

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 affected 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 a 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  $-55^\circ\text{C}$  to  $+125^\circ\text{C}$  (Also known as "NP0").

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

**Z5U:** Class III, with a maximum capacitance change of  $+22\% - 56\%$  over an operating temperature range of  $+10^\circ\text{C}$  to  $+85^\circ\text{C}$ .

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

### SPECIFIED ELECTRICAL LIMITS

PARAMETER	TEMPERATURE CHARACTERISTICS		
	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 $\leq$ 1000 pF X7R — 1 kHz and 1 vrms* Z5U — 1 kHz and 0.5 vrms	0.15%	2.5%	4.0%
Dielectric Strength: 2.5 times rated DC voltage.	Pass Subsequent IR Test		
Insulation Resistance (IR): At rated DC voltage, whichever of the two is smaller	1,000 M $\Omega$ - $\mu$ F or 100 G $\Omega$	1,000 M $\Omega$ - $\mu$ F or 100 G $\Omega$	1,000 M $\Omega$ - $\mu$ F or 10 G $\Omega$
Temperature Characteristics: Range, $^\circ\text{C}$ Capacitance Change without DC voltage	-55 to 125 $0 \pm 30$ ppm/ $^\circ\text{C}$	-55 to 125 $\pm 15\%$	+10 to 85 $+22\%, -56\%$

\* 1 MHz and 1 vrms if capacitance  $\leq$  100 pF on military product.

Table I

**GENERAL SPECIFICATIONS**

<b>Working Voltage:</b>	<b>Axial</b>	<b>Radial</b>
C0G	50 & 100 volts	100 & 200 volts
X7R	50 & 100 volts	50, 100 & 200 volts
Z5U	50 & 100 volts	50 & 100 volts

**Temperature Characteristics:**

C0G	0 ± 30 PPM/°C from - 55°C to + 125°C <sup>(1)</sup>
X7R	± 15% from - 55°C to + 125°C
Z5U	+ 22%; - 56% from + 10°C to + 85°C

**Capacitance Tolerance:**

C0G	± 5%, ± 10%, ± 20%
X7R	± 10%, ± 20%
Z5U	± 20%, - 20 + 80%, - 0 + 100%

**Construction:**

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

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

**Lead Material:**

Solder Coated Copper Clad Steel

**Solderability:**

EIA RS-198D, Method 302, Solder temperature - 230° ± 5°C. Dwell time in solder - 7 ± 1/2 seconds.

**Terminal Strength:**

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

**ELECTRICAL @ 25°C**

**Capacitance:**

Within specified tolerance at 25°C and following test conditions.

- C0G - Greater than 1000 pF with 1.0 vrms at 1 kHz.
- 1000 pF and less with 1.0 vrms at 1 MHz.
- X7R - with 1.0 vrms at 1 kHz.
- Z5U - with 0.5 vrms at 1 kHz.

**Dissipation Factor:**

At 25°C - same test conditions as capacitance.

- C0G - 0.15% maximum
- X7R - 2.5% maximum
- Z5U - 4.0% maximum

**Insulation Resistance:**

EIA RS-198D, Method 104, Condition A  
C0G - 100 gigohms or 1000 megohm x µF, whichever is less.

X7R - 100 gigohms or 1000 megohm x µF, whichever is less.

Z5U - 10 gigohms or 1000 megohm x µF, whichever is less.

**Dielectric Withstanding Voltage:**

EIA RS-198D, Method 103 (250% of rated voltage for 5 seconds, with current limited to 50mA)

**ENVIRONMENTAL**

**Vibration:**

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

**Shock:**

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

**Life Test:**

EIA RS-198D, Method 201, Condition D. Test Potential and Temperature.

C0G - 200% of rated voltage at + 125°C

X7R - 200% of rated voltage at + 125°C

Z5U - 200% of rated voltage at + 85°C

Post-Test Limits at + 25°C are:

Capacitance Change:

C0G - ± 3%, or 0.25 pF, whichever is greater.

X7R - ± 20% of initial value. <sup>(2)</sup>

Z5U - ± 30% of initial value. <sup>(2)</sup>

Dissipation Factor:

C0G - 0.25% maximum

X7R - 3.0% maximum

Z5U - 4.0% maximum

Insulation Resistance:

C0G - 10 gigohms or 100 megohm x µF, whichever is less.

X7R - 10 gigohms or 100 megohm x µF, whichever is less.

Z5U - 1 gigohm or 100 megohm x µF, whichever is less.

**Moisture Resistance:**

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

Post-Test Limits at + 25°C are:

Capacitance Change:

C0G - 3%, or 0.25 pF, whichever is greater.

X7R - ± 20% of initial value. <sup>(2)</sup>

Z5U - ± 30% of initial value. <sup>(2)</sup>

Dissipation Factor:

C0G - 0.25% maximum

X7R - 3.0% maximum

Z5U - 4.0% maximum

Insulation Resistance:

C0G - 10 gigohms or 100 megohm x µF, whichever is less.

X7R - 10 gigohms or 100 megohm x µF, whichever is less.

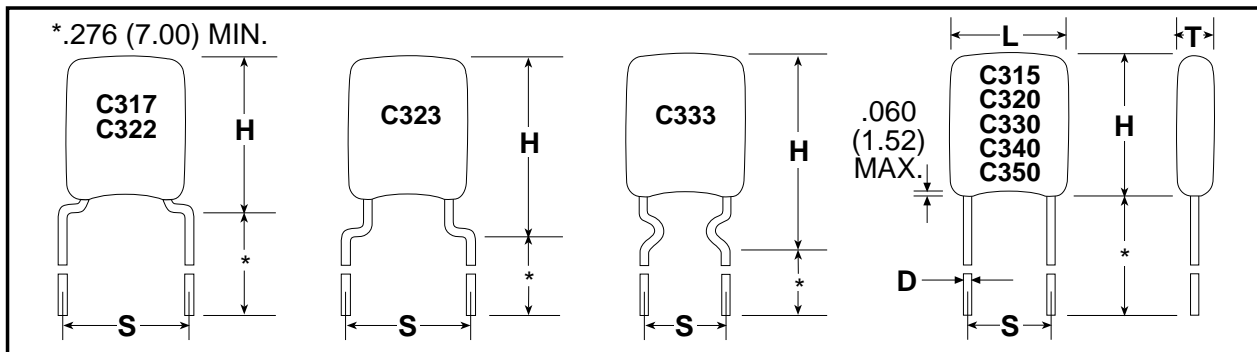
Z5U - 1 gigohm or 100 megohm x µF, whichever is less.

**Thermal Shock:**

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

- (1) +53 ppm -30 ppm/°C from + 25°C to - 55°C, ± 60 ppm below 10 pF.
- (2) X7R & 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.

STANDARD LEAD CONFIGURATION — OUTLINE DRAWINGS



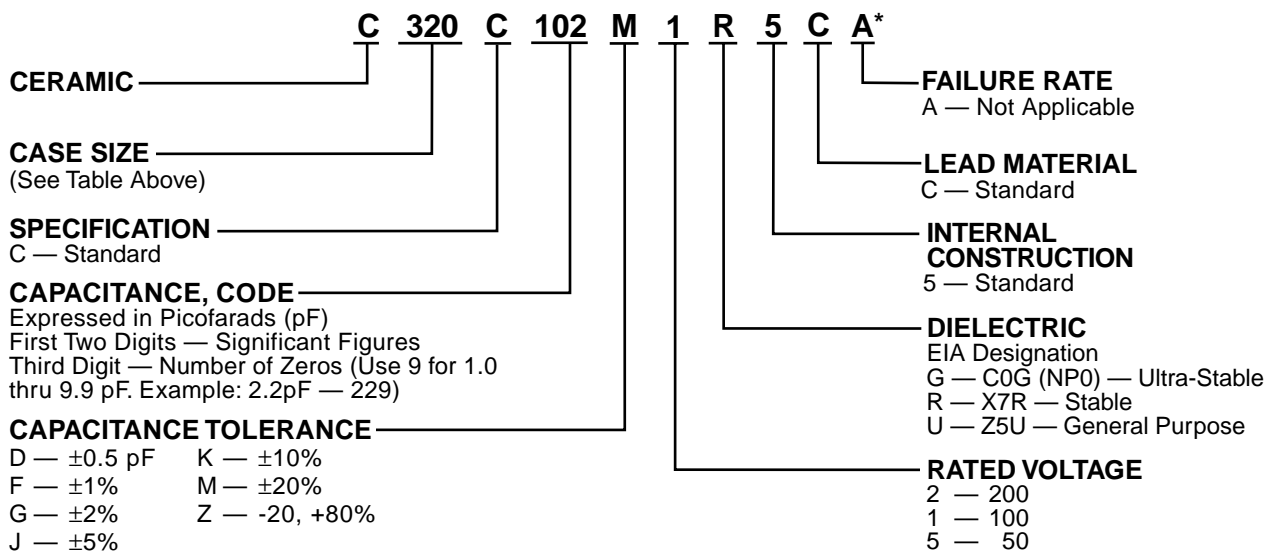
Drawings are not to scale. See table below for dimensions.  
See page 9 for optional lead configurations.

DIMENSIONS — INCHES & MILLIMETERS

CASE SIZE	L MAX.	H MAX.	T MAX.	S(1) ±.030	D +.004 - .001
C315	.150 (3.81)	.210 (5.33)	.100 (2.54)	.100 (2.54)	.020 (.51)
C317	.150 (3.81)	.230 (5.84)	.100 (2.54)	.200 (5.08)	.020 (.51)
C320	.200 (5.08)	.260 (6.60)	.125 (3.18)	.100 (2.54)	.020 (.51)
C322	.200 (5.08)	.260 (6.60)	.125 (3.18)	.200 (5.08)	.020 (.51)
C323	.200 (5.08)	.320 (8.13)	.125 (3.18)	.200 (5.08)	.020 (.51)
C330	.300 (7.62)	.360 (9.14)	.150 (3.81)	.200 (5.08)	.020 (.51)
C333	.300 (7.62)	.390 (9.91)	.150 (3.81)	.200 (5.08)	.020 (.51)
C340	.400 (10.16)	.460 (11.68)	.150 (3.81)	.200 (5.08)	.020 (.51)
C350	.500 (12.70)	.560 (14.22)	.200 (5.08)	.400 (10.16)	.025 (.64)

NOTE: 1 inch = 25.4 mm.  
NOTE: (1) Measured at seating plane.

ORDERING INFORMATION



\*Part Number Example: C320C102M1R5CA (14 digits – no spaces)

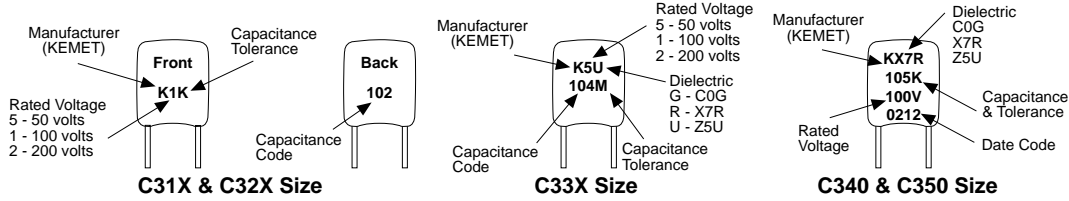
For packaging information, see pages 33 and 34.

**OPTIONAL CONFIGURATIONS BY LEAD SPACING**

The preferred lead configurations are shown on page 8. However, additional configurations are available. All available options, including those on page 8, are shown below grouped by lead spacing.

Lead Spacing <b>.100" ± .030</b>	<b>C 315</b> 	<b>C 316</b> 	<b>C 320</b> 	<b>C 324</b> 	<b>C 326</b> 
	Lead Spacing <b>.200" ± .030</b>	<b>C 317</b> 	<b>C 318</b> 	<b>C 322</b> 	<b>C 323</b> 
Lead Spacing <b>.200" ± .030</b>		<b>C 325</b> 	<b>C 327</b> 	<b>C 328</b> 	
	Lead Spacing <b>.200" ± .030</b>	<b>C 330</b> 	<b>C 333</b> 	<b>C 335</b> 	<b>C 336</b> 
Lead Spacing <b>.200" ± .030</b>		<b>C 346</b> 			
	Lead Spacing <b>.250" ± .030</b>	<b>C 321</b> 	<b>C 331</b> 	Lead Spacing <b>.400" ± .030</b>	
			<b>C 356</b> 		

## CAPACITOR MARKINGS



### RATINGS & PART NUMBER REFERENCE: ULTRA-STABLE TEMPERATURE CHARACTERISTICS — COG

CAPACITANCE	KEMET PART NUMBER
<b>200 VOLT — C31X SIZE</b>	
1.0 pF	C31(1)C109(3)2G5CA
1.5 pF	C31(1)C159(3)2G5CA
2.2 pF	C31(1)C229(3)2G5CA
2.7 pF	C31(1)C279(3)2G5CA
3.3 pF	C31(1)C339(3)2G5CA
3.9 pF	C31(1)C399(3)2G5CA
4.7 pF	C31(1)C479(3)2G5CA
5.6 pF	C31(1)C569(3)2G5CA
6.8 pF	C31(1)C689(3)2G5CA
8.2 pF	C31(1)C829(3)2G5CA
10 pF	C31(1)C100(3)2G5CA
12 pF	C31(1)C120(3)2G5CA
15 pF	C31(1)C150(3)2G5CA
18 pF	C31(1)C180(3)2G5CA
22 pF	C31(1)C220(3)2G5CA
27 pF	C31(1)C270(3)2G5CA
33 pF	C31(1)C330(3)2G5CA
39 pF	C31(1)C390(3)2G5CA
47 pF	C31(1)C470(3)2G5CA
56 pF	C31(1)C560(3)2G5CA
68 pF	C31(1)C680(3)2G5CA
82 pF	C31(1)C820(3)2G5CA
100 pF	C31(1)C101(3)2G5CA
120 pF	C31(1)C121(3)2G5CA
150 pF	C31(1)C151(3)2G5CA
180 pF	C31(1)C181(3)2G5CA
220 pF	C31(1)C221(3)2G5CA
270 pF	C31(1)C271(3)2G5CA
330 pF	C31(1)C331(3)2G5CA
390 pF	C31(1)C391(3)2G5CA
470 pF	C31(1)C471(3)2G5CA
<b>200 VOLT — C32X SIZE</b>	
1.0 pF	C32(2)C109(3)2G5CA
1.5 pF	C32(2)C159(3)2G5CA
2.2 pF	C32(2)C229(3)2G5CA
2.7 pF	C32(2)C279(3)2G5CA
3.3 pF	C32(2)C339(3)2G5CA
3.9 pF	C32(2)C399(3)2G5CA
4.7 pF	C32(2)C479(3)2G5CA
5.6 pF	C32(2)C569(3)2G5CA
6.8 pF	C32(2)C689(3)2G5CA
8.2 pF	C32(2)C829(3)2G5CA
10 pF	C32(2)C100(3)2G5CA
12 pF	C32(2)C120(3)2G5CA
15 pF	C32(2)C150(3)2G5CA
18 pF	C32(2)C180(3)2G5CA
22 pF	C32(2)C220(3)2G5CA
27 pF	C32(2)C270(3)2G5CA
33 pF	C32(2)C330(3)2G5CA
39 pF	C32(2)C390(3)2G5CA

CAPACITANCE	KEMET PART NUMBER
<b>200 VOLT — C32X SIZE (Cont'd)</b>	
47 pF	C32(2)C470(3)2G5CA
56 pF	C32(2)C560(3)2G5CA
68 pF	C32(2)C680(3)2G5CA
82 pF	C32(2)C820(3)2G5CA
100 pF	C32(2)C101(3)2G5CA
120 pF	C32(2)C121(3)2G5CA
150 pF	C32(2)C151(3)2G5CA
180 pF	C32(2)C181(3)2G5CA
220 pF	C32(2)C221(3)2G5CA
270 pF	C32(2)C271(3)2G5CA
330 pF	C32(2)C331(3)2G5CA
390 pF	C32(2)C391(3)2G5CA
470 pF	C32(2)C471(3)2G5CA
560 pF	C32(2)C561(3)2G5CA
680 pF	C32(2)C681(3)2G5CA
820 pF	C32(2)C821(3)2G5CA
1,000 pF	C32(2)C102(3)2G5CA
1,200 pF	C32(2)C122(3)2G5CA
1,500 pF	C32(2)C152(3)2G5CA
1,800 pF	C32(2)C182(3)2G5CA
2,200 pF	C32(2)C222(3)2G5CA
2,700 pF	C32(2)C272(3)2G5CA
3,300 pF	C32(2)C332(3)2G5CA
<b>200 VOLT — C33X SIZE</b>	
2,700 pF	C33(4)C272(3)2G5CA
3,300 pF	C33(4)C332(3)2G5CA
3,900 pF	C33(4)C392(3)2G5CA
4,700 pF	C33(4)C472(3)2G5CA
5,600 pF	C33(4)C562(3)2G5CA
6,800 pF	C33(4)C682(3)2G5CA
8,200 pF	C33(4)C822(3)2G5CA
.01 µF	C33(4)C103(3)2G5CA
.012 µF	C33(4)C123(3)2G5CA
.015 µF	C33(4)C153(3)2G5CA
.018 µF	C33(4)C183(3)2G5CA
<b>200 VOLT — C340 SIZE</b>	
.018 µF	C340C183(3)2G5CA
.022 µF	C340C223(3)2G5CA
.027 µF	C340C273(3)2G5CA
.033 µF	C340C333(3)2G5CA
.039 µF	C340C393(3)2G5CA
.047 µF	C340C473(3)2G5CA
<b>200 VOLT — C350 SIZE</b>	
.039 µF	C350C393(3)2G5CA
.047 µF	C350C473(3)2G5CA
.056 µF	C350C563(3)2G5CA
.068 µF	C350C683(3)2G5CA

CAPACITANCE	KEMET PART NUMBER
<b>100 VOLT — C31X SIZE</b>	
120 pF	C31(1)C121(3)1G5CA
150 pF	C31(1)C151(3)1G5CA
180 pF	C31(1)C181(3)1G5CA
220 pF	C31(1)C221(3)1G5CA
270 pF	C31(1)C271(3)1G5CA
330 pF	C31(1)C331(3)1G5CA
390 pF	C31(1)C391(3)1G5CA
470 pF	C31(1)C471(3)1G5CA
560 pF	C31(1)C561(3)1G5CA
680 pF	C31(1)C681(3)1G5CA
820 pF	C31(1)C821(3)1G5CA
1,000 pF	C31(1)C102(3)1G5CA
<b>100 VOLT — C32X SIZE</b>	
680 pF	C32(2)C681(3)1G5CA
820 pF	C32(2)C821(3)1G5CA
1,000 pF	C32(2)C102(3)1G5CA
1,200 pF	C32(2)C122(3)1G5CA
1,500 pF	C32(2)C152(3)1G5CA
1,800 pF	C32(2)C182(3)1G5CA
2,200 pF	C32(2)C222(3)1G5CA
2,700 pF	C32(2)C272(3)1G5CA
3,300 pF	C32(2)C332(3)1G5CA
3,900 pF	C32(2)C392(3)1G5CA
4,700 pF	C32(2)C472(3)1G5CA
5,600 pF	C32(2)C562(3)1G5CA
<b>100 VOLT — C33X SIZE</b>	
3,300 pF	C33(4)C332(3)1G5CA
3,900 pF	C33(4)C392(3)1G5CA
4,700 pF	C33(4)C472(3)1G5CA
5,600 pF	C33(4)C562(3)1G5CA
6,800 pF	C33(4)C682(3)1G5CA
8,200 pF	C33(4)C822(3)1G5CA
.01 µF	C33(4)C103(3)1G5CA
.012 µF	C33(4)C123(3)1G5CA
.015 µF	C33(4)C153(3)1G5CA
.018 µF	C33(4)C183(3)1G5CA
.022 µF	C33(4)C223(3)1G5CA
.027 µF	C33(4)C273(3)1G5CA
<b>100 VOLT — C340 SIZE</b>	
.027 µF	C340C273(3)1G5CA
.033 µF	C340C333(3)1G5CA
.039 µF	C340C393(3)1G5CA
.047 µF	C340C473(3)1G5CA
.056 µF	C340C563(3)1G5CA
.068 µF	C340C683(3)1G5CA
<b>100 VOLT — C350 SIZE</b>	
.039 µF	C350C393(3)1G5CA
.047 µF	C350C473(3)1G5CA
.056 µF	C350C563(3)1G5CA
.068 µF	C350C683(3)1G5CA
.082 µF	C350C823(3)1G5CA
.1 µF	C350C104(3)1G5CA
.12 µF	C350C124(3)1G5CA

**NOTES:** (1) Case Sizes C315/C317 are identical electrically, but differ in lead spacing. See table of dimensions. Insert the appropriate symbol, "5" or "7" in the part number.  
 (2) Case Sizes C320/C322/C323 are identical electrically. See table of dimensions. Insert the appropriate symbol, "0" or "2" or "3" in the part number.  
 (3) Insert proper symbol for capacitance tolerance as follows:  
 1.0 pF - 8.2 pF: D - ± 0.5pF  
 10 pF - 22 pF: J - ±5%, K - ±10%  
 27 pF - 47 pF: G - ±2%, J - ±5%, K - ±10%  
 56 pF and up: F - ±1%, G - ±2%, J - ±5%  
 (4) Case Sizes C330 and C333 are identical electrically. Insert the appropriate symbol "0" or "3" in the part number.

RATINGS & PART NUMBER REFERENCE: STABLE TEMPERATURE CHARACTERISTICS — X7R

CAPACITANCE	KEMET PART NUMBER
<b>200 VOLT — C31X SIZE</b>	
100 pF	C31(1)C101(3)2R5CA
120 pF	C31(1)C121(3)2R5CA
150 pF	C31(1)C151(3)2R5CA
180 pF	C31(1)C181(3)2R5CA
220 pF	C31(1)C221(3)2R5CA
270 pF	C31(1)C271(3)2R5CA
330 pF	C31(1)C331(3)2R5CA
390 pF	C31(1)C391(3)2R5CA
470 pF	C31(1)C471(3)2R5CA
560 pF	C31(1)C561(3)2R5CA
680 pF	C31(1)C681(3)2R5CA
820 pF	C31(1)C821(3)2R5CA
1,000 pF	C31(1)C102(3)2R5CA
1,200 pF	C31(1)C122(3)2R5CA
1,500 pF	C31(1)C152(3)2R5CA
1,800 pF	C31(1)C182(3)2R5CA
2,200 pF	C31(1)C222(3)2R5CA
<b>200 VOLT — C32X SIZE</b>	
1,000 pF	C32(2)C102(3)2R5CA
1,200 pF	C32(2)C122(3)2R5CA
1,500 pF	C32(2)C152(3)2R5CA
1,800 pF	C32(2)C182(3)2R5CA
2,200 pF	C32(2)C222(3)2R5CA
2,700 pF	C32(2)C272(3)2R5CA
3,300 pF	C32(2)C332(3)2R5CA
3,900 pF	C32(2)C392(3)2R5CA
4,700 pF	C32(2)C472(3)2R5CA
5,600 pF	C32(2)C562(3)2R5CA
6,800 pF	C32(2)C682(3)2R5CA
8,200 pF	C32(2)C822(3)2R5CA
.01 µF	C32(2)C103(3)2R5CA
.012 µF	C32(2)C123(3)2R5CA
.015 µF	C32(2)C153(3)2R5CA
.018 µF	C32(2)C183(3)2R5CA
.022 µF	C32(2)C223(3)2R5CA
<b>200 VOLT — C33X SIZE</b>	
.015 µF	C33(4)C153(3)2R5CA
.018 µF	C33(4)C183(3)2R5CA
.022 µF	C33(4)C223(3)2R5CA
.027 µF	C33(4)C273(3)2R5CA
.033 µF	C33(4)C333(3)2R5CA
.039 µF	C33(4)C393(3)2R5CA
.047 µF	C33(4)C473(3)2R5CA
.056 µF	C33(4)C563(3)2R5CA
.068 µF	C33(4)C683(3)2R5CA
.082 µF	C33(4)C823(3)2R5CA
.1 µF	C33(4)C104(3)2R5CA
<b>200 VOLT — C340 SIZE</b>	
.1 µF	C340C104(3)2R5CA
.12 µF	C340C124(3)2R5CA
.15 µF	C340C154(3)2R5CA
.18 µF	C340C184(3)2R5CA
.22 µF	C340C224(3)2R5CA
.27 µF	C340C274(3)2R5CA
<b>200 VOLT — C350 SIZE</b>	
.22 µF	C350C224(3)2R5CA
.27 µF	C350C274(3)2R5CA
.33 µF	C350C334(3)2R5CA
.39 µF	C350C394(3)2R5CA
.47 µF	C350C474(3)2R5CA

CAPACITANCE	KEMET PART NUMBER
<b>100 VOLT — C31X SIZE</b>	
820 pF	C31(1)C821(3)1R5CA
1,000 pF	C31(1)C102(3)1R5CA
1,200 pF	C31(1)C122(3)1R5CA
1,500 pF	C31(1)C152(3)1R5CA
1,800 pF	C31(1)C182(3)1R5CA
2,200 pF	C31(1)C222(3)1R5CA
2,700 pF	C31(1)C272(3)1R5CA
3,300 pF	C31(1)C332(3)1R5CA
3,900 pF	C31(1)C392(3)1R5CA
4,700 pF	C31(1)C472(3)1R5CA
5,600 pF	C31(1)C562(3)1R5CA
6,800 pF	C31(1)C682(3)1R5CA
8,200 pF	C31(1)C822(3)1R5CA
.01 µF	C31(1)C103(3)1R5CA
<b>100 VOLT — C32X SIZE</b>	
4,700 pF	C32(2)C472(3)1R5CA
5,600 pF	C32(2)C562(3)1R5CA
6,800 pF	C32(2)C682(3)1R5CA
8,200 pF	C32(2)C822(3)1R5CA
.01 µF	C32(2)C103(3)1R5CA
.012 µF	C32(2)C123(3)1R5CA
.015 µF	C32(2)C153(3)1R5CA
.018 µF	C32(2)C183(3)1R5CA
.022 µF	C32(2)C223(3)1R5CA
.027 µF	C32(2)C273(3)1R5CA
.033 µF	C32(2)C333(3)1R5CA
.039 µF	C32(2)C393(3)1R5CA
.047 µF	C32(2)C473(3)1R5CA
.056 µF	C32(2)C563(3)1R5CA
.068 µF	C32(2)C683(3)1R5CA
.082 µF	C32(2)C823(3)1R5CA
.1 µF	C32(2)C104(3)1R5CA
<b>100 VOLT — C33X SIZE</b>	
.068 µF	C33(4)C683(3)1R5CA
.082 µF	C33(4)C823(3)1R5CA
.1 µF	C33(4)C104(3)1R5CA
.12 µF	C33(4)C124(3)1R5CA
.15 µF	C33(4)C154(3)1R5CA
.18 µF	C33(4)C184(3)1R5CA
.22 µF	C33(4)C224(3)1R5CA
.27 µF	C33(4)C274(3)1R5CA
.33 µF	C33(4)C334(3)1R5CA
.39 µF	C33(4)C394(3)1R5CA
.47 µF	C33(4)C474(3)1R5CA
<b>100 VOLT — C340 SIZE</b>	
.47 µF	C340C474(3)1R5CA
.56 µF	C340C564(3)1R5CA
.68 µF	C340C684(3)1R5CA
.82 µF	C340C824(3)1R5CA
1.0 µF	C340C105(3)1R5CA
<b>100 VOLT — C350 SIZE</b>	
.68 µF	C350C684(3)1R5CA
.82 µF	C350C824(3)1R5CA
1.0 µF	C350C105(3)1R5CA
1.2 µF	C350C125(3)1R5CA

CAPACITANCE	KEMET PART NUMBER
<b>50 VOLT — C31X SIZE</b>	
3,300 pF	C31(1)C332(3)5R5CA
3,900 pF	C31(1)C392(3)5R5CA
4,700 pF	C31(1)C472(3)5R5CA
5,600 pF	C31(1)C562(3)5R5CA
6,800 pF	C31(1)C682(3)5R5CA
8,200 pF	C31(1)C822(3)5R5CA
.01 µF	C31(1)C103(3)5R5CA
.012 µF	C31(1)C123(3)5R5CA
.015 µF	C31(1)C153(3)5R5CA
.018 µF	C31(1)C183(3)5R5CA
.022 µF	C31(1)C223(3)5R5CA
.027 µF	C31(1)C273(3)5R5CA
.033 µF	C31(1)C333(3)5R5CA
<b>50 VOLT — C32X SIZE</b>	
.012 µF	C32(2)C123(3)5R5CA
.015 µF	C32(2)C153(3)5R5CA
.018 µF	C32(2)C183(3)5R5CA
.022 µF	C32(2)C223(3)5R5CA
.027 µF	C32(2)C273(3)5R5CA
.033 µF	C32(2)C333(3)5R5CA
.039 µF	C32(2)C393(3)5R5CA
.047 µF	C32(2)C473(3)5R5CA
.056 µF	C32(2)C563(3)5R5CA
.068 µF	C32(2)C683(3)5R5CA
.082 µF	C32(2)C823(3)5R5CA
.1 µF	C32(2)C104(3)5R5CA
.12 µF	C32(2)C124(3)5R5CA
.15 µF	C32(2)C154(3)5R5CA
.18 µF	C32(2)C184(3)5R5CA
.22 µF	C32(2)C224(3)5R5CA
.27 µF	C32(2)C274(3)5R5CA
<b>50 VOLT — C33X SIZE</b>	
.15 µF	C33(4)C154(3)5R5CA
.18 µF	C33(4)C184(3)5R5CA
.22 µF	C33(4)C224(3)5R5CA
.27 µF	C33(4)C274(3)5R5CA
.33 µF	C33(4)C334(3)5R5CA
.39 µF	C33(4)C394(3)5R5CA
.47 µF	C33(4)C474(3)5R5CA
.56 µF	C33(4)C564(3)5R5CA
.68 µF	C33(4)C684(3)5R5CA
.82 µF	C33(4)C824(3)5R5CA
1.0 µF	C33(4)C105(3)5R5CA
<b>50 VOLT — C340 SIZE</b>	
1.2 µF	C340C125(3)5R5CA
1.5 µF	C340C155(3)5R5CA
1.8 µF	C340C185(3)5R5CA
2.2 µF	C340C225(3)5R5CA
<b>50 VOLT — C350 SIZE</b>	
2.2 µF	C350C225(3)5R5CA
2.7 µF	C350C275(3)5R5CA
3.3 µF	C350C335(3)5R5CA
3.9 µF	C350C395(3)5R5CA
4.7 µF	C350C475(3)5R5CA

NOTES: (1) Case Sizes C315/C317 are identical electrically, but differ in lead spacing. See table of dimensions. Insert the appropriate symbol, "5" or "7" in the part number.  
 (2) Case Sizes C320/C322/C323 are identical electrically. See table of dimensions. Insert the appropriate symbol, "0" or "2" or "3" in the part number.  
 (3) Insert proper symbol for capacitance tolerance as follows: K - ±10%, M - ±20%  
 (4) Case Sizes C330 and C333 are identical electrically. Insert the appropriate symbol "0" or "3" in the part number.

**RATINGS & PART NUMBER REFERENCE**  
**GENERAL PURPOSE TEMPERATURE CHARACTERISTIC — Z5U**

CAPACITANCE	KEMET PART NUMBER
<b>100 VOLT — C31X SIZE</b>	
1,000 pF	C31(1)C102(3)1U5CA
1,200 pF	C31(1)C122(3)1U5CA
1,500 pF	C31(1)C152(3)1U5CA
1,800 pF	C31(1)C182(3)1U5CA
2,200 pF	C31(1)C222(3)1U5CA
2,700 pF	C31(1)C272(3)1U5CA
3,300 pF	C31(1)C332(3)1U5CA
3,900 pF	C31(1)C392(3)1U5CA
4,700 pF	C31(1)C472(3)1U5CA
5,600 pF	C31(1)C562(3)1U5CA
6,800 pF	C31(1)C682(3)1U5CA
8,200 pF	C31(1)C822(3)1U5CA
.01 µF	C31(1)C103(3)1U5CA
.012 µF	C31(1)C123(3)1U5CA
.015 µF	C31(1)C153(3)1U5CA
.018 µF	C31(1)C183(3)1U5CA
<b>100 VOLT — C32X SIZE</b>	
.01 µF	C32(2)C103(3)1U5CA
.012 µF	C32(2)C123(3)1U5CA
.015 µF	C32(2)C153(3)1U5CA
.018 µF	C32(2)C183(3)1U5CA
.022 µF	C32(2)C223(3)1U5CA
.027 µF	C32(2)C273(3)1U5CA
.033 µF	C32(2)C333(3)1U5CA
.039 µF	C32(2)C393(3)1U5CA
.047 µF	C32(2)C473(3)1U5CA
.056 µF	C32(2)C563(3)1U5CA
.068 µF	C32(2)C683(3)1U5CA
.082 µF	C32(2)C823(3)1U5CA
0.1 µF	C32(2)C104(3)1U5CA
.12 µF	C32(2)C124(3)1U5CA
.15 µF	C32(2)C154(3)1U5CA
<b>100 VOLT — C33X SIZE</b>	
0.1 µF	C33(4)C104(3)1U5CA
.12 µF	C33(4)C124(3)1U5CA
.15 µF	C33(4)C154(3)1U5CA
.18 µF	C33(4)C184(3)1U5CA
.22 µF	C33(4)C224(3)1U5CA
.27 µF	C33(4)C274(3)1U5CA
.33 µF	C33(4)C334(3)1U5CA
.39 µF	C33(4)C394(3)1U5CA
.47 µF	C33(4)C474(3)1U5CA
<b>100 VOLT — C340 SIZE</b>	
.47 µF	C340C474(3)1U5CA
.56 µF	C340C564(3)1U5CA
.68 µF	C340C684(3)1U5CA
.82 µF	C340C824(3)1U5CA
1.0 µF	C340C105(3)1U5CA
1.2 µF	C340C125(3)1U5CA
1.5 µF	C340C155(3)1U5CA
<b>100 VOLT — C350 SIZE</b>	
1.0 µF	C350C105(3)1U5CA
1.2 µF	C350C125(3)1U5CA
1.5 µF	C350C155(3)1U5CA
1.8 µF	C350C185(3)1U5CA
2.2 µF	C350C225(3)1U5CA

CAPACITANCE	KEMET PART NUMBER
<b>50 VOLT — C31X SIZE</b>	
4,700 pF	C31(1)C472(3)5U5CA
5,600 pF	C31(1)C562(3)5U5CA
6,800 pF	C31(1)C682(3)5U5CA
8,200 pF	C31(1)C822(3)5U5CA
.01 µF	C31(1)C103(3)5U5CA
.012 µF	C31(1)C123(3)5U5CA
.015 µF	C31(1)C153(3)5U5CA
.018 µF	C31(1)C183(3)5U5CA
.022 µF	C31(1)C223(3)5U5CA
.027 µF	C31(1)C273(3)5U5CA
.033 µF	C31(1)C333(3)5U5CA
.039 µF	C31(1)C393(3)5U5CA
.047 µF	C31(1)C473(3)5U5CA
.056 µF	C31(1)C563(3)5U5CA
.068 µF	C31(1)C683(3)5U5CA
.082 µF	C31(1)C823(3)5U5CA
0.1 µF	C31(1)C104(3)5U5CA
<b>50 VOLT — C32X SIZE</b>	
.027 µF	C32(2)C273(3)5U5CA
.033 µF	C32(2)C333(3)5U5CA
.039 µF	C32(2)C393(3)5U5CA
.047 µF	C32(2)C473(3)5U5CA
.056 µF	C32(2)C563(3)5U5CA
.068 µF	C32(2)C683(3)5U5CA
.082 µF	C32(2)C823(3)5U5CA
0.1 µF	C32(2)C104(3)5U5CA
.12 µF	C32(2)C124(3)5U5CA
.15 µF	C32(2)C154(3)5U5CA
.18 µF	C32(2)C184(3)5U5CA
.22 µF	C32(2)C224(3)5U5CA
.27 µF	C32(2)C274(3)5U5CA
.33 µF	C32(2)C334(3)5U5CA
.39 µF	C32(2)C394(3)5U5CA
.47 µF	C32(2)C474(3)5U5CA
.56 µF	C32(2)C564(3)5U5CA
<b>50 VOLT — C33X SIZE</b>	
.27 µF	C33(4)C274(3)5U5CA
.33 µF	C33(4)C334(3)5U5CA
.39 µF	C33(4)C394(3)5U5CA
.47 µF	C33(4)C474(3)5U5CA
.56 µF	C33(4)C564(3)5U5CA
.68 µF	C33(4)C684(3)5U5CA
.82 µF	C33(4)C824(3)5U5CA
1.0 µF	C33(4)C105(3)5U5CA
1.2 µF	C33(4)C125(3)5U5CA
1.5 µF	C33(4)C155(3)5U5CA
1.8 µF	C33(4)C185(3)5U5CA
2.2 µF	C33(4)C225(3)5U5CA
<b>50 VOLT — C340 SIZE</b>	
2.2 µF	C340C225(3)5U5CA
2.7 µF	C340C275(3)5U5CA
3.3 µF	C340C335(3)5U5CA
3.9 µF	C340C395(3)5U5CA
4.7 µF	C340C475(3)5U5CA
<b>50 VOLT — C350 SIZE</b>	
3.9 µF	C350C395(3)5U5CA
4.7 µF	C350C475(3)5U5CA
5.6 µF	C350C565(3)5U5CA
6.8 µF	C350C685(3)5U5CA

- NOTES:** (1) Case Sizes C315/C317 are identical electrically, but differ in lead spacing. See table of dimensions. Insert the appropriate symbol, "5" or "7" in the part number.  
 (2) Case Sizes C320/C322/C323 are identical electrically. See table of dimensions. Insert the appropriate symbol, "0" or "2" or "3" in the part number.  
 (3) Insert proper symbol for capacitance tolerance as follows:  
 M ± 20%  
 Z +80%, -20%  
 (4) Case Sizes C330 and C333 are identical electrically. Insert the appropriate symbol "0" or "3" in the part number.

## 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.

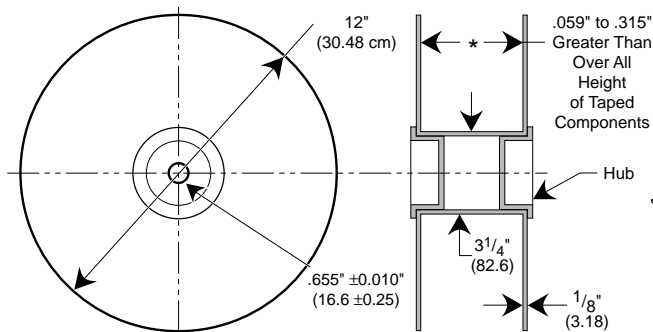


Figure 3: Standard Reel

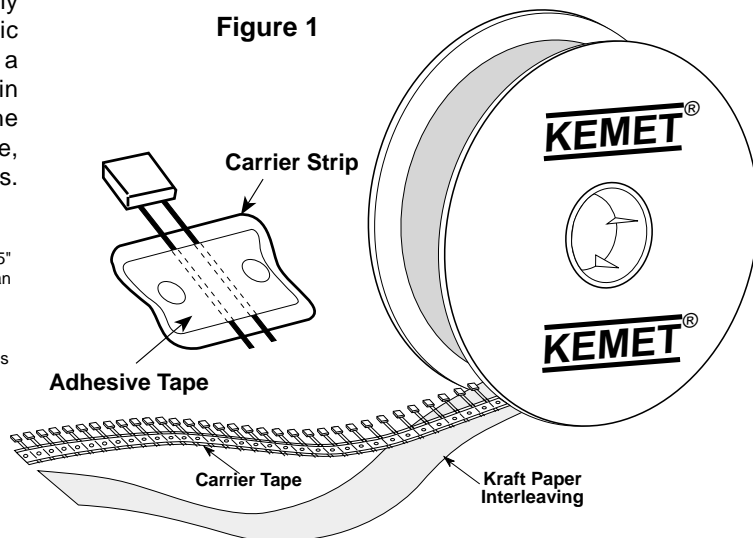


Figure 1

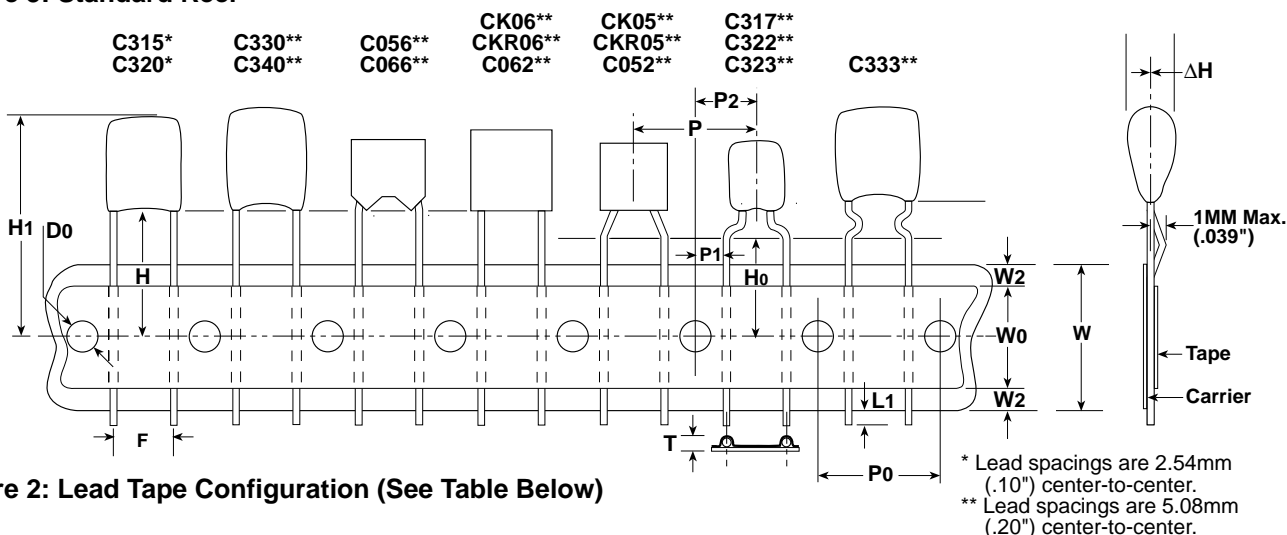


Figure 2: Lead Tape Configuration (See Table Below)

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

Dimension	Symbol	Nominal mm (inch)		Tolerance mm (inch)	Dimension	Symbol	Nominal mm (inch)		Tolerance mm (inch)
Sprocket Hole Diameter	Do	4.0 (.157)		± 0.2 (.008)	Height to Seating Plane (formed leads) (2)	Ho	C7301 16.0 (.630)	C7303 18.0 (.709)	C7301 ±0.5 (.020) Minimum
Sprocket Hole Pitch	P0	12.7 (.500)		± 0.3 (.012)	Component Alignment	Δh	4.0 (.157)		±0.2 (.008)
Component Pitch	P	12.7 (.500)		± 0.3 (.012)	Lead Protrusion	L1	1.0 (.039)		Maximum
Lead Spacing (1)	F	5.08 (.20)	2.54 (.10)	+0.6 -0.2 (+.024 -.008)	Composite Tape Thickness	t	0.7 (.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	T	1.5 (.059)		Maximum
Sprocket Hole Center to Component Center	P2	6.35 (.250)		± 1.3 (.051)	Carrier Tape Width	W	18.0 (.709)		+1.0 - 0.5 (+.039 -.020)
Height to Seating Plane (straight leads) (2)	H	C7301 16.0 (.630)	C7303 18.0 (.709)	C7301 ±0.5 (.020) Minimum	Hold-Down Tape Width	W0	5.0 (.197)		Minimum
Component Height Above Tape Center	H1	32.2 (1.27)		Maximum	Hold-Down Tape Location	W2	3.0 (.118)		Maximum

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

(2) Determined by a 4 digit suffix placed at the end of the part number, as follows:  
7301 = Recommended for parts with formed leads. Example: C322C104K5R5CA7301  
7303 = Recommended for parts with straight leads. Example: C320C104K5R5CA7303

<b>CERAMIC PACKAGING</b>					
<b>KEMET Number</b>	<b>Military Style</b>	<b>Military Specification</b>	<b>Standard (1) Bulk Quantity</b>	<b>Standard Reel Quantity</b>	<b>Reel Size</b>
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	12"
C062C-K-G	CK06, CC06		100/Bag	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	12"
C32X			500/Bag	2500	12"
C33X			250/Bag	1500	12"
C340			100/Bag	1000	12"
C350			50/Bag	N/A	N/A
C410			300/Box	5000	12"
C412			200/Box	5000	12"
C420			300/Box	5000	12"
C430			200/Box	2500	12"
C440			200/Box	2500	12"
C512	N/A	N/A	Footnote (2)	N/A	N/A
C522	N/A	N/A	Footnote (2)	N/A	N/A

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

(2) Quantity varies. For further details, please consult the factory.