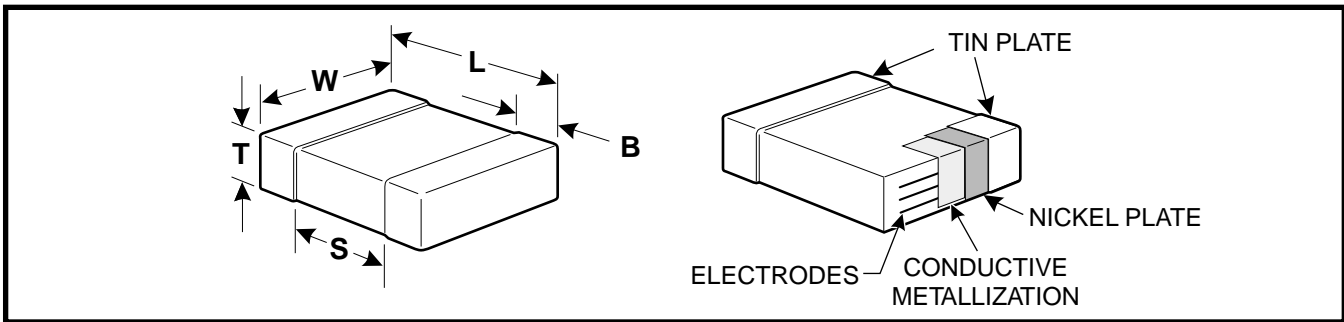


## FEATURES

- COG (NP0), X7R, X5R, Z5U and Y5V Dielectrics
- 10, 16, 25, 50, 100 and 200 Volts
- Standard End Metallization: Tin-plate over nickel barrier
- Available Capacitance Tolerances:  $\pm 0.10$  pF;  $\pm 0.25$  pF;  $\pm 0.5$  pF;  $\pm 1\%$ ;  $\pm 2\%$ ;  $\pm 5\%$ ;  $\pm 10\%$ ;  $\pm 20\%$ ; and  $+80\%$ - $20\%$
- Tape and reel packaging per EIA481-1. (See page 61 for specific tape and reel information.) Bulk Cassette packaging (0402, 0603, 0805 only) per IEC60286-6 and EIAJ 7201.

## CAPACITOR OUTLINE DRAWINGS



## DIMENSIONS—MILLIMETERS AND (INCHES)

EIA SIZE CODE	METRIC SIZE CODE (Ref only)	L # LENGTH	W # WIDTH	B BANDWIDTH	S MIN. SEPARATION	MOUNTING TECHNIQUE
0402*	1005	1.0 (.04) $\pm$ .05 (.002)	0.5 (.02) $\pm$ .05 (.002)	0.20 (0.008)-0.40 (0.016)	0.3 (.012)	Solder Reflow
0603*	1608	1.6 (.063) $\pm$ 0.15 (.006)	0.8 (.032) $\pm$ 0.15 (.006)	0.35 (.014) $\pm$ 0.15 (.006)	0.7 (.028)	Solder Wave † or Solder Reflow
0805*	2012	2.0 (.079) $\pm$ 0.2 (.008)	1.25 (.049) $\pm$ 0.2 (.008)	0.5 (.02) $\pm$ .25 (.010)	0.75 (.030)	
1206*	3216	3.2 (.126) $\pm$ 0.2 (.008)	1.6 (.063) $\pm$ 0.2 (.008)	0.5 (.02) $\pm$ .25 (.010)	N/A	
1210*	3225	3.2 (.126) $\pm$ 0.2 (.008)	2.5 (.098) $\pm$ 0.2 (.008)	0.5 (.02) $\pm$ .25 (.010)	N/A	Solder Reflow
1812	4532	4.5 (.177) $\pm$ 0.3 (.012)	3.2 (.126) $\pm$ 0.3 (.012)	0.6 (.024) $\pm$ .35 (.014)	N/A	
1825*	4564	4.5 (.177) $\pm$ 0.3 (.012)	6.4 (.252) $\pm$ 0.4 (.016)	0.6 (.024) $\pm$ .35 (.014)	N/A	
2220	5650	5.6 (.220) $\pm$ 0.4 (.016)	5.0 (.197) $\pm$ 0.4 (.016)	0.6 (.024) $\pm$ .35 (.014)	N/A	
2225	5664	5.6 (.220) $\pm$ 0.4 (.016)	6.3 (.248) $\pm$ 0.4 (.016)	0.6 (.024) $\pm$ .35 (.014)	N/A	

See pages 48-52 for thickness dimensions.

\* Note: Indicates EIA Preferred Case Sizes (Tightened tolerances apply for 0402, 0603, and 0805 packaged in bulk cassette, see page 65.)

#Note: These thicknesses are EIA maximums. Most chips are considerably thinner. Consult factory for details. Also, some extended values may be slightly thicker than EIA maximums.

† For extended value 1210 case size - solder reflow only.

## CAPACITOR ORDERING INFORMATION (Standard Chips - For Military see page 55)

**CERAMIC SIZE CODE SPECIFICATION** C - Standard

**CAPACITANCE CODE** Expressed in Picofarads (pF)  
First two digits represent significant figures.  
Third digit specifies number of zeros. (Use 9 for 1.0 through 9.9pF. Use 8 for 0.5 through 0.99pF)  
(Example: 2.2pF = 229 or 0.50 pF = 508)

**CAPACITANCE TOLERANCE**

B - $\pm 0.10$ pF	J - $\pm 5\%$
C - $\pm 0.25$ pF	K - $\pm 10\%$
D - $\pm 0.5$ pF	M - $\pm 20\%$
F - $\pm 1\%$	P - (GMV) - special order only
G - $\pm 2\%$	Z - $+80\%$ , $-20\%$

**END METALLIZATION**  
C-Standard (Tin-plated nickel barrier)

**FAILURE RATE LEVEL**  
A- Not Applicable

**TEMPERATURE CHARACTERISTIC**  
Designated by Capacitance Change Over Temperature Range

G - COG (NP0) ( $\pm 30$ PPM/ $^{\circ}$ C)
R - X7R ( $\pm 15\%$ ) ( $-55^{\circ}$ C + $125^{\circ}$ C)
P - X5R ( $\pm 15\%$ ) ( $-55^{\circ}$ C + $85^{\circ}$ C)
U - Z5U ( $+22\%$ , $-56\%$ ) ( $+10^{\circ}$ C + $85^{\circ}$ C)
V - Y5V ( $+22\%$ , $-82\%$ ) ( $-30^{\circ}$ C + $85^{\circ}$ C)

**VOLTAGE**

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

**\* Part Number Example: C0805C103K5RAC (14 digits - no spaces)**

C0G CAPACITANCE RANGE - 1210, 1812, 1825, 2220, 2225

Table with columns for CAP. PF, CAP. CODE, CAP. TOL., and voltage ratings (50V, 100V, 200V) for C1210\*, C1812\*, C1825\*, C2220, and C2225. Rows list various capacitor values from 10 to 33,000 pF.

X7R CAPACITANCE RANGE - 0402, 0603, 0805, 1206

Large table with columns for CAP. PF, CAP. CODE, CAP. TOL., and voltage ratings (6.3V, 10V, 16V, 25V, 50V) for C0402\*, C0603\*, C0805\*, and C1206\*. Rows list various capacitor values from 150 to 2,200,000 pF.

\* Indicates EIA preferred chip sizes. NOTE: For non-standard capacitance values or voltages, contact your local KEMET sales representative. # X7R dielectric - Extended Range Values - Cap and DF measured @ 0.5 Vrms.

See page 54 for Thickness Code Reference Chart.

Ceramic Surface Mount

## X7R CAPACITANCE RANGE – 1210, 1812, 1825, 2220, 2225

CAP. PF	CAP CODE	CAP. TOL.	C1210*							C1812*			C1825*			C2220			C2225			
			6.3V	10V	16V	25V	50V	100V	200V	50V	100V	200V	50V	100V	200V	50V	100V	200V	50V	100V	200V	
2200	222	K,M,J	FB	FB	FB	FB	FB	FB	FB													
2700	272	K,M,J	FB	FB	FB	FB	FB	FB	FB													
3300	332	K,M,J	FB	FB	FB	FB	FB	FB	FB													
3900	392	K,M,J	FB	FB	FB	FB	FB	FB	FB													
4700	472	K,M,J	FB	FB	FB	FB	FB	FB	FB													
5600	562	K,M,J	FB	FB	FB	FB	FB	FB	FB													
6800	682	K,M,J	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB										
8200	822	K,M,J	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB										
10,000	103	K,M,J	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB										
12,000	123	K,M,J	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB										
15,000	153	K,M,J	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB										
18,000	183	K,M,J	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB										
22,000	223	K,M,J	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB	HB	HB	HB							
27,000	273	K,M,J	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB	HB	HB	HB							
33,000	333	K,M,J	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB	HB	HB	HB							
39,000	393	K,M,J	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB	HB	HB	HB							
47,000	473	K,M,J	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB	HB	HB	HB					KC	KC	KC
56,000	563	K,M,J	FB	FB	FB	FB	FB	FB	FB	FC	GB	GB	GB	HB	HB	HB				KC	KC	KC
68,000	683	K,M,J	FB	FB	FB	FB	FB	FB	FB	FC	GB	GB	GB	HB	HB	HB				KC	KC	KC
82,000	823	K,M,J	FB	FB	FB	FB	FB	FC	FC	FC	GB	GB	GB	HB	HB	HB				KC	KC	KC
100,000	104	K,M,J	FB	FB	FB	FB	FB	FD	FD	FG	GB	GB	GB	HB	HB	HB				KC	KC	KC
120,000	124	K,M,J	FB	FB	FB	FB	FB	FD	FD		GB	GB	GB	HB	HB	HB				KC	KC	KC
150,000	154	K,M,J	FC	FC	FC	FC	FC	FD	FD		GB	GB	GE	HB	HB	HB				KC	KC	KC
180,000	184	K,M,J	FC	FC	FC	FC	FC	FD	FD		GB	GB	GG	HB	HB	HB				KC	KC	KC
220,000	224	K,M,J	FC	FC	FC	FC	FC	FD	FD		GB	GB		HB	HB	HB				KC	KC	KC
270,000	274	K,M,J	FC	FC	FC	FC	FC#	FD#	FD#		GB	GH		HB	HB	HB	JC	JC	JC	KB	KC	KC
330,000	334	K,M,J	FD	FD	FD	FD	FD#	FD#	FD#		GB	GH		HB	HB	HB	JC	JC	JC	KB	KC	KC
390,000	394	K,M,J	FD	FD	FD	FD	FD#	FD#	FD#		GB			HB	HB	HD	JC	JC	JC	KB	KC	KC
470,000	474	K,M,J	FD	FD	FD	FD	FD#	FD#	FD#		GB			HB	HB	HD	JC	JC	JC	KB	KC	KD
560,000	564	K,M,J	FD	FD	FD	FD	FD#	FD#	FD#		GC			HB	HD	HD	JC	JC	JC	KB	KC	
680,000	684	K,M,J	FD	FD	FD	FD	FD#	FD#	FD#		GC			HB	HD	HD	JC	JC	JD	KB	KC	
820,000	824	K,M,J	FF	FF	FF	FF	FF#	FF#	FF#		GE			HB	HD	HD	JC	JC	JD	KB	KC	
1,000,000	105	K,M,J	FH	FH	FH	FH	FH#	FH#	FH#		GE			HB	HD	HD	JC	JC	JD	KB	KD	
1,200,000	125	K,M,J	FH	FH	FH	FH	FH#	FH#	FH#					HB	HD	HD	JC	JC	JD	KB	KD	
1,500,000	155	K,M,J	FH	FH	FH	FH	FH#	FH#	FH#					HB	HD	HD	JC	JC	JD	KB	KD	
1,800,000	185	K,M,J	FH	FH	FH	FH	FH#	FH#	FH#					HD	HD	HD	JD	JD	JD	KD	KD	
2,200,000	225	K,M,J	FJ	FJ	FJ	FJ	FJ	FJ	FJ				HF	HF	HF	HF	JF	JF	JF	KD	KD	

\* Indicates EIA preferred chip sizes.  
 NOTE: For non-standard capacitance values or voltages, contact your local KEMET sales representative.  
 50 Volt Ceramic Chips can be used for 63 volt applications.  
 # Extended Range Values — Cap and DF measured @ 0.5 Vms.

## X5R CAPACITANCE RANGE

CAP. pF	CAP CODE	CAP. TOL.	C0402*		C0603*		C0805*		C1206*				C1210*								
			6.3V	10V	6.3V	10V	6.3V	10V	6.3V	10V	16V	25V	6.3V	10V	16V	25V	50V				
12,000	123	K,M	BB	BB																	
15,000	153	K,M	BB	BB																	
18,000	183	K,M	BB	BB																	
22,000	223	K,M	BB	BB																	
27,000	273	K,M	BB	BB																	
33,000	333	K,M	BB	BB																	
39,000	393	K,M	BB	BB																	
47,000	473	K,M	BB	BB																	
56,000	563	K,M	BB	BB																	
68,000	683	K,M	BB	BB																	
82,000	823	K,M	BB	BB																	
100,000	104	K,M	BB	BB								EB									
120,000	124	K,M										EC									
150,000	154	K,M										EC									
180,000	184	K,M										EC									
220,000	224	K,M										EC									
270,000	274	K,M			CC	CC						EB									
330,000	334	K,M			CC	CC						EB									
390,000	394	K,M			CC	CC						EB									
470,000	474	K,M			CC	CC						EC									
560,000	564	K,M			CC	CC						EE									
680,000	684	K,M			CC	CC						EE									
820,000	824	K,M			CC	CC						EF									
1,000,000	105	K,M			CC	CC						EH							FH+	FH+	FH+
1,200,000	125	K,M			CC	CC						EC							FD+	FD+	FD+
1,500,000	155	K,M			CC	CC	DD	DD	EC	EC	EC	EC							FD+	FD+	FD+
1,800,000	185	K,M			CC	CC	DH	DH	EC	EC	EC	EC							FD+	FD+	FD+
2,200,000	225	K,M			CC	CC	DD	DD	EE	EE	EE	EE							FG+	FG+	FG+
2,700,000	275	K,M					DH	DD	EE	EE	EE	EF							FG+	FG+	FG+
3,300,000	335	K,M					DE	DE	EH	EH	EH	EH							FH+	FH+	FH+
4,700,000	475	K,M					DE	DE	EH	EH	EH	EH							FH+	FH+	FH+
6,800,000	685	K,M					DH	DH	EH	EH	EH	EH							FK+	FK+	FK+
8,200,000	825	K,M					DH	DH	EH	EH	EH	EH							FK+	FK+	FK+
10,000,000	106	K,M					DH	DH	EH	EH	EH	EH							FK+	FK+	FK+
12,000,000	126	K,M							EH	EH	EH	EH							FF+	FF+	FF+
15,000,000	156	K,M							EH	EH	EH	EH							FF+	FF+	FF+
18,000,000	186	K,M							EH	EH	EH	EH							FG+	FG+	FG+
22,000,000	226	K,M							EH	EH	EH	EH							FG+	FG+	FG+

NOTE: For non-standard capacitance values or voltages, contact your local KEMET sales representative.  
 + Reflow only

**See page 54 for Thickness Code Reference Chart.**

## THICKNESS CODE REFERENCE CHART PACKAGING QTY 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
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
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
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 ± .15	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
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
HB	1825	1.10 ± .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

This chart refers to ceramic chip thickness codes on pages 50-53.