

Surface Mount Ceramic Chip Capacitors – Ultra Stable X8R Dielectric

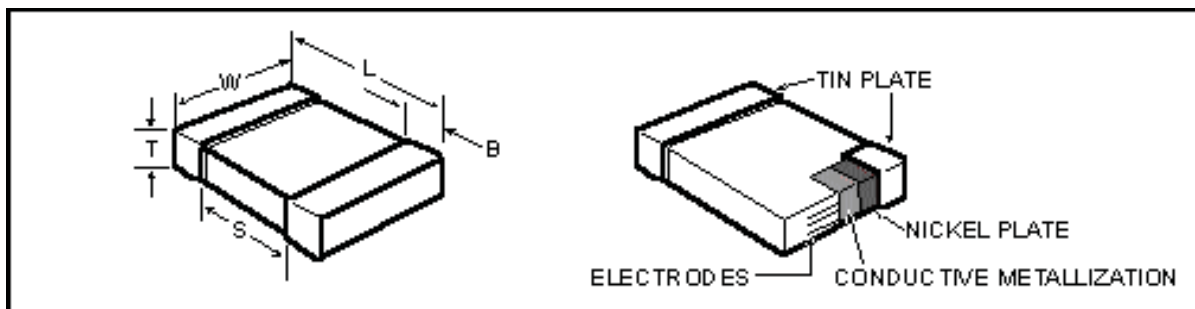


KEMET's Ultra Stable X8R Dielectric features a 150°C maximum operating temperature, offering the latest in high temperature dielectric technology and therefore a reliable choice for extreme temperature applications. It offers the same temperature capability as conventional X8R, but without the capacitance 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 or Solder Wave + Solder Reflow
0603	1608	1.6 (.063) ± .15 (.006)	0.8 (.032) ± .15 (.006)	0.35 (.014) ± .15 (.006)	0.7 (.028)	
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	Solder Reflow
1210	3225	3.2 (.126) ± .20 (.008)	2.5 (.098) ± .20 (.008)	0.50 (.02) ± .25 (.010)	N/A	
1812	4520	4.5 (.177) ± .3 (.012)	3.2 (.126) ± .3 (.012)	0.6 (.024) ± .35 (.014)	N/A	

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 150°C)
- 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.

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	25V	50V	100V
		Voltage Code	3	5	1	3	5	1	3	5	1	3	5	1	3	5	1	3	5	1
		Cap Tolerance	Product Availability and Chip Thickness Codes See Page 78 for Chip Thickness Dimensions																	
100	101	FG J KM	BB	BB	BB															
110	111	FG J KM	BB	BB	BB															
120	121	FG J KM	BB	BB	BB															
130	131	FG J KM	BB	BB	BB															
150	151	FG J KM	BB	BB	BB															
160	161	FG J KM	BB	BB	BB															
180	181	FG J KM	BB	BB	BB															
200	201	FG J KM	BB	BB	BB															
220	221	FG J KM	BB	BB	BB															
240	241	FG J KM	BB	BB	BB															
270	271	FG J KM	BB	BB	BB															
300	301	FG J KM	BB	BB	BB															
330	331	FG J KM	BB	BB	BB															
360	361	FG J KM	BB	BB	BB															
390	391	FG J KM	BB	BB	BB															
430	431	FG J KM	BB	BB	BB	CB	CB	CB												
470	471	FG J KM	BB	BB	BB	CB	CB	CB												
510	511	FG J KM	BB	BB	BB	CB	CB	CB												
560	561	FG J KM	BB	BB	BB	CB	CB	CB												
620	621	FG J KM	BB	BB	BB	CB	CB	CB												
680	681	FG J KM	BB	BB	BB	CB	CB	CB												
750	751	FG J KM	BB	BB	BB	CB	CB	CB												
820	821	FG J KM	BB	BB	BB	CB	CB	CB												
910	911	FG J KM	BB	BB	BB	CB	CB	CB												
1,000	102	FG J KM	BB	BB	BB	CB	CB	CB												
1,100	112	FG J KM	BB	BB		CB	CB	CB												
1,200	122	FG J KM	BB	BB		CB	CB	CB												
1,300	132	FG J KM	BB	BB		CB	CB	CB												
1,500	152	FG J KM	BB	BB		CB	CB	CB												
1,600	162	FG J KM				CB	CB	CB												
1,800	182	FG J KM				CB	CB	CB												
2,000	202	FG J KM				CB	CB	CB												
2,200	222	FG J KM				CB	CB	CB	DC	DC	DC									
2,400	242	FG J KM				CB	CB	CB	DC	DC	DC									
2,700	272	FG J KM				CB	CB	CB	DC	DC	DC									
3,000	302	FG J KM				CB	CB	CB	DC	DC	DC									
3,300	332	FG J KM				CB	CB	CB	DC	DC	DC									
3,600	362	FG J KM				CB	CB	CB	DC	DC	DC									
3,900	392	FG J KM				CB	CB	CB	DC	DC	DC									
4,300	432	FG J KM				CB	CB	CB	DC	DC	DC									
4,700	472	FG J KM				CB	CB	CB	DC	DC	DC									
5,100	512	FG J KM				CB	CB	CB	DC	DC	DC									
5,600	562	FG J KM				CB	CB	CB	DC	DC	DC									
6,200	622	FG J KM				CB	CB	CB	DC	DC	DC									
6,800	682	FG J KM				CB	CB	CB	DC	DC	DC	EB	EB	EB						
7,500	752	FG J KM				CB	CB	CB	DC	DC	DC	EB	EB	EB						
8,200	822	FG J KM				CB	CB	CB	DC	DC	DC	EB	EB	EB						
9,100	912	FG J KM				CB	CB	CB	DC	DC	DC	EB	EB	EB						
10,000	103	FG J KM				CB	CB	CB	DC	DC	DC	EB	EB	EB						
12,000	123	FG J KM				CB	CB	CB	DC	DC	DC	EB	EB	EB						
15,000	153	FG J KM							DC	DD	DG	EB	EB	EB	FB	FB	FB	GB	GB	
18,000	183	FG J KM							DC	DD	DG	EB	EB	EB	FB	FB	FB	GB	GB	
22,000	223	FG J KM							DD	DF		EB	EB	EB	EC	FB	FB	GB	GB	
27,000	273	FG J KM							DF			EB	EB	EB	EE	FB	FB	GB	GB	
33,000	333	FG J KM							DG			EB	EB	EB	EE	FB	FB	GB	GB	
47,000	473	FG J KM										EC	ED	EH	FB	FB	FE	GB	GB	
56,000	563	FG J KM										ED	EF	EH	FB	FB	FE	GB	GB	
68,000	683	FG J KM										EF	EH	EH	FB	FC	FG	GB	GB	
82,000	823	FG J KM										EF	EH	EH	FB	FF	FG	GB	GB	
100,000	104	FG J KM										EH			FE	FG	FM	GB	GD	
120,000	124	FG J KM													FG	FH		GB	GH	
150,000	154	FG J KM													FH	FM		GD	GN	
180,000	184	FG J KM													FJ			GH		
220,000	224	FG J KM																GK		
Cap pF	Cap Code	Voltage Code	3	5	1	3	5	1	3	5	1	3	5	1	3	5	1	3	5	1
Cap pF	Cap Code	Voltage	25V	50V	100V	25V	50V	100V	25V	50V	100V	25V	50V	100V	25V	50V	100V	25V	50V	100V
Cap pF	Cap Code	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	1.65 ± 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	1.65 ± 0.20	2000	8000	--	--	--
FO	1210	1.90 ± 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	1.80 ± 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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