



# **INDEX**

Multilayer Ceramic Capacitors/Axial & Radial	Page
General Information	
Conformally Coated/Axial & Radial	
Performance Characteristics	
General Specifications	Δ
"Aximax" Conformally Coated Axial	
Outline Drawing	5
Dimensions	
Ordering Information	
Marking	
Part Number Reference	
"Golden Max" Conformally Coated Radial	
Outline Drawing	
Dimensions	
Ordering Information	
Optional Lead Configurations	
Marking	
"High Voltage Golden Max" Conformally Coated Radial	11-14
Outline Drawing	15
Dimensions	
Ordering Information	_
Marking	
Part Number Reference	16-19
Molded/Axial & Radial	
Performance Characteristics	
General Specifications	20
Ceramic Molded Standard/Axial & Radial	
Outline Drawing	21
Dimensions	
Ordering Information	
Marking	
Part Number Reference	23-26
MIL-PRF-20	
Outline Drawing	27
Dimensions	
Ordering Information	
Marking	
Part Number Reference	
MIL-C-11015 (CK) & MIL-PRF-39014 (CKR)	00
Outline Drawing	
Dimensions	
Marking	
Part Number Reference	
Axial Tape & Reel Packaging Specifications	
Radial Tape & Reel Packaging Specifications	
Leaded Packaging Quantities	
Application Notes for Multilayer Ceramic Capacitors	42-46

#### **NOTICE**

Although the information in this catalog has been carefully checked for accuracy, and is believed to be correct and current, no warranty, either express or implied, is made as to either its applicability to, or its compatibility with, specific requirements; nor does KEMET Electronics Corporation assume any responsibility for correctness of this information, nor for damages consequent to its use. All design characteristics, specifications, tolerances, and the like are subject to change without notice.

# MULTILAYER CERAMIC CAPACITORS/AXIAL & RADIAL LEADED **KEMET**



Multilayer ceramic capacitors are available in a variety of physical sizes and configurations, including leaded devices and surface mounted chips. Leaded styles include molded and conformally coated parts with axial and radial leads. However, the basic capacitor element is similar for all styles. It is called a chip and consists of formulated dielectric materials which have been cast into thin layers, interspersed with metal electrodes alternately exposed on opposite

edges of the laminated structure. The entire structure is 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. Termination materials and methods vary depending on the intended use.

#### TEMPERATURE CHARACTERISTICS

Ceramic dielectric materials can be formulated with a wide range of characteristics. The EIA standard for ceramic dielectric capacitors (RS-198) divides ceramic dielectrics into the following classes:

Class I: Temperature compensating capacitors, suitable for resonant circuit application or other applications where high Q and stability of capacitance characteristics are required. Class I capacitors have predictable temperature coefficients and are not effected by voltage, frequency or time. They are made from materials which are not ferro-electric, yielding superior stability but low volumetric efficiency. Class I capacitors are the most stable type available, but have the lowest volumetric efficiency.

Class II: Stable capacitors, suitable for bypass or coupling applications or frequency discriminating circuits where Q and stability of capacitance characteristics are not of major importance. Class II capacitors have temperature characteristics of  $\pm$  15% or less. They are made from materials which are ferro-electric, yielding higher volumetric efficiency but less stability. Class II capacitors are affected by temperature, voltage, frequency and time.

Class III: General purpose capacitors, suitable for by-pass coupling or other applications in which dielectric losses, high insulation resistance and stability of capacitance characteristics are of little or no importance. Class III capacitors are similar to Class II capacitors except for temperature characteristics, which are greater than  $\pm$  15%. Class III capacitors have the highest volumetric efficiency and poorest stability of any type.

KEMET leaded ceramic capacitors are offered in the three most popular temperature characteristics:

**C0G:** Class I, with a temperature coefficient of  $0 \pm 30$  ppm per degree C over an operating temperature range of - 55°C to + 125°C (Also known as "NP0").

**X7R:** Class II, with a maximum capacitance change of  $\pm$  15% over an operating temperature range of - 55°C to + 125°C.

**Z5U:** Class III, with a maximum capacitance change of + 22% - 56% over an operating temperature range of + 10°C to + 85°C.

Specified electrical limits for these three temperature characteristics are shown in Table 1.

#### SPECIFIED ELECTRICAL LIMITS

	TEMPER	RATURE CHARACT	TERISTICS
PARAMETER	C0G	X7R	Z5U
Dissipation Factor: Measured at following conditions:  C0G — 1 kHz and 1 vrms if capacitance > 1000 pF  1 MHz and 1 vrms if capacitance ≤ 1000 pF  X7R — 1 kHz and 1 vrms* or if extended cap range 0.5 vrms  Z5U — 1 kHz and 0.5 vrms	0.15%	2.5%	4.0%
Dielectric Strength: 2.5 times rated DC voltage.	Pas	ss Subsequent IR	Test
Insulation Resistance (IR): At rated DC voltage, whichever of the two is smaller	1,000 MΩ-μF or 100 GΩ	1,000 MΩ-μF or 100 GΩ	1,000 MΩ-μF or 10 GΩ
Temperature Characteristics: Range, °C Capacitance Change without DC voltage	-55 to +125 0 ± 30 ppm/°C	-55 to +125 ±15%	+10 to +85 +22%, -56%

 $<sup>\</sup>stackrel{\star}{\ }$  1 MHz and 1 vrms if capacitance  $\leq$  100 pF on military product.

Table I



# CERAMIC CONFORMALLY COATED/AXIAL & RADIAL

#### PERFORMANCE CHARACTERISTICS FOR STANDARD AND HIGH VOLTAGE

#### **GENERAL SPECIFICATIONS**

Working Voltage: Axial (WVDC)

xial (WVDC) Radial (WVDC)

COG - 50 & 100 50, 100, 200, 500, 1k, 1.5k, 2k, 2.5k, 3k X7R - 50 & 100 50, 100, 200, 500, 1k, 1.5k, 2k, 2.5k, 3k Z5U - 50 & 100 50 & 100

**Temperature Characteristics:** 

 $C0G - 0 \pm 30 \text{ PPM} / ^{\circ}\text{C} \text{ from - } 55^{\circ}\text{C} \text{ to + } 125^{\circ}\text{C} \text{ (1)}$ 

X7R - ± 15% from - 55°C to + 125°C

Z5U - + 22% / -56% from + 10°C to + 85°C

Capacitance Tolerance:

C0G - ±0.5pF, ±1%, ±2%, ±5%, ±10%

X7R - ±10%, ±20%, +80% / -20%, +100% / -0%

Z5U - ±20%, +80% / -20%

Construction:

Epoxy encapsulated - meets flame test requirements of UL Standard 94V-0.

High-temperature solder - meets EIA RS-198, Method 302, Condition B (260°C for 10 seconds)

Lead Material:

100% matte tin (Sn) with nickel (Ni) underplate and steel core.

Solderability:

EIA RS-198, Method 301, Solder Temperature: 230°C ±5°C.

Dwell time in solder =  $7 \pm \frac{1}{2}$  seconds.

**Terminal Strength:** 

EIA RS-198, Method 303, Condition A (2.2kg)

**ELECTRICAL** 

Capacitance @ 25°C:

Within specified tolerance and following test conditions.

COG - > 1000pF with 1.0 vrms @ 1 kHz

≤ 1000pF with 1.0 vrms @ 1 MHz

 $X7R-with\ 1.0\ vrms\ \textcircled{@}\ 1\ kHz$ 

Z5U - with 1.0 vrms @ 1 kHz

Dissipation Factor @ 25°C:

Same test conditions as capacitance.

C0G - 0.15% maximum

X7R – 2.5% maximum

Z5U - 4.0% maximum

Insulation Resistance @ 25°C:

EIA RS-198, Method 104, Condition A <1kV

C0G – 100k Megohm or 1000 Megohm x µF, whichever is less. ≤500V test @ rated voltage, ≥1kV test @ 500V

X7R – 100k Megohm or 1000 Megohm x µF, whichever is less. ≤500V test @ rated voltage, ≥1kV test @ 500V

Z5U - 10k Megohm or 1000 Megohm x  $\mu F$ , whichever is less.

**Dielectric Withstanding Voltage:** 

EIA RS-198, Method 103

≤200V test @ 250% of rated voltage for 5 seconds with current limited to 50mA.

500V test @ 150% of rated voltage for 5 seconds with current limited to 50mA.

≥1000V test @ 120% of rated voltage for 5 seconds with current limited to 50mA.

**ENVIRONMENTAL** 

Vibration:

EIA RS-198, Method 304, Condition D (10-2000Hz; 20g)

Shock:

EIA RS-198, Method 305, Condition I (100g)

Life Test:

EIA RS-198, Method 201, Condition D. ≤ 200V

C0G – 200% of rated voltage @ +125°C

X7R – 200% of rated voltage @ +125°C Z5U – 200% of rated voltage @ +85°C

≥ 500V

C0G – rated voltage @ +125°C

X7R - rated voltage @ +125°C

Post Test Limits @ 25°C are:

Capacitance Change:

C0G (≤ 200V) – +3% or 0.25pF, whichever is greater.

C0G ( $\geq$  500V) – +3% or 0.50pF, whichever is greater.

X7R - + 20% of initial value (2)

Z5U - + 30% of initial value (2)

Dissipation Factor:

C0G - 0.15% maximum

X7R - 2.5% maximum

Z5U - 4.0% maximum

Insulation Resistance: C0G - 10k Megohm or 100 Megohm x  $\mu$ F, whichever is less.

≥1kV tested @ 500V.

X7R - 10k Megohm or 100 Megohm x  $\mu F$ , whichever is less.

≥1kV tested @ 500V.

Z5U – 1k Megohm or 100 Megohm x  $\mu$ F, whichever is less.

Moisture Resistance:

EIA RS-198, Method 204, Condition A (10 cycles without applied voltage.)

Post Test Limits @ 25°C are:

Capacitance Change:

C0G ( $\leq$  200V) – +3% or 0.25pF, whichever is greater.

COG (≥ 500V) – +3% or 0.50pF, whichever is greater.

X7R – + 20% of initial value (2)

Z5U - + 30% of initial value (2)

Dissipation Factor:

C0G - 0.25% maximum

X7R - 3.0% maximum

Z5U - 4.0% maximum

Insulation Resistance: C0G – 10k Megohm or 100 Megohm x μF, whichever is less. ≤500V test @ rated voltage, ≥1kV test @ 500V.

X7R – 10k Megohm or 100 Megohm x µF, whichever is less. ≥500V test @ rated voltage. >1kV test @ 500V.

Z5U – 1k Megohm or 100 Megohm x  $\mu$ F, whichever is less.

Thermal Shock:

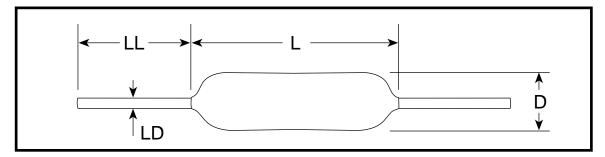
EIA RS-198, Method 202, Condition B (C0G & X7R: -55°C to +125°C); Condition A (Z5U: -55°C to 85°C)

- (1) +53 PPM -30 PPM/ °C from +25°C to -55°C, + 60 PPM below 10pF.
- (2) X7R and Z5U dielectrics exhibit aging characteristics; therefore, it is highly recommended that capacitors be deaged for 2 hours at 150°C and stabilized at room temperature for 48 hours before capacitance measurements are made.

# **CERAMIC CONFORMALLY COATED/AXIAL** "AXIMAX"



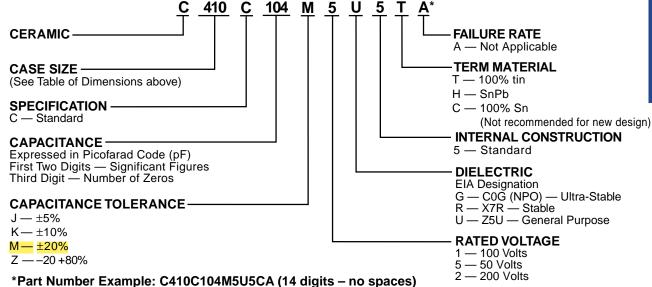
#### **CAPACITOR OUTLINE DRAWING**



### MAXIMUM DIMENSIONS—INCHES & (MILLIMETERS)

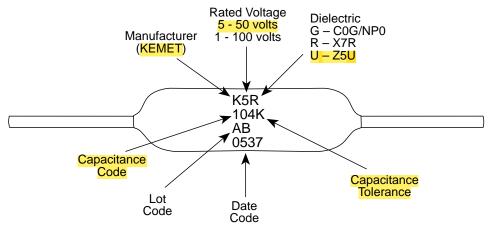
STYLE	L MAX	D MAX	<b>LD</b> +.001,003 (+.025,076)	LL MIN
C410	.170 (4.32)	.100 (2.54)	.020 (.51)	1.0 (25.4)
C412	.170 (4.32)	.120 (3.05)	.020 (.51)	1.0 (25.4)
C420	.260 (6.60)	.100 (2.54)	.020 (.51)	1.0 (25.4)
C430	.290 (7.37)	.150 (3.81)	.020 (.51)	1.0 (25.4)
C440	.400 (10.16)	.150 (3.81)	.020 (.51)	1.0 (25.4)

#### ORDERING INFORMATION



Slave Capacitor

K5u = KEMET, 50V, Z5U Dielectric **MARKING INFORMATION** 



 $105M = 0.000001 \pm 20\% = 1uF \pm 20\%$ 



# CERAMIC CONFORMALLY COATED/AXIAL "AXIMAX"

# RATINGS & PART NUMBER REFERENCE ULTRA-STABLE TEMPERATURE CHARACTERISTIC – COG/NPO

		Style		C410	)		C412	2		C42	0		C43	0		C44	<del></del>
_	Сар	Сар		WVDC	;		WVDO	<del>-</del>		WVD	C		WVD	<u> </u>		WVD	<del></del>
Сар	Code	Tol	50	100	200	50	100	200	50	100	200	50	100	200	50	100	200
1.0pF	109	J,K,M															
1.5	159	J,K,M															
1.8	189	J,K,M															
2.2	229	J,K,M										<b>†</b>					
2.7	279	J,K,M															
3.3	339	J,K,M															
3.9	399	J,K,M															
4.7	479	J,K,M															
5.6	569	J,K,M															
6.8	689	J,K,M															
8.2	829	J,K,M															
10	100	J,K,M										t					
12	120	J,K,M										l					
15	150	J,K,M							İ								
18	180	J,K,M										t					
22	220	J,K,M										t					
27	270	J,K,M															
33	330	J,K,M										t					
39	390	J,K,M										t					
47	470	J,K,M										t					
56	560	J,K,M										t					
68	680	J,K,M										t					
82	820	J,K,M															
100	101	J,K,M															
120	121	J,K,M										t					
150	151	J,K,M															
180	181	J,K,M										t					
220	221	J,K,M										<b>†</b>					
270	271	J,K,M										t					
330	331	J,K,M										<b>†</b>					
390	391	J,K,M															
470	471	J,K,M										t					
560	561	J,K,M										<b>†</b>					
680	681	J,K,M										<b>†</b>					
820	821	J,K,M															
1000	102	J,K,M															
1200	122	J,K,M															
1500	152	J,K,M															
1800	182	J,K,M															
2200	222	J,K,M															
2700	272	J,K,M															
3300	332	J,K,M															
3900	392	J,K,M															
4700	472	J,K,M															
5600	562	J,K,M															
6800	682	J,K,M															
8200	822	J,K,M															
.010uF	103	J,K,M															
.012	123	J,K,M										t					
.015	153	J,K,M															

# CERAMIC CONFORMALLY COATED/AXIAL "AXIMAX"



# RATINGS & PART NUMBER REFERENCE STABLE TEMPERATURE CHARACTERISTIC – X7R

		Style		C410	)		C412	<u> </u>		C420	)		C430	)		C440	,
	Сар	Сар		WVDC	;		WVDC	;		WVDC			WVDC	;		WVDC	<del></del>
Сар	Code	Tol	50	100	200	50	100	200	50	100	200	50	100	200	50	100	200
10pF	100	K,M															
12	120	K,M															
15	150	K,M															
18	180	K,M															
22	220	K,M															
27	270	K,M												_			
33	330	K,M						_			-		-	-			
39 47	390 470	K,M K,M															
56	560	K,M						_			_		_	_			
68	680	K,M															
82	820	K,M															
100	101	K,M															
120	121	K,M															
150	151	K,M															
180	181	K,M															
220	221	K,M															
270	271	K,M															
330	331	K,M				L											
390	391	K,M															
470	471	K,M						_			-		-	-			
560	561	K,M						_			_		_	_			
680 820	681 821	K,M K,M						_			_		_	_			
1000	102	K,M															
1200	122	K,M															
1500	152	K,M															
1800	182	K,M															
2200	222	K,M															
2700	272	K,M															
3300	332	K,M															
3900	392	K,M															
4700	472	K,M															
5600	562	K,M															
6800	682	K,M															
.010uF	822 103	K,M K,M															
.012	123	K,M															
.012	153	K,M										<u> </u>					
.018	183	K,M										$\vdash$					
.022	223	K,M															
.027	273	K,M															
.033	333	K,M															
.039	393	K,M															
.047	473	K,M															
.056	563	K,M															
.068	683	K,M															
.082 .10	823 104	K,M K,M									-			-			
.10	104	K,M K,M					-	-			<del> </del>			<del> </del>			
.12	154	K,M									<u> </u>			<u> </u>			
.18	184	K,M															
.22	224	K,M															
.27	274	K,M															
.33	334	K,M															
.39	394	K,M															
.47	474	K,M															
.56	564	K,M															
.68	684	K,M															



# CERAMIC CONFORMALLY COATED/AXIAL "AXIMAX"

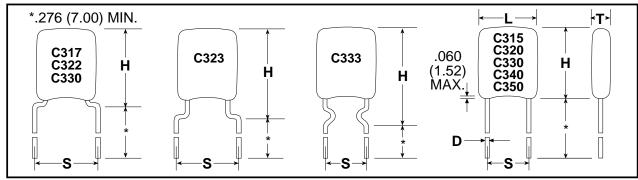
# RATINGS & PART NUMBER REFERENCE GENERAL PURPOSE TEMPERATURE CHARACTERISTIC – Z5U

		Style		C410	)		C412	2		C420	)		C430	)		C440	)
Сар	Сар	Сар		WVDC			WVDC	;		WVDC	;		WVDO	;		WVDC	;
Сар	Code	Tol	50	100	200	50	100	200	50	100	200	50	100	200	50	100	200
1000pF	102	M,Z															
1200	122	M,Z															
1500	152	M,Z															
1800	182	M,Z															
2200	222	M,Z															
2700	272	M,Z															
3300	332	M,Z															
3900	392	M,Z															
4700	472	M,Z															
5600	562	M,Z															
6800	682	M,Z															
8200	822	M,Z															
.010uF	103	M,Z															
.012	123	M,Z															
.015	153	M,Z															
.018	183	M,Z															
.022	223	M,Z															
.027	273	M,Z															
.033	333	M,Z															
.039	393	M,Z															
.047	473	M,Z															
.056	563	M,Z															
.068	683	M,Z															
.082	823	M,Z															
.10	104	M,Z															
.12	124	M,Z															
.15	154	M,Z															
.18	184	M,Z															
.22	224	M,Z															
		M,Z			_			_									
.27	274				_			_									
.33	334	M,Z			_			_									
.39	394	M,Z					-										
.47	474	M,Z	<b>—</b>		_	_		<u> </u>									_
.56	564	M,Z	-		_	_		_									
.68	684	M,Z															
.82	824	M,Z															
1.0	105	M,Z															
1.2	125	M,Z															
1.5	155	M,Z															
1.8	185	M,Z															
2.2	225	M.Z															

"STANDARD & HIGH VOLTAGE GOLDEN MAX"



#### STANDARD LEAD CONFIGURATION — OUTLINE DRAWINGS



Drawings are not to scale. See table below for dimensions.

See page 10 for optional lead configurations.

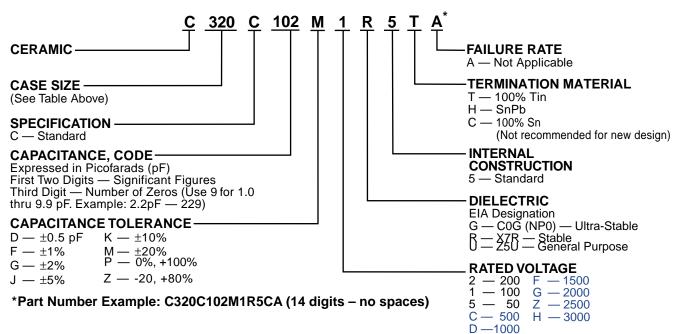
#### **DIMENSIONS — INCHES & MILLIMETERS**

Case Size	L Max.	H. Max	Standard T Max.	High Voltage T Max.	S(1) ±.030 (.78)	D +.004(.10) 001(.025)
C315	0.150 (3.81)	0.210 (5.33)	0.100	0.150	0.100 (2.54)	0.020 (.51)
C317	0.150 (3.81)	0.230 (5.84)	0.100	0.150	0.200 (5.08)	0.020 (.51)
C320	0.200 (5.08)	0.260 (6.60)	0.125	0.200	0.100 (2.54)	0.020 (.51)
C322	0.200 (5.08)	0.260 (6.60)	0.125	0.200	0.200 (5.08)	0.020 (.51)
C323	0.200 (5.08)	0.320 (8.13)	0.125	0.200	0.200 (5.08)	0.020 (.51)
C330	0.300 (7.62)	0.360 (9.14)	0.150	0.250	0.200 (5.08)	0.020 (.51)
C333	0.300 (7.62)	0.390 (9.91)	0.150	0.250	0.200 (5.08)	0.020 (.51)
C340	0.400 (10.16)	0.460 (11.68)	0.150	0.270	0.200 (5.08)	0.020 (.51)
C350	0.500 (12.70)	0.560 (14.22)	0.200	0.270	0.400 (10.16)	0.025 (.64)

**NOTE:** 1 inch = 25.4 mm.

NOTE: (1) Measured at seating plane.

#### **ORDERING INFORMATION**

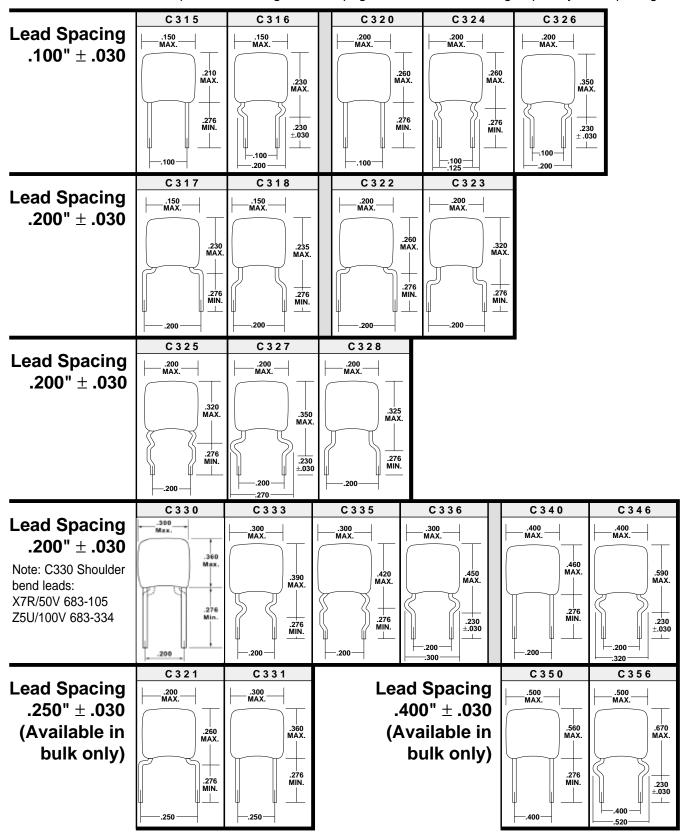




"STANDARD & HIGH VOLTAGE GOLDEN MAX"

#### OPTIONAL CONFIGURATIONS BY LEAD SPACING

The preferred lead wire configurations are shown on page 9. However, additional configurations are available. All available options, including those on page 9, are shown below grouped by lead spacing.

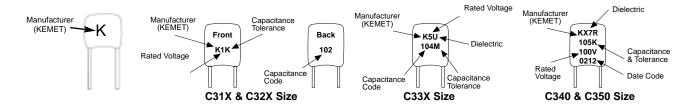


Note: Non-standard lead lengths are available in bulk only.

"STANDARD & HIGH VOLTAGE GOLDEN MAX"



### **CAPACITOR MARKINGS**



#### RATINGS & PART NUMBER REFERENCE: ULTRA-STABLE TEMPERATURE CHARACTERISTICS - C0G/NPO

	RA	MITA	GS	&	PAF	<b>₹</b> Т	NU	ME	BEF	RE	:FE	RE	NC	E:	UL	TR	A-S	TAE	3LE	TE	M	PEF	₹A	TUF	₹E	СН	ARA	AC	ſΕ	RIS	STI	CS	– C	:0G	/NF	Oc	
		Style		C	231	X				С	32X	(						С	33	Χ						C	34)	(					C	35>	(		
Сар	Сар	Cap			WVD						VVDC							٧	VVD	;						V	VVDC						١	VVDC			
Сар	Code	Tol	50	100	200	500	1k	50	100	200	500	1k	1.5k	2k	50	100	200	500	1k	1.5k	2k	2.5k	3k	50	100	200	500	1k	2k	3k	50	100	200	500	1k	2k	3k
1.0pF	109	D																																			
1.1	119	D																																	$\square$	$\square$	
1.2	129	D					_		_					_		_			ш				_					$\vdash$				_	_		ш	ш	
1.3	139	D			_	_	₩		_				_	_		_	-		Н		_	-	_	$\vdash$		_		$\vdash$		-	_	_	_	-	$\vdash$	$\vdash$	
1.5	159	D D				-	₩		_					<u> </u>		<u> </u>	$\vdash$		Ш		$\vdash$	$\vdash$	<u> </u>	$\vdash$				$\vdash$		-		<u> </u>	<u> </u>	$\vdash$	$\vdash$	$\vdash$	_
1.6	169				-	-	₩		-				_	$\vdash$		-	-	_	Н	_	$\vdash$	-	<u> </u>	$\vdash$		_		Н		-	_	-	_	-	$\vdash$	$\vdash$	
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"STANDARD & HIGH VOLTAGE GOLDEN MAX"

#### RATINGS & PART NUMBER REFERENCE: ULTRA-STABLE TEMPERATURE CHARACTERISTICS — C0G/NPO CONT.

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# CERAMIC CONFORMALLY COATED/RADIAL "STANDARD & HIGH VOLTAGE GOLDEN MAX"



#### RATINGS & PART NUMBER REFERENCE: STABLE TEMPERATURE CHARACTERISTICS — X7R

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2200 2700 3300 3900 4700 5600 6800 8200 .010uF	152	K,M,P,Z																						F					Ш	二			二	$\perp$
2700 3300 3900 4700 5600 6800 8200 .010uF	182	K,M,P,Z					$\vdash$							_	+	+					-		+	$\vdash$	$\vdash$	$\vdash$			$\vdash$	$\longrightarrow$	$\dashv$	$\square$	$\dashv$	+
3300 3900 4700 5600 6800 8200 .010uF	222 272	K,M,P,Z K,M,P,Z					$\vdash$							$\vdash$	+	+				-	-		+	+	+	+			$\vdash$	$\overline{}$	-		$\dashv$	+
3900 4700 5600 6800 8200 .010uF	332	K,M,P,Z	-				Н												Н	-	_		+	+						$\neg$			$\rightarrow$	+
5600 6800 8200 .010uF	392	K,M,P,Z																			$\rightarrow$					1								$\rightarrow$
6800 8200 .010uF	472	K,M,P,Z																																
8200 .010uF	562	K,M,P,Z																			_		$\perp$	$\perp$						$\Box$				$\dashv$
.010uF	682	K,M,P,Z	-				$\vdash$			_		ш	$\square$		-	-	-	⊢	ш		$\rightarrow$	_	+	+		╄	-		$\vdash$	$\dashv$	-			$\dashv$
	822 103	K,M,P,Z K,M,P,Z	-		-		Н			_		Н	Н	-	-			₩	Н		$\rightarrow$	+	+	+		₩	Н		$\vdash$	$\overline{}$	-			+
.012	123	K,M,P,Z	-		$\neg$		Н			_			Н	$\dashv$				$\vdash$	Н		$\rightarrow$	+	+	+		╫	Н		$\vdash$	$\overline{}$	-			
.015	153	K,M,P,Z											П													1								
.018	183	K,M,P,Z																																
.022	223	K,M,P,Z																	ш	$\Box$										$\Box$				
.027	273	K,M,P,Z	_		_								Ш		_			-	ш	-	-	_	+	-		┡			Ш	$\square$				4
.033	333 393	K,M,P,Z K,M,P,Z	-		-		H			_			Н	_	-	-		⊢	$\vdash$	$\dashv$	$\rightarrow$	+	+	+		╄			$\vdash$	$\longrightarrow$	-		$\rightarrow$	$\rightarrow$
.039	473	K,M,P,Z	-		$\neg$		Н			_			$\vdash$	$\dashv$				$\vdash$	Н	$\dashv$	$\rightarrow$	+	+	+		╫		$\vdash$	$\vdash$	$\overline{}$	-			
.056	563	K,M,P,Z	_										Н		_				Н	$\dashv$	$\neg$	$\top$	$\top$	+		+				$\neg$				
.068	683	K,M,P,Z																																
.082	823	K,M,P,Z																			I									$\Box$				
.10	104	K,M,P,Z	#	_	_		$\vdash$	#				$\square$	Щ						Щ	4	+	-						$\vdash$	$\vdash$	-	_			4
.12 .15	124 154	K,M,P,Z K,M,P,Z	-	$\dashv$			$\vdash$			$\dashv$		$\vdash$	$\vdash$						$\vdash$	$\dashv$	+	-							$\vdash$	$\overline{}$	-			+
.15	184	K,M,P,Z	$\dashv$	$\dashv$	$\dashv$		$\vdash$			$\dashv$		Н	$\vdash$						$\vdash$	$\dashv$	+													+
.22	224	K,M,P,Z	$\dashv$	$\dashv$	$\dashv$					$\neg$		Н	$\vdash$						H	$\dashv$	$\dashv$													+
.27	274	K,M,P,Z	J																	J														寸
.33	334	K,M,P,Z																			I													$\Box$
.39	394	K,M,P,Z	_	_	_				Щ	_		$\square$	Щ	Щ					Ш	4	4													4
.47 .56	474 564	K,M,P,Z K,M,P,Z	$\dashv$	-	-		$\vdash$		$\vdash$	-		$\vdash$	$\vdash\vdash$				-	$\vdash$	$\vdash$	$\dashv$	+	-		H			$\vdash$				-		$\dashv$	+
.68	684	K,M,P,Z	$\dashv$	$\dashv$			$\vdash$		$\vdash$	-		Н	$\vdash$				+	$\vdash$	$\vdash$	$\dashv$	+	+					$\vdash$				-		$\dashv$	+
.82	824	K,M,P,Z	$\dashv$	$\dashv$	$\dashv$				$\vdash$	$\dashv$		Н	$\vdash$				+	$\vdash$	H	$\dashv$	+										$\dashv$		$\dashv$	+
1.0	105	K,M,P,Z	$\dashv$	$\neg$	$\dashv$				$\neg$	$\neg$		П	$\Box$					T	П	$\dashv$	$\dashv$					$^{\dagger}$					$\neg$		$\dashv$	$\dashv$
1.2	125	K,M,P,Z																																
1.5	155	K,M,P,Z	$\Box$	$\Box$					Д	$\Box$		П	П			$\perp$	1	$\vdash$	Д	耳	Ţ	$\perp$		F		$\vdash$		П					$\Box$	工
1.8	185	K,M,P,Z	-	$\dashv$			$\vdash$	Н	$\square$	$\dashv$		Н	$\vdash$	$\vdash$		+	+	$\vdash$	$\vdash$	$\dashv$	+	-		$\vdash$	+	$\vdash$					-		$\dashv$	+
2.2	225 275	K,M,P,Z K,M,P,Z	$\dashv$	-	$\dashv$		$\vdash$	$\vdash$	$\dashv$	-		Н	$\vdash\vdash$	$\dashv$		+	+	$\vdash$	$\vdash$	$\dashv$	+	-		+	+	+	$\vdash$				$\dashv$		$\dashv$	+
3.3	335	K,M,P,Z	$\dashv$	$\dashv$	$\dashv$		$\vdash$	$\vdash$	$\vdash$	$\dashv$		Н	$\vdash$	$\dashv$	+	+	+	$\vdash$	$\vdash$	$\dashv$	+			+	+	+				$\rightarrow$	$\dashv$		$\rightarrow$	+
3.9	395	K,M,P,Z	$\dashv$	$\dashv$	$\dashv$			$\vdash$	$\dashv$	$\neg$		Н	$\vdash$	$\dashv$	+	+	+	$\vdash$	H	$\dashv$	$\dashv$			+		+				$\rightarrow$	$\neg$		$\dashv$	+
4.7	475	K,M,P,Z	J												工		工			J						İ								寸
5.6		K,M,P,Z														I																		
6.8	565	K,M,P,Z																1									1			, 7				T
	685		40.0				_	_											Ш				_	_	_	_				ш	_	_	_	_
# >		noulder b	end	llea	d co	nfigu	ırati	ion i	s sta	ında	rd fo	or the	ese	сар	code	es.			Ш				_											



"STANDARD & HIGH VOLTAGE GOLDEN MAX"

# RATINGS & PART NUMBER REFERENCE GENERAL PURPOSE TEMPERATURE CHARACTERISTIC – Z5U

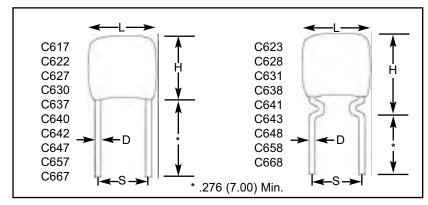
		Style	(	C31)	(		C32	X	Щ	233	X.		234)	(		C35	X
	Сар	Сар	٧	VWD	С	١	٧WD	C	٧	VWD	С	W	/WD	С	١	WWD	C
Сар	Code	Tol	50	100	200	50	100	200	50	100	200	50	100	200	50	100	200
1000pF	102	M,P,Z															
1200	122	M,P,Z															
1500	152	M,P,Z															
1800	182	M,P,Z															
2200	222	M,P,Z															
2700	272	M,P,Z															
3300	332	M,P,Z															
3900	392	M,P,Z															
4700	472	M,P,Z															
5600	562	M,P,Z															
6800	682	M,P,Z															
8200	822	M,P,Z															
.010uF	103	M,P,Z															
.012	123	M,P,Z													П		$\Box$
.015	153	M,P,Z															
.018	183	M,P,Z															
.022	223	M,P,Z															
.027	273	M,P,Z															
.033	333	M,P,Z															
.039	393	M,P,Z															
.047	473	M,P,Z															
.056	563	M,P,Z															
.068	683	M,P,Z															
.082	823	M,P,Z								$\vdash$							
.10	104	M,P,Z								_							
.12	124	M,P,Z								$\vdash$							
.15	154	M,P,Z								$\vdash$							
.18	184	M,P,Z								_							
.22	224	M,P,Z		-						_							
.27	274	M,P,Z		<u> </u>													
.33	334	M,P,Z		_						$\vdash$							
.39	394			_						-				_			
.39	474	M,P,Z M,P,Z		-										-			
	564			-										-			
.56 .68	684	M,P,Z M,P,Z		-										-			$\vdash$
	824			-						-			-	-	_		$\vdash$
.82		M,P,Z		<del> </del>	<u> </u>		$\vdash$	<del>                                     </del>			<u> </u>			<u> </u>			$\vdash$
1.0	105 125	M,P,Z		_			<u> </u>							_			$\vdash$
1.2		M,P,Z		<u> </u>	<u> </u>		$\vdash$			<u> </u>	<u> </u>			<u> </u>			$\vdash$
1.5	155	M,P,Z		_						_				_			$\vdash$
1.8	185	M,P,Z		<u> </u>	<u> </u>		$\vdash$			<u> </u>	<u> </u>		<u> </u>	<u> </u>			$\vdash$
2.2	225	M,P,Z		_			<u> </u>			_	_		_	_			$\vdash$
2.7	275	M,P,Z		<u> </u>	<u> </u>		<u> </u>		<u> </u>		_					<u> </u>	$\vdash$
3.3	335	M,P,Z					_		_							<u> </u>	$\vdash$
3.9	395	M,P,Z					<u> </u>		_							<u> </u>	-
4.7	475	M,P,Z		<u> </u>	<u> </u>		$\vdash$		<u> </u>		<u> </u>		<u> </u>	<u> </u>		<u> </u>	<u> </u>
5.6	565	M,P,Z					$\vdash$		<u> </u>		<u> </u>					<u> </u>	$\vdash$
6.8	685	M,P,Z															1

C330 shoulder bend lead configuration is standard for these cap codes.

**HIGH VOLTAGE "GOLDEN MAX"** 

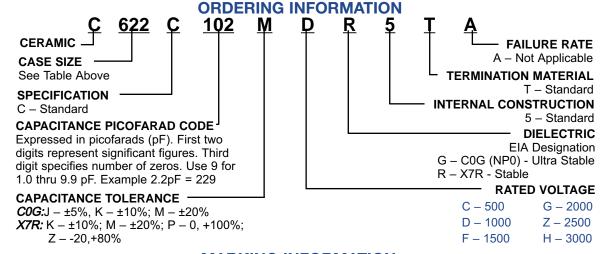


#### **CAPACITOR OUTLINE DRAWING**

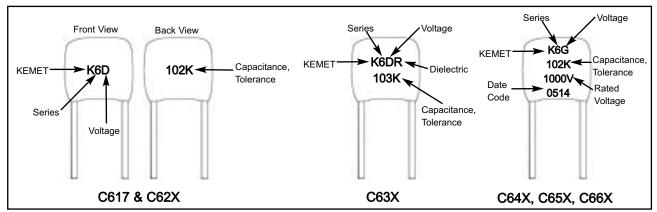


#### **DIMENSIONS - INCHES AND MILLIMETERS**

Case Size	L MAX inches (mm)	H MAX inches (mm)	T MAX. inches (mm)	Lead Spacing inches (mm)	LD (Nominal) inches (mm)
C617	.250 (6.35)	.220 (5.59)	.200 (5.08)	.170 (4.32)	.025 (.64)
C622/3	.320 (8.13)	.280(7.11)	.250 (6.35)	.220 (5.59)	.025 (.64)
C627/8	.370 (9.40)	.300 (7.62)	.250 (6.35)	.275 (6.98)	.025 (.64)
C630/1	.450 (11.40)	.220 (5.59)	.200 (5.08)	.300 (7.62)	.025 (.64)
C637/8	.470 (11.90)	.400 (10.20)	.270 (6.89)	.375 (9.52)	.025 (.64)
C640/1	.550 (14.00)	.280 (7.11)	.250 (6.35)	.400 (10.16)	.025 (.64)
C642/3	.500 (12.70)	.560(14.22)	.200 (5.08)	.400 (10.16)	.025 (.64)
C647/8	.570 (14.50)	.500(12.70)	.270 (6.89)	.475 (12.06)	.025 (.64)
C657/8	.670 (17.02	.600 (15.24)	.270 (6.89)	.575 (14.60)	.025 (.64)
C667/8	.770 (19.56)	.720 (18.29)	.270 (6.89)	.675 (17.14)	.025 (.64)



#### MARKING INFORMATION



For packaging information, see pages 40, and 41.



### **RATINGS & PART NUMBER REFERENCE - COG/NPO**

		64.1		(	2617	7			C	<b>262X</b>	(			C	62)	K				C6	3X					C6	3X		
		Style								=2, 3					=7,					(X=						(X=7			
	Сар	Сар		v	VVD	•				VVDC					VVD	<del>,</del>				WV						WV			_
Сар	Code	Tol	500	1k			3k	500	1k	1.5k	2k	3k	500		1.5k		3k	500	1k	1.5k		2.5k	3k	500	1k	1.5k	2k	2 5k	3k
.0pF	109	J,K,M	500	IK	1.01	Z.K	OK	500	- IK	1.00	Z.K	OK	500	IK	1.00	Z.K	OK	500	- IK	1.01	Z.K	2.00	OK	500	TK.	1.00	ZK	2.01	
1.5	159	J,K,M																											
2.2	229	J,K,M																											
2.7	279	J,K,M																											
3.3	339	J,K,M																											
3.9	399	J,K,M								$\square$																			
4.7	479	J,K,M								$\vdash$																			
5.6 6.8	569 689	J,K,M J,K,M			-					$\vdash$																			
8.2	829	J,K,M																											
10	100	J,K,M										_																	
12	120	J,K,M																											
15	150	J,K,M																											
18	180	J,K,M																											
22	220	J,K,M																											
27	270	J,K,M																											
33	330	J,K,M																											
39	390	J,K,M																											
47	470	J,K,M																											
56 68	560 680	J,K,M J,K,M																											
82	820	J,K,M																											
100	101	J,K,M																											
120	121	J,K,M																											
150	151	J,K,M																											
180	181	J,K,M																											
220	221	J,K,M																											
270	271	J,K,M																											
330	331	J,K,M																											
390	391	J,K,M					_																						
470 560	471 561	J,K,M					-																						
680	681	J,K,M J,K,M																											
820	821	J,K,M																											
000	102	J,K,M																											
200	122	J,K,M																											
500	152	J,K,M																											
800	182	J,K,M																											
200	222	J,K,M																											
700	272	J,K,M																											
300	332	J,K,M		<u> </u>	-	_	-			$\square$					-	_	-				_		_						H
3900	392	J,K,M		<u> </u>	-	-	-			$\vdash$		<u> </u>	-		-	-	-				-		-				$\vdash$		
700 600	472 562	J,K,M		-											-														
800	682	J,K,M J,K,M		_		-	-		-			_			_	-				_	-		-				$\vdash$		
3200	822	J,K,M				-			_			_											-						
10uF	103	J,K,M																											
012	123	J,K,M																											Г
015	153	J,K,M																											
018	183	J,K,M																											
022	223	J,K,M																											Ē
027	273	J,K,M		<u> </u>	-		-								<u> </u>		-							⊢	_	<u> </u>			H
033	333	J,K,M		-					-						-									_	-				H
039	393	J,K,M		-	-	-	-		-			_			-		-						-	-	-	-			H
047 056	473 563	J,K,M J,K,M		-					-						-														H
068	683	J,K,M J,K,M		_	-	-			_						_	-	-				-		-		-	_	$\vdash$		H
082	823	J,K,M		_											_														
.10	104	J,K,M																											Н



### **RATINGS & PART NUMBER REFERENCE - COG/NPO**

		Q4.dc		C6	4X			C6	4X			C6	4X			C6	5X			C6	6X	
		Style		(X=					2, 3)			(X=7				(X=7					7, 8)	
_	Сар	Сар		WV					DC			WV				WV					DC	
Сар	Code	Tol	500	1k	2k	3k	500	1k	2k	3k	500	1k	2k	3k	500	1k	2k	3k	500	1k	2k	3
1.0pF	109	J,K,M																				
1.5	159	J,K,M																				
2.2	229	J,K,M																				L
2.7	279	J,K,M																				L
3.3	339	J,K,M																				L
3.9	399	J,K,M											_					_				L
4.7	479	J,K,M		_	-							_	_	_		_	_	_		_	_	H
5.6	569	J,K,M		_	-							_	_				_	_				⊢
6.8	689	J,K,M		_	-							_	_				_	_				⊢
8.2	829	J,K,M																_				⊢
10	100	J,K,M		-	-	_				_		-	-	-		-	-	-		-	-	⊬
12	120	J,K,M		_								_	_				_	_				⊢
15	150	J,K,M		<u> </u>	-		$\vdash$					<u> </u>	<u> </u>	-	<b>—</b>		<u> </u>	<u> </u>				⊬
18	180	J,K,M		<u> </u>	-		$\vdash$					<u> </u>	<u> </u>	-	<b>—</b>		<u> </u>	<u> </u>				⊬
22	220	J,K,M		-		_	-		-	_		-	-	-		-	-	-		-	-	⊬
27	270	J,K,M		<b>—</b>			$\vdash$					<b>—</b>	<b>—</b>		<b>—</b>		<b>—</b>	<b>—</b>				+
33 39	330 390	J,K,M J,K,M		<u> </u>			$\vdash$				-	<u> </u>	-		$\vdash$		<u> </u>	<u> </u>				۰
47	470																	-				⊢
		J,K,M																-				⊢
56 68	560 680	J,K,M J,K,M		_								_					_					⊬
82	820	J,K,M																				Н
100	101	J,K,M																				⊢
120	121	J,K,M																				H
150	151	J,K,M																				⊢
180	181	J,K,M																				⊢
220	221	J,K,M																				t
270	271	J,K,M																				h
330	331	J,K,M																				
390	391	J,K,M																				
470	471	J,K,M																				
560	561	J,K,M																				
680	681	J,K,M																				
820	821	J,K,M																				
1000	102	J,K,M																				
1200	122	J,K,M																				
1500	152	J,K,M																				
1800	182	J,K,M																				
2200	222	J,K,M																				
2700	272	J,K,M																				
3300	332	J,K,M																				
3900	392	J,K,M																				
4700	472	J,K,M												_								
5600	562	J,K,M												_								
0086	682	J,K,M												_								
3200	822	J,K,M				_			-	_			<u> </u>	-				<u> </u>				П
10uF	103	J,K,M				_			-	_			<u> </u>	-				<u> </u>				Н
.012	123	J,K,M			-				-				<u> </u>	-			<u> </u>	<u> </u>				Н
.015	153	J,K,M		-		_			-	_		-	-	-			-	-				Н
.018	183	J,K,M		<u> </u>	-	-			-	-		<u> </u>	<u> </u>	-			<u> </u>	<u> </u>				Н
.022	223	J,K,M		<b>—</b>								<b>—</b>	<u> </u>				<b>—</b>	<b>—</b>				٠
.027	273 333	J,K,M		<b>—</b>								<b>—</b>	<u> </u>				<b>—</b>	<b>—</b>			-	+
		J,K,M		<b>—</b>								<b>—</b>	<u> </u>				<b>—</b>	<b>—</b>			-	+
.039	393	J,K,M		<b>—</b>								<b>—</b>	<u> </u>				<b>—</b>	<b>—</b>			-	+
.047	473 563	J,K,M J,K,M		<b>—</b>			$\vdash$					<b>—</b>	<u> </u>				<b>—</b>	<b>—</b>			-	+
.068	-	J,K,M		_			$\vdash$		-			_	<u> </u>	-		_	_	_			_	+
.082	683 823			<u> </u>			$\vdash$					<u> </u>	-			_	<u> </u>	$\vdash$			_	٠
.10	104	J,K,M J,K,M		-	-		$\vdash$				<b>—</b>	_	_			_	_	_			_	4



### **RATINGS & PART NUMBER REFERENCE - X7R**

		Style		C	617			C	<b>262</b>	(			С	62X	(				C6	3X					C6	3X		
		Style						(X	(=2, ;	3)			(X:	=7, 8	3)				(X=	0,1)					(X=7	7, 8)		_
_	Сар	Сар		W۱	/DC				VVDC					VDC					wv						`wv			_
Сар	Code	Tol	500	1k	1.5k	2k	500	1k	1.5k	2k	3k	500	1k	1.5k	2k	3k	500	1k	1.5k	2k	2.5k	3k	500	1k	1.5k	2k	2.5k	
0pF	100	K,M,P,Z																										Ī
12	120	K,M,P,Z																										
15	150	K,M,P,Z																										
18	180	K,M,P,Z																										
22 27	220 270	K,M,P,Z K,M,P,Z																										
33	330	K,M,P,Z																										
39	390	K,M,P,Z																										
47	470	K,M,P,Z																										
56	560	K,M,P,Z																										
68	680	K,M,P,Z																										
82	820	K,M,P,Z																										
00	101	K,M,P,Z																										
20	121	K,M,P,Z																										
50	151	K,M,P,Z																										
80	181	K,M,P,Z																										
70	221 271	K,M,P,Z K,M,P,Z																										
30	331	K,M,P,Z														_												
90	391	K,M,P,Z																										
70	471	K,M,P,Z																										
60	561	K,M,P,Z																										
80	681	K,M,P,Z																										
20	821	K,M,P,Z																										
000	102	K,M,P,Z																										
200	122	K,M,P,Z																										
500	152	K,M,P,Z																										
800 200	182	K,M,P,Z K,M,P,Z																										
700	222 272	K,M,P,Z																										
300	332	K,M,P,Z																			_							
900	392	K,M,P,Z																										
700	472	K,M,P,Z																										
600	562	K,M,P,Z																										
800	682	K,M,P,Z																										
200	822	K,M,P,Z																										
10uF	103	K,M,P,Z																										
)12	123	K,M,P,Z			_	-																						
)15 )18	153 183	K,M,P,Z				-				$\vdash$																		١
)22	223	K,M,P,Z K,M,P,Z			_	-				$\vdash$										_	-	_						ł
)27	273	K,M,P,Z								$\vdash$										_	-							ł
033	333	K,M,P,Z																										1
039	393	K,M,P,Z																										J
)47	473	K,M,P,Z																										
)56	563	K,M,P,Z																										J
068	683	K,M,P,Z								ш															$\square$			J
10	823	K,M,P,Z		-	-	-				$\square$					_							_			$\vdash$		<u> </u>	J
10	104	K,M,P,Z		-	-	-				$\vdash\vdash$			$\rightarrow$	-	-				$\vdash$	_	-				$\vdash$			ł
12 15	124 154	K,M,P,Z K,M,P,Z		-	1	-				$\vdash\vdash$			$\rightarrow$	-					$\vdash$	-					$\vdash\vdash$		<u> </u>	ł
18	184	K,M,P,Z			1					$\vdash$			-	-	-										$\vdash\vdash$		-	ł
22	224	K,M,P,Z								Н			-	$\neg$											Н			1
27	274	K,M,P,Z											_															ĺ
33	334	K,M,P,Z																										J
39	394	K,M,P,Z																										J
47	474	K,M,P,Z																										J
56	564	K,M,P,Z								Ш							$\square$								$\square$			J
68	684	K,M,P,Z		-	-	-	$\vdash$			$\square$		_	-		_		Ш					_	Ш		$\vdash$		<u> </u>	J
82	824	K,M,P,Z			-	-	$\vdash$			$\vdash \vdash$		-	-				Ш		$\vdash$				Ш		$\vdash\vdash$		<u> </u>	ł
1.0	105	K,M,P,Z		-	-	-	$\vdash$			$\vdash\vdash$		-	$\rightarrow$	-	-		$\vdash$		$\vdash$	_	-	_	$\vdash$		$\vdash\vdash$			ł
1.2	125	K,M,P,Z K,M,P,Z		-	1	-				$\vdash\vdash$		-	$\rightarrow$	-			$\vdash$		$\vdash$	-			$\vdash$		$\vdash\vdash$		<u> </u>	ł
1.5 1.8	155 185	K,M,P,Z K,M,P,Z		-	1		$\vdash$			$\vdash\vdash$	_	-	$\rightarrow$	-	-		$\vdash$		$\vdash$	-			$\vdash$		$\vdash$			ł
2.2	225	K,M,P,Z			1					$\vdash$		-	-	-		_	Н						Н		$\vdash$		$\vdash$	ł
2.7	275	K,M,P,Z		-	1		<b>—</b>				_	_	$\rightarrow$															



### **RATINGS & PART NUMBER REFERENCE - X7R**

		~ ·		C6	64X			CE	34X			C6	4X			CE	35X			C6	6X	
		Style			0,1)				2, 3)				7, 8)				7, 8)				7, 8)	
	Con	Сар			/DC				<u>z, s,</u> /DC				/DC				/DC			W/	/DC	_
Cap	Cap Code	Tol			Т	T			T	Ι			Г	T			Т	T			П	Τ.
10pF	100	K,M,P,Z	500	1k	2k	3k	500	1k	2k	3k	500	1k	2k	3k	500	1k	2k	3k	500	1k	2k	1
12	120	K,M,P,Z																				٠
15	150	K,M,P,Z																				۲
18	180	K,M,P,Z																				İ
22	220	K,M,P,Z																				I
17	270	K,M,P,Z				_		_				_			-							ł
33	330 390	K,M,P,Z K,M,P,Z				-		-				-										ł
39 47	470	K,M,P,Z																				t
56	560	K,M,P,Z																				t
68	680	K,M,P,Z																				İ
82	820	K,M,P,Z																				Ι
100	101	K,M,P,Z																				Ļ
120 150	121	K,M,P,Z				<u> </u>		<u> </u>				<u> </u>			$\vdash$				$\vdash$			ł
180	151 181	K,M,P,Z K,M,P,Z				<u> </u>		<u> </u>				<u> </u>			$\vdash$				$\vdash$			t
220	221	K,M,P,Z																	$\vdash$			t
270	271	K,M,P,Z																				İ
330	331	K,M,P,Z																				Į
390	391	K,M,P,Z			-	-		<u> </u>	-			-		-	$\vdash$		-	-	$\vdash$			1
470 560	471 561	K,M,P,Z K,M,P,Z						<u> </u>				<u> </u>			$\vdash$				$\vdash$			+
680	681	K,M,P,Z						<u> </u>				<u> </u>			$\vdash$				$\vdash$			t
820	821	K,M,P,Z																	$\vdash$			t
000	102	K,M,P,Z																				İ
200	122	K,M,P,Z																				Į
500	152	K,M,P,Z						-	-	_					$\vdash$		-	-	$\square$			+
800 200	182 222	K,M,P,Z K,M,P,Z						<u> </u>							$\vdash$				$\vdash$			+
2700	272	K,M,P,Z													$\vdash$				$\vdash$			t
300	332	K,M,P,Z																	$\Box$			t
3900	392	K,M,P,Z																				İ
700	472	K,M,P,Z																				Ĺ
600 8800	562 682	K,M,P,Z													$\vdash$				$\vdash$			ŀ
3200	822	K,M,P,Z K,M,P,Z																	Н			
10uF	103	K,M,P,Z																				
012	123	K,M,P,Z																				
015	153	K,M,P,Z																				
018	183	K,M,P,Z				<u> </u>																
022 027	223 273	K,M,P,Z K,M,P,Z				-				-												
033	333	K,M,P,Z				_																
039	393	K,M,P,Z																				
047	473	K,M,P,Z																				
056	563	K,M,P,Z				_																
068	683	K,M,P,Z			-	-												-				
.10	823 104	K,M,P,Z K,M,P,Z				<u> </u>																f
.12	124	K,M,P,Z																				r
.15	154	K,M,P,Z																				Ī
.18	184	K,M,P,Z																				C
.22	224	K,M,P,Z			-	<u> </u>			_	_			_				-	-			-	1
.27	274 334	K,M,P,Z K,M,P,Z		-		-											-	-				ł
.39	394	K,M,P,Z																				t
.47	474	K,M,P,Z																				Ť
.56	564	K,M,P,Z																				Ī
.68	684	K,M,P,Z																				Į
.82	824	K,M,P,Z		_		<u> </u>		-	-			<u> </u>	_				-	-			-	+
1.0	105 125	K,M,P,Z K,M,P,Z		-		-	$\vdash$	-	-			-						-				ł
1.5	155	K,M,P,Z	$\vdash$			<u> </u>						<u> </u>										t
1.8	185	K,M,P,Z																				t
2.2	225	K,M,P,Z																				Ť



### **CERAMIC MOLDED AXIAL & RADIAL**

#### PERFORMANCE CHARACTERISTICS

#### **GENERAL**

#### Working Voltage:

C0G - 50, 100 & 200 Volts X7R - 50, 100 & 200 Volts

#### **Temperature Characteristics:**

C0G - 0  $\pm$ 30 PPM/°C from -55°C to  $\pm$ 125°C X7R -  $\pm$ 15% from -55°C to  $\pm$ 125°C

#### **Capacitance Tolerance:**

C0G  $-\pm 0.5$  pF,  $\pm 1\%$ ,  $\pm 2\%$ ,  $\pm 5\%$ ,  $\pm 10\%$ ,  $\pm 20\%$  ( $\pm 0.5$  pF is tightest available tolerance) X7R  $-\pm 10\%$ ,  $\pm 20\%$ , -0 +100%, -20% +80%

#### Construction:

Monolithic block of ceramic dielectric with interdigitated internal electrodes, encapsulated in a molded case, and having axial or radial leads. Meets flame test requirements of UL Standard 94V-0.

#### **Terminal Strength:**

EIA-198 Method 303 Condition A (2.2 kg)

#### **ELECTRICAL**

#### Capacitance:

Within specified tolerance when measured with 1 volt rms at 1 kHz (1000 pF or less at 1 MHz for C0G).

#### **Dissipation Factor:**

25°C at 1 kHz (1000 pF or less at 1 MHz for C0G). C0G – .15% maximum X7R – 2.5% maximum

#### Insulation Resistance:

After 2 minutes electrification at 25°C and rated voltage C0G – 100K megohms or 1000 megohm -  $\mu F$ , whichever

X7R-100K megohms or 1000 megohm -  $\mu F$ , whichever is less.

#### **Dielectric Withstanding Voltage:**

250% of rated voltage for 5 seconds with current limited to 50 mA at 25°C.

#### Life Test:

2000 hours at 200% of rated voltage at 125°C. Post-Test limits at 25°C are:

#### Capacitance Change:

C0G – less than 3% or 0.25 pF, whichever is higher X7R –  $\pm$ 20% of initial value

#### Dissipation Factor:

COG – .25% maximum X7R – 3.0% maximum

#### Insulation Resistance:

C0G – 10K megohms or 100 megohm - μF, whichever is less

X7R – 10K megohms or 100 megohm - μF, whichever is less

#### Dielectric Withstanding Voltage:

250% of rated voltage for 5 seconds with current limited to 50 mA.

#### **ENVIRONMENTAL**

#### **Moisture Resistance:**

MIL-STD-202, Method 106, or EIA-198, Method 204, Condition A, except 20 cycles.

#### Insulation Resistance:

COG – 10K megohms or 100 megohm - μF, whichever is less

X7R – 10K megohms or 100 megohm - μF, whichever is less

#### Dielectric Withstanding Voltage:

250% of rated voltage for 5 seconds with current limited to 50 mA.

#### **Immersion Cycling:**

MIL-STD-202, Method 104, Condition B. Post-Test limits at 25°C are:

#### Insulation Resistance:

COG - 10K megohms or 100 megohm -  $\mu$ F, whichever is less

X7R – 10K megohms or 100 megohm - μF, whichever is less

#### Solderability:

MIL-STD-202, Method 208, Sn62 solder, 245°C for  $5 \pm 1/2$  seconds.

#### **Resistance to Soldering Heat:**

MIL-STD-202, Method 210, Condition B (260°C, 10 secs). Depth of immersion — to a minimum of .050" from the capacitor body.

#### Lead Material:

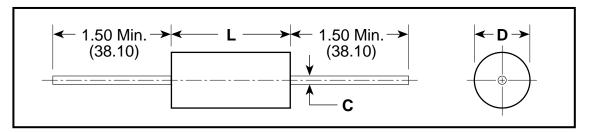
Axial: Solder-coated copper clad steel

Radial: Solder-coated copper standard; 100% tin plated optional

# CERAMIC MOLDED/AXIAL & RADIAL - STANDARD



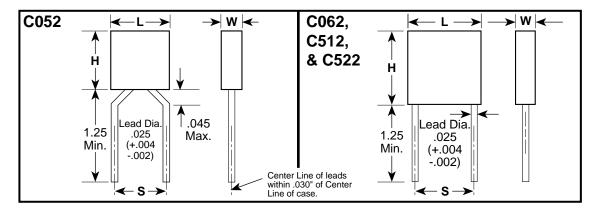
### **CAPACITOR OUTLINE DRAWINGS — (AXIAL LEADS)**



# **DIMENSIONS—INCHES & (MILLIMETERS)**

CASE SIZE	MILITARY EQUIVALENT STYLES	L	D	С
C114	CC75, CCR75 CK12, CKR11	.160 ± .010 (4.06 ± .25)	.090 ± .010 (2.29 ± .25)	.020, +.000,003 (.51, +.00,08)
C124	CC76, CCR76 CK13, CKR12	.250 ± .010 (6.35 ± .25)	.090 ± .010 (2.29 ± .25)	.020, +.000,003 (.51, +.00,08)
C192	CC77, CCR77 CK14, CKR14	.390 ± .010 (9.91 ± .25)	.140 ± .010 (3.56 ± .25)	.025, +.004,001 (.64, +.10,025)
C202	CC78, CCR78 CK15, CKR15	.500 ± .020 (12.70 ± .51)	.250 ± .015 (6.35 ± .38)	.025, +.004,001 (.64, +.10,025)
C222	CC79, CCR79 CK16, CKR16	.690 ± .030 (17.53 ± .76)	.350 ± .020 (8.89 ± .51)	.025, +.004,001 (.64, +.10,025)

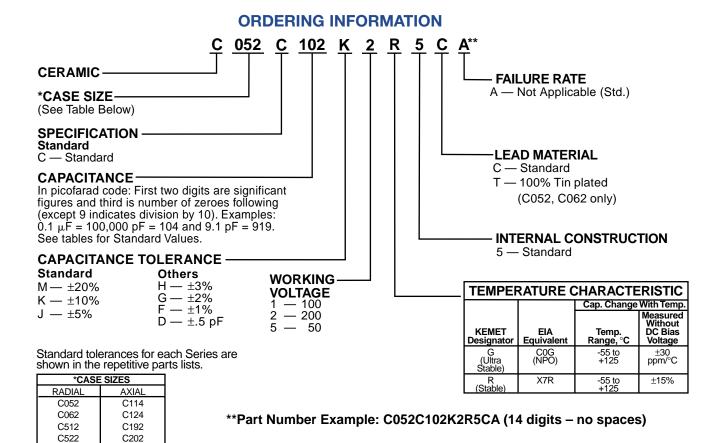
# CAPACITOR OUTLINE DRAWINGS — (RADIAL LEADS)



# **DIMENSIONS—INCHES & (MILLIMETERS)**

CASE SIZE	MILITARY EQUIVALENT STYLES	H HEIGHT	L LENGTH	W WIDTH	S LEAD SPACING
C052	CC05, CCR05 CK05, CKR05	.190 ± .010 (4.83 ± .25)	.190 ± .010 (4.83 ± .25)	.090 ± .010 (2.29 ± .25)	.200 ± .015 (5.08 ± .38)
C062	CC06, CCR06 CK06, CKR06	.290 ± .010 (7.37 ± .25)	.290 ± .010 (7.37 ± .25)	.090 ± .010 (2.29 ± .25)	.200 ± .015 (5.08 ± .38)
C512	CC07, CCR07	.480 ± .020 (12.19 ± .51)	.480 ± .020 (12.19 ± .51)	.140 ± .010 (3.56 ± .25)	.400 ± .020 (10.16 ± .51)
C522	CC08, CCR08	.480 ± .020 (12.19 ± .51)	.480 ± .020 (12.19 ± .51)	.240 ± .010 (6.10 ± .25)	.400 ± .020 (10.16 ± .51)

C222



#### **AXIAL CAPACITOR MARKING**

STANDARD C114C, C124C, C192C, C202C & C222C

KCOG	KEMET, Temperature Characteristic
101J	Capacitance, Capacitance Tolerance
200V	Voltage
0512	——Date Code
	24.0 0040

#### RADIAL CAPACITOR MARKING

#### C052C & C062C STANDARD MARKING

	FRONT	BACK	
Style———	C062	100V	Voltage
Temperature Characteristic————	X7R	K	KEMET
Capacitance, Capacitance Tolerance————	104K	0511	Date Code

#### C512 & C522 STANDARD MARKING

KEMET	KEMET
C512X7R	SIZE and Temperature Characteristic
105K 50V	Capacitance, Capacitance Tolerance, Voltage
0532	———Date Code

22

# **CERAMIC MOLDED/AXIAL - STANDARD**

ULTRA-STABLE TEMPERATURE CHARACTERISTIC—COG (NPO)



CAPACITANCE	KEMET
pF	PART NUMBER
200 VOLT — C	114 STANDARD COG
1.0	C114C109( <u>1</u> )2G5CA
1.5	C114C159( <u>1</u> )2G5CA
2.2	C114C229( <u>1</u> )2G5CA
2.7 3.3	C114C279( <u>1</u> )2G5CA
3.3	C114C339( <u>1</u> )2G5CA C114C399( <u>1</u> )2G5CA
4.7	C114C479(1)2G5CA
5.6	C114C569( <u>1</u> )2G5CA
6.8	C114C689( <u>1</u> )2G5CA
8.2	C114C829( <u>1</u> )2G5CA
10.0	C114C100( <u>2</u> )2G5CA
12.0	C114C120( <u>2</u> )2G5CA
15.0	C114C150( <u>2</u> )2G5CA
18.0	C114C180( <u>2</u> )2G5CA
22.0	C114C220( <u>2</u> )2G5CA
27.0	C114C270( <u>3</u> )2G5CA
33.0 39.0	C114C330( <u>3</u> )2G5CA C114C390(3)2G5CA
47.0	C114C390( <u>3</u> )2G5CA C114C470( <u>3</u> )2G5CA
56.0	C114C560( <u>4</u> )2G5CA
68.0	C114C680(4)2G5CA
82.0	C114C820(4)2G5CA
100.0	C114C101(4)2G5CA
120.0	C114C121(4)2G5CA
150.0	C114C151( <u>4</u> )2G5CA
180.0	C114C181( <u>4</u> )2G5CA
220.0	C114C221( <u>4</u> )2G5CA
270.0	C114C271(4)2G5CA
330.0	C114C331(4)2G5CA
	114 STANDARD COG
82.0 100.0	C114C820( <u>4</u> )1G5CA
120.0	C114C101( <u>4</u> )1G5CA C114C121( <u>4</u> )1G5CA
150.0	C114C121(4)1G5CA C114C151(4)1G5CA
180.0	C114C181(4)1G5CA C114C181(4)1G5CA
220.0	C114C161( <u>4</u> )1G5CA C114C221( <u>4</u> )1G5CA
270.0	C114C2Z1(4)1G5CA C114C271(4)1G5CA
330.0	C114C331(4)1G5CA
390.0	C114C391( <u>4</u> )1G5CA
470.0	C114C471(4)1G5CA
560.0	C114C561(4)1G5CA
680.0	
680.0	C114C681( <u>4</u> )1G5CA

CAPACITANCE pF	KEMET PART NUMBER
•	124 STANDARD COG
390.0	C124C391(4)2G5CA
470.0	C124C471(4)2G5CA
560.0	C124C561(4)2G5CA
100 VOLT — C	124 STANDARD COG
820.0	C124C821(4)1G5CA
1,000.0	C124C102(4)1G5CA
200 VOLT — C	192 STANDARD COG
680.0	C192C681( <u>4</u> )2G5CA
820.0	C192C821( <u>4</u> )2G5CA
1,000.0	C192C102(4)2G5CA
1,200.0	C192C122( <u>4</u> )2G5CA
1,500.0	C192C152( <u>4</u> )2G5CA
1,800.0	C192C182(4)2G5CA
2,200.0 2,700.0	C192C222( <u>4</u> )2G5CA C192C272( <u>4</u> )2G5CA
3.300.0	C192C272(4)2G5CA C192C332(4)2G5CA
3,900.0	C192C392(4)2G5CA
4,700.0	C192C472(4)2G5CA
	192 STANDARD COG
1,200.0	C192C122(4)1G5CA
1,500.0	C192C152(4)1G5CA
1,800.0	C192C182(4)1G5CA
2,200.0	C192C222(4)1G5CA
2,700.0	C192C272(4)1G5CA
3,300.0	C192C332(4)1G5CA
3,900.0	C192C392(4)1G5CA
4,700.0	C192C472(4)1G5CA
5,600.0	C192C562(4)1G5CA
6,800.0	C192C682(4)1G5CA
8,200.0	C192C822(4)1G5CA

NOTE 1: Insert proper symbol for capacitance tolerance as follows:

- (1) 1.0 pF to 8.2 pF: D— ±.5 pF

- (2) 10.0 pF to 22 pF: J $\pm$  ±5%, K $\pm$  10% (3) 27.0 pF to 47 pF: G $\pm$  ±2%, J $\pm$  ±5%, K $\pm$  ±10% (4) 56.0 pF and up: F $\pm$  1%, G $\pm$  ±2%, J $\pm$  ±5%, K $\pm$  ±10%

CAPACITANCE	KEMET
pF	PART NUMBER
200 VOLT — C	202 STANDARD COG
5,600.0	C202C562( <u>4</u> )2G5CA
6,800.0	C202C682( <u>4</u> )2G5CA
8,200.0	C202C822( <u>4</u> )2G5CA
10,000.0	C202C103( <u>4</u> )2G5CA
12,000.0	C202C123( <u>4</u> )2G5CA
15,000.0	C202C153( <u>4</u> )2G5CA
18,000.0	C202C183( <u>4</u> )2G5CA
22,000.0	C202C223( <u>4</u> )2G5CA
100 VOLT — C	202 STANDARD COG
10,000.0	C202C103( <u>4</u> )1G5CA
12,000.0	C202C123( <u>4</u> )1G5CA
15,000.0	C202C153( <u>4</u> )1G5CA
18,000.0	C202C183( <u>4</u> )1G5CA
22,000.0	C202C223( <u>4</u> )1G5CA
27,000.0	C202C273( <u>4</u> )1G5CA
33,000.0	C202C333( <u>4</u> )1G5CA
200 VOLT — C	222 STANDARD COG
27,000.0	C222C273( <u>4</u> )2G5CA
33,000.0	C222C333( <u>4</u> )2G5CA
39,000.0	C222C393( <u>4</u> )2G5CA
47,000.0	C222C473( <u>4</u> )2G5CA
100 VOLT — C	222 STANDARD COG
39,000.0	C222C393( <u>4</u> )1G5CA
47,000.0	C222C473( <u>4</u> )1G5CA
56,000.0	C222C563( <u>4</u> )1G5CA
68,000.0	C222C683( <u>4</u> )1G5CA
82,000.0	C222C823( <u>4</u> )1G5CA
100,000.0	C222C104( <u>4</u> )1G5CA
	umbal for capacitance talerance as

NOTE 1: Insert proper symbol for capacitance tolerance as follows:

- (1) 1.0 pF to 8.2 pF: D— ±.5 pF

- (2) 10.0 pF to 22 pF:  $J = \pm 5\%$ ,  $K = \pm 10\%$ (3) 27.0 pF to 47 pF:  $G = \pm 2\%$ ,  $J = \pm 5\%$ ,  $K = \pm 10\%$ (4) 56.0 pF and up:  $F = \pm 1\%$ ,  $G = \pm 2\%$ ,  $J = \pm 5\%$ ,  $K = \pm 10\%$

- NOTE 1: Insert proper symbol for capacitance tolerance as follows:

  - (1) 1.0 pF to 8.2 pF: D— ±.5 pF (2) 10.0 pF to 22 pF: J— ±5%, K— ±10% (3) 27.0 pF to 47 pF: G— ±2%, J— ±5%, K— ±10% (4) 56.0 pF and up: F— ±1%,G— ±2%, J— ±5%, K— ±10%



# **CERAMIC MOLDED/RADIAL - STANDARD** ULTRA-STABLE TEMPERATURE CHARACTERISTIC—COG (NPO)

CAPACITANCE	KEMET
pF	PART NUMBER
200 VOLT -	- C052 SIZE C0G
1.0	C052C109( <u>1</u> )2G5CA
1.5	C052C159( <u>1</u> )2G5CA
2.2	C052C229( <u>1</u> )2G5CA C052C279(1)2G5CA
2.7 3.3	C052C279( <u>1</u> )2G5CA C052C339( <u>1</u> )2G5CA
3.9	C052C399(1)2G5CA
4.7	C052C479(1)2G5CA
5.6	C052C569( <u>1</u> )2G5CA
6.8	C052C689( <u>1</u> )2G5CA
8.2	C052C829( <u>1</u> )2G5CA
10.0	C052C100( <u>2</u> )2G5CA
12.0 15.0	C052C120( <u>2</u> )2G5CA C052C150( <u>2</u> )2G5CA
18.0	C052C130( <u>2</u> )2G5CA C052C180( <u>2</u> )2G5CA
22.0	C052C220(2)2G5CA
27.0	C052C270(3)2G5CA
33.0	C052C330( <u>3</u> )2G5CA
39.0	C052C390( <u>3</u> )2G5CA
47.0	C052C470( <u>3</u> )2G5CA
56.0	C052C560( <u>4</u> )2G5CA
68.0 82.0	C052C680( <u>4</u> )2G5CA C052C820( <u>4</u> )2G5CA
100.0	C052C020( <u>4</u> )2G5CA C052C101(4)2G5CA
120.0	C052C121(4)2G5CA
150.0	C052C151(4)2G5CA
180.0	C052C181(4)2G5CA
220.0	C052C221( <u>4</u> )2G5CA
270.0	C052C271( <u>4</u> )2G5CA
330.0	C052C331( <u>4</u> )2G5CA C052C391( <u>4</u> )2G5CA
390.0 470.0	C052C391( <u>4</u> )2G5CA C052C471( <u>4</u> )2G5CA
560.0	C052C561(4)2G5CA
680.0	C052C681(4)2G5CA
820.0	C052C821( <u>4</u> )2G5CA
1,000.0	C052C102(4)2G5CA
1,200.0	C052C122( <u>4</u> )2G5CA
1,500.0	C052C152( <u>4</u> )2G5CA
1,800.0 2,200.0	C052C182( <u>4</u> )2G5CA C052C222( <u>4</u> )2G5CA
2,700.0	C052C272( <u>4</u> )2G5CA
100 VOLT -	- C052 SIZE C0G
390.0	C052C391( <u>4</u> )1G5CA
470.0	C052C471( <u>4</u> )1G5CA
560.0	C052C561(4)1G5CA
680.0	C052C681( <u>4</u> )1G5CA
820.0	C052C821( <u>4</u> )1G5CA
1,000.0 1,200.0	C052C102( <u>4</u> )1G5CA C052C122( <u>4</u> )1G5CA
1,500.0	C052C122(4)1G5CA C052C152(4)1G5CA
1,800.0	C052C182( <u>4</u> )1G5CA
2,200.0	C052C222( <u>4</u> )1G5CA
2,700.0	C052C272(4)1G5CA
3,300.0	C052C332(4)1G5CA
3,900.0	C052C392( <u>4</u> )1G5CA
4,700.0	C052C472( <u>4</u> )1G5CA

NOTE 1: Insert proper symbol for capacitance tolerance as follows:

- (1) 1.0 pF to 8.2 pF: D— ±.5 pF (2) 10.0 pF to 22 pF: J— ±5%, K— ±10% (3) 27.0 pF to 47 pF: G— ±2%, J— ±5%, K— ±10% (4) 56.0 pF and up: F— ±1%,G— ±2%, J— ±5%, K— ±10%

CAPACITANCE	KEMET
pF PART NUMBER	
200 VOLT	- C062 SIZE C0G
3,300.0	C062C332( <u>4</u> )2G5CA
3,900.0	C062C392( <u>4</u> )2G5CA
4,700.0	C062C472( <u>4</u> )2G5CA
5,600.0	C062C562(4)2G5CA
6,800.0	C062C682( <u>4</u> )2G5CA
8,200.0	C062C822( <u>4</u> )2G5CA
10,000.0	C062C103(4)2G5CA
100 VOLT	— C062 SIZE C0G
5,600.0	C062C562( <u>4</u> )1G5CA
6,800.0	C062C682( <u>4</u> )1G5CA
8,200.0	C062C822(4)1G5CA
10,000.0 12,000.0	C062C103( <u>4</u> )1G5CA
15,000.0	C062C123( <u>4</u> )1G5CA C062C153(4)1G5CA
18,000.0	C062C133(4)1G5CA C062C183(4)1G5CA
22,000.0	C062C163(4)1G5CA C062C223(4)1G5CA
200 VOLT	— C512 SIZE C0G
12.000.0	C512C123(4)2G5CA
15,000.0	C512C153( <u>4</u> )2G5CA
18,000.0	C512C183( <u>4</u> )2G5CA
22,000.0	C512C223(4)2G5CA
27,000.0	C512C273(4)2G5CA
33,000.0	C512C333( <u>4</u> )2G5CA
39,000.0	C512C393(4)2G5CA
47,000.0	C512C473(4)2G5CA
56,000.0	C512C563( <u>4</u> )2G5CA
68,000.0	C512C683(4)2G5CA
100 VOLT	— C512 SIZE C0G
27,000.0	C512C273(4)1G5CA
33,000.0	C512C333( <u>4</u> )1G5CA
39,000.0	C512C393(4)1G5CA
47,000.0	C512C473( <u>4</u> )1G5CA
56,000.0	C512C563( <u>4</u> )1G5CA
68,000.0	C512C683( <u>4</u> )1G5CA
82,000.0	C512C823( <u>4</u> )1G5CA
100,000.0	C512C104( <u>4</u> )1G5CA
200 VOLT	— C522 SIZE COG
82,000.0	C522C823( <u>4</u> )2G5CA
100,000.0	C522C104( <u>4</u> )2G5CA
100 VOLT	— C522 SIZE COG
120,000.0	C522C124( <u>4</u> )1G5CA
150,000.0 180,000.0	C522C154( <u>4</u> )1G5CA C522C184( <u>4</u> )1G5CA
160,000.0	03220164( <u>4</u> )1G30A

NOTE 1: Insert proper symbol for capacitance tolerance as follows:

- (1) 1.0 pF to 8.2 pF: D- ±.5 pF

- (2) 10.0 pF to 22 pF:  $J = \pm 5\%$ ,  $K = \pm 10\%$ (3) 27.0 pF to 47 pF:  $G = \pm 2\%$ ,  $J = \pm 5\%$ ,  $K = \pm 10\%$ (4) 56.0 pF and up:  $F = \pm 1\%$ ,  $G = \pm 2\%$ ,  $J = \pm 5\%$ ,  $K = \pm 10\%$

# Ceramic Molded kial/Radial - Standard

# CERAMIC MOLDED/AXIAL - STANDARD

STABLE TEMPERATURE CHARACTERISTIC—X7R



CAPACI-		
TANCE pF	TOL.	KEMET PART NUMBER
	0 VOLT	Г — C114 SIZE
10	10	C114C100K1R5CA
10	20	C114C100M1R5CA
12	10	C114C120K1R5CA
15	10	C114C150K1R5CA
15	20	C114C150M1R5CA
18	10	C114C180K1R5CA
22 22	20 10	C114C220K1R5CA C114C220M1R5CA
22 27	10	C114C2Z0W1R5CA C114C270K1R5CA
33	10	C114C330K1R5CA
33	20	C114C330M1R5CA
39	10	C114C390K1R5CA
47	10	C114C470K1R5CA
47	20	C114C470M1R5CA
56	10	C114C560K1R5CA
68 68	10 20	C114C680K1R5CA C114C680M1R5CA
82	10	C114C880K1R5CA
100	10	C114C101K1R5CA
100	20	C114C101M1R5CA
120	10	C114C121K1R5CA
150	10	C114C151K1R5CA
150	20	C114C151M1R5CA
180	10	C114C181K1R5CA
220	10	C114C221K1R5CA
220 270	20 10	C114C221M1R5CA C114C271K1R5CA
330	10	C114C331K1R5CA
330	20	C114C331M1R5CA
390	10	C114C391K1R5CA
470	10	C114C471K1R5CA
470	20	C114C471M1R5CA
560	10	C114C561K1R5CA
680	10	C114C681K1R5CA
680 820	20 10	C114C681M1R5CA C114C821K1R5CA
1,000	10	C114C102K1R5CA
1,000	20	C114C102M1R5CA
1,200	10	C114C122K1R5CA
1,500	10	C114C152K1R5CA
1,500	20	C114C152M1R5CA
1,800	10	C114C182K1R5CA
2,200	10 20	C114C222K1R5CA
2,200 2,700	10	C114C222M1R5CA C114C272K1R5CA
3,300	10	C114C332K1R5CA
3,300	20	C114C332M1R5CA
3,900	10	C114C392K1R5CA
4,700	10	C114C472K1R5CA
4,700	20	C114C472M1R5CA
50	VOLT	— C114 SIZE
5,600	10	C114C562K5R5CA
6,800	10	C114C682K5R5CA
6,800	20	C114C682M5R5CA
0 200	1 10	C114C000KEDECA

8,200

10,000

10,000

10

10

20

C114C822K5R5CA

C114C103K5R5CA

C114C103M5R5CA

TANCE   FART NUMBER	CARACI				
Tob   Volt	CAPACI-				
5,600         10         C124C562K1R5CA           6,800         10         C124C682K1R5CA           6,800         20         C124C682M1R5CA           8,200         10         C124C822K1R5CA           10,000         10         C124C103K1R5CA           10,000         20         C124C103M1R5CA           50 VOLT — C124 SIZE           12,000         10         C124C153K5R5CA           15,000         20         C124C153M5R5CA           15,000         10         C124C153M5R5CA           15,000         20         C124C183K5R5CA           15,000         10         C124C223K5R5CA           22,000         10         C124C223K5R5CA           22,000         20         C124C233K5R5CA           22,000         20         C124C233K5R5CA           27,000         10         C124C233K5R5CA           33,000         20         C124C333K5R5CA           47,000         10         C124C333K5R5CA           47,000         10         C124C33K5R5CA           47,000         10         C124C473M5R5CA           15,000         10         C192C13K1R5CA           15,000         10         C192C153K1R5CA <th></th> <th>%</th> <th>PART NUMBER</th>		%	PART NUMBER		
6,800	10	0 VOLT	— C124 SIZE		
6,800   20		10	C124C562K1R5CA		
8,200         10         C124C822K1R5CA           10,000         10         C124C103K1R5CA           10,000         20         C124C103M1R5CA           50 VOLT         C124 SIZE           12,000         10         C124C123K5R5CA           15,000         20         C124C153M5R5CA           15,000         20         C124C183K5R5CA           18,000         10         C124C223K5R5CA           22,000         20         C124C223M5R5CA           22,000         10         C124C23M5R5CA           27,000         10         C124C233M5R5CA           27,000         10         C124C333K5R5CA           33,000         20         C124C333K5R5CA           33,000         10         C124C333K5R5CA           47,000         10         C124C33K5R5CA           47,000         10         C124C333K5R5CA           47,000         10         C124C33K5R5CA           47,000         10         C124C33K5R5CA           47,000         10         C124C33K5R5CA           47,000         10         C192C13K1R5CA           15,000         10         C192C13K1R5CA           20,000         10         C192C223K1R5CA </td <td></td> <td></td> <td></td>					
10,000   10					
T0,000         20         C124C103M1R5CA           50 VOLT — C124 SIZE           12,000         10         C124C123K5R5CA           15,000         10         C124C153K5R5CA           15,000         20         C124C153M5R5CA           18,000         10         C124C23K5R5CA           22,000         20         C124C223M5R5CA           22,000         20         C124C223M5R5CA           22,000         10         C124C233M5R5CA           33,000         10         C124C333M5R5CA           33,000         10         C124C333K5R5CA           33,000         10         C124C333K5R5CA           47,000         10         C124C473K5R5CA           47,000         10         C124C473K5R5CA           47,000         10         C192C123K1R5CA           15,000         10         C192C123K1R5CA           15,000         10         C192C153M1R5CA           15,000         10         C192C123M1R5CA           22,000         20         C192C223M1R5CA           22,000         10         C192C223M1R5CA           27,000         10         C192C223M1R5CA           33,000         20					
12,000					
12,000					
15,000					
15,000   20					
18,000         10         C124C183K5R5CA           22,000         10         C124C223K5R5CA           22,000         20         C124C223M5R5CA           27,000         10         C124C223M5R5CA           33,000         10         C124C233M5R5CA           33,000         20         C124C333M5R5CA           33,000         10         C124C333K5R5CA           47,000         10         C124C473K5R5CA           47,000         20         C124C473M5R5CA           47,000         10         C192C123K1R5CA           47,000         10         C192C123K1R5CA           15,000         10         C192C153K1R5CA           15,000         10         C192C153K1R5CA           15,000         20         C192C153K1R5CA           22,000         10         C192C23M1R5CA           22,000         20         C192C23M1R5CA           27,000         10         C192C23M1R5CA           33,000         10         C192C33M1R5CA           33,000         10         C192C33M1R5CA           33,000         10         C192C33M1R5CA           47,000         10         C192C33M1R5CA           47,000         10					
22,000         10         C124C223K5R5CA           22,000         20         C124C223M5R5CA           27,000         10         C124C223K5R5CA           33,000         10         C124C333K5R5CA           33,000         20         C124C333M5R5CA           39,000         10         C124C393K5R5CA           47,000         10         C124C473K5R5CA           47,000         20         C124C473M5R5CA           47,000         20         C192C123K1R5CA           15,000         10         C192C153M1R5CA           15,000         10         C192C153M1R5CA           15,000         20         C192C153M1R5CA           15,000         20         C192C133K1R5CA           22,000         10         C192C223K1R5CA           22,000         20         C192C223M1R5CA           27,000         10         C192C223M1R5CA           33,000         10         C192C233M1R5CA           33,000         10         C192C33M1R5CA           47,000         10         C192C33K1R5CA           47,000         10         C192C473K1R5CA           47,000         20         C192C473M1R5CA           47,000         20 <td></td> <td></td> <td></td>					
22,000         20         C124C223M5R5CA           27,000         10         C124C273K5R5CA           33,000         10         C124C333K5R5CA           33,000         20         C124C333M5R5CA           39,000         10         C124C333M5R5CA           47,000         10         C124C473K5R5CA           47,000         20         C124C473M5R5CA           T00 VOLT — C192 SIZE           12,000         10         C192C123K1R5CA           15,000         10         C192C153K1R5CA           15,000         20         C192C153K1R5CA           15,000         10         C192C153K1R5CA           22,000         10         C192C23K1R5CA           22,000         10         C192C223K1R5CA           22,000         20         C192C223K1R5CA           27,000         10         C192C23M1R5CA           33,000         10         C192C233K1R5CA           33,000         10         C192C33K1R5CA           47,000         10         C192C33K1R5CA           47,000         10         C192C473M1R5CA           47,000         20         C192C473M1R5CA           68,000         10         C192C683K1R5CA					
33,000         10         C124C333K5R5CA           33,000         20         C124C333M5R5CA           39,000         10         C124C333M5R5CA           47,000         10         C124C473K5R5CA           47,000         20         C124C473M5R5CA           12,000         10         C192C123K1R5CA           15,000         10         C192C123K1R5CA           15,000         20         C192C153M1R5CA           15,000         20         C192C183K1R5CA           22,000         10         C192C223K1R5CA           22,000         10         C192C223K1R5CA           27,000         10         C192C223K1R5CA           27,000         10         C192C223K1R5CA           27,000         10         C192C23M1R5CA           33,000         20         C192C33K1R5CA           33,000         20         C192C33K1R5CA           47,000         10         C192C33K1R5CA           47,000         10         C192C473K1R5CA           47,000         20         C192C683K1R5CA           68,000         10         C192C563K1R5CA           68,000         10         C192C683K5R5CA           68,000					
33,000   20	27,000	10	C124C273K5R5CA		
39,000 10 C124C393K5R5CA 47,000 10 C124C473K5R5CA 47,000 20 C124C473M5R5CA  100 VOLT — C192 SIZE  12,000 10 C192C123K1R5CA 15,000 20 C192C153M1R5CA 18,000 10 C192C153M1R5CA 22,000 10 C192C153M1R5CA 22,000 10 C192C23K1R5CA 22,000 10 C192C23K1R5CA 22,000 10 C192C23M1R5CA 27,000 10 C192C23M1R5CA 33,000 10 C192C33M1R5CA 33,000 10 C192C33M1R5CA 33,000 10 C192C33M1R5CA 47,000 10 C192C33M1R5CA 47,000 10 C192C33M1R5CA 47,000 10 C192C33M1R5CA 47,000 10 C192C33M1R5CA 47,000 10 C192C33M1R5CA 68,000 10 C192C473M1R5CA 68,000 10 C192C473M1R5CA 68,000 10 C192C563K1R5CA 68,000 10 C192C683M1R5CA 100,000 10 C192C683M1R5CA 100,000 10 C192C104K1R5CA 100,000 10 C192C104M1R5CA 82,000 10 C192C104M1R5CA 82,000 10 C192C683M5R5CA 68,000 20 C192C683M5R5CA 68,000 20 C192C683M5R5CA 100,000 10 C192C683K5R5CA 100,000 10 C192C683M5R5CA 100,000 10 C192C104K5R5CA 100,000 10 C192C104K5R5CA 100,000 10 C192C124K5R5CA 100,000 10 C192C154K5R5CA 150,000 10 C192C154M5R5CA 150,000 10 C192C154M5R5CA 180,000 10 C192C224K5R5CA 220,000 10 C192C224K5R5CA	33,000	10	C124C333K5R5CA		
47,000         10         C124C473K5R5CA           47,000         20         C124C473M5R5CA           100 VOLT — C192 SIZE           12,000         10         C192C123K1R5CA           15,000         10         C192C153K1R5CA           15,000         20         C192C153K1R5CA           15,000         10         C192C153K1R5CA           22,000         10         C192C223K1R5CA           22,000         20         C192C223K1R5CA           27,000         10         C192C233K1R5CA           33,000         10         C192C333K1R5CA           33,000         10         C192C333K1R5CA           33,000         10         C192C333K1R5CA           33,000         10         C192C333K1R5CA           47,000         10         C192C33K1R5CA           47,000         10         C192C33K1R5CA           68,000         10         C192C563K1R5CA           68,000         10         C192C683K1R5CA           68,000         20         C192C683K5R5CA           68,000         10         C192C663K5R5CA           68,000         10         C192C663K5R5CA           68,000         20         C192C663K5R	33,000	20	C124C333M5R5CA		
47,000         20         C124C473M5R5CA           100 VOLT         C192 SIZE           12,000         10         C192C123K1R5CA           15,000         10         C192C153K1R5CA           15,000         20         C192C153M1R5CA           15,000         10         C192C183K1R5CA           22,000         10         C192C223K1R5CA           22,000         20         C192C223M1R5CA           27,000         10         C192C233K1R5CA           33,000         10         C192C333K1R5CA           33,000         20         C192C333M1R5CA           39,000         10         C192C333K1R5CA           47,000         10         C192C333K1R5CA           47,000         10         C192C33K1R5CA           47,000         10         C192C33K1R5CA           47,000         10         C192C33K1R5CA           68,000         10         C192C563K1R5CA           68,000         10         C192C683M1R5CA           82,000         10         C192C683K1R5CA           68,000         20         C192C104K1R5CA           56,000         10         C192C563K5R5CA           68,000         20         C192C683K		10			
100 VOLT — C192 SIZE					
12,000         10         C192C123K1R5CA           15,000         10         C192C153K1R5CA           15,000         20         C192C153M1R5CA           18,000         10         C192C153M1R5CA           22,000         10         C192C223K1R5CA           22,000         20         C192C223M1R5CA           27,000         10         C192C233K1R5CA           27,000         10         C192C333K1R5CA           33,000         20         C192C333M1R5CA           39,000         10         C192C333K1R5CA           47,000         10         C192C473K1R5CA           47,000         10         C192C473K1R5CA           47,000         20         C192C473M1R5CA           56,000         10         C192C563K1R5CA           68,000         20         C192C683M1R5CA           82,000         10         C192C823K1R5CA           68,000         20         C192C104K1R5CA           100,000         20         C192C104K1R5CA           68,000         10         C192C563K5R5CA           68,000         10         C192C563K5R5CA           68,000         10         C192C563M5R5CA           68,000         10<	47,000	20	C124C473M5R5CA		
15,000         10         C192C153K1R5CA           15,000         20         C192C153M1R5CA           18,000         10         C192C153M1R5CA           22,000         10         C192C223K1R5CA           22,000         20         C192C223M1R5CA           27,000         10         C192C233K1R5CA           33,000         10         C192C333K1R5CA           33,000         20         C192C333M1R5CA           39,000         10         C192C333K1R5CA           47,000         10         C192C333K1R5CA           47,000         10         C192C33K1R5CA           47,000         20         C192C473K1R5CA           68,000         10         C192C563K1R5CA           68,000         10         C192C563K1R5CA           68,000         20         C192C683M1R5CA           100,000         10         C192C683K5R5CA           68,000         20         C192C104K1R5CA           56,000         10         C192C683K5R5CA           68,000         20         C192C683K5R5CA           68,000         10         C192C683K5R5CA           68,000         20         C192C683K5R5CA           100,000         10<		0 VOLT			
15,000         20         C192C153M1R5CA           18,000         10         C192C183K1R5CA           22,000         10         C192C223K1R5CA           22,000         20         C192C223M1R5CA           27,000         10         C192C223M1R5CA           33,000         10         C192C333K1R5CA           33,000         20         C192C333M1R5CA           39,000         10         C192C333K1R5CA           47,000         10         C192C473K1R5CA           47,000         20         C192C473M1R5CA           56,000         10         C192C563K1R5CA           68,000         20         C192C683M1R5CA           82,000         10         C192C683M1R5CA           100,000         20         C192C683K1R5CA           68,000         10         C192C823K1R5CA           68,000         10         C192C823K5R5CA           68,000         10         C192C104K1R5CA           68,000         10         C192C563K5R5CA           68,000         10         C192C563K5R5CA           68,000         20         C192C683M5R5CA           68,000         10         C192C563K5R5CA           100,000         10					
18,000         10         C192C183K1R5CA           22,000         10         C192C223K1R5CA           22,000         20         C192C223M1R5CA           27,000         10         C192C223M1R5CA           33,000         10         C192C233M1R5CA           33,000         20         C192C333M1R5CA           39,000         10         C192C333K1R5CA           47,000         10         C192C473K1R5CA           47,000         20         C192C473M1R5CA           56,000         10         C192C563K1R5CA           68,000         10         C192C683M1R5CA           68,000         10         C192C683K1R5CA           100,000         10         C192C683M1R5CA           47,000         20         C192C683K1R5CA           68,000         10         C192C683K5R5CA           68,000         10         C192C104K1R5CA           56,000         10         C192C563K5R5CA           68,000         20         C192C683K5R5CA           68,000         20         C192C683K5R5CA           68,000         20         C192C683K5R5CA           68,000         20         C192C683K5R5CA           100,000         10					
22,000         10         C192C223K1R5CA           22,000         20         C192C223M1R5CA           27,000         10         C192C223K1R5CA           33,000         10         C192C333K1R5CA           33,000         20         C192C333M1R5CA           39,000         10         C192C393K1R5CA           47,000         10         C192C473K1R5CA           47,000         20         C192C473K1R5CA           56,000         10         C192C563K1R5CA           68,000         10         C192C683K1R5CA           68,000         10         C192C683K1R5CA           100,000         10         C192C683K5R5CA           100,000         10         C192C104K1R5CA           68,000         10         C192C563K5R5CA           68,000         10         C192C563K5R5CA           68,000         10         C192C683K5R5CA           68,000         10         C192C683K5R5CA           82,000         10         C192C683K5R5CA           100,000         20         C192C683K5R5CA           100,000         10         C192C683K5R5CA           100,000         10         C192C683K5R5CA           100,000 <t< td=""><td></td><td></td><td></td></t<>					
22,000         20         C192C223M1R5CA           27,000         10         C192C273K1R5CA           33,000         10         C192C333K1R5CA           33,000         20         C192C333M1R5CA           39,000         10         C192C333K1R5CA           47,000         10         C192C473K1R5CA           47,000         20         C192C473M1R5CA           56,000         10         C192C563K1R5CA           68,000         20         C192C683M1R5CA           68,000         20         C192C683M1R5CA           82,000         10         C192C683M1R5CA           100,000         10         C192C104K1R5CA           56,000         10         C192C104K1R5CA           68,000         20         C192C104K1R5CA           68,000         10         C192C563K5R5CA           68,000         10         C192C563K5R5CA           68,000         20         C192C683K5R5CA           82,000         10         C192C683K5R5CA           100,000         20         C192C683K5R5CA           100,000         10         C192C104K5R5CA           100,000         10         C192C104K5R5CA           100,000 <td< td=""><td></td><td></td><td></td></td<>					
27,000         10         C192C273K1R5CA           33,000         10         C192C333K1R5CA           33,000         20         C192C333M1R5CA           39,000         10         C192C393K1R5CA           47,000         10         C192C473K1R5CA           47,000         20         C192C473M1R5CA           56,000         10         C192C563K1R5CA           68,000         20         C192C683K1R5CA           68,000         20         C192C683M1R5CA           82,000         10         C192C683K1R5CA           100,000         20         C192C104K1R5CA           100,000         20         C192C104M1R5CA           56,000         10         C192C563K5R5CA           68,000         20         C192C683K5R5CA           68,000         20         C192C683M5R5CA           68,000         20         C192C683K5R5CA           68,000         20         C192C683K5R5CA           100,000         10         C192C683K5R5CA           100,000         10         C192C683K5R5CA           100,000         10         C192C104K5R5CA           100,000         10         C192C104K5R5CA           100,000         <					
33,000         10         C192C333K1R5CA           33,000         20         C192C333M1R5CA           39,000         10         C192C333M1R5CA           47,000         10         C192C373K1R5CA           47,000         20         C192C473K1R5CA           56,000         10         C192C563K1R5CA           68,000         20         C192C683K1R5CA           68,000         20         C192C683M1R5CA           82,000         10         C192C823K1R5CA           100,000         20         C192C104K1R5CA           50 VOLT         C192 SIZE           56,000         10         C192C563K5R5CA           68,000         20         C192C683K5R5CA           68,000         20         C192C683K5R5CA           68,000         20         C192C683K5R5CA           48,000         10         C192C683K5R5CA           100,000         10         C192C683K5R5CA           100,000         10         C192C104K5R5CA           100,000         10         C192C104K5R5CA           100,000         10         C192C154K5R5CA           150,000         10         C192C154M5R5CA           150,000         10         C					
33,000 20 C192C333M1R5CA 39,000 10 C192C393K1R5CA 47,000 10 C192C473K1R5CA 47,000 20 C192C473M1R5CA 56,000 10 C192C683K1R5CA 68,000 20 C192C683M1R5CA 82,000 10 C192C683M1R5CA 100,000 20 C192C683M1R5CA 100,000 10 C192C33K1R5CA 100,000 20 C192C104K1R5CA 100,000 20 C192C104M1R5CA  50 VOLT — C192 SIZE  56,000 10 C192C563K5R5CA 68,000 10 C192C683M5R5CA 68,000 20 C192C683M5R5CA 68,000 10 C192C683K5R5CA 100,000 20 C192C104K5R5CA 100,000 10 C192C104K5R5CA 100,000 20 C192C104M5R5CA 120,000 10 C192C124K5R5CA 150,000 10 C192C154K5R5CA 150,000 10 C192C154K5R5CA 180,000 10 C192C154K5R5CA 220,000 10 C192C224K5R5CA 220,000 10 C192C224K5R5CA					
39,000 10 C192C393K1R5CA 47,000 10 C192C473K1R5CA 47,000 20 C192C473M1R5CA 56,000 10 C192C563K1R5CA 68,000 20 C192C683M1R5CA 82,000 10 C192C683M1R5CA 100,000 10 C192C823K1R5CA 100,000 20 C192C104K1R5CA 100,000 20 C192C104M1R5CA  50 VOLT — C192 SIZE  56,000 10 C192C563K5R5CA 68,000 10 C192C683M5R5CA 68,000 20 C192C683M5R5CA 68,000 10 C192C683K5R5CA 100,000 10 C192C683K5R5CA 100,000 10 C192C683K5R5CA 100,000 10 C192C104K5R5CA 100,000 10 C192C104K5R5CA 100,000 10 C192C124K5R5CA 150,000 10 C192C154K5R5CA 150,000 10 C192C154K5R5CA 180,000 10 C192C154K5R5CA 180,000 10 C192C184K5R5CA 220,000 10 C192C224K5R5CA					
47,000         10         C192C473K1R5CA           47,000         20         C192C473M1R5CA           56,000         10         C192C563K1R5CA           68,000         20         C192C683K1R5CA           68,000         20         C192C683M1R5CA           82,000         10         C192C823K1R5CA           100,000         10         C192C104K1R5CA           100,000         20         C192C104M1R5CA           50 VOLT         C192 SIZE           56,000         10         C192C563K5R5CA           68,000         10         C192C563K5R5CA           68,000         20         C192C683M5R5CA           82,000         10         C192C683M5R5CA           100,000         10         C192C683K5R5CA           100,000         10         C192C683K5R5CA           100,000         10         C192C104K5R5CA           120,000         10         C192C104K5R5CA           150,000         10         C192C124K5R5CA           150,000         10         C192C154K5R5CA           180,000         10         C192C154K5R5CA           220,000         10         C192C124K5R5CA           220,000         10         <					
47,000         20         C192C473M1R5CA           56,000         10         C192C563K1R5CA           68,000         10         C192C683K1R5CA           68,000         20         C192C683M1R5CA           82,000         10         C192C823K1R5CA           100,000         10         C192C104K1R5CA           100,000         20         C192C104M1R5CA           50 VOLT         C192 SIZE           56,000         10         C192C563K5R5CA           68,000         10         C192C683K5R5CA           68,000         20         C192C683K5R5CA           82,000         10         C192C683K5R5CA           100,000         10         C192C683K5R5CA           100,000         10         C192C104K5R5CA           120,000         10         C192C104K5R5CA           150,000         10         C192C124K5R5CA           150,000         20         C192C154M5R5CA           180,000         10         C192C154M5R5CA           220,000         10         C192C224K5R5CA           220,000         20         C192C224K5R5CA					
56,000         10         C192C563K1R5CA           68,000         10         C192C683K1R5CA           68,000         20         C192C683M1R5CA           82,000         10         C192C683M1R5CA           100,000         10         C192C104K1R5CA           100,000         20         C192C104M1R5CA           50 VOLT — C192 SIZE           56,000         10         C192C563K5R5CA           68,000         20         C192C683K5R5CA           68,000         20         C192C683K5R5CA           82,000         10         C192C683K5R5CA           100,000         10         C192C683K5R5CA           100,000         10         C192C683K5R5CA           100,000         10         C192C683K5R5CA           100,000         10         C192C104K5R5CA           120,000         10         C192C124K5R5CA           150,000         10         C192C154M5R5CA           180,000         10         C192C154M5R5CA           220,000         10         C192C224K5R5CA           220,000         20         C192C224M5R5CA					
68,000 10 C192C683K1R5CA 68,000 20 C192C683M1R5CA 82,000 10 C192C683M1R5CA 100,000 10 C192C104K1R5CA 100,000 20 C192C104M1R5CA  50 VOLT — C192 SIZE  56,000 10 C192C563K5R5CA 68,000 20 C192C683K5R5CA 68,000 20 C192C683K5R5CA 100,000 10 C192C683K5R5CA 100,000 10 C192C823K5R5CA 100,000 10 C192C104K5R5CA 100,000 20 C192C104M5R5CA 120,000 10 C192C124K5R5CA 150,000 10 C192C154K5R5CA 150,000 20 C192C154M5R5CA 180,000 10 C192C184K5R5CA 220,000 10 C192C224K5R5CA 220,000 10 C192C224K5R5CA					
82,000         10         C192C823K1R5CA           100,000         10         C192C104K1R5CA           100,000         20         C192C104M1R5CA           50 VOLT — C192 SIZE           56,000         10         C192C563K5R5CA           68,000         10         C192C683K5R5CA           68,000         20         C192C683M5R5CA           82,000         10         C192C6823K5R5CA           100,000         10         C192C104K5R5CA           100,000         20         C192C104M5R5CA           120,000         10         C192C124K5R5CA           150,000         10         C192C154K5R5CA           150,000         20         C192C154M5R5CA           180,000         10         C192C184K5R5CA           220,000         10         C192C224K5R5CA           220,000         20         C192C224K5R5CA		10	C192C683K1R5CA		
100,000         10         C192C104K1R5CA           100,000         20         C192C104M1R5CA           50 VOLT         C192 SIZE           56,000         10         C192C563K5R5CA           68,000         10         C192C683K5R5CA           68,000         20         C192C683M5R5CA           82,000         10         C192C6823K5R5CA           100,000         10         C192C104K5R5CA           100,000         20         C192C104M5R5CA           120,000         10         C192C124K5R5CA           150,000         20         C192C154K5R5CA           180,000         10         C192C184K5R5CA           220,000         10         C192C224K5R5CA           220,000         20         C192C224K5R5CA           220,000         20         C192C224M5R5CA	68,000	20	C192C683M1R5CA		
100,000         20         C192C104M1R5CA           50 VOLT         — C192 SIZE           56,000         10         C192C563K5R5CA           68,000         10         C192C683K5R5CA           68,000         20         C192C683M5R5CA           82,000         10         C192C323K5R5CA           100,000         10         C192C104K5R5CA           100,000         20         C192C104M5R5CA           120,000         10         C192C124K5R5CA           150,000         10         C192C154K5R5CA           180,000         10         C192C184K5R5CA           220,000         10         C192C224K5R5CA           220,000         20         C192C224M5R5CA	82,000	10			
50 VOLT         — C192 SIZE           56,000         10         C192C563K5R5CA           68,000         10         C192C683K5R5CA           68,000         20         C192C683M5R5CA           82,000         10         C192C823K5R5CA           100,000         10         C192C104K5R5CA           100,000         20         C192C104M5R5CA           120,000         10         C192C124K5R5CA           150,000         10         C192C154K5R5CA           150,000         20         C192C154M5R5CA           180,000         10         C192C184K5R5CA           220,000         10         C192C224K5R5CA           220,000         20         C192C224M5R5CA					
56,000 10 C192C563K5R5CA 68,000 10 C192C683K5R5CA 68,000 20 C192C683M5R5CA 82,000 10 C192C823K5R5CA 100,000 10 C192C104K5R5CA 100,000 20 C192C104M5R5CA 120,000 10 C192C124K5R5CA 150,000 10 C192C154K5R5CA 150,000 20 C192C154M5R5CA 180,000 10 C192C184K5R5CA 220,000 10 C192C224K5R5CA 220,000 20 C192C224M5R5CA	<u> </u>				
68,000 10 C192C683K5R5CA 68,000 20 C192C683M5R5CA 82,000 10 C192C823K5R5CA 100,000 10 C192C104K5R5CA 100,000 20 C192C104M5R5CA 120,000 10 C192C124K5R5CA 150,000 10 C192C154K5R5CA 150,000 20 C192C154M5R5CA 180,000 10 C192C184K5R5CA 220,000 10 C192C224K5R5CA 220,000 20 C192C224M5R5CA					
68,000 20 C192C683M5R5CA 82,000 10 C192C823K5R5CA 100,000 10 C192C104K5R5CA 100,000 20 C192C104M5R5CA 120,000 10 C192C124K5R5CA 150,000 20 C192C154K5R5CA 180,000 10 C192C154K5R5CA 220,000 10 C192C224K5R5CA 220,000 20 C192C224M5R5CA					
82,000 10 C192C823K5R5CA 100,000 10 C192C104K5R5CA 100,000 20 C192C104M5R5CA 120,000 10 C192C124K5R5CA 150,000 20 C192C154K5R5CA 150,000 20 C192C154M5R5CA 180,000 10 C192C184K5R5CA 220,000 10 C192C224K5R5CA 220,000 20 C192C224M5R5CA					
100,000         10         C192C104K5R5CA           100,000         20         C192C104M5R5CA           120,000         10         C192C124K5R5CA           150,000         10         C192C154K5R5CA           150,000         20         C192C154M5R5CA           180,000         10         C192C184K5R5CA           220,000         10         C192C224K5R5CA           220,000         20         C192C224M5R5CA					
100,000         20         C192C104M5R5CA           120,000         10         C192C124K5R5CA           150,000         10         C192C154K5R5CA           150,000         20         C192C154M5R5CA           180,000         10         C192C184K5R5CA           220,000         10         C192C224K5R5CA           220,000         20         C192C224M5R5CA					
120,000         10         C192C124K5R5CA           150,000         10         C192C154K5R5CA           150,000         20         C192C154M5R5CA           180,000         10         C192C184K5R5CA           220,000         10         C192C224K5R5CA           220,000         20         C192C224M5R5CA					
150,000 10 C192C154K5R5CA 150,000 20 C192C154M5R5CA 180,000 10 C192C184K5R5CA 220,000 10 C192C224K5R5CA 220,000 20 C192C224M5R5CA					
150,000 20 C192C154M5R5CA 180,000 10 C192C184K5R5CA 220,000 10 C192C224K5R5CA 220,000 20 C192C224M5R5CA					
180,000 10 C192C184K5R5CA 220,000 10 C192C224K5R5CA 220,000 20 C192C224M5R5CA					
220,000 20 C192C224M5R5CA			C192C184K5R5CA		
	220,000	10	C192C224K5R5CA		
270,000   10   C192C274K5R5CA					
	270,000	10	C192C274K5R5CA		

CAPACI- TANCE	TOL.	KEMET PART NUMBER		
pF				
10	0 VOLT			
56,000	10	C202C563K1R5CA		
68,000	10	C202C683K1R5CA		
68,000	20	C202C683M1R5CA		
82,000	10	C202C823K1R5CA		
100,000	10	C202C104K1R5CA		
100,000	20	C202C104M1R5CA		
120,000	10	C202C124K1R5CA		
150,000	10	C202C154K1R5CA		
150,000	20	C202C154M1R5CA		
180,000	10	C202C184K1R5CA		
220,000	10	C202C224K1R5CA		
220,000	20	C202C224M1R5CA		
270,000	10	C202C274K1R5CA		
330,000	10	C202C334K1R5CA		
330,000	20	C202C334M1R5CA		
50 VOLT — C202 SIZE				
470,000	10	C202C474K5R5CA		
470,000	20	C202C474M5R5CA		
680,000	10	C202C684K5R5CA		
680,000	20	C202C684M5R5CA		
1,000,000	10	C202C105K5R5CA		
1,000,000	20	C202C105M5R5CA		
10	0 VOLT	— C222 SIZE		
470,000	10	C222C474K1R5CA		
470,000	20	C222C474M1R5CA		
680,000	10	C222C684K1R5CA		
680,000	20	C222C684M1R5CA		
1,000,000	10	C222C105K1R5CA		
1,000,000	20	C222C105M1R5CA		
50	VOLT	— C222 SIZE		
2,200,000	10	C222C225K5R5CA		
2,200,000	20	C222C225M5R5CA		
3,300,000	10	C222C335K5R5CA		
3,300,000	20	C222C335M5R5CA		
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# **CERAMIC MOLDED/RADIAL - STANDARD**

STABLE TEMPERATURE CHARACTERISTIC—X7R

047401				
CAPACI- TANCE pF	TOL.	KEMET PART NUMBER		
20	0 VOLT	— C052 SIZE		
10	10	C052C100K2R5CA		
10	20	C052C100M2R5CA		
12	10	C052C120K2R5CA		
15	10	C052C150K2R5CA		
15	20	C052C150M2R5CA		
18	10	C052C180K2R5CA		
22	10	C052C220K2R5CA		
22	20	C052C220M2R5CA		
27	10	C052C270K2R5CA		
33	10	C052C330K2R5CA		
33	20	C052C330M2R5CA		
39	10	C052C390K2R5CA		
47	10	C052C470K2R5CA		
47	20	C052C470M2R5CA		
56	10	C052C560K2R5CA		
68	10	C052C680K2R5CA		
68	20	C052C680M2R5CA		
82	10	C052C820K2R5CA		
100 100	10 20	C052C101K2R5CA C052C101M2R5CA		
120	10	C052C101M2R5CA C052C121K2R5CA		
150	10	C052C121K2R5CA C052C151K2R5CA		
150	20	C052C151K2R5CA C052C151M2R5CA		
180	10	C052C131W2R3CA		
220	10	C052C101K2R5CA		
220	20	C052C221M2R5CA		
270	10	C052C271K2R5CA		
330	10	C052C331K2R5CA		
330	20	C052C331M2R5CA		
390	10	C052C391K2R5CA		
470	10	C052C471K2R5CA		
470	20	C052C471M2R5CA		
560	10	C052C561K2R5CA		
680	10	C052C681K2R5CA		
680	20	C052C681M2R5CA		
820	10	C052C821K2R5CA		
1,000	10	C052C102K2R5CA		
1,000	20	C052C102M2R5CA		

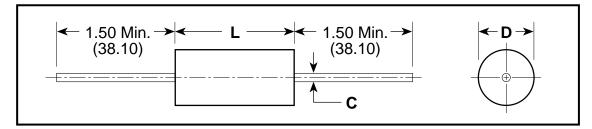
CADACI	CAPACI-			
TANCE	TOL.	KEMET PART NUMBER		
pF	0 VOLT			
1,200	10	C052C122K1R5CA		
1,500	10	C052C152K1R5CA		
1,500	20	C052C152K1R5CA C052C152M1R5CA		
1,800	10	C052C132M1R3CA		
2,200	10	C052C162K1R5CA		
2,200	20	C052C222K1R5CA C052C222M1R5CA		
2,700	10	C052C272K1R5CA		
3,300	10	C052C332K1R5CA		
3,300	20	C052C332M1R5CA		
3,900	10	C052C392K1R5CA		
4,700	10	C052C472K1R5CA		
4,700	20	C052C472M1R5CA		
5,600	10	C052C562K1R5CA		
6,800	10	C052C682K1R5CA		
6,800	20	C052C682M1R5CA		
8,200	10	C052C822K1R5CA		
10,000	10	C052C103K1R5CA		
10,000	20	C052C103M1R5CA		
50		— C052 SIZE		
12.000	10	C052C123K5R5CA		
15,000	10	C052C123K5R5CA		
15,000	20	C052C153M5R5CA		
18,000	10	C052C183K5R5CA		
22,000	10	C052C223K5R5CA		
22,000	20	C052C223M5R5CA		
27,000	10	C052C273K5R5CA		
33,000	10	C052C333K5R5CA		
33,000	20	C052C333M5R5CA		
39,000	10	C052C393K5R5CA		
47,000	10	C052C473K5R5CA		
47,000	20	C052C473M5R5CA		
56,000	10	C052C563K5R5CA		
68,000	10	C052C683K5R5CA		
68,000	20	C052C683M5R5CA		
82,000	10	C052C823K5R5CA		
100,000	10	C052C104K5R5CA		
100,000	20	C052C104M5R5CA		
20	0 VOLT	— C062 SIZE		
1,200	10	C062C122K2R5CA		
1,500	10	C062C152K2R5CA		
1,500	20	C062C152M2R5CA		
1,800	10	C062C182K2R5CA		
2,200	10	C062C222K2R5CA		
2,200	20	C062C222M2R5CA		
2,700	10	C062C272K2R5CA		
3,300	10	C062C332K2R5CA		
3,300	20	C062C332M2R5CA		
3,900	10	C062C392K2R5CA		
4,700	10	C062C472K2R5CA		
4,700	20	C062C472M2R5CA		
5,600	10	C062C562K2R5CA		
6,800	10	C062C682K2R5CA		
6,800	20	C062C682M2R5CA		
8,200	10	C062C822K2R5CA		
10,000	10	C062C103K2R5CA		
10,000	20	C062C103M2R5CA		

CAPACI-		
TANCE	TOL.	KEMET
pF	%	PART NUMBER
100 VOLT		— C062 SIZE
12,000	10	C062C123K1R5CA
15,000	10	C062C153K1R5CA
15,000	20	C062C153M1R5CA
18,000	10	C062C183K1R5CA
22,000 22,000	10 20	C062C223K1R5CA C062C223M1R5CA
27,000	10	C062C273K1R5CA
33,000	10	C062C333K1R5CA
33,000	20	C062C333M1R5CA
39,000	10	C062C393K1R5CA
47,000	10	C062C473K1R5CA
47,000	20	C062C473M1R5CA
56,000	10	C062C563K1R5CA
68,000	10 20	C062C683K1R5CA
68,000 82,000	10	C062C683M1R5CA C062C823K1R5CA
100,000	10	C062C104K1R5CA
100,000	20	C062C104M1R5CA
50		
120,000	10	C062C124K5R5CA
150,000	10	C062C154K5R5CA
150,000	20	C062C154M5R5CA
180,000	10	C062C184K5R5CA
220,000	10	C062C224K5R5CA
220,000	20	C062C224M5R5CA
270,000	10 10	C062C274K5R5CA C062C334K5R5CA
330,000 330,000	20	C062C334K5R5CA C062C334M5R5CA
390,000	10	C062C394K5R5CA
470,000	10	C062C474K5R5CA
470,000	20	C062C474M5R5CA
560,000	10	C062C564K5R5CA
680,000	10	C062C684K5R5CA
680,000	20	C062C684M5R5CA
820,000	10	C062C824K5R5CA
1,000,000	10 20	C062C105K5R5CA C062C105M5R5CA
<u> </u>		
1,000,000	10	— <b>C512 SIZE</b> C512C105K5X5CA
1,000,000	20	C512C105N5X5CA
1,500,000	10	C512C155K5X5CA
1,500,000	20	C512C155M5X5CA
2,000,000	10	C512C205K5X5CA
2,000,000	20	C512C205M5X5CA
2,200,000	10	C512C225K5X5CA
2,200,000	20	C512C225M5X5CA
10	VOLT	
1,000,000	10	C522C105K1X5CA
1,000,000	20	C522C105M1X5CA
50	VOLT	— C522 SIZE
2,700,000	10	C522C275K5X5CA
2,700,000	20	C522C275M5X5CA
3,300,000	10	C522C335K5X5CA
3,300,000	20	C522C335M5X5CA
		1

# CERAMIC MOLDED/AXIAL & RADIAL — MIL-PRF-20



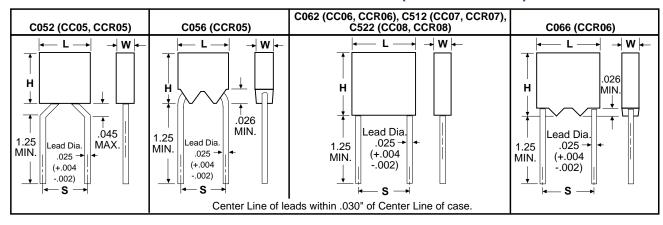
# **CAPACITOR OUTLINE DRAWINGS (AXIAL LEADS)**



### **DIMENSIONS — INCHES & (MILLIMETERS)**

CASE SIZE	MILITARY EQUIVALENT STYLES	L	D	С
C114	CC75, CCR75	.160 ± .010 (4.06 ± .25)	.090 ± .010 (2.29 ± .25)	.020, +.000,003 (.51, +.00,08)
C124	CC76, CCR76	.250 ± .010 (6.35 ± .25)	.090 ± .010 (2.29 ± .25)	.020, +.000,003 (.51, +.00,08)
C192	CC77, CCR77	.390 ± .010 (9.91 ± .25)	.140 ± .010 (3.56 ± .25)	.025, +.002,002 (.64, +.05,05)
C202	CC78, CCR78	.500 ± .020 (12.70 ± .51)	.250 ± .015 (6.35 ± .38)	.025, +.002,002 (.64, +.05,05)
C222	CC79, CCR79	.690 ± .030 (17.53 ± .76)	.350 ± .020 (8.89 ± .51)	.025, +.002,002 (.64, +.05,05)

#### **CAPACITOR OUTLINE DRAWINGS (RADIAL LEADS)**



 $<sup>^{\</sup>star}$  Leads are .625 minimum when tape and reel packaged

### **DIMENSIONS — INCHES & (MILLIMETERS)**

CASE SIZE	MILITARY EQUIVALENT STYLES	H HEIGHT	L LENGTH	W WIDTH	S LEAD SPACING
C052/ C056	CC05, CCR05	.190 ± .010 (4.83 ± .25)	.190 ± .010 (4.83 ± .25)	.090 ± .010 (2.29 ± .25)	.200 ± .015 (5.08 ± .38)
C062/ C066	CC06, CCR06	.290 ± .010 (7.37 ± .25)	.290 ± .010 (7.37 ± .25)	.090 ± .010 (2.29 ± .25)	.200 ± .015 (5.08 ± .38)
C512	CC07, CCR07	.480 ± .020 (12.19 ± .51)	.480 ± .020 (12.19 ± .51)	.140 ± .010 (3.56 ± .25)*	.400 ± .020 (10.16 ± .51)
C522	CC08, CCR08	.480 ± .020 (12.19 ± .51)	.480 ± .020 (12.19 ± .51)	.240 ± .010 (6.10 ± .25)	.400 ± .020 (10.16 ± .51)

<sup>\* 0.200 (5.08)</sup> maximum for 100,000 pF only.

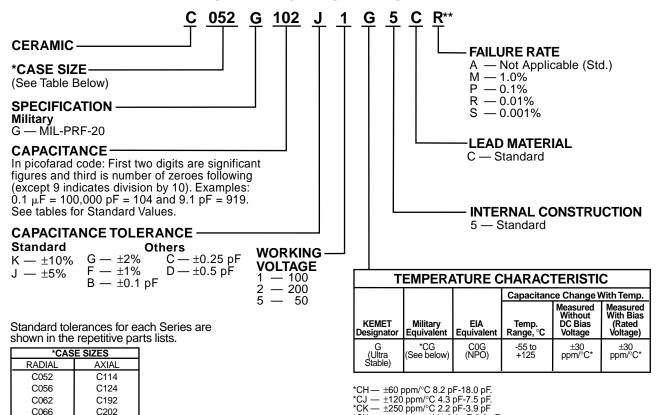
C066

C512

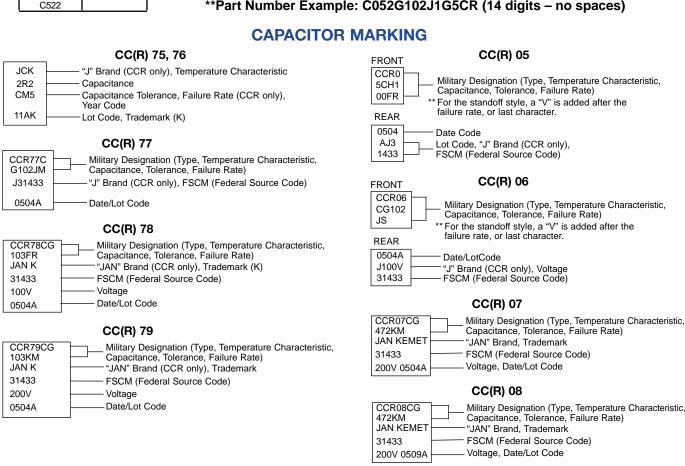
C202

C222

#### ORDERING INFORMATION



\*CX — not measurable 0.1 pF-2.0 pF. \*\*Part Number Example: C052G102J1G5CR (14 digits - no spaces)



28

# **CERAMIC MOLDED/AXIAL — MIL-PRF-20** ULTRA-STABLE TEMPERATURE CHARACTERISTIC — CG (EIA-COG)



CAP.	KEMET PART NUMBER	MILITARY STYLE	MILITARY STYLE CCR
Pi	200 VOLT — C114 (CC(R)75 PER MIL-PRF-20/27)		
1.0	C114G109(2)2G5C(1)	CC75CX1R0(2)	CCR75CX1R0(2)(1)
1.1	C114G109( <u>2</u> )2G5C( <u>1</u> ) C114G119(2)2G5C(1)	CC75CX1R0( <u>2</u> )	CCR75CX1R0( <u>2)(1)</u> CCR75CX1R1(2)(1)
1.2	( )	( – )	(, (,
1.3	C114G129( <u>2</u> )2G5C( <u>1</u> )	CC75CX1R2( <u>2</u> ) CC75CX1R3(2)	CCR75CX1R2( <u>2</u> )( <u>1</u> )
1.5	C114G139( <u>2</u> )2G5C( <u>1</u> )	( – )	CCR75CX1R3( <u>2</u> )( <u>1</u> )
1.6	C114G159( <u>2</u> )2G5C( <u>1</u> ) C114G169(2)2G5C(1)	CC75CX1R5( <u>2</u> ) CC75CX1R6( <u>2</u> )	CCR75CX1R5( <u>2</u> )( <u>1</u> ) CCR75CX1R6( <u>2</u> )( <u>1</u> )
1.8			CCR75CX1R8( <u>2</u> )( <u>1</u> )
2.0	C114G189( <u>2</u> )2G5C( <u>1</u> )	CC75CX1R8( <u>2</u> ) CC75CX2R0( <u>2</u> )	
	C114G209( <u>2</u> )2G5C( <u>1</u> )		CCR75CX2R0( <u>2</u> )( <u>1</u> ) CCR75CK2R2( <u>2</u> )( <u>1</u> )
2.2	C114G229( <u>2</u> )2G5C( <u>1</u> )	CC75CK2R2( <u>2</u> )	CCR75CK2R2( <u>2)(1)</u>
2.4	C114G249( <u>2</u> )2G5C( <u>1</u> )	CC75CK2R4( <u>2</u> )	CCR75CK2R4( <u>2</u> )( <u>1</u> )
2.7	C114G279( <u>3</u> )2G5C( <u>1</u> )	CC75CK2R7( <u>3</u> )	CCR75CK2R7( <u>3</u> )( <u>1</u> )
3.0	C114G309( <u>3</u> )2G5C( <u>1</u> )	CC75CK3R0( <u>3</u> )	CCR75CK3R0( <u>3</u> )( <u>1</u> )
3.3	C114G339( <u>3</u> )2G5C( <u>1</u> )	CC75CK3R3( <u>3</u> )	CCR75CK3R3( <u>3</u> )( <u>1</u> )
3.6	C114G369( <u>3</u> )2G5C( <u>1</u> )	CC75CK3R6( <u>3</u> )	CCR75CK3R6( <u>3</u> )( <u>1</u> )
3.9	C114G399( <u>3</u> )2G5C( <u>1</u> )	CC75CK3R9( <u>3</u> )	CCR75CK3R9( <u>3</u> )( <u>1</u> )
4.3	C114G439( <u>3</u> )2G5C( <u>1</u> )	CC75CJ4R3( <u>3</u> )	CCR75CJ4R3( <u>3</u> )( <u>1</u> )
4.7	C114G479( <u>3</u> )2G5C( <u>1</u> )	CC75CJ4R7( <u>3</u> )	CCR75CJ4R7( <u>3</u> )( <u>1</u> )
5.1	C114G519( <u>3</u> )2G5C( <u>1</u> )	CC75CJ5R1( <u>3</u> )	CCR75CJ5R1( <u>3</u> )( <u>1</u> )
5.6	C114G569( <u>3</u> )2G5C( <u>1</u> )	CC75CJ5R6( <u>3</u> )	CCR75CJ5R6( <u>3</u> )( <u>1</u> )
6.2	C114G629( <u>3</u> )2G5C( <u>1</u> )	CC75CJ6R2( <u>3</u> )	CCR75CJ6R2( <u>3</u> )( <u>1</u> )
6.8	C114G689( <u>3</u> )2G5C( <u>1</u> )	CC75CJ6R8( <u>3</u> )	CCR75CJ6R8( <u>3</u> )( <u>1</u> )
7.5	C114G759( <u>3</u> )2G5C( <u>1</u> )	CC75CJ7R5( <u>3</u> )	CCR75CJ7R5( <u>3</u> )( <u>1</u> )
8.2	C114G829( <u>3</u> )2G5C( <u>1</u> )	CC75CH8R2( <u>3</u> )	CCR75CH8R2( <u>3</u> )( <u>1</u> )
9.1	C114G919( <u>3</u> )2G5C( <u>1</u> )	CC75CH9R1( <u>3</u> )	CCR75CH9R1( <u>3</u> )( <u>1</u> )
10.0 11.0	C114G100( <u>4</u> )2G5C( <u>1</u> )	CC75CH100( <u>4</u> ) CC75CH110(4)	CCR75CH100( <u>4</u> )( <u>1</u> )
12.0	C114G110( <u>4</u> )2G5C( <u>1</u> )	CC75CH110(4)	CCR75CH110( <u>4</u> )( <u>1</u> )   CCR75CH120( <u>4</u> )( <u>1</u> )
13.0	C114G120(4)2G5C(1)	(,	
15.0	C114G130( <u>4</u> )2G5C( <u>1</u> ) C114G150( <u>4</u> )2G5C( <u>1</u> )	CC75CH130( <u>4</u> ) CC75CH150( <u>4</u> )	CCR75CH130( <u>4</u> )( <u>1</u> )   CCR75CH150( <u>4</u> )( <u>1</u> )
16.0	C114G160( <u>4</u> )2G5C( <u>1</u> )	CC75CH150(4)	CCR75CH160(4)(1)
18.0	C114G180(4)2G5C(1)	CC75CH180(4)	CCR75CH180(4)(1)
20.0	C114G180(4)2G5C(1)	CC75CG200(4)	CCR75CG200(4)(1)
22.0	C114G220(4)2G5C(1)	CC75CG200( <u>4</u> )	CCR75CG220(4)(1)
24.0	C114G240(4)2G5C(1)	CC75CG220( <u>4</u> )	CCR75CG220(4)(1) CCR75CG240(4)(1)
27.0	C114G270(4)2G5C(1)	CC75CG240(4)	CCR75CG240(4)(1)
30.0	C114G270(4)2G5C(1)	CC75CG270(4)	CCR75CG270(4)(1)
33.0	C114G330( <u>4</u> )2G5C( <u>1</u> )	CC75CG300( <u>4</u> )	CCR75CG300(4)(1)
36.0	C114G360(4)2G5C(1)	CC75CG350( <u>4</u> )	CCR75CG350(4)(1)
39.0	C114G390(4)2G5C(1)	CC75CG360( <u>4</u> )	CCR75CG360( <u>4)(1)</u> CCR75CG390(4)(1)
43.0	C114G390(4)2G5C(1)	CC75CG390( <u>4</u> )	CCR75CG390(4)(1) CCR75CG430(4)(1)
43.0	C114G430(4)2G5C(1)	CC75CG430( <u>4</u> )	CCR75CG430( <u>4)(1)</u> CCR75CG470(4)(1)
51.0	C114G470(4)2G5C(1) C114G510(4)2G5C(1)	CC75CG470( <u>4</u> )	CCR75CG470(4)(1)
56.0		CC75CG510( <u>4</u> )	CCR75CG510(4)(1)
62.0	C114G560( <u>4</u> )2G5C( <u>1</u> ) C114G620(4)2G5C(1)	CC75CG560( <u>4</u> )	CCR75CG560(4)(1)
	C114G620(4)2G5C(1)	(/	CCR75CG620(4)(1)   CCR75CG680(4)(1)
68.0 75.0	C114G680( <u>4</u> )2G5C( <u>1</u> ) C114G750(4)2G5C(1)	CC75CG680( <u>4</u> ) CC75CG750(4)	CCR75CG680(4)(1)
13.0	0114G13U(4)2G3U(1)	00/30G/30( <u>4</u> )	00n/30d/30( <u>4)(1)</u>

CAP. pF	KEMET PART NUMBER	MILITARY STYLE	MILITARY STYLE CCR
	00 VOLT — C114 (CC		
82.0	C114G820(4)1G5C(1)	CC75CG820(4)	CCR75CG820(4)(1)
91.0	C114G910(4)1G5C(1)	CC75CG620(4)	CCR75CG620(4)(1) CCR75CG910(4)(1)
100.0	C114G101(4)1G5C(1)	CC75CG910(4)	CCR75CG910(4)(1)
110.0	C114G101(4)1G5C(1)	CC75CG101(4)	CCR75CG101(4)(1)
120.0	C114G121(4)1G5C(1)	CC75CG121(4)	CCR75CG121(4)(1)
130.0	C114G131(4)1G5C(1)	CC75CG131(4)	CCR75CG131(4)(1)
150.0	C114G151(4)1G5C(1)	CC75CG151(4)	CCR75CG151(4)(1)
160.0	C114G161(4)1G5C(1)	CC75CG161(4)	CCR75CG161(4)(1)
180.0	C114G181(4)1G5C(1)	CC75CG181(4)	CCR75CG181(4)(1)
200.0	C114G201(4)1G5C(1)	CC75CG201(4)	CCR75CG201(4)(1)
220.0	C114G221(4)1G5C(1)	CC75CG221(4)	CCR75CG221(4)(1)
240.0	C114G241(4)1G5C(1)	CC75CG241(4)	CCR75CG241(4)(1)
	50 VOLT — C114 (CC	<b>₩</b>	, , , ,
	C114G271(4)5G5C(1)	CC75CG271(4)	CCR75CG271(4)(1)
270.0 300.0	C114G271(4)5G5C(1)	CC75CG271(4)	CCR75CG271(4)(1) CCR75CG301(4)(1)
330.0	C114G331(4)5G5C(1)	CC75CG301(4)	CCR75CG301(4)(1) CCR75CG331(4)(1)
360.0	C114G361(4)5G5C(1)	CC75CG351(4)	CCR75CG351(4)(1) CCR75CG361(4)(1)
390.0	C114G391(4)5G5C(1)	CC75CG381(4)	CCR75CG361(4)(1) CCR75CG391(4)(1)
430.0	C114G431(4)5G5C(1)	CC75CG391(4)	CCR75CG391(4)(1) CCR75CG431(4)(1)
470.0	C114G471(4)5G5C(1)	CC75CG431(4)	CCR75CG431(4)(1) CCR75CG471(4)(1)
510.0	C114G471(4)5G5C(1)	CC75CG471(4)	CCR75CG511(4)(1)
560.0	C114G561(4)5G5C(1)	CC75CG511(4)	CCR75CG511(4)(1)
620.0	C114G561(4)5G5C(1)	CC75CG561(4)	CCR75CG561(4)(1)
680.0		CC75CG621(4)	CCR75CG621(4)(1) CCR75CG681(4)(1)
	C114G681( <u>4</u> )5G5C( <u>1</u> )	, ,	
	00 VOLT — C124 (CC		
82.0	C124G820( <u>4</u> )2G5C( <u>1</u> )	CC76CG820( <u>4</u> )	CCR76CG820(4)(1)
91.0	C124G910( <u>4</u> )2G5C( <u>1</u> )	CC76CG910( <u>4</u> )	CCR76CG910(4)(1)
100.0	C124G101( <u>4</u> )2G5C( <u>1</u> )	CC76CG101( <u>4</u> )	CCR76CG101(4)(1)
110.0	C124G111( <u>4</u> )2G5C( <u>1</u> )	CC76CG111( <u>4</u> )	CCR76CG111(4)(1)
120.0	C124G121( <u>4</u> )2G5C( <u>1</u> )	CC76CG121( <u>4</u> )	CCR76CG121( <u>4</u> )( <u>1</u> )
130.0	C124G131( <u>4</u> )2G5C( <u>1</u> )	CC76CG131( <u>4</u> )	CCR76CG131( <u>4</u> )( <u>1</u> )
	00 VOLT — C124 (CC		
270.0	C124G271( <u>4</u> )1G5C( <u>1</u> )	CC76CG271(4)	CCR76CG271(4)(1)
300.0	C124G301( <u>4</u> )1G5C( <u>1</u> )	CC76CG301( <u>4</u> )	CCR76CG301(4)(1)
330.0	C124G331( <u>4</u> )1G5C( <u>1</u> )	CC76CG331(4)	CCR76CG331(4)(1)
360.0	C124G361( <u>4</u> )1G5C( <u>1</u> )	CC76CG361( <u>4</u> )	CCR76CG361(4)(1)
390.0	C124G391( <u>4</u> )1G5C( <u>1</u> )	CC76CG391(4)	CCR76CG391(4)(1)
430.0	C124G431( <u>4</u> )1G5C( <u>1</u> )	CC76CG431(4)	CCR76CG431(4)(1)
470.0	C124G471( <u>4</u> )1G5C( <u>1</u> )	CC76CG471(4)	CCR76CG471( <u>4</u> )( <u>1</u> )
510.0	C124G511( <u>4</u> )1G5C( <u>1</u> )	CC76CG511(4)	CCR76CG511(4)(1)
560.0 620.0	C124G561(4)1G5C(1)	CC76CG561(4)	CCR76CG561(4)(1) CCR76CG621(4)(1)
680.0	C124G621(4)1G5C(1)	CC76CG621( <u>4</u> ) CC76CG681( <u>4</u> )	CCR76CG621(4)(1) CCR76CG681(4)(1)
	C124G681( <u>4</u> )1G5C( <u>1</u> )		
		(R)76 PER MIL-I	
750.0	C124G751( <u>4</u> )5G5C( <u>1</u> )	CC76CG751( <u>4</u> )	CCR76CG751(4)(1)
820.0	C124G821( <u>4</u> )5G5C( <u>1</u> )	CC76CG821( <u>4</u> )	CCR76CG821(4)(1)
910.0	C124G911( <u>4</u> )5G5C( <u>1</u> )	CC76CG911( <u>4</u> )	CCR76CG911(4)(1)
1,000.0	C124G102(4)5G5C(1)	CC76CG102( <u>4</u> )	CCR76CG102( <u>4</u> )( <u>1</u> )
	00 VOLT — C192 (CC		
150.0	C192G151( <u>4</u> )2G5C( <u>1</u> )	CC77CG151( <u>4</u> )	CCR77CG151(4)(1)
160.0	C192G161( <u>4</u> )2G5C( <u>1</u> )	CC77CG161( <u>4</u> )	CCR77CG161(4)(1)
180.0	C192G181( <u>4</u> )2G5C( <u>1</u> )	CC77CG181( <u>4</u> )	CCR77CG181(4)(1)
200.0	C192G201( <u>4</u> )2G5C( <u>1</u> )	CC77CG201( <u>4</u> )	CCR77CG201(4)(1)
200 0	C192G221( <u>4</u> )2G5C( <u>1</u> )	CC77CG221( <u>4</u> )	CCR77CG221(4)(1)
220.0	LC100C041(4)0CEC(1)	CC77CG241(4)	CCR77CG241(4)(1)
240.0	C192G241( <u>4</u> )2G5C( <u>1</u> )	()	
240.0 270.0	C192G271(4)2G5C(1)	CC77CG271( <u>4</u> )	CCR77CG271(4)(1)
240.0 270.0 300.0	C192G271( <u>4</u> )2G5C( <u>1</u> ) C192G301( <u>4</u> )2G5C( <u>1</u> )	CC77CG271( <u>4</u> ) CC77CG301( <u>4</u> )	CCR77CG271(4)(1) CCR77CG301(4)(1)
240.0 270.0 300.0 330.0	C192G271(4)2G5C(1) C192G301(4)2G5C(1) C192G331(4)2G5C(1)	CC77CG271(4) CC77CG301(4) CC77CG331(4)	CCR77CG271(4)(1) CCR77CG301(4)(1) CCR77CG331(4)(1)
240.0 270.0 300.0 330.0 360.0	C192G271(4)2G5C(1) C192G301(4)2G5C(1) C192G331(4)2G5C(1) C192G361(4)2G5C(1)	CC77CG271(4) CC77CG301(4) CC77CG331(4) CC77CG361(4)	CCR77CG271(4)(1) CCR77CG301(4)(1) CCR77CG331(4)(1) CCR77CG361(4)(1)
240.0 270.0 300.0 330.0 360.0 390.0	C192G271(4)2G5C(1) C192G301(4)2G5C(1) C192G331(4)2G5C(1) C192G361(4)2G5C(1) C192G391(4)2G5C(1)	CC77CG271(4) CC77CG301(4) CC77CG331(4) CC77CG361(4) CC77CG391(4)	CCR77CG271(4)(1) CCR77CG301(4)(1) CCR77CG331(4)(1) CCR77CG361(4)(1) CCR77CG391(4)(1)
240.0 270.0 300.0 330.0 360.0 390.0 430.0	C192G271(4)2G5C(1) C192G301(4)2G5C(1) C192G331(4)2G5C(1) C192G361(4)2G5C(1) C192G391(4)2G5C(1) C192G431(4)2G5C(1)	CC77CG271(4) CC77CG301(4) CC77CG331(4) CC77CG361(4) CC77CG391(4) CC77CG431(4)	CCR77CG271(4)(1) CCR77CG301(4)(1) CCR77CG331(4)(1) CCR77CG361(4)(1) CCR77CG391(4)(1) CCR77CG431(4)(1)
240.0 270.0 300.0 330.0 360.0 390.0 430.0 470.0	C192G271(4)2G5C(1) C192G301(4)2G5C(1) C192G331(4)2G5C(1) C192G361(4)2G5C(1) C192G391(4)2G5C(1) C192G431(4)2G5C(1) C192G471(4)2G5C(1)	CC77CG271(4) CC77CG301(4) CC77CG331(4) CC77CG361(4) CC77CG391(4) CC77CG431(4) CC77CG471(4)	CCR77CG271(4)(1) CCR77CG301(4)(1) CCR77CG331(4)(1) CCR77CG361(4)(1) CCR77CG391(4)(1) CCR77CG431(4)(1) CCR77CG471(4)(1)
240.0 270.0 300.0 330.0 360.0 390.0 430.0 470.0 510.0	C192G271(4)2G5C(1) C192G301(4)2G5C(1) C192G331(4)2G5C(1) C192G361(4)2G5C(1) C192G391(4)2G5C(1) C192G431(4)2G5C(1) C192G471(4)2G5C(1) C192G511(4)2G5C(1)	CC77CG271(4) CC77CG301(4) CC77CG331(4) CC77CG361(4) CC77CG391(4) CC77CG471(4) CC77CG511(4)	CCR77CG271(4)(1) CCR77CG301(4)(1) CCR77CG331(4)(1) CCR77CG391(4)(1) CCR77CG391(4)(1) CCR77CG431(4)(1) CCR77CG471(4)(1) CCR77CG511(4)(1)
240.0 270.0 300.0 330.0 360.0 390.0 430.0 470.0 510.0 560.0	C192G271(4)2G5C(1) C192G301(4)2G5C(1) C192G331(4)2G5C(1) C192G331(4)2G5C(1) C192G391(4)2G5C(1) C192G431(4)2G5C(1) C192G471(4)2G5C(1) C192G511(4)2G5C(1) C192G561(4)2G5C(1)	CC77CG271(4) CC77CG301(4) CC77CG331(4) CC77CG391(4) CC77CG431(4) CC77CG471(4) CC77CG511(4) CC77CG561(4)	CCR77CG271(4)(1) CCR77CG301(4)(1) CCR77CG331(4)(1) CCR77CG391(4)(1) CCR77CG431(4)(1) CCR77CG471(4)(1) CCR77CG511(4)(1) CCR77CG511(4)(1)
240.0 270.0 300.0 330.0 360.0 390.0 430.0 470.0 510.0	C192G271(4)2G5C(1) C192G301(4)2G5C(1) C192G331(4)2G5C(1) C192G361(4)2G5C(1) C192G391(4)2G5C(1) C192G431(4)2G5C(1) C192G471(4)2G5C(1) C192G511(4)2G5C(1)	CC77CG271(4) CC77CG301(4) CC77CG331(4) CC77CG361(4) CC77CG391(4) CC77CG471(4) CC77CG511(4)	CCR77CG271(4)(1) CCR77CG301(4)(1) CCR77CG331(4)(1) CCR77CG391(4)(1) CCR77CG391(4)(1) CCR77CG431(4)(1) CCR77CG471(4)(1) CCR77CG511(4)(1)

To complete Part Number, insert the following letters:
(1) Available Failure Rates: A (CC styles only); M, P, R & S (CCR styles only).
(2) Available Capacitance Tolerances: B, C.
(3) Available Capacitance Tolerances: B, C, D.
(4) Available Capacitance Tolerances: F, G, J.



# CERAMIC MOLDED/AXIAL — MIL-PRF-20 ULTRA-STABLE TEMPERATURE CHARACTERISTIC — CG (EIA-COG)

CAP. pF	KEMET PART NUMBER	MILITARY STYLE CC	MILITARY STYLE CCR	CAP. pF	KEMET PART NUMBER	MILITARY STYLE CC	MILITARY STYLE CCR
	100 VOLT — C192 (CC	(R)77 PER MIL-		1	100 VOLT — C202 (CC	(R)78 PER MIL-	PRF-20/30)
750.0	C192G751(4)1G5C(1)	CC77CG751( <u>4</u> )	CCR77CG751(4)(1)	3,900.0	C202G392( <u>5</u> )1G5C( <u>1</u> )	CC78CG392( <u>5</u> )	CCR78CG392( <u>5</u> )( <u>1</u> )
820.0	C192G821(4)1G5C(1)	CC77CG821( <u>4</u> )	CCR77CG821(4)(1)	4,700.0	C202G472( <u>5</u> )1G5C( <u>1</u> )	CC78CG472( <u>5</u> )	CCR78CG472(5)(1)
910.0	C192G911(4)1G5C(1)	CC77CG911( <u>4</u> )	CCR77CG911(4)(1)	5,600.0	C202G562( <u>5</u> )1G5C( <u>1</u> )	CC78CG562( <u>5</u> )	CCR78CG562(5)(1)
1,000.0	C192G102( <u>4</u> )1G5C( <u>1</u> )	CC77CG102( <u>4</u> )	CCR77CG102( <u>4</u> )( <u>1</u> )	6,800.0	C202G682( <u>5</u> )1G5C( <u>1</u> )	CC78CG682( <u>5</u> )	CCR78CG682( <u>5</u> )( <u>1</u> )
1,100.0	C192G112( <u>4</u> )1G5C( <u>1</u> )	CC77CG112( <u>4</u> )	CCR77CG112( <u>4</u> )( <u>1</u> )	8,200.0	C202G822( <u>5</u> )1G5C( <u>1</u> )	CC78CG822( <u>5</u> )	CCR78CG822( <u>5</u> )( <u>1</u> )
1,200.0	C192G122( <u>4</u> )1G5C( <u>1</u> )	CC77CG122( <u>4</u> )	CCR77CG122( <u>4</u> )( <u>1</u> )	10,000.0	C202G103( <u>5</u> )1G5C( <u>1</u> )	CC78CG103( <u>5</u> )	CCR78CG103( <u>5</u> )( <u>1</u> )
1,300.0	C192G132(4)1G5C(1)	CC77CG132( <u>4</u> )	CCR77CG132( <u>4</u> )( <u>1</u> )	12,000.0	C202G123( <u>5</u> )1G5C( <u>1</u> )	CC78CG123( <u>5</u> )	CCR78CG123( <u>5</u> )( <u>1</u> )
1,500.0	C192G152( <u>4</u> )1G5C( <u>1</u> )	CC77CG152( <u>4</u> )	CCR77CG152( <u>4</u> )( <u>1</u> )	l l	50 VOLT — C202 (CC	(R)78 PER MIL-	PRF-20/30)
1,600.0	C192G162( <u>4</u> )1G5C( <u>1</u> )	CC77CG162( <u>4</u> )	CCR77CG162( <u>4</u> )( <u>1</u> )	15.000.0	· · · · · · · · · · · · · · · · · · ·	CC78CG153(5)	CCR78CG153(5)(1)
1,800.0	C192G182( <u>4</u> )1G5C( <u>1</u> )	CC77CG182( <u>4</u> )	CCR77CG182( <u>4</u> )( <u>1</u> )	18.000.0	C202G183(5)5G5C(1)	CC78CG183(5)	CCR78CG183(5)(1)
2,000.0	C192G202( <u>4</u> )1G5C( <u>1</u> )	CC77CG202( <u>4</u> )	CCR77CG202( <u>4</u> )( <u>1</u> )	22.000.0	C202G223(5)5G5C(1)	CC78CG223(5)	CCR78CG223(5)(1)
2,200.0	C192G222(4)1G5C(1)	CC77CG222( <u>4</u> )	CCR77CG222( <u>4</u> )( <u>1</u> )	27.000.0		CC78CG273(5)	CCR78CG273(5)(1)
	50 VOLT — C192 (CC	(R)77 PER MIL-I	PRF-20/29)	200 VOLT — C222 (CC(R)79 PER MIL-PRF-20/31)			
2,400.0	C192G242(4)5G5C(1)	CC77CG242( <u>4</u> )	CCR77CG242(4)(1)	3.900.0	,	CC79CG392(5)	CCR79CG392(5)(1)
2,700.0	C192G272(4)5G5C(1)	CC77CG272(4)	CCR77CG272(4)(1)	4.700.0		CC79CG392( <u>5</u> )	CCR79CG472(5)(1)
3,000.0	C192G302(4)5G5C(1)	CC77CG302( <u>4</u> )	CCR77CG302( <u>4</u> )( <u>1</u> )	5.600.0	_ (_)	CC79CG562(5)	CCR79CG562( <u>5</u> )( <u>1</u> )
3,300.0	C192G332(4)5G5C(1)	CC77CG332( <u>4</u> )	CCR77CG332( <u>4</u> )( <u>1</u> )	6.800.0		CC79CG682(5)	CCR79CG682(5)(1)
3,600.0	C192G362( <u>4</u> )5G5C( <u>1</u> )	CC77CG362( <u>4</u> )	CCR77CG362( <u>4</u> )( <u>1</u> )	8.200.0		CC79CG822(5)	CCR79CG822(5)(1)
3,900.0	C192G392( <u>4</u> )5G5C( <u>1</u> )	CC77CG392( <u>4</u> )	CCR77CG392( <u>4</u> )( <u>1</u> )	10.000.0		CC79CG103(5)	CCR79CG103(5)(1)
4,300.0	C192G432( <u>4</u> )5G5C( <u>1</u> )	CC77CG432( <u>4</u> )	CCR77CG432( <u>4</u> )( <u>1</u> )	-,		$\Box$	
4,700.0	C192G472( <u>4</u> )5G5C( <u>1</u> )	CC77CG472( <u>4</u> )	CCR77CG472( <u>4</u> )( <u>1</u> )		100 VOLT — C222 (CC		
5,100.0	C192G512( <u>5</u> )5G5C( <u>1</u> )	CC77CG512( <u>5</u> )	CCR77CG512( <u>5</u> )( <u>1</u> )	15,000.0		CC79CG153( <u>5</u> )	CCR79CG153( <u>5</u> )( <u>1</u> )
5,600.0	C192G562( <u>5</u> )5G5C( <u>1</u> )	CC77CG562( <u>5</u> )	CCR77CG562( <u>5</u> )( <u>1</u> )	18,000.0		CC79CG183( <u>5</u> )	CCR79CG183( <u>5</u> )( <u>1</u> )
	200 VOLT — C202 (CC	(R)78 PER MIL-	PRF-20/30)	22,000.0		CC79CG223( <u>5</u> )	CCR79CG223( <u>5</u> )( <u>1</u> )
820.0	C202G821(5)2G5C(1)	CC78CG821(5)	CCR78CG821(5)(1)	27,000.0		CC79CG273( <u>5</u> )	CCR79CG273( <u>5</u> )( <u>1</u> )
1.000.0	C202G102(5)2G5C(1)	CC78CG102(5)	CCR78CG102(5)(1)	33,000.0		CC79CG333( <u>5</u> )	CCR79CG333( <u>5</u> )( <u>1</u> )
1,200.0	C202G122(5)2G5C(1)	CC78CG122(5)	CCR78CG122( <u>5</u> )( <u>1</u> )	39,000.0	C222G393( <u>5</u> )1G5C( <u>1</u> )	CC79CG393( <u>5</u> )	CCR79CG393( <u>5</u> )( <u>1</u> )
1,500.0	C202G152(5)2G5C(1)	CC78CG152( <u>5</u> )	CCR78CG152(5)(1)		50 VOLT — C222 (CC	<del>`                                    </del>	
1,800.0	C202G182( <u>5</u> )2G5C( <u>1</u> )	CC78CG182( <u>5</u> )	CCR78CG182( <u>5</u> )( <u>1</u> )	47,000.0	1 1 1 1	CC79CG473( <u>5</u> )	CCR79CG473( <u>5</u> )( <u>1</u> )
2,200.0	C202G222( <u>5</u> )2G5C( <u>1</u> )	CC78CG222( <u>5</u> )	CCR78CG222( <u>5</u> )( <u>1</u> )	56,000.0		CC79CG563( <u>5</u> )	CCR79CG563( <u>5</u> )( <u>1</u> )
2,700.0	C202G272(5)2G5C(1)	CC78CG272( <u>5</u> )	CCR78CG272( <u>5</u> )( <u>1</u> )	68,000.0		CC79CG683( <u>5</u> )	CCR79CG683( <u>5</u> )( <u>1</u> )
3,300.0	C202G332( <u>5</u> )2G5C( <u>1</u> )	CC78CG332( <u>5</u> )	CCR78CG332( <u>5</u> )( <u>1</u> )	82,000.0	C222G823( <u>5</u> )5G5C( <u>1</u> )	CC79CG823( <u>5</u> )	CCR79CG823( <u>5</u> )( <u>1</u> )

To complete Part Number, insert the following letters:
(1) Available Failure Rates: A (CC styles only); M, P, R & S (CCR styles only).
(2) Available Capacitance Tolerances: B, C.
(3) Available Capacitance Tolerances: B, C, D.
(4) Available Capacitance Tolerances: F, G, J.
(5) Available Capacitance Tolerances: F, G, J, K.

# CERAMIC MOLDED/RADIAL — MIL-PRF-20 ULTRA-STABLE TEMPERATURE CHARACTERISTIC — CG (EIA-COG)



CAP.	KEMET	MILITARY STYLE	MILITARY STYLE
pF	PART NUMBER	CC	CCR
200	VOLT — C052/C056 SIZ	ZE (CC(R)05 PE	R MIL-PRF-20/35)
1.0	C05(6)G109(2)2G5C(1)	CC05CX1R0(2)	CCR05CX1R0(2)(1)(7)
1.1	C05(6)G119(2)2G5C(1)	CC05CX1R1(2)	CCR05CX1R1(2)(1)(7)
1.2	C05(6)G129(2)2G5C(1)	CC05CX1R2(2)	CCR05CX1R2(2)(1)(7)
1.3	C05( <u>6</u> )G139( <u>2</u> )2G5C( <u>1</u> )	CC05CX1R3(2)	CCR05CX1R3(2)(1)(7)
1.5	C05( <u>6</u> )G159( <u>2</u> )2G5C( <u>1</u> )	CC05CX1R5(2)	CCR05CX1R5(2)(1)(7)
1.6	C05( <u>6</u> )G169( <u>2</u> )2G5C( <u>1</u> )	CC05CX1R6(2)	CCR05CX1R6(2)(1)(7)
1.8	C05( <u>6</u> )G189( <u>2</u> )2G5C( <u>1</u> )	CC05CX1R8( <u>2</u> )	CCR05CX1R8(2)(1)(7)
2.0	C05( <u>6</u> )G209( <u>2</u> )2G5C( <u>1</u> )	CC05CX2R0( <u>2</u> )	CCR05CX2R0( <u>2</u> )( <u>1</u> )( <u>7</u> )
2.2	C05( <u>6</u> )G229( <u>2</u> )2G5C( <u>1</u> )	CC05CK2R2( <u>2</u> )	CCR05CK2R2( <u>2</u> )( <u>1</u> )( <u>7</u> )
2.4	C05( <u>6</u> )G249( <u>2</u> )2G5C( <u>1</u> )	CC05CK2R4(2)	CCR05CK2R4( <u>2</u> )( <u>1</u> )( <u>7</u> )
2.7	C05(6)G279(3)2G5C(1)	CC05CK2R7(3)	CCR05CK2R7( <u>3</u> )( <u>1</u> )( <u>7</u> )
3.0	C05(6)G309(3)2G5C(1)	CC05CK3R0( <u>3</u> )	CCR05CK3R0( <u>3</u> )( <u>1</u> )( <u>7</u> )
3.3	C05( <u>6</u> )G339( <u>3</u> )2G5C( <u>1</u> )	CC05CK3R3( <u>3</u> )	CCR05CK3R3(3)(1)(7)
3.6	C05( <u>6</u> )G369( <u>3</u> )2G5C( <u>1</u> )	CC05CK3R6(3)	CCR05CK3R6(3)(1)(7)
3.9	C05(6)G399(3)2G5C(1)	CC05CK3R9( <u>3</u> )	CCR05CK3R9( <u>3</u> )( <u>1</u> )( <u>7</u> )
4.3	C05(6)G439(3)2G5C(1)	CC05CJ4R3( <u>3</u> )	CCR05CJ4R3( <u>3</u> )( <u>1</u> )( <u>7</u> )
4.7	C05(6)G479(3)2G5C(1)	CC05CJ4R7( <u>3</u> )	CCR05CJ4R7( <u>3</u> )( <u>1</u> )( <u>7</u> )
5.1	C05( <u>6</u> )G519( <u>3</u> )2G5C( <u>1</u> )	CC05CJ5R1( <u>3</u> )	CCR05CJ5R1( <u>3</u> )( <u>1</u> )( <u>7</u> )
5.6	C05(6)G569(3)2G5C(1)	CC05CJ5R6( <u>3</u> )	CCR05CJ5R6( <u>3</u> )( <u>1</u> )( <u>7</u> )
6.2	C05(6)G629(3)2G5C(1)	CC05CJ6R2( <u>3</u> )	CCR05CJ6R2( <u>3</u> )( <u>1</u> )( <u>7</u> )
6.8	C05(6)G689(3)2G5C(1)	CC05CJ6R8( <u>3</u> )	CCR05CJ6R8( <u>3</u> )( <u>1</u> )( <u>7</u> )
7.5	C05( <u>6</u> )G759( <u>3</u> )2G5C( <u>1</u> )	CC05CJ7R5( <u>3</u> )	CCR05CJ7R5( <u>3</u> )( <u>1</u> )( <u>7</u> )
8.2	C05( <u>6</u> )G829( <u>3</u> )2G5C( <u>1</u> )	CC05CH8R2( <u>3</u> )	CCR05CH8R2(3)(1)(7)
9.1	C05( <u>6</u> )G919( <u>3</u> )2G5C( <u>1</u> )	CC05CH9R1(3)	CCR05CH9R1( <u>3</u> )( <u>1</u> )( <u>7</u> )
10.0	C05( <u>6</u> )G100( <u>4</u> )2G5C( <u>1</u> )	CC05CH100( <u>4</u> )	CCR05CH100(4)(1)(7)
11.0	C05( <u>6</u> )G110( <u>4</u> )2G5C( <u>1</u> )	CC05CH110( <u>4</u> )	CCR05CH110(4)(1)(7)
12.0	C05( <u>6</u> )G120( <u>4</u> )2G5C( <u>1</u> )	CC05CH120( <u>4</u> )	CCR05CH120(4)(1)(7)
13.0	C05( <u>6</u> )G130( <u>4</u> )2G5C( <u>1</u> )	CC05CH130( <u>4</u> )	CCR05CH130(4)(1)(7)
15.0	C05(6)G150(4)2G5C(1)	CC05CH150( <u>4</u> )	CCR05CH150(4)(1)(7)
16.0	C05(6)G160(4)2G5C(1)	CC05CH160( <u>4</u> )	CCR05CH160(4)(1)(7)
18.0	C05(6)G180(4)2G5C(1)	CC05CH180( <u>4</u> )	CCR05CH180(4)(1)(7)
20.0	C05(6)G200(4)2G5C(1)	CC05CG200( <u>4</u> )	CCR05CG200(4)(1)(7)
22.0	C05(6)G220(4)2G5C(1)	CC05CG220( <u>4</u> )	CCR05CG220(4)(1)(7)
24.0	C05(6)G240(4)2G5C(1)	CC05CG240( <u>4</u> )	CCR05CG240(4)(1)(7)
27.0	C05(6)G270(4)2G5C(1)	CC05CG270( <u>4</u> )	CCR05CG270(4)(1)(7)
30.0	C05( <u>6</u> )G300( <u>4</u> )2G5C( <u>1</u> )	CC05CG300( <u>4</u> )	CCR05CG300(4)(1)(7)
33.0	C05(6)G330(4)2G5C(1)	CC05CG330( <u>4</u> )	CCR05CG330(4)(1)(7)
36.0	C05( <u>6</u> )G360( <u>4</u> )2G5C( <u>1</u> )	CC05CG360( <u>4</u> )	CCR05CG360(4)(1)(7)
39.0	C05(6)G390(4)2G5C(1)	CC05CG390( <u>4</u> )	CCR05CG390(4)(1)(7)
43.0	C05( <u>6</u> )G430( <u>4</u> )2G5C( <u>1</u> )	CC05CG430( <u>4</u> )	CCR05CG430(4)(1)(7)
47.0	C05( <u>6</u> )G470( <u>4</u> )2G5C( <u>1</u> )	CC05CG470( <u>4</u> )	CCR05CG470(4)(1)(7)
51.0	C05( <u>6</u> )G510( <u>4</u> )2G5C( <u>1</u> )	CC05CG510( <u>4</u> )	CCR05CG510(4)(1)(7)

CAP. pF	KEMET PART NUMBER	MILITARY STYLE	MILITARY STYLE CCR
	OLT — C052/C056 SIZ		
56.0	C05(6)G560(4)2G5C(1)	CC05CG560(4)	CCR05CG560(4)(1)(7)
62.0	C05(6)G620(4)2G5C(1)	CC05CG620(4)	CCR05CG620(4)(1)(7)
68.0	C05(6)G680(4)2G5C(1)	CC05CG680(4)	CCR05CG680(4)(1)(7)
75.0 82.0	C05( <u>6</u> )G750( <u>4</u> )2G5C( <u>1</u> ) C05( <u>6</u> )G820( <u>4</u> )2G5C( <u>1</u> )	CC05CG750(4) CC05CG820(4)	CCR05CG750(4)(1)(7) CCR75CG820(4)(1)(7)
91.0	C05(6)G910(4)2G5C(1)	CC05CG820(4)	CCR75CG820(4)(1)(7)
100.0	C05(6)G101(4)2G5C(1)	CC05CG910(4)	CCR05CG910(4)(1)(7)
110.0	C05(6)G111(4)2G5C(1)	CC05CG101(4)	CCR05CG101(4)(1)(7)
120.0	C05( <u>6</u> )G121( <u>4</u> )2G5C( <u>1</u> )	CC05CG111(4)	CCR05CG111(4)(1)(7)
130.0	C05(6)G131(4)2G5C(1)	CC05CG121(4)	CCR05CG131(4)(1)(7)
150.0	C05(6)G151(4)2G5C(1)	CC05CG151(4)	CCR05CG151(4)(1)(7)
160.0	C05(6)G161(4)2G5C(1)	CC05CG161(4)	CCR05CG161(4)(1)(7)
180.0	C05(6)G181(4)2G5C(1)	CC05CG181(4)	CCR05CG181(4)(1)(7)
200.0	C05(6)G201(4)2G5C(1)	CC05CG201(4)	CCR05CG201(4)(1)(7)
220.0	C05(6)G221(4)2G5C(1)	CC05CG221(4)	CCR05CG221(4)(1)(7)
240.0	C05(6)G241(4)2G5C(1)	CC05CG241(4)	CCR05CG241(4)(1)(7)
270.0	C05(6)G271(4)2G5C(1)	CC05CG271(4)	CCR05CG271(4)(1)(7)
300.0	C05(6)G301(4)2G5C(1)	CC05CG301(4)	CCR05CG301(4)(1)(7)
330.0	C05(6)G331(4)2G5C(1)	CC05CG331(4)	CCR05CG331(4)(1)(7)
100 V	OLT — C052/C056 SIZ	F (CC(B)05 PE	B MII -PRF-20/35\
360.0	C05( <u>6</u> )G361( <u>4</u> )1G5C( <u>1</u> )	_ ` ` ` /	CCR05CG361(4)(1)(7)
390.0	C05(6)G391(4)1G5C(1)	CC05CG391(4)	CCR05CG391(4)(1)(7)
430.0	C05( <u>6</u> )G431( <u>4</u> )1G5C( <u>1</u> )	CC05CG431(4)	CCR05CG431(4)(1)(7)
470.0	C05(6)G471(4)1G5C(1)	CC05CG471(4)	CCR05CG471(4)(1)(7)
510.0	C05( <u>6</u> )G511( <u>4</u> )1G5C( <u>1</u> )	CC05CG511(4)	CCR05CG511(4)(1)(7)
560.0	C05(6)G561(4)1G5C(1)	CC05CG561(4)	CCR05CG561(4)(1)(7)
620.0	C05(6)G621(4)1G5C(1)	CC05CG621(4)	CCR05CG621(4)(1)(7)
680.0	C05(6)G681(4)1G5C(1)	CC05CG681(4)	CCR05CG681(4)(1)(7)
750.0	C05(6)G751(4)1G5C(1)	CC05CG751(4)	CCR05CG751(4)(1)(7)
820.0	C05(6)G821(4)1G5C(1)	CC05CG821(4)	CCR05CG821(4)(1)(7)
910.0	C05(6)G911(4)1G5C(1)	CC05CG911(4)	CCR05CG911(4)(1)(7)
1,000.0	C05( <u>6</u> )G102( <u>4</u> )1G5C( <u>1</u> )	CC05CG102( <u>4</u> )	CCR05CG102( <u>4</u> )( <u>1</u> )( <u>7</u> )
1,100.0	C05( <u>6</u> )G112( <u>4</u> )1G5C( <u>1</u> )	CC05CG112( <u>4</u> )	CCR05CG112(4)(1)(7)
1,200.0	C05( <u>6</u> )G122( <u>4</u> )1G5C( <u>1</u> )	CC05CG122( <u>4</u> )	CCR05CG122( <u>4</u> )( <u>1</u> )( <u>7</u> )
1,300.0	C05( <u>6</u> )G132( <u>4</u> )1G5C( <u>1</u> )	CC05CG132( <u>4</u> )	CCR05CG132( <u>4</u> )( <u>1</u> )( <u>7</u> )
1,500.0	C05( <u>6</u> )G152( <u>4</u> )1G5C( <u>1</u> )	CC05CG152( <u>4</u> )	CCR05CG152(4)(1)(7)
1,600.0	C05( <u>6</u> )G162( <u>4</u> )1G5C( <u>1</u> )	CC05CG162( <u>4</u> )	CCR05CG162( <u>4</u> )( <u>1</u> )( <u>7</u> )
1,800.0	C05( <u>6</u> )G182( <u>4</u> )1G5C( <u>1</u> )	CC05CG182( <u>4</u> )	CCR05CG182( <u>4</u> )( <u>1</u> )( <u>7</u> )
50 V	OLT — C052/C056 SIZ	E (CC(R)05 PEI	R MIL-PRF-20/35)
2,000.0	C05(6)G202(4)5G5C(1)	CC05CG202(4)	CCR05CG202( <u>4</u> )( <u>1</u> )( <u>7</u> )
2,200.0	C05( <u>6</u> )G222( <u>4</u> )5G5C( <u>1</u> )	CC05CG222( <u>4</u> )	CCR05CG222(4)(1)(7)
2,400.0	C05(6)G242(4)5G5C(1)	CC05CG242( <u>4</u> )	CCR05CG242(4)(1)(7)
2,700.0	C05( <u>6</u> )G272( <u>4</u> )5G5C( <u>1</u> )	CC05CG272( <u>4</u> )	CCR05CG272(4)(1)(7)
3,000.0	C05( <u>6</u> )G302( <u>4</u> )5G5C( <u>1</u> )	CC05CG302( <u>4</u> )	CCR05CG302(4)(1)(7)
3,300.0	C05( <u>6</u> )G332( <u>4</u> )5G5C( <u>1</u> )	CC05CG332( <u>4</u> )	CCR05CG332(4)(1)(7)

To complete Part Number, insert the following letters: (1) Available Failure Rates: A (CC styles only); M, P, R & S (CCR styles only).

<sup>(1)</sup> Available Falmine Rates. A (CC styles Only), wideling a substance Tolerances: B, C.
(3) Available Capacitance Tolerances: B, C, D.
(4) Available Capacitance Tolerances: F, G, J.
(5) Available Capacitance Tolerances: F, G, J, K.

<sup>(6)</sup> Insert "2" for standard design, Style C052G Insert "6" for stand-off design, Style C056G Stand-offs are available only as CCR's, not available as CC. (7) Add "V" for stand-off design, Style C056G

And leave blank for the flat bottom design (C052G)



# CERAMIC MOLDED/RADIAL — MIL-PRF-20

ULTRA-STABLE TEMPERATURE CHARACTERISTIC — CG (EIA-COG)

CAP. pF	KEMET PART NUMBER	MILITARY STYLE	MILITARY STYLE CCR	CAP. pF	KEMET PART NUMBER	MILITARY STYLE CC	MILITARY STYLE CCR
200 V	OLT — C062/C066 SIZ	F (CC(B)06 PE	R MII -PRF-20/36)	50 VO	LT — C062/C066 SIZ	E (CC(R)06 PE	R MIL-PRF-20/36)
360.0	C06(6)G361(4)2G5C(1)		CCR06CG361(4)(1)(7)		C06(6)G822(5)5G5C(1)		CCR06CG822(5)(1)(7)
390.0	C06(6)G391(4)2G5C(1)		CCR06CG391(4)(1)(7)		C06(6)G912(5)5G5C(1)		CCR06CG912(5)(1)(7)
430.0	C06(6)G431(4)2G5C(1)		CCR06CG431(4)(1)(7)		C06(6)G103(5)5G5C(1)		CCR06CG103(5)(1)(7)
470.0	C06(6)G471(4)2G5C(1)		CCR06CG471(4)(1)(7)		C06(6)G123(5)5G5C(1)		CCR06CG123(5)(1)(7)
510.0	C06(6)G511(4)2G5C(1)		CCR06CG511(4)(1)(7)	15,000.0	C06(6)G153(5)5G5C(1)	CC06CG153(5)	CCR06CG153(5)(1)(7)
560.0	C06(6)G561(4)2G5C(1)		CCR06CG561(4)(1)(7)	18,000.0	C06(6)G183(5)5G5C(1)	CC06CG183(5)	CCR06CG183(5)(1)(7)
620.0	C06(6)G621(4)2G5C(1)		CCR06CG621(4)(1)(7)	200	VOLT — C512 SIZE	CC(R)07 PER	MII -PRF-20/37)
680.0	C06(6)G681(4)2G5C(1)		CCR06CG681(4)(1)(7)		C512G222(5)2G5C(1)	CC07CG222(5)	CCR07CG222(5)(1)
750.0	C06( <u>6</u> )G751( <u>4</u> )2G5C( <u>1</u> )	CC06CG751(4)	CCR06CG751(4)(1)(7)		C512G272(5)2G5C(1)	CC07CG272(5)	CCR07CG272(5)(1)
820.0	C06( <u>6</u> )G821( <u>4</u> )2G5C( <u>1</u> )	CC06CG821( <u>4</u> )	CCR06CG821(4)(1)(7)		C512G332( <u>5</u> )2G5C( <u>1</u> )	CC07CG332(5)	CCR07CG332( <u>5</u> )( <u>1</u> )
910.0	C06(6)G911(4)2G5C(1)		CCR06CG911(4)(1)(7)		C512G392( <u>5</u> )2G5C( <u>1</u> )	CC07CG392(5)	CCR07CG392( <u>5</u> )( <u>1</u> )
1,000.0	C06( <u>6</u> )G102( <u>4</u> )2G5C( <u>1</u> )		CCR06CG102(4)(1)(7)	4 700 0	C512G472( <u>5</u> )2G5C( <u>1</u> )	CC07CG472( <u>5</u> )	CCR07CG472( <u>5</u> )( <u>1</u> )
1,100.0	C06( <u>6</u> )G112( <u>4</u> )2G5C( <u>1</u> )		CCR06CG112(4)(1)(7)				
1,200.0	C06( <u>6</u> )G122( <u>4</u> )2G5C( <u>1</u> )		CCR06CG122(4)(1)(7)		VOLT — C512 SIZE	, .	
1,300.0	C06( <u>6</u> )G132( <u>4</u> )2G5C( <u>1</u> )		CCR06CG132(4)(1)(7)		C512G562( <u>5</u> )1G5C( <u>1</u> )	CC07CG562( <u>5</u> )	CCR07CG562( <u>5</u> )( <u>1</u> )
1,500.0	C06( <u>6</u> )G152( <u>4</u> )2G5C( <u>1</u> )		CCR06CG152(4)(1)(7)		C512G682( <u>5</u> )1G5C( <u>1</u> )	CC07CG682( <u>5</u> )	
1,600.0	C06(6)G162(4)2G5C(1)		CCR06CG162( <u>4</u> )( <u>1</u> )( <u>7</u> )	1 '	C512G822( <u>5</u> )1G5C( <u>1</u> )	CC07CG822( <u>5</u> )	CCR07CG822( <u>5</u> )( <u>1</u> )
1,800.0	C06( <u>6</u> )G182( <u>4</u> )2G5C( <u>1</u> )	CC06CG182( <u>4</u> )	CCR06CG182( <u>4</u> )( <u>1</u> )( <u>7</u> )		C512G103( <u>5</u> )1G5C( <u>1</u> )	CC07CG103( <u>5</u> )	CCR07CG103( <u>5</u> )( <u>1</u> )
100 V	OLT — C062/C066 SIZ	E (CC(R)06 PE	R MIL-PRF-20/36)		C512G123( <u>5</u> )1G5C( <u>1</u> )	CC07CG123( <u>5</u> )	CCR07CG123( <u>5</u> )( <u>1</u> )
2,000.0	C06(6)G202(4)1G5C(1)	CC06CG202(4)	CCR06CG202(4)(1)(7)		VOLT — C512 SIZE (	_ ` '	
2,200.0	C06(6)G222(4)1G5C(1)	CC06CG222( <u>4</u> )	CCR06CG222(4)(1)(7)	1 '	C512G153( <u>5</u> )5G5C( <u>1</u> )	CC07CG153( <u>5</u> )	CCR07CG153( <u>5</u> )( <u>1</u> )
2,400.0	C06(6)G242(4)1G5C(1)		CCR06CG242(4)(1)(7)		C512G183( <u>5</u> )5G5C( <u>1</u> )	CC07CG183( <u>5</u> )	CCR07CG183( <u>5</u> )( <u>1</u> )
2,700.0	C06( <u>6</u> )G272( <u>4</u> )1G5C( <u>1</u> )		CCR06CG272(4)(1)(7)		C512G223( <u>5</u> )5G5C( <u>1</u> )	CC07CG223( <u>5</u> )	CCR07CG223( <u>5</u> )( <u>1</u> )
3,000.0	C06(6)G302(4)1G5C(1)		CCR06CG302(4)(1)(7)		C512G273( <u>5</u> )5G5C( <u>1</u> )	CC07CG273( <u>5</u> )	CCR07CG273( <u>5</u> )( <u>1</u> )
3,300.0	C06( <u>6</u> )G332( <u>4</u> )1G5C( <u>1</u> )		CCR06CG332( <u>4</u> )( <u>1</u> )( <u>7</u> )		C512G333( <u>5</u> )5G5C( <u>1</u> )	CC07CG333( <u>5</u> )	CCR07CG333( <u>5</u> )( <u>1</u> )
3,600.0	C06( <u>6</u> )G362( <u>4</u> )1G5C( <u>1</u> )		CCR06CG362(4)(1)(7)		C512G393( <u>5</u> )5G5C( <u>1</u> )	CC07CG393( <u>5</u> )	CCR07CG393( <u>5</u> )( <u>1</u> )
3,900.0	C06( <u>6</u> )G392( <u>4</u> )1G5C( <u>1</u> )		CCR06CG392(4)(1)(7)		C512G473( <u>5</u> )5G5C( <u>1</u> )	CC07CG473( <u>5</u> )	CCR07CG473( <u>5</u> )( <u>1</u> )
4,300.0	C06( <u>6</u> )G432( <u>4</u> )1G5C( <u>1</u> )		CCR06CG432( <u>4</u> )( <u>1</u> )( <u>7</u> )	1 '	C512G563( <u>5</u> )5G5C( <u>1</u> )	CC07CG563( <u>5</u> )	CCR07CG563( <u>5</u> )( <u>1</u> )
4,700.0	C06( <u>6</u> )G472( <u>4</u> )1G5C( <u>1</u> )	CC06CG472( <u>4</u> )	CCR06CG472(4)(1)(7)		C512G683( <u>5</u> )5G5C( <u>1</u> )	CC07CG683( <u>5</u> )	CCR07CG683( <u>5</u> )( <u>1</u> )
50 V	OLT — C062/C066 SIZ	E (CC(R)06 PER	R MIL-PRF-20/36)		C512G823( <u>5</u> )5G5C( <u>1</u> ) C512G104( <u>5</u> )5G5C( <u>1</u> )	CC07CG823( <u>5</u> ) CC07CG104( <u>5</u> )	CCR07CG823( <u>5</u> )( <u>1</u> ) CCR07CG104( <u>5</u> )( <u>1</u> )
5,100.0	C06(6)G512(5)5G5C(1)	CC06CG512(5)	CCR06CG512( <u>5</u> )( <u>1</u> )( <u>7</u> )		, , , , , ,	, ,	
5,600.0	C06(6)G562(5)5G5C(1)	CC06CG562(5)	CCR06CG562(5)(1)(7)		VOLT — C522 SIZE		1
6,200.0	C06(6)G622(5)5G5C(1)		CCR06CG622( <u>5</u> )( <u>1</u> )( <u>7</u> )	1 '	C522G392( <u>8</u> )2G5C( <u>1</u> )	CC08CG392( <u>8</u> )	
6,800.0	C06(6)G682(5)5G5C(1)		CCR06CG682( <u>5</u> )( <u>1</u> )( <u>7</u> )	4,700.0	C522G472( <u>8</u> )2G5C( <u>1</u> )	CC08CG472( <u>8</u> )	CCR08CG472( <u>8</u> )( <u>1</u> )
7,500.0	C06( <u>6</u> )G752( <u>5</u> )5G5C( <u>1</u> )	CC06CG752( <u>5</u> )	CCR06CG752( <u>5</u> )( <u>1</u> )( <u>7</u> )	100	VOLT — C522 SIZE		MIL-PRF-20/38)
				15,000.0	C522G153(8)1G5C(1)	CC08CG153(8)	CCR08CG153(8)(1)
	e Part Number, insert the follow e Failure Rates: A (CC styles on		styles only)	18,000.0	C522G183(8)1G5C(1)	CC08CG183( <u>8</u> )	CCR08CG183(8)(1)
	e Capacitance Tolerances: B, C.		oryioo oriiyj.	50	VOLT — C522 SIZE (	CC(R)08 PER M	IIL-PRF-20/38)

<sup>(3)</sup> Available Capacitance Tolerances: B, C, D. (4) Available Capacitance Tolerances: F, G, J. (5) Available Capacitance Tolerances: F, G, J, K.

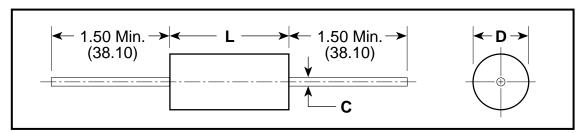
<sup>(6)</sup> Insert "2" for standard design, Style C062G Insert "6" for stand-off design, Style C066G Only as CCR's, not available as CC. (7) Add "V" for stand-off design, Style C066G

And leave blank for the flat bottom design (C062G) (8) Available Capacitance Tolerances: G, J, K

# CERAMIC MOLDED/MIL-C-11015 (CK) & MIL-PRF-39014 (CKR) KEMET



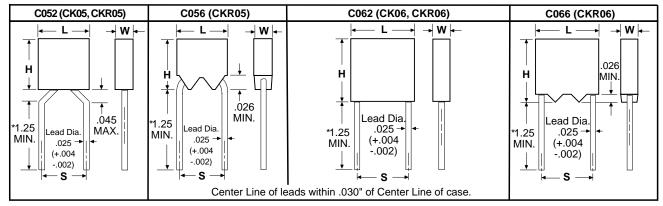
## **CAPACITOR OUTLINE DRAWINGS (AXIAL LEADS)**



### **DIMENSIONS — INCHES & (MILLIMETERS)**

CASE SIZE	MILITARY EQUIVALENT STYLES	L	D	С
C114	CK12, CKR11	.160 ± .010 (4.06 ± .25)	.090 ± .010 (2.29 ± .25)	.020, +.000,003 (.51, +.00,08)
C124	CK13, CKR12	.250 ± .010 (6.35 ± .25)	.090 ± .010 (2.29 ± .25)	.020, +.000,003 (.51, +.00,08)
C192	CK14, CKR14	.390 ± .010 (9.91 ± .25)	.140 ± .010 (3.56 ± .25)	.025, +.002,002 (.64, +.05,05)
C202	CK15, CKR15	.500 ± .020 (12.70 ± .51)	.250 ± .015 (6.35 ± .38)	.025, +.002,002 (.64, +.05,05)
C222	CK16, CKR16	.690 ± .030 (17.53 ± .76)	.350 ± .020 (8.89 ± .51)	.025, +.002,002 (.64, +.05,05)

# **CAPACITOR OUTLINE DRAWINGS (RADIAL LEADS)**



<sup>\*</sup> Leads are .625 minimum when tape and reel packaged.

#### **DIMENSIONS — INCHES & (MILLIMETERS)**

CASE SIZE	MILITARY EQUIVALENT STYLES	H HEIGHT	L LENGTH	W WIDTH	S LEAD SPACING
C052/ C056	CK05, CKR05	.190 ± .010 (4.83 ± .25)	.190 ± .010 (4.83 ± .25)	.090 ± .010 (2.29 ± .25)	.200 ± .015 (5.08 ± .38)
C062/ C066	CK06, CKR06	.290 ± .010 (7.37 ± .25)	.290 ± .010 (7.37 ± .25)	.090 ± .010 (2.29 ± .25)	.200 ± .015 (5.08 ± .38)



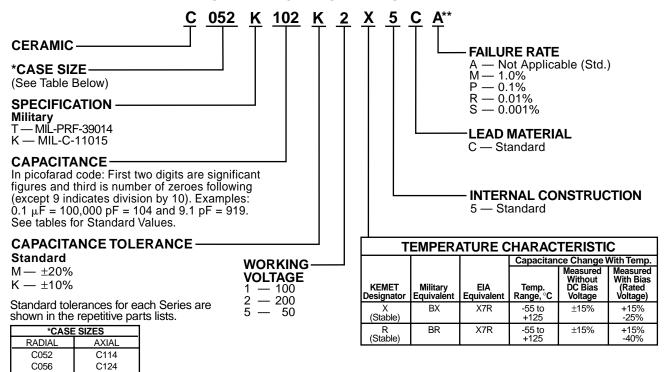
C062

C066

C192

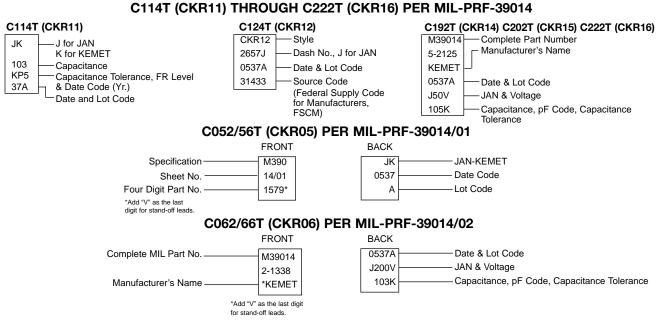
C202 C222





#### MARKING INFORMATION

\*\*Part Number Example: C052K102K2X5CA (14 digits – no spaces)



#### C114K (CK12) THROUGH C222K (CK16) PER MIL-C-11015

C114K (	CK12) C124K (CK13)	C192K (CK14) C202K (CK15) C222K (CK16)
KCK	├──KEMET, CK	K100V KEMET, Voltage
12BX	Style (12 or 13), Temp. Char. (BX or BR)	CK14BX — Style (14, 15 or 16), Temp. Char. (BX or BR)
102K	Capacitance, pF Code, Capacitance Tolerance	123K — Capacitance, pF Code, Capacitance Tolerance
0537	Date Code	0537 Date Code
	0050K (0K05) DED MIL 0 44045 (40 8 000	OK (OKOC) DED MIL O 44045/40

#### C052K (CK05) PER MIL-C-11015/18 & C062K (CK06) PER MIL-C-11015/19

	FRONT	BACK	
Style	CK05	200V	— Voltage
Temperature Characteristic —	вх	К	-KEMET
Capacitance, pF Code, Capacitance Tolerance	102K	0501	_ Date Code

# CERAMIC MOLDED/AXIAL — MIL-C-11015 & MIL-PRF-39014

STABLE TEMPERATURE CHARACTERISTICS—BX & BR (EIA-X7R)



#### **RATINGS & PART NUMBER REFERENCE**

CAP.	TOL.	KEMET	INGS & PART NUN		MIL-PRF-3	9014/05 Fo	r Failure Rate	e Levels (2)
pF	%	PART NUMBER	MIL-C-11015/20	MIL-PRF-39014/05	M	P	R	S
			OLT — C114 SIZE (MILI	TARY—CK12 or CKR11)				
10	10	C114( <u>1</u> )100K1X5C( <u>2</u> )	CK12BX100K	CKR11BX100K(2)	2601	2801	2001	2201
10	20	C114(1)100M1X5C(2)	CK12BX100M	CKR11BX100M(2)	2602	2802	2002	2202
12	10	C114( <u>1</u> )120K1X5C( <u>2</u> )	CK12BX120K	CKR11BX120K( <u>2</u> )	2603	2803	2003	2203
15	10	C114(1)150K1X5C(2)	CK12BX150K	CKR11BX150K( <u>2</u> )	2604	2804	2004	2204
15	20	C114( <u>1</u> )150M1X5C( <u>2</u> )	CK12BX150M	CKR11BX150M( <u>2</u> )	2605	2805	2005	2205
18 22	10 10	C114( <u>1</u> )180K1X5C( <u>2</u> ) C114(1)220K1X5C(2)	CK12BX180K CK12BX220K	CKR11BX180K( <u>2)</u> CKR11BX220K(2)	2606 2607	2806 2807	2006 2007	2206 2207
22	20	C114(1)220K1X3C(2) C114(1)220M1X5C(2)	CK12BX220K CK12BX220M	CKR11BX220M(2)	2608	2808	2007	2207
27	10	C114(1)270K1X5C(2)	CK12BX270K	CKR11BX270K(2)	2609	2809	2009	2209
33	10	C114(1)330K1X5C(2)	CK12BX330K	CKR11BX330K(2)	2610	2810	2010	2210
33	20	C114(1)330M1X5C(2)	CK12BX330M	CKR11BX330M(2)	2611	2811	2011	2211
39	10	C114( <u>1</u> )390K1X5C( <u>2</u> )	CK12BX390K	CKR11BX390K( <u>2</u> )	2612	2812	2012	2212
47	10	C114( <u>1</u> )470K1X5C( <u>2</u> )	CK12BX470K	CKR11BX470K( <u>2</u> )	2613	2813	2013	2213
47	20	C114( <u>1</u> )470M1X5C( <u>2</u> )	CK12BX470M	CKR11BX470M( <u>2</u> )	2614	2814	2014	2214
56	10 10	C114(1)560K1X5C(2)	CK12BX560K	CKR11BX560K( <u>2</u> )	2615	2815	2015	2215
68 68	20	C114(1)680K1X5C(2) C114(1)680M1X5C(2)	CK12BX680K CK12BX680M	CKR11BX680K( <u>2)</u> CKR11BX680M( <u>2</u> )	2616 2617	2816 2817	2016 2017	2216 2217
82	10	C114(1)820K1X5C(2)	CK12BX820K	CKR11BX820K(2)	2618	2818	2018	2218
100	10	C114(1)101K1X5C(2)	CK12BX101K	CKR11BX101K(2)	2619	2819	2019	2219
100	20	C114(1)101M1X5C(2)	CK12BX101M	CKR11BX101M(2)	2620	2820	2020	2220
120	10	C114( <u>1</u> )121K1X5C( <u>2</u> )	CK12BX121K	CKR11BX121K( <u>2</u> )	2621	2821	2021	2221
150	10	C114( <u>1</u> )151K1X5C( <u>2</u> )	CK12BX151K	CKR11BX151K( <u>2</u> )	2622	2822	2022	2222
150	20	C114( <u>1</u> )151M1X5C( <u>2</u> )	CK12BX151M	CKR11BX151M( <u>2</u> )	2623	2823	2023	2223
180	10	C114(1)181K1X5C(2)	CK12BX181K	CKR11BX181K( <u>2</u> )	2624	2824	2024	2224
220	10	C114(1)221K1X5C(2)	CK12BX221K	CKR11BX221K( <u>2</u> )	2625	2825	2025	2225 2226
220 270	20 10	C114( <u>1</u> )221M1X5C( <u>2</u> ) C114( <u>1</u> )271K1X5C( <u>2</u> )	CK12BX221M CK12BX271K	CKR11BX221M( <u>2</u> ) CKR11BX271K(2)	2626 2627	2826 2827	2026 2027	2226
330	10	C114(1)271K1X5C(2) C114(1)331K1X5C(2)	CK12BX331K	CKR11BX331K( <u>2</u> )	2628	2828	2027	2228
330	20	C114(1)331M1X5C(2)	CK12BX331M	CKR11BX331M(2)	2629	2829	2029	2229
390	10	C114(1)391K1X5C(2)	CK12BX391K	CKR11BX391K(2)	2630	2830	2030	2230
470	10	C114( <u>1</u> )471K1X5C( <u>2</u> )	CK12BX471K	CKR11BX471K( <u>2</u> )	2631	2831	2031	2231
470	20	C114( <u>1</u> )471M1X5C( <u>2</u> )	CK12BX471M	CKR11BX471M( <u>2</u> )	2632	2832	2032	2232
560	10	C114(1)561K1X5C(2)	CK12BX561K	CKR11BX561K( <u>2</u> )	2633	2833	2033	2233
680	10	C114(1)681K1X5C(2)	CK12BX681K	CKR11BX681K(2)	2634	2834	2034	2234
680 820	20 10	C114(1)681M1X5C(2) C114(1)821K1X5C(2)	CK12BX681M CK12BX821K	CKR11BX681M( <u>2</u> ) CKR11BX821K(2)	2635 2636	2835 2836	2035 2036	2235 2236
1,000	10	C114(1)102K1X5C(2)	CK12BX102K	CKR11BX102K(2)	2637	2837	2030	2237
1,000	20	C114(1)102M1X5C(2)	CK12BX102K	CKR11BX102M( <u>2</u> )	2638	2838	2038	2238
1,200	10	C114(1)122K1X5C(2)	CK12BX122K	CKR11BX122K(2)	2639	2839	2039	2239
1,500	10	C114(1)152K1X5C(2)	CK12BX152K	CKR11BX152K(2)	2640	2840	2040	2240
1,500	20	C114( <u>1</u> )152M1X5C( <u>2</u> )	CK12BX152M	CKR11BX152M( <u>2</u> )	2641	2841	2041	2241
1,800	10	C114(1)182K1X5C(2)	CK12BX182K	CKR11BX182K( <u>2</u> )	2642	2842	2042	2242
2,200	10	C114(1)222K1X5C(2)	CK12BX222K	CKR11BX222K( <u>2</u> )	2643	2843	2043	2243
2,200 2,700	20 10	C114( <u>1</u> )222M1X5C( <u>2</u> )	CK12BX222M	CKR11BX222M( <u>2</u> )	2644 2645	2844 2845	2044 2045	2244 2245
3,300	10	C114( <u>1</u> )272K1X5C( <u>2</u> ) C114(1)332K1X5C(2)	CK12BX272K CK12BX332K	CKR11BX272K( <u>2)</u> CKR11BX332K(2)	2646	2846	2043	2245
3,300	20	C114(1)332M1X5C(2)	CK12BX332M	CKR11BX332M2)	2647	2847	2047	2247
3,900	10	C114(1)392K1X5C(2)	CK12BX392K	CKR11BX392K(2)	2648	2848	2048	2248
4,700	10	C114(1)472K1X5C(2)	CK12BX472K	CKR11BX472K(2)	2649	2849	2049	2249
4,700	20	C114( <u>1</u> )472M1X5C( <u>2</u> )	CK12BX472M	CKR11BX472M <u>2</u> )	2650	2850	2050	2250
		50 V	OLT — C114 SIZE (MILI)	TARY—CK12 or CKR11)				
5,600	10	C114(1)562K5X5C(2)	CK12BX562K	CKR11BX562K(2)	2651	2851	2051	2251
6,800	10	C114(1)682K5X5C(2)	CK12BX682K	CKR11BX682K(2)	2652	2852	2052	2252
6,800	20	C114(1)682M5X5C(2)	CK12BX682M	CKR11BX682M( <u>2</u> )	2653	2853	2053	2253
8,200	10	C114(1)822K5X5C(2)	CK12BX822K	CKR11BX822K( <u>2</u> )	2654	2854	2054	2254
10,000 10,000	10 20	C114( <u>1</u> )103K5X5C( <u>2</u> ) C114(1)103M5X5C(2)	CK12BX103K CK12BX103M	CKR11BX103K( <u>2)</u> CKR11BX103M(2)	2655 2656	2855 2856	2055 2056	2255 2256
10,000	20			TARY—CK13 or CKR12)	2000		2000	2200
5,600	10	C124(1)562K1X5C(2)	CK13BX562K	CKR12BX562K( <u>2</u> )	2657	2857	2057	2257
6,800	10	C124(1)682K1X5C(2)	CK13BX682K	CKR12BX682K(2)	2658	2858	2058	2258
6,800	20	C124( <u>1</u> )682M1X5C( <u>2</u> )	CK13BX682M	CKR12BX682M( <u>2</u> )	2659	2859	2059	2259
8,200	10	C124(1)822K1X5C(2)	CK13BX822K	CKR12BX822K(2)	2660	2860	2060	2260
10,000	10	C124(1)103K1X5C(2)	CK13BX103K	CKR12BX103K( <u>2</u> )	2661	2861	2061	2261
10,000	20	C124( <u>1</u> )103M1X5C( <u>2</u> )	CK13BX103M	CKR12BX103M( <u>2</u> )	2662	2862	2062	2262
10.000	10		OLT — C124 SIZE (MILI)		0000	0000	0000	0000
12,000 15,000	10 10	C124( <u>1</u> )123K5X5C( <u>2</u> ) C124( <u>1</u> )153K5X5C( <u>2</u> )	CK13BX123K CK13BX153K	CKR12BX123K( <u>2)</u> CKR12BX153K( <u>2</u> )	2663 2664	2863 2864	2063 2064	2263 2264
15,000	20	C124(1)153K5X5C(2) C124(1)153M5X5C(2)	CK13BX153K CK13BX153M	CKR12BX153K( <u>2</u> ) CKR12BX153M( <u>2</u> )	2665	2865	2064	2265
18,000	10	C124(1)183K5X5C(2)	CK13BX183K	CKR12BX183K( <u>2</u> )	2666	2866	2066	2266
22,000	10	C124(1)223K5X5C(2)	CK13BX223K	CKR12BX223K(2)	2667	2867	2067	2267
22,000	20	C124(1)223M5X5C(2)	CK13BX223M	CKR12BX223M( <u>2</u> )	2668	2868	2068	2268
27,000	10	C124K273K5R5CA	CK13BR273K	]				
33,000	10	C124K333K5R5CA	CK13BR333K					
33,000	20	C124K333M5R5CA	CK13BR333M					
39,000	10	C124K393K5R5CA	CK13BR393K					
47,000 47,000	10 20	C124K473K5R5CA C124K473M5R5CA	CK13BR473K CK13BR473M					
47,000	20	U 124N47 SIVIUNUUA	UN IODN47 OW					

(1) Insert proper letter for specification: K — MIL-C-11015; T — MIL-PRF-39014 (2) Failure Rate Designator: A — Not applicable (MIL-C-11015); M — 1%/1000 Hours, P — .1%/1000 Hours, R — .01%/1000 Hours, S — .001%/1000 Hours (MIL-PRF-39014)



# CERAMIC MOLDED/AXIAL — MIL-C-11015 & MIL-PRF-39014

STABLE TEMPERATURE CHARACTERISTICS—BX & BR (EIA-X7R)

#### **RATINGS & PART NUMBER REFERENCE**

			INGS & PART NUM	BER REFERENCE	T			
CAP. pF	TOL. %	KEMET PART NUMBER	MIL-C-11015/20	MIL-PRF-39014/05	MIL-PRF-3	9014/05 Fo	r Failure Rat	e Levels (2)
,r.			— C124 SIZE (MILITARY	—CK13 or CKR12) (Conf	1	<u> </u>		
27,000	10	C124T273K5X5C(2)		CKR12BX273K( <u>2</u> )	2669	2869	2069	2269
33,000	10	C124T333K5X5C(2)		CKR12BX333K( <u>2</u> )	2670	2870	2070	2270
33,000 39,000	20 10	C124T333M5X5C( <u>2</u> ) C124T393K5X5C( <u>2</u> )		CKR12BX333M( <u>2)</u> CKR12BX393K(2)	2671 2672	2871 2872	2071 2072	2271 2272
47,000	10	C124T473K5X5C( <u>2</u> )		CKR12BX393K( <u>2</u> )	2673	2873	2072	2273
47,000	20	C124T473M5X5C(2)		CKR12BX473M( <u>2</u> )	2674	2874	2074	2274
		100 V	OLT — C192 SIZE (MILI	TARY—CK14 or CKR14)	l	ı		
12,000	10	C192(1)123K1X5C(2)	CK14BX123K	CKR14BX123K( <u>2</u> )	2675	2875	2075	2275
15,000	10	C192(1)153K1X5C(2)	CK14BX153K	CKR14BX153K(2)	2676	2876	2076	2276
15,000	20	C192(1)153M1X5C(2)	CK14BX153M	CKR14BX153M( <u>2</u> )	2677	2877	2077	2277
18,000 22,000	10 10	C192(1)183K1X5C(2) C192(1)223K1X5C(2)	CK14BX183K CK14BX223K	CKR14BX183K( <u>2)</u> CKR14BX223K(2)	2678 2679	2878 2879	2078 2079	2278 2279
22,000	20	C192(1)223M1X5C(2)	CK14BX223M	CKR14BX223M( <u>2</u> )	2680	2880	2080	2280
27,000	10	C192(1)273K1X5C(2)	CK14BX273K	CKR14BX273K(2)	2681	2881	2081	2281
33,000	10	C192( <u>1</u> )333K1X5C( <u>2</u> )	CK14BX333K	CKR14BX333K( <u>2</u> )	2682	2882	2082	2282
33,000	20	C192( <u>1</u> )333M1X5C( <u>2</u> )	CK14BX333M	CKR14BX333M( <u>2</u> )	2683	2883	2083	2283
39,000	10	C192(1)393K1X5C(2)	CK14BX393K	CKR14BX393K(2)	2684	2884	2084	2284
47,000 47,000	10 20	C192( <u>1</u> )473K1X5C( <u>2</u> ) C192(1)473M1X5C(2)	CK14BX473K CK14BX473M	CKR14BX473K( <u>2)</u> CKR14BX473M(2)	2685 2686	2885 2886	2085 2086	2285 2286
56,000	10	C192(1)563K1R5C(2)	CK14BR563K	CKR14BR563K(2)	2693	2893	2093	2293
68,000	10	C192(1)683K1R5C(2)	CK14BR683K	CKR14BR683K(2)	2694	2894	2094	2294
68,000	20	C192( <u>1</u> )683M1R5C( <u>2</u> )	CK14BR683M	CKR14BR683M( <u>2</u> )	2695	2895	2095	2295
82,000	10	C192( <u>1</u> )823K1R5C( <u>2</u> )	CK14BR823K	CKR14BR823K( <u>2</u> )	2696	2896	2096	2296
100,000	10	C192(1)104K1R5C(2)	CK14BR104K	CKR14BR104K( <u>2</u> )	2697	2897	2097	2297
100,000	20	C192( <u>1</u> )104M1R5C( <u>2</u> )	CK14BR104M	CKR14BR104M( <u>2</u> )	2698	2898	2098	2298
56,000	10	C192T563K5X5C(2)	OLT — C192 SIZE (MILIT	ARY—CK14 or CKR14) CKR14BX563K(2)	2687	2887	2087	2287
68,000	10	C192T683K5X5C(2)		CKR14BX683K(2)	2688	2888	2088	2288
68,000	20	C192T683M5X5C(2)		CKR14BX683M(2)	2689	2889	2089	2289
82,000	10	C192T823K5X5C(2)		CKR14BX823K( <u>2</u> )	2690	2890	2090	2290
100,000	10	C192T104K5X5C( <u>2</u> )		CKR14BX104K( <u>2</u> )	2691	2891	2091	2291
100,000 120,000	20 10	C192T104M5X5C( <u>2</u> ) C192( <u>1</u> )124K5R5C( <u>2</u> )	CK14BR124K	CKR14BX104M( <u>2)</u> CKR14BR124K( <u>2</u> )	2692 2699	2892 2899	2092 2099	2292 2299
150,000	10	C192(1)154K5R5C(2)	CK14BR154K	CKR14BR154K( <u>2</u> )	2700	2900	2100	2300
150,000	20	C192(1)154M5R5C(2)	CK14BR154M	CKR14BR154M(2)	2701	2901	2101	2301
180,000	10	C192(1)184K5R5C(2)	CK14BR184K	CKR14BR184K( <u>2</u> )	2702	2902	2102	2302
220,000	10	C192( <u>1</u> )224K5R5C( <u>2</u> )	CK14BR224K	CKR14BR224K( <u>2</u> )	2703	2903	2103	2303
220,000 270,000	20 10	C192(1)224M5R5C(2) C192(1)274K5R5C(2)	CK14BR224M CK14BR274K	CKR14BR224M( <u>2)</u> CKR14BR274K( <u>2</u> )	2704 2705	2904 2905	2104 2105	2304 2305
270,000	10		OLT — C202 SIZE (MILI	——————————————————————————————————————	2103	2303	2100	2000
56,000	10	C202T563K1X5C(2)	OLI — OZOZ GIZL (IVIILI	CKR15BX563K(2)	2706	2906	2106	2306
68,000	10	C202T683K1X5C(2)		CKR15BX683K(2)	2707	2907	2107	2307
68,000	20	C202T683M1X5C(2)		CKR15BX683M(2)	2708	2908	2108	2308
82,000	10	C202T823K1X5C( <u>2</u> )	OK4 FDV4 O 4K	CKR15BX823K( <u>2</u> )	2709	2909	2109	2309
100,000 100.000	10 20	C202( <u>1</u> )104K1X5C( <u>2</u> ) C202( <u>1</u> )104M1X5C( <u>2</u> )	CK15BX104K CK15BX104M	CKR15BX104K( <u>2)</u> CKR15BX104M( <u>2</u> )	2710 2711	2910 2911	2110 2111	2310 2311
120,000	10	C202(1)124K1R5C(2)	CK15BR124K	CKR15BR124K( <u>2</u> )	2712	2912	2112	2312
150,000	10	C202(1)154K1R5C(2)	CK15BR154K	CKR15BR154K(2)	2713	2913	2113	2313
150,000	20	C202(1)154M1R5C(2)	CK15BR154M	CKR15BR154M(2)	2714	2914	2114	2314
180,000	10	C202(1)184K1R5C(2)	CK15BR184K	CKR15BR184K( <u>2</u> )	2715	2915	2115	2315
220,000 220.000	10 20	C202( <u>1</u> )224K1R5C( <u>2</u> ) C202(1)224M1R5C(2)	CK15BR224K CK15BR224M	CKR15BR224K( <u>2)</u> CKR15BR224M(2)	2716 2717	2916 2917	2116 2117	2316 2317
270,000	10	C202(1)224MTR5C(2) C202(1)274K1R5C(2)	CK15BR224M CK15BR274K	CKR 15BR224M( <u>2)</u> CKR15BR274K( <u>2</u> )	2717	2917	2117	2317
330,000	10	C202(1)334K1R5C(2)	CK15BR334K	CKR15BR334K( <u>2</u> )	2719	2919	2119	2319
330,000	20	C202(1)334M1R5C(2)	CK15BR334M	CKR15BR334M( <u>2</u> )	2720	2920	2120	2320
		50 V	OLT — C202 SIZE (MILIT	ARY—CK15 or CKR15)				
470,000	10	C202( <u>1</u> )474K5R5C( <u>2</u> )	CK15BR474K	CKR15BR474K( <u>2</u> )	2721	2921	2121	2321
470,000	20	C202( <u>1</u> )474M5R5C( <u>2</u> )	CK15BR474M	CKR15BR474M( <u>2</u> )	2722	2922	2122	2322
680,000	10	C202T684K5R5C( <u>2</u> )		CKR15BR684K( <u>2</u> )	2723	2923	2123	2323
680,000 1,000,000	20 10	C202T684M5R5C( <u>2</u> ) C202(1)105K5R5C(2)	CK15BR105K	CKR15BR684M( <u>2</u> ) CKR15BR105K(2)	2724 2725	2924 2925	2124 2125	2324 2325
1,000,000	20	C202(1)105K5R5C(2)	CK15BR105M	CKR15BR105M( <u>2</u> )	2726	2926	2123	2326
			OLT — C222 SIZE (MILI		1	1	I .	•
470,000	10	C222( <u>1</u> )474K1R5C( <u>2</u> )	CK16BR474K	CKR16BR474K( <u>2</u> )	2727	2927	2127	2327
470,000	20	C222(1)474M1R5C(2)	CK16BR474M	CKR16BR474M( <u>2</u> )	2728	2928	2128	2328
680,000 680,000	10 20	C222T684K1R5C( <u>2</u> )		CKR16BR684K( <u>2</u> )	2729	2929	2129	2329
1,000,000	10	C222T684M1R5C( <u>2</u> ) C222( <u>1</u> )105K1R5C( <u>2</u> )	CK16BR105K	CKR16BR684M( <u>2</u> ) CKR16BR105K(2)	2730 2731	2930 2931	2130 2131	2330 2331
1,000,000	20	C222( <u>1</u> )105K1R5C( <u>2</u> ) C222( <u>1</u> )105M1R5C( <u>2</u> )	CK16BR105M	CKR16BR105M( <u>2</u> )	2732	2932	2131	2332
,,		— — — — — — — — — — — — — — — — — — —	OLT — C222 SIZE (MILIT	\— <b>/</b>		1		
2,200,000	10	C222(1)225K5R5C(2)	CK16BR225K	CKR16BR225K( <u>2</u> )	2733	2933	2133	2333
2,200,000	20	C222(1)225M5R5C(2)	CK16BR225M	CKR16BR225M(2)	2734	2934	2134	2334
3,300,000	10	C222(1)335K5R5C(2)	CK16BR335M	CKR16BR335K( <u>2</u> )	2735	2935	2135	2335
3,300,000	20	C222( <u>1</u> )335M5R5C( <u>2</u> )	CK16BR335M	CKR16BR335M( <u>2</u> )	2736	2936	2136	2336

(1) Insert proper letter for specification: K — MIL-C-11015; T — MIL-PRF-39014 (2) Failure Rate Designator: A — Not applicable (MIL-C-11015); M — 1%/1000 Hours, P — .1%/1000 Hours, R — .01%/1000 Hours, S — .001%/1000 Hours (MIL-PRF-39014)

# CERAMIC MOLDED/RADIAL — MIL-C-11015 & MIL-PRF-39014

STABLE TEMPERATURE CHARACTERISTICS—BX & BR (EIA-X7R)



#### **BATINGS & PART NUMBER REFERENCE**

CARD   TOL   Pr		RATINGS & PART NUMBER REFERENCE										
10				MIL-C-11015/18	MIL-PRF-39014/01							
10	Pr	/0		T — C052/C056 SIZE (M	LITARY—CK05 or CKR0	1	<u> </u>	n n				
10	10	10				1201(3)	1241(3)	1281(3)	1321(3)			
15	10						1242(3)	1282( <u>3</u> )	1322( <u>3</u> )			
15   20   COSH(1)   SOMEONE   CKOSS   SOMEONE   CKRSS   SOMEONE   CKRSS   SOMEONE   CKRSS   SOMEONE   CKRSS   SOMEONE   CKRSS   SOMEONE   CKRSS   SOMEONE   CKRSS   SOMEONE   CKRSS   SOMEONE   CKRSS   SOMEONE   CKRSS   SOMEONE   CKRSS   SOMEONE   CKRSS   SOMEONE   CKRSS   SOMEONE   CKRSS   SOMEONE   CKRSS   SOMEONE   CKRSS   SOMEONE   CKRSS   SOMEONE   CKRSS   SOMEONE   CKRSS   SOMEONE   CKRSS   SOMEONE   CKRSS   SOMEONE   CKRSS   SOMEONE   CKRSS   SOMEONE   CKRSS   SOMEONE   CKRSS   SOMEONE   CKRSS   SOMEONE   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS   CKRSS						1203( <u>3</u> )						
18						1204(3)			1324( <u>3</u> )			
222   10												
222   20												
33   10   CDS-(c)(1)390/E2/SC/2)   CNOSBX390M   CHROSBX390M(2)(3)   1210(3)   1250(3)   1290(3)   1390(3)   330   330   31   01   0256(1)390/E2/SC/2)   CNOSBX390M   CHROSBX390M(2)(3)   1210(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)   1211(3)	22		$C05(\overline{4})(\overline{1})220M2X5C(\overline{2})$	CK05BX220M	CKR05BX220M(2)(3)	1208(3)	1248( <u>3</u> )	1288( <u>3</u> )	1328(3)			
33   20	27											
39	33				CKR05BX330K( <u>2</u> )( <u>3</u> )							
47	39				CKR05BX390K(2)(3)	1211(3)	1251( <u>3)</u>	1291(3)	1332(3)			
56												
68   10   COSéd() GBORZESC(2)   CKOSBX890M   CKROSBX890K(2) G  121(G)   125(G)   125(G)   133(G)   133(G)   120   10   COSÉD() GBORZESC(2)   CKOSBX890M   CKROSBX890K(2) G  121(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)   125(G)												
68   20   C054(I)(1890M2XSC)2   CK05BX880M   CKR95BX80M2(3)   1217(3)   1257(3)   1397(3)   1398(3)   1308   1308   1308   1208   1208   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   1308   130												
B82					CKRUSBX68UK( <u>2)(3)</u> CKRUSBX68UM(2)(3)							
100								1298(3)	1338(3)			
100   20	100		C05(4)(1)101K2X5C(2)	CK05BX101K	CKR05BX101K( <u>2</u> )( <u>3</u> )	1219( <u>3</u> )	1259( <u>3</u> )	1299( <u>3</u> )	1339( <u>3</u> )			
150								1300( <u>3</u> )				
150   20												
180					CKRU5BX151K( <u>2</u> )( <u>3</u> )							
220					CKR05BX151W( <u>2)(3)</u> CKR05BX181K(2)(3)							
220												
330	220	20	$C05(\overline{4})(\overline{1})221M2X5C(\overline{2})$	CK05BX221M	CKR05BX221M(2)(3)	1226(3)	1266( <u>3</u> )	1306( <u>3</u> )	1346( <u>3</u> )			
330 20 C05(4)(1)331M2X5C(2) CK05BX331M CKR05BX331M(2)3 122(3) 126(8)3 1309(9) 1349(9) 470 10 C05(4)(1)471M2X5C(2) CK05BX4371K CKR05BX391K(2)3 123(3) 127(3) 1311(3) 135(3) 470 20 C05(4)(1)471M2X5C(2) CK05BX471M CKR05BX471M(2)3 123(2) 127(3) 1311(3) 135(3) 560 10 C05(4)(1)451M2X5C(2) CK05BX471M CKR05BX471M(2)3 123(2) 127(3) 1313(3) 1352(3) 560 10 C05(4)(1)561K2X5C(2) CK05BX681K CKR05BX681K(2)3 1234(3) 1274(3) 1313(3) 1353(3) 680 10 C05(4)(1)681M2X5C(2) CK05BX681K CKR05BX681K(2)3 1234(3) 1274(3) 1314(3) 1354(3) 680 20 C05(4)(1)681M2X5C(2) CK05BX681K CKR05BX681M(2)3 1234(3) 1274(3) 1314(3) 1354(3) 820 10 C05(4)(1)681M2X5C(2) CK05BX681K CKR05BX681M(2)3 1235(3) 1275(3) 1315(3) 1355(3) 1,000 20 C05(4)(1)162K2X5C(2) CK05BX681K CKR05BX681M(2)(3) 1235(3) 1277(3) 1317(3) 1355(3) 1,000 20 C05(4)(1)162K2X5C(2) CK05BX61K2K CKR05BX12K(2)(3) 123(3) 1277(3) 1317(3) 1357(3) 1,000 20 C05(4)(1)162K2X5C(2) CK05BX12K(2) CK05BX12K(2)(3) 123(3) 123(3) 1277(3) 1317(3) 1357(3) 1,000 10 C05(4)(1)162K2X5C(2) CK05BX12K(2) CKR05BX12K(2)(3) 123(3) 123(3) 123(3) 1358(3) 1.200 10 C05(4)(1)162K1X5C(2) CK05BX12K(2) CKR05BX12K(2)(3) 123(3) 123(3) 135(3) 135(3) 1.500 10 C05(4)(1)162K1X5C(2) CK05BX12K(2) CKR05BX12K(2)(3) 123(3) 123(3) 135(3) 135(3) 1.500 10 C05(4)(1)162K1X5C(2) CK05BX12K(2) CKR05BX12K(2)(3) 1240(3) 1280(3) 1320(3) 1360(3) 1.500 10 C05(4)(1)162K1X5C(2) CK05BX12K(2) CKR05BX12K(2)(3) 1441(3) 1441(3) 143(3) 152(3) 1561(3) 1.500 10 C05(4)(1)162K1X5C(2) CK05BX12K(2) CKR05BX12K(2)(3) 1441(3) 1441(3) 152(3) 1561(3) 1.500 10 C05(4)(1)162K1X5C(2) CK05BX12K(2) CKR05BX12K(2)(3) 1441(3) 1441(3) 152(3) 1561(3) 1.500 10 C05(4)(1)162K1X5C(2) CK05BX12K(2) CKR05BX12K(2)(3) 1441(3) 1441(3) 1441(3) 152(3) 1561(3) 1.500 10 C05(4)(1)162K1X5C(2) CK05BX12K(2) CKR05BX12K(2)(3) 1441(3) 1441(3) 1441(3) 152(3) 1561(3) 1.500 10 C05(4)(1)162K1X5C(2) CK05BX12K(2) CKR05BX12K(2)(3) 1441(3) 1441(3) 1441(3) 152(3) 1561(3) 1.500 10 C05(4)(1)162K1X5C(2) CK05BX2K(2) CKR05BX3K(2)(3) 1441(3) 1441(3) 1441(3) 152(3) 1561(3) 1.500 10 C05(4)(1)162K1X5C(2) CK05BX3K(2) CKR05BX				CK05BX271K	CKR05BX271K(2)(3)							
390   10   C05(4)(1)391K2X5C(2)   CK05BX391K   CKR05BX391K(2)(3   1230(3)   1270(3)   1310(3)   1351(3)   470   10   C05(4)(1)471K2X5C(2)   CK05BX471K   CKR05BX471K(2)(3)   1231(3)   1271(3)   1311(3)   1351(3)   470   20   C05(4)(1)471M2X5C(2)   CK05BX471K   CKR05BX561K(2)(3)   1233(3)   1273(3)   1312(3)   1351(3)   1351(3)   680   10   C05(4)(1)681K2X5C(2)   CK05BX681K   CKR05BX561K(2)(3)   1234(3)   1274(3)   1314(3)   1354(3)   680   20   C05(4)(1)681K2X5C(2)   CK05BX681K   CKR05BX681K(2)(3)   1236(3)   1274(3)   1314(3)   1354(3)   1300(4)   10   10   10   10   10   10   10   1												
470 10 C05(4)(1)471/182/SC(2) CK05BX471K CKR05BX471K(2)(3) 123(3) 127(3) 1311(3) 1351(3) 551(3) 560 10 C05(4)(1)561K2/SC(2) CK05BX561K CKR05BX561K(2)(3) 123(2) 127(3) 131(3) 1352(3) 560 10 C05(4)(1)661K2/SC(2) CK05BX561K CKR05BX61K(2)(3) 123(3) 127(3) 1313(3) 1353(3) 680 10 C05(4)(1)661K2/SC(2) CK05BX681K CKR05BX61K(2)(3) 1234(3) 1274(3) 1314(3) 1353(3) 680 10 C05(4)(1)661K2/SC(2) CK05BX681K CKR05BX61K(2)(3) 1236(3) 1275(3) 1315(3) 1355(3) 10 C05(4)(1)621K2/SC(2) CK05BX681K CKR05BX61K(2)(3) 1236(3) 1275(3) 1315(3) 1355(3) 10 C05(4)(1)621K2/SC(2) CK05BX102K CKR05BX61K2/(2) 1236(3) 1275(3) 1315(3) 1356(3) 1,000 10 C05(4)(1)102K2/SC(2) CK05BX102K CKR05BX61K2/(2)(3) 1237(3) 1277(3) 1317(3) 1357(3) 130(3) 130(3) 130(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4) 120(4)	330								1349( <u>3)</u>			
470   20   CO564/113471M2K5C/2)   CKOBSK471M   CKROGSX471M/2(3)   1223(3)   1272(3)   1312(3)   1352(3)   680   10   CO564/116811K2K5C/2)   CKOBSK681K   CKROGSX681K2(3)   1234(3)   1234(3)   1234(3)   1314(3)   1354(3)   680   20   CO564/11681M2K5C/2)   CKOBSK681K   CKROGSX681K2(3)   1234(3)   1274(3)   1314(3)   1354(3)   680   20   CO564/11681K2K5C/2)   CKOBSK681K   CKROGSX681K2(3)   1236(3)   1276(3)   1316(3)   1356(3)   1,000   10   CO564/1102K2K5C/2)   CKOBSK102K   CKROGSX681K2(3)   1237(3)   1277(3)   1317(3)   1357(3)   1,000   20   CO564/1102K2K5C/2)   CKOBSK102K   CKROGSX102K(3)   1237(3)   1277(3)   1317(3)   1357(3)   1,000   20   CO564/1102K2K5C/2)   CKOBSK102K   CKROGSX102K(3)   1237(3)   1277(3)   1317(3)   1357(3)   1,000   10   CO564/1102K2K5C/2)   CKOSSK102K12K   CKROGSX102K(3)   1238(3)   1278(3)   1318(3)   1358(3)   1,000   10   CO564/1102K1X5C/2)   CKOSSK112ZK   CKROGSK102K(2)(3)   1239(3)   1279(3)   1318(3)   1358(3)   1,500   10   CO564/1102K1X5C/2)   CKOSSK112K   CKROGSK12K(2)(3)   1240(3)   1280(3)   1320(3)   1360(3)   1,500   20   CO564/1102K1X5C/2)   CKOSSK112K   CKROGSK15K2K(2)(3)   1441(3)   1481(3)   1521(3)   1561(3)   1,800   10   CO564/1102K1X5C/2)   CKOSSK132K   CKROGSK12K2K(2)(3)   1444(3)   1481(3)   1522(3)   1562(3)   1,500   20   CO564/1102K1X5C/2)   CKOSSK132K   CKROGSK22KL(2)(3)   1444(3)   1482(3)   1522(3)   1562(3)   1,500   20   CO564/1102K1X5C/2)   CKOSSK32K2K   CKROSSK22KL(2)(3)   1444(3)   1482(3)   1522(3)   1562(3)   1,500   20   CO564/1102K1X5C/2)   CKOSSK32K2K   CKROSSK27KL(2)(3)   1444(3)   1484(3)   1524(3)   1564(3)   1,500   20   CO564/1102K1X5C/2)   CKOSSK32K2K   CKROSSK27KL(2)(3)   1444(3)   1484(3)   1524(3)   1564(3)   1,500   20   CO564/1103K1X5C/2)   CKOSSK332K   CKROSSK32KL(2)(3)   1444(3)   1484(3)   1524(3)   1564(3)   1,500   20   CO564/1103K1X5C/2)   CKOSSK332K   CKROSSK32KL(2)(3)   1444(3)   1484(3)   1524(3)   1564(3)   1,500   20   CO564/1103K1X5C/2)   CKOSSK332K   CKROSSK32KL(2)(3)   1444(3)   1484(3)   1584(3)   1568(3)   1,500   20									1351(3)			
680   10	470				CKR05BX471M(2)(3)			1312( <u>3</u> )	1352( <u>3</u> )			
680   20					CKR05BX561K( <u>2)(3)</u>		1273( <u>3</u> )		1353( <u>3</u> )			
B20							1274( <u>3</u> )		1354( <u>3</u> )			
1,000												
1,000												
1,200								1318(3)				
1,200			100 VOL	T — C052/C056 SIZE (M	ILITARY—CK05 or CKR0	5)		, ,				
1,500   20   C05[4](i]152M1X5C(2)   CK05BX182M   CKR05BX182K(2)(3)   1441(3)   1481(3)   1521(3)   1561(3)   2,200   10   C05(4)(1)22K1X5C(2)   CK05BX222K   CKR05BX182K(2)(3)   1443(3)   1483(3)   1523(3)   1563(3)   2,200   20   C05(4)(1)22M1X5C(2)   CK05BX222K   CKR05BX22K(2)(3)   1444(3)   1483(3)   1523(3)   1563(3)   2,700   10   C05(4)(1)272K1X5C(2)   CK05BX222K   CKR05BX272K(2)(3)   1444(3)   1484(3)   1524(3)   1564(3)   1563(3)   3,300   10   C05(4)(1)32X1X5C(2)   CK05BX322K   CKR05BX272K(2)(3)   1444(3)   1445(3)   1526(3)   1566(3)   3,300   20   C05(4)(1)332K1X5C(2)   CK05BX332K   CKR05BX32X(2)(3)   1446(3)   1486(3)   1526(3)   1566(3)   3,300   10   C05(4)(1)32X1X5C(2)   CK05BX332K   CKR05BX332K(2)(3)   1447(3)   1487(3)   1527(3)   1567(3)   3,900   10   C05(4)(1)472K1X5C(2)   CK05BX332K   CKR05BX332K(2)(3)   1448(3)   1488(3)   1528(3)   1568(3)   4,700   10   C05(4)(1)472K1X5C(2)   CK05BX472K   CKR05BX472K(2)(3)   1448(3)   1489(3)   1528(3)   1569(3)   4,700   20   C05(4)(1)472K1X5C(2)   CK05BX472K   CKR05BX472K(2)(3)   1449(3)   1489(3)   1529(3)   1569(3)   4,700   20   C05(4)(1)472K1X5C(2)   CK05BX62K   CKR05BX62K(2)(3)   1451(3)   1491(3)   1531(3)   1571(3)   5,600   10   C05(4)(1)62K1X5C(2)   CK05BX62K   CKR05BX62K(2)(3)   1451(3)   1491(3)   1531(3)   1571(3)   6,800   10   C05(4)(1)62K1X5C(2)   CK05BX62K   CKR05BX62K(2)(3)   1451(3)   1492(3)   1533(3)   1573(3)   6,800   20   C05(4)(1)62K1X5C(2)   CK05BX62K   CKR05BX62K(2)(3)   1451(3)   1492(3)   1533(3)   1573(3)   1,600   10   C05(4)(1)62K1X5C(2)   CK05BX62K   CKR05BX62K(2)(3)   1451(3)   1492(3)   1533(3)   1573(3)   1,600   10   C05(4)(1)62K1X5C(2)   CK05BX62K   CKR05BX62K(2)(3)   1451(3)   1492(3)   1533(3)   1573(3)   1,600   10   C05(4)(1)62K1X5C(2)   CK05BX62K   CKR05BX62K(2)(3)   1451(3)   1492(3)   1533(3)   1573(3)   1,600   10   C05(4)(1)63K1X5C(2)   CK05BX62K   CKR05BX133K   CKR05BX133K(2)(3)   1456(3)   1496(3)   1536(3)   1576(3)   1,600   10   C05(4)(1)63K1X5C(2)   CK05BX133K   CKR05BX133K(2)(3)   1456(3)   1496(3)				CK05BX122K	CKR05BX122K( <u>2</u> )( <u>3</u> )	1239( <u>3</u> )						
1,800									1360( <u>3</u> )			
2,200									1561(3)			
2,200   20   CO5(4)(1)222M1X5C(2)   CKO5BX22ZM   CKRO5BX22ZM(2)(3)   1444(3)   1484(3)   1524(3)   1564(3)   3,300   10   CO5(4)(1)332K1X5C(2)   CKO5BX332K   CKRO5BX332K(2)(3)   1446(3)   1486(3)   1526(3)   1566(3)   3,300   20   CO5(4)(1)332M1X5C(2)   CKO5BX332K   CKRO5BX332K(2)(3)   1446(3)   1486(3)   1526(3)   1566(3)   3,300   10   CO5(4)(1)332M1X5C(2)   CKO5BX332K   CKRO5BX332K(2)(3)   1447(3)   1447(3)   1487(3)   1527(3)   1567(3)   3,900   10   CO5(4)(1)472M1X5C(2)   CKO5BX32K   CKRO5BX392K(2)(3)   1448(3)   1488(3)   1528(3)   1528(3)   1568(3)   4,700   10   CO5(4)(1)472M1X5C(2)   CKO5BX472K   CKRO5BX472K(2)(3)   1449(3)   1489(3)   1529(3)   1568(3)   4,700   20   CO5(4)(1)472M1X5C(2)   CKO5BX472K   CKRO5BX472K(2)(3)   1449(3)   1489(3)   1529(3)   1550(3)   1570(3)   5,600   10   CO5(4)(1)562K1X5C(2)   CKO5BX562K   CKRO5BX62K(2)(3)   1451(3)   1491(3)   1531(3)   1571(3)   6,800   10   CO5(4)(1)682K1X5C(2)   CKO5BX682K   CKRO5BX62K(2)(3)   1451(3)   1491(3)   1531(3)   1571(3)   6,800   20   CO5(4)(1)682K1X5C(2)   CKO5BX682K   CKRO5BX62K(2)(3)   1452(3)   1492(3)   1533(3)   1573(3)   8,200   10   CO5(4)(1)103X1X5C(2)   CKO5BX682K   CKRO5BX62K(2)(3)   1454(3)   1494(3)   1534(3)   1574(3)   10,000   20   CO5(4)(1)103X1X5C(2)   CKO5BX103K   CKRO5BX103K(2)(3)   1456(3)   1496(3)   1536(3)   1576(3)   10,000   20   CO5(4)(1)103M1X5C(2)   CKO5BX103K   CKRO5BX103K(2)(3)   1456(3)   1496(3)   1536(3)   1576(3)   15,000   20   CO5(4)(1)133K5X5C(2)   CKO5BX103K   CKRO5BX123K(2)(3)   1456(3)   1496(3)   1538(3)   1578(3)   15,000   20   CO5(4)(1)133K5X5C(2)   CKO5BX123K   CKRO5BX123K(2)(3)   1457(3)   1497(3)   1537(3)   1577(3)   15,000   20   CO5(4)(1)133K5X5C(2)   CKO5BX123K   CKRO5BX123K(2)(3)   1456(3)   1499(3)   1538(3)   1578(3)   15,000   20   CO5(4)(1)133K5X5C(2)   CKO5BX123K   CKRO5BX123K(2)(3)   1456(3)   1499(3)   1538(3)   1578(3)   15,000   20   CO5(4)(1)133M5X5C(2)   CKO5BX233K   CKRO5BX23X(2)(3)   1461(3)   1501(3)   1541(3)   1581(3)   1581(3)   1581(3)   1581(3)   1581(3)   1581(3)   1												
2,700												
3,300   20	2,700	10		CK05BX272K	CKR05BX272K( <u>2)(3)</u>	1445( <u>3</u> )		1525( <u>3</u> )	1565( <u>3</u> )			
3,900												
4,700												
4,700   20	1 1 700		005(4)(4)(50(6)	01/0550/4701/			4 400 (0)	4500	4500(0)			
5,600									1570( <u>3</u> )			
6,800   20	5,600	10	C05(4)(1)562K1X5C(2)	CK05BX562K	CKR05BX562K(2)(3)	1451( <u>3</u> )	1491( <u>3</u> )	1531( <u>3</u> )	1571( <u>3</u> )			
8,200												
10,000							1493( <u>3</u> )		15/3( <u>3)</u>   1574(3)			
10,000   20												
12,000							1496( <u>3</u> )					
15,000			50 VOLT	Г — C052/C056 SIZE (MI	LITARY—CK05 or CKR05							
15,000						1457( <u>3</u> )	1497(3)	1537( <u>3</u> )	1577( <u>3</u> )			
18,000         10         C05(4)(1)183K5X5C(2)         CK05BX183K         CKR05BX183K(2)(3)         1460(3)         1500(3)         1540(3)         1580(3)           22,000         10         C05(4)(1)223K5X5C(2)         CK05BX223K         CKR05BX223K(2)(3)         1461(3)         1501(3)         1541(3)         1581(3)           22,000         20         C05(4)(1)223M5X5C(2)         CK05BX223M         CKR05BX223M(2)(3)         1462(3)         1502(3)         1542(3)         1582(3)           27,000         10         C05(4)(1)273K5X5C(2)         CK05BX273K         CKR05BX273K(2)(3)         1463(3)         1503(3)         1543(3)         1583(3)           33,000         10         C05(4)(1)333M5X5C(2)         CK05BX333K         CKR05BX333K(2)(3)         1464(3)         1504(3)         1543(3)         1585(3)           39,000         10         C05(4)(1)333M5X5C(2)         CK05BX333M         CKR05BX333M(2)(3)         1466(3)         1506(3)         1545(3)         1585(3)           39,000         10         C05(4)(1)393K5X5C(2)         CK05BX333M         CKR05BX333M(2)(3)         1466(3)         1506(3)         1546(3)         1586(3)           47,000         10         C05(4)(1)473M5X5C(2)         CK05BX473K         CKR05BX473K(2)(3)         1467(3)         1507(												
22,000												
22,000         20         C05(4)(1)223M5X5C(2)         CK05BX223M         CKR05BX223M(2)(3)         1462(3)         1502(3)         1542(3)         1582(3)           27,000         10         C05(4)(1)273K5X5C(2)         CK05BX273K         CKR05BX273K(2)(3)         1463(3)         1503(3)         1543(3)         1583(3)           33,000         10         C05(4)(1)333M5X5C(2)         CK05BX333M         CKR05BX333K(2)(3)         1464(3)         1504(3)         1544(3)         1584(3)           39,000         20         C05(4)(1)393K5X5C(2)         CK05BX333M         CKR05BX333M(2)(3)         1465(3)         1506(3)         1545(3)         1586(3)           47,000         10         C05(4)(1)473K5X5C(2)         CK05BX333K         CKR05BX473K(2)(3)         1467(3)         1507(3)         1547(3)         1587(3)           47,000         10         C05(4)(1)473K5X5C(2)         CK05BX473K         CKR05BX473K(2)(3)         1467(3)         1507(3)         1547(3)         1587(3)           47,000         20         C05(4)(1)473M5X5C(2)         CK05BX473M         CKR05BX473M(2)(3)         1468(3)         1508(3)         1548(3)         1588(3)           56,000         10         C05(4)(1)683K5X5C(2)         CK05BX63K         CKR05BX63K(2)(3)         1469(3)         1509(3)												
27,000									1582(3)			
33,000   20	27,000	10	C05(4)(1)273K5X5C(2)	CK05BX273K	CKR05BX273K( <u>2)(3)</u>	1463( <u>3</u> )	1503( <u>3</u> )	1543( <u>3</u> )	1583( <u>3</u> )			
39,000   10												
47,000         10         C05(4)(1)473K5X5C(2)         CK05BX473K         CKR05BX473K(2)(3)         1467(3)         1507(3)         1547(3)         1587(3)           47,000         20         C05(4)(1)473M5X5C(2)         CK05BX473M         CKR05BX473M(2)(3)         1468(3)         1508(3)         1548(3)         1588(3)           56,000         10         C05(4)(1)683K5X5C(2)         CK05BX563K         CKR05BX563K(2)(3)         1470(3)         1510(3)         1550(3)         1589(3)           68,000         20         C05(4)(1)683M5X5C(2)         CK05BX863M         CKR05BX683M(2)(3)         1471(3)         1511(3)         1551(3)         1591(3)           82,000         10         C05(4)(1)823K5X5C(2)         CK05BX823K         CKR05BX823K(2)(3)         1472(3)         1512(3)         1552(3)         1592(3)           100,000         10         C05(4)(1)104K5X5C(2)         CK05BX104K         CKR05BX104K(2)(3)         1473(3)         1513(3)         1553(3)         1593(3)												
47,000         20         C05(4)(1)473M5X5C(2)         CK05BX473M         CKR05BX473M(2)(3)         1468(3)         1508(3)         1548(3)         1588(3)           56,000         10         C05(4)(1)663K5X5C(2)         CK05BX563K         CKR05BX563K(2)(3)         1469(3)         1509(3)         1549(3)         1589(3)           68,000         10         C05(4)(1)683K5X5C(2)         CK05BX683K         CKR05BX683K(2)(3)         1470(3)         1510(3)         1550(3)         1590(3)           82,000         10         C05(4)(1)823K5X5C(2)         CK05BX823K         CKR05BX823K(2)(3)         1471(3)         1511(3)         1551(3)         1592(3)           100,000         10         C05(4)(1)104K5X5C(2)         CK05BX104K         CKR05BX104K(2)(3)         1473(3)         1513(3)         1553(3)         1593(3)												
56,000         10         C05(4)(1)563K5X5C(2)         CK05BX563K         CKR05BX563K(2)(3)         1469(3)         1509(3)         1549(3)         1589(3)           68,000         10         C05(4)(1)683K5X5C(2)         CK05BX683K         CKR05BX683K(2)(3)         1470(3)         1510(3)         1550(3)         1590(3)           68,000         20         C05(4)(1)683M5X5C(2)         CK05BX683M         CKR05BX683M(2)(3)         1471(3)         1511(3)         1551(3)         1591(3)           82,000         10         C05(4)(1)823K5X5C(2)         CK05BX823K         CKR05BX823K(2)(3)         1472(3)         1512(3)         1552(3)         1592(3)           100,000         10         C05(4)(1)104K5X5C(2)         CK05BX104K         CKR05BX104K(2)(3)         1473(3)         1513(3)         1553(3)         1593(3)												
68,000   20   C05(4)(1)683M5X5C(2)   CK05BX683M   CKR05BX683M(2)(3)   1471(3)   1511(3)   1551(3)   1591(3)   82,000   10   C05(4)(1)823K5X5C(2)   CK05BX823K   CKR05BX823K(2)(3)   1472(3)   1512(3)   1552(3)   1592(3)   100,000   10   C05(4)(1)104K5X5C(2)   CK05BX104K   CKR05BX104K(2)(3)   1473(3)   1513(3)   1553(3)   1593(3)	56,000	10	C05(4)(1)563K5X5C(2)	CK05BX563K	CKR05BX563K(2)(3)	1469(3)	1509( <u>3</u> )	1549( <u>3</u> )	1589( <u>3</u> )			
82,000   10   C05(4)(1)823K5X5C(2)   CK05BX823K   CKR05BX823K(2)(3)   1472(3)   1512(3)   1552(3)   1592(3)   100,000   10   C05(4)(1)104K5X5C(2)   CK05BX104K   CKR05BX104K(2)(3)   1473(3)   1513(3)   1553(3)   1593(3)												
100,000   10   C05⑷(1)104K5X5C(2)   CK05BX104K   CKR05BX104K(2)(3)   1473(3)   1513(3)   1553(3)   1593( <u>3</u> )												
									1592( <u>3</u> ) 1593(3)			

<sup>(1)</sup> Insert proper letter for specification: K — MIL-C-11015; T — MIL-PRF-39014 (2) Failure Rate Designator: A — Not applicable (MIL-C-11015); M — 1%/1000 Hours, P — .1%/1000 Hours, R — .01%/1000 Hours, S — .001%/1000 Hours (MIL-PRF-39014) (3) Insert "V" for standard design (C056). Leave blank for the flat bottom design (C052). (4) Insert "2" for standard design (Style C052) Note: Stand-offs are available only Insert "6" for stand-off design (Style C056) with the CKR, not the CK.



# CERAMIC MOLDED/RADIAL — MIL-C-11015 & MIL-PRF-39014

STABLE TEMPERATURE CHARACTERISTICS—BX & BR (EIA-X7R)

#### **RATINGS & PART NUMBER REFERENCE**

CAP.	TOL.	KEMET	MII C 44045/40	MIL DDE 20044/22	MIL-PRF-3	9014/02 For	Failure Rat	e Levels (2)
pF	%	PART NUMBER	MIL-C-11015/19	MIL-PRF-39014/02	М	Р	R	S
		200 VOL	T — C062/C066 SIZE (M	IILITARY—CK06 or CKR0	6)			
1,200	10	C06( <u>4</u> )( <u>1</u> )122K2X5C( <u>2</u> )	CK06BX122K	CKR06BX122K( <u>2</u> )( <u>3</u> )	1201( <u>3</u> )	1241( <u>3</u> )	1281( <u>3</u> )	1321( <u>3</u> )
1,500	10	C06(4)(1)152K2X5C(2)	CK06BX152K	CKR06BX152K( <u>2</u> )( <u>3</u> )	1202( <u>3</u> )	1242( <u>3</u> )	1282( <u>3</u> )	1322( <u>3</u> )
1,500	20	C06(4)(1)152M2X5C(2)	CK06BX152M	CKR06BX152M( <u>2</u> )( <u>3</u> )	1203( <u>3</u> )	1243( <u>3</u> )	1283( <u>3</u> )	1323( <u>3</u> )
1,800	10	C06(4)(1)182K2X5C(2)	CK06BX182K	CKR06BX182K(2)(3)	1204( <u>3</u> )	1244( <u>3</u> )	1284( <u>3</u> )	1324( <u>3</u> )
2,200	10	C06(4)(1)222K2X5C(2)	CK06BX222K	CKR06BX222K( <u>2</u> )( <u>3</u> )	1206( <u>3</u> )	1246( <u>3</u> )	1286( <u>3</u> )	1326( <u>3</u> )
2,200	20	C06(4)(1)222M2X5C(2)	CK06BX222M	CKR06BX222M(2)(3)	1207( <u>3</u> )	1247( <u>3</u> )	1287( <u>3</u> )	1327( <u>3</u> )
2,700	10	C06(4)(1)272K2X5C(2)	CK06BX272K	CKR06BX272K(2)(3)	1208( <u>3</u> )	1248( <u>3</u> )	1288( <u>3</u> )	1328( <u>3</u> )
3,300	10	C06(4)(1)332K2X5C(2)	CK06BX332K	CKR06BX332K(2)(3)	1209( <u>3</u> )	1249( <u>3</u> )	1289(3)	1329( <u>3</u> )
3,300	20	C06(4)(1)332M2X5C(2)	CK06BX332M	CKR06BX332M( <u>2</u> )( <u>3</u> )	1210(3)	1250( <u>3</u> )	1290( <u>3</u> )	1330( <u>3</u> )
3,900	10	C06(4)(1)392K2X5C(2)	CK06BX392K	CKR06BX392K(2)(3)	1211( <u>3</u> )	1251( <u>3</u> )	1291(3)	1331(3)
4,700	10	C06(4)(1)472K2X5C(2)	CK06BX472K	CKR06BX472K(2)(3)	1212(3)	1252(3)	1292(3)	1332(3)
4,700	20	C06(4)(1)472M2X5C(2)	CK06BX472M	CKR06BX472M( <u>2</u> )( <u>3</u> )	1213( <u>3</u> )	1253( <u>3</u> )	1293(3)	1333( <u>3</u> )
5,600	10	C06(4)(1)562K2X5C(2)	CK06BX562K	CKR06BX562K(2)(3)	1214( <u>3</u> )	1254( <u>3</u> )	1294( <u>3</u> )	1334( <u>3</u> )
6,800	10	C06(4)(1)682K2X5C(2)	CK06BX682K	CKR06BX682K( <u>2</u> )( <u>3</u> )	1215( <u>3</u> )	1255( <u>3</u> )	1295(3)	1335( <u>3</u> )
6,800	20	C06(4)(1)682M2X5C(2)	CK06BX682M	CKR06BX682M( <u>2</u> )( <u>3</u> )	1216( <u>3</u> )	1256( <u>3</u> )	1296(3)	1336( <u>3</u> )
8,200	10	C06(4)(1)822K2X5C(2)	CK06BX822K	CKR06BX822K(2)(3)	1217(3)	1257(3)	1297(3)	1337( <u>3</u> )
10,000	10	C06(4)(1)103K2X5C(2)	CK06BX103K	CKR06BX103K( <u>2</u> )( <u>3</u> )	1218(3)	1258( <u>3</u> )	1298( <u>3</u> )	1338( <u>3</u> )
10,000	20	C06(4)(1)103M2X5C(2)	CK06BX103M	CKR06BX103M( <u>2</u> )( <u>3</u> )	1219( <u>3</u> )	1259( <u>3</u> )	1299( <u>3</u> )	1339( <u>3</u> )
40.000				IILITARY—CK06 or CKR0		10=1(0)	1011(0)	10=1(0)
12,000	10	C06(4)(1)123K1X5C(2)	CK06BX123K	CKR06BX123K( <u>2</u> )( <u>3</u> )	1231( <u>3</u> )	1271(3)	1311( <u>3)</u> 1300( <u>3</u> )	1351( <u>3</u> )
15,000	10	C06(4)(1)153K1X5C(2)	CK06BX153K	CKR06BX153K( <u>2</u> )( <u>3</u> )	1220( <u>3</u> )	1260( <u>3</u> )	1300( <u>3</u> )	1340( <u>3</u> )
15,000	20	C062K153M1X5CA	CK06BX153M	OKDOCDV100K(0)(0)	1001(0)	1001(0)	1001(0)	10.41(0)
18,000 22,000	10 10	C06(4)(1)183K1X5C(2)	CK06BX183K	CKR06BX183K( <u>2</u> )( <u>3</u> )	1221( <u>3</u> ) 1222(3)	1261( <u>3</u> ) 1262(3)	1301( <u>3</u> ) 1302(3)	1341( <u>3)</u> 1342(3)
		C06( <u>4</u> )( <u>1</u> )223K1X5C( <u>2</u> ) C062K223M1X5CA	CK06BX223K	CKR06BX223K( <u>2</u> )( <u>3</u> )	1222( <u>3</u> )	1202( <u>3</u> )	1302( <u>3</u> )	1342( <u>3</u> )
22,000	20		CK06BX223M	OKDOCD VOZOK(O)(O)	1000(0)	1070(0)	1010(0)	1050(0)
27,000	10	C06(4)(1)273K1X5C(2)	CK06BX273K	CKR06BX273K( <u>2</u> )( <u>3</u> )	1232( <u>3</u> )	1272( <u>3</u> )	1312( <u>3</u> )	1352( <u>3</u> )
33,000 33,000	10 20	C06( <u>4</u> )( <u>1</u> )333K1X5C( <u>2</u> ) C062K333M1X5CA	CK06BX333K	CKR06BX333K( <u>2</u> )( <u>3</u> )	1223( <u>3</u> )	1263( <u>3</u> )	1303( <u>3</u> )	1343( <u>3</u> )
39,000	10		CK06BX333M CK06BX393K	CKB06BA303K(3)(3)	1004(2)	1064(2)	1204(2)	10/1/(2)
47.000	10	C06( <u>4</u> )( <u>1</u> )393K1X5C( <u>2</u> ) C06( <u>4</u> )( <u>1</u> )473K1X5C( <u>2</u> )	CK06BX393K CK06BX473K	CKR06BX393K( <u>2</u> )( <u>3</u> ) CKR06BX473K( <u>2</u> )(3)	1224( <u>3</u> ) 1225(3)	1264( <u>3)</u> 1265(3)	1304( <u>3</u> ) 1305( <u>3</u> )	1344( <u>3</u> ) 1345(3)
47,000	20	C06(4)(1)473K1X5C(2) C062K473M1X5CA	CK06BX473K CK06BX473M	UNDUBA473N( <u>2)(3)</u> 1223		1203( <u>3</u> )	1303( <u>3</u> )	1343( <u>3</u> )
56,000	10	C06(4)(1)563K1X5C(2)	CK06BX473W	CKR06BX563K( <u>2</u> )( <u>3</u> )	1226(3)	1266(3)	1306( <u>3</u> )	1346(3)
68,000	10	C06(4)(1)683K1X5C(2)	CK06BX683K	CKR06BX683K(2)(3)	1227(3)	1260( <u>3)</u> 1267(3)	1307(3)	1347(3)
68,000	20	C06(4)(1)063K1X5C(2) C062K683M1X5CA	CK06BX683M		1227 (3)	1207( <u>3</u> )	1307( <u>3</u> )	1347 ( <u>3</u> )
82,000	10	C06(4)(1)823K1X5C(2)	CK06BX823K	CKR06BX823K( <u>2</u> )( <u>3</u> )	1229(3)	1269( <u>3</u> )	1309(3)	1349(3)
100,000	10	C06(4)(1)104K1X5C(2)	CK06BX023K CK06BX104K	CKR06BX104K(2)(3)	1230(3)	1270(3)	1310(3)	1350(3)
100,000	20	C062K104M1X5CA	CK06BX104K CK06BX104M	CKH00BX104K( <u>z)(3</u> )	1230( <u>3</u> )	1270( <u>3</u> )	1310( <u>3</u> )	1330( <u>3</u> )
100,000	20			ILITADY OKOC - OKDO	206)			
120.000	10	50 VOL	CK06BX124K	ILITARY—CK06 or CKR06 CKR06BX124K( <u>2)(3)</u>	1233( <u>3</u> )	1273(3)	1313(3)	1353( <u>3</u> )
150,000	10	C06(4)(1)124K5X5C(2) C06(4)(1)154K5X5C(2)				1273( <u>3)</u> 1274(3)	1313( <u>3)</u>	1353( <u>3)</u> 1354(3)
150,000	20	C06(4)(1)154K5X5C(2) C062K154M5X5CA	CK06BX154K CK06BX154M	CKR06BX154K( <u>2</u> )( <u>3</u> )	1234( <u>3</u> )	1214(3)	1314(3)	1334( <u>3</u> )
180,000	20 10	C06(4)(1)184K5X5C(2)	CK06BX154M CK06BX184K	CKR06BX184K(2)(3)	1235(3)	1275(3)	1315( <u>3</u> )	1355(3)
220,000	10	C06(4)(1)164K5X5C(2) C06(4)(1)224K5X5C(2)	CK06BX164K CK06BX224K	CKR06BX224K(2)(3)	1235( <u>3)</u>	1275(3)	1316(3)	1356(3)
220,000	20	C06(4)(1)224K5X5C(2) C062K224M5X5CA	CK06BX224K CK06BX224M		1230( <u>3</u> )	1210(3)	1010( <u>0</u> )	1000( <u>0</u> )
270,000	10	C06(4)(1)274K5X5C(2)	CK06BX274K	CKR06BX274K(2)(3)	1237(3)	1277( <u>3</u> )	1317(3)	1357( <u>3</u> )
330,000	10	C06(4)(1)334K5X5C(2)	CK06BX334K	CKR06BX334K(2)(3)	1237( <u>3)</u> 1238( <u>3</u> )	1277(3)	1317( <u>3)</u>	1357( <u>3)</u> 1358( <u>3</u> )
330,000	20	C062K334M5X5CA	CK06BX334K		1230(3)	1210(3)	1010(0)	1000( <u>0</u> )
390,000   20   C062K334M5X5CA   390,000   10   C06(4)(1)394K5X5C(2)		CK06BX394K	CKR06BX394K(2)(3)	1239(3)	1279(3)	1319( <u>3</u> )	1359(3)	
		CK06BX394K CK06BX474K	CKR06BX474K(2)(3)	1239(3)	1279(3)	1320(3)	1360(3)	
470,000 10 C06(4)(1)474K5X5C(2) 470,000 20 C062K474M5X5CA		CK06BX474K CK06BX474M		1270(0)	1200(0)	1020(0)	1000( <u>0</u> )	
560,000	10	C06(4)(1)564K5X5C(2)	CK06BX564K	CKR06BX564K(2)(3)	1404(3)	1408(3)	1412(3)	1416(3)
680,000	10	C06(4)(1)684K5X5C(2)	CK06BX564K CK06BX684K	CKR06BX684K(2)(3)	1404( <u>3</u> )	1409( <u>3</u> )	1413(3)	1417(3)
680,000	20	C062K684M5X5CA	CK06BX684M		1403(3)	1403(3)	1410( <u>0</u> )	1417(2)
820,000	10	C06(4)(1)824K5X5C(2)	CK06BX824K	CKR06BX824K( <u>2</u> )( <u>3</u> )	1406( <u>3</u> )	1410(3)	1414(3)	1418( <u>3</u> )
1,000,000	10	C06(4)(1)105K5X5C(2)	CK06BX024K CK06BX105K	CKR06BX105K(2)(3)	1400( <u>3)</u>	1411(3)	1415(3)	1419(3)
1,000,000	20	C062K105M5X5CA	CK06BX105K		1707( <u>0</u> )	1711( <u>0</u> )	1713( <u>3</u> )	1 7 1 3 ( <u>0</u> )
1,000,000	20	COSZICIOSIVISACOA	OTTOOD/TTOOIVI					

<sup>(1)</sup> Insert proper letter for specification: K — MIL-C-11015; T — MIL-PRF-39014.

<sup>(2)</sup> Failure Rate Designator: A — Not applicable (MIL-C-11015); M — 1%/1000 Hours, P — .1%/1000 Hours, R — .01%/1000 Hours, S — .001%/1000 Hours (MIL-PRF-39014) (3) Add "V" for stand-off design (C066). Leave blank for the flat bottom design (C062). (4) Insert "2" for standard design (Style C062). Insert "6" for stand-off design (Style C066). Note: Stand-offs are available only with the CKR, not the CK.

# CERAMIC LEADED PACKAGING INFORMATION

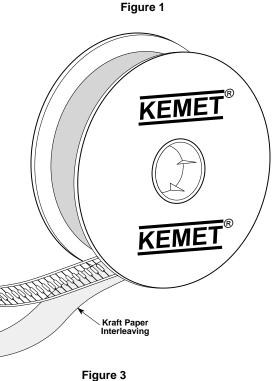


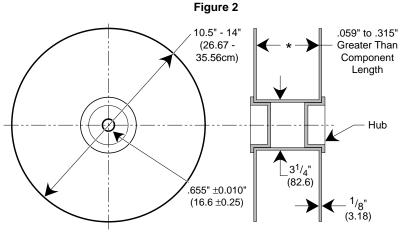
#### Ceramic Axial

Lead Tape and Reel Packaging

KEMET offers standard reeling of Molded and Conformally Coated Axial Leaded Ceramic Capacitors for automatic insertion or lead forming machines per EIA specification RS-296. KEMET'S internal specification four-digit suffix, 7200, is placed at the end of the part number to designate tape and reel packaging, ie: C410C104Z5U5CA7200.

Paper (50 lb.) test minimum is inserted between the layers of capacitors wound on reels for component pitch  $\leq 0.400".$  Capacitor lead length may extend only a maximum of .0625" (1.59mm) beyond the tapes' edges. Capacitors are centered in a row between the two tapes and will deviate only  $\pm$  0.031 (0.79mm) from the row center. A minimum of 36" (91.5 cm) leader tape is provided at each end of the reel capacitors. Universal splicing clips are used to connect the tape. Standard reel quantities are shown on page 41.





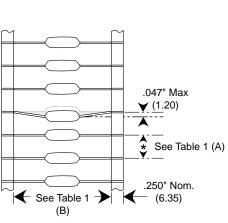


Table 1 Dimensions in Inches & (Millimeters)

Component Body Diameter	Component Pitch "A"	Inside Tape ± 1.5mm	Spacing "B" (0.059")
	0.020" or (±0.5mm)	I	*
0" (0mm) to 0.197" (5mm) 0.197" (5.01mm) to 0.394: (10mm)	0.197" or (5mm) 0.394" or (10mm)	2.062" (52.4mm)	2.874" (73mm)

Adhesive Tape

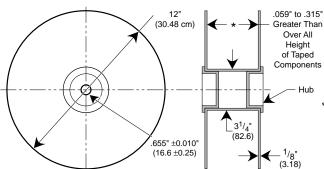
Adhesive Tape

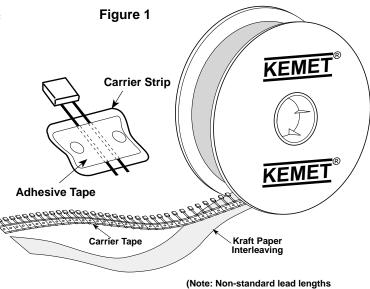
<sup>\*</sup> Not Available for Conformally Coated Parts.

### Ceramic Radial

## Lead Tape and Reel Packaging

KEMET offers standard reeling of Molded and Conformally Coated Radial Leaded Ceramic Capacitors for automatic insertion per EIA specification RS-468. Parts are taped to a tagboard carrier strip, and wound on a reel as shown in Figure 1. Kraft paper interleaving is inserted between the layers of capacitors on the reel. Ammopack is also available, with the same lead tape configuration and package quantities.





available in bulk only.) Figure 3: Standard Reel C330\*\* CK06\*\* CK05\*\* C317\*\*

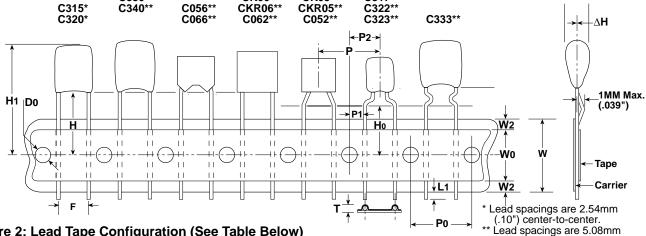


Figure 2: Lead Tape Configuration (See Table Below)

# Ceramic Radial Tape and Reel Dimensions in Millimeters & (Inches)

Dimension	Symbol	Nom mm	inal (inch)	Tolera mm (ir		Dimension	Symbol	Nomir mm (iı		Toler mm (	
Sprocket Hole Diameter	Do	4.0 (	.157)	± 0.2 (	.008)	Height to Seating Plane (formed leads) (2)	H <sub>0</sub>	7301 16.0 (.630) 1	7303 18.0 (.709)	7301 ±0.5 (.020)	7303 Minimum
Sprocket Hole Pitch	P0	12.7	(.500)	± 0.3 (	.012)	Component Alignment	Δh	4.0 (.1	157)	±0.2 (	.008)
Component Pitch	Р	12.7	(.500)	± 0.3 (	.012)	Lead Protrusion	L1	1.0 (.0	039)	Maxii	mum
Lead Spacing (1)	F	5.08 (.20)	2.54 (.10)	+0.6 (+.024	•	Composite Tape Thickness	t	0.7 (.0	051)	±0.2 (	.008)
Sprocket Hole Center to Lead Center (1)	P1	3.81 (.150)	5.08 (.200)	± 0.7 (	.028)	Overall Tape and Lead Thickness	Т	1.5 (.0	059)	Maxii	mum
Sprocket Hole Center to Component Center	P2	6.35	(.250)	± 1.3 (	.051)	Carrier Tape Width	W	18.0 (.	.709)	+1.0 (+.039	
Height to Seating Plane (straight leads) (2)	Н	7301 16.0 (.630)	7303 18.0 (.709)	7301 ±0.5 (.020)	7303 Minimum	Hold-Down Tape Width	W0	5.0 (.1	197)	Minir	num
Component Height Above Tape Center	H1	32.2	(1.27)	Maxir	num	Hold-Down Tape Location	W2	3.0 (.1	118)	Maxii	mum

Measured at the egress from the carrier tape, on the component side.

<sup>(.20&</sup>quot;) center-to-center. # See page 15 for exact lead configuration for Series.

Determined by a 4 digit suffix placed at the end of the part number, as follows:
7301 = Recommended for parts with formed leads.
7303 = Recommended for parts with straight leads.
Example: C322C104K5R5CA7303
Example: C320C104K5R5CA7303

# CERAMIC LEADED PACKAGING INFORMATION



KEMET Series	Military Style	Military Specification	Standard (1) Bulk Quantity	Ammo Pack Quantity Maximum	Maximum Reel Quantity	Reel Size
C114C-K-G	CK12, CC75	MIL-C-11015/	200/Box		5000	12"
C124C-K-G	CK13, CC76	MIL-PRF-20	200/Box		5000	12"
C192C-K-G	CK14, CC77		100/Box		3000	12"
C202C-K	CK15		25/Box		500	12"
C222C-K	CK16		10/Tray		300	12"
C052C-K-G	CK05, CC05		100/Bag	2000	2000	12"
C062C-K-G	CK06, CC06		100/Bag	1500	1500	12"
C114G	CCR75	MIL-PRF-20	200/Box		5000	12"
C124G	CCR76		200/Box		5000	12"
C192G	CCR77		100/Box		3000	12"
C202G	CC78-CCR78		25/Box		500	12"
C222G	CC79-CCR79		10/Tray		300	12"
C052/56G	CCR05		100/Bag		1700	12"
C062/66G	CCR06		100/Bag		1500	12"
C512G	CC07-CCR07		Footnote (2)		N/A	N/A
C522G	CC08-CCR08		Footnote (2)		N/A	N/A
C114T	CKR11	MIL-PRF-39014	200/Box		5000	12"
C124T	CKR12		200/Box		5000	12"
C192T	CKR14		100/Box		3000	12"
C202T	CKR15		25/Box		500	12"
C222T	CKR16		10/Tray		300	12"
C052/56T	CKR05		100/Bag		1700	12"
C062/66T	CKR06		100/Bag		1500	12"
C31X			500/Bag	2500	2500	12"
C32X			500/Bag	2500	2500	12"
C33X			250/Bag	1500	1500	12"
C340			100/Bag	1000	1000	12"
C350			50/Bag	N/A	N/A	N/A
C410			300/Box	4000	5000	12"
C412			200/Box	4000	5000	12"
C420			300/Box	4000	5000	12"
C430			200/Box	2000	2500	12"
C440			200/Box	2000	2500	12"
C512	N/A	N/A	Footnote (2)		N/A	N/A
C522	N/A	N/A	Footnote (2)		N/A	N/A
C617			500/Bag			
C622/C623			500/Bag			
C627/C628			500/Bag			
C630/C631			250/Bag			
C637/C638			250/Bag			
C640/C641			100/Bag			
C642/C643			100/Bag			
C647/C648			100/Bag			
C657/C658			50/Bag			
C667/C668			50/Bag			

NOTE: (1) Standard packaging refers to number of pieces per bag, tray or vial.

<sup>(2)</sup> Quantity varies. For further details, please consult the factory.

#### **ELECTRICAL CHARACTERISTICS**

The fundamental electrical properties of multilayer ceramic capacitors are as follows:

Polarity: Multilayer ceramic capacitors are not polar, and may be used with DC voltage applied in either direction.

Rated Voltage: This term refers to the maximum continuous DC working voltage permissible across the entire operating temperature range. Multilayer ceramic capacitors are not extremely sensitive to voltage, and brief applications of voltage above rated will not result in immediate failure. However, reliability will be reduced by exposure to sustained voltages above rated.

Capacitance: The standard unit of capacitance is the farad. For practical capacitors, it is usually expressed in microfarads (10-6 farad), nanofarads (10-9 farad), or picofarads (10<sup>-12</sup> farad). Standard measurement conditions are as follows:

Class I (up to 1,000 pF): 1MHz and 1.2 VRMS

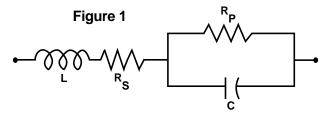
maximum.

Class I (over 1,000 pF): 1kHz and 1.2 VRMS

maximum.

Class II: 1 kHz and 1.0  $\pm$  0.2 VRMS. Class III: 1 kHz and  $0.5 \pm 0.1$  VRMS.

Like all other practical capacitors, multilayer ceramic capacitors also have resistance and inductance. A simplified schematic for the equivalent circuit is shown in Figure 1. Other significant electrical characteristics resulting from these additional properties are as follows:



C = Capacitance

R<sub>S</sub> = Equivalent Series Resistance (ESR)

L = Inductance

R<sub>D</sub> = Insulation Resistance (IR)

Impedance: Since the parallel resistance (Rp) is normally very high, the total impedance of the capacitor is:

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

Where Z = Total Impedance

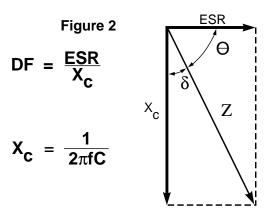
RS = Equivalent Series Resistance

 $X_{C}$  = Capacitive Reactance =  $\frac{1}{2\pi fC}$ 

 $X_1$  = Inductive Reactance =  $2\pi fL$ 

The variation of a capacitor's impedance with frequency determines its effectiveness in many applications.

Dissipation Factor: 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 usually measured simultaneously with capacitance, and under the same conditions. The vector diagram in Figure 2 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. DF is sometimes called the "loss tangent" or "tangent  $\delta$ ", as derived from this diagram.



Insulation Resistance: Insulation Resistance (IR) is the DC resistance measured across the terminals of a capacitor, represented by the parallel resistance (Rp) 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 is usually specified as the "RC" (IR x C) product, in terms of ohm-farads or megohm-microfarads. 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 on the IR calculated from that value. For example, a typical IR specification might read "1,000 megohm-microfarads or 100 gigohms, whichever is less."

Insulation Resistance is the measure of a capacitor to resist the flow of DC leakage current. It is sometimes referred to as "leakage resistance." The DC leakage current may be calculated by dividing the applied voltage by the insulation resistance (Ohm's Law).

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

KEMET specification limits for these characteristics at standard measurement conditions are shown in Table 1 on page 4. Variations in these properties caused by changing conditions of temperature, voltage, frequency, and time are covered in the following sections.

# APPLICATION NOTES FOR MULTILAYER CERAMIC CAPACITORS KEMET



#### TABLE 1 **EIA TEMPERATURE CHARACTERISTIC CODES FOR CLASS I DIELECTRICS**

Significant Figure of Temperature Coefficient			Multiplied to Temp Coeff		Tolerance of Temperature Coefficient *		
	PPM per Degree C	Letter Symbol	Multi- plier	Number Symbol	PPM per Degree C	Letter Symbol	
	0.0	C	-1	0	±30	G	
	0.3	В	-10	1	±60	Н	
	0.9	Α	-100	2	±120	J	
	1.0	M	-1000	3	±250	K	
	1.5	Р	-100000	4	±500	L	
	2.2	R	+1	5	±1000	M	
	3.3	S	+10	6	±2500	Ν	
	4.7	Т	+100	7			
	7.5	U	+1000	8			
			+10000	9			
	+ Tl						

<sup>\*</sup> These symetrical tolerances apply to a two-point measurement of temperature coefficient: one at 25°C and one at 85°C. Some deviation is permitted at lower temperatures. For example, the PPM tolerance for COG at -55 is +30 / -72 PPM.

#### **TABLE 2 EIA TEMPERATURE CHARACTERISTIC CODES FOR CLASS II & III DIELECTRICS**

Low Temperature Rating		High Tem Rat	•	Maximum Ca Shif		
	Degree Celcius	Letter Symbol	Degree Celcius	Number Symbol	Percent	Letter Symbol
	+10C	Z	+45C	2	±1.0%	A
	-30C	Υ	+65C	4	±1.5%	В
	-55C	Χ	+85C	5	±2.2%	С
			+105C	6	±3.3%	D
			+125C	7	±4.7%	Ε
			+150C	8	±7.5%	F
			+200C	9	±10.0%	Р
					±15.0%	R
					±22.0%	S
				-	+22/-33%	Τ
				-	+22/-56%	U
				-	+22/-82%	V

#### **EFFECT OF TEMPERATURE**

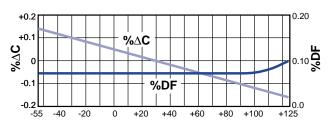


Figure 3. Temperature °C Capacitance & DF vs Temperature - C0G

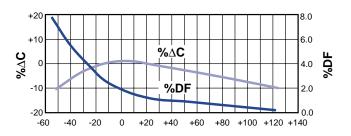


Figure 4. Temperature °C Capacitance & DF vs Temperature - X7R

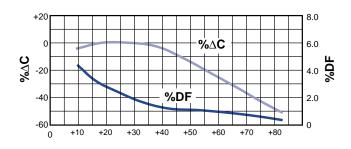


Figure 5. Temperature °C Capacitance & DF vs Temperature - Z5U

#### **EFFECT OF APPLIED VOLTAGE**

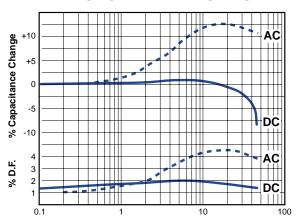


Figure 6. AC or DC Volts Applied Typical Effects of 1000 Hz AC and DC Voltage Level on Capacitance and Dissipation Factor - X7R

Note: COG Dielectric capacitance and dissipation factor are stable with voltage.

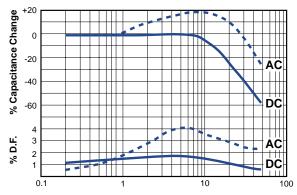


Figure 7. AC or DC Volts Applied Typical Effects of 1000 Hz AC and DC Voltage Level on Capacitance and Dissipation Factor - Z5U

Note: COG Dielectric capacitance and dissipation factor are stable with voltage.

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 a "box" bounded by the upper and lower operating temperatures and the minimum and maximum capacitance values. Within this "box", the variation with temperature depends upon the specific dielectric formulation. Typical curves for KEMET capacitors are shown in Figures 3, 4, and 5. These figures also include the typical change in dissipation factor for KEMET capacitors.

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

Effect of Voltage: Class I ceramic capacitors are not affected by variations in applied AC or DC voltages. For Class II and III ceramic capacitors, variations in voltage affect only

the capacitance and dissipation factor. The application of DC voltage higher than 5 vdc reduces both the capacitance and dissipation factor. The application of AC voltages up to 10-20 Vac tends to increase both capacitance and dissipation factor. At higher AC voltages, both capacitance and dissipation factor begin to decrease.

Typical curves showing the effect of applied AC and DC voltage are shown in Figure 6 for KEMET X7R capacitors and Figure 7 for KEMET Z5U capacitors.

Effect of Frequency: Frequency affects both capacitance and dissipation factor. Typical curves for KEMET multilayer ceramic capacitors are shown in Figures 8 and 9.

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 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 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.

Typical impedance versus frequency curves for KEMET multilayer ceramic capacitors are shown in Figures 10, 11, and 12. These curves apply to KEMET capacitors in chip form, without leads. Lead configuration and lead length have a significant impact on the series inductance. The lead inductance is approximately 10nH/inch, which is large compared to the inductance of the chip. The effect of this additional inductance is a decrease in the self-resonant frequency, and an increase in impedance in the inductive region above the self-resonant frequency.

Effect of Time: The capacitance of Class II and III dielectrics change with time as well as with temperature, voltage and frequency. This 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. Typical aging rates for C0G, X7R, and Z5U dielectrics are as follows:

> COG None

X7R 2.0% per decade of time Z5U 5.0% per decade of time

Typical aging curves for X7R and Z5U dielectrics are shown in Figure 13.

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 deaging depends on both the elevated temperature and the length of time at that temperature. Exposure to 150°C for onehalf hour or 125°C for two hours is usually sufficient to return the capacitor to its initial value.

Because the capacitance changes rapidly immediately after de-aging, capacitance measurements are usually delayed for at least 10 hours after the de-aging process, which is often referred to as the "last heat." In addition, manufacturers utilize

## APPLICATION NOTES FOR MULTILAYER CERAMIC CAPACITORS KEMET



the aging rates to set factory test limits which will bring the capacitance within the specified tolerance at some future time, to allow for customer receipt and use. Typically, the test limits are adjusted so that the capacitance will be within the specified tolerance after either 1,000 hours or 100 days, depending on the manufacturer and the product type.

#### **POWER DISSIPATION**

Power dissipation has been empirically determined for two representative KEMET series: C052 and C062. Power dissipation capability for various mounting configurations is shown in Table 3. This table was extracted from Engineering Bulletin F-2013, which provides a more detailed treatment of this subject.

Note that no significant difference was detected between the two sizes in spite of a 2 to 1 surface area ratio. Due to the materials used in the construction of multilayer ceramic capacitors, the power dissipation capability does not depend greatly on the surface area of the capacitor body, but rather on how well heat is conducted out of the capacitor lead wires. Consequently, this power dissipation capability is applicable to other leaded multilayer styles and sizes.

TABLE 3
POWER DISSIPATION CAPABILITY
(Rise in Celsius degrees per Watt)

Mounting Configuration	Power Dissipation of C052 & C062
1.00" leadwires attached to binding post of GR-1615 bridge (excellent heat sink)	90 Celsius degrees rise per Watt ±10%
0.25" leadwires attached to binding post of GR-1615 bridge	55 Celsius degrees rise per Watt ±10%
Capacitor mounted flush to 0.062" glass- epoxy circuit board with small copper traces	77 Celsius degrees rise per Watt ±10%
Capacitor mounted flush to 0.062" glass- epoxy circuit board with four square inches of copper land area as a heat sink	53 Celsius degrees rise per Watt ±10%

As shown in Table 3, the power dissipation capability of the capacitor is very sensitive to the details of its use environment. The temperature rise due to power dissipation should not exceed 20°C. Using that constraint, the maximum permissible power dissipation may be calculated from the data provided in Table 3.

It is often convenient to translate power dissipation capability into a permissible AC voltage rating. Assuming a sinusoidal wave form, the RMS "ripple voltage" may be calculated from the following formula:

$$E = Z \times \sqrt{\frac{P_{MAX}}{R}}$$

Where E = RMS Ripple Voltage (volts)

P = Power Dissipation (watts)

Z = Impedence

R = ESR

The data necessary to make this calculation is included in Engineering Bulletin F-2013. However, the following criteria must be observed:

- 1. The temperature rise due to power dissipation should be limited to 20°C.
- The peak AC voltage plus the DC voltage must not exceed the maximum working voltage of the capacitor.

Provided that these criteria are met, multilayer ceramic capacitors may be operated with AC voltage applied without need for DC bias.

#### **RELIABILITY**

A well constructed multilayer ceramic capacitor is extremely reliable and, for all practical purposes, has an infinite life span when used within the maximum voltage and temperature ratings. Capacitor failure may be induced by sustained operation at voltages that exceed the rated DC voltage, voltage spikes or transients that exceed the dielectric withstanding voltage, sustained operation at temperatures above the maximum rated temperature, or the excessive temperature rise due to power dissipation.

Failure rate is usually expressed in terms of percent per 1,000 hours or in FITS (failure per billion hours). Some KEMET series are qualified under U.S. military established reliability specifications MIL-PRF-20, MIL-PRF-123, MIL-PRF-39014, and MIL-PRF-55681. Failure rates as low as 0.001% per 1,000 hours are available for all capacitance / voltage ratings covered by these specifications. These specifications and accompanying Qualified Products List should be consulted for details.

For series not covered by these military specifications, an internal testing program is maintained by KEMET Quality Assurance. Samples from each week's production are subjected to a 2,000 hour accelerated life test at 2 x rated voltage and maximum rated temperature. Based on the results of these tests, the average failure rate for all non-military series covered by this test program is currently 0.06% per 1,000 hours at maximum rated conditions. The failure rate would be much lower at typical use conditions. For example, using MIL-HDBK-217D this failure rate translates to 0.9 FITS at 50% rated voltage and 50°C.

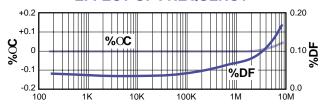
Current failure rate details for specific KEMET multilayer ceramic capacitor series are available on request.

#### **MISAPPLICATION**

Ceramic capacitors, like any other capacitors, may fail if they are misapplied. Typical misapplications include exposure to excessive voltage, current or temperature. If the dielectric layer of the capacitor is damaged by misapplication the electrical energy of the circuit can be released as heat, which may damage the circuit board and other components as well.

If potential for misapplication exists, it is recommended that precautions be taken to protect personnel and equipment during initial application of voltage. Commonly used precautions include shielding of personnel and sensing for excessive power drain during board testing.

#### **EFFECT OF FREQUENCY**



Frequency - Hertz Figure 8. Capacitance & DF vs Frequency - C0G

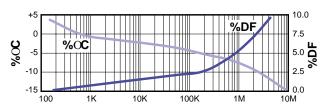


Figure 9. Frequency - Hertz Capacitance & DF vs Frequency - X7R & Z5U

#### **EFFECT OF TIME**

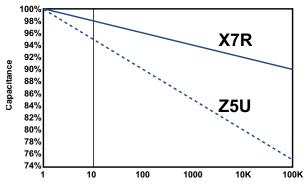


Figure 13. Typical Aging Rates for X7R & Z5U

#### **IMPEDANCE VS FREQUENCY**

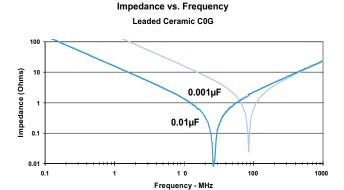
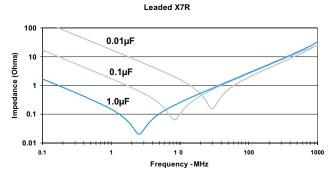
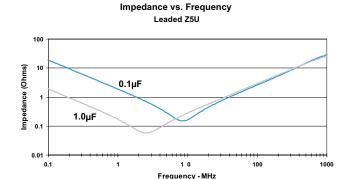


Figure 10. Impedance vs Frequency for C0G Dielectric

## Impedance vs. Frequency



Impedance vs Frequency for X7R Dielectric Figure 11.



Impedance vs Frequency for Z5U Dielectric Figure 12.



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