

INTRODUCTION

Ceramic chips consist of formulated ceramic dielectric materials which have been fabricated into thin layers, interspersed with metal electrodes alternately exposed on opposite edges of the laminated structure. The entire structure is then fired at high temperature to produce a monolithic block which provides high capacitance values in a small physical volume. After firing, conductive terminations are applied to opposite ends of the chip to make contact with the exposed electrodes. Standard end terminations use a nickel barrier layer and a tin overplate to provide excellent solderability for the customer.

KEMET multilayer ceramic chip capacitors are produced in plants designed specifically for chip capacitor manufacture. The process features a high degree of mechanization as well as precise controls over raw materials and process conditions. Manufacturing is supplemented by extensive Technology, Engineering and Quality Assurance programs.

KEMET ceramic chip capacitors are offered in the five most popular temperature characteristics. These are designated by the Electronics Industies Association (EIA) as the ultra-stable C0G (also known as NP0, military version BP), the stable X7R (military BX or BR), the stable X5R, and the general purpose Z5U and Y5V. A wide range of sizes are available. KEMET multilayer ceramic chip capacitors are available in KEMET's tape and reel packaging, compatible with automatic placement equipment. Bulk cassette packaging is also available (0805,0603 and 0402 only) for those pick and place machines requiring its use.

ELECTRICAL CHARACTERISTICS

1. Working Voltage:

Refers to the maximum continuous DC working voltage permissible across the entire operating temperature range. The reliability of multilayer ceramic capacitors is not extremely sensitive to voltage, and brief applications of voltage above rated will not result in immediate failure. However, reliability will be degraded by sustained exposure to voltages above rated.

2. Temperature Characteristics:

Within the EIA classifications, various temperature characteristics are identified by a three-symbol code; for example: C0G, X7R, X5R, Z5U and Y5V.

For Class I temperature compensating dielectrics (includes COG), the first symbol designates the significant figures of the temperature coefficient in PPM per degree Celsius, the second designates the multiplier to be applied, and the third designates the tolerance in PPM per degrees Celsius. EIA temperature characteristic codes for Class I dielectrics are shown in Table 1.

Table 1 – EIA Temperature Characteristic Codes for Class I Dielectrics

of Tem	ant Figure perature fficient	to Temp	r Applied perature ficient	Toleran Temper Coeffic	ature
PPM per	Letter	Multi-	Number	PPM per	Letter
Degree C	Symbol	plier	Symbol	Degree C	Symbol
0.0	C	-1	0	± 30	G
0.3	B	-10	1	± 60	H
0.9	A	-100	2	± 120	J
1.0	M	-1000	3	± 250	K
1.5	P	-10000	4	± 500	L

KEMET supplies the C0G characteristic.

For Class II and III dielectrics (including X7R, X5R, Z5U & Y5V), the first symbol indicates the lower limit of the operating temperature range, the second indicates the upper limit of the operating temperature range, and the third indicates the maximum capacitance change allowed over the operating temperature range. EIA type designation codes for Class II and III dielectrics are shown in Table 2.

Table 2 – EIA Temperature Characteristic Codes for Class II & III Dielectrics

	mperature ating		nperature ting	Maxii	num Capaci Shift	tance
Degree Celsius	Letter Symbol	Degree Celsius	Number Symbol	Percent	Letter Symbol	EIA Class
+10C -30C -55C	Z Y X	+45C +65C +85C +105C +125C +125C +120C	2 4 5 6 7 8 9	± 1.0% ± 1.5% ± 2.2% ± 3.3% ± 4.7% ± 7.5% ± 10.0% ± 15.0% ± 22.0% + 22/-33% + 22/-56% + 22/-62%	ABCDEFPRSTUV	

KEMET supplies the X7R, X5R, Z5U and Y5V characteristics.

3. Capacitance Tolerance:

See tables on pages 73-76.

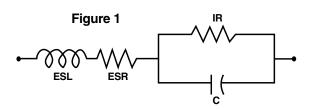
4. Capacitance:

Within specified tolerance when measured per Table 3.

The standard unit of capacitance is the farad. For practical capacitors, capacitance is usually expressed in microfarads (10 ⁻⁶ farad), nanofarads (10 ⁻⁹ farad), or picofarads (10 ⁻¹² farad). Standard measurement conditions are listed in Table 3 - Specified Electrical Limits.

Like all other practical capacitors, multilayer ceramic capacitors also have resistance and inductance. A simplified schematic for the single frequency equivalent circuit is shown in Figure 1. At high frequency more complex models apply see KEMET SPICE models at www.kemet.com for details.





C = Capacitance

ESR = Equivalent Series Resistance

ESL = Equivalent Series Inductance

IR = Insulation Resistance

Dissipation Factor: Measured under same conditions as capacitance. (See Table 3)

Dissipation factor (DF) is a measure of the losses in a capacitor under AC application. It is the ratio of the equivalent series resistance to the capacitive reactance, and is usually expressed in percent. It is normally measured simultaneously with capacitance, and under the same conditions. The vector diagram below illustrates the relationship between DF, ESR and impedance. The reciprocal of the dissipation factor is called the "Q" or quality factor. For convenience, the "Q" factor is often used for very low values of dissipation factor especially when measured at high frequencies. DF is sometimes called the "loss tangent" or "tangent δ ", as shown in Figure 2.

Figure 2

DF(%) =
$$\frac{\text{ESR} \times 100}{\text{X}_{c}}$$
 \times_{c}
 \times_{c}
 \times_{c}
 \times_{c}
 \times_{c}

6. Impedance:

Since the parallel resistance (IR) is normally very high, the total impedance of the capacitor can be approximated by:

Figure 3

$$Z = \sqrt{ESR^2 + (X_L - X_C)^2}$$

Where: Z = Total Impedance

ESR = Equivalent Series Resistance

 $X_C = Capacitive Reactance = 1/(2 \pi fC)$

 X_{I} = Inductive Reactance = (2 π f) (ESL)

The variation of a capacitor's impedance with frequency determines its effectiveness in many applications. At high frequency more detailed models apply see KEMET SPICE models for such instances.

7. Insulation Resistance:

Measured after 2 minutes electrification at 25°C and rated voltage: Limits per Table 3.

Insulation Resistance is the measure of a capacitor to resist the flow of DC leakage current. It is sometimes referred to as "leakage resistance". Insulation resistance (IR) is the DC resistance measured across the terminals of a capacitor, represented by the parallel resistance (IR) shown in Figure 1. For a given dielectric type, electrode area increases with capacitance, resulting in a decrease in the insulation resistance. Consequently, insulation resistance limits are usually specified as the "RC" (IR x C) product, in terms of ohmfarads or megohm-micro-farads. The insulation resistance for a specific capacitance value is determined by dividing this product by the capacitance. However, as the nominal capacitance values become small, the insulation resistance calculated from the RC product reaches values which are impractical. Consequently, IR specifications usually include both a minimum RC product and a maximum limit based on the IR calculated

Table 3 – Specified Electrical Limits

Parameter		Temperature (Characteristics	s
Parameter	C0G	X7R/X5R	Z5U	Y5V
Capacitance & Dissipation Factor: Measured at following conditions: C0G − 1kHz and 1 vrms if capacitance >1000 pF 1MHz and 1 vrms if capacitance ≤1000 pF X7R/X5R/Y5V − 1kHz and 1 vrms if capacitance ≤ 10 μF X7R/X5RY5V − 120Hz and 0.5 vrms if capacitance > 10 μF Z5U − 1kHz and 0.5 vrms				
DF Limits: **X5R Cap DF 50 - 200 volts - 25 volts - 25 volts - 16 volts - 25 volts - 25 volts - 26 volts - 27 volts - 27 volts - 28	0.10% 0.10% 	2.5% 2.5% 3.5% 5.0% 3.5% ** 5.0% **	4.0% 4.0% 	5.0% 7.0% 7.0% 10.0%
Dielectric Strength: At 2.5 times rated DC voltage		Pass Subseq	uent IR Test	
Insulation Resistance (IR): At rated DC voltage, whichever of the two is smaller. To get IR limit, divide $M\Omega$ - μ F value by the capacitance and compare to $G\Omega$ limit. Select the lower of the two limits.	1,000 MΩ – μF or 100 GΩ (100,000 MΩ)	1,000 MΩ – μF or 100 GΩ (100,000 MΩ)	100 MΩ – μF or 10 GΩ (10,000 MΩ)	$ \begin{array}{c} 100 \ M\Omega - \mu F \\ or \ 10 \ G \ (\geq 16 \ volt) \\ 50 \ M\Omega - \mu F \\ or \ 10G \ (\leq 10 v) \\ (10,000 \ M\Omega) \end{array} $
Temperature: Range, °C Capacitance Change (without DC voltage)	-55 to +125 0 ± 30 ppm/°C	X7R: -55 to +125 ±15% X5R: -55 to +85 ±15%	+10 to +85 +22% -56%	-30 to +85 +22% -82%

*Note: Some values measured at ½ volt, see X7R Table for specific details on pages 74 and 75.



from that value. For example, a typical IR specification might read "1,000 megohm-microfarads or 100 gigohms, whichever is less". The DC leakage current may be calculated by dividing the applied voltage by the insulation resistance (Ohm's Law).

Dielectric Withstanding Voltage: 250% of rated voltage for 5 seconds with current limited to 50mA at 25°C. Limits per Table 3.

Dielectric withstanding voltage (DWV) is the peak DC voltage which a capacitor is designed to withstand without damage for short periods of time. All KEMET multilayer ceramic surface mount capacitors will withstand a DC test voltage of 2.5 x the rated voltage for 60 seconds.

KEMET specification limits for all electrical characteristics at standard measurement conditions are shown in Table 3. Variations in these properties caused by changing conditions (temperature, voltage, frequency, and time) are covered in the following sections.

9. Aging Rate:

Maximum % Capacitance Loss/Decade Hour

COG - 0%

X7R - 2.0%

X5R - 5.0%

Z5U - 7.0% Y5V - 7.0%

Actual rates may be lower. Consult factory for details.

The capacitance of Class II and III dielectric changes with time as well as with temperature, voltage and frequency. The change with time is known as "aging". It is caused by gradual realignment of the crystalline structure of the ceramic dielectric material as it is cooled below its Curie temperature, which produces a loss of capacitance with time. The aging process is predictable and follows a logarithmic decay.

The aging process is reversible. If the capacitor is heated to a temperature above its Curie point for some period of time, de-aging will occur and the capacitor will regain the capacitance lost during the aging process. The amount of de-aging depends on both the elevated temperature and the length of time at that temperature. Exposure to 150°C for one-half hour is sufficient to return the capacitor to its initial value.

Because the capacitance changes rapidly immediately after de-aging, capacitance measurements are indexed to a referee time of 1,000 hours. All Kemet capacitors are shipped to be within tolerance at the referee time of 1,000 hours after the deaging process (this time is often referred to as "last heat"). The selection of this referree time has proven practical, as the actual 12. decline of capacitance after 1,000 hours is very low.

10. Effect of Temperature:

Both capacitance and dissipation factor are affected by variations in temperature. The maximum capacitance change with temperature is defined by the temperature characteristic. However, this only defines an "envelope" bounded by the upper and lower operating temperatures and the minimum and maximum capacitance values. Within this "envelope", the variation with temperature depends upon the specific dielectric formulation.

Insulation resistance decreases with increasing temperature. Typically, the insulation resistance limit at maximum rated temperature is 10% of the 25°C value.

11. Effect of Voltage:

Certain high dielectric constant ceramic capacitors may show variation in values of capacitance and dissipation factor with various levels of applied AC and DC voltages. Such variation is a natural characteristic of ceramic capacitors, and should be considered by the circuit designer.

In general, ceramic capacitors with the lowest dielectric constant (C0G or NP0) are extremely stable, and show little or no variation in capacitance and/or dissipation factor. On the other hand, ceramic capacitors with the highest dielectric constant (Z5U & Y5V) may show significant variation, particularly in capacitance. Other dielectric formulations such as X7R and X5R will show less variation than Y5V, but more than C0G.

The application of AC voltages in the range of 10 to 20 VAC tends to increase the values of both the capacitance and dissipation factor, while higher AC voltages tend to produce decreases in both.

However, the variation of capacitance with applied DC is the parameter of most interest to design engineers. Figure 8 shows typical variation of capacitance with applied DC voltage for some standard dielectrics. As can be seen, the decrease in capacitance is greatest for the Y5V dielectric (the C0G is not plotted, since it would not have a perceptible capacitance nor dissipa-

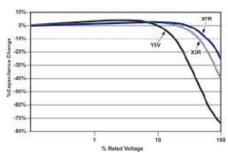


Figure 8 - Typical Variation of Capacitance with Applied DC Voltage tion factor change.)

More detailed modelling information on the effect of various voltages on specific capacitor ratings can be obtained by use of the KEMET SPICE models, available for free downloading at our website (www.kemet.com).

2. Effect of Frequency:

Frequency affects both capacitance and dissipation factor. Typical curves for KEMET multilayer ceramic capacitors are shown in Figures 4, 5, 6 and 7.

The variation of impedance with frequency is an important consideration in the application of multilayer ceramic capacitors. Total impedance of the capacitor is



the vector summation of the capacitive reactance, the inductive reactance, and the ESR, as illustrated in Figure 2. As frequency increases, the capacitive reactance decreases. However, the series inductance (L) shown in Figure 1 produces some inductive reactance, which increases with frequency. At some frequency, the impedance ceases to be capacitive and becomes inductive. This point, at the bottom of the V-shaped impedance versus frequency curves, is the self-resonant frequency. At the self-resonant frequency, the reactance is zero, and the impedance consists of the ESR only. At high frequency more detailed models apply - See KEMET SPICE models for such instances.

Typical impedance versus frequency curves for KEMET multilayer ceramic capacitors are shown in Figures 4, 5, 6 and 7.

ENVIRONMENTAL AND PHYSICAL

13. Thermal Shock:

EIA-198, Method 202, Condition B (5 cycles -55° to + 125° C).

14. Life Test:

EIA-198, Method 201, 1000 hours at 200% of rated voltage at 125°C. (Except 85°C for Z5U, Y5V & X5R).

See Table 4 on page 71 for limits.

*Note: 150% of rated voltage for selected high capacitance X5R values. Please contact factory

15. Humidity Test:

EIA-198, Method 206, (Except 1000 hours,85°C, 85% RH, Rated Voltage).

See Table 4 on page 71 for limits.

16. Moisture Resistance:

EIA-198, Method 204, Condition B (20 cycles with 50 volts applied.

See Table 4 on page 71 for limits.

17. Solderability:

EIA-198, Method 301 (245°, 5 secs, Sn62 solder) 95% smooth solder on terminations. See page 14 for recommended profiles.

- Resistance to Soldering Heat:
 EIA-198, Method 302, Condition B (260°C, 10 seconds) no leaching of nickel barrier.
- Terminal Strength:
 EIA-198, Method 303, Condition D .

RELIABILITY

20. A well constructed multilayer ceramic capacitor chip is extremely reliable and, for all practical purposes, has no wearout mechanism when used within the maximum voltage and temperature ratings. Most failures occur as a result of mechanical or thermal damage during mounting on the board, or during subsequent testing. Capacitor failure may also be induced by sustained operation at voltages that exceed the rated DC voltage, voltage spikes or transients that exceed the dielectric's voltage capability, sustained operation at temperatures above the maximum rated temperature, internal defects, or excessive temperature rise due to power

dissipation. As with any practical device, multilayer ceramic capacitors also possess an inherent, although low, failure rate when operated within rated conditions. The primary failure mode is by short-circuit or low insulation resistance, resulting from cracks or from dielectric breakdown at a defect site. KEMET monitors reliability with a periodic sampling program for selected values. Results are available in our FIT (Failure in Time) report for commercial chips.

21. Storage and Handling:

Ceramic chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature - reels may soften or warp, and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40 degrees C, and maximum storage humidity not exceed 70% relative humidity. In addition, temperature fluctuations should be minimized to avoid condensation on the parts, and atmospheres should be free of chlorine and sulfur bearing compounds. For optimized solderability, chip stock should be used promptly, preferably within 1.5 years of receipt.

MISAPPLICATION

22. Ceramic capacitors, like any other capacitors, may fail if they are misapplied. Some misapplications include mechanical damage, such as impact or excessive flexing of the circuit board. Others include severe mounting or rework cycles that may also introduce thermal shock. Still others include exposure to excessive voltage, current or temperature. If the dielectric layer of the capacitor is damaged by misapplication, the circuit may fail. The electrical energy of the circuit can be released as heat, which may damage the circuit board and other components as well.

ADDITIONAL INFORMATION

23. Detailed application information can be found in KEMET Engineering Bulletins.

Surface Mount-Mounting Pad

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	Dimensions and Considerations
F-2102	Reflow Soldering Process
F-2105	Wave Solder Process
F-2103	Surface Mount Repair
F-2110	Capacitance Monitoring while Flex Testing
F-2111	Ceramic Chip Capacitors "Flex Cracks" -
	Understanding and Solutions

For analysis of high frequency applications, KEMET has SPICE models of most chip capacitors. Models may be downloaded from KEMET's website www.kemet.com.

Additional information is also available - See your KEMET representative for details or post your questions to KEMET's homepage on the web http://www.kemet.com.



TABLE 4 – ENVIRONMENTAL LIMITS

Body	Rated DC Voltage	Initial DF (%)	$\begin{array}{c} \text{IR} \\ (\text{G}\Omega \text{ or } \Omega\text{F}) \\ \text{whichever is} \\ \text{less} \end{array}$	DF (%) Post Life/ Hum/Moisture Resistance	Cap Shift (% or pf, whichever is greater) Post Life/ Hum/Moisture Resistance	IR (GΩ or ΩF) whichever is less Post Life/ Hum/Moisture Resistance
COG	200*	0.1	100/1000	0.5	0.3% or ± 0.25 pf	10/100
	100	0.1	100/1000	0.5	0.3% or ± 0.25 pf	10/100
	50	0.1	100/1000	0.5	0.3% or ± 0.25 pf	10/100
	25	0.1	100/1000	0.5	0.3% or ± 0.25 pf	10/100
	16	0.1	100/1000	0.5	0.3% or ± 0.25 pf	10/100
X7R	200*	2.5	100/1000	3.0	± 20%	10/100
	100	2.5	100/1000	3.0	± 20%	10/100
	50	2.5	100/1000	3.0	± 20%	10/100
	25	3.5	100/1000	5.0	± 20%	10/100
	16	3.5	100/1000	5.0	± 20%	10/100
	6.3/10	5.0	100/1000	7.5	± 20%	10/100
X5R	50V all cap values	2.5	100/1000	3.0	± 20%	10/100
	25V all cap values	5.0	100/1000	7.5	± 20%	10/100
	<25≤564 cap value	5.0	100/1000	7.5	± 20%	10/100
	>564 cap value	10.0	100/1000	12.0	± 20%	10/100
Z5U	100	4.0	10/100	5.0	± 30%	1/10
	50	4.0	10/100	5.0	± 30%	1/10
	25	4.0	10/100	7.5	± 30%	1/10
Y5V	100	5.0	10/100	7.5	± 30%	1/10
	50	5.0	10/100	7.5	± 30%	1/10
	25	7.0	10/100	10.0	± 30%	1/10
	16	7.0	10/100	10.0	± 30%	1/10
	6.3/10	10.0	10/50	15.0	± 30%	1/5

^{*200} Volt limits not currently included in EIA-198.

PERFORMANCE CURVES EFFECT OF FREQUENCY (See SPICE models for specific ratings.)

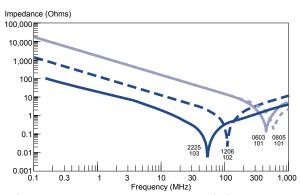


FIGURE 4. Impedance versus Frequency C0G Dielectric

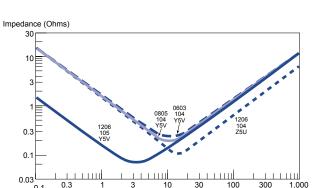


FIGURE 6. Impedance versus Frequency Z5U/Y5V Dielectric

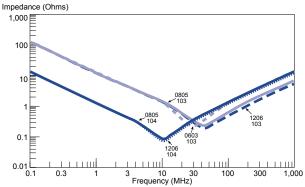


FIGURE 5 Impedance versus Frequency X7R Dielectric

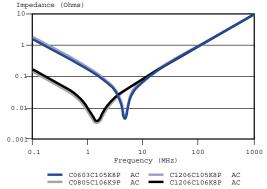


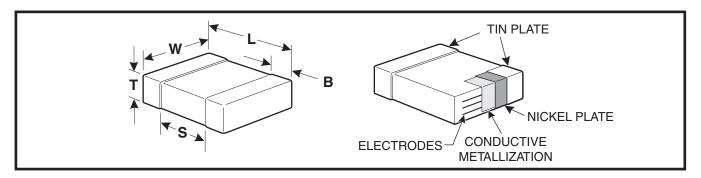
FIGURE 7. Impedence versus Frequency X5R Dielectric



FEATURES

- C0G (NP0), X7R, X5R, Z5U and Y5V Dielectrics
- 10, 16, 25, 50, 100 and 200 Volts
- Standard End Metalization: Tin-plate over nickel barrier
- Available Capacitance Tolerances: ±0.10 pF; ±0.25 pF; ±0.5 pF; ±1%; ±2%; ±5%; ±10%; ±20%; and +80%-20%
- Tape and reel packaging per EIA481-1. (See page 92 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	L - LENGTH	W - WIDTH	T THICKNESS	B - BANDWIDTH	S SEPARATION minimum	MOUNTING TECHNIQUE
0201*	0603	0.6 (.024) ± .03 (.001)	$0.3 \pm (.012) \pm .03 (.001)$		0.15 (.006) ± .05 (.002)	N/A	Solder Reflow
0402*	1005	1.0 (.04) ± .05 (.002)	0.5 (.02) ± .05 (.002)		0.20 (.008)40 (.016)	0.3 (.012)	Solder Reliow
0603	1608	1.6 (.063) ± .15 (.006)	0.8 (.032) ± .15 (.006)		0.35 (.014) ± .15 (.006)	0.7 (.028)	
0805*	2012	2.0 (.079) ± .20 (.008)	1.25 (.049) ± .20 (.008)		0.50 (.02) ± .25 (.010)	0.75 (.030)	Solder Wave +
1206*	3216	3.2 (.126) ± .20 (.008)	1.6 (.063) ± .20 (.008)	See page 78	0.50 (.02) ± .25 (.010)	N/A	Solder Reflow
1210*	3225	3.2 (.126) ± .20 (.008)	2.5 (.098) ± .20 (.008)	for thickness	0.50 (.02) ± .25 (.010)	N/A	
1808	4520	4.5 (.177) ± .30 (.012)	2.0 (.079) ± .20 (.008)	dimensions.	0.60 (.024) ± .35 (.014)	N/A	
1812	4532	4.5 (.177) ± .30 (.012)	3.2 (.126) ± .30 (.012)	,	0.60 (.024) ± .35 (.014)	N/A	
1825*	4564	4.5 (.177) ± .30 (.012)	6.4 (.252) ± .40 (.016)	,	0.60 (.024) ± .35 (.014)	N/A	Solder Reflow
2220	5650	5.6 (.220) ± .40 (.016)	5.0 (.197) ± .40 (.016)		0.60 (.024) ± .35 (.014)	N/A	
2225	5664	5.6 (.220) ± .40 (.016)	6.3 (.248) ± .40 (.016)		0.60 (.024) ± .35 (.014)	N/A	

^{*} Note: Indicates EIA Preferred Case Sizes (Tightened tolerances apply for 0402, 0603, and 0805 packaged in bulk bassette, see page 96.)

CAPACITOR ORDERING INFORMATION (Standard Chips - For Military see page 87) C 0805 C 103 K 5 R **CERAMIC** -**END METALLIZATION** SIZE CODE C-Standard (Tin-plated nickel barrier) **SPECIFICATION FAILURE RATE LEVEL** C - Standard CAPACITANCE CODE -A- Not Applicable Expressed in Picofarads (pF) First two digits represent significant figures. **TEMPERATURE CHARACTERISTIC** Designated by Capacitance Third digit specifies number of zeros. (Use 9 Change Over Temperature Range for 1.0 through 9.9pF. Use 8 for 0.5 through 0.99pF) G - C0G (NP0) (±30 PPM/°C) (Example: 2.2pF = 229 or 0.50 pF = 508) $R - X7R (\pm 15\%) (-55^{\circ}C + 125^{\circ}C)$ **CAPACITANCE TOLERANCE** $P-X5R (\pm 15\%) (-55^{\circ}C + 85^{\circ}C)$ $B - \pm 0.10 pF$ $J - \pm 5\%$ $U - Z5U (+22\%, -56\%) (+10^{\circ}C + 85^{\circ}C)$ $K - \pm 10\%$ $C - \pm 0.25 pF$ V – Y5V (+22%, -82%) (-30°C + 85°C) $D - \pm 0.5pF$ $M - \pm 20\%$ **VOLTAGE** 1 - 100V 3 - 25V $F - \pm 1\%$ P - (GMV) - special order only 2 - 200V 4 - 16V Z - +80%. -20% $G-\pm2\%$ 5 - 50V 8 - 10V 6 - 35V 9 - 6.3V

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

7 - 4V

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



COG CAPACITANCE RANGE - 0201, 0402, 0603, 0805, 1206

Сар	Can	Can	C0201*			C0402	*				Cr	603*					Cn	805*					C1	206*		\neg
pF	Cap Code	Cap Tolerance	25V	10V	16V	25V	50V	100V	10V	16V	25V	50V	100V	200V	10V	16V	25V	50V	100V	200V	10V	16V	25V	50V	100V	200V
0.50 0.75 1.0 1.1 1.2 1.3 1.5 1.6	508 758 109 119 129 139 159 169 189	C,D C,D C,D C,D C,D C,D C,D C,D		BB BB BB BB BB BB BB BB	BB BB BB BB BB BB BB BB	BB	BB BB BB BB BB BB BB BB		CB CB CB CB CB CB	CBBCBBCBCBCB	CB CB CB CB CB CB CB	CB CB CB CB CB CB CB	CB CB CB CB CB CB CB	CB CB CB CB CB CB CB	DC DC DC DC DC DC DC	DC DC DC DC DC DC DC		DC DC DC DC DC DC DC	DC DC DC DC DC DC DC	DC DC DC DC DC DC DC	EB EB EB EB EB		EB EB EB EB EB	EB EB EB EB EB	EB EB EB EB EB EB	EB EB EB EB EB EB
2.0 2.2 2.4 2.7 3.0 3.3 3.6 3.9 4.3	209 229 249 279 309 339 369 399 439	C,D C,D C,D C,D C,D K,M C,D K,M C,D K,M C,D K,M		88 88 88 88 88 88 88 88 88	BB BB BB BB BB BB BB	BB	BB BB BB BB BB BB BB BB		CB C	C C C C C C C C C C C C C C C C C C C	CB C	CB CB CB CB CB CB CB	CB CB CB CB CB CB CB	CB CB CB CB CB CB CB	DC DC DC DC DC DC DC DC	DC DC DC DC DC DC DC DC	000000000000000000000000000000000000000	DC DC DC DC DC DC DC DC		DC DC DC DC DC DC DC DC			EB E	EB E		
4.7 5.1 5.6 6.2 6.8 7.5 8.2 9.1 10.0 11.0	479 519 569 629 689 759 829 919 100 110	C,D K,M C,D J,K,M C,D J,K,M C,D J,K,M C,D J,K,M C,D J,K,M C,D J,K,M C,D J,K,M	AA^	BB	BB BB BB BB BB BB BB BB	BB	BB BB BB BB BB BB BB BB		CB CB CB CB CB CB CB CB CB	CB C	CB C	CB CB CB CB CB CB CB	CB CB CB CB CB CB CB CB	CB CB CB CB CB CB CB CB	DC DC DC DC DC DC DC DC DC	DC DC DC DC DC DC DC DC	000000000000000000000000000000000000000	DC DC DC DC DC DC DC DC		DC DC DC DC DC DC DC DC			EB E	EB E	EB E	
12.0 13.0 15.0 16.0 18.0 20.0 22.0 24.0 27.0 30.0	120 130 150 160 180 200 220 240 270 300	D.F.G.J.K.M C.D G.J.K.M C.D G.J.K.M C.D G.J.K.M C.D G.J.K.M C.D G.J.K.M C.D G.J.K.M C.D G.J.K.M	AA~ AA~ AA~ AA~	BB	BB BB BB BB BB BB BB BB	88 88 88 88 88 88 88 88 88 88 88 88	BB BB BB BB BB BB BB BB BB		CB CB CB CB CB CB CB CB	CBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB	CB B B B B B B B B B B B B B B B B B B	CB CB CB CB CB CB CB	CB CB CB CB CB CB CB CB	CB CB CB CB CB CB CB CB	DC	DC DC DC DC DC DC DC DC		DC DC DC DC DC DC DC DC		DC DC DC DC DC DC DC DC			EB E	EB E	EB E	
33.0 36.0 39.0 43.0 47.0 51.0 56.0 62.0 68.0 75.0	330 360 390 430 470 510 560 620 680 750	D,F,G,J,K,M D,F,G,J,K,M D,F,G,J,K,M D,F,G,J,K,M D,F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M	AA~ AA~ AA~ AA~	BB BB BB BB BB BB BB BB BB BB	BB BB BB BB BB BB BB BB BB	88 88 88 88 88 88 88 88 88 88	BB BB BB BB BB BB BB BB BB		CB CB CB CB CB CB CB CB CB CB	CB CB CB CB CB	CB CB CB CB CB CB CB CB CB CB CB CB	CB CB CB CB CB CB CB CB	CB CB CB CB CB CB CB CB	CB CB CB CB CB CB CB	DC	DC DC DC DC DC DC DC DC DC	000000000000000000000000000000000000000	DC		DC DC DC DC DC DC DC DC			EB EB EB EB EB EB EB	EB EB EB EB EB EB EB		EB EB EB EB EB EB EB
82.0 91.0 100.0 110.0 120.0 130.0 150.0 160.0 180.0 200.0	820 910 101 111 121 131 151 161 181 201	F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M	AA~	BB BB BB BB BB BB BB BB BB BB BB BB	BB BB BB BB BB BB BB BB BB	88 88 88 88 88 88 88 88 88	BB BB BB BB BB BB BB BB BB	BB BB BB BB BB BB	CB CB CB CB CB CB CB CB CB CB CB CB CB C	C C C C C C C C C C C C C C C C C C C	CB CB BB B	CB CB CB CB CB CB CB CB CB	CB CB CB CB CB CB CB CB	CB CB CB CB CB CB CB CB	DC	DC DC DC DC DC DC DC DC DC	000000000000000000000000000000000000000	DC		DC DC DC DC DC DC DC DC DC	EB EB EB EB EB EB EB EB					EB EB EB EB EB EB EB EB EB EB EB EB EB E
220.0 240.0 270.0 300.0 330.0 360.0 390.0 430.0 470.0	221 241 271 301 331 361 391 431 471	F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M		88 88 88 88 88 88 88 88	BB BB BB BB BB BB BB BB	88 88 88 88 88 88 88 88 88 88 88 88 88	88 88 88 88 88 88 88 88	BB BB BB BB BB BB BB BB	CBB CBB CBB CBB	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		CB CB CB CB CB CB CB CB	CB CB CB CB CB CB CB		DC DC DC DC DC DC DC DC	DC DC DC DC DC DC DC DC	866666666666	DC DC DC DC DC DC DC DC		DC DC DC DC DC DC DD				EB EB EB EB EB EB	EB EB EB EB EB EB	EB EB EB EB EB EB
510.0 560.0 620.0 680.0 750.0 820.0 910.0 1000.0	511 561 621 681 751 821 911 102	F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M		BB	BB BB BB BB BB BB BB	BB	BB BB BB BB BB BB BB	BB BB BB BB BB BB BB	CB CB CB CB CB CB CB CB CB CB	CB C	CB C	CB CB CB CB CB CB CB CB	CB CB CB CB CB CB CB		DC DC DC DC DC DC DC	DC DC DC DC DC DC DC DC	000000000000000000000000000000000000000	DC DC DC DC DC DC DC DC		DC DC DC DC DC DC DD				EB E	EB E	EB EC C C E E E E E E
1200.0 1300.0 1500.0 1600.0 1800.0 2000.0 2200.0 2400.0 2700.0 3000.0	122 132 152 162 182 202 222 242 272 302	R,J,L,B,F F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M		BB BB BB BB BB BB	BB BB BB BB BB BB	BB BB BB BB BB BB	BB BB BB		CB CB CB CB CB	CBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB	CB B B B B B B CB CB	CB CB CB CB CB CB CB CB	CB CB CB CB CB CB CB CB		DC DD DD DD DC DC DC DC	DC DD DD DD DC DC DC DC		DC DD DD DD DC DC DC DC			EB EB EB EB EB EC		EB EB EB EB EC	EB EB EB EB EC	EB EC EC EC EC	EB EC ED ED EE EC EC
3300.0 3600.0 3900.0 4300.0 4700.0 5100.0 5600.0 6200.0 6800.0 7500.0	332 362 392 432 472 512 562 622 682 752	F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M							CB CB CB CB CB CB CB CB	CB CB CB CB CB CB	CB CB CB CB CB CB CB	CB CB CB CB CB CB CB CB	CB CB CB CB		DD DD DE DE DE DC DC DC DC	DD DD DE DE DE DC DC DC DC	DD DD DE DE DE DC DC DC DC	DD DD DE DE DE DC DC DC DC			EC EC EC ED EB EB EB		EC EC EC ED EB EB EB	EC EC EC ED EB EB EB	EE EF C EC ED EB EB EB	
8200.0 9100.0 10,000.0 12,000.0 15,000.0 18,000.0 22,000.0 27,000.0 33,000.0	822 912 103 123 153 183 223 273 333	F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M							CB CB CB CB	CB CB CB	CB CB CB CB				DC DC DC DC DC DC DD DF	DC DC DC DC DC DC DD DF DG		DC DC DC DC DC DC	DC DC DC DE DG		EC ED B B B B B B B B B B B B B B B B B B	EC EC E B E B E B E B E B E B E B E B E	EC EC EB EB EB EB EB	EC ED EB EB EB EB	EB EB EB EC EE EE	
47,000.0 56,000.0 58,000.0 32,000.0 00,000.0	473 563 683 823 104	F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M F,G,J,K,M													DG	DG	DG				ECEFE	EC EF EH EH	EC ED EF EH EH	EE EF EH EH	EH	

* 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 in 63 volt applications.

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.

• Greater or equal to J (5%) tolerance available. • J Tolerance Only; ^ = D Tolerance Only ~ = J,K,M Tolerance Only



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

Code Tolerance Tolerance	2220 00V 200V	_	50V	100V	200V
0.52.4 (309-249 D	300 2001	2300	300	1300	2300
2.7-9.1 279-919 D KM FB					
100-130 100-130 10 JKM FB					
270-0510 270-510 DF,GJJKM FB					
56-0-82.0 560-82.0 FG_JKM_FB_FB_FB_FB_FB_FB_FB_FB_FB_FB_FB_FB_FB_					
910-3600 910-361 F,G,J,K,M FB					
380.0 391 F,GJJKM FB					
430.0 431 F,G,J,KM FB FB FB FB FB FB GB GB GB GB FB					
470.0 471 F.G.J.K.M FB FB FB FB FB FB FB GB GB GB GB 510.0 511 F.G.J.K.M FB					
Secon					
680.0 621 F,GJJKM FB					
680.0 681 F.G.J.K.M FB FB FB FB FB FB FB GB GB GB FB					
750.0 751 F.G.J.K.M FB FB FB FB FB FB FB GB GB GB FB					
820.0 821 F.G.J.K.M FB					
910.0 911 F,GJJKM FB FB FB FB FB FB FB GB GB GB FB					1
1,100.0 112 F,G,J,K,M FB FB FB FB FB FB FB FB GB GB GB 1,200.0 132 F,G,J,K,M FB FB FB FB FB FB FB GB GB GB 1,300.0 132 F,G,J,K,M FB			1	1	1
1,200.0 122 F,G.J.K.M FB FB FB FB FB FB GB GB GB GB 1300.0 152 F,G.J.K.M FB FB FB FB FB FC FC FG FC FG.J.K.M FB FB FB FB FB FB FC GB	1		1	1	
1,300.0 132 F.G.J.K.M FB FB FB FB FB FC FB FC FB FC FB			1	1	
1,500.0 152 F,G,J,K,M FB FB FB FB FB FE GB GB GB 1,600.0 162 F,G,J,K,M FB FB FB FB FB FE			_	_	
1,600.0 162 F,G,J,K,M FB FB FB FB FF FE					
1.800.0 182 F.G.J.K.M FB FB FB FB FB FB GB GB GB					
2,000.0 202 F,G,J,K,M FB FB FB FB FC FE					
2,200.0 222 F,G,J,K,M FB FB FB FB FC FG GB GB GB					
2,400.0 242 F,G,J,K,M FB FB FB FB FC FC FC					
2,700.0 272 F,G,J,K,M FB FB FB FB FC FC GB GB GB 3,000.0 302 F,G,J,K,M FB FB FB FB FC FF					
3,300.0 332 F.G.J.K.M FB FB FB FB FF FF GB GB GB					
3,600.0 362 F.G.J.K.M FB FB FB FB FF FF					
3,900.0 392 F.G.J.K.M FB FB FB FB FF FF GB GB GB HB HB HB HB					
4,300.0 432 F,G,J,K,M FB FB FB FF FF FF					
4,700.0 472 F,G,J,K,M FF FF FF FF FG FG GB GB GD HB HB HB S 5,100.0 512 F,G,J,K,M FB FB FB FB FB FG FG			KB	KB	KB
5,100.0 512 F,G,J,K,M FB FB FB FB FG FG FG SB GB GH HB HB HB HB			KB	КВ	КВ
6,200.0 622 F.G.J.K.M FB FB FB FB FG			110		
6,800.0 682 F,G,J,K,M FB FB FB FB FG GB GJ HB HB HB JB	JB		KB	KB	KB
7,500.0 752 F,G,J,K,M FC FC FC FC FC	_		l		
8,200.0 822 F,G,J,K,M FC FC FC FC FC GB GH HB HB HB JB	JB		KB	KB	KB
9,100.0 912 F,G,J,K,M FE	JB		кв	кв	кв
12,000.0 123 F,G,J,K,M FG FG FG FG FB GB GG HB HB HE JB	JB JB		KB	KB	KB
15,000.0 153 F.G.J.K.M FG FG FG FG FB GB GB HB HB JB	JB		KB	KB	KE
18,000.0 183 F,G,J,K,M FB FB FB FB FB GB GB HB HE JB	JB		KB	KB	
22,000.0 223 F,G,J,K,M FB FB FB FB FB GB GB HB HE JB	JB	1	KB	KB	1
27,000.0 273 F,G,J,K,M FB FB FB FB FB GB GB HB HF JB	JB		KB	KE	1
33,000.0 333 F.G.J.K.M FB FB FB FB FB GB GB JB JB 47,000.0 473 F.G.J.K.M FB FB FB FB FB FB GB GB JB	JB JB		KB	1	
47,000.0 473 F.G.J.K.M FB FB FB FB FF GB GB JB	JB JB		1	1	
68,000.0 683 F,G,J,K,M FB FB FB FC FG GB GB JB	JB				
82,000.0 823 F,G,J,K,M FC FC FC FF FH GB GB JB	JB				
100,000.0 104 F,G,J,K,M FE FE FE FG FM+ GB GD JB	JB				
120,000.0 124 F,G,J,K,M FG FG FG FH GB GH JB	JB				
150,000.0 154 F,G,J,K,M FH FH FH FM GD GN JB 220,000.0 224 F,G,J,K,M FK+ FK+ FK+ GK GK JB	JB JD				
270,000.0 274 F.G.J.K.M FR+ FR+ FR+ JB JB	JE .		1	1	
330,000.0 334 F,G,J,K,M JD	JH		1	1	1
470,000.0 474 F,G,J,K,M JG			1	1	
560,000.0 564 F,G,J,K,M			<u> </u>		

X7R CAPACITANCE RANGE - 0402, 0603, 0805, 1206

Cap	Cap				C0402						C0603							C0805							C1206			
рF	Code	Cap Tol	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	100V	200V	6.3V	10V	16V	25V	50V	100V	200V	6.3V	10V	16V	25V	50V	100V	200V
150 180	151 181	J, K, M J, K, M	BB BB	BB BB	BB BB	BB BB	BB BB	СВ	DC																			
220	221	J, K, M	BB	BB	BB	BB	BB	CB	DC																			
270	271	J, K, M	BB	BB	BB BB	BB	BB	CB	DC	DC	DC	DC DC	DC	DC	DC DC													
330 390	331 391	J, K, M J, K, M	BB BB	BB BB	BB	BB BB	BB BB	CB CB	DC DC	DC DC	DC DC	DC	DC DC	DC DC	DC													
470	471	J, K, M	BB	BB	BB	BB	BB	CB	DC																			
560 680	561 681	J, K, M J, K, M	BB BB	BB BB	BB BB	BB BB	BB BB	CB CB	DC DC																			
820	821	J, K, M	BB	BB	BB	BB	BB	CB	DC																			
1,000 1,200		J, K, M J, K, M	BB BB	BB BB	BB BB	BB BB	BB BB	CB CB	DC DC	EB EB																		
1,500	152	J, K, M	BB	BB	BB	BB	BB	CB	СВ	CB	CB	CB	CB	CB	DC	EB												
1,800 2,200		J, K, M J, K, M	BB BB	BB BB	BB BB	BB BB	BB BB	CB CB	DC DC	EB EB																		
2,700		J, K, M	BB	BB	BB	BB	BB	CB	DC	EB																		
3,300	332 392	J, K, M	BB BB	BB	BB BB	BB BB	BB BB	CB	CB CB	CB CB	CB CB	CB CB	CB CB	CB CB	DC DC	EB EB												
3,900 4,700		J, K, M J, K, M	BB	BB BB	BB	BB	BB	CB CB	CB	CB	CB	CB	CB	CB	DC	EB												
5,600	562	J, K, M	BB	BB	BB	BB	BB	CB	CB	CB	СВ	CB	CB	CB	DC	EB												
6,800 8,200		J, K, M J, K, M	BB BB	BB BB	BB BB	BB BB	BB BB	CB CB	DC DC	EB EB																		
10,000	103	J, K, M	BB	BB	BB	BB	BB	CB	DC	EB																		
12,000 15,000	123 153	J, K, M J, K, M	BB BB	BB BB	BB BB	BB BB	BB BB	CB CB	CB CB	CB CB	CB CB	CB CB	CB CB		DC DC	DC DC	DC DC	DC DC	DC DC	DC DD	DC DC	EB EB						
18,000	183	J, K, M	BB	BB	BB	BB	BB	CB	CB	CB	CB	CB	CB		DC	DC	DC	DC	DC	DD	DC	EB						
22,000 27,000	223 273	J, K, M J. K. M	BB BB	BB BB	BB BB	BB BB	BB	CB CB	CB CB	CB CB	CB CB	CB CB	CB CB		DC DC	DC DC	DC DC	DC DC	DC DC	DD DD	DC DE	EB EB						
33,000	333	J, K, M	BB	BB	BB	BB		CB	CB	CB	CB	CB	CB		DC	DC	DC	DC	DC	DD	DE	EB						
39,000	393 473	J, K, M	BB BB	BB BB	BB BB	BB BB		CB	CB CB	CB	CB	CB CB	CB CB		DC DC	DC	DC	DC DC	DC DC	DD DE	DE DG	EB EB	EB EB	EB EB	EB EB	EB EB	EC EC	EB ED
47,000 56,000		J, K, M J, K, M	BB	BB	BB	BB		CB CB	CB	CB CB	CB	CB	CB		DD	DD	DD	DD	DD	DE	DG	EB	EB	EB	EB	EB	EB	ED
68,000	683	J, K, M	BB	BB	BB			CB	CB	CB	CB	CB			DD	DD	DD	DD	DD	DE		EB	EB	EB	EB	EB	EB	ED
82,000 100,000		J, K, M J, K, M	BB BB	BB BB	BB BB			CB CB	CB CB	CB CB	CB CB	CB CB			DD DD	DD DD	DD DD	DD DD	DD DD	DE DE		EB EB	EB EB	EB EB	EB EB	EB EB	EB EB	ED EM
120,000	124	J, K, M						CB	CB	CB		СВ			DC	DC	DC	DC	DD	DG		EC	EC	EC	EC	EC	EC	EM
150,000 180,000	154 184	J, K, M J, K, M						CB CB	CB CB	CB CB		CD			DC DC	DC DC	DC DC	DC DC	DD DD			EC EC	EC EC	EC EC	EC EC	EC EC	EC EC	EG
220,000	224	J, K, M						CB	CB	CB	CD				DC	DC	DC	DC	DD	DG		EC	EC	EC	EC	EC	EC	
270,000 330,000	274 334	J, K, M J, K, M						CB CB	CB CB	CB CB					DD DD	DD DD	DD DD	DD DD	DD			EB EB	EB EB	EB EB	EB EB	EC EC	EM EG	
390,000	394	J, K, M						CB	CB	CB					DG	DG	DG	DG	DE			EB	EB	EB	EB	EC	EG	
470,000 560,000		J, K, M J, K, M						CB	СВ	CB					DD DD	DD DD	DD DD	DD DG	DE DH			EC ED	EC ED	EC ED	EC ED	EC EC	EG	
680,000	684	J, K, M													DD	DD	DD	DG	DH			EE	EE	EE	EE	ED		
820,000	824 105	J, K, M						CC*	CC*	CC*					DD DD	DD DD	DD DD	DG DG				EF	EF EF	EF EF	EF EG	ED ED		
1,000,000 1,200,000	105	J, K, M J, K, M						CC	CC.	CC.					DE	DE	DE	DG				EF ED	ED	ED	EG	EH		
1,500,000	155	J, K, M													DG	DG	DG					EF	EF	EF	EG	EH		
1,800,000 2,200,000	185 225	J, K, M J. K. M													DG DG	DG DG	DG DG					EF ED	EF ED	EF ED	EF	EH		
2,700,000	275	J, K, M																				EN	EN	EN				
3,300,000 3,900,000		J, K, M J, K, M																				ED EF	ED EF	ED EF	EH			
4,700,000	475	J, K, M																				EF+	EF+	EF+	EH+			
5,600,000	565	J, K, M																				EH+	EH+	EH+				
6,800,000 8,200,000	685 825	J, K, M J, K, M																				EH+	EH+	EH+				
10,000,000		J, K, M																				EH+	EH+	EH+				

^{*} Capacitance K or M. ontact KEMET Sales Rep for J tolerance availability. +_Reflow Only.

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



X7R CAPACITANCE RANGE - 1210, 1808, 1812, 1825, 2220, 2225

Сар	Сар					C1210					C1808			C1	812			C1825			C2	220			C2225	
pF	Code	Cap Tol.	6.3V	10V	16V	25V	50V	100V	200V	50V	100V	200V	25V	50V	100V	200V	50V	100V	200V	25V	50V	100V	200V	50V	100V	200V
2,200	222	J,K,M	FB	FB	FB	FB	FB	FB	FB	-		2001				200.	-		2001		-		2001			2001
2,700	272	J,K,M	FB	FB	FB	FB	FB	FB	FB																	
3,300		J,K,M	FB	FB	FB	FB	FB	FB	FB																	
3,900	392	J,K,M	FB	FB	FB	FB	FB	FB	FB																	
4,700		J,K,M	FB	FB	FB	FB	FB	FB	FB	LD	LD	LD														
5,600	562	J,K,M	FB	FB	FB	FB	FB	FB	FB	LD	LD	LD														
6,800	682	J,K,M	FB	FB	FB	FB	FB	FB	FB	LD	LD	LD	GB	GB	GB	GB										
8,200	822	J,K,M	FB	FB	FB	FB	FB	FB	FB	LD	LD	LD	GB	GB	GB	GB										
10,000	103	J,K,M	FB	FB	FB	FB	FB	FB	FB	LD	LD	LD	GB	GB	GB	GB										
12,000	123	J,K,M	FB	FB	FB	FB	FB	FB	FB	LD	LD	LD	GB	GB	GB	GB										
15,000	153	J,K,M	FB	FB	FB	FB	FB	FB	FB	LD	LD	LD	GB	GB	GB	GB										
18,000	183	J,K,M	FB	FB	FB	FB	FB	FB	FB	LD	LD	LD	GB	GB	GB	GB										
22,000	223	J,K,M	FB	FB	FB	FB	FB	FB	FB	LD	LD		GB	GB	GB	GB	HB	HB	HB							
27,000	273	J,K,M	FB	FB	FB	FB	FB	FB	FB	LD	LD		GB	GB	GB	GB	НВ	НВ	НВ							
33,000	333	J,K,M	FB	FB	FB	FB	FB	FB	FB	LD	LD		GB	GB	GB	GB	НВ	НВ	НВ							
39,000	393	J,K,M	FB	FB	FB	FB	FB	FB	FB	LD	LD		GB	GB	GB	GB	НВ	НВ	НВ							
47,000	473	J,K,M	FB	FB	FB	FB	FB	FB	FC	LD	LD		GB	GB	GB	GB	HB	НВ	НВ					KC	KC	KC
56,000	563	J,K,M	FB	FB	FB	FB	FB	FB	FC	LD	LD		GB	GB	GB	GB	HB	HB	HB					KC	KC	KC
68,000	683	J,K,M	FB	FB	FB	FB	FB	FB	FC	LD			GB	GB	GB	GB	НВ	НВ	НВ					KC	KC	KC
82,000	823	J,K,M	FB	FB	FB	FB	FB	FC	FF	LD			GB	GB	GB	GB	HB	HB	HB				JC	KC	KC	KC
100,000	104	J,K,M	FB	FB	FB	FB	FB	FD	FG	LD			GB	GB	GB	GB	HB	HB	HB				JC	KC	KC	KC
120,000	124	J,K,M	FB	FB	FB	FB	FB	FD		LD			GB	GB	GB	GB	HB	HB	HB				JC	KC	KC	KC
150,000	154	J,K,M	FC	FC	FC	FC	FC	FD		LD			GB	GB	GB	GE	HB	HB	HB				JC	KC	KC	KC
180,000	184	J,K,M	FC	FC	FC	FC	FC	FD		LD			GB	GB	GB	GF	HB	HB	HB				JC	KC	KC	KC
220,000	224	J,K,M	FC	FC	FC	FC	FC	FD					GB	GB	GB	GG	HB	HB	HB				JC	KC	KC	KC
270,000	274	J,K,M	FC	FC	FC	FC	FC	FD					GB	GB	GG	GG	HB	HB	HB	JC	JC	JC	JC	KB	KC	KC
330,000	334	J,K,M	FD	FD	FD	FD	FD	FD					GB	GB	GG	GG	HB	HB	HB	JC	JC	JC	JC	KB	KC	KC
390,000	394	J,K,M	FD	FD	FD	FD	FD						GB	GB	GG	GG	HB	HB	HD	JC	JC	JC	JC	KB	KC	KC
470,000	474	J,K,M	FD	FD	FD	FD	FD	FD					GB	GB	GG	GJ	HB	HB	HD	JC	JC	JC	JC	KB	KC	KD
560,000	564	J,K,M	FD	FD	FD	FD	FD						GC	GC	GG		HB	HD	HD	JC	JC	JC	JD	KB	KC	KD
680,000	684	J,K,M	FD	FD	FD	FD	FD						GC	GC	GG		HB	HD	HD	JC	JC	JD	JD	KB	KC	KD
820,000	824	J,K,M	FF	FF	FF	FF	FF						GE	GE	GG		HB		HF	JC	JC	JF	JF	KB	KC	KE
1,000,000	105	J,K,M	FH	FH	FH	FH	FH	FM					GE	GE	GG		HB		HF	JC	JC	JF	JF	KB	KD	KE
1,200,000	125	J,K,M	FH	FH	FH	FH	FG										HB			JC	JC			KB		KE
1,500,000	155	J,K,M	FH	FH	FH	FH	FG										HC			JC	JC			KC		
1,800,000	185	J,K,M	FH	FH	FH	FH	FG										HD			JD	JD			KD		
2,200,000	225	J,K,M	FJ	FJ	FJ	FJ	FG	FT*							GO°		HF			JF	JF			KD		
2,700,000	275	J,K,M	FE	FE	FE																					
3,300,000		J,K,M	FF	FF	FF	FM	FM																			
3,900,000	395	J,K,M	FG	FG	FG																					
4,700,000	475	J,K,M	FC+	FC+	FC+	FG+	FS+						GK*	GK*												
5,600,000		J,K,M	FF+	FF+	FF+																					
6,800,000	685	J,K,M	FG+	FG+	FG+	FM+																				
8,200,000	825	J,K,M	FH+	FH+	FH+																					
10,000,000	106	J,K,M	FH+	FH+	FH+	FS+							GK*							JF	JO					
12,000,000	126	J,K,M																								
15,000,000	156	J,K,M																			JO					
18,000,000	186	J,K,M																								
22,000,000	226	J,K,M	FS+	FS+																JO						
47,000,000	476	M	FS+																							

^{*} Capacitance tolerance K or M. Contact your local KEMET Sales Rep for J tolerance availability. + Reflow Only 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.

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.

Y5V CAPACITANCE RANGE

Сар	Сар	Сар	(C0402	*		C06	03*			C	0805	*			(1206	*			(1210	*	
pF	Code	Tol.	6.3V	10V	16V	6.3V	10V	16V	25V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	50V
22,000	223	Z	BB	BB	BB	CB	CB	CB	CB					DC					EB					
27,000	273	Z	BB	BB	BB	CB	CB	CB	CB					DC					EB					
33,000	333	Z	BB	BB	BB	CB	CB	CB	CB					DC					EB					
39,000	393	Z	BB	BB	BB	CB	CB	CB	CB					DD					EB					
47,000	473	Z	BB	BB	BB	CB	CB	CB	CB					DD					EB					
56,000	563	Z	BB	BB	BB	CB	CB	CB	CB					DD					EB					
68,000	683	Z	BB	BB	BB	CB	CB	CB	CB					DD					EB					
82,000	823	Z	BB	BB	BB	CB	CB	CB	CB					DD					EB					
100,000	104	Z	BB	BB	BB	CB	CB	CB	CB					DD					EB					
120,000	124	Z				CC	CC	CC	CC	DC	DC	DC	DC											
150,000	154	Z				CC	CC	CC	CC	DC	DC	DC	DC											
180,000	184	Z				CC	CC	CC	CC	DC	DC	DC	DC											
220,000	224	Z	BB			CC	CC	CC	CC	DC	DC	DC	DC	DD	EC	EC	EC	EC		FD	FD	FD	FD	FD
270,000	274	Z				CC	CC	CC	CC	DC	DC	DC	DC		EB	EB	EB	EB		FD	FD	FD	FD	FD
330,000	334	Z				CC	CC	CC	CC	DC	DC	DC	DC		EB	EB	EB	EB		FD	FD	FD	FD	FD
390,000	394	Z				CC	CC	CC		DC	DC	DC	DC		EB	EB	EB	EB		FD	FD	FD	FD	FD
470,000 560,000	474 564	Z Z	BB			CC	CC	CC		DC DD	DC DD	DC DD	DC DD		EC EB	EC EB	EC EB	EC EB		FD FD	FD FD	FD FD	FD FD	FD FD
680,000	684	Z				CC	CC			DE	DE	DE	DE		EB	EB	EB	EB		FD	FD	FD	FD	FD
820,000	824	Ź				čč	CC			DG	DĞ	ĎĞ	DĞ		ĒВ	ĒΒ	ĒВ	ĒВ		FF	FF	FF	FF	FF
1,000,000	105	Z	BB			CC	CC			DĞ	DĞ	DG	DĞ		EG	EG	EG	EG		FH	FH	FH	FH	FH
1,200,000	125	Z								DC	DC	DC			EC	EC	EC			FD	FD	FD		
1,500,000 1,800,000	155 185	Z Z								DC DD	DC DD	DC DD			EC	EC	EC			FD FD	FD FD	FD FD		
2,200,000	225	Ž								DD	DD	DD			ĒĔ	ΕĔ	EE			FD	FD	FD		
3,300,000	335	Z								DE	DE	DH			EF	EF	EF			FE	FE	FE		
4,700,000	475	Z								DH	DH	DH			ΕM	EM	EM			FG	FG	FG		
5,600,000	565	Z								DH	DH				ΕJ	ΕÌ	EJ			FG	FĞ	FĞ		
6,800,000 10,000,000	685 106	Z								DH	DH				EJ EJ	EJ EJ				FH FH	FH FH	FH		
15.000.000	156	Ž								ווט	ווט				LJ	LJ				FH	FH	FH		
22.000.000	226	Z													EH					FT	FT	FM		

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.

* EIA preferred chip sizes

⁺ Reflow only



X5R CAPACITANCE RANGE

Сар	Сар	Сар	02	201		C04	02*			C06	03*			С	0805*				C	1206	*				C12	10*		
pF	Code	Tol.	6.3V	16V	4V	6.3V	10V	16V	6.3V	10V	16V	25V	4V	6.3V	10V	16V	25V	6.3V	10V	16V	25V	50V	6.3V	10V	16V	25V	35V	50V
10,000	103	K,M		AA~																								
12,000	123	K,M				BB	BB	BB																				
15,000	153	K,M				BB	BB	BB																				
18,000	183	K,M				BB	BB	BB																				
22,000 27,000	223 273	K,M K,M				BB BB	BB BB	BB BB																				
33,000	333	K,M				BB	BB	BB																				
39,000	393	K,M				BB	BB	BB																				
47,000	473	K,M				BB	BB	BB																				
56,000	563	K,M				BB	BB	BB																				
68,000	683	K,M				BB	BB	BB																				
82,000	823	K,M				BB	BB	BB																				
100,000	104	K,M	AA~			BB	BB	BB																				
120,000	124	K,M																										
150,000 180,000	154 184	K,M K.M																										
220,000	224	K,M				BB																						
270,000	274	K,M				DD			CC	CC	СС										EB							
330,000	334	K,M							CC	CC	CC										EB							
390,000	394	K,M							CC	CC	CC										EB							
470,000	474	K,M							CC	CC	CC						DC				EC							
560,000	564	K,M							CC	CC	CC						DD				ED							
680,000	684	K,M							CC	CC	CC						DE				EE							
820,000	824	K,M				DD	DD		CC	CC	CC	00		БО.	D0	ъ0	DF DG				EF ED				ELL.	- LI.		FH+
1,000,000 1,200,000	105 125	K,M K.M				BB	BB		CC	CC	CC	CD		DG DD	DG DD	DG DD	DG				EC				FH+ FD+	FH+ FD+		гп+
1,500,000	155	K.M												DC	DC	DC		EC	EC	EC	EC				FD+	FD+		
1,800,000	185	K,M												DD	DD	DD		EC	EC	EC	ĒČ				FD+	FD+		
2,200,000	225	K,M				BB°			CC+	CC+	CC+			DD	DK	DD		EE	EE	EE	EE				FG+	FG+		
2,700,000	275	K,M																EF	EF	EF	EF				FG+	FG+		
3,300,000	335	K,M			BB°				CC+°					DF	DF	DH		EH	EH	EH	EH		FG+		FG+	FG+		
4,700,000	475	K,M			BB°				CC+	CC+				DH	DH	DH	DG	EH	EH	EH	EH	EH°	FG+	FG+	_	FG+		
5,600,000	565	K,M																ED	ED	EII			FG+	FG+	FG+	FG+		
6,800,000 8,200,000	685 825	K,M K,M																ED ED	ED ED	EH			FG+ FG+	FG+	FG+	FG+		
10,000,000	106	K,M							CD°+					DK+	DK+	DK+		EH	EH	EH	EH+		FT+	FT+	FO+	FH+	FT°+	
12,000,000	126	K,M							OD T					DAT	DICT	DAT							FD+	FD+	FG+			
15,000,000	156	K,M															l						FG+	FG+	FL+			
18,000,000	186	K,M															l						FG+	FG+	FH+			
22,000,000	226	K,M												DH+°				EH+	EH+°				FH+	FH+	FJ+			
27,000,000	276	K,M																										
33,000,000	336	K,M																										
39,000,000 47,000,000	396 476	K,M											D 10 .	DK°.				EU°.	EH°+				EO°.	EO.	FQ°+			
100,000,000	107	K,M K.M											D3.+	DK°+				EH°+	En+				FQ°+	rQ+°	רעי+			
100,000,000	107	rx,ivl																CH +					TQ +					

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

° Available M ±20% tolerance only

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.

Z5U CAPACITANCE RANGE

(KEMET's Z5U also meets Y5V Characteristics)

Сар	Сар	C0	805*	C12	206*	C12	210*	C1	B12*	C18	325*	C2	225
Code	Tol.	50V	100V	50V	100V	50V	100V	50V	100V	50V	100V	50V	100V
682	M,Z	DC	DC										
			DC										
						FR	FR						
								GB	GB				
124				EC		FB	FD	GB	GB				
154	M,Z			EC		FC	FD	GB	GB				
184	M,Z			EC		FC		GB		HB	HB		
224	M,Z			EC		FC		GB		HB	HB		
	M,Z									HB	HB		
													KC
											HD		KC
													KC
						FH		GE					
										110			
	682 822 103 123 153 183 223 333 393 473 3563 683 823 104 124 154 224 274 394 474 474 474 474 684 824 105 125 155 185	Code Tol. 682 M,Z 822 M,Z 103 M,Z 153 M,Z 153 M,Z 223 M,Z 273 M,Z 393 M,Z 473 M,Z 563 M,Z 823 M,Z 124 M,Z 154 M,Z 124 M,Z 124 M,Z 134 M,Z 244 M,Z 394 M,Z 474 M,Z 684 M,Z 824 M,Z 125 M,Z 155 M,Z 185 M,Z 185 M,Z 185 M,Z 185 M,Z 186 M,Z 187 M,Z 188 M,Z 189 M,Z 180 M,Z 181	Gode Tol. 50V 682 M,Z DC 822 M,Z DC 103 M,Z DC 123 M,Z DC 153 M,Z DC 183 M,Z DC 273 M,Z DC 273 M,Z DC 333 M,Z DC 333 M,Z DC 473 M,Z DD 473 M,Z DD 473 M,Z DD 473 M,Z DD 474 M,Z DD 823 M,Z DD 823 M,Z DD 823 M,Z DD 824 M,Z DD 825 M,Z DD 827 M,Z DD 828 M,Z DD 829 M,Z DD 820 M,Z DD 821 M,Z DD 822 M,Z DD 823 M,Z DD 824 M,Z DD 825 M,Z DD 826 M,Z DD 827 M,Z DD 828 M,Z DD 829 M,Z DD 820 M,Z DD 821 M,Z DD 822 M,Z DD 823 M,Z DD 824 M,Z DD 825 M,Z DD 826 M,Z DD 827 M,Z DD 828 M,Z DD 829 M,Z DD 820 M,Z DD 821 M,Z DD 822 M,Z DD 823 M,Z DD 824 M,Z DD 825 M,Z DD 826 M,Z DD 827 M,Z DD 828 M,Z DD 828 M,Z DD 829 M,Z DD 820 M,Z DD 821 M,Z DD 822 M,Z DD 823 M,Z DD 834 M,Z DD 845 M,Z DD 85 M,Z DD 868	Code Tol. 50V 100V 682 M.Z DC DC 822 M.Z DC DC 103 M.Z DC DC 153 M.Z DC DC 183 M.Z DC DC 223 M.Z DC DC 393 M.Z DC DC 393 M.Z DD DC 393 M.Z DD D 473 M.Z DD D 663 M.Z DD D 823 M.Z DD D 823 M.Z DD D 104 M.Z DD D 154 M.Z D D 154 M.Z D D 164 M.Z D D 334 M.Z D D 474 M.Z D D 564	Code Tol. 50V 100V 50V 682 M.Z DC DC BC BC DC BC BC DC BC BC DC BC	Gode Tol. 50V 100V 50V 100V 682 M.Z DC DC BE EB	Code Tol. 50V 100V 50V 100V 50V 682 M,Z DC DC	Code Tol. 50V 100V 50V 100V 50V 100V 682 M,Z DC DC DC BZ DO 100V 50V 100V	Code Tol. 50V 100V 50V 100V 50V 100V 50V 50	Code Tol. 50V 100V 5	Code Tol. 50V 100V 20V 20V	Code Tol. 50V 100V 20V 20V <td>Code Tol. 50V 100V 20V 100V 2</td>	Code Tol. 50V 100V 20V 100V 2

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.

* EIA preferred chip sizes

See page 78 for Thickness Code Reference Chart.

CERAMIC CHIP/CAPACITORS **Tin Lead L Termination**

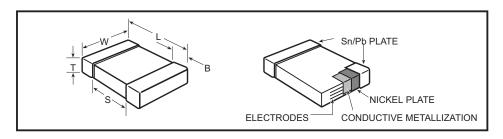


FEATURES

KEMET's line of Tin/Lead termination commercial MLCC surface mount capacitors are designed to meet the needs of the commercial, high reliability, and military customer applications where Tin/Lead plating is required. KEMET's Tin/Lead electroplating process is designed to meet a 5% minimum lead content in the termination of the component. As the bulk of the electronics industry marches to RoHS compliance it is important that KEMET provide the Tin/Lead terminated products for our valued high reliability and military customers.

KEMET Tin/Lead MLCC surface mount capacitors are available in standard EIA case sizes from 0402 to 2225 and standard capacitance values in X7R and C0G dielectrics. Voltage ratings range from 6.3V to 200V. To order the Tin/Lead terminations indicate an "L" in the 14th digit of the part number. To request the L Series termination for other surface mount product lines (Open Mode, High Voltage, Arrays, etc.) or for additional dielectrics and higher voltage ratings, please contact the factory or local Sales representative.

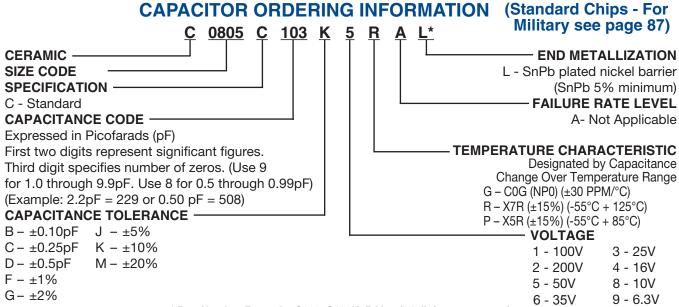
CAPACITOR OUTLINE DRAWINGS



DIMENSIONS—MILLIMETERS AND (INCHES)

EIA SIZE CODE	METRIC SIZE CODE	L - LENGTH	W - WIDTH	T THICKNESS	B - BANDWIDTH	S SEPARATION minimum	MOUNTING TECHNIQUE
0201*	0603	0.6 (.024) ± .03 (.001)	$0.3 \pm (.012) \pm .03 (.001)$		0.15 (.006) ± .05 (.002)	N/A	Solder Reflow
0402*	1005	1.0 (.04) ± .05 (.002)	0.5 (.02) ± .05 (.002)		0.20 (.008)40 (.016)	0.3 (.012)	Solder Reliow
0603	1608	1.6 (.063) ± .15 (.006)	0.8 (.032) ± .15 (.006)		0.35 (.014) ± .15 (.006)	0.7 (.028)	0 11 111
0805*	2012	2.0 (.079) ± .20 (.008)	1.25 (.049) ± .20 (.008)		0.50 (.02) ± .25 (.010)	0.75 (.030)	Solder Wave + or
1206*	3216	3.2 (.126) ± .20 (.008)	1.6 (.063) ± .20 (.008)	See page 78	0.50 (.02) ± .25 (.010)	N/A	Solder Reflow
1210*	3225	3.2 (.126) ± .20 (.008)	2.5 (.098) ± .20 (.008)	for thickness	0.50 (.02) ± .25 (.010)	N/A	
1808	4520	4.5 (.177) ± .30 (.012)	2.0 (.079) ± .20 (.008)	dimensions.	0.60 (.024) ± .35 (.014)	N/A	
1812	4532	4.5 (.177) ± .30 (.012)	3.2 (.126) ± .30 (.012)		0.60 (.024) ± .35 (.014)	N/A	
1825*	4564	4.5 (.177) ± .30 (.012)	6.4 (.252) ± .40 (.016)		0.60 (.024) ± .35 (.014)	N/A	Solder Reflow
2220	5650	5.6 (.220) ± .40 (.016)	5.0 (.197) ± .40 (.016)		0.60 (.024) ± .35 (.014)	N/A	
2225	5664	5.6 (.220) ± .40 (.016)	6.3 (.248) ± .40 (.016)		0.60 (.024) ± .35 (.014)	N/A	

^{*} Note: Indicates EIA Preferred Case Sizes (Tightened tolerances apply for 0402, 0603, and 0805 packaged in bulk cassette, see page 96.) † For extended value 1210 case size - solder reflow only.





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	0.30 ± 0.03	N/A	N/A	15,000	N/A	N/A
BB	0402	0.50 ± 0.05	N/A	N/A	10,000	50,000	50,000
CB	0603	0.80 ± 0.07	N/A	N/A	4,000	10,000	15,000
CC	0603	0.80 ± 0.10	N/A	N/A	4,000	10,000	N/A
CD	0603	0.80 ± 0.15	N/A	N/A	4,000	10,000	N/A
DB	0805	0.60 ± 0.10	N/A	N/A	4,000	10,000	10,000
DC	0805	0.78 ± 0.10	N/A	N/A	4,000	10,000	N/A
DD	0805	0.90 ± 0.10	N/A	N/A	4,000	10,000	N/A
DE	0805	1.00 ± 0.10	2,500	10,000	N/A	N/A	N/A
DF	0805	1.10 ± 0.10	2,500	10,000	N/A	N/A	N/A
DG	0805	1.25 ± 0.15	2,500	10,000	N/A	N/A	N/A
DH	0805	1.25 ± 0.20	2,500	10,000	N/A	N/A	N/A
DJ	0805	1.25 ± 0.20	3,000	N/A	N/A	N/A	N/A
DK	0805	1.25 ± 0.15	3,000	N/A	N/A	N/A	N/A
DL	0805	0.95 ± 0.10	4,000	10,000	N/A	N/A	N/A
EB EC	1206	0.78 ± 0.10	4,000	10,000	4,000	10,000 N/A	N/A N/A
ED	1206 1206	0.90 ± 0.10	4,000 2,500	10,000	N/A N/A	N/A N/A	N/A
EE	1206	1.00 ± 0.10 1.10 ± 0.10	2,500	10,000 10,000	N/A N/A	N/A N/A	N/A
EF	1206	1.20 ± 0.15	2,500	10,000	N/A	N/A	N/A
EG	1206	1.60 ± 0.15	2,000	8,000	N/A N/A	N/A	N/A N/A
EH	1206	1.60 ± 0.13	2,000	8,000	N/A	N/A	N/A
EJ	1206	1.70 ± 0.20	2,000	8,000	N/A	N/A	N/A
EK	1206	0.80 ± 0.10	2,000	8,000	N/A	N/A	N/A
EL	1206	1.15 ± 0.15	2,000	8,000	N/A	N/A	N/A
EM	1206	1.25 ± 0.15	2,500	10,000	N/A	N/A	N/A
EN	1206	0.95 ± 0.10	4,000	10,000	N/A	N/A	N/A
FB	1210	0.78 ± 0.10	4,000	10,000	N/A	N/A	N/A
FC	1210	0.90 ± 0.10	4,000	10,000	N/A	N/A	N/A
FD	1210	0.95 ± 0.10	4,000	10,000	N/A	N/A	N/A
FE	1210	1.00 ± 0.10	2,500	10,000	N/A	N/A	N/A
FF	1210	1.10 ± 0.10	2,500	10,000	N/A	N/A	N/A
FG	1210	1.25 ± 0.15	2,500	10,000	N/A	N/A	N/A
FH	1210	1.55 ± 0.15	2,000	8,000	N/A	N/A	N/A
FJ	1210	1.85 ± 0.20	2,000	8,000	N/A	N/A	N/A
FK	1210	2.10 ± 0.20	2,000	8,000	N/A	N/A	N/A
FL	1210	1.40 ± 0.15	2,000	8,000	N/A	N/A	N/A
FM	1210	1.70 ± 0.20	2,000	8,000	N/A	N/A	N/A
FN	1210	1.85 ± 0.20	2,000	8,000	N/A	N/A	N/A
FO	1210	1.50 ± 0.20	2,000	8,000	N/A	N/A	N/A
FP	1210	1.60 ± 0.20	2,000	8,000	N/A	N/A	N/A
FQ	1210	2.50 ± 0.22	1,500	N/A	N/A	N/A	N/A
FR	1210	2.25 ± 0.20	2,000	8,000	N/A	N/A	N/A
FS	1210	2.50 ± 0.20	1,000	4,000	N/A	N/A	N/A
FT	1210	1.90 ± 0.20	1,500	4,000	N/A	N/A	N/A
LD CD	1808	0.90 ± 0.10	4,000	10,000	N/A	N/A	N/A
GB	1812	1.00 ± 0.10 1.10 ± 0.10	1,000	4,000	N/A	N/A	N/A
GC GD	1812 1812	1.10 ± 0.10 1.25 ± 0.15	1,000 1,000	4,000 4,000	N/A N/A	N/A N/A	N/A N/A
GE	1812	1.30 ± 0.10	1,000	4,000	N/A N/A	N/A N/A	N/A
GF	1812		1,000	4,000	N/A N/A	N/A N/A	N/A
GG	1812	1.50 ± 0.10 1.55 ± 0.10	1,000	4,000	N/A N/A	N/A N/A	N/A N/A
GH	1812	1.40 ± 0.15	1,000	4,000	N/A	N/A	N/A
GJ	1812	1.70 ± 0.15	1,000	4,000	N/A	N/A	N/A
GK	1812	1.60 ± 0.13	1,000	4,000	N/A	N/A	N/A
GL	1812	1.90 ± 0.20	1,000	4,000	N/A	N/A	N/A
GM	1812	2.00 ± 0.20	1,000	4,000	N/A	N/A	N/A
GN	1812	1.70 ± 0.20	1,000	4,000	N/A	N/A	N/A
GO	1812	2.50 ± 0.20	500	N/A	N/A	N/A	N/A
HB	1825	1.10 ± 0.15	1,000	4,000	N/A	N/A	N/A
HC	1825	1.15 ± 0.15	1,000	4,000	N/A	N/A	N/A
HD	1825	1.30 ± 0.15	1,000	4,000	N/A	N/A	N/A
HE	1825	1.40 ± 0.15	1,000	4,000	N/A	N/A	N/A
HF	1825	1.50 ± 0.15	1,000	4,000	N/A	N/A	N/A
JB	2220	1.00 ± 0.15	1,000	4,000	N/A	N/A	N/A
JC	2220	1.10 ± 0.15	1,000	4,000	N/A	N/A	N/A
JD	2220	1.30 ± 0.15	1,000	4,000	N/A	N/A	N/A
JE	2220	1.40 ± 0.15	1,000	4,000	N/A	N/A	N/A
JF	2220	1.50 ± 0.15	1,000	4,000	N/A	N/A	N/A
JG	2220	1.70 ± 0.15	1,000	4,000	N/A	N/A	N/A
JH	2220	1.80 ± 0.15	1,000	4,000	N/A	N/A	N/A
JO	2220	2.40 ± 0.15	500	2,000	N/A	N/A	N/A
KB	2225	1.00 ± 0.15	1,000	4,000	N/A	N/A	N/A
		4 40 0 45	4 000	4 000	N/A	N/A	N/A
KC KD	2225 2225	1.10 ± 0.15 1.30 ± 0.15	1,000 1,000	4,000 4,000	N/A N/A	N/A N/A	N/A

This chart refers to ceramic chip thickness codes on pages 73 - 76.

Note: TU suffix represents tape and reel packaging of unmarked components.

Note: TM suffix represents tape and reel packaging of marked components.

Cases sizes ≤1210 are 8mm tape with 4mm pitch and Case Sizes >1210 are 12mm tape and 8mm pitch.

CERAMIC OPEN MODE CAPACITORS **KEN**



FEATURES

KEMET's Open Mode Ceramic Surface Mount Capacitor is designed to significantly minimize the probability of a low IR or Short Circuit Condition when forced to failure in a board flex situation. This reduces the potential for causing catastrophic failures. This product is RoHS Compliant.

Applications:

- Input side filtering (power plane/bus)
- High current applications (battery line)
- Circuits that cannot be fused to open when short circuits occur due to flex cracks

Markets:

- Automotive
 - All applications connected directly to the battery
 - Conversion to 42V power system
- · Power Conversion
 - Raw power input side filtering

OUTLINE DRAWING

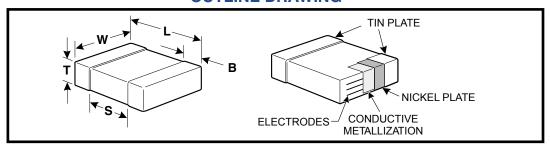
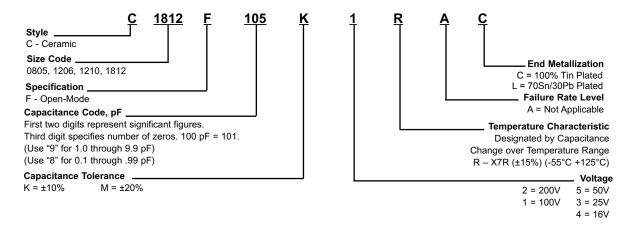


TABLE 1 - DIMENSIONS - MILLIMETERS (INCHES)

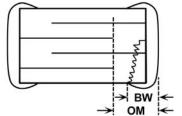
Metric Size Code	EIA Size Code	L - Length	W - Width	B - Bandwidth	Separation
2012	0805	2.0 (.079) ± .20 (.008)	1.25 (.049) ± 0.2 (.008)	0.50 (.02) ± .25 (.010)	0.75 (.030)
3216	1206	3.2 (.126) ± .20 (.008)	1.6 (.063) ± 0.2 (.008)	0.50 (.02) ± .25 (.010)	N/A
3225	1210	3.2 (.126) ± .20 (.008)	2.5 (.098) ± 0.2 (.008)	0.50 (.02) ± .25 (.010)	N/A
4532	1812	4.5 (.177) ± 0.3 (.012)	3.2 (.126) ± 0.3 (.012)	0.60 (.024) ± .35 (.014)	N/A

Note: For thickness dimensions, see Table 2.

CAPACITOR ORDERING INFORMATION



OPEN-MODE INTERNAL DESIGN



The open-mode dimension (OM) exceeds the termination bandwidth dimensions: OM >BW



KEVET CERAMIC OPEN MODE CAPACITORS

TABLE 2 X7R DIELECTRIC CAPACITANCE RANGE AND THICKNESS TARGETS (mm)

Сар			0805	<u> </u>				120	6				1210				1	812	
Code	16V	25V	50V	100V	200V	16V	25V	50V	100V	200V	16V	25V	50V	100V	200V	25V	50V	100V	200V
102	DD	DD	DD	DD	DD														
122	DD	DD	DD	DD	DD														
152	DD	DD	DD	DD	DD														
182	DD	DD	DD	DD	DD														
222	DD	DD	DD	DD	DD														
272	DD	DD	DD	DD	DD														
332	DD	DD	DD	DD	DD														
392	DD	DD	DD	DD	DD														
472	DD	DD	DD	DD	DD														
562	DD	DD	DD	DD	DD														
682	DD	DD	DD	DD	DD														
822	DD	DD	DD	DD	DD														
103	DD	DD	DD	DD	DD														
123	DD	DD	DD	DD	DG														
153	DD	DD	DD	DD	DG														
183	DD	DD	DD	DD						EC									
223	DD	DD	DD	DG						EC									
273	DD	DD	DD	DG						EC									
333	DD	DD	DD	DG						EC									
393	DD	DD	DD	DG						EC									
473	DD	DD	DD	DE		EC	EC	EC	EC	EG									GB
563	DD	DD	DD			EC	EC	EC	EC	EG									GB
683	DD	DD	DG	DG		EC	EC	EC	EC	EG					FD				GB
823	DD	DD	DG			EC	EC	EC	EC	EG					FD	0.0	0.0	0.0	GB
104	DG DG	DG	DG			EC EC	EC EC	EC	EC	EG	FD FD	FD FD	FD FD	FD FD	FG FG	GB GB	GB GB	GB GB	GB GB
124 154	DG	DG DG				EC	EC	EC EC	EC EG		FD	FD	FD	FD	FH	GB	GB	GB	GB
184	DG	DG				EC	EC	EC	EG		FD	FD	FD	FD	FH	GB	GB	GB	GB
224	DG	DD	DG			EC	EC	EC	ED		FD	FD	FD	FG	FJ	GB	GB	GB	GC
274	DD	DD	טט			EC	EC	EC	ED		FD	FD	FD	FG	ΓJ	GB	GB	GB	GF
334	DG	DG				EG	EG	EG	EG		FD	FD	FD	FH		GB	GB	GB	GK
394	DG	DG				EG	EG		LG		FD	FD	FG	FH		GB	GB	GB	GL
474	DE	DG		1		EG	EG	EC			FD	FD	FG	FJ		GB	GB	GC	OL.
564	DL	20				EG					FD	FD	FG	FR		GB	GB	GD	
684	DG					EG					FD	FG	FH	FR		GD	GD	GF	
824	- 50					EG					FD	FG	FJ			GD	GD	GK	
105						EG	EC	EH			FD	FH	FJ	FQ		GN	GN	GM	
125						ΙŢ	Ť				FG	i	l . Š			<u> </u>		<u> </u>	
155											FH								
185											FH								
225						EC	EH				FJ		FM						
475						EH					FG	FM							
685												FQ							

THICKNESS AND PACKAGING INFORMATION

Thickness Code	Series	Dimension	7" Reel Qty.	13" Reel Qty.
DD	0805	.90 ± .10	4000	10000
DE	0805	1.00 ± .10	2500	10000
DG	0805	1.25 ± .15	2500	10000
EC	1206	.90 ± .10	4000	10000
ED	1206	1.00 ± .10	2500	10000
EG	1206	1.60 ± .15	2000	8000
EH	1206	1.60 ± .20	2000	8000
FD	1210	.95 ± .10	4000	10000
FG	1210	1.25 ± .15	2500	10000
FH	1210	1.55 ± .15	2000	8000
FJ	1210	1.85 ± .20	2000	8000
FM	1210	1.70 ± .20	2000	8000
FR	1210	2.25 ± .20	2000	8000
FQ	1210	2.5 ± .20	1500	8000
GB	1812	1.0 ± .10	1000	4000
GC	1812	1.1 ± .10	1000	4000
GD	1812	1.25 ± .15	1000	4000
GF	1812	1.50 ± .15	1000	4000
GK	1812	1.60 ± .20	1000	4000
GL	1812	1.90 ± .20	1000	4000
GM	1812	2.00 ± .20	1000	4000
GN	1812	1.70 ± .20	1000	4000

CERAMIC CHIP / HIGH VOLTAGE



KEMET's High Voltage Surface Mount Capacitors are designed to withstand high voltage applications. They offer high capacitance with low leakage current and low ESR at high frequency. The capacitors have pure tin (Sn) plated external electrodes for good solderability. X7R dielectrics are not designed for AC line filtering applications. An insulating coating may be required to prevent surface arcing. These components are RoHS compliant.

APPLICATIONS

- Switch Mode Power Supply
 - Input Filter
 - Resonators
 - Tank Circuit
 - Snubber Circuit
 - Output Filter
- High Voltage Coupling
- · High Voltage DC Blocking
- Lighting Ballast
- Voltage Multiplier Circuits
- Coupling Capacitor/CUK

MARKETS

- Power Supply
- · High Voltage Power Supply
- DC-DC Converter
- · LCD Fluorescent Backlight Ballast
- HID Lighting
- Telecommunications Equipment
- Industrial Equipment/Control
- Medical Equipment/Control
- Computer (LAN/WAN Interface)
- · Analog and Digital Modems
- Automotive

OUTLINE DRAWING

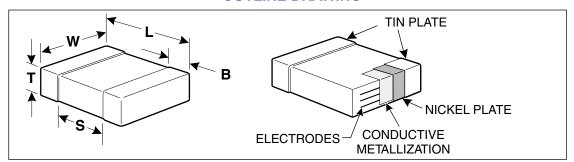


TABLE 1 - DIMENSIONS - MILLIMETERS (in.)

Metric Code	EIA Size Code	L - Length	W - Width	B - Bandwidth	Band Separation
2012	0805	2.0 (0.079) ± 0.2 (0.008)	1.2 (0.049) ± 0.2 (0.008)	0.5 (0.02 ±0.25 (0.010)	0.75 (0.030)
3216	1206	3.2 (0.126) ± 0.2 (0.008)	1.6 (0.063) ± 0.2 (0.008)	0.5 (0.02) ± 0.25 (0.010)	N/A
3225	1210	3.2 (0.126) ± 0.2 (0.008)	2.5 (0.098) ± 0.2 (0.008)	0.5 (0.02) ± 0.25 (0.010)	N/A
4520	1808	4.5 (0.177) ± 0.3 (0.012)	2.0 (0.079 ± 0.2 (0.008)	0.6 (0.024) ± 0.35 (0.014)	N/A
4532	1812	4.5 (0.177) ± 0.3 (0.012)	3.2 (0.126) ± 0.3 (0.012)	0.6 (0.024) ± 0.35 (0.014)	N/A
4564	1825	4.5 (0.177) ± 0.3 (0.012)	6.4 (0.250) ± 0.4 (0.016)	0.6 (0.024) ± 0.35 (0.014)	N/A
5650	2220	5.6 (0.224) ± 0.4 (0.016)	5.0 (0.197) ± 0.4 (0.016)	0.6 (0.024) ± 0.35 (0.014)	N/A
5664	2225	5.6 (0.224) ± 0.4 (0.016)	6.4 (0.250) ± 0.4 (0.016)	0.6 (0.024) ± 0.35 (0.014)	N/A



KEMET CERAMIC CHIP / HIGH VOLTAGE

COG DIELECTRIC CAPACITANCE VALUES AND THICKNESS TARGETS (mm)

		Series	08	05			120	6			121	0				180	В				1	812	2				18	25					22	20					22	25		
Сар	Cap Tol.	Cap Code/	> >	> ≥	: >	· >	>	>	≥ >	> >	. >	≥ :	≥ :	> >	. >	2	≥	≥ :	2 >	> >	. >	>	≥ ;	≥ ≥	≥ >	> 2	≥ ≥	: ≥		>	> :	> [2 2	٤	2 ≥	>	>	> 3	2 2	≥ ≥	: ≥	>
pF		Voltage	2000	1000	2007	630V	1000V	1500V	20007	630	1000	1500V	20007	2000	1000	1500V	2000V	2500V	3000V	630	1000	1500V	20007		200	630V	15007	2007	2500	3000V	200	630	1000V		2500V	8	500V	630V	1000V		2500V	300
	C,D		DG D	G D	G	H	Ì	Ì	1	t	È	Ì	7		Ť	È			7		ì	H	``	+		H	Ť	Ť	Ť	Н			Ť	Ť	1	Ť	Н		ì	Ť	Ť	Ĥ
2.7-5.1 5.6-9.1	C,D K,M C,D J,K,M		DG D																																							
10	C,D J,K,M	100	DG D	G D	G EG							FM F	м		B LE	B LB	LB	LB	LB G	K GI	K GK	GK	GK (SK G	зк на	HG F	IG H	G H	ЭНС	HG	JP	JP	JP J	P J	P JP		KF					
11 12	C,D J,K,M C,D J,K,M		DG D	G D					EG F EG F			FM F		LB LI LB L	B LE	B LB	LB LB	LB LB		K GI	K GK K GK	GK GK	GK C	SK C	SK HG	HG H	IG H	G H	HO	HG HG		JP JP	JP J JP J	P J	P JP				KF K	KF KI		KF
13	C,D J,K,M	130	DG D	G D	G EG	G EG	EG	EG	EG F	M FN	и FN	FM F	М	LB LI	B LE	B LB	LB	LB	LB G	K G	K GK	GK	GK (SK C	GK HG	HG F	IG H	G H	3 HC	HG	JP	JP	JP J	PJ	P JP	JP	KF	KF	KF K	KF K	FKF	KF
15 16	C,D G,J,K,M C,D G,J,K,M		DG D		G EG		EG	EG	EG F	MFN	A FN	FM F	M	LB LI	B LE										GK HG GK HG								JP J JP J		P JP		KF KF				F KF	
18	C,D G,J,K,M	180	DG D	G D	G EG		EG	EG	EG F	M FN	и ΕΝ	FM F	М	LB L	B LE	B LB	LB	LB	LB G	K G	K GK	GK	GK (SK G	GK HG	HG F	IG H	G H	ЭН	HG	JP	JP	JP J	РJ	P JP	JP	KF	KF	KF K	(F K	FKF	KF
20	C,D G,J,K,M C,D G,J,K,M		DG D		G EG				EG F			FM F		LB LI		B LB		LB	LB G		K GK				GK HG	HG H				HG HG	JP JP		JP J JP J		P JP		KF	KF	KF K	(F K		KF
24	C,D G,J,K,M	240	DG D	G D	G EG	G EG	EG	EG	EG F	M FN	иFN	FM F	M	LB LI	B LE	B LB	LB	LB	LB G	K G	K GK	GK	GK C	SK G	SK HG SK HG	HG F	iG H	G H	S HO	HG	JP	JP	JP J	РJ	P JP	JP	KF	KF	KF K	(F K	FKF	KF
27 30	D,F,G,J,K,M D,F,G,J,K,M		DG D			G EG		EG EG	EG F	MFN	A FN	FM F	M	LB LI LB LI	B LE	B LB	LB LB	LB	LB G	K G	K GK	GK	GK C	GK G	GK HG GK HG	HG H	IG H	G H	HO	HG	JP JP		JP J JP J		P JP				KF K			KF KF
33	D,F,G,J,K,M		DG D	G D	G EG	G EG	EG	EG	EG F	M FN	и ΕΝ	FM F	M	LB LI	B LE	B LB	LB	LB	LB G	K G	K GK	GK	GK (SK 0	GK HG	HG F	IG H	G H	ЭН	HG	JP	JP	JP J	PJ	P JP	JP	KF	KF	KF K	KF KI		
36	D,F,G,J,K,M		DG D				EG	EG	EG F	M FN	/ FN	FM F	M	LB L	B LE	LB	LB	LB	LB G	K G	K GK	GK	GK C	SK G	GK HG GK HG	HG H	IG H	G HC	HO	HG	JP JP		JP J JP J		P JP	JP	KF KF	KF	KF K	(F K	F KF	
39 43	D,F,G,J,K,M D,F,G,J,K,M		DG D	G D	G EG	G EG	EG	EG	EG F	M FN	и FN	FM F	М	LB L	B LE	B LB	LB	LB	LB G	K G	K GK	GK	GK (SK G	GK HG	HG F	IG H	G H	ЭН	HG	JP	JP	JP J	РJ	P JP	JP	KF	KF	KF K	(F K	FKF	KF
47 51	D,F,G,J,K,M D,F,G,J,K,M		DG D									FM F				B LB	LB	LB	LB G	K G	K GK	GK	GK (SK G	3K HG	HG F	IG H	G H	ЭН	HG	JP		JP J JP J		P JP		KF KF				F KF	
56	F,G,J,K,M	560	DG D						EG F	M FN	ИFN	FM F	M	LB L	B LE	B LB	LB	LB	LB G	K G	K GK	GK	GK C	SK C	GK HG GK HG	HG H	IG H	G HC	HC HC	HG	JP	JP	JP J	P J	P JP	JP	KF	KF		KF KI		KF
62 68	F,G,J,K,M F,G,J,K,M		DG D	G D					EG F			FM F	M	LB L	B LE	B LB	LB	LB	LB G	K G	K GK	GK	GK (SK 0	GK HG	HG F	IG H	G H	3 HC	HG	JP		JP J JP J	P J	P JP				KF K	KF KI		KF KF
75	F,G,J,K,M	750	DG D	G D	G EF	EF	EF	EG	EG F	M FN	и ΕΝ	FM F	M	LB LI	B LE	B LB	LB	LB	LB G	K G	K GK	GK	GK (SK G	GK HG	HG F	IG H	G H	ЭН	HG	JP	JP	JP J	РJ	P JP	JP	KF	KF	KF K	(F K	FKF	KF
82 91	F,G,J,K,M F,G,J,K,M	820 910	DG D		G EF				EG F EG F			FM F	M I	LB LI LB LI	B LE	LB		LB LB			K GK K GK	GK	GK C	SK C	GK HG GK HG	HG H	IG H	G HC	HO	HG	JP		JP J JP J		P JP		KF		KF K		F KF	KF
100	F,G,J,K,M F,G,J,K,M		DG D						EG F			FM F	M	LB L	B LE	B LB	LB	LC	LB G	K G	K GK	GK	GK (SK 0	GK HG	HG F	IG H	G H	3 HC	HG	JP	JP JP	JP J JP J	PJ	P JP	JP	KF		KF K		F KF	
110	F,G,J,K,M		DG DG		EF EF				EG F EG E	M FN M EN				LB LI LA L					LB G	K GI					GK HG GK HG								JP J JP J	P J	P JP		KF KF				F KF	
120 130	F,G,J,K,M F,G,J,K,M	131	DG		EF			EG		M EN		FM F	М	LA L				LC		K G					GK HG						JP		JP J JP J		P JP	JP			KF K			KF
150	F,G,J,K,M		DG DG	_	EF			EG		M EN		FM F	M	LA L				LC		K GI	K GK	GK	GK C	SK C	SK HG SK HG	HG H	IG H	G HC	HO	HG	JP		JP J		P JP				KF K			KF
160 180	F,G,J,K,M F,G,J,K,M	161 181	DG		EF EF		EF	FG	E			FM F	М	LA L		A LA	LC			K GI	K GK	GK	GK (SK G	SK HG SK HG	HG H	IG H	G H	H	HG	JP	JP	JP J JP J		P JP		KF KF	KF	KF K	(F K		KF KF
200	F,G,J,K,M	201			EF									LA L			LC			H GI	H GH	GH	GH C	ЭK	HE	HE F	IE H	E HE	HE	HG	JP		JP J		P JP				KF K			KF
220 240	F,G,J,K,M F,G,J,K,M	221 241			EF EF	EG	EG					FM F	M	LA L			LC LC		G	H GI	H GH	GH GH	GH C	SK SK	HE HE		IE H	E HE				JP	JP J JP J	PJ	P JP		KE	KE I	KF K	KF KI		KF KF
270	F,G,J,K,M	271			EF	EG	EG EG		E			FK I		LA L	A LA		LC		G	H GI	H GH	GH	GH C	SK SK	HE		IE H	E HE	HE	HG	JP	JP	JP J JP J	P J	P JP	JP	KE	KE	KE K	KE KI	E KE	
300	F,G,J,K,M F,G,J,K,M	301 331			EF EF	EG	EG				и EN	FK I		LA L			LC LC			H GI	H GH	GH	GH C	ЭK	HE		iE H	E HE			JP JE		JP J JE J		P JP E JP				KE K		E KE	KF
360	F,G,J,K,M	361					EG			M EN		FK I	S		A LA					K G	K GK	GK	GH C			HE H		E HE		HG	JE	JE	JE J	E J	E JP		KE					
390 430	F,G,J,K,M F,G,J,K,M	391 431			EG		EG EG		E	M EN	и EN и FN	FS I	S I	LA L		LB LC				K GI	K GK K GK	GK	GK C	3K 3K		HE H		E HE			JE JE	JE JE	JE J JE J	E J	E JP				KE K		E KE	
470	F,G,J,K,M	471					EG		E					LA L							K GK		GK C	ЗK		HE H		E HE			JE	JE	JE J	E J	E JP				KF K		E KE	
510 560	F,G,J,K,M F,G,J,K,M	511 561			EG		EG EG				и FN и FN				B LE	LC LC				H GI	H GH H GH				HE			E H					JP J JP J		P JP			KF	KF K		E KE	
620	F,G,J,K,M	621			EG	3			E	M FN	иFN	FS	1	LA L	B LE	3			G	H G	H GH	GK			HE	HE I	н Э	E HO	HE		JP	JP	JP J	РJ	P JP	•	KF	KF	KF K	KF KI	E KF	
680 750	F,G,J,K,M F,G,J,K,M	681 751			EG	3 3			E E		и FN и FN			LB LI LB LI						H GI	H GH H GH	GK GK			HE HE			E HO					JE J JE J		P JP		KF KE		KF K		E KF	
820	F,G,J,K,M	821	T		EG	3		П	E	M FN	и FΝ			LB L	B LE	3	I	T	G	H G	H GH	GK	Т	T	HE	HE I	IE H	G H	ЭН	9	JE	JΕ	JE J JP J	ΡJ	P JP	,	KE	KE	KE K	KF KI	E KF	П
910 1,000	F,G,J,K,M F,G,J,K,M	911 102			EG					M FN	ИFN				B LE		J				H GH H GH				HE			G HC			JE		JP J JP J		P JP		KE KE		KE K		E KF	
1,100	F,G,J,K,M F.G.J.K.M	112							F		K FK		- 1	LC L	C LC				G	H G	K GK					HE I	IE H	G H	3		JE	JP	JP J	РJ	P		KE	KE	KE K	KF K	FKF	1 1
1,200	F,G,J,K,M F,G,J,K,M	122 132							F	M F	K FK			LC L	C LC					H G	K GK K GK				HE		1E H		2		JE	JP	JP J	r J P	P		KE	KE	KE K	KF K		
1,500	F,G,J,K,M	152							F	K FS	S FS		- 1	LC L	C LC				G	K G	K GK				HE	HE H	IE H	G			JE	JP	JP J	Р			KE	KE	KE K	KF K		
1,600	F,G,J,K,M F,G,J,K,M	162 182								K FS	S FS			LC L						K GI	K GK K GK				HE HE	HG H					JE JE	JP JP	JP J JP J				KE	KE	KE K	(F		
2,000	F,G,J,K,M	202							F	K			1	LC					G	K G	K GK				HE	HG H	łG				JE JE JE	JP	JP				KE	KE	KE K	(F		
2,200	F,G,J,K,M F,G,J,K,M	222 242							F	K S		П	_	LC LC						K GI K	K GK				HE	HG H	lG				JP	JP	JP JP	T			KE	KE	KE	KF		
2,700	F,G,J,K,M	272								s				LC			J		G	iκ						HG F					JP	JP JP	JP				KE	KE	KE	1		
3,000	F,G,J,K,M F,G,J,K,M	302 332								S							J			SK SK					HG HG	HG H	iG IG				JP	JP JP					KE	KE KE	KE	1		
3,600	F,G,J,K,M	362				L		Ш		\perp	L	Ш	_						G	šΚ		Ш			HG	HG F	łG		L	Ш	JP	JP	JP		\perp	L	KE	KF	KF		L	Ш
3,900 4,300	F,G,J,K,M F,G,J,K,M	392 432																	G	SK						HG F					JP	JP	JP JP				KE	KF KF	KF			
4,700	F,G,J,K,M	472																							HG	HG H					JP	JP	JP				KE	KF	KF			
5,100 5,600	F,G,J,K,M F,G,J,K,M	512 562																							HG HG								JP JP				KE	KF KF	KF KF			
6,200	F,G,J,K,M	622																							HG						JP						KE	KF	KF			
6,800 7,500	F,G,J,K,M F,G,J,K,M	682 752				1											J			1					HG HG				1		JP JP	ļ					KE KF	KF	KF			
8,200	F,G,J,K,M	822											I							1					HG						JP	1					KF KF			1		
9,100	F,G,J,K,M F,G,J,K,M	912 103															J			1						Ш					l	- [KF KF					
.0,000	. , ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	.50					•			_							_			_									_							_	. 41					

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^{*} Contact KEMET Sales Representative for C, D, F & G Capacitance Tolerance availability.

Note: Actual thickness dimensions may be less than stated maximum. Check the KEMET website, www.kemet.com, for additional values and chip sizes available.

Ceramic Surface Mount

CERAMIC CHIP / HIGH VOLTAGE KEN



X7R DIELECTRIC CAPACITANCE VALUES AND THICKNESS TARGETS (mm)

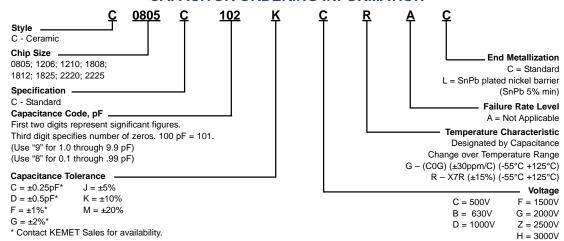
		Series	0	80	5		12	06			12	10				_1	808	3					181:	2				_1	825					2	2220	0				,	222	5	
Cap pF	Cap Tol.	Cap Code/ Voltage	200N	630V	1000V	2000	630V	1500V	2000V	2000	630V	-	20007	5000	630V	1000V	1500V	2000V	2500V	30007	0000	. ≥	>	>		3000V 500V	900A	1000V	1500V	20000	30000	5000	630V	1000V	1500V	2000V	2500V	5000	9000	1000V	1500V	2000V	3000V
10 11 12	J,K,M J,K,M J,K,M	100 110 120	DG DG DG DG	DG DG	DG I	EG E	G E	G EC	G EG	FM	FM F	M FI M FI	M FN	A LE	LB LB LB	LB LB LB	LB LB LB	LB LB LB	LB L LB L LB L	.B G .B G	SK G SK G SK G	K GK K GK K GK	1500 P P P P P P P P P P P P P P P P P P	GK GK GK	GK G	SK SK SK																	
13 15 16 18	J,K,M J,K,M J,K,M J,K,M	130 150 160 180	DG DG DG DG		DG I	EG E	G E	G EC	3 E0	FM FM	FM F	M F M F M F	M FN	A LE A LE A LE A LE	LB LB LB	LB LB	LB LB	LB I	LB L LB L	B G B G	SK G SK G	K GK K GK	GK	GK GK GK	GK C	SK SK SK																	
20 22 24	J,K,M J,K,M J,K,M	200 220 240	DG DG DG	DG DG DG	DG I DG I DG I	EG E	G E	G E	3 E0	FM	FM F	MF	M FN	A LB	LB LB LB	LB LB LB	LB LB LB	LB LB LB	LB L LB L LB L	.B G	SK G SK G SK G	K GK K GK K GK	GK GK GK	GK GK GK	GK G GK G	SK SK																	
27 30 33	J,K,M J,K,M J,K,M	270 300 330	DG DG DG	DG DG DG	DG I DG I DG I	EG E EG E	G E	G EG	G EG G EG	FM FM FM	FM F FM F	M F M F	M FN M FN M FN	M LE	LB LB LB	LB LB LB	LB LB LB	LB LB LB	LB L LB L LB L	_B G _B G	SK G SK G	K GK K GK	GK GK GK	GK GK GK	GK G GK G	SK SK SK																	
36 39 43 47	J,K,M J,K,M J,K,M J,K,M	360 390 430 470	DG DG DG	DG DG	DG I	EG E EG E EG E	EG EG EG EG EG EG	G EG G EG G EG	G EG G EG G EG	FM FM FM	FM F FM F FM F FM F FM F FM F FM F	M F M F M F	M FN M FN M FN	A LE	LB LB LB	LB LB LB	LB LB LB	LB LB LB	LB L LB L LB L	_B G _B G _B G	SK G SK G SK G	K GK K GK K GK	GK GK GK	GK GK GK	GK 0	SK SK SK																	
51 56 62	J,K,M J,K,M J,K,M	510 560 620	DG DG DG	DG DG DG	DG I DG I DG I	EG E EG E	G E	G E	3 EG	FM	FM F	M F	M FN	A LE	LB LB LB	LB LB LB	LB LB LB	LB LB LB	LB L LB L LB L	B G	SK G SK G SK G	K GK K GK K GK	GK GK GK	GK GK GK	GK C GK C	SK SK																	
68 75 82 91	J,K,M J,K,M J,K,M	680 750 820 910	DG DG DG DG	DG DG	DG I	EG E	G E	G EC G EC G EC	G EG G EG G EG	FM FM FM	FM F FM F	M F M F M F	M FN M FN M FN	A LE	LB LB LB	LB LB LB	LB LB LB	LB I LB I	LB L LB L LB L	B G B G	SK G SK G	K GK K GK K GK	GK	GK GK GK	01/	SK SK SK																	
100 110 120	J,K,M J,K,M J,K,M	101 111 121	DG DG DG	DG DG DG	DG I DG I DG	EG E EF I	EG E	G EG F EF	G EG F EG	FM FM FM	FM F FM F FM F FM F FM F	M FI M FI M FI	M FN M FN M FN	A LB	LB LB LA	LB LB LA	LB LB LA	LB LB	LB L LB L	B G	SK G SK G	K GK K GK K GK	GK GK GK	GK GK GK	GK G GK G GK G GK G	SK H SK H	G HG G HG G HG	но	HG I HG I HG I	HG H HG H	IG H	G JP G JP G JP	JP	JP JP JP	JP	JP	JP J	IP K	(F K	F KF	KF	KF K	
130 150 180 220	J,K,M J,K,M J,K,M J,K,M	131 151 181 221	DG DG DG DG	DG DG	DG DG	EF I	EF E EF E EF E	F E	F EG	FL	FL F	LF	M FM F	LA LA LA	LA LA LA	LA LA LA	LA LA LA	LB LB LB	LB L LB L LB L	B G	SK G SK G SK G	K GK K GK	GK	GK GK GK GK	GK C GK C GK C	SK H SK H	G HG G HG G HG G HG E HE	HG HG HG	HG I HG I HG I	HG H HG H	IG H	G JP	JP	JP JP JP	JP JP JP	JP JP	JP J	IP K IP K IP K	F K	F KF F KF	KF KF KF KF	KF K KF K KF K	F KF F KF
270 330 390	J,K,M J,K,M J,K,M	271 331 391	DG DG DG	DG DG DG	DG DG I	EF I EF I	EF E EF E	F EI F EI	F EG	FL FL FL	FL FL FL	L F	L FL L FL	LA LA	LA LA LA	LA LA	LA LA LA	LB I	LB L LB L	_C G	SK G SK G SK G	K GK K GK K GK	GK GK GK	GK GK GK	GKLG	SKI H	E HE G HG G HG	HE HG HG	HE I	HE H	IE H	G JP	JP JP JP	JP JP JP	JP JP JP	JP JP JP	JP J	IP K IP K	E KI	E KE E KE	KE KE KE	KE K KE K	**************************************
470 560 680 820	J,K,M J,K,M J,K,M J,K,M	471 561 681 821	DG DG DG DG	DG DG	DG I	EF I	EF E EF E EF E	F EF	F EG	FL FL	FLIF	L F	L FL L FL L FL	LA LA	LA LA LA	LA LA	LA LA	LB I LB I	LB L LB L LC L	.C G	SH GI SH GI SH GI	H GH H GH H GH	GH GH GH	GH GH GH	GK G GK G GK G	SK H	G HG G HG	HG HG HG	HG II HG II HG II HG II HG II HG II	HG H HG H	IG H	G JP G JP G JP	JP JP JP JP	JP JP JP JP JP JP JP	JP JP JP JP	JP JP JP JP	JP J	IP K IP K	F K	F KF	KF	KF K KF K KF K	F KF F KF
1,000 1,200 1,500	J,K,M J,K,M J,K,M	102 122 152	DG DG DG	DG DG DG	DG DG DG	EF I EF I	EF E EF E	F EC	F EG G EG G EG	FL FL	FL F	L F	L FN L FN	LA I LE	LA LB LA	LA LB LA	LA LB LB	LB I	LC I	_C G	SH GI SH GI SH GI	H GH H GH H GH	GH GH GH	GH GH GH	GK 0	SK H	G HG G HG G HG	HG	HG I	IG H	IG H	G JP G JP	JP JP	JP JP	JP JP	JP JP	JP J	IP K IP K IP K	F K	F KF F KF	KF KF	KF K KF K	F KF
1,800 2,000 2,200 2,700	J,K,M J,K,M J,K,M J,K,M	182 202 222 272	DG DG DG DG	DG DG	DG DG	EF I	EF E EF E EF E	F EC	G EG G EG	FL	FL F	L F L F L F		л LA Л LA	LA LA LA	LA LA LA	LB LB	LC		9	GH GI GH GI GH GI GH GI	H GH H GH	GH GH GH	GH GH GH GK		H H H		HE HE HE	HE I	HE H	IG H	G JE	JE JE	JP JE JE JE	JP JE JE JE	JE JE	JP J	IP K IP K IP K	F K	F KF	KF KF KF KE	KF K KF K KE K	F KF F KF
3,300 3,900 4,700	J,K,M J,K,M J,K,M	332 392 472	DG DG DG	DG	DG	EF I EF I	EF E EF E	F EC	3	FL FL	FL FL FL FL	L F	L FM L FM L FM	A LA	LA LA LA	LA LA LA	LB LB LB			9	SH GI SH GI SH GI	H GH H GH H GH	GH GH GH	GK GK		H H	E HE E HE	HE HE	HE I	HE H HE HE	IG H	G JE JE JE	JE JE JE	JE JE JE	JE JE JE	JE JE JP	JP J	IP K IP K	E KI	E KE E KE	KE KE	KE K KE K	F KF
5,600 6,800 8,200 10,000	J,K,M J,K,M J,K,M J,K,M	562 682 822 103	DG DG DG		1	EG E	EF E G E G E	G G	Г	FL FL FL	FL F	L FI L FI L F	M K	LA LA	LB LB	LB LB LB	LC	Ī		G	GH GI GH GI GH GI	H GH H GH	GK			H	E HE	HE HE		HE HE	Ī	JE JE JE	JE JE	JE JE JE JE	JE	JP JP JP				E KE	KE KE KE	KF KF	F KF
12,000 15,000 18,000	J,K,M J,K,M J,K,M	123 153 183			1	EG EG				FL FL	FL F FL F	L F		LA LA LA		TC TC	LC			G	SH GI SH GI SH GI	K GK K GK K GK	GK			H H	E HE	HE HE	HG HG HG			JE JE	JP JP	JP JP	JP JP JP			K K	E KI	E KE E KE	KE KE	KF	L
22,000 27,000 33,000 39,000	J,K,M J,K,M J,K,M J,K,M	223 273 333 393								FL FM FM FK		M K		LA LC LC						G	SH GI SH SH SH	K G				H H H	E HG	HG HG HG HG	HG HG			JE JE JE	JP JP	JP JP JP JP	JP JP			K	E K E K E K	F KF	KF KF KF		
47,000 56,000 62,000	J,K,M J,K,M J,K,M	473 563 623								FK				LC	:					G	SH SH SK					H H	E HG E G	HG				JE JE	JP	JP				K K	E KI	F KF F KF	KF		
68,000 82,000 100,000	J,K,M J,K,M J,K,M	683 823 104							L											G	SK SK		Ц			H H	G G					JE JE						K K	E KI	F KF			
120,000 150,000 180,000 220,000	J,K,M J,K,M J,K,M J,K,M	124 154 184 224																								H H	G G G					JP JP						K K K	CF CF CF				

Note: Actual thickness dimensions may be less than stated maximum.

Check the KEMET website, www.kemet.com, for additional values and chip sizes available.

CERAMIC CHIP / HIGH VOLTAGE

CAPACITOR ORDERING INFORMATION



ELECTRICAL PARAMETERS

Property	Specification
Capacitance	C0G: 1 pF to 0.010 μ F X7R: 10 pF to 0.22 μ F 25°C, 1.0 \pm 0.2 Vrms, 1 kHz (1 MHz for ≤ 1000 pF (C0G only)
Cap Tolerance	C0G: C*, D*, F*, G*, J, K, M * Contact KEMET Sales for availability. X7R: J, K, M
DF	C0G: 0.1% Max X7R: 2.5% Max
Voltage Ratings	500 V, 1000 V, 1500 V, 2000 V, 2500 V, 3000 V
Operating Temperature Range	From -55°C to +125°C
25°C IR @ 500V	100 G Ω or 1000 M Ω -μF, whichever is less
125°C IR @ 500V	10 G Ω or 100 M Ω -μF, whichever is less
-55°C TCC +125°C TCC	X7R: ± 15% C0G: ± 30 ppm / °C
Dielectric Strength	150% of Rated Voltage for Rated Voltage <1000 V 120% of Rated Voltage for Rated Voltage >=1000V
Ripple Current	Consult KEMET Sales Representative

MARKING

These chips are supplied unmarked. If required, they can be supplied LASER-marked at an extra cost. Details on the marking format is located on page 97.

PACKAGING

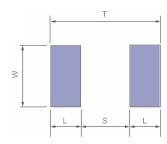
KEMET High Voltage Surface Mount MLCC are available packaged in tape and reel configuration, or bulk bag as outlined on page 83. Please consult factory for waffle packaging options.

SOLDERING PROCESS

The 0805 and 1206 case sizes are suitable for either reflow or wave soldering processes. Sizes 1210 and larger should be limited to reflow soldering only. All sizes incorporate the standard KEMET barrier layer of pure nickel with an overplating of pure tin (Sn) for excellent solderability and resistance to solder leaching of the termination.

RECOMMENDED SOLDER PAD DIMENSIONS

Chip Size	T (Total	Length)	S (Sep	aration	W (Pad	d Width)	L (Pad I	Length)
	mm	in.	mm	in.	mm	in.	mm	in.
0805	3.30	0.130	0.70	0.028	1.60	0.063	1.30	0.051
1206	4.50	0.177	1.50	0.059	2.00	0.079	1.50	0.059
1210	4.50	0.177	1.50	0.059	2.90	0.114	1.50	0.059
1808	5.90	0.232	2.30	0.091	2.40	0.094	1.80	0.071
1812	5.90	0.232	2.30	0.091	3.70	0.146	1.80	0.071
1825	5.90	0.232	2.30	0.091	6.90	0.272	1.80	0.071
2220	7.00	0.276	3.30	0.130	5.50	0.217	1.85	0.073
2225	7.00	0.276	3.30	0.130	6.80	0.268	1.85	0.073



CERAMIC CAPACITOR ARRAY



FEATURES

- Four individual capacitors inside one 1206 monolithic structure
- · Saves board and inventory space
- One placement instead of four less costly
- Easier to handle and solder than 4 smaller chips
- Tape and reel per EIA 481-1
- RoHS Compliant

CAPACITOR OUTLINE DRAWING

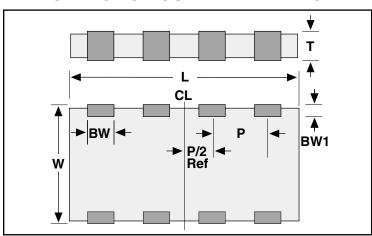


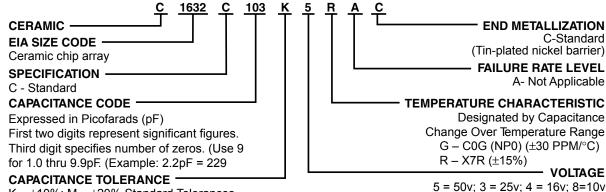
TABLE 1
EIA DIMENSIONS – MILLIMETERS (INCHES)

Size	Length	Width	Thickness	Bandwidth	Bandwidth	Pitch
Code	L	W	T (max.)	BW	BW1	P
1632	3.2 (0.126)	1.6 (.063)	0.7 - 1.35	0.40 (0.016)	0.1 - 0.5	0.8 (0.031)
	± 0.2 (0.008)	± 0.2 (.008)	(0.027 - 0.053)	± 0.2 (0.008)	(0.004 - 0.020)	± 0.1 (0.004)

Notes:

- 1. Metric is controlling English for reference only.
- 2. Pitch (P) tolerances are non-cumulative along the package.
- 3. Thickness (T) depends on capacitance.

CERAMIC ARRAY ORDERING INFORMATION



 $K - \pm 10\%$: $M - \pm 20\%$ Standard Tolerances Contact factory for any special requirements.



CERAMIC CHIP ARRAY

TABLE 2A COG DIELECTRIC – CAPACITANCE RANGE

0001/							
200V	100V	50V	25V	10V 16V	Capacitance Tolerance	KEMET Part Number	Capacitance Values (pF)
100	100	100	100	100	K,M	C1632C100(1)(2)GAC	10
120	120	120	120	120	K,M	C1632C120(1)(2)GAC	12
150	150	150	150	150	K,M	C1632C150(1)(2)GAC	15
180	180	180	180	180	K,M	C1632C180(1)(2)GAC	18
220	220	220	220	220	K,M	C1632C220(1)(2)GAC	22
270	270	270	270	270	K,M	C1632C270(1)(2)GAC	27
330	330	330	330	330	K,M	C1632C330(1)(2)GAC	33
390	390	390	390	390	K,M	C1632C390(1)(2)GAC	39
470	470	470	470	470	K,M	C1632C470(1)(2)GAC	47
560	560	560	560	560	K,M	C1632C560(1)(2)GAC	56
680	680	680	680	680	K,M	C1632C680(1)(2)GAC	68
820	820	820	820	820	K,M	C1632C820(1)(2)GAC	82
	101	101	101	101	K,M	C1632C101(1)(2)GAC	100
	121	121	121	121	K,M	C1632C121(1)(2)GAC	120
	151	151	151	151	K,M	C1632C151(1)(2)GAC	150
	181	181	181	181	K,M	C1632C181(1)(2)GAC	180
		221	221	221	K,M	C1632C221(1)(2)GAC	220
		271	271	271	K,M	C1632C271(1)(2)GAC	270
		331	331	331	K,M	C1632C331(1)(2)GAC	330
		391	391	391	K,M	C1632C391(1)(2)GAC	390
		471	471	471	K,M	C1632C471(1)(2)GAC	470
	151	151 181 221 271 331 391	151 181 221 271 331 391	151 181 221 271 331 391	K,M K,M K,M K,M K,M K,M	C1632C151(1)(2)GAC C1632C181(1)(2)GAC C1632C221(1)(2)GAC C1632C271(1)(2)GAC C1632C331(1)(2)GAC C1632C391(1)(2)GAC	150 180 220 270 330 390

(1) To complete the KEMET part number, insert the alpha code for the tolerance desired. K = ±10% and M = ±20% – standard tolerance. Contact factory for any special requirements. (2) To complete the KEMET part number, insert appropriate number for voltage desired: "5" = 50 volts, "3" = 25 volts, "4" = 16 volts, and "8" = 10 volts.

TABLE 2B X7R DIELECTRIC - CAPACITANCE RANGE

		I		l			
Capacitance Values (pF)	KEMET Part Number	Capacitance Tolerance	10V 16V	25V	50V	100V	200V
330	C1632C331(1)(2)RAC	K,M	331	331	331	331	331
390	C1632C391(1)(2)RAC	K.M	391	391	391	391	391
470	C1632C471(1)(2)RAC	K,M	471	471	471	471	471
560	C1632C561(1)(2)RAC	K,M	561	561	561	561	561
680	C1632C681(1)(2)RAC	K.M	681	681	681	681	
820	C1632C821(1)(2)RAC	K,M	821	821	821	821	
1000	C1632C102(1)(2)RAC	K.M	102	102	102	102	
1200	C1632C122(1)(2)RAC	K,M	122	122	122	122	
1500	C1632C152(1)(2)RAC	K,M	152	152	152	152	
1800	C1632C182(1)(2)RAC	K,M	182	182	182	182	
2200	C1632C222(1)(2)RAC	K,M	222	222	222	222	
2700	C1632C272(1)(2)RAC	K,M	272	272	272	272	
3300	C1632C332(1)(2)RAC	K,M	332	332	332	332	
3900	C1632C392(1)(2)RAC	K,M	392	392	392	392	
4700	C1632C472(1)(2)RAC	K,M	472	472	472	472	
5600	C1632C562(1)(2)RAC	K,M	562	562	562		
6800	C1632C682(1)(2)RAC	K,M	682	682	682		
8200	C1632C822(1)(2)RAC	K,M	822	822	822		
10,000	C1632C103(1)(2)RAC	K,M	103	103	103		
12,000	C1632C123(1)(2)RAC	K,M	123	123	123		
15,000	C1632C153(1)(2)RAC	K,M	153	153	153		
18,000	C1632C183(1)(2)RAC	K,M	183	183	183		
22,000	C1632C223(1)(2)RAC	K,M	223	223	223		
27,000	C1632C273(1)(2)RAC	K,M	273				
33,000	C1632C333(1)(2)RAC	K,M	333				
39,000	C1632C393(1)(2)RAC	K,M	393				
47,000	C1632C473(1)(2)RAC	K,M	473				
56,000	C1632C563(1)(2)RAC	K,M	563				
68,000	C1632C683(1)(2)RAC	K,M	683				
82,000	C1632C823(1)(2)RAC	K,M	823				
100,000	C1632C104(1)(2)RAC	K,M	104				

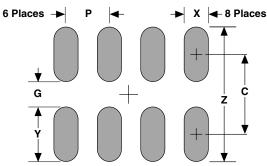
⁽¹⁾ To complete the KEMET part number, insert the alpha code for the tolerance desired:

K = ±10% and M = ±20% – standard tolerances. Contact factory for any special requirements.

(2) To complete the KEMET part number, insert appropriate number for voltage desired:

"5" = 50 volts, "3" = 25 volts, "4" = 16 volts, and "8" = 10 volts.

1632 CERAMIC ARRAY LAND PATTERN LAYOUT



Additional pad dimension information is available in KEMET Technical Bulletin F-2100.

LAND PATTERN DIMENSIONS - CERAMIC CHIP CAPACITOR ARRAYS - MM

	Reflow Solder					
Dimension 3216		G 0.40	X 0.52	Y(ref) 1.20	C(ref) 1.60	P(ref) 0.80

Calculation Formula

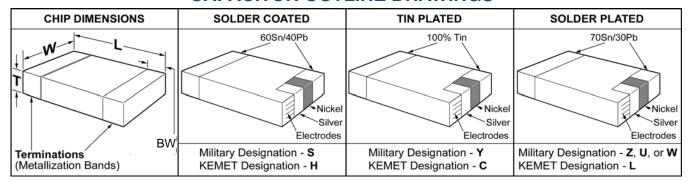
 $7 = 1 \min + 2.1t + Tt$ G = Smax - 2Jh -Th

X = Wmin + 2Js + Ts

Tt, Th, Ts = Combined tolerances



CAPACITOR OUTLINE DRAWINGS



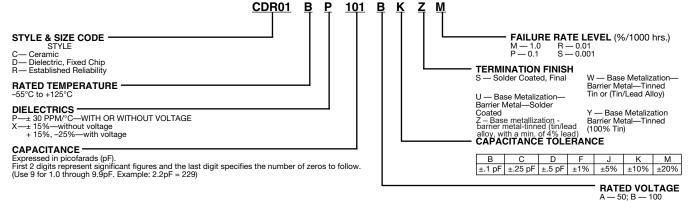
DIMENSIONS—MILLIMETERS AND (INCHES)

	KEMET SIZE				Т	
STYLE	CODE	L	W	MIN.	MAX.	BW
CDR01	C0805	2.03 ±.38 (.080 ±.015)	1.27 ±.38 (.050 ±.015)	.56 (.022)	1.40 (.055)	.51 ± 0.25 (.020 ±.010)
CDR02	C1805	4.57 ±.38 (.180 ±.015)	1.27 ±.38 (.050 ±.015)	.56 (.022)	1.40 (.055)	.51 ± 0.25 (.020 ±.010)
CDR03	C1808	4.57 ±.38 (.180 ±.015)	2.03 ±.38 (.080 ±.015)	.56 (.022)	2.03 (.080)	.51 ± 0.25 (.020 ±.010)
CDR04	C1812	4.57 ±.38 (.180 ±.015)	3.18 ±.38 (.125 ±.015)	.56 (.022)	2.03 (.080)	.51 ± 0.25 (.020 ±.010)
CDR05	C1825	+.51 (+.020 4.57 (.180 015	+.51 (+.020 6.35 (.250 38 (015	.51 (.020)	2.03 (.080)	.51 ± 0.25 (.020 ±.010)
CDR06	C2225	5.72 ±.51 (.225 ±.020)	6.35 ±.51 (.250 ±.020)	.51 (.020)	2.03 (.080)	.51 ± 0.25 (.020 ±.010)
CDR31	C0805	2.00 ±.20 (.078 ±.008)	1.25 ±.20 (.049 ±.008)		1.30 (.051)	.50 ± 0.20 (.020 ±.008)
CDR32	C1206	3.20 ±.20 (.125 ±.008)	1.60 ±.20 (.062 ±.008)		1.30 (.051)	.50 ± 0.20 (.020 ±.008)
CDR33	C1210	3.20 ±.25 (.125 ±.010)	2.50 ±.25 (.098 ±.010)		1.50 (.059)	.50 ± 0.25 (.020 ±.010)
CDR34	C1812	4.50 ±.25 (.176 ±.010)	3.20 ±.25 (.125 ±.010)		1.50 (.059)	.50 ± 0.25 (.020 ±.010)
CDR35	C1825	4.50 ±.30 (.176 ±.012)	6.40 ±.30 (.250 ±.012)		1.50 (.059)	.50 ± 0.30 (.020 ±.012)

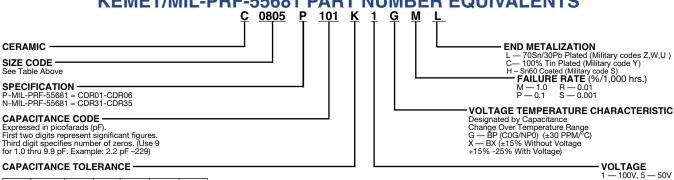
Note: For MIL-C55681 "S" Endmet, the length, width and thickness positive tolerances (including bandwidth) cited above are allowed to increase by the following amounts:

Width Length CDR01 0.51MM (.020) 0.38MM (.015) CDR02-06 0.64MM (.025) 0.38MM (.015) CDR31-35 0.60MM (.023) 0.30MM (.012)





KEMET/MIL-PRF-55681 PART NUMBER EQUIVALENTS



D ±.1 pF ±.25 pF ±.5 pF ±1% ±5% ±10% ±20%



Established Reliability

RATINGS & PART NUMBER REFERENCE

Charac-	Сар	Avail.	KEMET	MIL-PRF-55681			
teristics	pF	Tol.	Part Number	Part Number			
teristics	•						
			C0805 Size (Military C	,			
	10	J,K	C0805P100(3)1G(4)L	CDR01BP100B(3)Z(4)			
	12	J	C0805P120J1G(4)L	CDR01BP120BJZ(4)			
	15	J,K	C0805P150(3)1G(4)L	CDR01BP150B(3)Z(4)			
	18	J	C0805P180J1G(4)L	CDR01BP180BJZ(4)			
	22 27	J,K	C0805P220(3)1G(4)L	CDR01BP220B(3)Z(4)			
ВР	33	J J,K	C0805P270J1G(4)L C0805P330(3)1G(4)L	CDR01BP270BJZ(4) CDR01BP330B(3)Z(4)			
6	39	J,N J	C0805P390J1G(4)L	CDR01BP390BJZ(4)			
	47	J,K	C0805P470(3)1G(4)L	CDR01BP470B(3)Z(4)			
	56	J	C0805P560J1G(4)L	CDR01BP560BJZ(4)			
	68	J,K	C0805P680(3)1G(4)L	CDR01BP680B(3)Z(4)			
	82	J	C0805P820J1G(4)L	CDR01BP820BJZ(4)			
	100	J,K	C0805P101(3)1G(4)L	CDR01BP101B(3)Z(4)			
	120	J.K	C0805P121(3)1(2)(4)L	CDR01B(1)121B(3)Z(4)			
BP or	150	J,K	C0805P151(3)1(2)(4)L	CDR01B(1)151B(3)Z(4)			
ВХ	180	J,K	C0805P181(3)1(2)(4)L	CDR01B(1)181B(3)Z(4)			
	220	K,M	C0805P221(3)1X(4)L	CDR01BX221B(3)Z(4)			
	270	K	C0805P271K1X(4)L	CDR01BX271BKZ(4)			
	330	K,M	C0805P331(3)1X(4)L	CDR01BX331B(3)Z(4)			
	390	K	C0805P391K1X(4)L	CDR01BX391BKZ(4)			
	470	K,M	C0805P471(3)1X(4)L	CDR01BX471B(3)Z(4)			
	560	K	C0805P561K1X(4)L	CDR01BX561BKZ(4)			
	680	K,M	C0805P681(3)1X(4)L	CDR01BX681B(3)Z(4)			
ВХ	820	K	C0805P821K1X(4)L	CDR01BX821BKZ(4)			
	1,000	K,M	C0805P102(3)1X(4)L	CDR01BX102B(3)Z(4)			
	1,200	K	C0805P122K1X(4)L	CDR01BX122BKZ(4)			
	1,500	K,M	C0805P152(3)1X(4)L	CDR01BX152B(3)Z(4)			
	1,800	K	C0805P182K1X(4)L	CDR01BX182BKZ(4)			
	2,200	K,M K	C0805P222(3)1X(4)L C0805P272K1X(4)L	CDR01BX222B(3)Z(4) CDR01BX272BKZ(4)			
	2,700			` '			
3,300 K,M C0805P332(3)1X(4)L CDR01BX332B(3)Z(4) 50 Volt - C0805 Size (Military CDR01)							
	3,900	K	C0805P392K5X(4)L	CDR01BX392AKZ(4)			
BX	4,700	K,M	C0805P472(3)5X(4)L	CDR01BX392AK2(4) CDR01BX472A(3)Z(4)			
			C1805 Size (Military C				
	220	J,K	C1805P221(3)1G(4)L	CDR02BP221B(3)Z(4)			
BP	270	J	C1805P271J1G(4)L	CDR02BP271BJZ(4)			
	3.900	K	C1805P392K1X(4)L	CDR02BX392BKZ(4)			
	4,700	K,M	C1805P472(3)1X(4)L	CDR02BX472B(3)Z(4)			
5,,	5,600	K	C1805P562K1X(4)L	CDR02BX562BKZ(4)			
ВХ	6,800	K,M	C1805P682(3)1X(4)L	CDR02BX682B(3)Z(4)			
	8,200	K	C1805P822K1X(4)L	CDR02BX822BKZ(4)			
	10,000	K,M	C1805P103(3)1X(4)L	CDR02BX103B(3)Z(4)			
	50	Volt - 0	C1805 Size (Military CI				
	12,000	K	C1805P123K5X(4)L	CDR02BX123AKZ(4)			
вх	15,000	K,M	C1805P153(3)5X(4)L	CDR02BX153A(3)Z(4)			
5^	18,000	K	C1805P183K5X(4)L	CDR02BX183AKZ(4)			
	22,000	K,M	C1805P223(3)5X(4)L	CDR02BX223A(3)Z(4)			
	100	Volt -	C1808 Size (Military C	DR03)			
	330	J,K	C1808P331(3)1G(4)L	CDR03BP331B(3)Z(4)			
BP	390	J	C1808P391J1G(4)L	CDR03BP391BJZ(4)			
I	470	J,K	C1808P471(3)1G(4)L	CDR03BP471B(3)Z(4)			

Part Number	Charac-	Сар	Avail.	KEMET	MIL-PRF-55681			
Tob Volt - C1808 Size (Military CDR03) cont.								
BP	teristics							
BP	,							
BP				/				
1,000	BP			. , , , ,	` ' ' '			
12,000 K				· ' '	` '			
BX								
BX								
BX								
27,000	вх	· ·		\ '	` '			
33,000		,	,		` ' ' '			
BX				, ,				
BX								
BX								
S6,000				\ '	` '			
BP	вх							
100 Volt - C1812 Size (Military CDR04)				\ '	` '			
1,200								
BP								
BP		,		· ' '	` '			
2,200		,	,		` ' ' '			
2,700	BP	,		· ' '				
3,300								
BX		,		· ' '	` '			
BX								
S5,000 K C1812P563K1X(4)L CDR04BX563BKZ(4) S0 Volt - C1812 Size (Military CDR04) 82,000 K C1812P823K5X(4)L CDR04BX823AKZ(4) 100,000 K,M C1812P104(3)5X(4)L CDR04BX104A(3)Z(4) 150,000 K C1812P154(5)X(4)L CDR04BX104A(3)Z(4) 150,000 K C1812P154(3)5X(4)L CDR04BX154A(3)Z(4) 180,000 K C1812P184K5X(4)L CDR04BX154A(3)Z(4) 180,000 K C1825 Size (Military CDR05) 3,900 J,K C1825P392(3)1G(4)L CDR05BP392B(3)Z(4) 5,600 J,K C1825P562(3)1G(4)L CDR05BP472B(3)Z(4) 5,600 K,M C1825P63(3)1X(4)L CDR05BX683B(3)Z(4) 68,000 K,M C1825P63(3)1X(4)L CDR05BX683B(3)Z(4) 82,000 K C1825P104(3)1X(4)L CDR05BX124BKZ(4) 120,000 K C1825P104(3)1X(4)L CDR05BX124BKZ(4) 150,000 K,M C1825P154(3)1X(4)L CDR05BX124BKZ(4) 150,000 K,M C1825P154(3)1X(4)L CDR05BX154B(3)Z(4) 50 Volt - C1825 Size (Military CDR05)	DV	· ·		\ '	` '			
S0 Volt - C1812 Size (Military CDR04) 82,000	ВХ			. , , , ,				
B2,000 K								
BX								
BX								
150,000	ВV		,					
180,000 K C1812P184K5X(4)L CDR04BX184AKZ(4)	ΒΛ	· ·		\ '	` '			
100 Volt - C1825 Size (Military CDR05) 3,900		· ·	,	. , , , ,				
BP 4,700 J,K C1825P392(3)1G(4)L CDR05BP392B(3)Z(4) 5,600 J,K C1825P472(3)1G(4)L CDR05BP472B(3)Z(4) 68,000 K,M C1825P62(3)1G(4)L CDR05BP562B(3)Z(4) 82,000 K C1825P83(3)1X(4)L CDR05BX683B(3)Z(4) BX 100,000 K,M C1825P134X(4)L CDR05BX683BXZ(4) 120,000 K C1825P104(3)1X(4)L CDR05BX104B(3)Z(4) 120,000 K,M C1825P124K1X(4)L CDR05BX124BKZ(4) 150,000 K,M C1825P154(3)1X(4)L CDR05BX124BKZ(4) 50 Volt - C1825 Size (Military CDR05)								
BP 4,700 J,K C1825P472(3)1G(4)L CDR05BP472B(3)Z(4) 5,600 J,K C1825P562(3)1G(4)L CDR05BP472B(3)Z(4) 68,000 K,M C1825P683(3)1X(4)L CDR05BX683B(3)Z(4) 82,000 K C1825P823K1X(4)L CDR05BX823BKZ(4) 100,000 K,M C1825P104(3)1X(4)L CDR05BX104B(3)Z(4) 120,000 K C1825P124K1X(4)L CDR05BX124BKZ(4) 150,000 K,M C1825P154(3)1X(4)L CDR05BX124BKZ(4) 150,000 K,M C1825P154(3)1X(4)L CDR05BX154B(3)Z(4)								
5,600								
BX	ВР		,					
82,000 K C1825P823K1X(4)L CDR05BX823BKZ(4) 100,000 K,M C1825P104(3)1X(4)L CDR05BX104B(3)Z(4) 120,000 K C1825P124K1X(4)L CDR05BX124BKZ(4) 150,000 K,M C1825P154(3)1X(4)L CDR05BX154B(3)Z(4) 50 Volt - C1825 Size (Military CDR05)			-,					
BX		· ·	,	. , , , ,				
120,000 K C1825P124K1X(4)L CDR05BX124BKZ(4) 150,000 K,M C1825P154(3)1X(4)L CDR05BX154B(3)Z(4) 50 Volt - C1825 Size (Military CDR05)	ВV			\ '	` '			
150,000 K,M C1825P154(3)1X(4)L CDR05BX154B(3)Ž(4) 50 Volt - C1825 Size (Military CDR05)	ΒΛ	,	,					
50 Volt - C1825 Size (Military CDR05)								
BX 270,000 K C1825P274K5X(4)L CDR05BX274AKZ(4)	DV							
,	DΛ	,			CDR05BX274AKZ(4) CDR05BX334A(3)Z(4)			
100 Volt - C2225 Size (Military CDR06)								
	-							
		,	,		CDR06BP682B(3)Z(4)			
	ъР	,			CDR06BP822B(3)Z(4)			
					CDR06BP103B(3)Z(4)			
50 Volt - C2225 Size (Military CDR06)								
BX 390,000 K C2225P394K5X(4)L CDR06BX394AKZ(4)	вх			\ '				
470,000 K,M C2225P474(3)5X(4)L CDR06BX474A(3)Z(4)		470,000	K,M	C2225P474(3)5X(4)L	CDR06BX474A(3)Z(4)			

- (1) To complete Part Number for Dielectric, insert P or X symbol as defined by Military specification.
- (2) To complete Part Number for Dielectric, insert G or X symbol. ("G" for Military "BP," or "X" for Military "BX.")
- (3) To complete Part Number, insert Capacitance Tolerance Symbol (when applicable) as available in ML-PRF-55681: B − ±0.1 pF, C − ±0.25 pF, D − ±0.5pF, F − ±1%, J − ±5%, K − ±10%, M − ±20%. **NOTE: Available tolerances are listed in columns above.**
- (4) To complete Part Number, insert Failure Rate Symbol: M –1.0%; P –0.1%; R –0.01%; S –.001%.

Note: All MIL-PRF-55681 and KEMET Part Numbers tabulated above assume use of (MIL-PRF-55681 "Z"; KEMET "L") end metalization. If MIL-PRF-55681 "U" or "W" (KEMET "L") or MIL-PRF-55681 "S" (KEMET "H"), OR MIL-PRF-55681 "Y' (KEMET "C" is required, please change designators accordingly.

Established Reliablility



RATINGS & PART NUMBER REFERENCE

Сар	Avail.	KEMET	MIL-PRF-55681
pF	Tol.	Part Number	Part Number
Pi		olt - BP - C0805 Size (Mi	
1.0	B,C	C0805N109(3)1G(4)L	CDR31BP1R0B(3)Z(4)
1.1	B,C	C0805N119(3)1G(4)L	CDR31BP1R1B(3)Z(4)
1.2	B,C	C0805C129(3)1G(4)L	CDR31BP1R2B(3)Z(4)
1.3	B,C	C0805N139(3)1G(4)L	CDR31BP1R3B(3)Z(4)
1.5	B,C	C0805N159(3)1G(4)L	CDR31BP1R5B(3)Z(4)
1.6	B,C	C0805N169(3)1G(4)L	CDR31BP1R6B(3)Z(4)
1.8	B.C	C0805N189(3)1G(4)L	CDR31BP1R8B(3)Z(4)
2.0	B,C	C0805N209(3)1G(4)L	CDR31BP2R0B(3)Z(4)
2.2	B,C	C0805N229(3)1G(4)L	CDR31BP2R2B(3)Z(4)
2.4	B,C	C0805N249(3)1G(4)L	CDR31BP2R4B(3)Z(4)
2.7	B,C,D	C0805N279(3)1G(4)L	CDR31BP2R7B(3)Z(4)
3.0	B,C,D	C0805N309(3)1G(4)L	CDR31BP3R0B(3)Z(4)
3.3	B,C,D	C0805N339(3)1G(4)L	CDR31BP3R3B(3)Z(4)
3.6	B,C,D	C0805N369(3)1G(4)L	CDR31BP3R6B(3)Z(4)
3.9	B,C,D	C0805N399(3)1G(4)L	CDR31BP3R9B(3)Z(4)
4.3	B,C,D	C0805N439(3)1G(4)L	CDR31BP4R3B(3)Z(4)
4.7	B,C,D	C0805N479(3)1G(4)L	CDR31BP4R7B(3)Z(4)
5.1	B,C,D	C0805N519(3)1G(4)L	CDR31BP5R1B(3)Z(4)
5.6	B,C,D	C0805N569(3)1G(4)L	CDR31BP5R6B(3)Z(4)
6.2	B,C,D	C0805N629(3)1G(4)L	CDR31BP6R2B(3)Z(4)
6.8	B,C,D	C0805N689(3)1G(4)L	CDR31BP6R8B(3)Z(4)
7.5	B,C,D	C0805N759(3)1G(4)L	CDR31BP7R5B(3)Z(4)
8.2	B,C,D	C0805N829(3)1G(4)L	CDR31BP8R2B(3)Z(4)
9.1	B,C,D	C0805N919(3)1G(4)L	CDR31BP9R1B(3)Z(4)
10	F,J,K	C0805N100(3)1G(4)L	CDR31BP100B(3)Z(4)
11	F,J,K	C0805N110(3)1G(4)L	CDR31BP110B(3)Z(4)
12	F,J,K	C0805N120(3)1G(4)L	CDR31BP120B(3)Z(4)
13	F,J,K	C0805N130(3)1G(4)L	CDR31BP130B(3)Z(4)
15	F,J,K	C0805N150(3)1G(4)L	CDR31BP150B(3)Z(4)
16	F,J,K	C0805N160(3)1G(4)L	CDR31BP160B(3)Z(4)
18	F,J,K	C0805N180(3)1G(4)L	CDR31BP180B(3)Z(4)
20	F,J,K	C0805N200(3)1G(4)L	CDR31BP200B(3)Z(4)
22	F,J,K	C0805N220(3)1G(4)L	CDR31BP220B(3)Z(4)
24	F,J,K	C0805N240(3)1G(4)L	CDR31BP240B(3)Z(4)
27	F,J,K	C0805N270(3)1G(4)L	CDR31BP270B(3)Z(4)
30	F,J,K	C0805N300(3)1G(4)L	CDR31BP300B(3)Z(4)
33	F,J,K	C0805N330(3)1G(4)L	CDR31BP330B(3)Z(4)
36	F,J,K	C0805N360(3)1G(4)L	CDR31BP360B(3)Z(4)
39	F,J,K	C0805N390(3)1G(4)L	CDR31BP390B(3)Z(4)
43	F,J,K	C0805N430(3)1G(4)L	CDR31BP430B(3)Z(4)
47	F,J,K	C0805N470(3)1G(4)L	CDR31BP470B(3)Z(4)
51	F,J,K	C0805N510(3)1G(4)L	CDR31BP510B(3)Z(4)
56	F,J,K	C0805N560(3)1G(4)L	CDR31BP560B(3)Z(4)
62	F,J,K	C0805N620(3)1G(4)L	CDR31BP620B(3)Z(4)
68	F,J,K	C0805N680(3)1G(4)L	CDR31BP680B(3)Z(4)
75	F,J,K	C0805N750(3)1G(4)L	CDR31BP750B(3)Z(4)
82	F,J,K	C0805N820(3)1G(4)L	CDR31BP820B(3)Z(4)

Cap	Avail.	KEMET	MIL-PRF-55681			
рF	Tol.	Part Number	Part Number			
pr I						
		It - BP - C0805 Size (Mi				
91	F,J,K	C0805N910(3)1G(4)L	CDR31BP910B(3)Z(4)			
100	F,J,K	C0805N101(3)1G(4)L	CDR31BP101B(3)Z(4)			
110	F,J,K	C0805N111(3)1G(4)L	CDR31BP111B(3)Z(4)			
120	F,J,K	C0805N121(3)1G(4)L	CDR31BP121B(3)Z(4)			
130	F,J,K	C0805N131(3)1G(4)L	CDR31BP131B(3)Z(4)			
150	F,J,K	C0805N151(3)1G(4)L	CDR31BP151B(3)Z(4)			
160	F,J,K	C0805N161(3)1G(4)L	CDR31BP161B(3)Z(4)			
180	F,J,K	C0805N181(3)1G(4)L	CDR31BP181B(3)Z(4)			
200	F,J,K	C0805N201(3)1G(4)L	CDR31BP201B(3)Z(4)			
220	F,J,K	C0805N221(3)1G(4)L	CDR31BP221B(3)Z(4)			
240	F,J,K	C0805N241(3)1G(4)L	CDR31BP241B(3)Z(4)			
270	F,J,K	C0805N271(3)1G(4)L	CDR31BP271B(3)Z(4)			
300	F,J,K	C0805N301(3)1G(4)L	CDR31BP301B(3)Z(4)			
330	F,J,K	C0805N331(3)1G(4)L	CDR31BP331B(3)Z(4)			
360	F,J,K	C0805N361(3)1G(4)L	CDR31BP361B(3)Z(4)			
390	F,J,K	C0805N391(3)1G(4)L	CDR31BP391B(3)Z(4)			
430	F,J,K	C0805N431(3)1G(4)L	CDR31BP431B(3)Z(4)			
470	F,J,K	C0805N471(3)1G(4)L	CDR31BP471B(3)Z(4)			
50 Volt - BP - C0805 Size (Military CDR31)						
510	F,J,K	C0805N511(3)5G(4)L	CDR31BP511A(3)Z(4)			
560	F,J,K	C0805N561(3)5G(4)L	CDR31BP561A(3)Z(4)			
620	F,J,K	C0805N621(3)5G(4)L	CDR31BP621A(3)Z(4)			
680	F,J,K	C0805N681(3)5G(4)L	CDR31BP681A(3)Z(4)			
	100 Vo	lt - BX - C0805 Size (Mi	litary CDR31)			
470	K,M	C0805N471(3)1X(4)L	CDR31BX471B(3)Z(4)			
560	K,M	C0805N561(3)1X(4)L	CDR31BX561B(3)Z(4)			
680	K,M	C0805N681(3)1X(4)L	CDR31BX681B(3)Z(4)			
820	K,M	C0805N821(3)1X(4)L	CDR31BX821B(3)Z(4)			
1,000	K,M	C0805N102(3)1X(4)L	CDR31BX102B(3)Z(4)			
1,200	K,M	C0805N122(3)1X(4)L	CDR31BX122B(3)Z(4)			
1,500	K,M	C0805N152(3)1X(4)L	CDR31BX152B(3)Z(4)			
1,800	K,M	C0805N182(3)1X(4)L	CDR31BX182B(3)Z(4)			
2,200	K,M	C0805N222(3)1X(4)L	CDR31BX222B(3)Z(4)			
2,700	K,M	C0805N272(3)1X(4)L	CDR31BX272B(3)Z(4)			
3,300	K,M	C0805N332(3)1X(4)L	CDR31BX332B(3)Z(4)			
3,900	K,M	C0805N392(3)1X(4)L	CDR31BX392B(3)Z(4)			
4,700	K,M	C0805N472(3)1X(4)L	CDR31BX472B(3)Z(4)			
	50 Vo	t - BX - C0805 Size (Mil	itary CDR31)			
5,600	K,M	C0805N562(3)5X(4)L	CDR31BX562A(3)Z(4)			
6,800	K,M	C0805N682(3)5X(4)L	CDR31BX682A(3)Z(4)			
8,200	K,M	C0805N822(3)5X(4)L	CDR31BX822A(3)Z(4)			
10,000	K,M	C0805N103(3)5X(4)L	CDR31BX103A(3)Z(4)			
12,000	K,M	C0805N123(3)5X(4)L	CDR31BX123A(3)Z(4)			
15,000	K,M	C0805N153(3)5X(4)L	CDR31BX153A(3)Z(4)			
18,000	K,M	C0805N183(3)5X(4)L	CDR31BX183A(3)Z(4)			

- (1) To complete Part Number for Dielectric, insert P or X symbol as defined by Military specification.
- (2) To complete Part Number for Dielectric, insert G or X symbol. ("G" for Military "BP," or "X" for Military "BX.")
- (3) To complete Part Number, insert Capacitance Tolerance Symbol (when applicable) as available in MIL-PRF-55681: B − ±0.1 pF, C − ±0.25 pF. D − ±0.5pF, F − ±1%, J − ±5%, K − ±10%, M − ±20%. **NOTE: Available tolerances are listed in columns above.**
- (4) To complete Part Number, insert Failure Rate Symbol: M –1.0%; P –0.1%; R –0.01%; S –.001%.

Note: All MIL-PRF-55681 and KEMET Part Numbers tabulated above assume use of MIL-PRF-55681 "Z"; KEMET "L") end metalization. If MIL-PRF-55681 "U" or "W" (KEMET "L") or MIL-PRF-55681 "S" (KEMET "H"), or MIL-PRF-55681 "Y" (KEMET "C") is required, change designators accordingly.

MARKING

See page 97 for MIL-PRF-55681 Marking



Established Reliability

RATINGS & PART NUMBER REFERENCE

		LENATT	MU DDE SEGOA
Cap	Avail.	KEMET	MIL-PRF-55681
pF	Tol.	Part Number	Part Number
		It - BP - C1206 Size (Mi	• '
1.0	B,C	C1206N109(3)1G(4)L	CDR32BP1R0B(3)Z(4)
1.1	B,C	C1206N119(3)1G(4)L	CDR32BP1R1B(3)Z(4)
1.2	B,C	C1206C129(3)1G(4)L	CDR32BP1R2B(3)Z(4)
1.3	B,C	C1206N139(3)1G(4)L	CDR32BP1R3B(3)Z(4)
1.5	B,C	C1206N159(3)1G(4)L	CDR32BP1R5B(3)Z(4)
1.6	B,C	C1206N169(3)1G(4)L	CDR32BP1R6B(3)Z(4))
1.8	B,C	C1206N189(3)1G(4)L	CDR32BP1R8B(3)Z(4)
2.0	B,C	C1206N209(3)1G(4)L	CDR32BP2R0B(3)Z(4)
2.2	B,C	C1206N229(3)1G(4)L	CDR32BP2R2B(3)Z(4)
2.4	B,C	C1206N249(3)1G(4)L	CDR32BP2R4B(3)Z(4)
2.7	B,C,D	C1206N279(3)1G(4)L	CDR32BP2R7B(3)Z(4)
3.0	B,C,D	C1206N309(3)1G(4)L	CDR32BP3R0B(3)Z(4)
3.3	B,C,D	C1206N339(3)1G(4)L	CDR32BP3R3B(3)Z(4)
3.6	B,C,D	C1206N369(3)1G(4)L	CDR32BP3R6B(3)Z(4)
3.9	B,C,D	C1206N399(3)1G(4)L	CDR32BP3R9B(3)Z(4)
4.3	B,C,D	C1206N439(3)1G(4)L	CDR32BP4R3B(3)Z(4)
4.7	B,C,D	C1206N479(3)1G(4)L	CDR32BP4R7B(3)Z(4)
5.1	B,C,D	C1206N519(3)1G(4)L	CDR32BP5R1B(3)Z(4)
5.6	B,C,D	C1206N569(3)1G(4)L	CDR32BP5R6B(3)Z(4)
6.2	B,C,D	C1206N629(3)1G(4)L	CDR32BP6R2B(3)Z(4)
6.8	B,C,D	C1206N689(3)1G(4)L	CDR32BP6R8B(3)Z(4)
7.5	B,C,D	C1206N759(3)1G(4)L	CDR32BP7R5B(3)Z(4)
8.2	B,C,D	C1206N829(3)1G(4)L	CDR32BP8R2B(3)Z(4)
9.1	B,C,D	C1206N919(3)1G(4)L	CDR32BP9R1B(3)Z(4)
10	F,J,K	C1206N100(3)1G(4)L	CDR32BP100B(3)Z(4)
11 12	F,J,K	C1206N110(3)1G(4)L	CDR32BP110B(3)Z(4)
	F,J,K	C1206N120(3)1G(4)L	CDR32BP120B(3)Z(4)
13 15	F,J,K	C1206N130(3)1G(4)L	CDR32BP130B(3)Z(4)
16	F,J,K	C1206N150(3)1G(4)L	CDR32BP150B(3)Z(4)
18	F,J,K F,J,K	C1206N160(3)1G(4)L C1206N180(3)1G(4)L	CDR32BP160B(3)Z(4) CDR32BP180B(3)Z(4)
20	F,J,K	. , , , ,	` ' ' '
20	F,J,K	C1206N200(3)1G(4)L C1206N220(3)1G(4)L	CDR32BP200B(3)Z(4) CDR32BP220B(3)Z(4)
24	F,J,K	C1206N240(3)1G(4)L	CDR32BP240B(3)Z(4)
27	F,J,K	C1206N270(3)1G(4)L	CDR32BP270B(3)Z(4)
30	F,J,K	C1206N300(3)1G(4)L	CDR32BP300B(3)Z(4)
33	F,J,K	C1206N330(3)1G(4)L	CDR32BP330B(3)Z(4)
36	F,J,K	C1206N360(3)1G(4)L	CDR32BP360B(3)Z(4)
39	F,J,K	C1206N390(3)1G(4)L	CDR32BP390B(3)Z(4)
43	F,J,K	C1206N430(3)1G(4)L	CDR32BP430B(3)Z(4)
47	F,J,K	C1206N470(3)1G(4)L	CDR32BP470B(3)Z(4)
51	F,J,K	C1206N510(3)1G(4)L	CDR32BP510B(3)Z(4)
56	F,J,K	C1206N560(3)1G(4)L	CDR32BP560B(3)Z(4)
62	F,J,K	C1206N620(3)1G(4)L	CDR32BP620B(3)Z(4)
68	F,J,K	C1206N680(3)1G(4)L	CDR32BP680B(3)Z(4)
75	F,J,K	C1206N750(3)1G(4)L	CDR32BP750B(3)Z(4)
82	F,J,K	C1206N820(3)1G(4)L	CDR32BP820B(3)Z(4)
91	F,J,K	C1206N910(3)1G(4)L	CDR32BP910B(3)Z(4)
100	F,J,K	C1206N101(3)1G(4)L	CDR32BP101B(3)Z(4)
100	1,0,11	10.20014101(0)10(4)L	101D(0)2(4)

Cap	Avail.	KEMET	MIL-PRF-55681				
pF	Tol.	Part Number	Part Number				
Pr I		lt - BP - C1206 Size (Mi					
440							
110	F,J,K	C1206N111(3)1G(4)L	CDR32BP111B(3)Z(4)				
120	F,J,K	C1206N121(3)1G(4)L	CDR32BP121B(3)Z(4)				
130	F,J,K	C1206N131(3)1G(4)L	CDR32BP131B(3)Z(4)				
150	F,J,K	C1206N151(3)1G(4)L	CDR32BP151B(3)Z(4)				
160	F,J,K	C1206N161(3)1G(4)L	CDR32BP161B(3)Z(4)				
180	F,J,K	C1206N181(3)1G(4)L	CDR32BP181B(3)Z(4)				
200	F,J,K	C1206N201(3)1G(4)L	CDR32BP201B(3)Z(4)				
220	F,J,K	C1206N221(3)1G(4)L	CDR32BP221B(3)Z(4)				
240	F,J,K	C1206N241(3)1G(4)L	CDR32BP241B(3)Z(4)				
270	F,J,K	C1206N271(3)1G(4)L	CDR32BP271B(3)Z(4)				
300	F,J,K	C1206N301(3)1G(4)L	CDR32BP301B(3)Z(4)				
330	F,J,K	C1206N331(3)1G(4)L	CDR32BP331B(3)Z(4)				
360	F,J,K	C1206N361(3)1G(4)L	CDR32BP361B(3)Z(4)				
390	F,J,K	C1206N391(3)1G(4)L	CDR32BP391B(3)Z(4)				
430	F,J,K	C1206N431(3)1G(4)L	CDR32BP431B(3)Z(4)				
470	F,J,K	C1206N471(3)1G(4)L	CDR32BP471B(3)Z(4)				
510	F,J,K	C1206N511(3)1G(4)L	CDR32BP511B(3)Z(4)				
560	F,J,K	C1206N561(3)1G(4)L	CDR32BP561B(3)Z(4)				
620	F,J,K	C1206N621(3)1G(4)L	CDR32BP621B(3)Z(4)				
680	F,J,K	C1206N681(3)1G(4)L	CDR32BP681B(3)Z(4)				
750	F,J,K	C1206N751(3)1G(4)L	CDR32BP751B(3)Z(4)				
820	F,J,K	C1206N821(3)1G(4)L	CDR32BP821B(3)Z(4)				
910	F,J,K	C1206N911(3)1G(4)L	CDR32BP911B(3)Z(4)				
1,000	F,J,K	C1206N102(3)1G(4)L	CDR32BP102B(3)Z(4)				
	50 Vol	t - BP - C1206 Size (Mil	litary CDR32)				
1,100	F,J,K	C1206N112(3)5G(4)L	CDR32BP112A(3)Z(4)				
1,200	F,J,K	C1206N122(3)5G(4)L	CDR32BP122A(3)Z(4)				
1,300	F,J,K	C1206N132(3)5G(4)L	CDR32BP132A(3)Z(4)				
1,500	F,J,K	C1206N152(3)5G(4)L	CDR32BP152A(3)Z(4)				
1,600	F,J,K	C1206N162(3)5G(4)L	CDR32BP162A(3)Z(4)				
1,800	F,J,K	C1206N182(3)5G(4)L	CDR32BP182A(3)Z(4)				
2,000	F,J,K	C1206N202(3)5G(4)L	CDR32BP202A(3)Z(4)				
2,200	F,J,K	C1206N222(3)5G(4)L	CDR32BP222A(3)Z(4)				
100 Volt - BX - C1206 Size (Military CDR32)							
4,700	K,M	C1206N472(3)1X(4)L	CDR32BX472B(3)Z(4)				
5,600	K,M	C1206N562(3)1X(4)L	CDR32BX562B(3)Z(4)				
6,800	K,M	C1206N682(3)1X(4)L	CDR32BX682B(3)Z(4)				
8,200	K,M	C1206N822(3)1X(4)L	CDR32BX822B(3)Z(4)				
10,000	K,M	C1206N103(3)1X(4)L	CDR32BX103B(3)Z(4)				
12,000	K,M	C1206N123(3)1X(4)L	CDR32BX123B(3)Z(4)				
15,000	K,M	C1206N153(3)1X(4)L	CDR32BX153B(3)Z(4)				
<u> </u>	50 Volt - BX - C1206 Size (Military CDR32)						
18,000	K,M	C1206N183(3)5X(4)L	CDR32BX183A(3)Z(4)				
22,000	K.M	C1206N223(3)5X(4)L	CDR32BX223A(3)Z(4)				
27,000	K,M	C1206N273(3)5X(4)L	CDR32BX273A(3)Z(4)				
33,000	K.M	C1206N333(3)5X(4)L	CDR32BX333A(3)Z(4)				
39,000	K,M	C1206N393(3)5X(4)L	CDR32BX393A(3)Z(4)				
	· · · · · ·						

Note: All MIL-PRF-55681 and KEMET Part Numbers tabulated above assume use of MIL-PRF-55681 "Z"; KEMET "L") end metalization. If MIL-PRF-55681 "U" or "W" (KEMET "L") or MIL-PRF-55681 "S" (KEMET "H"), or MIL-PRF-55681 "Y" (KEMET "C") is required, please change designators.

⁽¹⁾ To complete Part Number for Dielectric, insert P or X symbol – as defined by Military specification.
(2) To complete Part Number for Dielectric, insert G or X symbol. ("G" for Military "BP," or "X" for Military "BX.")

⁽³⁾ To complete Part Number, insert Capacitance Tolerance Symbol (when applicable) as available in MIL-PRF-55681: B - ±0.1 pF, C - ±0.25 pF. $D - \pm 0.5 pF$, $F - \pm 1\%$, $J - \pm 5\%$, $K - \pm 10\%$, $M - \pm 20\%$. NOTE: Available tolerances are listed in columns above.

⁽⁴⁾ To complete Part Number, insert Failure Rate Symbol: M –1.0%; P –0.1%; R –0.01%; S –.001%.

Established Reliability



RATINGS & PART NUMBER REFERENCE

Cap	Avail.	KEMET	MIL-PRF-55681			
	Tol.					
pF		Part Number	Part Number			
ļ		BP - C1210 Size (Mili				
1,000	F,J,K	C1210N102(3)1G(4)L	CDR33BP102B(3)Z(4)			
1,100	F,J,K	C1210N112(3)1G(4)L	CDR33BP112B(3)Z(4)			
1,200	F,J,K	C1210N122(3)1G(4)L	CDR33BP122B(3)Z(4)			
1,300	F,J,K	C1210N132(3)1G(4)L	CDR33BP132B(3)Z(4)			
1,500	F,J,K	C1210N152(3)1G(4)L	CDR33BP152B(3)Z(4)			
1,600	F,J,K	C1210N162(3)1G(4)L	CDR33BP162B(3)Z(4)			
1,800	F,J,K	C1210N182(3)1G(4)L	CDR33BP182B(3)Z(4)			
2,000	F,J,K	C1210N202(3)1G(4)L	CDR33BP202B(3)Z(4)			
2,200	F,J,K	C1210N222(3)1G(4)L	CDR33BP222B(3)Z(4)			
	50 Volt -	•				
2,400	F,J,K	C1210N242(3)5G(4)L	CDR33BP242A(3)Z(4)			
2,700	F,J,K	C1210N272(3)5G(4)L	CDR33BP272A(3)Z(4)			
3,000	F,J,K	C1210N302(3)5G(4)L	CDR33BP302A(3)Z(4)			
3,300	F,J,K	C1210N332(3)5G(4)L	CDR33BP332A(3)Z(4)			
	100 Volt	- BX - C1210 Size (Mili				
15,000	K,M	C1210N153(3)1X(4)L	CDR33BX153B(3)Z(4)			
18,000	K,M	C1210N183(3)1X(4)L	CDR33BX183B(3)Z(4)			
22,000	K,M	C1210N223(3)1X(4)L	CDR33BX223B(3)Z(4)			
27,000	K,M	C1210N273(3)1X(4)L	CDR33BX273B(3)Z(4)			
50 Volt - BX - C1210 Size (Military CDR33)						
39,000	K,M	C1210N393(3)5X(4)L	CDR33BX393A(3)Z(4)			
47,000	K,M	C1210N473(3)5X(4)L	CDR33BX473A(3)Z(4)			
56,000	K,M	C1210N563(3)5X(4)L	CDR33BX563A(3)Z(4)			
68,000	K,M	C1210N683(3)5X(4)L	CDR33BX683A(3)Z(4)			
82,000	K,M	C1210N823(3)5X(4)L	CDR33BX823A(3)Z(4)			
100,000	K,M	C1210N104(3)5X(4)L	CDR33BX104A(3)Z(4)			
	100 Volt	- BP - C1812 Size (Mili	tary CDR34)			
2,200	F,J,K	C1812N222(3)1G(4)L	CDR34BP222B(3)Z(4)			
2,400	F,J,K	C1812N242(3)1G(4)L	CDR34BP242B(3)Z(4)			
2,700	F,J,K	C1812N272(3)1G(4)L	CDR34BP272B(3)Z(4)			
3,000	F,J,K	C1812N322(3)1G(4)L	CDR34BP302B(3)Z(4)			
3,300	F,J,K	C1812N332(3)1G(4)L	CDR34BP332B(3)Z(4)			
3,600	F,J,K	C1812N362(3)1G(4)L	CDR34BP362B(3)Z(4)			
3,900	F,J,K	C1812N392(3)1G(4)L	CDR34BP392B(3)Z(4)			
4,300	F,J,K	C1812N432(3)1G(4)L	CDR34BP432B(3)Z(4)			
4,700	F,J,K	C1812N472(3)1G(4)L	CDR34BP472B(3)Z(4)			
50 Volt - BP - C1812 Size (Military CDR34)						
5,100	F,J,K	C1812N512(3)5G(4)L	CDR34BP512A(3)Z(4)			
5,600	F,J,K	C1812N562(3)5G(4)L	CDR34BP562A(3)Z(4)			
6,200	F,J,K	C1812N622(3)5G(4)L	CDR34BP622A(3)Z(4)			
6,800	F,J,K	C1812N682(3)5G(4)L	CDR34BP682A(3)Z(4)			
7,500	F,J,K	C1812N752(3)5G(4)L	CDR34BP752A(3)Z(4)			
8,200	F,J,K	C1812N822(3)5G(4)L	CDR34BP822A(3)Z(4)			
9,100	F,J,K	C1812N912(3)5G(4)L	CDR34BP912A(3)Z(4)			
10,000	F,J,K	C1812N103(3)5G(4)L	CDR34BP103A(3)Z(4)			

Сар	Avail.	KEMET	MIL-PRF-55681				
pF	Tol.	Part Number	Part Number				
100 Volt - BX - C1812 Size (Military CDR34)							
27,000	K,M	C1812N273(3)1X(4)L	CDR34BX273B(3)Z(4)				
33,000	K,M	C1812N333(3)1X(4)L	CDR34BX333B(3)Z(4)				
39,000	K,M	C1812N393(3)1X(4)L	CDR34BX393B(3)Z(4)				
47,000	K,M	C1812N473(3)1X(4)L	CDR34BX473B(3)Z(4)				
56,000	K,M	C1812N563(3)1X(4)L	CDR34BX563B(3)Z(4)				
	50 Volt -						
100,000	K,M	C1812N104(3)5X(4)L	CDR34BX104A(3)Z(4)				
120,000	K,M	C1812N124(3)5X(4)L	CDR34BX124A(3)Z(4)				
150,000	K,M	C1812N154(3)5X(4)L	CDR34BX154A(3)Z(4)				
180,000	K,M	C1812N184(3)5X(4)L	CDR34BX184A(3)Z(4)				
		BP - C1825 Size (Mili					
4,700	F,J,K	C1825N472(3)1G(4)L	CDR35BP472B(3)Z(4)				
5,100	F,J,K	C1825N512(3)1G(4)L	CDR35BP512B(3)Z(4)				
5,600	F,J,K	C1825N562(3)1G(4)L	CDR35BP562B(3)Z(4)				
6,200	F,J,K	C1825N622(3)1G(4)L	CDR35BP622B(3)Z(4)				
6,800	F,J,K	C1825N682(3)1G(4)L	CDR35BP682B(3)Z(4)				
7,500	F,J,K	C1825N752(3)1G(4)L	CDR35BP752B(3)Z(4)				
8,200	F,J,K	C1825N822(3)1G(4)L	CDR35BP822B(3)Z(4)				
9,100	F,J,K	C1825N912(3)1G(4)L	CDR35BP912B(3)Z(4)				
10,000	F,J,K	C1825N103(3)1G(4)L	CDR35BP103B(3)Z(4)				
		BP - C1825 Size (Milit	• ,				
11,000	F,J,K	C1825N113(3)5G(4)L	CDR35BP113A(3)Z(4)				
12,000	F,J,K	C1825N123(3)5G(4)L	CDR35BP123A(3)Z(4)				
13,000	F,J,K	C1825N133(3)5G(4)L	CDR35BP133A(3)Z(4)				
15,000	F,J,K	C1825N153(3)5G(4)L	CDR35BP153A(3)Z(4)				
16,000	F,J,K	C1825N163(3)5G(4)L	CDR35BP163A(3)Z(4)				
18,000	F,J,K	C1825N183(3)5G(4)L	CDR35BP183A(3)Z(4)				
20,000	F,J,K	C1825N203(3)5G(4)L	CDR35BP203A(3)Z(4)				
22,000	F,J,K	C1825N223(3)5G(4)L	CDR35BP223A(3)Z(4)				
FC 000		- BX - C1825 Size (Mili	<u> </u>				
56,000	K,M	C1825N563(3)1X(4)L	CDR35BX563B(3)Z(4)				
68,000	K,M	C1825N683(3)1X(4)L	CDR35BX683B(3)Z(4)				
82,000	K,M	C1825N823(3)1X(4)L	CDR35BX823B(3)Z(4)				
100,000	K,M	C1825N104(3)1X(4)L	CDR35BX104B(3)Z(4)				
120,000	K,M	C1825N124(3)1X(4)L	CDR35BX124B(3)Z(4)				
150,000	K,M	C1825N154(3)1X(4)L BX - C1825 Size (Milit	CDR35BX154B(3)Z(4)				
180,000	K.M	C1825N184(3)5X(4)L	CDR35BX184A(3)Z(4)				
220,000	K,M	C1825N184(3)5X(4)L C1825N224(3)5X(4)L	CDR35BX184A(3)Z(4) CDR35BX224A(3)Z(4)				
,	,						
270,000 330,000	K,M K,M	C1825N274(3)5X(4)L C1825N334(3)5X(4)L	CDR35BX274A(3)Z(4) CDR35BX334A(3)Z(4)				
390,000	K,M	C1825N394(3)5X(4)L	CDR35BX394A(3)Z(4)				
470,000	K,M	C1825N474(3)5X(4)L	CDR35BX394A(3)Z(4)				
470,000	rivi	C 102314/4(3)3A(4)L	ODN33BA414A(3)Z(4)				

- (1) To complete Part Number for Dielectric, insert P or X symbol as defined by Military specification.
- (2) To complete Part Number for Dielectric, insert G or X symbol. ("G" for Military "BP," or "X" for Military "BX.")
- (3) To complete Part Number, insert Capacitance Tolerance Symbol (when applicable) as available in MÍL-PRF-55681: B − ±0.1 pF, C − ±0.25 pF, D − ±0.5pF, F − ±1%, J − ±5%, K − ±10%, M − ±20%. **NOTE: Available tolerances are listed in columns above.**
- (4) To complete Part Number, insert Failure Rate Symbol: M -1.0%; P -0.1%; R -0.01%; S -.001%.

Note: All MIL-PRF-55681 and KEMET Part Numbers tabulated above assume use of MIL-PRF-55681 "Z"; KEMET "L") end metalization. If MIL-PRF-55681 "U" or "W" (KEMET "L") or MIL-PRF-55681 "S" (KEMET "H"), or MIL-PRF-55681 "Y" (KEMET "C") is required, please change designators.

MIL-PRF-55681 MAXIMUM INDIVIDUAL PACKAGING QUANTITIES

			BULK -				BULK -
CHIP		BULK-	ANTI-STATIC	CHIP		BULK-	ANTI-STATIC
SIZE	REELED	STD BAG	BAG	SIZE	REELED	STD BAG	BAG
C0805	2,500	25,000	10,000	C1808	2,500	7,500	3,000
C1206	2,500	25,000	10,000	C1812	1,100	7,500	3,000
C1210	2,500	25,000	10,000	C1825	1,100	7,500	1,000
C1805	2,500	7,500	3,000	C2225	1,100	5,000	1,000

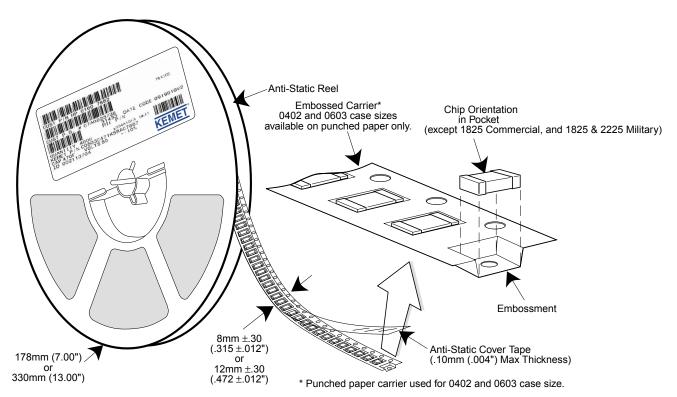
MIL-PRF-55681 chips available in 7" reels only.

Packaging Information



Tape & Reel Packaging

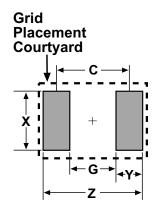
KEMET offers Multilayer Ceramic Chip Capacitors packaged in 8mm and 12mm plastic tape on 7" and 13" reels in accordance with EIA standard 481-1: Taping of surface mount components for automatic handling. This packaging system is compatible with all tape fed automatic pick and place systems. See page 78 for details on reeling quantities for commercial chips and page 87 for MIL-PRF-55681 chips.



Case Sizes ≤ 1210 are 8 mm tape with 4 mm pitch. Case Sizes >1210 are 12 mm tape with 8 mm pitch.

Note: TU suffix represents tape and reel packaging of unmarked components. TM suffix represents tape and reel packaging of marked components.

SURFACE MOUNT LAND DIMENSIONS - CERAMIC CHIP CAPACITORS - MM



		Ref	low So	lder			W	ave Sc	older	
Dimension	Z	G	Х	Y(ref)	C(ref)	Z	G	Х	Y(ref)	Smin
0402	2.14	0.28	0.74	0.93	1.21		Not I	Recomme	nded	
0603	2.78	0.68	1.08	1.05	1.73	3.18	0.68	0.80	1.25	1.93
0805	3.30	0.70	1.60	1.30	2.00	3.70	0.70	1.10	1.50	2.20
1206	4.50	1.50	2.00	1.50	3.00	4.90	1.50	1.40	1.70	3.20
1210	4.50	1.50	2.90	1.50	3.00	4.90	1.50	2.00	1.70	3.20
1812	5.90	2.30	3.70	1.80	4.10					
1825	5.90	2.30	6.90	1.80	4.10					
2220	7.00	3.30	5.50	1.85	5.15	Not Recommended				
2225	7.00	3.30	6.80	1.85	5.15					

Calculation Formula

Z = Lmin + 2Jt + Tt G = Smax - 2Jh - ThX = Wmin + 2Js + Ts

Tt, Th, Ts = Combined tolerances



TANTALUM, CERAMIC AND ALUMINUM CHIP CAPACITORS

Packaging Information

Performance Notes

1. Cover Tape Break Force: 1.0 Kg Minimum.

2. Cover Tape Peel Strength: The total peel strength of the cover tape from the carrier tape shall be:

Tape Width Peel Strength

8 mm 0.1 Newton to 1.0 Newton (10g to 100g) 12 mm 0.1 Newton to 1.3 Newton (10g to 130g)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ± 10 mm/minute.

- 3. Reel Sizes: Molded tantalum capacitors are available on either 180 mm (7") reels (standard) or 330 mm (13") reels (with C-7280). Note that 13" reels are preferred.
- **4. Labeling:** Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. Refer to EIA-556.

Embossed Carrier Tape Configuration: Figure 1

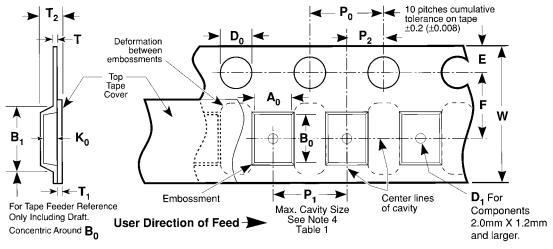


Table 1 — EMBOSSED TAPE DIMENSIONS (Metric will govern)

Constant Dimensions — Millimeters (Inches)													
Tape Size	$\mathbf{D}_{\scriptscriptstyle{0}}$		E	P_{o}	P_{2}	T Max	T₁ Max						
8 mm and	1.5 +0.10 -0		±0.10	4.0 ±0.10	2.0 ±0.05	0.600	0.100						
12 mm	(0.059 +0.004, -	١, ١	±0.004)	(0.157 ±0.004)	(0.079 ±0.002)	(0.024)	(0.004)						
		V	ariable l	Dimensions —	Millimeters (Ir	ches)							
Tape Size	Pitch	B₁ Max.	D₁ Min.	F	P ₁	R Min.	T ₂ Max	W	A ₀ B ₀ K ₀				
		Note 1	Note 2			Note 3			Note 4				
8 mm	Single (4 mm)	4.4	1.0	3.5 ±0.05	4.0 ±0.10	25.0	2.5	8.0 ±0.30					
	,	(0.173)	(0.039)	(0.138 ±0.002)	(0.157 ±0.004)	(0.984)	(0.098)	(.315 ±0.012)					
12 mm	Double (8 mm)	8.2 (0.323)	1.5 (0.059)	5.5 ±0.05 (0.217 ±0.002)	8.0 ±0.10 (0.315 ±0.004)	30.0 (1.181)	4.6 (0.181)	12.0 ±0.30 (0.472 ±0.012)					

NOTES

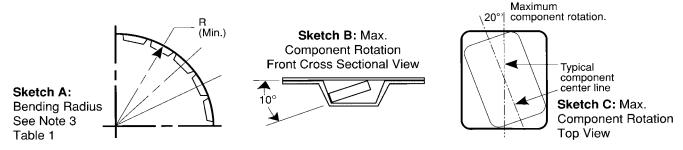
- 1. B1 dimension is a reference dimension for tape feeder clearance only.
- 2. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.
- 3. Tape with components shall pass around radius "R" without damage (see sketch A). The minimum trailer length (Fig. 2) may require additional length to provide R min. for 12 mm embossed tape for reels with hub diameters approaching N min. (Table 2)
- 4. The cavity defined by A₀, B₀, and K₀ shall be configured to surround the part with sufficient clearance such that the chip does not protrude beyond the sealing plane of the cover tape, the chip can be removed from the cavity in a vertical direction without mechanical restriction, rotation of the chip is limited to 20 degrees maximum in all 3 planes, and lateral movement of the chip is restricted to 0.5 mm maximum in the pocket (not applicable to vertical clearance.)

TANTALUM, CERAMIC AND ALUMINUM CHIP CAPACITORS

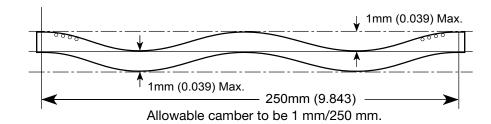


Packaging Information

Embossed Carrier Tape Configuration (cont.)



Sketch D: Tape Camber (Top View)



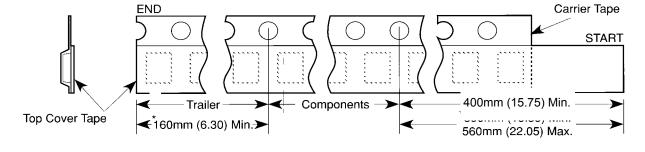
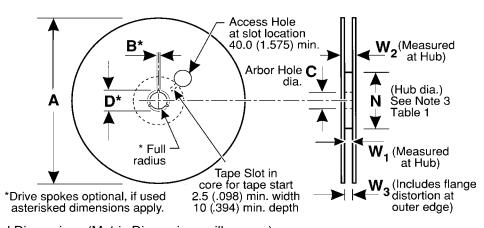


Figure 2: Tape Leader & Trailer Dimensions (Metric Dimensions Will Govern)



User Direction of Feed

Figure 3: Reel Dimensions (Metric Dimensions will govern)

Table 2 – REEL DIMENSIONS (Metric will govern)

	10000 = 11=== 2= (go 10)											
Tape Size	A Max	B* Min	С	D* Min	N Min	W ₁	W ₂ Max	W ₃				
8 mm	330.0 (12.992)	1.5 (0.059)	13.0 ± 0.20 (0.512 ± 0.008)	20.2 (0.795)	50.0 (1.969) See Note 3	8.4 +1.5, -0.0 (0.331 +0.059, -0.0)	14.4 (0.567)	7.9 Min (0.311) 10.9 Max (0.429)				
12 mm	330.0 (12.992)	1.5 (0.059)	13.0 ± 0.20 (0.512 ± 0.008)	20.2 (0.795)	Table 1	12.4 +2.0, -0.0 (0.488 +0.078, -0.0)	18.4 (0.724)	11.9 Min (0.469) 15.4 Max (0.606)				



Packaging Information

Punched Carrier (Paper Tape) Configuration (Ceramic Chips Only):

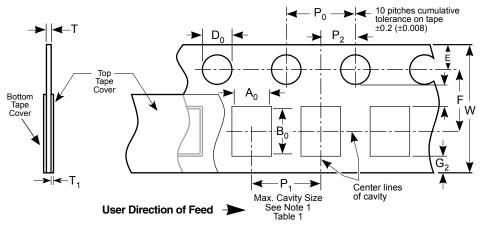


Table 1: 8 & 12mm Punched Tape (Metric Dimensions Will Govern)

Constant Dimensions - Millimeters (Inches)

Tape Size	D ₀	E	P_0	P ₂	T ₁	G ₁	G_2	R Min.
8mm and 12mm	1.5 +0.10, -0.0 (.059 +0.004, -0.0)		4.0 ± 0.10 $(.157 \pm 0.004)$	2.0 ± 0.05 $(.079 \pm 0.002)$	(.004)	(.030)		See Note 2

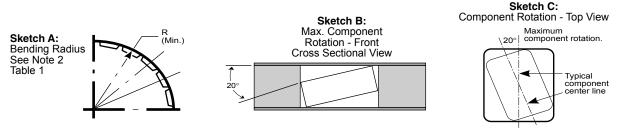
Table 1: 8 & 12mm Punched Tape (Metric Dimensions Will Govern)

Variable Dimensions - Millimeters (Inches)

Tape Size	P ₁	F	W	A ₀ B ₀	Т
8mm 1/2 Pitch	$\begin{array}{c} 2.0 \pm 0.10 \\ (.079 \pm .004) \\ \text{See Requirements} \\ \text{Section 3.3 (d)} \end{array}$	3.5 ± 0.05 $(.138 \pm .002)$	8.0 ± 0.3 (.315 ± 0.012)	See Note 1 Table 1	1.1mm (.043) Max. for Paper Base Tape and 1.6mm (.063) Max. for Non-
8mm	4.0 ± 0.10 (0.157 ± .004)				Paper Base Compositions.
12mm	4.0 ± 0.10 (0.157 ± .004)	5.5 ± 0.05	12.0 ± 0.3		See Note 3.
12mm Double Pitch	8.0 ± 0.10 (0.315 ± .004)	(.217 ± .002)	(.472 ± .012)		

Note

- 1. A_0 , B_0 and T determined by the maximum dimensions to the ends of the terminals extending from the body and/or the body dimensions of the component. The clearance between the ends of the terminals or body of the component to the sides and depth of the cavity (A_0 , B_0 and T) must be within 0.05mm (.002) minimum and 0.50mm (.020) maximum. The clearance allowed must also prevent rotation of the component within the cavity of not more than 20 degrees (see sketches A and B).
- 2. Tape with components shall pass around radius "R" without damage.
- 3. KEMET nominal thicknesses are: 0402 = 0.6mm and all others 0.95mm minimum.

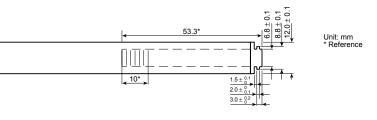


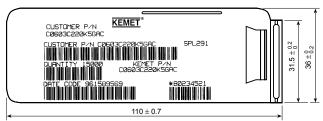
Packaging Information



Bulk Cassette Packaging (Ceramic Chips only)

(Meets Dimensional Requirements IEC-286-6 and EIAJ 7201)





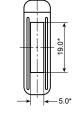


Table 2 – Capacitance Values Available In Bulk Cassette Packaging

			_	_
Case Size	Dielectric	Voltage	Min. Cap Value	Max. Cap Value
0402	All	All	All	All
0603	All	All	All	All
0805	C0G	200 100 50	109 109 109	181 331 102
	X7R	200 100 50 25 16	221 221 221 221 221 221	392 103 273 104 104
	Y5V	25 16	104 104	224 224

Table 1 - Capacitor Dimensions for Bulk Cassette Packaging – Millimeters

Metric Size Code	EIA Size Code	Length L	Width W	Thickness T	Bandwidth B	Minimum Separation S	Number of Pcs/Cassette
1005 1608 2012	0402 0603 0805	1.6 ± 0.07	$\begin{array}{c} 0.5 \pm 0.05 \\ 0.8 \pm 0.07 \\ 1.25 \pm 0.10 \end{array}$	0.5 ± .05 0.8 ± .07 0.6 ± .10	0.2 to 0.4 0.2 to 0.5 0.5 to 0.75	0.3 0.7 0.75	50,000 15,000 10,000

Terminations: KEMET nickel barrier layer with a tin overplate.

CAPACITOR MARKING TABLE (Marking Optional - Not Available for 0402 Size or Y5V Dielectric)

Numeral		Capacitance (pF) For Various Numeral Identifiers									
Alpha Character	9	0	1	2	3	4	5	6	7		
Α	0.10	1.0	10	100	1000	10,000	100,000	1,000,000	10,000,000		
В	0.11	1.1	11	110	1100	11,000	110,000	1,100,000	11,000,000		
С	0.12	1.2	12	120	1200	12,000	120,000	1,200,000	12,000,000		
D	0.13	1.3	13	130	1300	13,000	130,000	1,300,000	13,000,000		
E	0.15	1.5	15	150	1500	15,000	150,000	1,500,000	15,000,000		
F	0.16	1.6	16	160	1600	16,000	160,000	1,600,000	16,000,000		
G	0.18	1.8	18	180	1800	18,000	180,000	1,800,000	18,000,000		
H	0.20	2.0	20	200	2000	20,000	200,000	2,000,000	20,000,000		
J	0.22	2.2	22	220	2200	22,000	220,000	2,200,000	22,000,000		
K	0.24	2.4	24	240	2400	24,000	240,000	2,400,000	24,000,000		
L	0.27	2.7	27	270	2700	27,000	270,000	2,700,000	27,000,000		
M	0.30	3.0	30	300	3000	30,000	300,000	3,000,000	30,000,000		
N	0.33	3.3	33	330	3300	33,000	330,000	3,300,000	33,000,000		
P	0.36	3.6	36	360	3600	36,000	360,000	3,600,000	36,000,000		
Q	0.39	3.9	39	390	3900	39,000	390,000	3,900,000	39,000,000		
R	0.43	4.3	43	430	4300	43,000	430,000	4,300,000	43,000,000		
S	0.47	4.7	47	470	4700	47,000	470,000	4,700,000	47,000,000		
T	0.51	5.1	51	510	5100	51,000	510,000	5,100,000	51,000,000		
U	0.56	5.6	56	560	5600	56,000	560,000	5,600,000	56,000,000		
V	0.62	6.2	62	620	6200	62,000	620,000	6,200,000	62,000,000		
W	0.68	6.8	68	680	6800	68,000	680,000	6,800,000	68,000,000		
X	0.75	7.5	75	750	7500	75,000	750,000	7,500,000	75,000,000		
Y	0.82	8.2	82	820	8200	82,000	820,000	8,200,000	82,000,000		
Z	0.91	9.1	91	910	9100	91,000	910,000	9,100,000	91,000,000		
а	0.25	2.5	25	250	2500	25,000	250,000	2,500,000	25,000,000		
b	0.35	3.5	35	350	3500	35,000	350,000	3,500,000	35,000,000		
d	0.40	4.0	40	400	4000	40,000	400,000	4,000,000	40,000,000		
е	0.45	4.5	45	450	4500	45,000	450,000	4,500,000	45,000,000		
f	0.50	5.0	50	500	5000	50,000	500,000	5,000,000	50,000,000		
m	0.60	6.0	60	600	6000	60,000	600,000	6,000,000	60,000,000		
n	0.70	7.0	70	700	7000	70,000	700,000	7,000,000	70,000,000		
t	0.80	8.0	80	800	8000	80,000	800,000	8,000,000	80,000,000		
У	0.90	9.0	90	900	9000	90,000	900,000	9,000,000	90,000,000		

Laser marking is available as an extra-cost option for most KEMET ceramic chips. Such marking is two sided, and includes a K to identify KEMET, followed by two characters (per EIA-198 - see table below) to identify the capacitance value. Note that marking is not available for size 0402 nor for any Y5V chip. In addition, the 0603 marking option is limited to the \bar{K} only.



Example shown is 1,000 pF capacitor.