Surface Mount Ceramic Chip Capacitors – Ultra Stable X8R Dielectric

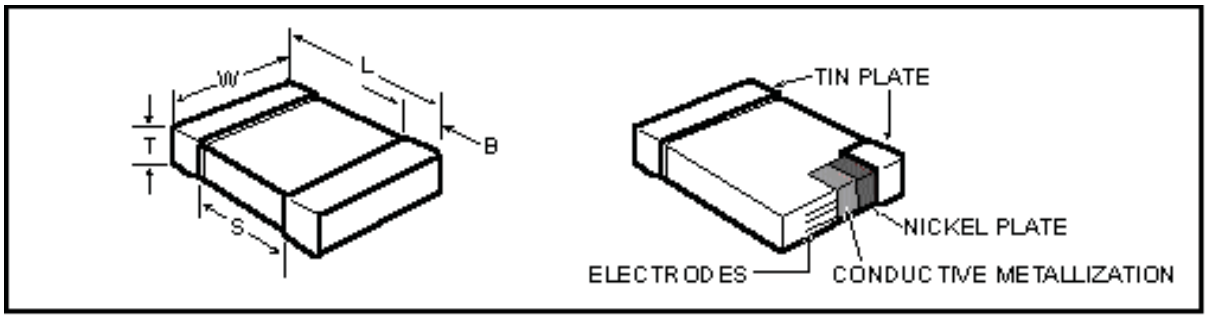


KEMET's Ultra Stable X8R Dielectric features a 150°C maximum operating temperature, offering the latest in high temperature dielectric technology and therefore a reliable choice for extreme temperature applications. It offers the same temperature capability as conventional X8R, but without the capacitance loss due to applied DC voltage. Ultra Stable X8R exhibits no capacitance loss and is a suitable replacement for higher capacitance and larger footprint devices that fail to offer capacitance stability. Product applications include harsh environments such as Down Hole (Oil Exploration), Automotive (Under Hood), Military and Aerospace.

Six standard package options are available which include EIA 0402, 0603, 0805, 1206, 1210, and 1812 case sizes. Devices are available in dc voltage ratings of 25V, 50V and 100V, with capacitance offerings ranging from 10pF to 0.22µF. Capacitance tolerances offerings include ±1%, ±2%, ±5%, ±10% and ±20%, with capacitance shift limited to ±15% from -55°C to +150°C.

All parts are environmentally friendly, in compliance with RoHS legislation (RoHS 6/6) and are being offered in both commercial and automotive grades with 100% pure matte tin-plated terminations that allow for excellent solderability. A Sn/Pb termination option is also available upon request.

Outline Drawing



Dimensions - Millimeters (Inches)

EIA SIZE CODE	METRIC SIZE CODE	L - LENGTH	W - WIDTH	B - BANDWIDTH	S SEPARATION minimum	MOUNTING TECHNIQUE
0402	1005	1.0 (.04) ± .05 (.002)	0.5 (.02) ± .05 (.002)	0.30 (.012) ±.10 (.004)	0.3 (.012)	Solder Reflow
0603	1608	1.6 (.063) ± .15 (.006)	0.8 (.032) ± .15 (.006)	0.35 (.014) ± .15 (.006)	0.7 (.028)	Solder Wave + or Solder Reflow
0805	2012	2.0 (.079) ± .20 (.008)	1.25 (.049) ± .20 (.008)	0.50 (.02) ± .25 (.010)	0.75 (.030)	
1206	3216	3.2 (.126) ± .20 (.008)	1.6 (.063) ± .20 (.008)	0.50 (.02) ± .25 (.010)	N/A	
1210	3225	3.2 (.126) ± .20 (.008)	2.5 (.098) ± .20 (.008)	0.50 (.02) ± .25 (.010)	N/A	Solder Reflow
1812	4520	4.5 (.177) ± .3 (.012)	3.2 (.126) ± .3 (.012)	0.6 (.024) ± .35 (.014)	N/A	

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Qualification Certification:

Automotive Grade Available: AEC-Q200 Rev. C
RoHS-PRC (6/6) - 100% matte Sn termination

Electrical Parameters:

As detailed in the KEMET Surface Mount Catalog F3102 for X8R, with following specific requirements based on room temperature (25°C) parameters:

- Operating Temperature Range: -55°C to +150°C
- Temperature Coefficient of Capacitance : ±15% (-55 to 150ºC)
- Insulation Resistance (IR) measured after 2 minutes at rated voltage @ 25°C:
  Limit is 1000 megohm microfarads or 100GΩ, whichever of the two is smaller.
- Capacitance and Dissipation Factor (DF) measured under the following conditions:
  1kHz and 1 Vrms

DF Limits are:

25 - 100 Volts: 2.5%

Ordering Information

C	1210	C	184	K	3	H	A	C
Ceramic	Case Size (L"x W")	Specification/ Series	Capacitance Code (pF)	Capacitance Tolerance	Voltage	Dielectric	Failure Rate/ Design	End Metallization (Plated)
	0402 0603 0805 1206 1210 1812	C = Standard	2 Sig. Digits + Number of Zeros	F = ±1% G = ±2% J = ±5% K = ±10% M = ±20%	3 = 25V 5 = 50V 1 = 100V	H = X8R (Ultra Stable)	A = N/A	C = 100% Matte Sn L = SnPb (5% min)

Soldering Process

All parts incorporate the standard KEMET barrier layer of pure nickel, with an overplate of pure tin to provide excellent solderability as well as resistance to leaching. The recommended techniques are as follows:

- 0402 and ≥1210 Case Sizes - Solder Reflow Only
- 0603/0805/1206 Case Sizes - Solder Wave/Solder Reflow

Marking

These chips will be supplied unmarked. If required, they can be laser-marked as an extra option. Details on the marking format are included in KEMET Surface Mount catalog F3102.

In general, the information in the KEMET Surface Mount catalog F3102 applies to these capacitors. The information in this bulletin supplements that in the catalog.

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ULTRA STABLE X8R DIELECTRIC (0402 - 1812 Case Sizes)

Cap pF	Cap Code	Series	C0402C			C0603C			C0805C			C1206C			C1210C			C1812	
		Voltage	25V	50V	100V	25V	50V	100V	25V	50V	100V	25V	50V	100V	25V	50V	100V	50V	100V
		Voltage Code	3	5	1	3	5	1	3	5	1	3	5	1	3	5	1	5	1
		Cap Tolerance	Product Availability and Chip Thickness Codes See Page 78 for Chip Thickness Dimensions																
100	101	F G J K M	BB	BB	BB														
110	111	F G J K M	BB	BB	BB														
120	121	F G J K M	BB	BB	BB														
130	131	F G J K M	BB	BB	BB														
150	151	F G J K M	BB	BB	BB														
160	161	F G J K M	BB	BB	BB														
180	181	F G J K M	BB	BB	BB														
200	201	F G J K M	BB	BB	BB														
220	221	F G J K M	BB	BB	BB														
240	241	F G J K M	BB	BB	BB														
270	271	F G J K M	BB	BB	BB														
300	301	F G J K M	BB	BB	BB														
330	331	F G J K M	BB	BB	BB														
360	361	F G J K M	BB	BB	BB														
390	391	F G J K M	BB	BB	BB														
430	431	F G J K M	BB	BB	BB	CB	CB	CB											
470	471	F G J K M	BB	BB	BB	CB	CB	CB											
510	511	F G J K M	BB	BB	BB	CB	CB	CB											
560	561	F G J K M	BB	BB	BB	CB	CB	CB											
620	621	F G J K M	BB	BB	BB	CB	CB	CB											
680	681	F G J K M	BB	BB	BB	CB	CB	CB											
750	751	F G J K M	BB	BB	BB	CB	CB	CB											
820	821	F G J K M	BB	BB	BB	CB	CB	CB											
910	911	F G J K M	BB	BB	BB	CB	CB	CB											
1,000	102	F G J K M	BB	BB	BB	CB	CB	CB											
1,100	112	F G J K M	BB	BB		CB	CB	CB											
1,200	122	F G J K M	BB	BB		CB	CB	CB											
1,300	132	F G J K M	BB	BB		CB	CB	CB											
1,500	152	F G J K M	BB	BB		CB	CB	CB											
1,600	162	F G J K M				CB	CB	CB											
1,800	182	F G J K M				CB	CB	CB											
2,000	202	F G J K M				CB	CB	CB											
2,200	222	F G J K M				CB	CB	CB	DC	DC	DC								
2,400	242	F G J K M				CB	CB	CB	DC	DC	DC								
2,700	272	F G J K M				CB	CB	CB	DC	DC	DC								
3,000	302	F G J K M				CB	CB	CB	DC	DC	DC								
3,300	332	F G J K M				CB	CB	CB	DC	DC	DC								
3,600	362	F G J K M				CB	CB	CB	DC	DC	DC								
3,900	392	F G J K M				CB	CB	CB	DC	DC	DC								
4,300	432	F G J K M				CB	CB	CB	DC	DC	DC								
4,700	472	F G J K M				CB	CB	CB	DC	DC	DC								
5,100	512	F G J K M				CB	CB		DC	DC	DC								
5,600	562	F G J K M				CB	CB		DC	DC	DC								
6,200	622	F G J K M				CB	CB		DC	DC	DC								
6,800	682	F G J K M				CB	CB		DC	DC	DC	EB	EB	EB					
7,500	752	F G J K M				CB			DC	DC	DC	EB	EB	EB					
8,200	822	F G J K M				CB			DC	DC	DC	EB	EB	EB					
9,100	912	F G J K M				CB			DC	DC	DC	EB	EB	EB					
10,000	103	F G J K M				CB			DC	DC	DD	EB	EB	EB					
12,000	123	F G J K M							DC	DC	DE	EB	EB	EB	FB	FB	FB		
15,000	153	F G J K M							DC	DD	DG	EB	EB	EB	FB	FB	FB	GB	GB
18,000	183	F G J K M							DC	DD		EB	EB	EB	FB	FB	FB	GB	GB
22,000	223	F G J K M							DD	DF		EB	EB	EC	FB	FB	FB	GB	GB
27,000	273	F G J K M							DF			EB	EB	EE	FB	FB	FB	GB	GB
33,000	333	F G J K M							DG			EB	EB	EE	FB	FB	FB	GB	GB
47,000	473	F G J K M										EC	EE	EH	FB	FB	FE	GB	GB
56,000	563	F G J K M										ED	EF	EH	FB	FB	FF	GB	GB
68,000	683	F G J K M										EF	EH		FB	FC	FG	GB	GB
82,000	823	F G J K M										EH	EH		FC	FF	FH	GB	GB
100,000	104	F G J K M										EH			FE	FG	FM	GB	GD
120,000	124	F G J K M													FG	FH		GB	GH
150,000	154	F G J K M													FH	FM		GD	GN
180,000	184	F G J K M													FJ			GH	
220,000	224	F G J K M																GK	
		Voltage Code	3	5	1	3	5	1	3	5	1	3	5	1	3	5	1	5	1
Cap pF	Cap Code	Voltage	25V	50V	100V	25V	50V	100V	25V	50V	100V	25V	50V	100V	25V	50V	100V	50V	100V
		Series	C0402C			C0603C			C0805C			C1206C			C1210C			C1812	

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Packaging Specifications

Thickness Code	Chip Size	Thickness ± Range (mm)	Qty per Reel 7" Plastic	Qty per Reel 13" Plastic	Qty per Reel 7" Paper	Qty per Reel 13" Paper	Qty per Bulk Cassette
AA	01005	0.20 ± 0.02	--	--	15000	--	--
AB	0201	0.30 ± 0.03	--	--	15000	--	--
BB	0402	0.50 ± 0.05	--	--	10000	50000	50000
CB	0603	0.80 ± 0.07	--	--	4000	10000	15000
CC	0603	0.80 ± 0.10	--	--	4000	10000	--
CD	0603	0.80 ± 0.15	--	--	4000	10000	--
DB	0805	0.60 ± 0.10	--	--	4000	10000	10000
DC	0805	0.78 ± 0.10	--	--	4000	10000	--
DD	0805	0.90 ± 0.10	--	--	4000	10000	--
DE	0805	1.00 ± 0.10	2500	10000	--	--	--
DF	0805	1.10 ± 0.10	2500	10000	--	--	--
DG	0805	1.25 ± 0.15	2500	10000	--	--	--
DH	0805	1.25 ± 0.20	2500	10000	--	--	--
DL	0805	0.95 ± 0.10	4000	10000	--	--	
EB	1206	0.78 ± 0.10	4000	10000	4000	10000	--
EC	1206	0.90 ± 0.10	4000	10000	--	--	--
ED	1206	1.00 ± 0.10	2500	10000	--	--	--
EE	1206	1.10 ± 0.10	2500	10000	--	--	--
EF	1206	1.20 ± 0.15	2500	10000	--	--	--
EG	1206	1.60 ± 0.15	2000	8000	--	--	--
EH	1206	1.60 ± 0.20	2000	8000	--	--	--
EJ	1206	1.70 ± 0.20	2000	8000	--	--	--
EK	1206	0.80 ± 0.10	2000	8000	--	--	--
EM	1206	1.25 ± 0.15	2500	10000	--	--	--
EN	1206	0.95 ± 0.10	4000	10000	--	--	--
FB	1210	0.78 ± 0.10	4000	10000	--	--	--
FC	1210	0.90 ± 0.10	4000	10000	--	--	--
FD	1210	0.95 ± 0.10	4000	10000	--	--	--
FE	1210	1.00 ± 0.10	2500	10000	--	--	--
FF	1210	1.10 ± 0.10	2500	10000	--	--	--
FG	1210	1.25 ± 0.15	2500	10000	--	--	--
FH	1210	1.55 ± 0.15	2000	8000	--	--	--
FJ	1210	1.85 ± 0.20	2000	8000	--	--	--
FK	1210	2.10 ± 0.20	2000	8000	--	--	--
FL	1210	1.40 ± 0.15	2000	8000	--	--	--
FM	1210	1.70 ± 0.20	2000	8000	--	--	--
FN	1210	1.85 ± 0.20	2000	8000	--	--	--
FO	1210	1.50 ± 0.20	2000	8000	--	--	--
FP	1210	1.60 ± 0.20	2000	8000	--	--	--
FR	1210	2.25 ± 0.20	2000	8000	--	--	--
FS	1210	2.50 ± 0.20	1000	4000	--	--	--
FT	1210	1.90 ± 0.20	1500	4000	--	--	--
GB	1812	1.00 ± 0.10	1000	4000	--	--	--
GC	1812	1.10 ± 0.10	1000	4000	--	--	--
GD	1812	1.25 ± 0.15	1000	4000	--	--	--
GE	1812	1.30 ± 0.10	1000	4000	--	--	--
GF	1812	1.50 ± 0.10	1000	4000	--	--	--
GG	1812	1.55 ± 0.10	1000	4000	--	--	--
GH	1812	1.40 ± 0.15	1000	4000	--	--	--
GJ	1812	1.70 ± 0.15	1000	4000	--	--	--
GK	1812	1.60 ± 0.20	1000	4000	--	--	--
GL	1812	1.90 ± 0.20	1000	4000	--	--	--
GM	1812	2.00 ± 0.20	1000	4000	--	--	--
GN	1812	1.70 ± 0.20	1000	4000	--	--	--
GO	1812	2.50 ± 0.20	500	2000	--	--	--
HB	1825	1.10 ± 0.15	1000	4000	--	--	--
HC	1825	1.15 ± 0.15	1000	4000	--	--	--
HD	1825	1.30 ± 0.15	1000	4000	--	--	--
HE	1825	1.40 ± 0.15	1000	4000	--	--	--
HF	1825	1.50 ± 0.15	1000	4000	--	--	--
HG	1825	1.60 ± 0.20	1000	4000	--	--	--
JB	2220	1.00 ± 0.15	1000	4000	--	--	--
JC	2220	1.10 ± 0.15	1000	4000	--	--	--
JD	2220	1.30 ± 0.15	1000	4000	--	--	--
JE	2220	1.40 ± 0.15	1000	4000	--	--	--
JF	2220	1.50 ± 0.15	1000	4000	--	--	--
JG	2220	1.70 ± 0.15	1000	4000	--	--	--
JH	2220	1.60 ± 0.15	1000	4000	--	--	--
JO	2220	2.40 ± 0.15	500	2000	--	--	--
JP	2220	1.60 ± 0.20	1000	4000	--	--	--
KB	2225	1.00 ± 0.15	1000	4000	--	--	--
KC	2225	1.10 ± 0.15	1000	4000	--	--	--
KD	2225	1.30 ± 0.15	1000	4000	--	--	--
KE	2225	1.40 ± 0.15	1000	4000	--	--	--
KF	2225	1.60 ± 0.20	1000	4000	--	--	--
LA	1808	1.40 ± 0.15	1000	4000	--	--	--
LB	1808	1.60 ± 0.15	1000	4000	--	--	--
LC	1808	2.00 ± 0.15	1000	4000	--	--	--
LD	1808	0.90 ± 0.10	2500	10000	--	--	--
MA	1632	0.80 ± 0.10	4000	10000	--	--	--
NA	1706	0.90 ± 0.10	4000	10000	--	--	--
NA	1706	0.90 ± 0.10	4000	10000	--	--	--
PA	1220	0.80 ± 0.10	4000	10000	--	--	--

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