

Tantalum Surface Mount Capacitors

High Reliability Commercial Off-The-Shelf (COTS)



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Electronic Components
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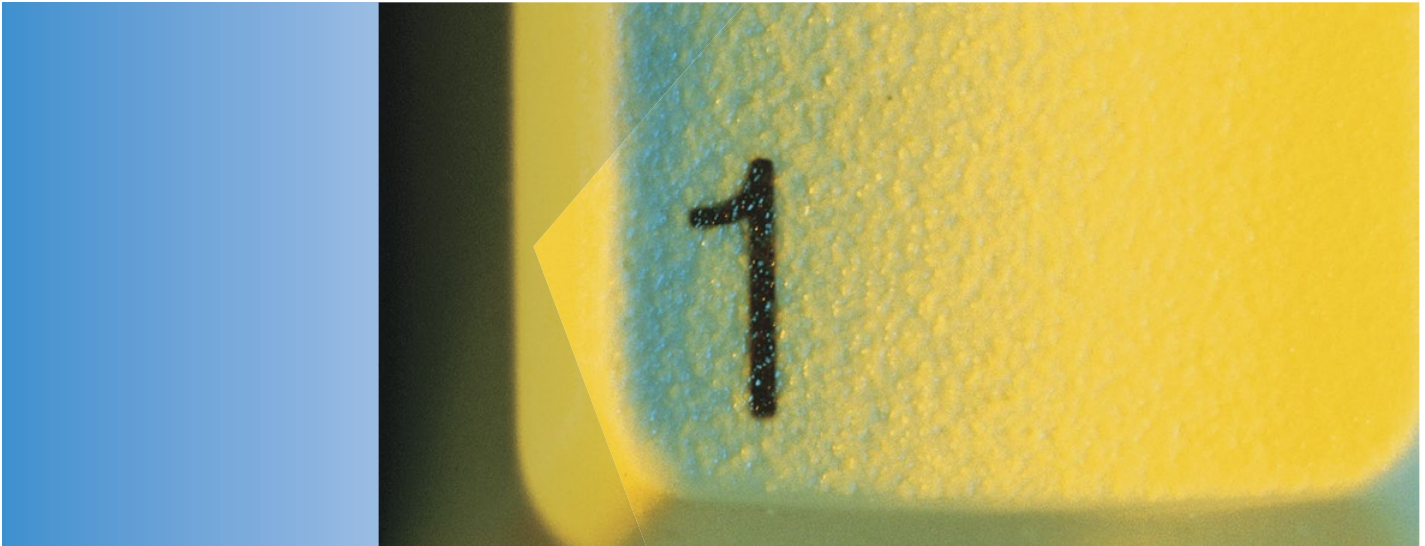
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One world. One source. One KEMET.

When you partner with KEMET, our entire global organization provides you with the coordinated service you need. No bouncing from supplier to supplier. No endless phone calls and web browsing. We're your single, integrated source for electronic component solutions worldwide.

Less hassles. More solutions.

Our commitment to product quality and on-time delivery has helped customers succeed for over 90 years. There's a reason KEMET components can be found in defense and aerospace equipment. Our reputation is built on a history of consistency, reliability and service.

The "Easy-to-Buy-From" company.

KEMET offers a level of responsiveness that far surpasses any other supplier. Our passion for customer service is evident throughout our global sales organization, which offers localized support bolstered by our worldwide logistics capabilities. Whether you need rush samples, technical assistance, in-person consultation, accelerated custom design, design collaboration or prototype services, we have a solution.



Made for you.

When you need custom products delivered on a tight schedule, you can trust KEMET. Get direct design consultation from global experts, who help you get the job done on time and within budget.

Working for a better world.

KEMET is dedicated to economically, environmentally and socially sustainable development. We've adopted the Electronic Industry Code of Conduct (EICC) to address all aspects of corporate responsibility. Our manufacturing facilities have won numerous environmental excellence awards and recognitions, and our supply chain is certified. We believe doing the right thing is in everyone's interest.

About KEMET.

KEMET Corporation is a leading global supplier of electronic components. We offer our customers the broadest selection of capacitor technologies in the industry across multiple dielectrics, along with an expanding range of electromechanical devices, and electromagnetic compatibility solutions. Our vision is to be the preferred supplier of electronic component solutions for customers demanding the highest standards of quality, delivery and service.

T428 Series High Volumetric Efficiency Facedown Commercial Off-The-Shelf (COTS) MnO₂

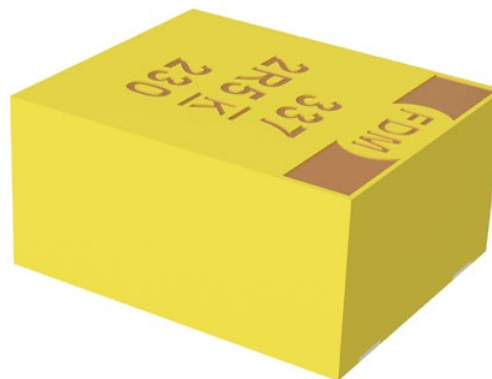
Overview

The KEMET T428 Series was developed to provide the volumetric efficiency of a conformally coated capacitor in a pick-and-place friendly molded package. The planerity of the molded package eliminates the “drops” associated with the conformally coated tantalum surface mount devices. This new package

design offers the highest CV/cc of any molded leadframe product. In addition, the facedown construction offers higher power ratings per cc. The robust design features and testing protocol make this part suitable for application in the telecommunications, industrial, military and aerospace markets.

Benefits

- High CV/cc
- Taped and reeled per EIA 481
- SnPb termination finish
- Laser-marked case
- 100% surge current test available
- Halogen-free epoxy
- Capacitance values of 15 to 470 µF
- Tolerances of ±5%, ±10%, and ±20%
- Voltage rating of 4 to 50 VDC
- Extended range values
- Pick-and-place friendly
- RoHS Compliant and lead-free terminations available
- Operating temperature range of -55°C to +125°C



Applications

Typical applications include decoupling and filtering in telecommunications, computer, industrial, defense and aerospace applications.

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	428	P	227	K	006	A	H	61	10
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Voltage	Failure Rate/Design	Lead Material	Surge	ESR
T = Tantalum	High Volumetric Efficient Facedown Hi-Rel MnO ₂ COTS	P	First two digits represent significant figures. Third digit specifies number of zeros.	J = ±5% K = ±10% M = ±20%	004 = 4 V 006 = 6.3 V 010 = 10 V 016 = 16 V 020 = 20 V 025 = 25 V 035 = 35 V 050 = 50 V	A = N/A B = 0.1%/1,000 hours	H = Standard solder coated (SnPb 5% Pb) T = 100% tin (Sn)	61 = None 62 = 10 cycles, 25°C 63 = 10 cycles, -55°C and 85°C	10 = Standard 20 = Low 30 = Ultra-low

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	-55°C to 125°C
Rated Capacitance Range	15 – 470 µF @ 120 Hz/25°C
Capacitance Tolerance	J Tolerance (5%), 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 (µA) at rated voltage after 5 minutes

Qualification

Test	Condition		Characteristics			
Endurance	85°C @ rated voltage, 2,000 hours 125°C @ 2/3 rated voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Storage Life	125°C @ 0 volts, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Thermal Shock	MIL–STD–202, Method 107, Condition B, mounted, -55°C to 125°C, 1,000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, -55°C, +25°C, +85°C, +125°C, +25°C	Δ C/C	+25°C	-55°C	+85°C	+125°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	85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage)		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10 of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
Additional Qualification Tests per MIL–PRF–55365/8	Please contact KEMET for more information.					

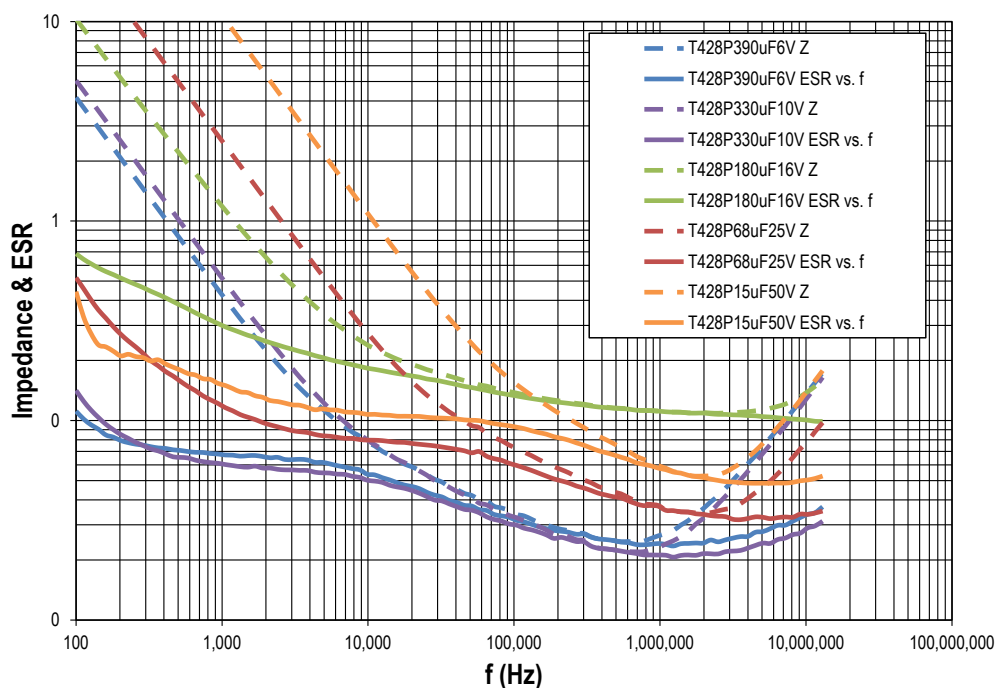
*IL = Initial limit

Certification

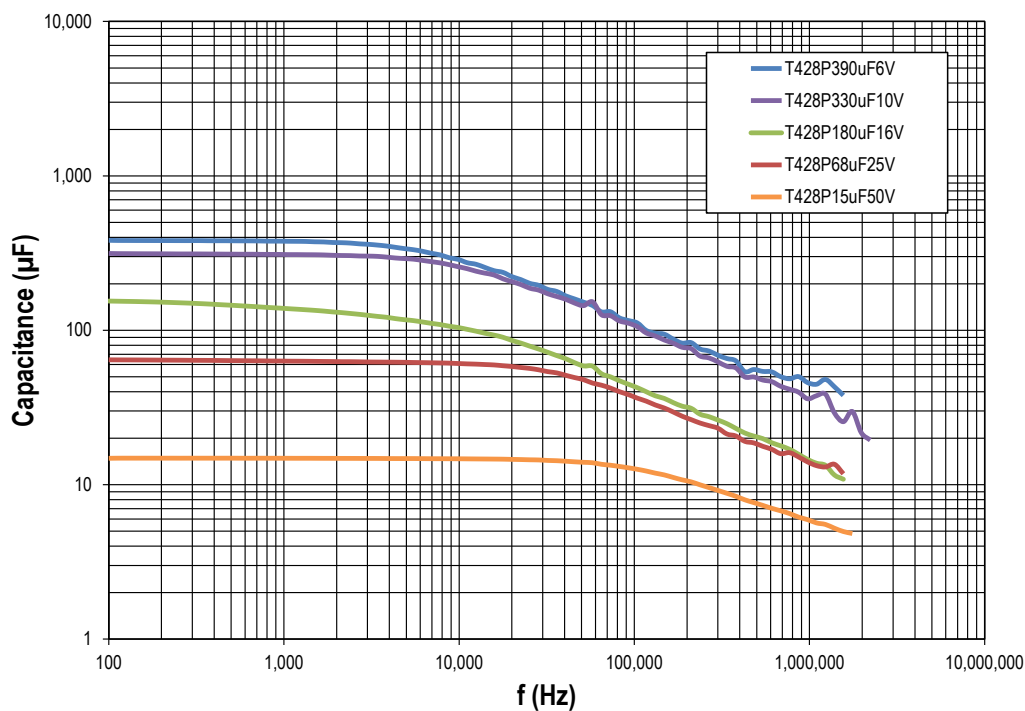
MIL-PRF-55365/8

Electrical Characteristics

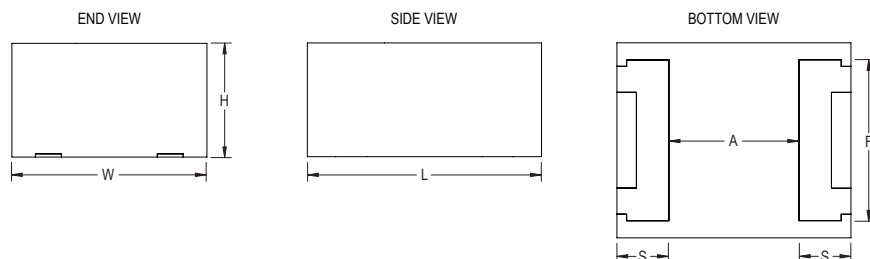
Impedance & ESR vs. Frequency



Capacitance vs. Frequency



Dimensions – Millimeters



Case Size	Component					
EIA	L Max	W ±0.3	H ±0.3	F ±0.20	S ±0.20	A (Nom)
7360-38	7.2	6.0	3.5	4.95	1.6	3.8

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Capacitance	Case Code/Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-Low ESR
VDC	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	mΩ @ +20°C 100 kHz Maximum	Ω @ +20°C 100 kHz Maximum
4	470	P/7360-38	T428P477(1)004(2)(3)(4)(5)	18.8	10.0	130	45	NA
6.3	390	P/7360-38	T428P397(1)006(2)(3)(4)(5)	24.6	8.0	130	45	NA
6.3	470	P/7360-38	T428P477(1)006(2)(3)(4)(5)	29.6	10.0	120	50	NA
10	330	P/7360-38	T428P337(1)010(2)(3)(4)(5)	33.0	8.0	130	45	NA
16	180	P/7360-38	T428P187(1)016(2)(3)(4)(5)	28.8	8.0	130	55	NA
16	220	P/7360-38	T428P227(1)016(2)(3)(4)(5)	35.2	8.0	120	55	NA
20	150	P/7360-38	T428P157(1)020(2)(3)(4)(5)	30.0	8.0	140	100	NA
25	68	P/7360-38	T428P686(1)025(2)(3)(4)(5)	17.0	6.0	200	95	NA
35	22	P/7360-38	T428P226(1)035(2)(3)(4)(5)	7.7	6.0	280	220	NA
50	15	P/7360-38	T428P156(1)050(2)(3)(4)(5)	7.5	6.0	400	350	NA
VDC	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	mΩ @ +20°C 100 kHz Maximum	Ω @ +20°C 100 kHz Maximum
Rated Voltage	Rated Capacitance	Case Code/Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-Low ESR

(1) To complete KEMET part number, insert J for ±5%, K for ±10% and M for ±20%. Designates capacitance tolerance.

(2) To complete KEMET part number, insert B (0.1%/1,000 hours) or A = N/A.

(3) To complete KEMET part number, insert H = solder plated or T = 100% tin (Sn). Designates termination finish.

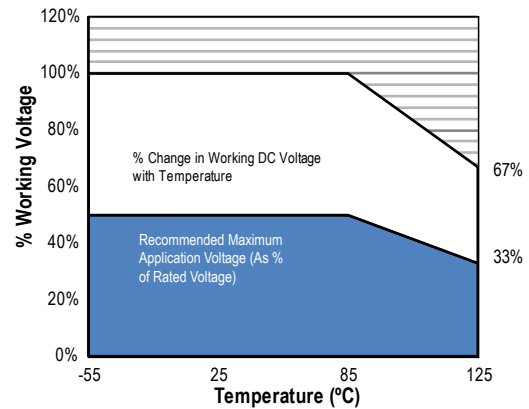
(4) To complete KEMET part number, insert 61 = none, 62 = 10 cycles +25°C or 63 = 10 cycles -55°C +85°C. Designates surge current option.

(5) To complete KEMET part number, insert 10 = standard, 20 = low or 30 = ultra-low. Designates ESR option.

Please refer to Ordering Information for additional details.

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
P	7360–38	325

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

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

T = Environmental Temperature

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

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

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

I = rms ripple current (amperes)

E = rms ripple voltage (volts)

P max = maximum power dissipation (watts)

R = ESR at specified frequency (ohms)

Z = Impedance at specified frequency (ohms)

Reverse Voltage

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

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

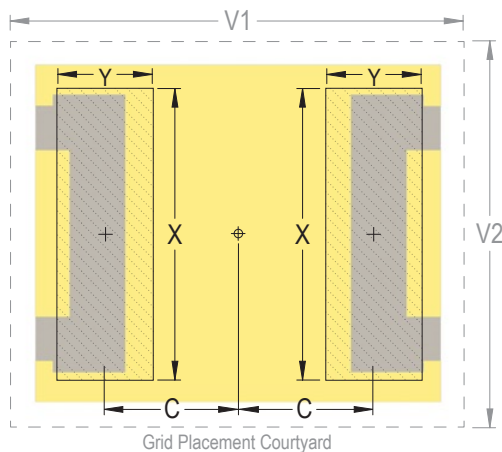
Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	X	Y	C	V1	V2	X	Y	C	V1	V2	X	Y	C	V1	V2
P	7360-38	5.25	1.80	2.35	8.50	7.30	5.15	1.70	2.35	8.00	6.80	5.05	1.60	2.35	7.70	6.50

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).



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.

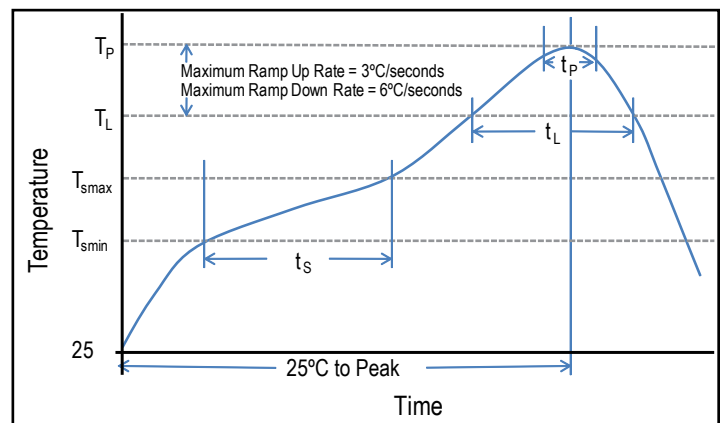
During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

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

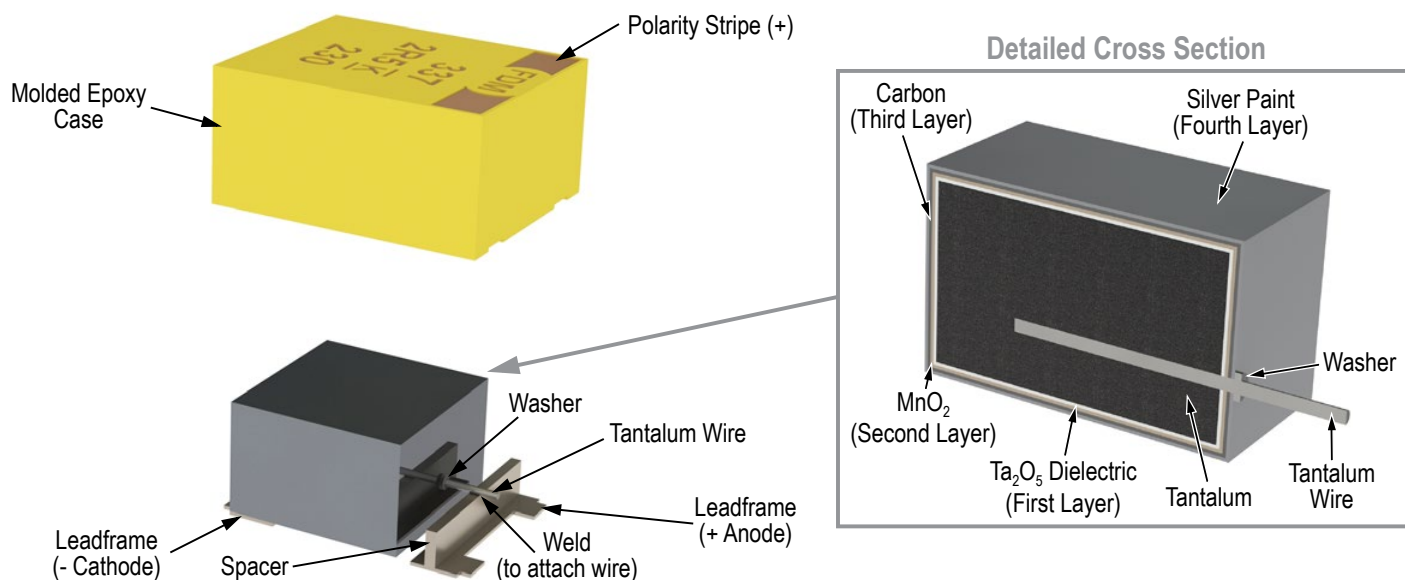
**Case Size A, B, C, H, I, K, M, R, S, T, U, V, W, and Z



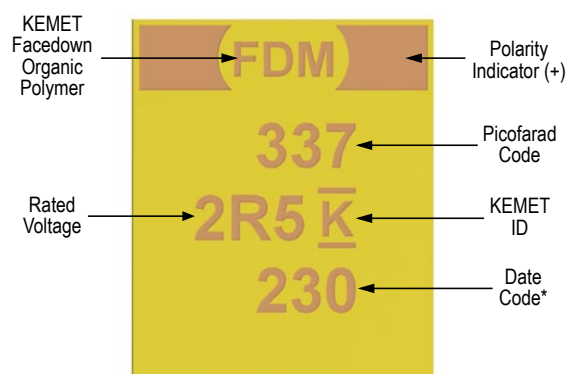
Storage

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

T493 Series Commercial Off-The-Shelf (COTS) MnO₂ (CWR11 Style)

Overview

The KEMET T493 Series is designed for the Commercial Off-The-Shelf (COTS) requirements of military and aerospace applications. This series is a surface mount product offering various lead-frame plating options, Weibull grading options, surge current testing, F-Tech (an improved anode manufacturing process) and Simulated Breakdown Voltage (SBDV) screening options to improve long term reliability. Standard, low, and ultra-low ESR options are available. All lots of this series are conditioned with MIL-PRF-55365 Group A testing. This series is also approved for DSCC Drawing 07016 (please see part number list specific to this drawing).

KEMET's F-Tech eliminates hidden defects in the dielectric which continue to grow in the field, causing capacitor failures. Based on the fundamental understanding of degradation mechanisms in tantalum and niobium capacitors, F-Tech incorporates multiple process methodologies. Some minimize the oxygen and carbon content in the anodes which become contaminants and can lead to the crystallization of the anodic oxide dielectric. This process methodology reduces the contaminants, improving quality of the dielectric. An additional technology provides a stronger mechanical connection point between the tantalum lead wire and tantalum anode, enhancing robustness and product reliability. The benefit of F-Tech is illustrated by a 2,000 hour, 85°C, 1.32 X rated voltage accelerated life test. F-Tech parts see no degradation while standard tantalums have 1.5 orders of magnitude degradation in leakage current. F-Tech is currently available for

T493 Series (select D and X case capacitance values in 20 V and higher rated voltage). Please contact KEMET for details on ordering other part types with these capabilities.

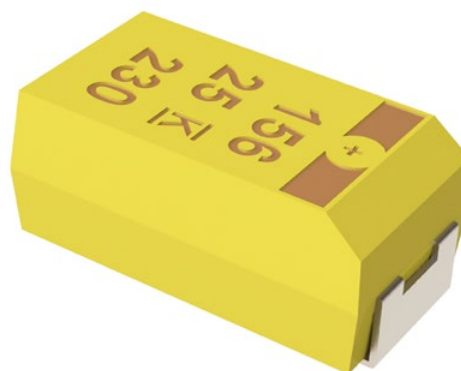
KEMET's patented Simulated Breakdown Screening (SBDS) is a nondestructive testing technique that simulates the breakdown voltage (BDV) of a capacitor without damage to its dielectric or to the general population of capacitors. This screening identifies hidden defects in the dielectric, providing the highest level of dielectric testing. SBDS is based on the simulation of breakdown voltage (BDV), the ultimate test of the dielectric in a capacitor.

Low BDV indicates defects in the dielectric, and therefore, a higher probability of failure in the field. High BDV indicates a stronger dielectric and high-reliability performance in the field. This new screening method allows KEMET to identify the breakdown voltage of each individual capacitor and provide only the strongest capacitors from each lot.

SBDS is currently available on select part types in the T493 and T497 Series. Please contact KEMET for details on ordering other part types with these capabilities.

KEMET offers these technologies per the following options:

- F-Tech only
- SBDS only
- Combination of both F-Tech and SBDS for the ultimate protection



Benefits

- F-Tech and Simulated Breakdown Voltage (SBDS) screening options available
- Taped and reeled per EIA 481
- Symmetrical, compliant terminations
- Laser-marked case
- 100% surge current test available on all case sizes
- Termination options B, C, H, K, T, N & M
- Weibull failure options B and C
- Voltage rating of 4 – 63 VDC
- Operating temperature range of -55°C to +125°C
- Capacitance values of 0.1 µF to 470 µF
- 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.



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	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, B, C, D, E, X	First two digits represent significant figures. Third digit specifies number of zeros.	J = ±5% K = ±10% M = ±20%	004 = 4 V 006 = 6.3 V 010 = 10 V 016 = 16 V 020 = 20 V 025 = 25 V 035 = 35 V 050 = 50 V 063 = 63 V	A = N/A B = 0.1%/1,000 hours C = 0.01%/1,000 hours	C = Hot Solder Dipped H = Standard Solder Coated (SnPb 5% Pb minimum) B = Gold Plated K = Solder Fused T = 100% Tin N = Non-Magnetic 100% Tin (Sn) M = Non-Magnetic (SnPb)	61 = None 62 = 10 Cycles after Weibull, 25°C 63 = 10 cycles after Weibull, -55°C and 85°C after Weibull 64 = 10 cycles before Weibull, -55° and +85°C	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 Part Number Reference	J = ±5% K = ±10% M = ±20%	B = 0.1%/1,000 hours C = 0.01%/1,000 hours	C = Hot Solder Dipped H = Standard Solder Coated (SnPb 5% Pb minimum) B = Gold Plated	A = + 25°C after Weibull B = -55°C and +85°C after Weibull C = -55°C and + 85°C before Weibull Z or no option= No test required

Ordering Information – F-Tech +SBDS

T	493	D	226	K	020	C	H	61	20
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Voltage	Failure Rate/ Design	Lead Material	Surge	Screening + ESR
T = Tantalum	Military COTS	A, B, C, D, E, X	First two digits represent significant figures. Third digit specifies number of zeros.	J = ±5% K = ±10% M = ±20%	020 = 20V 025 = 25V 035 = 35V 050 = 50V 063 = 63V	A = N/A B = 0.1%/1,000 hours C = 0.01%/1,000 hours	C = Hot Solder Dipped H = Standard Solder Coated (SnPb 5% Pb minimum) B = Gold Plated K = Solder Fused K = Solder Fused T = 100% Tin N = Non-Magnetic 100% Tin (Sn) M = Non-Magnetic (SnPb)	61 = None 62 = 10 Cycles after Weibull, 25°C 63 = 10 cycles after Weibull, -55°C and 85°C after Weibull 64 = 10 cycles before Weibull, -55° and +85°C	11 = F-Tech + SBDS * 12 = SBDS 13 = F-Tech * 21 = Low ESR + 11 22= Low ESR + 12 23 = Low ESR + 13 31= Ultra Low ESR + 11 32 = Ultra Low ESR + 12 33 = Ultra Low ESR + 13

* Select "C", "D" and "X" case sizes in 20V and higher rated voltage

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	-55°C to 125°C
Rated Capacitance Range	0.1 – 330 µF @ 120 Hz/25°C
Capacitance Tolerance	J Tolerance (5%), K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	4 – 63 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01 CV (µA) at rated voltage after 5 minutes

Qualification

Test	Condition		Characteristics			
Endurance	85°C @ rated voltage, 2,000 hours 125°C @ 2/3 rated voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Storage Life	125°C @ 0 volts, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Thermal Shock	MIL–STD–202, Method 107, Condition B, mounted, -55°C to 125°C, 1,000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, -55°C, +25°C, +85°C, +125°C, +25°C	Δ C/C	+25°C	-55°C	+85°C	+125°C
		IL*	±10%	±10%	±15%	
		DF	IL	IL	1.5 x IL	1.5 x IL
		DCL	IL	n/a	10 x IL	12 x IL
Surge Voltage	25°C and 85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage)		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		

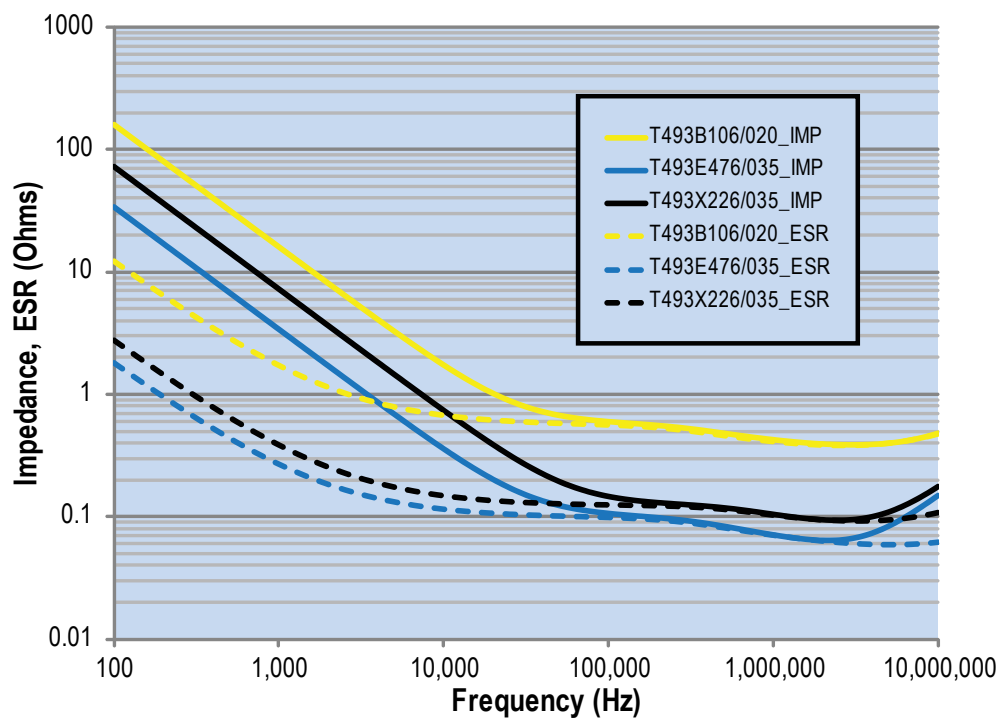
*IL = Initial limit

Certification

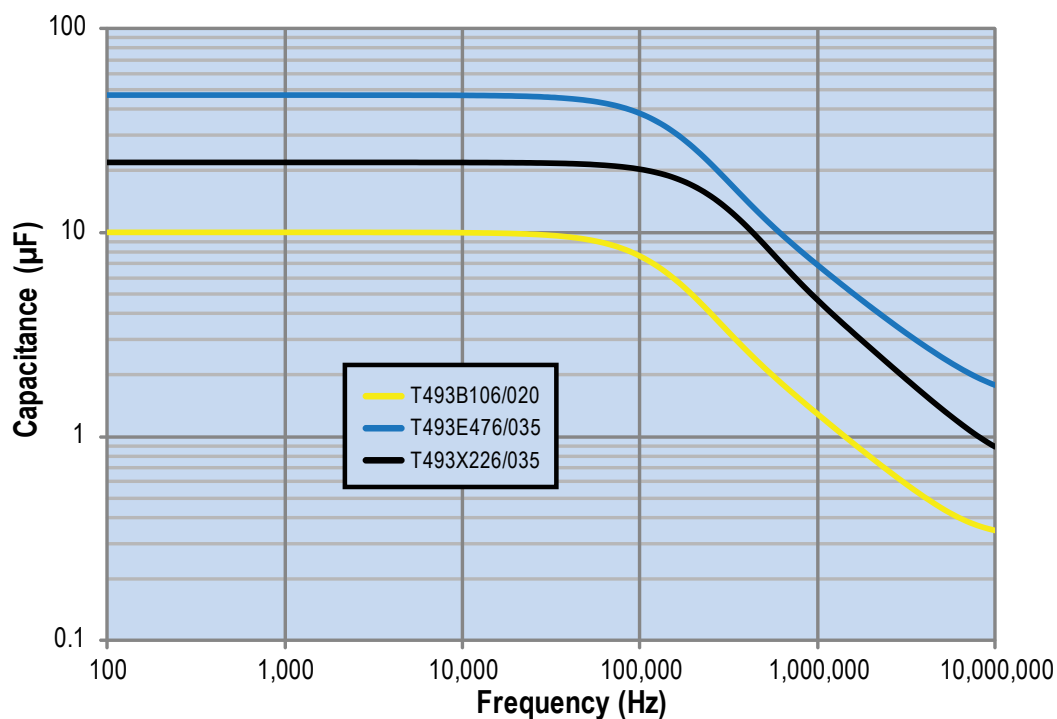
MIL-PRF-55365/8
DSCC Drawing 07016

Electrical Characteristics

ESR vs. Frequency



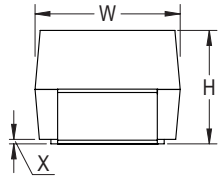
Capacitance vs. Frequency



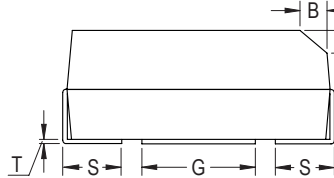
Dimensions – Millimeters (Inches)

Metric will govern

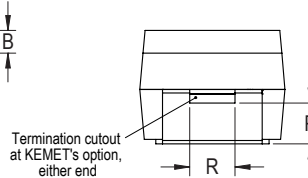
CATHODE (-) END VIEW



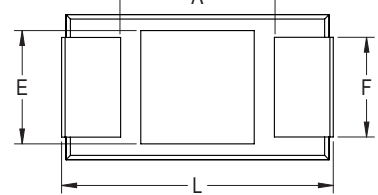
SIDE VIEW



ANODE (+) END VIEW



BOTTOM VIEW



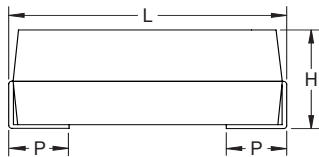
Case Size		Component												
KEMET	EIA	L*	W*	H*	F* ±0.1 ±(.004)	S* ±0.3 ±(.012)	B* ±0.15 (Ref) ±.006	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)
A	3216-18	3.2 ±0.2 (0.126 ±0.008)	1.6 ±0.2 (0.063 ±0.008)	1.6 ±0.2 (0.063 ±0.008)	1.2 (.047)	0.8 (.031)	0.4 (.016)	0.10 ± 0.10 (.004 ± .004)	0.4 (0.016)	0.4 (0.016)	0.13 (0.005)	0.8 (0.031)	1.1 (.043)	1.3 (.051)
B	3528-21	3.5 ±0.2 (0.138 ±0.008)	2.8 ±0.2 (0.110 ±0.008)	1.9 ±0.2 (0.075 ±0.008)	2.2 (.087)	0.8 (.031)	0.4 (.016)	0.10 ± 0.10 (.004 ± .004)	0.5 (0.020)	1.0 (0.039)	0.13 (0.005)	1.1 (0.043)	1.8 (.071)	2.2 (.087)
C	6032-28	6.0 ±0.3 (0.236 ±0.012)	3.2 ±0.3 (0.126 ±0.012)	2.5 ±0.3 (0.098 ±0.012)	2.2 (.087)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	2.5 (0.098)	2.8 (.110)	2.4 (.094)
D	7343-31	7.3 ±0.3 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	2.8 ±0.3 (0.110 ±0.012)	2.4 (.094)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	0.9 (0.035)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (.138)	3.5 (.138)
X	7343-43	7.3 ±0.3 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	4.0 ±0.3 (0.157 ±0.012)	2.4 (.094)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	1.7 (0.067)	1.0 (0.039)	0.13 (0.005)	3.8 (0.150)	3.5 (.138)	3.5 (.138)
E	7360-38	7.3 ±0.3 (0.287 ±0.012)	6.0 ±0.3 (0.236 ±0.012)	3.6 ±0.2 (0.142 ±0.008)	4.1 (.161)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	n/a	n/a	0.13 (0.005)	3.8 (0.150)	3.5 (.138)	3.5 (.138)

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

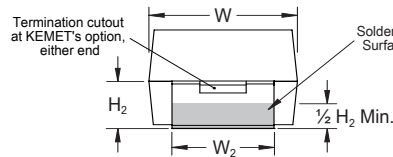
* MIL-PRF-55365/8 specified dimensions

Dimensions – Millimeters (Inches) DSCC 07016

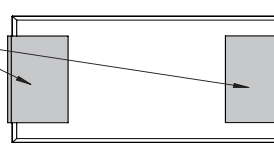
SIDE VIEW



END VIEW



BOTTOM VIEW



Case Size		Component				
KEMET	H*	H ₂ Minimum	L	P +/- 0.3 (0.012)	W	W ₂ +/- 0.1 (0.004)
A	1.6 ±0.2 (0.063 ±0.008)	0.7 (0.028)	3.2 ±0.2 (0.126 ±0.008)	0.8 (0.031)	1.6 ±0.2 (0.063 ±0.008)	1.2 (0.047)
B	1.9 ±0.2 (0.075 ±0.008)	0.7 (0.028)	3.5 ±0.2 (0.138 ±0.008)	0.8 (0.031)	2.8 ±0.2 (0.110 ±0.008)	2.2 (0.087)
C	2.5 ±0.3 (0.098 ±0.012)	1.0 (0.039)	6.0 ±0.3 (0.236 ±0.012)	1.3 (0.051)	3.2 ±0.3 (0.126 ±0.012)	2.2 (0.087)
D	2.8 ±0.3 (0.110 ±0.012)	1.0 (0.039)	7.3 ±0.3 (0.287 ±0.012)	1.3 (0.051)	4.3 ±0.3 (0.169 ±0.012)	2.4 (0.094)

Table 1A – Ratings & Part Number Reference

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Moisture Sensitivity
VDC	μF	KEMET/EIA	(See below for part options)	μAmps +25°C Maximum/ 5 Minutes	% @ +25°C 120 Hz Maximum	Ω @ 25°C 100 kHz Maximum	Ω @ 25°C 100 kHz Maximum	Ω @ 25°C 100 kHz Maximum	Reflow Temperature ≤ 260°C
4	2.2	A/3216-18	T493A225(1)004(2)(3)(4)(5)	0.5	6.0	8.0	6.0	N/A	1
4	3.3	A/3216-18	T493A335(1)004(2)(3)(4)(5)	0.5	6.0	8.0	4.0	N/A	1
4	4.7	A/3216-18	T493A475(1)004(2)(3)(4)(5)	0.5	6.0	8.0	3.5	N/A	1
4	6.8	A/3216-18	T493A685(1)004(2)(3)(4)(5)	0.5	6.0	6.0	3.0	N/A	1
4	6.8	B/3528-21	T493B685(1)004(2)(3)(4)(5)	0.5	6.0	5.5	2.0	N/A	1
4	10	A/3216-18	T493A106(1)004(2)(3)(4)(5)	0.5	6.0	6.0	2.0	N/A	1
4	10	B/3528-21	T493B106(1)004(2)(3)(4)(5)	0.5	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	A/3216-18	T493A107(1)004(2)(3)(4)(5)	4	30.0	1.4	N/A	N/A	1
4	100	B/3528-21	T493B107(1)004(2)(3)(4)(5)	4	8.0	1.0	0.7	0.50	1
4	100	C/6032-28	T493C107(1)004(2)(3)(4)(5)	4	8.0	1.2	0.2	N/A	1
4	100	D/7343-31	T493D107(1)004(2)(3)(4)(5)	4	8.0	0.8	0.2	N/A	1
4	150	C/6032-28	T493C157(1)004(2)(3)(4)(5)	6	8.0	1.2	0.3	0.25	1
4	150	D/7343-31	T493D157(1)004(2)(3)(4)(5)	6	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)	0.5	6.0	8.0	6.0	N/A	1
6.3	2.2	A/3216-18	T493A225(1)006(2)(3)(4)(5)	0.5	6.0	8.0	6.0	N/A	1
6.3	3.3	A/3216-18	T493A335(1)006(2)(3)(4)(5)	0.5	6.0	8.0	6.0	N/A	1
6.3	4.7	A/3216-18	T493A475(1)006(2)(3)(4)(5)	0.5	6.0	6.0	3.5	N/A	1
6.3	4.7	B/3528-21	T493B475(1)006(2)(3)(4)(5)	0.5	6.0	5.5	3.5	N/A	1
6.3	6.8	A/3216-18	T493A685(1)006(2)(3)(4)(5)	0.5	6.0	6.0	2.0	N/A	1
6.3	6.8	B/3528-21	T493B685(1)006(2)(3)(4)(5)	0.5	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	N/A	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)	μAmps +20°C Maximum/ 5 Minutes	% @ +25°C 120 Hz Maximum	Ω @ 25°C 100 kHz Maximum	Ω @ 25°C 100 kHz Maximum	Ω @ 25°C 100 kHz Maximum	Reflow Temperature ≤ 260°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Moisture Sensitivity

- (1) To complete KEMET part number, insert M for ± 20%, K for ± 10% or J for 5%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert B (0.1%/1000Hrs), C (0.01%/1000Hrs) or A = N/A. Designates Reliability Level.
(3) To complete KEMET part number, insert B = Gold Plated, 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 = None, 62 = 10 cycles +25°C, 63 = 10 cycles -55°C +85°C after Weibull 64 = 10 cycles -55°C +85°C before Weibull or 6(X)11, 6(X)12, 6(X)13, 6(X)21, 6(X)22, 6(X)23, 6(X)31, 6(X)32, 6(X)33. Designates screening options.
(5) To complete KEMET part number, insert 10 = Standard ESR, 20 = Low ESR or 30 = Ultra Low ESR. Designates ESR option.
Refer to Ordering Information for additional detail.

Table 1A – Ratings & Part Number Reference cont'd

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Moisture Sensitivity
VDC	μF	KEMET/EIA	(See below for part options)	μAmps +25°C Maximum/ 5 Minutes	% @ +25°C 120 Hz Maximum	Ω @ 25°C 100 kHz Maximum	Ω @ 25°C 100 kHz Maximum	Ω @ 25°C 100 kHz Maximum	Reflow Temperature ≤ 260°C
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)	0.5	4.0	10.0	6.0	N/A	1
10	1.5	A/3216-18	T493A155(1)010(2)(3)(4)(5)	0.5	6.0	8.0	6.0	N/A	1
10	2.2	A/3216-18	T493A225(1)010(2)(3)(4)(5)	0.5	6.0	8.0	6.0	N/A	1
10	3.3	A/3216-18	T493A335(1)010(2)(3)(4)(5)	0.5	6.0	6.0	4.0	N/A	1
10	3.3	B/3528-21	T493B335(1)010(2)(3)(4)(5)	0.5	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	6.0	4.0	1.8	N/A	1
10	10	B/3528-21	T493B106(1)010(2)(3)(4)(5)	1	6.0	3.5	0.8	0.75	1
10	10	C/6032-28	T493C106(1)010(2)(3)(4)(5)	1	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	N/A	1
10	100	C/6032-28	T493C107(1)010(2)(3)(4)(5)	10	8.0	1.2	0.3	N/A	1
10	100	D/7343-31	T493D107(1)010(2)(3)(4)(5)	10	8.0	0.7	0.1	0.08	1
10	150	D/7343-31	T493D157(1)010(2)(3)(4)(5)	15	8.0	0.7	0.1	0.08	1
10	150	X/7343-43	T493X157(1)010(2)(3)(4)(5)	15	8.0	0.7	0.2	0.09	1
10	220	D/7343-31	T493D227(1)010(2)(3)(4)(5)	22	8.0	0.5	0.2	0.08	1
10	220	X/7343-43	T493X227(1)010(2)(3)(4)(5)	22	8.0	0.5	0.1	0.05	1
10	330	X/7343-43	T493X337(1)010(2)(3)(4)(5)	33	10.0	0.5	0.1	0.05	1
10	470	X/7343-43	T493X477(1)010(2)(3)(4)(5)	47	10.0	0.2	0.05	N/A	1
16	0.68	A/3216-18	T493A684(1)016(2)(3)(4)(5)	0.5	6.0	12.0	8.0	N/A	1
16	1	A/3216-18	T493A105(1)016(2)(3)(4)(5)	0.5	4.0	10.0	6.0	N/A	1
VDC	μF	KEMET/EIA	(See below for part options)	μAmps +20°C Maximum/ 5 Minutes	% @ +25°C 120 Hz Maximum	Ω @ 25°C 100 kHz Maximum	Ω @ 25°C 100 kHz Maximum	Ω @ 25°C 100 kHz Maximum	Reflow Temperature ≤ 260°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Moisture Sensitivity

(1) To complete KEMET part number, insert M for ± 20%, K for ± 10% or J for 5%. Designates Capacitance tolerance.

(2) To complete KEMET part number, insert B (0.1%/1000Hrs), C (0.01%/1000Hrs) or A = N/A. Designates Reliability Level.

(3) To complete KEMET part number, insert B = Gold Plated, 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 = None, 62 = 10 cycles +25°C, 63 = 10 cycles -55°C +85°C after Weibull 64 = 10 cycles -55°C +85°C before Weibull or 6(X)11, 6(X)12, 6(X)13, 6(X)21, 6(X)22, 6(X)23, 6(X)31, 6(X)32, 6(X)33. Designates screening options.

(5) To complete KEMET part number, insert 10 = Standard ESR, 20 = Low ESR or 30 = Ultra Low ESR. Designates ESR option.

Refer to Ordering Information for additional detail.

Table 1A – Ratings & Part Number Reference cont'd

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Moisture Sensitivity
VDC	μF	KEMET/EIA	(See below for part options)	μAmps +25°C Maximum/ 5 Minutes	% @ +25°C 120 Hz Maximum	Ω @ 25°C 100 kHz Maximum	Ω @ 25°C 100 kHz Maximum	Ω @ 25°C 100 kHz Maximum	Reflow Temperature ≤ 260°C
16	1.5	A/3216-18	T493A155(1)016(2)(3)(4)(5)	0.5	6.0	8.0	6.0	N/A	1
16	2.2	A/3216-18	T493A225(1)016(2)(3)(4)(5)	0.5	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	A/3216-18	T493A106(1)016(2)(3)(4)(5)	1.6	6.0	3.0	N/A	N/A	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	N/A	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	8.0	0.7	0.125	0.10	1
16	100	X/7343-43	T493X107(1)016(2)(3)(4)(5)	16	8.0	0.7	0.1	0.08	1
16	150	D/7343-31	T493D157(1)016(2)(3)(4)(5)	24	8.0	0.7	0.4	0.15	1
16	150	X/7343-43	T493X157(1)016(2)(3)(4)(5)	24	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)	0.5	4.0	14.0	9.0	N/A	1
20	0.68	A/3216-18	T493A684(1)020(2)(3)(4)(5)	0.5	4.0	12.0	8.0	N/A	1
20	1	A/3216-18	T493A105(1)020(2)(3)(4)(5)	0.5	4.0	10.0	5.5	N/A	1
20	1.5	A/3216-18	T493A155(1)020(2)(3)(4)(5)	0.5	6.0	8.0	4.5	N/A	1
20	1.5	B/3528-21	T493B155(1)020(2)(3)(4)(5)	0.5	6.0	6.0	4.0	N/A	1
20	2.2	A/3216-18	T493A225(1)020(2)(3)(4)(5)	0.5	6.0	7.0	4.0	N/A	1
20	2.2	B/3528-21	T493B225(1)020(2)(3)(4)(5)	0.5	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	6.0	3.0	1.0	N/A	1
20	10	C/6032-28	T493C106(1)020(2)(3)(4)(5)	2	6.0	1.8	0.5	0.48	1
20	15	C/6032-28	T493C156(1)020(2)(3)(4)(5)	3	6.0	1.7	0.4	0.38	1
20	15	D/7343-31	T493D156(1)020(2)(3)(4)(5)	3	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
20	47	D/7343-31	T493D476(1)020(2)(3)(4)(5)	9.4	6.0	0.7	0.2	0.10	1
VDC	μF	KEMET/EIA	(See below for part options)	μAmps +20°C Maximum/ 5 Minutes	% @ +25°C 120 Hz Maximum	Ω @ 25°C 100 kHz Maximum	Ω @ 25°C 100 kHz Maximum	Ω @ 25°C 100 kHz Maximum	Reflow Temperature ≤ 260°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Moisture Sensitivity

- (1) To complete KEMET part number, insert M for ± 20%, K for ± 10% or J for 5%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert B (0.1%/1000Hrs), C (0.01%/1000Hrs) or A = N/A. Designates Reliability Level.
(3) To complete KEMET part number, insert B = Gold Plated, 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 = None, 62 = 10 cycles +25°C, 63 = 10 cycles -55°C +85°C after Weibull 64 = 10 cycles -55°C +85°C before Weibull or 6(X)11, 6(X)12, 6(X)13, 6(X)21, 6(X)22, 6(X)23, 6(X)31, 6(X)32, 6(X)33. Designates screening options.
(5) To complete KEMET part number, insert 10 = Standard ESR, 20 = Low ESR or 30 = Ultra Low ESR. Designates ESR option.
Refer to Ordering Information for additional detail.

Table 1A – Ratings & Part Number Reference cont'd

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Moisture Sensitivity
VDC	μF	KEMET/EIA	(See below for part options)	μAmps +25°C Maximum/ 5 Minutes	% @ +25°C 120 Hz Maximum	Ω @ 25°C 100 kHz Maximum	Ω @ 25°C 100 kHz Maximum	Ω @ 25°C 100 kHz Maximum	Reflow Temperature ≤ 260°C
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)	0.5	4.0	15.0	10.0	N/A	1
25	0.47	A/3216-18	T493A474(1)025(2)(3)(4)(5)	0.5	4.0	14.0	9.0	N/A	1
25	0.68	A/3216-18	T493A684(1)025(2)(3)(4)(5)	0.5	4.0	10.0	6.0	N/A	1
25	0.68	B/3528-21	T493B684(1)025(2)(3)(4)(5)	0.5	4.0	7.5	5.5	N/A	1
25	1	A/3216-18	T493A105(1)025(2)(3)(4)(5)	0.5	4.0	8.0	4.0	N/A	1
25	1	B/3528-21	T493B105(1)025(2)(3)(4)(5)	0.5	4.0	5.0	2.0	N/A	1
25	1.5	A/3216-18	T493A155(1)025(2)(3)(4)(5)	0.5	6.0	10.0	3.0	N/A	1
25	1.5	B/3528-21	T493B155(1)025(2)(3)(4)(5)	0.5	6.0	5.0	1.5	N/A	1
25	2.2	A/3216-18	T493A225(1)025(2)(3)(4)(5)	0.6	6.0	7.0	N/A	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	A/3216-18	T493A475(1)025(2)(3)(4)(5)	1.2	6.0	3.1	N/A	N/A	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	B/3528-21	T493B685(1)025(2)(3)(4)(5)	1.7	6.0	2.8	0.7	N/A	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	N/A	1
25	22	C/6032-28	T493C226(1)025(2)(3)(4)(5)	5.5	6.0	0.4	0.275	N/A	1
25	22	D/7343-31	T493D226(1)025(2)(3)(4)(5)	5.5	6.0	0.8	0.2	N/A	1
25	22	X/7343-43	T493X226(1)025(2)(3)(4)(5)	5.5	4.0	0.7	0.23	N/A	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
25	68	X/7343-43	T493X686(1)025(2)(3)(4)(5)	17	8.0	0.3	N/A	N/A	1
25	68	E/7360-38	T493E686(1)025(2)(3)(4)(5)	17	8.0	0.1	N/A	N/A	1
35	0.1	A/3216-18	T493A104(1)035(2)(3)(4)(5)	0.5	4.0	20.0	10.0	N/A	1
35	0.15	A/3216-18	T493A154(1)035(2)(3)(4)(5)	0.5	4.0	19.0	6.0	N/A	1
35	0.22	A/3216-18	T493A224(1)035(2)(3)(4)(5)	0.5	4.0	18.0	6.0	N/A	1
35	0.33	A/3216-18	T493A334(1)035(2)(3)(4)(5)	0.5	4.0	15.0	6.0	N/A	1
35	0.47	A/3216-18	T493A474(1)035(2)(3)(4)(5)	0.5	4.0	14.0	4.0	N/A	1
35	0.47	B/3528-21	T493B474(1)035(2)(3)(4)(5)	0.5	4.0	8.0	2.5	1.5	1
35	0.68	A/3216-18	T493A684(1)035(2)(3)(4)(5)	0.5	4.0	10.0	6.0	N/A	1
35	0.68	B/3528-21	T493B684(1)035(2)(3)(4)(5)	0.5	4.0	6.5	2.5	N/A	1
35	1	A/3216-18	T493A105(1)035(2)(3)(4)(5)	0.5	4.0	10.0	6.0	N/A	1
35	1	B/3528-21	T493B105(1)035(2)(3)(4)(5)	0.5	4.0	5.0	2.0	1.5	1
35	1.5	A/3216-18	T493A155(1)035(2)(3)(4)(5)	0.5	6.0	7.5	N/A	N/A	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
VDC	μF	KEMET/EIA	(See below for part options)	μAmps +20°C Maximum/ 5 Minutes	% @ +25°C 120 Hz Maximum	Ω @ 25°C 100 kHz Maximum	Ω @ 25°C 100 kHz Maximum	Ω @ 25°C 100 kHz Maximum	Reflow Temperature ≤ 260°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Moisture Sensitivity

(1) To complete KEMET part number, insert M for ± 20%, K for ± 10% or J for 5%. Designates Capacitance tolerance.

(2) To complete KEMET part number, insert B (0.1%/1000Hrs), C (0.01%/1000Hrs) or A = N/A. Designates Reliability Level.

(3) To complete KEMET part number, insert B = Gold Plated, 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 = None, 62 = 10 cycles +25°C, 63 = 10 cycles -55°C +85°C after Weibull 64 = 10 cycles -55°C +85°C before Weibull or 6(X)11, 6(X)12, 6(X)13, 6(X)21, 6(X)22, 6(X)23, 6(X)31, 6(X)32, 6(X)33. Designates screening options.

(5) To complete KEMET part number, insert 10 = Standard ESR, 20 = Low ESR or 30 = Ultra Low ESR. Designates ESR option.

Refer to Ordering Information for additional detail.

Table 1A – Ratings & Part Number Reference cont'd

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Moisture Sensitivity
VDC	μF	KEMET/EIA	(See below for part options)	μAmps +25°C Maximum/ 5 Minutes	% @ +25°C 120 Hz Maximum	Ω @ 25°C 100 kHz Maximum	Ω @ 25°C 100 kHz Maximum	Ω @ 25°C 100 kHz Maximum	Reflow Temperature ≤ 260°C
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
35	4.7	B/3528-21	T493B475(1)035(2)(3)(4)(5)	1.6	6.0	1.5	N/A	N/A	1
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	C/6032-28	T493C156(1)035(2)(3)(4)(5)	5.3	6.0	0.45	N/A	N/A	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	D/7343-31	T493D336M035(2)(3)(4)(5)	11.6	6.0	0.3	N/A	N/A	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	X/7343-43	T493X476(1)035(2)(3)(4)(5)	16.5	6.0	0.3	N/A	N/A	1
35	47	E/7360-38	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)	0.5	4.0	20.0	10.0	N/A	1
50	0.15	A/3216-18	T493A154(1)050(2)(3)(4)(5)	0.5	4.0	19.0	10.0	N/A	1
50	0.15	B/3528-21	T493B154(1)050(2)(3)(4)(5)	0.5	4.0	16.0	10.0	N/A	1
50	0.22	A/3216-18	T493A224(1)050(2)(3)(4)(5)	0.5	4.0	18.0	N/A	N/A	1
50	0.22	B/3528-21	T493B224(1)050(2)(3)(4)(5)	0.5	4.0	14.0	10.0	N/A	1
50	0.33	B/3528-21	T493B334(1)050(2)(3)(4)(5)	0.5	4.0	10.0	2.5	N/A	1
50	0.47	B/3528-21	T493B474(1)050(2)(3)(4)(5)	0.5	4.0	9.0	2.0	N/A	1
50	0.47	C/6032-28	T493C474(1)050(2)(3)(4)(5)	0.5	4.0	8.0	1.8	N/A	1
50	0.68	A/3216-18	T493A684(1)050(2)(3)(4)(5)	0.5	4.0	7.9	N/A	N/A	1
50	0.68	C/6032-28	T493C684(1)050(2)(3)(4)(5)	0.5	4.0	7.0	1.6	N/A	1
50	1	B/3528-21	T493B105(1)050(2)(3)(4)(5)	0.5	4.0	7.0	N/A	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	N/A	1
50	6.8	D/7343-31	T493D685(1)050(2)(3)(4)(5)	3.4	6.0	0.6	0.3	N/A	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	6.0	0.7	0.4	N/A	1
50	15	X/7343-43	T493X156(1)050(2)(3)(4)(5)	7.5	6.0	1.0	N/A	N/A	1
63	6.8	X/7343-43	T493X685(1)063(2)(3)(4)(5)	4.3	6.0	1.0	0.6	0.3	1
63	10	X/7343-43	T493X106(1)063(2)(3)(4)(5)	6.3	6.0	0.6	0.4	0.2	1
VDC	μF	KEMET/EIA	(See below for part options)	μAmps +20°C Maximum/ 5 Minutes	% @ +25°C 120 Hz Maximum	Ω @ 25°C 100 kHz Maximum	Ω @ 25°C 100 kHz Maximum	Ω @ 25°C 100 kHz Maximum	Reflow Temperature ≤ 260°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR	Moisture Sensitivity

- (1) To complete KEMET part number, insert M for ± 20%, K for ± 10% or J for 5%. Designates Capacitance tolerance.
(2) To complete KEMET part number, insert B (0.1%/1000Hrs), C (0.01%/1000Hrs) or A = N/A. Designates Reliability Level.
(3) To complete KEMET part number, insert B = Gold Plated, 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 = None, 62 = 10 cycles +25°C, 63 = 10 cycles -55°C +85°C after Weibull 64 = 10 cycles -55°C +85°C before Weibull or 6(X)11, 6(X)12, 6(X)13, 6(X)21, 6(X)22, 6(X)23, 6(X)31, 6(X)32, 6(X)33. Designates screening options.
(5) To complete KEMET part number, insert 10 = Standard ESR, 20 = Low ESR or 30 = Ultra Low ESR. Designates ESR option.
Refer to Ordering Information for additional detail.

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

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DSCC Drawing 07016 Part Number	DC Leakage	DF	Standard ESR	Moisture Sensitivity
VDC	µF	KEMET/EIA	See page 2 for Ordering Information	See page 2 for Ordering Information	µA @ +25°C Max/5 Min	% @ +25°C 120 Hz Max	Ω @+25°C 100 kHz Max	Temperature ≤ 260°C
4	33	A/3216-18	T493A336(1)004(2)(3)(4)20	07016-001(1)(2)(3)(4)	1.3	6.0	3.0	1
4	100	A/3216-18	T493A107(1)004(2)(3)(4)10	07016-003(1)(2)(3)(4)	4.0	30.0	1.4	1
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/3216-18	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	B/3528-20	T493B686(1)006(2)(3)(4)10	07016-015(1)(2)(3)(4)	4.3	8.0	0.5	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	150	D/7343-31	T493D157(1)006(2)(3)(4)10	07016-019(1)(2)(3)(4)	9.5	6.0	0.125	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)10	07016-021(1)(2)(3)(4)	20.8	8.0	0.1	1
6.3	330	X/7343-44	T493X337(1)006(2)(3)(4)20	07016-022(1)(2)(3)(4)	20.8	8.0	0.05	1
6.3	470	X/7343-45	T493X477M006(2)(3)(4)10	07016-023M(2)(3)(4)	29.6	10.0	0.20	1
6.3	470	X/7343-45	T493X477M006(2)(3)(4)20	07016-024M(2)(3)(4)	29.6	10.0	0.05	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)	1.5	6.0	3.2	1
10	15	B/3528-20	T493B156(1)010(2)(3)(4)20	07016-032(1)(2)(3)(4)	1.5	6.0	0.6	1
10	22	B/3528-20	T493B226(1)010(2)(3)(4)10	07016-033(1)(2)(3)(4)	2.2	6.0	0.7	1
10	22	B/3528-20	T493B226(1)010(2)(3)(4)20	07016-034(1)(2)(3)(4)	2.2	6.0	0.5	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	B/3528-20	T493B336(1)010(2)(3)(4)20	07016-038(1)(2)(3)(4)	3.3	6.0	0.425	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)10	07016-040(1)(2)(3)(4)	4.7	6.0	0.3	1
10	47	C/6032-28	T493C476(1)010(2)(3)(4)20	07016-041(1)(2)(3)(4)	4.7	6.0	0.2	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	100	C/6032-28	T493C107(1)010(2)(3)(4)10	07016-045(1)(2)(3)(4)	10.0	8.0	0.2	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
10	470	X/7343-44	T493X477M010(2)(3)(4)10	07016-057M(2)(3)(4)	47.0	10.0	0.2	1
10	470	X/7343-44	T493X477M010(2)(3)(4)20	07016-058M(2)(3)(4)	47.0	10.0	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	4.7	A/3216-18	T493A475(1)016(2)(3)(4)10	07016-063(1)(2)(3)(4)	0.8	6.0	2.0	1
16	6.8	A/3216-18	T493A685(1)016(2)(3)(4)10	07016-064(1)(2)(3)(4)	1.1	6.0	1.5	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	A/3216-18	T493A106(1)016(2)(3)(4)10	07016-066(1)(2)(3)(4)	1.6	6.0	3.0	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)10	07016-068(1)(2)(3)(4)	2.4	6.0	0.8	1
16	15	B/3528-20	T493B156(1)016(2)(3)(4)20	07016-069(1)(2)(3)(4)	2.4	6.0	0.5	1
16	22	B/3528-20	T493B226(1)016(2)(3)(4)10	07016-070(1)(2)(3)(4)	3.6	6.0	0.6	1
16	22	C/6032-28	T493C226(1)016(2)(3)(4)20	07016-071(1)(2)(3)(4)	3.5	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
VDC	µF	KEMET/EIA	See page 2 for Ordering Information	See page 2 for Ordering Information	µA @ +25°C Max/5 Min	% @ +25°C 120 Hz Max	Ω @+25°C 100 kHz Max	Temperature ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DSCC Drawing 07016 Part Number	DC Leakage	DF	Standard ESR	Moisture Sensitivity

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

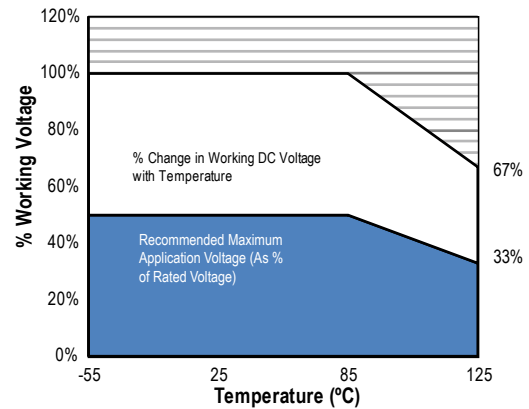
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DSCC Drawing 07016 Part Number	DC Leakage	DF	Standard ESR	Moisture Sensitivity
VDC	µF	KEMET/EIA	See page 2 for Ordering Information	See page 2 for Ordering Information	µA @ +25°C Max/5 Min	% @ +25°C 120 Hz Max	Ω @+25°C 100 kHz Max	Temperature ≤ 260°C
16	47	C/6032-28	T493C476(1)016(2)(3)(4)30	07016-076(1)(2)(3)(4)	7.5	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	T493D157M016(2)(3)(4)20	07016-082M(1)(2)(3)(4)	24.0	6.0	0.15	1
16	150	D/7343-31	T493D157M016(2)(3)(4)30	07016-083M(1)(2)(3)(4)	24.0	6.0	0.06	1
16	150	E/7360-38	T493E157(1)016(2)(3)(4)10	07016-084(1)(2)(3)(4)	24.0	6.0	0.05	1
16	220	E/7360-38	T493E227(1)016(2)(3)(4)10	07016-085(1)(2)(3)(4)	35.2	8.0	0.05	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
20	2.2	A/3216-18	T493A225(1)020(2)(3)(4)10	07016-087(1)(2)(3)(4)	0.5	6.0	3.0	1
20	4.7	A/3216-18	T493A475(1)020(2)(3)(4)10	07016-088(1)(2)(3)(4)	0.9	6.0	4.0	1
20	4.7	A/3216-18	T493A475(1)020(2)(3)(4)20	07016-089(1)(2)(3)(4)	0.9	6.0	1.8	1
20	4.7	B/3528-20	T493B475(1)020(2)(3)(4)20	07016-090(1)(2)(3)(4)	0.9	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)10	07016-092(1)(2)(3)(4)	2.0	6.0	1.0	1
20	10	B/3528-20	T493B106(1)020(2)(3)(4)20	07016-093(1)(2)(3)(4)	0.7	6.0	0.5	1
20	10	C/6032-28	T493C106(1)020(2)(3)(4)20	07016-094(1)(2)(3)(4)	2.0	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	A/3216-18	T493A225(1)025(2)(3)(4)10	07016-112(1)(2)(3)(4)	0.5	6.0	7.0	1
25	2.2	B/3528-20	T493B225(1)025(2)(3)(4)20	07016-113(1)(2)(3)(4)	0.6	6.0	2.0	1
25	3.3	B/3528-20	T493B335(1)025(2)(3)(4)20	07016-114(1)(2)(3)(4)	0.8	6.0	2.0	1
25	4.7	A/3216-18	T493A475(1)025(2)(3)(4)10	07016-115(1)(2)(3)(4)	1.2	6.0	3.1	1
25	4.7	B/3528-20	T493B475(1)025(2)(3)(4)10	07016-118(1)(2)(3)(4)	1.7	6.0	2.8	1
25	4.7	B/3528-20	T493B475(1)025(2)(3)(4)20	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)30	07016-119(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	C/6032-28	T493C226(1)025(2)(3)(4)10	07016-123(1)(2)(3)(4)	5.5	6.0	0.4	1
25	22	C/6032-28	T493C226(1)025(2)(3)(4)20	07016-124(1)(2)(3)(4)	5.5	6.0	0.275	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
25	68	E/7360-38	T493E686(1)025(2)(3)(4)10	07016-132(1)(2)(3)(4)	17.0	8.0	0.1	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	A/3216-18	T493A155(1)035(2)(3)(4)10	07016-136(1)(2)(3)(4)	0.5	6.0	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	4.7	B/3528-20	T493B475(1)035(2)(3)(4)10	07016-140(1)(2)(3)(4)	1.6	6.0	1.5	1
35	4.7	D/7343-31	T493D475(1)035(2)(3)(4)10	07016-141(1)(2)(3)(4)	1.6	6.0	0.45	1
35	6.8	C/6032-28	T493C685(1)035(2)(3)(4)10	07016-142(1)(2)(3)(4)	2.4	6.0	0.35	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	C/6032-28	T493C156(1)035(2)(3)(4)10	07016-146(1)(2)(3)(4)	5.3	6.0	0.45	1
35	15	D/7343-31	T493D156(1)035(2)(3)(4)10	07016-147(1)(2)(3)(4)	5.3	6.0	0.3	1
VDC	µF	KEMET/EIA	See page 2 for Ordering Information	See page 2 for Ordering Information	µA @ +25°C Max/5 Min	% @ +25°C 120 Hz Max	Ω @+25°C 100 kHz Max	Temperature ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DSCC Drawing 07016 Part Number	DC Leakage	DF	Standard ESR	Moisture Sensitivity

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

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DSCC Drawing 07016 Part Number	DC Leakage	DF	Standard ESR	Moisture Sensitivity
VDC	µF	KEMET/EIA	See page 2 for Ordering Information	See page 2 for Ordering Information	µA @ +25°C Max/5 Min	% @ +25°C 120 Hz Max	Ω @+25°C 100 kHz Max	Temperature ≤ 260°C
35	15	D/7343-31	T493D156(1)035(2)(3)(4)20	07016-148(1)(2)(3)(4)	5.3	6.0	0.1	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	D/7343-31	T493D336M035(2)(3)(4)10	07016-152M(2)(3)(4)	11.6	6.0	0.3	1
35	33	D/7343-31	T493D336M035(2)(3)(4)20	07016-153M(2)(3)(4)	11.6	6.0	0.2	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
35	47	X/7343-43	T493X476M035(2)(3)(4)10	07016-155M(1)(2)(3)(4)	16.5	6.0	0.25	1
35	47	E/7260-38	T493E476M035(2)(3)(4)10	07016-156M(1)(2)(3)(4)	16.5	6.0	0.20	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	0.22	A/3216-18	T493A224M050(2)(3)(4)10	07016-158M(1)(2)(3)(4)	0.5	4.0	18.0	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	0.68	A/3216-18	T493A684(1)050(2)(3)(4)10	07016-161(1)(2)(3)(4)	0.5	4.0	7.9	1
50	1	B/3528-20	T493B105(1)050(2)(3)(4)10	07016-163(1)(2)(3)(4)	0.5	4.0	7.0	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	D/7343-31	T493D685(1)050(2)(3)(4)10	07016-169(1)(2)(3)(4)	3.4	6.0	0.6	1
50	6.8	D/7343-31	T493D685(1)050(2)(3)(4)20	07016-170(1)(2)(3)(4)	3.4	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	µA @ +25°C Max/5 Min	% @ +25°C 120 Hz Max	Ω @+25°C 100 kHz Max	Temperature ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DSCC Drawing 07016 Part Number	DC Leakage	DF	Standard ESR	Moisture Sensitivity

Recommended Voltage Derating Guidelines

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



Ripple Current/Ripple Voltage

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

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

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

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

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

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

T = Environmental Temperature

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

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

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

I = rms ripple current (amperes)

E = rms ripple voltage (volts)

P max = maximum power dissipation (watts)

R = ESR at specified frequency (ohms)

Z = Impedance at specified frequency (ohms)

Reverse Voltage

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

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

Table 2 – Land Dimensions/Courtyard

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

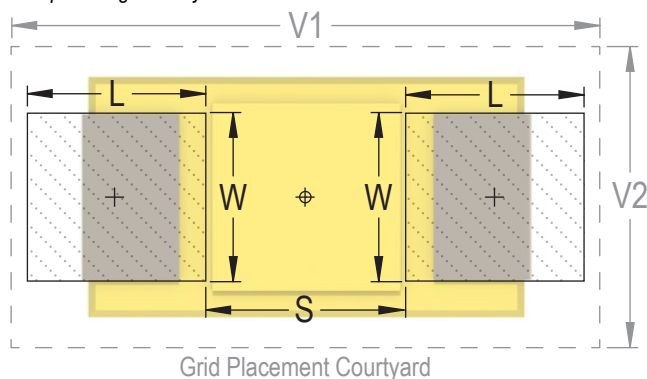
Density Level A: For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.

Density Level B: For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.

Density Level C: For high component 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.

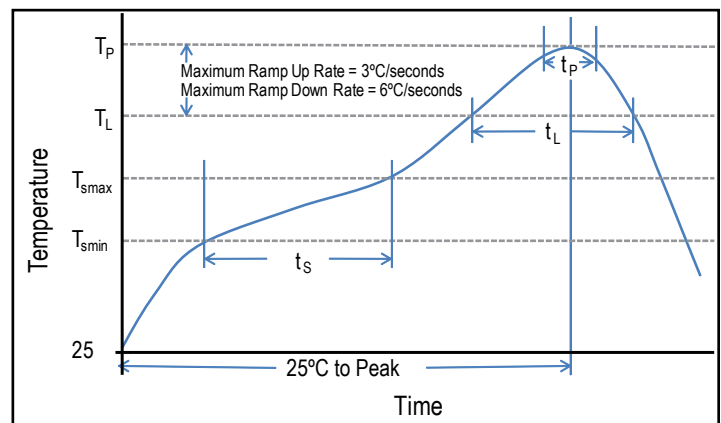
During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

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

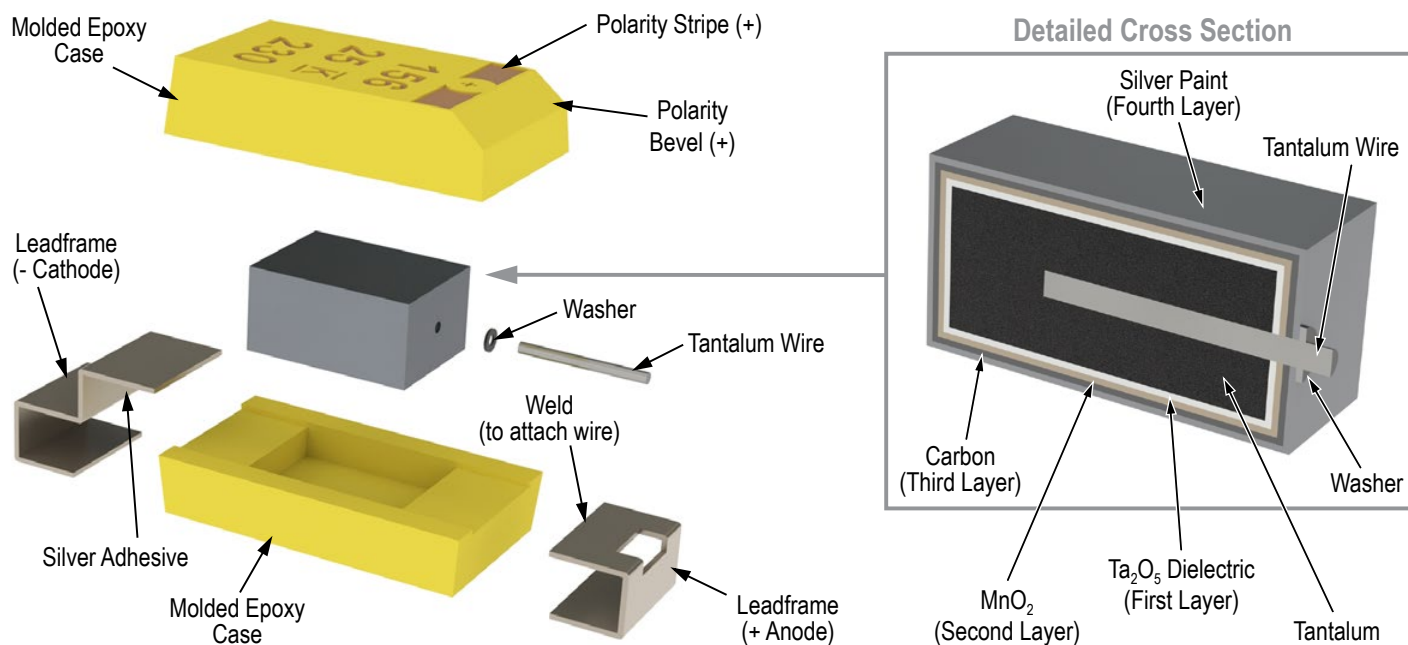
**Case Size A, B, C, H, I, K, M, R, S, T, U, V, W, and Z



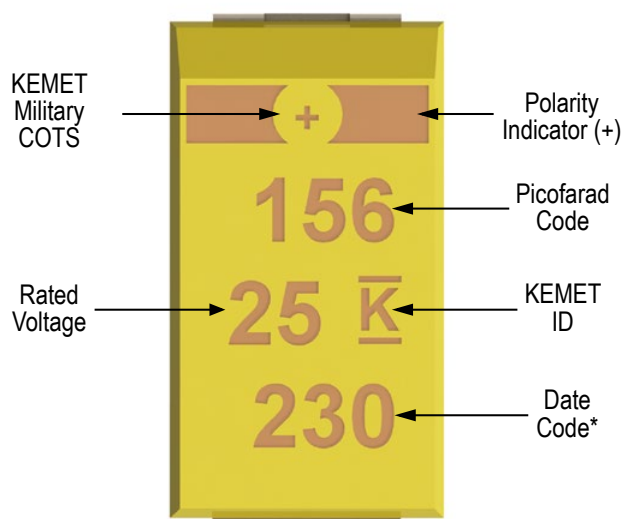
Storage

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

T495 Series Surge Robust Commercial Off-The-Shelf (COTS) Low ESR MnO₂ DLA Drawing 95158

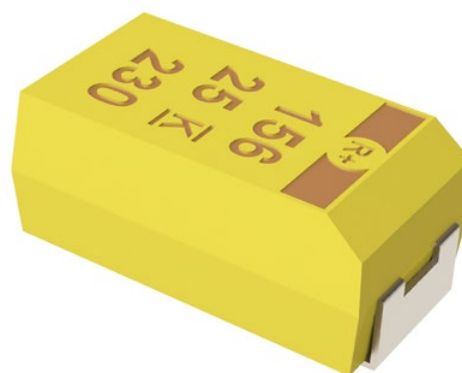
Overview

The low ESR, surge-robust T495 Series Commercial Off-The-Shelf (COTS) is designed for demanding applications that require high surge current and high ripple current capability. This series is approved for DLA Drawing 95158, incorporating an intensive testing and screening protocol that is customizable depending on specific customer requirements. This series

offer several advantages such as low ESR, high ripple current capability, excellent capacitance stability, and improved resistance to high in-rush currents. These benefits are achieved through a combination of proprietary design, materials, and process parameters as well as high-stress, low impedance electrical conditioning performed prior to screening.

Benefits

- Approved for DLA Drawing 95158
- Complies with AEC-Q200
- Meets or exceeds EIA standard 535BAAC
- Taped and reeled per EIA 481
- High surge current capability
- Optional gold-plated terminations
- High ripple current capability
- 100% surge current test
- 100% steady-state accelerated aging
- Capacitance values of 4.7 μ F to 220 μ F
- Tolerances of $\pm 10\%$ and $\pm 20\%$
- Voltage rating of 6 – 50 VDC
- Operating temperature range of -55°C to +125°C



Applications

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

SPICE

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

Ordering Information

T	495	X	107	M	010	A	H	4095	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Voltage	Failure Rate/Design	Lead Material	Customer Specification	Packaging (C-Spec)
T = Tantalum	Surge Robust Low ESR	C, D, X	First two digits represent significant figures. Third digit specifies number of zeros.	K = $\pm 10\%$ M = $\pm 20\%$	006 = 6.3 V 010 = 10 V 016 = 16 V 020 = 20 V 025 = 25 V 035 = 35 V 050 = 50 V	A = N/A	H = Standard Solder Coated (SnPb 5% Pb minimum) B = Gold Plated	Tested to meet the Established Reliability	Blank = 7" Reel 7280 = 13" Reel

DSCC 95158 Ordering Information

95158-	07	M	H
Drawing Number	Dash Number	Capacitance Tolerance	Termination Finish
Capacitor, Fixed, Tantalum Chip, Low ESR	See Part Number List	K = $\pm 10\%$ M = $\pm 20\%$	H = Solder Plated B = Gold Plated

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	-55°C to 125°C
Rated Capacitance Range	4.7 μ F – 220 μ F @ 120 Hz/25° C
Capacitance Tolerance	K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	6 V – 50 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	Refer to Part Number Electrical Specification Table

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		+25°C	-55°C	+85°C
		Δ C/C	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

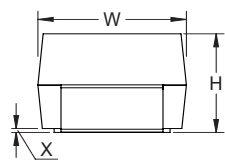
Certification

DLA Drawing 95158

Dimensions – Millimeters (Inches)

Metric will govern

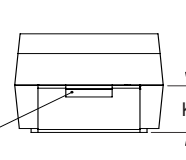
CATHODE (-) END VIEW



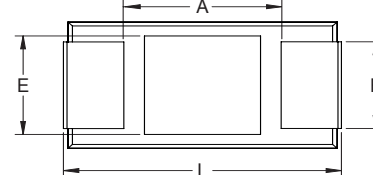
SIDE VIEW



ANODE (+) END VIEW



BOTTOM VIEW



Case Code	Component											
KEMET	L	W	H	K ±0.20 ±(.008) (Ref)	F ±0.1 ±(.004) (Ref)	S ±0.3 ±(.012) (Ref)	B ±0.15 ±(.006) (Ref)	X ± 0.10 ±(.004)(Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)
C	6.0 ±0.3 (0.236 ±0.012)	3.2 ±0.3 (0.126 ±0.012)	2.5 ± 0.3 (0.098 ±0.012)	1.4 (0.055)	2.2 (0.087)	1.3 (0.051)	0.5 (0.020)	0.10 (0.004)	0.13 (0.005)	3.1 (0.122)	2.8 (0.110)	2.4 (0.094)
D	7.3 ±0.3 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	2.8 ±0.3 (0.110 ±0.012)	1.5 (0.059)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10 (0.004)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)
X	7.3 ±0.3 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	4.0 ±0.3 (0.157 ±0.012)	2.3 (0.091)	2.4 (0.094)	1.3 (0.051)	0.5 (0.020)	0.10 (0.004)	0.13 (0.005)	3.8 (0.150)	3.5 (0.138)	3.5 (0.138)

Table 1 – Ratings & Part Number Reference

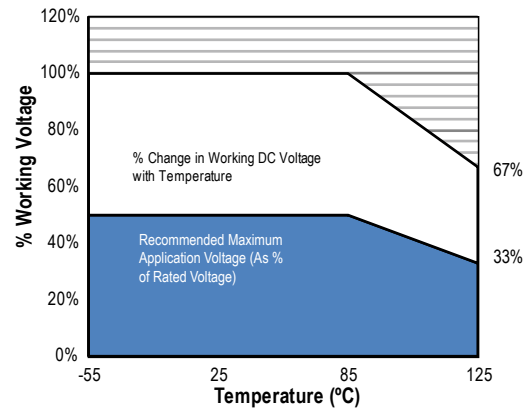
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DLA (DSCC) 95158/1	DC Leakage	DF	ESR	Maximum Allowable Ripple Current			Moisture Sensitivity
VDC	µF	KEMET/EIA	(See below for part options)	Drawing Number	µA +25°C Max/5 Min	% @ +25°C 120 Hz Max	mΩ @ 25°C 100 kHz Max	(mA) 100 kHz +25°C	(mA) 100 kHz +85°C	(mA) 100 kHz +125°C	Reflow Temp ≤ 260°C
6.3	68	D/7343-31	T495D686(1)006A(2)4095	95158-01(1)(2)	3.3	4.0	175	926	833	370	1
6.3	150	X/7343-43	T495X157(1)006A(2)4095	95158-02(1)(2)	7.2	6.0	125	1149	1034	460	1
6.3	220	X/7343-43	T495X227(1)006A(2)4095	95158-03(1)(2)	13.2	8.0	100	1285	1157	514	1
6.3	220	D/7343-31	T495D227(1)006A(2)4095	95158-25(1)(2)	13.2	8.0	100	1225	1103	490	1
10	47	D/7343-31	T495D476(1)010A(2)4095	95158-04(1)(2)	3.8	4.0	200	866	779	346	1
10	68	X/7343-43	T495X686(1)010A(2)4095	95158-05(1)(2)	5.4	4.0	150	1049	944	420	1
10	100	D/7343-31	T495D107(1)010A(2)4095	95158-06(1)(2)	10.0	8.0	100	1225	1103	490	1
10	100	X/7343-43	T495X107(1)010A(2)4095	95158-07(1)(2)	8.0	6.0	100	1285	1157	514	1
10	150	X/7343-43	T495X157(1)010A(2)4095	95158-08(1)(2)	15.0	8.0	100	1285	1157	514	1
10	150	D/7343-31	T495D157(1)010A(2)4095	95158-26(1)(2)	15.0	8.0	100	1225	1103	490	1
10	220	X/7343-43	T495X227(1)010A(2)4095	95158-28(1)(2)	15.0	8.0	100	1285	1157	514	1
16	33	D/7343-31	T495D336(1)016A(2)4095	95158-09(1)(2)	4.2	4.0	250	775	698	310	1
16	47	D/7343-31	T495D476(1)016A(2)4095	95158-10(1)(2)	7.5	6.0	200	866	779	346	1
16	100	X/7343-43	T495X107(1)016A(2)4095	95158-11(1)(2)	16.0	8.0	125	1149	1034	460	1
20	15	D/7343-31	T495D156(1)020A(2)4095	95158-12(1)(2)	2.4	4.0	275	739	665	296	1
20	22	D/7343-31	T495D226(1)020A(2)4095	95158-13(1)(2)	3.5	4.0	275	739	665	296	1
20	47	X/7343-43	T495X476(1)020A(2)4095	95158-14(1)(2)	7.5	4.0	150	1049	944	420	1
20	68	X/7343-43	T495X686(1)020A(2)4095	95158-15(1)(2)	13.6	6.0	150	1049	944	420	1
25	15	D/7343-31	T495D156(1)025A(2)4095	95158-16(1)(2)	3.8	6.0	275	739	665	296	1
25	15	X/7343-43	T495X156(1)025A(2)4095	95158-17(1)(2)	3.0	4.0	200	908	817	363	1
25	22	X/7343-43	T495X226(1)025A(2)4095	95158-18(1)(2)	4.4	4.0	225	856	770	342	1
25	33	X/7343-43	T495X336(1)025A(2)4095	95158-19(1)(2)	6.6	4.0	175	971	874	388	1
35	4.7	C/6032-28	T495C475(1)035A(2)4095	95158-29(1)(2)	1.7	6.0	600	428	385	171	1
35	6.8	X/7343-43	T495X685(1)035A(2)4095	95158-20(1)(2)	1.9	4.0	300	742	668	297	1
35	10	D/7343-31	T495D106(1)035A(2)4095	95158-27(1)(2)	3.5	4.0	300	707	636	283	1
35	10	X/7343-43	T495X106(1)035A(2)4095	95158-21(1)(2)	2.8	4.0	250	812	731	325	1
35	15	X/7343-43	T495X156(1)035A(2)4095	95158-22(1)(2)	5.3	6.0	225	856	770	342	1
35	22	X/7343-43	T495X226(1)035A(2)4095	95158-23(1)(2)	7.7	6.0	300	742	668	297	1
50	4.7	X/7343-43	T495X475(1)050A(2)4095	95158-24(1)(2)	1.9	4.0	300	742	668	297	1
VDC	µF	KEMET/EIA	(See below for part options)	Drawing Number	µA +25°C Max/5 Min	% @ +25°C 120 Hz Max	mΩ @ 25°C 100 kHz Max	(mA) 100 kHz +25°C	(mA) 100 kHz +85°C	(mA) 100 kHz +125°C	Reflow Temp ≤ 260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DLA (DSCC) 95158/1	DC Leakage	DF	ESR	Maximum Allowable Ripple Current			Moisture Sensitivity

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

(2) To complete KEMET part number, insert B = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates Termination Finish.
Refer to Ordering Information for additional detail.

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
C	6032-28	110
D	7343-31	150
X	7343-43	165

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

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

T = Environmental Temperature

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

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

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

I = rms ripple current (amperes)

E = rms ripple voltage (volts)

P max = maximum power dissipation (watts)

R = ESR at specified frequency (ohms)

Z = Impedance at specified frequency (ohms)

Reverse Voltage

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

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

Table 2 – Land Dimensions/Courtyard

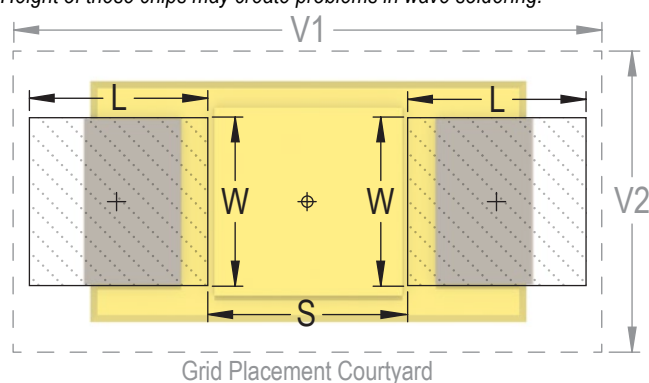
KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
C	6032-25	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	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
X ¹	7343-43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

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

Density Level B: For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.

Density Level C: For high component 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).

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



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.

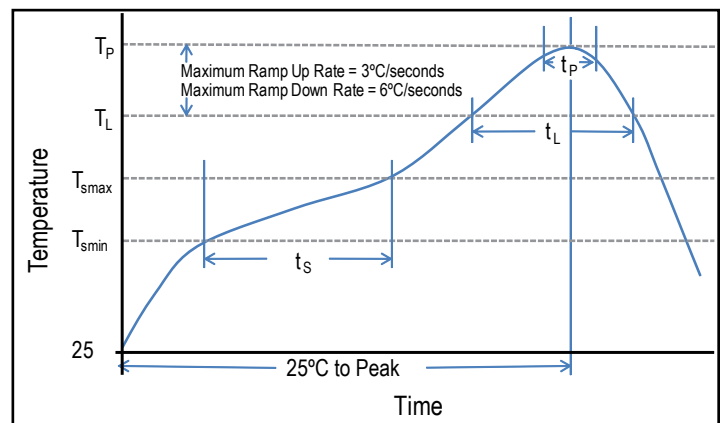
During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

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

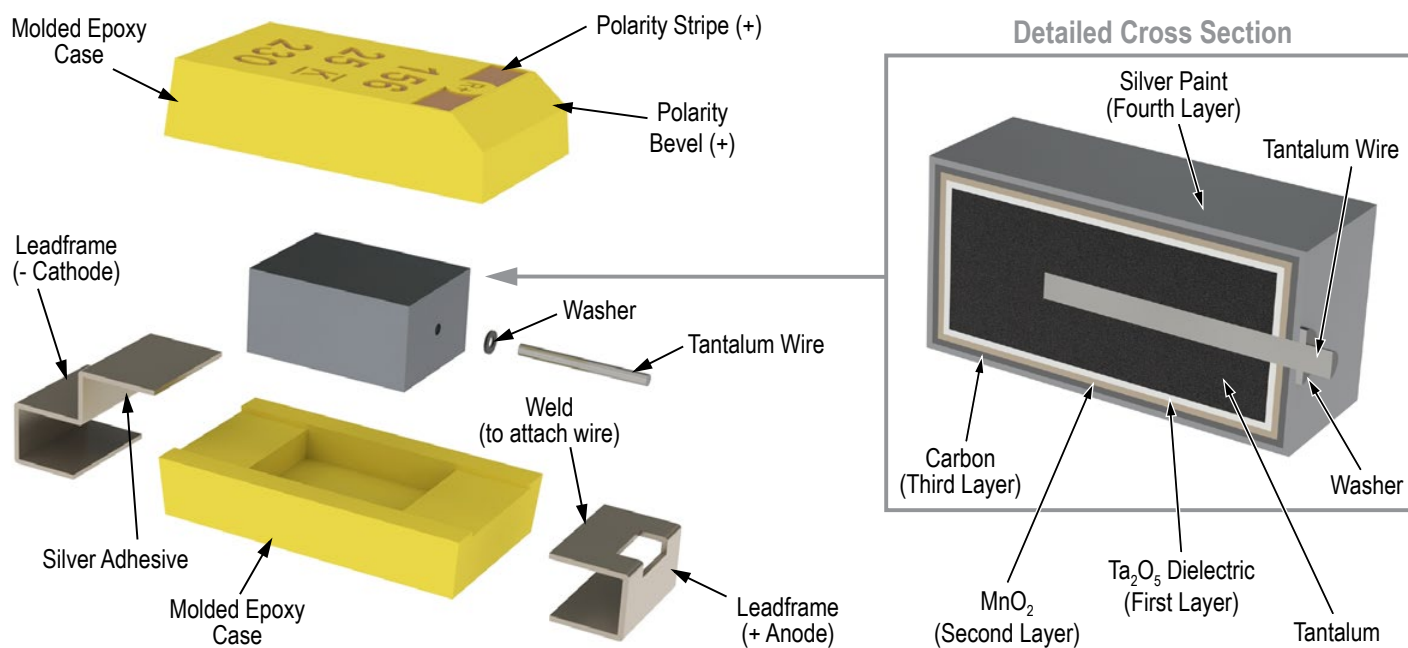
**Case Size A, B, C, H, I, K, M, R, S, T, U, V, W, and Z



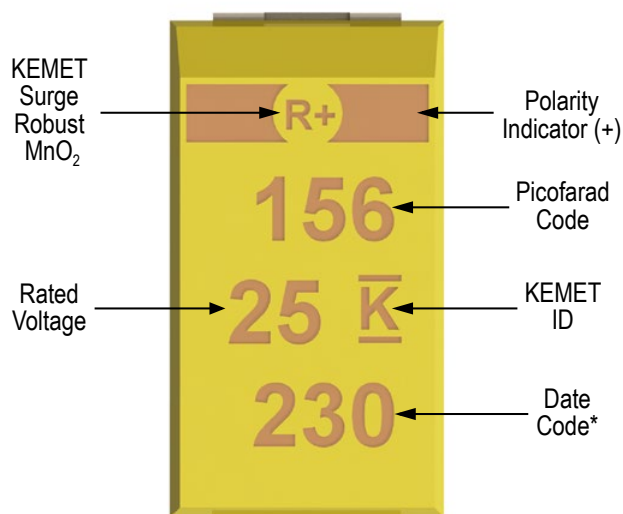
Storage

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

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



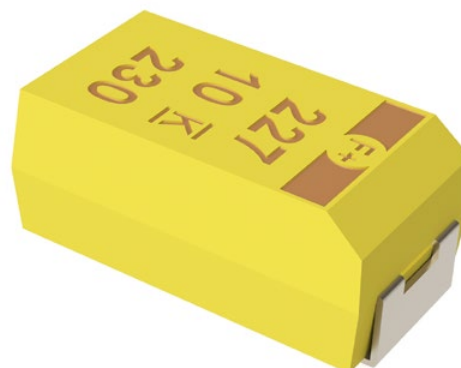
Overview

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

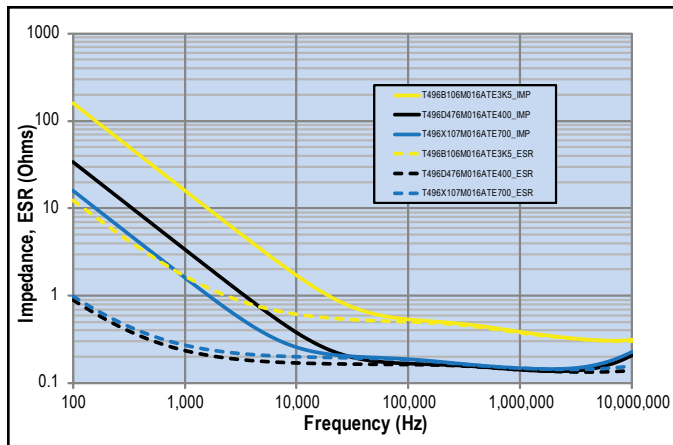
Certification

MIL-PRF-55365/8

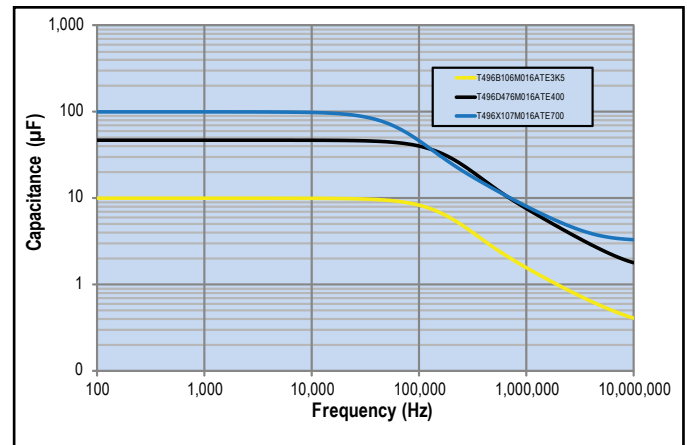
DSCC Drawing 04053

Electrical Characteristics

ESR vs. Frequency



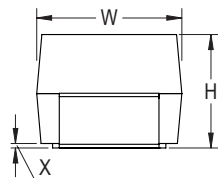
Capacitance vs. Frequency



Dimensions – Millimeters (Inches)

Metric will govern

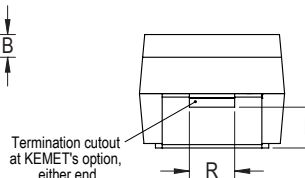
CATHODE (-) END VIEW



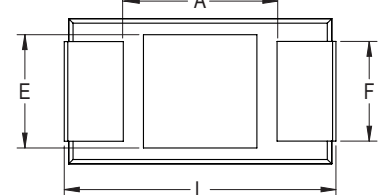
SIDE VIEW



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.

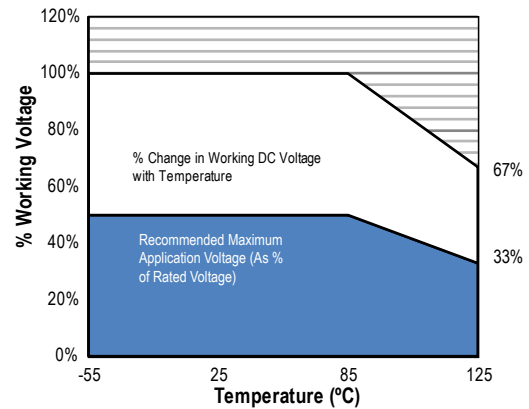
(2) To complete KEMET part number, insert B (0.1%/1,000 hours), C (0.01%/1,000 hours), D (0.001%/1,000 hours), or A (Non-Weibull Graded).

(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

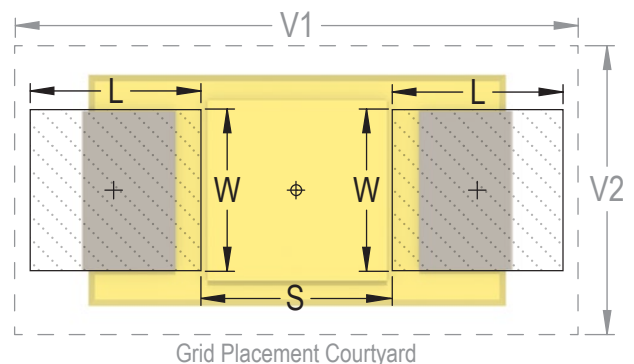
Density Level A: For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.

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.

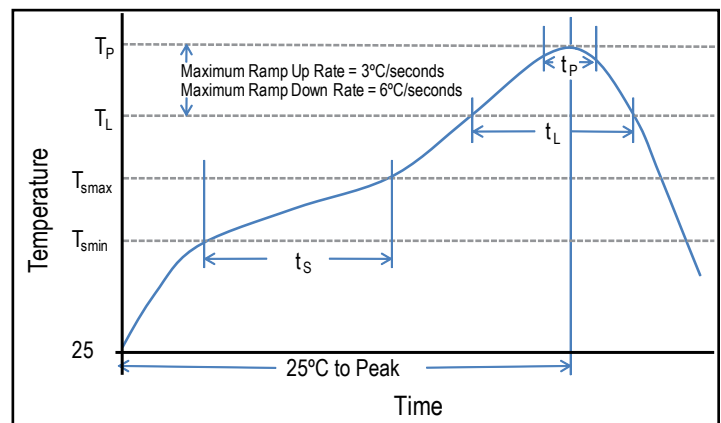
During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

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

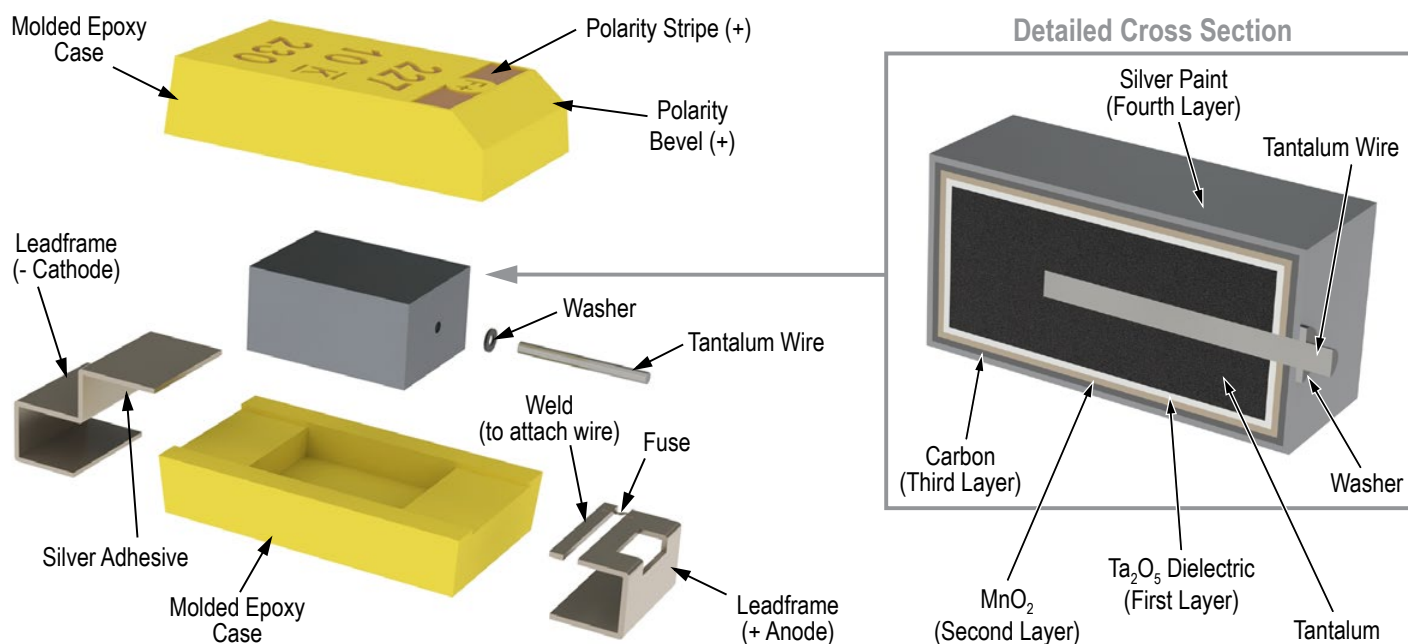
**Case Size A, B, C, H, I, K, M, R, S, T, U, V, W, and Z



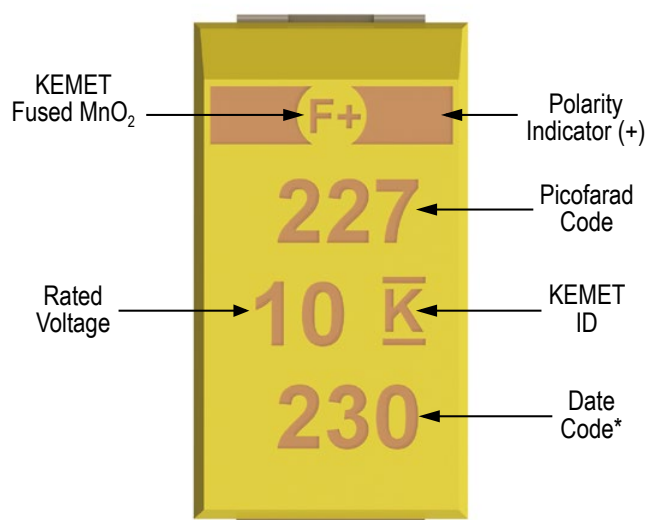
Storage

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

T497 Series Commercial Off-The-Shelf (COTS) MnO₂ (CWR09/19/29 Style)



Overview

The KEMET T497 Series is designed for the Commercial Off-The-Shelf (COTS) requirements of military, medical, and aerospace applications. This product is a COTS version of CWR09, 19, and 29 products. The T497 Series is a surface mount product offering various lead-frame plating options, Weibull grading options, X-ray inspection, surge current testing, F-Tech (an improved anode manufacturing process) and Simulated Breakdown Voltage (SBDV) screening options to improve long term reliability.

KEMET's F-Tech eliminates hidden defects in the dielectric which continue to grow in the field, causing capacitor failures. Based on the fundamental understanding of degradation mechanisms in tantalum and niobium capacitors, F-Tech incorporates multiple process methodologies. Some minimize the oxygen and carbon content in the anodes which become contaminants and can lead to the crystallization of the anodic oxide dielectric. This process methodology reduces the contaminants, improving quality of the dielectric. An additional technology provides a stronger mechanical connection point between the tantalum lead wire and tantalum anode, enhancing robustness and product reliability. The benefit of F-Tech is illustrated by a 2,000 hour, 85°C, 1.32 X rated voltage accelerated life test. The F-Tech parts see no degradation while standard tantalums have 1.5 orders of magnitude degradation in leakage current. F-Tech is currently available for T493 Series (select D and X case capacitance values in 20 V and higher rated voltage) and T497 Series (select H case capacitance values in 20 V and higher rated voltage). Please contact KEMET for details on ordering other part types with these capabilities.

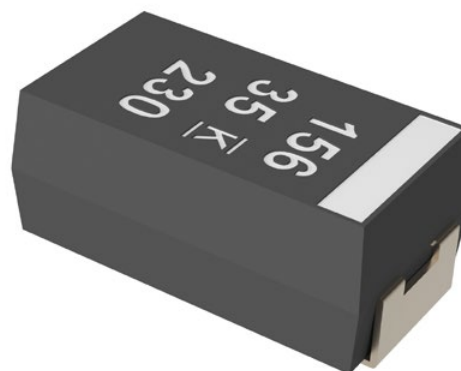
KEMET's patented Simulated Breakdown Screening (SBDS) is a nondestructive testing technique that simulates the breakdown voltage (BDV) of a capacitor without damage to its dielectric or to the general population of capacitors. This screening identifies hidden defects in the dielectric, providing the highest level of dielectric testing. SBDS is based on the simulation of breakdown voltage (BDV), the ultimate test of the dielectric in a capacitor.

Low BDV indicates defects in the dielectric, and therefore, a higher probability of failure in the field. High BDV indicates a stronger dielectric and high-reliability performance in the field. This new screening method allows KEMET to identify the breakdown voltage of each individual capacitor and provide only the strongest capacitors from each lot.

SBDS is currently available on select part types in the T493 and T497 Series. Please contact KEMET for details on ordering other part types with these capabilities.

KEMET offers these technologies per the following options:

- F-Tech only
- SBDS only
- Combination of both F-Tech and SBDS for the ultimate protection



Benefits

- F-Tech and Simulated Breakdown Voltage (SBDS) screening options available
- Taped and reeled per EIA 481
- Symmetrical, compliant terminations
- Laser-marked case
- 100% surge current test available on all case sizes
- Termination options B, H, and 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 0.1 µF to 150 µF
- 100% thermal shock

Applications

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

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	497	G	226	K	020	A	H	61	10
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Voltage	Failure Rate/Design	Lead Material	Surge	X-ray
T = Tantalum	High Grade COTS	A, B, C, D, E, F, G, H, X	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	004 = 4 V 006 = 6.3 V 010 = 10 V 016 = 16 V 020 = 20 V 025 = 25 V 035 = 35 V 050 = 50 V	A = N/A B = 0.1%/1,000 hours C = 0.01%/1,000 hours	T = 100% Matte Tin (Sn) Plated H = Standard Solder Coated (SnPb 5% Pb minimum) B = Gold Plated	61 = Standard (in-process) 62 = 10 Cycles After Weibull, 25°C 63 = 10 Cycles After Weibull, -55° and 85°C 64 = 10 Cycles Before Weibull, -55° and 85°C	10 = None 15 = 100%

Ordering Information – F-Tech +SBDS

T	497	H	226	K	020	A	H	61	10
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Voltage	Failure Rate/Design	Lead Material	Surge	Design/Screening
T = Tantalum	High Grade COTS	H	First two digits represent significant figures. Third digit specifies number of zeros.	K = ±10% M = ±20%	020 = 20V 025 = 25V 035 = 35V 050 = 50V	A = N/A B=0.1%/1,000 hours C=.01%/1,000 hours	T = 100% Matte Tin (Sn) Plated H = Standard Solder Coated (SnPb 5% Pb minimum) B = Gold Plated	61 = Standard (in-process) 62 = 10 Cycles After Weibull, 25°C 63 = 10 Cycles After Weibull, -55° and 85°C 64 = 10 Cycles Before Weibull, -55° and 85°C	10 = Standard 11 = F-Tech & SBDS * 12 = SBDS 13 = F-Tech * 15 = 100% X-ray 16 = F-Tech & SBDS & 100% X-ray * 17 = SBDS & 100% X-ray 18 = F-Tech & 100% X-ray *

* Select "C", "D" and "X" case sizes in 20V and higher rated voltage

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	-55°C to 125°C
Rated Capacitance Range	0.1 µF – 150 µF @ 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 (µA) at rated voltage after 5 minutes

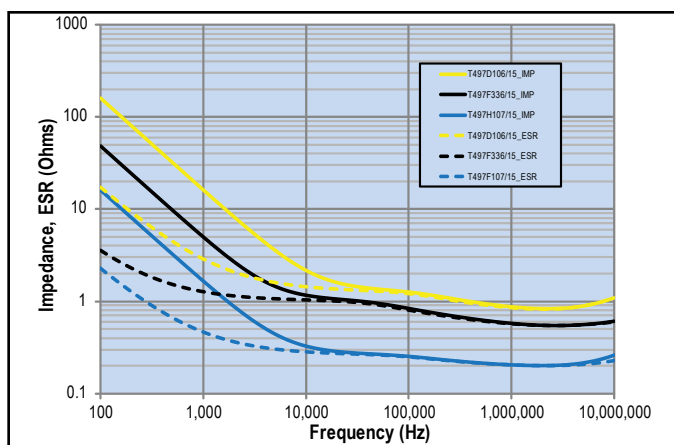
Qualification

Test	Condition		Characteristics			
Endurance	105°C @ rated voltage, 2,000 hours 125°C @ 2/3 rated voltage, 2,000 hours		Δ C/C	Within -20%/+10% of initial value		
			DF	≤ Initial Limit		
			DCL	2 x IL @ 125°C		
			ESR	2 x Initial Limit		
Storage Life	125°C @ 0 volts, 2,000 hours		Δ C/C	Within -20%/+10% of initial value		
			DF	Within initial limits		
			DCL	Within 2.0 x initial limit		
			ESR	Within 2.0 x initial limit		
Humidity	85°C, 85% RH, 1,000 hours No Load		Δ C/C	Within -5%/+35% of initial value		
			DF	≤ Initial Limit		
			DCL	Within 3.0 x initial limit		
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	+125°C
		DF	IL*	±20%	±20%	±30%
		DCL	IL	IL	1.2 x IL	1.5 x IL
Surge Voltage	105°C, 1.32 x rated voltage 1,000 cycles		Δ C/C	Within -20%/+10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		

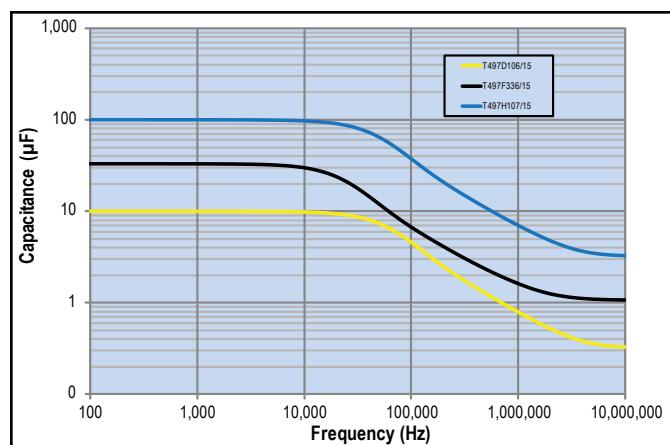
*IL = Initial limit

Electrical Characteristics

ESR vs. Frequency

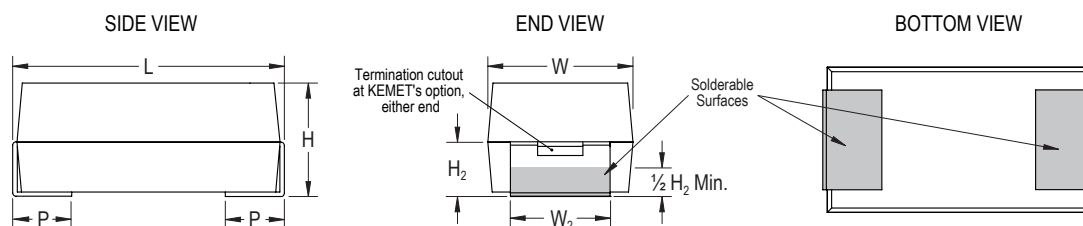


Capacitance vs. Frequency



Dimensions – Millimeters (Inches)

Metric will govern



Case Size	Component					
KEMET	L* ±0.38 (0.015)	W* ±0.38 (0.015)	H* ±0.38 (0.015)	P +0.25 (0.010), -0.13 (0.005)	W ₂	H ₂ Minimum
A	2.54 (.100)	1.27 (.050)	1.27 (.050)	0.76 (.030)	1.27 ±0.13 (0.050 ±0.005)	0.76 (0.030)
B	3.81 (.150)	1.27 (.050)	1.27 (.050)	0.76 (.030)	1.27 ±0.13 (0.050 ±0.005)	0.76 (0.030)
C	5.08 (.200)	1.27 (.050)	1.27 (.050)	0.76 (.030)	1.27 ±0.13 (0.050 ±0.005)	0.76 (0.030)
D	3.81 (.150)	2.54 (.100)	1.27 (.050)	0.76 (.030)	2.41 +0.13, -0.25 (0.095 +0.005, -0.010)	0.76 (0.030)
E	5.08 (.200)	2.54 (.100)	1.27 (.050)	0.76 (.030)	2.41 +0.13, -0.25 (0.095 +0.005, -0.010)	0.76 (0.030)
F	5.59 (.220)	3.43 (.135)	1.78 (.070)	0.76 (.030)	3.30 ±0.13 (0.130 ±0.005)	1.02 (0.040)
G	6.73 (.265)	2.79 (.110)	2.79 (.110)	1.27 (.050)	2.67 ±0.13 (0.105 ±0.005)	1.52 (0.060)
H	7.24 (.285)	3.81 (.150)	2.79 (.110)	1.27 (.050)	3.68 +0.013, -0.51 (0.145 +0.005, -0.020)	1.52 (0.060)
X	6.93 (.273)	5.41 (.213)	2.74 (.108)	1.19 (.047)	3.05 ±0.13 (0.120 ±0.005)	1.22 (0.048)

Note: When solder coated terminations are required, add an additional 0.38 mm (0.015 inch) to the above tolerances for "L", "W", "H", "P", "W₂" and "H₂"

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Moisture Sensitivity
VDC	µF	KEMET/EIA	(See below for part options)	µA @ +20°C Maximum/5 Min	% @ 20°C 120 Hz Maximum	Ω @ +20°C 100 kHz Maximum	Reflow Temperature ≤ 260°C
4	4.7	A/1005	T497A475(1)004(2)(3)	0.2	6.0	12.0	1.0
4	4.7	B/1505	T497B475(1)004(2)(3)	0.2	6.0	8.0	1.0
4	15	B/1505	T497B156(1)004(2)(3)	0.6	8.0	8.0	1.0
4	33	D/1510	T497D336(1)004(2)(3)	1.3	8.0	4.0	1.0
4	33	F/2214	T497F336(1)004(2)(3)	1.3	8.0	2.2	1.0
4	68	E/2010	T497E686(1)004(2)(3)	2.7	8.0	3.0	1.0
4	68	F/2214	T497F686(1)004(2)(3)	2.7	6.0	2.0	1.0
4	68	G/2711	T497G686(1)004(2)(3)	2.7	10.0	1.1	1.0
4	100	H/2915	T497H107(1)004(2)(3)	4.0	10.0	0.9	1.0
6.3	1.5	A/1005	T497A155(1)006(2)(3)	0.1	6.0	8.0	1.0
6.3	2.2	A/1005	T497A225(1)006(2)(3)	0.1	6.0	10.0	1.0
6.3	3.3	A/1005	T497A335(1)006(2)(3)	0.2	6.0	12.0	1.0
6.3	3.3	B/1505	T497B335(1)006(2)(3)	0.2	6.0	8.0	1.0
6.3	4.7	A/1005	T497A475(1)006(2)(3)	0.3	6.0	12.0	1.0
6.3	4.7	D/1510	T497D475(1)006(2)(3)	0.3	6.0	5.5	1.0
6.3	6.8	B/1505	T497B685(1)006(2)(3)	0.4	6.0	8.0	1.0
6.3	6.8	D/1510	T497D685(1)006(2)(3)	0.4	6.0	4.5	1.0
6.3	10	B/1505	T497B106(1)006(2)(3)	0.6	6.0	8.0	1.0
6.3	10	E/2010	T497E106(1)006(2)(3)	0.6	8.0	3.5	1.0
6.3	15	B/1505	T497B156(1)006(2)(3)	0.9	8.0	8.0	1.0
6.3	15	D/1510	T497D156(1)006(2)(3)	0.9	8.0	5.0	1.0
6.3	22	D/1510	T497D226(1)006(2)(3)	1.4	6.0	5.0	1.0
6.3	22	E/2010	T497E226(1)006(2)(3)	1.4	8.0	3.5	1.0
6.3	22	F/2214	T497F226(1)006(2)(3)	1.4	8.0	2.2	1.0
6.3	33	E/2010	T497E336(1)006(2)(3)	2.1	6.0	3.5	1.0
6.3	47	F/2214	T497F476(1)006(2)(3)	3.0	8.0	3.5	1.0
6.3	47	G/2711	T497G476(1)006(2)(3)	3.0	10.0	1.1	1.0
6.3	68	F/2214	T497F686(1)006(2)(3)	4.3	10.0	1.5	1.0
6.3	68	H/2915	T497H686(1)006(2)(3)	4.3	10.0	0.9	1.0
6.3	100	G/2711	T497G107(1)006(2)(3)	6.3	10.0	1.1	1.0
6.3	150	G/2711	T497G157(1)006(2)(3)	9.5	10.0	1.1	1.0
6.3	150	H/2915	T497H157(1)006(2)(3)	9.5	10.0	0.9	1.0
10	0.47	A/1005	T497A474(1)010(2)(3)	0.0	6.0	10.0	1.0
10	1	A/1005	T497A105(1)010(2)(3)	0.1	6.0	10.0	1.0
10	1.5	A/1005	T497A155(1)010(2)(3)	0.2	6.0	10.0	1.0
10	2.2	A/1005	T497A225(1)010(2)(3)	0.2	6.0	12.0	1.0
10	2.2	B/1505	T497B225(1)010(2)(3)	0.2	6.0	8.0	1.0
10	3.3	A/1005	T497A335(1)010(2)(3)	0.3	6.0	12.0	1.0
10	3.3	B/1505	T497B335(1)010(2)(3)	0.3	6.0	10.0	1.0
10	4.7	B/1505	T497B475(1)010(2)(3)	0.5	6.0	8.0	1.0
10	4.7	D/1510	T497D475(1)010(2)(3)	0.5	6.0	4.5	1.0
10	6.8	B/1505	T497B685(1)010(2)(3)	0.7	6.0	8.0	1.0
10	6.8	F/2214	T497F685(1)010(2)(3)	0.7	6.0	5.0	1.0
10	6.8	E/2010	T497E685(1)010(2)(3)	0.7	6.0	3.5	1.0
10	10	B/1505	T497B106(1)010(2)(3)	1.0	8.0	8.0	1.0
10	10	D/1510	T497D106(1)010(2)(3)	1.0	6.0	4.0	1.0
10	10	E/2010	T497E106(1)010(2)(3)	1.0	6.0	3.5	1.0
10	15	D/1510	T497D156(1)010(2)(3)	1.5	6.0	5.0	1.0
VDC	µF	KEMET/EIA	(See below for part options)	µA @ +20°C Maximum/5 Min	% @ 20°C 120 Hz Maximum	Ω @ +20°C 100 kHz Maximum	Reflow Temperature ≤ 260°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Moisture Sensitivity

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

(2) To complete KEMET part number, insert B (0.1%/1,000 hours), C (0.01%/1,000 hours) or A = N/A. Designates Reliability Level.

(3) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, B = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates Termination Finish.

Refer to Ordering Information for additional detail.

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

Table 1 – Ratings & Part Number Reference cont'd

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Moisture Sensitivity
VDC	µF	KEMET/EIA	(See below for part options)	µA @ +20°C Maximum/5 Min	% @ 20°C 120 Hz Maximum	Ω @ +20°C 100 kHz Maximum	Reflow Temperature ≤ 260°C
10	15	E/2010	T497E156(1)010(2)(3)	1.5	8.0	3.0	1.0
10	15	F/2214	T497F156(1)010(2)(3)	1.5	8.0	2.5	1.0
10	22	D/1510	T497D226(1)010(2)(3)	2.2	6.0	4.0	1.0
10	22	E/2010	T497E226(1)010(2)(3)	2.2	8.0	2.0	1.0
10	22	F/2214	T497F226(1)010(2)(3)	2.2	8.0	1.5	1.0
10	22	G/2711	T497G226(1)010(2)(3)	2.2	8.0	1.5	1.0
10	33	F/2214	T497F336(1)010(2)(3)	3.3	8.0	1.5	1.0
10	33	G/2711	T497G336(1)010(2)(3)	3.3	10.0	1.5	1.0
10	47	F/2214	T497F476(1)010(2)(3)	4.7	10.0	1.5	1.0
10	47	G/2711	T497G476(1)010(2)(3)	4.7	10.0	1.0	1.0
10	47	H/2915	T497H476(1)010(2)(3)	4.7	10.0	0.9	1.0
10	68	G/2711	T497G686(1)010(2)(3)	6.8	10.0	1.1	1.0
10	100	G/2711	T497G107(1)010(2)(3)	10.0	10.0	1.1	1.0
10	100	H/2915	T497H107(1)010(2)(3)	10.0	10.0	0.9	1.0
10	150	H/2915	T497H157(1)010(2)(3)	15.0	10.0	0.9	1.0
15	0.1	A/1005	T497A104(1)015(2)(3)	0.0	6.0	15.0	1.0
15	0.22	A/1005	T497A224(1)015(2)(3)	0.0	6.0	15.0	1.0
15	0.33	A/1005	T497A334(1)015(2)(3)	0.0	6.0	15.0	1.0
15	0.68	A/1005	T497A684(1)015(2)(3)	0.1	6.0	20.0	1.0
15	1	A/1005	T497A105(1)015(2)(3)	0.2	6.0	15.0	1.0
15	1.5	A/1005	T497A155(1)015(2)(3)	0.2	6.0	15.0	1.0
15	1.5	B/1505	T497B155(1)015(2)(3)	0.2	6.0	8.0	1.0
15	2.2	A/1005	T497A225(1)015(2)(3)	0.3	6.0	15.0	1.0
15	3.3	B/1505	T497B335(1)015(2)(3)	0.5	6.0	9.0	1.0
15	3.3	D/1510	T497D335(1)015(2)(3)	0.5	6.0	5.0	1.0
15	4.7	B/1505	T497B475(1)015(2)(3)	0.7	6.0	5.0	1.0
15	4.7	D/1510	T497D475(1)015(2)(3)	0.7	6.0	6.0	1.0
15	4.7	E/2010	T497E475(1)015(2)(3)	0.7	6.0	4.0	1.0
15	6.8	D/1510	T497D685(1)015(2)(3)	1.0	6.0	6.0	1.0
15	10	D/1510	T497D106(1)015(2)(3)	1.5	6.0	6.0	1.0
15	10	E/2010	T497E106(1)015(2)(3)	1.5	6.0	4.0	1.0
15	10	F/2214	T497F106(1)015(2)(3)	1.5	6.0	2.5	1.0
15	15	E/2010	T497E156(1)015(2)(3)	2.3	6.0	4.0	1.0
15	15	F/2214	T497F156(1)015(2)(3)	2.3	6.0	2.5	1.0
15	22	F/2214	T497F226(1)015(2)(3)	3.3	8.0	3.0	1.0
15	22	G/2711	T497G226(1)015(2)(3)	3.3	6.0	1.1	1.0
15	33	F/2214	T497F336(1)015(2)(3)	5.0	6.0	3.0	1.0
15	33	H/2915	T497H336(1)015(2)(3)	5.0	8.0	0.9	1.0
15	47	G/2711	T497G476(1)015(2)(3)	7.1	8.0	1.1	1.0
15	68	H/2915	T497H686(1)015(2)(3)	10.2	8.0	0.9	1.0
15	100	H/2915	T497H107(1)015(2)(3)	15.0	10.0	0.9	1.0
20	0.15	A/1005	T497A154(1)020(2)(3)	0.0	8.0	15.0	1.0
20	0.47	A/1005	T497A474(1)020(2)(3)	0.1	8.0	14.0	1.0
20	0.68	A/1005	T497A684(1)020(2)(3)	0.1	6.0	15.0	1.0
20	0.68	B/1505	T497B684(1)020(2)(3)	0.1	6.0	10.0	1.0
20	1	A/1005	T497A105(1)020(2)(3)	0.2	6.0	15.0	1.0
20	1	B/1505	T497B105(1)020(2)(3)	0.2	6.0	12.0	1.0
20	1.5	B/1505	T497B155(1)020(2)(3)	0.3	6.0	9.0	1.0
VDC	µF	KEMET/EIA	(See below for part options)	µA @ +20°C Maximum/5 Min	% @ 20°C 120 Hz Maximum	Ω @ +20°C 100 kHz Maximum	Reflow Temperature ≤ 260°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Moisture Sensitivity

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

(2) To complete KEMET part number, insert B (0.1%/1,000 hours), C (0.01%/1,000 hours) or A = N/A. Designates Reliability Level.

(3) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, B = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates Termination Finish.

Refer to Ordering Information for additional detail.

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

Table 1 – Ratings & Part Number Reference cont'd

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Moisture Sensitivity
VDC	µF	KEMET/EIA	(See below for part options)	µA @ +20°C Maximum/5 Min	% @ 20°C 120 Hz Maximum	Ω @ +20°C 100 kHz Maximum	Reflow Temperature ≤ 260°C
20	2.2	B/1505	T497B225(1)020(2)(3)	0.4	6.0	9.0	1.0
20	2.2	D/1510	T497D225(1)020(2)(3)	0.4	6.0	5.0	1.0
20	3.3	D/1510	T497D335(1)020(2)(3)	0.7	6.0	6.0	1.0
20	3.3	E/2010	T497E335(1)020(2)(3)	0.7	6.0	4.0	1.0
20	4.7	E/2010	T497E475(1)020(2)(3)	0.9	6.0	6.0	1.0
20	4.7	F/2214	T497F475(1)020(2)(3)	0.9	6.0	4.0	1.0
20	6.8	D/1510	T497D685(1)020(2)(3)	1.4	6.0	5.0	1.0
20	6.8	E/2010	T497E685(1)020(2)(3)	1.4	6.0	5.0	1.0
20	6.8	F/2214	T497F685(1)020(2)(3)	1.4	6.0	2.4	1.0
20	10	F/2214	T497F106(1)020(2)(3)	2.0	6.0	3.0	1.0
20	15	F/2214	T497F156(1)020(2)(3)	3.0	6.0	3.0	1.0
20	15	G/2711	T497G156(1)020(2)(3)	3.0	6.0	1.1	1.0
20	22	G/2711	T497G226(1)020(2)(3)	4.4	6.0	2.5	1.0
20	22	H/2915	T497H226(1)020(2)(3)	4.4	6.0	0.9	1.0
20	33	H/2915	T497H336(1)020(2)(3)	6.6	8.0	0.9	1.0
20	47	H/2915	T497H476(1)020(2)(3)	9.4	8.0	0.9	1.0
25	0.33	A/1005	T497A334(1)025(2)(3)	0.1	6.0	15.0	1.0
25	0.47	A/1005	T497A474(1)025(2)(3)	0.1	6.0	15.0	1.0
25	0.68	B/1505	T497B684(1)025(2)(3)	0.2	6.0	7.5	1.0
25	1	B/1505	T497B105(1)025(2)(3)	0.3	6.0	10.0	1.0
25	1	C/2005	T497C105(1)025(2)(3)	0.3	6.0	6.5	1.0
25	1.5	D/1510	T497D155(1)025(2)(3)	0.4	6.0	6.5	1.0
25	2.2	D/1510	T497D225(1)025(2)(3)	0.6	6.0	6.0	1.0
25	2.2	E/2010	T497E225(1)025(2)(3)	0.6	6.0	3.5	1.0
25	3.3	E/2010	T497E335(1)025(2)(3)	0.8	6.0	4.0	1.0
25	4.7	F/2214	T497F475(1)025(2)(3)	1.2	6.0	2.5	1.0
25	6.8	F/2214	T497F685(1)025(2)(3)	1.7	6.0	3.0	1.0
25	6.8	G/2711	T497G685(1)025(2)(3)	1.7	6.0	1.2	1.0
25	10	F/2214	T497F106(1)025(2)(3)	2.5	6.0	2.5	1.0
25	10	G/2711	T497G106(1)025(2)(3)	2.5	6.0	1.4	1.0
25	15	G/2711	T497G156(1)025(2)(3)	3.8	6.0	1.4	1.0
25	15	H/2915	T497H156(1)025(2)(3)	3.8	6.0	1.0	1.0
25	22	G/2711	T497G226(1)025(2)(3)	5.5	6.0	1.4	1.0
25	22	H/2915	T497H226(1)025(2)(3)	5.5	6.0	0.9	1.0
25	22	X/2824	T497X226(1)025(2)(3)	5.5	6.0	0.9	1.0
25	33	H/2915	T497H336(1)025(2)(3)	8.3	8.0	0.9	1.0
25	33	X/2824	T497X336(1)025(2)(3)	8.3	8.0	0.9	1.0
35	0.22	A/1005	T497A224(1)035(2)(3)	0.1	6.0	18.0	1.0
35	0.33	A/1005	T497A334(1)035(2)(3)	0.1	6.0	22.0	1.0
35	0.47	B/1505	T497B474(1)035(2)(3)	0.2	6.0	10.0	1.0
35	0.68	C/2005	T497C684(1)035(2)(3)	0.2	6.0	8.0	1.0
35	1	D/1510	T497D105(1)035(2)(3)	0.4	6.0	6.5	1.0
35	1.5	E/2010	T497E155(1)035(2)(3)	0.5	6.0	4.5	1.0
35	3.3	F/2214	T497F335(1)035(2)(3)	1.2	6.0	2.5	1.0
35	4.7	G/2711	T497G475(1)035(2)(3)	1.6	6.0	1.5	1.0
35	6.8	G/2711	T497G685(1)035(2)(3)	2.4	6.0	1.3	1.0
35	6.8	H/2915	T497H685(1)035(2)(3)	2.4	6.0	1.3	1.0
35	10	H/2915	T497H106(1)035(2)(3)	3.5	8.0	0.9	1.0
VDC	µF	KEMET/EIA	(See below for part options)	µA @ +20°C Maximum/5 Min	% @ 20°C 120 Hz Maximum	Ω @ +20°C 100 kHz Maximum	Reflow Temperature ≤ 260°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Moisture Sensitivity

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

(2) To complete KEMET part number, insert B (0.1%/1,000 hours), C (0.01%/1,000 hours) or A = N/A. Designates Reliability Level.

(3) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, B = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates Termination Finish.

Refer to Ordering Information for additional detail.

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

Table 1 – Ratings & Part Number Reference cont'd

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Moisture Sensitivity
VDC	μF	KEMET/EIA	(See below for part options)	μA @ +20°C Maximum/5 Min	% @ 20°C 120 Hz Maximum	Ω @ +20°C 100 kHz Maximum	Reflow Temperature ≤ 260°C
35	15	X/2824	T497X156(1)035(2)(3)	5.3	6.0	0.9	1.0
50	0.1	A/1005	T497A104(1)050(2)(3)	0.1	6.0	22.0	1.0
50	0.15	A/1005	T497A154(1)050(2)(3)	0.1	6.0	17.0	1.0
50	0.22	B/1505	T497B224(1)050(2)(3)	0.1	6.0	14.0	1.0
50	0.33	B/1505	T497B334(1)050(2)(3)	0.2	6.0	12.0	1.0
50	0.47	C/2005	T497C474(1)050(2)(3)	0.2	6.0	8.0	1.0
50	0.68	D/1510	T497D684(1)050(2)(3)	0.3	6.0	7.0	1.0
50	1	E/2010	T497E105(1)050(2)(3)	0.5	6.0	6.0	1.0
50	1.5	F/2214	T497F155(1)050(2)(3)	0.8	6.0	4.0	1.0
50	2.2	F/2214	T497F225(1)050(2)(3)	1.1	6.0	2.5	1.0
50	3.3	G/2711	T497G335(1)050(2)(3)	1.7	6.0	2.0	1.0
50	4.7	H/2915	T497H475(1)050(2)(3)	2.4	6.0	1.5	1.0
VDC	μF	KEMET/EIA	(See below for part options)	μA @ +20°C Maximum/5 Min	% @ 20°C 120 Hz Maximum	Ω @ +20°C 100 kHz Maximum	Reflow Temperature ≤ 260°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Moisture Sensitivity

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

(2) To complete KEMET part number, insert B (0.1%/1,000 hours), C (0.01%/1,000 hours) or A = N/A. Designates Reliability Level.

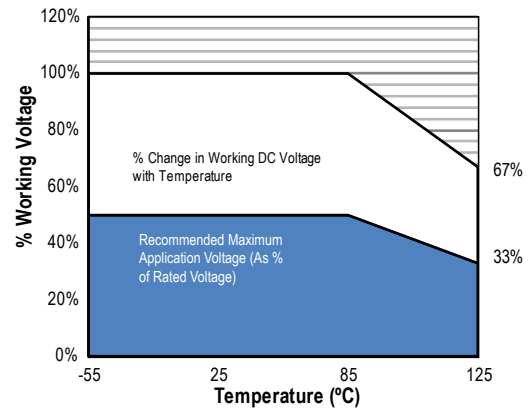
(3) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, B = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates Termination Finish.

Refer to Ordering Information for additional detail.

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

Recommended Voltage Derating Guidelines

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



Ripple Current/Ripple Voltage

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

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

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

KEMET Case Code	EIA Case Code	Maximum Power Dissipation (P max) mWatts @ 25°C w/+20°C Rise
A	1005	50
B	1505	70
C	2005	75
D	1510	80
E	2010	90
F	2214	100
G	2711	125
H	2915	150

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

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

T = Environmental Temperature

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

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

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

I = rms ripple current (amperes)

E = rms ripple voltage (volts)

P max = maximum power dissipation (watts)

R = ESR at specified frequency (ohms)

Z = Impedance at specified frequency (ohms)

Reverse Voltage

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

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

Table 2 – Land Dimensions/Courtyard

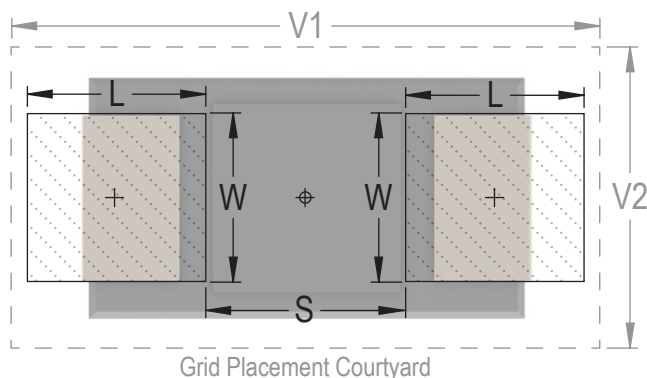
KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
		L	W	S	V1	V2	L	W	S	V1	V2	L	W	S	V1	V2
A ¹	1005	2.19	1.44	0.15	5.54	2.66	1.89	1.32	0.15	4.44	2.16	1.52	1.22	0.29	3.58	1.90
B	1505	2.30	1.44	1.20	6.80	2.66	1.90	1.32	1.40	5.70	2.16	1.52	1.22	1.56	4.84	1.90
C	2005	2.30	1.44	2.47	8.08	2.66	1.90	1.32	2.67	6.98	2.16	1.52	1.22	2.83	6.12	1.90
D	1510	2.30	2.58	1.20	6.80	3.92	1.90	2.46	1.40	5.70	3.42	1.52	2.36	1.56	4.84	3.16
E	2010	2.30	2.58	2.47	8.08	3.92	1.90	2.46	2.67	6.98	3.42	1.52	2.36	2.83	6.12	3.16
F	2214	2.30	3.47	2.98	8.58	4.82	1.90	3.35	3.18	7.48	4.32	1.52	3.25	3.34	6.62	4.06
G	2711	2.81	2.84	3.10	9.72	4.18	2.41	2.72	3.30	8.62	3.68	2.03	2.62	3.46	7.76	3.42
H	2915	2.81	3.84	3.61	10.24	5.20	2.41	3.72	3.81	9.14	4.70	2.03	3.62	3.97	8.28	4.44
X	2824	2.73	3.22	3.46	9.92	6.80	2.33	3.10	3.66	8.82	6.30	1.95	3.00	3.82	7.96	6.04

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 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.

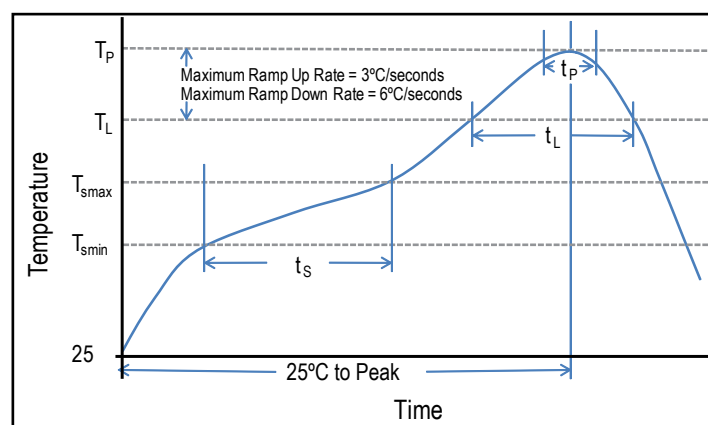
During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

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

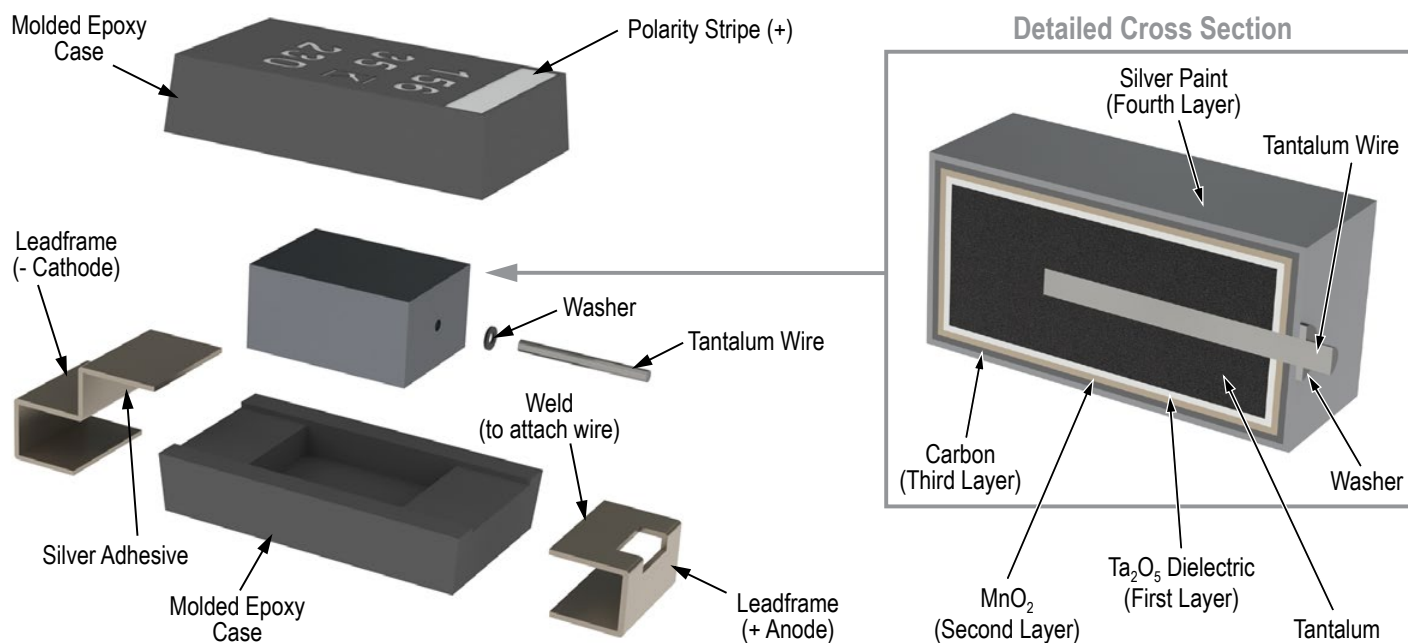
**Case Size A, B, C, H, I, K, M, R, S, T, U, V, W, and Z



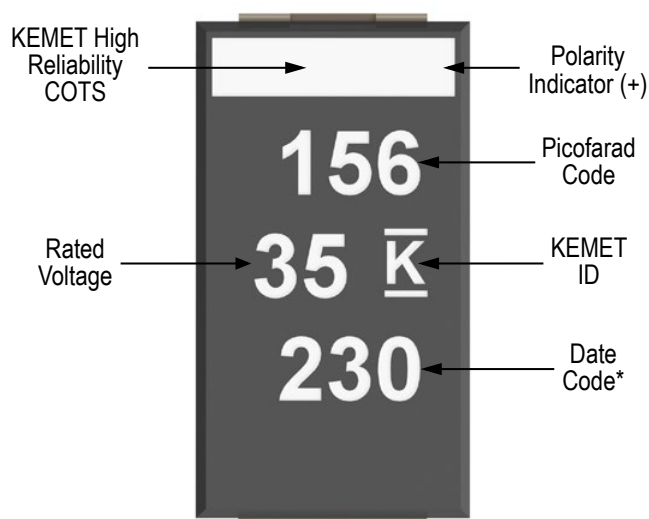
Storage

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

T513 Series Commercial Off-The-Shelf (COTS) Multiple Anode Low ESR MnO₂

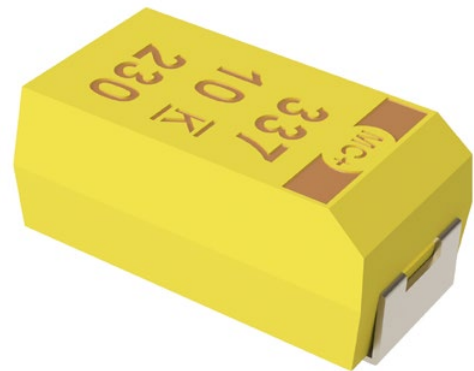
Overview

The KEMET T513 Series is suitable for the Commercial Off-The-Shelf (COTS) requirements of industrial, telecom, defense and aerospace markets. This surface mount series offers very low ESR and surge robustness designed for applications that require high surge current and high ripple current capability. These

benefits are achieved via a multiple anode construction similar to KEMET's T510 Series. The T513 Series COTS also offers various options including Weibull Grading, termination finish and surge current.

Benefits

- Meets or exceeds EIA Standard 535BAAC
- Taped and reeled per EIA 481
- High surge current capability
- Termination options B, C, H, K, T
- High ripple current capability
- Surge testing options
- 100% steady-state accelerated aging
- Capacitance values of 15 μ F to 1,000 μ F
- Tolerances of $\pm 10\%$ and $\pm 20\%$
- Voltage rating of 4 – 35 VDC
- Case sizes D, E, and X
- ESR as low as 10 m Ω
- RoHS compliant 100% Sn terminations available
- Operating temperature range of -55°C to +125°



Applications

The T513 Series is suitable for the industrial, telecom, defense and aerospace markets. Typical applications include decoupling and filtering in radar, sonar, power supply, guidance systems and other high reliability applications.

Environmental Compliance

RoHS Compliant (6/6) according to Directive 2002/95/EC when ordered with 100% Sn solder or gold plated.



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	513	X	108	K	004	B	H	61	10
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Voltage	Failure Rate/Design	Lead Material	Surge	ESR
T = Tantalum	Multiple Anode COTS	D, E, 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 016 = 16 V 020 = 20 V 025 = 25 V 035 = 35 V	A = N/A B = 0.1%/1,000 hours	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 & 85°C after Weibull 64 = 10 cycles, -55°C & 85°C before Weibull	10 = Standard ESR 20 = Low ESR 30 = Ultra Low ESR

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	-55°C to 125°C
Rated Capacitance Range	15 – 1,000 μ F @ 120 Hz/25°C
Capacitance Tolerance	K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	4 – 35 VDC
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

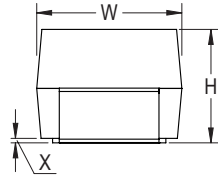
Test	Condition		Characteristics			
Endurance	85°C @ rated voltage, 2,000 hours 125°C @ 2/3 rated voltage, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Storage Life	125°C @ 0 volts, 2,000 hours		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Thermal Shock	MIL–STD–202, Method 107, Condition B, mounted, -55°C to 125°C, 1,000 cycles		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within initial limits		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, -55°C, +25°C, +85°C, +125°C, +25°C	Δ C/C	+25°C	-55°C	+85°C	+125°C
		IL*	±10%	±10%	±20%	
		DF	IL	IL	1.5 x IL	1.5 x IL
		DCL	IL	n/a	10 x IL	12 x IL
Surge Voltage	25°C and 85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage)		Δ C/C	Within ±5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10 of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
Additional Qualification Tests per MIL–PRF–55365/8	Please contact KEMET for more information.					

*IL = Initial limit

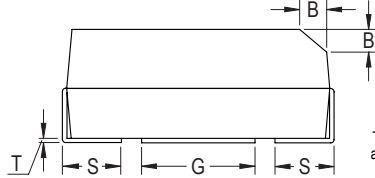
Dimensions – Millimeters (Inches)

Metric will govern

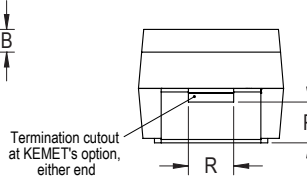
CATHODE (-) END VIEW



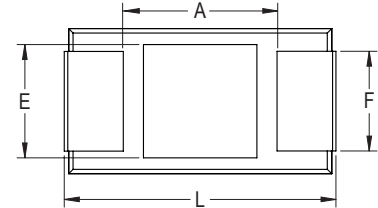
SIDE VIEW



ANODE (+) END VIEW



BOTTOM VIEW



Case Size		Component												
KEMET	EIA	L*	W*	H*	F* ±0.1 ±(.004)	S* ±0.3 ±(.012)	B* ±0.15 (Ref) ±.006	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)
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 (.095)	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 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	4.0 ±0.3 (0.157 ±0.012)	2.4 (.094)	1.3 (.051)	0.5 (.020)	0.10 ±0.10 (.004 ±.004)	1.7 (.067)	1.0 (.039)	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)
E	7360-38	7.3 ±0.3 (0.287 ±0.012)	6.0 ±0.3 (0.236 ±.012)	3.6 ±0.2 (0.142 ±0.008)	4.1 (.161)	1.3 (.051)	0.5 (.020)	0.10 ±0.10 (.004 ±.004)	0.9 (.035)	1.0 (.039)	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)

Notes: (Ref) – Dimensions provided for reference only. No dimensions are provided for B, P or R because low profile cases do not have a bevel or a notch.

* MIL-PRF-55365/8 specified dimensions

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR
VDC	µF	KEMET/EIA	(See below for part options)	µA @ +20°C Max/5 Min	% @ +20°C 120 Hz Max	mΩ @ +20°C 100 kHz Max	mΩ @ +20°C 100 kHz Max	mΩ @ +20°C 100 kHz Max
4	680	X/7343-43	T513X687(1)004(2)(3)(4)(5)	27.2	6.0	30	N/A	N/A
4	1000	X/7343-43	T513X108(1)004(2)(3)(4)(5)	40.0	6.0	23	18	N/A
4	1000	E/7360-38	T513E108(1)004(2)(3)(4)(5)	40.0	6.0	18	10	N/A
6.3	470	X/7343-43	T513X477(1)006(2)(3)(4)(5)	29.6	6.0	30	N/A	N/A
6.3	680	X/7343-43	T513X687(1)006(2)(3)(4)(5)	42.8	6.0	45	23	N/A
6.3	680	E/7360-38	T513E687(1)006(2)(3)(4)(5)	42.8	6.0	23	12	N/A
10	330	X/7343-43	T513X337(1)010(2)(3)(4)(5)	33.0	6.0	35	N/A	N/A
16	100	D/7343-31	T513D107(1)016(2)(3)(4)(5)	16.0	6.0	75	N/A	N/A
16	150	X/7343-43	T513X157(1)016(2)(3)(4)(5)	24.0	6.0	40	30	N/A
16	220	X/7343-43	T513X227(1)016(2)(3)(4)(5)	35.2	10.0	40	25	N/A
20	100	X/7343-43	T513X107(1)020(2)(3)(4)(5)	20.0	8.0	45	40	35
25	68	X/7343-43	T513X686(1)025(2)(3)(4)(5)	17.0	8.0	45	N/A	N/A
25	100	E/7360-38	T513E107(1)025(2)(3)(4)(5)	25.0	8.0	50	N/A	N/A
35	15	D/7343-31	T513D156(1)035(2)(3)(4)(5)	5.3	6.0	100	N/A	N/A
35	33	X/7343-43	T513X336(1)035(2)(3)(4)(5)	11.6	6.0	65	55	N/A
35	47	X/7343-43	T513X476(1)035(2)(3)(4)(5)	16.5	8.0	65	55	N/A
VDC	µF	KEMET/EIA	(See below for part options)	µA @ +20°C Max/5 Min	% @ +20°C 120 Hz Max	mΩ @ +20°C 100 kHz Max	mΩ @ +20°C 100 kHz Max	mΩ @ +20°C 100 kHz Max
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	Standard ESR	Low ESR	Ultra-low ESR

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

(2) To complete KEMET part number, insert B (0.1%/1,000 hours), or A = N/A. Designates Reliability Level.

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

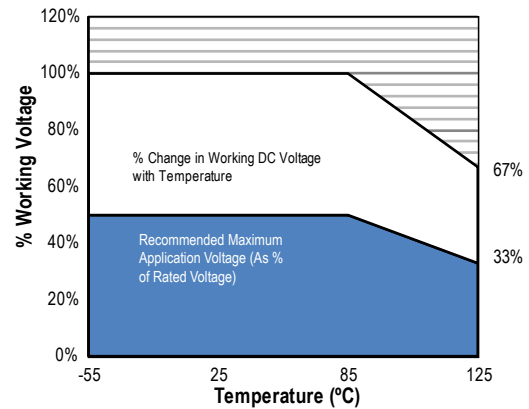
(4) To complete KEMET part number, insert 61 = None, 62 = 10 cycles +25°C, 63 = 10 cycles -55°C +85°C after Weibull or 64 = 10 cycles -55°C +85°C before Weibull. Designates Surge current option.

(5) To complete KEMET part number, insert 10 = Standard ESR, 20 = Low ESR or 30 = Ultra Low ESR. Designates ESR option.

Refer to Ordering Information for additional detail.

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.

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

T = Environmental Temperature

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

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

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

I = rms ripple current (amperes)

E = rms ripple voltage (volts)

P max = maximum power dissipation (watts)

R = ESR at specified frequency (ohms)

Z = Impedance at specified frequency (ohms)

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.

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 below table. The capacitors should not be operated continuously in reverse mode, even within these limits.

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

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2
D	7343–31	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
E ¹	7360–38	4.25	2.77	3.67	10.22	7.30	4.13	2.37	3.87	9.12	6.80	4.03	1.99	4.03	8.26	6.54
X ¹	7343–43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

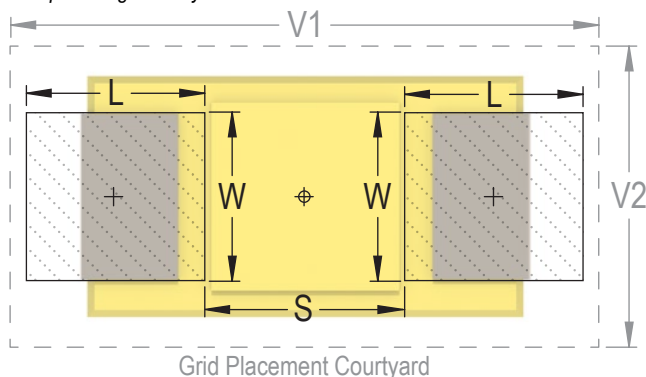
Density Level A: For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.

Density Level B: For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.

Density Level C: For high component 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.

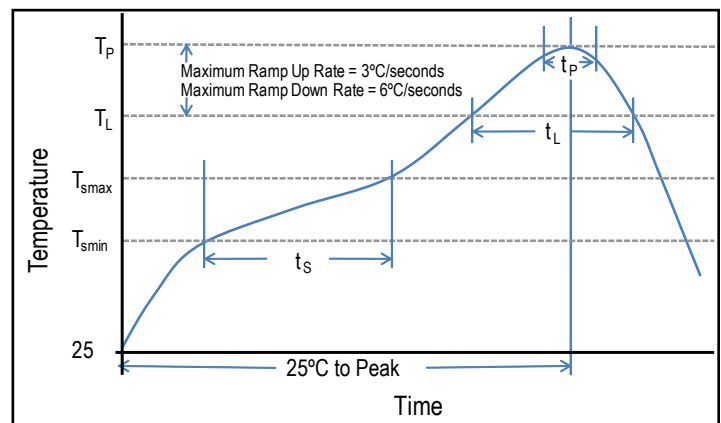
During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

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

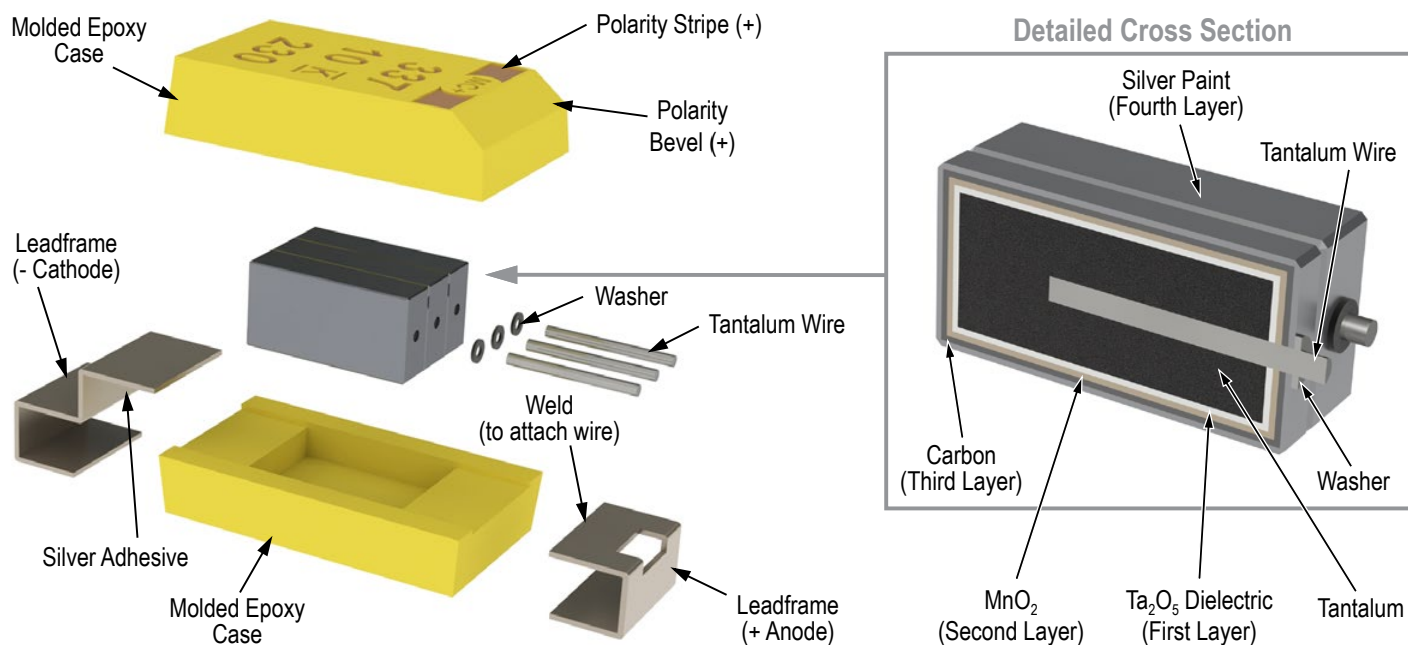
**Case Size A, B, C, H, I, K, M, R, S, T, U, V, W, and Z



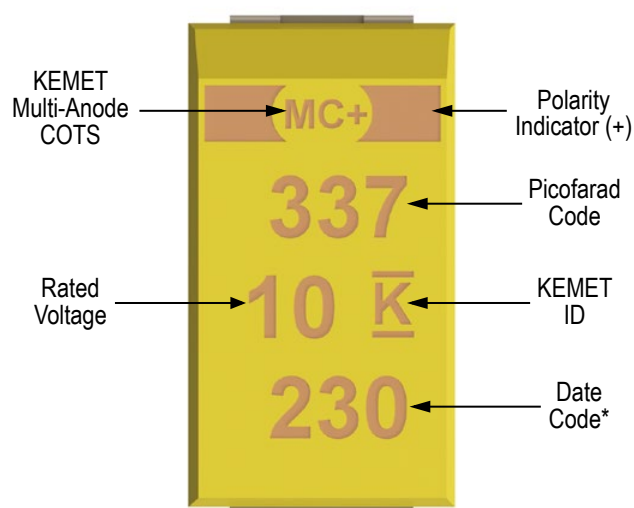
Storage

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

T540 Series Commercial Off-The-Shelf (COTS) Single Anode Polymer Tantalum

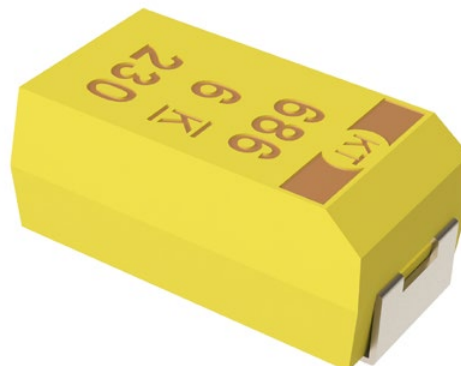
Overview

The KEMET Organic Capacitor (KO-CAP) is a tantalum capacitor with a Ta anode and Ta₂O₅ dielectric. A conductive organic polymer replaces the traditionally used MnO₂ as the cathode plate of the capacitor. This results in very low ESR and improved capacitance retention at high frequency. The KO-CAP may also be operated at steady state voltages at up to 90% of rated voltage for part types with rated voltages of ≤ 10 volts

and up to 80% of rated voltage for part types > 10 volts. The T540 Series KO-CAP offers the same advantages as the T525 Series but is also designed for Commercial Off-The-Shelf (COTS) high reliability applications. This surface mount product offers a tin lead (SnPb) leadframe finish, surge current testing options and standard or low ESR levels.

Benefits

- Approved for DLA Drawing 04051
- Polymer cathode technology
- 125°C maximum operating temperature
- High frequency capacitance retention
- Benign failure mode
- Capacitance: 4.7 µF to 680 µF
- Voltage: 2.5 V to 63 V
- Use at up to 90% of rated voltage (10% derating) for part types ≤ 10 V
- Use at up to 80% of rated voltage (20% derating) for part types > 10 V
- Surge current testing options
- Self-healing mechanism
- Volumetrically efficient
- Low ESR
- EIA standard case sizes



Applications

Typical applications include decoupling and filtering in defense and aerospace applications that require low ESR or a benign failure mode.

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	540	D	107	M	10	A	H	65	10	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Voltage	Failure Rate/Design	Lead Material	Surge Option	ESR	Packaging (C-Spec)
T = Tantalum	540 = Polymer COTS	B, C, D	First two digits represent significant figures. Third digit specifies number of zeros.	M = $\pm 20\%$	2R5 = 2.5 V 003 = 3 V 004 = 4 V 006 = 6.3 V 010 = 10 V 016 = 16 V 020 = 20 V 025 = 25 V 035 = 35 V 050 = 50 V 063 = 63 V	A = N/A	H = Standard Solder Coated (SnPb 5% Pb minimum)	65 = 4 cycles @ 25°C * 66 = 10 cycles @ 25°C * 67 = 10 cycles -55°C and 85°C *	10 = ESR - Standard 20 = ESR - Low	Blank = 7" Reel 7280 = 13" Reel

* After Voltage Aging

DLA 04051 Ordering Information

04051-	001	A
Drawing Number	Dash Number	Surge Current Option
0451	See Part number List	Blank = 4 cycles +25°C $\pm 5^\circ\text{C}$ Before Voltage Aging A = 10 cycles +25°C $\pm 5^\circ\text{C}$ After Voltage Aging B = 10 cycles -55°C $\pm 5^\circ\text{C}$, +0°C $\pm 5^\circ\text{C}$, and +85°C $\pm 5^\circ\text{C}$ After Voltage Aging

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	-55°C to 125°C *
Rated Capacitance Range	4.7 – 680 μF @ 120 Hz/25°C
Capacitance Tolerance	M Tolerance (20%)
Rated Voltage Range	2.5 – 63 V
DF (120 Hz)	$\leq 10\%$
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	$\leq 0.1\text{C V } (\mu\text{A})$ at rated voltage after 5 minutes

* KEMET's Polymer COTS (T540/T541 Series) capacitors are rated for operation between -55°C and +125°C. Parametric electrical performance remains within stated specification limits after 1,000 hours of continuous operation and/or storage at +125°C. Long-term duty cycles or storage at or above +125°C may result in an increase in ESR performance outside of the stated specification limits.

Qualification

Test	Condition		Characteristics			
Endurance	105°C @ rated voltage, 2,000 hours 125°C @ 2/3 rated voltage, 2,000 hours		Δ C/C	Within -20%/+10% of initial value		
			DF	≤ initial limit		
			DCL**	1.25 x initial limit @ 125°C		
			ESR	2 x initial limit		
Storage Life	125°C @ 0 volts, 2,000 hours		Δ C/C	Within -20%/+10% of initial value		
			DF	Within initial limits		
			DCL**	Within 2.0 x initial limit		
			ESR	Within 2.0 x initial limit		
Humidity	60°C, 90% RH, 500 hours, rated voltage 60°C, 90% RH, 500 hours, no load		Δ C/C	Within -5%/+35% of initial value		
			DF	≤ initial limit		
			DCL	Within 3.0 x initial limit		
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 (1)	+125°C (2)
		DF	±5%	±10%	±20%	±30%
		DCL	IL	IL	1.2 x IL	1.5 x IL
Surge Voltage	105°C, 1.32 x rated voltage, 33 Ω resistance, 1,000 cycles		Δ C/C	Within -20/+5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
Additional Qualification Tests per MIL–PRF–55365/8	Please contact KEMET for more information.					

*IL = Initial limit

** The test voltage shall be maintained during the cool down from elevated test temperature to +25°C. After cool down, the capacitors shall be discharged for a minimum of 5 minutes. DC leakage measurements are allowed at this time.

(1) $\geq 16V$ - D C/C = $\pm 30\%$

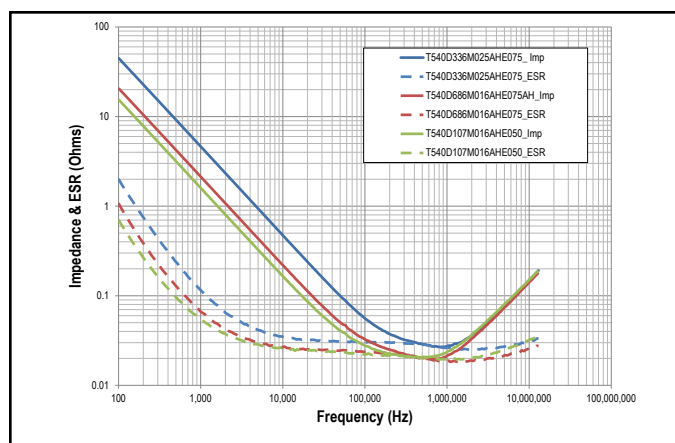
(2) $\geq 16V$ - D C/C = $\pm 40\%$

Certification

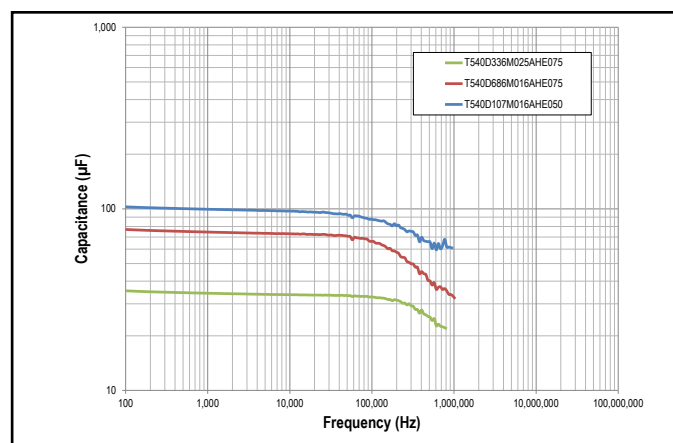
MIL-PRF-55365/8
DLA Drawing 04051

Electrical Characteristics

ESR vs. Frequency



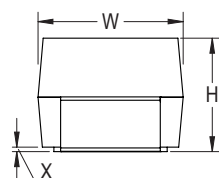
Capacitance vs. Frequency



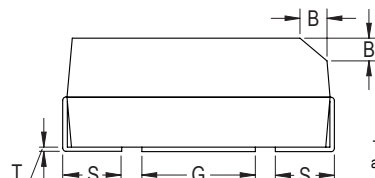
Dimensions – Millimeters (Inches)

Metric will govern

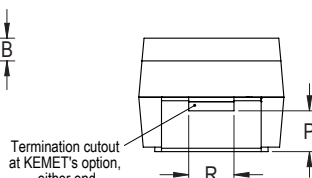
CATHODE (-) END VIEW



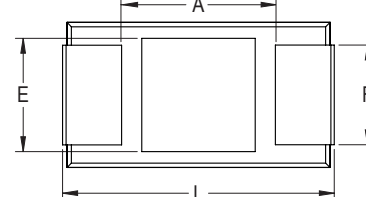
SIDE VIEW



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 (.087)	0.8 (.031)	0.4 (.016)	0.10 ±0.10 (.004 ±.004)	0.5 (.020)	1.0 (.039)	0.13 (.005)	1.1 (.043)	1.8 (.071)	2.2 (.087)
C	6032-28	6.0 ±0.3 (0.236 ±0.012)	3.2 ±0.3 (0.126 ±0.012)	2.5 ±0.3 (0.098 ±0.012)	2.2 (.087)	1.3 (.051)	0.5 (.020)	0.10 ±0.10 (.004 ±.004)	0.9 (.035)	1.0 (.039)	0.13 (.005)	2.5 (.098)	2.8 (.110)	2.4 (.095)
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 (.095)	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)

Notes: (Ref) – Dimensions provided for reference only. No dimensions are provided for B, P or R because low profile cases do not have a bevel or a notch.

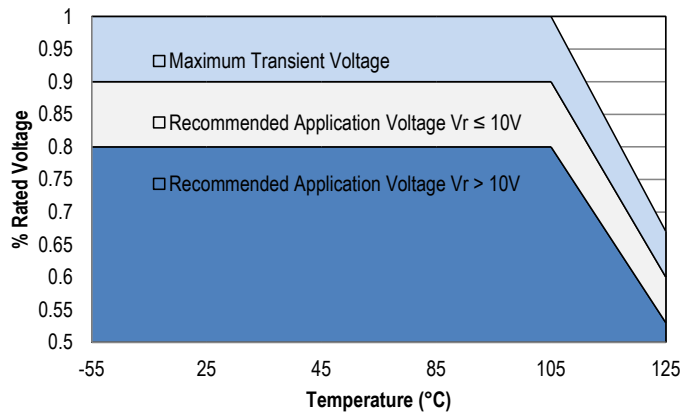
* MIL-PRF-55365/8 specified dimensions.

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DSCC Drawing Number 04051	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (A) 100 kHz	
V	µF	KEMET/EIA	(See below for part options)	Part Number	(µA) @ 25°C Maximum	% @ 25°C 120 Hz Maximum	(mΩ) @ 25°C 100 kHz Maximum	w/ΔT = 20°C @ -55°C to 105°C	w/ΔT = 2°C @ 125°C
2.5	330	D/7343-31	T540D337M2R5AH(1)10	04051-002(2)	83	10	25	2.4	0.8
2.5	470	D/7343-31	T540D477M2R5AH(1)10	04051-003(2)	118	10	25	2.4	0.8
2.5	680	D/7343-31	T540D687M2R5AH(1)10	04051-004(2)	170	10	25	2.4	0.8
3	100	B/3528-21	T540B107M003AH(1)10	04051-005(2)	30	8	80	1	0.3
3	150	B/3528-21	T540B157M003AH(1)10	04051-006(2)	45	8	80	1	0.3
3	330	D/7343-31	T540D337M003AH(1)10	04051-007(2)	99	10	25	2.4	0.8
3	470	D/7343-31	T540D477M003AH(1)10	04051-008(2)	141	10	25	2.4	0.8
3	680	D/7343-31	T540D687M003AH(1)10	04051-009(2)	204	10	25	2.4	0.8
4	68	B/3528-21	T540B686M004AH(1)10	04051-011(2)	28	8	80	1	0.3
4	100	B/3528-21	T540B107M004AH(1)10	04051-012(2)	40	8	80	1	0.3
4	220	D/7343-31	T540D227M004AH(1)10	04051-013(2)	88	10	25	2.4	0.8
4	330	D/7343-31	T540D337M004AH(1)10	04051-014(2)	132	10	25	2.4	0.8
4	470	D/7343-31	T540D477M004AH(1)20	04051-015(2)	188	10	25	2.4	0.8
4	470	D/7343-31	T540D477M004AH(1)10	04051-016(2)	188	10	40	1.9	0.6
6.3	33	B/3528-21	T540B336M006AH(1)10	04051-017(2)	21	8	80	1	0.3
6.3	47	B/3528-21	T540B476M006AH(1)10	04051-019(2)	30	8	80	1	0.3
6.3	68	B/3528-21	T540B686M006AH(1)10	04051-020(2)	43	8	80	1	0.3
6.3	150	D/7343-31	T540D157M006AH(1)10	04051-021(2)	95	10	25	2.4	0.8
6.3	220	D/7343-31	T540D227M006AH(1)10	04051-022(2)	139	10	25	2.4	0.8
6.3	330	D/7343-31	T540D337M006AH(1)20	04051-023(2)	208	10	25	2.4	0.8
6.3	330	D/7343-31	T540D337M006AH(1)10	04051-024(2)	208	10	40	1.9	0.6
10	22	B/3528-21	T540B226M010AH(1)10	04051-025(2)	22	8	80	1	0.3
10	33	B/3528-21	T540B336M010AH(1)10	04051-027(2)	33	8	80	1	0.3
10	100	D/7343-31	T540D107M010AH(1)20	04051-028(2)	100	10	25	2.4	0.8
10	100	D/7343-31	T540D107M010AH(1)10	04051-029(2)	100	10	55	1.7	0.5
10	150	D/7343-31	T540D157M010AH(1)20	04051-030(2)	150	10	25	2.4	0.8
10	150	D/7343-31	T540D157M010AH(1)10	04051-031(2)	150	10	55	1.7	0.5
10	220	D/7343-31	T540D227M010AH(1)10	04051-032(2)	220	10	25	2.4	0.8
16	47	D/7343-31	T540D476M016AH(1)20	04051-033(2)	76	10	35	2.1	0.7
16	47	D/7343-31	T540D476M016AH(1)10	04051-034(2)	76	10	65	1.5	0.5
16	68	D/7343-31	T540D686M016AH(1)10	04051-035(2)	109	10	75	1.4	0.5
16	100	D/7343-31	T540D107M016AH(1)10	04051-036(2)	160	10	50	1.7	0.6
20	22	D/7343-31	T540D226M020AH(1)10	04051-037(2)	44	10	75	1.4	0.5
20	33	D/7343-31	T540D336M020AH(1)10	04051-038(2)	66	10	75	1.4	0.5
20	47	D/7343-31	T540D476M020AH(1)10	04051-039(2)	94	10	75	1.4	0.5
25	6.8	C/6032-28	T540C685M025AH(1)10	NA	17	10	150	0.9	0.3
25	10	C/6032-28	T540C106M025AH(1)10	NA	25	10	150	0.9	0.3
25	15	D/7343-31	T540D156M025AH(1)20	04051-040(2)	38	10	75	1.4	0.5
25	15	D/7343-31	T540D156M025AH(1)10	04051-041(2)	38	10	100	1.2	0.4
25	22	D/7343-31	T540D226M025AH(1)10	04051-042(2)	55	10	75	1.4	0.5
25	33	D/7343-31	T540D336M025AH(1)10	04051-043(2)	83	10	75	1.4	0.5
35	15	D/7343-31	T540D156M035AH(1)20	04051-044(2)	53	10	75	1.4	0.5
35	15	D/7343-31	T540D156M035AH(1)10	04051-045(2)	53	10	100	1.2	0.4
50	10	D/7343-31	T540D106M050AH(1)20	04051-046(2)	50	10	100	1.2	0.4
50	10	D/7343-31	T540D106M050AH(1)10	04051-047(2)	50	10	125	1.1	0.4
63	4.7	D/7343-31	T540D475M063AH(1)20	04051-048(2)	30	10	100	1.8	0.5
63	4.7	D/7343-31	T540D475M063AH(1)10	04051-049(2)	30	10	120	1.1	0.3
V	µF	KEMET/EIA	(See below for part options)	Part Number	(µA) @ 25°C Maximum	% @ 25°C 120 Hz Maximum	(mΩ) @ 25°C 100 kHz Maximum	w/ΔT = 20°C @ -55°C to 105°C	w/ΔT = 2°C @ 125°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DSCC Drawing Number 04051	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (A) 100 kHz	

(1) To complete KEMET part number, insert 65 = None, 66 = 10 cycles +25°C, 67 = 10 cycles -55°C and +85°C. Designates surge current option. Please refer to Ordering Information for additional details.

Derating Guidelines



Voltage Rating	Maximum Recommended Steady State Voltage	Maximum Recommended Transient Voltage (1 ms – 1 μs)	Maximum Recommended Steady State Voltage	Maximum Recommended Transient Voltage (1 ms – 1 μs)
	-55°C to 105°C		105°C to 125°C	
2 V ≤ V _R ≤ 10 V	90% of V _R	V _R	60% of V _R	V _R
12.5 V ≤ V _R ≤ 63 V	80% of V _R	V _R	54% of V _R	V _R

V_R = Rated Voltage

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.

Temperature Compensation Multipliers for Maximum Ripple Current		
T ≤ 45°C	45° C < T ≤ 85°C	85°C < T ≤ 125°C
1.00	0.70	0.25

T= Environmental Temperature

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

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

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

I = rms ripple current (amperes)

E = rms ripple voltage (volts)

P max = maximum power dissipation (watts)

R = ESR at specified frequency (ohms)

Z = Impedance at specified frequency (ohms)

Case Code	EIA Case Code	Maximum Power Dissipation (P max) mWatts @ 45°C with +30°C Rise
T	3528-12	105
M	3528-15	120
A	3216-18	112
B	3528-21	127
U	6032-15	135
L	6032-19	150
C	6032-28	165
W	7343-15	180
V	7343-20	187
D	7343-31	225
Y	7343-40	241
X	7343-43	247
H	7360-20	187
I	3216-10	95

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

Reverse Voltage

Polymer tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected in the wrong polarity. These devices will withstand a small degree of transient voltage reversal for short periods as shown in the below table.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
55°C	10% of Rated Voltage
85°C	5% of Rated Voltage
105°C	3% of Rated Voltage
125°C*	1% of Rated Voltage

*For series rated to 125°C

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
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

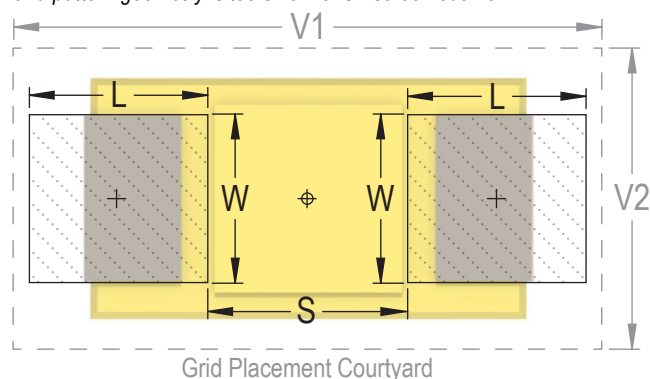
Density Level A: For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.

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.

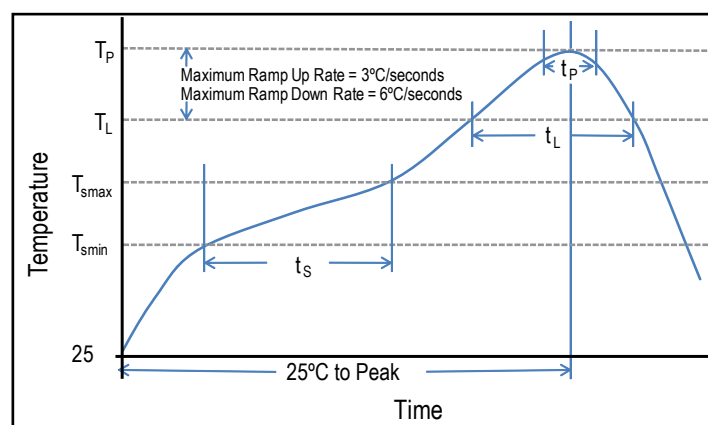
During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

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

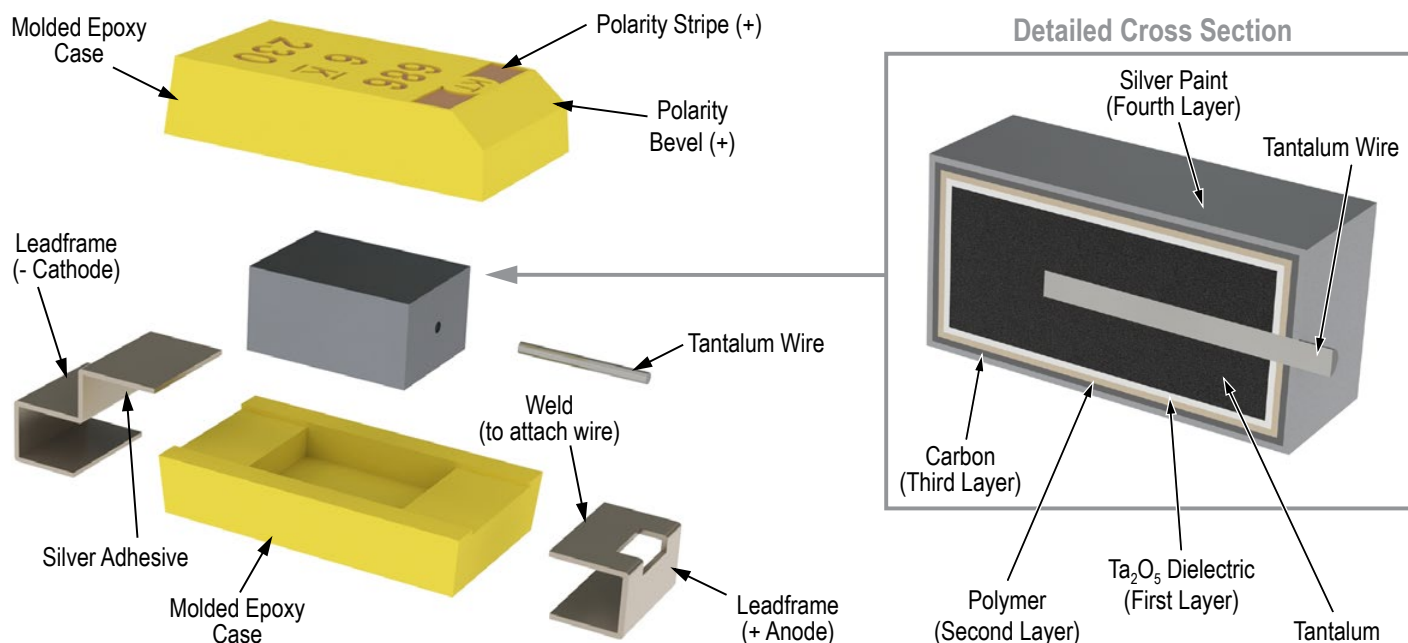
**Case Size A, B, C, H, I, K, M, R, S, T, U, V, W, and Z



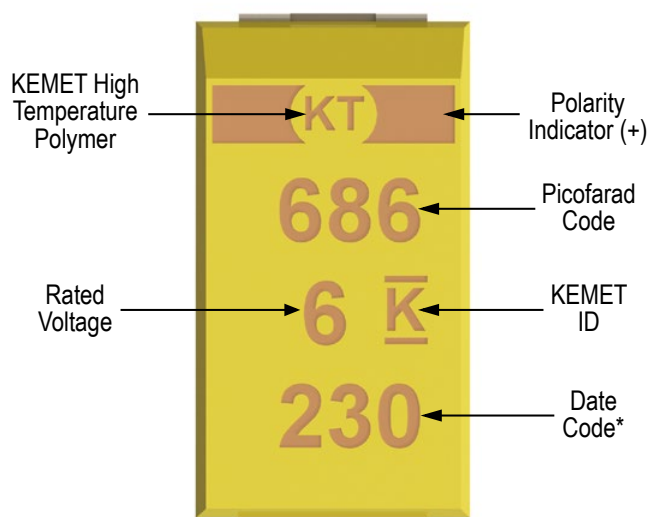
Storage

All KO-CAP series are shipped in moisture barrier bags with a desiccant and moisture indicator card. These series are classified as MSL3 (Moisture Sensitivity Level 3). Product contained within the moisture barrier bags should be stored in normal working environments with temperatures not to exceed 40°C and humidity not in excess of 60% RH.

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

T541 Series Commercial Off-The-Shelf (COTS) Multiple Anode Polymer Tantalum

Overview

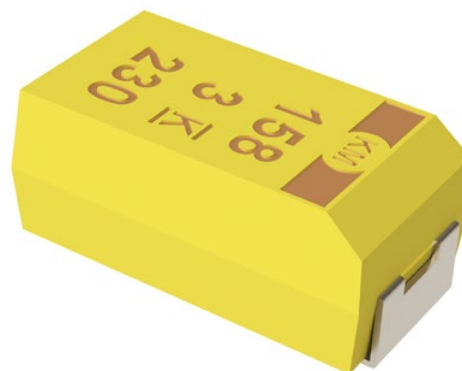
The KEMET Organic Capacitor (KO-CAP) is a tantalum capacitor with a Ta anode and Ta₂O₅ dielectric. A conductive organic polymer replaces the traditionally used MnO₂ as the cathode plate of the capacitor. This results in very low ESR and improved capacitance retention at high frequency. Combining this advancement with the use of a multiple anode design delivers the lowest ESR values available in the industry. The KO-CAP may also be operated at steady state voltages at up

to 90% of rated voltage for part types with rated voltages of ≤ 10 volts and up to 80% of rated voltage for part types > 10 volts.

The T541 Series KO-CAP offers the same advantages as the T530 Series but is also designed for Commercial Off-The-Shelf (COTS) high reliability applications. This surface mount product offers a tin lead (SnPb) leadframe finish, surge current testing options and standard or low ESR levels.

Benefits

- Approved for DLA Drawing 04052
- ESR: 5 mΩ to 150 mΩ
- 125°C maximum operating temperature
- Polymer cathode technology
- High frequency capacitance retention
- Benign failure mode
- Capacitance: 10 μF to 1,500 μF
- 100% accelerated steady state aging
- Surge current testing options
- Utilizes multiple tantalum anode technology
- Volumetrically efficient
- Use at up to 90% of rated voltage (10% derating) for part types ≤ 10 V
- Use at up to 80% of rated voltage (20% derating) for part types > 10 V
- Very low ESR
- EIA standard case sizes



Applications

Typical applications include decoupling and filtering in defense and aerospace applications that require low ESR or a benign failure mode.

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	541	D	157	M	10	A	H	65	10	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Voltage	Failure Rate/Design	Lead Material	Surge Option	ESR	Packaging (C-Spec)
T = Tantalum	541 = Polymer COTS Multiple Anode	D, X, Y	First two digits represent significant figures. Third digit specifies number of zeros.	M = $\pm 20\%$	2R5 = 2.5 V 003 = 3 V 004 = 4 V 006 = 6.3 V 010 = 10 V 016 = 16 V 020 = 20 V 025 = 25 V 035 = 35 V 050 = 50 V 063 = 63 V	A = N/A	H = Standard Solder Coated (SnPb 5% Pb minimum)	65 = 4 cycles @ 25°C * 66 = 10 cycles @ 25°C * 67 = 10 cycles -55°C and 85°C	10 = ESR - Standard 20 = ESR - Low 30 = ESR - Ultra Low ESR	Blank = 7" Reel 7280 = 13" Reel

* After Voltage Aging

DLA 04052 Ordering Information

04052-	001	A
Drawing Number	Dash Number	Surge Current Option
0452	See Part number List	Blank = 4 cycles +25°C $\pm 5^\circ\text{C}$ Before Voltage Aging A = 10 cycles +25°C $\pm 5^\circ\text{C}$ After Voltage Aging B = 10 cycles -55°C $\pm 5^\circ\text{C}$, +0°C $\pm 5^\circ\text{C}$, and +85°C $\pm 5^\circ\text{C}$ After Voltage Aging

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	-55°C to 125°C *
Rated Capacitance Range	10 – 1,500 μF @ 120 Hz/25°C
Capacitance Tolerance	M Tolerance (20%)
Rated Voltage Range	2.5 – 63 V
DF (120 Hz)	10%
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	$\leq 0.1\text{C V}$ (μA) at rated voltage after 5 minutes

* KEMET's Polymer COTS (T540/T541 Series) capacitors are rated for operation between -55°C and +125°C. Parametric electrical performance remains within stated specification limits after 1,000 hours of continuous operation and/or storage at +125°C. Long-term duty cycles or storage at or above +125°C may result in an increase in ESR performance outside of the stated specification limits.

Qualification

Test	Condition		Characteristics			
Endurance	105°C @ rated voltage, 2,000 hours 125°C @ 2/3 rated voltage, 2,000 hours		Δ C/C	Within -20%/+10% of initial value		
			DF	≤ initial limit		
			DCL**	1.25 x initial limit @ 125°C		
			ESR	2 x IL @ 105°C, 5 x IL @ 125°C		
Storage Life	125°C @ 0 volts, 2,000 hours		Δ C/C	Within -20%/+10% of initial value		
			DF	Within initial limits		
			DCL**	Within 2.0 x initial limit		
			ESR	Within 5.0 x initial limit		
Humidity	60°C, 90% RH, 500 hours, rated voltage 60°C, 90% RH, 500 hours, no load		Δ C/C	Within -5%/+35% of initial value		
			DF	≤ initial limit		
			DCL	Within 3.0 x initial limit		
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 (1)	+125°C (2)
		DF	±5%	±10%	±20%	±30%
		DCL	IL	IL	1.2 x IL	1.5 x IL
		DCL	IL	n/a	10 x IL	10 x IL
Surge Voltage	105°C, 1.32 x rated voltage, 33 Ω resistance, 1,000 cycles		Δ C/C	Within -20/+5% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/Vibration	MIL–STD–202, Method 213, Condition I, 100 G peak MIL–STD–202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10% of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
Additional Qualification Tests per MIL–PRF–55365/8	Please contact KEMET for more information.					

*IL = Initial limit

** The test voltage shall be maintained during the cool down from elevated test temperature to +25°C. After cool down, the capacitors shall be discharged for a minimum of 5 minutes. DC leakage measurements are allowed at this time.

(1) $\geq 16V$ - D C/C = $\pm 30\%$

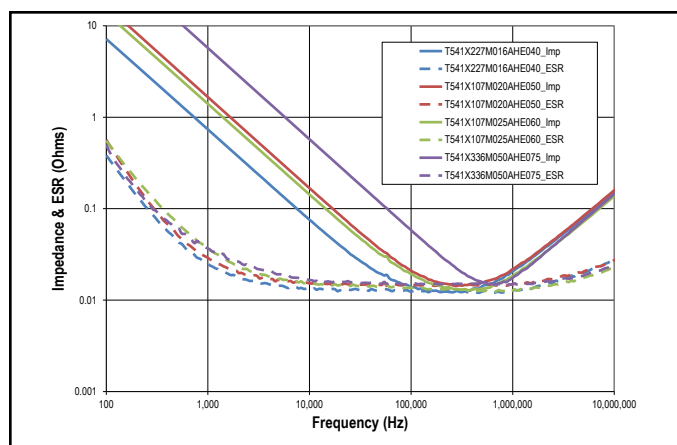
(2) $\geq 16V$ - D C/C = $\pm 40\%$

Certification

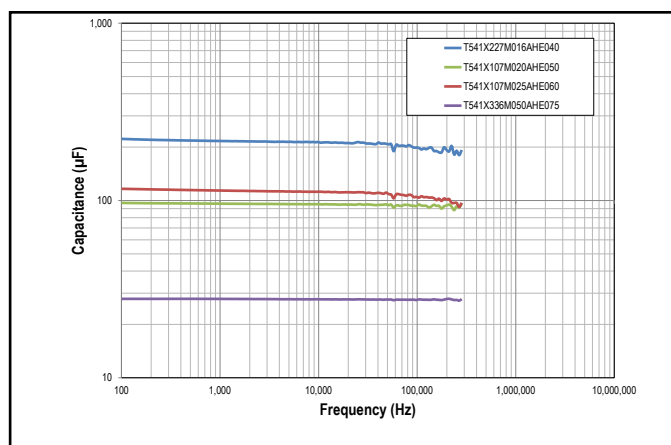
MIL-PRF-55365/8
DLA Drawing 04052

Electrical Characteristics

ESR vs. Frequency



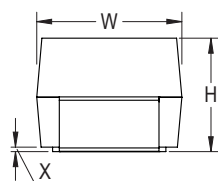
Capacitance vs. Frequency



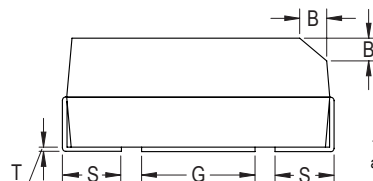
Dimensions – Millimeters (Inches)

Metric will govern

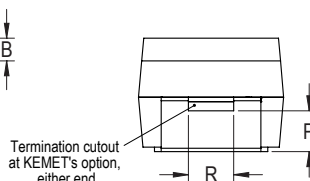
CATHODE (-) END VIEW



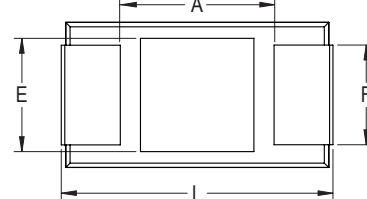
SIDE VIEW



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)
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 (.095)	1.3 (.051)	0.5 (.020)	0.10 ±0.10 (.004 ±0.004)	0.9 (.035)	1.0 (.039)	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)
X	7343-43	7.3 ±0.3 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	4.0 ±0.3 (0.157 ±0.012)	2.4 (.095)	1.3 (.051)	0.5 (.020)	0.10 ±0.10 (.004 ±0.004)	1.7 (.067)	1.0 (.039)	0.13 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)
Y	7343-40	7.3 ±0.3 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	4.0 (.157) Maximum	2.4 (.095)	1.3 (.051)	0.5 (.020)	0.10 ±0.10 (.004 ±0.004)	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 are 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	DSCC Drawing Number 04052	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (A) 100 kHz	
V	μF	KEMET/EIA	(See below for part options)	Part Number	(μA) @ 25°C Maximum	% @ 25°C 120 Hz Maximum	(mΩ) @ 25°C 100 kHz Maximum	w/ΔT = 20°C @ -55°C to 105°C	w/ΔT = 2°C @ 125°C
2.5	470	D/7343-31	T541D477M2R5AH(1)20	04052-002(2)	118	10	6	6.5	2.1
2.5	470	D/7343-31	T541D477M2R5AH(1)10	04052-003(2)	118	10	10	5.0	1.6
2.5	680	Y/7343-40	T541Y687M2R5AH(1)30	04052-005(2)	170	10	5	7.3	2.3
2.5	680	Y/7343-40	T541Y687M2R5AH(1)20	04052-006(2)	170	10	6	6.6	2.1
2.5	680	Y/7343-40	T541Y687M2R5AH(1)10	04052-042(2)	170	10	10	5.1	1.6
2.5	680	D/7343-31	T541D687M2R5AH(1)20	04052-007(2)	170	10	6	6.5	2.1
2.5	680	D/7343-31	T541D687M2R5AH(1)10	04052-008(2)	170	10	10	5.0	1.6
2.5	1000	X/7343-43	T541X108M2R5AH(1)30	04052-009(2)	250	10	5	7.3	2.4
2.5	1000	X/7343-43	T541X108M2R5AH(1)20	04052-010(2)	250	10	6	6.7	2.1
2.5	1000	X/7343-43	T541X108M2R5AH(1)10	04052-043(2)	250	10	10	5.2	1.7
2.5	1500	X/7343-43	T541X158M2R5AH(1)30	04052-011(2)	375	10	5	7.3	2.4
2.5	1500	X/7343-43	T541X158M2R5AH(1)20	04052-044(2)	375	10	6	6.7	2.1
2.5	1500	X/7343-43	T541X158M2R5AH(1)10	04052-045(2)	375	10	10	5.2	1.7
3	470	D/7343-31	T541D477M003AH(1)10	04052-012(2)	141	10	10	5.0	1.6
3	680	D/7343-31	T541D687M003AH(1)10	04052-013(2)	204	10	10	5.0	1.6
3	1000	X/7343-43	T541X108M003AH(1)10	04052-014(2)	300	10	10	5.2	1.7
3	1500	X/7343-43	T541X158M003AH(1)10	04052-015(2)	450	10	8	5.8	1.9
4	330	D/7343-31	T541D337M004AH(1)20	04052-017(2)	132	10	6	6.5	2.1
4	330	D/7343-31	T541D337M004AH(1)10	04052-046(2)	132	10	10	5.0	1.6
4	470	D/7343-31	T541D477M004AH(1)10	04052-018(2)	188	10	10	5.0	1.6
4	470	Y/7343-40	T541Y477M004AH(1)30	04052-019(2)	188	10	5	7.3	2.3
4	470	Y/7343-40	T541Y477M004AH(1)20	04052-020(2)	188	10	6	6.6	2.1
4	470	Y/7343-40	T541Y477M004AH(1)10	04052-047(2)	188	10	10	5.1	1.6
4	680	X/7343-43	T541X687M004AH(1)30	04052-021(2)	272	10	5	7.3	2.4
4	680	X/7343-43	T541X687M004AH(1)20	04052-022(2)	272	10	6	6.7	2.1
4	680	X/7343-43	T541X687M004AH(1)10	04052-023(2)	272	10	10	5.2	1.7
4	1000	X/7343-43	T541X108M004AH(1)20	04052-024(2)	400	10	6	6.7	2.1
4	1000	X/7343-43	T541X108M004AH(1)10	04052-048(2)	400	10	10	5.2	1.7
6.3	220	D/7343-31	T541D227M006AH(1)20	04052-026(2)	139	10	6	6.5	2.1
6.3	220	D/7343-31	T541D227M006AH(1)10	04052-049(2)	139	10	10	5.0	1.6
6.3	330	D/7343-31	T541D337M006AH(1)10	04052-027(2)	208	10	10	5.0	1.6
6.3	330	Y/7343-40	T541Y337M006AH(1)30	04052-028(2)	208	10	5	7.3	2.3
6.3	330	Y/7343-40	T541Y337M006AH(1)20	04052-029(2)	208	10	6	6.6	2.1
6.3	330	Y/7343-40	T541Y337M006AH(1)10	04052-030(2)	208	10	10	5.1	1.6
6.3	470	X/7343-43	T541X477M006AH(1)30	04052-031(2)	296	10	5	7.3	2.4
6.3	470	X/7343-43	T541X477M006AH(1)20	04052-032(2)	296	10	6	6.7	2.1
6.3	470	X/7343-43	T541X477M006AH(1)10	04052-033(2)	296	10	10	5.2	1.7
10	150	D/7343-31	T541D157M010AH(1)20	04052-035(2)	150	10	6	6.5	2.1
10	150	D/7343-31	T541D157M010AH(1)10	04052-050(2)	150	10	10	5.0	1.6
10	220	D/7343-31	T541D227M010AH(1)20	04052-036(2)	220	10	6	6.5	2.1
10	220	D/7343-31	T541D227M010AH(1)10	04052-037(2)	220	10	10	5.0	1.6
10	220	Y/7343-40	T541Y227M010AH(1)20	04052-038(2)	220	10	6	6.6	2.1
10	220	Y/7343-40	T541Y227M010AH(1)10	04052-051(2)	220	10	10	5.1	1.6
10	330	X/7343-43	T541X337M010AH(1)30	04052-039(2)	330	10	5	7.3	2.4
10	330	X/7343-43	T541X337M010AH(1)20	04052-040(2)	330	10	6	6.7	2.1
10	330	X/7343-43	T541X337M010AH(1)10	04052-041(2)	330	10	10	5.2	1.7
16	150	X/7343-43	T541X157M016AH(1)20	04052-052(2)	240	10	25	3.3	1.1
16	150	X/7343-43	T541X157M016AH(1)10	04052-053(2)	240	10	40	2.6	0.8
16	220	X/7343-43	T541X227M016AH(1)20	04052-054(2)	352	10	25	3.3	1.1
16	220	X/7343-43	T541X227M016AH(1)10	04052-055(2)	352	10	40	2.6	0.8
16	330	X/7343-43	T541X337M016AH(1)20	04052-056(2)	528	10	25	3.3	1.1
16	330	X/7343-43	T541X337M016AH(1)10	04052-057(2)	528	10	50	2.3	0.7
20	100	X/7343-43	T541X107M020AH(1)10	04052-058(2)	200	10	50	2.3	0.7
V	μF	KEMET/EIA	(See below for part options)	Part Number	(μA) @ 25°C Maximum	% @ 25°C 120 Hz Maximum	(mΩ) @ 25°C 100 kHz Maximum	w/ΔT = 20°C @ -55°C to 105°C	w/ΔT = 2°C @ 125°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DSCC Drawing Number 04052	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (A) 100 kHz	

(1) To complete KEMET part number, insert 65 = None, 66 = 10 cycles +25°C, 67 = 10 cycles -55°C and +85°C. Designates surge current option.

Please refer to Ordering Information for additional details.

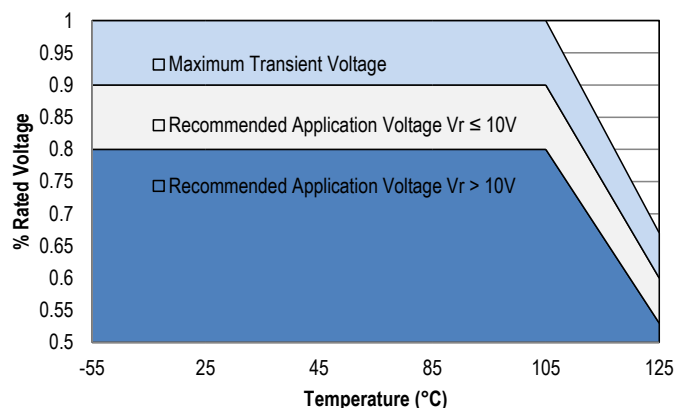
Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DSCC Drawing Number 04052	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (A) 100 kHz	
V	μF	KEMET/EIA	(See below for part options)	Part Number	(μA) @ 25°C Maximum	% @ 25°C 120 Hz Maximum	(mΩ) @ 25°C 100 kHz Maximum	w/ΔT = 20°C @ -55°C to 105°C	w/ΔT = 2°C @ 125°C
25	68	X/7343-43	T541X686M025AH(1)10	04052-059(2)	170	10	50	2.3	0.7
25	100	X/7343-43	T541X107M025AH(1)10	04052-060(2)	250	10	60	2.1	0.7
35	33	X/7343-43	T541X336M035AH(1)10	04052-061(2)	116	10	60	2.1	0.7
35	47	X/7343-43	T541X476M035AH(1)10	04052-062(2)	165	10	60	2.1	0.7
50	22	X/7343-43	T541X226M050AH(1)10	04052-063(2)	110	10	75	1.9	0.6
50	33	X/7343-43	T541X336M050AH(1)10	04052-064(2)	165	10	75	1.9	0.6
63	10	X/7343-43	T541X106M063AH(1)10	04052-067(2)	63	10	150	1.5	0.5
63	10	X/7343-43	T541X106M063AH(1)20	04052-066(2)	63	10	100	1.6	0.5
63	10	X/7343-43	T541X106M063AH(1)30	04052-065(2)	63	10	75	1.9	0.6
63	15	X/7343-43	T541X156M063AH(1)10	04052-068(2)	95	10	50	2.3	0.8
V	μF	KEMET/EIA	(See below for part options)	Part Number	(μA) @ 25°C Maximum	% @ 25°C 120 Hz Maximum	(mΩ) @ 25°C 100 kHz Maximum	w/ΔT = 20°C @ -55°C to 105°C	w/ΔT = 2°C @ 125°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DSCC Drawing Number 04052	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (A) 100 kHz	

(1) To complete KEMET part number, insert 65 = None, 66 = 10 cycles +25°C, 67 = 10 cycles -55°C and +85°C. Designates surge current option.

Please refer to Ordering Information for additional details.

Derating Guidelines



Voltage Rating	Maximum Recommended Steady State Voltage	Maximum Recommended Transient Voltage (1 ms – 1 μs)	Maximum Recommended Steady State Voltage	Maximum Recommended Transient Voltage (1 ms – 1 μs)
	-55°C to 105°C		105°C to 125°C	
$2.5 V \leq V_R \leq 10 V$	90% of V_R	V_R	60% of V_R	V_R
$12.5 V \leq V_R \leq 63 V$	80% of V_R	V_R	54% of V_R	V_R

V_R = Rated Voltage

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.

Case Code	EIA Case Code	Maximum Power Dissipation (P max) mWatts @ 45°C with +30°C Rise
I	3216-10	96
K	3528-10	162
B	3528-20	127
W	7343-15	325
Z	7343-17	325
D	7343-31	255
Y	7343-40	263
X	7443-43	270

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 ≤ 45°C	45° C < T ≤ 85°C	85°C < T ≤ 125°C
1.00	0.70	0.25

T= Environmental Temperature

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

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

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

I = rms ripple current (amperes)

E = rms ripple voltage (volts)

P max = maximum power dissipation (watts)

R = ESR at specified frequency (ohms)

Z = Impedance at specified frequency (ohms)

Reverse Voltage

Polymer tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected in the wrong polarity. These devices will withstand a small degree of transient voltage reversal for short periods as shown in the below table.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
55°C	10% of Rated Voltage
85°C	5% of Rated Voltage
105°C	3% of Rated Voltage
125°C*	1% of Rated Voltage

*For series rated to 125°C

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
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
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

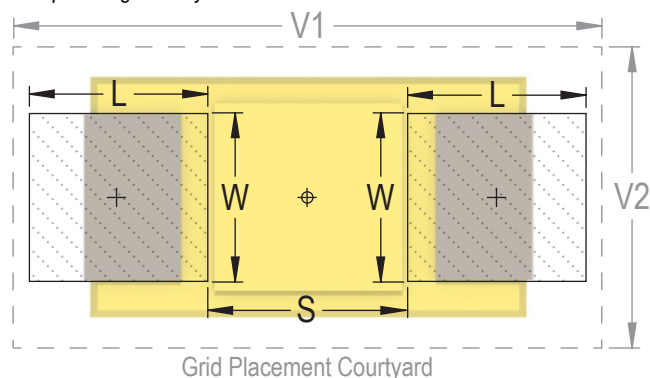
Density Level A: For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.

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.

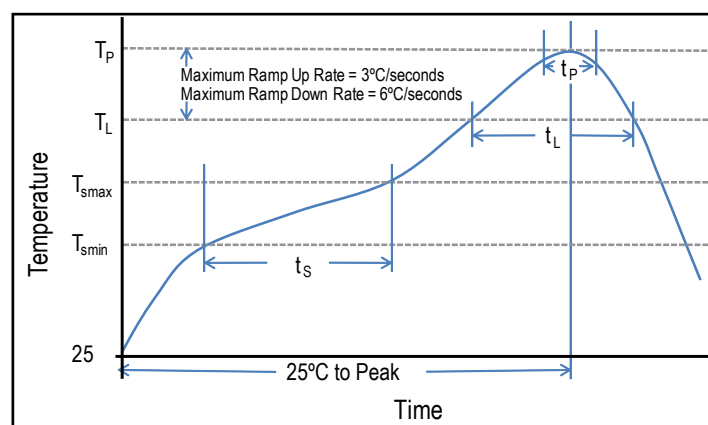
During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

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

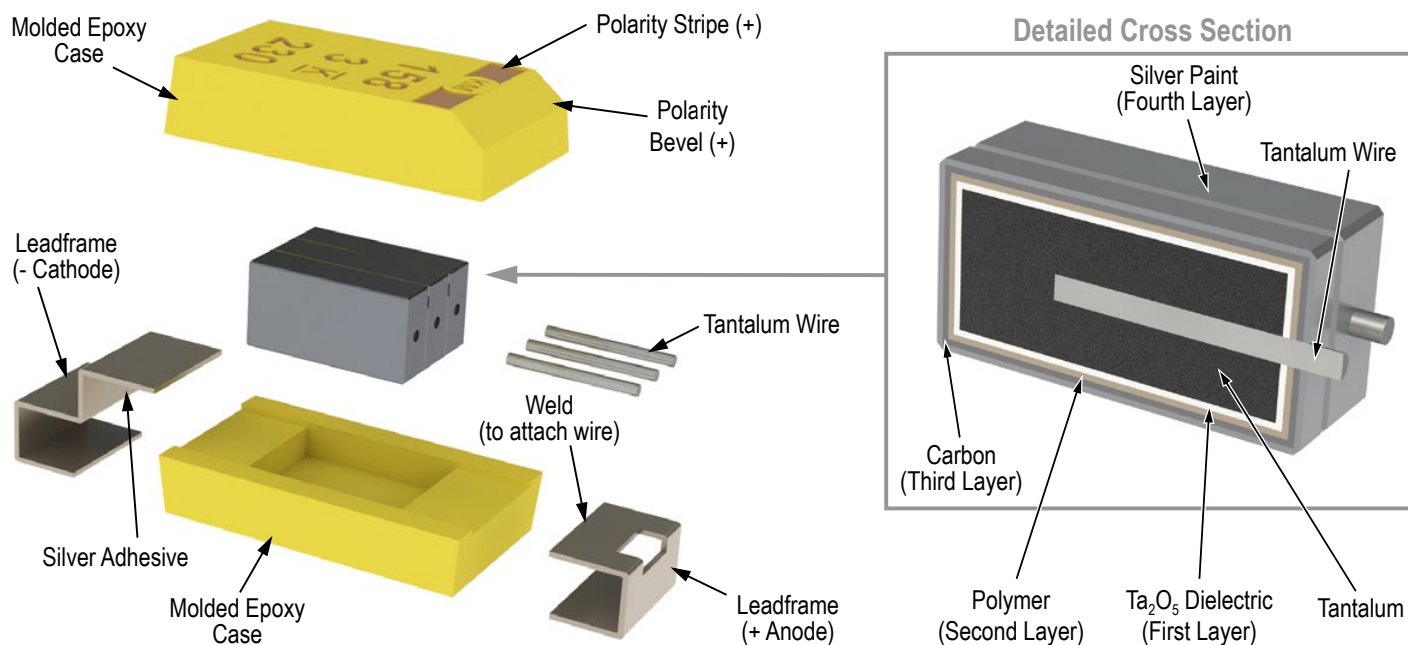
**Case Size A, B, C, H, I, K, M, R, S, T, U, V, W, and Z



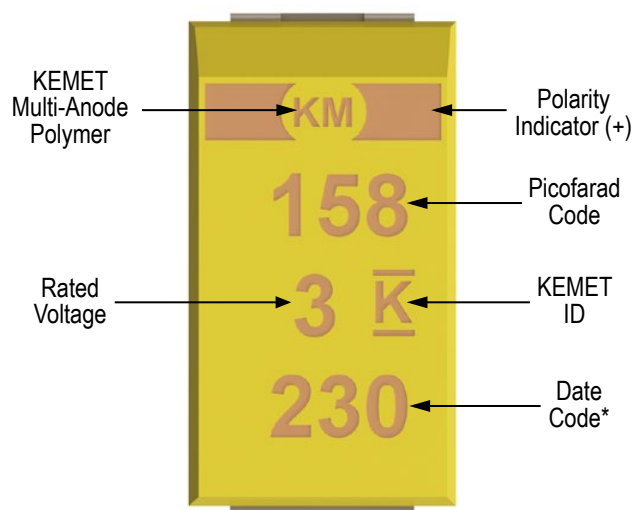
Storage

All KO-CAP series are shipped in moisture barrier bags with a desiccant and moisture indicator card. These series are classified as MSL3 (Moisture Sensitivity Level 3). Product contained within the moisture barrier bags should be stored in normal working environments with temperatures not to exceed 40°C and humidity not in excess of 60% RH.

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

T543 Series Commercial Off-The-Shelf (COTS) Polymer Tantalum

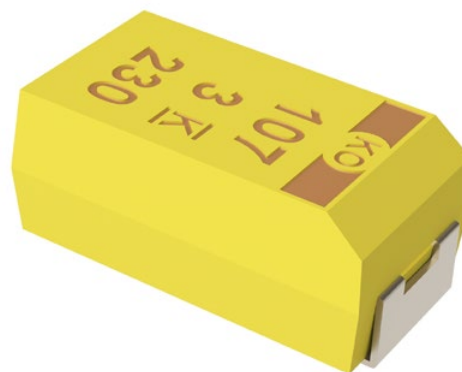
Overview

The KEMET Organic Capacitor is a tantalum capacitor with a Ta anode and Ta₂O₅ dielectric. A conductive organic polymer replaces the traditionally used MnO₂ as the cathode plate of the capacitor. This results in very low ESR, improved capacitance retention at high frequency and improved ripple current handling capability. The polymer technology also exhibits a benign failure mode which eliminates the ignition failures. Tantalum polymers may also be operated at voltages up to 90% of rated voltage for part types with rated voltages of ≤ 10 volts and up to 80% of rated voltage for part types > 10 volts with equivalent or better reliability than traditional MnO₂ tantalum capacitors operated at 50% of rated voltage.

The T543 Series Polymer COTS is an upscreened version of KEMET's commercial polymer product offering and captures the best features of multilayer ceramic capacitors (low ESR, high frequency capacitance retention), aluminum electrolytic capacitors (higher capacitance, benign failure mode), and proven solid tantalum technology (volumetric efficiency, surface mount capability, extremely long life). The T543 also offers an option for surge current testing (10 cycles at +25°C and 10 cycles at -55°C/+85°C) and termination finish (SnPb and 100% Sn).

Benefits

- Extremely low ESR
- -55°C to 105°C operating temperature range
- Polymer cathode technology
- High frequency capacitance retention
- Non-ignition failure mode
- Capacitance up to 1,500 µF
- Enhanced derating
- 100% accelerated steady state aging
- 100% surge current tested
- Taped and reeled per EIA 481
- Volumetric efficiency and self-healing mechanism
- Termination options (SnPb and 100% Sn)
- Surge options at 25°C and -55°C/85°C
- EIA standard case sizes



Applications

Typical applications include DC/DC converters, switch mode and point of load power supply, radar pulse capacitor and telecommunications (mobile phone and base station). Other general applications include decoupling and filtering in applications requiring low ESR or a benign failure mode.

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	543	D	156	K	035	A	H	E	100	
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Voltage	Failure Rate/Design	Lead Material	Surge	ESR	Packaging (C-Spec)
T = Tantalum	Polymer Tantalum COTS	A, B, C, D, H, L, M, T, U, V, W, X, Y	First two digits represent significant figures. Third digit specifies number of zeros.	K = $\pm 10\%$ M = $\pm 20\%$	2R5 = 2.5 V 003 = 3 V 004 = 4 V 006 = 6.3 V 010 = 10 V 12R = 12.5 V 016 = 16 V 020 = 20 V 025 = 25 V 035 = 35 V 050 = 50 V 063 = 63 V	A = N/A	H = Standard Solder Coated (SnPb 5% Pb minimum) T = 100% Tin (Sn)	E = None S = 10 cycles 25°C W = 10 cycles -55°C and 85°C	ESR in mΩ	Blank = 7" Reel 7280 = 13" Reel

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	-55°C to 105°C
Rated Capacitance Range	4.7 – 1,500 μF @ 120 Hz/25°C
Capacitance Tolerance	K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	2.5 – 63 V
DF (120 Hz)	Refer to Part Number Electrical Specification Table
ESR (100 kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	$\leq 0.1 \text{ CV } (\mu\text{A})$ at rated voltage after 5 minutes

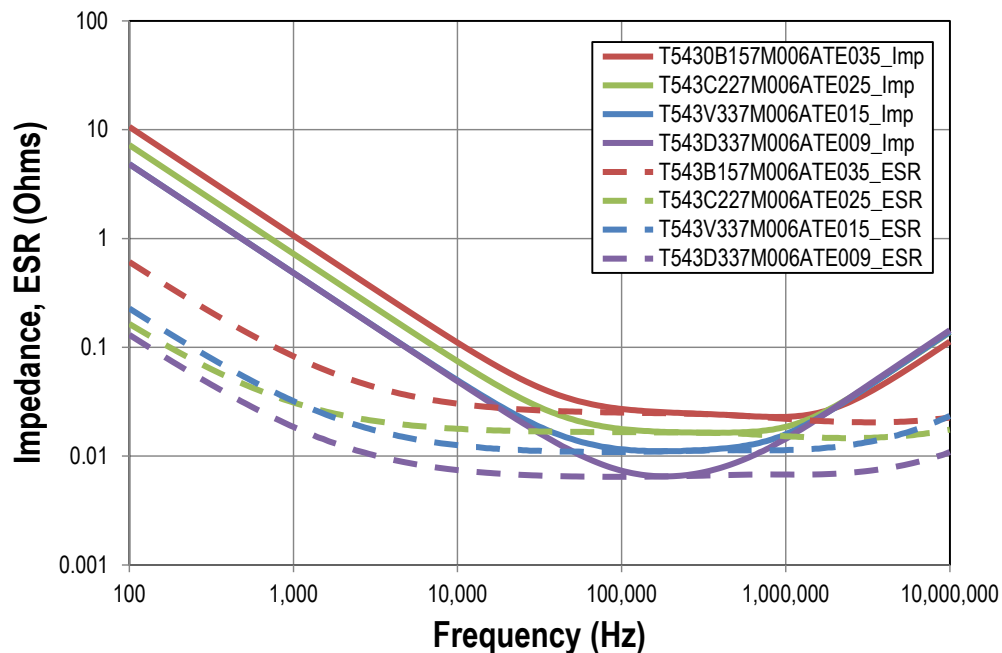
Qualification

Test	Condition		Characteristics			
Endurance	105°C @ rated voltage, 2,000 hours		Δ C/C	Within -20/+10 of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within 2.0 x initial limit		
Storage Life	105°C @ 0 volts, 2,000 hours		Δ C/C	Within -20/+10 of initial value		
			DF	Within initial limits		
			DCL	Within 1.25 x initial limit		
			ESR	Within 2.0 x initial limit		
Humidity	60°C, 90% RH, 500 hours		Δ C/C	Within -5%/+35% of initial value		
			DF	Within initial limits		
			DCL	Within 5.0 x initial limit		
			ESR	Within 2.0 x initial limit		
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, -55°C, +25°C, +85°C, +105°C, +25° C	Δ C/C	+25°C	-55°C	+85°C	+105°C
		DF	IL*	+/-20%	+/-20%	+/-30%
		DCL	IL	IL	1.2 x IL	1.5 x IL
			IL	n/a	10 x IL	10 x IL
Surge Voltage	105°C, 1.32 x rated voltage, 1,000 cycles		Δ C/C	Within -20/+10 of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		
			ESR	Within initial limits		
Mechanical Shock/Vibration	MIL-STD-202, Method 213, Condition I, 100 G peak MIL-STD-202, Method 204, Condition D, 10 Hz to 2,000 Hz, 20 G peak		Δ C/C	Within ±10 of initial value		
			DF	Within initial limits		
			DCL	Within initial limits		

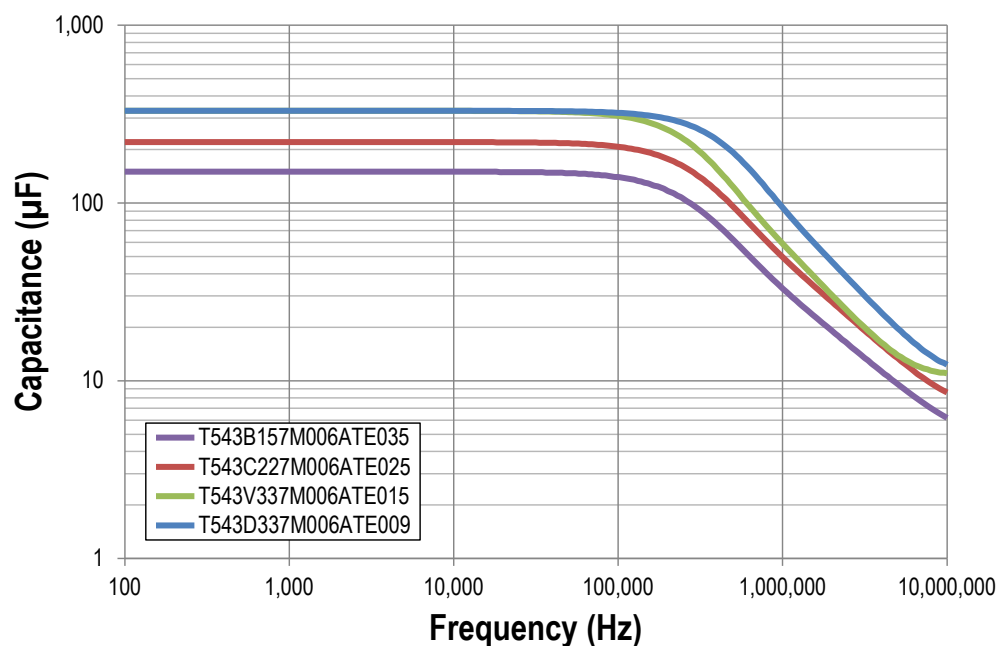
*IL = Initial limit

Electrical Characteristics

ESR vs. Frequency

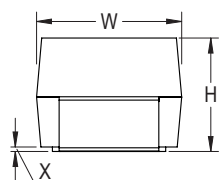


Capacitance vs. Frequency

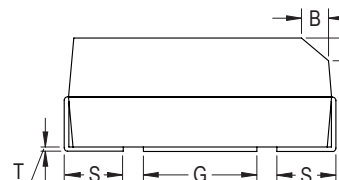


Dimensions – Millimeters

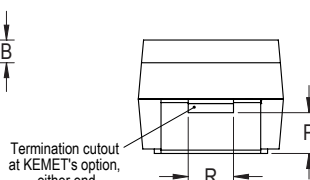
CATHODE (-) END VIEW



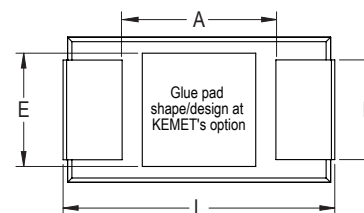
SIDE VIEW



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)
A	3216-18	3.2 ±0.2 (0.126 ±0.008)	1.6 ±0.2 (0.063 ±0.008)	1.6 ±0.2 (0.063 ±0.008)	1.2 (0.047)	0.8 (0.031)	0.4 (0.016)	0.10 ±0.10 (0.004 ±0.004)	0.4 (.016)	0.4 (0.016)	0.13 (0.005)	0.8 (.31)	1.1 (0.043)	1.3 (0.051)
B	3528-21	3.5 ±0.2 (0.138 ±0.008)	2.8 ±0.2 (0.110 ±0.008)	1.9 ±0.2 (0.075 ±0.008)	2.2 (0.087)	0.8 (0.031)	0.4 (0.016)	0.10 ±0.10 (0.004 ±0.004)	0.5 (.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 (.035)	1.0 (0.039)	0.13 (0.005)	2.5 (.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 (.150)	3.5 (0.138)	3.5 (0.138)
H	7360-20	7.3 ±0.3 (0.287 ±0.012)	6.0 ±0.3 (0.236 ±0.012)	2.0 (0.078) Maximum	4.1 (0.161)	1.3 (0.051)	n/a	0.10 ±0.10 (0.004 ±0.004)	n/a	n/a	0.13 (0.005)	3.3 (.130)	3.5 (0.138)	3.5 (0.138)
L	6032-19	6.0 ±0.3 (0.236 ±0.012)	3.2 ±0.2 (0.110 ±0.008)	1.9 (0.075)	2.2 (0.087)	1.3 (0.051)	n/a	0.05 (0.002)	n/a	n/a	0.13 (0.005)	2.5 (.098)	2.8 (0.110)	2.4 (0.094)
M	3528-15	3.5 ±0.2 (0.138 ±0.008)	2.8 ±0.2 (0.110 ±0.008)	1.5 (0.059)	2.2 (0.087)	0.8 (0.031)	n/a	0.05 (0.002)	n/a	n/a	0.13 (0.005)	1.1 (.043)	1.8 (0.071)	2.2 (0.087)
T	3528-12	3.5 ±0.2 (0.138 ±0.008)	2.8 ±0.2 (0.110 ±0.008)	1.2 (0.047)	2.2 (0.087)	0.8 (0.031)	n/a	0.05 (0.002)	n/a	n/a	0.13 (0.005)	1.1 (.043)	1.8 (0.071)	2.2 (0.087)
U	6032-15	6.0 ±0.3 (0.236 ±0.012)	3.2 ±0.2 (0.110 ±0.008)	1.5 (0.059)	2.2 (0.087)	1.3 (0.051)	n/a	0.05 (0.002)	n/a	n/a	0.13 (0.005)	2.5 (.098)	2.8 (0.110)	2.4 (0.094)
V	7343-20	7.3 ±0.3 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	2.0 (0.079)	2.4 (0.094)	1.3 (0.051)	n/a	0.05 (0.002)	n/a	n/a	0.13 (0.005)	3.8 (.150)	3.5 (0.138)	3.5 (0.138)
W	7343-15	7.3 ±0.3 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	1.5 (0.059)	2.4 (0.094)	1.3 (0.051)	n/a	0.05 (0.002)	n/a	n/a	0.13 (0.005)	3.8 (.150)	3.5 (0.138)	3.5 (0.138)
X	7343-43	7.3 ±0.3 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	4.0 ±0.3 (0.157 ±0.012)	2.4 (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 (.150)	3.5 (0.138)	3.5 (0.138)
Y	7343-40	7.3 ±0.3 (0.287 ±0.012)	4.3 ±0.3 (0.169 ±0.012)	4.0 (0.157)	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 (.150)	3.5 (0.138)	3.5 (0.138)

Notes: (Ref) – Dimensions provided for reference only. No dimensions are provided for B, P or R because low profile cases do not have a bevel or a notch.

* MIL-PRF-55365/8 specified dimensions

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Rated Temp	Moisture Sensitivity
V	μF	KEMET/EIA	(See below for part options)	(μA) @ V _R , 20°C Maximum/ 5 Minutes	% @ 20°C 120 Hz Maximum	(mΩ) @ 20°C 100 kHz Maximum	(mA) 45°C 100 kHz	(°C)	Temperature ≤ 260°C
2.5	47	A/3216-18	T543A476(1)2R5A(2)(3)090	12	8	90	1116	105	3
2.5	56	T/3528-12	T543T566(1)2R5A(2)(3)040	14	8	40	1620	105	3
2.5	56	T/3528-12	T543T566(1)2R5A(2)(3)070	14	8	70	1225	105	3
2.5	68	A/3216-18	T543A686(1)2R5A(2)(3)070	17	8	70	1265	105	3
2.5	68	A/3216-18	T543A686(1)2R5A(2)(3)080	17	8	80	1183	105	3
2.5	100	T/3528-12	T543T107(1)2R5A(2)(3)040	25	8	40	1620	105	3
2.5	100	T/3528-12	T543T107(1)2R5A(2)(3)070	25	8	70	1225	105	3
2.5	100	T/3528-12	T543T107(1)2R5A(2)(3)080	25	8	80	1146	105	3
2.5	100	B/3528-21	T543B107(1)2R5A(2)(3)025	25	8	25	2254	105	3
2.5	100	B/3528-21	T543B107(1)2R5A(2)(3)035	25	8	35	1905	105	3
2.5	100	B/3528-21	T543B107(1)2R5A(2)(3)040	25	8	40	1782	105	3
2.5	100	B/3528-21	T543B107(1)2R5A(2)(3)070	25	8	70	1347	105	3
2.5	150	U/6032-15	T543U157(1)2R5A(2)(3)055	38	8	55	1567	105	3
2.5	220	B/3528-21	T543B227(1)2R5A(2)(3)025	55	8	25	2254	105	3
2.5	220	B/3528-21	T543B227(1)2R5A(2)(3)030	55	8	30	2058	105	3
2.5	220	B/3528-21	T543B227(1)2R5A(2)(3)035	55	8	35	1905	105	3
2.5	220	B/3528-21	T543B227(1)2R5A(2)(3)055	55	8	55	1520	105	3
2.5	220	B/3528-21	T543B227(1)2R5A(2)(3)070	55	8	70	1347	105	3
2.5	220	U/6032-15	T543U227(1)2R5A(2)(3)055	55	8	55	1567	105	3
2.5	220	C/6032-25	T543C227(1)2R5A(2)(3)025	55	8	25	2569	105	3
2.5	220	C/6032-25	T543C227(1)2R5A(2)(3)045	55	8	45	1915	105	3
2.5	220	W/7343-15	T543W227(1)2R5A(2)(3)025	55	10	25	2683	105	3
2.5	220	V/7343-20	T543V227(1)2R5A(2)(3)015	55	10	15	3531	105	3
2.5	220	V/7343-20	T543V227(1)2R5A(2)(3)025	55	10	25	2735	105	3
2.5	220	V/7343-20	T543V227(1)2R5A(2)(3)045	55	10	45	2039	105	3
2.5	220	D-7343-31	T543D227(1)2R5A(2)(3)040	55	10	40	2372	105	3
2.5	330	B/3528-21	T543B337(1)2R5A(2)(3)035	83	8	35	1905	105	3
2.5	330	B/3528-21	T543B337(1)2R5A(2)(3)045	83	8	45	1680	105	3
2.5	330	B/3528-21	T543B337(1)2R5A(2)(3)070	83	8	70	1347	105	3
2.5	330	L/6032-19	T543L337(1)2R5A(2)(3)012	83	8	12	3536	105	3
2.5	330	L/6032-19	T543L337(1)2R5A(2)(3)025	83	8	25	2449	105	3
2.5	330	C/6032-25	T543C337(1)2R5A(2)(3)015	83	8	15	3317	105	3
2.5	330	C/6032-25	T543C337(1)2R5A(2)(3)018	83	8	18	3028	105	3
2.5	330	C/6032-25	T543C337(1)2R5A(2)(3)025	83	8	25	2569	105	3
2.5	330	C/6032-25	T543C337(1)2R5A(2)(3)045	83	8	45	1915	105	3
2.5	330	W/7343-15	T543W337(1)2R5A(2)(3)015	83	10	15	3464	105	3
2.5	330	W/7343-15	T543W337(1)2R5A(2)(3)025	83	10	25	2683	105	3
2.5	330	W/7343-15	T543W337(1)2R5A(2)(3)040	83	10	40	2121	105	3
2.5	330	V/7343-20	T543V337(1)2R5A(2)(3)015	83	10	15	3531	105	3
2.5	330	V/7343-20	T543V337(1)2R5A(2)(3)018	83	10	18	3223	105	3
2.5	330	V/7343-20	T543V337(1)2R5A(2)(3)025	83	10	25	2735	105	3
2.5	330	V/7343-20	T543V337(1)2R5A(2)(3)040	83	10	40	2162	105	3
2.5	330	D-7343-31	T543D337(1)2R5A(2)(3)006	83	10	6	6124	105	3
2.5	330	D-7343-31	T543D337(1)2R5A(2)(3)007	83	10	7	5669	105	3
2.5	330	D-7343-31	T543D337(1)2R5A(2)(3)025	83	10	25	3000	105	3
2.5	470	C/6032-25	T543C477(1)2R5A(2)(3)025	118	8	25	2569	105	3
2.5	470	C/6032-25	T543C477(1)2R5A(2)(3)045	118	8	45	1915	105	3
2.5	470	V/7343-20	T543V477(1)2R5A(2)(3)018	118	10	18	3223	105	3
2.5	470	D-7343-31	T543D477(1)2R5A(2)(3)005	118	10	5	6708	105	3
2.5	470	D-7343-31	T543D477(1)2R5A(2)(3)006	118	10	6	6124	105	3
2.5	470	D-7343-31	T543D477(1)2R5A(2)(3)007	118	10	7	5669	105	3
2.5	470	D-7343-31	T543D477(1)2R5A(2)(3)009	118	10	9	5000	105	3
V	μF	KEMET/EIA	(See below for part options)	(μA) @ V _R , 20°C Maximum/ 5 Minutes	% @ 20°C 120 Hz Maximum	(mΩ) @ 20°C 100 kHz Maximum	(mA) 45°C 100 kHz	(°C)	Temperature ≤ 260°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Rated Temperature	Moisture Sensitivity

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

(2) To complete KEMET part number, H = Solder Plated, T = 100% Tin (Sn). Designates termination finish.

(3) To complete KEMET part number, insert E = None, S = 10 cycles +25°C, W = 10 cycles -55°C +85°C. Designates surge current option.

Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont'd

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Rated Temp	Moisture Sensitivity
V	μF	KEMET/EIA	(See below for part options)	(μA) @ V _R , 20°C Maximum/ 5 Minutes	% @ 20°C 120 Hz Maximum	(mΩ) @ 20°C 100 kHz Maximum	(mA) 45°C 100 kHz	(°C)	Temperature ≤ 260°C
2.5	470	D-7343-31	T543D477(1)2R5A(2)(3)010	118	10	10	4743	105	3
2.5	470	D-7343-31	T543D477(1)2R5A(2)(3)025	118	10	25	3000	105	3
2.5	560	D-7343-31	T543D567(1)2R5A(2)(3)005	140	10	5	6708	105	3
2.5	680	D-7343-31	T543D687(1)2R5A(2)(3)006	170	10	6	6124	105	3
2.5	680	D-7343-31	T543D687(1)2R5A(2)(3)010	170	10	10	4743	105	3
2.5	680	D-7343-31	T543D687(1)2R5A(2)(3)015	170	10	15	3873	105	3
2.5	680	D-7343-31	T543D687(1)2R5A(2)(3)040	170	10	40	2372	105	3
2.5	680	Y/7343-40	T543Y687(1)2R5A(2)(3)005	170	10	5	6943	105	3
2.5	680	Y/7343-40	T543Y687(1)2R5A(2)(3)006	170	10	6	6338	105	3
2.5	680	Y/7343-40	T543Y687(1)2R5A(2)(3)010	170	10	10	4909	105	3
2.5	680	Y/7343-40	T543Y687(1)2R5A(2)(3)015	170	10	15	4008	105	3
2.5	680	Y/7343-40	T543Y687(1)2R5A(2)(3)025	170	10	25	3105	105	3
2.5	680	X/7343-43	T543X687(1)2R5A(2)(3)006	170	10	6	6416	105	3
2.5	1000	Y/7343-40	T543Y108(1)2R5A(2)(3)005	250	10	5	6943	105	3
2.5	1000	Y/7343-40	T543Y108(1)2R5A(2)(3)006	250	10	6	6338	105	3
2.5	1000	Y/7343-40	T543Y108(1)2R5A(2)(3)010	250	10	10	4909	105	3
2.5	1000	Y/7343-40	T543Y108(1)2R5A(2)(3)015	250	10	15	4008	105	3
2.5	1000	Y/7343-40	T543Y108(1)2R5A(2)(3)025	250	10	25	3105	105	3
2.5	1000	X/7343-43	T543X108(1)2R5A(2)(3)005	250	10	5	7029	105	3
2.5	1000	X/7343-43	T543X108(1)2R5A(2)(3)006	250	10	6	6416	105	3
2.5	1000	X/7343-43	T543X108(1)2R5A(2)(3)010	250	10	10	4970	105	3
2.5	1500	X/7343-43	T543X158(1)2R5A(2)(3)005	375	10	5	7029	105	3
2.5	1500	X/7343-43	T543X158(1)2R5A(2)(3)010	375	10	10	4970	105	3
3	100	B/3528-21	T543B107(1)003A(2)(3)035	30	8	35	1905	105	3
3	100	B/3528-21	T543B107(1)003A(2)(3)040	30	8	40	1782	105	3
3	100	B/3528-21	T543B107(1)003A(2)(3)070	30	8	70	1347	105	3
3	100	B/3528-21	T543B107(1)003A(2)(3)080	30	8	80	1260	105	3
3	150	B/3528-21	T543B157(1)003A(2)(3)035	45	8	35	1905	105	3
3	150	B/3528-21	T543B157(1)003A(2)(3)040	45	8	40	1782	105	3
3	150	B/3528-21	T543B157(1)003A(2)(3)070	45	8	70	1347	105	3
3	150	B/3528-21	T543B157(1)003A(2)(3)080	45	8	80	1260	105	3
3	330	V/7343-20	T543V337(1)003A(2)(3)015	99	10	15	3531	105	3
3	330	V/7343-20	T543V337(1)003A(2)(3)025	99	10	25	2735	105	3
3	330	D-7343-31	T543D337(1)003A(2)(3)025	99	10	25	3000	105	3
3	470	D-7343-31	T543D477(1)003A(2)(3)010	141	10	10	4743	105	3
3	470	D-7343-31	T543D477(1)003A(2)(3)025	141	10	25	3000	105	3
3	680	D-7343-31	T543D687(1)003A(2)(3)010	204	10	10	4743	105	3
3	680	D-7343-31	T543D687(1)003A(2)(3)015	204	10	15	3873	105	3
3	680	D-7343-31	T543D687(1)003A(2)(3)025	204	10	25	3000	105	3
3	680	D-7343-31	T543D687(1)003A(2)(3)040	204	10	40	2372	105	3
3	1000	X/7343-43	T543X108(1)003A(2)(3)010	300	10	10	4970	105	3
3	1000	X/7343-43	T543X108(1)003A(2)(3)015	300	10	15	4058	105	3
3	1000	X/7343-43	T543X108(1)003A(2)(3)030	300	10	30	2869	105	3
3	1500	X/7343-43	T543X158(1)003A(2)(3)008	450	10	8	5557	105	3
4	15	T/3528-12	T543T156(1)004A(2)(3)100	6	8	100	1025	105	3
4	33	A/3216-18	T543A336(1)004A(2)(3)070	13	8	70	1265	105	3
4	33	A/3216-18	T543A336(1)004A(2)(3)080	13	8	80	1183	105	3
4	47	A/3216-18	T543A476(1)004A(2)(3)070	19	8	70	1265	105	3
4	47	A/3216-18	T543A476(1)004A(2)(3)080	19	8	80	1183	105	3
4	47	T/3528-12	T543T476(1)004A(2)(3)070	19	8	70	1225	105	3
4	68	T/3528-12	T543T686(1)004A(2)(3)070	27	8	70	1225	105	3
4	68	T/3528-12	T543T686(1)004A(2)(3)080	27	8	80	1146	105	3
V	μF	KEMET/EIA	(See below for part options)	(μA) @ V _R , 20°C Maximum/ 5 Minutes	% @ 20°C 120 Hz Maximum	(mΩ) @ 20°C 100 kHz Maximum	(mA) 45°C 100 kHz	(°C)	Temperature ≤ 260°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Rated Temperature	Moisture Sensitivity

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

(2) To complete KEMET part number, H = Solder Plated, T = 100% Tin (Sn). Designates termination finish.

(3) To complete KEMET part number, insert E = None, S = 10 cycles +25°C, W = 10 cycles -55°C +85°C. Designates surge current option.

Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont'd

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Rated Temp	Moisture Sensitivity
V	μF	KEMET/EIA	(See below for part options)	(μA) @ V _R , 20°C Maximum/ 5 Minutes	% @ 20°C 120 Hz Maximum	(mΩ) @ 20°C 100 kHz Maximum	(mA) 45°C 100 kHz	(°C)	Temperature ≤ 260°C
4	68	B/3528-21	T543B686(1)004A(2)(3)035	27	8	35	1905	105	3
4	68	B/3528-21	T543B686(1)004A(2)(3)040	27	8	40	1782	105	3
4	68	B/3528-21	T543B686(1)004A(2)(3)070	27	8	70	1347	105	3
4	68	B/3528-21	T543B686(1)004A(2)(3)080	27	8	80	1260	105	3
4	68	U/6032-15	T543U686(1)004A(2)(3)055	27	8	55	1567	105	3
4	100	A/3216-18	T543A107(1)004A(2)(3)150	40	8	150	864	105	3
4	100	A/3216-18	T543A107(1)004A(2)(3)200	40	8	200	748	105	3
4	100	T/3528-12	T543T107(1)004A(2)(3)070	40	8	70	1225	105	3
4	100	T/3528-12	T543T107(1)004A(2)(3)150	40	8	150	837	105	3
4	100	B/3528-21	T543B107(1)004A(2)(3)035	40	8	35	1905	105	3
4	100	B/3528-21	T543B107(1)004A(2)(3)040	40	8	40	1782	105	3
4	100	B/3528-21	T543B107(1)004A(2)(3)070	40	8	70	1347	105	3
4	100	B/3528-21	T543B107(1)004A(2)(3)080	40	8	80	1260	105	3
4	100	U/6032-15	T543U107(1)004A(2)(3)055	40	8	55	1567	105	3
4	150	B/3528-21	T543B157(1)004A(2)(3)035	60	8	35	1905	105	3
4	150	B/3528-21	T543B157(1)004A(2)(3)040	60	8	40	1782	105	3
4	150	B/3528-21	T543B157(1)004A(2)(3)070	60	8	70	1347	105	3
4	150	U/6032-15	T543U157(1)004A(2)(3)055	60	8	55	1567	105	3
4	150	C/6032-25	T543C157(1)004A(2)(3)015	60	8	15	3317	105	3
4	150	C/6032-25	T543C157(1)004A(2)(3)025	60	8	25	2569	105	3
4	150	C/6032-25	T543C157(1)004A(2)(3)045	60	8	45	1915	105	3
4	150	C/6032-25	T543C157(1)004A(2)(3)100	60	8	100	1285	105	3
4	150	V/7343-20	T543V157(1)004A(2)(3)015	60	10	15	3531	105	3
4	150	V/7343-20	T543V157(1)004A(2)(3)025	60	10	25	2735	105	3
4	220	B/3528-21	T543B227(1)004A(2)(3)035	88	8	35	1905	105	3
4	220	B/3528-21	T543B227(1)004A(2)(3)045	88	8	45	1680	105	3
4	220	B/3528-21	T543B227(1)004A(2)(3)070	88	8	70	1347	105	3
4	220	L/6032-19	T543L227(1)004A(2)(3)012	88	8	12	3536	105	3
4	220	L/6032-19	T543L227(1)004A(2)(3)025	88	8	25	2449	105	3
4	220	C/6032-25	T543C227(1)004A(2)(3)015	88	8	15	3317	105	3
4	220	C/6032-25	T543C227(1)004A(2)(3)018	88	8	18	3028	105	3
4	220	C/6032-25	T543C227(1)004A(2)(3)025	88	8	25	2569	105	3
4	220	C/6032-25	T543C227(1)004A(2)(3)045	88	8	45	1915	105	3
4	220	C/6032-25	T543C227(1)004A(2)(3)055	88	8	55	1732	105	3
4	220	W/7343-15	T543W227(1)004A(2)(3)025	88	10	25	2683	105	3
4	220	W/7343-15	T543W227(1)004A(2)(3)040	88	10	40	2121	105	3
4	220	V/7343-20	T543V227(1)004A(2)(3)015	88	10	15	3531	105	3
4	220	V/7343-20	T543V227(1)004A(2)(3)018	88	10	18	3223	105	3
4	220	V/7343-20	T543V227(1)004A(2)(3)025	88	10	25	2735	105	3
4	220	V/7343-20	T543V227(1)004A(2)(3)040	88	10	40	2162	105	3
4	220	V/7343-20	T543V227(1)004A(2)(3)045	88	10	45	2039	105	3
4	220	D-7343-31	T543D227(1)004A(2)(3)025	88	10	25	3000	105	3
4	220	D-7343-31	T543D227(1)004A(2)(3)065	88	10	65	1861	105	3
4	330	C/6032-25	T543C337(1)004A(2)(3)025	132	8	25	2569	105	3
4	330	C/6032-25	T543C337(1)004A(2)(3)045	132	8	45	1915	105	3
4	330	V/7343-20	T543V337(1)004A(2)(3)018	132	10	18	3223	105	3
4	330	V/7343-20	T543V337(1)004A(2)(3)025	132	10	25	2735	105	3
4	330	V/7343-20	T543V337(1)004A(2)(3)040	132	10	40	2162	105	3
4	330	D-7343-31	T543D337(1)004A(2)(3)005	132	10	5	6708	105	3
4	330	D-7343-31	T543D337(1)004A(2)(3)006	132	10	6	6124	105	3
4	330	D-7343-31	T543D337(1)004A(2)(3)007	132	10	7	5669	105	3
4	330	D-7343-31	T543D337(1)004A(2)(3)009	132	10	9	5000	105	3
V	μF	KEMET/EIA	(See below for part options)	(μA) @ V _R , 20°C Maximum/ 5 Minutes	% @ 20°C 120 Hz Maximum	(mΩ) @ 20°C 100 kHz Maximum	(mA) 45°C 100 kHz	(°C)	Temperature ≤ 260°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Rated Temperature	Moisture Sensitivity

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

(2) To complete KEMET part number, H = Solder Plated, T = 100% Tin (Sn). Designates termination finish.

(3) To complete KEMET part number, insert E = None, S = 10 cycles +25°C, W = 10 cycles -55°C +85°C. Designates surge current option.

Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont'd

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Rated Temp	Moisture Sensitivity
V	μF	KEMET/EIA	(See below for part options)	(μA) @ V _R , 20°C Maximum/ 5 Minutes	% @ 20°C 120 Hz Maximum	(mΩ) @ 20°C 100 kHz Maximum	(mA) 45°C 100 kHz	(°C)	Temperature ≤ 260°C
4	330	D-7343-31	T543D337(1)004A(2)(3)010	132	10	10	4743	105	3
4	330	D-7343-31	T543D337(1)004A(2)(3)012	132	10	12	4330	105	3
4	330	D-7343-31	T543D337(1)004A(2)(3)015	132	10	15	3873	105	3
4	330	D-7343-31	T543D337(1)004A(2)(3)025	132	10	25	3000	105	3
4	330	D-7343-31	T543D337(1)004A(2)(3)040	132	10	40	2372	105	3
4	330	D-7343-31	T543D337(1)004A(2)(3)045	132	10	45	2236	105	3
4	470	D-7343-31	T543D477(1)004A(2)(3)006	188	10	6	6124	105	3
4	470	D-7343-31	T543D477(1)004A(2)(3)010	188	10	10	4743	105	3
4	470	D-7343-31	T543D477(1)004A(2)(3)012	188	10	12	4330	105	3
4	470	D-7343-31	T543D477(1)004A(2)(3)015	188	10	15	3873	105	3
4	470	D-7343-31	T543D477(1)004A(2)(3)018	188	10	18	3536	105	3
4	470	D-7343-31	T543D477(1)004A(2)(3)025	188	10	25	3000	105	3
4	470	D-7343-31	T543D477(1)004A(2)(3)040	188	10	40	2372	105	3
4	470	Y/7343-40	T543Y477(1)004A(2)(3)005	188	10	5	6943	105	3
4	470	Y/7343-40	T543Y477(1)004A(2)(3)006	188	10	6	6338	105	3
4	470	Y/7343-40	T543Y477(1)004A(2)(3)010	188	10	10	4909	105	3
4	470	Y/7343-40	T543Y477(1)004A(2)(3)025	188	10	25	3105	105	3
4	470	Y/7343-40	T543Y477(1)004A(2)(3)040	188	10	40	2455	105	3
4	680	D-7343-31	T543D687(1)004A(2)(3)025	272	10	25	3000	105	3
4	680	Y/7343-40	T543Y687(1)004A(2)(3)005	272	10	5	6943	105	3
4	680	Y/7343-40	T543Y687(1)004A(2)(3)010	272	10	10	4909	105	3
4	680	Y/7343-40	T543Y687(1)004A(2)(3)015	272	10	15	4008	105	3
4	680	Y/7343-40	T543Y687(1)004A(2)(3)025	272	10	25	3105	105	3
4	680	X/7343-43	T543X687(1)004A(2)(3)005	272	10	5	7029	105	3
4	680	X/7343-43	T543X687(1)004A(2)(3)006	272	10	6	6416	105	3
4	680	X/7343-43	T543X687(1)004A(2)(3)010	272	10	10	4970	105	3
4	680	X/7343-43	T543X687(1)004A(2)(3)015	272	10	15	4058	105	3
4	680	X/7343-43	T543X687(1)004A(2)(3)035	272	10	35	2657	105	3
4	1000	X/7343-43	T543X108(1)004A(2)(3)006	400	10	6	6416	105	3
4	1000	X/7343-43	T543X108(1)004A(2)(3)010	400	10	10	4970	105	3
6.3	15	T/3528-12	T543T156(1)006A(2)(3)100	9	8	100	1025	105	3
6.3	22	A/3216-18	T543A226(1)006A(2)(3)090	14	8	90	1116	105	3
6.3	22	A/3216-18	T543A226(1)006A(2)(3)100	14	8	100	1058	105	3
6.3	33	A/3216-18	T543A336(1)006A(2)(3)070	21	8	70	1265	105	3
6.3	33	A/3216-18	T543A336(1)006A(2)(3)080	21	8	80	1183	105	3
6.3	33	A/3216-18	T543A336(1)006A(2)(3)120	21	8	120	966	105	3
6.3	33	T/3528-12	T543T336(1)006A(2)(3)070	21	8	70	1225	105	3
6.3	33	B/3528-21	T543B336(1)006A(2)(3)025	21	8	25	2254	105	3
6.3	33	B/3528-21	T543B336(1)006A(2)(3)035	21	8	35	1905	105	3
6.3	33	B/3528-21	T543B336(1)006A(2)(3)040	21	8	40	1782	105	3
6.3	33	B/3528-21	T543B336(1)006A(2)(3)070	21	8	70	1347	105	3
6.3	33	B/3528-21	T543B336(1)006A(2)(3)080	21	8	80	1260	105	3
6.3	33	C/6032-25	T543C336(1)006A(2)(3)100	21	8	100	1285	105	3
6.3	47	A/3216-18	T543A476(1)006A(2)(3)150	30	8	150	864	105	3
6.3	47	T/3528-12	T543T476(1)006A(2)(3)070	30	8	70	1225	105	3
6.3	47	T/3528-12	T543T476(1)006A(2)(3)080	30	8	80	1146	105	3
6.3	47	B/3528-21	T543B476(1)006A(2)(3)025	30	8	25	2254	105	3
6.3	47	B/3528-21	T543B476(1)006A(2)(3)035	30	8	35	1905	105	3
6.3	47	B/3528-21	T543B476(1)006A(2)(3)040	30	8	40	1782	105	3
6.3	47	B/3528-21	T543B476(1)006A(2)(3)070	30	8	70	1347	105	3
6.3	47	B/3528-21	T543B476(1)006A(2)(3)080	30	8	80	1260	105	3
6.3	68	A/3216-18	T543A686(1)006A(2)(3)150	43	8	150	864	105	3
V	μF	KEMET/EIA	(See below for part options)	(μA) @ V _R , 20°C Maximum/ 5 Minutes	% @ 20°C 120 Hz Maximum	(mΩ) @ 20°C 100 kHz Maximum	(mA) 45°C 100 kHz	(°C)	Temperature ≤ 260°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Rated Temperature	Moisture Sensitivity

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

(2) To complete KEMET part number, H = Solder Plated, T = 100% Tin (Sn). Designates termination finish.

(3) To complete KEMET part number, insert E = None, S = 10 cycles +25°C, W = 10 cycles -55°C +85°C. Designates surge current option.

Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont'd

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Rated Temp	Moisture Sensitivity
V	μF	KEMET/EIA	(See below for part options)	(μA) @ V _R , 20°C Maximum/ 5 Minutes	% @ 20°C 120 Hz Maximum	(mΩ) @ 20°C 100 kHz Maximum	(mA) 45°C 100 kHz	(°C)	Temperature ≤ 260°C
6.3	68	T/3528-12	T543T686(1)006A(2)(3)070	43	8	70	1225	105	3
6.3	68	T/3528-12	T543T686(1)006A(2)(3)150	43	8	150	837	105	3
6.3	68	B/3528-21	T543B686(1)006A(2)(3)025	43	8	25	2254	105	3
6.3	68	B/3528-21	T543B686(1)006A(2)(3)035	43	8	35	1905	105	3
6.3	68	B/3528-21	T543B686(1)006A(2)(3)040	43	8	40	1782	105	3
6.3	68	B/3528-21	T543B686(1)006A(2)(3)070	43	8	70	1347	105	3
6.3	68	B/3528-21	T543B686(1)006A(2)(3)080	43	8	80	1260	105	3
6.3	68	U/6032-15	T543U686(1)006A(2)(3)055	43	8	55	1567	105	3
6.3	68	U/6032-15	T543U686(1)006A(2)(3)070	43	8	70	1389	105	3
6.3	68	C/6032-25	T543C686(1)006A(2)(3)100	43	8	100	1285	105	3
6.3	100	T/3528-12	T543T107(1)006A(2)(3)070	63	8	70	1225	105	3
6.3	100	B/3528-21	T543B107(1)006A(2)(3)025	63	8	25	2254	105	3
6.3	100	B/3528-21	T543B107(1)006A(2)(3)035	63	8	35	1905	105	3
6.3	100	B/3528-21	T543B107(1)006A(2)(3)040	63	8	40	1782	105	3
6.3	100	B/3528-21	T543B107(1)006A(2)(3)045	63	8	45	1680	105	3
6.3	100	B/3528-21	T543B107(1)006A(2)(3)070	63	8	70	1347	105	3
6.3	100	U/6032-15	T543U107(1)006A(2)(3)055	63	8	55	1567	105	3
6.3	100	C/6032-25	T543C107(1)006A(2)(3)025	63	8	25	2569	105	3
6.3	100	C/6032-25	T543C107(1)006A(2)(3)045	63	8	45	1915	105	3
6.3	100	W/7343-15	T543W107(1)006A(2)(3)040	63	10	40	2121	105	3
6.3	100	V/7343-20	T543V107(1)006A(2)(3)015	63	10	15	3531	105	3
6.3	100	V/7343-20	T543V107(1)006A(2)(3)045	63	10	45	2039	105	3
6.3	120	B/3528-21	T543B127(1)006A(2)(3)035	76	8	35	1905	105	3
6.3	150	M/3528-15	T543M157(1)006A(2)(3)070	95	8	70	1309	105	3
6.3	150	M/3528-15	T543M157(1)006A(2)(3)150	95	8	150	894	105	3
6.3	150	B/3528-21	T543B157(1)006A(2)(3)025	95	8	25	2254	105	3
6.3	150	B/3528-21	T543B157(1)006A(2)(3)035	95	8	35	1905	105	3
6.3	150	B/3528-21	T543B157(1)006A(2)(3)045	95	8	45	1680	105	3
6.3	150	B/3528-21	T543B157(1)006A(2)(3)070	95	8	70	1347	105	3
6.3	150	U/6032-15	T543U157(1)006A(2)(3)045	95	8	45	1732	105	3
6.3	150	U/6032-15	T543U157(1)006A(2)(3)055	95	8	55	1567	105	3
6.3	150	L/6032-19	T543L157(1)006A(2)(3)012	95	8	12	3536	105	3
6.3	150	L/6032-19	T543L157(1)006A(2)(3)025	95	8	25	2449	105	3
6.3	150	C/6032-25	T543C157(1)006A(2)(3)015	95	8	15	3317	105	3
6.3	150	C/6032-25	T543C157(1)006A(2)(3)025	95	8	25	2569	105	3
6.3	150	C/6032-25	T543C157(1)006A(2)(3)045	95	8	45	1915	105	3
6.3	150	C/6032-25	T543C157(1)006A(2)(3)055	95	8	55	1732	105	3
6.3	150	W/7343-15	T543W157(1)006A(2)(3)025	95	10	25	2683	105	3
6.3	150	W/7343-15	T543W157(1)006A(2)(3)040	95	10	40	2121	105	3
6.3	150	V/7343-20	T543V157(1)006A(2)(3)015	95	10	15	3531	105	3
6.3	150	V/7343-20	T543V157(1)006A(2)(3)018	95	10	18	3223	105	3
6.3	150	V/7343-20	T543V157(1)006A(2)(3)025	95	10	25	2735	105	3
6.3	150	V/7343-20	T543V157(1)006A(2)(3)040	95	10	40	2162	105	3
6.3	150	V/7343-20	T543V157(1)006A(2)(3)045	95	10	45	2039	105	3
6.3	150	D-7343-31	T543D157(1)006A(2)(3)015	95	10	15	3873	105	3
6.3	150	D-7343-31	T543D157(1)006A(2)(3)025	95	10	25	3000	105	3
6.3	150	D-7343-31	T543D157(1)006A(2)(3)055	95	10	55	2023	105	3
6.3	220	B/3528-21	T543B227(1)006A(2)(3)035	139	8	35	1905	105	3
6.3	220	B/3528-21	T543B227(1)006A(2)(3)045	139	8	45	1680	105	3
6.3	220	B/3528-21	T543B227(1)006A(2)(3)070	139	8	70	1347	105	3
6.3	220	C/6032-25	T543C227(1)006A(2)(3)015	139	8	15	3317	105	3
6.3	220	C/6032-25	T543C227(1)006A(2)(3)018	139	8	18	3028	105	3
V	μF	KEMET/EIA	(See below for part options)	(μA) @ V _R , 20°C Maximum/ 5 Minutes	% @ 20°C 120 Hz Maximum	(mΩ) @ 20°C 100 kHz Maximum	(mA) 45°C 100 kHz	(°C)	Temperature ≤ 260°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Rated Temperature	Moisture Sensitivity

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

(2) To complete KEMET part number, H = Solder Plated, T = 100% Tin (Sn). Designates termination finish.

(3) To complete KEMET part number, insert E = None, S = 10 cycles +25°C, W = 10 cycles -55°C +85°C. Designates surge current option.

Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont'd

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Rated Temp	Moisture Sensitivity
V	μF	KEMET/EIA	(See below for part options)	(μA) @ V _R , 20°C Maximum/ 5 Minutes	% @ 20°C 120 Hz Maximum	(mΩ) @ 20°C 100 kHz Maximum	(mA) 45°C 100 kHz	(°C)	Temperature ≤ 260°C
6.3	220	C/6032-25	T543C227(1)006A(2)(3)025	139	8	25	2569	105	3
6.3	220	C/6032-25	T543C227(1)006A(2)(3)045	139	8	45	1915	105	3
6.3	220	V/7343-20	T543V227(1)006A(2)(3)018	139	10	18	3223	105	3
6.3	220	V/7343-20	T543V227(1)006A(2)(3)025	139	10	25	2735	105	3
6.3	220	V/7343-20	T543V227(1)006A(2)(3)040	139	10	40	2162	105	3
6.3	220	D-7343-31	T543D227(1)006A(2)(3)005	139	10	5	6708	105	3
6.3	220	D-7343-31	T543D227(1)006A(2)(3)006	139	10	6	6124	105	3
6.3	220	D-7343-31	T543D227(1)006A(2)(3)007	139	10	7	5669	105	3
6.3	220	D-7343-31	T543D227(1)006A(2)(3)009	139	10	9	5000	105	3
6.3	220	D-7343-31	T543D227(1)006A(2)(3)010	139	10	10	4743	105	3
6.3	220	D-7343-31	T543D227(1)006A(2)(3)015	139	10	15	3873	105	3
6.3	220	D-7343-31	T543D227(1)006A(2)(3)018	139	10	18	3536	105	3
6.3	220	D-7343-31	T543D227(1)006A(2)(3)025	139	10	25	3000	105	3
6.3	220	D-7343-31	T543D227(1)006A(2)(3)040	139	10	40	2372	105	3
6.3	220	D-7343-31	T543D227(1)006A(2)(3)050	139	10	50	2121	105	3
6.3	330	V/7343-20	T543V337(1)006A(2)(3)015	208	10	15	3531	105	3
6.3	330	V/7343-20	T543V337(1)006A(2)(3)018	208	10	18	3223	105	3
6.3	330	V/7343-20	T543V337(1)006A(2)(3)025	208	10	25	2735	105	3
6.3	330	V/7343-20	T543V337(1)006A(2)(3)040	208	10	40	2162	105	3
6.3	330	V/7343-20	T543V337(1)006A(2)(3)045	208	10	45	2039	105	3
6.3	330	D-7343-31	T543D337(1)006A(2)(3)006	208	10	6	6124	105	3
6.3	330	D-7343-31	T543D337(1)006A(2)(3)009	208	10	9	5000	105	3
6.3	330	D-7343-31	T543D337(1)006A(2)(3)010	208	10	10	4743	105	3
6.3	330	D-7343-31	T543D337(1)006A(2)(3)015	208	10	15	3873	105	3
6.3	330	D-7343-31	T543D337(1)006A(2)(3)018	208	10	18	3536	105	3
6.3	330	D-7343-31	T543D337(1)006A(2)(3)025	208	10	25	3000	105	3
6.3	330	D-7343-31	T543D337(1)006A(2)(3)040	208	10	40	2372	105	3
6.3	330	D-7343-31	T543D337(1)006A(2)(3)045	208	10	45	2236	105	3
6.3	330	Y/7343-40	T543Y337(1)006A(2)(3)005	208	10	5	6943	105	3
6.3	330	Y/7343-40	T543Y337(1)006A(2)(3)006	208	10	6	6338	105	3
6.3	330	Y/7343-40	T543Y337(1)006A(2)(3)010	208	10	10	4909	105	3
6.3	330	Y/7343-40	T543Y337(1)006A(2)(3)015	208	10	15	4008	105	3
6.3	330	Y/7343-40	T543Y337(1)006A(2)(3)025	208	10	25	3105	105	3
6.3	330	Y/7343-40	T543Y337(1)006A(2)(3)040	208	10	40	2455	105	3
6.3	470	W/7343-15	T543W477(1)006A(2)(3)055	296	10	55	1809	85	3
6.3	470	V/7343-20	T543V477(1)006A(2)(3)055	296	10	55	1844	85	3
6.3	470	D-7343-31	T543D477(1)006A(2)(3)015	296	10	15	3873	105	3
6.3	470	D-7343-31	T543D477(1)006A(2)(3)025	296	10	25	3000	105	3
6.3	470	D-7343-31	T543D477(1)006A(2)(3)030	296	10	30	2739	105	3
6.3	470	Y/7343-40	T543Y477(1)006A(2)(3)005	296	10	5	6943	105	3
6.3	470	Y/7343-40	T543Y477(1)006A(2)(3)010	296	10	10	4909	105	3
6.3	470	Y/7343-40	T543Y477(1)006A(2)(3)015	296	10	15	4008	105	3
6.3	470	Y/7343-40	T543Y477(1)006A(2)(3)018	296	10	18	3659	105	3
6.3	470	Y/7343-40	T543Y477(1)006A(2)(3)025	296	10	25	3105	105	3
6.3	470	Y/7343-40	T543Y477(1)006A(2)(3)035	296	10	35	2624	105	3
6.3	470	X/7343-43	T543X477(1)006A(2)(3)005	296	10	5	7029	105	3
6.3	470	X/7343-43	T543X477(1)006A(2)(3)006	296	10	6	6416	105	3
6.3	470	X/7343-43	T543X477(1)006A(2)(3)010	296	10	10	4970	105	3
6.3	470	X/7343-43	T543X477(1)006A(2)(3)018	296	10	18	3704	105	3
6.3	470	X/7343-43	T543X477(1)006A(2)(3)035	296	10	35	2657	105	3
6.3	470	X/7343-43	T543X477(1)006A(2)(3)040	296	10	40	2485	105	3
6.3	680	X/7343-43	T543X687(1)006A(2)(3)010	428	10	10	4970	105	3
V	μF	KEMET/EIA	(See below for part options)	(μA) @ V _R , 20°C Maximum/ 5 Minutes	% @ 20°C 120 Hz Maximum	(mΩ) @ 20°C 100 kHz Maximum	(mA) 45°C 100 kHz	(°C)	Temperature ≤ 260°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Rated Temperature	Moisture Sensitivity

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

(2) To complete KEMET part number, H = Solder Plated, T = 100% Tin (Sn). Designates termination finish.

(3) To complete KEMET part number, insert E = None, S = 10 cycles +25°C, W = 10 cycles -55°C +85°C. Designates surge current option.

Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont'd

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Rated Temp	Moisture Sensitivity
V	μF	KEMET/EIA	(See below for part options)	(μA) @ V _R , 20°C Maximum/ 5 Minutes	% @ 20°C 120 Hz Maximum	(mΩ) @ 20°C 100 kHz Maximum	(mA) 45°C 100 kHz	(°C)	Temperature ≤ 260°C
6.3	680	X/7343-43	T543X687(1)006A(2)(3)018	428	10	18	3704	105	3
6.3	1000	H/7360-20	T543H108(1)006A(2)(3)055	630	20	55	1844	85	4
6.3	1500	H/7360-20	T543H158(1)006A(2)(3)055	945	20	55	1844	85	4
8	33	T/3528-12	T543T336(1)008A(2)(3)070	26	8	70	1225	105	3
8	33	T/3528-12	T543T336(1)008A(2)(3)080	26	8	80	1146	105	3
8	33	B/3528-21	T543B336(1)008A(2)(3)025	26	8	25	2254	105	3
8	33	B/3528-21	T543B336(1)008A(2)(3)035	26	8	35	1905	105	3
8	33	B/3528-21	T543B336(1)008A(2)(3)040	26	8	40	1782	105	3
8	33	B/3528-21	T543B336(1)008A(2)(3)070	26	8	70	1347	105	3
8	33	U/6032-15	T543U336(1)008A(2)(3)070	26	8	70	1389	105	3
8	47	B/3528-21	T543B476(1)008A(2)(3)035	38	8	35	1905	105	3
8	47	B/3528-21	T543B476(1)008A(2)(3)070	38	8	70	1347	105	3
8	150	V/7343-20	T543V157(1)008A(2)(3)040	120	10	40	2162	105	3
8	150	D-7343-31	T543D157(1)008A(2)(3)025	120	10	25	3000	105	3
8	150	D-7343-31	T543D157(1)008A(2)(3)040	120	10	40	2372	105	3
8	150	D-7343-31	T543D157(1)008A(2)(3)055	120	10	55	2023	105	3
10	10	A/3216-18	T543A106(1)010A(2)(3)080	10	8	80	1183	105	3
10	15	A/3216-18	T543A156(1)010A(2)(3)080	15	8	80	1183	105	3
10	22	A/3216-18	T543A226(1)010A(2)(3)080	22	8	80	1183	105	3
10	22	B/3528-21	T543B226(1)010A(2)(3)080	22	8	80	1260	105	3
10	33	T/3528-12	T543T336(1)010A(2)(3)070	33	8	70	1225	105	3
10	33	T/3528-12	T543T336(1)010A(2)(3)080	33	8	80	1146	105	3
10	33	B/3528-21	T543B336(1)010A(2)(3)025	33	8	25	2254	105	3
10	33	B/3528-21	T543B336(1)010A(2)(3)035	33	8	35	1905	105	3
10	33	B/3528-21	T543B336(1)010A(2)(3)040	33	8	40	1782	105	3
10	33	B/3528-21	T543B336(1)010A(2)(3)070	33	8	70	1347	105	3
10	33	B/3528-21	T543B336(1)010A(2)(3)080	33	8	80	1260	105	3
10	33	U/6032-15	T543U336(1)010A(2)(3)070	33	8	70	1389	105	3
10	47	B/3528-21	T543B476(1)010A(2)(3)035	47	8	35	1905	105	3
10	47	B/3528-21	T543B476(1)010A(2)(3)070	47	8	70	1347	105	3
10	47	U/6032-15	T543U476(1)010A(2)(3)055	47	8	55	1567	105	3
10	47	C/6032-25	T543C476(1)010A(2)(3)100	47	8	100	1285	105	3
10	68	U/6032-15	T543U686(1)010A(2)(3)055	68	8	55	1567	105	3
10	68	C/6032-25	T543C686(1)010A(2)(3)045	68	8	45	1915	105	3
10	68	W/7343-15	T543W686(1)010A(2)(3)025	68	10	25	2683	105	3
10	68	W/7343-15	T543W686(1)010A(2)(3)040	68	10	40	2121	105	3
10	68	V/7343-20	T543V686(1)010A(2)(3)025	68	10	25	2735	105	3
10	68	V/7343-20	T543V686(1)010A(2)(3)040	68	10	40	2162	105	3
10	68	V/7343-20	T543V686(1)010A(2)(3)045	68	10	45	2039	105	3
10	68	V/7343-20	T543V686(1)010A(2)(3)060	68	10	60	1765	105	3
10	68	V/7343-20	T543V686(1)010A(2)(3)100	68	10	100	1367	105	3
10	68	D-7343-31	T543D686(1)010A(2)(3)100	68	10	100	1500	105	3
10	100	L/6032-19	T543L107(1)010A(2)(3)025	100	8	25	2449	105	3
10	100	C/6032-25	T543C107(1)010A(2)(3)025	100	8	25	2569	105	3
10	100	C/6032-25	T543C107(1)010A(2)(3)045	100	8	45	1915	105	3
10	100	W/7343-15	T543W107(1)010A(2)(3)040	100	10	40	2121	105	3
10	100	V/7343-20	T543V107(1)010A(2)(3)018	100	10	18	3223	105	3
10	100	V/7343-20	T543V107(1)010A(2)(3)025	100	10	25	2735	105	3
10	100	V/7343-20	T543V107(1)010A(2)(3)045	100	10	45	2039	105	3
10	100	V/7343-20	T543V107(1)010A(2)(3)050	100	10	50	1934	105	3
10	100	D-7343-31	T543D107(1)010A(2)(3)018	100	10	18	3536	105	3
10	100	D-7343-31	T543D107(1)010A(2)(3)025	100	10	25	3000	105	3
V	μF	KEMET/EIA	(See below for part options)	(μA) @ V _R , 20°C Maximum/ 5 Minutes	% @ 20°C 120 Hz Maximum	(mΩ) @ 20°C 100 kHz Maximum	(mA) 45°C 100 kHz	(°C)	Temperature ≤ 260°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Rated Temperature	Moisture Sensitivity

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

(2) To complete KEMET part number, H = Solder Plated, T = 100% Tin (Sn). Designates termination finish.

(3) To complete KEMET part number, insert E = None, S = 10 cycles +25°C, W = 10 cycles -55°C +85°C. Designates surge current option.

Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont'd

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Rated Temp	Moisture Sensitivity
V	μF	KEMET/EIA	(See below for part options)	(μA) @ V _R , 20°C Maximum/ 5 Minutes	% @ 20°C 120 Hz Maximum	(mΩ) @ 20°C 100 kHz Maximum	(mA) 45°C 100 kHz	(°C)	Temperature ≤ 260°C
10	100	D-7343-31	T543D107(1)010A(2)(3)055	100	10	55	2023	105	3
10	100	D-7343-31	T543D107(1)010A(2)(3)080	100	10	80	1677	105	3
10	150	C/6032-25	T543C157(1)010A(2)(3)055	150	8	55	1732	105	3
10	150	V/7343-20	T543V157(1)010A(2)(3)025	150	10	25	2735	105	3
10	150	V/7343-20	T543V157(1)010A(2)(3)040	150	10	40	2162	105	3
10	150	D-7343-31	T543D157(1)010A(2)(3)005	150	10	5	6708	105	3
10	150	D-7343-31	T543D157(1)010A(2)(3)006	150	10	6	6124	105	3
10	150	D-7343-31	T543D157(1)010A(2)(3)010	150	10	10	4743	105	3
10	150	D-7343-31	T543D157(1)010A(2)(3)015	150	10	15	3873	105	3
10	150	D-7343-31	T543D157(1)010A(2)(3)018	150	10	18	3536	105	3
10	150	D-7343-31	T543D157(1)010A(2)(3)025	150	10	25	3000	105	3
10	150	D-7343-31	T543D157(1)010A(2)(3)040	150	10	40	2372	105	3
10	150	D-7343-31	T543D157(1)010A(2)(3)055	150	10	55	2023	105	3
10	150	Y/7343-40	T543Y157(1)010A(2)(3)018	150	10	18	3659	105	3
10	150	Y/7343-40	T543Y157(1)010A(2)(3)025	150	10	25	3105	105	3
10	220	V/7343-20	T543V227(1)010A(2)(3)025	220	10	25	2735	105	3
10	220	V/7343-20	T543V227(1)010A(2)(3)045	220	10	45	2039	105	3
10	220	D-7343-31	T543D227(1)010A(2)(3)006	220	10	6	6124	105	3
10	220	D-7343-31	T543D227(1)010A(2)(3)010	220	10	10	4743	105	3
10	220	D-7343-31	T543D227(1)010A(2)(3)018	220	10	18	3536	105	3
10	220	D-7343-31	T543D227(1)010A(2)(3)025	220	10	25	3000	105	3
10	220	D-7343-31	T543D227(1)010A(2)(3)040	220	10	40	2372	105	3
10	220	Y/7343-40	T543Y227(1)010A(2)(3)006	220	10	6	6338	105	3
10	220	Y/7343-40	T543Y227(1)010A(2)(3)010	220	10	10	4909	105	3
10	220	Y/7343-40	T543Y227(1)010A(2)(3)040	220	10	40	2455	105	3
10	330	Y/7343-40	T543Y337(1)010A(2)(3)015	330	10	15	4008	105	3
10	330	Y/7343-40	T543Y337(1)010A(2)(3)035	330	10	35	2624	105	3
10	330	X/7343-43	T543X337(1)010A(2)(3)005	330	10	5	7029	105	3
10	330	X/7343-43	T543X337(1)010A(2)(3)006	330	10	6	6416	105	3
10	330	X/7343-43	T543X337(1)010A(2)(3)010	330	10	10	4970	105	3
10	330	X/7343-43	T543X337(1)010A(2)(3)025	330	10	25	3143	105	3
10	330	X/7343-43	T543X337(1)010A(2)(3)040	330	10	40	2485	105	3
12.5	10	T/3528-12	T543T106(1)12RA(2)(3)150	13	8	150	837	105	3
12.5	15	T/3528-12	T543T156(1)12RA(2)(3)080	19	8	80	1146	105	3
12.5	330	X/7343-43	T543X337(1)12RA(2)(3)015	413	10	15	4058	105	3
16	10	B/3528-21	T543B106(1)016A(2)(3)100	16	8	100	1127	105	3
16	22	C/6032-25	T543C226(1)016A(2)(3)080	35	8	80	1436	105	3
16	33	W/7343-15	T543W336(1)016A(2)(3)045	53	10	45	2000	105	3
16	33	V/7343-20	T543V336(1)016A(2)(3)045	53	10	45	2039	105	3
16	33	V/7343-20	T543V336(1)016A(2)(3)060	53	10	60	1765	105	3
16	33	V/7343-20	T543V336(1)016A(2)(3)070	53	10	70	1634	105	3
16	47	W/7343-15	T543W476(1)016A(2)(3)045	75	10	45	2000	105	3
16	47	V/7343-20	T543V476(1)016A(2)(3)045	75	10	45	2039	105	3
16	47	V/7343-20	T543V476(1)016A(2)(3)070	75	10	70	1634	105	3
16	47	V/7343-20	T543V476(1)016A(2)(3)080	75	10	80	1529	105	3
16	47	D-7343-31	T543D476(1)016A(2)(3)035	75	10	35	2535	105	3
16	47	D-7343-31	T543D476(1)016A(2)(3)065	75	10	65	1861	105	3
16	47	D-7343-31	T543D476(1)016A(2)(3)070	75	10	70	1793	105	3
16	68	V/7343-20	T543V686(1)016A(2)(3)050	109	10	50	1934	105	3
16	68	V/7343-20	T543V686(1)016A(2)(3)090	109	10	90	1441	105	3
16	100	V/7343-20	T543V107(1)016A(2)(3)050	160	10	50	1934	105	3
16	100	D-7343-31	T543D107(1)016A(2)(3)035	160	10	35	2535	105	3
V	μF	KEMET/EIA	(See below for part options)	(μA) @ V _R , 20°C Maximum/ 5 Minutes	% @ 20°C 120 Hz Maximum	(mΩ) @ 20°C 100 kHz Maximum	(mA) 45°C 100 kHz	(°C)	Temperature ≤ 260°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Rated Temperature	Moisture Sensitivity

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

(2) To complete KEMET part number, H = Solder Plated, T = 100% Tin (Sn). Designates termination finish.

(3) To complete KEMET part number, insert E = None, S = 10 cycles +25°C, W = 10 cycles -55°C +85°C. Designates surge current option.

Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont'd

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Rated Temp	Moisture Sensitivity
V	μF	KEMET/EIA	(See below for part options)	(μA) @ V _R , 20°C Maximum/ 5 Minutes	% @ 20°C 120 Hz Maximum	(mΩ) @ 20°C 100 kHz Maximum	(mA) 45°C 100 kHz	(°C)	Temperature ≤ 260°C
16	100	D-7343-31	T543D107(1)016A(2)(3)050	160	10	50	2121	105	3
16	150	X/7343-43	T543X157(1)016A(2)(3)015	240	10	15	4058	105	3
16	150	X/7343-43	T543X157(1)016A(2)(3)025	240	10	25	3143	105	3
16	150	X/7343-43	T543X157(1)016A(2)(3)040	240	10	40	2485	105	3
16	150	X/7343-43	T543X157(1)016A(2)(3)080	240	10	80	1757	105	3
16	220	X/7343-43	T543X227(1)016A(2)(3)035	352	10	35	2657	105	3
16	220	X/7343-43	T543X227(1)016A(2)(3)080	352	10	80	1757	105	3
16	330	X/7343-43	T543X337(1)016A(2)(3)025	528	10	25	3143	105	3
16	330	X/7343-43	T543X337(1)016A(2)(3)050	528	10	50	2223	105	3
20	22	V/7343-20	T543V226(1)020A(2)(3)040	44	10	40	2162	105	3
20	22	V/7343-20	T543V226(1)020A(2)(3)045	44	10	45	2039	105	3
20	22	V/7343-20	T543V226(1)020A(2)(3)090	44	10	90	1441	105	3
20	22	D-7343-31	T543D226(1)020A(2)(3)040	44	10	40	2372	105	3
20	22	D-7343-31	T543D226(1)020A(2)(3)045	44	10	45	2236	105	3
20	22	D-7343-31	T543D226(1)020A(2)(3)090	44	10	90	1581	105	3
20	33	D-7343-31	T543D336(1)020A(2)(3)060	66	10	60	1936	105	3
20	47	V/7343-20	T543V476(1)020A(2)(3)055	94	10	55	1844	105	3
20	47	V/7343-20	T543V476(1)020A(2)(3)090	94	10	90	1441	105	3
20	47	D-7343-31	T543D476(1)020A(2)(3)055	94	10	55	2023	105	3
20	100	X/7343-43	T543X107(1)020A(2)(3)035	200	10	35	2657	105	3
20	100	X/7343-43	T543X107(1)020A(2)(3)050	200	10	50	2223	105	3
25	15	V/7343-20	T543V156(1)025A(2)(3)090	38	10	90	1441	105	3
25	15	D-7343-31	T543D156(1)025A(2)(3)060	38	10	60	1936	105	3
25	15	D-7343-31	T543D156(1)025A(2)(3)080	38	10	80	1677	105	3
25	22	V/7343-20	T543V226(1)025A(2)(3)060	55	10	60	1765	105	3
25	22	V/7343-20	T543V226(1)025A(2)(3)090	55	10	90	1441	105	3
25	33	V/7343-20	T543V336(1)025A(2)(3)060	83	10	60	1765	105	3
25	33	D-7343-31	T543D336(1)025A(2)(3)060	83	10	60	1936	105	3
25	68	X/7343-43	T543X686(1)025A(2)(3)035	170	10	35	2657	105	3
25	68	X/7343-43	T543X686(1)025A(2)(3)050	170	10	50	2223	105	3
25	100	X/7343-43	T543X107(1)025A(2)(3)060	250	10	60	2029	105	3
35	15	V/7343-20	T543V156(1)035A(2)(3)100	53	10	100	1367	105	3
35	15	V/7343-20	T543V156(1)035A(2)(3)125	53	10	125	1223	105	3
35	15	D-7343-31	T543D156(1)035A(2)(3)100	53	10	100	1500	105	3
35	15	D-7343-31	T543D156(1)035A(2)(3)125	53	10	125	1342	105	3
35	33	X/7343-43	T543X336(1)035A(2)(3)065	116	10	65	1949	105	3
35	47	X/7343-43	T543X476(1)035A(2)(3)030	165	10	30	2869	105	3
35	47	X/7343-43	T543X476(1)035A(2)(3)060	165	10	60	2029	105	3
50	5.6	D-7343-31	T543D565(1)050A(2)(3)070	28	10	70	1793	105	3
50	5.6	D-7343-31	T543D565(1)050A(2)(3)090	28	10	90	1581	105	3
50	10	D-7343-31	T543D106(1)050A(2)(3)090	50	10	90	1581	105	3
50	12	X/7343-43	T543X126(1)050A(2)(3)045	60	10	45	2343	105	3
50	12	X/7343-43	T543X126(1)050A(2)(3)070	60	10	70	1878	105	3
50	18	X/7343-43	T543X186(1)050A(2)(3)035	90	10	35	2657	105	3
50	18	X/7343-43	T543X186(1)050A(2)(3)070	90	10	70	1878	105	3
50	22	X/7343-43	T543X226(1)050A(2)(3)040	110	10	40	2485	105	3
50	22	X/7343-43	T543X226(1)050A(2)(3)075	110	10	75	1815	105	3
50	33	X/7343-43	T543X336(1)050A(2)(3)040	165	10	40	2485	105	3
50	33	X/7343-43	T543X336(1)050A(2)(3)075	165	10	75	1815	105	3
50	10	D-7343-31	T543D106(1)050A(2)(3)100	50	10	100	1500	105	3
50	10	D-7343-31	T543D106(1)050A(2)(3)120	50	10	120	1369	105	3
63	4.7	D-7343-31	T543D475(1)063A(2)(3)100	30	10	100	1500	105	3
V	μF	KEMET/EIA	(See below for part options)	(μA) @ V _R , 20°C Maximum/ 5 Minutes	% @ 20°C 120 Hz Maximum	(mΩ) @ 20°C 100 kHz Maximum	(mA) 45°C 100 kHz	(°C)	Temperature ≤ 260°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Rated Temperature	Moisture Sensitivity

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

(2) To complete KEMET part number, H = Solder Plated, T = 100% Tin (Sn). Designates termination finish.

(3) To complete KEMET part number, insert E = None, S = 10 cycles +25°C, W = 10 cycles -55°C +85°C. Designates surge current option.

Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont'd

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Rated Temp	Moisture Sensitivity
V	μF	KEMET/EIA	(See below for part options)	(μA) @ V _R , 20°C Maximum/ 5 Minutes	% @ 20°C 120 Hz Maximum	(mΩ) @ 20°C 100 kHz Maximum	(mA) 45°C 100 kHz	(°C)	Temperature ≤ 260°C
63	4.7	D-7343-31	T543D475(1)063A(2)(3)120	30	10	120	1369	105	3
63	10	X/7343-43	T543X106(1)063A(2)(3)050	63	10	50	2223	105	3
63	10	X/7343-43	T543X106(1)063A(2)(3)075	63	10	75	1815	105	3
63	10	X/7343-43	T543X106(1)063A(2)(3)100	63	10	100	1572	105	3
63	10	X/7343-43	T543X106(1)063A(2)(3)150	63	10	150	1283	105	3
63	15	X/7343-43	T543X156(1)063A(2)(3)050	95	10	50	2223	105	3
V	μF	KEMET/EIA	(See below for part options)	(μA) @ V _R , 20°C Maximum/ 5 Minutes	% @ 20°C 120 Hz Maximum	(mΩ) @ 20°C 100 kHz Maximum	(mA) 45°C 100 kHz	(°C)	Temperature ≤ 260°C
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Rated Temperature	Moisture Sensitivity

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

(2) To complete KEMET part number, H = Solder Plated, T = 100% Tin (Sn). Designates termination finish.

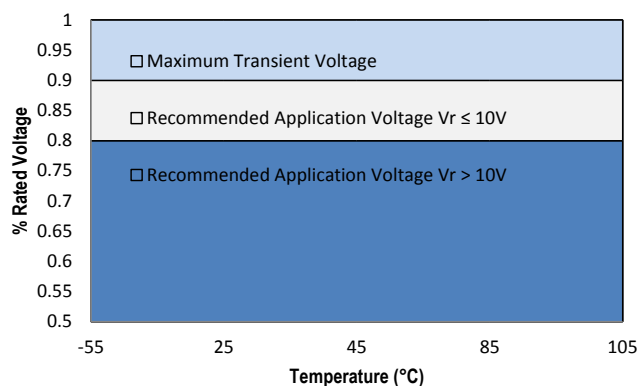
(3) To complete KEMET part number, insert E = None, S = 10 cycles +25°C, W = 10 cycles -55°C +85°C. Designates surge current option.

Refer to Ordering Information for additional detail.

Derating Guidelines

Voltage Rating	Maximum Recommended Steady State Voltage	Maximum Recommended Transient Voltage (1 ms – 1 μ s)
-55°C to 105°C		
$2.5\text{ V} \leq V_R \leq 10\text{ V}$	90% of V_R	V_R
$12.5\text{ V} \leq V_R \leq 63\text{ V}$	80% of V_R	V_R

V_R = Rated Voltage



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.

Temperature Compensation Multipliers for Maximum Ripple Current		
$T \leq 45^\circ\text{C}$	$45^\circ\text{C} < T \leq 85^\circ\text{C}$	$85^\circ\text{C} < T \leq 125^\circ\text{C}$
1.00	0.70	0.25

T = Environmental Temperature

Case Code	EIA Case Code	Maximum Power Dissipation (P max) mWatts @ 45°C with +30°C Rise
T	3528-12	105
M	3528-15	120
A	3216-18	112
B	3528-21	127
U	6032-15	135
L	6032-19	150
C	6032-28	165
W	7343-15	180
V	7343-20	187
D	7343-31	225
Y	7343-40	241
X	7343-43	247
H	7360-20	187
I	3216-10	95

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

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

Polymer tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected in the wrong polarity. These devices will withstand a small degree of transient voltage reversal for short periods as shown in the below table.

Temperature	Permissible Transient Reverse Voltage
25°C	15% of Rated Voltage
55°C	10% of Rated Voltage
85°C	5% of Rated Voltage
105°C	3% of Rated Voltage
125°C*	1% of Rated Voltage

*For series rated to 125°C

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

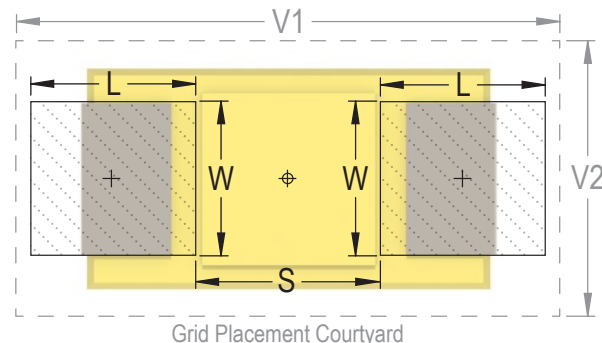
Density Level A: For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.

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.

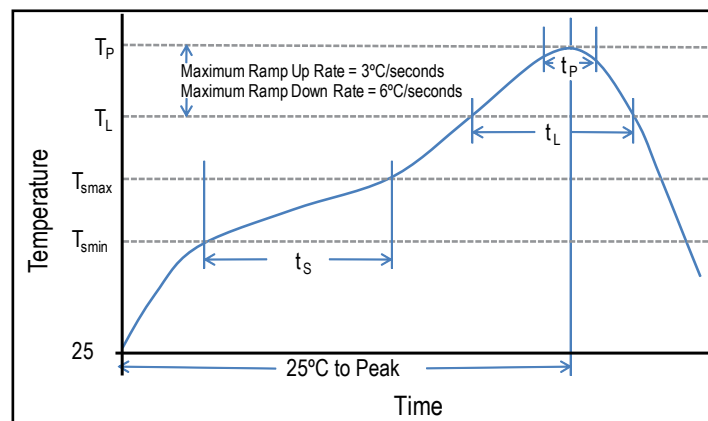
During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

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

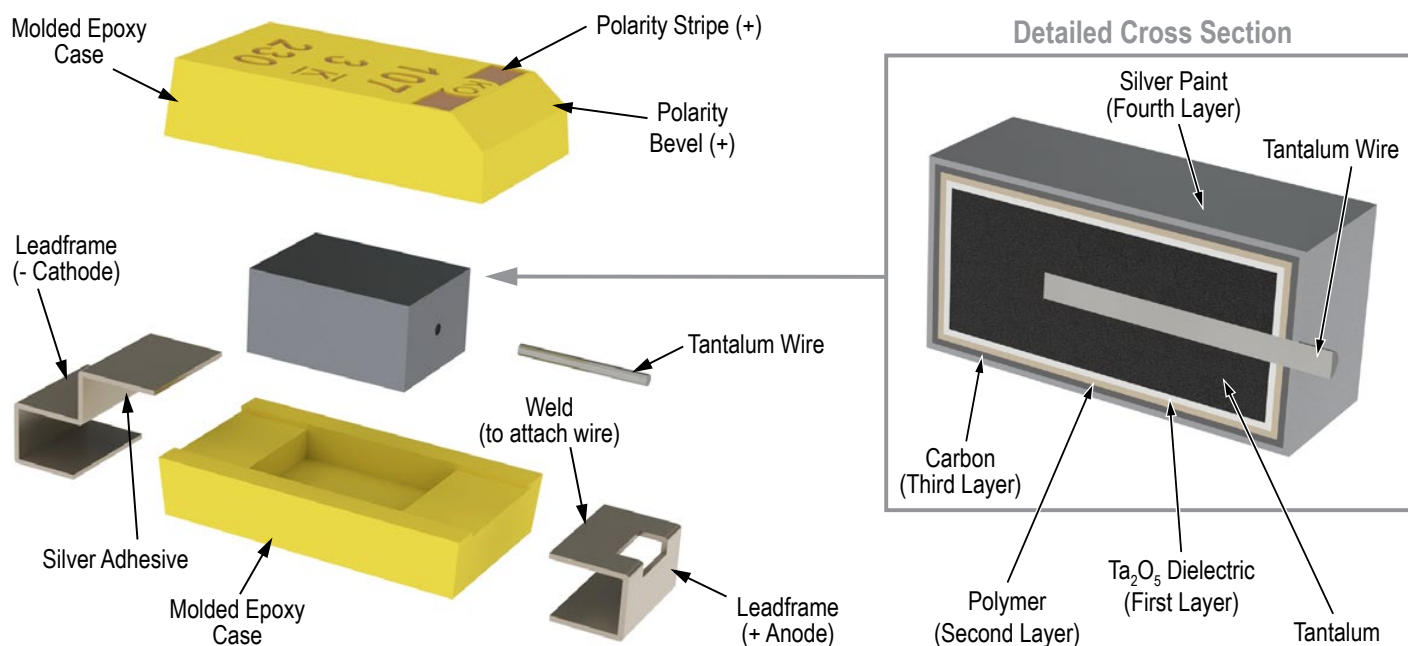
**Case Size A, B, C, H, I, K, M, R, S, T, U, V, W, and Z



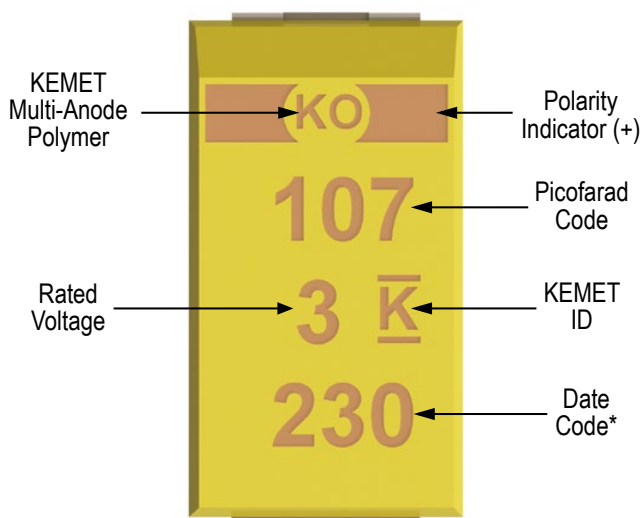
Storage

All KO-CAP Series are shipped in moisture barrier bags with a desiccant and moisture indicator card. These series are classified as MSL3 (Moisture Sensitivity Level 3). Product contained within the moisture barrier bags should be stored in normal working environments with temperatures not to exceed 40°C and humidity not in excess of 60% RH.

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.

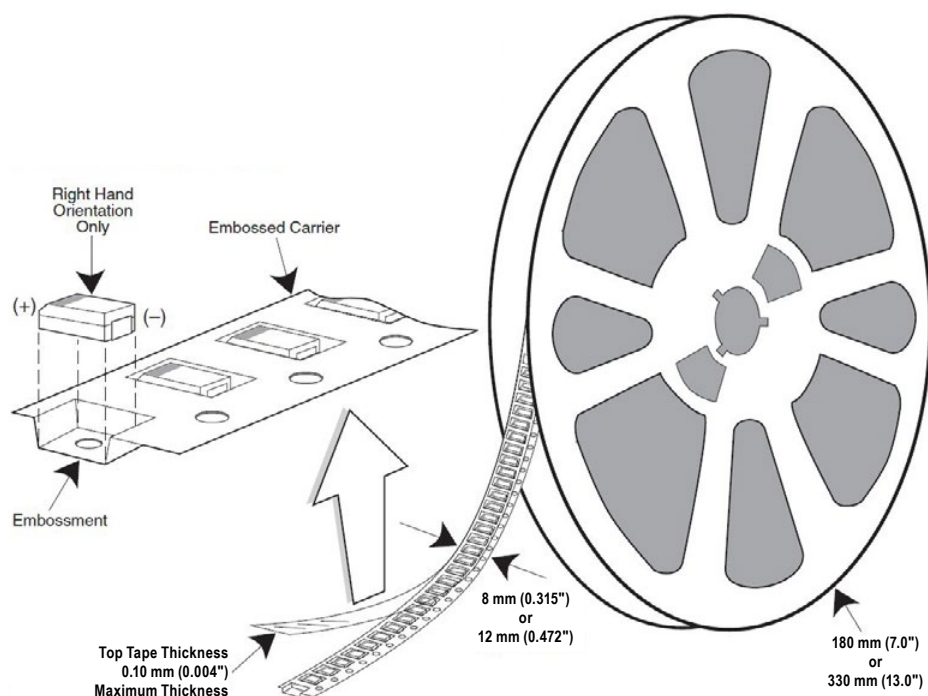
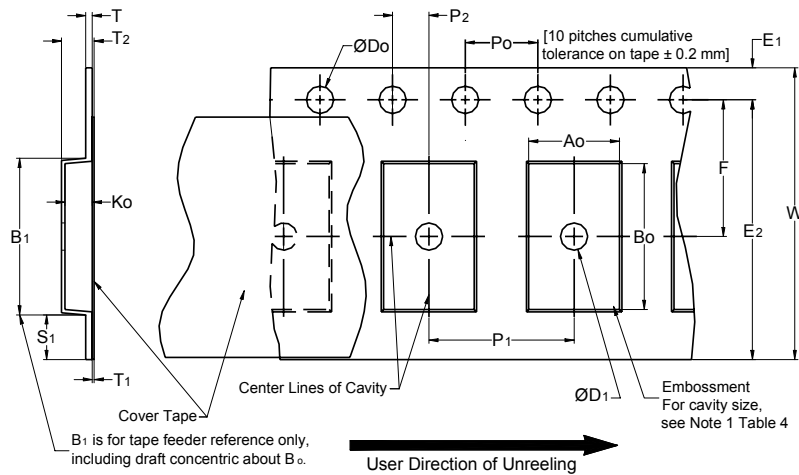


Table 3 – Packaging Quantity

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 $S_1 < 1.0$ mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481–D, paragraph 4.3, section b).
4. B_1 dimension is a reference dimension for tape feeder clearance only.
5. The cavity defined by A_0 , B_0 and K_0 shall surround the component with sufficient clearance that:
 - (a) the component does not protrude above the top surface of the carrier tape.
 - (b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.
 - (c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes and 10° maximum for 16 mm tapes (see Figure 2).
 - (d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape and to 1.0 mm maximum for 16 mm tape (see Figure 3).
 - (e) see Addendum in EIA Standard 481–D for standards relating to more precise taping requirements.

Packaging Information Performance Notes

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

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

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

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

Figure 2 – Maximum Component Rotation

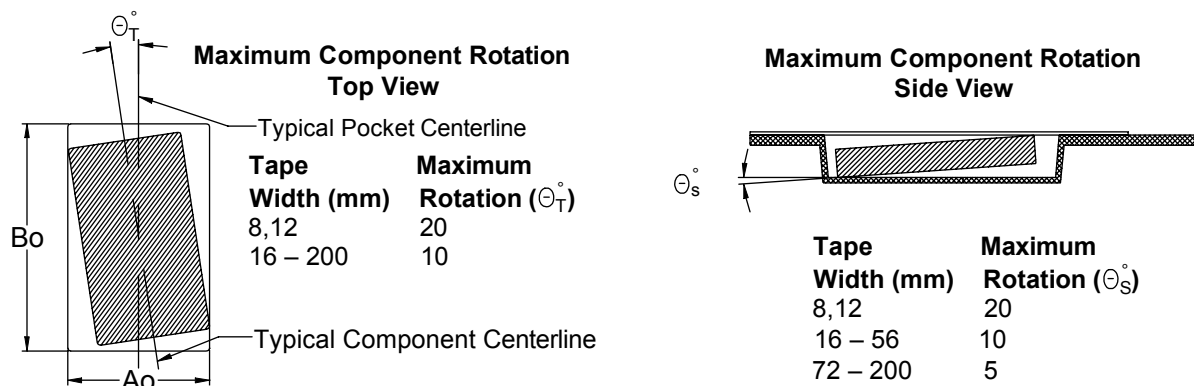


Figure 3 – Maximum Lateral Movement

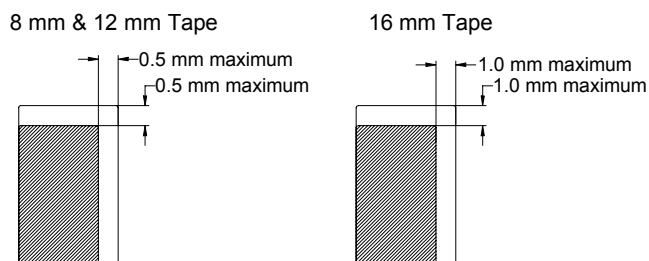


Figure 4 – Bending Radius

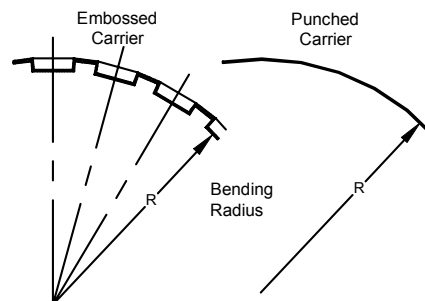
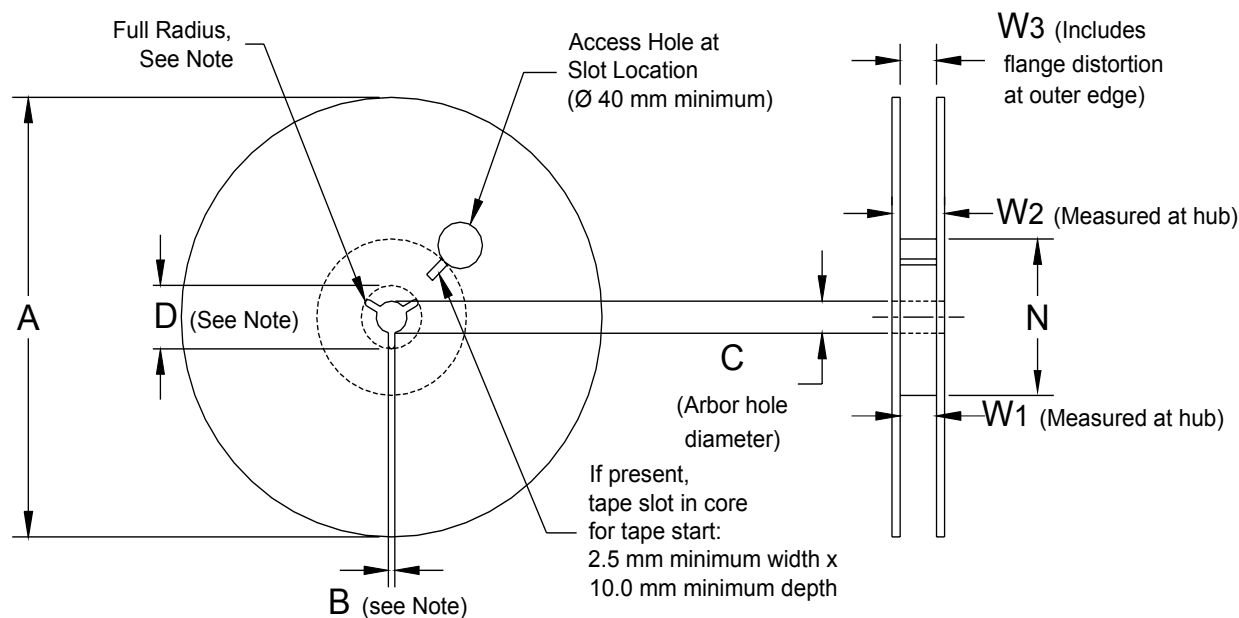


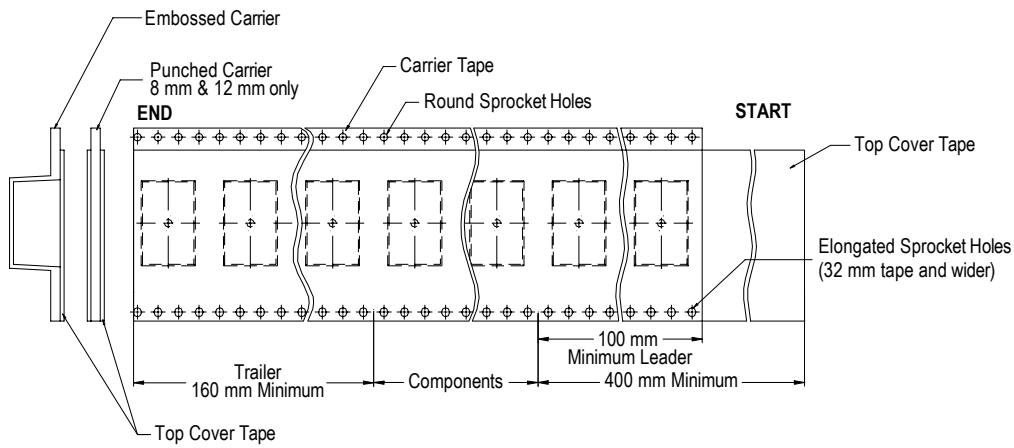
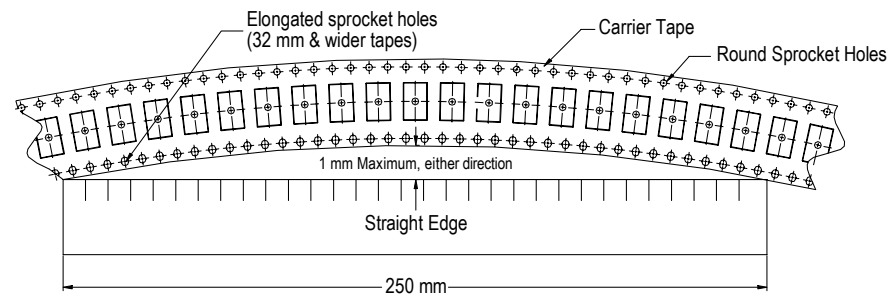
Figure 5 – Reel Dimensions

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

Table 5 – Reel Dimensions

Metric will govern

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

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

KEMET Corporation World Headquarters

2835 KEMET Way
Simpsonville, SC 29681

Mailing Address:
P.O. Box 5928
Greenville, SC 29606

www.kemet.com
Tel: 864-963-6300
Fax: 864-963-6521

Corporate Offices
Fort Lauderdale, FL
Tel: 954-766-2800

North America

Southeast

Lake Mary, FL
Tel: 407-855-8886

Northeast

Wilmington, MA
Tel: 978-658-1663

Central

Novi, MI
Tel: 248-306-9353

West

Milpitas, CA
Tel: 408-433-9950

Mexico

Guadalajara, Jalisco
Tel: 52-33-3123-2141

Europe

Southern Europe

Paris, France
Tel: 33-1-4646-1006

Sasso Marconi, Italy
Tel: 39-051-939111

Central Europe

Landsberg, Germany
Tel: 49-8191-3350800

Kamen, Germany
Tel: 49-2307-438110

Northern Europe

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

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

Asia

Northeast Asia

Hong Kong
Tel: 852-2305-1168

Shenzhen, China
Tel: 86-755-2518-1306

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

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Tel: 886-2-27528585

Southeast Asia

Singapore
Tel: 65-6586-1900

Penang, Malaysia
Tel: 60-4-6430200

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Corporate Office

KEMET Corporation
2835 KEMET Way
Simpsonville, SC 29681
USA

Tel: 864.963.6300

Fax: 864.963.6521

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