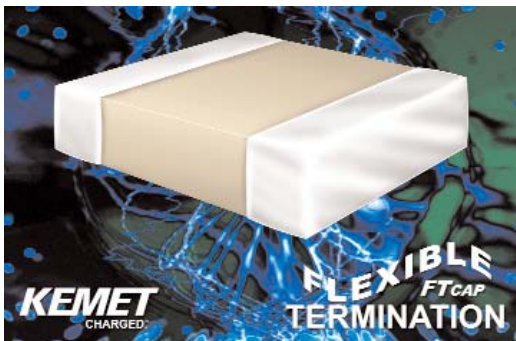
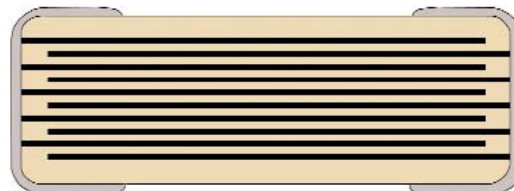


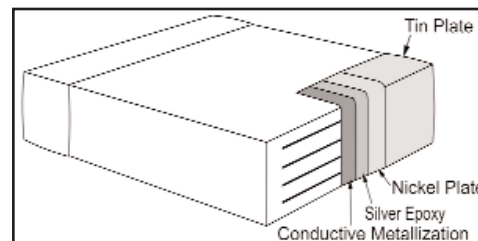
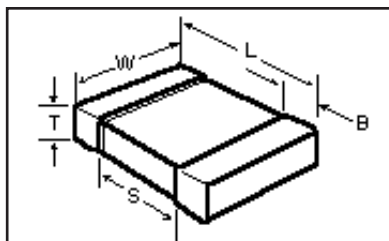
Surface Mount Ceramic Chip Capacitors / **FT-CAP** / Flexible Terminations



Standard Electrode Internal Design



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.

Dimensions – Millimeters (Inches)

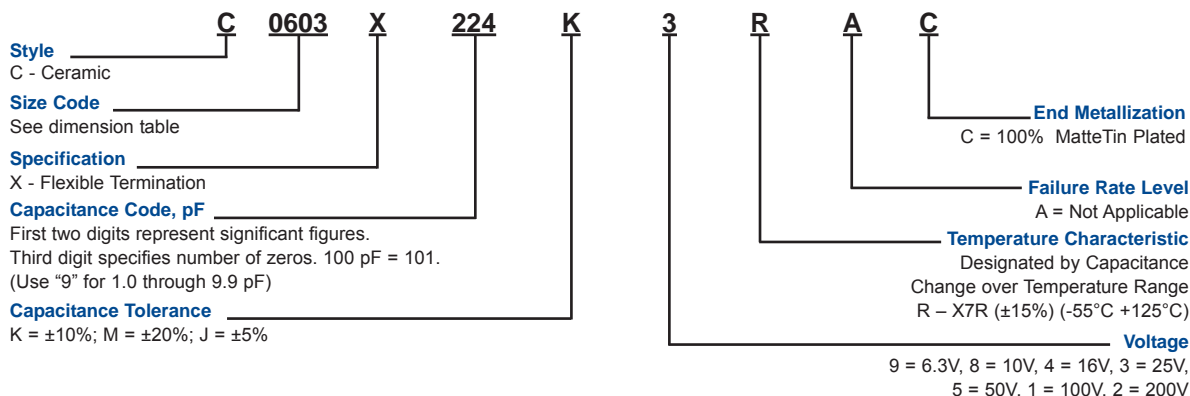
EIA SIZE CODE	METRIC SIZE CODE	L LENGTH	W WIDTH	B BANDWIDTH	S SEPARATION Minimum
0603	1608	1.6 (.063) ± 0.20 (.008)	0.80 (.032) ± 0.15 (.006)	0.45 (.018) ± 0.15 (.006)	0.70 (.028)
0805	2012	2.1 (.083) ± 0.30 (.012)	1.25 (.049) ± 0.20 (.008)	0.50 (0.02) ± 0.25 (.010)	0.75 (.030)
1206	3216	3.4 (.134) ± 0.30 (.012)	1.60 (.063) ± 0.20 (.008)	0.60 (.024) ± 0.25 (.010)	-
1210	3225	3.4 (.134) ± 0.40 (.016)	2.50 (.098) ± 0.20 (.008)	0.60 (.024) ± 0.25 (.010)	-
1808	4520	4.7 (.185) ± 0.50 (.020)	2.00 (.079) ± 0.20 (.008)	0.70 (.028) ± 0.35 (.014)	-
1812	4532	4.6 (.181) ± 0.40 (.016)	3.20 (.126) ± 0.30 (.012)	0.70 (.028) ± 0.35 (.014)	-
1825	4564	4.6 (.181) ± 0.40 (.016)	6.40 (.252) ± 0.40 (.016)	0.70 (.028) ± 0.35 (.014)	-
2220	5650	5.9 (.232) ± 0.75 (.030)	5.00 (.197) ± 0.40 (.016)	0.70 (.028) ± 0.35 (.014)	-
2225	5664	5.9 (.232) ± 0.75 (.030)	6.40 (.248) ± 0.40 (.016)	0.70 (.028) ± 0.35 (.014)	-

See “Capacitance Range” tables next page for capacitor chip thickness code specification. Capacitor chip thickness dimensions are detailed in the “Thickness Code Reference Chart” on page 5.

## Qualification/Certification

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

## Ordering Information



## 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 MΩ, 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%

## 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:

- 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.***

RoHS Compliant





Product Availability - 1808 thru 2225 Case Sizes

FT-CAP / FLEXIBLE TERMINATION / X7R DIELECTRIC (1808 - 2225 Case Sizes)																				
Cap pF	Cap Code	Series	C1808X				C1812X				C1825X			C2220X			C2225X			
		Voltage	50V	100V	200V	250V	25V	50V	100V	200V	50V	100V	200V	25V	50V	100V	200V	50V	100V	200V
		Voltage Code	5	1	2	A	3	5	1	2	5	1	2	3	5	1	2	5	1	2
		Cap Tolerance	Product Availability and Chip Thickness Codes - See "ThicknessCodeReferenceChart"																	
2,200	222	J,K,M																		
2,700	272	J,K,M																		
3,300	332	J,K,M																		
2,900	392	J,K,M																		
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	JC	JC	JC	KC	KC	KC
100,000	104	J,K,M	LD				GB	GB	GB	GB	HB	HB	HB	JC	JC	JC	JC	KC	KC	KC
120,000	124	J,K,M	LD				GB	GB	GB	GB	HB	HB	HB	JC	JC	JC	JC	KC	KC	KC
150,000	154	J,K,M	LD				GB	GB	GB	GE	HB	HB	HB	JC	JC	JC	JC	KC	KC	KC
180,000	184	J,K,M	LD				GB	GB	GB	GF	HB	HB	HB	JC	JC	JC	JC	KC	KC	KC
220,000	224	J,K,M					GB	GB	GB	GG	HB	HB	HB	JC	JC	JC	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	JC	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	HF	JC	JC	JF	JF	KB	KC	KE
1,000,000	105	J,K,M					GE	GE	GG		HB	HF	HF	JC	JC	JF	JF	KB	KD	KE
1,200,000	125	J,K,M									HB			JC	JC			KB	KE	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																		
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						
Cap pF	Cap Code	Voltage Code	5	1	2	A	3	5	1	2	5	1	2	3	5	1	2	5	1	2
Cap pF	Cap Code	Voltage	50V	100V	200V	250V	25V	50V	100V	200V	50V	100V	200V	25V	50V	100V	200V	50V	100V	200V
Cap pF	Cap Code	Series	C1808X				C1812X				C1825X			C2220X			C2225X			

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## Thickness Code Reference Chart

Chip Size	Thickness Code	Chip 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
0603	CB	0.80 ± 0.07	-	-	4,000	10,000	15,000
0603	CC	0.80 ± 0.10	-	-	4,000	10,000	-
0603	CD	0.80 ± 0.15	-	-	4,000	10,000	-
0805	DB	0.60 ± 0.10	-	-	4,000	10,000	10,000
0805	DC	0.78 ± 0.10	-	-	4,000	10,000	-
0805	DD	0.90 ± 0.10	-	-	4,000	10,000	-
0805	DE	1.00 ± 0.10	2,500	10,000	-	-	-
0805	DF	1.10 ± 0.10	2,500	10,000	-	-	-
0805	DG	1.25 ± 0.15	2,500	10,000	-	-	-
0805	DH	1.25 ± 0.20	2,500	10,000	-	-	-
0805	DL	0.95 ± 0.10	4,000	10,000	-	-	-
1206	EB	0.78 ± 0.10	4,000	10,000	4,000	10,000	-
1206	EC	0.90 ± 0.10	4,000	10,000	-	-	-
1206	ED	1.00 ± 0.10	2,500	10,000	-	-	-
1206	EE	1.10 ± 0.10	2,500	10,000	-	-	-
1206	EF	1.20 ± 0.15	2,500	10,000	-	-	-
1206	EG	1.60 ± 0.15	2,000	8,000	-	-	-
1206	EH	1.60 ± 0.20	2,000	8,000	-	-	-
1206	EJ	1.70 ± 0.20	2,000	8,000	-	-	-
1206	EK	0.80 ± 0.10	2,000	8,000	-	-	-
1206	EM	1.25 ± 0.15	2,500	10,000	-	-	-
1206	EN	0.95 ± 0.10	4,000	10,000	-	-	-
1210	FB	0.78 ± 0.10	4,000	10,000	-	-	-
1210	FC	0.90 ± 0.10	4,000	10,000	-	-	-
1210	FD	0.95 ± 0.10	4,000	10,000	-	-	-
1210	FE	1.00 ± 0.10	2,500	10,000	-	-	-
1210	FF	1.10 ± 0.10	2,500	10,000	-	-	-
1210	FG	1.25 ± 0.15	2,500	10,000	-	-	-
1210	FH	1.55 ± 0.15	2,000	8,000	-	-	-
1210	FJ	1.85 ± 0.20	2,000	8,000	-	-	-
1210	FK	2.10 ± 0.20	2,000	8,000	-	-	-
1210	FL	1.40 ± 0.15	2,000	8,000	-	-	-
1210	FM	1.70 ± 0.20	2,000	8,000	-	-	-
1210	FN	1.85 ± 0.20	2,000	8,000	-	-	-
1210	FO	1.50 ± 0.20	2,000	8,000	-	-	-
1210	FP	1.60 ± 0.20	2,000	8,000	-	-	-
1210	FR	2.25 ± 0.20	2,000	8,000	-	-	-
1210	FS	2.50 ± 0.20	1,000	4,000	-	-	-
1210	FT	1.90 ± 0.20	1,500	4,000	-	-	-
1632	MA	0.80 ± 0.10	4,000	10,000	-	-	-
1808	LD	0.90 ± 0.10	2,500	10,000	-	-	-
1808	LA	1.40 ± 0.15	1,000	4,000	-	-	-
1808	LB	1.60 ± 0.15	1,000	4,000	-	-	-
1808	LC	2.00 ± 0.15	1,000	4,000	-	-	-
1812	GB	1.00 ± 0.10	1,000	4,000	-	-	-
1812	GC	1.10 ± 0.10	1,000	4,000	-	-	-
1812	GD	1.25 ± 0.15	1,000	4,000	-	-	-
1812	GE	1.30 ± 0.10	1,000	4,000	-	-	-
1812	GF	1.50 ± 0.10	1,000	4,000	-	-	-
1812	GG	1.55 ± 0.10	1,000	4,000	-	-	-
1812	GH	1.40 ± 0.15	1,000	4,000	-	-	-
1812	GJ	1.70 ± 0.15	1,000	4,000	-	-	-
1812	GK	1.60 ± 0.20	1,000	4,000	-	-	-
1812	GL	1.90 ± 0.20	1,000	4,000	-	-	-
1812	GM	2.00 ± 0.20	1,000	4,000	-	-	-
1812	GN	1.70 ± 0.20	1,000	4,000	-	-	-
1812	GO	2.50 ± 0.20	500	-	-	-	-
1825	HB	1.10 ± 0.15	1,000	4,000	-	-	-
1825	HC	1.15 ± 0.15	1,000	4,000	-	-	-
1825	HD	1.30 ± 0.15	1,000	4,000	-	-	-
1825	HE	1.40 ± 0.15	1,000	4,000	-	-	-
1825	HF	1.50 ± 0.15	1,000	4,000	-	-	-
1825	HG	1.60 ± 0.20	1,000	4,000	-	-	-
2220	JB	1.00 ± 0.15	1,000	4,000	-	-	-
2220	JC	1.10 ± 0.15	1,000	4,000	-	-	-
2220	JD	1.30 ± 0.15	1,000	4,000	-	-	-
2220	JE	1.40 ± 0.15	1,000	4,000	-	-	-
2220	JF	1.50 ± 0.15	1,000	4,000	-	-	-
2220	JP	1.60 ± 0.20	1,000	4,000	-	-	-
2220	JG	1.70 ± 0.15	1,000	4,000	-	-	-
2220	JH	1.80 ± 0.15	1,000	4,000	-	-	-
2220	JO	2.40 ± 0.15	500	2,000	-	-	-
2225	KB	1.00 ± 0.15	1,000	4,000	-	-	-
2225	KC	1.10 ± 0.15	1,000	4,000	-	-	-
2225	KD	1.30 ± 0.15	1,000	4,000	-	-	-
2225	KE	1.40 ± 0.15	1,000	4,000	-	-	-
2225	KF	1.60 ± 0.20	1,000	4,000	-	-	-