

Overview

The KEMET T492 series is approved to MIL-PRF-55365/8 (CWR11) with Weibull failure rates of B level (0.1% failures per 1000 hours), C level (0.01% failures per 1000 hours), or D level (0.001% failures per 1000 hours). This CWR11 product is a precision-molded device, with compliant terminations and indelible laser marking. This is the military version of the global IEC/EIA standard represented by KEMET's T491 Series. Tape and reeling per EIA 481-1 is standard.

Benefits

- Established reliability options
- Taped and reeled per EIA 481-1
- Symmetrical, compliant terminations
- Laser-marked case
- 100% surge current test available on all case sizes
- Qualified to MIL-PRF-55365/8, Style CWR11
- Termination options B, C, H, K
- Weibull failure options B, C, and D
- Voltage rating of 4-50 VDC
- Operating temperature range of -55°C to +125°C

Applications

Typical applications include decoupling and filtering in military and aerospace applications requiring CWR11 devices.



Environmental Compliance

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

*When ordered with 100% Sn Solder

SPICE

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

Ordering Information – T492 Series CWR11 Style MIL-PRF 55365/8

T	492	D	156	K	020	A	C	4251
Capacitor Class	Series	Case Size	Capacitance Code (pF)	Capacitance Tolerance	Voltage	Failure Rate/Design	Lead Material	Surge (C-Spec)
T = Tantalum	CWR 11 Established Reliability	A = 3216-18 B = 3528-21 C = 6032-28 D = 7343-31	First two digits represent significant figures. Third digit specifies number of zeros.	J = ±5% K = ±10% M = ±20%	006 = 6.3V 010 = 10V 015 = 15V 020 = 20V 025 = 25V 035 = 35V 050 = 50V	A = N/A B = 0.1%/1000 hrs C = .01%/1000 hrs D = .001%/1000 hrs	C = Hot Solder Dipped H = Standard Solder Coated (SnPb 5% Pb minimum) B = Gold Plated K = Solder Fused	4250 = 25°C after Weibull 4251 = -55°C and 85°C after Weibull 4252 = -55°C and 85°C before Weibull

Performance Characteristics

Item	Performance Characteristics
Operating Temperature	-55°C to 125°C
Rated Capacitance Range	0.1µF - 100µF @ 120 Hz/25°C
Capacitance Tolerance	J Tolerance (5%), K Tolerance (10%), M Tolerance (20%)
Rated Voltage Range	4V - 50V
DF(120Hz)	Refer to Part Number Electrical Specification Table
ESR (100kHz)	Refer to Part Number Electrical Specification Table
Leakage Current	≤ 0.01CV (µA) at Rated Voltage after 5 minutes

Qualification – T492 Series CWR11 Style MIL-PRF 55365/8

Test	Condition	Characteristics				
Endurance	85°C @ Rated Voltage, 2000 Hours. 125°C @ 2/3 Rated Voltage, 2000 Hours.	$\Delta C/C$	Within $\pm 10\%$ of initial value			
		DF	Within initial limits			
		DCL	Within 1.25 x initial limit			
		ESR	Within initial limits			
Storage Life	125°C @ 0 Volts, 2000 Hours.	$\Delta C/C$	Within $\pm 10\%$ of initial value			
		DF	Within initial limits			
		DCL	Within 1.25 x initial limit			
		ESR	Within initial limits			
Thermal Shock	MIL-Std-202, Method 107, Condition B, mounted, -55°C to 125°C, 1000 cycles.	$\Delta C/C$	Within $\pm 5\%$ 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	
		$\Delta C/C$	IL*	$\pm 10\%$	$\pm 10\%$	$\pm 20\%$
		DF	IL	IL	1.5 x IL	1.5 x IL
		DCL	IL	n/a	10 x IL	12 x IL
Surge Voltage	25°C and 85°C, 1.32 x Rated Voltage 1000 cycles (125°C, 1.2 x Rated Voltage).	$\Delta C/C$	Within $\pm 5\%$ of initial value			
		DF	Within initial limits			
		DCL	Within initial limits			
		ESR	Within initial limits			
Mechanical Shock/Vibration	MIL-Std-202, Meth. 213, Cond. I, 100G Peak. MIL-Std-202, Meth. 204, Cond. D, 10Hz to 2000Hz, 20G Peak.	$\Delta C/C$	Within $\pm 10\%$ of initial value			
		DF	Within initial limits			
		DCL	Within initial limits			

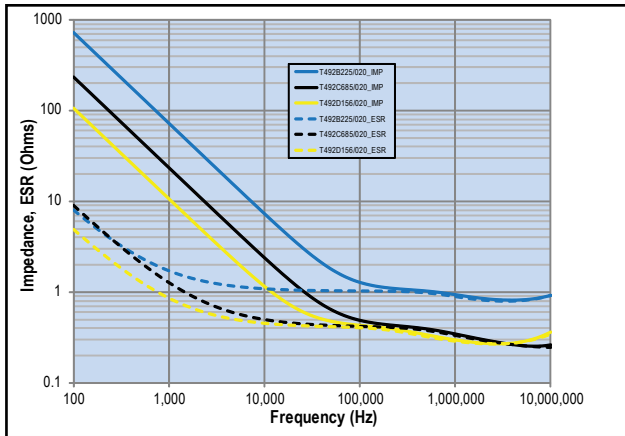
*IL = Initial Limit

Certification

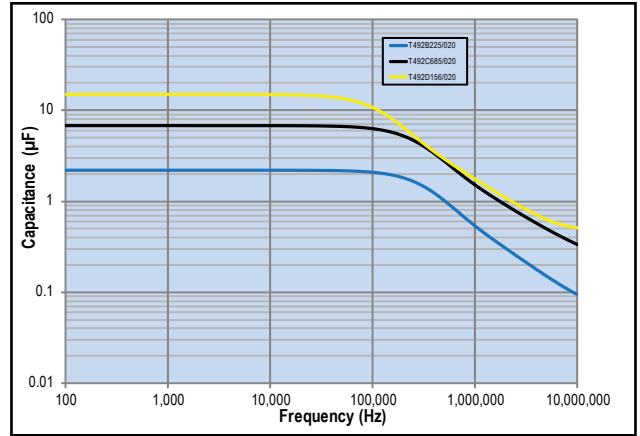
MIL-PRF-55365/8

Electrical Characteristics – T492 Series CWR11 Style MIL-PRF 55365/8

ESR vs. Frequency

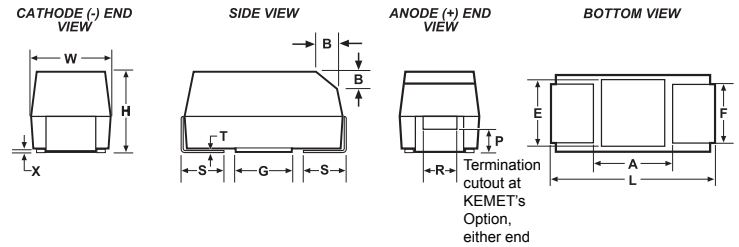


Capacitance vs. Frequency



Dimensions – Millimeters (Inches)

Metric will govern



Case Size		Component												
KEMET	EIA	L*	W*	H*	F* ±0.1 ±(.004)	S* ±0.3 ±(.012)	B* ±0.15 (Ref) ±.006	X (Ref)	P (Ref)	R (Ref)	T (Ref)	A (Min)	G (Ref)	E (Ref)
A	3216-18	3.2 ± 0.2 (.126 ± .008)	1.6 ± 0.2 (.063 ± .008)	1.6 ± 0.2 (.063 ± .008)	1.2 (.047)	0.8 (.031)	0.4 (.016)	0.10 ± 0.10 (.004 ± .004)	0.4 (.016)	0.4 (.016)	0.13 (.005)	1.4 (.055)	1.1 (.043)	1.3 (.051)
B	3528-21	3.5 ± 0.2 (.138 ± .008)	2.8 ± 0.2 (.110 ± .008)	1.9 ± 0.2 (.075 ± .008)	2.2 (.087)	0.8 (.031)	0.4 (.016)	0.10 ± 0.10 (.004 ± .004)	0.5 (.020)	1.0 (.039)	0.13 (.005)	2.1 (.083)	1.8 (.071)	2.2 (.087)
C	6032-28	6.0 ± 0.3 (.236 ± .03)	3.2 ± 0.3 (.126 ± .012)	2.5 ± 0.3 (.098 ± .012)	2.2 (.087)	1.3 (.051)	0.5 (.020)	0.10 ± 0.10 (.004 ± .004)	0.9 (.035)	1.0 (.039)	0.13 (.005)	3.1 (.122)	2.8 (.110)	2.4 (.094)
D	7343-31	7.3 ± 0.3 (.287 ± .012)	4.3 ± 0.3 (.169 ± .012)	2.8 ± 0.3 (.110 ± .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)

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

* MIL-C-55365/8 specified dimensions

Table 1 – T492 Series CWR11 Style MIL-PRF 55365/8, Ratings & Part Number Reference

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	MIL-C-55365/4F Part Number	DC Leakage	DF	ESR	Moisture Sensitivity
					μAmps +20°C max/5min	+20°C 120Hz % Max	+20°C 100kHz Ohms	Temp≤260°C J-STD-020D
85°C VDC	120Hz μF	KEMET/EIA	(See below for part options)	(See below for part options)				
4	2.2	A/3216-18	T492A225(1)004(2)(3)(4)	CWR11C(6)225(1)(2)(5)	0.1	6.0	8.0	1.0
4	4.7	A/3216-18	T492A475(1)004(2)(3)(4)	CWR11C(6)475(1)(2)(5)	0.2	6.0	8.0	1.0
4	6.8	B/3528-21	T492B685(1)004(2)(3)(4)	CWR11C(6)685(1)(2)(5)	0.3	6.0	5.5	1.0
4	10	B/3528-21	T492B106(1)004(2)(3)(4)	CWR11C(6)106(1)(2)(5)	0.4	6.0	4.0	1.0
4	15	B/3528-21	T492B156(1)004(2)(3)(4)	CWR11C(6)156(1)(2)(5)	0.6	6.0	3.5	1.0
4	33	C/6032-28	T492C336(1)004(2)(3)(4)	CWR11C(6)336(1)(2)(5)	1.3	6.0	2.2	1.0
4	68	D/7343-31	T492D686(1)004(2)(3)(4)	CWR11C(6)686(1)(2)(5)	2.7	6.0	1.1	1.0
4	100	D/7343-31	T492D107(1)004(2)(3)(4)	CWR11C(6)107(1)(2)(5)	4.0	8.0	0.9	1.0
6.3	1.5	A/3216-18	T492A155(1)006(2)(3)(4)	CWR11D(6)155(1)(2)(5)	0.1	6.0	8.0	1.0
6.3	2.2	A/3216-18	T492A225(1)006(2)(3)(4)	CWR11D(6)225(1)(2)(5)	0.1	6.0	8.0	1.0
6.3	3.3	A/3216-18	T492A335(1)006(2)(3)(4)	CWR11D(6)335(1)(2)(5)	0.2	6.0	8.0	1.0
6.3	4.7	B/3528-21	T492B475(1)006(2)(3)(4)	CWR11D(6)475(1)(2)(5)	0.3	6.0	5.5	1.0
6.3	6.8	B/3528-21	T492B685(1)006(2)(3)(4)	CWR11D(6)685(1)(2)(5)	0.4	6.0	4.5	1.0
6.3	10	B/3528-21	T492B106(1)006(2)(3)(4)	CWR11D(6)106(1)(2)(5)	0.6	6.0	3.5	1.0
6.3	15	C/6032-28	T492C156(1)006(2)(3)(4)	CWR11D(6)156(1)(2)(5)	0.9	6.0	3.0	1.0
6.3	22	C/6032-28	T492C226(1)006(2)(3)(4)	CWR11D(6)226(1)(2)(5)	1.4	6.0	2.2	1.0
6.3	47	D/7343-31	T492D476(1)006(2)(3)(4)	CWR11D(6)476(1)(2)(5)	3.0	6.0	1.1	1.0
6.3	68	D/7343-31	T492D686(1)006(2)(3)(4)	CWR11D(6)686(1)(2)(5)	4.3	6.0	0.9	1.0
10	1	A/3216-18	T492A105(1)010(2)(3)(4)	CWR11F(6)105(1)(2)(5)	0.1	4.0	10.0	1.0
10	1.5	A/3216-18	T492A155(1)010(2)(3)(4)	CWR11F(6)155(1)(2)(5)	0.2	6.0	8.0	1.0
10	2.2	A/3216-18	T492A225(1)010(2)(3)(4)	CWR11F(6)225(1)(2)(5)	0.2	6.0	8.0	1.0
10	3.3	B/3528-21	T492B335(1)010(2)(3)(4)	CWR11F(6)335(1)(2)(5)	0.3	6.0	5.5	1.0
10	4.7	B/3528-21	T492B475(1)010(2)(3)(4)	CWR11F(6)475(1)(2)(5)	0.5	6.0	4.5	1.0
10	6.8	B/3528-21	T492B685(1)010(2)(3)(4)	CWR11F(6)685(1)(2)(5)	0.7	6.0	3.5	1.0
10	15	C/6032-28	T492C156(1)010(2)(3)(4)	CWR11F(6)156(1)(2)(5)	1.5	6.0	2.5	1.0
10	33	D/7343-31	T492D336(1)010(2)(3)(4)	CWR11F(6)336(1)(2)(5)	3.3	6.0	1.1	1.0
10	47	D/7343-31	T492D476(1)010(2)(3)(4)	CWR11F(6)476(1)(2)(5)	4.7	6.0	0.9	1.0
15	0.68	A/3216-18	T492A684(1)015(2)(3)(4)	CWR11H(6)684(1)(2)(5)	0.1	4.0	12.0	1.0
15	1	A/3216-18	T492A105(1)015(2)(3)(4)	CWR11H(6)105(1)(2)(5)	0.2	4.0	10.0	1.0
15	1.5	A/3216-18	T492A155(1)015(2)(3)(4)	CWR11H(6)155(1)(2)(5)	0.2	6.0	8.0	1.0
15	2.2	B/3528-21	T492B225(1)015(2)(3)(4)	CWR11H(6)225(1)(2)(5)	0.3	6.0	5.5	1.0
15	3.3	B/3528-21	T492B335(1)015(2)(3)(4)	CWR11H(6)335(1)(2)(5)	0.5	6.0	5.0	1.0
15	4.7	B/3528-21	T492B475(1)015(2)(3)(4)	CWR11H(6)475(1)(2)(5)	0.7	6.0	4.0	1.0
15	10	C/6032-28	T492C106(1)015(2)(3)(4)	CWR11H(6)106(1)(2)(5)	1.5	6.0	2.5	1.0
15	22	D/7343-31	T492D226(1)015(2)(3)(4)	CWR11H(6)226(1)(2)(5)	3.3	6.0	1.1	1.0
15	33	D/7343-31	T492D336(1)015(2)(3)(4)	CWR11H(6)336(1)(2)(5)	5.0	6.0	0.9	1.0
20	0.47	A/3216-18	T492A474(1)020(2)(3)(4)	CWR11J(6)474(1)(2)(5)	0.1	4.0	14.0	1.0
20	0.68	A/3216-18	T492A684(1)020(2)(3)(4)	CWR11J(6)684(1)(2)(5)	0.1	4.0	12.0	1.0
20	1	A/3216-18	T492A105(1)020(2)(3)(4)	CWR11J(6)105(1)(2)(5)	0.2	4.0	10.0	1.0
20	1.5	B/3528-21	T492B155(1)020(2)(3)(4)	CWR11J(6)155(1)(2)(5)	0.3	6.0	6.0	1.0
20	2.2	B/3528-21	T492B225(1)020(2)(3)(4)	CWR11J(6)225(1)(2)(5)	0.4	6.0	5.0	1.0
20	3.3	B/3528-21	T492B335(1)020(2)(3)(4)	CWR11J(6)335(1)(2)(5)	0.7	6.0	4.0	1.0
20	4.7	C/6032-28	T492C475(1)020(2)(3)(4)	CWR11J(6)475(1)(2)(5)	0.9	6.0	3.0	1.0
VDC	μF	KEMET/EIA	(see below for part options)	(see below for part options)	max/5min	% Max	Ohms	J-STD-020D
85°C	120Hz				μAmps +20°C	+20°C 120Hz	+20°C 100kHz	Temp≤260°C
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	MIL-C-55365/4F Part Number	DC Leakage	DF	ESR	Moisture Sensitivity

Other part number options:

- (1) To complete KEMET/CWR part number, insert M for ± 20%, K for ± 10%, or J for ± 5%. Designates Capacitance tolerance.
 - (2) To complete KEMET/CWR part number, insert B (0.1%/1000Hrs), C (0.01%/1000Hrs), D (0.001%/1000Hrs) or A = N/A. Designates Reliability Level.
 - (3) To complete KEMET part number, insert B = Gold Plated, C = Hot solder dipped, H or S = Solder Plated or K = Solder Fused. Designates Termination Finish.
 - (4) To complete KEMET part number, insert 4250 = +25°C after Weibull, 4251 = -55°C +85°C after Weibull, or 4252 = -55°C +85°C before Weibull. Designates Surge current option.
 - (5) To complete CWR part number, insert A = +25°C after Weibull, B = -55°C +85°C after Weibull, C = -55°C +85°C before Weibull or Z = None. Designates Surge current option.
 - (6) To complete CWR part number, insert B = Gold Plated, C = Hot Solder Dipped, H = Solder Plated or K = Solder Fused. Designates Termination Finish.
- Refer to Ordering Information for additional detail.

Table 1 – T492 Series CWR11 Style MIL-PRF 55365/8, Ratings & Part Number Reference con't

Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	MIL-C-55365/4F Part Number	DC Leakage		DF	ESR	Moisture Sensitivity
					μ Amps +20°C max/5min	+20°C 120Hz % Max			
85°C VDC	120Hz μ F	KEMET/EIA	(See below for part options)	(See below for part options)	μ Amps +20°C max/5min	+20°C 120Hz % Max	+20°C 100kHz Ohms	Temp \leq 260°C J-STD-020D	
20	6.8	C/6032-28	T492C685(1)020(2)(3)(4)	CWR11J(6)685(1)(2)(5)	1.4	6.0	2.4	1.0	
20	15	D/7343-31	T492D156(1)020(2)(3)(4)	CWR11J(6)156(1)(2)(5)	3.0	6.0	1.1	1.0	
20	22	D/7343-31	T492D226(1)020(2)(3)(4)	CWR11J(6)226(1)(2)(5)	4.4	6.0	0.9	1.0	
25	0.33	A/3216-18	T492A334(1)025(2)(3)(4)	CWR11K(6)334(1)(2)(5)	0.1	4.0	15.0	1.0	
25	0.47	A/3216-18	T492A474(1)025(2)(3)(4)	CWR11K(6)474(1)(2)(5)	0.1	4.0	14.0	1.0	
25	0.68	B/3528-21	T492B684(1)025(2)(3)(4)	CWR11K(6)684(1)(2)(5)	0.2	4.0	7.5	1.0	
25	1	B/3528-21	T492B105(1)025(2)(3)(4)	CWR11K(6)105(1)(2)(5)	0.3	4.0	6.5	1.0	
25	1.5	B/3528-21	T492B155(1)025(2)(3)(4)	CWR11K(6)155(1)(2)(5)	0.4	6.0	6.5	1.0	
25	2.2	C/6032-28	T492C225(1)025(2)(3)(4)	CWR11K(6)225(1)(2)(5)	0.6	6.0	3.5	1.0	
25	3.3	C/6032-28	T492C335(1)025(2)(3)(4)	CWR11K(6)335(1)(2)(5)	0.8	6.0	3.5	1.0	
25	4.7	C/6032-28	T492C475(1)025(2)(3)(4)	CWR11K(6)475(1)(2)(5)	1.2	6.0	2.5	1.0	
25	6.8	D/7343-31	T492D685(1)025(2)(3)(4)	CWR11K(6)685(1)(2)(5)	1.7	6.0	1.4	1.0	
25	10	D/7343-31	T492D106(1)025(2)(3)(4)	CWR11K(6)106(1)(2)(5)	2.5	6.0	1.2	1.0	
25	15	D/7343-31	T492D156(1)025(2)(3)(4)	CWR11K(6)156(1)(2)(5)	3.8	6.0	1.0	1.0	
35	0.1	A/3216-18	T492A104(1)035(2)(3)(4)	CWR11M(6)104(1)(2)(5)	0.0	4.0	24.0	1.0	
35	0.15	A/3216-18	T492A154(1)035(2)(3)(4)	CWR11M(6)154(1)(2)(5)	0.1	4.0	21.0	1.0	
35	0.22	A/3216-18	T492A224(1)035(2)(3)(4)	CWR11M(6)224(1)(2)(5)	0.1	4.0	18.0	1.0	
35	0.33	A/3216-18	T492A334(1)035(2)(3)(4)	CWR11M(6)334(1)(2)(5)	0.1	4.0	15.0	1.0	
35	0.47	B/3528-21	T492B474(1)035(2)(3)(4)	CWR11M(6)474(1)(2)(5)	0.2	4.0	10.0	1.0	
35	0.68	B/3528-21	T492B684(1)035(2)(3)(4)	CWR11M(6)684(1)(2)(5)	0.2	4.0	8.0	1.0	
35	1	B/3528-21	T492B105(1)035(2)(3)(4)	CWR11M(6)105(1)(2)(5)	0.4	4.0	6.5	1.0	
35	1.5	C/6032-28	T492C155(1)035(2)(3)(4)	CWR11M(6)155(1)(2)(5)	0.5	6.0	4.5	1.0	
35	2.2	C/6032-28	T492C225(1)035(2)(3)(4)	CWR11M(6)225(1)(2)(5)	0.8	6.0	3.5	1.0	
35	3.3	C/6032-28	T492C335(1)035(2)(3)(4)	CWR11M(6)335(1)(2)(5)	1.2	6.0	2.5	1.0	
35	4.7	D/7343-31	T492D475(1)035(2)(3)(4)	CWR11M(6)475(1)(2)(5)	1.6	6.0	1.5	1.0	
35	6.8	D/7343-31	T492D685(1)035(2)(3)(4)	CWR11M(6)685(1)(2)(5)	2.4	6.0	1.3	1.0	
50	0.1	A/3216-18	T492A104(1)050(2)(3)(4)	CWR11N(6)104(1)(2)(5)	0.1	6.0	22.0	1.0	
50	0.15	B/3528-21	T492B154(1)050(2)(3)(4)	CWR11N(6)154(1)(2)(5)	0.1	4.0	17.0	1.0	
50	0.22	B/3528-21	T492B224(1)050(2)(3)(4)	CWR11N(6)224(1)(2)(5)	0.1	4.0	14.0	1.0	
50	0.33	B/3528-21	T492B334(1)050(2)(3)(4)	CWR11N(6)334(1)(2)(5)	0.2	4.0	12.0	1.0	
50	0.47	C/6032-28	T492C474(1)050(2)(3)(4)	CWR11N(6)474(1)(2)(5)	0.2	4.0	8.0	1.0	
50	0.68	C/6032-28	T492C684(1)050(2)(3)(4)	CWR11N(6)684(1)(2)(5)	0.3	4.0	7.0	1.0	
50	1	C/6032-28	T492C105(1)050(2)(3)(4)	CWR11N(6)105(1)(2)(5)	0.5	4.0	6.0	1.0	
50	1.5	D/7343-31	T492D155(1)050(2)(3)(4)	CWR11N(6)155(1)(2)(5)	0.8	6.0	4.0	1.0	
50	2.2	D/7343-31	T492D225(1)050(2)(3)(4)	CWR11N(6)225(1)(2)(5)	1.1	6.0	2.5	1.0	
50	3.3	D/7343-31	T492D335(1)050(2)(3)(4)	CWR11N(6)335(1)(2)(5)	1.7	6.0	2.0	1.0	
50	4.7	D/7343-31	T492D475(1)050(2)(3)(4)	CWR11N(6)475(1)(2)(5)	2.4	6.0	1.5	1.0	
VDC	μ F	KEMET/EIA	(see below for part options)	(see below for part options)	max/5min	% Max	Ohms	J-STD-020D	
85°C	120Hz	KEMET/EIA	(see below for part options)	(see below for part options)	μ Amps +20°C	+20°C 120Hz	+20°C 100kHz	Temp \leq 260°C	
Rated Voltage	Rated Cap	Case Code/ Case Size	KEMET Part Number	MIL-C-55365/4F Part Number	DC Leakage	DF	ESR	Moisture Sensitivity	

Other part number options:

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

(2) To complete KEMET/CWR part number, insert B (0.1%/1000Hrs), C (0.01%/1000Hrs), D (0.001%/1000Hrs) or A = N/A. Designates Reliability Level.

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

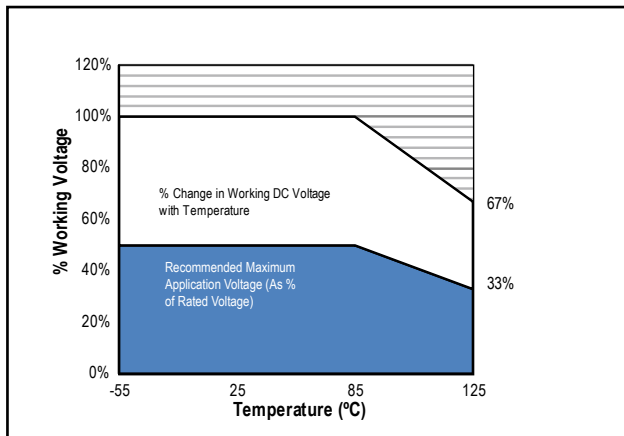
(4) To complete KEMET part number, insert 4250 = +25°C after Weibull, 4251 = -55°C +85°C after Weibull, or 4252 = -55°C +85°C before Weibull. Designates Surge current option.

(5) To complete CWR part number, insert A = +25°C after Weibull, B = -55°C +85°C after Weibull, C = -55°C +85°C before Weibull or Z = None. Designates Surge current option.

(6) To complete CWR part number, insert B = Gold Plated, C = Hot Solder Dipped, H = Solder Plated or K = Solder Fused. Designates Termination Finish.

Refer to Ordering Information for additional detail.

Recommended Voltage Derating Guidelines



Ripple Current/Ripple Voltage

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

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

T = Environmental Temperature

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

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

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

I = rms ripple current (amperes)

E = rms ripple voltage (volts)

*P*_{max} = maximum power dissipation (watts)

R = ESR at specified frequency (ohms)

Reverse Voltage

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

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

Table 2 – Land Dimensions/Courtyard

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)						
		Case	EIA	X	Y	C	V1	V2	X	Y	C	V1	V2	X	Y	C	V1	V2
A	3216-18			1.35	2.15	1.45	6.10	2.80	1.25	1.75	1.35	5.00	2.30	1.15	1.35	1.25	4.10	2.00
B	3528-21			2.35	2.15	1.45	6.10	4.00	2.25	1.75	1.35	5.00	3.50	2.15	1.35	1.25	4.10	3.20
C	6032-28			2.35	2.65	2.60	8.90	4.40	2.25	2.25	2.50	7.80	3.90	2.15	1.85	2.40	6.90	3.60
D	7343-31			2.55	3.75	2.70	10.20	5.50	2.45	3.35	2.60	9.10	5.00	2.35	2.95	2.50	8.20	4.70

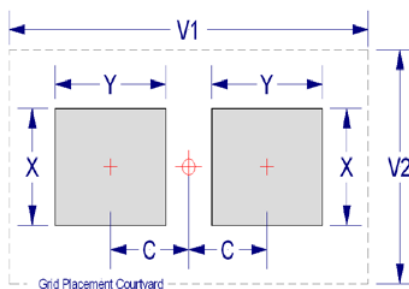
Density Level A: For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.

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 occurred, the iron should be removed immediately. "Wiping" the edges of a chip and heating the top surface is not recommended.

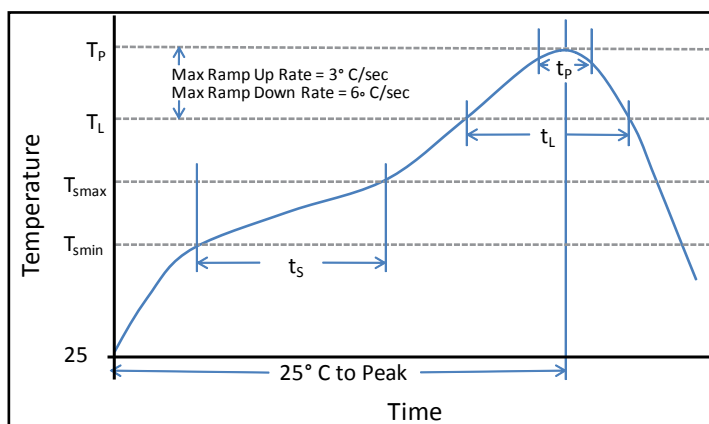
During typical reflow operations, a slight darkening of the gold-colored epoxy may be observed. This slight darkening is normal and is not harmful to the product. Marking permanency is not affected by this change.

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

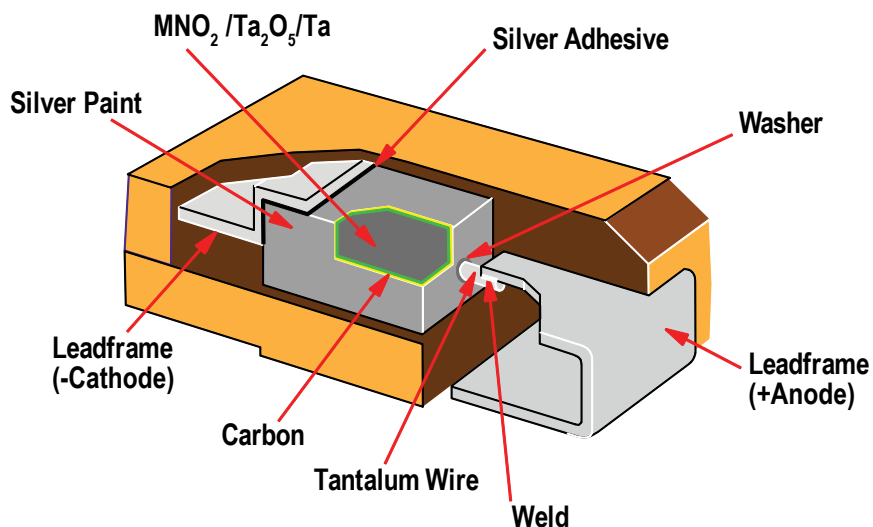
Note: All temperatures refer to the center of the package, measured on the package body surface that is facing up during assembly reflow.

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

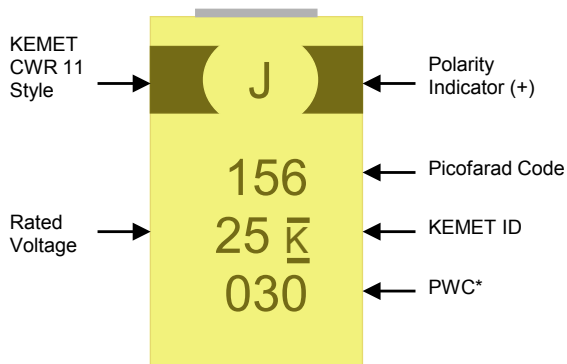
**Case Size A, B, C, H, I, K, M, R, S, T, U, V, W and Z



Construction



Capacitor Marking



* 030 = 30th week of 2010

Storage

Tantalum chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature - reels may soften or warp, and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C, and maximum storage humidity not exceed 60% relative humidity. In addition, temperature fluctuations should be minimized to avoid condensation on the parts, and atmospheres should be free of chlorine and sulphur bearing compounds. For optimized solderability, chip stock should be used promptly, preferably within three years of receipt.