

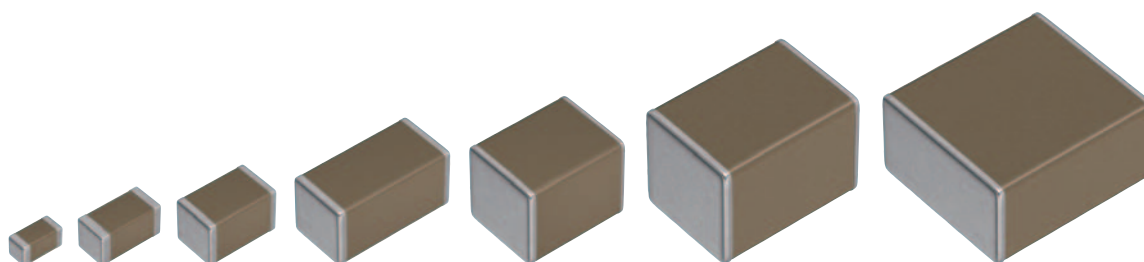
MULTILAYER CERAMIC CHIP CAPACITORS

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]



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

- 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 | (8) Public information-processing equipment |
| (2) Transportation equipment (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.

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.

- We may modify products or discontinue production of a product listed in this catalog without prior notification.
- 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.
- 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.
- Any reproduction or transferring of the contents of this catalog is prohibited without prior permission from our company.
- 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.
- 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

CGA series

High temperature application



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

Automotive grade high temperature application CGA series is a product that supports high temperature environments with a maximum operating temperature of 150°C. The maximum capacitance value is 22μF.

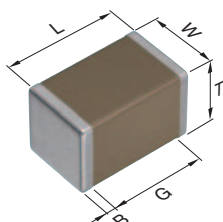
FEATURES

- Operating temperature range: -55 to +150°C.
- NP0 temperature characteristic which has excellent stable temperature and DC-bias characteristics is applicable. (NP0: $0 \pm 30 \text{ ppm}/^\circ\text{C}$, -55 to +150°C)
- AEC-Q200 compliant.

APPLICATIONS

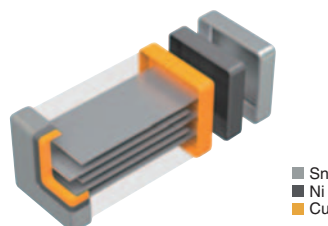
- Engine rooms
- Peripheral circuits of IGBT, SiC, GaN used at high temperature environments
- Decoupling, smoothing, snubber and resonant circuit of high-temperature operating equipment.

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.

Type	Dimensions in mm				
	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.

MULTILAYER CERAMIC CHIP CAPACITORS



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 × 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

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						
2	020						
3	030						
4	040						
5	050						
6	060						
7	070						
8	080						
9	090						
10	100						
15	150						
22	220						
33	330						
47	470						
68	680						
100	101						
150	151						
220	221						
330	331						
470	471						
680	681						
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: These products are not recommended for new designs. For details such as the catalog numbers, please refer to the capacitance range table on page 11 and after.

Capacitance range chart

CGA3/1608 [0603 inch]

Capacitance		NP0			X8R	
(pF)	Code	2E (250V)	2A (100V)	1H (50V)	2A (100V)	1H (50V)
1	010					
2	020					
3	030					
4	040					
5	050					
6	060					
7	070					
8	080					
9	090					
10	100					
15	150					
22	220					
33	330					
47	470					
68	680					
100	101					
150	151					
220	221					
330	331					
470	471					
680	681					
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: These products are not recommended for new designs. For details such as the catalog numbers, please refer to the capacitance range table on page 11 and after.

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						

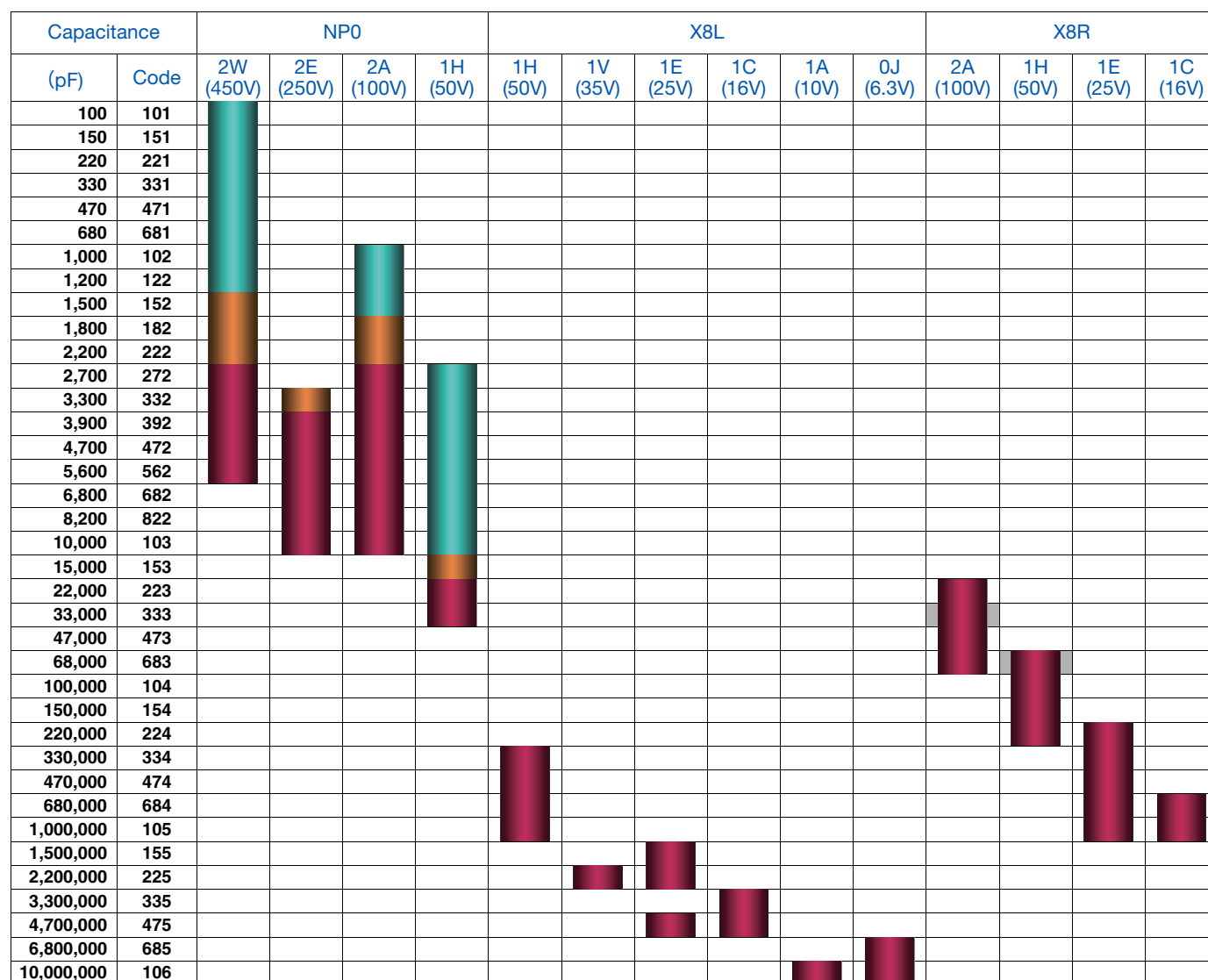
Standard thickness  0.80mm

 Background gray: These products are not recommended for new designs.

■ For details such as the catalog numbers, please refer to the capacitance range table on page 11 and after.

Capacitance range chart

CGA4/2012 [0805 inch]



Standard thickness 0.60 mm 0.85 mm 1.25 mm

Background gray: These products are not recommended for new designs.

For details such as the catalog numbers, please refer to the capacitance range table on page 11 and after.

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: These products are not recommended for new designs.

■ For details such as the catalog numbers, please refer to the capacitance range table on page 11 and after.

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

■ For details such as the catalog numbers, please refer to the capacitance range table on page 11 and after.

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

■ For details such as the catalog numbers, please refer to the capacitance range table on page 11 and after.

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 mm

■ For details such as the catalog numbers, please refer to the capacitance range table on page 11 and after.

MULTILAYER CERAMIC CHIP CAPACITORS



Capacitance range table

Temperature characteristic: 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
2pF	1005	0.50±0.05	±0.25pF			CGA2B2NP01H020C050BA
	1608	0.80±0.10	±0.25pF		CGA3E2NP02A020C080AA	CGA3E2NP01H020C080AA
3pF	1005	0.50±0.05	±0.25pF			CGA2B2NP01H030C050BA
	1608	0.80±0.10	±0.25pF		CGA3E2NP02A030C080AA	CGA3E2NP01H030C080AA
4pF	1005	0.50±0.05	±0.25pF			CGA2B2NP01H040C050BA
	1608	0.80±0.10	±0.25pF		CGA3E2NP02A040C080AA	CGA3E2NP01H040C080AA
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
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
15pF	1005	0.50±0.05	±5%			CGA2B2NP01H150J050BA
	1608	0.80±0.10	±5%		CGA3E2NP02A150J080AA	CGA3E2NP01H150J080AA
22pF	1005	0.50±0.05	±5%			CGA2B2NP01H220J050BA
	1608	0.80±0.10	±5%		CGA3E2NP02A220J080AA	CGA3E2NP01H220J080AA
33pF	1005	0.50±0.05	±5%			CGA2B2NP01H330J050BA
	1608	0.80±0.10	±5%		CGA3E2NP02A330J080AA	CGA3E2NP01H330J080AA
47pF	1005	0.50±0.05	±5%			CGA2B2NP01H470J050BA
	1608	0.80±0.10	±5%		CGA3E2NP02A470J080AA	CGA3E2NP01H470J080AA
68pF	1005	0.50±0.05	±5%			CGA2B2NP01H680J050BA
	1608	0.80±0.10	±5%		CGA3E2NP02A680J080AA	CGA3E2NP01H680J080AA
100pF	1005	0.50±0.05	±5%		CGA2B2NP02A101J050BA	CGA2B2NP01H101J050BA
	1608	0.80±0.10	±5%	CGA4C4NP02W101J060AA	CGA3E2NP02A101J080AA	CGA3E2NP01H101J080AA
	2012	0.60±0.15	±5%			
150pF	1005	0.50±0.05	±5%		CGA2B2NP02A151J050BA	CGA2B2NP01H151J050BA
	1608	0.80±0.10	±5%		CGA3E2NP02A151J080AA	CGA3E2NP01H151J080AA
	2012	0.60±0.15	±5%	CGA4C4NP02W151J060AA		

■ Gray items: These products are not recommended for new designs.

MULTILAYER CERAMIC CHIP CAPACITORS



Capacitance range table

Temperature characteristic: 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			
330pF	1005	0.50±0.05	±5%				CGA2B2NP02A331J050BA	CGA2B2NP01H331J050BA
	1608	0.80±0.10	±5%				CGA3E2NP02A331J080AA	CGA3E2NP01H331J080AA
	2012	0.60±0.15	±5%		CGA4C4NP02W331J060AA			
470pF	1005	0.50±0.05	±5%					CGA2B2NP01H471J050BA
		0.50±0.10	±5%				CGA2B2NP02A471J050BA	
	1608	0.80±0.10	±5%				CGA3E2NP02A471J080AA	CGA3E2NP01H471J080AA
680pF	2012	0.60±0.15	±5%		CGA4C4NP02W471J060AA			
	1005	0.50±0.05	±5%					CGA2B2NP01H681J050BA
	1608	0.80±0.10	±5%				CGA3E2NP02A681J080AA	CGA3E2NP01H681J080AA
1nF	2012	0.60±0.15	±5%		CGA4C4NP02W681J060AA			
	1005	0.50±0.05	±5%					CGA2B2NP01H102J050BA
	1608	0.80±0.10	±5%			CGA3E3NP02E102J080AA	CGA3E2NP02A102J080AA	CGA3E2NP01H102J080AA
1.2nF	2012	0.60±0.15	±5%		CGA4C4NP02W102J060AA		CGA4C2NP02A102J060AA	
	1608	0.80±0.10	±5%			CGA3E3NP02E122J080AA	CGA3E2NP02A122J080AA	CGA3E2NP01H122J080AA
1.5nF	2012	0.60±0.15	±5%		CGA4C4NP02W122J060AA		CGA4C2NP02A122J060AA	
	1608	0.80±0.10	±5%			CGA3E3NP02E152J080AA	CGA3E2NP02A152J080AA	CGA3E2NP01H152J080AA
1.8nF	2012	0.60±0.15	±5%		CGA4F4NP02W152J085AA		CGA4C2NP02A152J060AA	
		0.85±0.15	±5%					
	1608	0.80±0.10	±5%			CGA3E3NP02E182J080AA	CGA3E2NP02A182J080AA	CGA3E2NP01H182J080AA
2.2nF	2012	0.85±0.15	±5%		CGA4F4NP02W182J085AA		CGA4F2NP02A182J085AA	
	1608	0.80±0.10	±5%				CGA3E2NP02A222J080AA	CGA3E2NP01H222J080AA
2.7nF	2012	0.85±0.15	±5%		CGA4F4NP02W222J085AA		CGA4F2NP02A222J085AA	
	1608	0.80±0.10	±5%					CGA3E2NP01H272J080AA
3.3nF	2012	0.80±0.10	±5%				CGA3E2NP02A272J080AA	
		0.60±0.15	±5%		CGA4J4NP02W272J125AA		CGA4J2NP02A272J125AA	CGA4C2NP01H272J060AA
		1.25±0.20	±5%					
3.9nF	1608	0.80±0.10	±5%					CGA3E2NP01H332J080AA
		0.80±0.20	±5%				CGA3E2NP02A332J080AA	
	2012	0.60±0.15	±5%					CGA4C2NP01H332J060AA
4.7nF	2012	0.85±0.15	±5%		CGA4F3NP02E332J085AA			
		1.25±0.20	±5%		CGA4J4NP02W332J125AA		CGA4J2NP02A332J125AA	
	1608	0.80±0.10	±5%					CGA3E2NP01H392J080AA
5.6nF	2012	0.60±0.15	±5%					CGA4C2NP01H392J060AA
		1.25±0.20	±5%		CGA4J4NP02W392J125AA	CGA4J3NP02E392J125AA	CGA4J2NP02A392J125AA	
	3216	0.85±0.15	±5%	CGA5F4NP02J392J085AA			CGA5C2NP02A392J060AA	
7.5nF	1608	0.80±0.10	±5%					CGA3E2NP01H472J080AA
		0.60±0.15	±5%					CGA4C2NP01H472J060AA
	2012	0.60±0.15	±5%		CGA4J4NP02W472J125AA	CGA4J3NP02E472J125AA	CGA4J2NP02A472J125AA	
10nF	3216	0.60±0.15	±5%					CGA5C2NP01H472J060AA
		0.85±0.15	±5%	CGA5F4NP02J472J085AA			CGA5F2NP02A472J085AA	
	1608	0.80±0.10	±5%					CGA3E2NP01H562J080AA
15nF	2012	0.60±0.15	±5%					CGA4C2NP01H562J060AA
		1.25±0.20	±5%		CGA4J4NP02W562J125AA	CGA4J3NP02E562J125AA	CGA4J2NP02A562J125AA	
	3216	0.85±0.15	±5%				CGA5F2NP02A562J085AA	
22nF		1.15±0.15	±5%	CGA5H4NP02J562J115AA				

■ Gray items: These products are not recommended for new designs.

MULTILAYER CERAMIC CHIP CAPACITORS



Capacitance range table

Temperature characteristic: 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
		0.60±0.15	±5%					CGA4C2NP01H682J060AA
	2012	1.25±0.20	±5%			CGA4J3NP02E682J125AA	CGA4J2NP02A682J125AA	
	3216	0.60±0.15	±5%					CGA5C2NP01H682J060AA
8.2nF		1.15±0.15	±5%	CGA5H4NP02J682J115AA	CGA5H4NP02W682J115AA		CGA5H2NP02A682J115AA	
	1608	0.80±0.10	±5%					CGA3E2NP01H822J080AA
		0.60±0.15	±5%					CGA4C2NP01H822J060AA
	2012	1.25±0.20	±5%			CGA4J3NP02E822J125AA	CGA4J2NP02A822J125AA	
		1.15±0.15	±5%		CGA5H4NP02W822J115AA		CGA5H2NP02A822J115AA	
	3216	1.60±0.20	±5%	CGA5L4NP02J822J160AA				
10nF	3225	1.25±0.20	±5%	CGA6J4NP02J822J125AA				
	1608	0.80±0.10	±5%					CGA3E2NP01H103J080AA
		0.60±0.15	±5%					CGA4C2NP01H103J060AA
	2012	1.25±0.20	±5%			CGA4J3NP02E103J125AA	CGA4J2NP02A103J125AA	
		0.60±0.15	±5%					CGA5C2NP01H103J060AA
	3216	1.15±0.15	±5%			CGA5H3NP02E103J115AA	CGA5H2NP02A103J115AA	
15nF		1.60±0.20	±5%	CGA5L4NP02J103J160AA	CGA5L4NP02W103J160AA			
	3225	1.25±0.20	±5%	CGA6J4NP02J103J125AA				
	2012	0.85±0.15	±5%					CGA4F2NP01H153J085AA
		0.60±0.15	±5%					CGA5C2NP01H153J060AA
	3216	1.15±0.15	±5%				CGA5H2NP02A153J115AA	
		1.60±0.20	±5%			CGA5L3NP02E153J160AA		
22nF		1.60+0.30,-0.10	±5%		CGA5L4NP02W153J160AA			
	3225	1.60±0.20	±5%	CGA6L4NP02J153J160AA				
	2012	1.25±0.20	±5%					CGA4J2NP01H223J125AA
		0.60±0.15	±5%					CGA5C2NP01H223J060AA
	3216	1.60±0.20	±5%				CGA5L2NP02A223J160AA	
		1.60+0.30,-0.10	±5%			CGA5L3NP02E223J160AA		
33nF	3225	1.60±0.20	±5%			CGA6L3NP02E223J160AA		
		2.30±0.20	±5%	CGA6N4NP02J223J230AA	CGA6N4NP02W223J230AA			
	2012	1.25±0.20	±5%					CGA4J2NP01H333J125AA
		0.85±0.15	±5%					CGA5F2NP01H333J085AA
	3216	1.60+0.30,-0.10	±5%				CGA5L2NP02A333J160AA	
	3225	2.30±0.20	±5%			CGA6N3NP02E333J230AA		
47nF		2.50±0.30	±5%	CGA6P4NP02J333J250AA	CGA6P4NP02W333J250AA			
	4532	2.00±0.20	±5%	CGA8M4NP02J333J200KA				
	3216	1.15±0.15	±5%					CGA5H2NP01H473J115AA
	3225	2.50±0.30	±5%			CGA6P3NP02E473J250AA		
		2.30±0.20	±5%		CGA8N4NP02W473J230KA			
	4532	3.20±0.30	±5%	CGA8R4NP02J473J320KA				
68nF	3216	1.60±0.20	±5%					CGA5L2NP01H683J160AA
	3225	2.30±0.20	±5%				CGA6N2NP02A683J230AA	
		2.30±0.20	±5%			CGA8N4NP02E683J230KN		
	4532	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	

■ Gray items: These products are not recommended for new designs.

MULTILAYER CERAMIC CHIP CAPACITORS



Capacitance range table

Temperature characteristic: 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		
33nF	2012	1.25±0.20	±10%	CGA4J2X8R2A223K125AA			
			±20%	CGA4J2X8R2A223M125AA			
	1005	0.50±0.05	±10%			CGA2B1X8R1E333K050BC	CGA2B3X8R1C333K050BB
			±20%			CGA2B1X8R1E333M050BC	CGA2B3X8R1C333M050BB
47nF	1608	0.80±0.10	±10%	CGA3E3X8R2A333K080AB	CGA3E2X8R1H333K080AA		
			±20%	CGA3E3X8R2A333M080AB	CGA3E2X8R1H333M080AA		
	2012	1.25±0.20	±10%	CGA4J3X8R2A333K125AB			
			±20%	CGA4J3X8R2A333M125AB			
68nF	1005	0.50±0.05	±10%			CGA2B1X8R1E473K050BC	CGA2B3X8R1C473K050BB
			±20%			CGA2B1X8R1E473M050BC	CGA2B3X8R1C473M050BB
	1608	0.80±0.10	±10%		CGA3E2X8R1H473K080AA		
			±20%		CGA3E2X8R1H473M080AA		
3216	1608	0.80±0.10	±10%	CGA4J3X8R2A473M125AB			
			±20%				
	2012	1.25±0.20	±10%	CGA4J3X8R2A683K125AB	CGA4J2X8R1H683K125AA		
			±20%	CGA4J3X8R2A683M125AB	CGA4J2X8R1H683M125AA		
3216	3216	1.15±0.15	±10%	CGA5H2X8R2A683K115AA			
			±20%	CGA5H2X8R2A683M115AA			

■ Gray items: These products are not recommended for new designs.

MULTILAYER CERAMIC CHIP CAPACITORS



Capacitance range table

Temperature characteristic: 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		
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		
680nF	3225	2.00±0.20	±10%	CGA6M3X8R2A474K200AB			
			±20%	CGA6M3X8R2A474M200AB			
	2012	1.25±0.20	±10%			CGA4J1X8R1E684K125AC	CGA4J3X8R1C684K125AB
			±20%			CGA4J1X8R1E684M125AC	CGA4J3X8R1C684M125AB
	3216	1.15±0.15	±10%			CGA5H2X8R1E684K115AA	
			±20%			CGA5H2X8R1E684M115AA	
1µF	3216	1.60±0.20	±10%		CGA5L3X8R1H684K160AB		
			±20%		CGA5L3X8R1H684M160AB		
	3225	2.50±0.30	±10%	CGA6P3X8R2A684K250AB			
			±20%	CGA6P3X8R2A684M250AB			
	2012	1.25±0.20	±10%			CGA4J1X8R1E105K125AC	CGA4J3X8R1C105K125AB
			±20%			CGA4J1X8R1E105M125AC	CGA4J3X8R1C105M125AB
1.5µF	3216	1.60±0.20	±10%		CGA5L3X8R1H105K160AB	CGA5L2X8R1E105K160AA	
			±20%		CGA5L3X8R1H105M160AB	CGA5L2X8R1E105M160AA	
	3225	1.60±0.20	±10%			CGA5L3X8R1E155K160AB	
			±20%			CGA5L3X8R1E155M160AB	
	3216	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	
	3216	1.60±0.20	±10%			CGA5L1X8R1E335K160AC	CGA5L3X8R1C335K160AB
			±20%			CGA5L1X8R1E335M160AC	CGA5L3X8R1C335M160AB
3.3µF	3225	2.50±0.30	±10%			CGA6P2X8R1E335K250AA	
			±20%			CGA6P2X8R1E335M250AA	
	3216	1.60±0.20	±10%			CGA5L1X8R1E475K160AC	CGA5L3X8R1C475K160AB
			±20%			CGA5L1X8R1E475M160AC	CGA5L3X8R1C475M160AB
	3225	2.50±0.30	±10%			CGA6P3X8R1E475K250AB	
			±20%			CGA6P3X8R1E475M250AB	
4.7µF	3216	1.60±0.20	±10%			CGA6M1X8R1E685K200AC	CGA6M3X8R1C685K200AB
			±20%			CGA6M1X8R1E685M200AC	CGA6M3X8R1C685M200AB
	3225	2.50±0.30	±10%			CGA6P1X8R1E106K250AC	CGA6P3X8R1C106K250AB
			±20%			CGA6P1X8R1E106M250AC	CGA6P3X8R1C106M250AB
	3216	1.60±0.20	±10%				
			±20%				
6.8µF	3225	2.00±0.20	±10%				
			±20%				
	3216	1.60±0.20	±10%				
			±20%				
	3225	2.50±0.30	±10%				
			±20%				
10µF	3225	2.50±0.30	±10%				
			±20%				
	3216	1.60±0.20	±10%				
			±20%				
	3225	2.50±0.30	±10%				
			±20%				

MULTILAYER CERAMIC CHIP CAPACITORS



Capacitance range table

Temperature characteristic: X8L (–55 to +150°C, +15,–40%)

Capacitance	Dimensions	Thickness (mm)	Capacitance tolerance	Catalog number			
				Rated voltage Edc:50V	Rated voltage Edc:35V	Rated voltage Edc:25V	Rated voltage Edc:16V
330nF	2012	1.25±0.20	±10%	CGA4J1X8L1H334K125AC			
470nF	2012	1.25±0.20	±10%	CGA4J1X8L1H474K125AC			
680nF	1608	0.80±0.10	±10%				CGA3E1X8L1C684K080AC
	2012	1.25±0.20	±10%	CGA4J1X8L1H684K125AC			
1µF	1608	0.80±0.10	±10%				CGA3E1X8L1C105K080AC
	2012	1.25±0.20	±10%	CGA4J1X8L1H105K125AC			
1.5µF	2012	1.25±0.20	±10%			CGA4J3X8L1E155K125AB	
	3216	1.60±0.20	±10%	CGA5L1X8L1H155K160AC			
2.2µF	2012	1.25±0.20	±10%		CGA4J1X8L1V225K125AC		
		1.25±0.20	±10%			CGA4J3X8L1E225K125AB	
	3216	1.60±0.20	±10%	CGA5L1X8L1H225K160AC			
3.3µF	2012	1.25±0.20	±10%				CGA4J1X8L1C335K125AC
		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
	3225	2.50±0.30	±10%	CGA6P1X8L1H106K250AC			
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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<u>CGA2B2NP01H470J050BA</u>	<u>CGA2B2NP02A331J050BA</u>	<u>CGA2B2NP02A471J050BA</u>	<u>CGA2B2NP02A271J050BA</u>
<u>CGA2B2NP02A101J050BA</u>	<u>CGA2B2NP02A151J050BA</u>	<u>CGA2B2NP02A221J050BA</u>	<u>CGA2B2NP02A121J050BA</u>
<u>CGA2B2NP02A181J050BA</u>	<u>CGA2B2NP02A391J050BA</u>	<u>CGA2B2NP01H271J050BA</u>	<u>CGA2B2NP01H270J050BA</u>
<u>CGA2B2NP01H390J050BA</u>	<u>CGA2B2NP01H3R3C050BA</u>	<u>CGA2B2NP01H030C050BA</u>	<u>CGA2B2NP01H090D050BA</u>
<u>CGA2B2NP01H120J050BA</u>	<u>CGA2B2NP01H102J050BA</u>	<u>CGA2B2NP01H040C050BA</u>	<u>CGA2B2NP01H180J050BA</u>
<u>CGA2B2NP01H680J050BA</u>	<u>CGA2B2NP01H101J050BA</u>	<u>CGA2B2NP01H331J050BA</u>	<u>CGA2B2NP01H100D050BA</u>
<u>CGA2B2NP01H391J050BA</u>	<u>CGA2B2NP01H560J050BA</u>	<u>CGA2B2NP01H080D050BA</u>	<u>CGA2B2NP01H681J050BA</u>
<u>CGA2B2NP01H6R8D050BA</u>	<u>CGA2B2NP01H050C050BA</u>	<u>CGA2B2NP01H151J050BA</u>	<u>CGA2B2NP01H2R2C050BA</u>
<u>CGA2B2NP01H020C050BA</u>	<u>CGA2B2NP01H1R5C050BA</u>	<u>CGA2B2NP01H471J050BA</u>	<u>CGA2B2NP01H221J050BA</u>
<u>CGA2B2NP01H121J050BA</u>	<u>CGA2B2NP01H330J050BA</u>	<u>CGA2B2NP01H820J050BA</u>	<u>CGA2B2NP01H060D050BA</u>
<u>CGA2B2NP01H070D050BA</u>	<u>CGA2B2NP01H181J050BA</u>	<u>CGA2B2NP01H4R7C050BA</u>	<u>CGA2B2NP01H150J050BA</u>
<u>CGA2B2NP01H010C050BA</u>	<u>CGA2B2NP01H220J050BA</u>	<u>CGA2B2NP01H561J050BA</u>	<u>CGA2B2NP01H821J050BA</u>
<u>CGA5C4C0G2J331G060AA</u>	<u>CGA6M1C0G3A222G200AE</u>	<u>CGA9N1C0G2J683G230KE</u>	<u>CGA6L4NP02J153G160AA</u>
<u>CGA6P4C0G2J333G250AE</u>	<u>CGA6M1C0G3A392G200AE</u>	<u>CGA5H4C0G2J562G115AA</u>	<u>CGA6M1C0G3A332G200AE</u>
<u>CGA6M1C0G3A472G200AE</u>	<u>CGA6N4C0G2J223G230AA</u>	<u>CGA9Q1C0G3A333G280KC</u>	<u>CGA5L4C0G2J822G160AE</u>
<u>CGA6J4NP02J822G125AA</u>	<u>CGA5F4NP02J392G085AA</u>	<u>CGA5C4C0G2J221G060AA</u>	<u>CGA5F4C0G2J472G085AA</u>
<u>CGA5H4NP02J562G115AA</u>	<u>CGA6M1C0G3A272G200AE</u>	<u>CGA6M4C0G2J682G200AA</u>	<u>CGA6M1C0G3A682G200AE</u>
<u>CGA6J4NP02J103G125AA</u>	<u>CGA6L4C0G2J562G160AA</u>	<u>CGA6P4NP02J333G250AA</u>	<u>CGA9Q1C0G2J104G280KC</u>
<u>CGA5F4C0G2J392G085AA</u>	<u>CGA5L4C0G2J103G160AE</u>	<u>CGA6P4C0G2J333G250AA</u>	<u>CGA5C4C0G2J101G060AA</u>
<u>CGA5H4C0G2J682G115AA</u>	<u>CGA5L4C0G2J332G160AA</u>	<u>CGA5L4NP02J822G160AA</u>	<u>CGA6L4C0G2J153G160AE</u>
<u>CGA6M1C0G3A182G200AE</u>	<u>CGA6J4C0G2J392G125AA</u>	<u>CGA5H4C0G2J182G115AA</u>	<u>CGA5F4C0G2J102G085AA</u>
<u>CGA9Q1C0G3A153G280KC</u>	<u>CGA5H4C0G2J152G115AA</u>	<u>CGA6J4C0G2J822G125AA</u>	<u>CGA6M1C0G3A562G200AE</u>
<u>CGA5F4C0G2J122G085AA</u>	<u>CGA5L4C0G2J272G160AA</u>	<u>CGA6M1C0G3A122G200AE</u>	<u>CGA5F4C0G2J681G085AA</u>
<u>CGA5F4NP02J472G085AA</u>	<u>CGA5F4C0G2J392G085AE</u>	<u>CGA5H4NP02J682G115AA</u>	<u>CGA9Q1C0G3A103G280KC</u>
<u>CGA5H4C0G2J562G115AE</u>	<u>CGA5L4C0G2J822G160AA</u>	<u>CGA5H4C0G2J222G115AA</u>	<u>CGA6J4C0G2J103G125AA</u>