

Tantalum Surface Mount Capacitors

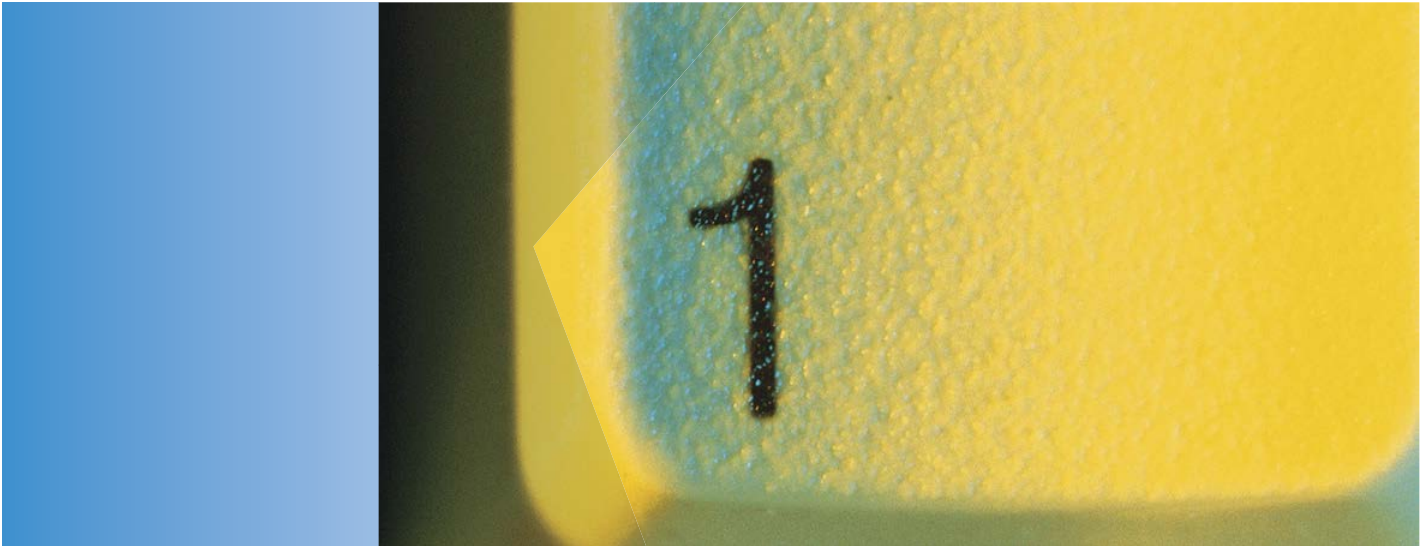
High Reliability Commercial Off-The-Shelf (COTS)



One world. One KEMET.

Electronic Components
KEMET
CHARGED.®

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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.

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 planarity 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 481-1
- 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	+25°C	-55°C	+85°C	+125°C	
		Δ C/C	IL*	±10%	±10%	±20%
		DF	IL	IL	1.5 x IL	1.5 x IL
Surge Voltage	25°C and 85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage)	DCL	10 x IL			
		ESR	12 x IL			
		IL	n/a			
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.					

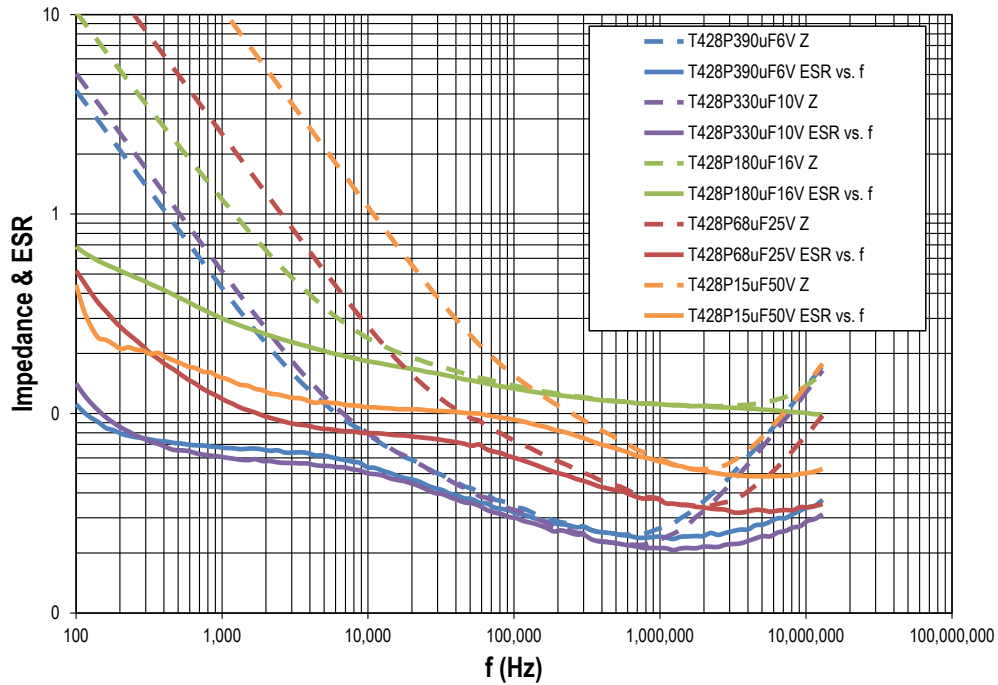
*IL = Initial limit

Certification

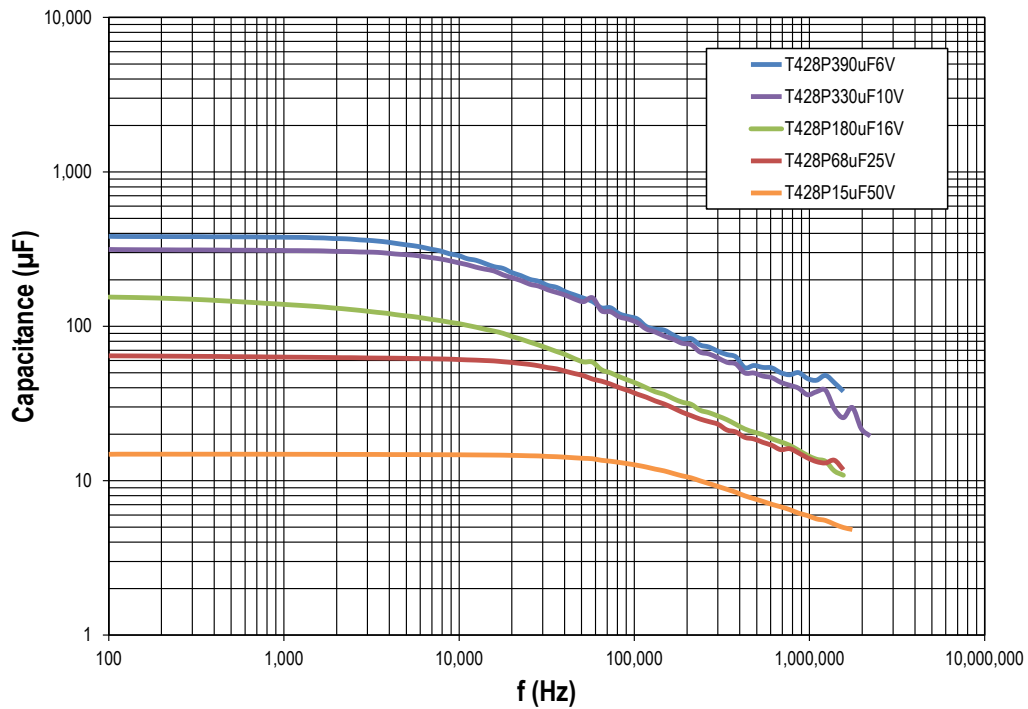
MIL-PRF-55365/8

Electrical Characteristics

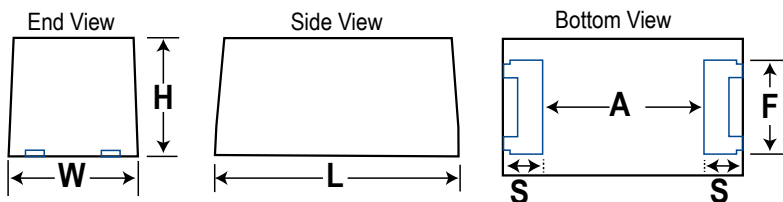
Impedance & ESR vs. Frequency



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.

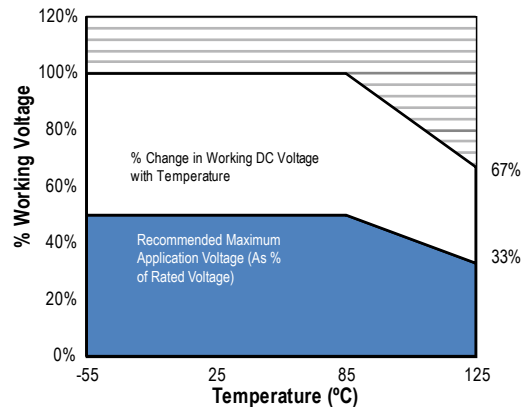
(4) To complete KEMET part number, insert 61 = none, 62 = 10 cycles +25°C or 63 = 10 cycles -55°C +85°C. Designates surge current option.

(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 Power Dissipation		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

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

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

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

I = rms ripple current (amperes)

E = rms ripple voltage (volts)

P max = maximum power dissipation (watts)

R = ESR at specified frequency (ohms)

Z = Impedance at specified frequency (ohms)

Reverse Voltage

Solid tantalum capacitors are polar devices and may be permanently damaged or destroyed if connected with the wrong polarity. The positive terminal is identified on the capacitor body by a stripe, plus in some cases a beveled edge. A small degree of transient reverse voltage is permissible for short periods per the 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

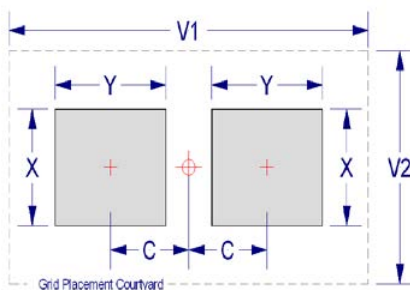
Table 2 – Land Dimensions/Courtyard

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)				
		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.

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.

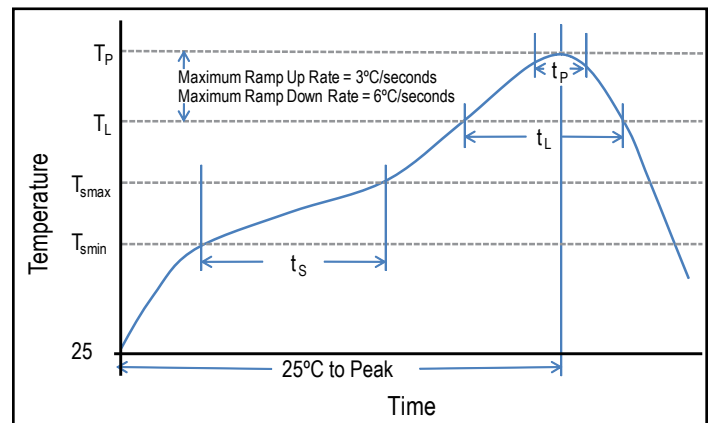
During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

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

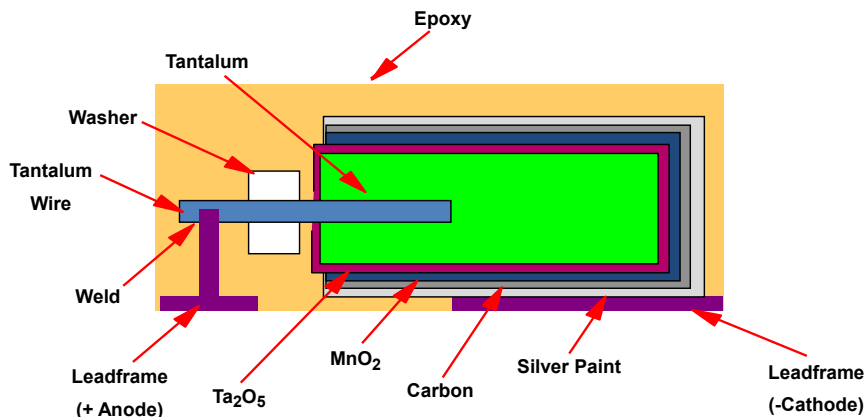
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.

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

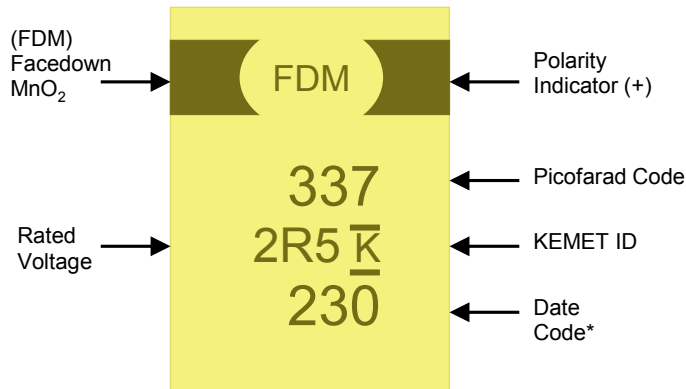
**Case Size A, B, C, H, I, K, M, R, S, T, U, V, W, and Z



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

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.

Overview

The KEMET T493 Series is designed for the COTS (Commercial Off-The-Shelf) requirements of military and aerospace applications. This series is a surface mount product offering various lead-frame plating options, Weibull grading options, surge current testing, F1 technology (improved anode manufacturing process) and Simulated Breakdown Voltage 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 Formula 1 (F1) Technology 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, F1 Technology 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 this F1 Technology is illustrated by a 2,000 hour, 85°C, 1.32 X rated voltage accelerated life test. The F1 Technology parts see no degradation while standard tantalums have 1.5 orders

of magnitude degradation in leakage current. F1 Technology 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).

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.

KEMET offers these technologies per the following options:

- F1 Technology only
- SBDS only
- Combination of both F1 Technology and SBDS for the ultimate protection

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.

Benefits

- F1 Technology and SBDV screening (Simulated Break Down Voltage) available
- Taped and reeled per EIA 481–1
- Symmetrical, compliant terminations
- Laser-marked case
- 100% surge current test available on all case sizes
- Termination options B, C, H, K, T
- Weibull failure options B and C
- Voltage rating of 4 – 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.

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 25°C 63 = 10 cycles, -55°C 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 F1 +SBDV

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	D, 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 T = 100% Tin N = Non-Magnetic 100% Tin (Sn) M = Non-Magnetic (SnPb)	61 = None 62 = 10 Cycles 25°C 63 = 10 cycles, -55°C and 85°C	11 = F1 +SBDV 12 = SBDV 13 = F1 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

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
		DF	IL*	±10%	±10%	±20%
		DCL	IL	IL	1.5 x IL	1.5 x IL
Surge Voltage	25°C and 85°C, 1.32 x rated voltage 1,000 cycles (125°C, 1.2 x rated voltage)	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			

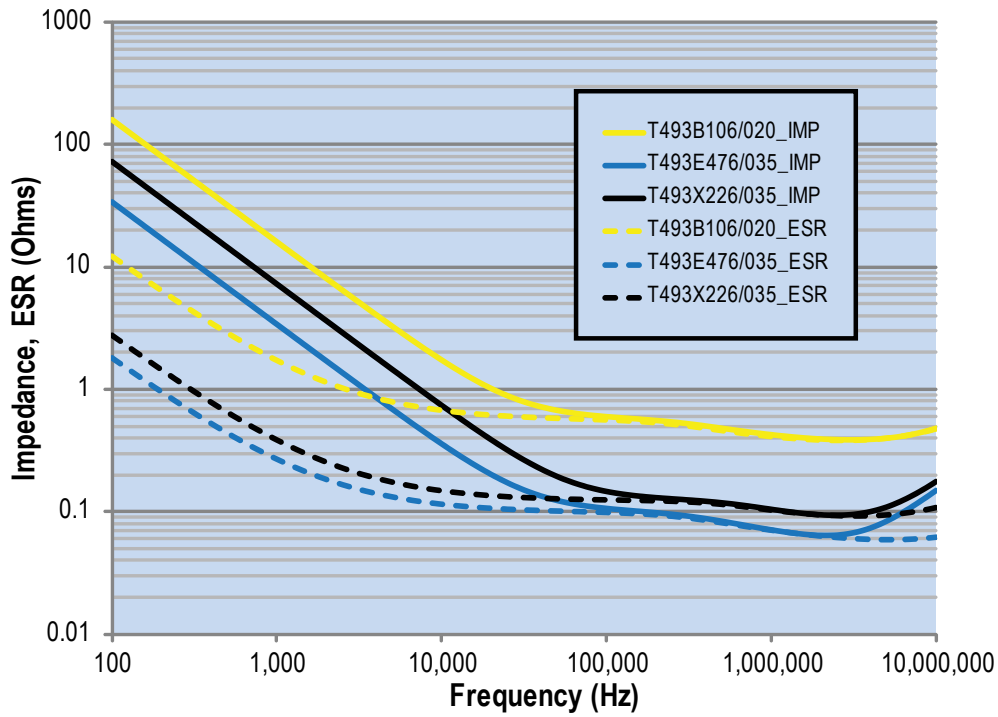
*IL = Initial limit

Certification

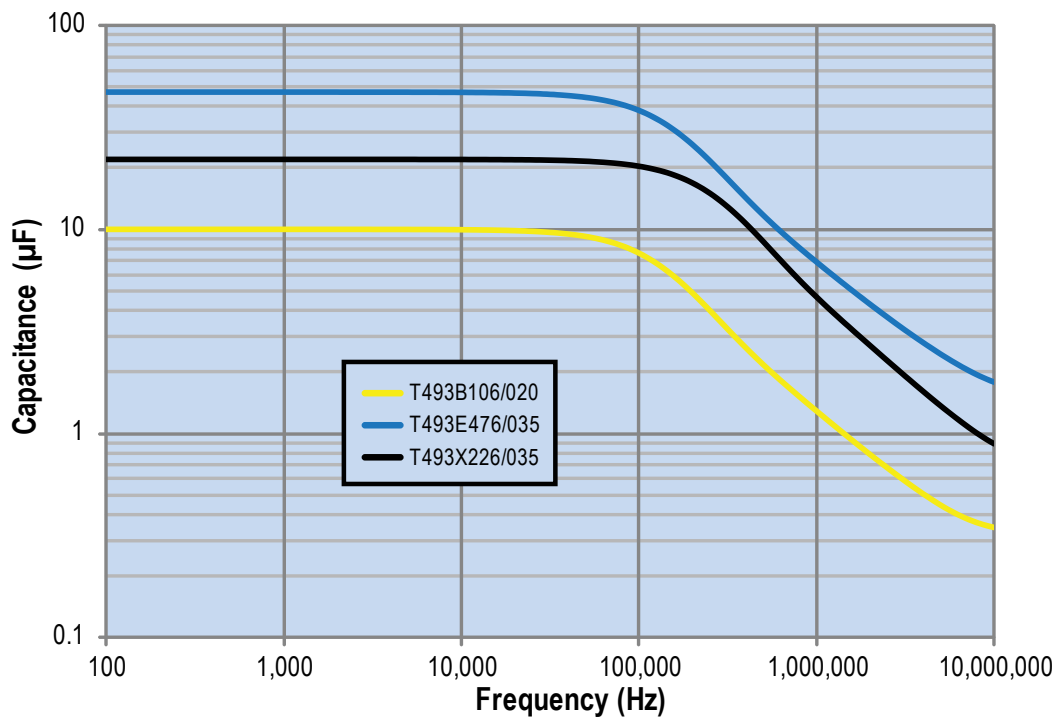
MIL-PRF-55365/8
DSCC Drawing 07016

Electrical Characteristics

ESR vs. Frequency

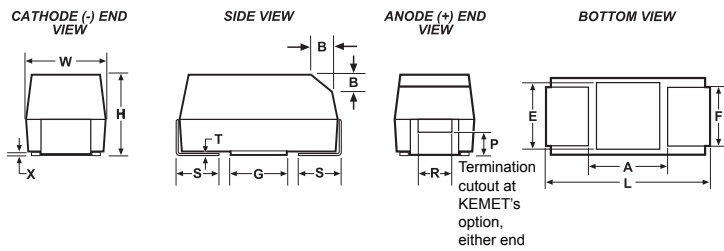


Capacitance vs. Frequency



Dimensions – Millimeters (Inches)

Metric will govern

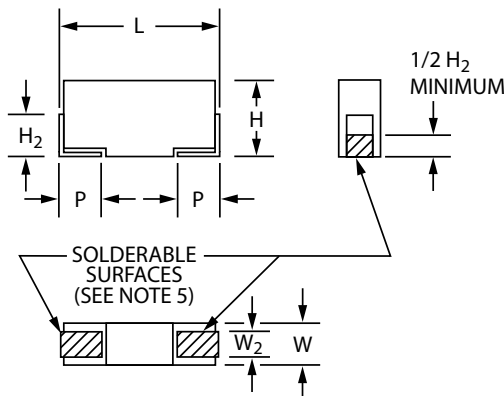


Case Size		Component												
KEMET	EIA	L*	W*	H*	F* ±0.1 ±(.004)	S* ±0.3 ±(.012)	B* ±0.15 (Ref) ±.006	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)
A	3216-18	3.2 ±0.2 (0.126 ±0.008)	1.6 ±0.2 (0.063 ±0.008)	1.6 ±0.2 (0.063 ±0.008)	1.2 (.047)	0.8 (.031)	0.4 (.016)	0.10 ± 0.10 (.004 ± .004)	0.4 (.016)	0.4 (.016)	0.13 (.005)	0.8 (.31)	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 (.020)	1.0 (.039)	0.13 (.005)	1.1 (0.043)	1.8 (.071)	2.2 (.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 (.087)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	0.9 (.035)	1.0 (.039)	0.13 (.005)	2.5(.098)	2.8 (.110)	2.4 (.094)
D	7343-31	7.3 ±0.3 (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 (.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 ±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 (.005)	3.8 (.150)	3.5 (.138)	3.5 (.138)

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

* MIL-PRF-55365/8 specified dimensions

Dimensions – Millimeters (Inches) DSCC 07016



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 ±0.03)	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 +20°C Maximum/ 5 Minutes	% @ +20°C 120 Hz Maximum	Ω @ 20°C 100 kHz Maximum	Ω @ 20°C 100 kHz Maximum	Ω @ 20°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	% @ +20°C 120 Hz Maximum	Ω @ 20°C 100 kHz Maximum	Ω @ 20°C 100 kHz 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	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 +20°C Maximum/ 5 Minutes	% @ +20°C 120 Hz Maximum	Ω @ 20°C 100 kHz Maximum	Ω @ 20°C 100 kHz Maximum	Ω @ 20°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	% @ +20°C 120 Hz Maximum	Ω @ 20°C 100 kHz Maximum	Ω @ 20°C 100 kHz 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	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 +20°C Maximum/ 5 Minutes	% @ +20°C 120 Hz Maximum	Ω @ 20°C 100 kHz Maximum	Ω @ 20°C 100 kHz Maximum	Ω @ 20°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	% @ +20°C 120 Hz Maximum	Ω @ 20°C 100 kHz Maximum	Ω @ 20°C 100 kHz 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	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 +20°C Maximum/ 5 Minutes	% @ +20°C 120 Hz Maximum	Ω @ 20°C 100 kHz Maximum	Ω @ 20°C 100 kHz Maximum	Ω @ 20°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	.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	% @ +20°C 120 Hz Maximum	Ω @ 20°C 100 kHz Maximum	Ω @ 20°C 100 kHz 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	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 +20°C Maximum/ 5 Minutes	% @ +20°C 120 Hz Maximum	Ω @ 20°C 100 kHz Maximum	Ω @ 20°C 100 kHz Maximum	Ω @ 20°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	% @ +20°C 120 Hz Maximum	Ω @ 20°C 100 kHz Maximum	Ω @ 20°C 100 kHz 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	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

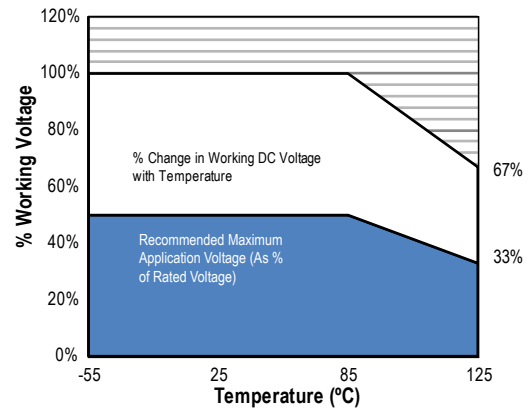
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DSCC Drawing 07016 Part Number	DC Leakage	DF	Standard ESR	Moisture Sensitivity
VDC	µF	KEMET/EIA	See page 2 for Ordering Information	See page 2 for Ordering Information	µA @ +20°C Max/5 Min	% @ +20°C 120 Hz Max	Ω @+20°C 100 kHz Max	Temperature ≤ 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	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	C/6032-28	T493C686(1)006(2)(3)(4)20	07016-016(1)(2)(3)(4)	4.3	6.0	0.2	1
6.3	100	C/6032-28	T493C107(1)006(2)(3)(4)30	07016-017(1)(2)(3)(4)	6.3	6.0	0.15	1
6.3	220	D/7343-31	T493D227(1)006(2)(3)(4)20	07016-020(1)(2)(3)(4)	13.9	8.0	0.1	1
6.3	330	X/7343-43	T493X337(1)006(2)(3)(4)20	07016-021(1)(2)(3)(4)	20.8	8.0	0.1	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)20	07016-033(1)(2)(3)(4)	2.2	6.0	0.7	1
10	22	C/6032-28	T493C226(1)010(2)(3)(4)30	07016-035(1)(2)(3)(4)	2.2	6.0	0.3	1
10	33	B/3528-20	T493B336(1)010(2)(3)(4)10	07016-037(1)(2)(3)(4)	3.3	6.0	0.6	1
10	33	C/6032-28	T493C336(1)010(2)(3)(4)20	07016-039(1)(2)(3)(4)	3.3	6.0	0.5	1
10	47	C/6032-28	T493C476(1)010(2)(3)(4)20	07016-040(1)(2)(3)(4)	4.7	6.0	0.3	1
10	68	C/6032-28	T493C686(1)010(2)(3)(4)20	07016-042(1)(2)(3)(4)	6.8	8.0	0.3	1
10	68	D/7343-31	T493D686(1)010(2)(3)(4)30	07016-044(1)(2)(3)(4)	6.8	6.0	0.15	1
10	220	D/7343-31	T493D227(1)010(2)(3)(4)30	07016-049(1)(2)(3)(4)	22.0	8.0	0.15	1
10	220	X/7343-43	T493X227(1)010(2)(3)(4)30	07016-051(1)(2)(3)(4)	22.0	8.0	0.05	1
10	330	X/7343-43	T493X337(1)010(2)(3)(4)20	07016-054(1)(2)(3)(4)	33.0	8.0	0.1	1
10	330	X/7343-43	T493X337(1)010(2)(3)(4)30	07016-055(1)(2)(3)(4)	33.0	8.0	0.05	1
16	2.2	A/3216-18	T493A225(1)016(2)(3)(4)30	07016-060(1)(2)(3)(4)	0.5	6.0	5.5	1
16	3.3	A/3216-18	T493A335(1)016(2)(3)(4)10	07016-061(1)(2)(3)(4)	0.5	6.0	5.0	1
16	3.3	A/3216-18	T493A335(1)016(2)(3)(4)20	07016-062(1)(2)(3)(4)	0.5	6.0	3.5	1
16	6.8	B/3528-20	T493B685(1)016(2)(3)(4)20	07016-065(1)(2)(3)(4)	1.1	6.0	1.2	1
16	10	B/3528-20	T493B106(1)016(2)(3)(4)20	07016-067(1)(2)(3)(4)	1.6	6.0	0.9	1
16	15	B/3528-20	T493B156(1)016(2)(3)(4)20	07016-068(1)(2)(3)(4)	2.4	6.0	0.8	1
16	22	C/6032-28	T493C226(1)016(2)(3)(4)20	07016-071(1)(2)(3)(4)	3.5	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
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	T493D157(1)016(2)(3)(4)30	07016-082M(1)(2)(3)(4)	24.0	6.0	0.15	1
16	150	E/7260-38	T493E157(1)016(2)(3)(4)10	07016-084(1)(2)(3)(4)	24.0	6.0	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	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
VDC	µF	KEMET/EIA	See page 2 for Ordering Information	See page 2 for Ordering Information	µA @ +20°C Max/5 Min	% @ +20°C 120 Hz Max	Ω @+20°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 @ +20°C Max/5 Min	% @ +20°C 120 Hz Max	Ω @+20°C 100 kHz Max	Temperature ≤ 260°C
20	6.8	B/3528-20	T493B685(1)020(2)(3)(4)20	07016-091(1)(2)(3)(4)	1.4	6.0	1.0	1
20	10	B/3528-20	T493B106(1)020(2)(3)(4)20	07016-092(1)(2)(3)(4)	2.0	6.0	1.0	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	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	B/3528-20	T493B475(1)025(2)(3)(4)10	07016-116(1)(2)(3)(4)	1.2	6.0	1.5	1
25	4.7	B/3528-20	T493B475(1)025(2)(3)(4)20	07016-117(1)(2)(3)(4)	1.2	6.0	0.7	1
25	6.8	C/6032-28	T493C685(1)025(2)(3)(4)20	07016-120(1)(2)(3)(4)	1.7	6.0	0.7	1
25	10	C/6032-28	T493C106(1)025(2)(3)(4)10	07016-121(1)(2)(3)(4)	2.5	6.0	0.5	1
25	10	C/6032-28	T493C106(1)025(2)(3)(4)20	07016-122(1)(2)(3)(4)	2.5	6.0	0.3	1
25	22	D/7343-31	T493D226(1)025(2)(3)(4)20	07016-125(1)(2)(3)(4)	5.5	6.0	0.2	1
25	33	D/7343-31	T493D336(1)025(2)(3)(4)20	07016-127(1)(2)(3)(4)	8.3	6.0	0.3	1
25	33	D/7343-31	T493D336(1)025(2)(3)(4)30	07016-128(1)(2)(3)(4)	8.3	6.0	0.09	1
25	47	D/7343-31	T493D476(1)025(2)(3)(4)20	07016-130M(1)(2)(3)(4)	11.8	6.0	0.25	1
25	47	D/7343-31	T493D476(1)025(2)(3)(4)30	07016-131M(1)(2)(3)(4)	11.8	6.0	0.175	1
25	68	E/7260-38	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	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	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	0.5	1
35	15	D/7343-31	T493D156(1)035(2)(3)(4)20	07016-147(1)(2)(3)(4)	5.3	6.0	0.3	1
35	22	D/7343-31	T493D226(1)035(2)(3)(4)20	07016-149(1)(2)(3)(4)	7.7	6.0	0.4	1
35	33	D/7343-31	T493D336M035(2)(3)(4)10	07016-152M(2)(3)(4)	11.6	6.0	0.3	1
35	33	X/7343-43	T493X336(1)035(2)(3)(4)20	07016-154M(1)(2)(3)(4)	11.6	6.0	0.3	1
50	0.15	A/3216-18	T493A154(1)050(2)(3)(4)20	07016-157M(1)(2)(3)(4)	0.5	4.0	15.0	1
50	0.47	B/3528-20	T493B474(1)050(2)(3)(4)20	07016-160(1)(2)(3)(4)	0.5	4.0	9.5	1
50	1.5	C/6032-28	T493C155(1)050(2)(3)(4)20	07016-164(1)(2)(3)(4)	0.8	6.0	2.0	1
50	1.5	D/7343-31	T493D155(1)050(2)(3)(4)20	07016-165(1)(2)(3)(4)	0.8	6.0	1.5	1
50	2.2	D/7343-31	T493D225(1)050(2)(3)(4)20	07016-166(1)(2)(3)(4)	1.1	6.0	1.2	1
50	3.3	D/7343-31	T493D335(1)050(2)(3)(4)20	07016-167(1)(2)(3)(4)	1.7	6.0	0.8	1
50	4.7	D/7343-31	T493D475(1)050(2)(3)(4)30	07016-168(1)(2)(3)(4)	2.4	6.0	0.3	1
50	6.8	X/7343-43	T493X685(1)050(2)(3)(4)20	07016-171(1)(2)(3)(4)	3.4	6.0	0.4	1
VDC	µF	KEMET/EIA	See page 2 for Ordering Information	See page 2 for Ordering Information	µA @ +20°C Max/5 Min	% @ +20°C 120 Hz Max	Ω @+20°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 Power Dissipation		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T = Environmental Temperature

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

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

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

I = rms ripple current (amperes)

E = rms ripple voltage (volts)

P max = maximum power dissipation (watts)

R = ESR at specified frequency (ohms)

Z = Impedance at specified frequency (ohms)

Reverse Voltage

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

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

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
		Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S
A	3216-18	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
B	3528-21	2.35	2.21	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
C	6032-25	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
D	7343-31	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
L	6032-19	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
M	3528-15	2.35	2.20	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
H	7360-20	4.25	2.77	3.67	10.22	7.30	4.13	2.37	3.87	9.12	6.80	4.03	1.99	4.03	8.26	6.54
E ¹	7360-38	4.25	2.77	3.67	10.22	7.30	4.13	2.37	3.87	9.12	6.80	4.03	1.99	4.03	8.26	6.54
Q	7343-12	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
R ²	2012-12	1.05	1.83	0.15	4.82	2.50	0.93	1.50	0.22	3.72	2.00	0.83	1.12	0.38	2.86	1.74
S ²	3216-12	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
T	3528-12	2.35	2.20	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
U	6032-15	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
V	7343-20	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
W	7343-15	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
X ¹	7343-43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
Y ¹	7343-40	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

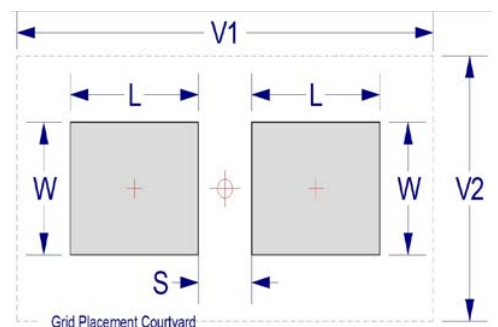
Density Level A: For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.

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

Density Level C: For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC-7351).

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

² Land pattern geometry is too small for silkscreen outline.



T496 Hi-Rel Fused COTS MnO₂ Series and DLA (DSCC)

Drawing 04053

Overview

The T496 COTS (Commercial-Off-the-Shelf) Series 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.

Applications

Typical applications include decoupling and filtering in computing, telecommunications, defense, and industrial end applications requiring built-in fuse capability.

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



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 = ±10% M = ±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 Z = 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 Z = Non-Weibull Graded

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	-55°C to 125°C
Rated Capacitance Range	0.15 µF – 470 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	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	+125°C
		Δ C/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
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			

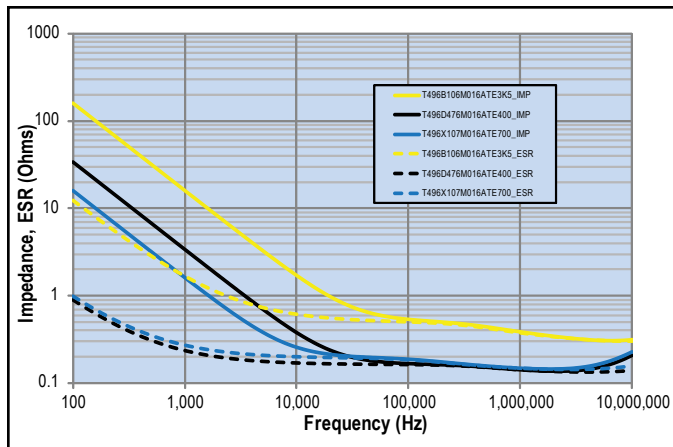
*IL = Initial limit

Certification

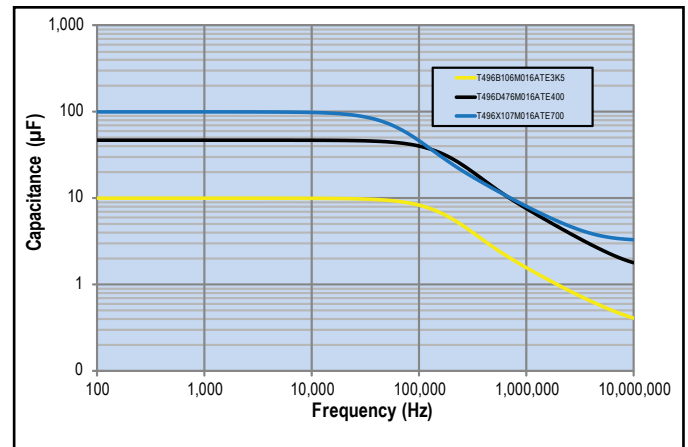
DSCC Drawing 04053
MIL-PRF-55365/8

Electrical Characteristics

ESR vs. Frequency

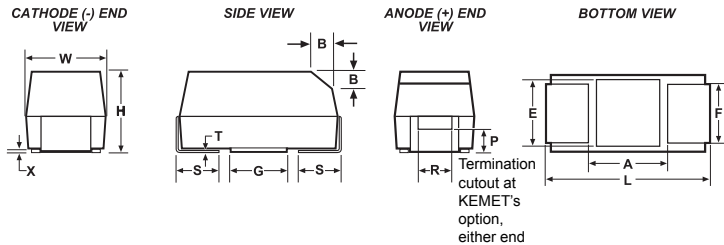


Capacitance vs. Frequency



Dimensions – Millimeters (Inches)

Metric will govern



Case Size		Component												
KEMET	EIA	L*	W*	H*	F* ±0.1 ±(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)	4.3 ±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 (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)10	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.

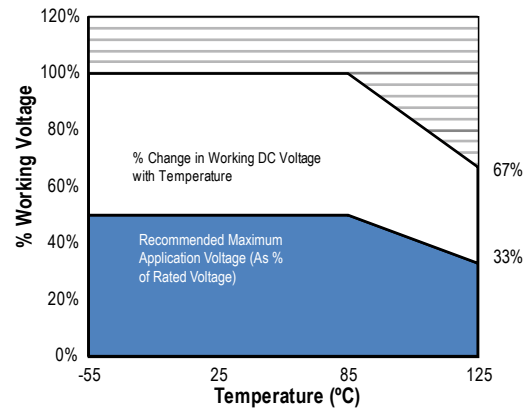
Table 1 – Ratings & Part Number Reference cont'd

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 Power Dissipation		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T= Environmental Temperature

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

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

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

I = rms ripple current (amperes)

R = ESR at specified frequency (ohms)

E = rms ripple voltage (volts)

Z = Impedance at specified frequency (ohms)

P max = maximum power dissipation (watts)

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 Case	Metric Size Code EIA	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

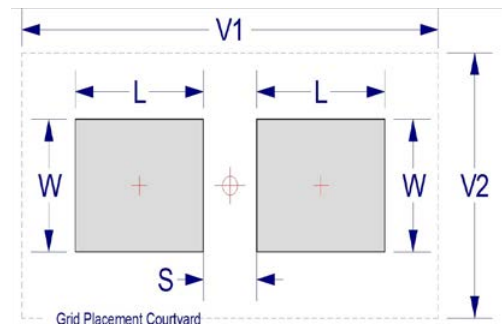
Density Level A: For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.

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.

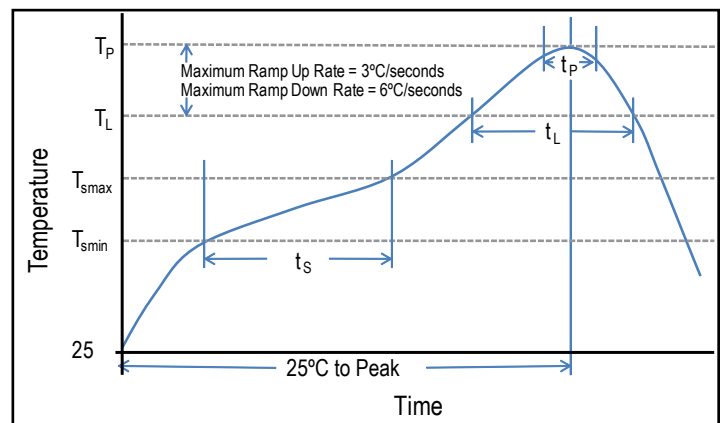
During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

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	6 minutes maximum	8 minutes maximum

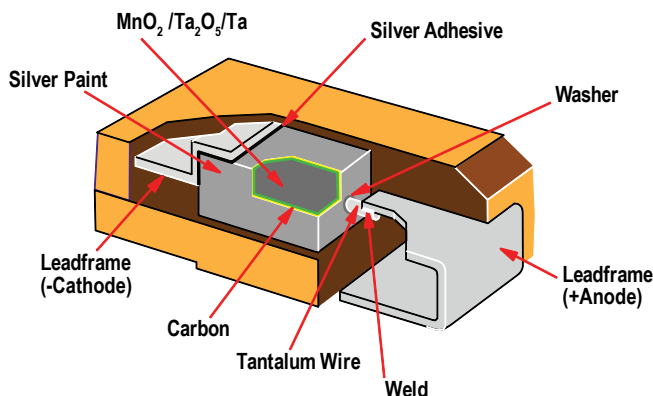
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.

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

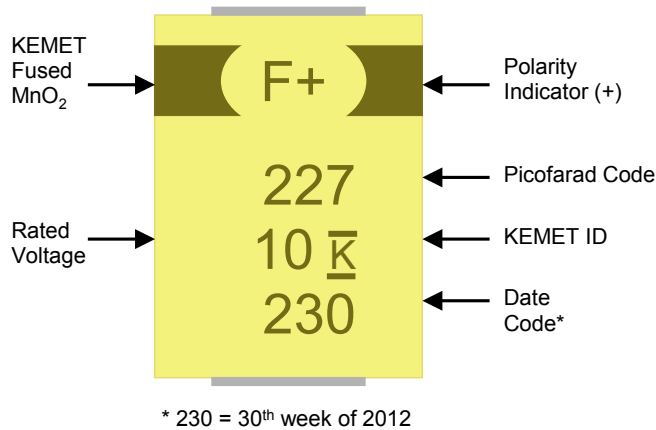
**Case Size A, B, C, H, I, K, M, R, S, T, U, V, W, and Z



Construction



Capacitor Marking



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

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.

Overview

The KEMET T497 Series is designed for the COTS (Commercial Off-The-Shelf) 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, F1 technology (improved anode manufacturing process) and Simulated Breakdown Voltage screening options (to improve long term reliability).

KEMET's Formula 1 (F1) Technology 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, F1 Technology 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 this F1 Technology is illustrated by a 2,000 hour, 85°C, 1.32 X rated voltage accelerated life test. The F1 Technology parts see no degradation while standard tantalums have 1.5 orders of magnitude degradation in leakage current. F1 Technology 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).

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.

KEMET offers these technologies per the following options:

- F1 Technology only
- SBDS only
- Combination of both F1 Technology and SBDS for the ultimate protection

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.

Benefits

- F1 Technology and SBDV screening (Simulated Break Down Voltage) available
- Taped and reeled per EIA 481–1
- Symmetrical, compliant terminations
- Laser-marked case
- 100% surge current test available on all case sizes
- Termination options B, 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.

Ordering Information

T	497	G	226	K	020	A	H	6110
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Voltage	Failure Rate/ Design	Lead Material	Performance Options
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	6110 = Standard features 6115 = No surge, 100% X-ray, 6210 Surge = 10 cycles 25°C, 6215 Surge = 10 cycles 25°C, 100% X-ray 6410 Surge = 10 cycles -55°C and 85°C 6415 Surge = 10 cycles -55°C and 85°C, 100% X-ray

Ordering Information F1 +SBDV

T	497	H	226	K	020	A	H	6110
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Voltage	Failure Rate/ Design	Lead Material	Performance Options
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	6110 = Standard features 6111 = F1 + SBDV 6112 = SBDV 6113 = F1 6115 = No surge, 100% X-ray. 6210 Surge = 10 cycles 25C, 6211 = 6210 + F1 + SBDV 6212 = 6210 + SBDV 6213= 6210 + F1 6215 Surge = 10 cycles 25C, 100% X-ray 6410 Surge = 10 cycles -55C and 85C . 6411 = 6410 + F1 +SBDV 6412 = 6410 + SBDV 6413 = 6410 + F1 6415 Surge = 10 cycles -55C and 85C, 100% X-ray

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 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	≤ 0.01 CV (μA) at rated voltage after 5 minutes

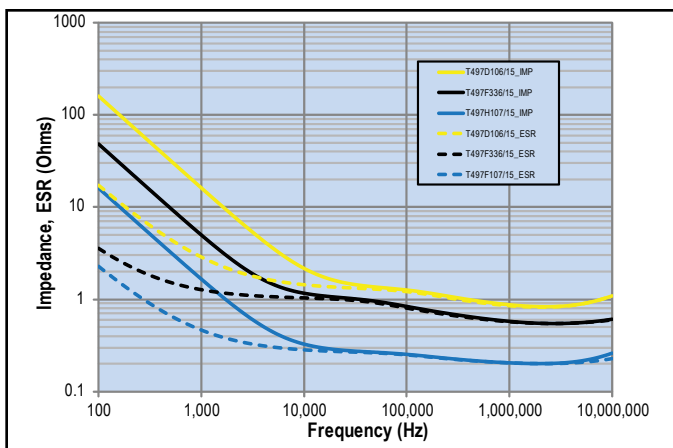
Qualification

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		+25°C	-55°C	+85°C	+125°C
		Δ C/C	IL*	±20%	±20%	±30%
		DF	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			
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			

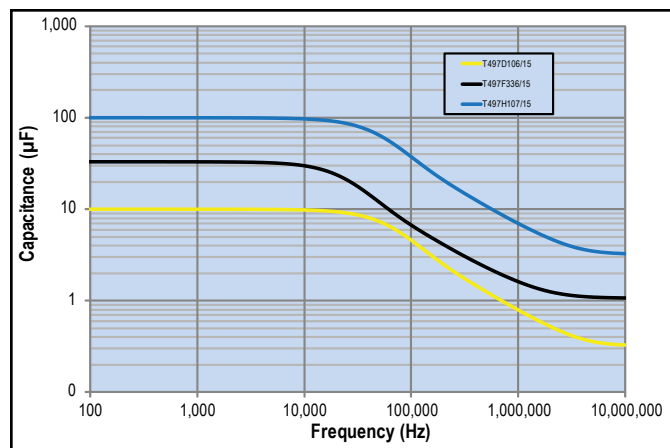
*IL = Initial limit

Electrical Characteristics

ESR vs. Frequency

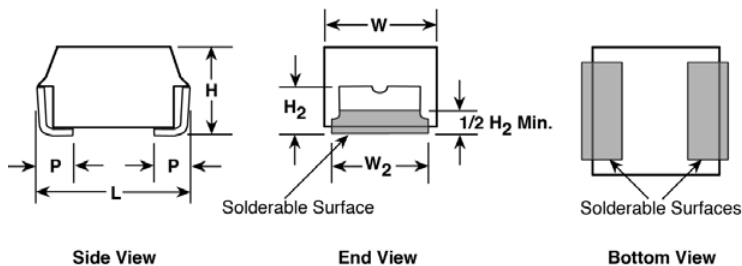


Capacitance vs. Frequency



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.

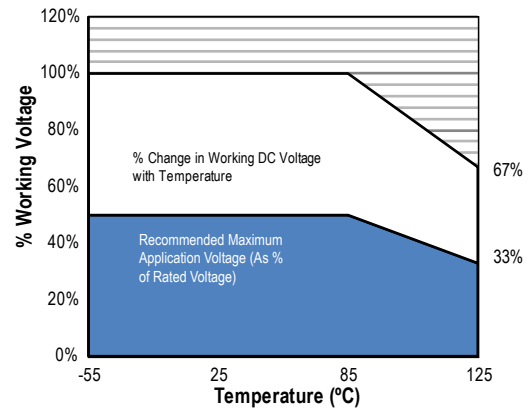
(3) To complete KEMET part number, insert T = 100% Matte Tin (Sn) Plated, B = Gold Plated, H = Standard Solder coated (SnPb 5% Pb minimum). Designates Termination Finish.

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 Power Dissipation		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T = Environmental Temperature

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

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

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

I = rms ripple current (amperes)

R = ESR at specified frequency (ohms)

E = rms ripple voltage (volts)

Z = Impedance at specified frequency (ohms)

P max = maximum power dissipation (watts)

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

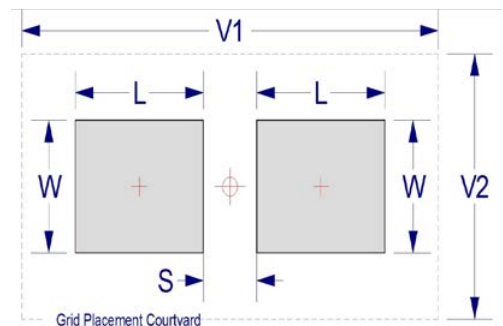
KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)				
		Case	EIA	L	W	S	V1	V2	L	W	S	V1	V2	L	W	S
A ¹	1005	2.19	1.44	0.15	5.54	2.66	1.89	1.32	0.15	4.44	2.16	1.52	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.

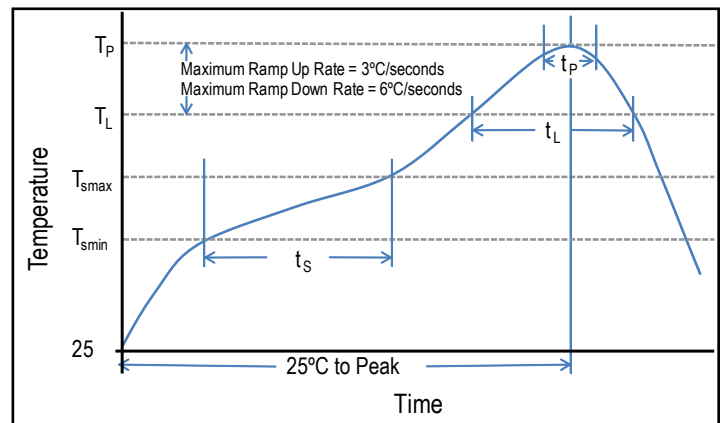
During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

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

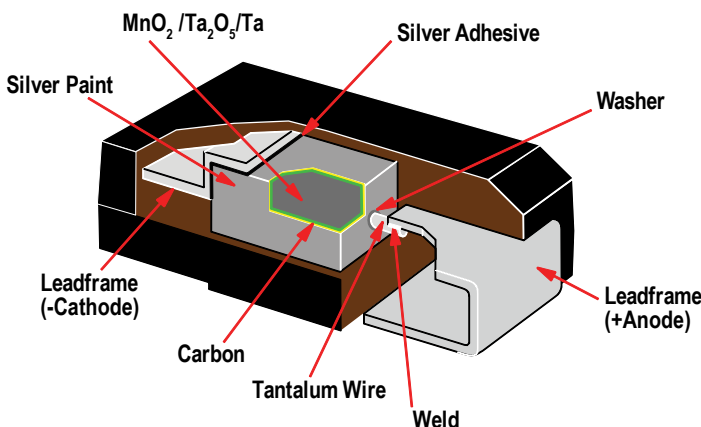
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.

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

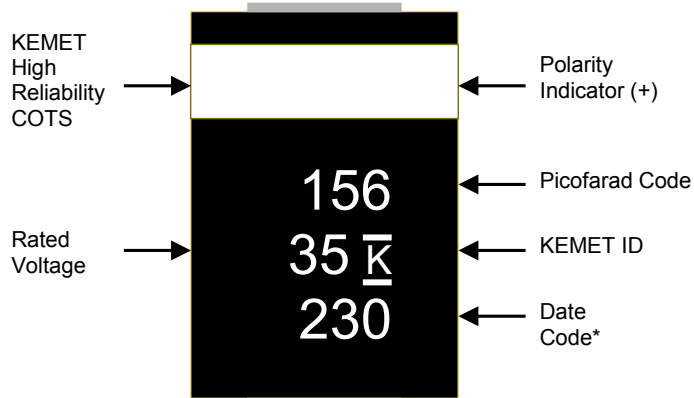
**Case Size A, B, C, H, I, K, M, R, S, T, U, V, W, and Z



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

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.

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.

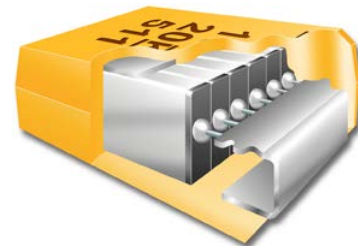
These benefits are achieved via a multiple anode construction similar to KEMET's T510 Series. The T513 COTS Series also offers various options including Weibull Grading, termination finish and surge current.

Benefits

- Meets or exceeds EIA Standard 535BAAC
- Taped and reeled per EIA 481-1
- 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°C

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 = ±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	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 µF @ 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 (µA) at rated voltage after 5 minutes

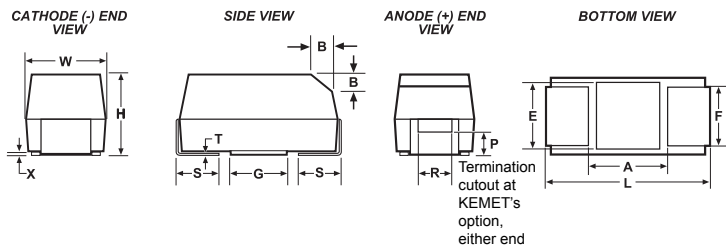
Qualification

Test	Condition	Characteristics					
Endurance	85°C @ rated voltage, 2,000 hours 125°C @ 2/3 rated voltage, 2,000 hours	Δ C/C	Within ±10% of initial value				
		DF	Within initial limits				
		DCL	Within 1.25 x initial limit				
		ESR	Within initial limits				
Storage Life	125°C @ 0 volts, 2,000 hours	Δ C/C	Within ±10% of initial value				
		DF	Within initial limits				
		DCL	Within 1.25 x initial limit				
		ESR	Within initial limits				
Thermal Shock	MIL-STD-202, Method 107, Condition B, mounted, -55°C to 125°C, 1,000 cycles	Δ C/C	Within ±5% of initial value				
		DF	Within initial limits				
		DCL	Within 1.25 x initial limit				
		ESR	Within initial limits				
Temperature Stability	Extreme temperature exposure at a succession of continuous steps at +25°C, -55°C, +25°C, +85°C, +125°C, +25°C	+25°C	-55°C	+85°C	+125°C		
		Δ C/C	IL*	±10%	±10%	±20%	
		DF	IL	IL	1.5 x IL	1.5 x IL	
		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



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)
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-C-55365/8 specified dimensions

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	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	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
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.

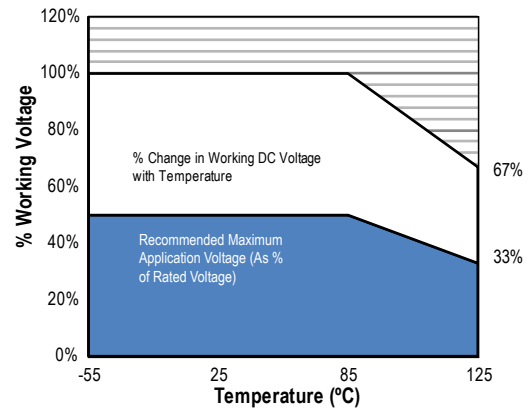
(4) To complete KEMET part number, insert 61 = None, 62 = 10 cycles +25°C, 63 = 10 cycles -55°C +85°C after Weibull or 64 = 10 cycles -55°C +85°C before Weibull. Designates Surge current option.

(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.

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

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

Temperature Compensation Multipliers for Maximum Power Dissipation		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C
1.00	0.90	0.40

T = Environmental Temperature

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

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

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

I = rms ripple current (amperes)

R = ESR at specified frequency (ohms)

E = rms ripple voltage (volts)

Z = Impedance at specified frequency (ohms)

P max = maximum power dissipation (watts)

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
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

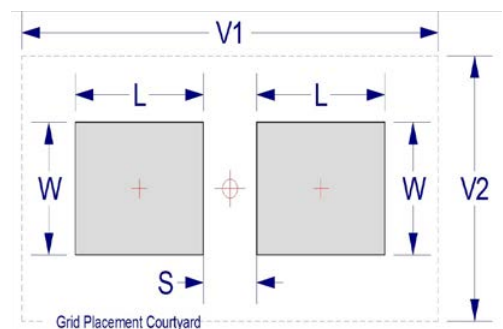
Density Level A: For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.

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.

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.

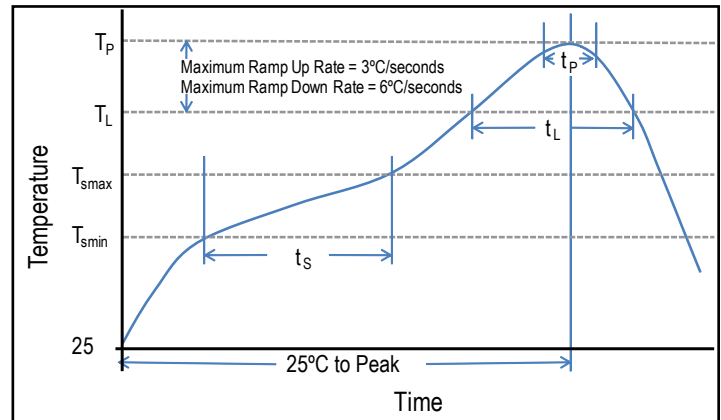
During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and is not harmful to the product. Marking permanency is not affected by this change.

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

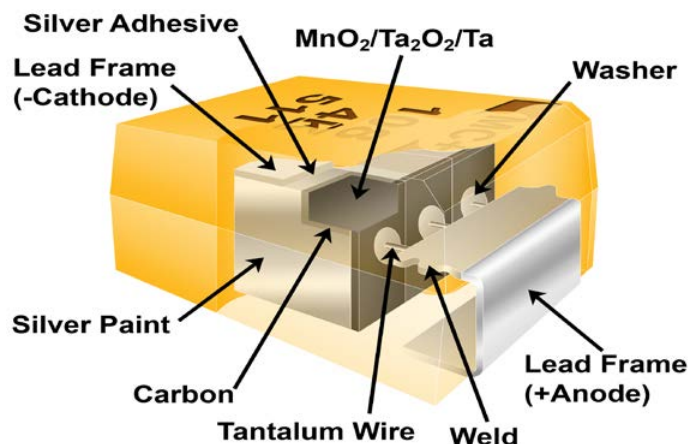
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.

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

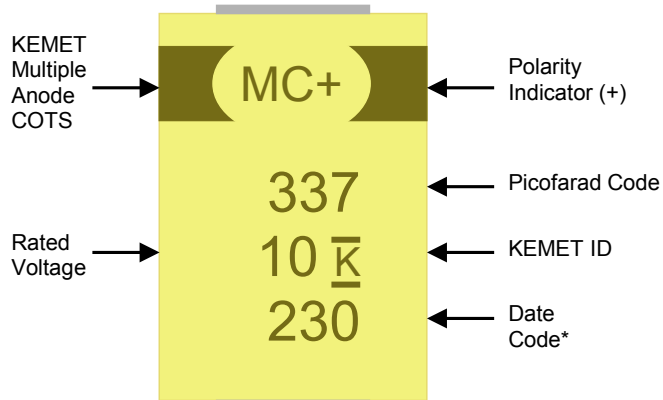
**Case Size A, B, C, H, I, K, M, R, S, T, U, V, W and Z



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

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.

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 the Commercial Off-the-Shelf (COTS) requirements of defense and aerospace applications. This surface mount product offers a tin lead (SnPb) leadframe finish, surge current testing options and standard or low ESR levels.

Benefits

- 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 = No Surge 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

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	$\leq 0.1\text{C V}$ (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 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		+25°C	-55°C	+85°C	+125°C
		Δ C/C	IL*	±20%	±20%	±30%
		DF	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%/+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			
Additional Qualification Tests per MIL-PRF-55365/8	Please contact KEMET for more information.					

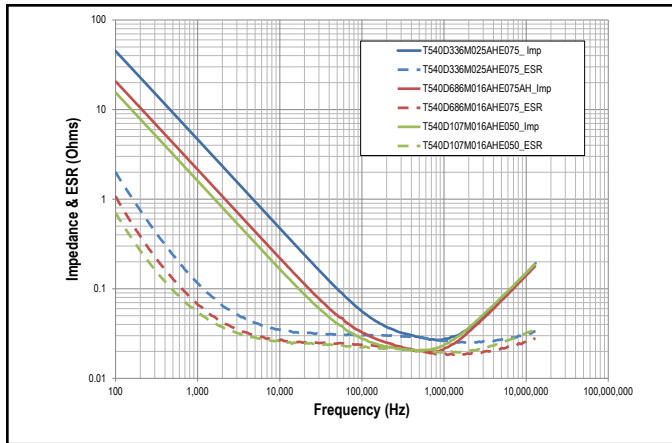
*IL = Initial limit

Certification

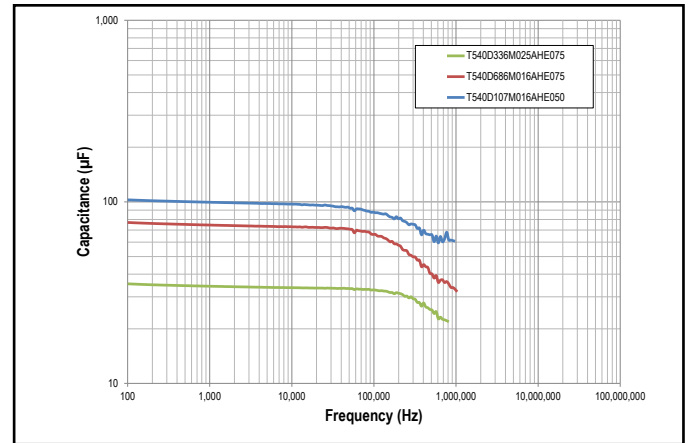
MIL-PRF-55365/8

Electrical Characteristics

ESR vs. Frequency

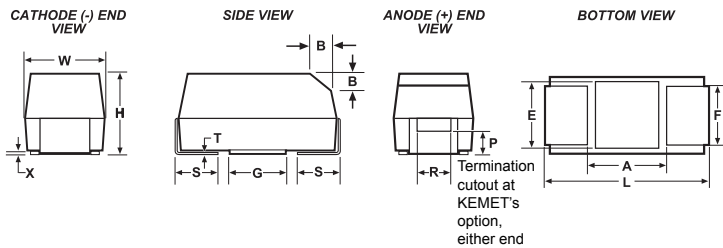


Capacitance vs. Frequency



Dimensions – Millimeters (Inches)

Metric will govern



Case Size		Component												
KEMET	EIA	L*	W*	H*	F* ±0.1 ±(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.

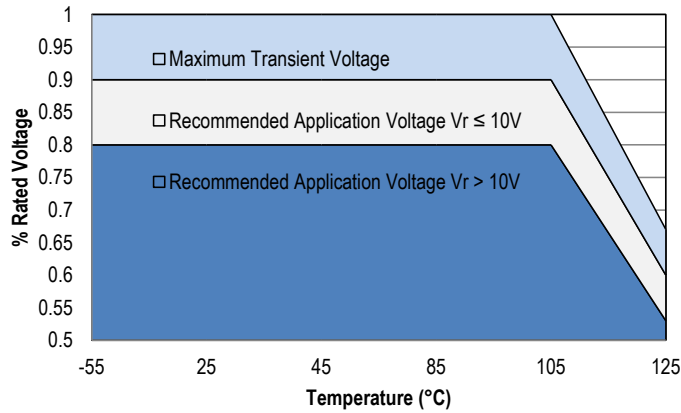
Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (A) 100 kHz	
							w/ΔT = 20°C @ -55°C to 105°C	w/ΔT = 2°C @ 125°C
V	μF	KEMET/EIA	(See below for part options)	(μA) @ 25°C Maximum	% @ 25°C 120 Hz Maximum	(mΩ) @ 25°C 100 kHz Maximum		
2.5	330	D/7343-31	T540D337M2R5AH(1)10	83	10	25	2.4	0.8
2.5	470	D/7343-31	T540D477M2R5AH(1)10	118	10	25	2.4	0.8
2.5	680	D/7343-31	T540D687M2R5AH(1)10	170	10	25	2.4	0.8
3	100	B/3528-21	T540B107M003AH(1)10	30	8	80	1	0.3
3	150	B/3528-21	T540B157M003AH(1)10	45	8	80	1	0.3
3	330	D/7343-31	T540D337M003AH(1)10	99	10	25	2.4	0.8
3	470	D/7343-31	T540D477M003AH(1)10	141	10	25	2.4	0.8
3	680	D/7343-31	T540D687M003AH(1)10	204	10	25	2.4	0.8
4	68	B/3528-21	T540B686M004AH(1)10	28	8	80	1	0.3
4	100	B/3528-21	T540B107M004AH(1)10	40	8	80	1	0.3
4	220	D/7343-31	T540D227M004AH(1)10	88	10	25	2.4	0.8
4	330	D/7343-31	T540D337M004AH(1)10	132	10	25	2.4	0.8
4	470	D/7343-31	T540D477M004AH(1)20	188	10	25	2.4	0.8
4	470	D/7343-31	T540D477M004AH(1)10	188	10	40	1.9	0.6
6.3	33	B/3528-21	T540B336M006AH(1)10	21	8	80	1	0.3
6.3	47	B/3528-21	T540B476M006AH(1)10	30	8	80	1	0.3
6.3	68	B/3528-21	T540B686M006AH(1)10	43	8	80	1	0.3
6.3	150	D/7343-31	T540D157M006AH(1)10	95	10	25	2.4	0.8
6.3	220	D/7343-31	T540D227M006AH(1)10	139	10	25	2.4	0.8
6.3	330	D/7343-31	T540D337M006AH(1)20	208	10	25	2.4	0.8
6.3	330	D/7343-31	T540D337M006AH(1)10	208	10	40	1.9	0.6
10	22	B/3528-21	T540B226M010AH(1)10	22	8	80	1	0.3
10	33	B/3528-21	T540B336M010AH(1)10	33	8	80	1	0.3
10	100	D/7343-31	T540D107M010AH(1)20	100	10	25	2.4	0.8
10	100	D/7343-31	T540D107M010AH(1)10	100	10	55	1.7	0.5
10	150	D/7343-31	T540D157M010AH(1)20	150	10	25	2.4	0.8
10	150	D/7343-31	T540D157M010AH(1)10	150	10	55	1.7	0.5
10	220	D/7343-31	T540D227M010AH(1)10	220	10	25	2.4	0.8
16	47	D/7343-31	T540D476M016AH(1)20	76	10	35	2.1	0.7
16	47	D/7343-31	T540D476M016AH(1)10	76	10	65	1.5	0.5
16	68	D/7343-31	T540D686M016AH(1)10	109	10	75	1.4	0.5
16	100	D/7343-31	T540D107M016AH(1)10	160	10	50	1.7	0.6
20	22	D/7343-31	T540D226M020AH(1)10	44	10	75	1.4	0.5
20	33	D/7343-31	T540D336M020AH(1)10	66	10	75	1.4	0.5
20	47	D/7343-31	T540D476M020AH(1)10	94	10	75	1.4	0.5
25	6.8	C/6032-28	T540C685M025AH(1)10	17	10	150	0.9	0.3
25	10	C/6032-28	T540C106M025AH(1)10	25	10	150	0.9	0.3
25	15	D/7343-31	T540D156M025AH(1)20	38	10	75	1.4	0.5
25	15	D/7343-31	T540D156M025AH(1)10	38	10	100	1.2	0.4
25	22	D/7343-31	T540D226M025AH(1)10	55	10	75	1.4	0.5
25	33	D/7343-31	T540D336M025AH(1)10	83	10	75	1.4	0.5
35	15	D/7343-31	T540D156M035AH(1)20	53	10	75	1.4	0.5
35	15	D/7343-31	T540D156M035AH(1)10	53	10	100	1.2	0.4
50	10	D/7343-31	T540D106M050AH(1)20	50	10	100	1.2	0.4
50	10	D/7343-31	T540D106M050AH(1)10	50	10	125	1.1	0.4
63	4.7	D/7343-31	T540D475M063AH(1)20	30	10	100	1.8	0.5
63	4.7	D/7343-31	T540D475M063AH(1)10	30	10	120	1.1	0.3
V	μF	KEMET/EIA	(See below for part options)	(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	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	
$2\text{ V} \leq V_R \leq 10\text{ V}$	90% of V_R	V_R	60% of V_R	V_R
$12.5\text{ V} \leq V_R \leq 63\text{ V}$	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 Power Dissipation		
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)				
		Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S
A	3216-18	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
B	3528-21	2.35	2.21	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
C	6032-25	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
D	7343-31	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
L	6032-19	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
M	3528-15	2.35	2.20	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
H	7360-20	4.25	2.77	3.67	10.22	7.30	4.13	2.37	3.87	9.12	6.80	4.03	1.99	4.03	8.26	6.54
E ¹	7360-38	4.25	2.77	3.67	10.22	7.30	4.13	2.37	3.87	9.12	6.80	4.03	1.99	4.03	8.26	6.54
Q	7343-12	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
R ²	2012-12	1.05	1.83	0.15	4.82	2.50	0.93	1.50	0.22	3.72	2.00	0.83	1.12	0.38	2.86	1.74
S ²	3216-12	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
T	3528-12	2.35	2.20	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
U	6032-15	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
V	7343-20	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
W	7343-15	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
X ¹	7343-43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
Y ¹	7343-40	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

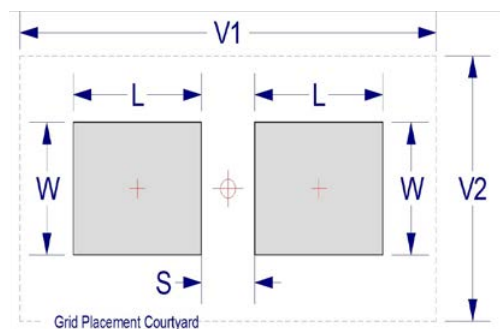
Density Level A: For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.

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

Density Level C: For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC-7351).

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

² Land pattern geometry is too small for silkscreen outline.



Soldering Process

KEMET’s families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET’s recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J–STD–020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

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

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. “Wiping” the edges of a chip and heating the top surface is not recommended.

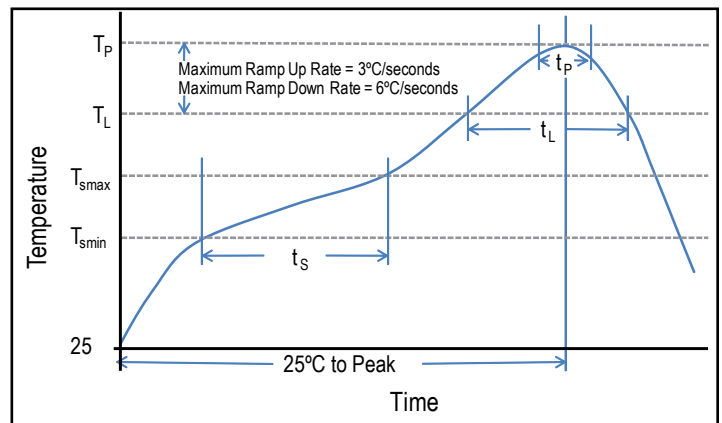
During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{smin})	100°C	150°C
Temperature Maximum (T_{smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax}	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_p)	3°C/seconds maximum	3°C/seconds maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_l)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_p)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_p)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_p to T_L)	6°C/seconds maximum	6°C/seconds maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

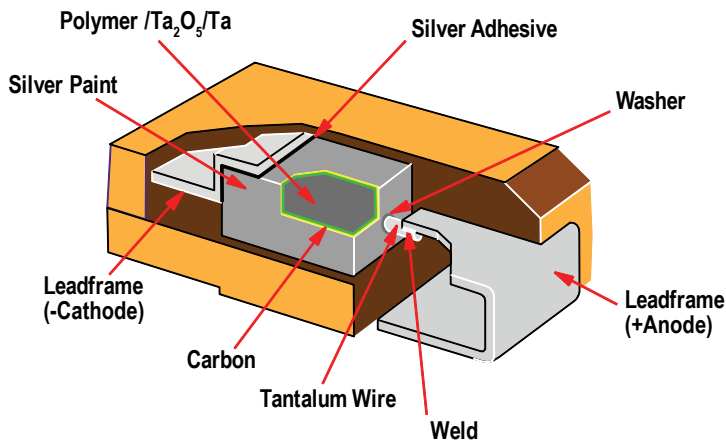
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.

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

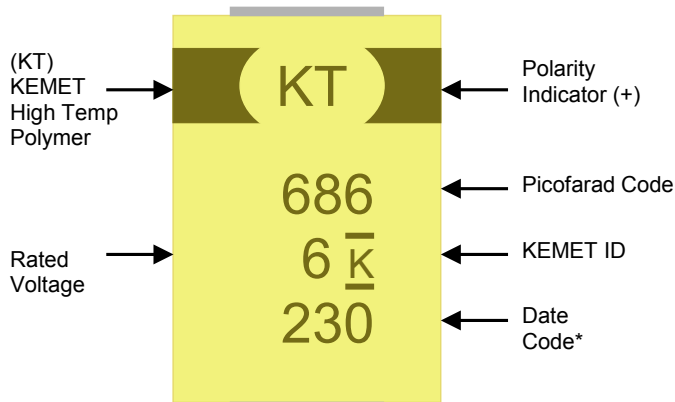
**Case Size A, B, C, H, I, K, M, R, S, T, U, V, W, and Z



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

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.

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

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 the Commercial Off-the-Shelf (COTS) requirements of defense and aerospace applications. This surface mount product offers a tin lead (SnPb) leadframe finish, surge current testing options and standard or low ESR levels.

Benefits

- 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
- Volumetric efficiency
- 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 = No Surge 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

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		+25°C	-55°C	+85°C	+125°C
		Δ C/C	IL*	±20%	±20%	±30%
		DF	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%/+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			
Additional Qualification Tests per MIL-PRF-55365/8	Please contact KEMET for more information.					

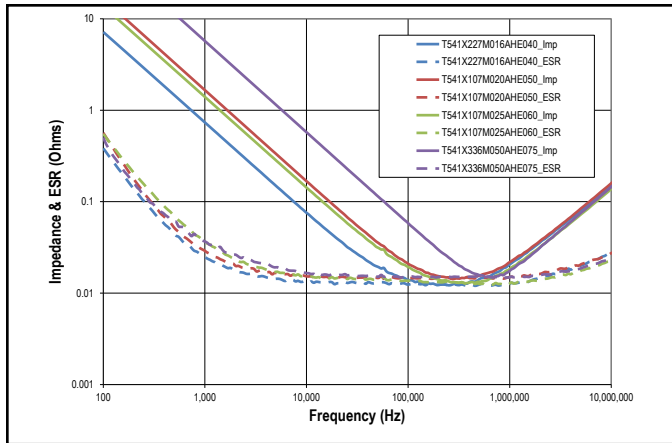
*IL = Initial limit

Certification

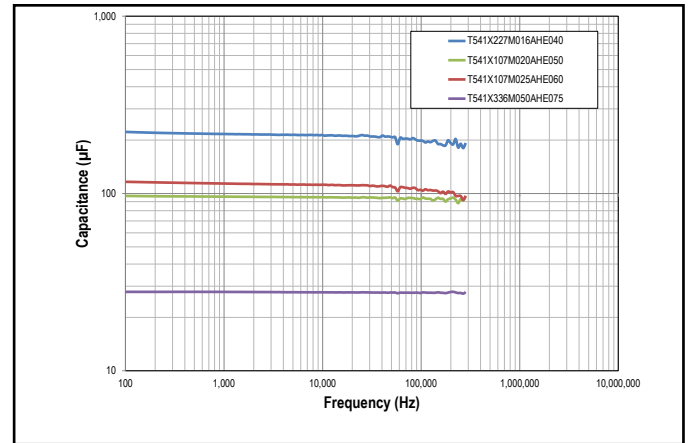
MIL-PRF-55365/8

Electrical Characteristics

ESR vs. Frequency

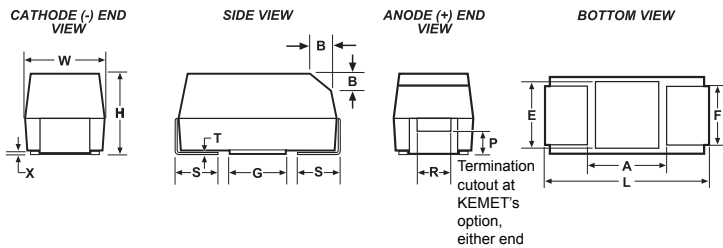


Capacitance vs. Frequency



Dimensions – Millimeters (Inches)

Metric will govern



Case Size		Component												
KEMET	EIA	L*	W*	H*	F* ±0.1 ±(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	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (A) 100 kHz	
							w/ΔT = 20°C @ -55°C to 105°C	w/ΔT = 2°C @ 125°C
V	μF	KEMET/EIA	(See below for part options)	(μA) @ 25°C Maximum	% @ 25°C 120 Hz Maximum	(mΩ) @ 25°C 100 kHz Maximum		
2.5	470	D/7343-31	T541D477M2R5AH(1)20	118	10	6	6.5	2.1
2.5	470	D/7343-31	T541D477M2R5AH(1)10	118	10	10	5.0	1.6
2.5	680	Y/7343-40	T541Y687M2R5AH(1)30	170	10	5	7.3	2.3
2.5	680	Y/7343-40	T541Y687M2R5AH(1)20	170	10	6	6.6	2.1
2.5	680	Y/7343-40	T541Y687M2R5AH(1)10	170	10	10	5.1	1.6
2.5	680	D/7343-31	T541D687M2R5AH(1)20	170	10	6	6.5	2.1
2.5	680	D/7343-31	T541D687M2R5AH(1)10	170	10	10	5.0	1.6
2.5	1000	X/7343-43	T541X108M2R5AH(1)30	250	10	5	7.3	2.4
2.5	1000	X/7343-43	T541X108M2R5AH(1)20	250	10	6	6.7	2.1
2.5	1000	X/7343-43	T541X108M2R5AH(1)10	250	10	10	5.2	1.7
2.5	1500	X/7343-43	T541X158M2R5AH(1)30	375	10	5	7.3	2.4
2.5	1500	X/7343-43	T541X158M2R5AH(1)20	375	10	6	6.7	2.1
2.5	1500	X/7343-43	T541X158M2R5AH(1)10	375	10	10	5.2	1.7
3	470	D/7343-31	T541D477M003AH(1)10	141	10	10	5.0	1.6
3	680	D/7343-31	T541D687M003AH(1)10	204	10	10	5.0	1.6
3	1000	X/7343-43	T541X108M003AH(1)10	300	10	10	5.2	1.7
3	1500	X/7343-43	T541X158M003AH(1)10	450	10	8	5.8	1.9
4	330	D/7343-31	T541D337M004AH(1)20	132	10	6	6.5	2.1
4	330	D/7343-31	T541D337M004AH(1)10	132	10	10	5.0	1.6
4	470	D/7343-31	T541D477M004AH(1)10	188	10	10	5.0	1.6
4	470	Y/7343-40	T541Y477M004AH(1)30	188	10	5	7.3	2.3
4	470	Y/7343-40	T541Y477M004AH(1)20	188	10	6	6.6	2.1
4	470	Y/7343-40	T541Y477M004AH(1)10	188	10	10	5.1	1.6
4	680	X/7343-43	T541X687M004AH(1)30	272	10	5	7.3	2.4
4	680	X/7343-43	T541X687M004AH(1)20	272	10	6	6.7	2.1
4	680	X/7343-43	T541X687M004AH(1)10	272	10	10	5.2	1.7
4	1000	X/7343-43	T541X108M004AH(1)20	400	10	6	6.7	2.1
4	1000	X/7343-43	T541X108M004AH(1)10	400	10	10	5.2	1.7
6.3	220	D/7343-31	T541D227M006AH(1)20	139	10	6	6.5	2.1
6.3	220	D/7343-31	T541D227M006AH(1)10	139	10	10	5.0	1.6
6.3	330	D/7343-31	T541D337M006AH(1)10	208	10	10	5.0	1.6
6.3	330	Y/7343-40	T541Y337M006AH(1)30	208	10	5	7.3	2.3
6.3	330	Y/7343-40	T541Y337M006AH(1)20	208	10	6	6.6	2.1
6.3	330	Y/7343-40	T541Y337M006AH(1)10	208	10	10	5.1	1.6
6.3	470	X/7343-43	T541X477M006AH(1)30	296	10	5	7.3	2.4
6.3	470	X/7343-43	T541X477M006AH(1)20	296	10	6	6.7	2.1
6.3	470	X/7343-43	T541X477M006AH(1)10	296	10	10	5.2	1.7
10	150	D/7343-31	T541D157M010AH(1)20	150	10	6	6.5	2.1
10	150	D/7343-31	T541D157M010AH(1)10	150	10	10	5.0	1.6
10	220	D/7343-31	T541D227M010AH(1)20	220	10	6	6.5	2.1
10	220	D/7343-31	T541D227M010AH(1)10	220	10	10	5.0	1.6
10	220	Y/7343-40	T541Y227M010AH(1)20	220	10	6	6.6	2.1
10	220	Y/7343-40	T541Y227M010AH(1)10	220	10	10	5.1	1.6
10	330	X/7343-43	T541X337M010AH(1)30	330	10	5	7.3	2.4
10	330	X/7343-43	T541X337M010AH(1)20	330	10	6	6.7	2.1
10	330	X/7343-43	T541X337M010AH(1)10	330	10	10	5.2	1.7
16	150	X/7343-43	T541X157M016AH(1)20	240	10	25	3.3	1.1
16	150	X/7343-43	T541X157M016AH(1)10	240	10	40	2.6	0.8
16	220	X/7343-43	T541X227M016AH(1)20	352	10	25	3.3	1.1
16	220	X/7343-43	T541X227M016AH(1)10	352	10	40	2.6	0.8
16	330	X/7343-43	T541X337M016AH(1)20	528	10	25	3.3	1.1
V	μF	KEMET/EIA	(See below for part options)	(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	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (A) 100 kHz	

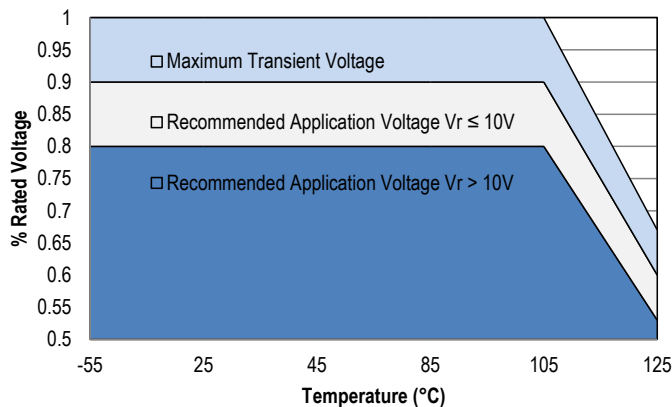
(1) To complete KEMET part number, insert 65 = None, 66 = 10 cycles +25°C, 67 = 10 cycles -55°C and +85°C. Designates surge current option. Please refer to Ordering Information for additional details.

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current (A) 100 kHz	
							w/ΔT = 20°C @ -55°C to 105°C	w/ΔT = 2°C @ 125°C
V	μF	KEMET/EIA	(See below for part options)	(μA) @ 25°C Maximum	% @ 25°C 120 Hz Maximum	(mΩ) @ 25°C 100 kHz Maximum		
16	330	X/7343-43	T541X337M016AH(1)10	528	10	50	2.3	0.7
20	100	X/7343-43	T541X107M020AH(1)10	200	10	50	2.3	0.7
25	68	X/7343-43	T541X686M025AH(1)10	170	10	50	2.3	0.7
25	100	X/7343-43	T541X107M025AH(1)10	250	10	60	2.1	0.7
35	33	X/7343-43	T541X336M035AH(1)10	116	10	60	2.1	0.7
35	47	X/7343-43	T541X476M035AH(1)10	165	10	60	2.1	0.7
50	22	X/7343-43	T541X226M050AH(1)10	110	10	75	1.9	0.6
50	33	X/7343-43	T541X336M050AH(1)10	165	10	75	1.9	0.6
63	10	X/7343-43	T541X106M063AH(1)10	63	10	150	1.5	0.5
63	10	X/7343-43	T541X106M063AH(1)20	63	10	100	1.6	0.5
63	10	X/7343-43	T541X106M063AH(1)30	63	10	75	1.9	0.6
63	15	X/7343-43	T541X156M063AH(1)10	95	10	50	2.3	0.8
V	μF	KEMET/EIA	(See below for part options)	(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	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)	
	-55°C to 105°C	105°C to 125°C	-55°C to 105°C	105°C to 125°C
2.5 V ≤ Vr ≤ 10 V	90% of Vr	Vr	60% of Vr	Vr
12.5 V ≤ Vr ≤ 63 V	80% of Vr	Vr	54% of Vr	Vr

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 Power Dissipation		
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)				
		Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S
A	3216-18	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
B	3528-21	2.35	2.21	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
C	6032-25	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
D	7343-31	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
L	6032-19	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
M	3528-15	2.35	2.20	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
H	7360-20	4.25	2.77	3.67	10.22	7.30	4.13	2.37	3.87	9.12	6.80	4.03	1.99	4.03	8.26	6.54
E ¹	7360-38	4.25	2.77	3.67	10.22	7.30	4.13	2.37	3.87	9.12	6.80	4.03	1.99	4.03	8.26	6.54
Q	7343-12	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
R ²	2012-12	1.05	1.83	0.15	4.82	2.50	0.93	1.50	0.22	3.72	2.00	0.83	1.12	0.38	2.86	1.74
S ²	3216-12	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
T	3528-12	2.35	2.20	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
U	6032-15	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
V	7343-20	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
W	7343-15	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
X ¹	7343-43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
Y ¹	7343-40	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

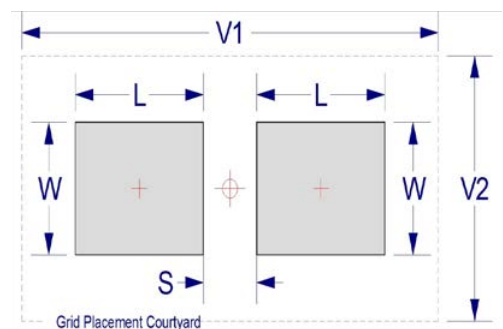
Density Level A: For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.

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

Density Level C: For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC-7351).

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

² Land pattern geometry is too small for silkscreen outline.



Soldering Process

KEMET's families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J-STD-020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

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

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. "Wiping" the edges of a chip and heating the top surface is not recommended.

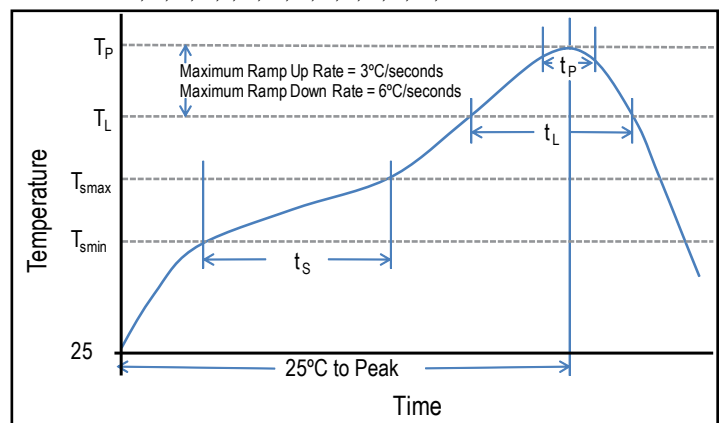
During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{smin})	100°C	150°C
Temperature Maximum (T_{smax})	150°C	200°C
Time (t_s) from T_{smin} to T_{smax}	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_p)	3°C/seconds maximum	3°C/seconds maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_p)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_p)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_p to T_L)	6°C/seconds maximum	6°C/seconds maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

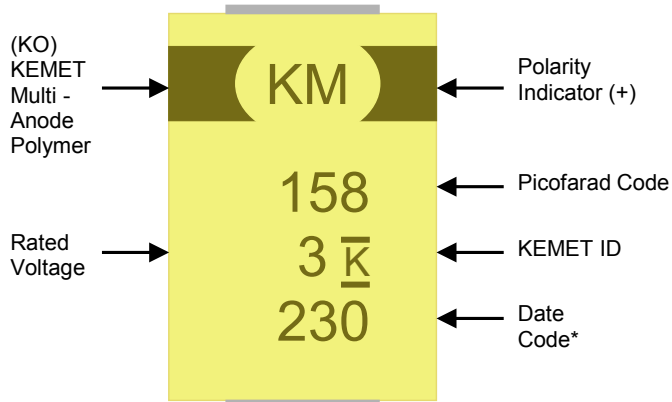
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.

*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



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

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.

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 Tantalum 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 481-1
- 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
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 = ±10% M = ±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

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	≤ 0.1 CV (µA) at rated voltage after 5 minutes

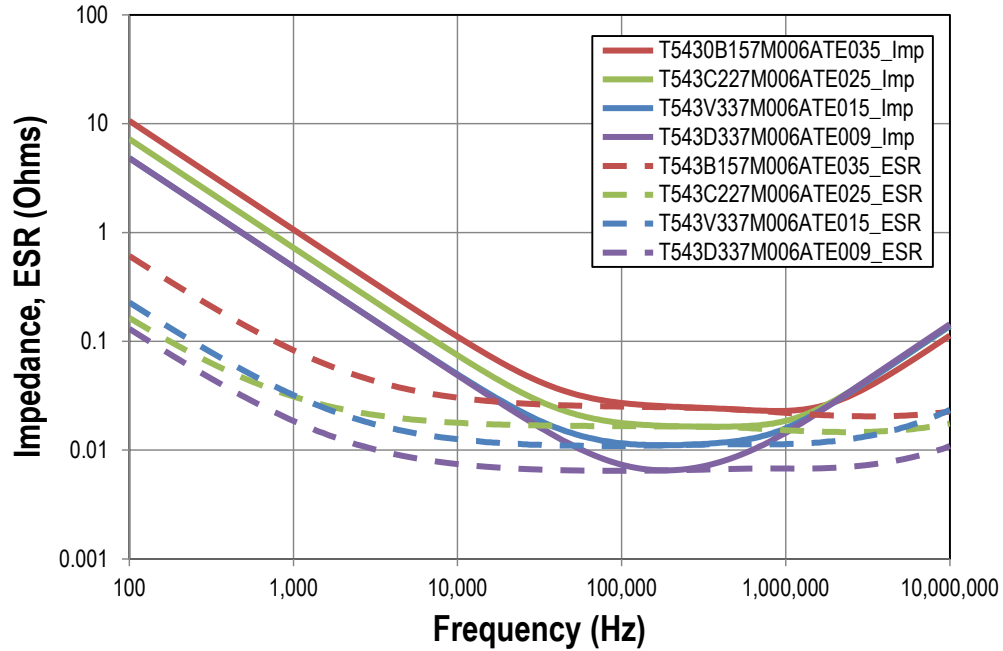
Qualification

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	+25°C	-55°C	+85°C	+105°C	
		Δ C/C	IL*	+/-20%	+/-20%	+/-30%
		DF	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, 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			

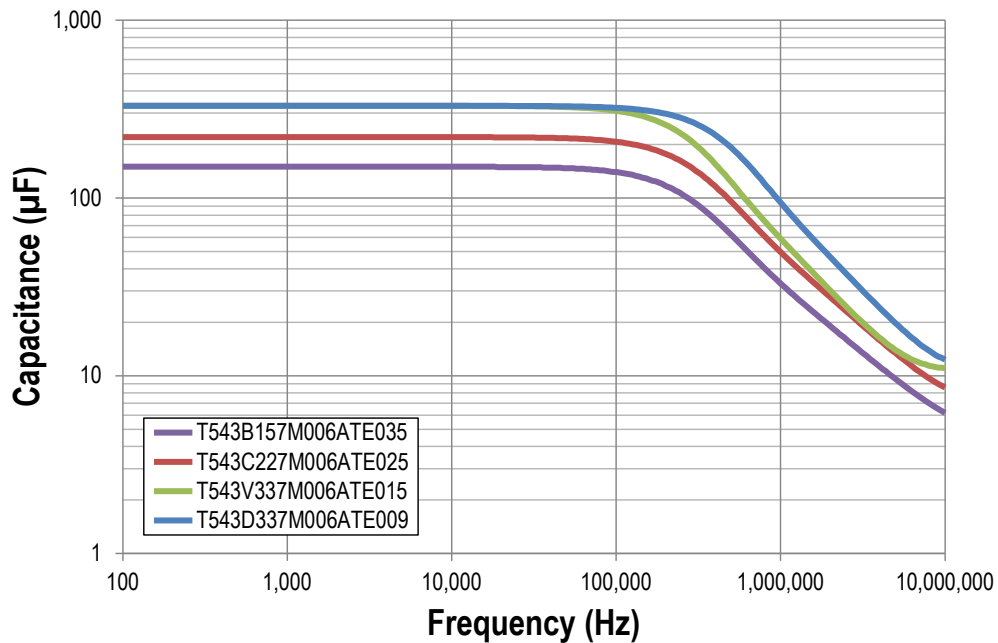
*IL = Initial limit

Electrical Characteristics

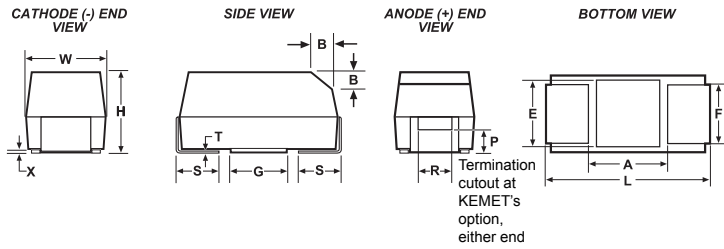
ESR vs. Frequency



Capacitance vs. Frequency



Dimensions – Millimeters



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 (0.150)	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 (0.150)	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 (0.150)	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 (0.150)	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)(4)	12	8	90	1116	105	3
2.5	56	T/3528-12	T543T566(1)2R5A(2)(3)(4)	14	8	40	1620	105	3
2.5	56	T/3528-12	T543T566(1)2R5A(2)(3)(4)	14	8	70	1225	105	3
2.5	68	A/3216-18	T543A686(1)2R5A(2)(3)(4)	17	8	70	1265	105	3
2.5	68	A/3216-18	T543A686(1)2R5A(2)(3)(4)	17	8	80	1183	105	3
2.5	100	T/3528-12	T543T107(1)2R5A(2)(3)(4)	25	8	40	1620	105	3
2.5	100	T/3528-12	T543T107(1)2R5A(2)(3)(4)	25	8	70	1225	105	3
2.5	100	T/3528-12	T543T107(1)2R5A(2)(3)(4)	25	8	80	1146	105	3
2.5	100	B/3528-21	T543B107(1)2R5A(2)(3)(4)	25	8	25	2254	105	3
2.5	100	B/3528-21	T543B107(1)2R5A(2)(3)(4)	25	8	35	1905	105	3
2.5	100	B/3528-21	T543B107(1)2R5A(2)(3)(4)	25	8	40	1782	105	3
2.5	100	B/3528-21	T543B107(1)2R5A(2)(3)(4)	25	8	70	1347	105	3
2.5	150	U/6032-15	T543U157(1)2R5A(2)(3)(4)	38	8	55	1567	105	3
2.5	220	B/3528-21	T543B227(1)2R5A(2)(3)(4)	55	8	25	2254	105	3
2.5	220	B/3528-21	T543B227(1)2R5A(2)(3)(4)	55	8	30	2058	105	3
2.5	220	B/3528-21	T543B227(1)2R5A(2)(3)(4)	55	8	35	1905	105	3
2.5	220	B/3528-21	T543B227(1)2R5A(2)(3)(4)	55	8	55	1520	105	3
2.5	220	B/3528-21	T543B227(1)2R5A(2)(3)(4)	55	8	70	1347	105	3
2.5	220	U/6032-15	T543U227(1)2R5A(2)(3)(4)	55	8	55	1567	105	3
2.5	220	C/6032-28	T543C227(1)2R5A(2)(3)(4)	55	8	25	2569	105	3
2.5	220	C/6032-28	T543C227(1)2R5A(2)(3)(4)	55	8	45	1915	105	3
2.5	220	W/7343-15	T543W227(1)2R5A(2)(3)(4)	55	10	25	2683	105	3
2.5	220	V/7343-20	T543V227(1)2R5A(2)(3)(4)	55	10	15	3531	105	3
2.5	220	V/7343-20	T543V227(1)2R5A(2)(3)(4)	55	10	25	2735	105	3
2.5	220	V/7343-20	T543V227(1)2R5A(2)(3)(4)	55	10	45	2039	105	3
2.5	220	D/7343-31	T543D227(1)2R5A(2)(3)(4)	55	10	40	2372	105	3
2.5	330	B/3528-21	T543B337(1)2R5A(2)(3)(4)	83	8	35	1905	105	3
2.5	330	B/3528-21	T543B337(1)2R5A(2)(3)(4)	83	8	45	1680	105	3
2.5	330	B/3528-21	T543B337(1)2R5A(2)(3)(4)	83	8	70	1347	105	3
2.5	330	L/6032-19	T543L337(1)2R5A(2)(3)(4)	83	8	12	3536	105	3
2.5	330	L/6032-19	T543L337(1)2R5A(2)(3)(4)	83	8	25	2449	105	3
2.5	330	C/6032-28	T543C337(1)2R5A(2)(3)(4)	83	8	15	3317	105	3
2.5	330	C/6032-28	T543C337(1)2R5A(2)(3)(4)	83	8	18	3028	105	3
2.5	330	C/6032-28	T543C337(1)2R5A(2)(3)(4)	83	8	25	2569	105	3
2.5	330	C/6032-28	T543C337(1)2R5A(2)(3)(4)	83	8	45	1915	105	3
2.5	330	W/7343-15	T543W337(1)2R5A(2)(3)(4)	83	10	15	3464	105	3
2.5	330	W/7343-15	T543W337(1)2R5A(2)(3)(4)	83	10	25	2683	105	3
2.5	330	W/7343-15	T543W337(1)2R5A(2)(3)(4)	83	10	40	2121	105	3
2.5	330	V/7343-20	T543V337(1)2R5A(2)(3)(4)	83	10	15	3531	105	3
2.5	330	V/7343-20	T543V337(1)2R5A(2)(3)(4)	83	10	18	3223	105	3
2.5	330	V/7343-20	T543V337(1)2R5A(2)(3)(4)	83	10	25	2735	105	3
2.5	330	V/7343-20	T543V337(1)2R5A(2)(3)(4)	83	10	40	2162	105	3
2.5	330	D/7343-31	T543D337(1)2R5A(2)(3)(4)	83	10	6	6124	105	3
2.5	330	D/7343-31	T543D337(1)2R5A(2)(3)(4)	83	10	7	5669	105	3
2.5	330	D/7343-31	T543D337(1)2R5A(2)(3)(4)	83	10	25	3000	105	3
2.5	470	C/6032-28	T543C477(1)2R5A(2)(3)(4)	118	8	25	2569	105	3
2.5	470	C/6032-28	T543C477(1)2R5A(2)(3)(4)	118	8	45	1915	105	3
2.5	470	V/7343-20	T543V477(1)2R5A(2)(3)(4)	118	10	18	3223	105	3
2.5	470	D/7343-31	T543D477(1)2R5A(2)(3)(4)	118	10	5	6708	105	3
2.5	470	D/7343-31	T543D477(1)2R5A(2)(3)(4)	118	10	6	6124	105	3
2.5	470	D/7343-31	T543D477(1)2R5A(2)(3)(4)	118	10	7	5669	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.
 (4) To complete KEMET part number, insert the ESR in mΩ, for example 50 mΩ = 050. Designates ESR 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)(4)	118	10	9	5000	105	3
2.5	470	D/7343-31	T543D477(1)2R5A(2)(3)(4)	118	10	10	4743	105	3
2.5	470	D/7343-31	T543D477(1)2R5A(2)(3)(4)	118	10	25	3000	105	3
2.5	560	D/7343-31	T543D567(1)2R5A(2)(3)(4)	140	10	5	6708	105	3
2.5	680	D/7343-31	T543D687(1)2R5A(2)(3)(4)	170	10	6	6124	105	3
2.5	680	D/7343-31	T543D687(1)2R5A(2)(3)(4)	170	10	10	4743	105	3
2.5	680	D/7343-31	T543D687(1)2R5A(2)(3)(4)	170	10	15	3873	105	3
2.5	680	D/7343-31	T543D687(1)2R5A(2)(3)(4)	170	10	40	2372	105	3
2.5	680	Y/7343-40	T543Y687(1)2R5A(2)(3)(4)	170	10	5	6943	105	3
2.5	680	Y/7343-40	T543Y687(1)2R5A(2)(3)(4)	170	10	6	6338	105	3
2.5	680	Y/7343-40	T543Y687(1)2R5A(2)(3)(4)	170	10	10	4909	105	3
2.5	680	Y/7343-40	T543Y687(1)2R5A(2)(3)(4)	170	10	15	4008	105	3
2.5	680	Y/7343-40	T543Y687(1)2R5A(2)(3)(4)	170	10	25	3105	105	3
2.5	680	X/7343-43	T543X687(1)2R5A(2)(3)(4)	170	10	6	6416	105	3
2.5	1000	Y/7343-40	T543Y108(1)2R5A(2)(3)(4)	250	10	5	6943	105	3
2.5	1000	Y/7343-40	T543Y108(1)2R5A(2)(3)(4)	250	10	6	6338	105	3
2.5	1000	Y/7343-40	T543Y108(1)2R5A(2)(3)(4)	250	10	10	4909	105	3
2.5	1000	Y/7343-40	T543Y108(1)2R5A(2)(3)(4)	250	10	15	4008	105	3
2.5	1000	Y/7343-40	T543Y108(1)2R5A(2)(3)(4)	250	10	25	3105	105	3
2.5	1000	X/7343-43	T543X108(1)2R5A(2)(3)(4)	250	10	5	7029	105	3
2.5	1000	X/7343-43	T543X108(1)2R5A(2)(3)(4)	250	10	6	6416	105	3
2.5	1000	X/7343-43	T543X108(1)2R5A(2)(3)(4)	250	10	10	4970	105	3
2.5	1500	X/7343-43	T543X158(1)2R5A(2)(3)(4)	375	10	5	7029	105	3
2.5	1500	X/7343-43	T543X158(1)2R5A(2)(3)(4)	375	10	10	4970	105	3
3	100	B/3528-21	T543B107(1)003A(2)(3)(4)	30	8	35	1905	105	3
3	100	B/3528-21	T543B107(1)003A(2)(3)(4)	30	8	40	1782	105	3
3	100	B/3528-21	T543B107(1)003A(2)(3)(4)	30	8	70	1347	105	3
3	100	B/3528-21	T543B107(1)003A(2)(3)(4)	30	8	80	1260	105	3
3	150	B/3528-21	T543B157(1)003A(2)(3)(4)	45	8	35	1905	105	3
3	150	B/3528-21	T543B157(1)003A(2)(3)(4)	45	8	40	1782	105	3
3	150	B/3528-21	T543B157(1)003A(2)(3)(4)	45	8	70	1347	105	3
3	150	B/3528-21	T543B157(1)003A(2)(3)(4)	45	8	80	1260	105	3
3	330	V/7343-20	T543V337(1)003A(2)(3)(4)	99	10	15	3531	105	3
3	330	V/7343-20	T543V337(1)003A(2)(3)(4)	99	10	25	2735	105	3
3	330	D/7343-31	T543D337(1)003A(2)(3)(4)	99	10	25	3000	105	3
3	470	D/7343-31	T543D477(1)003A(2)(3)(4)	141	10	10	4743	105	3
3	470	D/7343-31	T543D477(1)003A(2)(3)(4)	141	10	25	3000	105	3
3	680	D/7343-31	T543D687(1)003A(2)(3)(4)	204	10	10	4743	105	3
3	680	D/7343-31	T543D687(1)003A(2)(3)(4)	204	10	15	3873	105	3
3	680	D/7343-31	T543D687(1)003A(2)(3)(4)	204	10	25	3000	105	3
3	680	D/7343-31	T543D687(1)003A(2)(3)(4)	204	10	40	2372	105	3
3	1000	X/7343-43	T543X108(1)003A(2)(3)(4)	300	10	10	4970	105	3
3	1000	X/7343-43	T543X108(1)003A(2)(3)(4)	300	10	15	4058	105	3
3	1000	X/7343-43	T543X108(1)003A(2)(3)(4)	300	10	30	2869	105	3
3	1500	X/7343-43	T543X158(1)003A(2)(3)(4)	450	10	8	5557	105	3
4	15	T/3528-12	T543T156(1)004A(2)(3)(4)	6	8	100	1025	105	3
4	33	A/3216-18	T543A336(1)004A(2)(3)(4)	13	8	70	1265	105	3
4	33	A/3216-18	T543A336(1)004A(2)(3)(4)	13	8	80	1183	105	3
4	47	A/3216-18	T543A476(1)004A(2)(3)(4)	19	8	70	1265	105	3
4	47	A/3216-18	T543A476(1)004A(2)(3)(4)	19	8	80	1183	105	3
4	47	T/3528-12	T543T476(1)004A(2)(3)(4)	19	8	70	1225	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.
 (4) To complete KEMET part number, insert the ESR in mΩ, for example 50 mΩ = 050. Designates ESR 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	T/3528-12	T543T686(1)004A(2)(3)(4)	27	8	70	1225	105	3
4	68	T/3528-12	T543T686(1)004A(2)(3)(4)	27	8	80	1146	105	3
4	68	B/3528-21	T543B686(1)004A(2)(3)(4)	27	8	35	1905	105	3
4	68	B/3528-21	T543B686(1)004A(2)(3)(4)	27	8	40	1782	105	3
4	68	B/3528-21	T543B686(1)004A(2)(3)(4)	27	8	70	1347	105	3
4	68	B/3528-21	T543B686(1)004A(2)(3)(4)	27	8	80	1260	105	3
4	68	U/6032-15	T543U686(1)004A(2)(3)(4)	27	8	55	1567	105	3
4	100	A/3216-18	T543A107(1)004A(2)(3)(4)	40	8	150	864	105	3
4	100	A/3216-18	T543A107(1)004A(2)(3)(4)	40	8	200	748	105	3
4	100	T/3528-12	T543T107(1)004A(2)(3)(4)	40	8	70	1225	105	3
4	100	T/3528-12	T543T107(1)004A(2)(3)(4)	40	8	150	837	105	3
4	100	B/3528-21	T543B107(1)004A(2)(3)(4)	40	8	35	1905	105	3
4	100	B/3528-21	T543B107(1)004A(2)(3)(4)	40	8	40	1782	105	3
4	100	B/3528-21	T543B107(1)004A(2)(3)(4)	40	8	70	1347	105	3
4	100	B/3528-21	T543B107(1)004A(2)(3)(4)	40	8	80	1260	105	3
4	100	U/6032-15	T543U107(1)004A(2)(3)(4)	40	8	55	1567	105	3
4	150	B/3528-21	T543B157(1)004A(2)(3)(4)	60	8	35	1905	105	3
4	150	B/3528-21	T543B157(1)004A(2)(3)(4)	60	8	40	1782	105	3
4	150	B/3528-21	T543B157(1)004A(2)(3)(4)	60	8	70	1347	105	3
4	150	U/6032-15	T543U157(1)004A(2)(3)(4)	60	8	55	1567	105	3
4	150	C/6032-28	T543C157(1)004A(2)(3)(4)	60	8	25	3317	105	3
4	150	C/6032-28	T543C157(1)004A(2)(3)(4)	60	8	15	2569	105	3
4	150	C/6032-28	T543C157(1)004A(2)(3)(4)	60	8	45	1915	105	3
4	150	C/6032-28	T543C157(1)004A(2)(3)(4)	60	8	100	1285	105	3
4	150	V/7343-20	T543V157(1)004A(2)(3)(4)	60	10	15	3531	105	3
4	150	V/7343-20	T543V157(1)004A(2)(3)(4)	60	10	25	2735	105	3
4	220	B/3528-21	T543B227(1)004A(2)(3)(4)	88	8	35	1905	105	3
4	220	B/3528-21	T543B227(1)004A(2)(3)(4)	88	8	45	1680	105	3
4	220	B/3528-21	T543B227(1)004A(2)(3)(4)	88	8	70	1347	105	3
4	220	L/6032-19	T543L227(1)004A(2)(3)(4)	88	8	12	3536	105	3
4	220	L/6032-19	T543L227(1)004A(2)(3)(4)	88	8	25	2449	105	3
4	220	C/6032-28	T543C227(1)004A(2)(3)(4)	88	8	15	3317	105	3
4	220	C/6032-28	T543C227(1)004A(2)(3)(4)	88	8	18	3028	105	3
4	220	C/6032-28	T543C227(1)004A(2)(3)(4)	88	8	25	2569	105	3
4	220	C/6032-28	T543C227(1)004A(2)(3)(4)	88	8	45	1915	105	3
4	220	C/6032-28	T543C227(1)004A(2)(3)(4)	88	8	55	1732	105	3
4	220	W/7343-15	T543W227(1)004A(2)(3)(4)	88	10	25	2683	105	3
4	220	W/7343-15	T543W227(1)004A(2)(3)(4)	88	10	40	2121	105	3
4	220	V/7343-20	T543V227(1)004A(2)(3)(4)	88	10	15	3531	105	3
4	220	V/7343-20	T543V227(1)004A(2)(3)(4)	88	10	18	3223	105	3
4	220	V/7343-20	T543V227(1)004A(2)(3)(4)	88	10	25	2735	105	3
4	220	V/7343-20	T543V227(1)004A(2)(3)(4)	88	10	40	2162	105	3
4	220	V/7343-20	T543V227(1)004A(2)(3)(4)	88	10	45	2039	105	3
4	220	D/7343-31	T543D227(1)004A(2)(3)(4)	88	10	25	3000	105	3
4	220	D/7343-31	T543D227(1)004A(2)(3)(4)	88	10	65	1861	105	3
4	330	C/6032-28	T543C337(1)004A(2)(3)(4)	132	8	25	2569	105	3
4	330	C/6032-28	T543C337(1)004A(2)(3)(4)	132	8	45	1915	105	3
4	330	V/7343-20	T543V337(1)004A(2)(3)(4)	132	10	18	3223	105	3
4	330	V/7343-20	T543V337(1)004A(2)(3)(4)	132	10	25	2735	105	3
4	330	V/7343-20	T543V337(1)004A(2)(3)(4)	132	10	40	2162	105	3
4	330	D/7343-31	T543D337(1)004A(2)(3)(4)	132	10	5	6708	105	3
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.
 (4) To complete KEMET part number, insert the ESR in mΩ, for example 50 mΩ = 050. Designates ESR 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)(4)	132	10	6	6124	105	3
4	330	D/7343-31	T543D337(1)004A(2)(3)(4)	132	10	7	5669	105	3
4	330	D/7343-31	T543D337(1)004A(2)(3)(4)	132	10	9	5000	105	3
4	330	D/7343-31	T543D337(1)004A(2)(3)(4)	132	10	10	4743	105	3
4	330	D/7343-31	T543D337(1)004A(2)(3)(4)	132	10	12	4330	105	3
4	330	D/7343-31	T543D337(1)004A(2)(3)(4)	132	10	15	3873	105	3
4	330	D/7343-31	T543D337(1)004A(2)(3)(4)	132	10	25	3000	105	3
4	330	D/7343-31	T543D337(1)004A(2)(3)(4)	132	10	40	2372	105	3
4	330	D/7343-31	T543D337(1)004A(2)(3)(4)	132	10	45	2236	105	3
4	470	D/7343-31	T543D477(1)004A(2)(3)(4)	188	10	6	6124	105	3
4	470	D/7343-31	T543D477(1)004A(2)(3)(4)	188	10	10	4743	105	3
4	470	D/7343-31	T543D477(1)004A(2)(3)(4)	188	10	12	4330	105	3
4	470	D/7343-31	T543D477(1)004A(2)(3)(4)	188	10	15	3873	105	3
4	470	D/7343-31	T543D477(1)004A(2)(3)(4)	188	10	18	3536	105	3
4	470	D/7343-31	T543D477(1)004A(2)(3)(4)	188	10	25	3000	105	3
4	470	D/7343-31	T543D477(1)004A(2)(3)(4)	188	10	40	2372	105	3
4	470	Y/7343-40	T543Y477(1)004A(2)(3)(4)	188	10	5	6943	105	3
4	470	Y/7343-40	T543Y477(1)004A(2)(3)(4)	188	10	6	6338	105	3
4	470	Y/7343-40	T543Y477(1)004A(2)(3)(4)	188	10	10	4909	105	3
4	470	Y/7343-40	T543Y477(1)004A(2)(3)(4)	188	10	25	3105	105	3
4	470	Y/7343-40	T543Y477(1)004A(2)(3)(4)	188	10	40	2455	105	3
4	680	D-7343-31	T543D687(1)004A(2)(3)(4)	272	10	25	3000	105	3
4	680	Y/7343-40	T543Y687(1)004A(2)(3)(4)	272	10	5	6943	105	3
4	680	Y/7343-40	T543Y687(1)004A(2)(3)(4)	272	10	10	4909	105	3
4	680	Y/7343-40	T543Y687(1)004A(2)(3)(4)	272	10	15	4008	105	3
4	680	Y/7343-40	T543Y687(1)004A(2)(3)(4)	272	10	25	3105	105	3
4	680	X/7343-43	T543X687(1)004A(2)(3)(4)	272	10	5	7029	105	3
4	680	X/7343-43	T543X687(1)004A(2)(3)(4)	272	10	6	6416	105	3
4	680	X/7343-43	T543X687(1)004A(2)(3)(4)	272	10	10	4970	105	3
4	680	X/7343-43	T543X687(1)004A(2)(3)(4)	272	10	15	4058	105	3
4	680	X/7343-43	T543X687(1)004A(2)(3)(4)	272	10	35	2657	105	3
4	1000	X/7343-43	T543X108(1)004A(2)(3)(4)	400	10	6	6416	105	3
4	1000	X/7343-43	T543X108(1)004A(2)(3)(4)	400	10	10	4970	105	3
6.3	15	T/3528-12	T543T156(1)006A(2)(3)(4)	9	8	100	1025	105	3
6.3	22	A/3216-18	T543A226(1)006A(2)(3)(4)	14	8	90	1116	105	3
6.3	22	A/3216-18	T543A226(1)006A(2)(3)(4)	14	8	100	1058	105	3
6.3	33	A/3216-18	T543A336(1)006A(2)(3)(4)	21	8	70	1265	105	3
6.3	33	A/3216-18	T543A336(1)006A(2)(3)(4)	21	8	80	1183	105	3
6.3	33	A/3216-18	T543A336(1)006A(2)(3)(4)	21	8	120	966	105	3
6.3	33	T/3528-12	T543T336(1)006A(2)(3)(4)	21	8	70	1225	105	3
6.3	33	B/3528-21	T543B336(1)006A(2)(3)(4)	21	8	25	2254	105	3
6.3	33	B/3528-21	T543B336(1)006A(2)(3)(4)	21	8	35	1905	105	3
6.3	33	B/3528-21	T543B336(1)006A(2)(3)(4)	21	8	40	1782	105	3
6.3	33	B/3528-21	T543B336(1)006A(2)(3)(4)	21	8	70	1347	105	3
6.3	33	B/3528-21	T543B336(1)006A(2)(3)(4)	21	8	80	1260	105	3
6.3	33	C/6032-28	T543C336(1)006A(2)(3)(4)	21	8	100	1285	105	3
6.3	47	A/3216-18	T543A476(1)006A(2)(3)(4)	30	8	150	864	105	3
6.3	47	T/3528-12	T543T476(1)006A(2)(3)(4)	30	8	70	1225	105	3
6.3	47	T/3528-12	T543T476(1)006A(2)(3)(4)	30	8	80	1146	105	3
6.3	47	B/3528-21	T543B476(1)006A(2)(3)(4)	30	8	25	2254	105	3
6.3	47	B/3528-21	T543B476(1)006A(2)(3)(4)	30	8	35	1905	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.
 (4) To complete KEMET part number, insert the ESR in mΩ, for example 50 mΩ = 050. Designates ESR 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	47	B/3528-21	T543B476(1)006A(2)(3)(4)	30	8	40	1782	105	3
6.3	47	B/3528-21	T543B476(1)006A(2)(3)(4)	30	8	70	1347	105	3
6.3	47	B/3528-21	T543B476(1)006A(2)(3)(4)	30	8	80	1260	105	3
6.3	68	A/3216-18	T543A686(1)006A(2)(3)(4)	43	8	150	864	105	3
6.3	68	T/3528-12	T543T686(1)006A(2)(3)(4)	43	8	70	1225	105	3
6.3	68	T/3528-12	T543T686(1)006A(2)(3)(4)	43	8	150	837	105	3
6.3	68	B/3528-21	T543B686(1)006A(2)(3)(4)	43	8	25	2254	105	3
6.3	68	B/3528-21	T543B686(1)006A(2)(3)(4)	43	8	35	1905	105	3
6.3	68	B/3528-21	T543B686(1)006A(2)(3)(4)	43	8	40	1782	105	3
6.3	68	B/3528-21	T543B686(1)006A(2)(3)(4)	43	8	70	1347	105	3
6.3	68	B/3528-21	T543B686(1)006A(2)(3)(4)	43	8	80	1260	105	3
6.3	68	U/6032-15	T543U686(1)006A(2)(3)(4)	43	8	55	1567	105	3
6.3	68	U/6032-15	T543U686(1)006A(2)(3)(4)	43	8	70	1389	105	3
6.3	68	C/6032-28	T543C686(1)006A(2)(3)(4)	43	8	100	1285	105	3
6.3	100	T/3528-12	T543T107(1)006A(2)(3)(4)	63	8	70	1225	105	3
6.3	100	B/3528-21	T543B107(1)006A(2)(3)(4)	63	8	25	2254	105	3
6.3	100	B/3528-21	T543B107(1)006A(2)(3)(4)	63	8	35	1905	105	3
6.3	100	B/3528-21	T543B107(1)006A(2)(3)(4)	63	8	40	1782	105	3
6.3	100	B/3528-21	T543B107(1)006A(2)(3)(4)	63	8	45	1680	105	3
6.3	100	B/3528-21	T543B107(1)006A(2)(3)(4)	63	8	70	1347	105	3
6.3	100	U/6032-15	T543U107(1)006A(2)(3)(4)	63	8	55	1567	105	3
6.3	100	C/6032-28	T543C107(1)006A(2)(3)(4)	63	8	25	2569	105	3
6.3	100	C/6032-28	T543C107(1)006A(2)(3)(4)	63	8	45	1915	105	3
6.3	100	W/7343-15	T543W107(1)006A(2)(3)(4)	63	10	40	2121	105	3
6.3	100	V/7343-20	T543V107(1)006A(2)(3)(4)	63	10	15	3531	105	3
6.3	100	V/7343-20	T543V107(1)006A(2)(3)(4)	63	10	45	2039	105	3
6.3	120	B/3528-21	T543B127(1)006A(2)(3)(4)	76	8	35	1905	105	3
6.3	150	M/3528-15	T543M157(1)006A(2)(3)(4)	95	8	70	1309	105	3
6.3	150	M/3528-15	T543M157(1)006A(2)(3)(4)	95	8	150	894	105	3
6.3	150	B/3528-21	T543B157(1)006A(2)(3)(4)	95	8	25	2254	105	3
6.3	150	B/3528-21	T543B157(1)006A(2)(3)(4)	95	8	35	1905	105	3
6.3	150	B/3528-21	T543B157(1)006A(2)(3)(4)	95	8	45	1680	105	3
6.3	150	B/3528-21	T543B157(1)006A(2)(3)(4)	95	8	70	1347	105	3
6.3	150	U/6032-15	T543U157(1)006A(2)(3)(4)	95	8	45	1732	105	3
6.3	150	U/6032-15	T543U157(1)006A(2)(3)(4)	95	8	55	1567	105	3
6.3	150	L/6032-19	T543L157(1)006A(2)(3)(4)	95	8	12	3536	105	3
6.3	150	L/6032-19	T543L157(1)006A(2)(3)(4)	95	8	25	2449	105	3
6.3	150	C/6032-28	T543C157(1)006A(2)(3)(4)	95	8	15	3317	105	3
6.3	150	C/6032-28	T543C157(1)006A(2)(3)(4)	95	8	25	2569	105	3
6.3	150	C/6032-28	T543C157(1)006A(2)(3)(4)	95	8	45	1915	105	3
6.3	150	C/6032-28	T543C157(1)006A(2)(3)(4)	95	8	55	1732	105	3
6.3	150	W/7343-15	T543W157(1)006A(2)(3)(4)	95	10	25	2683	105	3
6.3	150	W/7343-15	T543W157(1)006A(2)(3)(4)	95	10	40	2121	105	3
6.3	150	V/7343-20	T543V157(1)006A(2)(3)(4)	95	10	15	3531	105	3
6.3	150	V/7343-20	T543V157(1)006A(2)(3)(4)	95	10	18	3223	105	3
6.3	150	V/7343-20	T543V157(1)006A(2)(3)(4)	95	10	25	2735	105	3
6.3	150	V/7343-20	T543V157(1)006A(2)(3)(4)	95	10	40	2162	105	3
6.3	150	V/7343-20	T543V157(1)006A(2)(3)(4)	95	10	45	2039	105	3
6.3	150	D/7343-31	T543D157(1)006A(2)(3)(4)	95	10	15	3873	105	3
6.3	150	D/7343-31	T543D157(1)006A(2)(3)(4)	95	10	25	3000	105	3
6.3	150	D/7343-31	T543D157(1)006A(2)(3)(4)	95	10	55	2023	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.
 (4) To complete KEMET part number, insert the ESR in mΩ, for example 50 mΩ = 050. Designates ESR 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	B/3528-21	T543B227(1)006A(2)(3)(4)	139	8	35	1905	105	3
6.3	220	B/3528-21	T543B227(1)006A(2)(3)(4)	139	8	45	1680	105	3
6.3	220	B/3528-21	T543B227(1)006A(2)(3)(4)	139	8	70	1347	105	3
6.3	220	C/6032-28	T543C227(1)006A(2)(3)(4)	139	8	15	3317	105	3
6.3	220	C/6032-28	T543C227(1)006A(2)(3)(4)	139	8	18	3028	105	3
6.3	220	C/6032-28	T543C227(1)006A(2)(3)(4)	139	8	25	2569	105	3
6.3	220	C/6032-28	T543C227(1)006A(2)(3)(4)	139	8	45	1915	105	3
6.3	220	V/7343-20	T543V227(1)006A(2)(3)(4)	139	10	18	3223	105	3
6.3	220	V/7343-20	T543V227(1)006A(2)(3)(4)	139	10	25	2735	105	3
6.3	220	V/7343-20	T543V227(1)006A(2)(3)(4)	139	10	40	2162	105	3
6.3	220	D/7343-31	T543D227(1)006A(2)(3)(4)	139	10	5	6708	105	3
6.3	220	D/7343-31	T543D227(1)006A(2)(3)(4)	139	10	6	6124	105	3
6.3	220	D/7343-31	T543D227(1)006A(2)(3)(4)	139	10	7	5669	105	3
6.3	220	D/7343-31	T543D227(1)006A(2)(3)(4)	139	10	9	5000	105	3
6.3	220	D/7343-31	T543D227(1)006A(2)(3)(4)	139	10	10	4743	105	3
6.3	220	D/7343-31	T543D227(1)006A(2)(3)(4)	139	10	15	3873	105	3
6.3	220	D/7343-31	T543D227(1)006A(2)(3)(4)	139	10	18	3536	105	3
6.3	220	D/7343-31	T543D227(1)006A(2)(3)(4)	139	10	25	3000	105	3
6.3	220	D/7343-31	T543D227(1)006A(2)(3)(4)	139	10	40	2372	105	3
6.3	220	D/7343-31	T543D227(1)006A(2)(3)(4)	139	10	50	2121	105	3
6.3	330	V/7343-20	T543V337(1)006A(2)(3)(4)	208	10	15	3531	105	3
6.3	330	V/7343-20	T543V337(1)006A(2)(3)(4)	208	10	18	3223	105	3
6.3	330	V/7343-20	T543V337(1)006A(2)(3)(4)	208	10	25	2735	105	3
6.3	330	V/7343-20	T543V337(1)006A(2)(3)(4)	208	10	40	2162	105	3
6.3	330	V/7343-20	T543V337(1)006A(2)(3)(4)	208	10	45	2039	105	3
6.3	330	D/7343-31	T543D337(1)006A(2)(3)(4)	208	10	6	6124	105	3
6.3	330	D/7343-31	T543D337(1)006A(2)(3)(4)	208	10	9	5000	105	3
6.3	330	D/7343-31	T543D337(1)006A(2)(3)(4)	208	10	10	4743	105	3
6.3	330	D/7343-31	T543D337(1)006A(2)(3)(4)	208	10	15	3873	105	3
6.3	330	D/7343-31	T543D337(1)006A(2)(3)(4)	208	10	18	3536	105	3
6.3	330	D/7343-31	T543D337(1)006A(2)(3)(4)	208	10	25	3000	105	3
6.3	330	D/7343-31	T543D337(1)006A(2)(3)(4)	208	10	40	2372	105	3
6.3	330	D/7343-31	T543D337(1)006A(2)(3)(4)	208	10	45	2236	105	3
6.3	330	Y/7343-40	T543Y337(1)006A(2)(3)(4)	208	10	5	6943	105	3
6.3	330	Y/7343-40	T543Y337(1)006A(2)(3)(4)	208	10	6	6338	105	3
6.3	330	Y/7343-40	T543Y337(1)006A(2)(3)(4)	208	10	10	4909	105	3
6.3	330	Y/7343-40	T543Y337(1)006A(2)(3)(4)	208	10	15	4008	105	3
6.3	330	Y/7343-40	T543Y337(1)006A(2)(3)(4)	208	10	25	3105	105	3
6.3	330	Y/7343-40	T543Y337(1)006A(2)(3)(4)	208	10	40	2455	105	3
6.3	470	W/7343-15	T543W477(1)006A(2)(3)(4)	296	10	55	1809	85	3
6.3	470	V/7343-20	T543V477(1)006A(2)(3)(4)	296	10	55	1844	85	3
6.3	470	D-7343-31	T543D477(1)006A(2)(3)(4)	296	10	15	3873	105	3
6.3	470	D-7343-31	T543D477(1)006A(2)(3)(4)	296	10	25	3000	105	3
6.3	470	D-7343-31	T543D477(1)006A(2)(3)(4)	296	10	30	2739	105	3
6.3	470	Y/7343-40	T543Y477(1)006A(2)(3)(4)	296	10	5	6943	105	3
6.3	470	Y/7343-40	T543Y477(1)006A(2)(3)(4)	296	10	10	4909	105	3
6.3	470	Y/7343-40	T543Y477(1)006A(2)(3)(4)	296	10	15	4008	105	3
6.3	470	Y/7343-40	T543Y477(1)006A(2)(3)(4)	296	10	18	3659	105	3
6.3	470	Y/7343-40	T543Y477(1)006A(2)(3)(4)	296	10	25	3105	105	3
6.3	470	Y/7343-40	T543Y477(1)006A(2)(3)(4)	296	10	35	2624	105	3
6.3	470	X/7343-43	T543X477(1)006A(2)(3)(4)	296	10	5	7029	105	3
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.
 (4) To complete KEMET part number, insert the ESR in mΩ, for example 50 mΩ = 050. Designates ESR 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	470	X/7343-43	T543X477(1)006A(2)(3)(4)	296	10	6	6416	105	3
6.3	470	X/7343-43	T543X477(1)006A(2)(3)(4)	296	10	10	4970	105	3
6.3	470	X/7343-43	T543X477(1)006A(2)(3)(4)	296	10	18	3704	105	3
6.3	470	X/7343-43	T543X477(1)006A(2)(3)(4)	296	10	35	2657	105	3
6.3	470	X/7343-43	T543X477(1)006A(2)(3)(4)	296	10	40	2485	105	3
6.3	680	X/7343-43	T543X687(1)006A(2)(3)(4)	428	10	10	4970	105	3
6.3	680	X/7343-43	T543X687(1)006A(2)(3)(4)	428	10	18	3704	105	3
6.3	1000	H/7360-20	T543H108(1)006A(2)(3)(4)	630	20	55	1844	85	4
6.3	1500	H/7360-20	T543H158(1)006A(2)(3)(4)	945	20	55	1844	85	4
8	33	T/3528-12	T543T336(1)008A(2)(3)(4)	26	8	70	1225	105	3
8	33	T/3528-12	T543T336(1)008A(2)(3)(4)	26	8	80	1146	105	3
8	33	B/3528-21	T543B336(1)008A(2)(3)(4)	26	8	25	2254	105	3
8	33	B/3528-21	T543B336(1)008A(2)(3)(4)	26	8	35	1905	105	3
8	33	B/3528-21	T543B336(1)008A(2)(3)(4)	26	8	40	1782	105	3
8	33	B/3528-21	T543B336(1)008A(2)(3)(4)	26	8	70	1347	105	3
8	33	U/6032-15	T543U336(1)008A(2)(3)(4)	26	8	70	1389	105	3
8	47	B/3528-21	T543B476(1)008A(2)(3)(4)	38	8	35	1905	105	3
8	47	B/3528-21	T543B476(1)008A(2)(3)(4)	38	8	70	1347	105	3
8	150	V/7343-20	T543V157(1)008A(2)(3)(4)	120	10	40	2162	105	3
8	150	D/7343-31	T543D157(1)008A(2)(3)(4)	120	10	25	3000	105	3
8	150	D/7343-31	T543D157(1)008A(2)(3)(4)	120	10	40	2372	105	3
8	150	D/7343-31	T543D157(1)008A(2)(3)(4)	120	10	55	2023	105	3
10	10	A/3216-18	T543A106(1)010A(2)(3)(4)	10	8	80	1183	105	3
10	15	A/3216-18	T543A156(1)010A(2)(3)(4)	15	8	80	1183	105	3
10	22	A/3216-18	T543A226(1)010A(2)(3)(4)	22	8	80	1183	105	3
10	22	B/3528-21	T543B226(1)010A(2)(3)(4)	22	8	80	1260	105	3
10	33	T/3528-12	T543T336(1)010A(2)(3)(4)	33	8	70	1225	105	3
10	33	T/3528-12	T543T336(1)010A(2)(3)(4)	33	8	80	1146	105	3
10	33	B/3528-21	T543B336(1)010A(2)(3)(4)	33	8	25	2254	105	3
10	33	B/3528-21	T543B336(1)010A(2)(3)(4)	33	8	35	1905	105	3
10	33	B/3528-21	T543B336(1)010A(2)(3)(4)	33	8	40	1782	105	3
10	33	B/3528-21	T543B336(1)010A(2)(3)(4)	33	8	70	1347	105	3
10	33	B/3528-21	T543B336(1)010A(2)(3)(4)	33	8	80	1260	105	3
10	33	U/6032-15	T543U336(1)010A(2)(3)(4)	33	8	70	1389	105	3
10	47	B/3528-21	T543B476(1)010A(2)(3)(4)	47	8	35	1905	105	3
10	47	B/3528-21	T543B476(1)010A(2)(3)(4)	47	8	70	1347	105	3
10	47	U/6032-15	T543U476(1)010A(2)(3)(4)	47	8	55	1567	105	3
10	47	C/6032-28	T543C476(1)010A(2)(3)(4)	47	8	100	1285	105	3
10	68	U/6032-15	T543U686(1)010A(2)(3)(4)	68	8	55	1567	105	3
10	68	C/6032-28	T543C686(1)010A(2)(3)(4)	68	8	45	1915	105	3
10	68	W/7343-15	T543W686(1)010A(2)(3)(4)	68	10	25	2683	105	3
10	68	W/7343-15	T543W686(1)010A(2)(3)(4)	68	10	40	2121	105	3
10	68	V/7343-20	T543V686(1)010A(2)(3)(4)	68	10	25	2735	105	3
10	68	V/7343-20	T543V686(1)010A(2)(3)(4)	68	10	40	2162	105	3
10	68	V/7343-20	T543V686(1)010A(2)(3)(4)	68	10	45	2039	105	3
10	68	V/7343-20	T543V686(1)010A(2)(3)(4)	68	10	60	1765	105	3
10	68	V/7343-20	T543V686(1)010A(2)(3)(4)	68	10	100	1367	105	3
10	68	D/7343-31	T543D686(1)010A(2)(3)(4)	68	10	100	1500	105	3
10	100	L/6032-19	T543L107(1)010A(2)(3)(4)	100	8	25	2449	105	3
10	100	C/6032-28	T543C107(1)010A(2)(3)(4)	100	8	25	2569	105	3
10	100	C/6032-28	T543C107(1)010A(2)(3)(4)	100	8	45	1915	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.
 (4) To complete KEMET part number, insert the ESR in mΩ, for example 50 mΩ = 050. Designates ESR 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	W/7343-15	T543W107(1)010A(2)(3)(4)	100	10	40	2121	105	3
10	100	V/7343-20	T543V107(1)010A(2)(3)(4)	100	10	18	3223	105	3
10	100	V/7343-20	T543V107(1)010A(2)(3)(4)	100	10	25	2735	105	3
10	100	V/7343-20	T543V107(1)010A(2)(3)(4)	100	10	45	2039	105	3
10	100	V/7343-20	T543V107(1)010A(2)(3)(4)	100	10	50	1934	105	3
10	100	D/7343-31	T543D107(1)010A(2)(3)(4)	100	10	18	3536	105	3
10	100	D/7343-31	T543D107(1)010A(2)(3)(4)	100	10	25	3000	105	3
10	100	D/7343-31	T543D107(1)010A(2)(3)(4)	100	10	55	2023	105	3
10	100	D/7343-31	T543D107(1)010A(2)(3)(4)	100	10	80	1677	105	3
10	150	C/6032-28	T543C157(1)010A(2)(3)(4)	150	8	55	1732	105	3
10	150	V/7343-20	T543V157(1)010A(2)(3)(4)	150	10	25	2735	105	3
10	150	V/7343-20	T543V157(1)010A(2)(3)(4)	150	10	40	2162	105	3
10	150	D/7343-31	T543D157(1)010A(2)(3)(4)	150	10	5	6708	105	3
10	150	D/7343-31	T543D157(1)010A(2)(3)(4)	150	10	6	6124	105	3
10	150	D/7343-31	T543D157(1)010A(2)(3)(4)	150	10	10	4743	105	3
10	150	D/7343-31	T543D157(1)010A(2)(3)(4)	150	10	15	3873	105	3
10	150	D/7343-31	T543D157(1)010A(2)(3)(4)	150	10	18	3536	105	3
10	150	D/7343-31	T543D157(1)010A(2)(3)(4)	150	10	25	3000	105	3
10	150	D/7343-31	T543D157(1)010A(2)(3)(4)	150	10	40	2372	105	3
10	150	D/7343-31	T543D157(1)010A(2)(3)(4)	150	10	55	2023	105	3
10	150	Y/7343-40	T543Y157(1)010A(2)(3)(4)	150	10	25	3105	105	3
10	150	Y/7343-40	T543Y157(1)010A(2)(3)(4)	150	10	18	3659	105	3
10	150	Y/7343-40	T543Y157(1)010A(2)(3)(4)	150	10	25	3105	105	3
10	220	V/7343-20	T543V227(1)010A(2)(3)(4)	220	10	25	2735	105	3
10	220	V/7343-20	T543V227(1)010A(2)(3)(4)	220	10	45	2039	105	3
10	220	D/7343-31	T543D227(1)010A(2)(3)(4)	220	10	6	6124	105	3
10	220	D/7343-31	T543D227(1)010A(2)(3)(4)	220	10	10	4743	105	3
10	220	D/7343-31	T543D227(1)010A(2)(3)(4)	220	10	18	3536	105	3
10	220	D/7343-31	T543D227(1)010A(2)(3)(4)	220	10	25	3000	105	3
10	220	D/7343-31	T543D227(1)010A(2)(3)(4)	220	10	40	2372	105	3
10	220	Y/7343-40	T543Y227(1)010A(2)(3)(4)	220	10	6	6338	105	3
10	220	Y/7343-40	T543Y227(1)010A(2)(3)(4)	220	10	10	4909	105	3
10	220	Y/7343-40	T543Y227(1)010A(2)(3)(4)	220	10	40	2455	105	3
10	330	Y/7343-40	T543Y337(1)010A(2)(3)(4)	330	10	15	4008	105	3
10	330	Y/7343-40	T543Y337(1)010A(2)(3)(4)	330	10	35	2624	105	3
10	330	X/7343-43	T543X337(1)010A(2)(3)(4)	330	10	5	7029	105	3
10	330	X/7343-43	T543X337(1)010A(2)(3)(4)	330	10	6	6416	105	3
10	330	X/7343-43	T543X337(1)010A(2)(3)(4)	330	10	10	4970	105	3
10	330	X/7343-43	T543X337(1)010A(2)(3)(4)	330	10	25	3143	105	3
10	330	X/7343-43	T543X337(1)010A(2)(3)(4)	330	10	40	2485	105	3
12.5	10	T/3528-12	T543T106(1)12RA(2)(3)(4)	13	8	150	837	105	3
12.5	15	T/3528-12	T543T156(1)12RA(2)(3)(4)	19	8	80	1146	105	3
12.5	330	X/7343-43	T543X337(1)12RA(2)(3)(4)	413	10	15	4058	105	3
16	10	B/3528-21	T543B106(1)016A(2)(3)(4)	16	8	100	1127	105	3
16	22	C/6032-28	T543C226(1)016A(2)(3)(4)	35	8	80	1436	105	3
16	33	W/7343-15	T543W336(1)016A(2)(3)(4)	53	10	45	2000	105	3
16	33	V/7343-20	T543V336(1)016A(2)(3)(4)	53	10	45	2039	105	3
16	33	V/7343-20	T543V336(1)016A(2)(3)(4)	53	10	60	1765	105	3
16	33	V/7343-20	T543V336(1)016A(2)(3)(4)	53	10	70	1634	105	3
16	47	W/7343-15	T543W476(1)016A(2)(3)(4)	75	10	45	2000	105	3
16	47	V/7343-20	T543V476(1)016A(2)(3)(4)	75	10	45	2039	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.
 (4) To complete KEMET part number, insert the ESR in mΩ, for example 50 mΩ = 050. Designates ESR 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	47	V/7343-20	T543V476(1)016A(2)(3)(4)	75	10	70	1634	105	3
16	47	V/7343-20	T543V476(1)016A(2)(3)(4)	75	10	80	1529	105	3
16	47	D/7343-31	T543D476(1)016A(2)(3)(4)	75	10	35	2535	105	3
16	47	D/7343-31	T543D476(1)016A(2)(3)(4)	75	10	65	1861	105	3
16	47	D/7343-31	T543D476(1)016A(2)(3)(4)	75	10	70	1793	105	3
16	68	V/7343-20	T543V686(1)016A(2)(3)(4)	109	10	50	1934	105	3
16	68	V/7343-20	T543V686(1)016A(2)(3)(4)	109	10	90	1441	105	3
16	100	V/7343-20	T543V107(1)016A(2)(3)(4)	160	10	50	1934	105	3
16	100	D/7343-31	T543D107(1)016A(2)(3)(4)	160	10	35	2535	105	3
16	100	D/7343-31	T543D107(1)016A(2)(3)(4)	160	10	50	2121	105	3
16	150	X/7343-43	T543X157(1)016A(2)(3)(4)	240	10	15	4058	105	3
16	150	X/7343-43	T543X157(1)016A(2)(3)(4)	240	10	25	3143	105	3
16	150	X/7343-43	T543X157(1)016A(2)(3)(4)	240	10	40	2485	105	3
16	150	X/7343-43	T543X157(1)016A(2)(3)(4)	240	10	80	1757	105	3
16	220	X/7343-43	T543X227(1)016A(2)(3)(4)	352	10	35	2657	105	3
16	220	X/7343-43	T543X227(1)016A(2)(3)(4)	352	10	80	1757	105	3
16	330	X/7343-43	T543X337(1)016A(2)(3)(4)	528	10	25	3143	105	3
16	330	X/7343-43	T543X337(1)016A(2)(3)(4)	528	10	50	2223	105	3
20	22	V/7343-20	T543V226(1)020A(2)(3)(4)	44	10	40	2162	105	3
20	22	V/7343-20	T543V226(1)020A(2)(3)(4)	44	10	45	2039	105	3
20	22	V/7343-20	T543V226(1)020A(2)(3)(4)	44	10	90	1441	105	3
20	22	D/7343-31	T543D226(1)020A(2)(3)(4)	44	10	40	2372	105	3
20	22	D/7343-31	T543D226(1)020A(2)(3)(4)	44	10	45	2236	105	3
20	22	D/7343-31	T543D226(1)020A(2)(3)(4)	44	10	90	1581	105	3
20	33	D/7343-31	T543D336(1)020A(2)(3)(4)	66	10	60	1936	105	3
20	47	V/7343-20	T543V476(1)020A(2)(3)(4)	94	10	55	1844	105	3
20	47	V/7343-20	T543V476(1)020A(2)(3)(4)	94	10	90	1441	105	3
20	47	D/7343-31	T543D476(1)020A(2)(3)(4)	94	10	55	2023	105	3
20	100	X/7343-43	T543X107(1)020A(2)(3)(4)	200	10	35	2657	105	3
20	100	X/7343-43	T543X107(1)020A(2)(3)(4)	200	10	50	2223	105	3
25	15	V/7343-20	T543V156(1)025A(2)(3)(4)	38	10	90	1441	105	3
25	15	D/7343-31	T543D156(1)025A(2)(3)(4)	38	10	60	1936	105	3
25	15	D/7343-31	T543D156(1)025A(2)(3)(4)	38	10	80	1677	105	3
25	22	V/7343-20	T543V226(1)025A(2)(3)(4)	55	10	60	1765	105	3
25	22	V/7343-20	T543V226(1)025A(2)(3)(4)	55	10	90	1441	105	3
25	33	V/7343-20	T543V336(1)025A(2)(3)(4)	83	10	60	1765	105	3
25	33	D/7343-31	T543D336(1)025A(2)(3)(4)	83	10	60	1936	105	3
25	68	X/7343-43	T543X686(1)025A(2)(3)(4)	170	10	35	2657	105	3
25	68	X/7343-43	T543X686(1)025A(2)(3)(4)	170	10	50	2223	105	3
25	100	X/7343-43	T543X107(1)025A(2)(3)(4)	250	10	60	2029	105	3
35	15	V/7343-20	T543V156(1)035A(2)(3)(4)	53	10	100	1367	105	3
35	15	V/7343-20	T543V156(1)035A(2)(3)(4)	53	10	125	1223	105	3
35	15	D/7343-31	T543D156(1)035A(2)(3)(4)	53	10	100	1500	105	3
35	15	D/7343-31	T543D156(1)035A(2)(3)(4)	53	10	125	1342	105	3
35	33	X/7343-43	T543X336(1)035A(2)(3)(4)	116	10	65	1949	105	3
35	47	X/7343-43	T543X476(1)035A(2)(3)(4)	165	10	30	2869	105	3
35	47	X/7343-43	T543X476(1)035A(2)(3)(4)	165	10	60	2029	105	3
50	5.6	D/7343-31	T543D565(1)050A(2)(3)(4)	28	10	70	1793	105	3
50	5.6	D/7343-31	T543D565(1)050A(2)(3)(4)	28	10	90	1581	105	3
50	10	D/7343-31	T543D106(1)050A(2)(3)(4)	50	10	90	1581	105	3
50	12	X/7343-43	T543X126(1)050A(2)(3)(4)	60	10	45	2343	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.
 (4) To complete KEMET part number, insert the ESR in mΩ, for example 50 mΩ = 050. Designates ESR option.
 Refer to Ordering Information for additional detail.

Table 1 – Ratings & Part Number Reference cont'd

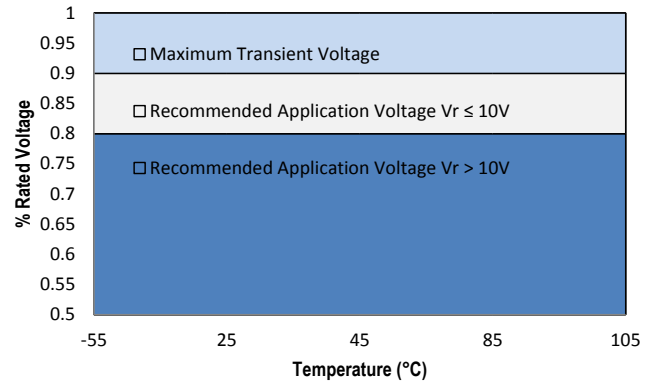
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	Rated Temp	Moisture Sensitivity
V	μF	KEMET/EIA	(See below for part options)	(μA) @ V _R , 20°C Maximum/ 5 Minutes	% @ 20°C 120 Hz Maximum	(mΩ) @ 20°C 100 kHz Maximum	(mA) 45°C 100 kHz	(°C)	Temperature ≤ 260°C
50	12	X/7343-43	T543X126(1)050A(2)(3)(4)	60	10	70	1878	105	3
50	18	X/7343-43	T543X186(1)050A(2)(3)(4)	90	10	35	2657	105	3
50	18	X/7343-43	T543X186(1)050A(2)(3)(4)	90	10	70	1878	105	3
50	22	X/7343-43	T543X226(1)050A(2)(3)(4)	110	10	40	2485	105	3
50	22	X/7343-43	T543X226(1)050A(2)(3)(4)	110	10	75	1815	105	3
50	33	X/7343-43	T543X336(1)050A(2)(3)(4)	165	10	40	2485	105	3
50	33	X/7343-43	T543X336(1)050A(2)(3)(4)	165	10	75	1815	105	3
50	10	D/7343-31	T543D106(1)050A(2)(3)(4)	50	10	100	1572	105	3
50	10	D/7343-31	T543D106(1)050A(2)(3)(4)	50	10	120	1435	105	3
50	18	X/7343-43	T543X186(1)050A(2)(3)(4)	90	10	70	1878	105	3
63	4.7	D/7343-31	T543D475(1)063A(2)(3)(4)	30	10	100	1572	105	3
63	4.7	D/7343-31	T543D475(1)063A(2)(3)(4)	30	10	120	1435	105	3
63	10	X/7343-43	T543X106(1)063A(2)(3)(4)	63	10	50	2223	105	3
63	10	X/7343-43	T543X106(1)063A(2)(3)(4)	63	10	75	1815	105	3
63	10	X/7343-43	T543X106(1)063A(2)(3)(4)	63	10	100	1572	105	3
63	10	X/7343-43	T543X106(1)063A(2)(3)(4)	63	10	150	1283	105	3
63	15	X/7343-43	T543X156(1)063A(2)(3)(4)	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.
 (4) To complete KEMET part number, insert the ESR in mΩ, for example 50 mΩ = 050. Designates ESR option.
 Refer to Ordering Information for additional detail.

Derating Guidelines

Voltage Rating	Maximum Recommended Steady State Voltage	Maximum Recommended Transient Voltage (1 ms – 1 μs)
-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 Power Dissipation		
$T \leq 45^\circ\text{C}$	$45^\circ\text{C} < T \leq 85^\circ\text{C}$	$85^\circ\text{C} < T \leq 125^\circ\text{C}$
1.00	0.70	0.25

T = Environmental Temperature

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)				
		Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S
A	3216-18	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
B	3528-21	2.35	2.21	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
C	6032-25	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
D	7343-31	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
L	6032-19	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
M	3528-15	2.35	2.20	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
H	7360-20	4.25	2.77	3.67	10.22	7.30	4.13	2.37	3.87	9.12	6.80	4.03	1.99	4.03	8.26	6.54
E ¹	7360-38	4.25	2.77	3.67	10.22	7.30	4.13	2.37	3.87	9.12	6.80	4.03	1.99	4.03	8.26	6.54
Q	7343-12	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
R ²	2012-12	1.05	1.83	0.15	4.82	2.50	0.93	1.50	0.22	3.72	2.00	0.83	1.12	0.38	2.86	1.74
S ²	3216-12	1.35	2.20	0.62	6.02	2.80	1.23	1.80	0.82	4.92	2.30	1.13	1.42	0.98	4.06	2.04
T	3528-12	2.35	2.20	0.92	6.32	4.00	2.23	1.80	1.12	5.22	3.50	2.13	1.42	1.28	4.36	3.24
U	6032-15	2.35	2.77	2.37	8.92	4.50	2.23	2.37	2.57	7.82	4.00	2.13	1.99	2.73	6.96	3.74
V	7343-20	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
W	7343-15	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
X ¹	7343-43	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84
Y ¹	7343-40	2.55	2.77	3.67	10.22	5.60	2.43	2.37	3.87	9.12	5.10	2.33	1.99	4.03	8.26	4.84

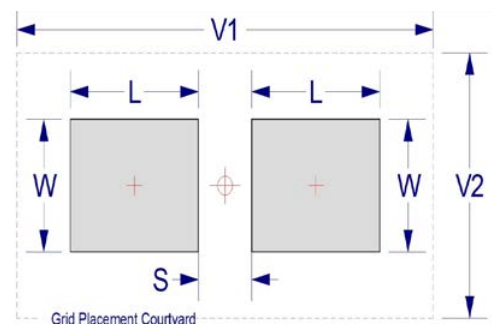
Density Level A: For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.

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

Density Level C: For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC-7351).

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

² Land pattern geometry is too small for silkscreen outline.



Soldering Process

KEMET's families of surface mount capacitors are compatible with wave (single or dual), convection, IR, or vapor phase reflow techniques. Preheating of these components is recommended to avoid extreme thermal stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the IPC/J-STD-020D standard for moisture sensitivity testing. The devices can safely withstand a maximum of three reflow passes at these conditions.

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

Hand soldering should be performed with care due to the difficulty in process control. If performed, care should be taken to avoid contact of the soldering iron to the molded case. The iron should be used to heat the solder pad, applying solder between the pad and the termination, until reflow occurs. Once reflow occurs, the iron should be removed immediately. "Wiping" the edges of a chip and heating the top surface is not recommended.

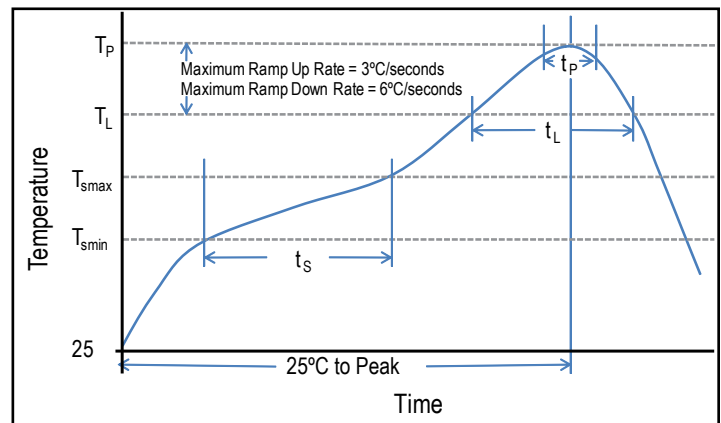
During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and not harmful to the product. Marking permanency is not affected by this change.

Profile Feature	SnPb Assembly	Pb-Free Assembly
Preheat/Soak		
Temperature Minimum (T_{Smin})	100°C	150°C
Temperature Maximum (T_{Smax})	150°C	200°C
Time (t_s) from T_{Smin} to T_{Smax}	60 – 120 seconds	60 – 120 seconds
Ramp-up Rate (T_L to T_P)	3°C/seconds maximum	3°C/seconds maximum
Liquidous Temperature (T_L)	183°C	217°C
Time Above Liquidous (t_L)	60 – 150 seconds	60 – 150 seconds
Peak Temperature (T_P)	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum Peak Temperature (t_p)	20 seconds maximum	30 seconds maximum
Ramp-down Rate (T_P to T_L)	6°C/seconds maximum	6°C/seconds maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

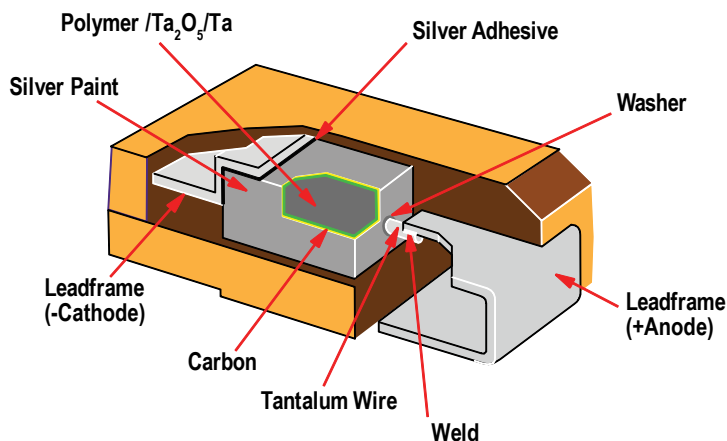
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.

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

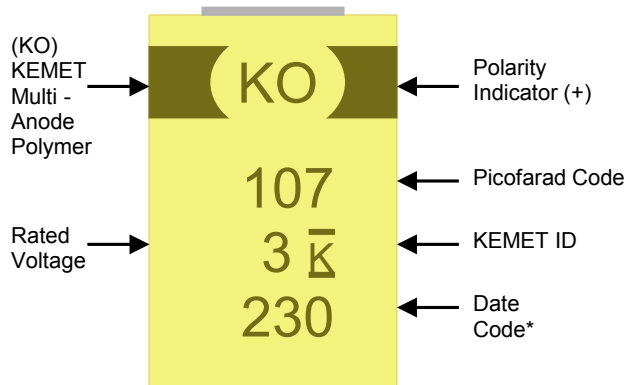
**Case Size A, B, C, H, I, K, M, R, S, T, U, V, W, and Z



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

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.

Tape & Reel Packaging Information

KEMET's molded tantalum and aluminum chip capacitor families are packaged in 8 and 12 mm plastic tape on 7" and 13" reels in accordance with *EIA Standard 481-1: Embossed Carrier Taping of Surface Mount Components for Automatic Handling*. This packaging system is compatible with all tape-fed automatic pick-and-place systems.

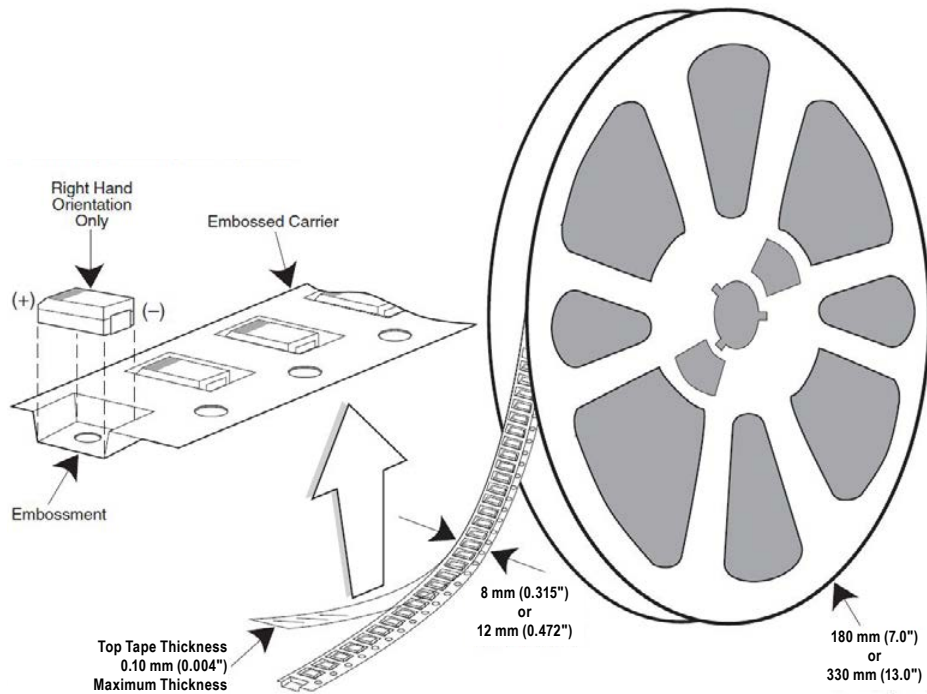


Table 3 – Packaging Quantity

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

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

Figure 1 – Embossed (Plastic) Carrier Tape Dimensions

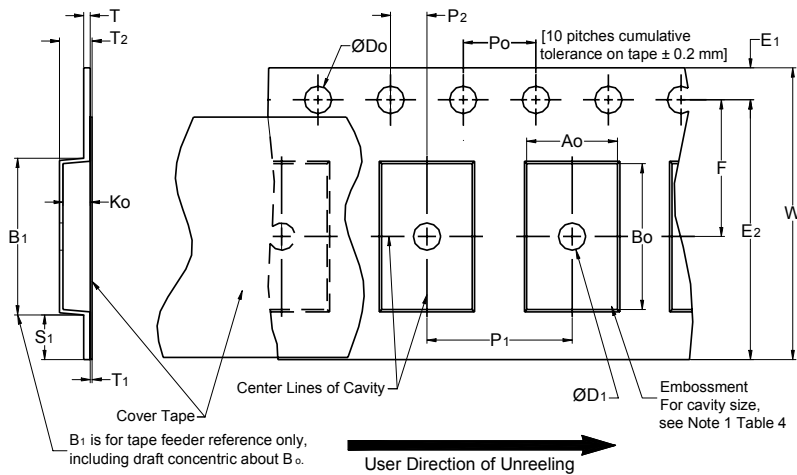


Table 4 – Embossed (Plastic) Carrier Tape Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)									
Tape Size	D_0	D_1 Minimum Note 1	E_1	P_0	P_2	R Reference Note 2	S_1 Minimum Note 3	T Maximum	T_1 Maximum
8 mm	1.5 +0.10/-0.0 (0.059 +0.004/-0.0)	1.0 (0.039)	1.75 ±0.10 (0.069 ±0.004)	4.0 ±0.10 (0.157 ±0.004)	2.0 ±0.05 (0.079 ±0.002)	25.0 (0.984)	0.600 (0.024)	0.600 (0.024)	0.100 (0.004)
12 mm		1.5 (0.059)				30 (1.181)			
16 mm									
Variable Dimensions — Millimeters (Inches)									
Tape Size	Pitch	B_1 Maximum Note 4	E_2 Minimum	F	P_1	T_2 Maximum	W Maximum	A_0, B_0 & K_0	
8 mm	Single (4 mm)	4.35 (0.171)	6.25 (0.246)	3.5 ±0.05 (0.138 ±0.002)	4.0 ±0.10 (0.157 ±0.004)	2.5 (0.098)	8.3 (0.327)	Note 5	
12 mm	Single (4 mm) & Double (8 mm)	8.2 (0.323)	10.25 (0.404)	5.5 ±0.05 (0.217 ±0.002)	8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	12.3 (0.484)		
16 mm	Triple (12 mm)	12.1 (0.476)	14.25 (0.561)	5.5 ±0.05 (0.217 ±0.002)	8.0 ±0.10 (0.315 ±0.004)	4.6 (0.181)	16.3 (0.642)		

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

Packaging Information Performance Notes

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

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

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

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

Figure 2 – Maximum Component Rotation

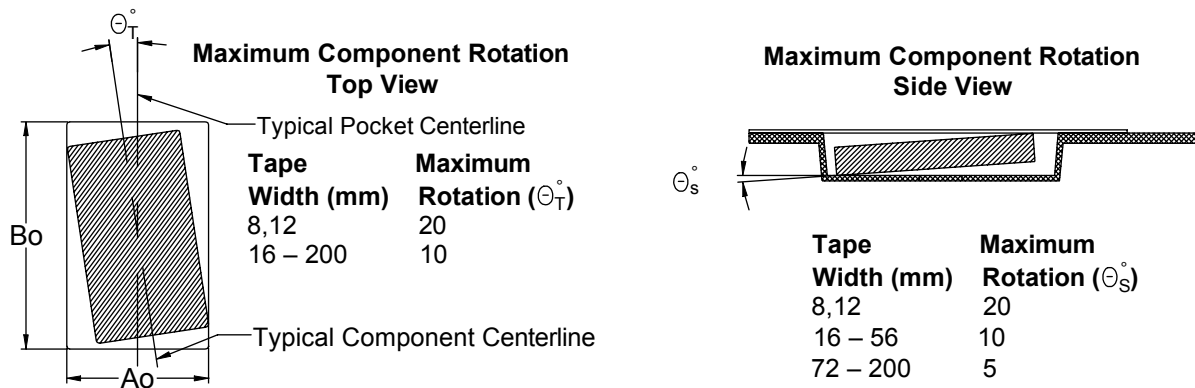


Figure 3 – Maximum Lateral Movement

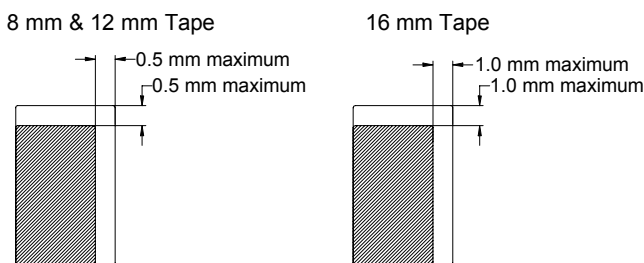


Figure 4 – Bending Radius

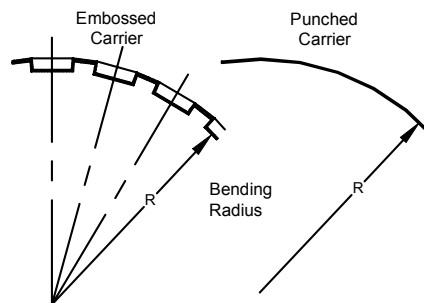


Figure 5 – Reel Dimensions

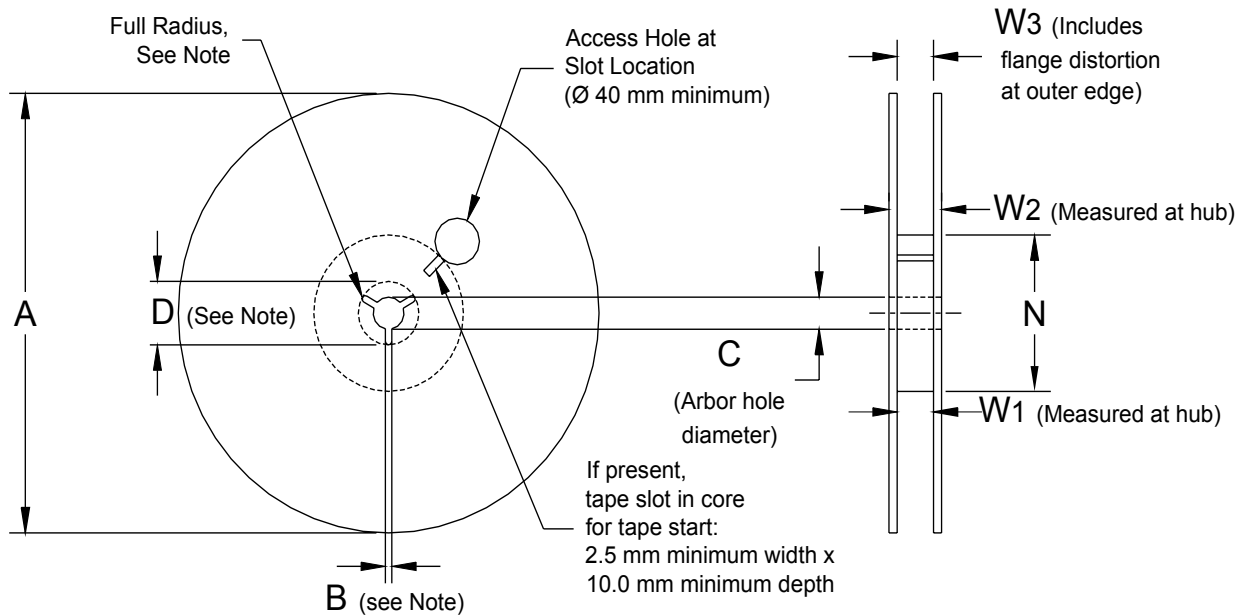


Table 5 – Reel Dimensions

Metric will govern

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

Figure 6 – Tape Leader & Trailer Dimensions

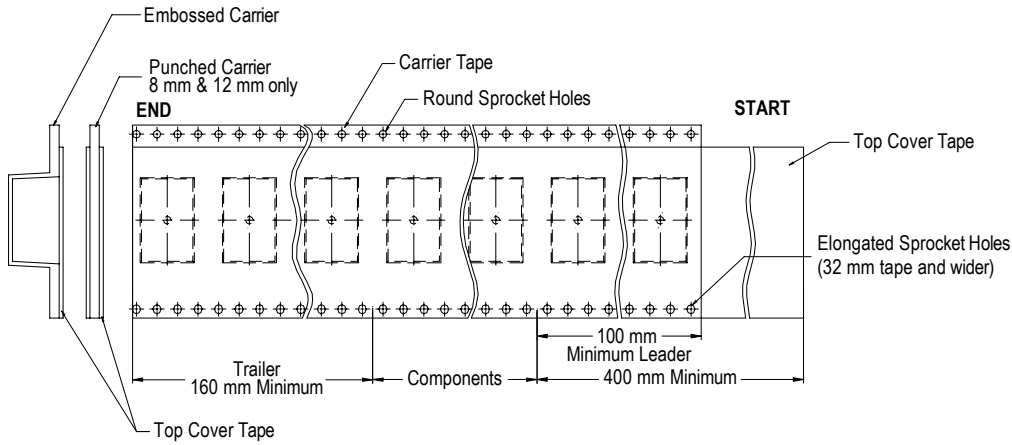
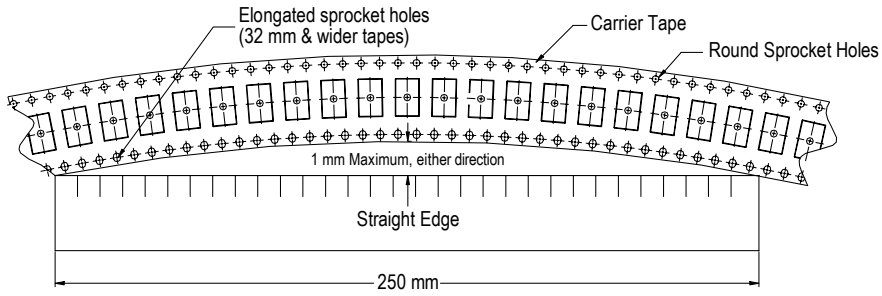


Figure 7 – Maximum Camber



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

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