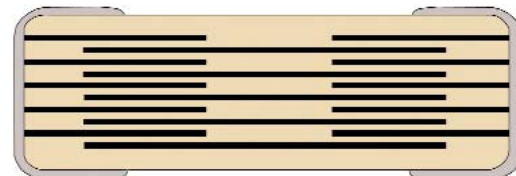


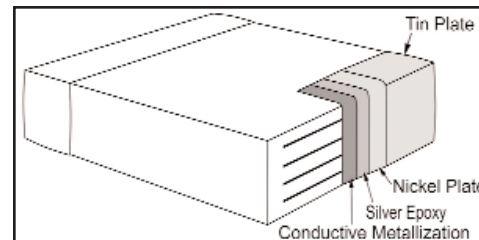
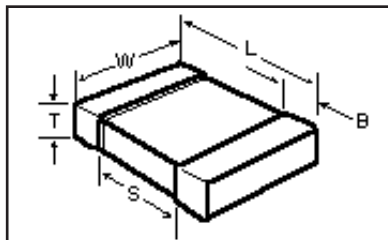
**Fail-Safe Floating Electrode MLCC with Flexible Termination  
FF-CAP / X7R Dielectric**



**Floating (Cascading) Electrode Internal Design**



**Outline Drawing**



**Product Description**

The FF-CAP incorporates two existing KEMET technologies; Floating Electrode (cascading electrode design) and Flexible Termination. The floating electrode component of these capacitors yields improved voltage and ESD performance over standard designs, and also mitigates the risk of low IR or short circuit failures associated with mechanical flex cracks. The flexible termination component incorporates a measure of flexibility to the capacitor, shifting flex stress away from the ceramic body and into the termination area.

The combination of these technologies ensures an increased measure of protection from board flex, offering up to 5mm of flex-bend capability. This provides for an enhanced level of mechanical flex crack protection for low to mid capacitance part types.

**Dimensions – Millimeters (Inches)**

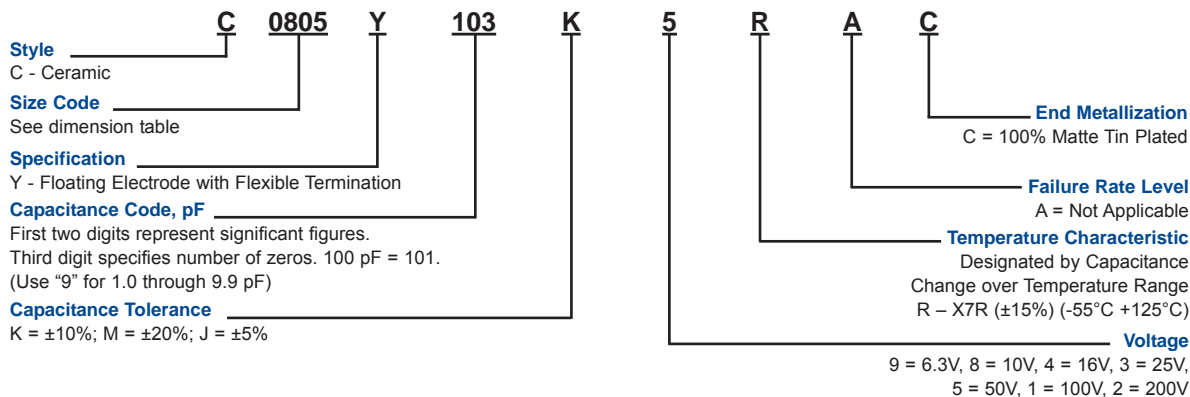
EIA Size Code	Metric Size Code	L Length	W Width	B Bandwidth	S Separation
0603	1608	1.6 (.063) ± 0.20 (.008)	0.8 (.031) ± 0.15 (.006)	0.35 (.014) ± 0.15 (.006)	0.70 (.028)
0805	2012	2.1 (.083) ± 0.30 (.012)	1.25 (.049) ± 0.20 (.008)	0.05 (.020) ± 0.25 (.010)	0.75 (.030)
1206	3216	3.3 (.130) ± 0.30 (.012)	1.6 (.063) ± 0.20 (.008)	0.50 (.020) ± 0.25 (.010)	-
1210	3225	3.4 (.134) ± 0.40 (.016)	2.5 (.098) ± 0.20 (.008)	0.50 (.020) ± 0.25 (.010)	-
1812	4532	4.6 (.181) ± 0.40 (.016)	3.2 (.126) ± 0.30 (.021)	0.60 (.024) ± 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 4.

## 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 & 1812 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.***

RoHS Compliant



**X7R Capacitance Range**

<b>FF-CAP / X7R DIELECTRIC (0603 &amp; 0805 Case Sizes)</b>																		
Cap pF	Cap Code	Series	C0603Y								C0805Y							
		Voltage	6.3V	10V	16V	25V	50V	100V	200V	6.3V	10V	16V	25V	50V	100V	200V	250V	
		Voltage Code	9	8	4	3	5	1	2	9	8	4	3	5	1	2	A	
		Cap	Product Availability and Chip Thickness Codes - See "ThicknessCodeReferenceChart"															
150	151	J,K,M																
180	181	J,K,M	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	
220	221	J,K,M	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	
270	271	J,K,M	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	
330	331	J,K,M	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	
390	391	J,K,M	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	
470	471	J,K,M	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	
560	561	J,K,M	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	
680	681	J,K,M	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	
820	821	J,K,M	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	
1,000	102	J,K,M	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	
1,200	122	J,K,M	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	
1,500	152	J,K,M	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	
1,800	182	J,K,M	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	
2,200	222	J,K,M	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	
2,700	272	J,K,M	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	
3,300	332	J,K,M	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	
3,900	392	J,K,M	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	
4,700	472	J,K,M	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	
5,600	562	J,K,M	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	
6,800	682	J,K,M	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	
8,200	822	J,K,M	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	
10,000	103	J,K,M	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	
12,000	123	J,K,M	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	
15,000	153	J,K,M	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	
18,000	183	J,K,M	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	
22,000	223	J,K,M	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	CB	
27,000	273	J,K,M																
33,000	333	J,K,M																
39,000	393	J,K,M																
47,000	473	J,K,M																
56,000	563	J,K,M																
68,000	683	J,K,M																
82,000	823	J,K,M																
100,000	104	J,K,M																

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<b>FF-CAP / X7R DIELECTRIC (1206 - 1812 Case Sizes)</b>																							
Cap pF	Cap Code	Series	C1206Y								C1210Y					C1812Y							
		Voltage	6.3V	10V	16V	25V	50V	100V	200V	250V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V			
		Voltage Code	9	8	4	3	5	1	2	A	9	8	4	3	5	1	2	A	9	8	4	3	5
		Cap	Product Availability and Chip Thickness Codes - See Page 78 for Chip Thickness Dimensions																				
1,000	102	J,K,M	EB	EB	EB	EB	EB	EB	EB	EB													
1,200	122	J,K,M	EB	EB	EB	EB	EB	EB	EB	EB													
1,500	152	J,K,M	EB	EB	EB	EB	EB	EB	EB	EB													
1,800	182	J,K,M	EB	EB	EB	EB	EB	EB	EB	EB													
2,200	222	J,K,M	EB	EB	EB	EB	EB	EB	EB	EB	FB	FB	FB	FB	FB	FB	FB						
2,700	272	J,K,M	EB	EB	EB	EB	EB	EB	EB	EB	FB	FB	FB	FB	FB	FB	FB						
3,300	332	J,K,M	EB	EB	EB	EB	EB	EB	EB	EB	FB	FB	FB	FB	FB	FB	FB						
3,900	392	J,K,M	EB	EB	EB	EB	EB	EB	EB	EB	FB	FB	FB	FB	FB	FB	FB						
4,700	472	J,K,M	EB	EB	EB	EB	EB	EB	EB	EB	FB	FB	FB	FB	FB	FB	FB						
5,600	562	J,K,M	EB	EB	EB	EB	EB	EB	EB	EB	FB	FB	FB	FB	FB	FB	FB						
6,800	682	J,K,M	EB	EB	EB	EB	EB	EB	EB	EB	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB			
8,200	822	J,K,M	EB	EB	EB	EB	EB	EB	EB	EB	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB			
10,000	103	J,K,M	EB	EB	EB	EB	EB	EB	EB	EB	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB			
12,000	123	J,K,M	EB	EB	EB	EB	EB	EB	EB	EB	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB			
15,000	153	J,K,M	EB	EB	EB	EB	EB	EB	EB	EB	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB			
18,000	183	J,K,M	EB	EB	EB	EB	EB	EB	EB	EB	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB			
22,000	223	J,K,M	EB	EB	EB	EB	EB	EB	EB	EB	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB			
27,000	273	J,K,M	EB	EB	EB	EB	EB	EB	EB	EB	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB			
33,000	333	J,K,M	EB	EB	EB	EB	EB	EB	EB	EB	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB			
39,000	393	J,K,M	EB	EB	EB	EB	EB	EB	EB	EB	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB			
47,000	473	J,K,M	EB	EB	EB	EB	EB	EB	EB	EB	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB			
56,000	563	J,K,M	EB	EB	EB	EB	EB	EB	EB	EB	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB			
68,000	683	J,K,M	EB	EB	EB	EB	EB	EB	EB	EB	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB			
82,000	823	J,K,M	EB	EB	EB	EB	EB	EB	EB	EB	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB			
100,000	104	J,K,M	EB	EB	EB	EB	EB	EB	EB	EB	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB			
120,000	124	J,K,M	EC	EC	EC	EC	EC	EC	EC	EC	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB			
150,000	154	J,K,M									FC	FC	FC	FC	FC	FC	FC	GB	GB	GB			
180,000	184	J,K,M									FC	FC	FC	FC	FC	FC	FC	GB	GB	GB			
220,000	224	J,K,M									FC	FC	FC	FC	FC	FC	FC	GB	GB	GB			

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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	-	-	-