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TDK

April 2019

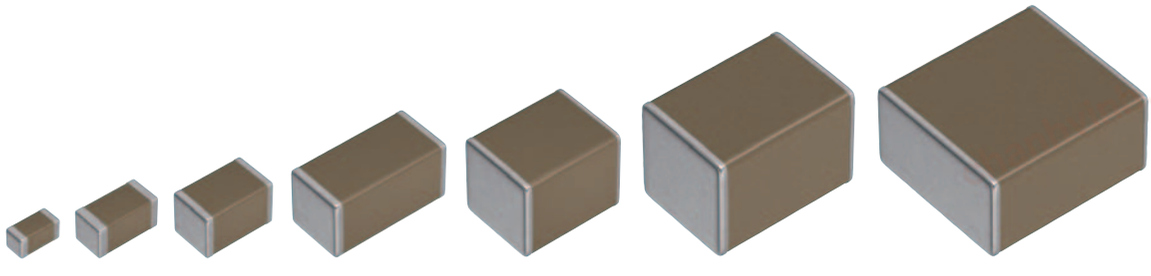
MULTILAYER CERAMIC CHIP CAPACITORS

Automotive grade, high temperature application

CGA series

CGA2	**1005 [0402 inch]**
CGA3	**1608 [0603 inch]**
CGA4	**2012 [0805 inch]**
CGA5	**3216 [1206 inch]**
CGA6	**3225 [1210 inch]**
CGA8	**4532 [1812 inch]**
CGA9	**5750 [2220 inch]**

*** Dimensions code: JIS[EIA]**



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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 in this specification are intended for use in automotive applications under normal operation and usage conditions.
   The products are not designed or warranted to meet the requirements of the applications listed below, whose performance and/or quality requires a more stringent level of safety or reliability, or whose failure, malfunction or defect could cause serious damage to society, person or property.
   Please understand that we are not responsible for any damage or liability caused by use of the products in any of the applications below or for any other use exceeding the range or conditions set forth in this specification sheet. 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 this specification, please contact us.

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

   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.

   In addition, although the products listed in this specification are intended for use in automotive applications as described above, they are not prohibited to use in general electronic equipment, whose performance and/or quality doesn't require a more stringent level of safety or reliability, or whose failure, malfunction or defect could not cause serious damage to society, person or property. Therefore, the description of this caution will be applied, when the products are used in general electronic equipment under a normal operation and usage conditions.
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

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CGA series

High temperature application

RoHS REACH SVHC-Free Halogen Free Lead Free

Type: CGA2/1005 [0402 inch], CGA3/1608 [0603 inch], CGA4/2012 [0805 inch], CGA5/3216 [1206 inch], CGA6/3225 [1210 inch], CGA8/4532 [1812 inch], CGA9/5750 [2220 inch]

SERIES OVERVIEW

High temperature application CGA series, automotive grade of TDK's multilayer ceramic chip capacitor, is a product whose maximum operating temperature is 150°C. The capacitance range is up to 22μF.

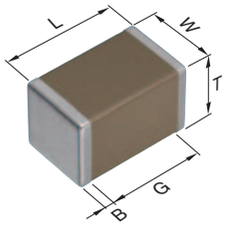
FEATURES

- Operating temperature range: –55 to +150°C.
- NP0 temperature characteristic which has excellent stable temperature and DC-bias characteristcs is applicable. (NP0：0±30ppm/°C, –55 to +150°C)
- AEC-Q200 compliant.

APPLICATIONS

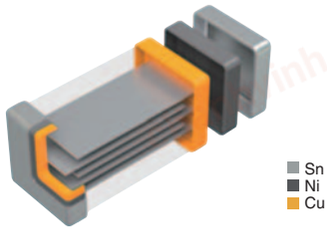
- Engine rooms
- Peripheral circuits of IGBT, SiC, GaN used at high temperature environments
- Decoupling, smoothing, snubber and resonant circuit of high-temperature operating equipment.

SHAPE & DIMENSIONS



L	Body length
W	Body width
T	Body height
B	Terminal width
G	Terminal spacing

PRODUCT STRUCTURE



The structure which multiple sheets of dielectric and conductive material are layered alternately. The superior mechanical strength and reliability are realized by the monolithic and simple structure.

Dimensions in mm

Type	L	W	T	B	G
CGA2	1.00±0.05	0.50±0.05	0.50±0.05	0.10 min.	0.30 min.
CGA3	1.60±0.10	0.80±0.10	0.80±0.10	0.20 min.	0.30 min.
CGA4	2.00±0.20	1.25±0.20	1.25±0.20	0.20 min.	0.50 min.
CGA5	3.20±0.20	1.60±0.20	1.60±0.20	0.20 min.	1.00 min.
CGA6	3.20±0.40	2.50±0.30	2.50±0.30	0.20 min.	—
CGA8	4.50±0.40	3.20±0.40	3.20±0.30	0.20 min.	—
CGA9	5.70±0.40	5.00±0.40	2.80±0.30	0.20 min.	—

*Dimensional tolerances are typical values.

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Please note that the contents may change without any prior notice due to reasons such as upgrading.

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CATALOG NUMBER CONSTRUCTION

CGA	6	P	1	X8L	1C	226	M	250	A	C
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)

(1) Series

(2) Dimensions L x W (mm)

Code	EIA	Length	Width	Terminal width
2	CC0402	1.00	0.50	0.10
3	CC0603	1.60	0.80	0.20
4	CC0805	2.00	1.25	0.20
5	CC1206	3.20	1.60	0.20
6	CC1210	3.20	2.50	0.20
8	CC1812	4.50	3.20	0.20
9	CC2220	5.70	5.00	0.20

(3) Thickness code

Code	Thickness
B	0.50 mm
C	0.60 mm
E	0.80 mm
F	0.85 mm
H	1.15 mm
J	1.25 mm
L	1.60 mm
M	2.00 mm
N	2.30 mm
P	2.50 mm
Q	2.80 mm
R	3.20 mm

(4) Voltage condition for life test

Symbol	Condition
1	1 × R.V.
2	2 × R.V.
3	1.5 × R.V.
4	1.2 x R.V.

(5) Temperature characteristics

Temperature characteristics	Temperature coefficient or capacitance change	Temperature range
NP0	0±30ppm/°C	–55 to +150°C
X8R	±15%	–55 to +150°C
X8L	+15,–40%	–55 to +150°C

(6) Rated voltage (DC)

Code	Voltage (DC)
0G	4V
0J	6.3V
1A	10V
1C	16V
1E	25V
1H	50V
2A	100V
2E	250V
2W	450V
2J	630V

(7) 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

(8) Capacitance tolerance

Code	Tolerance
C	±0.25pF
D	±0.50pF
J	±5%
K	±10%
M	±20%

(9) Thickness

Code	Thickness
050	0.50mm
060	0.60mm
080	0.80mm
085	0.85mm
115	1.15mm
125	1.25mm
160	1.60mm
200	2.00mm
230	2.30mm
250	2.50mm
280	2.80mm
320	3.20mm

(10) Packaging style

Code	Style
A	178mm reel, 4mm pitch
B	178mm reel, 2mm pitch
K	178mm reel, 8mm pitch

(11) Special reserved code

Code	Description
A,B,C,N	TDK internal code

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Capacitance range chart

CGA2/1005 [0402 inch]

Capacitance		NP0		X8R			
(pF)	Code	2A (100V)	1H (50V)	2A (100V)	1H (50V)	1E (25V)	1C (16V)
1	010						
1.5	1R5						
2	020						
2.2	2R2						
3	030						
3.3	3R3						
4	040						
4.7	4R7						
5	050						
6	060						
6.8	6R8						
7	070						
8	080						
9	090						
10	100						
12	120						
15	150						
18	180						
22	220						
27	270						
33	330						
39	390						
47	470						
56	560						
68	680						
82	820						
100	101						
120	121						
150	151						
180	181						
220	221						
270	271						
330	331						
390	391						
470	471						
560	561						
680	681						
820	821						
1,000	102						
1,500	152						
2,200	222						
3,300	332						
4,700	472						
6,800	682						
10,000	103						
15,000	153						
22,000	223						
33,000	333						
47,000	473						

Standard thickness 0.50mm

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

■ Please refer to the capacitance range table at P-11 and after for the details such as product thickness and capacitance tolerance.

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Capacitance range chart

CGA3/1608 [0603 inch]

Capacitance		NP0			X8R	
(pF)	Code	2E (250V)	2A (100V)	1H (50V)	2A (100V)	1H (50V)
1	010					
1.5	1R5					
2	020					
2.2	2R2					
3	030					
3.3	3R3					
4	040					
4.7	4R7					
5	050					
6	060					
6.8	6R8					
7	070					
8	080					
9	090					
10	100					
12	120					
15	150					
18	180					
22	220					
27	270					
33	330					
39	390					
47	470					
56	560					
68	680					
82	820					
100	101					
120	121					
150	151					
180	181					
220	221					
270	271					
330	331					
390	391					
470	471					
560	561					
680	681					
820	821					
1,000	102					
1,200	122					
1,500	152					
1,800	182					
2,200	222					
2,700	272					
3,300	332					
3,900	392					
4,700	472					
5,600	562					
6,800	682					
8,200	822					
10,000	103					

Standard thickness 0.80mm

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

■ Please refer to the capacitance range table at P-11 and after for the details such as product thickness and capacitance tolerance.

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Capacitance range chart

CGA3/1608 [0603 inch]

Capacitance		X8L		X8R			
(pF)	Code	1C (16V)	0J (6.3V)	2A (100V)	1H (50V)	1E (25V)	1C (16V)
15,000	**153**						
22,000	**223**						
33,000	**333**						
47,000	**473**						
68,000	**683**						
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**						

Standard thickness 0.80mm

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

■ Please refer to the capacitance range table at P-11 and after for the details such as product thickness and capacitance tolerance.

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Capacitance range chart

CGA4/2012 [0805 inch]

Capacitance		NP0				X8L				X8R			
(pF)	Code	2W (450V)	2E (250V)	2A (100V)	1H (50V)	1E (25V)	1C (16V)	1A (10V)	0J (6.3V)	2A (100V)	1H (50V)	1E (25V)	1C (16V)
100	101												
120	121												
150	151												
180	181												
220	221												
270	271												
330	331												
390	391												
470	471												
560	561												
680	681												
820	821												
1,000	102												
1,200	122												
1,500	152												
1,800	182												
2,200	222												
2,700	272												
3,300	332												
3,900	392												
4,700	472												
5,600	562												
6,800	682												
8,200	822												
10,000	103												
15,000	153												
22,000	223												
33,000	333												
47,000	473												
68,000	683												
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												
3,300,000	335												
4,700,000	475												
6,800,000	685												
10,000,000	106												

Standard thickness 0.60 mm 0.85 mm 1.25 mm

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

■ Please refer to the capacitance range table at P-11 and after for the details such as product thickness and capacitance tolerance.

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Capacitance range chart

CGA5/3216 [1206 inch]

Capacitance		NP0					X8L				X8R			
(pF)	Code	2J (630V)	2W (450V)	2E (250V)	2A (100V)	1H (50V)	1H (50V)	1E (25V)	1C (16V)	0G (4V)	2A (100V)	1H (50V)	1E (25V)	1C (16V)
3,900	392													
4,700	472													
5,600	562													
6,800	682													
8,200	822													
10,000	103													
15,000	153													
22,000	223													
33,000	333													
47,000	473													
68,000	683													
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													
3,300,000	335													
4,700,000	475													
6,800,000	685													
10,000,000	106													
15,000,000	156													
22,000,000	226													

Standard thickness 0.60 mm 0.85 mm 1.15 mm 1.60 mm

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

■ Please refer to the capacitance range table at P-11 and after for the details such as product thickness and capacitance tolerance.

Capacitance range chart

CGA6/3225 [1210 inch]

Capacitance		NP0				X8L		X8R		
(pF)	Code	2J (630V)	2W (450V)	2E (250V)	2A (100V)	1H (50V)	1C (16V)	2A (100V)	1E (25V)	1C (16V)
8,200	822									
10,000	103									
15,000	153									
22,000	223									
33,000	333									
47,000	473									
68,000	683									
470,000	474									
680,000	684									
1,500,000	155									
2,200,000	225									
3,300,000	335									
4,700,000	475									
6,800,000	685									
10,000,000	106									
15,000,000	156									
22,000,000	226									

Standard thickness 1.25 mm 1.60 mm 2.00 mm 2.30 mm 2.50 mm

■ Please refer to the capacitance range table at P-11 and after for the details such as product thickness and capacitance tolerance.

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Capacitance range chart

CGA8/4532 [1812 inch]

Capacitance		NP0		
(pF)	Code	2J (630V)	2W (450V)	2E (250V)
33,000	**333**			
47,000	**473**			
68,000	**683**			
100,000	**104**			

Standard thickness 2.00 mm 2.30 mm 3.20 mm

■ Please refer to the capacitance range table at P-11 and after for the details such as product thickness and capacitance tolerance.

Capacitance range chart

CGA9/5750 [2220 inch]

Capacitance		NP0		
(pF)	Code	2W (450V)	2E (250V)	2A (100V)
100,000	**104**			
150,000	**154**			

Standard thickness 2.30 mm 2.80 mms

■ Please refer to the capacitance range table at P-11 and after for the details such as product thickness and capacitance tolerance.

⚠ Please be sure to request delivery specifications that provide further details on the features and specifications of the products for proper and safe use.
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Capacitance range table — Temperature characteristics: NP0 (–55 to +150°C, 0±30ppm/°C)

Capacitance	Dimensions	Thickness (mm)	Capacitance tolerance	Catalog number		
				Rated voltage Edc: 450V	Rated voltage Edc: 100V	Rated voltage Edc: 50V
1pF	1005	0.50±0.05	±0.25pF			CGA2B2NP01H010C050BA
	1608	0.80±0.10	±0.25pF		CGA3E2NP02A010C080AA	CGA3E2NP01H010C080AA
1.5pF	1005	0.50±0.05	±0.25pF			CGA2B2NP01H1R5C050BA
	1608	0.80±0.10	±0.25pF		CGA3E2NP02A1R5C080AA	CGA3E2NP01H1R5C080AA
2pF	1005	0.50±0.05	±0.25pF			CGA2B2NP01H020C050BA
	1608	0.80±0.10	±0.25pF		CGA3E2NP02A020C080AA	CGA3E2NP01H020C080AA
2.2pF	1005	0.50±0.05	±0.25pF			CGA2B2NP01H2R2C050BA
	1608	0.80±0.10	±0.25pF		CGA3E2NP02A2R2C080AA	CGA3E2NP01H2R2C080AA
3pF	1005	0.50±0.05	±0.25pF			CGA2B2NP01H030C050BA
	1608	0.80±0.10	±0.25pF		CGA3E2NP02A030C080AA	CGA3E2NP01H030C080AA
3.3pF	1005	0.50±0.05	±0.25pF			CGA2B2NP01H3R3C050BA
	1608	0.80±0.10	±0.25pF		CGA3E2NP02A3R3C080AA	CGA3E2NP01H3R3C080AA
4pF	1005	0.50±0.05	±0.25pF			CGA2B2NP01H040C050BA
	1608	0.80±0.10	±0.25pF		CGA3E2NP02A040C080AA	CGA3E2NP01H040C080AA
4.7pF	1005	0.50±0.05	±0.25pF			CGA2B2NP01H4R7C050BA
	1608	0.80±0.10	±0.25pF		CGA3E2NP02A4R7C080AA	CGA3E2NP01H4R7C080AA
5pF	1005	0.50±0.05	±0.25pF			CGA2B2NP01H050C050BA
	1608	0.80±0.10	±0.25pF		CGA3E2NP02A050C080AA	CGA3E2NP01H050C080AA
6pF	1005	0.50±0.05	0.50pF			CGA2B2NP01H060D050BA
	1608	0.80±0.10	0.50pF		CGA3E2NP02A060D080AA	CGA3E2NP01H060D080AA
6.8pF	1005	0.50±0.05	0.50pF			CGA2B2NP01H6R8D050BA
	1608	0.80±0.10	0.50pF		CGA3E2NP02A6R8D080AA	CGA3E2NP01H6R8D080AA
7pF	1005	0.50±0.05	0.50pF			CGA2B2NP01H070D050BA
	1608	0.80±0.10	0.50pF		CGA3E2NP02A070D080AA	CGA3E2NP01H070D080AA
8pF	1005	0.50±0.05	0.50pF			CGA2B2NP01H080D050BA
	1608	0.80±0.10	0.50pF		CGA3E2NP02A080D080AA	CGA3E2NP01H080D080AA
9pF	1005	0.50±0.05	0.50pF			CGA2B2NP01H090D050BA
	1608	0.80±0.10	0.50pF		CGA3E2NP02A090D080AA	CGA3E2NP01H090D080AA
10pF	1005	0.50±0.05	0.50pF			CGA2B2NP01H100D050BA
	1608	0.80±0.10	0.50pF		CGA3E2NP02A100D080AA	CGA3E2NP01H100D080AA
12pF	1005	0.50±0.05	±5%			CGA2B2NP01H120J050BA
	1608	0.80±0.10	±5%		CGA3E2NP02A120J080AA	CGA3E2NP01H120J080AA
15pF	1005	0.50±0.05	±5%			CGA2B2NP01H150J050BA
	1608	0.80±0.10	±5%		CGA3E2NP02A150J080AA	CGA3E2NP01H150J080AA
18pF	1005	0.50±0.05	±5%			CGA2B2NP01H180J050BA
	1608	0.80±0.10	±5%		CGA3E2NP02A180J080AA	CGA3E2NP01H180J080AA
22pF	1005	0.50±0.05	±5%			CGA2B2NP01H220J050BA
	1608	0.80±0.10	±5%		CGA3E2NP02A220J080AA	CGA3E2NP01H220J080AA
27pF	1005	0.50±0.05	±5%			CGA2B2NP01H270J050BA
	1608	0.80±0.10	±5%		CGA3E2NP02A270J080AA	CGA3E2NP01H270J080AA
33pF	1005	0.50±0.05	±5%			CGA2B2NP01H330J050BA
	1608	0.80±0.10	±5%		CGA3E2NP02A330J080AA	CGA3E2NP01H330J080AA
39pF	1005	0.50±0.05	±5%			CGA2B2NP01H390J050BA
	1608	0.80±0.10	±5%		CGA3E2NP02A390J080AA	CGA3E2NP01H390J080AA
47pF	1005	0.50±0.05	±5%			CGA2B2NP01H470J050BA
	1608	0.80±0.10	±5%		CGA3E2NP02A470J080AA	CGA3E2NP01H470J080AA
56pF	1005	0.50±0.05	±5%			CGA2B2NP01H560J050BA
	1608	0.80±0.10	±5%		CGA3E2NP02A560J080AA	CGA3E2NP01H560J080AA
68pF	1005	0.50±0.05	±5%			CGA2B2NP01H680J050BA
	1608	0.80±0.10	±5%		CGA3E2NP02A680J080AA	CGA3E2NP01H680J080AA
82pF	1005	0.50±0.05	±5%			CGA2B2NP01H820J050BA
	1608	0.80±0.10	±5%		CGA3E2NP02A820J080AA	CGA3E2NP01H820J080AA
100pF	1005	0.50±0.05	±5%		CGA2B2NP02A101J050BA	CGA2B2NP01H101J050BA
	1608	0.80±0.10	±5%		CGA3E2NP02A101J080AA	CGA3E2NP01H101J080AA
	2012	0.60±0.15	±5%	CGA4C4NP02W101J060AA		
120pF	1005	0.50±0.05	±5%		CGA2B2NP02A121J050BA	CGA2B2NP01H121J050BA
	1608	0.80±0.10	±5%		CGA3E2NP02A121J080AA	CGA3E2NP01H121J080AA
	2012	0.60±0.15	±5%	CGA4C4NP02W121J060AA		
150pF	1005	0.50±0.05	±5%		CGA2B2NP02A151J050BA	CGA2B2NP01H151J050BA
	1608	0.80±0.10	±5%		CGA3E2NP02A151J080AA	CGA3E2NP01H151J080AA
	2012	0.60±0.15	±5%	CGA4C4NP02W151J060AA		
180pF	1005	0.50±0.05	±5%		CGA2B2NP02A181J050BA	CGA2B2NP01H181J050BA
	1608	0.80±0.10	±5%		CGA3E2NP02A181J080AA	CGA3E2NP01H181J080AA
	2012	0.60±0.15	±5%	CGA4C4NP02W181J060AA		

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Capacitance range table — Temperature characteristics: NP0 (–55 to +150°C, 0±30ppm/°C)

Capacitance	Dimensions	Thickness (mm)	Capacitance tolerance	Catalog number				
				Rated voltage Edc: 630V	Rated voltage Edc: 450V	Rated voltage Edc: 250V	Rated voltage Edc: 100V	Rated voltage Edc: 50V
220pF	1005	0.50±0.05	±5%				CGA2B2NP02A221J050BA	CGA2B2NP01H221J050BA
	1608	0.80±0.10	±5%				CGA3E2NP02A221J080AA	CGA3E2NP01H221J080AA
	2012	0.60±0.15	±5%		CGA4C4NP02W221J060AA			
270pF	1005	0.50±0.05	±5%				CGA2B2NP02A271J050BA	CGA2B2NP01H271J050BA
	1608	0.80±0.10	±5%				CGA3E2NP02A271J080AA	CGA3E2NP01H271J080AA
	2012	0.60±0.15	±5%		CGA4C4NP02W271J060AA			
330pF	1005	0.50±0.05	±5%				CGA2B2NP02A331J050BA	CGA2B2NP01H331J050BA
	1608	0.80±0.10	±5%				CGA3E2NP02A331J080AA	CGA3E2NP01H331J080AA
	2012	0.60±0.15	±5%		CGA4C4NP02W331J060AA			
390pF	1005	0.50±0.05	±5%				CGA2B2NP02A391J050BA	CGA2B2NP01H391J050BA
	1608	0.80±0.10	±5%				CGA3E2NP02A391J080AA	CGA3E2NP01H391J080AA
	2012	0.60±0.15	±5%		CGA4C4NP02W391J060AA			
470pF	1005	0.50±0.05	±5%					CGA2B2NP01H471J050BA
		0.50±0.10	±5%				CGA2B2NP02A471J050BA	
	1608	0.80±0.10	±5%				CGA3E2NP02A471J080AA	CGA3E2NP01H471J080AA
	2012	0.60±0.15	±5%		CGA4C4NP02W471J060AA			
560pF	1005	0.50±0.05	±5%					CGA2B2NP01H561J050BA
	1608	0.80±0.10	±5%				CGA3E2NP02A561J080AA	CGA3E2NP01H561J080AA
	2012	0.60±0.15	±5%		CGA4C4NP02W561J060AA			
680pF	1005	0.50±0.05	±5%					CGA2B2NP01H681J050BA
	1608	0.80±0.10	±5%				CGA3E2NP02A681J080AA	CGA3E2NP01H681J080AA
	2012	0.60±0.15	±5%		CGA4C4NP02W681J060AA			
820pF	1005	0.50±0.05	±5%					CGA2B2NP01H821J050BA
	1608	0.80±0.10	±5%			CGA3E3NP02E821J080AA	CGA3E2NP02A821J080AA	CGA3E2NP01H821J080AA
	2012	0.60±0.15	±5%		CGA4C4NP02W821J060AA			
1nF	1005	0.50±0.05	±5%					CGA2B2NP01H102J050BA
	1608	0.80±0.10	±5%			CGA3E3NP02E102J080AA	CGA3E2NP02A102J080AA	CGA3E2NP01H102J080AA
	2012	0.60±0.15	±5%		CGA4C4NP02W102J060AA		CGA4C2NP02A102J060AA	
1.2nF	1608	0.80±0.10	±5%			CGA3E3NP02E122J080AA	CGA3E2NP02A122J080AA	CGA3E2NP01H122J080AA
	2012	0.60±0.15	±5%		CGA4C4NP02W122J060AA		CGA4C2NP02A122J060AA	
1.5nF	1608	0.80±0.10	±5%			CGA3E3NP02E152J080AA	CGA3E2NP02A152J080AA	CGA3E2NP01H152J080AA
	2012	0.60±0.15	±5%				CGA4C2NP02A152J060AA	
		0.85±0.15	±5%		CGA4F4NP02W152J085AA			
1.8nF	1608	0.80±0.10	±5%			CGA3E3NP02E182J080AA	CGA3E2NP02A182J080AA	CGA3E2NP01H182J080AA
	2012	0.85±0.15	±5%		CGA4F4NP02W182J085AA		CGA4F2NP02A182J085AA	
2.2nF	1608	0.80±0.10	±5%				CGA3E2NP02A222J080AA	CGA3E2NP01H222J080AA
		0.80±0.20	±5%			CGA3E3NP02E222J080AA		
	2012	0.85±0.15	±5%		CGA4F4NP02W222J085AA		CGA4F2NP02A222J085AA	
2.7nF	1608	0.80±0.10	±5%					CGA3E2NP01H272J080AA
		0.80±0.20	±5%				CGA3E2NP02A272J080AA	
	2012	0.60±0.15	±5%					CGA4C2NP01H272J060AA
		1.25±0.20	±5%		CGA4J4NP02W272J125AA		CGA4J2NP02A272J125AA	
3.3nF	1608	0.80±0.10	±5%					CGA3E2NP01H332J080AA
		0.80±0.20	±5%				CGA3E2NP02A332J080AA	
	2012	0.60±0.15	±5%					CGA4C2NP01H332J060AA
		0.85±0.15	±5%			CGA4F3NP02E332J085AA		
		1.25±0.20	±5%		CGA4J4NP02W332J125AA		CGA4J2NP02A332J125AA	
3.9nF	1608	0.80±0.10	±5%					CGA3E2NP01H392J080AA
	2012	0.60±0.15	±5%					CGA4C2NP01H392J060AA
		1.25±0.20	±5%		CGA4J4NP02W392J125AA	CGA4J3NP02E392J125AA	CGA4J2NP02A392J125AA	
	3216	0.60±0.15	±5%				CGA5C2NP02A392J060AA	
		0.85±0.15	±5%	CGA5F4NP02J392J085AA				
4.7nF	1608	0.80±0.10	±5%					CGA3E2NP01H472J080AA
	2012	0.60±0.15	±5%					CGA4C2NP01H472J060AA
		1.25±0.20	±5%		CGA4J4NP02W472J125AA	CGA4J3NP02E472J125AA	CGA4J2NP02A472J125AA	
	3216	0.60±0.15	±5%					CGA5C2NP01H472J060AA
		0.85±0.15	±5%	CGA5F4NP02J472J085AA			CGA5F2NP02A472J085AA	
5.6nF	1608	0.80±0.10	±5%					CGA3E2NP01H562J080AA
	2012	0.60±0.15	±5%					CGA4C2NP01H562J060AA
		1.25±0.20	±5%		CGA4J4NP02W562J125AA	CGA4J3NP02E562J125AA	CGA4J2NP02A562J125AA	
	3216	0.60±0.15	±5%					CGA5C2NP01H562J060AA
		0.85±0.15	±5%				CGA5F2NP02A562J085AA	
		1.15±0.15	±5%	CGA5H4NP02J562J115AA				

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Capacitance range table — Temperature characteristics: NP0 (–55 to +150°C, 0±30ppm/°C)

Capacitance	Dimensions	Thickness (mm)	Capacitance tolerance	Catalog number				
				Rated voltage Edc: 630V	Rated voltage Edc: 450V	Rated voltage Edc: 250V	Rated voltage Edc: 100V	Rated voltage Edc: 50V
6.8nF	1608	0.80±0.10	±5%					CGA3E2NP01H682J080AA
	2012	0.60±0.15	±5%					CGA4C2NP01H682J060AA
		1.25±0.20	±5%			CGA4J3NP02E682J125AA	CGA4J2NP02A682J125AA	
	3216	0.60±0.15	±5%					CGA5C2NP01H682J060AA
		1.15±0.15	±5%	CGA5H4NP02J682J115AA	CGA5H4NP02W682J115AA		CGA5H2NP02A682J115AA	
8.2nF	1608	0.80±0.10	±5%					CGA3E2NP01H822J080AA
	2012	0.60±0.15	±5%					CGA4C2NP01H822J060AA
		1.25±0.20	±5%			CGA4J3NP02E822J125AA	CGA4J2NP02A822J125AA	
	3216	0.60±0.15	±5%					CGA5C2NP01H822J060AA
		1.15±0.15	±5%		CGA5H4NP02W822J115AA		CGA5H2NP02A822J115AA	
		1.60±0.20	±5%	CGA5L4NP02J822J160AA				
	3225	1.25±0.20	±5%	CGA6J4NP02J822J125AA				
10nF	1608	0.80±0.10	±5%					CGA3E2NP01H103J080AA
	2012	0.60±0.15	±5%					CGA4C2NP01H103J060AA
		1.25±0.20	±5%			CGA4J3NP02E103J125AA	CGA4J2NP02A103J125AA	
	3216	0.60±0.15	±5%					CGA5C2NP01H103J060AA
		1.15±0.15	±5%			CGA5H3NP02E103J115AA	CGA5H2NP02A103J115AA	
		1.60±0.20	±5%	CGA5L4NP02J103J160AA	CGA5L4NP02W103J160AA			
	3225	1.25±0.20	±5%	CGA6J4NP02J103J125AA				
15nF	2012	0.85±0.15	±5%					CGA4F2NP01H153J085AA
	3216	0.60±0.15	±5%					CGA5C2NP01H153J060AA
		1.15±0.15	±5%				CGA5H2NP02A153J115AA	
		1.60±0.20	±5%			CGA5L3NP02E153J160AA		
		1.60+0.30,-0.10	±5%		CGA5L4NP02W153J160AA			
	3225	1.60±0.20	±5%	CGA6L4NP02J153J160AA				
22nF	2012	1.25±0.20	±5%					CGA4J2NP01H223J125AA
	3216	0.60±0.15	±5%					CGA5C2NP01H223J060AA
		1.60±0.20	±5%				CGA5L2NP02A223J160AA	
		1.60+0.30,-0.10	±5%			CGA5L3NP02E223J160AA		
	3225	1.60±0.20	±5%			CGA6L3NP02E223J160AA		
		2.30±0.20	±5%	CGA6N4NP02J223J230AA	CGA6N4NP02W223J230AA			
33nF	2012	1.25±0.20	±5%					CGA4J2NP01H333J125AA
	3216	0.85±0.15	±5%					CGA5F2NP01H333J085AA
		1.60+0.30,-0.10	±5%				CGA5L2NP02A333J160AA	
	3225	2.30±0.20	±5%			CGA6N3NP02E333J230AA		
		2.50±0.30	±5%	CGA6P4NP02J333J250AA	CGA6P4NP02W333J250AA			
	4532	2.00±0.20	±5%	CGA8M4NP02J333J200KA				
47nF	3216	1.15±0.15	±5%					CGA5H2NP01H473J115AA
	3225	2.50±0.30	±5%			CGA6P3NP02E473J250AA		
	4532	2.30±0.20	±5%		CGA8N4NP02W473J230KA			
		3.20±0.30	±5%	CGA8R4NP02J473J320KA				
68nF	3216	1.60±0.20	±5%					CGA5L2NP01H683J160AA
	3225	2.30±0.20	±5%				CGA6N2NP02A683J230AA	
	4532	2.30±0.20	±5%			CGA8N4NP02E683J230KN		
		3.20±0.30	±5%		CGA8R4NP02W683J320KA			
100nF	3216	1.60±0.20	±5%					CGA5L2NP01H104J160AA
	4532	3.20±0.30	±5%			CGA8R4NP02E104J320KN		
	5750	2.80±0.30	±5%		CGA9Q4NP02W104J280KA			
150nF	5750	2.30±0.20	±5%			CGA9N4NP02E154J230KN	CGA9N2NP02A154J230KA	

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Capacitance range table — Temperature characteristics: X8R (–55 to +150°C, ±15%)

Capacitance	Dimensions	Thickness (mm)	Capacitance tolerance	Catalog number			
				Rated voltage Edc: 100V	Rated voltage Edc: 50V	Rated voltage Edc: 25V	Rated voltage Edc: 16V
150pF	1005	0.50±0.05	±10%	CGA2B2X8R2A151K050BA	CGA2B2X8R1H151K050BA		
			±20%	CGA2B2X8R2A151M050BA	CGA2B2X8R1H151M050BA		
220pF	1005	0.50±0.05	±10%	CGA2B2X8R2A221K050BA	CGA2B2X8R1H221K050BA		
			±20%	CGA2B2X8R2A221M050BA	CGA2B2X8R1H221M050BA		
330pF	1005	0.50±0.05	±10%	CGA2B2X8R2A331K050BA	CGA2B2X8R1H331K050BA		
			±20%	CGA2B2X8R2A331M050BA	CGA2B2X8R1H331M050BA		
470pF	1005	0.50±0.05	±10%	CGA2B2X8R2A471K050BA	CGA2B2X8R1H471K050BA		
			±20%	CGA2B2X8R2A471M050BA	CGA2B2X8R1H471M050BA		
680pF	1005	0.50±0.05	±10%	CGA2B2X8R2A681K050BA	CGA2B2X8R1H681K050BA		
			±20%	CGA2B2X8R2A681M050BA	CGA2B2X8R1H681M050BA		
1nF	1005	0.50±0.05	±10%	CGA2B2X8R2A102K050BA	CGA2B2X8R1H102K050BA		
			±20%	CGA2B2X8R2A102M050BA	CGA2B2X8R1H102M050BA		
	1608	0.80±0.10	±10%	CGA3E2X8R2A102K080AA	CGA3E2X8R1H102K080AA		
			±20%	CGA3E2X8R2A102M080AA	CGA3E2X8R1H102M080AA		
1.5nF	1005	0.50±0.05	±10%	CGA2B2X8R2A152K050BA	CGA2B2X8R1H152K050BA		
			±20%	CGA2B2X8R2A152M050BA	CGA2B2X8R1H152M050BA		
	1608	0.80±0.10	±10%	CGA3E2X8R2A152K080AA	CGA3E2X8R1H152K080AA		
			±20%	CGA3E2X8R2A152M080AA	CGA3E2X8R1H152M080AA		
2.2nF	1005	0.50±0.05	±10%	CGA2B2X8R2A222K050BA	CGA2B2X8R1H222K050BA		
			±20%	CGA2B2X8R2A222M050BA	CGA2B2X8R1H222M050BA		
	1608	0.80±0.10	±10%	CGA3E2X8R2A222K080AA	CGA3E2X8R1H222K080AA		
			±20%	CGA3E2X8R2A222M080AA	CGA3E2X8R1H222M080AA		
3.3nF	1005	0.50±0.05	±10%	CGA2B3X8R2A332K050BB	CGA2B2X8R1H332K050BA		
			±20%	CGA2B3X8R2A332M050BB	CGA2B2X8R1H332M050BA		
	1608	0.80±0.10	±10%	CGA3E2X8R2A332K080AA	CGA3E2X8R1H332K080AA		
			±20%	CGA3E2X8R2A332M080AA	CGA3E2X8R1H332M080AA		
4.7nF	1005	0.50±0.05	±10%		CGA2B2X8R1H472K050BA		
			±20%		CGA2B2X8R1H472M050BA		
	1608	0.80±0.10	±10%	CGA3E2X8R2A472K080AA	CGA3E2X8R1H472K080AA		
			±20%	CGA3E2X8R2A472M080AA	CGA3E2X8R1H472M080AA		
6.8nF	1005	0.50±0.05	±10%		CGA2B3X8R1H682K050BB	CGA2B2X8R1E682K050BA	
			±20%		CGA2B3X8R1H682M050BB	CGA2B2X8R1E682M050BA	
	1608	0.80±0.10	±10%	CGA3E2X8R2A682K080AA	CGA3E2X8R1H682K080AA		
			±20%	CGA3E2X8R2A682M080AA	CGA3E2X8R1H682M080AA		
10nF	1005	0.50±0.05	±10%		CGA2B3X8R1H103K050BB	CGA2B2X8R1E103K050BA	
			±20%		CGA2B3X8R1H103M050BB	CGA2B2X8R1E103M050BA	
	1608	0.80±0.10	±10%	CGA3E2X8R2A103K080AA	CGA3E2X8R1H103K080AA		
			±20%	CGA3E2X8R2A103M080AA	CGA3E2X8R1H103M080AA		
15nF	1005	0.50±0.05	±10%			CGA2B3X8R1E153K050BB	
			±20%			CGA2B3X8R1E153M050BB	
	1608	0.80±0.10	±10%	CGA3E2X8R2A153K080AA	CGA3E2X8R1H153K080AA		
			±20%	CGA3E2X8R2A153M080AA	CGA3E2X8R1H153M080AA		
22nF	1005	0.50±0.05	±10%			CGA2B3X8R1E223K050BB	
			±20%			CGA2B3X8R1E223M050BB	
	1608	0.80±0.10	±10%	CGA3E3X8R2A223K080AB	CGA3E2X8R1H223K080AA		
			±20%	CGA3E3X8R2A223M080AB	CGA3E2X8R1H223M080AA		
	2012	1.25±0.20	±10%	CGA4J2X8R2A223K125AA			
			±20%	CGA4J2X8R2A223M125AA			
33nF	1005	0.50±0.05	±10%			CGA2B1X8R1E333K050BC	CGA2B3X8R1C333K050BB
			±20%			CGA2B1X8R1E333M050BC	CGA2B3X8R1C333M050BB
	1608	0.80±0.10	±10%	CGA3E3X8R2A333K080AB	CGA3E2X8R1H333K080AA		
			±20%	CGA3E3X8R2A333M080AB	CGA3E2X8R1H333M080AA		
	2012	1.25±0.20	±10%	CGA4J3X8R2A333K125AB			
			±20%	CGA4J3X8R2A333M125AB			
47nF	1005	0.50±0.05	±10%			CGA2B1X8R1E473K050BC	CGA2B3X8R1C473K050BB
			±20%			CGA2B1X8R1E473M050BC	CGA2B3X8R1C473M050BB
	1608	0.80±0.10	±10%		CGA3E2X8R1H473K080AA		
			±20%		CGA3E2X8R1H473M080AA		
	2012	1.25±0.20	±10%	CGA4J3X8R2A473K125AB			
			±20%	CGA4J3X8R2A473M125AB			
68nF	1608	0.80±0.10	±10%		CGA3E3X8R1H683K080AB	CGA3E2X8R1E683K080AA	
			±20%		CGA3E3X8R1H683M080AB	CGA3E2X8R1E683M080AA	
	2012	1.25±0.20	±10%	CGA4J3X8R2A683K125AB	CGA4J2X8R1H683K125AA		
			±20%	CGA4J3X8R2A683M125AB	CGA4J2X8R1H683M125AA		
	3216	1.15±0.15	±10%	CGA5H2X8R2A683K115AA			
			±20%	CGA5H2X8R2A683M115AA			

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

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Capacitance range table — Temperature characteristics: X8R (–55 to +150°C, ±15%)

Capacitance	Dimensions	Thickness (mm)	Capacitance tolerance	Catalog number			
				Rated voltage Edc: 100V	Rated voltage Edc: 50V	Rated voltage Edc: 25V	Rated voltage Edc: 16V
100nF	1608	0.80±0.10	±10%		CGA3E3X8R1H104K080AB	CGA3E2X8R1E104K080AA	
			±20%		CGA3E3X8R1H104M080AB	CGA3E2X8R1E104M080AA	
	2012	1.25±0.20	±10%		CGA4J2X8R1H104K125AA		
			±20%		CGA4J2X8R1H104M125AA		
	3216	1.15±0.15	±10%	CGA5H2X8R2A104K115AA			
			±20%	CGA5H2X8R2A104M115AA			
150nF	1608	0.80±0.10	±10%			CGA3E3X8R1E154K080AB	
			±20%			CGA3E3X8R1E154M080AB	
	2012	1.25±0.20	±10%		CGA4J3X8R1H154K125AB		
			±20%		CGA4J3X8R1H154M125AB		
	3216	1.60±0.20	±10%	CGA5L2X8R2A154K160AA			
			±20%	CGA5L2X8R2A154M160AA			
220nF	1608	0.80±0.15	±10%			CGA3E3X8R1E224K080AB	
			±20%			CGA3E3X8R1E224M080AB	
	2012	1.25±0.20	±10%		CGA4J3X8R1H224K125AB	CGA4J2X8R1E224K125AA	
			±20%		CGA4J3X8R1H224M125AB	CGA4J2X8R1E224M125AA	
	3216	1.15±0.15	±10%		CGA5H2X8R1H224K115AA		
			±20%		CGA5H2X8R1H224M115AA		
		1.60±0.20	±10%	CGA5L3X8R2A224K160AB			
			±20%	CGA5L3X8R2A224M160AB			
330nF	1608	0.80±0.10	±10%			CGA3E1X8R1E334K080AC	CGA3E3X8R1C334K080AB
			±20%			CGA3E1X8R1E334M080AC	CGA3E3X8R1C334M080AB
	2012	1.25±0.20	±10%			CGA4J2X8R1E334K125AA	
			±20%			CGA4J2X8R1E334M125AA	
	3216	1.60±0.20	±10%	CGA5L3X8R2A334K160AB	CGA5L2X8R1H334K160AA		
			±20%	CGA5L3X8R2A334M160AB	CGA5L2X8R1H334M160AA		
470nF	1608	0.80±0.15	±10%				CGA3E3X8R1C474K080AB
			±20%				CGA3E3X8R1C474M080AB
	2012	1.25±0.20	±10%			CGA4J3X8R1E474K125AB	
			±20%			CGA4J3X8R1E474M125AB	
	3216	1.60±0.20	±10%		CGA5L2X8R1H474K160AA		
			±20%		CGA5L2X8R1H474M160AA		
	3225	2.00±0.20	±10%	CGA6M3X8R2A474K200AB			
			±20%	CGA6M3X8R2A474M200AB			
680nF	2012	1.25±0.20	±10%			CGA4J1X8R1E684K125AC	CGA4J3X8R1C684K125AB
			±20%			CGA4J1X8R1E684M125AC	CGA4J3X8R1C684M125AB
	3216	1.15±0.15	±10%			CGA5H2X8R1E684K115AA	
			±20%			CGA5H2X8R1E684M115AA	
		1.60±0.20	±10%		CGA5L3X8R1H684K160AB		
			±20%		CGA5L3X8R1H684M160AB		
	3225	2.50±0.30	±10%	CGA6P3X8R2A684K250AB			
			±20%	CGA6P3X8R2A684M250AB			
1µF	2012	1.25±0.20	±10%			CGA4J1X8R1E105K125AC	CGA4J3X8R1C105K125AB
			±20%			CGA4J1X8R1E105M125AC	CGA4J3X8R1C105M125AB
	3216	1.60±0.20	±10%		CGA5L3X8R1H105K160AB	CGA5L2X8R1E105K160AA	
			±20%		CGA5L3X8R1H105M160AB	CGA5L2X8R1E105M160AA	
1.5µF	3216	1.60±0.20	±10%			CGA5L3X8R1E155K160AB	
			±20%			CGA5L3X8R1E155M160AB	
	3225	1.60±0.20	±10%			CGA6L2X8R1E155K160AA	
			±20%			CGA6L2X8R1E155M160AA	
2.2µF	3216	1.60±0.20	±10%			CGA5L3X8R1E225K160AB	
			±20%			CGA5L3X8R1E225M160AB	
	3225	2.00±0.20	±10%			CGA6M2X8R1E225K200AA	
			±20%			CGA6M2X8R1E225M200AA	
3.3µF	3216	1.60±0.20	±10%			CGA5L1X8R1E335K160AC	CGA5L3X8R1C335K160AB
			±20%			CGA5L1X8R1E335M160AC	CGA5L3X8R1C335M160AB
	3225	2.50±0.30	±10%			CGA6P2X8R1E335K250AA	
			±20%			CGA6P2X8R1E335M250AA	
4.7µF	3216	1.60±0.20	±10%			CGA5L1X8R1E475K160AC	CGA5L3X8R1C475K160AB
			±20%			CGA5L1X8R1E475M160AC	CGA5L3X8R1C475M160AB
	3225	2.50±0.30	±10%			CGA6P3X8R1E475K250AB	
			±20%			CGA6P3X8R1E475M250AB	
6.8µF	3225	2.00±0.20	±10%			CGA6M1X8R1E685K200AC	CGA6M3X8R1C685K200AB
			±20%			CGA6M1X8R1E685M200AC	CGA6M3X8R1C685M200AB
10µF	3225	2.50±0.30	±10%			CGA6P1X8R1E106K250AC	CGA6P3X8R1C106K250AB
			±20%			CGA6P1X8R1E106M250AC	CGA6P3X8R1C106M250AB

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Capacitance range table — Temperature characteristics: X8L (–55 to +150°C, +15, –40%)

Capacitance	Dimensions	Thickness (mm)	Capacitance tolerance	Catalog number		
				Rated voltage Edc: 50V	Rated voltage Edc: 25V	Rated voltage Edc: 16V
680nF	1608	0.80±0.10	±10%			CGA3E1X8L1C684K080AC
1µF	1608	0.80±0.10	±10%			CGA3E1X8L1C105K080AC
1.5µF	2012	1.25±0.20	±10%		CGA4J3X8L1E155K125AB	
	3216	1.60±0.20	±10%	CGA5L1X8L1H155K160AC		
2.2µF	2012	1.25±0.20	±10%		CGA4J3X8L1E225K125AB	
	3216	1.60±0.20	±10%	CGA5L1X8L1H225K160AC		
3.3µF	2012	1.25±0.20	±10%			CGA4J1X8L1C335K125AC
	3216	1.60+0.30,-0.10	±10%	CGA5L1X8L1H335K160AC		
	3225	2.00±0.20	±10%	CGA6M1X8L1H335K200AC		
4.7µF	2012	1.25±0.20	±10%			CGA4J1X8L1C475K125AC
		1.25+0.25,-0.15	±10%		CGA4J1X8L1E475K125AC	
	3225	2.00±0.20	±10%	CGA6M1X8L1H475K200AC		
6.8µF	3216	1.60+0.30,-0.10	±10%			CGA5L1X8L1C685K160AC
10µF	3216	1.60+0.30,-0.10	±10%		CGA5L1X8L1E106K160AC	CGA5L1X8L1C106K160AC
15µF	3225	2.00±0.20	±20%			CGA6M1X8L1C156M200AC
22µF	3225	2.50±0.30	±20%			CGA6P1X8L1C226M250AC

Capacitance	Dimensions	Thickness (mm)	Capacitance tolerance	Catalog number		
				Rated voltage Edc: 10V	Rated voltage Edc: 6.3V	Rated voltage Edc: 4V
1.5µF	1608	0.80±0.10	±10%		CGA3E1X8L0J155K080AC	
2.2µF	1608	0.80±0.10	±10%		CGA3E1X8L0J225K080AC	
6.8µF	2012	1.25±0.20	±10%		CGA4J1X8L0J685K125AC	
10µF	2012	1.25±0.20	±10%		CGA4J1X8L0J106K125AC	
		1.25+0.25,-0.15	±10%	CGA4J1X8L1A106K125AC		
15µF	3216	1.60+0.30,-0.10	±20%			CGA5L1X8L0G156M160AC
22µF	3216	1.60+0.30,-0.10	±20%			CGA5L1X8L0G226M160AC

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