)20	07016-130M(1)(2)(3)(4)	11.8	6.0	0.25	1
25	47	D/7343-31	T493D476(1)025(2)(3)(4)30	07016-131M(1)(2)(3)(4)	11.8	6.0	0.175	1
35	0.47	A/3216-18	T493A474(1)035(2)(3)(4)20	07016-133M(1)(2)(3)(4)	0.5	4.0	12.0	1
35	0.68	A/3216-18	T493A684(1)035(2)(3)(4)20	07016-134M(1)(2)(3)(4)	0.5	4.0	8.0	1
35	1	A/3216-18	T493A105(1)035(2)(3)(4)20	07016-135(1)(2)(3)(4)	0.5	4.0	7.5	1
35	1.5	B/3528-20	T493B155(1)035(2)(3)(4)10	07016-137(1)(2)(3)(4)	0.5	6.0	5.2	1
35	2.2	B/3528-20	T493B225(1)035(2)(3)(4)30	07016-138(1)(2)(3)(4)	0.8	6.0	2.0	1
35	6.8	D/7343-31	T493D685(1)035(2)(3)(4)30	07016-143(1)(2)(3)(4)	2.4	6.0	0.4	1
35	10	C/6032-28	T493C106(1)035(2)(3)(4)20	07016-144(1)(2)(3)(4)	3.5	6.0	1.6	1
35	15	D/7343-31	T493D156(1)035(2)(3)(4)20	07016-147(1)(2)(3)(4)	5.3	6.0	0.3	1
35	22	D/7343-31	T493D226(1)035(2)(3)(4)20	07016-149(1)(2)(3)(4)	7.7	6.0	0.4	1
35	33	X/7343-43	T493X336(1)035(2)(3)(4)20	07016-154M(1)(2)(3)(4)	11.6	6.0	0.3	1
50	0.15	A/3216-18	T493A154(1)050(2)(3)(4)20	07016-157M(1)(2)(3)(4)	0.5	4.0	15.0	1
50	0.47	B/3528-20	T493B474(1)050(2)(3)(4)20	07016-160(1)(2)(3)(4)	0.5	4.0	9.5	1
50	1.5	C/6032-28	T493C155(1)050(2)(3)(4)20	07016-164(1)(2)(3)(4)	0.8	6.0	2.0	1
50	1.5	D/7343-31	T493D155(1)050(2)(3)(4)20	07016-165(1)(2)(3)(4)	0.8	6.0	1.5	1
50	2.2	D/7343-31	T493D225(1)050(2)(3)(4)20	07016-166(1)(2)(3)(4)	1.1	6.0	1.2	1
50	3.3	D/7343-31	T493D335(1)050(2)(3)(4)20	07016-167(1)(2)(3)(4)	1.7	6.0	0.8	1
50	4.7	D/7343-31	T493D475(1)050(2)(3)(4)30	07016-168(1)(2)(3)(4)	2.4	6.0	0.3	1
50	6.8	X/7343-43	T493X685(1)050(2)(3)(4)20	07016-171(1)(2)(3)(4)	3.4	6.0	0.4	1
VDC	µF	KEMET/EIA	See page 2 for Ordering Information	See page 2 for Ordering Information	max/5min	% Max	Ohms	J-STD-020D
85°C	120Hz				µAmps +20°C	+20°C 120Hz	+20°C 100kHz	Temp≤260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DSCC Dwg 07016 Part Number	DC Leakage	DF	Standard ESR	Moisture Sensitivity

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)

*P*_{max} = 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
A	3216-18		1.35	2.15	1.45	6.10	2.80	1.25	1.75	1.35	5.00	2.30	1.15	1.35	1.25	4.10	2.00
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
E ¹	7260-38		4.25	2.65	3.20	10.10	7.20	4.15	2.25	3.30	9.40	6.70	4.05	1.85	3.00	8.10	6.40
X ¹	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

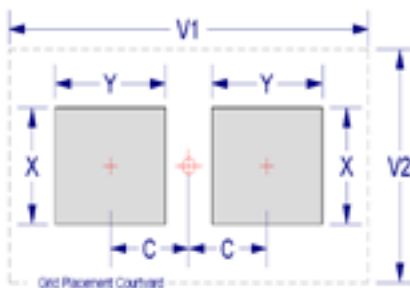
Density Level A: For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.

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).

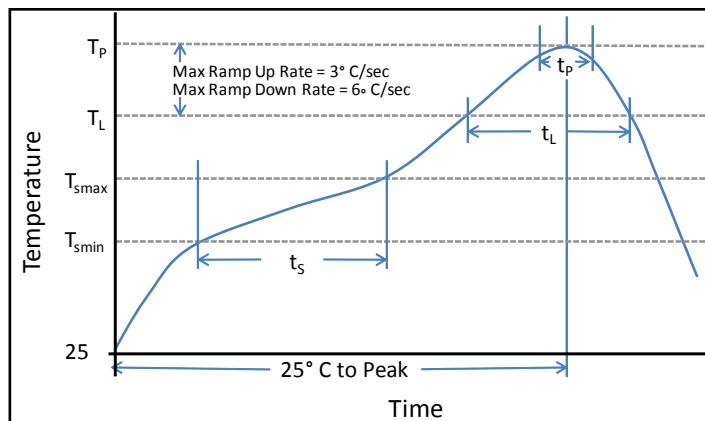
¹ Height of these chips may create problems in wave soldering.

² Land pattern geometry is too small for silkscreen outline.



Soldering Process

KEMET's families of surface mount 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

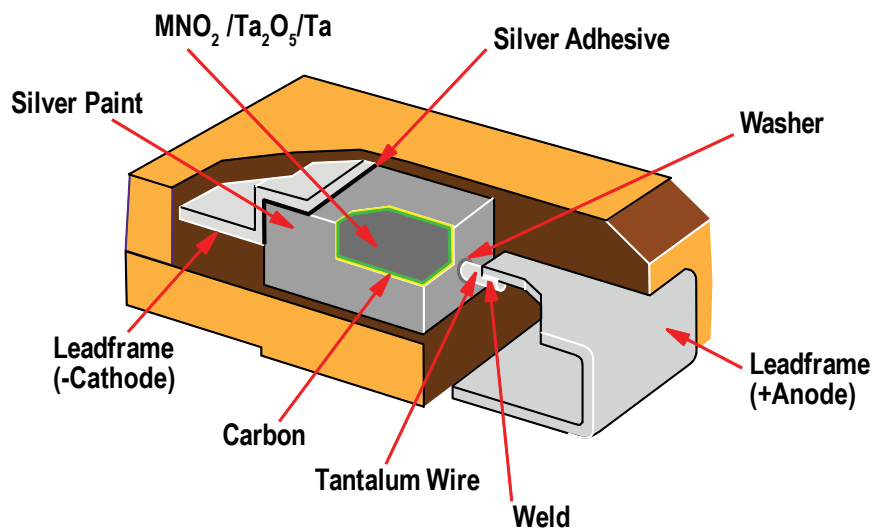
Profile Feature	Sn-Pb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Min (T_{smin})	100°C	150°C
Temperature Max (T_{smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax}	60-120 sec	60-120 sec
Ramp-up rate (T_L to T_p)	3°C/sec max	3°C/sec max
Liquidous temperature (T_L)	183°C	217°C
Time above liquidous (t_L)	60-150 sec	60-150 sec
Peak Temperature (T_p)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of max peak temperature (t_p)	20 sec max	30 sec max
Ramp-down rate (T_p to T_L)	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.

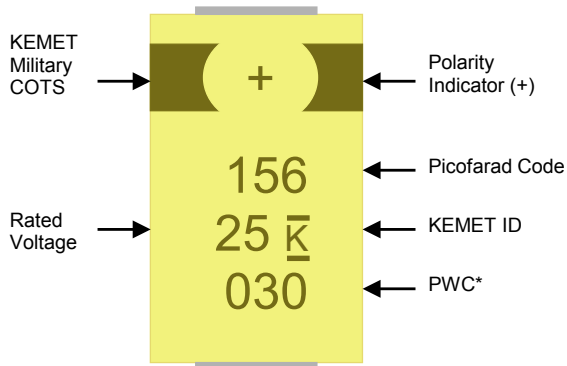
* Case Size D, E, P, Y and X

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

Construction



Capacitor Marking



* 030 = 30th 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.

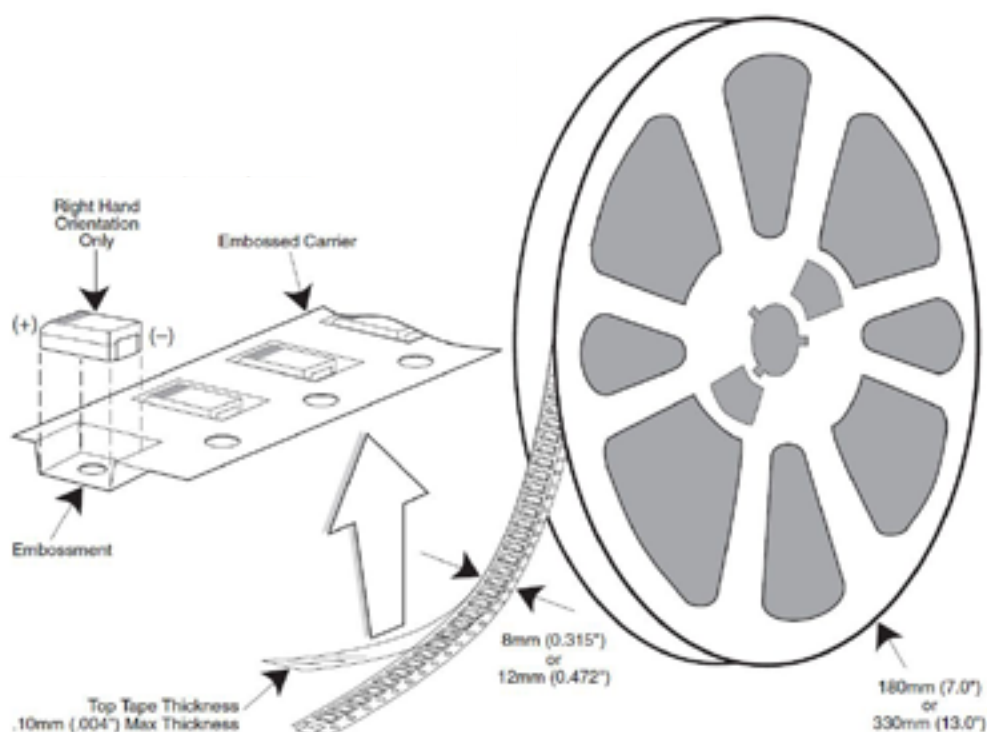


Table 4 – Packaging Quantity

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

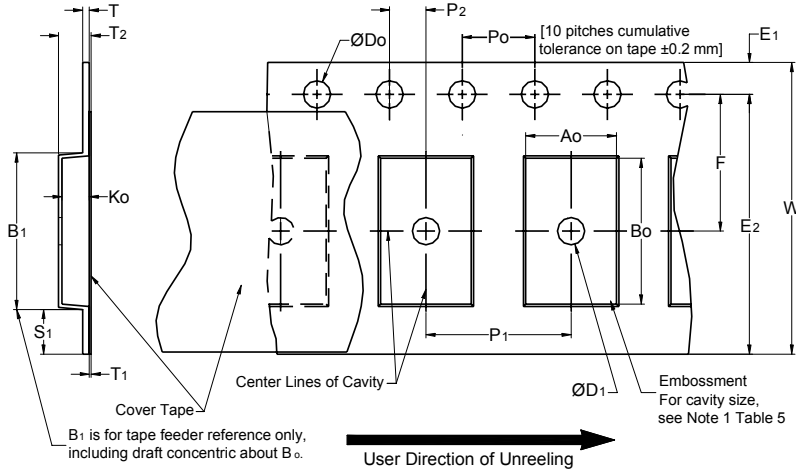


Table 5 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D ₀	D ₁ Min. Note 1	E ₁	P ₀	P ₂	R Ref. Note 2	S ₁ Min. Note 3	T Max.	T ₁ 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 ₁ Max. Note 4	E ₂ Min.	F	P ₁	T ₂ Max	W Max	A ₀ , B ₀ & K ₀	
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 S₁ < 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. B₁ dimension is a reference dimension for tape feeder clearance only.
5. The cavity defined by A₀, B₀ and K₀ 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) 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

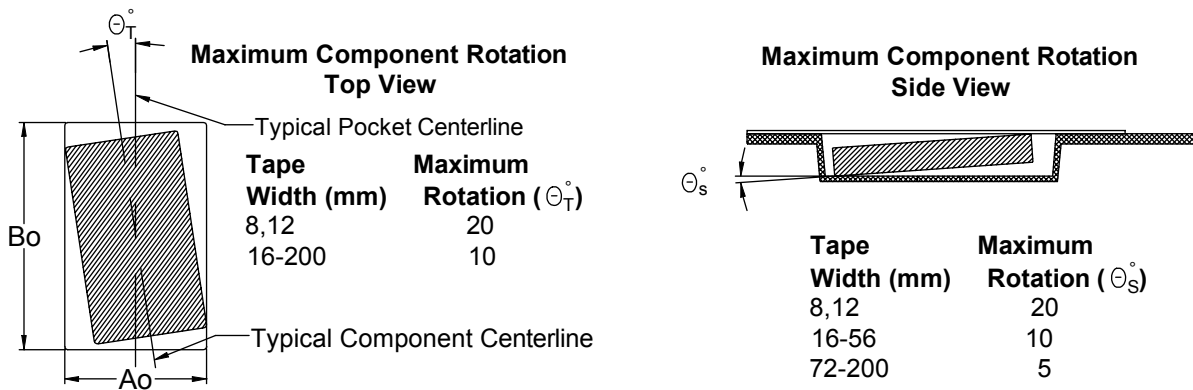


Figure 4 – Maximum Lateral Movement

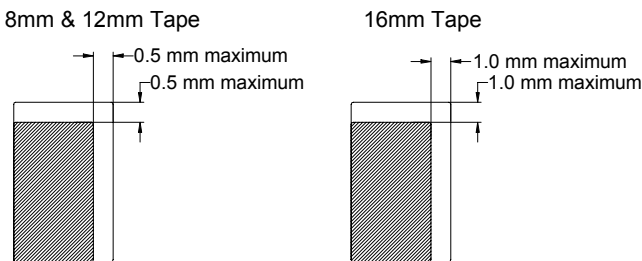


Figure 5 – Bending Radius

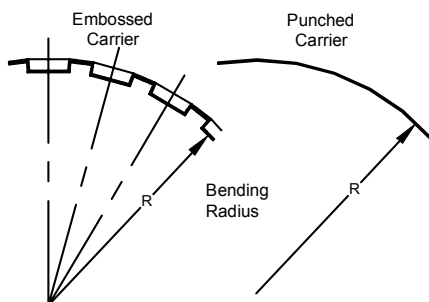
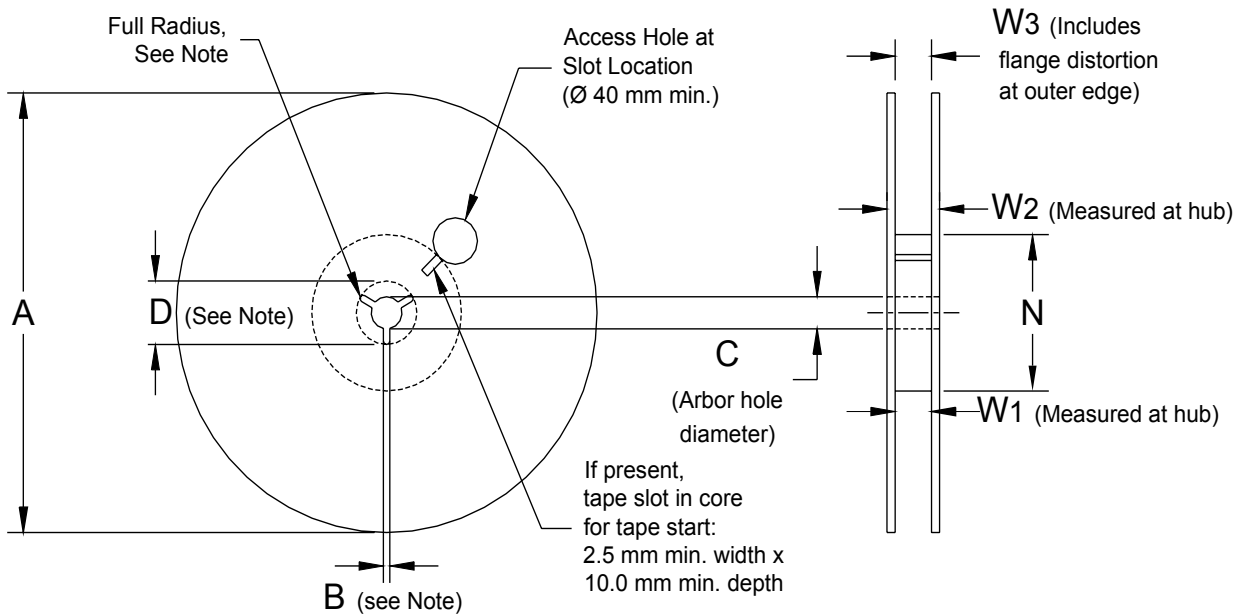


Figure 6 – Reel Dimensions



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 ₁	W ₂ Max	W ₃
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

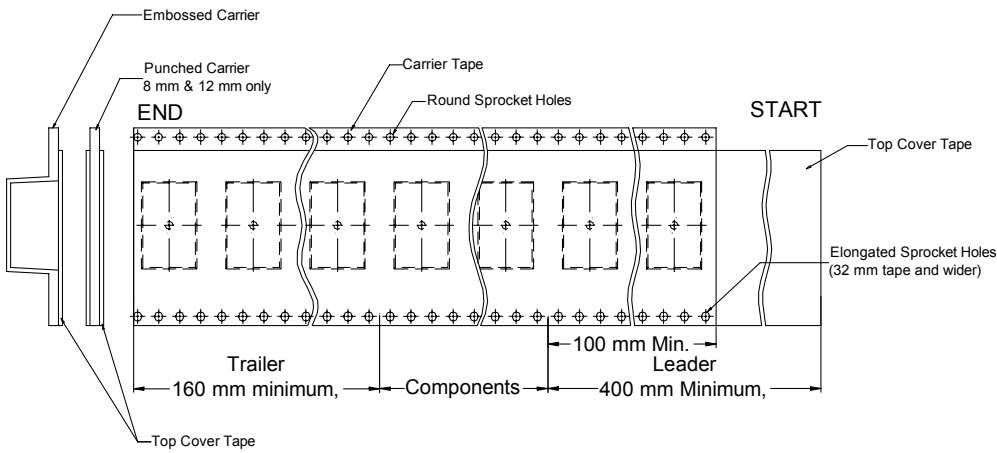
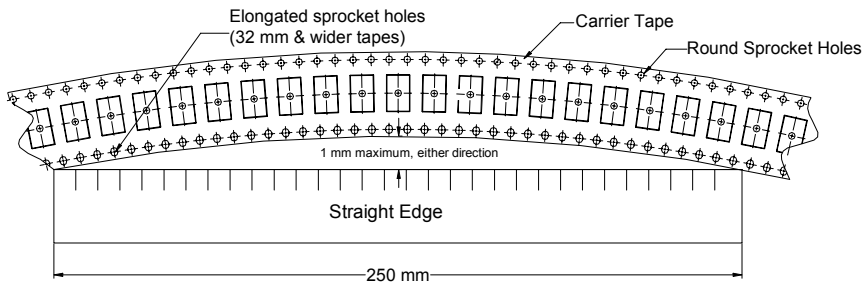


Figure 8 – Maximum Camber



Other KEMET Resources

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

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

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Tel: 44-1305-830747

Coatbridge, Scotland
Tel: 44-1236-434455

Färjestaden, Sweden
Tel: 46-485-563934

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

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

Shanghai, China
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Taipei, Taiwan
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Singapore
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Penang, Malaysia
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Bangalore, India
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