Goldmax, 300 Series, Radial, Conformally Coated, X7R Dielectric, 25 – 250 VDC (Automotive Grade)

Overview

KEMET's Goldmax conformally coated radial leaded ceramic capacitors in X7R dielectric feature a 125°C maximum operating temperature. The Electronics Industries Alliance (EIA) characterizes X7R dielectric as a Class II "temperature stable" material. Components of this classification are fixed, ceramic dielectric capacitors suited for bypass and decoupling applications or for frequency discriminating circuits where Q and stability of capacitance characteristics are not critical. X7R exhibits a predictable change in capacitance with respect to time and voltage and boasts a minimal change in capacitance with reference to ambient temperature. Capacitance change is limited to ±15% from −55°C to +125°C.

These devices meets the flame test requirements outlined in UL Standard 94V–0 and the demanding Automotive Electronics Council's AEC–Q200 qualification requirements.

Benefits

- Radial leaded form factor
- Conformally coated
- Encapsulation meets flamability standard UL 94V–0.
- 0.100", 0.200", and 0.250" lead spacing
- Operating temperature range of −55°C to +125°C



Ordering Information

C	320			C	106	K	3	R	5	T	A	9170
Ceramic	Style/Size			Specification/ Series	Capacitance Code (pF)	Capacitance Tolerance[1]	Voltage	Dielectric	Design	Lead Finish[2]	Failure Rate	Packaging/Grade (C-Spec)
	315 316 317 318 320 321	322 323 324 325 326 327	328 330 331 333 335 336	C = Standard	First two digits represent significant figures. Third digit specifies number of zeros.	J = ±5% K = ±10% M = ±20%	3 = 25 5 = 50 1 = 100 2 = 200 A = 250	R = X7R	5 = Multilayer	T = 100% Matte Sn	A = N/A	Automotive Grade See "Packaging C-Spec Ordering Options Table"

[1] *Additional capacitance Tolerance offerings may be available. Contact KEMET for details.*
For Overmolding applications please contact your KEMET representative.

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Benefits cont.

- Lead (Pb)-free, RoHS and REACH compliant
- X7R temperature stable dielectric
- DC voltage ratings of 25 V, 50 V, 100 V, 200 V, and 250 V
- Capacitance offerings ranging from 100 pF to 10 µF
- Available capacitance Tolerances of ±5%, ±10% and ±20%
- Non-polar device, minimizing installation concerns
- 100% pure matte tin-plated lead finish allowing for excellent solderability
- Automotive (AEC–Q200) grade

Applications

Typical applications include decoupling, bypass, filtering and transient voltage suppression.

Application Notes

These devices are not recommended for use in overmold applications and/or processes.

Packaging C-Spec Ordering Options Table

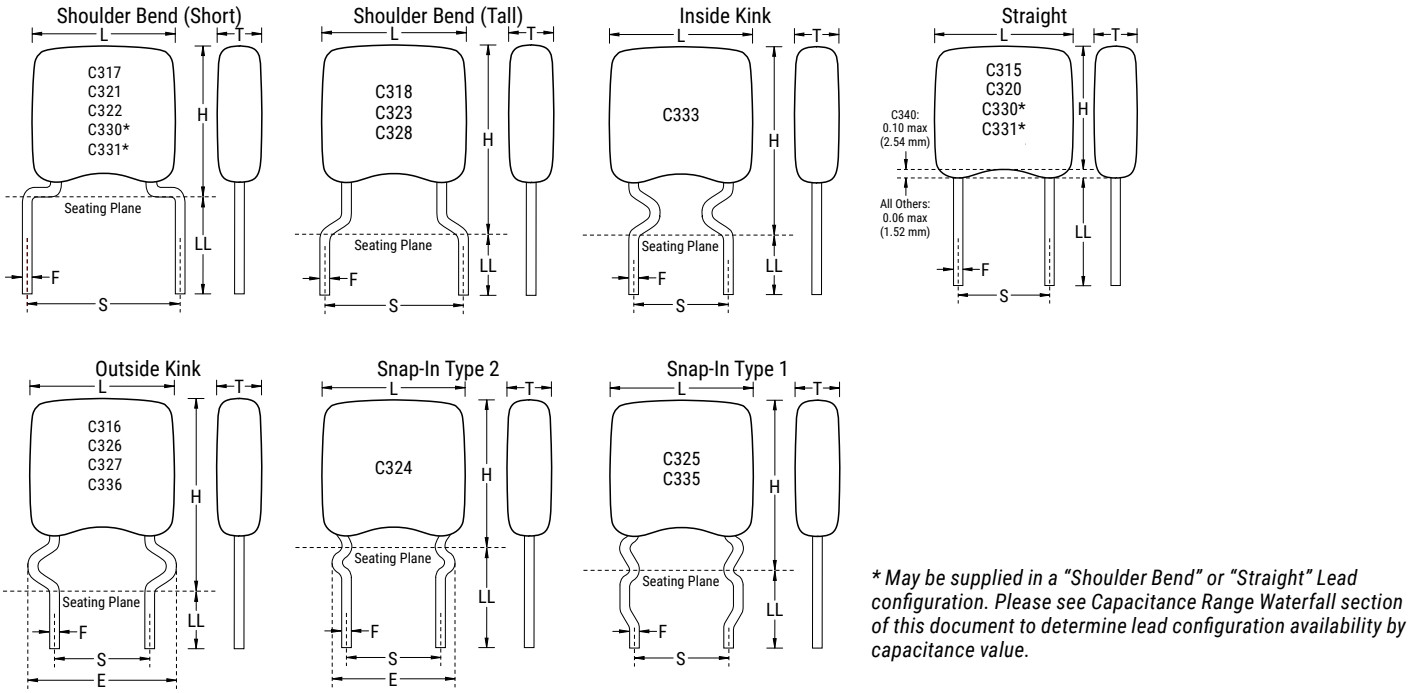
Packaging Type[1]	Packaging/Grade Ordering Code (C-Spec)
Bulk Bag Automotive Grade	9170
12" Tape & Reel (16.0±0.5 mm lead length)	9170 (7301)
12" Tape & Reel (18.0 mm minimum lead length)	9170 (7303) and 9170 TR
Ammo Pack (16.0±0.5 mm lead length)	9170 (7305)
Ammo Pack (18.0 mm minimum lead length)	9170 (7317)

[1] Default packaging is "Bulk Bag" with ordering code 9170 for Automotive Grade. Bulk bag option is required for Size/Style C321 &C331.
[1] "Tape and Reel" packaging option is not available for Size/Style C321 and C331. For more information see "Packaging Quantities".
[1] "Ammo Pack" packaging option is not available for Size/Style C321 and C331. For more information see "Packaging Quantities".
[1] "Ammo Pack" and "Tape and Reel" packaging options have the same lead tape configuration. For more information see "Tape & Reel Packaging Information".

Qualification/Certification

Automotive Grade products meet or exceed the requirements outlined by the Automotive Electronics Council. Details regarding test methods and conditions are referenced in document AEC–Q200, Stress Test Qualification for Passive Components. For additional information regarding the Automotive Electronics Council and AEC–Q200, please visit their website at www.aecouncil.com.

Dimensions – Inches (Millimeters)



** May be supplied in a "Shoulder Bend" or "Straight" Lead configuration. Please see Capacitance Range Waterfall section of this document to determine lead configuration availability by capacitance value.*

Series	Style / Size	S Lead Spacing ±0.030 (0.78)	L Length Maximum	H Height Maximum	T Thickness Maximum	F Lead Diameter +0.004 (0.10), −0.001 (0.025)	LL Lead Length Minimum
C31X	315	0.100 (2.54)	0.150 (3.81)	0.120 (3.14)	0.100 (2.54)	0.020 (0.51)	0.276 (7.00)
	316		0.150 (3.81)	0.230 (5.08)	0.100 (2.54)		0.200 (5.08)
C32X	324		0.200 (5.08)	0.230 (5.84)	0.125 (3.18)[1]		0.276 (7.00)
	320		0.200 (5.08)	0.230 (5.84)	0.125 (3.18)[1]		0.276 (7.00)
	326		0.200 (5.08)	0.300 (7.62)	0.125 (3.18)[1]		0.200 (5.08)
C31X	317	0.200 (5.08)	0.150 (3.81)	0.200 (5.08)	0.100 (2.54)		0.276 (7.00)
	318		0.150 (3.81)	0.235 (5.97)	0.100 (2.54)		0.276 (7.00)
C32X	321	0.250 (6.35)	0.200 (5.08)	0.260 (6.60)	0.125 (3.18)[1]		0.276 (7.00)
	322	0.200 (5.08)	0.200 (5.08)	0.260 (6.60)	0.125 (3.18)[1]		0.276 (7.00)
	323		0.200 (5.08)	0.300 (7.62)	0.125 (3.18)[1]		0.276 (7.00)
	325		0.200 (5.08)	0.300 (7.62)	0.125 (3.18)[1]		0.276 (7.00)
	328		0.200 (5.08)	0.300 (7.62)	0.125 (3.18)[1]		0.276 (7.00)
	327		0.200 (5.08)	0.320 (8.13)	0.125 (3.18)[1]		0.200 (5.08)
C33X	330		0.280 (7.11)	0.360 (9.14)	0.160 (4.07)		0.276 (7.00)
	331	0.250 (6.35)	0.300 (7.62)	0.360 (9.14)	0.160 (4.07)		0.276 (7.00)
	333	0.200 (5.08)	0.280 (7.11)	0.400 (10.16)	0.160 (4.07)		0.276 (7.00)
	335		0.280 (7.11)	0.400 (10.16)	0.160 (4.07)		0.276 (7.00)
	336		0.280 (7.11)	0.400 (10.16)	0.160 (4.07)		0.200 (5.08)

[1] Thickness maximum (T) = 0.160" (4.07 mm) for capacitance values greater than or equal to 4.7 µF

Automotive C-Spec Information

KEMET Automotive Grade products meet or exceed the requirements outlined by the Automotive Electronics Council. Details regarding test methods and conditions are referenced in document AEC–Q200, Stress Test Qualification for Passive Components. These products are supported by a Product Change Notification (PCN) and Production Part Approval Process warrant (PPAP).

Automotive products offered through our distribution channel have been assigned an inclusive ordering code C-Spec, "9170." This C-Spec was developed in order to better serve small and medium sized companies that prefer an automotive grade component without the requirement to submit a customer Source Controlled Drawing (SCD) or specification for review by a KEMET engineering specialist. This C-Spec is therefore not intended for use by KEMET's OEM Automotive customers and are not granted the same "privileges" as other automotive C-Specs. Customer PCN approval and PPAP request levels are limited (see details below).

Product Change Notification (PCN)

The KEMET Product Change Notification system is used to communicate primarily the following types of changes:

- Product/process changes that affect product form, fit, function, and/or reliability
- Changes in manufacturing site
- Product obsolescence

KEMET Automotive C-Spec	Customer Notification due to:		Days prior to implementation
	Process/Product change	Obsolescence*	
KEMET assigned[1]	Yes (with approval and sign off)	Yes	180 days Minimum
9170	Yes (without approval)	Yes	90 days Minimum

[1] KEMET assigned C-Specs require the submittal of a customer SCD or customer specification for review. For additional information contact KEMET.

Production Part Approval Process (PPAP)

The purpose of the Production Part Approval Process is:

- To ensure that supplier can meet the manufacturability and quality requirements for the purchased parts.
- To provide the evidence that all customer engineering design record and specification requirements are properly understood and fulfilled by the manufacturing organization.
- To demonstrate that the established manufacturing process has the potential to produce the part

KEMET Automotive C-Spec	PPAP Level				
	1	2	3	4	5
KEMET assigned[1]	●	●	●	●	●
9170			○		

[1] KEMET assigned C-Specs require the submittal of a customer SCD or customer specification for review. For additional information contact KEMET.

● Part number specific PPAP available with customer information included.
○ Product family PPAP only

Environmental Compliance

Lead (Pb)-free, REACH and RoHS compliant without exemptions when ordered with a 100% tin (Sn) wire lead finish.

Series	Termination Finish (Wire Lead)	RoHS Compliant	RoHS Exemption Code	REACH Compliant[1]	Halogen Free
300 (C3XX)	100% Matte Sn	Yes	n/a	Yes	Yes

[1] *REACH compliance indicates product does not contain Substance/s of Very High Concern (SVHC)*

Electrical Parameters/Characteristics

Item	Parameters/Characteristics
Operating Temperature Range	−55°C to +125°C
Capacitance Change with Reference to +25°C and 0 VDC Applied (TCC)	±15%
Aging Rate (Maximum % Cap Loss/Decade Hour)	3.0%
Dielectric Withstanding Voltage	250% of rated voltage (5±1 second and charge/discharge not exceeding 50 mA)
Dissipation Factor (DF) Maximum Limit at 25°C	3.5%(25 V) and 2.5%(50 V to 250 V)
Insulation Resistance (IR) Limit at 25°C	See Insulation Resistance Limit Table (Rated voltage applied for 120±5 seconds at 25°C)

Regarding aging rate: Capacitance measurements (including tolerance) are indexed to a referee time of 1,000 hours.
To obtain IR limit, divide MΩ-µF value by the capacitance and compare to GΩ limit. Select the lower of the two limits.
Capacitance and dissipation factor (DF) measured under the following conditions:

1 kHz ±50 Hz and 1.0 ±0.2 V_{rms} if capacitance ≤ 10 µF

120 Hz ±10 Hz and 0.5 ±0.1 V_{rms} if capacitance > 10 µF

Note: When measuring capacitance, it is important to ensure the set voltage level is held constant. The HP4284 and Agilent E4980 have a feature known as Automatic Level Control (ALC). The ALC feature should be switched to "ON."

Post Environmental Limits

High Temperature Life, Biased Humidity, Moisture Resistance					
Style/Size	Rated DC Voltage	Capacitance Value	Dissipation Factor (Maximum %)	Capacitance Shift	Insulation Resistance
All	25	All	5.0	±20%	10% of Initial Limit
	> 25		3.0		

Insulation Resistance Limit Table

Style/Size	1,000 Megohm Microfarads or 100 GΩ	500 Megohm Microfarads or 10 GΩ	100 Megohm Microfarads or 10GΩ
C31X	≤ 0.15 µF	≥ 0.15 µF	NA
C32X	≤ 0.12 µF	NA	≥ 0.12 µF
C33X	≤ 0.12 µF	NA	≥ 0.12 µF

Table 1A – C31X Style/Size (0.100" & 0.200" Lead Spacing), Capacitance Range Waterfall

C31X Style/Size (0.100" & 0.200" Lead Spacing)						
Rated Voltage (VDC)		25	50	100	200	250
Voltage Code		3	5	1	2	A
Capacitance	Capacitance Tolerance	Capacitance Code (Available Capacitance)				
100pF	J = ±5% K = ±10% M = ±20%	101	101	101	101	101
120pF		121	121	121	121	121
150pF		151	151	151	151	151
180pF		181	181	181	181	181
220pF		221	221	221	221	221
270pF		271	271	271	271	271
330pF		331	331	331	331	331
390pF		391	391	391	391	391
470pF		471	471	471	471	471
560pF		561	561	561	561	561
680pF		681	681	681	681	681
820pF		821	821	821	821	821
1000pF		102	102	102	102	102
1200pF		122	122	122	122	122
1500pF		152	152	152	152	152
1800pF		182	182	182	182	182
2200pF		222	222	222	222	222
2700pF		272	272	272	272	272
3300pF		332	332	332	332	332
3900pF		392	392	392	392	392
4700pF		472	472	472	472	472
5600pF		562	562	562	562	562
6800pF		682	682	682	682	682
8200pF		822	822	822	822	822
0.01µF		103	103	103	103	103
0.012µF		123	123	123	123	123
0.015µF		153	153	153	153	153
0.018µF		183	183	183	183	183
0.022µF		223	223	223	223	223
0.027µF		273	273	273	273	
0.033µF		333	333	333	333	
0.039µF		393	393	393	393	
0.047µF		473	473	473	473	
0.056µF		563	563	563	563	
0.068µF		683	683	683		
0.082µF		823	823	823		
0.1µF		104	104	104		
0.12µF		124	124	124		
0.15µF		154	154	154		
0.18µF		184	184	184		
0.22µF		224	224	224		
0.27µF		274	274			
0.33µF		334	334			
0.39µF		394	394			
0.47µF		474	474			
0.56µF		564	564			
0.68µF		684	684			
0.82µF		824				
1.0µF		105				
Rated Voltage (VDC)		25	50	100	200	250
Voltage Code		3	5	1	2	A

Table 1B – C32X Style/Size (0.100" & 0.200" Lead Spacing), Capacitance Range Waterfall

C32X Style/Size (0.100" & 0.200" Lead Spacing)						
Rated Voltage (VDC)		**25**	**50**	**100**	**200**	**250**
Voltage Code		**3**	**5**	**1**	**2**	**A**
Capacitance	**Capacitance Tolerance**	**Capacitance Code (Available Capacitance)**				
100pF	J = ±5% K = ±10% M = ±20%	101	101	101	101	101
120pF		121	121	121	121	121
150pF		151	151	151	151	151
180pF		181	181	181	181	181
220pF		221	221	221	221	221
270pF		271	271	271	271	271
330pF		331	331	331	331	331
390pF		391	391	391	391	391
470pF		471	471	471	471	471
560pF		561	561	561	561	561
680pF		681	681	681	681	681
820pF		821	821	821	821	821
1000pF		102	102	102	102	102
1200pF		122	122	122	122	122
1500pF		152	152	152	152	152
1800pF		182	182	182	182	182
2200pF		222	222	222	222	222
2700pF		272	272	272	272	272
3300pF		332	332	332	332	332
3900pF		392	392	392	392	392
4700pF		472	472	472	472	472
5600pF		562	562	562	562	562
6800pF		682	682	682	682	682
8200pF		822	822	822	822	822
0.01µF		103	103	103	103	103
0.012µF		123	123	123	123	123
0.015µF		153	153	153	153	153
0.018µF		183	183	183	183	183
0.022µF		223	223	223	223	223
0.027µF		273	273	273	273	273
0.033µF		333	333	333	333	333
0.039µF		393	393	393	393	393
0.047µF		473	473	473	473	473
0.056µF		563	563	563	563	563
0.068µF		683	683	683	683	683
0.082µF		823	823	823	823	823
0.1µF		104	104	104	104	104
0.12µF		124	124	124	124	124
0.15µF		154	154	154	154	154
0.18µF		184	184	184	184	184
0.22µF		224	224	224	224	224
0.27µF		274	274	274		
0.33µF		334	334	334		
0.39µF		394	394	394		
0.47µF		474	474	474		
0.56µF		564	564	564		
0.68µF		684	684	684		
0.82µF		824	824	824		
1.0µF		105	105	105		
1.2µF		125	125			
Rated Voltage (VDC)		**25**	**50**	**100**	**200**	**250**
Voltage Code		**3**	**5**	**1**	**2**	**A**

[1]Thickness max (T) = 0.160" (4.07mm) for capacitance values greater than or equal to 4.7µF

Table 1B – C32X Style/Size (0.100" & 0.200" Lead Spacing), Capacitance Range Waterfall cont.

C32X Style/Size (0.100" & 0.200" Lead Spacing)						
Rated Voltage (VDC)		25	50	100	200	250
Voltage Code		3	5	1	2	A
Capacitance	Capacitance Tolerance	Capacitance Code (Available Capacitance)				
1.5µF	J = ±5% K = ±10% M = ±20%	155	155			
1.8µF		185	185			
2.2µF		225	225			
2.7µF		275	275			
3.3µF		335	335			
3.9µF		395	395			
4.7µF		475	475			
5.6µF		565				
6.8µF		685				
10µF		106				
Rated Voltage (VDC)		25	50	100	200	250
Voltage Code		3	5	1	2	A

[1]Thickness max (T) = 0.160" (4.07mm) for capacitance values greater than or equal to 4.7µF

Table 1C – C32X Style/Size (0.100", 0.200" & 0.250" Lead Spacing), Capacitance Range Waterfall

C32X Style/Size (0.100", 0.200" & 0.250" Lead Spacing)						
Rated Voltage (VDC)		25	50	100	200	250
Voltage Code		3	5	1	2	A
Capacitance	Capacitance Tolerance	Capacitance Code (Available Capacitance)				
100pF	J = ±5% K = ±10% M = ±20%	101	101	101	101	101
120pF		121	121	121	121	121
150pF		151	151	151	151	151
180pF		181	181	181	181	181
220pF		221	221	221	221	221
270pF		271	271	271	271	271
330pF		331	331	331	331	331
390pF		391	391	391	391	391
470pF		471	471	471	471	471
560pF		561	561	561	561	561
680pF		681	681	681	681	681
820pF		821	821	821	821	821
1000pF		102	102	102	102	102
1200pF		122	122	122	122	122
1500pF		152	152	152	152	152
1800pF		182	182	182	182	182
2200pF		222	222	222	222	222
2700pF		272	272	272	272	272
3300pF		332	332	332	332	332
3900pF		392	392	392	392	392
4700pF		472	472	472	472	472
5600pF		562	562	562	562	562
6800pF		682	682	682	682	682
8200pF		822	822	822	822	822
0.01µF		103	103	103	103	103
0.012µF		123	123	123	123	123
0.015µF		153	153	153	153	153
Rated Voltage (VDC)		25	50	100	200	250
Voltage Code		3	5	1	2	A

[1]Thickness max (T) = 0.160" (4.07mm) for capacitance values greater than or equal to 4.7µF

Table 1C – C32X Style/Size (0.100", 0.200" & 0.250" Lead Spacing), Capacitance Range Waterfall cont.

C32X Style/Size (0.100", 0.200" & 0.250" Lead Spacing)						
Rated Voltage (VDC)		**25**	**50**	**100**	**200**	**250**
Voltage Code		**3**	**5**	**1**	**2**	**A**
Capacitance	**Capacitance Tolerance**	**Capacitance Code (Available Capacitance)**				
0.018µF		183	183	183	183	183
0.022µF		223	223	223	223	223
0.027µF		273	273	273	273	273
0.033µF		333	333	333	333	333
0.039µF		393	393	393	393	393
0.047µF		473	473	473	473	473
0.056µF		563	563	563	563	563
0.068µF		683	683	683	683	683
0.082µF		823	823	823	823	823
0.1µF		104	104	104	104	104
0.12µF		124	124	124	124	124
0.15µF		154	154	154	154	154
0.18µF		184	184	184	184	184
0.22µF		224	224	224	224	224
0.27µF		274	274	274		
0.33µF	J = ±5%	334	334	334		
0.39µF	K = ±10%	394	394	394		
0.47µF	M = ±20%	474	474	474		
0.56µF		564	564	564		
0.68µF		684	684	684		
0.82µF		824	824	824		
1.0µF		105	105	105		
1.2µF		125	125			
1.5µF		155	155			
1.8µF		185	185			
2.2µF		225	225			
2.7µF		275	275			
3.3µF		335	335			
3.9µF		395	395			
4.7µF		475	475			
5.6µF		565				
6.8µF		685				
10µF		106				
Rated Voltage (VDC)		**25**	**50**	**100**	**200**	**250**
Voltage Code		**3**	**5**	**1**	**2**	**A**

[1]Thickness max (T) = 0.160" (4.07mm) for capacitance values greater than or equal to 4.7µF

Table 1D – C33X Style/Size (0.200" & 0.250" Lead Spacing), Capacitance Range Waterfall

C33X Style/Size (0.200" & 0.250" Lead Spacing)						
Rated Voltage (VDC)		**25**	**50**	**100**	**200**	**250**
Voltage Code		**3**	**5**	**1**	**2**	**A**
Capacitance	**Capacitance Tolerance**	**Capacitance Code (Available Capacitance)**				
100pF	J = ±5% K = ±10% M = ±20%	101*	101*	101*	101*	101*
120pF		121*	121*	121*	121*	121*
150pF		151*	151*	151*	151*	151*
180pF		181*	181*	181*	181*	181*
220pF		221*	221*	221*	221*	221*
270pF		271*	271*	271*	271*	271*
330pF		331*	331*	331*	331*	331*
390pF		391*	391*	391*	391*	391*
470pF		471*	471*	471*	471*	471*
560pF		561*	561*	561*	561*	561*
680pF		681*	681*	681*	681*	681*
820pF		821*	821*	821*	821*	821*
1000pF		102*	102*	102*	102*	102*
1200pF		122*	122*	122*	122*	122*
1500pF		152*	152*	152*	152*	152*
1800pF		182*	182*	182*	182*	182*
2200pF		222*	222*	222*	222*	222*
2700pF		272*	272*	272*	272*	272*
3300pF		332*	332*	332*	332*	332*
3900pF		392*	392*	392*	392*	392*
4700pF		472*	472*	472*	472*	472*
5600pF		562*	562*	562*	562*	562*
6800pF		682*	682*	682*	682*	682*
8200pF		822*	822*	822*	822*	822*
0.01µF		103*	103*	103*	103*	103*
0.012µF		123*	123*	123*	123*	123*
0.015µF		153*	153*	153*	153*	153*
0.018µF		183*	183*	183*	183*	183*
0.022µF		223*	223*	223*	223*	223*
0.027µF		273*	273*	273*	273*	273*
Rated Voltage (VDC)		**25**	**50**	**100**	**200**	**250**
Voltage Code		**3**	**5**	**1**	**2**	**A**

**Capacitor is supplied with a "Shoulder-Bend" lead configuration in Style/Size C330 and C331.*

Table 1D – C33X Style/Size (0.200" & 0.250" Lead Spacing), Capacitance Range Waterfall cont.

C33X Style/Size (0.200" & 0.250" Lead Spacing)						
Rated Voltage (VDC)		25	50	100	200	250
Voltage Code		3	5	1	2	A
Capacitance	Capacitance Tolerance	Capacitance Code (Available Capacitance)				
0.033µF		333*	333*	333*	333*	333*
0.039µF		393*	393*	393*	393*	393*
0.047µF		473*	473*	473*	473*	473*
0.056µF		563*	563*	563*	563*	563*
0.068µF		683*	683*	683*	683*	683*
0.082µF		823*	823*	823*	823*	823*
0.1µF		104*	104*	104*	104*	104*
0.12µF		124*	124*	124*	124*	124*
0.15µF		154*	154*	154*	154*	154*
0.18µF		184*	184*	184*	184*	184*
0.22µF		224*	224*	224*	224	224
0.27µF		274*	274*	274*	274	274
0.33µF		334*	334*	334*	334	334
0.39µF		394*	394*	394*	394	394
0.47µF		474*	474*	474*	474	474
0.56µF		564*	564*	564*		
0.68µF		684*	684*	684*		
0.82µF		824*	824*	824*		
1.0µF		105*	105*	105*		
1.2µF		125*	125*			
1.5µF		155*	155*			
1.8µF		185*	185*			
2.2µF		225*	225*			
2.7µF		275*	275*			
3.3µF		335*	335*			
3.9µF		395*	395*			
4.7µF		475*	475*			
5.6µF		565*				
6.8µF		685*				
10µF		106*				
Rated Voltage (VDC)		25	50	100	200	250
Voltage Code		3	5	1	2	A

**Capacitor is supplied with a "Shoulder-Bend" lead configuration in Style/Size C330 and C331.*

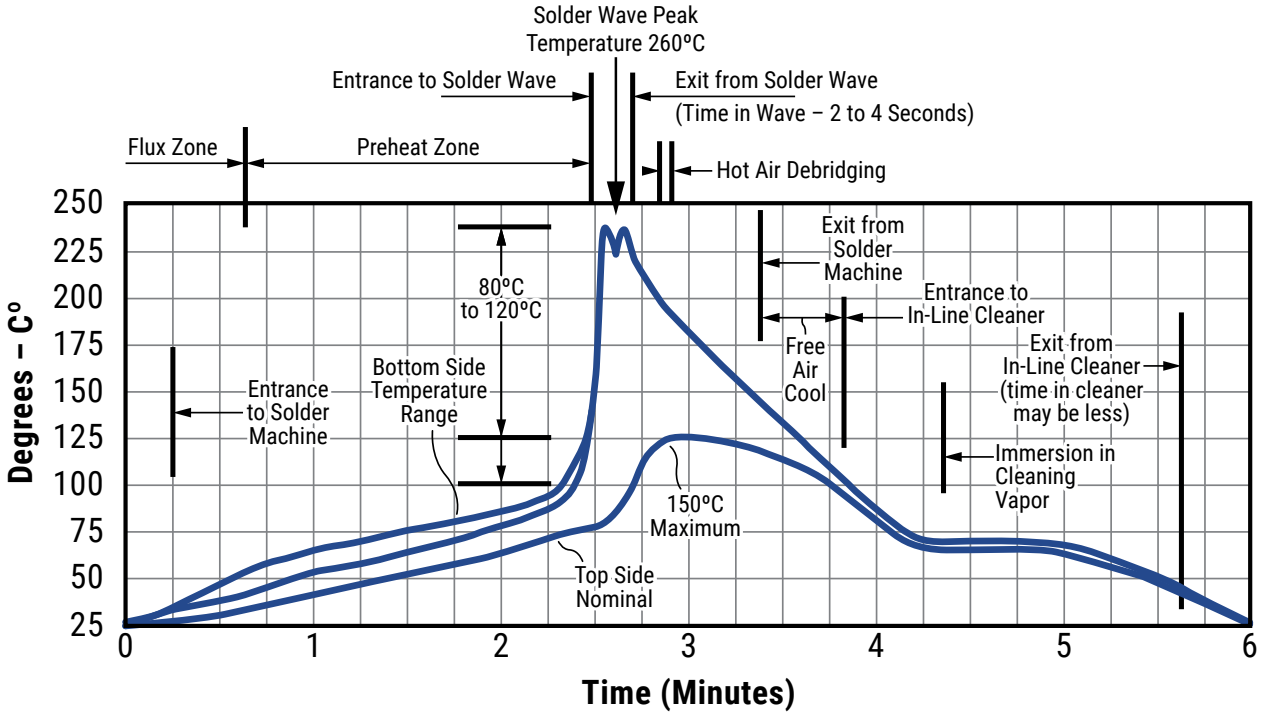
Soldering Process

Recommended Soldering Technique:

- Solder Wave
- Hand Soldering (Manual)

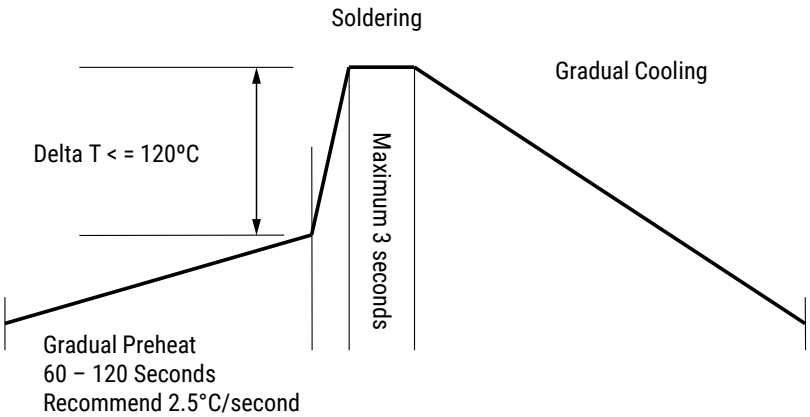
Recommended Soldering Profile:

- Optimum Wave Solder Profile



- Hand Soldering (Manual)

Manual Solder Profile with Pre-heating



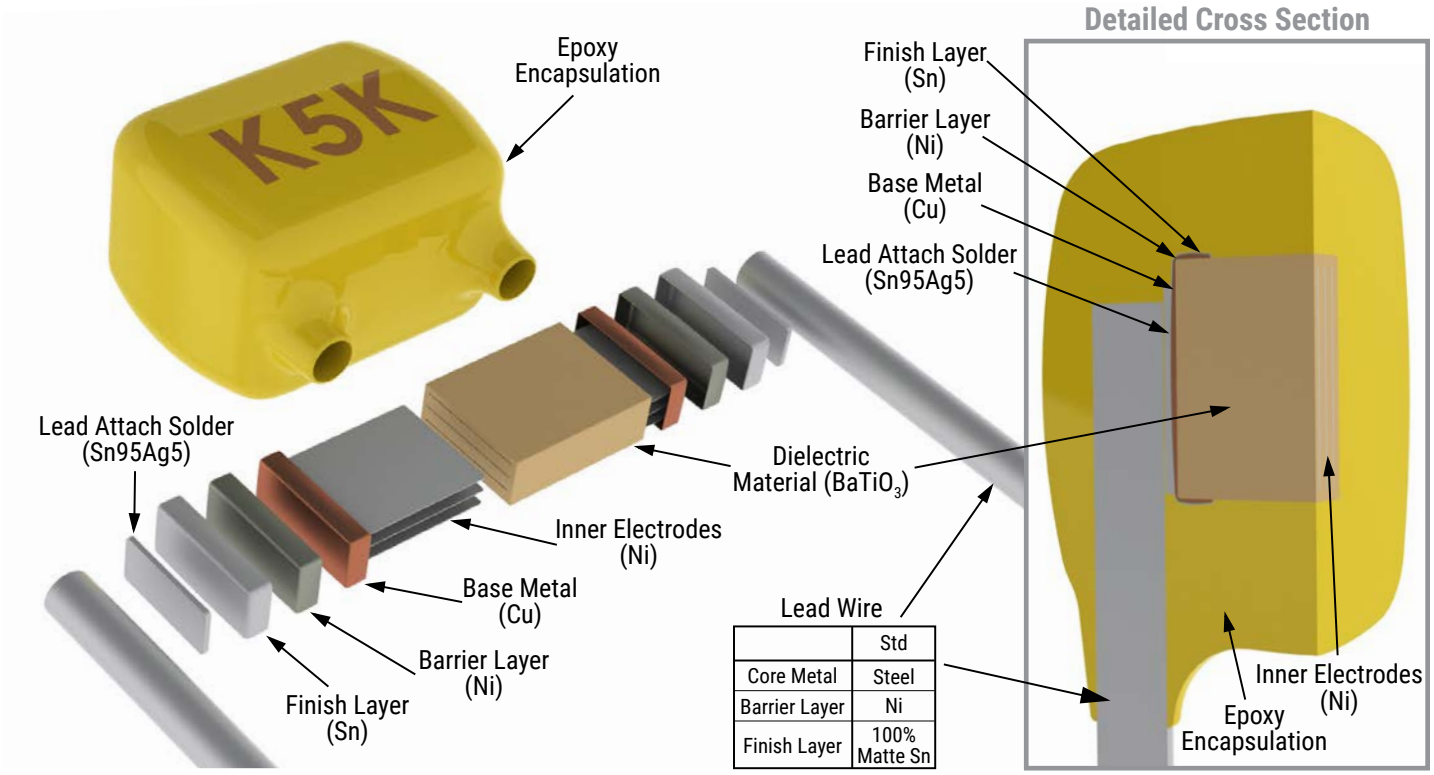
KEMET recommends following the guidelines and techniques outlined in technical bulletins F2103 and F9207.

Storage & Handling

The un-mounted storage life of a leaded ceramic capacitor is dependent upon storage and atmospheric conditions as well as packaging materials. While the ceramic chips enveloped under the epoxy coating themselves are quite robust in most environments, solderability of the wire lead on the final epoxy-coated product 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 and exposure todirect sunlight – reels may soften or warp, and tape peel force may increase.

KEMET recommends storing the un-mounted capacitors in their original packaging, in a location away from direct sunlight, and where the temperature and relative humidity do not exceed 40 degrees centigrade and 70% respectively. For optimum solderability, capacitor stock should be used promptly, preferably within 18 months of receipt. For applications requiring pre-tinning of components, storage life may be extended if solderability is verified. Before cleaning, bonding or molding these devices, it is important to verify that your process does not affect product quality and performance. KEMET recommends testing and evaluating the performance of a cleaned, bonded or molded product prior to implementing and/or qualifying any of these processes.

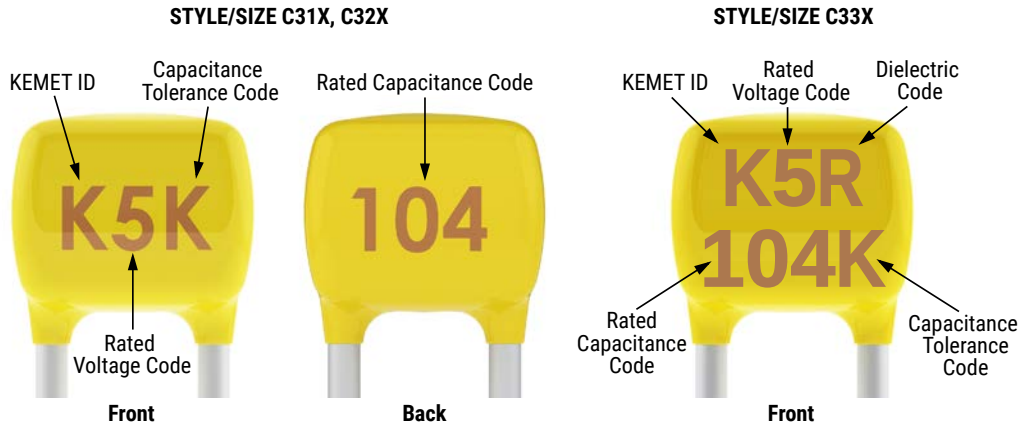
Construction



	Std
Core Metal	Steel
Barrier Layer	Ni
Finish Layer	100% Matte Sn

Capacitor Marking

These capacitors shall be stamped or laser marked with KEMET's trademark, rated voltage, rated capacitance and capacitance tolerance. DIelectric information will be included only when the body size of the component allows. Marking will be supplied on one or both sides of the coated capacitor body. All marking shall be legible to allow for clear identification of the component. Marking appears in legible contrast. An example of the marking format and content is illustrated below.



Packaging Quantities

Series	Standard Bulk Quantity	Ammo Pack Quantity Maximum	Reel Quantity Maximum (12" Reel)
315	500/Bag	2500	
316			
317			
318			
320			
321		N/A	N/A
322		2500	
323			
324			
325			
326			
327			
328			
330	250/Bag	1500	
331		N/A	N/A
333		1500	
335			
336			

Tape & Reel Packaging Information

KEMET offers standard reeling of Molded and Conformally Coated Radial Leaded Capacitors in accordance with EIA standard 468. Parts are taped to a tagboard carrier strip, and wound on a reel as shown in Figure 1. Kraft paper interleaving is inserted between the layers of capacitors on the reel. Ammopack is also available, with the same lead tape configuration and package quantities.

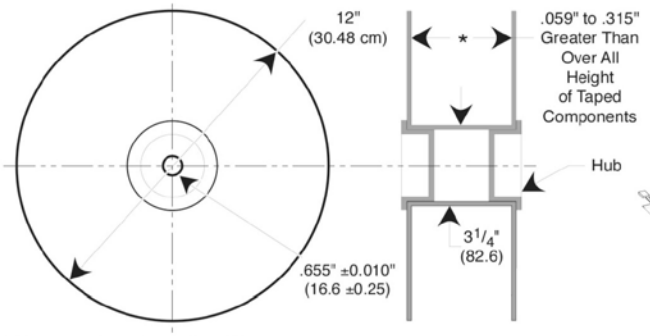
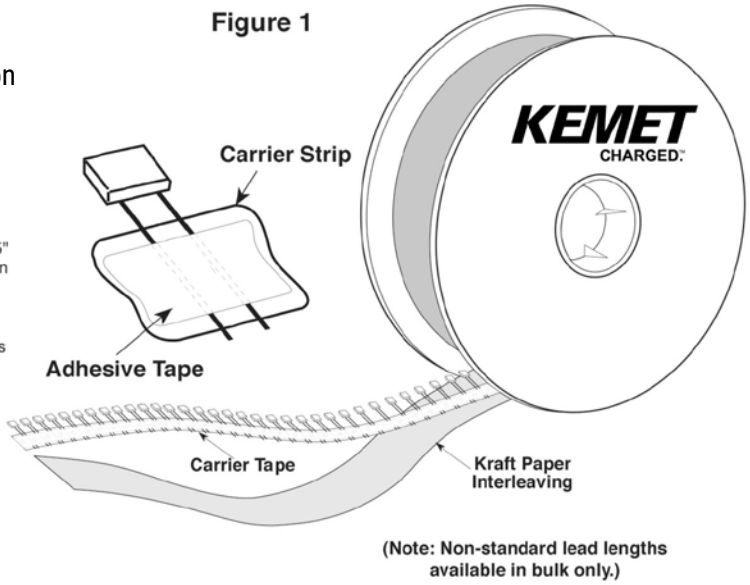


Figure 3: Standard Reel

Figure 1



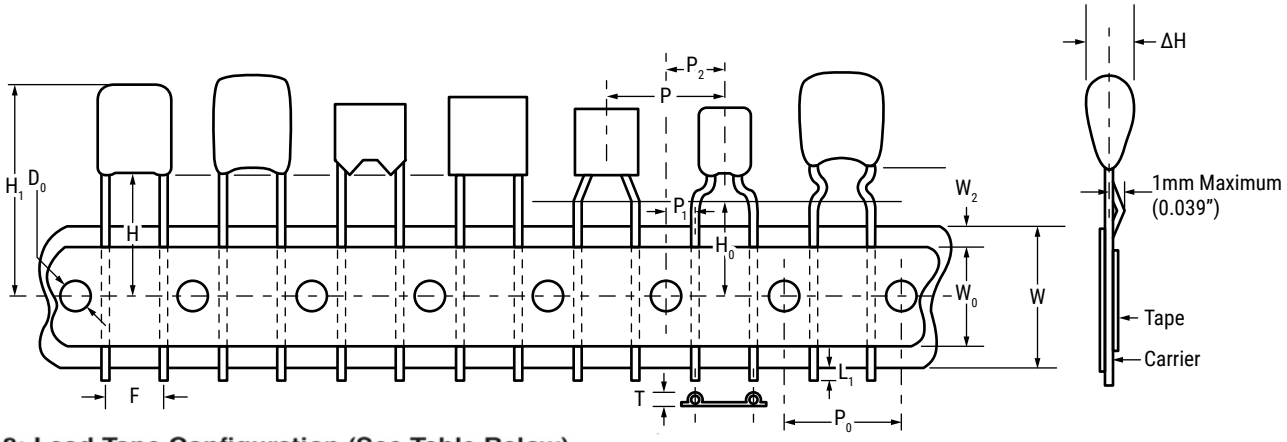


Figure 2: Lead Tape Configuration (See Table Below)

Ceramic Radial Tape and Reel Dimensions

Metric will govern

Constant Dimensions — Millimeters (Inches)								
D_0 ±0.2 (0.008)	P_0 ±0.3 (0.012)	ΔH ±0.2 (0.008)	L_1 Maximum	t ±0.2 (0.008)	T Maximum	W +1.0/−0.5 (+0.039/−0.020)	W_0 Minimum	W_2 Maximum
4.00 (0.157)	12.7 (0.500)	4.0 (0.157)	1.0 (0.039)	0.7 (0.051)	1.5 (0.059)	18.0 (0.709)	5.0 (0.197)	3.0 (0.118)

Ceramic Radial Tape and Reel Dimensions cont.

Metric will govern

Variable Dimensions — Millimeters (Inches)							
F ±0.78 (0.030)[1]	P_1 ±0.30 (0.012)[1]	P ±0.3 (0.012)	P_2 ±1.3 (0.051)	H		H_0	
				Straight Lead Configuration		Formed Lead Configuration[2]	
				Packaging C-Spec[3]			
				7301/7305	7303/7317	7301/7305	7303/7317
2.54 (0.100)	5.08 (0.200)	12.7 (0.500)	6.35 (0.250)	16.0±0.5 (0.630±0.020)	18.0 (0.709) Minimum	16.0±0.5 (0.630±0.020)	18.0 (0.709) Minimum
4.32 (0.170)	3.89 (0.153)	12.7 (0.500)	6.35 (0.250)				
5.08 (0.200)	3.81 (0.150)	12.7 (0.500)	6.35 (0.250)				
5.59 (0.220)	3.25 (0.128)	12.7 (0.500)	6.35 (0.250)				
6.98 (0.275)	2.54 (0.100)	12.7 (0.500)	6.35 (0.250)				
7.62 (0.300)	2.24 (0.088)	12.7 (0.500)	6.35 (0.250)				
9.52 (0.375)	7.62 (0.300)	12.7 (0.500)	6.35 (0.250)				
10.16 (0.400)	7.34 (0.290)	25.4 (1.000)	N/A				
12.06 (0.475)	6.35 (0.250)	25.4 (1.000)	N/A				
14.60 (0.575)	5.08 (0.200)	25.4 (1.000)	N/A				
17.14 (0.675)	3.81 (0.15)	25.4 (1.000)	N/A				

[1] Measured at the egress from the carrier tape, on the component side.

[2] Formed lead configuration includes: "shoulder bend", "inside kink", "outside kink", and "snap-in". For more information regarding available lead configurations see "Dimensions" section of this document.

[3] The "Packaging C-Spec" is a 4 digit code which identifies the packaging type, lead length and/or lead material. When ordering, the proper code must be included in the 15th through 18th character positions of the ordering code. See "Ordering Information" section of this document for further details.

Symbol Reference Table	
D_0	Sprocket Hole Diameter
P_0	Sprocket Hole Pitch
P	Component Pitch
F	Lead Spacing
P_1	Sprocket Hole Center to Lead Center
P_2	Sprocket Hole Center To Component Center
H	Height to Seating Plane (Straight Leads Only)
H_0	Height to Seating Plane (Formed Leads Only)
H_1	Component Height Above Tape Center
ΔH	Component Alignment
L_1	Lead Protrusion
t	Composite Tape Thickness
W	Carrier Tape Width
W_0	Hold-Down Tape Width
W_2	Hold-Down Tape Location

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EXV227M050A9PAA MPXV1D1054L100 C0603C273K1RACTU C4AQLBU5160M11K CBR04C808B5GAC MPX1D1740L6R8 PEH532RDG4180M2 SN8S-40P2 T498X106K050ATE500 GTX-2200-Y0X SBC4-471-491 C0603X339C5GACTU C1206C222K2RACTU R66ID3220AA7AK T496X227K010ATE500 C0603C470K5RACAUTO RSBEC1470AA00K SNT-D30T SS26V-080350 C0805C473K2RACTU LDEDD4100KA0N00 MPX1D1235L1R0 C0805C339D5GACTU C0805X221M5RACTU CBR04C339B5GAC T350A104K035AT C0603C160J5GACTU CBR04C180F2GAC R413F1100CK00M RM4A(025)-185X70T0800