

# MULTILAYER CERAMIC CHIP CAPACITORS

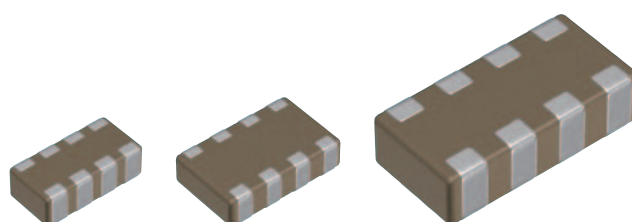
Commercial grade, low ESL ULI

## CLL series

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CLLC1A	1608 [0603 inch]
CLLE1A	2012 [0805 inch]
CLLG1A	3216 [1206 inch]

\* Dimensions code: JIS[EIA]



# REMINDERS FOR USING THESE PRODUCTS

Before using these products, be sure to request the delivery specifications.

## SAFETY REMINDERS

Please pay sufficient attention to the warnings for safe designing when using this products.



### REMINDERS

1. The products listed on this catalog are intended for use in general electronic equipment (AV equipment, telecommunications equipment, home appliances, amusement equipment, computer equipment, personal equipment, office equipment, measurement equipment, industrial robots) under a normal operation and use condition.

The products are not designed or warranted to meet the requirements of the applications listed below, whose performance and/or quality require a more stringent level of safety or reliability, or whose failure, malfunction or trouble could cause serious damage to society, person or property.

If you intend to use the products in the applications listed below or if you have special requirements exceeding the range or conditions set forth in the each catalog, please contact us.

- |  |  |
|--|--|
| (1) Aerospace/aviation equipment   | (8) Public information-processing equipment                                  |
| (2) Transportation equipment (cars, electric trains, ships, etc.)                    | (9) Military equipment   |
| (3) Medical equipment (excepting Pharmaceutical Affairs Law classification Class1,2) | (10) Electric heating apparatus, burning equipment                           |
| (4) Power-generation control equipment   | (11) Disaster prevention/crime prevention equipment                          |
| (5) Atomic energy-related equipment  | (12) Safety equipment  |
| (6) Seabed equipment   | (13) Other applications that are not considered general-purpose applications |
| (7) Transportation control equipment   |  |

When designing your equipment even for general-purpose applications, you are kindly requested to take into consideration securing protection circuit/device or providing backup circuits in your equipment.

2. We may modify products or discontinue production of a product listed in this catalog without prior notification.
3. We provide "Delivery Specification" that explain precautions for the specifications and safety of each product listed in this catalog. We strongly recommend that you exchange these delivery specifications with customers that use one of these products.
4. If you plan to export a product listed in this catalog, keep in mind that it may be a restricted item according to the "Foreign Exchange and Foreign Trade Control Law". In such cases, it is necessary to acquire export permission in harmony with this law.
5. Any reproduction or transferring of the contents of this catalog is prohibited without prior permission from our company.
6. We are not responsible for problems that occur related to the intellectual property rights or other rights of our company or a third party when you use a product listed in this catalog. We do not grant license of these rights.
7. This catalog only applies to products purchased through our company or one of our company's official agencies. This catalog does not apply to products that are purchased through other third parties.

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

# CLL series

## Low ESL ULI



Type: CLLC1A [0603 inch], CLLE1A [0805 inch], CLLG1A [1206 inch]

### SERIES OVERVIEW

TDK multilayer ceramic chip capacitor low ESL ULI type commercial grade CLL series have eight terminal electrodes per capacitor and unique internal structures. The ESL and impedance are reduced by alternating current flows and offsetting the magnetic field generated.

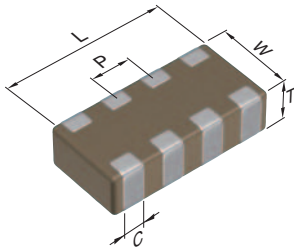
### FEATURES

- The number of decoupling MLCCs can be decreased because the impedance is lower than standard termination type.
- Small and low profile design enables undersurface mounting for semi-conductor packages.

### APPLICATIONS

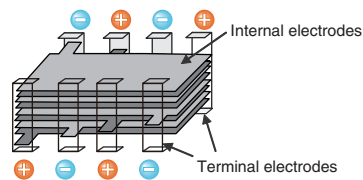
- Decoupling applications in power lines of CPUs, GPUs, and high speed digital IC.

### SHAPE & DIMENSIONS



L	Body length
W	Body width
T	Body height
C	Terminal width
P	Terminal spacing

### PRODUCT STRUCTURE



The eight terminal electrodes are connected +/– alternately to reverse the current flow and offset the magnetic field generated.

Dimensions in mm					
Type	L	W	T	C	P
CLLC1A	1.60±0.10	0.80±0.10	0.50+0.05,–0.10	0.25 nom.	0.40 nom.
CLLE1A	2.00±0.15	1.25±0.15	0.50+0.05,–0.10	0.25 nom.	0.50 nom.
CLLG1A	3.20±0.15	1.60±0.15	0.85±0.10	0.40 nom.	0.80 nom.

\*Dimensional tolerances are typical values.

# MULTILAYER CERAMIC CHIP CAPACITORS



## CATALOG NUMBER CONSTRUCTION

CLL	C1A	X6S	0G	475	M	050	A	C
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

### (1) Series

### (2) Dimensions L x W (mm)

Dimensions code	EIA	Length	Width	Terminal width
C1A	CC0603	1.60	0.80	0.25
E1A	CC0805	2.00	1.25	0.25
G1A	CC1206	3.20	1.60	0.40

### (3) Temperature characteristics

Temperature characteristics	Capacitance change	Temperature range
X6S	±22%	-55 to +105°C
X7R	±15%	-55 to +125°C
X7S	±22%	-55 to +125°C

### (4) Rated voltage (DC)

Code	Voltage (DC)
0G	4V
0J	6.3V
1A	10V

### (5) 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. R designates a decimal point.

(Example) 0R5 = 0.5pF

101 = 100pF

225 = 2,200,000pF = 2.2μF

### (6) Capacitance tolerance

Code	Tolerance
M	±20%

### (7) Thickness

Code	Thickness
050	0.50mm
085	0.85mm

### (8) Packaging style

Code	Style
A	178mm reel, 4mm pitch

### (9) Special reserved code

Code	Description
C	TDK internal code

## Capacitance range chart

CLLC1A/1608 [0603 inch]

Capacitance		X6S	X7R	X7S
(pF)	Code	0G (4V)	0G (4V)	0G (4V)
47,000	473			
100,000	104			
330,000	334			
470,000	474			
680,000	684			
1,000,000	105			
2,200,000	225			
4,700,000	475			

Standard thickness 0.50 mm

Background gray: The product which is not recommended to a new design.

Please refer to the capacitance range table at P-6 for the details such as product thickness and capacitance tolerance.

## Capacitance range chart

CLLE1A/2012 [0805 inch]

Capacitance		X7R			X7S		
(pF)	Code	1A (10V)	0J (6.3V)	0G (4V)	1A (10V)	0J (6.3V)	0G (4V)
47,000	473						
100,000	104						
150,000	154						
220,000	224						
330,000	334						
470,000	474						
680,000	684						
1,000,000	105						
1,500,000	155						
2,200,000	225						
4,700,000	475						
6,800,000	685						

Standard thickness 0.50 mm 0.85 mm

Background red: The product which is planning to stop production

Please refer to the capacitance range table at P-6 for the details such as product thickness and capacitance tolerance.

## Capacitance range chart

CLLG1A/3216 [1206 inch]

Capacitance		X7R	
(pF)	Code	1A (10V)	0J (6.3V)
1,000,000	105		
2,200,000	225		

Standard thickness 0.85 mm

Background red: The product which is planning to stop production

Please refer to the capacitance range table at P-6 for the details such as product thickness and capacitance tolerance.

## MULTILAYER CERAMIC CHIP CAPACITORS



## Capacitance range table

Temperature characteristics: X6S (–55 to +105°C, ±22%)

Capacitance	Dimensions	Thickness (mm)	Capacitance tolerance	Catalog number
4.7μF	1608	0.50+0.05,–0.10	±20%	CLLC1AX6S0G475M050AC

## Capacitance range table

Temperature characteristics: X7R (–55 to +125°C, ±15%)

Capacitance	Dimensions	Thickness (mm)	Capacitance tolerance	Catalog number	Rated voltage Edc: 10V	Rated voltage Edc: 6.3V	Rated voltage Edc: 4V
47nF	2012	0.50+0.05,–0.10	±20%				CLLE1AX7R0G473M050AC
100nF	1608	0.50+0.05,–0.10	±20%				CLLC1AX7R0G104M050AC
	2012	0.50+0.05,–0.10	±20%	CLLE1AX7R1A104M050AC			CLLE1AX7R0G104M050AC
150nF	2012	0.50+0.05,–0.10	±20%	CLLE1AX7R1A154M050AC			
220nF	2012	0.50+0.05,–0.10	±20%	CLLE1AX7R1A224M050AC			
330nF	2012	0.50+0.05,–0.10	±20%	CLLE1AX7R1A334M050AC			
470nF	2012	0.50+0.05,–0.10	±20%			CLLE1AX7R0J474M050AC	
680nF	2012	0.50+0.05,–0.10	±20%			CLLE1AX7R0J684M050AC	
	2012	0.85±0.10	±20%			CLLE1AX7R0J105M085AC	CLLE1AX7R0G105M085AC
1μF	3216	0.85±0.10	±20%	CLLG1AX7R1A105M085AC			
1.5μF	2012	0.85±0.10	±20%			CLLE1AX7R0J155M085AC	
2.2μF	3216	0.85±0.10	±20%			CLLG1AX7R0J225M085AC	

■ The red items are products which the production will be stopped.

## Capacitance range table

Temperature characteristics: X7S (–55 to +125°C, ±22%)

Capacitance	Dimensions	Thickness (mm)	Capacitance tolerance	Catalog number	Rated voltage Edc: 10V	Rated voltage Edc: 6.3V	Rated voltage Edc: 4V
47nF	1608	0.50+0.05,–0.10	±20%				CLLC1AX7S0G473M050AC
	2012	0.50+0.05,–0.10	±20%				CLLE1AX7S0G473M050AC
100nF	1608	0.50+0.05,–0.10	±20%				CLLC1AX7S0G104M050AC
	2012	0.50+0.05,–0.10	±20%				CLLE1AX7S0G104M050AC
150nF	2012	0.50+0.05,–0.10	±20%	CLLE1AX7S1A154M050AC			
220nF	2012	0.50+0.05,–0.10	±20%	CLLE1AX7S1A224M050AC			
330nF	1608	0.50+0.05,–0.10	±20%				CLLC1AX7S0G334M050AC
	2012	0.50+0.05,–0.10	±20%	CLLE1AX7S1A334M050AC			
470nF	1608	0.50+0.05,–0.10	±20%				CLLC1AX7S0G474M050AC
	2012	0.50+0.05,–0.10	±20%			CLLE1AX7S0J474M050AC	
680nF	1608	0.50+0.05,–0.10	±20%				CLLC1AX7S0G684M050AC
	2012	0.50+0.05,–0.10	±20%			CLLE1AX7S0J684M050AC	
1μF	1608	0.50+0.05,–0.10	±20%				CLLC1AX7S0G105M050AC
	2012	0.50+0.05,–0.10	±20%				CLLE1AX7S0G105M050AC
		0.50+0.05,–0.10	±20%				CLLE1AX7S0G155M050AC
1.5μF	2012	0.85±0.10	±20%			CLLE1AX7S0J155M085AC	
	1608	0.50+0.05,–0.10	±20%				CLLC1AX7S0G225M050AC
2.2μF		0.50+0.05,–0.10	±20%				CLLE1AX7S0G225M050AC
	2012	0.85±0.10	±20%				CLLE1AX7S0G225M085AC
4.7μF	2012	0.50+0.05,–0.10	±20%				CLLE1AX7S0G475M050AC
		0.85±0.10	±20%				CLLE1AX7S0G475M085AC
6.8μF	2012	0.50+0.05,–0.10	±20%				CLLE1AX7S0G685M050AC

■ Gray item: The product which is not recommended to a new design.

■ The red items are products which the production will be stopped.