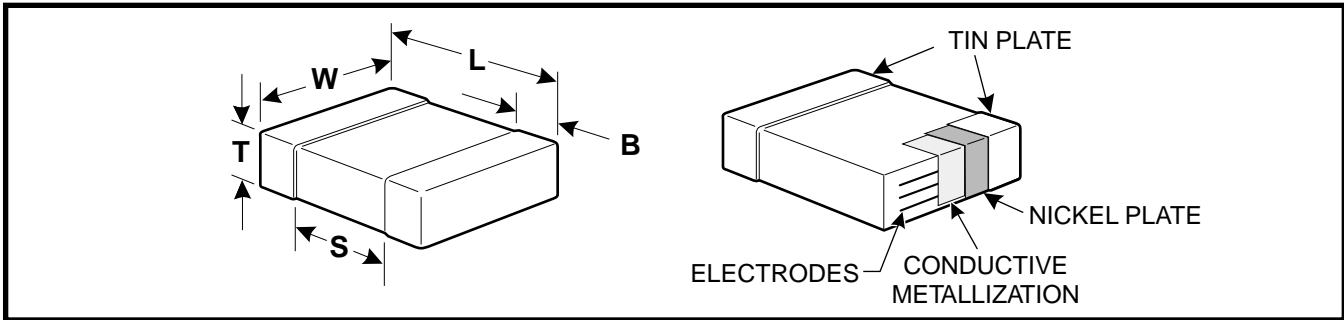


## FEATURES

- 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 63 for specific tape and reel information.) Bulk Cassette packaging (0402, 0603, 0805 only) per IEC60286-6 and EIAJ 7201.
- RoHS Compliant

## CAPACITOR OUTLINE DRAWINGS



## DIMENSIONS—MILLIMETERS AND (INCHES)

EIA SIZE CODE	METRIC SIZE CODE (Ref only)	L # LENGTH	W # WIDTH	See page 63 for thickness dimensions.	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	

\* Note: Indicates EIA Preferred Case Sizes (Tightened tolerances apply for 0402, 0603, and 0805 packaged in bulk cassette, see page 82.)

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

## CAPACITOR ORDERING INFORMATION (Standard Chips - For Military see page 72)

**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)**



## 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	
2,200	222	K,M,J	FB	FB	FB	FB	FB	FB	FB													
2,700	272	K,M,J	FB	FB	FB	FB	FB	FB	FB													
3,300	332	K,M,J	FB	FB	FB	FB	FB	FB	FB													
3,900	392	K,M,J	FB	FB	FB	FB	FB	FB	FB													
4,700	472	K,M,J	FB	FB	FB	FB	FB	FB	FB													
5,600	562	K,M,J	FB	FB	FB	FB	FB	FB	FB													
6,800	682	K,M,J	FB	FB	FB	FB	FB	FB	FB	GB	GB	GB										
8,200	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					KC	KC	KC
47,000	473	K,M,J	FB	FB	FB	FB	FB	FB	FC	GB	GB	GB	HB	HB	HB					KC	KC	KC
56,000	563	K,M,J	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	FC	GB	GB	GB	HB	HB	HB					KC	KC	KC
82,000	823	K,M,J	FB	FB	FB	FB	FB	FC	FC	GB	GB	GB	HB	HB	HB					KC	KC	KC
100,000	104	K,M,J	FB	FB	FB	FB	FB	FD	FD	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	GK		HB	HB	HD	JC	JC	JC		KB	KC	KC
470,000	474	K,M,J	FD	FD	FD	FD	FD#	FD#	FD#	GB	GK		HB	HB	HD	JC	JC	JC		KB	KC	KD
560,000	564	K,M,J	FD	FD	FD	FD	FD#	FD#	FD#	GC	GK		HB	HD	HD	JC	JC	JC		KB	KC	KD
680,000	684	K,M,J	FD	FD	FD	FD	FD#	FD#	FD#	GC	GK		HB	HD	HD	JC	JD	JF		KB	KC	KD
820,000	824	K,M,J	FF	FF	FF	FF	FF#	FF#	FF#	GE	GK		HB	HD	HD	JC	JF	JF		KB	KC	KD
1,000,000	105	K,M,J	FH	FH	FH	FH	FH#	FH#	FH#	GE	GK		HB	HD	HD	JC	JF	JF		KB	KC	KD
1,200,000	125	K,M,J	FH	FH	FH	FH	FH#	FH#	FH#	GE	GK		HB	HD	HD	JC	JF	JF		KB	KC	KD
1,500,000	155	K,M,J	FH	FH	FH	FH	FH#	FH#	FH#	GE	GK		HB	HD	HD	JC	JF	JF		KB	KC	KD
1,800,000	185	K,M,J	FH	FH	FH	FH	FH#	FH#	FH#	HD	HF		HD	HD	HD	JD	JF	JF		KD	KD	KD
2,200,000	225	K,M,J	FJ	FJ	FJ	FJ	FJ	FJ	FJ													

\* 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 Vrms.

Improved product with higher ratings and tighter capacitance tolerance product may be substituted within the same size (length, width, and thickness) at KEMET's option.

Reels with such substitutions will be marked with the improved KEMET part numbers.

## X5R CAPACITANCE RANGE

Cap pF	Cap Code	Cap Tol.	C0402*		C0603*			C0805*				C1206*				C1210*					
			6.3V	10V	6.3V	10V	16V	6.3V	10V	16V	25V	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																	
120,000	124	K,M	BB	BB																	
150,000	154	K,M	BB	BB																	
180,000	184	K,M	BB	BB																	
220,000	224	K,M	BB	BB																	
270,000	274	K,M	BB	BB	CC	CC	CC									EB					
330,000	334	K,M	BB	BB	CC	CC	CC									EB					
390,000	394	K,M	BB	BB	CC	CC	CC									EB					
470,000	474	K,M	BB	BB	CC	CC	CC									EC					
560,000	564	K,M	BB	BB	CC	CC	CC			DC						ED					
680,000	684	K,M	BB	BB	CC	CC	CC			DD						EE					
820,000	824	K,M	BB	BB	CC	CC	CC			DE						EF					
1,000,000	105	K,M	BB	BB	CC	CC	CC			DF						EH				FH+	FH+
1,200,000	125	K,M			CC	CC	CC			DG						EC					FH+
1,500,000	155	K,M			CC	CC	CC	DD	DD	DD						EC	EC	EC	EC		FD+
1,800,000	185	K,M			CC	CC	CC	DE	DE	DE						EC	EC	EC	EC		FD+
2,200,000	225	K,M			CC	CC	CC	DH	DH	DH						EE	EE	EE	EE		FG+
2,700,000	275	K,M			CD	CD	CD	DH	DD	DD						EF	EF	EF	EF		FG+
3,300,000	335	K,M			CD	CD	CD	DE	DE	DH						EH	EH	EH	EH		FG+
4,700,000	475	K,M			CD	CD	CD	DH	DH	DH						EH	EH	EH	EH		FH+
6,800,000	685	K,M						DH	DH	DH						EK	EK	EK	EK	FK+	FK+
8,200,000	825	K,M						DH	DH	DH						EK	EK	EK	EK	FK+	FK+
10,000,000	106	K,M						DH	DH	DH						EL	EL	EL	EL	FK+	FK+
12,000,000	126	K,M														EH				FD+	FD+
15,000,000	156	K,M														EH				FD+	FD+
18,000,000	186	K,M														EH				FL+	FL+
22,000,000	226	K,M														EH				FL+	FL+
27,000,000	276	K,M																		FH+	FH+
33,000,000	336	K,M																		FM+	FM+
39,000,000	396	K,M																		FM+	FM+
47,000,000	476	K,M																		FM+	FM+

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

Improved product with higher ratings and tighter capacitance tolerance product (length, width, and thickness) at KEMET's option.

Reels with such substitutions will be marked with the improved KEMET part numbers. + Reflow Only.

## 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
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
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 ± 0.1	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
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
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

This chart refers to ceramic chip thickness codes on pages 59-62.

Ceramic Surface Mount