

Multilayer Ceramic Chip Capacitors

For automobile(Mid voltage)

CGA series

Type: **CGA2(C1005[EIA CC0402])**
 CGA3(C1608[EIA CC0603])
 CGA4(C2012[EIA CC0805])
 CGA5(C3216[EIA CC1206])
 CGA6(C3225[EIA CC1210])

Issue date: October 2011

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 - Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.
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REMINDERS

Please read this before using the product.

SAFETY REMINDERS

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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.
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8. The descriptions in this catalog apply as of October, 2011.

Multilayer Ceramic Chip Capacitors For Automobile(Mid Voltage)

Conformity to RoHS Directive

CGA Series

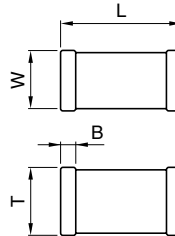
FEATURES

- A series of small SMD products with rated voltages ranging from 100V to 630V.
The series has achieved a high capacitance, and is suited for size and thickness reduction of devices.
- A lineup with wide-ranging rated voltages that enables selections that are suitable for needs.
- Features a wide operating temperature range from -55 to $+125^{\circ}\text{C}$.

APPLICATION EXAMPLES

- Countermeasure against voltage surge and noise in connectors
- Application in decoupling, smoothing, and snubber circuits of inverters or DC to DC converters of HEVs or EVs
- Surge removal of various motors

SHAPES AND DIMENSIONS



DIMENSIONS

The dimensions of each product are described within the product name.

Dimensions L×W

The fourth digit number in the product name corresponds to the dimensions of L×W.

Refer to the table below for specific values.

Dimension code	Dimensions in mm		
	L	W	B
2	1.0 ± 0.05	0.5 ± 0.05	0.1min.
3	1.6 ± 0.1	0.8 ± 0.1	0.2min.
4	2.0 ± 0.2	1.25 ± 0.2	0.2min.
5	3.2 ± 0.2	1.6 ± 0.2	0.2min.
6	3.2 ± 0.4	2.5 ± 0.3	0.2min.

• Dimension tolerances are typical values.

Product's Thickness T

The value in parentheses at the end of the product name corresponds to thickness T.

Refer to the table of "CAPACITANCE RANGES" for specific values.

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PRODUCT IDENTIFICATION

CGA 2 B 2 X7R 1H 103 K (050 B B)
 (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11)

(1) Series name
(2) Dimensions L×W

2	1.0×0.5mm
3	1.6×0.8mm
4	2.0×1.25mm
5	3.2×1.6mm
6	3.2×2.5mm

(3) Dimensions T

B	0.50mm
C	0.60mm
E	0.80mm
F	0.85mm
G	1.10mm
H	1.15mm
J	1.25mm
K	1.30mm
L	1.60mm
M	2.00mm
N	2.30mm
P	2.50mm

• Overlaps with (9).

**(4) Test voltage of the high temperature load test
(guaranteed voltage)**

1	1× the rated voltage
2	2× the rated voltage
3	1.5× the rated voltage
4	1.2× the rated voltage
5	1.1× the rated voltage

(5) Capacitance temperature characteristics
Class 1 (Temperature compensation)

Temperature characteristics	Capacitance change	Temperature range
C0G	0±30ppm/°C	-55 to +125°C

Class 2 (Temperature stable and general purpose)

Temperature characteristics	Capacitance change	Temperature range
X7R	±15%	-55 to +125°C
X7S	±22%	-55 to +125°C
X7T	+22, -33%	-55 to +125°C

(6) Rated voltage Edc

2A	100V
2E	250V
2W	450V
2J	630V

(7) Nominal capacitance

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.

010	1pF
100	10pF
471	470pF
102	1,000pF
333	33,000pF
474	470,000pF
225	2,200,000pF (2.2μF)

(8) Capacitance tolerance

Symbol	Tolerance	Applicable capacitance range
J	±5%	Over 10pF
K	±10%	

(9) Dimensions T

Expressed by a three-digit number in mm units.

The second and third digits denote the first and second decimal places, respectively.

030	0.30mm
050	0.50mm
085	0.85mm
125	1.25mm

• Overlaps with (3).

(10) Packaging style

A	ø178mm reel with 4mm-pitch
B	ø178mm reel with 2mm-pitch
C	ø178mm reel with 1mm-pitch
D	ø330mm reel with 4mm-pitch
E	ø330mm reel with 2mm-pitch
F	ø330mm reel with 1mm-pitch
H	Bulk(bag)
J	ø330mm reel with 8mm-pitch
K	ø178mm reel with 8mm-pitch

(11) TDK internal code

In brochures issued in August, 2011 and later, the product thickness and packing specifications are described at the end of the ordering name [the product name described in brochures] in parentheses.

Since the existing ordering name could not clearly express the product thickness and packing specifications, it has been changed to a new product description method that solves this inconvenience.

Please be aware that the last five digits of the ordering name on the delivery label and those in the brochure differ.

No changes have been made to the delivery name.

(Example)

Brochure issued date	Ordering name (description in the brochure)	Delivery name (description on the delivery label)
Prior to July, 2011	C1608X5R1C105K	C1608X5R1C105KT000N
August, 2011 or later	C1608X5R1C105K(080AA)	C1608X5R1C105KT000N

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CAPACITANCE RANGES: CLASS 1 (TEMPERATURE COMPENSATION)
TEMPERATURE CHARACTERISTICS: C0G(0±30ppm/°C)

Capacitance	Dimension L×W	Thickness T(mm)	Capacitance tolerance	Part No.			
				Rated voltage Edc: 630V	Rated voltage Edc: 450V	Rated voltage Edc: 250V	Rated voltage Edc: 100V
100pF	1608	0.80±0.10	±5%	CGA3E3C0G2E101J(080AB)			
		0.80±0.10					
120pF	1608	0.80±0.10	±5%	CGA3E2C0G2A121J(080AA)			
		0.80±0.10					
150pF	1608	0.80±0.10	±5%	CGA3E3C0G2E151J(080AB)			
		0.80±0.10					
180pF	1608	0.80±0.10	±5%	CGA3E2C0G2A181J(080AA)			
		0.80±0.10					
220pF	1608	0.80±0.10	±5%	CGA3E2C0G2A221J(080AA)			
		0.80±0.10					
270pF	1608	0.80±0.10	±5%	CGA3E2C0G2A271J(080AA)			
		0.80±0.10					
330pF	1608	0.80±0.10	±5%	CGA3E2C0G2A331J(080AA)			
		0.80±0.10					
390pF	1608	0.80±0.10	±5%	CGA3E2C0G2A391J(080AA)			
		0.80±0.10					
470pF	1608	0.80±0.10	±5%	CGA3E2C0G2A471J(080AA)			
		0.80±0.10					
560pF	1608	0.80±0.10	±5%	CGA3E2C0G2A561J(080AA)			
		0.80±0.10					
680pF	1608	0.80±0.10	±5%	CGA3E2C0G2A681J(080AA)			
		0.80±0.10					
820pF	1608	0.80±0.10	±5%	CGA3E2C0G2A821J(080AA)			
		0.80±0.10					
1nF	2012	0.60±0.15	±5%	CGA4C2C0G2A102J(060AA)			
		0.60±0.15					
1.2nF	2012	0.85±0.15	±5%	CGA4F3C0G2E122J(085AB)			
		0.85±0.15					
1.5nF	2012	0.60±0.15	±5%	CGA4C2C0G2A152J(060AA)			
		0.60±0.15					
1.8nF	2012	0.85±0.15	±5%	CGA4F2C0G2A182J(085AA)			
		0.85±0.15					
2.2nF	2012	1.25±0.20	±5%	CGA4J3C0G2E222J(125AB)			
		1.25±0.20					
2.7nF	2012	1.25±0.20	±5%	CGA4J2C0G2A272J(125AA)			
		1.25±0.20					
3.3nF	3216	1.60±0.20	±5%	CGA4J3C0G2E272J(125AB)			
		1.60±0.20					
	3216	1.60±0.20	±5%	CGA4J2C0G2A332J(125AA)			
		1.60±0.20					
				CGA5F3C0G2E332J(085AB)			
				CGA5L4C0G2J332J(160AA)			

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CAPACITANCE RANGES: CLASS 1 (TEMPERATURE COMPENSATION)
TEMPERATURE CHARACTERISTICS: C0G(0±30ppm/°C)

Capacitance	Dimension L×W	Thickness T(mm)	Capacitance tolerance	Part No.			
				Rated voltage Edc: 630V	Rated voltage Edc: 450V	Rated voltage Edc: 250V	Rated voltage Edc: 100V
3.9nF	2012	1.25±0.20	±5%				CGA4J2C0G2A392J(125AA)
		0.60±0.15	±5%				CGA5C2C0G2A392J(060AA)
	3216	1.15±0.15	±5%			CGA5H3C0G2E392J(115AB)	
	3225	1.25±0.20	±5%	CGA6J4C0G2J392J(125AA)			
4.7nF	2012	1.25±0.20	±5%				CGA4J2C0G2A472J(125AA)
		0.85±0.15	±5%				CGA5F2C0G2A472J(085AA)
	3216	1.15±0.15	±5%			CGA5H3C0G2E472J(115AB)	
	3225	1.60±0.20	±5%	CGA6L4C0G2J472J(160AA)			
5.6nF	3216	0.85±0.15	±5%				CGA5F2C0G2A562J(085AA)
		1.15±0.15	±5%			CGA5H3C0G2E562J(115AB)	
	3225	1.60±0.20	±5%	CGA6L4C0G2J562J(160AA)			
6.8nF	3216	1.15±0.15	±5%				CGA5H2C0G2A682J(115AA)
		1.60±0.20	±5%			CGA5L3C0G2E682J(160AB)	
	3225	2.00±0.20	±5%	CGA6M4C0G2J682J(200AA)			
8.2nF	3216	1.15±0.15	±5%				CGA5H2C0G2A822J(115AA)
		1.60±0.20	±5%			CGA5L3C0G2E822J(160AB)	
10nF	3216	1.15±0.15	±5%				CGA5H2C0G2A103J(115AA)
		1.60±0.20	±5%			CGA6L3C0G2E103J(160AB)	
15nF	3225	1.25±0.20	±5%				CGA6J2C0G2A153J(125AA)
		2.00±0.20	±5%			CGA6M3C0G2E153J(200AB)	
22nF	3225	1.60±0.20	±5%				CGA6L2C0G2A223J(160AA)
33nF	3225	2.00±0.20	±5%				CGA6M2C0G2A333J(200AA)
47nF	3225	2.30±0.20	±5%				CGA6N2C0G2A473J(230AA)

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CAPACITANCE RANGES: CLASS 2
TEMPERATURE CHARACTERISTICS: X7R(±15%)

Capacitance	Dimension L×W	Thickness T(mm)	Capacitance tolerance	Part No.			
				Rated voltage Edc: 630V	Rated voltage Edc: 450V	Rated voltage Edc: 250V	Rated voltage Edc: 100V
1nF	1608	0.80±0.10	±10%				CGA3E2X7R2A102K(080AA)
		0.85±0.15	±10%				CGA4F2X7R2A102K(085AA)
	2012	0.85±0.15	±10%			CGA4F3X7R2E102K(085AB)	
1.5nF	1608	0.80±0.10	±10%				CGA3E2X7R2A152K(080AA)
		0.85±0.15	±10%				CGA4F2X7R2A152K(085AA)
	2012	0.85±0.15	±10%			CGA4F3X7R2E152K(085AB)	
2.2nF	1608	0.80±0.10	±10%				CGA3E2X7R2A222K(080AA)
		0.85±0.15	±10%				CGA4F2X7R2A222K(085AA)
	2012	0.85±0.15	±10%			CGA4F3X7R2E222K(085AB)	
3.3nF	1608	0.80±0.10	±10%				CGA3E2X7R2A332K(080AA)
		0.85±0.15	±10%				CGA4F2X7R2A332K(085AA)
	2012	0.85±0.15	±10%			CGA4F3X7R2E332K(085AB)	
4.7nF	1608	0.80±0.10	±10%				CGA3E2X7R2A472K(080AA)
		0.85±0.15	±10%				CGA4F2X7R2A472K(085AA)
	2012	0.85±0.15	±10%			CGA4F3X7R2E472K(085AB)	
6.8nF	1608	0.80±0.10	±10%				CGA3E2X7R2A682K(080AA)
		0.85±0.15	±10%				CGA4F2X7R2A682K(085AA)
	2012	0.85±0.15	±10%			CGA4J3X7R2E682K(125AB)	
10nF	1608	0.80±0.10	±10%				CGA3E2X7R2A103K(080AA)
		0.85±0.15	±10%				CGA4F2X7R2A103K(085AA)
	2012	0.85±0.15	±10%			CGA4J3X7R2E103K(125AB)	
15nF	1608	0.80±0.10	±10%				CGA3E2X7R2A153K(080AA)
		0.85±0.15	±10%				CGA4J2X7R2A153K(125AA)
	2012	0.85±0.15	±10%			CGA4J3X7R2E153K(125AB)	
22nF	1608	0.80±0.10	±10%				CGA3E2X7R2A223K(080AA)
		0.85±0.15	±10%				CGA4J2X7R2A223K(125AA)
	2012	0.85±0.15	±10%			CGA4J3X7R2E223K(125AB)	
33nF	1608	0.80±0.10	±10%				CGA3E2X7R2A333K(125AA)
		0.85±0.15	±10%				CGA4J2X7R2A333K(125AA)
	2012	0.85±0.15	±10%			CGA4J3X7R2E333K(125AB)	
47nF	1608	0.80±0.10	±10%				CGA3E2X7R2A473K(125AA)
		0.85±0.15	±10%				CGA4J2X7R2A473K(125AA)
	2012	0.85±0.15	±10%			CGA4J3X7R2E473K(125AB)	
68nF	1608	0.80±0.10	±10%				CGA3E2X7R2A683K(160AA)
		0.85±0.15	±10%				CGA4J2X7R2A683K(160AA)
	2012	0.85±0.15	±10%			CGA4J3X7R2E683K(160AB)	
100nF	1608	0.80±0.10	±10%				CGA3E2X7R2A104K(125AA)
		0.85±0.15	±10%				CGA4J2X7R2A104K(125AA)
	2012	0.85±0.15	±10%			CGA4J3X7R2E104K(125AB)	
150nF	1608	0.80±0.10	±10%				CGA3E2X7R2A154K(160AA)
		0.85±0.15	±10%				CGA4J2X7R2A154K(160AA)
	2012	0.85±0.15	±10%			CGA4J3X7R2E154K(160AB)	
220nF	1608	0.80±0.10	±10%				CGA3E2X7R2A224K(115AA)
		0.85±0.15	±10%				CGA4J2X7R2A224K(115AA)
	2012	0.85±0.15	±10%			CGA4J3X7R2E224K(115AB)	
330nF	1608	0.80±0.10	±10%				CGA3E2X7R2A334K(130AA)
		0.85±0.15	±10%				CGA4J2X7R2A334K(130AA)
	2012	0.85±0.15	±10%			CGA4J3X7R2E334K(130AB)	
470nF	1608	0.80±0.10	±10%				CGA3E2X7R2A474K(160AA)
		0.85±0.15	±10%				CGA4J2X7R2A474K(160AA)
	2012	0.85±0.15	±10%			CGA4J3X7R2E474K(160AB)	
680nF	1608	0.80±0.10	±10%				CGA3E2X7R2A684K(160AA)
		0.85±0.15	±10%				CGA4J2X7R2A684K(160AA)
	2012	0.85±0.15	±10%			CGA4J3X7R2E684K(160AB)	
1µF	1608	0.80±0.10	±10%				CGA3E2X7R2A105K(160AA)
		0.85±0.15	±10%				CGA4J2X7R2A105K(160AA)
	2012	0.85±0.15	±10%			CGA4J3X7R2E105K(160AB)	
1.5µF	1608	0.80±0.10	±10%				CGA3E2X7R2A155K(200AB)
		0.85±0.15	±10%				CGA4J2X7R2A155K(200AB)
	2012	0.85±0.15	±10%			CGA4J3X7R2E155K(200AB)	
2.2µF	1608	0.80±0.10	±10%				CGA3E2X7R2A225K(230AB)
		0.85±0.15	±10%				CGA4J2X7R2A225K(230AB)
	2012	0.85±0.15	±10%			CGA4J3X7R2E225K(230AB)	

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CAPACITANCE RANGES: CLASS 2
TEMPERATURE CHARACTERISTICS: X7S(±22%)

Capacitance	Dimension L×W	Thickness T(mm)	Capacitance tolerance	Part No.			
				Rated voltage Edc: 630V	Rated voltage Edc: 450V	Rated voltage Edc: 250V	Rated voltage Edc: 100V
1nF	1005	0.50±0.05	±10%				CGA2B3X7S2A102K(050BB)
1.5nF	1005	0.50±0.05	±10%				CGA2B3X7S2A152K(050BB)
2.2nF	1005	0.50±0.05	±10%				CGA2B3X7S2A222K(050BB)
3.3nF	1005	0.50±0.05	±10%				CGA2B3X7S2A332K(050BB)
4.7nF	1005	0.50±0.05	±10%				CGA2B3X7S2A472K(050BB)
6.8nF	1005	0.50±0.05	±10%				CGA2B3X7S2A682K(050BB)
10nF	1005	0.50±0.05	±10%				CGA2B3X7S2A103K(050BB)
33nF	1608	0.80±0.10	±10%				CGA3E3X7S2A333K(080AB)
47nF	1608	0.80±0.10	±10%				CGA3E3X7S2A473K(080AB)
68nF	1608	0.80±0.10	±10%				CGA3E3X7S2A683K(080AB)
100nF	1608	0.80±0.10	±10%				CGA3E3X7S2A104K(080AB)
150nF	2012	0.85±0.15	±10%				CGA4F3X7S2A154K(085AB)
220nF	2012	0.85±0.15	±10%				CGA4F3X7S2A224K(085AB)
330nF	2012	1.25±0.20	±10%				CGA4J3X7S2A334K(125AB)
470nF	2012	1.25±0.20	±10%				CGA4J3X7S2A474K(125AB)
680nF	2012	1.25±0.20	±10%				CGA4J3X7S2A684K(125AB)
1µF	2012	1.25±0.20	±10%				CGA4J3X7S2A105K(125AB)
1.5µF	3216	1.60±0.20	±10%				CGA5L3X7S2A155K(160AB)
2.2µF	3216	1.60±0.20	±10%				CGA5L3X7S2A225K(160AB)
3.3µF	3225	2.00±0.20	±10%				CGA6M3X7S2A335K(200AB)

TEMPERATURE CHARACTERISTICS: X7T(+22, -33%)

Capacitance	Dimension L×W	Thickness T(mm)	Capacitance tolerance	Part No.			
				Rated voltage Edc: 630V	Rated voltage Edc: 450V	Rated voltage Edc: 250V	Rated voltage Edc: 100V
10nF	2012	0.85±0.15	±10%				CGA4F4X7T2W103K(085AA)
	3216	0.85±0.15	±10%	CGA5F1X7T2J103K(085AC)			
15nF	2012	0.85±0.15	±10%				CGA4F4X7T2W153K(085AA)
	3216	0.85±0.15	±10%	CGA5F1X7T2J153K(085AC)			
22nF	2012	1.25±0.20	±10%				CGA4J4X7T2W223K(125AA)
	3216	1.15±0.15	±10%	CGA5H1X7T2J223K(115AC)			
33nF	2012	1.25±0.20	±10%				CGA4J3X7T2E333K(125AB)
		1.25±0.20	±10%				CGA4J4X7T2W333K(125AA)
	3216	1.15±0.15	±10%	CGA5H1X7T2J333K(115AC)			
47nF	2012	1.25±0.20	±10%				CGA4J3X7T2E473K(125AB)
	3216	1.25±0.20	±10%				CGA4J4X7T2W473K(125AA)
68nF	2012	1.25±0.20	±10%				CGA4J3X7T2E683K(125AB)
	3216	1.30±0.20	±10%				CGA5K4X7T2W683K(130AA)
100nF	2012	1.25±0.20	±10%				CGA4J3X7T2E104K(125AB)
	3216	1.60±0.20	±10%				CGA5L4X7T2W104K(160AA)
150nF	3225	1.60±0.20	±10%	CGA6L1X7T2J104K(160AC)			
	3216	1.30±0.20	±10%				CGA5K3X7T2E154K(130AB)
220nF	3225	2.00±0.20	±10%	CGA6M1X7T2J154K(200AC)			
	3216	1.60±0.20	±10%				CGA5L3X7T2E224K(160AB)
	3225	2.00±0.20	±10%				CGA6M4X7T2W224K(200AA)

- For more information about the products of other capacitance or data, please contact us.
- Conformity to RoHS Directive: This means that, in conformity with EU Directive 2002/95/EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

• All specifications are subject to change without notice.

Please read the precautions before using this catalog.