

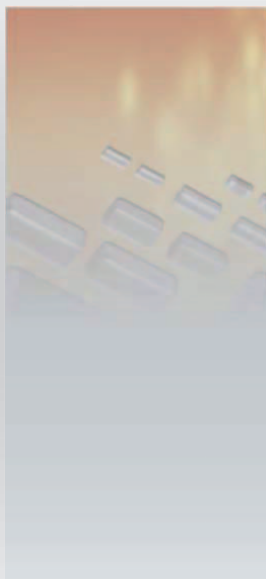
## MULTILAYER CERAMIC CHIP CAPACITORS



### **C Series Commercial Grade Low ESL Reverse Geometry**

**Type:**

- C0510 [EIA CC0204]**
- CGBD [EIA CC0204]**
- C0816 [EIA CC0306]**
- C1220 [EIA CC0508]**
- C1632 [EIA CC0612]**



## REMINDERS

Please read before using this product

### SAFETY REMINDERS

#### REMINDERS

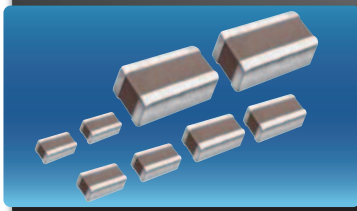
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Notice: Effective January 2013, TDK will use a new catalog number which adds product thickness and packaging specification detail. This new catalog number should be referenced on all catalog orders going forward, and is not applicable for OEM part number orders. Please be aware the last five digits of the catalog number will differ from the item description (internal control number) on the product label. Contact your local TDK Sales representative for more information.

(Example)

Catalog Issued date	Catalog Number	Item Description (On Delivery Label)
Prior to January 2013	C1608C0G1E103J(080AA)	C1608C0G1E103JT000N
January 2013 and Later	C1608C0G1E103J080AA	C1608C0G1E103JT000N

# MULTILAYER CERAMIC CHIP CAPACITORS



## C Series Low ESL Reverse Geometry

Type: C0510 [EIA CC0204], CGBD [EIA CC0204], C0816 [EIA CC0306], C1220 [EIA CC0508], C1632 [EIA CC0612]

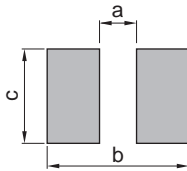
### Features

- Positioning the electrodes along the length of the chip device, reduces ESR and ESL components over conventional products.
- Provides high frequency noise suppression effect because the resonating frequency is high.
- Flipped geometry provides low inductance (less than 400 pH).
- Provides stabilization of power line voltage.
- Suitable for IC decoupling application.

### Applications

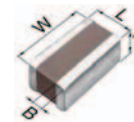
- Decoupling CPU power line
- Bias line in CPU
- High speed digital IC/decoupling
- PC, cell phones, camcorders, etc.

### PC Board Pattern



Size	Dimensions (mm)		
	a	b	c
C0510	0.2	0.6	1.0
CGBD	0.2	0.6	1.0
C0816	0.3	1.0	1.6
C1220	0.5	1.6	2.0
C1632	0.75	2.2	3.2

### Shape & Dimensions



L	Body Length
W	Body Width
T	Body Height
B	Terminal Width

### Catalog Number Construction

C • 1632 • X5R • 0J • 106 • M • 130 • A • C

#### Series Name

#### Dimensions L x W (mm)

Code	Length	Width	Terminal
C0510	0.52 ± 0.05	1.00 ± 0.05	0.10 min.
CGBD*	0.52 ± 0.05	1.00 ± 0.05	0.10min.
C0816	0.80 ± 0.10	1.60 ± 0.10	0.10 min.
C1220	1.25 ± 0.20	2.00 ± 0.20	0.20 min.
C1632	1.60 ± 0.20	3.20 ± 0.20	0.20 min.

\* CGBD: Thickness 0.22mm max.  
\*\* Dimension tolerance are typical values

#### Temperature Characteristics

Temperature Characteristics	Capacitance Change	Temperature Range
X5R	±15%	-55 to +85°C
X6S	±22%	-55 to +105°C
X7R	±15%	-55 to +125°C
X7S	±22%	-55 to +125°C
X7T	+22, -33%	-55 to +125°C

#### Rated Voltage (DC)

Code	Voltage (DC)	Code	Voltage (DC)
0E	2.5V	1C	16V
0G	4.0V	1E	25V
0J	6.3V	1H	50V
1A	10V		

#### Nominal Capacitance (pF)

The capacitance is expressed in three digit codes and in units of pico Farads (pF). The first and second digits identify the first and second significant figures of the capacitance. The third digit identifies the multiplier.

Ex. 103 = 10,000pF; 105 = 1,000,000pF = 1μF

#### Capacitance Tolerance

Code	Tolerance
M	± 20%

#### Nominal Thickness

Code	Thickness
022	0.22 mm
030	0.30 mm
050	0.50 mm
070	0.70 mm
085	0.85 mm
115	1.15 mm
130	1.30 mm

#### Packaging Style

Code	Style
A	178 mm Reel, 4 mm Pitch
B	178 mm Reel, 2 mm Pitch

#### Special Reserved Code

Code	Description
C	TDK Internal Code

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# MULTILAYER CERAMIC CHIP CAPACITORS



## Capacitance Range Chart

### EIA CC0204 [C0510]

#### Capacitance Range Chart

Temperature Characteristics: X5R ( $\pm 15\%$ ), X6S ( $\pm 22\%$ ), X7S ( $\pm 22\%$ )

Rated Voltage: 16V (1C), 10V (1A), 6.3V (0J), 4V (0G), 2.5V (0E)

Capacitance		Tolerance	X5R			X6S		X7S	
(pF)	Code		1C (16V)	1A (10V)	0J (6.3V)	0J (6.3V)	0G (4V)	0G (4V)	0E (2.5V)
100,000	104	M: $\pm 20\%$							
220,000	224								
470,000	474								
1,000,000	105								

Standard Thickness  
 0.30 mm

## Capacitance Range Chart

### CGBD [EIA CC0204 [C0510]]

#### Capacitance Range Chart

Temperature Characteristics: X5R ( $\pm 15\%$ ), X6S ( $\pm 22\%$ ), X7T ( $+22\%$ ,  $-33\%$ )

Rated Voltage: 4V (0G), 2.5V (0E)

Capacitance		Tolerance	X5R	X6S	X7T
(pF)	Code		0G (4V)	0G (4V)	0E (2.5V)
1,000,000	105	M: $\pm 20\%$			

Standard Thickness  
 0.22 mm max.

## Capacitance Range Chart

### EIA CC0306 [C0816]

#### Capacitance Range Chart

Temperature Characteristics: X5R ( $\pm 15\%$ ), X6S ( $\pm 22\%$ ), X7R ( $\pm 15\%$ ), X7S ( $\pm 22\%$ )

Rated Voltage: 16V (1C), 10V (1A), 6.3V (0J), 4V (0G)

Capacitance		Tolerance	X5R			X6S	X7R		X7S
(pF)	Code		1C (16V)	1A (10V)	0J (6.3V)	0G (4V)	1C (16V)	0J (6.3V)	0G (4V)
10,000	103	M: $\pm 20\%$							
22,000	223								
47,000	473								
100,000	104								
220,000	224								
470,000	474								
1,000,000	105								
2,200,000	225								
4,700,000	475								

Standard Thickness  
 0.50 mm

# MULTILAYER CERAMIC CHIP CAPACITORS



## Capacitance Range Chart

## EIA CC0508 [C1220]

### Capacitance Range Chart

Temperature Characteristics: X5R (±15%), X7R (±15%)

Rated Voltage: 50V (1H), 25V (1E), 16V (1C), 10V (1A), 6.3V (0J)

Capacitance		Tolerance	X5R				X7R			
(pF)	Code		1H (50V)	1E (25V)	1C (16V)	1A (10V)	1H (50V)	1E (25V)	1C (16V)	0J (6.3V)
10,000	103	M: ± 20%	■				■			
22,000	223									
47,000	473									
100,000	104			■				■		
220,000	224				■				■	
470,000	474					■				■
1,000,000	105						■			■

Standard Thickness  
■ 0.85 mm

## Capacitance Range Chart

## EIA CC0612 [C1632]

### Capacitance Range Chart

Temperature Characteristics: X5R (±15%), X7R (±15%), X7S (±22%)

Rated Voltage: 50V (1H), 25V (1E), 16V (1C), 10V (1A), 6.3V (0J), 4V (0G)

Capacitance		Tolerance	X5R					X7R					X7S
(pF)	Code		1H (50V)	1E (25V)	1C (16V)	1A (10V)	0J (6.3V)	1H (50V)	1E (25V)	1C (16V)	1A (10V)	0J (6.3V)	0G (4V)
10,000	103	M: ± 20%	■					■					
22,000	223												
47,000	473												
100,000	104			■					■				
220,000	224				■					■			
470,000	474					■					■		
1,000,000	105						■					■	
2,200,000	225												
4,700,000	475											■	
10,000,000	106												

Standard Thickness  
■ 0.70 mm   ■ 1.15 mm   ■ 1.30 mm

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# MULTILAYER CERAMIC CHIP CAPACITORS



## Capacitance Range Table

### Class 2 (Temperature Stable)

Temperature Characteristics: X5R (-55 to +85°C, ±15%)

Capacitance	Size	Thickness (mm)	Capacitance Tolerance	Catalog Number			
				Rated VoltageEdc : 50V	Rated VoltageEdc : 25V	Rated VoltageEdc : 16V	Rated VoltageEdc : 10V
10 nF	0816	0.50 ± 0.10	± 20%			C0816X5R1C103M050AC	
	1220	0.85 ± 0.15	± 20%	C1220X5R1H103M085AC			
	1632	0.70 ± 0.10	± 20%	C1632X5R1H103M070AC			
22 nF	0816	0.50 ± 0.10	± 20%			C0816X5R1C223M050AC	
	1220	0.85 ± 0.15	± 20%	C1220X5R1H223M085AC			
	1632	0.70 ± 0.10	± 20%	C1632X5R1H223M070AC			
47 nF	0816	0.50 ± 0.10	± 20%			C0816X5R1C473M050AC	
	1220	0.85 ± 0.15	± 20%	C1220X5R1H473M085AC			
	1632	0.70 ± 0.10	± 20%	C1632X5R1H473M070AC			
100 nF	0510	0.30 ± 0.05	± 20%			C0510X5R1C104M030AC	
	0816	0.50 ± 0.10	± 20%			C0816X5R1C104M050AC	
	1220	0.85 ± 0.15	± 20%		C1220X5R1E104M085AC		
	1632	0.70 ± 0.10	± 20%	C1632X5R1H104M070AC			
220 nF	0816	0.50 ± 0.10	± 20%				C0816X5R1A224M050AC
	1220	0.85 ± 0.15	± 20%			C1220X5R1C224M085AC	
	1632	0.70 ± 0.10	± 20%		C1632X5R1E224M070AC		
		1.15 ± 0.15	± 20%	C1632X5R1H224M115AC			
470 nF	0510	0.30 ± 0.05	± 20%			C0510X5R1C474M030AC	C0510X5R1A474M030AC
	0816	0.50 ± 0.10	± 20%				C0816X5R1A474M050AC
	1220	0.85 ± 0.15	± 20%				C1220X5R1A474M085AC
	1632	0.70 ± 0.10	± 20%			C1632X5R1C474M070AC	
		1.15 ± 0.15	± 20%		C1632X5R1E474M115AC		
1 μF	0816	0.50 ± 0.10	± 20%			C0816X5R1C105M050AC	
	1220	0.85 ± 0.15	± 20%				C1220X5R1A105M085AC
	1632	0.70 ± 0.10	± 20%				C1632X5R1A105M070AC
		1.15 ± 0.15	± 20%			C1632X5R1C105M115AC	
2.2 μF	1632	1.15 ± 0.15	± 20%				C1632X5R1A225M115AC

Capacitance	Size	Thickness (mm)	Capacitance Tolerance	Catalog Number	
				Rated VoltageEdc : 6.3V	Rated VoltageEdc : 4.0V
470 nF	0816	0.50 ± 0.10	± 20%	C0816X5R0J474M050AC	
1 μF	0510	0.30 ± 0.05	± 20%	C0510X5R0J105M030AC	
		0.22max.	± 20%		CGBDT1X5R0G105M022BC
2.2 μF	0816	0.50 ± 0.10	± 20%	C0816X5R0J225M050AC	
4.7 μF	0816	0.50 ± 0.10	± 20%	C0816X5R0J475M050AC	
		1.30 ± 0.15	± 20%	C1632X5R0J475M130AC	
10 μF	1632	1.30 ± 0.15	± 20%	C1632X5R0J106M130AC	

### Class 2 (Temperature Stable)

Temperature Characteristics: X6S (-55 to +105°C, ±22%)

Capacitance	Size	Thickness (mm)	Capacitance Tolerance	Catalog Number	
				Rated VoltageEdc : 6.3V	Rated VoltageEdc : 4.0V
100 nF	0510	0.30 ± 0.05	± 20%		C0510X6S0G104M030AC
220 nF	0510	0.30 ± 0.05	± 20%		C0510X6S0G224M030AC
470 nF	0510	0.30 ± 0.05	± 20%	C0510X6S0J474M030AC	C0510X6S0G474M030AC
		0.30 ± 0.05	± 20%		C0510X6S0G105M030AC
1 μF	0510	0.22max.	± 20%		CGBDT1X6S0G105M022BC
		0.50 ± 0.10	± 20%		C0816X6S0G475M050AC

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# MULTILAYER CERAMIC CHIP CAPACITORS



## Capacitance Range Table

### Class 2 (Temperature Stable)

Temperature Characteristics: X7R (-55 to +125°C, ±15%)

Capacitance	Size	Thickness (mm)	Capacitance Tolerance	Catalog Number			
				Rated VoltageEdc : 50V	Rated VoltageEdc : 25V	Rated VoltageEdc : 16V	Rated VoltageEdc : 10V
10 nF	0816	0.50 ± 0.10	± 20%			C0816X7R1C103M050AC	
	1220	0.85 ± 0.15	± 20%	C1220X7R1H103M085AC			
	1632	0.70 ± 0.10	± 20%	C1632X7R1H103M070AC			
22 nF	0816	0.50 ± 0.10	± 20%			C0816X7R1C223M050AC	
	1220	0.85 ± 0.15	± 20%	C1220X7R1H223M085AC			
	1632	0.70 ± 0.10	± 20%	C1632X7R1H223M070AC			
47 nF	0816	0.50 ± 0.10	± 20%			C0816X7R1C473M050AC	
	1220	0.85 ± 0.15	± 20%	C1220X7R1H473M085AC			
	1632	0.70 ± 0.10	± 20%	C1632X7R1H473M070AC			
100 nF	0816	0.50 ± 0.10	± 20%			C0816X7R1C104M050AC	
	1220	0.85 ± 0.15	± 20%		C1220X7R1E104M085AC		
	1632	0.70 ± 0.10	± 20%	C1632X7R1H104M070AC			
220 nF	1220	0.85 ± 0.15	± 20%			C1220X7R1C224M085AC	
	1632	0.70 ± 0.10	± 20%		C1632X7R1E224M070AC		
	1632	1.15 ± 0.15	± 20%	C1632X7R1H224M115AC			
470 nF	1632	0.70 ± 0.10	± 20%			C1632X7R1C474M070AC	
	1632	1.15 ± 0.15	± 20%		C1632X7R1E474M115AC		
	1632	0.70 ± 0.10	± 20%				C1632X7R1A105M070AC
1 µF	1632	0.70 ± 0.10	± 20%			C1632X7R1C105M115AC	
	1632	1.15 ± 0.15	± 20%				C1632X7R1A225M115AC
2.2 µF	1632	1.15 ± 0.15	± 20%				C1632X7R1A225M115AC

Capacitance	Size	Thickness (mm)	Capacitance Tolerance	Catalog Number
				Rated VoltageEdc : 6.3V
220 nF	0816	0.50 ± 0.10	± 20%	C0816X7R0J224M050AC
470 nF	1220	0.85 ± 0.15	± 20%	C1220X7R0J474M085AC
	1220	0.85 ± 0.15	± 20%	C1220X7R0J105M085AC
1 µF	1632	0.70 ± 0.10	± 20%	C1632X7R0J105M070AC
	1632	1.15 ± 0.15	± 20%	C1632X7R0J225M115AC

### Class 2 (Temperature Stable)

Temperature Characteristics: X7S (-55 to +125°C, ±22%)

Capacitance	Size	Thickness (mm)	Capacitance Tolerance	Catalog Number	
				Rated VoltageEdc : 4.0V	Rated VoltageEdc : 2.5V
470 nF	0510	0.30 ± 0.05	± 20%	C0510X7S0G474M030AC	
	0816	0.50 ± 0.10	± 20%	C0816X7S0G474M050AC	
1 µF	0510	0.30 ± 0.05	± 20%		C0510X7S0E105M030AC
	0816	0.50 ± 0.10	± 20%	C0816X7S0G105M050AC	
2.2 µF	0816	0.50 ± 0.10	± 20%	C0816X7S0G225M050AC	
4.7 µF	1632	1.30 ± 0.15	± 20%	C1632X7S0G475M130AC	
10 µF	1632	1.30 ± 0.15	± 20%	C1632X7S0G106M130AC	

Temperature Characteristics: X7T (-55 to +125°C, +22%, -33%)

Capacitance	Size	Thickness (mm)	Capacitance Tolerance	Catalog Number
				Rated VoltageEdc : 2.5V
1 µF	0510	0.22max.	± 20%	CGBDT1X7T0E105M022BC

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