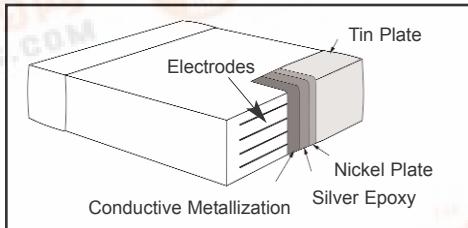
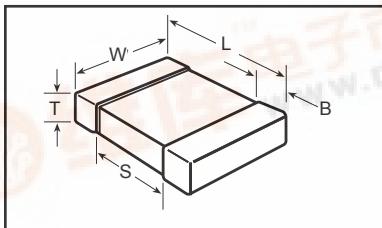


## Surface Mount Ceramic Chip Capacitors / **FT-CAP** / Flexible Terminations

### 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) $\pm$ 0.15 (.006)	0.8 (.032) $\pm$ 0.15 (.006)	0.35 (.014) $\pm$ 0.15 (.006)	0.70 (.028)
0805	2012	2.0 (.079) $\pm$ 0.20 (.008)	1.25 (.049) $\pm$ 0.20 (.008)	0.05 (.02) $\pm$ 0.25 (.010)	0.75 (.030)
1206	3216	3.2 (.126) $\pm$ 0.20 (.008)	1.6 (.063) $\pm$ 0.20 (.008)	0.50 (.02) $\pm$ .25 (.010)	N/A
1210	3225	3.2 (.126) $\pm$ 0.20 (.008)	2.5 (.098) $\pm$ 0.20 (.008)	0.50 (.02) $\pm$ .25 (.010)	N/A

See Capacitance Value Table next page for thickness dimension.

### Ordering Information

Style <u>C</u>	<u>0603</u>	<u>X</u>	<u>224</u>	<u>K</u>	<u>3</u>	<u>R</u>	<u>A</u>	<u>C</u>	End Metallization C = Standard (Tin-plate)
C - Ceramic									
Size Code									Failure Rate Level A = Not Applicable
See dimension table									
Specification									Temperature Characteristic Designated by Capacitance Change over Temperature Range
X - Flexible Termination									R - X7R ( $\pm 15\%$ ) (-55°C +125°C)
Capacitance Code, pF									Voltage 9 = 6.3V, 8 = 10V, 4 = 16V, 3 = 25V, 5 = 50V, 1 = 100V, 2 = 200V
First two digits represent significant figures.									
Third digit specifies number of zeros. 100 pF = 101.									
(Use "9" for 1.0 through 9.9 pF)									
Capacitance Tolerance									
K = $\pm 10\%$ ; M = $\pm 20\%$ ; J = $\pm 5\%$									

## X7R Capacitance Range

**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 ± .20	2,000	8,000	N/A	N/A	N/A
EJ	1206	1.70 ± .20	2,000	8,000	N/A	N/A	N/A
EK	1206	.80 ± .10	2,000	8,000	N/A	N/A	N/A
EL	1206	1.15 ± .15	2,000	8,000	N/A	N/A	N/A
EM	1206	1.25 ± .15	2,500	10,000	N/A	N/A	N/A
EN	1206	0.95 ± .10	4,000	10,000	N/A	N/A	N/A
FB	1210	.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	.95 ± .10	4,000	10,000	N/A	N/A	N/A
FE	1210	1.00 ± .10	2,500	10,000	N/A	N/A	N/A
FF	1210	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	1210	1.55 ± .15	2,000	8,000	N/A	N/A	N/A
FJ	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

## 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  $\pm 15\%$  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  $\leq 10\mu\text{F}$   
120Hz and 0.5 Vrms if capacitance  $> 10\mu\text{F}$
- 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.***