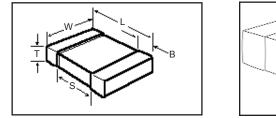
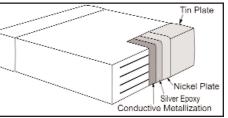


Surface Mount Ceramic Chip Capacitors / FT-CAP / Flexible Terminations

Outline Drawing





The "Flexible Termination (FT-CAP)" capacitor is a surface mount multi-layer ceramic capacitor that incorporates a unique, flexible termination system that is integrated with standard termination materials. A conductive silver epoxy is utilized between the conductive metallization and nickel barrier finish in order to establish pliability while maintaining terminal strength, solderability and electrical performance. This technology was developed to address the primary failure mode of MLCC's, flex cracks, which are typically the result of excessive shear stresses produced during board flexure. Flexible termination technology directs board flex stress away from the ceramic body and into the conductive epoxy area, therefore mitigating flex cracks which can result in low-IR or short-circuit failures. The FT-CAP offers up to 5mm of flex-bend capability, complementing our current "Open Mode", "Floating Electrode (FE-CAP)" and "Floating Electrode with Flexible Termination (FF-CAP) product lines by providing our customers with a complete portfolio of flex solutions.

Qualification/Certification

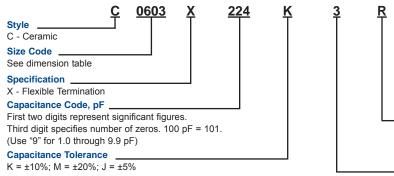
Automotive Grade Available: AEC-Q200 Rev. C RoHS 6/6 - 100% matte tin termination

Dimensio	Dimensions – Millimeters (Inches)										
EIA Size Code	Metric Size Code	L Length	W Width	B Bandwidth	S Separation						
0603	1608	1.6 (.063) ± 0.15 (.006)	0.8 (.032) ± 0.15 (.006)	0.35 (.014) ± 0.15 (.006)	0.70 (.028)						
0805	2012	2.1 (.083) ± 0.20 (.008)	1.25 (.049) ± 0.20 (.008)	0.05 (.02) ± 0.25 (.010)	0.75 (.030)						
1206	3216	3.4 (.134) ± 0.20 (.008)	1.6 (.063) ± 0.20 (.008)	0.50 (.02) ± .25 (.010)	N/A						
1210	3225	3.4 (.134) ± 0.20 (.008)	2.5 (.098) ± 0.20 (.008)	0.50 (.02) ± .25 (.010)	N/A						
1808	4520	4.8 (.189) ± 0.40 (.016)	2.0 (.079) ± 0.20 (.008)	0.60 (.024) ± 0.35 (.014)	N/A						
1812	4532	4.8 (.189) ± 0.40 (.016)	3.2 (.126) ± 0.30 (.021)	0.60 (.024) ± 0.35 (.014)	N/A						
1825	4564	4.8 (.177) ± 0.40 (.016)	6.4 (.250) ± 0.40 (.016)	0.60 (.024) ± 0.35 (.014)	N/A						
2220	5650	6.0 (.236) ± 0.55 (.022)	5.0 (.197) ± 0.40 (.016)	0.60 (.024) ± 0.35 (.014)	N/A						
2225	5664	6.0 (.236) ± 0.55 (.022)	6.4 (.250) ± 0.40 (.016)	0.60 (.024) ± 0.35 (.014)	N/A						

See "Capacitance Range" tables next page for capacitor chip thickness code specification. Capacitor chip thickness dimensions are detailed in the "Thickness Code Reference Chart" of KEMET Surface Mount Catalog F3102.



Ordering Information



End Metallization C = 100% MatteTin Plated Failure Rate Level A = Not Applicable Temperature Characteristic Designated by Capacitance Change over Temperature Range R – X7R (±15%) (-55°C +125°C) Voltage

<u><u><u></u></u></u>

<u>A</u>

9 = 6.3V, 8 = 10V, 4 = 16V, 3 = 25V, 5 = 50V, 1 = 100V, 2 = 200V

X7R Capacitance Range - 0603 thru 1210 Case Sizes

Cap	Сар	Cap Tol.			_	C0603				C0805						C1206						C1210								
pF	Code		6.3V	10V	16V	25V	50V	100V	200V	6.3V	10V	16V	25V	50V	100V	200V	6.3V	10V	16V	25V	50V	100V	200V	6.3V	10V	16V	25V	50V	100V	200V
180	181	J,K,M	CB	DC																										
220 270	221 271	J,K,M J,K,M	CB CB	DC DC				<u> </u>		<u> </u>		<u> </u>																		
330	331	J,K,M	CB	DC		-										-														
390	391	J,K,M	СВ	CB	CB	CB	СВ	CB	CB	DC																				
470	471	J,K,M	CB	DC																										
560	561 681	J,K,M J,K,M	CB CB	DC DC							<u> </u>	<u> </u>			<u> </u>			\vdash												
820	821	J,K,M	CB	DC														\vdash												
1,000	102	J,K,M	СВ	CB	CB	CB	СВ	CB	CB	DC	EB																			
1,200	122	J,K,M	CB	DC	EB																									
1,500	152 182	J,K,M J,K,M	CB CB	DC DC	EB EB	<u> </u>																								
2,200	222	J,K,M	CB	DC	EB	FB																								
2,700	272	J,K,M	СВ	СВ	CB	СВ	СВ	CB	СВ	DC	EB	FB																		
3,300	332	J,K,M	CB	DC	EB	FB																								
3,900	392 472	J,K,M J,K,M	CB CB	DC DC	EB EB	FB FB																								
5,600	562	J,K,M	CB	DC	EB	FB																								
6,800	682	J,K,M	СВ	CB	CB	CB	СВ	CB	CB	DC	EB	FB																		
8,200	822	J,K,M	CB	DC	EB	FB																								
10,000	103 123	J,K,M J,K,M	CB CB	CB CB	CB CB	CB CB	CB CB	CB CB	CB	DC DC	EB EB	FB FB																		
12,000	123	J,K,M	CB	CB	CB	CB	CB	CB		DC	DC	DC	DC	DC	DD	DC	EB	FB												
18,000	183	J,K,M	CB	CB	СВ	CB	СВ	CB		DC	DC	DC	DC	DC	DD	DC	EB	FB												
22,000	223	J,K,M	СВ	CB	CB	CB	СВ	CB		DC	DC	DC	DC	DC	DD	DC	EB	FB												
27,000	273	J,K,M	CB	CB	CB	CB	CB	CB		DC	DC	DC	DC	DC	DD	DE	EB	FB												
33,000 39,000	333 393	J,K,M J,K,M	CB CB	CB CB	CB CB	CB CB	CB CB	CB CB		DC DC	DC DC	DC DC	DC DC	DC DC	DD DD	DE DE	EB EB	EB EB	EB EB	EB EB	EB EB	EB EC	EB EB	FB FB						
47,000	473	J,K,M	CB	CB	CB	CB	CB	CB		DC	DC	DC	DC	DC	DE	DG	EB	EB	EB	EB	EB	EC	ED	FB	FB	FB	FB	FB	FB	FC
56,000	563	J,K,M	CB	CB	CB	CB	CB			DD	DD	DD	DD	DD	DE	DG	EB	EB	EB	EB	EB	EB	ED	FB	FB	FB	FB	FB	FB	FC
68,000	683	J,K,M	CB	CB	CB	CB	CB			DD	DD	DD	DD	DD	DE		EB	EB	EB	EB	EB	EB	ED	FB	FB	FB	FB	FB	FB	FC
82,000	823 104	J,K,M J,K,M	CB CB	CB CB	CB CB	CB CB	CB CB			DD DD	DD DD	DD DD	DD DD	DD DD	DE DE		EB EB	EB EB	EB EB	EB EB	EB EB	EB EB	ED EM	FB FB	FB FB	FB FB	FB FB	FB FB	FC FD	FF FG
120,000	124	J,K,M	CB	CB	CB	00	CB			DC	DC	DC	DC	DD	DG		EC	EC	EC	EC	EC	EC	EM	FB	FB	FB	FB	FB	FD	
150,000	154	J,K,M	СВ	CB	CB		CD			DC	DC	DC	DC	DD			EC	EC	EC	EC	EC	EC	EG	FC	FC	FC	FC	FC	FD	
180,000	184	J,K,M	CB	CB	CB					DC	DC	DC	DC	DD			EC	EC	EC	EC	EC	EC		FC	FC	FC	FC	FC	FD	
220,000	224 274	J,K,M J,K,M	CB CB	CB CB	CB CB	CD	<u> </u>			DC DD	DC DD	DC DD	DC DD	DD	DG		EC EB	EC EB	EC EB	EC EB	EC EC	EC EM	<u> </u>	FC FC	FC FC	FC FC	FC FC	FC FC	FD FD	
330,000	334	J,K,M	CB	CB	CB					DE	DE	DE	DE	DD			EB	EB	EB	EB	EC	EG		FD	FD	FD	FD	FD	FD	
390,000	394	J,K,M	СВ	CB	CB					DG	DG	DG	DG	DE			EB	EB	EB	EB	EC	EG		FD	FD	FD	FD	FD		
470,000	474	J,K,M	СВ	CB	CB					DG	DG	DG	DG	DE			EC	EC	EC	EC	EC	EG		FD	FD	FD	FD	FD	FD	
560,000 680,000	564 684	J,K,M J,K,M						-		DG DG	DG DG	DG DG	DG DG	DH DH			ED EE	ED EE	ED EE	ED EE	EC ED			FD FD	FD FD	FD FD	FD FD	FD FD	-	
820,000	824	J,K,M								DG	DG	DG	DG	UII			EF	EF	EF	EF	ED			FF	FF	FF	FF	FF		
1,000,000	105	J,K,M								DG	DG	DG	DG				EF	EF	EF	EG	ED			FH	FH	FH	FH	FH	FM	
1,200,000	125	J,K,M								DE	DE	DE					ED	ED	ED	EG	EH			FH	FH	FH	FH	FG		
1,500,000	155 185	J,K,M J,K,M	-	<u> </u>	—					DG DG	DG DG	DG DG			<u> </u>		EF EF	EF EF	EF EF	EG	EH			FH FH	FH	FH FH	FH FH	FG FG		\vdash
2,200,000	225	J,K,M	-	-		<u> </u>				DG	DG	DG				<u> </u>	EG	EG	EG	EF	EH		<u> </u>	FJ	FJ	FJ	FI	FG		\vdash
2,700,000	275	J,K,M															EN	EN	EN					FE	FE	FE				
3,300,000	335	J,K,M															ED	ED	ED	EH				FF	FF	FF	FM	FM		
3,900,000	395 475	J,K,M J,K,M															EF EF	EF EF	EF EF	EH				FG FC	FG FC	FG FC	FG	FS		
4,700,000	475 565	J,K,M J,K,M															EH	EH	EF	En				FC	FC	FC	FG	-5		
6,800,000	685	J,K,M															EH	EH	EH					FG	FG	FG	FM			
8,200,000	825	J,K,M															EH	EH	EH					FH	FH	FH				
10,000,000	106	J,K,M															EH	EH	EH					FH	FH	FH	FS			\square
12,000,000	126 156	J,K,M J,K,M			<u> </u>			<u> </u>	<u> </u>						<u> </u>							<u> </u>	<u> </u>	<u> </u>						\vdash
18,000,000	186	J,K,M																												
22,000,000	226	J,K,M																						FS	FS					

X7R Capacitance Range - 1808 thru 2225 Case Sizes

Сар	Сар		C1808				C18	312*			C1825			C2	220	C2225			
pF	Code	Cap Tol. 50V 100V 200V 25V 50V 100V 200V 50V		50V	50V 100V 200V			50V	100V	200V	50V	100V	200V						
4,700	472	J, K, M	LD	LD	LD														
5,600	562	J, K, M	LD	LD	LD														
6,800	682	J, K, M	LD	LD	LD	GB	GB	GB	GB										
8,200	822	J, K, M	LD	LD	LD	GB	GB	GB	GB										
10,000	103	J, K, M	LD	LD	LD	GB	GB	GB	GB										
12,000	123	J, K, M	LD	LD	LD	GB	GB	GB	GB										
15,000	153	J, K, M	LD	LD	LD	GB	GB	GB	GB										
18,000	183	J, K, M	LD	LD	LD	GB	GB	GB	GB										
22,000	223	J, K, M	LD	LD		GB	GB	GB	GB	HB	HB	HB							
27,000	273	J, K, M	LD	LD		GB	GB	GB	GB	HB	HB	HB							
33,000	333	J, K, M	LD	LD		GB	GB	GB	GB	HB	HB	HB							
39,000	393	J, K, M	LD	LD		GB	GB	GB	GB	HB	HB	HB							
47,000	473	J, K, M	LD	LD		GB	GB	GB	GB	HB	HB	HB					KC	KC	KC
56,000	563	J, K, M	LD	LD		GB	GB	GB	GB	HB	HB	HB					KC	KC	KC
68,000	683	J, K, M	LD			GB	GB	GB	GB	HB	HB	HB					KC	KC	KC
82,000	823	J, K, M	LD			GB	GB	GB	GB	HB	HB	HB				JC	KC	KC	KC
100,000	104	J, K, M	LD			GB	GB	GB	GB	HB	HB	HB				JC	KC	KC	KC
120,000	124	J, K, M	LD			GB	GB	GB	GB	HB	HB	HB				JC	KC	KC	KC
150,000	154	J, K, M	LD			GB	GB	GB	GE	HB	HB	HB				JC	KC	KC	KC
180,000	184	J, K, M	LD			GB	GB	GB	GF	HB	HB	HB				JC	KC	KC	KC
220,000	224	J, K, M				GB	GB	GB	GG	HB	HB	HB				JC	KC	KC	KC
270,000	274	J, K, M				GB	GB	GG	GG	HB	HB	HB	JC	JC	JC	JC	KB	KC	KC
330,000	334	J, K, M				GB	GB	GG	GG	HB	HB	HB	JC	JC	JC	JC	KB	KC	KC
390,000	394	J, K, M				GB	GB	GG	GG	HB	HB	HD	JC	JC	JC	JC	KB	KC	KC
470,000	474	J, K, M				GB	GB	GG	GJ	HB	HB	HD	JC	JC	JC	JC	KB	KC	KD
560,000	564	J, K, M				GC	GC	GG		HB	HD	HD	JC	JC	JC	JD	KB	KC	KD
680,000	684	J, K, M				GC	GC	GG		HB	HD	HD	JC	JC	JD	JD	KB	KC	KD
820,000	824	J, K, M				GE	GE	GG		HB		HF	JC	JC	JF	JF	KB	KC	KE
1,000,000	105	J, K, M				GE	GE	GG		HB		HF	JC	JC	JF	JF	KB	KD	KE
1,200,000	125	J, K, M								HB			JC	JC			KB		KE
1,500,000	155	J, K, M								HC			JC	JC			KC		
1,800,000	185	J, K, M								HD			JD	JD			KD		
2,200,000	225	J, K, M								HF			JF	JF			KD		
2,700,000	275	J, K, M																	
3,300,000	335	J, K, M																	
3,900,000	395	J, K, M																	
4,700,000	475	J, K, M				GK	GK												
5,600,000	565	J, K, M																	
6,800,000	685	J, K, M		L															
8,200,000	825	J, K, M																	
10,000,000	106	J, K, M				GK							JF	JO					
12,000,000	126	J, K, M																	
15,000,000	156	J, K, M												JO					
18,000,000	186	J, K, M																	
22,000,000	226	J, K, M											JO						

Electrical Parameters

As detailed in the KEMET Surface Mount Catalog F3102 for X7R, with following specific requirements based on room temperature (25°C) parameters:

- Operating Range: -55°C to +125°C, with no-bias capacitance shift limited to ± 15% over that range.
- Insulation Resistance (IR) measured after 2 minutes at rated voltage @ 25°C: Limit is 1000
- megohm microfarads or 100,000 $\mbox{M}\Omega,$ whichever of the two is smaller.
- Capacitance and Dissipation Factor (DF) measured under the following conditions: 1kHz and 1 Vrms if capacitance ≤ 10µF 120Hz and 0.5 Vrms if capacitance > 10µF
- DF Limits are:

50 - 200 Volts	2.5%
16 - 25 Volts	3.5%
6.3/10 Volts	5.0%

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:

- 1210-2225 case sizes Solder Reflow
- 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.

