

T496 Series Fused Commercial Off-The-Shelf (COTS) MnO₂ and DLA (DSCC) Drawing 04053

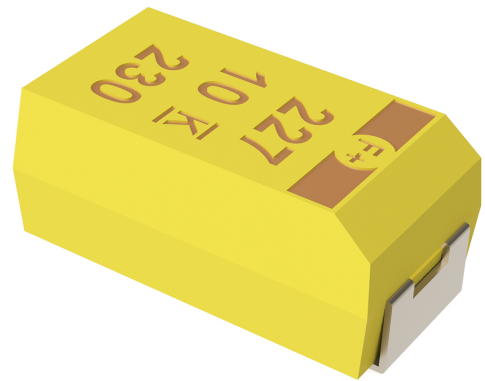
Overview

The T496 Series Commercial Off-The-Shelf (COTS) with a built-in fuse design provides excellent protection from short circuit conditions in applications where damaging high fault currents exist. This series meets the MIL-PRF-55365 requirements

and is suitable for use in high reliability applications, incorporating an intensive testing and screening protocol that is customizable depending on specific customer requirements. The T496 COTS Series is available in standard and low ESR.

Benefits

- Meets or exceeds EIA standard 535BAACC
- Halogen-free epoxy
- Patented fuse assembly which protects against short circuit mode
- DLA (DSCC) Drawing 04053 Available
- Established Reliability Weibull Options B, C, or D
- 100% surge current testing options per MIL-PRF-55365 available
- Capacitance values of 0.15 μ F to 470 μ F
- Voltage rating of 4 – 50 VDC
- Fuse actuation, 25°C: within 1 second at fault currents of 4 amps and higher
- Continuous current capability: 0.75 amps
- Post actuation resistance, 25°C: 10 M Ω , minimum
- Test tabs on side of case bypass the capacitor element to allow direct testing of the fuse assembly
- RoHS Compliant (100% Sn) and SnPb terminations available
- Standard termination SnPb
- Operating temperature range of -55°C to +125°C
- MSL Level = 1



Applications

Typical applications include decoupling and filtering in computing, telecommunications, defense, and industrial end applications requiring built-in fuse 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	496	X	227	M	010	B	T	61	10	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Voltage	Failure Rate/Design	Lead Material	Performance	ESR	Packaging (C-Spec)
T = Tantalum	Fail Safe	B, C, D, X	First two digits represent significant figures. Third digit specifies number of zeros.	K = $\pm 10\%$ M = $\pm 20\%$	004 = 4 V 006 = 6.3 V 010 = 10 V 015 = 15 V 020 = 20 V 025 = 25 V 035 = 35 V 050 = 50 V	B = 0.1%/1,000 hours C = 0.01%/1,000 hours D = 0.001%/1,000 hours A = Non-Weibull Graded	T = 100% Matte Tin (Sn) Plated H = Standard Solder Coated (SnPb 5% Pb minimum) C = Hot Solder Dipped K = Solder Fused	61 = Surge None 62 = Surge @ 25°C after Weibull 63 = Surge -55°C and +85°C after Weibull 64 = Surge -55°C and +85°C before Weibull	10 = Standard 20 = Low	Blank = 7" Reel 7280 = 13" Reel

04053-	001	B
Drawing Number	Dash Number	Reliability Grade
	See Part Number List	B = 0.1%/1,000 hours C = 0.01%/1,000 hours D = 0.001%/1,000 hours A = Non-Weibull Graded

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	-55°C to 125°C
Rated Capacitance Range	0.15 μ F – 470 μ F @ 120 Hz/25°C
Capacitance Tolerance	K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	4 – 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 (μ A) 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		
Moisture Resistance	65°C to -10°C, 100% RH, 20 cycles, no load	Δ C/C	Within +/-15% of initial value		
		DF	Within 150 x initial limit		
		DCL	Within 200 x initial limit		
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	Δ C/C	+25°C	-55°C	+85°C
		IL*	IL*	±10%	±10%
		DF	IL	IL	1.5 x IL
		DCL	IL	n/a	10 x IL
Resistance to Solder Heat	MIL-STD-202, Method 210, 1 cycle	Δ C/C	Within ±5% of initial value		
		DF	Within initial limits		
		DCL	Within initial limits		
Surge Voltage	25°C and 85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage)	Δ C/C	Within ±5% of initial value		
		DF	Within initial limits		
		DCL	Within initial limits		
		ESR	Within initial limits		
Resistance to Solvents	MIL-STD-202, Method 215, Aqueous wash chemical or equivalent	Δ C/C	Within ±10 of initial value		
		DF	Within initial limits		
		DCL	Within initial limits		
Mechanical Shock/Vibration	MIL-STD-202, Method 213, Condition I, 100 G peak MIL-STD-202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak	Δ C/C	Within ±10% of initial value		
		DF	Within initial limits		
		DCL	Within initial limits		

*IL = Initial limit

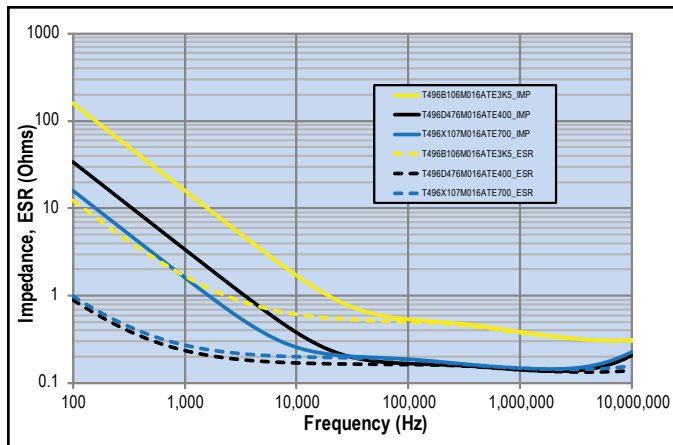
Certification

MIL-PRF-55365/8

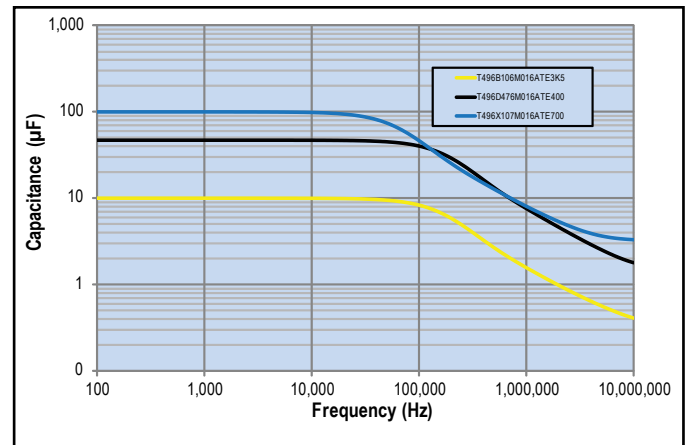
DSCC Drawing 04053

Electrical Characteristics

ESR vs. Frequency



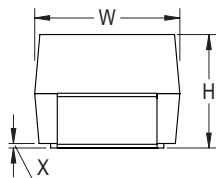
Capacitance vs. Frequency



Dimensions – Millimeters (Inches)

Metric will govern

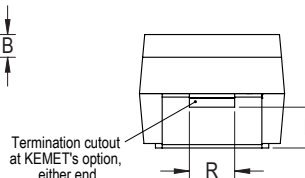
CATHODE (-) END VIEW



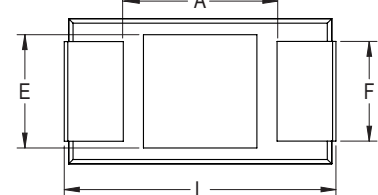
SIDE VIEW



ANODE (+) END VIEW



BOTTOM VIEW



Case Size		Component												
KEMET	EIA	L*	W*	H*	F* ±0.1 ±(0.004)	S* ±0.3 ±(0.012)	B* ±0.15 (Ref) ±0.006	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)
B	3528-21	3.5 ±0.2 (0.138 ±0.008)	2.8 ±0.2 (0.110 ±0.008)	1.9 ±0.2 (0.075 ±0.008)	2.2 (0.087)	0.8 (0.031)	0.4 (0.016)	0.10 ±0.10 (0.004 ±0.004)	0.5 (0.020)	1.0 (0.039)	0.13 (0.005)	1.1 (0.043)	1.8 (0.071)	2.2 (0.087)
C	6032-28	6.0 ±0.3 (0.236 ±0.03)	3.2 ±0.3 (0.126 ±0.012)	2.5 ±0.3 (0.098 ±0.012)	2.2 (0.087)	1.3 (0.051)	0.5 (0.020)	0.10 ±0.10 (0.004 ±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	2.5 (0.098)	2.8 (0.110)	2.4 (0.094)
D	7343-31	7.3 ±0.3 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	2.8 ±0.3 (0.110 ±0.012)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10 ±0.10 (0.004 ±0.004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)
X	7343-43	7.3 ±0.3 (0.287 ±0.012)	4.0 ±0.3 (0.169 ±0.012)	4.0 ±0.3 (0.157 ±0.012)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10 ±0.10 (0.004 ±0.004)	1.7 (0.067)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)

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 Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	DLA (DSCC)
V	μF	KEMET/EIA	(See below for part options)	μA @ +20°C Maximum/ 5 Minutes	% @ +20°C 120 Hz Maximum	mΩ @ +20°C 100 kHz Maximum	Drawing Number
4	68	C/6032-28	T496C686(1)004(2)(3)(4)10	2.7	6.0	1600	N/A
4	68	C/6032-28	T496C686(1)004(2)(3)(4)20	2.7	6.0	400	N/A
4	68	C/6032-28	T496C686M004(2)H4095	2.7	6.0	1600	04053-001(2)
4	100	C/6032-28	T496C107(1)004(2)(3)(4)10	4.0	8.0	1200	N/A
4	100	C/6032-28	T496C107M004(2)H4095	4.0	8.0	1200	04053-002(2)
4	150	D/7343-31	T496D157(1)004(2)(3)(4)10	6.0	8.0	800	N/A
4	150	D/7343-31	T496D157M004(2)H4095	6.0	8.0	800	04053-003(2)
4	150	C/6032-28	T496C157(1)004(2)(3)(4)10	6.0	8.0	1200	N/A
4	220	D/7343-31	T496D227(1)004(2)(3)(4)10	8.8	8.0	700	N/A
4	220	D/7343-31	T496D227(1)004(2)(3)(4)20	8.8	8.0	400	N/A
4	220	D/7343-31	T496D227M004(2)H4095	8.8	8.0	700	04053-004(2)
4	330	D/7343-31	T496D337(1)004(2)(3)(4)10	13.2	8.0	700	N/A
4	330	D/7343-31	T496D337(1)004(2)(3)(4)20	13.2	8.0	400	N/A
4	330	D/7343-31	T496D337M004(2)H4095	13.2	8.0	700	04053-005(2)
4	330	X/7343-43	T496X337(1)004(2)(3)(4)10	13.2	8.0	700	N/A
4	330	X/7343-43	T496X337M004(2)H4095	13.2	8.0	700	04053-006(2)
4	470	X/7343-43	T496X477(1)004(2)(3)(4)10	18.8	8.0	500	N/A
4	470	X/7343-43	T496X477M004(2)H4095	18.8	8.0	500	04053-007(2)
6.3	4.7	B/3528-21	T496B475(1)006(2)(3)(4)10	0.3	6.0	3500	N/A
6.3	4.7	B/3528-21	T496B475M006(2)H4095	0.3	6.0	3500	04053-008(2)
6.3	6.8	B/3528-21	T496B685(1)006(2)(3)(4)10	0.4	6.0	3500	N/A
6.3	6.8	B/3528-21	T496B685M006(2)H4095	0.4	6.0	3500	04053-009(2)
6.3	10	B/3528-21	T496B106(1)006(2)(3)(4)10	0.6	6.0	3500	N/A
6.3	10	B/3528-21	T496B106M006(2)H4095	0.6	6.0	3500	04053-010(2)
6.3	15	C/6032-28	T496C156(1)006(2)(3)(4)10	0.9	6.0	2000	N/A
6.3	15	C/6032-28	T496C156M006(2)H4095	0.9	6.0	2000	04053-011(2)
6.3	22	B/3528-21	T496B226(1)006(2)(3)(4)10	1.4	6.0	3500	N/A
6.3	22	B/3528-21	T496B226(1)006(2)(3)(4)20	1.4	6.0	1500	N/A
6.3	22	B/3528-21	T496B226M006(2)H4095	1.4	6.0	3500	04053-012(2)
6.3	22	C/6032-28	T496C226(1)006(2)(3)(4)10	1.4	6.0	2000	N/A
6.3	22	C/6032-28	T496C226M006(2)H4095	1.4	6.0	2000	04053-013(2)
6.3	33	C/6032-28	T496C336(1)006(2)(3)(4)10	2.1	6.0	2000	N/A
6.3	33	C/6032-28	T496C336(1)006(2)(3)(4)20	2.1	6.0	600	N/A
6.3	33	C/6032-28	T496C336M006(2)H4095	2.1	6.0	2000	04053-014(2)
6.3	47	C/6032-28	T496C476(1)006(2)(3)(4)10	3.0	6.0	1600	N/A
6.3	47	C/6032-28	T496C476(1)006(2)(3)(4)20	3.0	6.0	600	N/A
6.3	47	C/6032-28	T496C476M006(2)H4095	3.0	6.0	1600	04053-016(2)
6.3	47	D/7343-31	T496D476(1)006(2)(3)(4)10	3.0	6.0	1000	N/A
6.3	47	D/7343-31	T496D476M006(2)H4095	3.0	6.0	1000	04053-015(2)
6.3	68	C/6032-28	T496C686(1)006(2)(3)(4)10	4.3	6.0	1200	N/A
6.3	68	C/6032-28	T496C686M006(2)H4095	4.3	6.0	1200	04053-018(2)
6.3	68	D/7343-31	T496D686(1)006(2)(3)(4)10	4.3	6.0	1000	N/A
6.3	68	D/7343-31	T496D686M006(2)H4095	4.3	6.0	1000	04053-017(2)
6.3	100	X/7343-43	T496X107(1)006(2)(3)(4)10	6.3	8.0	900	N/A
6.3	100	X/7343-43	T496X107(1)006(2)(3)(4)20	6.3	8.0	300	N/A
6.3	100	X/7343-43	T496X107M006(2)H4095	6.3	8.0	300	04053-019(2)
6.3	100	D/7343-31	T496D107(1)006(2)(3)(4)10	6.3	8.0	800	N/A
6.3	100	D/7343-31	T496D107(1)006(2)(3)(4)20	6.3	8.0	400	N/A
6.3	100	D/7343-31	T496D107M006(2)H4095	6.3	8.0	800	04053-020(2)
6.3	100	C/6032-28	T496C107(1)006(2)(3)(4)10	6.3	8.0	400	N/A
V	μF	KEMET/EIA	(See below for part options)	μA @ +20°C Maximum/ 5 Minutes	% @ +20°C 120 Hz Maximum	mΩ @ +20°C 100 kHz Maximum	Drawing Number
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	DLA (DSCC)

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

(2) To complete KEMET part number, insert B (0.1%/1,000 hours), C (0.01%/1,000 hours), D (0.001%/1,000 hours), or A (Non-Weibull Graded).

(3) To complete KEMET part number, insert C = Hot Solder Dipped, H = Solder Plated, K = Solder Fused, or T = 100% Tin (Sn). Designates Termination Finish.

(4) To complete KEMET part number, insert 61 = No Surge, 62 = 10 cycles Surge +25°C, 63 = 10 cycles Surge -55°C and +85°C after Weibull or 64 = 10 cycles Surge -55°C and +85°C before Weibull; N/A for DLA (DSCC) 04053 product - 4095 applies.

Table 1 – Ratings & Part Number Reference cont'd

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	DLA (DSCC)
V	μF	KEMET/EIA	(See below for part options)	μA @ +20°C Maximum/ 5 Minutes	% @ +20°C 120 Hz Maximum	mΩ @ +20°C 100 kHz Maximum	Drawing Number
6.3	150	D/7343-31	T496D157(1)006(2)(3)(4)10	9.5	8.0	700	N/A
6.3	150	D/7343-31	T496D157(1)006(2)(3)(4)20	9.5	8.0	300	N/A
6.3	150	D/7343-31	T496D157M006(2)H4095	9.5	8.0	700	04053-021(2)
6.3	150	X/7343-43	T496X157(1)006(2)(3)(4)10	9.5	8.0	300	N/A
6.3	220	X/7343-43	T496X227(1)006(2)(3)(4)10	13.9	8.0	700	N/A
6.3	220	X/7343-43	T496X227(1)006(2)(3)(4)20	13.9	8.0	300	N/A
6.3	220	X/7343-43	T496X227M006(2)H4095	13.9	8.0	700	04053-023(2)
6.3	220	D/7343-31	T496D227(1)006(2)(3)(4)10	13.9	8.0	700	N/A
6.3	220	D/7343-31	T496D227(1)006(2)(3)(4)20	13.9	8.0	300	N/A
6.3	220	D/7343-31	T496D227M006(2)H4095	13.9	8.0	700	04053-022(2)
6.3	330	X/7343-43	T496X337(1)006(2)(3)(4)10	20.8	8.0	500	N/A
6.3	330	X/7343-43	T496X337(1)006(2)(3)(4)20	20.8	8.0	300	N/A
6.3	330	X/7343-43	T496X337M006(2)H4095	20.8	8.0	500	04053-024(2)
10	3.3	B/3528-21	T496B335(1)010(2)(3)(4)10	0.3	6.0	3500	N/A
10	3.3	B/3528-21	T496B335M010(2)H4095	0.3	6.0	3500	04053-025(2)
10	4.7	B/3528-21	T496B475(1)010(2)(3)(4)10	0.5	6.0	3500	N/A
10	4.7	B/3528-21	T496B475M010(2)H4095	0.5	6.0	3500	04053-026(2)
10	6.8	B/3528-21	T496B685(1)010(2)(3)(4)10	0.7	6.0	3500	N/A
10	6.8	B/3528-21	T496B685M010(2)H4095	0.7	6.0	3500	04053-027(2)
10	10	C/6032-28	T496C106(1)010(2)(3)(4)10	1.0	6.0	2000	N/A
10	10	C/6032-28	T496C106M010(2)H4095	1.0	6.0	2000	04053-028(2)
10	15	B/3528-21	T496B156(1)010(2)(3)(4)10	1.5	6.0	3500	N/A
10	15	B/3528-21	T496B156M010(2)H4095	1.5	6.0	3500	04053-029(2)
10	15	C/6032-28	T496C156(1)010(2)(3)(4)10	1.5	6.0	2000	N/A
10	15	C/6032-28	T496C156(1)010(2)(3)(4)20	1.5	6.0	600	N/A
10	15	C/6032-28	T496C156M010(2)H4095	1.5	6.0	2000	04053-030(2)
10	22	C/6032-28	T496C226(1)010(2)(3)(4)10	2.2	6.0	2000	N/A
10	22	C/6032-28	T496C226(1)010(2)(3)(4)20	2.2	6.0	500	N/A
10	22	C/6032-28	T496C226M010(2)H4095	2.2	6.0	2000	04053-031(2)
10	33	D/7343-31	T496D336(1)010(2)(3)(4)10	3.3	6.0	1000	N/A
10	33	D/7343-31	T496D336(1)010(2)(3)(4)20	3.3	6.0	400	N/A
10	33	D/7343-31	T496D336M010(2)H4095	3.3	6.0	1000	04053-032(2)
10	33	C/6032-28	T496C336(1)010(2)(3)(4)10	3.3	6.0	1600	N/A
10	33	C/6032-28	T496C336(1)010(2)(3)(4)20	3.3	6.0	400	N/A
10	33	C/6032-28	T496C336M010(2)H4095	3.3	6.0	1600	04053-033(2)
10	47	D/7343-31	T496D476(1)010(2)(3)(4)10	4.7	6.0	1000	N/A
10	47	D/7343-31	T496D476(1)010(2)(3)(4)20	4.7	6.0	400	N/A
10	47	D/7343-31	T496D476M010(2)H4095	4.7	6.0	1000	04053-034(2)
10	47	C/6032-28	T496C476(1)010(2)(3)(4)10	4.7	6.0	1200	N/A
10	47	C/6032-28	T496C476(1)010(2)(3)(4)20	4.7	6.0	400	N/A
10	47	C/6032-28	T496C476M010(2)H4095	4.7	6.0	1200	04053-035(2)
10	68	X/7343-43	T496X686(1)010(2)(3)(4)10	6.8	6.0	900	N/A
10	68	X/7343-43	T496X686M010(2)H4095	6.8	6.0	900	04053-036(2)
10	68	D/7343-31	T496D686(1)010(2)(3)(4)10	6.8	6.0	800	N/A
10	68	D/7343-31	T496D686(1)010(2)(3)(4)20	6.8	6.0	400	N/A
10	68	D/7343-31	T496D686M010(2)H4095	6.8	6.0	800	04053-037(2)
10	100	X/7343-43	T496X107(1)010(2)(3)(4)10	10.0	8.0	400	N/A
10	100	D/7343-31	T496D107(1)010(2)(3)(4)10	10.0	8.0	700	N/A
10	100	D/7343-31	T496D107(1)010(2)(3)(4)20	10.0	8.0	400	N/A
10	100	D/7343-31	T496D107M010(2)H4095	10.0	8.0	700	04053-038(2)
V	μF	KEMET/EIA	(See below for part options)	μA @ +20°C Maximum/ 5 Minutes	% @ +20°C 120 Hz Maximum	mΩ @ +20°C 100 kHz Maximum	Drawing Number
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	DLA (DSCC)

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

(2) To complete KEMET part number, insert B (0.1%/1,000 hours), C (0.01%/1,000 hours), D (0.001%/1,000 hours), or A (Non-Weibull Graded).

(3) To complete KEMET part number, insert C = Hot Solder Dipped, H = Solder Plated, K = Solder Fused, or T = 100% Tin (Sn). Designates Termination Finish.

(4) To complete KEMET part number, insert 61 = No Surge, 62 = 10 cycles Surge +25°C, 63 = 10 cycles Surge -55°C and +85°C after Weibull or 64 = 10 cycles Surge -55°C and +85°C before Weibull; N/A for DLA (DSCC) 04053 product - 4095 applies.

Table 1 – Ratings & Part Number Reference cont'd

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	DLA (DSCC)
V	μF	KEMET/EIA	(See below for part options)	μA @ +20°C Maximum/ 5 Minutes	% @ +20°C 120 Hz Maximum	mΩ @ +20°C 100 kHz Maximum	Drawing Number
10	150	X/7343-43	T496X157(1)010(2)(3)(4)10	15.0	8.0	700	N/A
10	150	X/7343-43	T496X157(1)010(2)(3)(4)20	15.0	8.0	400	N/A
10	150	X/7343-43	T496X157M010(2)H4095	15.0	8.0	700	04053-039(2)
10	150	D/7343-31	T496D157(1)010(2)(3)(4)10	15.0	8.0	700	N/A
10	150	D/7343-31	T496D157(1)010(2)(3)(4)20	15.0	8.0	400	N/A
10	150	D/7343-31	T496D157M010(2)H4095	15.0	8.0	700	04053-040(2)
10	220	X/7343-43	T496X227(1)010(2)(3)(4)10	22.0	8.0	500	N/A
10	220	X/7343-43	T496X227(1)010(2)(3)(4)20	22.0	8.0	300	N/A
10	220	X/7343-43	T496X227M010(2)H4095	22.0	8.0	500	04053-041(2)
10	220	D/7343-31	T496D227(1)010(2)(3)(4)10	22.0	8.0	300	N/A
16	2.2	B/3528-21	T496B225(1)016(2)(3)(4)10	0.4	6.0	3500	N/A
16	2.2	B/3528-21	T496B225M016(2)H4095	0.4	6.0	3500	04053-042(2)
16	3.3	B/3528-21	T496B335(1)016(2)(3)(4)10	0.5	6.0	3500	N/A
16	3.3	B/3528-21	T496B335(1)016(2)(3)(4)20	0.5	6.0	2100	N/A
16	3.3	B/3528-21	T496B335M016(2)H4095	0.5	6.0	3500	04053-043(2)
16	4.7	B/3528-21	T496B475(1)016(2)(3)(4)10	0.8	6.0	3500	N/A
16	4.7	B/3528-21	T496B475(1)016(2)(3)(4)20	0.8	6.0	1600	N/A
16	4.7	B/3528-21	T496B475M016(2)H4095	0.8	6.0	3500	04053-044(2)
16	6.8	C/6032-28	T496C685(1)016(2)(3)(4)10	1.1	6.0	2000	N/A
16	6.8	C/6032-28	T496C685(1)016(2)(3)(4)20	1.1	6.0	600	N/A
16	6.8	C/6032-28	T496C685M016(2)H4095	1.1	6.0	2000	04053-045(2)
16	10	B/3528-21	T496B106(1)016(2)(3)(4)10	1.6	6.0	3500	N/A
16	10	B/3528-21	T496B106M016(2)H4095	1.6	6.0	3500	04053-046(2)
16	10	C/6032-28	T496C106(1)016(2)(3)(4)10	1.6	6.0	2000	N/A
16	10	C/6032-28	T496C106(1)016(2)(3)(4)20	1.6	6.0	700	N/A
16	10	C/6032-28	T496C106M016(2)H4095	1.6	6.0	2000	04053-047(2)
16	15	C/6032-28	T496C156(1)016(2)(3)(4)10	2.4	6.0	2000	N/A
16	15	C/6032-28	T496C156(1)016(2)(3)(4)20	2.4	6.0	600	N/A
16	15	C/6032-28	T496C156M016(2)H4095	2.4	6.0	2000	04053-048(2)
16	22	D/7343-31	T496D226(1)016(2)(3)(4)10	3.5	6.0	1000	N/A
16	22	D/7343-31	T496D226(1)016(2)(3)(4)20	3.5	6.0	500	N/A
16	22	D/7343-31	T496D226M016(2)H4095	3.5	6.0	1000	04053-049(2)
16	22	C/6032-28	T496C226(1)016(2)(3)(4)10	3.5	6.0	1600	N/A
16	22	C/6032-28	T496C226(1)016(2)(3)(4)20	3.5	6.0	1000	N/A
16	22	C/6032-28	T496C226M016(2)H4095	3.5	6.0	1600	04053-050(2)
16	33	D/7343-31	T496D336(1)016(2)(3)(4)10	5.3	6.0	1000	N/A
16	33	D/7343-31	T496D336(1)016(2)(3)(4)20	5.3	6.0	400	N/A
16	33	D/7343-31	T496D336M016(2)H4095	5.3	6.0	1000	04053-051(2)
16	47	X/7343-43	T496X476(1)016(2)(3)(4)10	7.5	6.0	900	N/A
16	47	X/7343-43	T496X476(1)016(2)(3)(4)20	7.5	6.0	400	N/A
16	47	X/7343-43	T496X476M016(2)H4095	7.5	6.0	900	04053-052(2)
16	47	D/7343-31	T496D476(1)016(2)(3)(4)10	7.5	6.0	800	N/A
16	47	D/7343-31	T496D476(1)016(2)(3)(4)20	7.5	6.0	400	N/A
16	47	D/7343-31	T496D476M016(2)H4095	7.5	6.0	800	04053-053(2)
16	68	D/7343-31	T496D686(1)016(2)(3)(4)10	10.9	8.0	400	N/A
16	100	X/7343-43	T496X107(1)016(2)(3)(4)10	16.0	8.0	700	N/A
16	100	X/7343-43	T496X107M016(2)H4095	16.0	8.0	700	04053-054(2)
20	1.5	B/3528-21	T496B155(1)020(2)(3)(4)10	0.3	6.0	5000	N/A
20	1.5	B/3528-21	T496B155M020(2)H4095	0.3	6.0	5000	04053-055(2)
20	2.2	B/3528-21	T496B225(1)020(2)(3)(4)10	0.4	6.0	3500	N/A
V	μF	KEMET/EIA	(See below for part options)	μA @ +20°C Maximum/ 5 Minutes	% @ +20°C 120 Hz Maximum	mΩ @ +20°C 100 kHz Maximum	Drawing Number
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	DLA (DSCC)

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

(2) To complete KEMET part number, insert B (0.1%/1,000 hours), C (0.01%/1,000 hours), D (0.001%/1,000 hours), or A (Non-Weibull Graded).

(3) To complete KEMET part number, insert C = Hot Solder Dipped, H = Solder Plated, K = Solder Fused, or T = 100% Tin (Sn). Designates Termination Finish.

(4) To complete KEMET part number, insert 61 = No Surge, 62 = 10 cycles Surge +25°C, 63 = 10 cycles Surge -55°C and +85°C after Weibull or 64 = 10 cycles Surge -55°C and +85°C before Weibull; N/A for DLA (DSCC) 04053 product - 4095 applies.

Table 1 – Ratings & Part Number Reference cont'd

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	DLA (DSCC)
V	μF	KEMET/EIA	(See below for part options)	μA @ +20°C Maximum/ 5 Minutes	% @ +20°C 120 Hz Maximum	mΩ @ +20°C 100 kHz Maximum	Drawing Number
20	2.2	B/3528-21	T496B225(1)020(2)(3)(4)20	0.4	6.0	1600	N/A
20	2.2	B/3528-21	T496B225M020(2)H4095	0.4	6.0	3500	04053-056(2)
20	3.3	B/3528-21	T496B335(1)020(2)(3)(4)10	0.7	6.0	3500	N/A
20	3.3	B/3528-21	T496B335M020(2)H4095	0.7	6.0	3500	04053-057(2)
20	4.7	C/6032-28	T496C475(1)020(2)(3)(4)10	0.9	6.0	2000	N/A
20	4.7	C/6032-28	T496C475M020(2)H4095	0.9	6.0	2000	04053-058(2)
20	6.8	C/6032-28	T496C685(1)020(2)(3)(4)10	1.4	6.0	2000	N/A
20	6.8	C/6032-28	T496C685(1)020(2)(3)(4)20	1.4	6.0	600	N/A
20	6.8	C/6032-28	T496C685M020(2)H4095	1.4	6.0	2000	04053-059(2)
20	10	C/6032-28	T496C106(1)020(2)(3)(4)10	2.0	6.0	2000	N/A
20	10	C/6032-28	T496C106(1)020(2)(3)(4)20	2.0	6.0	800	N/A
20	10	C/6032-28	T496C106M020(2)H4095	2.0	6.0	2000	04053-060(2)
20	15	D/7343-31	T496D156(1)020(2)(3)(4)10	3.0	6.0	1000	N/A
20	15	D/7343-31	T496D156(1)020(2)(3)(4)20	3.0	6.0	500	N/A
20	15	D/7343-31	T496D156M020(2)H4095	3.0	6.0	1000	04053-061(2)
20	15	C/6032-28	T496C156(1)020(2)(3)(4)10	3.0	6.0	500	N/A
20	22	D/7343-31	T496D226(1)020(2)(3)(4)10	4.4	6.0	1000	N/A
20	22	D/7343-31	T496D226(1)020(2)(3)(4)20	4.4	6.0	500	N/A
20	22	D/7343-31	T496D226M020(2)H4095	4.4	6.0	1000	04053-062(2)
20	33	X/7343-43	T496X336(1)020(2)(3)(4)10	6.6	6.0	900	N/A
20	33	X/7343-43	T496X336(1)020(2)(3)(4)20	6.6	6.0	400	N/A
20	33	X/7343-43	T496X336M020(2)H4095	6.6	6.0	900	04053-063(2)
20	33	D/7343-31	T496D336(1)020(2)(3)(4)10	6.6	6.0	400	N/A
20	47	X/7343-43	T496X476(1)020(2)(3)(4)10	9.4	6.0	300	N/A
20	47	X/7343-43	T496X476M020(2)H4095	9.4	6.0	300	04053-064(2)
20	47	D/7343-31	T496D476(1)020(2)(3)(4)10	9.4	6.0	300	N/A
25	0.68	B/3528-21	T496B684(1)025(2)(3)(4)10	0.2	4.0	6500	N/A
25	0.68	B/3528-21	T496B684M025(2)H4095	0.2	4.0	6500	04053-065(2)
25	1	B/3528-21	T496B105(1)025(2)(3)(4)10	0.3	4.0	5000	N/A
25	1	B/3528-21	T496B105(1)025(2)(3)(4)20	0.3	4.0	3500	N/A
25	1	B/3528-21	T496B105M025(2)H4095	0.3	4.0	5000	04053-066(2)
25	1.5	B/3528-21	T496B155(1)025(2)(3)(4)10	0.4	6.0	5000	N/A
25	1.5	B/3528-21	T496B155(1)025(2)(3)(4)20	0.4	6.0	1600	N/A
25	1.5	B/3528-21	T496B155M025(2)H4095	0.4	6.0	5000	04053-067(2)
25	2.2	C/6032-28	T496C225(1)025(2)(3)(4)10	0.6	6.0	3500	N/A
25	2.2	C/6032-28	T496C225M025(2)H4095	0.6	6.0	3500	04053-068(2)
25	3.3	C/6032-28	T496C335(1)025(2)(3)(4)10	0.8	6.0	2500	N/A
25	3.3	C/6032-28	T496C335(1)025(2)(3)(4)20	0.8	6.0	2100	N/A
25	3.3	C/6032-28	T496C335M025(2)H4095	0.8	6.0	2500	04053-069(2)
25	4.7	B/3528-21	T496B475(1)025(2)(3)(4)10	1.2	6.0	4000	N/A
25	4.7	C/6032-28	T496C475(1)025(2)(3)(4)10	1.2	6.0	2500	N/A
25	4.7	C/6032-28	T496C475(1)025(2)(3)(4)20	1.2	6.0	1300	N/A
25	4.7	C/6032-28	T496C475M025(2)H4095	1.2	6.0	2500	04053-070(2)
25	6.8	C/6032-28	T496C685(1)025(2)(3)(4)10	1.7	6.0	2000	N/A
25	6.8	C/6032-28	T496C685(1)025(2)(3)(4)20	1.7	6.0	600	N/A
25	6.8	C/6032-28	T496C685M025(2)H4095	1.7	6.0	2000	04053-071(2)
25	10	C/6032-28	T496C106(1)025(2)(3)(4)10	2.5	6.0	600	N/A
25	10	C/6032-28	T496C106M025(2)H4095	2.5	6.0	600	04053-072(2)
25	10	D/7343-31	T496D106(1)025(2)(3)(4)10	2.5	6.0	1200	N/A
25	10	D/7343-31	T496D106(1)025(2)(3)(4)20	2.5	6.0	600	N/A
V	μF	KEMET/EIA	(See below for part options)	μA @ +20°C Maximum/ 5 Minutes	% @ +20°C 120 Hz Maximum	mΩ @ +20°C 100 kHz Maximum	Drawing Number
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	DLA (DSCC)

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

(2) To complete KEMET part number, insert B (0.1%/1,000 hours), C (0.01%/1,000 hours), D (0.001%/1,000 hours), or A (Non-Weibull Graded).

(3) To complete KEMET part number, insert C = Hot Solder Dipped, H = Solder Plated, K = Solder Fused, or T = 100% Tin (Sn). Designates Termination Finish.

(4) To complete KEMET part number, insert 61 = No Surge, 62 = 10 cycles Surge +25°C, 63 = 10 cycles Surge -55°C and +85°C after Weibull or 64 = 10 cycles Surge -55°C and +85°C before Weibull; N/A for DLA (DSCC) 04053 product - 4095 applies.

Table 1 – Ratings & Part Number Reference cont'd

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	DLA (DSCC)
V	μF	KEMET/EIA	(See below for part options)	μA @ +20°C Maximum/ 5 Minutes	% @ +20°C 120 Hz Maximum	mΩ @ +20°C 100 kHz Maximum	Drawing Number
25	10	D/7343-31	T496D106M025(2)H4095	2.5	6.0	1200	04053-073(2)
25	15	C/6032-28	T496C156(1)025(2)(3)(4)10	3.8	6.0	750	N/A
25	15	D/7343-31	T496D156(1)025(2)(3)(4)10	3.8	6.0	1000	N/A
25	15	D/7343-31	T496D156(1)025(2)(3)(4)20	3.8	6.0	500	N/A
25	15	D/7343-31	T496D156M025(2)H4095	3.8	6.0	1000	04053-074(2)
25	22	X/7343-43	T496X226(1)025(2)(3)(4)10	5.5	6.0	900	N/A
25	22	X/7343-43	T496X226(1)025(2)(3)(4)20	5.5	6.0	400	N/A
25	22	X/7343-43	T496X226M025(2)H4095	5.5	6.0	900	04053-075(2)
25	22	D/7343-31	T496D226(1)025(2)(3)(4)10	5.5	6.0	800	N/A
25	22	D/7343-31	T496D226(1)025(2)(3)(4)20	5.5	6.0	400	N/A
25	22	D/7343-31	T496D226M025(2)H4095	5.5	6.0	800	04053-076(2)
35	0.47	B/3528-21	T496B474(1)035(2)(3)(4)10	0.2	4.0	8000	N/A
35	0.47	B/3528-21	T496B474(1)035(2)(3)(4)20	0.2	4.0	2600	N/A
35	0.47	B/3528-21	T496B474M035(2)H4095	0.2	4.0	8000	04053-077(2)
35	0.68	B/3528-21	T496B684(1)035(2)(3)(4)10	0.2	4.0	6500	N/A
35	0.68	B/3528-21	T496B684M035(2)H4095	0.2	4.0	6500	04053-078(2)
35	1	B/3528-21	T496B105(1)035(2)(3)(4)10	0.4	4.0	5000	N/A
35	1	B/3528-21	T496B105(1)035(2)(3)(4)20	0.4	4.0	3100	N/A
35	1	B/3528-21	T496B105M035(2)H4095	0.4	4.0	5000	04053-079(2)
35	1.5	C/6032-28	T496C155(1)035(2)(3)(4)10	0.5	6.0	4500	N/A
35	1.5	C/6032-28	T496C155(1)035(2)(3)(4)20	0.5	6.0	2600	N/A
35	1.5	C/6032-28	T496C155M035(2)H4095	0.5	6.0	4500	04053-080(2)
35	2.2	C/6032-28	T496C225(1)035(2)(3)(4)10	0.8	6.0	3500	N/A
35	2.2	C/6032-28	T496C225(1)035(2)(3)(4)20	0.8	6.0	1600	N/A
35	2.2	C/6032-28	T496C225M035(2)H4095	0.8	6.0	3500	04053-081(2)
35	3.3	C/6032-28	T496C335(1)035(2)(3)(4)10	1.2	6.0	2500	N/A
35	3.3	C/6032-28	T496C335(1)035(2)(3)(4)20	1.2	6.0	900	N/A
35	3.3	C/6032-28	T496C335M035(2)H4095	1.2	6.0	2500	04053-082(2)
35	4.7	D/7343-31	T496D475(1)035(2)(3)(4)10	1.6	6.0	1500	N/A
35	4.7	D/7343-31	T496D475(1)035(2)(3)(4)20	1.6	6.0	700	N/A
35	4.7	D/7343-31	T496D475M035(2)H4095	1.6	6.0	1500	04053-083(2)
35	6.8	D/7343-31	T496D685(1)035(2)(3)(4)10	2.4	6.0	1300	N/A
35	6.8	D/7343-31	T496D685(1)035(2)(3)(4)20	2.4	6.0	750	N/A
35	6.8	D/7343-31	T496D685M035(2)H4095	2.4	6.0	1300	04053-084(2)
35	10	X/7343-43	T496X106(1)035(2)(3)(4)10	3.5	6.0	1000	N/A
35	10	X/7343-43	T496X106(1)035(2)(3)(4)20	3.5	6.0	500	N/A
35	10	X/7343-43	T496X106M035(2)H4095	3.5	6.0	1000	04053-085(2)
35	10	D/7343-31	T496D106(1)035(2)(3)(4)10	3.5	6.0	400	N/A
35	15	X/7343-43	T496X156(1)035(2)(3)(4)10	5.3	6.0	900	N/A
35	15	X/7343-43	T496X156(1)035(2)(3)(4)20	5.3	6.0	500	N/A
35	15	X/7343-43	T496X156M035(2)H4095	5.3	6.0	900	04053-086(2)
35	15	D/7343-31	T496D156(1)035(2)(3)(4)10	5.3	6.0	500	N/A
35	22	X/7343-43	T496X226(1)035(2)(3)(4)10	7.7	6.0	300	N/A
35	22	X/7343-43	T496X226M035(2)H4095	7.7	6.0	300	04053-087(2)
50	0.15	B/3528-21	T496B154(1)050(2)(3)(4)10	0.1	4.0	16000	N/A
50	0.15	B/3528-21	T496B154M050(2)H4095	0.1	4.0	16000	04053-088(2)
50	0.22	B/3528-21	T496B224(1)050(2)(3)(4)10	0.1	4.0	14000	N/A
50	0.22	B/3528-21	T496B224(1)050(2)(3)(4)20	0.1	4.0	10000	N/A
50	0.22	B/3528-21	T496B224M050(2)H4095	0.1	4.0	14000	04053-089(2)
50	0.33	B/3528-21	T496B334(1)050(2)(3)(4)10	0.2	4.0	10000	N/A
V	μF	KEMET/EIA	(See below for part options)	μA @ +20°C Maximum/ 5 Minutes	% @ +20°C 120 Hz Maximum	mΩ @ +20°C 100 kHz Maximum	Drawing Number
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	DLA (DSCC)

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

(2) To complete KEMET part number, insert B (0.1%/1,000 hours), C (0.01%/1,000 hours), D (0.001%/1,000 hours), or A (Non-Weibull Graded).

(3) To complete KEMET part number, insert C = Hot Solder Dipped, H = Solder Plated, K = Solder Fused, or T = 100% Tin (Sn). Designates Termination Finish.

(4) To complete KEMET part number, insert 61 = No Surge, 62 = 10 cycles Surge +25°C, 63 = 10 cycles Surge -55°C and +85°C after Weibull or 64 = 10 cycles Surge -55°C and +85°C before Weibull; N/A for DLA (DSCC) 04053 product - 4095 applies.

Table 1 – Ratings & Part Number Reference cont'd

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	DLA (DSCC)
V	μF	KEMET/EIA	(See below for part options)	μA @ +20°C Maximum/ 5 Minutes	% @ +20°C 120 Hz Maximum	mΩ @ +20°C 100 kHz Maximum	Drawing Number
50	0.33	B/3528-21	T496B334(1)050(2)(3)(4)20	0.2	4.0	2600	N/A
50	0.33	B/3528-21	T496B334M050(2)H4095	0.2	4.0	10000	04053-090(2)
50	0.47	C/6032-28	T496C474(1)050(2)(3)(4)10	0.2	4.0	8000	N/A
50	0.47	C/6032-28	T496C474(1)050(2)(3)(4)20	0.2	4.0	1900	N/A
50	0.47	C/6032-28	T496C474M050(2)H4095	0.2	4.0	8000	04053-091(2)
50	0.68	C/6032-28	T496C684(1)050(2)(3)(4)10	0.3	4.0	7000	N/A
50	0.68	C/6032-28	T496C684(1)050(2)(3)(4)20	0.3	4.0	1700	N/A
50	0.68	C/6032-28	T496C684M050(2)H4095	0.3	4.0	7000	04053-092(2)
50	1	C/6032-28	T496C105(1)050(2)(3)(4)10	0.5	4.0	5500	N/A
50	1	C/6032-28	T496C105(1)050(2)(3)(4)20	0.5	4.0	2700	N/A
50	1	C/6032-28	T496C105M050(2)H4095	0.5	4.0	5500	04053-093(2)
50	1.5	C/6032-28	T496C155(1)050(2)(3)(4)10	0.8	6.0	5000	N/A
50	1.5	C/6032-28	T496C155(1)050(2)(3)(4)20	0.8	6.0	2000	N/A
50	1.5	C/6032-28	T496C155M050(2)H4095	0.8	6.0	5000	04053-094(2)
50	2.2	D/7343-31	T496D225(1)050(2)(3)(4)10	1.1	6.0	2500	N/A
50	2.2	D/7343-31	T496D225(1)050(2)(3)(4)20	1.1	6.0	900	N/A
50	2.2	D/7343-31	T496D225M050(2)H4095	1.1	6.0	2500	04053-095(2)
50	3.3	D/7343-31	T496D335(1)050(2)(3)(4)10	1.7	6.0	2000	N/A
50	3.3	D/7343-31	T496D335(1)050(2)(3)(4)20	1.7	6.0	1000	N/A
50	3.3	D/7343-31	T496D335M050(2)H4095	1.7	6.0	2000	04053-096(2)
50	4.7	X/7343-43	T496X475(1)050(2)(3)(4)10	2.4	6.0	1500	N/A
50	4.7	X/7343-43	T496X475(1)050(2)(3)(4)20	2.4	6.0	400	N/A
50	4.7	D/7343-31	T496D475(1)050(2)(3)(4)10	2.4	6.0	1500	N/A
V	μF	KEMET/EIA	(See below for part options)	μA @ +20°C Maximum/ 5 Minutes	% @ +20°C 120 Hz Maximum	mΩ @ +20°C 100 kHz Maximum	Drawing Number
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	DLA (DSCC)

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

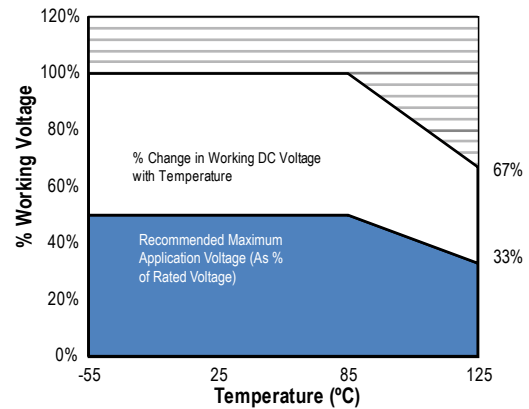
(2) To complete KEMET part number, insert B (0.1%/1,000 hours), C (0.01%/1,000 hours), D (0.001%/1,000 hours), or A (Non-Weibull Graded).

(3) To complete KEMET part number, insert C = Hot Solder Dipped, H = Solder Plated, K = Solder Fused, or T = 100% Tin (Sn). Designates Termination Finish.

(4) To complete KEMET part number, insert 61 = No Surge, 62 = 10 cycles Surge +25°C, 63 = 10 cycles Surge -55°C and +85°C after Weibull or 64 = 10 cycles Surge -55°C and +85°C before Weibull; N/A for DLA (DSCC) 04053 product - 4095 applies.

Recommended Voltage Derating Guidelines

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



Ripple Current/Ripple Voltage

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

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

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

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

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

Temperature Compensation Multipliers for Maximum Ripple Current		
$T \leq 25^\circ\text{C}$	$T \leq 85^\circ\text{C}$	$T \leq 125^\circ\text{C}$
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.

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

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

I = rms ripple current (amperes)

E = rms ripple voltage (volts)

$P \text{ max}$ = 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)				
		W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
A	3216-18	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
B	3528-21	2.35	2.21	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
C	6032-25	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
D	7343-31	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
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

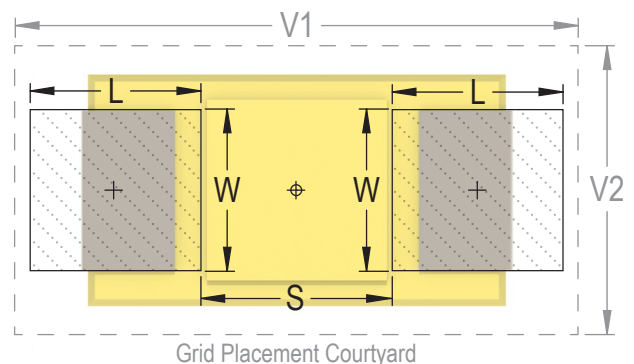
Density Level A: For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.

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.

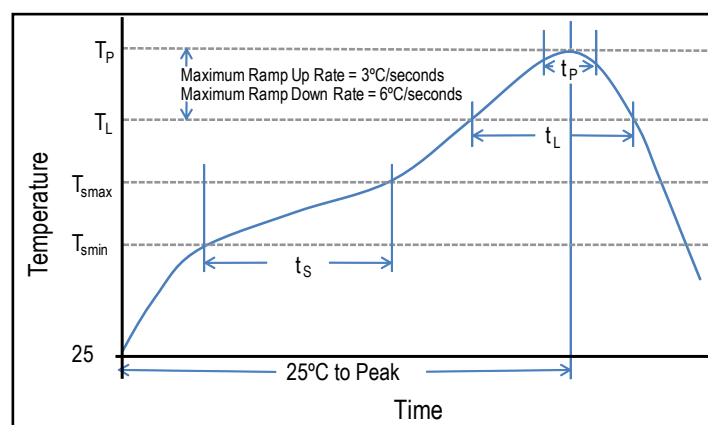
During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

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 Temperature	6 minutes maximum	8 minutes maximum

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

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

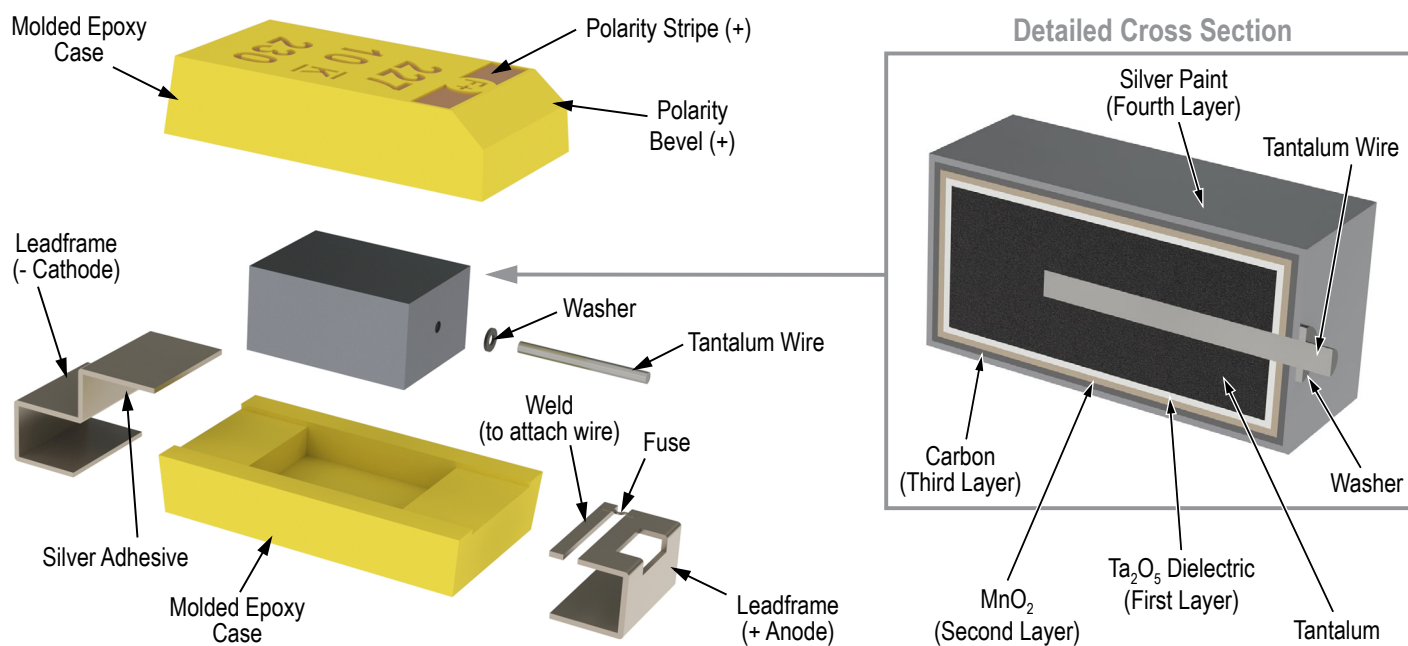
**Case Size A, B, C, H, I, K, M, R, S, T, U, V, W, and Z



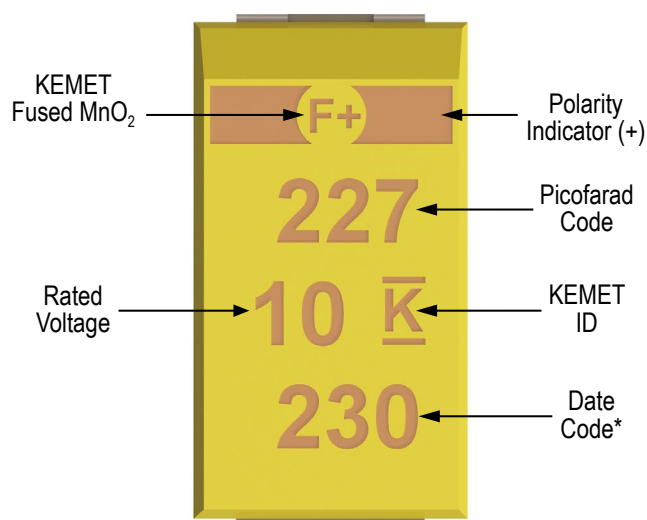
Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature—reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 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.

Construction



Capacitor Marking



* 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

Tape & Reel Packaging Information

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

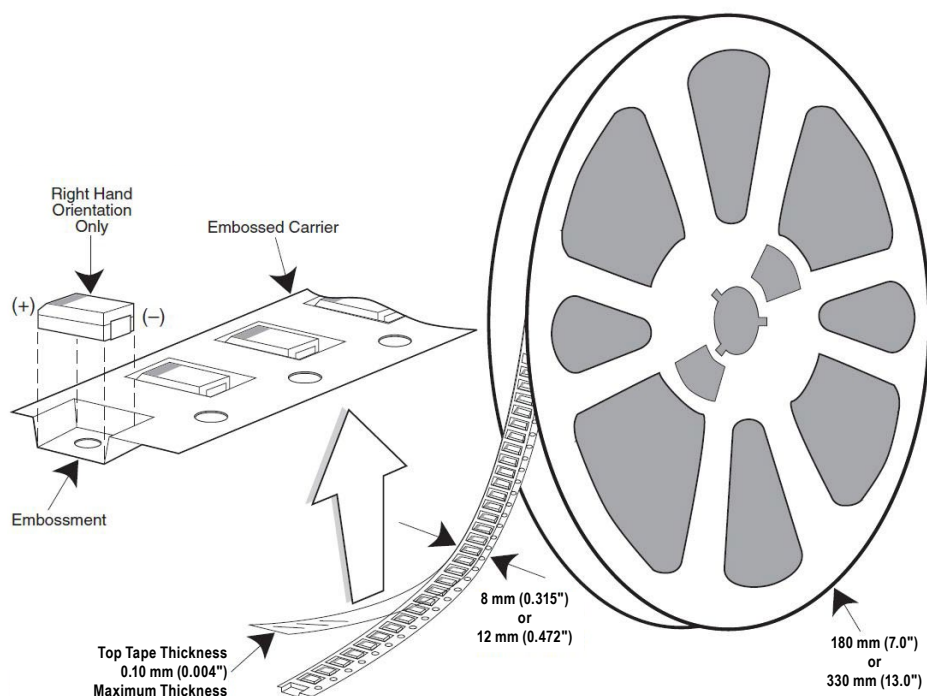
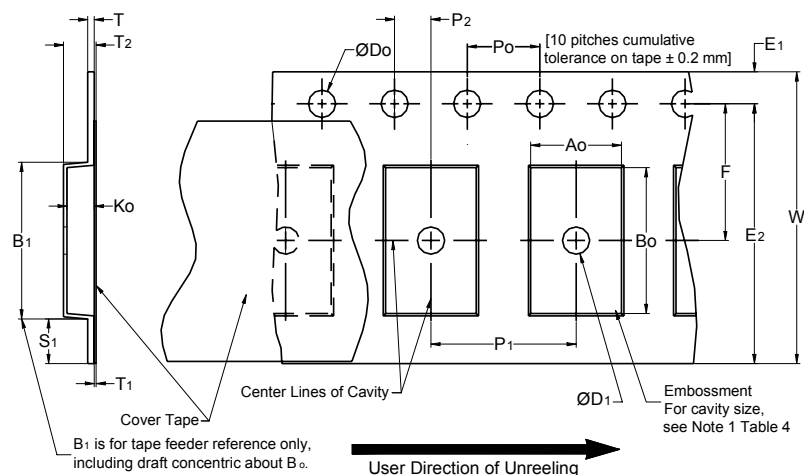


Table 3 – Packaging Quantity

Case Code		Tape Width (mm)	7" Reel*	13" Reel*
KEMET	EIA			
S	3216-12	8	2,500	10,000
T	3528-12	8	2,500	10,000
M	3528-15	8	2,000	8,000
U	6032-15	12	1,000	5,000
L	6032-19	12	1,000	5,000
W	7343-15	12	1,000	3,000
Z	7343-17	12	1,000	3,000
V	7343-20	12	1,000	3,000
A	3216-18	8	2,000	9,000
B	3528-21	8	2,000	8,000
C	6032-28	12	500	3,000
D	7343-31	12	500	2,500
Q	7343-12	12	1,000	3,000
Y	7343-40	12	500	2,000
X	7343-43	12	500	2,000
E/T428P	7360-38	12	500	2,000
H	7360-20	12	1,000	2,500

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

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions**Table 4 – Embossed (Plastic) Carrier Tape Dimensions**

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D ₀	D ₁ Minimum Note 1	E ₁	P ₀	P ₂	R Reference Note 2	S ₁ Minimum Note 3	T Maximum	T ₁ Maximum
8 mm	1.5 +0.10/-0.0 (0.059 +0.004/-0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)			2.0 ±0.1 (0.079 ±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)	2.0 ±0.05 or 4.0 ±0.10 (0.079 ±0.002 or 0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5	
12 mm	Single (4 mm) & Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	2.0 ±0.05 (0.079 ±0.002) or 4.0 ±0.10 (0.157 ±0.004) or 8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)		
16 mm	Triple (12 mm)	12.1 (0.476)	14.25 (0.561)	7.5±0.10 (0.295 ±0.004)	4.0 ±0.10 (0.157 ±0.004) to 12.0 ±0.10 (0.472 ±0.004)	8.0 (0.315)	16.3 (0.642)		

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.
2. The tape, with or without components, shall pass around R without damage (see Figure 4).
3. If 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).
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 12 mm tapes and 10° maximum for 16 mm tapes (see Figure 2).
 - (d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape and to 1.0 mm maximum for 16 mm tape (see Figure 3).
 - (e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

- Cover Tape Break Force:** 1.0 Kg minimum.
- 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.

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

Figure 2 – Maximum Component Rotation

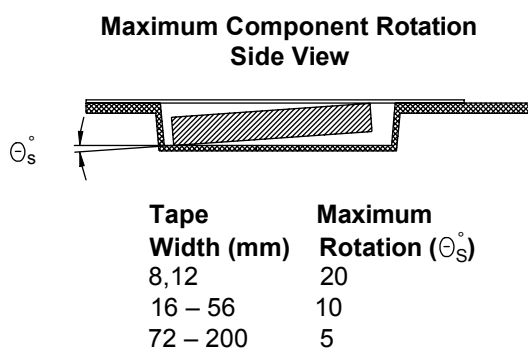
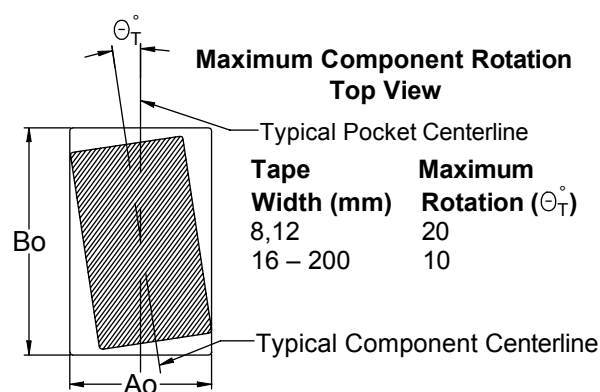


Figure 3 – Maximum Lateral Movement

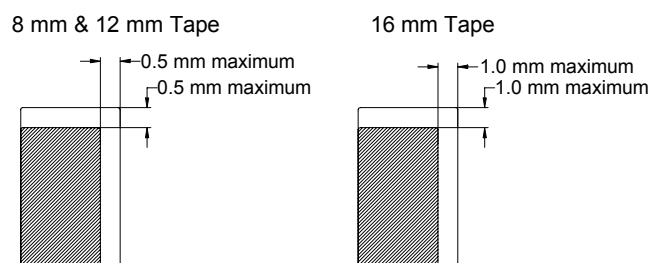


Figure 4 – Bending Radius

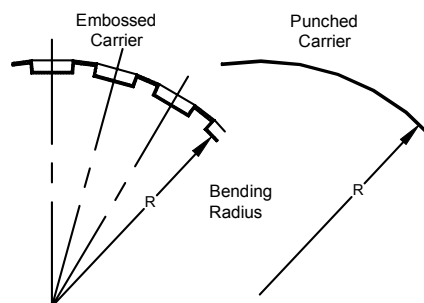
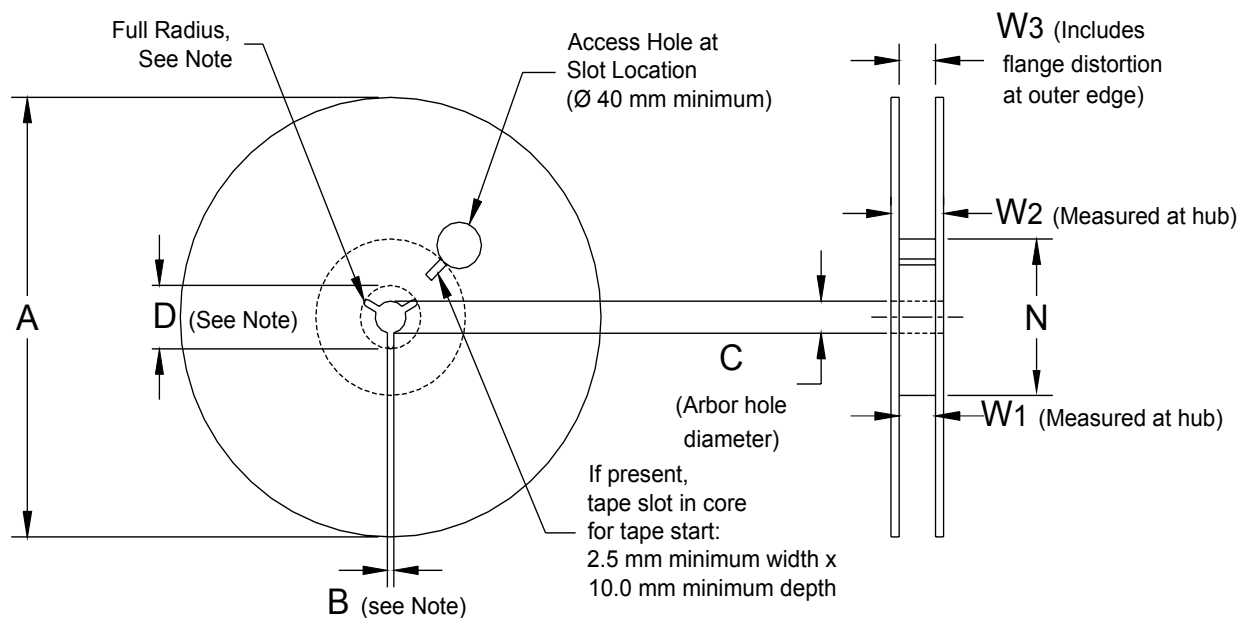


Figure 5 – Reel Dimensions

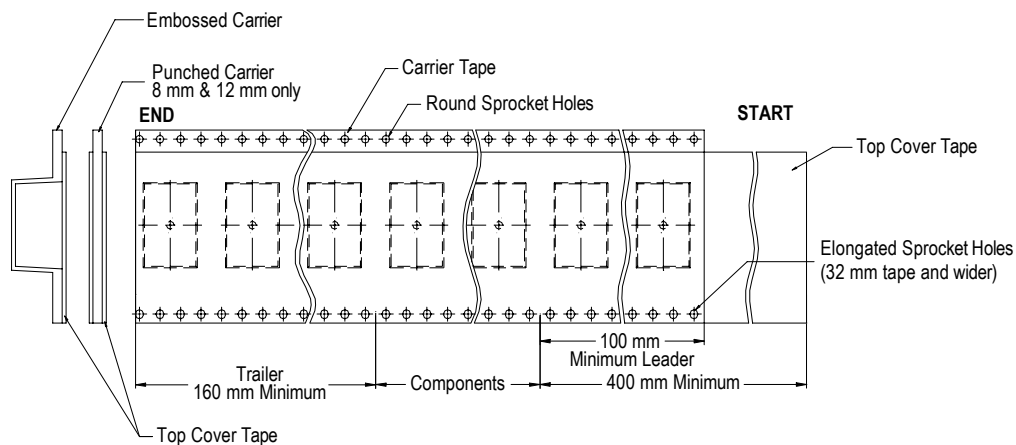
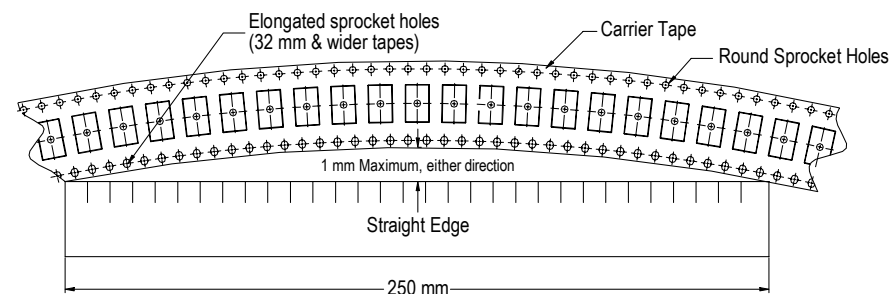


Note: Drive spokes optional; if used, dimensions B and D shall apply.

Table 5 – Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)				
Tape Size	A	B Minimum	C	D Minimum
8 mm	178 ±0.20 (7.008 ±0.008) or 330 ±0.20 (13.000 ±0.008)	1.5 (0.059)	13.0 +0.5/-0.2 (0.521 +0.02/-0.008)	20.2 (0.795)
12 mm				
16 mm				
Variable Dimensions — Millimeters (Inches)				
Tape Size	N Minimum	W ₁	W ₂ Maximum	W ₃
8 mm	50 (1.969)	8.4 +1.5/-0.0 (0.331 +0.059/-0.0)	14.4 (0.567)	Shall accommodate tape width without interference
12 mm		12.4 +2.0/-0.0 (0.488 +0.078/-0.0)	18.4 (0.724)	
16 mm		16.4 +2.0/-0.0 (0.646 +0.078/-0.0)	22.4 (0.882)	

Figure 6 – Tape Leader & Trailer Dimensions**Figure 7 – Maximum Camber**

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