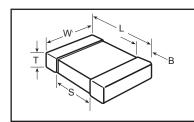
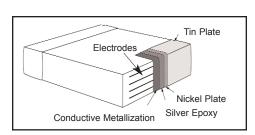


# Surface Mount Ceramic Chip Capacitors / FT-CAP / Flexible Terminations

### **Outline Drawing**

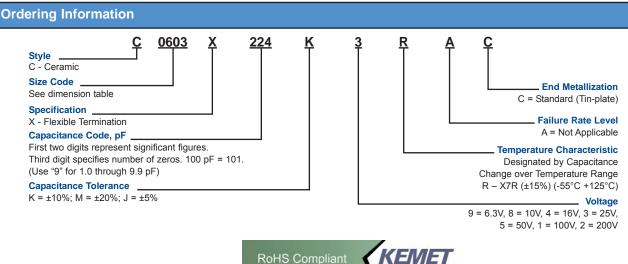




The FT-CAP is a surface mount multi-layer ceramic capacitor that incorporates a unique and flexible termination system. Integrated with KEMET's standard termination materials, a conductive epoxy is utilized between the conductive metallization and nickel barrier finish in order to establish pliability while maintaining terminal strength, solderability and electrical performance. This technology directs board flex stress away from the ceramic body and into the termination area. As a result, this termination system mitigates the risk of low-IR or short-circuit failures associated with board flex. The FT-CAP complements our current "Open Mode" and "Flexible Electrode (FE-CAP)" products 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							
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	2.0 (.079) ± 0.20 (.008)	1.25 (.049) ± 0.20 (.008)	0.05 (.02) ± 0.25 (.010)	0.75 (.030)							
1206	3216	3.2 (.126) ± 0.20 (.008)	1.6 (.063) ± 0.20 (.008)	0.50 (.02) ± .25 (.010)	N/A							
1210	3225	3.2 (.126) ± 0.20 (.008)	2.5 (.098) ± 0.20 (.008)	0.50 (.02) ± .25 (.010)	N/A							

See Capacitance Value Table next page for thickness dimension.



RoHS Compliant

# X7R Capacitance Range

Con Con Con						C0805						C1206							C1210											
Cap pF	cap cap cap				C0805												C1210													
	Code	Tol.	6.3V						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
180 220	181 221	K,M,J	CB	CB	CB	CB CB	CB	CB CB	CB CB	DC				<u> </u>						<u> </u>										
220	271	K,M,J K,M,J	CB CB	CB CB	CB CB	CB	CB CB	CB	СВ	DC																				
330	331	K,M,J	CB	DC				<u> </u>																						
390	391	K,M,J	CB	DC																										
470	471	K,M,J	СВ	DC																										
560	561	K,M,J	CB	CB	СВ	СВ	CB	CB	CB	DC																				
680	681	K,M,J	CB	DC																										
820	821	K,M,J	CB	DC			_																							
1,000 1,200	102	K,M,J	CB CB	CB	CB	CB	CB	CB	CB CC	DC	DC DC	DC DC	DC DC	DC DC	DC DC	DC	EB	EB	EB	EB EB	EB EB	EB EB	EB EB			<u> </u>				
1,200	122 152	K,M,J K,M,J	CB	CB CB	CB CB	CB CB	CB CB	CB CB	CC	DC DC	DC	DC	DC	DC	DC	DC DC	EB EB	EB EB	EB EB	EB	EB	EB	EB							
1,300	182	K,M,J	CB	CB	CB	CB	CB	CB	CC	DC	EB																			
2.200	222	K,M,J	CB	CB	CB	CB	CB	CB	CC	DC	EB	FB																		
2,700	272	K,M,J	CB	CB	CB	CB	CB	CB	CC	DC	EB	FB																		
3,300	332	K,M,J	СВ	СВ	СВ	СВ	СВ	CB	CC	DC	EB	FB																		
3,900	392	K,M,J	СВ	СВ	СВ	СВ	СВ	CB	CC	DC	EB	FB																		
4,700	472	K,M,J	СВ	СВ	СВ	СВ	СВ	СВ	CC	DC	EB	FB																		
5,600	562	K,M,J	CB	CB	CB	CB	CB	CB	CC	DC	EB	FB																		
6,800	682	K,M,J	CB	CB	CB	CB	CB	CB		DC	EB EB	EB	EB	EB	EB	EB	EB	FB	FB	FB	FB	FB	FB FB	FB						
8,200 10,000	822 103	K,M,J K,M,J	CB CB	CB CB	CB CB	CB CB	CB CB	CB CB	CC CC	DC DC	EB	EB EB	EB EB	EB EB	EB EB	EB EB	EB EB	FB FB												
12,000	103	K,IM,J K,M,J	CB	CB	CB	CB	CB	CC		DC	EB	FB																		
15.000	153	K,M,J	CB	CB	CB	CB	CB	CC		DC	DC	DC	DC	DC	DD	DC	EB	FB												
18,000	183	K,M,J	CB	CB	CB	CB	CB	CC		DC	DC	DC	DC	DC	DD	DC	EB	FB												
22,000	223	K,M,J	СВ	СВ	СВ	СВ	CB	CC		DC	DC	DC	DC	DC	DD	DC	EB	FB												
27,000	273	K,M,J	СВ	СВ	СВ	СВ	СВ	CC		DC	DC	DC	DC	DC	DD	DE	EB	FB												
33,000	333	K,M,J	CB	CB	CB	CB	CB	CC		DC	DC	DC	DC	DC	DD	DE	EB	FB												
39,000	393	K,M,J	CB	CB	CB	CB	CB	CC		DC	DC	DC	DC	DC	DD	DE	EB	EB	EB	EB	EB	EC	EB	FB						
47,000	473	K,M,J	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 68,000	563 683	K,M,J K,M,J	CB CB	CB CB	CB CB	CB CB	CC CC			DD DD	DD DD	DD DD	DD DD	DD DD	DE DE	DG	EB EB	EB EB	EB EB	EB EB	EB EB	EB EB	ED ED	FB FB	FB FB	FB FB	FB FB	FB FB	FB FB	FC FC
82,000	823	K,M,J	CB	CB	CB	CB	CC			DD	DD	DD	DD	DD	DE		EB	EB	EB	EB	EB	EB	ED	FB	FB	FB	FB	FC	FC	FF
100,000	104	K,M,J	CB	CB	CB	CB	CC			DD	DD	DD	DD	DD	DE		EB	EB	EB	EB	EB	EB	EM	FB	FB	FB	FB	FB	FD	FG
120,000	124	K,M,J	CB	CB	СВ	-	_			DC	DC	DC	DC	DD	DG		EC	EC	EC	EC	EC	EC	EM	FB	FB	FB	FB	FB	FD	
150,000	154	K,M,J	СВ	СВ	СВ		CD			DC	DC	DC	DC	DD			EC	EC	EC	EC	EC	EC	EG	FC	FC	FC	FC	FC	FD	
180,000	184	K,M,J	CB	CB	СВ					DC	DC	DC	DC	DD			EC	EC	EC	EC	EC	EC		FC	FC	FC	FC	FC	FD	
220,000	224	K,M,J	СВ	СВ	СВ	CD				DC	DC	DC	DC	DD	DG		EC	EC	EC	EC	EC	EC		FC	FC	FC	FC	FC	FD	
270,000	274	K,M,J	CB	CB	CB					DD	DD	DD	DD				EB	EB	EB	EB	EC	EM		FC	FC	FC	FC	FC	FD	
330,000 390,000	334 394	K,M,J	CB CB	CB CB	CB CB					DE DG	DE DG	DE DG	DE DG				EB EB	EB EB	EB EB	EB EB	EC EG	EG EG		FD FD	FD	FD FD	FD FD	FD FD	FD	
470,000	394 474	K,M,J K,M,J	CB	CB	CB					DG	DG	DG	DG	DE			EC	EC	EC	EC	EG	EG		FD	FD FD	FD	FD	FD	FD	
560.000	564	K,M,J	00	00	55					DG	DG	DG	DG	DL			ED	ED	ED	ED	EC			FD	FD	FD	FD	FD	10	
680,000	684	K,M,J								DG	DG	DG		DJ			EE	EE	EE	EE	ED			FD	FD	FD	FD	FD		
820,000	824	K,M,J								DG	DG	DG					EF	EF	EF	EF				FF	FF	FF	FF	FF		
1,000,000	105	K,M,J								DG	DG	DG	DJ				EE	EE	EF	EG	ED		i —	FH	FH	FH	FH	FH	FM	
1,200,000	125	K,M,J								DE	DE	DE					ED	ED	ED	EG				FH	FH	FH	FH	FH		
1,500,000	155	K,M,J								DG	DG	DG					EF	EF	EF	EG				FH	FH	FH	FH	FH		
1,800,000	185	K,M,J								DG	DG	DG					EF	EF	EF	-	FL			FH	FH	FH	FH	FH		
2,200,000	225	K,M,J	-							DG	DG	DG					EG EN	EG	EG	EF	EH						FJ	FG		
2,700,000 3,300,000	275 335	K,M,J K,M,J															EN	EN ED	EK ED	-								FM		
3,300,000	395	K,IM,J K,M,J															ED	EL	EL									Fivi		
4,700,000	475	K,M,J															EM	EM	EM	EH				FC	FC	FC	FG	FS		
5,600,000	565	K,M,J															EH	EH	EH											
6,800,000	685	K,M,J															EH	EH	EH								FM			
8,200,000	825	K,M,J															EH	EH	EH											
10,000,000	106	K,M,J															EH	EH	EH					FH	FH	FH	FS			

Thickness Code Reference Chart Packaging Quantity Based on Finished Chip Thickness Specifications

Thickness Code	Chip Size	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
AA	0201	.30 ± .03	N/A	N/A	15,000	N/A	N/A
BB	0402	.50 ± .05	N/A	N/A	10,000	50,000	50,000
CB	0603	.80 ± .07	N/A	N/A	4,000	10,000	15,000
CC	0603	.80 ± .10	N/A	N/A	4,000	10,000	N/A
CD	0603	.80 ± .15	N/A	N/A	4,000	10,000	N/A
DB	0805	.60 ± .10	N/A	N/A	N/A	N/A	10,000
DC	0805	.78 ± .10	4,000	10,000	4,000	10,000	N/A
DD	0805	.90 ± .10	4,000	10,000	N/A	N/A	N/A
DE	0805	1.00 ± .10	2,500	10,000	N/A	N/A	N/A
DF	0805	1.10 ± .10	2,500	10,000	N/A	N/A	N/A
DG	0805	1.25 ± .15	2,500	10,000	N/A	N/A	N/A
DH	0805	1.25 ± .20	2,500	10,000	N/A	N/A	N/A
DJ	0805	1.25 ± .20	3,000	10,000	N/A	N/A	N/A
DK	0805	1.25 ± .15	3,000	10,000	N/A	N/A	N/A
EB	1206	.78 ± .10	4,000	10,000	4,000	10,000	N/A
EC	1206	.90 ± .10	4,000	10,000	N/A	N/A	N/A
ED	1206	1.00 ± .10	2,500	10,000	N/A	N/A	N/A
EE	1206	1.10 ± .10	2,500	10,000	N/A	N/A	N/A
EF	1206	1.20 ± .15	2,500	10,000	N/A	N/A	N/A
EG	1206	1.60 ± .15	2,000	8,000	N/A	N/A	N/A
EH	1206	1.60 ± .10	2,000	8,000	N/A	N/A	N/A
EJ	1200	1.70 ± .20	2,000	8,000	N/A	N/A	N/A
EK	1200	.80 ± .10	2,000	8,000	N/A	N/A	N/A
EL	1200	1.15 ± .15	2,000	8,000	N/A	N/A	N/A
EM	1200	1.15 ± .15	2,500	10,000	N/A	N/A	N/A
EN	1206	$1.25 \pm .15$ $0.95 \pm .10$	4,000	10,000	N/A N/A	N/A N/A	N/A N/A
FB	1200	.78 ± .10	4,000	10,000	N/A	N/A	N/A
FC	1210	.90 ± .10	4,000	10,000	N/A	N/A	N/A
FD	1210	.90 ± .10 .95 ± .10	4,000	10,000	N/A N/A	N/A	N/A N/A
FE	1210	1.00 ± .10	2,500	10,000	N/A N/A	N/A	N/A N/A
	1210			1			
FF	-	1.10 ± .10	2,500	10,000	N/A	N/A	N/A
FG	1210	1.25 ± .15	2,500	10,000	N/A	N/A	N/A
FH FJ	1210	1.55 ± .15	2,000	8,000	N/A	N/A	N/A
	1210	1.85 ± .20	2,000	8,000	N/A	N/A	N/A
FK	1210	2.10 ± .20	2,000	8,000	N/A	N/A	N/A
FL	1210	1.40 ± .15	2,000	8,000	N/A	N/A	N/A
FM	1210	1.70 ± .20	2,000	8,000	N/A	N/A	N/A
FN	1210	1.85 ± .20	2,000	8,000	N/A	N/A	N/A
FO	1210	1.50 ± .20	2,000	8,000	N/A	N/A	N/A
FP	1210	1.60 ± .20	2,000	8,000	N/A	N/A	N/A
FQ	1210	2.5 ± .20	1,500	8,000	N/A	N/A	N/A
FR	1210	2.25 ± .20	2,000	8,000	N/A	N/A	N/A
FS	1210	2.50 ± .20	1,000	4,000	N/A	N/A	N/A
FT	1210	1.90 ± .20	1,500	4,000	N/A	N/A	N/A
GB	1812	1.00 ± .10	1,000	4,000	N/A	N/A	N/A
GC	1812	1.10 ± .10	1,000	4,000	N/A	N/A	N/A
GD	1812	1.25 ± .15	1,000	4,000	N/A	N/A	N/A
GE	1812	1.30 ± .10	1,000	4,000	N/A	N/A	N/A
GF	1812	1.50 ± .10	1,000	4,000	N/A	N/A	N/A
GG	1812	1.55 ± .10	1,000	4,000	N/A	N/A	N/A
GH	1812	1.40 ± .15	1,000	4,000	N/A	N/A	N/A
GJ	1812	1.70 ± .15	1,000	4,000	N/A	N/A	N/A
GK	1812	1.60 ± .20	1,000	4,000	N/A	N/A	N/A
GL	1812	1.90 ± .20	1,000	4,000	N/A	N/A	N/A
GM	1812	2.00 ± .20	1,000	4,000	N/A	N/A	N/A
GN	1812	1.70 ± .20	1,000	4,000	N/A	N/A	N/A
HB	1825	1.10 ± .15	1,000	4,000	N/A	N/A	N/A
HC	1825	1.15 ± .15	1,000	4,000	N/A	N/A	N/A
HD	1825	1.30 ± .15	1,000	4,000	N/A	N/A	N/A
HE	1825	1.40 ± .15	1,000	4,000	N/A	N/A	N/A
HF	1825	1.50 ± .15	1,000	4,000	N/A	N/A	N/A
JB	2220	1.00 ± .15	1,000	4,000	N/A	N/A	N/A
JC	2220	1.10 ± .15	1,000	4,000	N/A	N/A	N/A
JD	2220	1.30 ± .15	1,000	4,000	N/A	N/A	N/A
JE	2220	1.40 ± .15	1,000	4,000	N/A	N/A	N/A
JF	2220	1.50 ± .15	1,000	4,000	N/A	N/A	N/A
KB	2225	1.00 ± .15	1,000	4,000	N/A	N/A	N/A
KC	2225	1.10 ± .15	1,000	4,000	N/A	N/A	N/A
KD	2225	1.30 ± .15	1,000	4,000	N/A	N/A	N/A
KE	2225	1.40 ± .15	1,000	4,000	N/A N/A	N/A N/A	N/A N/A

# **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 500 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 case size 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.

#### **Qualification/Certification**

AEC-Q200 Rev. C - Automotive RoHS 6 - 100% tin termination

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.

