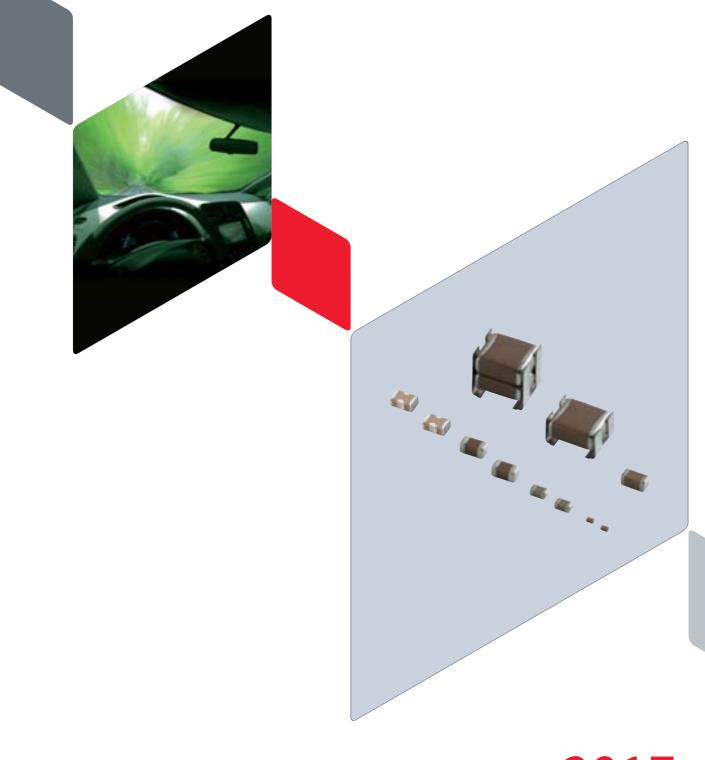


# Chip Multilayer Ceramic Capacitors for Automotive





#### EU RoHS Compliant

- All the products in this catalog comply with EU RoHS.
- EU RoHS is "the European Directive 2011/65/EU on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment."
- For more details, please refer to our web page, "Murata's Approach for EU RoHS" (http://www.murata.com/eneu/support/compliance/rohs).

# muRata

**GRT** Series

GCM Series



Product specifications are as of May 2017.

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Soft Termination MLSC Design Chip Multilayer Ceramic Capacitors for Automo	otive	
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for Automotive KCA Series	p57	p19
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Please check the MURATA website (http://www.murata.com/) if you cannot find a part number in this catalog.

muRata

**GCG** Series

KC3 Series

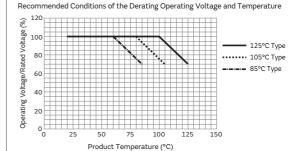
# Explanation of Symbols in This Catalog

Links are provided to the latest information from the PDF version of the catalog, which is available on the web.

General	For applications that do not require the particular reliability such as the general equipment	
Info- tainment	Infotainment for Automotive The product for entertainment equipment like car navigations, car audios, and body control equipment like wipers, power windows.	
Power- train	Powertrain/Safety for Automotive Product used for applications (running, turning, stopping and safety devices) which particularly concern human life, such as in devices for automobiles.	D1
Medical Device	Medical-grade products for Implanted Medical Devices These products are intended for use in implanted medical devices such as cardiac pacemakers, cochlear implants, insulin pumps and gastric electrostimulators. They are suitable for use in non-critical circuits. *1 *1 Non-critical circuits This term refers to circuits in implanted medical devices that are not directly linked to life support, i.e. circuits that will not directly endanger the life of the patient should the functionality of the device be reduced or halted by failure of the circuit.	Derati
AEC- Q200	AEC-Q200 compliant product	
Safety standard	Safety Standard Certified Product Products that acquired safety standard certification IEC60384-14 and products based on the Electrical Appliance and Material Safety Law of Japan.	
High Q	Low dissipation for high frequency By devising ceramic materials and electrode materials, low dissipation is achieved in frequency bands of VHF, UHF and microwave or beyond.	D2 Derati
Low ESL	Low inductance This capacitor is designed so that the parasitic inductance component (ESL) that the capacitor has on the high frequency side becomes lower.	2
Fail safe	Fail safe product This capacitor is designed to prevent failures as much as possible by short mode.	
Deflecting crack	Product resistant to deflection cracking This capacitor is designed to prevent failures as much as possible by short mode caused by cracking when there is board deflection.	
Soldering crack	Product with solder cracking suppression This capacitor is configured with metal terminals and leads connected to the chip. The metal terminals and leads relieve the stress from expansion and contraction of the solder, to suppress solder cracking.	Derati 3
Anti- noise	Product suitable for acoustic noise reduction and low distortion This product suppresses acoustic noise, which occurs when a ceramic capacitor is used, by devising the materials and configuration.	D4
Effective Cap	No DC bias characteristics Polymer capacitor is no capacitance change with DC bias due to aluminum oxidized film for dielectric.	Derati 4
EMI FIL®	Low-inductance product suitable for noise suppression. This product has extremely low ESL and is suitable for suppression of noise, including high frequencies. This product can also be used as a low-ESL, high-performance bypass capacitor.	
Limited to conductive glue mounting	Limited to Conductive Glue Mounting Since silver palladium is used for the external electrodes,the	D5

WEB

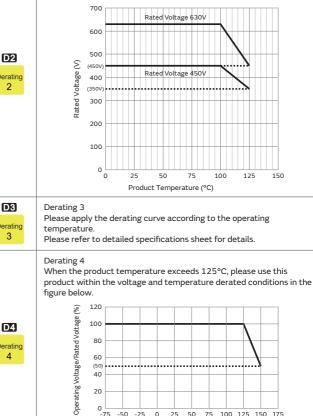
#### This product is suitable when a voltage continuously applied to a capacitor in an operating circuit, is used below (derated) the rated voltage of the capacitor. This model guarantees the test conditions in the endurance test, at a rated voltage x 100% at the maximum operating temperature. A reliability assurance level equivalent to a common product can be secured, by using this product within the voltage and temperature derated conditions recommended in the figure below.



#### Derating 2

Derating 1

When the product temperature exceeds 105°C, please use this product within the voltage and temperature derated conditions in the figure below.



50

Please apply the rated voltage derating over 150°C. Please refer to

75 100 125 150 175

(50) 40 20 0 └─ -75

Derating 5

-50 -25 0 25 Product Temperature (°C)

detailed specifications sheet for details.

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 ANote
 • Please read rating and 
 ACAUTION (for storage, operating, rating, soldering, mounting and handling) in this catalog to prevent smoking and/or burning, etc.
 • This catalog has only typical specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.

# Selection Guide for Capacitors

Info	Infotainment for automotive							
Info- tainment	SMD							
AEC- Q200			Solder mounting					
			Chip type					
			GRT GRT	P23				

SMD						
Sc	lder n	nounting				
	Chi	p type				
		GCM	1			P
		GC3	Anti- noise		High effective capacitance & high ripple current	P
		GCJ	Fail Deflecti safe crack	9	Soft termination	P
		GGM	Water Repellent			W
		GCQ	High Q			W
		GCD	Fail Deflecti safe crack	9	MLSC design	P
		GCE @	Fail Deflecti safe crack	9	Soft termination MLSC design	P
		GGD	Fail Deflecti safe crack	Water Repellent	MLSC design	W
		NFM	Low ESL		3 terminals	Р
	Met	tal terminal	type			
		🦏 ксм	Anti- noise crack	soldering crack		F
		👘 ксз	Anti- noise crack	soldering crack	High effective capacitance & high ripple current	F
		👘 кса	Safety standard nois	- Deflecting crack	Soldering crack	F
		to Conducti	ve Glue N	1ount	ing	
Limite condu glu moun	Chi	p type				
		🜒 GCB	Deflecting Solderi crack crack	9	Ni plating + Pd plating termination conductive glue mounting	w
		GCG 🧼	Deflecting Solderi crack crack	9	AgPd termination conductive glue mounting	P
Lead ty	/pe					
Sc	lder n	nounting				_
		RCE	Anti- noise	Soldering crack		W
			Anti- noise crack	+	150°C operation leaded	W
		RHS	Anti- noise Crack	soldering crack	200°C operation leaded	W
		DE6	Safety standard			w

Medical-grade products for implanted medical devices								
Medical Device	SMD							
		Solder mounting						
		Chip type						
			ССН	WEB 🖢				

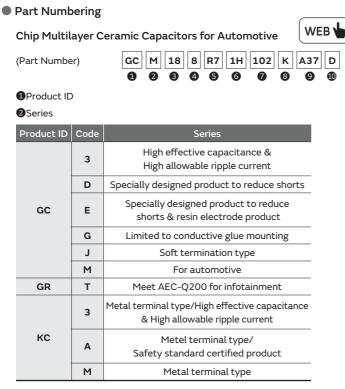
or g	gene	ral						
	SME							
		Sold	ler m	ountir	ng			
			Chip	type	-			
					GRM			WEB 🖕
					GRM		For LCD backlight inverter circuit only	WEB 🖕
					GR3	Anti- noise	High effective capacitance &	WEB 👆
					GRJ	Deflecting crack	high ripple current Soft termination	WEB 🖕
					GXM	Water Repellent		WEB 🖕
					GR4		For information devices only	WEB
					GR7		For camera flash circuit only	WEB
					GJM	High		WEB
					GQM	High	High power	WEB
					GA2		Based on the Electrical Appliance	WEB
					GA3	Safety standard	and Material Safety Law of Japan	WEB
					LLL	Low	LW reversed	WEB
					LLA	Low	8 terminals	WEB
					LLM		10 terminals	WEB
					LLR	Low	LW reversed controlled ESR	WEB
					NFM	Low	3 terminals	WEB
					GJ4	Anti- noise	Low distortion	WEB
					GJ8	Anti- noise	Low acoustic noise	WEB
			On i	nterpo				
						Anti- noise		WEB
					ZRB	Anti- noise		WEB
			Met	al tern				<u> </u>
				(2)	KRM			WEB
					KR3	Anti- noise Crack Soldering crack crack	High effective capacitance &	WEB
			Resi	n mole		MD type	high ripple current	
					DK1	Safety standard		WEB
		Wire	- bon	ding n	·			
				type		0		
		Bonding			GMA		Microchip	WEB 🖕
					GMD		· .	WEB
	Lea	d typ	e					
	200			ountir	וס			
					RDE	Anti- Deflecting Soldering crack crack		WEB 🖕
					DEH	Clack Clack	High temperature low loss	WEB
					DEA		High temperature Class 1	WEB
					DEB		Class 2	WEB
					DEC			WEB
					DEF		For LCD backlight inverter circuit	WEB
					DHR	Ultrahigh- voltage crack crack	only	WEB
					DEJ	Crack Crack	Based on the Electrical Appliance	WEB
					DEJ	Safety standard	and Material Safety Law of Japan X1/Y1 Class certified product	WEB
					DE1	standard Safety standard	X1/Y2 Class certified product	
	Scr	wte	rmin	ation r				
	Jure				DHS	Ultrahigh- voltage		WEB 🖕
				00	DHS	voltage Ultrahigh- voltage	High voltage AC rated	
				6		Voltage		



# Catalog Information

Catalog relates to a multilayer ceramic capacitor is below.





#### Chip Dimension (L x W)

Code	Dimension (L x W)	EIA
03	0.6 x 0.3mm	0201
15	1.0 x 0.5mm	0402
18	1.6 x 0.8mm	0603
21	2.0 x 1.25mm	0805
31	3.2 x 1.6mm	1206
32	3.2 x 2.5mm	1210
43	4.5 x 3.2mm	1812
55	5.7 x 5.0mm	2220

#### ④Height Dimension (T) (Except KC□)

Code	Dimension (T)
3	0.3mm
5	0.5mm
6	0.6mm
8	0.8mm
9	0.85mm
А	1.0mm
В	1.25mm
с	1.6mm
D	2.0mm
E	2.5mm
М	1.15mm
Q	1.5mm
x	Depends on individual standards.

#### ④Height Dimension (T) (KC□ Only)

Code	Dimension (T)
L	2.8mm
Q	3.7mm
т	4.8mm
W	6.4mm

#### **⑤**Temperature Characteristics

	mperature cteristic Co	I demonstration Characteristics I Canacitance Change Fach Lei			nperatu	re (%)						
Code	, Public		Reference	Temperature	Capacitance Change	Range	-5	5°C	*4		-10°C	
Code	STD Co	de	Temperature	Range	or Temperature Coefficient		Max.	Min.	Max.	Min.	Max.	Min.
5C	COG	EIA	25°C	25 to 125°C	0±30ppm/°C	–55 to 125°C	0.58	-0.24	0.4	-0.17	0.25	-0.11
5G	X8G	*2	25°C	25 to 150°C	0±30ppm/°C	–55 to 150°C	0.58	-0.24	0.4	-0.17	0.25	-0.11
7U	U2J	EIA	25°C	25 to 125°C *3	-750±120ppm/°C	–55 to 125°C	8.78	5.04	6.04	3.47	3.84	2.21
				–55 to –40°C	-4700+1000/-2500ppm/°C		-	-	-	-	-	-
05	9E ZLM *		20°C	–40 to 20°C	-5350±750ppm/°C	–55 to 125°C	-	-	-	-	-	-
9E		*2	20-0	20 to 85°C	-4700±500ppm/°C		-	-	-	-	-	-
				85 to 125°C	-4700+2000/-1000ppm/°C		-	-	-	-	-	-
C7	X7S	EIA	25°C	–55 to 125°C	±22%	–55 to 125°C	-	-	-	-	-	-
C8	X6S	EIA	25°C	–55 to 105°C	±22%	–55 to 105°C	-	-	-	-	-	-
D7	Х7Т	EIA	25°C	–55 to 125°C	+22%, -33%	–55 to 125°C	-	-	-	-	-	-
L8	X8L	*2	25°C	–55 to 150°C	+15%, –40%	–55 to 150°C	-	-	-	-	-	-
M8	X8M	*2	25°C	–55 to 150°C	+15%, –50%	–55 to 150°C	-	-	-	-	-	-
R6	X5R	EIA	25°C	–55 to 85°C	±15%	–55 to 85°C	-	-	-	-	-	-
R7	X7R	EIA	25°C	–55 to 125°C	±15%	–55 to 125°C	-	-	-	-	-	-
R9	X8R	EIA	25°C	–55 to 150°C	±15%	–55 to 150°C	-	-	-	-	-	-

\*1 Capacitance change is specified with 50% rated voltage applied.

\*2 Murata Temperature Characteristic Code.

\*3 Rated Voltage 100Vdc max: 25 to 85°C

\*4 –25°C (Reference Temperature 20°C) / –30°C (Reference Temperature 25°C)



(Part Number)

Continued from the preceding page. >

Co	de		
Standard Product	Voltage Derated Product	Rated Voltage	
OE	-	DC2.5V	
0G	-	DC4V	
LO	EC	DC6.3V	
1A	ED	DC10V	
1C	EE	DC16V	
1E	EF	DC25V	
YA	EG	DC35V	
1H	EH	DC50V	
1J	-	DC63V	
1K	-	DC80V	
2A	EL	DC100V	
2E	-	DC250V	
2W	LP	DC450V	
2J	LQ	DC630V	
ЗA	-	DC1kV	
MF	-	X1/Y2: AC250V (Safety Standard Certified Type MF)	

#### Capacitance

Expressed by three-digit alphanumerics. The unit is pico-farad (pF). The first and second figures are significant digits, and the third figure expresses the number of zeros that follow the two numbers.

If there is a decimal point, it is expressed by the capital letter "**R**." In this case, all figures are significant digits.

If any letter, other than  $"{\bf R}"$  is included, this indicates the specific part number is a non-standard part.

Ex.)	Code	Capacitance
	R50	0.50pF
	1R0	1.0pF
	100	10pF
	103	10000pF

Please contact us if you find any part number not provided in this table.

#### Output Contract Co

Code	Capacitance Tolerance							
С	±0.25pF							
D	±0.5pF (Less than 10pF)							
	±0.5% (10pF and over)							
J	±5%							
к	±10%							
М	±20%							

Individual Specification Code Expressed by three figures.

#### Package

Code	Package
L	ø180mm Embossed Taping
D/W	ø180mm Paper Taping
к	ø330mm Embossed Taping
L	ø330mm Paper Taping

3 Terminal Low ESL	Multilayer Ceramic Capacitors	WEB 🖕
(Part Number)	NF M 3D CC 102 R 1H 3 <b>0 2 6 4 5 6 7 8</b>	
1Product ID 2Series		

Product ID	Series
NFM	3 Terminal Low ESL Type

#### Oimensions (LxW)

Code	Dimensions (LxW)	EIA
21	2.0x1.25mm	0805
31	3.2x1.6mm	1206

#### 4 Features

Code	Features							
нс	Powertrain/Safety for Automotive	For Signal Lines / For Large Current						
НК		For Very Large Current						

#### GCapacitance

Expressed by three figures. The unit is in pico-farad (pF). The first and second figures are significant digits, and the third figure expresses the number of zeros that follow the two figures.

#### 6Characteristics

Code	Capacitance Temperature Characteristics
R	±15%, +15/-18%

#### Rated Voltage

Code	Rated Voltage
1A	10V
1C	16V
1H	50V
2A	100V

#### 8Electrode

Code	Electrode
3	Sn Plating

#### Packaging

Code	Packaging
L	Embossed Taping (ø180mm Reel)
D	Paper Taping (ø180mm Reel)

Please contact us if you find any part number not provided in this table.

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# Capacitance Table

#### How to read the Capacitance Table

L×W (mm)	1	0×0.	5	1	6×		
T max. (mm)		0.55			0.9		The values can be narrowed down in the order of size,
Rated Voltage (Vdc)	100	50	25	100	50		rated voltage, and temperature characteristics.
Cap. / TC Code	COG	C0G	COG	COG	C0		
1.0pF	p24	p24		p24	p2	٦	
2.0pF	p24	p24		p24	p2		
3.0pF	p24	p24		p24	p2	┢	<ul> <li>Refers to the page of the part number list.</li> <li>Check the part number list for the applicable product number.</li> </ul>
4.0pF	p24	p24		p24	p2		F
5.0pF	p24	p24		p24	p2		

#### Temperature Characteristics Table

The Table is colored by temperature characteristic codes. Refer to the following Table for the meaning of each code.

Temperature Temperature Characteristics					Operating	Capacitance Change Each Temperature (%)					
Public		Reference	Temperature	Capacitance Change	Temperature Range	-5	5°C	*	3	-10°C	
STD Code		Temperature	Range	or Temperature Coefficient		Max.	Min.	Max.	Min.	Max.	Min.
COG	EIA	25°C	25 to 125°C	0±30ppm/°C	–55 to 125°C	0.58	-0.24	0.4	-0.17	0.25	-0.11
X8G	*1	25°C	25 to 150°C	0±30ppm/°C	–55 to 150°C	0.58	-0.24	0.4	-0.17	0.25	-0.11
U2J	EIA	25°C	25 to 125°C *2	-750±120ppm/°C	–55 to 125°C	8.78	5.04	6.04	3.47	3.84	2.21
		20°C	–55 to –40°C	-4700+1000/-2500ppm/°C		-	-	-	-	-	-
71.54	*1		-40 to 20°C	-5350±750ppm/°C		-	-	-	-	-	-
ZLM	~1		20 to 85°C	-4700±500ppm/°C		-	-	-	-	-	-
			85 to 125°C	-4700+2000/-1000ppm/°C		-	-	-	-	-	-
X7S	EIA	25°C	–55 to 125°C	±22%	–55 to 125°C	-	-	-	-	-	-
X6S	EIA	25°C	–55 to 105°C	±22%	–55 to 105°C	-	-	-	-	-	-
Х7Т	EIA	25°C	–55 to 125°C	+22%, -33%	–55 to 125°C	-	-	-	-	-	-
X8L	*1	25°C	–55 to 150°C	+15%, -40%	–55 to 150°C	-	-	-	-	-	-
X8M	*1	25°C	–55 to 150°C	+15%, -50%	–55 to 150°C	-	-	-	-	-	-
X5R	EIA	25°C	–55 to 85°C	±15%	–55 to 85°C	-	-	-	-	-	-
X7R	EIA	25°C	–55 to 125°C	±15%	–55 to 125°C	-	-	-	-	-	-
X8R	EIA	25°C	–55 to 150°C	±15%	–55 to 150°C	-	-	-	-	-	-

\*1 Murata Temperature Characteristic Code.

\*2 Rated Voltage 100Vdc max: 25 to 85°C

\*3 –25°C (Reference Temperature 20°C) / –30°C (Reference Temperature 25°C)

# Capacitance Table

**p00** Each number in the Part Number List refers to the page number printed at the bottom of the page.

#### GRT Series Temperature Compensating Type

	•		•
p00	← Part Number List	EIA: COG	

· · · · · ·	1						2.0			
L×W (mm)	1	.0×0.	5	1	6×0.	8	2.0× 1.25	3	8.2×1.	6
T max. (mm)		0.55			0.9		1.35		1.8	
Rated Voltage (Vdc)	100	50	25	100	50	25	50	50	25	16
Cap. / TC Code		COG	COG	C0G		COG	C0G	COG	C0G	COG
1.0pF	p24	p24		p24	p25					
2.0pF	p24	p24		p24	p25					
3.0pF	p24	p24		p24	p25					
4.0pF	p24	p24		p24	p25					
5.0pF	p24	p24		p24	p25					
6.0pF	p24	p24		p24	p25					
7.0pF	p24	p24		p24	p25					
8.0pF	p24	p24		p24	p25					
9.0pF	p24	p24		p24	p25					
10pF	p24	p24	p24	p24	p25					
12pF	p24	p24	p24	p24	p25					
15pF	p24	p24	p24	p24	p25					
18pF	p24	p24	p24	p24	p25					
22pF	p24	р24	р24	p24	p25					
27pF	p24	p24	p24	p24	p25					
33pF	p24	p24	p24	p24	p25					
39pF	p24	p24	p24	p24	p25					
47pF	p24	p24	p24	p24	p25					
56pF	p24	p24	p24		p25					
68pF	p24			p24						
· · ·		p24	p24	p24	p25					
82pF	p24	p24	p24	p25	p25					
100pF	p24	p24	p24	p25	p25					
120pF		p24	p24	p25	p25					
150pF		p24	p24	p25	p25					
180pF		p24	p24	p25	p25					
220pF		p24	p24	p25	p25					
270pF		p24	p24	p25	p25					
330pF		p24	p24	p25	p25					
390pF		p24	p24	p25	p25					
470pF	-	p24	p24	p25	p25					
560pF		p24	p24	p25	p25	p25				
680pF		p24	p24	p25	p25	p25				
820pF		p24	p24	p25	p25	p25				
1000pF		p24	p24	p25	p25	p25				
1200pF				p25	p25	p25				
1500pF				p25	p25	p25				
1800pF					p25					
2200pF					p25					
2700pF					p25					
3300pF					p25					
3900pF					p25					
4700pF					p25	p25				
5600pF					p25	p25				
6800pF					p25	p25				
8200pF					p25	p25				
10000pF					p25	p25				
18000pF							p25			
22000pF							p25			
56000pF								p25		
68000pF								p25		
82000pF								p25		
0.10µF								p25	p25	
0.12µF									p25	p25
	I					:			-1	

Capacitance Table Each number in the Part Number List refers to the page number printed at the bottom of the page.

#### GRT Series High Dielectric Constant Type

 p00
 ← Part Number List
 EIA:
 X6S
 X7S
 X5R
 X7R

L×W (mm)							C	.6×0.	3											1	0×0.	5				
T max. (mm)							0.33							0.	35						0.55					
Rated Voltage (Vdc)	35		25		1	.6		10			6.3		4	6.3	4	50	3	5		25			16		1	.0
Cap. / TC Code	X5R	X7R	X6S	X5R	X6S	X5R	X7R	X6S	X5R	X7R	X6S	X5R	X6S	X5R	X5R	X7R	X6S	X5R	X7R	X6S	X5R	X7R	X6S	X5R	X7R	X6S
100pF				p26																						
220pF	-			p26												p26										
470pF		p26	p26	p26												p26										
1000pF		p26	p26	p26												p26										
2200pF									p26	p26	p26					p26										
4700pF				p26					p26	p26	p26					p26										
10000pF				p26		p26	p26		p26	p26	p26	p26				p26			p26			p26				
22000pF						p26			p26		p26	p26				p26			p26			p26				
47000pF						p26			p26		p26	-				p26			p26			p26				
68000pF											p26		p26													
0.10µF	p26		p26	p26	p26	p26		p26	p26		p26	p26				p26			p26			p26				
0.22µF									p26		p26	p26	p26				p26	p26		p26	p26	p26		p26	p26	
0.47µF												p26						p26			p26		p26	p26	p26	
1.0µF														p26	p26						p26			p26		p26
2.2µF																										
4.7µF																										
10µF																										
22µF																										
33µF																										
47µF																										
100µF																										

L×W (mm)									1	0×0.	5											1	6×0.	8		
T max. (mm)			0.55					0	.6			0.0	65			0	.7						0.9			
Rated Voltage (Vdc)	10		6.3		4	35	25	16	10	6.3	4	10	6.3	25	1	.6	1	0	2.5	50	3	5		25		16
Cap. / TC Code	X5R	X7R	X6S	X5R	X7R	X5R	X6S	X6S	X7S	X5R	X5R	X5R	X6S	X5R	X6S	X5R	X7S	X6S	X6S	X5R	X6S	X5R	X7R	X6S	X5R	X7R
100pF																										
220pF																										
470pF																										
1000pF																										
2200pF																										
4700pF																										
10000pF																										
22000pF		p26																								
47000pF																										
68000pF																										
0.10µF																										
0.22µF	p26		p26	p26																						
0.47µF	p26		p26	p26																						
1.0µF	p26	p26	p26	p26	p26	p26	p26	p26	p26											p27	p27	p27	p27	p27	p27	p27
2.2µF	p26		p26	p26										p27	p27	p27	p27	p27				p27			p27	
4.7µF										p26	p27	p27	p27													
10µF																			p27							
22µF																										
33µF																										
47µF																										
100µF																										

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Capacitance Table Each number in the Part Number List refers to the page number printed at the bottom of the page.

#### $(\rightarrow \text{GRT Series High Dielectric Constant Type})$

p00 ← Part Number List

EIA: X6S X7S X5R X7R

L×W (mm)											1	L.6×0.	8											2.	0×1.2	25
T max. (mm)					0.9							0.95							1.0						1.35	
Rated Voltage (Vdc)		.6	1			6.3			4	25		.6	10	2.5	50	3			5	16	10	6.3	4	50	2	-
Cap. / TC Code	X6S	X5R	X6S	X5R	X7R	X6S	X5R	X6S	X5R	X5R	X6S	X5R	X5R	X5R	X5R	X6S	X5R	X6S	X5R	X6S	X6S	X6S	X6S	X7R	X6S	X5R
100pF																										
220pF																										
470pF																										
1000pF																										
2200pF																										
4700pF																										
10000pF																										
22000pF																										
47000pF																										
68000pF																										
0.10µF																										
0.22µF																										
0.47µF																										
1.0µF	p27	p27	p27	p27			p27	p27																p27		
2.2µF	p27			p27	p27		p27								p27	p27		p27							p27	p27
4.7µF						p27	p27	p27		p27	p27	p27					p27	p27							p27	p27
10µF							p27	p27	p27			p27	p27						p27	p27	p27					
22µF														p27								p27	p27			
33µF																										
47µF																										
100µF																										

L×W (mm)										2	.0×1.2	25											3	.2×1.	6	
T max. (mm)			1.	35							1.4							1.4	45					1.8		
Rated Voltage (Vdc)		16		1	0	6.3	50	35	2	5	16	1	0	6	.3	2	5	16	10	6.3	4		50		3	5
Cap. / TC Code	X7R	X6S	X5R	X6S	X5R	X5R	X5R	X6S	X7R	X5R	X7R	X7R	X5R	X7R	X5R	X7S	X5R	X5R	X6S	X5R	X5R	X7R	X6S	X5R	X6S	X5R
100pF																										
220pF																										
470pF																										
1000pF																										
2200pF																										
4700pF																										
10000pF																										
22000pF																										
47000pF																										
68000pF																										
0.10µF																										
0.22µF																										
0.47µF																										
1.0µF																										
2.2µF	p27	p27	p27				p27	p27	p27													p27	p27			
4.7µF		p27	p27				p27	p27			p27	p27	p27		p27											
10µF		p27	p27	p27	p27	p27				p27		p27		p27		p27								p27	p27	p27
22µF	-												p27		p27		p27	p27	p27							
33µF																										
47µF																				p27	p27					
100µF																										

# Capacitance Table Poo Each number in the Part Number List refers to the page number printed at the bottom of the page.

#### $(\rightarrow \text{GRT Series High Dielectric Constant Type})$

 p00
 ← Part Number List
 EIA:
 X65
 X75
 X5R
 X7R

L×W (mm)					(F)	.2×1.	6									3.2	×2.5				
T max. (mm)						1.8							2.2					2.7			
Rated Voltage (Vdc)		25		1	6	1	0		6.3		4	2	5	6.3	5	0	16	10		6.3	
Cap. / TC Code	X7R	X6S	X5R	X6S	X5R	X6S	X5R	X7R	X6S	X5R	X6S	X6S	X5R	X5R	X7R	X6S	X6S	X6S	X7R	X6S	X5R
100pF																					
220pF																					
470pF																					
1000pF																					
2200pF																					
4700pF																					
10000pF																					
22000pF																					
47000pF																					
68000pF																					
0.10µF																					
0.22µF																					
0.47µF																					
1.0µF																					
2.2µF																					
4.7µF															p28	p28					
10µF	p27	p27	p27									p28	p28								
22µF			p28	p28	p28	p28	p28	p28	p28	p28	p28										
33µF														p28							
47µF							p28		p28	p28	p28						p28	p28	p28	p28	
100µF																					p28

Capacitance Table

**p00** Each number in the Part Number List refers to the page number printed at the bottom of the page.

#### GCM Series Temperature Compensating Type

p00 ← Part Number List EIA: COG U2J

Murata Temperature Characteristic: X8G ZLM

T max. (mm)     O       Rated Voltage (Vdc)     S       Cap. / TC Code     COG       1.0pF     p30       2.0pF     p30       3.0pF     p30	p30 p30 p30	p30	U2J C	50 0G U2J	0.	.7 50	100	0.9 80		0×1.2		1.0			1.4			1.45	0.9	95	.2×1.6	1.0	
Rated Voltage (Vdc)     5       Cap. / TC Code     COG       1.0pF     p30       2.0pF     p30       3.0pF     p30	50 X8G <b>p30</b> <b>p30</b> <b>p30</b>	C0G p30	0 U2J C				100			FO								1.10	0				
Cap. / TC Code         COG           1.0pF         p30           2.0pF         p30           3.0pF         p30	<ul> <li>X8G</li> <li>p30</li> <li>p30</li> <li>p30</li> <li>p30</li> </ul>	C0G p30	U2J C		100	50					630	20	50	80	63	50	630	250	100	80	100	20	630
1.0pF p30 2.0pF p30 3.0pF p30	p30 p30 p30	p30			COG	COG	71 M		COG									COG U2J			COG		COG
2.0pF p30 3.0pF p30	p30 p30		-	31	cou	cou	ZLIII	cou	cou	cou	cou	cou	025	cou	cou	cou	cou		cou	cou	cou	025	coa
3.0pF p30	р30																						
	· ·	p30		31																			
		p30		31																			
4.0pF p30		p30		31																			
5.0pF p30		p30		31																			
6.0pF p30		p30		31																			
7.0pF p30		p30		31																			
8.0pF p30		p30		31																			
9.0pF p30		р30		31																			
10pF p30		p30		31							p32	p32									p32	p33	p33
12pF p30		p30		31							p32	p32									p32	p33	p33
15pF p30		p30	p	31							p32	p32									p32	p33	p33
18pF p30	p30	р30	p	31							p32	p32									p32	р33	p33
22pF p30	p30	р30	p	31							p32	p32									p32	р33	p33
27pF p30	p30	р30	p	31							p32	p32									p32	p33	p33
33pF p30	p30	p30	p	31							p32	p32									p32	р33	р33
39рF <mark>р3</mark> 0	p30	р30	p	31							p32	p32									p33	р33	р33
47pF p30	p30	р30	p	31							p32	p32									p33	p33	р33
56pF p30	p30	р30	p	31							p32	p32									p33	р33	р33
68pF <b>p30</b>	p30	р30	p	31							p32	p32									p33	р33	р33
82pF p30	p30	р30	p	31							p32	p32									p33	р33	p33
100pF p30	p30	р30	p	31	p31						p32	p32	p32								p33	р33	р33
120pF p30	p30	р30	p	31	p31						p32	p32	p32								p33	p33	p33
150pF p30	p30	p30	p	31	p31						p32	p32	p32								p33	р33	p33
180pF p30	p30	p30	p	31	p31						p32	p32	p32								p33	р33	p33
220pF p30	p30	р30	p	31	p31						p32	p32	p32								p33	р33	р33
270pF p30	p30	р30	p	31	p31						p32	p32	p32								p33	р33	p33
330pF p30	p30	р30	p	31	p31						p32	p32	p32								р33	р33	p33
390pF p30	p30	р30	p	31	p31						p32	p32	p32								p33		p33
470pF p30	p30	p30	p	31	p31						p32	p32	p32								p33		p33
560pF p30	p30	p30	p	31	p31						p32	p32	p32										p33
680pF p30	p30	p30	p	31	p31							p32	p32				p32						p33
820pF p30	p30	p30	p	31	p31							p32	p32				p32						p33
1000pF p30	p30	p30	p30 p	<mark>31</mark> p31	p31		p31					p32	p32				p32						p33
1100pF							p31																
1200pF		p30	p30 p	31 p31	p31		p31					p32	p32				p32						p33
1300pF							p31																
1500pF		p30	p31 p	31 p31	p31		p31					p32	p32										p33
1800pF		-		31 p31	p31								p32										р33 р33
2200pF				31 p31	p31							p32	p32										
2700pF				31 p31	p31							p32						p32					
3300pF				31 p31	p31													p32 p32					
3900pF				31 p31														p32 p32					
4700pF			p31	p31 p31		p31												p32 p32					
5600pF			p31	p31						p31								p32 p32					
6800pF			p31	p31						рэт р31								-p52	p32				
8200pF			p31	p31						p31									p32				
10000pF			p31 p31	p31						рэт р31									p32				
12000pF			51	p31						р31 р31									<b>P32</b>				
12000pF 15000pF								p31	p31														
								p51	psi	p31					-22								
18000pF																p32							
20000pF															p32								
22000pF														p32	p32	p32							
27000pF																							
33000pF																				p32			
39000pF																							
47000pF																		Continue					<u> </u>

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Capacitance Table

**p00** Each number in the Part Number List refers to the page number printed at the bottom of the page.

#### $(\rightarrow$ GCM Series Temperature Compensating Type)

 p00
 ← Part Number List
 EIA:
 COG
 U2J
 Murata Temperature Characteristic:
 X8G
 ZLM

p00 ← Part Number	LIST			COG	-025				прега	licure		cteris	uc: 1		2014										
L×W (mm)								×1.6										3.2×2.					4.5×		
T max. (mm)		1.0				1.2						1.8			1.0		25	1		2.			.5	2.	
Rated Voltage (Vdc)		<u> </u>	50	10			30		50		00		30										630		
Cap. / TC Code	U2J	C0G	U2J	C0G	U2J	COG	U2J	COG	U2J	C0G	U2J	C0G	U2J	C0G	U2J	U2J	U2J	U2J	U2J	U2J	U2J	U2J	U2J	U2J	U2J
1.0pF																									
2.0pF																									
3.0pF																									
4.0pF																									
5.0pF																									
6.0pF																									
7.0pF																									
8.0pF																									
9.0pF																									
10pF												-		-			-								
12pF																									
15pF																									
18pF																									
22pF																									
27pF																									
33pF																									
39pF																									
47pF																									
56pF		-																							
68pF																									
82pF		p33																							
100pF		<u> </u>																							
120pF		-																							
150pF																									
180pF		-																							
220pF												-													
270pF																									
330pF																									
390pF					p34	_																			
470pF					p34							-													
560pF				-	p34	_																			
680pF		<u> </u>		р34	p34																				
820pF		1.2								p34	р34	_													
1000pF		р34								p34	p34														
1100pF																									
1200pF	p33	p34													р34	p34									
1300pF																									
1500pF															p34			p34							
1800pF															p34					р34 р34					
2200pF	p33					p34		1							p34					p34					
2700pF			p34			p34	p34															p34			
3300pF		p34	p34				p34					p34										p34			
3900pF		p34	p34										p34											p34	
4700pF		p34	p34										p34											p34	
5600pF		p34	p34														p34								
6800pF		p34							p34										p34						
8200pF								p34	p34												р34 р34				
10000pF								p34	p34												p34	1			
12000pF								p34															p34		
15000pF														p34											р34 р34
18000pF																									p34
20000pF																									
22000pF																									p34
27000pF																									
33000pF																									
39000pF																									
47000pF						1						1													

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Murata Temperature Characteristic: X8G ZLM

## Capacitance Table

p00 Each number in the Part Number List refers to the page number printed at the bottom of the page.

#### mpensating Type)

GCM Series Te				
00 ← Part Number	List		EIA:	C0G
L×W (mm)		5.7		
T max. (mm)	1			.0
	1000			
Cap. / TC Code	U2J	U2J	U2J	U2J
1.0pF				
2.0pF				
3.0pF				
4.0pF				
5.0pF				
6.0pF 7.0pF				
8.0pF				
9.0pF				
10pF				
10pr 12pF				
15pF				
13pr 18pF				
22pF				
22pi 27pF				
33pF				
39pF				
47pF				
56pF				
68pF				
100pF				
120pF				
150pF				
180pF				
220pF				
270pF				
330pF				
390pF				
470pF				
560pF				
680pF				
820pF				
1000pF				
1100pF				
1200pF				
1300pF				
1500pF				
1800pF				
2200pF				
2700pF 3300pF				
3300pF 3900pF				
4700pF				
4700pF 5600pF	p34			
6800pF	р34 р34			
8200pF 8200pF	-p54		р34	
10000pF			р34 р34	
12000pF			-p34	
12000pF 15000pF				
18000pF 18000pF				
20000pF				
20000pF 22000pF				
22000pF 27000pF		p34		
33000pF		1.0.1		p34
39000pF				р34 р34
47000pF				

Capacitance Table Each number in the Part Number List refers to the page number printed at the bottom of the page.

#### GCM Series High Dielectric Constant Type

 p00
 ← Part Number List
 EIA:
 X7S
 X7R
 Murata Temperature Characteristic:
 X8L

L×W (mm)	C	).6×0.	3				1.0	×0.5					1	6×0.	8						2.0×	1.25				
T max. (mm)		0.33				0.	55			0.6	0.7			0.9			0.7		0.	95				1.4		
Rated Voltage (Vdc)	25	16	10	100	5	0	2	5	16	10	10	100	50	25	16	6.3	100	100	50	25	16	100	50		35	
Cap. / TC Code	X7R	X7R	X7R	X7R	X8L	X7R	X8L	X7R	X7R	X7S	X7S	X7R	X7R	X7R	X7R	X7R	X7R	X7R	X7R	X7R	X7R	X7R	X7R	X8L	X7R	X7S
100pF	p35																									
150pF	p35																									
220pF	p35			p35		р35																				
330pF	p35	p35		p35		р35																				
470pF	p35			p35		р35																				
680pF	p35	p35		p35		p35																				
1000pF	p35			p35		p35						p35														
1500pF	p35			p35		p35						p35														
2200pF	p35	p35		p35		p35						p35														
3300pF	p35	p35		p35		p35						p35														
4700pF			p35	p35		р35						p35														
6800pF			p35			p35						p35					p35									
10000pF			p35			p35		p35				p35					p35									
15000pF						p35		p35				p35					p35									
22000pF						p35		p35				p35					p35									
33000pF					p35	p35	1	p35	p35									p35								
47000pF					p35	p35		p35	p35													р35				
68000pF					p35	p35			p35													р35				
0.10µF					p35	p35	p35		p35													р35				
0.15µF									p35																	
0.22µF									p35				p35	p35									р36	р36		
0.33µF															р35				p35							
0.47µF										p35				p35	p35					p35			р36			
0.68µF											p35										p35				р36	
1.0µF											p35			p35	p35						p35		p36		р36	
1.5µF																									р36	
2.2µF																p35										р36
4.7µF																										
10µF																										
22µF																										
47µF																										

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Capacitance Table P00 Each number in the Part Number List refers to the page number printed at the bottom of the page.

#### $(\rightarrow$ GCM Series High Dielectric Constant Type)

 p00
 ← Part Number List
 EIA:
 X7S
 X7R
 Murata Temperature Characteristic:
 X8L

L×W (mm)						2.0×	1.25											3.2×1	L.6						3.2×2.5
T max. (mm)			1.	.4					1.	45			1.	25				:	1.8					1.9	2.2
Rated Voltage (Vdc)	2	25	16	1	0	6.3	100	3	5	2	25	16	100	50		100		50		25	16	10	6.3	25	100
Cap. / TC Code	X8L	X7R	X7R	X7R	X7S	X7R	X7S	X8L	X7S	X8L	X7S	X7S	X7R	X7R	X8L	X7R	X7S	X7R X	<7S	X7R	X7R	X7R	X7R	X7S	X8L X75
100pF																									
150pF																									
220pF																									
330pF																									
470pF																									
680pF																									
1000pF																									
1500pF																									
2200pF																									
3300pF																									
4700pF																									
6800pF																									
10000pF																									
15000pF																									
22000pF																									
33000pF																									
47000pF																									
68000pF																									
0.10µF																									
0.15µF	р36	p36																							
0.22µF		р36											р36												
0.33µF		р36												р36											
0.47µF														р36											
0.68µF		р36												р36											
1.0µF		р36					р36									р36									
1.5µF		р36																							
2.2µF		р36	p36	р36											p36		р36	р36							
4.7µF			р36		р36			p36	р36	p36	р36							F	536	р36	p36				р36 р36
10µF				p36		p36						р36									p36	р36		p36	
22µF	1																					р36	p36		
47µF																									

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## Capacitance Table

p00 Each number in the Part Number List refers to the page number printed at the bottom of the page.

#### $(\rightarrow$ GCM Series High Dielectric Constant Type)

p00 ← Part Number	List		EIA:	X7S	X7R		Mura	ta Ter	npera	ture (	Chara	cteristic:	X8L
L×W (mm)					3	8.2×2.	5						
T max. (mm)	2.2				2	.7				2.	85		
Rated Voltage (Vdc)	16		50		35	25	16	10	6.3	2	:5		
Cap. / TC Code	X7R	X8L	X7R	X7S	X7S	X7R	X7R	X7R	X7R	X8L	X7S		
100pF													
150pF													
220pF													
330pF													
470pF													
680pF													
1000pF													
1500pF													
2200pF													
3300pF													
4700pF													
6800pF													
10000pF													
15000pF													
22000pF													
33000pF													
47000pF													
68000pF													
0.10µF													
0.15µF	1												
0.22µF													
0.33µF													
0.47µF													
0.68µF													
1.0µF													
1.5µF													
2.2µF													
4.7µF			р36										
10µF	р36	p36		р36	р36	р36							
22µF							р36	p36		p36	р36		
47µF									р36				

#### GC3 Series High Dielectric Constant Type

p00 ← Part Number List EIA: X7T

L×W (mm)	2.0*	1 2 5				32	×1.6					1	3.2×2.	5			45	×3.2				5.7×5.	า	
T max. (mm)		1		.0		1.25	.1.0		1.8		1			2.0		1.5	5	2.0			2.0		-	.7
Rated Voltage (Vdc)				-	620		250	620	-	250			620		250		620	-	250	620		250		
Cap. / TC Code			X/1	X/1		X/1	X/1	X/1	X/1	X/1	X/1	X/1	X/1	X/1	X/1	X/1	X/1	X/1	X/1	X/1	X/1	X/1	X/I	X/1
10000pF	р38		p38		p38																			
15000pF	р38		р38					p38																
22000pF		p38				p38					p38													
33000pF				р38		р38							р38											
47000pF							р38		р38				р38											
68000pF										p38				р38			р38							
0.10µF												p38		p38						p38				
0.15µF															р38			р38		р38				
0.22µF																р38					р38		р38	
0.33µF																			p38		p38			
0.47µF																					p38	p38		
0.68µF																						p38		
1.0µF							1											1						р38

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Capacitance Table P00 Each number in the Part Number List refers to the page number printed at the bottom of the page.

#### GCJ Series High Dielectric Constant Type

p00 ← Part Number List

EIA: X7S X7R X8R

Murata Temperature Characteristic: X8L X8M

L×W (mm)								1.6	×0.8													2	.0×1.2	25					
T max. (mm)							0.9								1.0			0.7			0.9	95		1.0			1.45		
Rated Voltage (Vdc)		100			50		35	2	25	1	.6	10	6.3		6.3		100	50	25	100	50	25	16	250	250	100	5	0	35
Cap. / TC Code	X8L		X7R	X8L		X7R	X8L		X7R			<u> </u>		X8L		X7S									<u> </u>		X8L		
220pF	-							-												p41									
270pF																				p41									
330pF																		p41	İ	p41									
390pF																		p41		p41									
470pF																		p41	p41	p41									
560pF																		p41	p41	p41									
680pF																		p41	p41	p42									
820pF																		p41	p41	p42									
1000pF		p40	p40	p40	1	p40	i –		p41	i							p41		P	P				p42	i -				
1200pF		p40	p40	p40		p40			p41								p41							P					
1500pF		p40	р40 р40	p40		p40			p41								p41							p42	i				
1800pF		p40	р40 р40	p40		p40			p41								p41							P-12					
2200pF		р40 р40	р40 р40	p40		p40			p41								p41							p42	i i				
2700pF		p40	р40 р40	p40		p40			p41								p41							P72	-				
		р40 р40	р40 р40	p40		p40 p40			-								p41							p42	i				
3300pF		р40 р40	р40 р40	р40 р40		р40 р40			р41 р41								р41 р41							P4Z					
3900pF		р40 р40	р40 р40	р40 р40	p40	р40 р40			p41 p41								p41 p41							p42					
4700pF		-	-	<u> </u>	p40				-								p41 p41							P42					
5600pF		p40	р40 р40	p40		р40 р40			p41								р41 р41							p42					
6800pF		p40		p40		-			p41								р41 р41							p42					
8200pF		p40	p40	p40		p40			p41		- 44																		
10000pF		p40	p40	p40	p40	p40			p41		p41						p41								p42				
12000pF		p40	p40	p40		p40			p41								p41												
15000pF		p40	p40	p40		p40			p41								p41								p42				
18000pF		p40	p40	p40		p40			p41				1				p41												
22000pF		p40	p40	p40		p40			p41								p41								p42				
27000pF		p40						-	p41		p41									p42	p42						p42		
33000pF		p40				p40	<u> -</u>	+	p41	p41	p41									p42	p42						p42		
39000pF		p40				p40	p40	p40		p41	p41		-							p42	p42						p42		
47000pF		p40				p40		_	p41	p41	p41															p42		p42	
56000pF		p40				p40	<u> </u>	<u> </u>	p41	p41	p41															p42	p42	p42	
68000pF		p40				p40	p40	· ·	p41	p41	p41															p42	p42	p42	
82000pF						p40		p40	p41	p41	p41															p42	p42	p42	
·	p40		p40		p40	p40			p41	p41	p41															p42	p42	p42	
0.12µF					p40				p41	p41	p41	p41																p42	p42
0.15µF				p40		p40		p40			p41																	p42	
0.18µF					p40			p40			p41	p41																p42	
0.22µF				p40	p40	p40		p40	p41	p41	p41	p41																p42	p42
0.27µF											p41																		
0.33µF								p41			p41										p42	p42							p42
0.39µF								p41			p41																		
0.47µF								p41			p41											p42						p42	p42
0.56µF																													
0.68µF																							р42 р42						
0.82µF																							p42						
1.0µF									p41														p42					p42	
1.5µF																													
2.2µF													p41																
3.3µF														p41		p41													
4.7µF															p41	p41													
6.8µF																													
10µF																													
22µF																													
47µF													1																

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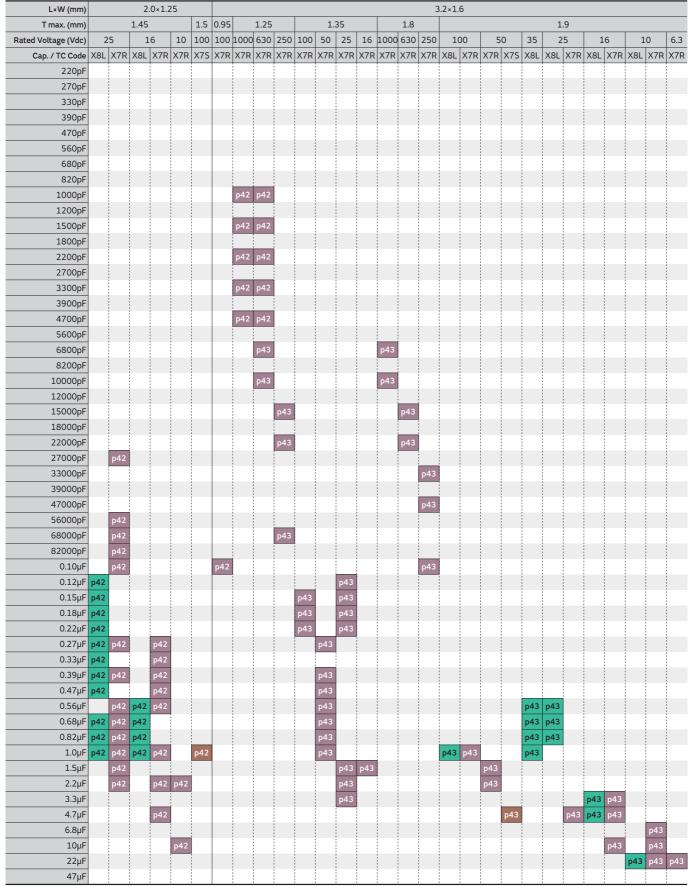
# Capacitance Table Each number in the Part Number List refers to the page number printed at the bottom of the page.

#### $(\rightarrow$ GCJ Series High Dielectric Constant Type)

p00 ← Part Number List

EIA: X7S X7R X8R

Murata Temperature Characteristic: X8L X8M



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# Capacitance Table Each number in the Part Number List refers to the page number printed at the bottom of the page.

#### $(\rightarrow$ GCJ Series High Dielectric Constant Type)

p00 ← Part Number List

EIA: X7S X7R X8R

Murata Temperature Characteristic: X8L X8M

L×W (mm)	3.2×1.6								3.2	<2.5									4	l.5×3.	2		5	.7×5.0	C
T max. (mm)	2.0	1	5		2.0			2.3				2	.8			2	85	1	.5		2.0			2.0	
Rated Voltage (Vdc)	25		250	1000		250		100		5	50	25		.6	6.3		25			1000		250	1000		250
Cap. / TC Code							X8L		X7S													X7R			
220pF									_																
 270pF																									
330pF																									
390pF																									
470pF																									
560pF																									
680pF																									
820pF																									
1000pF																									
1200pF																									
1500pF																									
1800pF																									
2200pF																									
2700pF																									
3300pF																									
3900pF																									
4700pF																									
5600pF																									
6800pF		p43																							
8200pF 8200pF		p=3																							
10000pF		p43																							
		P43																							
12000pF 15000pF				p43	p43																				
15000pF 18000pF				p43	-p43																				
22000pF				p43	p43																				
22000pF 27000pF				p43	P43																				
33000pF					p43															p43	- 42				
39000pF					p43															p43	p43				
47000pF					p43															p43	p43				
56000pF			10															10					10		
68000pF			p43															p43					p43		
82000pF						10																	10	40	
0.10µF						p43															p43		p43	p43	
0.12µF																									
0.15µF			p43																p43					p43	
0.18µF																									
0.22µF						p43																p43		p44	
0.27µF																									
0.33µF																						p43			p44
0.39µF																									
0.47µF																						p43			p44
0.56µF																									
0.68µF																									p44
0.82µF																									
1.0µF																									p44
1.5µF																									
2.2µF							p43	p43																	
3.3µF																									
4.7µF									p43	p43		p43													
6.8µF													p43												
	<b>p43</b> p43										p43		p43												
22µF														p43		p43	p43								
47µF															p43										

Capacitance Table

p00 Each number in the Part Number List refers to the page number printed at the bottom of the page.

#### GCD Series High Dielectric Constant Type

p00 ← Part Number	List		EIA:	X7R			
L×W (mm)	1	6×0.	8		2.0×	1.25	
T max. (mm)		0.9		0.7	0.95	1.	.4
Rated Voltage (Vdc)	100	50	25	100	100	100	50
Cap. / TC Code	X7R	X7R	X7R	X7R	X7R	X7R	X7R
1000pF	p46	p46		p46			
1200pF	p46	p46		p46			
1500pF	p46	p46		p46			
1800pF	p46	p46		p46			
2200pF	p46	p46		p46			
2700pF	p46	p46		p46			
3300pF	p46	p46		p46			
3900pF	p46	p46		p46			
4700pF	p46	p46		p46			
5600pF	p46	p46		p46			
6800pF	p46	p46			p46		
8200pF	p46	p46				p46	
10000pF	p46	p46				p46	
12000pF	p46	p46				p46	
15000pF	p46	p46				p46	p46
18000pF	p46	p46				p46	p46
22000pF	p46	p46				p46	p46
27000pF			p46			p46	p46
33000pF			p46			p46	p46
39000pF			p46			p46	p46
47000pF			p46			p46	p46
56000pF						p46	p46
68000pF						p46	p46
82000pF						p46	p46
0.10µF						p46	p46

#### GCE Series High Dielectric Constant Type

p00 ← Part Number	List		EIA:	X7R			
L×W (mm)	1	6×0.	8		2.0×	1.25	
T max. (mm)		0.9		0.7	0.95	1.4	45
Rated Voltage (Vdc)	100	50	25	100	100	100	50
Cap. / TC Code	X7R	X7R	X7R	X7R	X7R	X7R	X7R
220pF					p48		
270pF					p48		
330pF					p48		
390pF					p48		
470pF					p48		
560pF					p48		
680pF					p48		
820pF					p48		
1000pF	p48	p48		p48			
1200pF	p48	p48		p48			
1500pF	p48	p48		p48			
1800pF	p48	p48		p48			
2200pF	p48	p48		p48			
2700pF	p48	p48		p48			
3300pF	p48	p48		p48			
3900pF	p48	p48		p48			
4700pF	p48	p48		p48			
5600pF	p48	p48		p48			
6800pF	p48	p48			p48		
8200pF	p48	p48				p48	
10000pF	p48	p48				p48	
12000pF	p48	p48				p48	
15000pF	p48	p48				p48	p48
18000pF	p48	p48				p48	p48
22000pF	p48	p48				p48	p48
27000pF			p48			p48	p48
33000pF			p48			p48	p48
39000pF			p48			p48	p48
47000pF			p48			p48	p48
56000pF						p48	p48
68000pF						p48	p48
82000pF						p48	p48
0.10µF						p48	p48

#### **NFM Series**



L×W (mm)	2.	0×1.2	25	3.2,	1.6
T max. (mm)		0.95		1	.5
Rated Voltage (Vdc)	50	16	10	100	50
Cap. / TC Code	-	-	-	-	-
220pF	p50				
470pF	p50				
1000pF	p50				
2200pF	p50				
10000pF				p50	p50
15000pF					p50
22000pF	p50				p50
0.10µF			p50		p50
0.22µF			p50		
0.47µF			p50		
1.0µF		p50			

Capacitance Table Each number in the Part Number List refers to the page number printed at the bottom of the page.

#### KCM Series High Dielectric Constant Type

L×W (mm)										6	.1×5.	3									
T max. (mm)			3.0					3.	.9				5.	.0				6.	.7		
Rated Voltage (Vdc)	100	63	50	35	25	100	63	50	35	2	5	100	50	35	25	100	63	50	35	2	5
Cap. / TC Code	X7R	X7S	X7R	X7S																	
4.7µF	p53	p53	p53																		
6.8µF						p53															
10µF			p53	p53		p53	p53					p53									
15µF				p53	p53											p53					
17µF								p53	p53												
22µF									p53	p53			p53	p53		p53	p53				
33µF										p53				p53	p53			p53			
47µF											p53								p53	p53	
68µF																				p53	
100µF																					p53

#### KC3 Series High Dielectric Constant Type

p00 ← Part Number	List		EIA:	X7T								
L×W (mm)						6.1,	×5.3					
T max. (mm)		3.0			3.9			5.0			6.7	
Rated Voltage (Vdc)	630	450	250	630	450	250	630	450	250	630	450	250
Cap. / TC Code	X7T	X7T	X7T	X7T	X7T	X7T	X7T	X7T	X7T	X7T	X7T	X7T
0.10µF	p56											
0.15µF	p56											
0.22µF		p56		p56								
0.27µF				p56								
0.33µF	p56	p56										
0.47µF	p56	p56	p56							p56		
0.56µF				p56	p56					p56		
0.68µF		p56	p56				p56	p56				
1.0µF					p56	p56	p56	p56				
1.2µF										p56	p56	
1.5µF								p56	p56			
2.2µF											p56	p56

#### KCA Series Temperature Compensating Type

p00 ← Part Number	List	l	EIA:	U2J
L×W (mm)		6.1	×5.3	
T max. (mm)	3.0	3.9	5.0	6.7
Rated Voltage (Vac (r.m.s.))	250	250	250	250
Cap. / TC Code	U2J	U2J	U2J	U2J
100pF	p59			
150pF	p59			
220pF	p59			
330pF	p59			
470pF	p59			
680pF	p59			
1000pF	p59			
1500pF	p59			
2200pF	p59			
3300pF	p59			
4700pF		p59		
6800pF			p59	
10000pF				p59

#### GCG Series Temperature Compensating Type

p00 ← Part Number List Murata Temperature Characteristic: X8G

L×W (mm)	1.0× 0.5	1.6× 0.8	2.0×	1.25
T max. (mm)	0.55	0.9	0.7	0.95
Rated Voltage (Vdc)	50	50	50	50
Cap. / TC Code	X8G	X8G	X8G	X8G
10pF		p61		
12pF		p61		
15pF		p61		
18pF		p61		
22pF		p61		
27pF		p61		
33pF		p61		
39pF		p61		
47pF		p61		
56pF		p61		
68pF		p61		
82pF		p61		
100pF		p61		
120pF	p61	p61		
150pF	p61	p61		
180pF	p61	p61		
220pF	p61	p61		
270pF	p61	p61		
330pF	p61	p61		
390pF	p61	p61		
470pF	p61	p61		
560pF		p61		
680pF		p61		
820pF		p61		
1000pF		p61	p61	
1200pF		p61	p61	
1500pF		p61	p61	
1800pF		p61	p61	
2200pF		p61	p61	
2700pF			p61	
3300pF			p61	
3900pF			p61	
4700pF			p61	
5600pF				p61
6800pF				p61
8200pF				p61
10000pF				p61

Capacitance Table P00 Each number in the Part Number List refers to the page number printed at the bottom of the page.

#### GCG Series High Dielectric Constant Type

p00 ← Part Number List

EIA: X7S X7R X8R

Murata Temperature Characteristic: X8L

L×W (mm)		1	1.0×0.	5						1	L.6×0.	8									2.0×	1.25				
T max. (mm)			0.55								0.9						0.95					1.45				
Rated Voltage (Vdc)	50	2	25	1	6	100		50		2	:5		16		10	6.3	50	100		50		3	5		25	
Cap. / TC Code	X7R	X8L	X7R	X8L	X7R	X8R	X8L	X8R	X7R	X8R	X7R	X8L	X8R	X7R	X7R	X7R	X8R	X7R	X8L	X8R	X7R	X8L	X7R	X8L	X8R	X7R
220pF	p62						p62																			
270pF	p62						p62																			
330pF	p62						p62																			
390pF	p62						p62																			
470pF							p62																			
560pF	p62						p62																			
680pF	p62						p62																			
820pF							p62																			
1000pF						p62	p62			p63																
1200pF	p62					p62	p62	p62		p63																
1500pF	p62					p62	p62	p62		p63																
1800pF	p62					p62	p62			p63																
2200pF						p62	p62	p62		p63																
2700pF	p62					p62	p62	p62		p63																
3300pF	p62					p62	p62	p62		p63																
3900pF						p62	p62	p62		p63																
4700pF	p62					p62		p62		p63																
5600pF		p62	p62			p62		p63		p63																
6800pF		p62	p62			p62	p62	p63		p63																
8200pF		p62	p62			p62	p62	p63		p63																
10000pF		p62	p62			p62	p62	p63	p63	p63								p63								
12000pF						p62	p62																			
15000pF				p62	p62	p62		p63	p63	p63																
18000pF				p62	p62	p62	p62										p63									
22000pF				p62	p62	p62	p62	p63	p63	p63																
27000pF				p62	p62	p62			p63										p63							
33000pF				p62	p62	p62		p63	p63	p63									p63							
39000pF				p62	p62	p62			p63										p63						p63	
47000pF				p62	p62	p62		p63	p63	p63									p63							
56000pF					p62	p62			p63											p63						
68000pF					p62	p62			p63	p63			p63							p63						
82000pF					p62				p63																p63	
0.10µF					p62	p62		p63	p63				p63						p63	p63				p63		
0.12µF								p63		1	p63															
0.15μF 0.18μF							p62	р63 р63	р63	1	р63 р63	p63									р63 р63				р63 р63	
0.18μr 0.22μF							p62		p63		рөз р63	-62													рөз р63	
0.22μF 0.27μF							poz	pos	-po3		p03	P03									p63					p63
0.27μF 0.33μF										p63											p63			p63		р63
0.39µF										р63											pos			pos		p63
0.33μF 0.47μF										р63											p63					p63
0.56µF										-p05											905					p63
0.56µF																						p63	p63		p63	p63
0.82µF																						233	<b>P</b> 05			p63
1.0µF												p63		p63					p63		p63	p63	p63			p63
1.2µF														100					100		100		100		100	p.03
1.5µF																										
2.2µF															p63	p63										
3.3µF															100											
3.9µF																										
4.7µF																										
6.8µF																										
10µF																										
22µF																										
47µF																										
τιμι			:	:								<u> </u>			!			!		!	:					



# Capacitance Table P00 Each number in the Part Number List refers to the page number printed at the bottom of the page.

#### $(\rightarrow$ GCG Series High Dielectric Constant Type)

p00 ← Part Number List

EIA: X7S X7R X8R

Murata Temperature Characteristic: X8L

L×W (mm)		2.	.0×1.2	25					9	3.2×1.0	6							3.2	×2.5			
T max. (mm)			1.45				1.	35				1.9			2.3				2.8			
Rated Voltage (Vdc)	1	.6	10	6	.3	50	2	5	16	2	5	1	6	6.3	25	5	0	3	5	25	16	6.3
Cap. / TC Code	X8L	X7R	X7R	X8L	X7R	X8R	X8R	X7R	X8L	X8R	X7R	X8L	X8R	X7R	X7R	X8L	X7S	X8L	X7S	X7R	X8R	X7R
220pF																						
270pF																						
330pF																						
390pF																						
470pF																						
560pF																						
680pF																						
820pF																						
1000pF																						
1200pF																						
1500pF																						
1800pF																						
2200pF																						
2700pF																						
3300pF																						
3900pF																						
4700pF																						
5600pF																						
6800pF																						
8200pF																						
10000pF																						
12000pF																						
15000pF																						
18000pF																						
22000pF																						
27000pF																						
33000pF																						
39000pF																						
47000pF																						
56000pF																						
68000pF																						
82000pF																						
0.10µF																						
0.12µF																						
0.15µF							p64															
0.18µF																						
0.22µF						p64	p64															
0.27µF																						
0.33µF						p64	p64															
0.39µF																						
0.47µF																						
0.56µF	p63																					
0.68µF	p63									p64			p64									
0.82µF	p63																					
1.0µF								p64	p64				p64									
1.2µF								p64														
1.5µF								p64	p64													
2.2µF								p64														
3.3µF											p64	p64			p64							
3.9µF											p64											
4.7µF		p64									p64	p64								p64		
6.8µF																					p64	
10µF			p64	p64	p64											p64	p64	p64	p64	p64	р64	
22µF														p64								
47µF																						p64
							!		!					!			!	<u> </u>		!		



A Note
 • Please read rating and A CAUTION (for storage, operating, rating, soldering, mounting and handling) in this catalog to prevent smoking and/or burning, etc.
 • This catalog has only typical specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.

C03E.pdf Jun 22.2017

# **Search Capacitors**

Specifications and Test Methods, Package, Chart of Characteristic Data, please refer to the search web page. http://www.murata.com/en-global/products/capacitor

GRT Series Temperature Compensating 1.0×0.5mm

0.25pF GRT1555

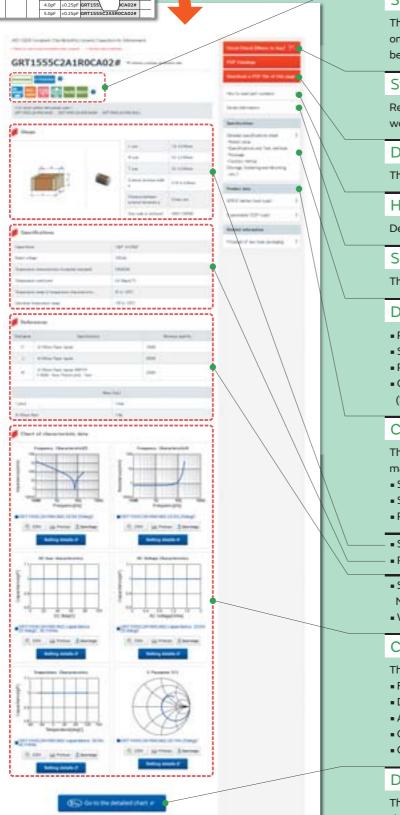
0.25p GRT155 A2R0 A02# CA02#

CA02#

2.0pF

3.0pF

Links are provided to the product detail pages on the web, and are shown below in the product number table from the PDF version of the catalog which is available on the web.



#### Status and Features Icons

The status and features of products can be checked at once. When 😮 is clicked, a description of each icon will be displayed

#### Stock Check (Where to buy)

Reference inventory information from agents and web-based companies.

#### Data Sheet

The product details page can be output in PDF.

How to read part numbers

Describes the meaning of the part number

#### Series Information

This links to the introduction page of each series.

#### **Detailed Specifications Sheet**

- Rated value
- Specifications and Test Methods
- Package
- Caution, Notice (Storage, Soldering and Mounting, ....etc.)

#### **Characteristics Data**

The following characteristics data of the main products can be acquired.

- SPICE Netlist (mod type)
- S parameter (S2P type)
- Reliability Test Data \*Typical data

#### Shape (Dimensions)

Rated Values

Specification by Packaging Code/ Minimum Order Quantity

Weight (1 pc/ø180mm reel)

#### Chart of Characteristic Data

The main products published characteristic data.

- Frequency characteristics (ESR, Impedance)
- DC bias characteristics
- AC voltage characteristics
- Capacitance temperature characteristics
- Calorific property by ripple current

#### Design Tools SimSurfing

The SimSurfing design tools are useful for displaying the graph, downloading CSV data and overwriting the product number graph.



**GRT** Series

AEC-Q200 Compliant Chip Multilayer Ceramic Capacitors for Infotainment







# Capacitor meet AEC-Q200 (Grade2 or Grade3).

#### Features

#### 1 This product has clearded test conditions meet AEC-Q200.

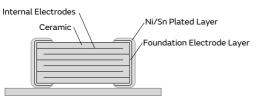
This series is designed for use in Car Multimedia, Car Interior, Car Comfort application and General Electronic equipment. It is not appropriate for use in applications critical to passenger safety and car driving function (e.g. ABS, AIRBAG, etc.). Please use the GCM series is in critical applications.

	General Purpose GRM Series Maximum operating temperature: <b>125°C</b>	AEC-Q200 meeted GRT Series Maximum operating temperature: <b>125°C</b>
Items	Test Method	Test Method
Temperature Cycle	Temperature Cycle: 5 cycles	Temperature Cycle: 1,000 cycles
Humidity Loading	Test temperature: <b>40±2°C</b> Test humidity: <b>90 to 95%RH</b> Test time: 500 hours	Test temperature: <b>85±2°C</b> Test humidity: <b>80 to 85%RH</b> Test time: 1,000 hours

#### 2 Meet AEC-Q200 (Grade2 or Grade3).

105°C product: Grade2. 85°C product: Grade3.

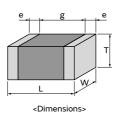
#### 3 Sn plating is applied to the external electrodes; excellent solderability.



<Example of Structure>

#### Specifications

Size	0.6×0.3mm to 3.2×2.5mm
Rated Voltage	2.5Vdc to 100Vdc
Capacitance	0.50pF to 100µF
Main Applications	Such as Information and Comfort equipment, car navigation, communication module and entertainment system



**GCG** Series

## muRata

# GRT Series Temperature Compensating Type 📰 🐯 Part Number List

#### 1.0×0.5mm

T max.         Rated Voltage         TC Code         Cap.         Tol.         Part Number           0.55mm         100Vdc         COG         1.0pF         ±0.25pF         GRT1555C2A1R0CA02#         2.0pF         ±0.25pF         GRT1555C2A2R0CA02#         3.0pF         ±0.25pF         GRT1555C2A3R0CA02#         4.0pF         ±0.25pF         GRT1555C2A3R0CA02#         5.0pF         ±0.25pF         GRT1555C2A4R0CA02#         4.0pF         ±0.25pF         GRT1555C2A4R0CA02#         5.0pF         ±0.25pF         GRT1555C2A4R0CA02#         4.0pF         ±0.25pF         GRT1555C2A4R0CA02#         6.0pF         ±0.5pF         GRT1555C2A4R0CA02#         4.0pF         ±0.5pF         GRT1555C2A4R0CA02#         6.0pF         ±0.5pF         GRT1555C2A4R0DA02#         6.0pF         ±0.5pF         GRT1555C2A100JA02#         10pF         ±5%         GRT1555C2A120JA02#         12pF         ±5%         GRT1555C2A120JA02#         15pF         15pF         15pF         50.5pF         GRT1555C2A120JA02#	Part Number	~ 1		тс	Pated	Ŧ
2.0pF       ±0.25pF       GRT1555C2A2R0CA02#         3.0pF       ±0.25pF       GRT1555C2A3R0CA02#         4.0pF       ±0.25pF       GRT1555C2A4R0CA02#         5.0pF       ±0.25pF       GRT1555C2A4R0CA02#         6.0pF       ±0.25pF       GRT1555C2A6R0DA02#         7.0pF       ±0.5pF       GRT1555C2A6R0DA02#         8.0pF       ±0.5pF       GRT1555C2A6R0DA02#         9.0pF       ±0.5pF       GRT1555C2A8R0DA02#         9.0pF       ±0.5pF       GRT1555C2A8R0DA02#         10pF       ±5%       GRT1555C2A100JA02#         12pF       ±5%       GRT1555C2A120JA02#		I Ol.	Cap.			
3.0pF       ±0.25pF       GRT1555C2A3R0CA02#         4.0pF       ±0.25pF       GRT1555C2A4R0CA02#         5.0pF       ±0.25pF       GRT1555C2A5R0CA02#         6.0pF       ±0.5pF       GRT1555C2A6R0DA02#         7.0pF       ±0.5pF       GRT1555C2A7R0DA02#         8.0pF       ±0.5pF       GRT1555C2A8R0DA02#         9.0pF       ±0.5pF       GRT1555C2A8R0DA02#         10pF       ±5%       GRT1555C2A100JA02#         12pF       ±5%       GRT1555C2A120JA02#	 GRT1555C2A1R0CA02#	±0.25pF	1.0pF	COG	100Vdc	0.55mm
4.0pF       ±0.25pF       GRT1555C2A4R0CA02#         5.0pF       ±0.25pF       GRT1555C2A5R0CA02#         6.0pF       ±0.5pF       GRT1555C2A6R0DA02#         7.0pF       ±0.5pF       GRT1555C2A7R0DA02#         8.0pF       ±0.5pF       GRT1555C2A3R0DA02#         9.0pF       ±0.5pF       GRT1555C2A3R0DA02#         10pF       ±5%       GRT1555C2A100JA02#         12pF       ±5%       GRT1555C2A120JA02#	 GRT1555C2A2R0CA02#	±0.25pF	2.0pF			
5.0pF       ±0.25pF       GRT1555C2A5R0CA02#         6.0pF       ±0.5pF       GRT1555C2A6R0DA02#         7.0pF       ±0.5pF       GRT1555C2A7R0DA02#         8.0pF       ±0.5pF       GRT1555C2A8R0DA02#         9.0pF       ±0.5pF       GRT1555C2A9R0DA02#         10pF       ±5%       GRT1555C2A100JA02#         12pF       ±5%       GRT1555C2A120JA02#	GRT1555C2A3R0CA02#	±0.25pF	3.0pF			
6.0pF         ±0.5pF         GRT1555C2A6R0DA02#           7.0pF         ±0.5pF         GRT1555C2A7R0DA02#           8.0pF         ±0.5pF         GRT1555C2A8R0DA02#           9.0pF         ±0.5pF         GRT1555C2A8R0DA02#           10pF         ±5%         GRT1555C2A100JA02#           12pF         ±5%         GRT1555C2A120JA02#	GRT1555C2A4R0CA02#	±0.25pF	4.0pF			
7.0pF       ±0.5pF       GRT1555C2A7R0DA02#         8.0pF       ±0.5pF       GRT1555C2A8R0DA02#         9.0pF       ±0.5pF       GRT1555C2A9R0DA02#         10pF       ±5%       GRT1555C2A100JA02#         12pF       ±5%       GRT1555C2A120JA02#	GRT1555C2A5R0CA02#	±0.25pF	5.0pF			
8.0pF         ±0.5pF         GRT1555C2A8R0DA02#           9.0pF         ±0.5pF         GRT1555C2A9R0DA02#           10pF         ±5%         GRT1555C2A100JA02#           12pF         ±5%         GRT1555C2A120JA02#	GRT1555C2A6R0DA02#	±0.5pF	6.0pF			
9.0pF         ±0.5pF         GRT1555C2A9R0DA02#           10pF         ±5%         GRT1555C2A100JA02#           12pF         ±5%         GRT1555C2A120JA02#	GRT1555C2A7R0DA02#	±0.5pF	7.0pF			
10pF         ±5%         GRT1555C2A100JA02#           12pF         ±5%         GRT1555C2A120JA02#	 GRT1555C2A8R0DA02#	±0.5pF	8.0pF			
12pF ±5% <b>GRT1555C2A120JA02#</b>	 GRT1555C2A9R0DA02#	±0.5pF	9.0pF			
	 GRT1555C2A100JA02#	±5%	10pF			
	 GRT1555C2A120JA02#	±5%	12pF			
15pr ±5% GR11555C2A150JA02#	 GRT1555C2A150JA02#	±5%	15pF			
18pF ±5% <b>GRT1555C2A180JA02#</b>	GRT1555C2A180JA02#	±5%	18pF			
22pF ±5% GRT1555C2A220JA02#	 GRT1555C2A220JA02#	±5%	22pF			
27pF ±5% GRT1555C2A270JA02#	 GRT1555C2A270JA02#	±5%	27pF			
33pF ±5% GRT1555C2A330JA02#	 GRT1555C2A330JA02#	±5%	33pF			
39pF ±5% GRT1555C2A390JA02#	 GRT1555C2A390JA02#	±5%	39pF			
47pF ±5% GRT1555C2A470JA02#	 GRT1555C2A470JA02#	±5%	47pF			
56pF ±5% <b>GRT1555C2A560JA02#</b>	 GRT1555C2A560JA02#	±5%	56pF			
68pF ±5% GRT1555C2A680JA02#	 GRT1555C2A680JA02#	±5%	68pF			
82pF ±5% GRT1555C2A820JA02#	 GRT1555C2A820JA02#	±5%	82pF			
100pF ±5% <b>GRT1555C2A101JA02#</b>	 GRT1555C2A101JA02#	±5%	100pF			
50Vdc C0G 1.0pF ±0.25pF <b>GRT1555C1H1R0CA02#</b>	GRT1555C1H1R0CA02#	±0.25pF	1.0pF	COG	50Vdc	
2.0pF ±0.25pF GRT1555C1H2R0CA02#	 GRT1555C1H2R0CA02#	±0.25pF	2.0pF			
3.0pF ±0.25pF GRT1555C1H3R0CA02#	GRT1555C1H3R0CA02#	±0.25pF	3.0pF			
4.0pF ±0.25pF GRT1555C1H4R0CA02#	GRT1555C1H4R0CA02#	±0.25pF	4.0pF			
5.0pF ±0.25pF GRT1555C1H5R0CA02#	GRT1555C1H5R0CA02#	±0.25pF	5.0pF			
6.0pF ±0.5pF GRT1555C1H6R0DA02#	GRT1555C1H6R0DA02#	±0.5pF	6.0pF			
7.0pF ±0.5pF <b>GRT1555C1H7R0DA02#</b>	GRT1555C1H7R0DA02#	±0.5pF	7.0pF			
8.0pF ±0.5pF <b>GRT1555C1H8R0DA02#</b>	GRT1555C1H8R0DA02#	±0.5pF	8.0pF			
9.0pF ±0.5pF <b>GRT1555C1H9R0DA02#</b>	GRT1555C1H9R0DA02#	±0.5pF	9.0pF			
10pF ±5% GRT1555C1H100JA02#	 GRT1555C1H100JA02#	±5%	10pF			
12pF ±5% GRT1555C1H120JA02#	 GRT1555C1H120JA02#	±5%	12pF			
15pF ±5% GRT1555C1H150JA02#	GRT1555C1H150JA02#	±5%	15pF			
18pF ±5% GRT1555C1H180JA02#	GRT1555C1H180JA02#	±5%	18pF			
22pF ±5% GRT1555C1H220JA02#	GRT1555C1H220JA02#	±5%	22pF			
27pF ±5% <b>GRT1555C1H270JA02#</b>	GRT1555C1H270JA02#	±5%	27pF			
33pF ±5% GRT1555C1H330JA02#	 GRT1555C1H330JA02#	±5%	33pF			
39pF ±5% GRT1555C1H390JA02#	 GRT1555C1H390JA02#	±5%	39pF			
47pF ±5% GRT1555C1H470JA02#	GRT1555C1H470JA02#	±5%	47pF			
56pF ±5% GRT1555C1H560JA02#	GRT1555C1H560JA02#	±5%	56pF			
68pF ±5% GRT1555C1H680JA02#	GRT1555C1H680JA02#	±5%	68pF			
82pF ±5% <b>GRT1555C1H820JA02#</b>	 GRT1555C1H820JA02#	±5%	82pF			
100pF ±5% <b>GRT1555C1H101JA02#</b>	 GRT1555C1H101JA02#	±5%	100pF			
120pF ±5% <b>GRT1555C1H121JA02#</b>	 GRT1555C1H121JA02#	±5%	120pF			
150pF ±5% <b>GRT1555C1H151JA02#</b>	 GRT1555C1H151JA02#	±5%	150pF			
180pF ±5% <b>GRT1555C1H181JA02#</b>	 GRT1555C1H181JA02#	±5%	180pF			
220pF ±5% <b>GRT1555C1H221JA02#</b>	 GRT1555C1H221JA02#	±5%	220pF			
270pF ±5% <b>GRT1555C1H271JA02#</b>	 GRT1555C1H271JA02#	±5%	270pF			
330pF ±5% <b>GRT1555C1H331JA02#</b>	GRT1555C1H331JA02#	±5%	330pF			
390pF ±5% <b>GRT1555C1H391JA02#</b>	 GRT1555C1H391JA02#	±5%	390pF			
470pF ±5% GRT1555C1H471JA02#	 GRT1555C1H471JA02#	±5%	470pF			

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number																																
0.55mm	50Vdc	COG	560pF	±5%	GRT1555C1H561JA02#																																
			680pF	±5%	GRT1555C1H681JA02#																																
				820pF	±5%	GRT1555C1H821JA02#																															
			1000pF	±5%	GRT1555C1H102JA02#																																
	25Vdc	COG	10pF	±5%	GRT1555C1E100JA02#																																
			12pF	±5%	GRT1555C1E120JA02#																																
			15pF	±5%	GRT1555C1E150JA02#																																
			18pF	±5%	GRT1555C1E180JA02#																																
			22pF	±5%	GRT1555C1E220JA02#																																
			27pF	±5%	GRT1555C1E270JA02#																																
			33pF	±5%	GRT1555C1E330JA02#																																
			39pF	±5%	GRT1555C1E390JA02#																																
										47pF	±5%	GRT1555C1E470JA02#																									
			56pF	±5%	GRT1555C1E560JA02#																																
																68pF	±5%	GRT1555C1E680JA02#																			
																																					82pF
					100pF	±5%	GRT1555C1E101JA02#																														
								120pF	±5%	GRT1555C1E121JA02#																											
																	150pF	±5%	GRT1555C1E151JA02#																		
																180pF	±5%	GRT1555C1E181JA02#																			
			220pF	±5%	GRT1555C1E221JA02#																																
			270pF	±5%	GRT1555C1E271JA02#																																
			330pF	±5%	GRT1555C1E331JA02#																																
			390pF	±5%	GRT1555C1E391JA02#																																
				-						-	-			-		-			470pF	±5%	GRT1555C1E471JA02#																
												680pF	±5%	GRT1555C1E681JA02#																							
			820pF	±5%	GRT1555C1E821JA02#																																
			1000pF	±5%	GRT1555C1E102JA02#																																

#### 1.6×0.8mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
0.9mm	100Vdc	COG	1.0pF	±0.25pF	GRT1885C2A1R0CA02#
			2.0pF	±0.25pF	GRT1885C2A2R0CA02#
			3.0pF	±0.25pF	GRT1885C2A3R0CA02#
			4.0pF	±0.25pF	GRT1885C2A4R0CA02#
			5.0pF	±0.25pF	GRT1885C2A5R0CA02#
			6.0pF	±0.5pF	GRT1885C2A6R0DA02#
			7.0pF	±0.5pF	GRT1885C2A7R0DA02#
			8.0pF	±0.5pF	GRT1885C2A8R0DA02#
			9.0pF	±0.5pF	GRT1885C2A9R0DA02#
			10pF	±5%	GRT1885C2A100JA02#
			12pF	±5%	GRT1885C2A120JA02#
			15pF	±5%	GRT1885C2A150JA02#
			18pF	±5%	GRT1885C2A180JA02#
			22pF	±5%	GRT1885C2A220JA02#
			27pF	±5%	GRT1885C2A270JA02#
			33pF	±5%	GRT1885C2A330JA02#
			39pF	±5%	GRT1885C2A390JA02#
			47pF	±5%	GRT1885C2A470JA02#
			56pF	±5%	GRT1885C2A560JA02#
			68pF	±5%	GRT1885C2A680JA02#

Part number # indicates the package specification code.



KCA Series

GCG Series

①Caution/ Notice

**GRT** Series

**GCM** Series

GC3 Series

**GCJ** Series

**GCD** Series

**GCE** Series

NMF Series

KCM Series

# GRT Series Temperature Compensating Type 🔝 🐯 Part Number List

0

#### (→ 1.6×0.8mm)

(→ 1.0,	0.011111	)			
T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
0.9mm	100Vdc	COG	82pF	±5%	GRT1885C2A820JA02#
			100pF	±5%	GRT1885C2A101JA02#
			120pF	±5%	GRT1885C2A121JA02#
			150pF	±5%	GRT1885C2A151JA02#
			180pF	±5%	GRT1885C2A181JA02#
			220pF	±5%	GRT1885C2A221JA02#
			270pF	±5%	GRT1885C2A271JA02#
			330pF	±5%	GRT1885C2A331JA02#
			390pF	±5%	GRT1885C2A391JA02#
			470pF	±5%	GRT1885C2A471JA02#
			560pF	±5%	GRT1885C2A561JA02#
			680pF	±5%	GRT1885C2A681JA02#
			820pF	±5%	GRT1885C2A821JA02#
			1000pF	±5%	GRT1885C2A102JA02#
			1200pF	±5%	GRT1885C2A122JA02#
			1500pF	±5%	GRT1885C2A152JA02#
	50Vdc	COG	1.0pF	±0.25pF	GRT1885C1H1R0CA02#
			2.0pF	±0.25pF	GRT1885C1H2R0CA02#
			3.0pF	±0.25pF	GRT1885C1H3R0CA02#
			4.0pF	±0.25pF	GRT1885C1H4R0CA02#
			5.0pF	±0.25pF	GRT1885C1H5R0CA02#
			6.0pF	±0.5pF	GRT1885C1H6R0DA02#
			7.0pF	-	GRT1885C1H7R0DA02#
			8.0pF	±0.5pF	GRT1885C1H8R0DA02#
			9.0pF	±0.5pF	GRT1885C1H9R0DA02#
			10pF	±5%	GRT1885C1H100JA02#
			12pF	±5%	GRT1885C1H120JA02#
			15pF	±5%	GRT1885C1H150JA02#
			18pF	±5%	GRT1885C1H180JA02#
			22pF	±5%	GRT1885C1H220JA02#
			27pF	±5%	GRT1885C1H270JA02#
			33pF	±5%	GRT1885C1H330JA02#
			39pF	±5%	GRT1885C1H390JA02#
			47pF	±5%	GRT1885C1H470JA02#
			56pF	±5%	GRT1885C1H560JA02#
			68pF	±5%	GRT1885C1H680JA02#
			82pF	±5%	GRT1885C1H820JA02#
			100pF	±5%	GRT1885C1H101JA02#
			120pF	±5%	GRT1885C1H121JA02#
			150pF	±5%	GRT1885C1H151JA02#
			180pF	±5%	GRT1885C1H181JA02#
			220pF	±5%	GRT1885C1H221JA02#
			270pF	±5%	GRT1885C1H271JA02#
			330pF	±5%	GRT1885C1H331JA02#
			390pF	±5%	GRT1885C1H391JA02#
			470pF	±5%	GRT1885C1H471JA02#
			560pF	±5%	GRT1885C1H561JA02#
			680pF	±5%	GRT1885C1H681JA02#
			820pF	±5%	GRT1885C1H821JA02#
			1000pF	±5%	GRT1885C1H102JA02#
			1200pF	±5%	GRT1885C1H122JA02#
			1500pF	±5%	GRT1885C1H152JA02#
			1800pF	±5%	GRT1885C1H182JA02#
			2200pF	±5%	GRT1885C1H222JA02#

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
.9mm	50Vdc	COG	2700pF	±5%	GRT1885C1H272JA02#
			3300pF	±5%	GRT1885C1H332JA02#
			3900pF	±5%	GRT1885C1H392JA02#
			4700pF	±5%	GRT1885C1H472JA02#
			5600pF	±5%	GRT1885C1H562JA02#
			6800pF	±5%	GRT1885C1H682JA02#
			8200pF	±5%	GRT1885C1H822JA02#
			10000pF	±5%	GRT1885C1H103JA02#
	25Vdc	COG	560pF	±5%	GRT1885C1E561JA02#
			680pF	±5%	GRT1885C1E681JA02#
			820pF	±5%	GRT1885C1E821JA02#
			1000pF	±5%	GRT1885C1E102JA02#
			1200pF	±5%	GRT1885C1E122JA02#
			1500pF	±5%	GRT1885C1E152JA02#
			4700pF	±5%	GRT1885C1E472JA02#
			5600pF	±5%	GRT1885C1E562JA02#
			6800pF	±5%	GRT1885C1E682JA02#
			8200pF	±5%	GRT1885C1E822JA02#
			10000pF	±5%	GRT1885C1E103JA02#

#### 2.0×1.25mm

T max.	Rated Voltage		Cap.	Tol.	Part Number	
1.35mm	50Vdc	COG	18000pF	±5%	GRT21B5C1H183JA02#	
			22000pF	±5%	GRT21B5C1H223JA02#	

#### 3.2×1.6mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
1.8mm	50Vdc	COG	56000pF	±5%	GRT31C5C1H563JA02#	
			68000pF	±5%	GRT31C5C1H683JA02#	
			82000pF	±5%	GRT31C5C1H823JA02#	
			0.10µF	±5%	GRT31C5C1H104JA02#	
	25Vdc	COG	0.10µF	±5%	GRT31C5C1E104JA02#	
			0.12µF	±5%	GRT31C5C1E124JA02#	
	16Vdc	COG	0.12µF	±5%	GRT31C5C1C124JA02#	

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# GRT Series High Dielectric Constant Type 📰 🐯 Part Number List

#### 0.6×0.3mm

**GRT** Series

GCM Series

GC3 Series

**GCJ** Series

**GCD** Series

**GCE** Series

NMF Series

KCM Series

KC3 Series

KCA Series

GCG Series

①Caution/ Notice

0.0 ~ 0.						
T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
0.33mm	35Vdc	X5R	0.10µF	±10%	GRT033R6YA104KE01#	D1
	25Vdc	X7R	470pF	±10%	GRT033R71E471KE01#	
			1000pF	±10%	GRT033R71E102KE01#	
		X6S	470pF	±10%	GRT033C81E471KE01#	
			1000pF	±10%	GRT033C81E102KE01#	
			0.10µF	±10%	GRT033C81E104KE01#	D1
		X5R	100pF	±10%	GRT033R61E101KE01#	
			220pF	±10%	GRT033R61E221KE01#	
			470pF	±10%	GRT033R61E471KE01#	
			1000pF	±10%	GRT033R61E102KE01#	
			4700pF	±10%	GRT033R61E472KE01#	D1
			10000pF	±10%	GRT033R61E103KE01#	D1
			0.10µF	±10%	GRT033R61E104KE01#	
	16Vdc	X6S	0.10µF	±10%	GRT033C81C104KE01#	
		X5R	10000pF	±10%	GRT033R61C103KE01#	
			22000pF	±10%	GRT033R61C223KE01#	D1
			47000pF	±10%	GRT033R61C473KE01#	D1
			0.10µF	±10%	GRT033R61C104KE01#	D1
	10Vdc	X7R	10000pF	±10%	GRT033R71A103KE01#	
		X6S	0.10µF	±10%	GRT033C81A104KE01#	
		X5R	2200pF	±10%	GRT033R61A222KE01#	
			4700pF	±10%	GRT033R61A472KE01#	
			10000pF	±10%	GRT033R61A103KE01#	
			22000pF	±10%	GRT033R61A223KE01#	
			47000pF	±10%	GRT033R61A473KE01#	
			0.10µF	±10%	GRT033R61A104KE01#	
			0.22µF	±10%	GRT033R61A224KE01#	D1
	6.3Vdc	X7R	2200pF	±10%	GRT033R70J222KE01#	
			4700pF	±10%	GRT033R70J472KE01#	
			10000pF	±10%	GRT033R70J103KE01#	
		X6S	2200pF	±10%	GRT033C80J222KE01#	
			4700pF	±10%	GRT033C80J472KE01#	
			10000pF	±10%	GRT033C80J103KE01#	
			22000pF	±10%	GRT033C80J223KE01#	
			47000pF	±10%	GRT033C80J473KE01#	
			68000pF	±10%	GRT033C80J683KE01#	D1
			0.10µF	±10%	GRT033C80J104KE01#	D1
			0.22µF	±10%	GRT033C80J224KE01#	D1
		X5R	10000pF	±10%	GRT033R60J103KE01#	
			22000pF	±10%	GRT033R60J223KE01#	
			47000pF	±10%	GRT033R60J473KE01#	
			68000pF		GRT033R60J683KE01#	
			0.10µF	±10%	GRT033R60J104KE01#	
			0.22µF	±10%	GRT033R60J224KE01#	D1
			0.47µF	±10%	GRT033R60J474KE01#	
	4Vdc	X6S	68000pF		GRT033C80G683KE01#	<u> </u>
			0.10µF	±10%	GRT033C80G104KE01#	
			0.22µF	±20%	GRT033C80G224ME01#	D1
0.35mm	6.3Vdc	X5R	1.0µF	±20%	GRT033R60J105ME13#	
	4Vdc	X5R	1.0µF	±20%	GRT033R60G105ME13#	
	, vac		1 T.Ohi	_2070		

#### 1.0×0.5mm

0.55mm50VckX7R220pF110%CRT155R71H221KE01#470pF100%CRT155R71H22KE01#200pF10%CRT155R71H22KE01#200pF10%CRT15SR71H22KE01#4700pF10%CRT15SR71H22KE01#200pF10%CRT15SR71H473KE01#200pF10%CRT15SR71H473KE01#200pF10%CRT15SR71H473KE01#200pF10%CRT15SR71H473KE01#200pF10%CRT15SR71H473KE01#200pF10%CRT15SR71H473KE01#200pF10%CRT15SR71E03KE01#200pF10%CRT15SR71E03KE01#25VckX7R10000F10%25VckX7R10000F10%25VckX7R10000F10%25VckX7R10000F10%25VckX7R10000F10%25VckX7R10000F10%25VckX7R10000F10%25VckX7R10000F10%10VcF10%CRT15SR1103KE01#25VckX7R10000F10VcF10%CRT15SR1103KE01#10VcF100WF10%10VcF100WF10%10VcF10%CRT15SR1102KE01#10VcF100WF10%10VcF10WF10%10VcF10WF10%10VcF10WFCRT15SR1224KE01#10VcF10WF10%10VcF10WFCRT15SR1224KE01#10VcF10WFCRT15SR1224KE01# <th>T max.</th> <th>Rated Voltage</th> <th>TC Code</th> <th>Cap.</th> <th>Tol.</th> <th>Part Number</th> <th></th>	T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
	0.55mm	50Vdc	X7R	220pF	±10%	GRT155R71H221KE01#	
				470pF	±10%	GRT155R71H471KE01#	
				1000pF	±10%	GRT155R71H102KE01#	
				2200pF	±10%	GRT155R71H222KE01#	
				4700pF	±10%	GRT155R71H472KE01#	
47000pF         110%         GR115SR71H473KE01#           35Vdc         X6S         0.22µF         110%         GR115SR71H104KE01#         I           35Vdc         X6S         0.22µF         110%         GR115SR04224KE01#         I           25Vdc         X7R         10000pF         110%         GR115SR71E03KE01#         I           25Vdc         X7R         10000pF         110%         GR115SR71E03KE01#         I           2000pF         100%         GR115SR71E03KE01#         I         I           47000pF         100%         GR115SR71E03KE01#         I           47000pF         100%         GR115SR1E03KE01#         I           X6S         0.22µF         110%         GR115SR1E03KE01#         I           10µF         10µF         10%         GR115SR120XKE01#         I           16Vdc         X7R         10000pF         10%         GR115SR120XKE01#         I           10µF         10%F         10%         GR115SR120XKE01#         I         I           10µF         10%         GR115SR120XKE01#         I         I         I         I         I         I         I         I         I         I         I         I				10000pF	±10%	GRT155R71H103KE01#	
Image: state s				22000pF	±10%	GRT155R71H223KE01#	
35VdcX6S0.22µF110%GRT155C8VA224KE01#IX5R0.47µF10%GRT155R6VA224KE01#I25VdcX7R10000F11%GRT155R71E103KE01#25VdcX7R10000F11%GRT155R71E03KE01#26000F110%GRT155R71E03KE01#I26000F110%GRT155R71E04KE01#I26000F110%GRT155R61E24KE01#IX5R0.22µF110%GRT155R61E24KE01#IX5R0.22µF110%GRT155R61E24KE01#I16VdcX7R10000F110%GRT155R71C03KE01#I20000F110%GRT155R71C03KE01#II20000F110%GRT155R71C03KE01#II16VdcX7R10000F110%GRT155R71C04KE01#I100µF110%GRT155R71C04KE01#II10µF110%GRT155R71C24KE01#II10µF10%GRT155R71A24KE01#II10µF10%GRT155R1A224KE01#II10µF110%GRT155R61A224KE01#II10µF110%GRT155R61A224KE01#II10µF110%GRT155R61A224KE01#II10µF110%GRT155R61A224KE01#II10µF110%GRT155R61A224KE01#II10µF110%GRT155R61A224KE01#II10µF110%GRT155R61A224KE01#II10µF110%<				47000pF	±10%	GRT155R71H473KE01#	
Normal NormaNormal 0.47µF10% 0.47µFGRT155R6VA224KE01#I25VdcX7R 2000pF10% 2000pFGRT155R71E03KE01#I25VdcX7R 2000pF10% 2000pFGRT155R71E03KE01#I2600pF10% 2000pFGRT155R71E03KE01#I2700pF10% 200pFGRT155R71E04KE01#IX5R 				0.10µF	±10%	GRT155R71H104KE01#	
</td <td></td> <td>35Vdc</td> <td>X6S</td> <td>0.22µF</td> <td>±10%</td> <td>GRT155C8YA224KE01#</td> <td>D1</td>		35Vdc	X6S	0.22µF	±10%	GRT155C8YA224KE01#	D1
25VdcX7R 2000pF1000pF110% 2100pFGRT155R71E103KE01#I2000pF100%GRT155R71E223KE01#I100µF210%GRT155R71E104KE01#IX650.22µF10%GRT155R61E224KE01#I0.7µF110%GRT155R61E224KE01#I10Vc10µF110%GRT155R61E105KE01#I16VdcX7R1000pF110%GRT155R71C03KE01#I16VdcX7R1000pF110%GRT155R71C23KE01#I16VdcX7R1000pF110%GRT155R71C23KE01#I100µF110%GRT155R71C23KE01#II100µF110%GRT155R71C23KE01#II100µF110%GRT155R71C23KE01#II101µF110%GRT155R61C474KE01#II101µF110%GRT155R61C105KE01#II101µF110%GRT155R61C105KE01#II101µF110%GRT155R61A224KE01#II101µF110%GRT155R61A224KE01#II101µF110%GRT155R61A224KE01#II101µF110%GRT155R61A224KE01#II101µF110%GRT155R61A224KE01#II101µF110%GRT155R61A224KE01#II101µF110%GRT155R61A224KE01#II101µF110%GRT155R61A224KE01#II101µF110%GRT155R61A224KE01#I <t< td=""><td></td><td></td><td>X5R</td><td>0.22µF</td><td>±10%</td><td>GRT155R6YA224KE01#</td><td>D1</td></t<>			X5R	0.22µF	±10%	GRT155R6YA224KE01#	D1
				0.47µF	±10%	GRT155R6YA474KE01#	D1
47000pF         110%         GRT155R71E473KE01#         .           0.10µF         10%         GRT155R71E104KE01#         .           X6S         0.22µF         11%         GRT155R61E224KE01#         .           10µF         10µF         10%         GRT155R61E224KE01#         .           10µF         10µF         10%         GRT155R61E224KE01#         .           10µF         10µF         10%         GRT155R61E105KE01#         .           10µF         100µF         10%         GRT155R71C103KE01#         .           10µF         10000pF         10%         GRT155R71C23KE01#         .           10µF         100%         GRT155R71C24KE01#         .         .           10µF         10%         GRT155R61C24KE01#         .         .           10µF         10µF         10%         GRT155R61C24KE01#         .           10µF         10µF         10%         GRT155R6124KE01#         .		25Vdc	X7R	10000pF	±10%	GRT155R71E103KE01#	
				22000pF	±10%	GRT155R71E223KE01#	
X6S0.22µF±10%GRT1S5C81E224KE01#X5R0.22µF±10%GRT155R61E224KE01#0.47µF±10%GRT155R61E05KE01#I1.0µF±10%GRT155R61E105KE01#I2000pF±10%GRT155R71C03KE01#I2000pF±10%GRT155R71C223KE01#I47000pF±10%GRT155R71C04KE01#I0.10µF±10%GRT155R71C224KE01#I0.22µF±10%GRT155R61C224KE01#IX6S0.47µF±10%GRT155R61C234KE01#10µF±10%GRT155R61C234KE01#I10µF±10%GRT155R61C35KE01#I10µF±10%GRT155R61C35KE01#I10µF±10%GRT155R61A224KE01#I10µF±10%GRT155R61A224KE01#I10µF±10%GRT155R61A224KE01#I10µF±10%GRT155R61A224KE01#I10µF±10%GRT155R61A225KE01#I10µF±10%GRT155R61A225KE01#I10µF±10%GRT155R60J22KE01#I10µF±10%GRT155R60J22KE01#I10µF±10%GRT155R60J22KE01#I10µF±10%GRT155R60J22KE01#I10µF±10%GRT155R60J22KE01#I10µF±10%GRT155R60J22KE01#I10µF±10%GRT155R60J22KE01#I10µF±10%GRT155R60J22KE01#I10µF±10%GRT1558R60J225KE01#I				47000pF	±10%	GRT155R71E473KE01#	
XSR 0.22µF0.22µF10% 0.47µFGRT155R61E224KE01#I1.0µF110%GRT155R61E105KE01#I1.0µF110%GRT155R61E105KE01#I16VdcX7R10000pF110%GRT155R71C223KE01#22000pF110%GRT155R71C23KE01#I22000pF110%GRT155R71C23KE01#I0.10µF110%GRT155R71C23KE01#I0.22µF110%GRT155R61C224KE01#IXSR0.22µF110%GRT155R61C224KE01#I10VdcX7R0.22µF10%GRT155R61C224KE01#I10VdcX7R0.22µF10%GRT155R61C324KE01#I10VdcX7R0.22µF10%GRT155R61C324KE01#I10VdcX7R0.22µF10%GRT155R61C324KE01#I10VdcX7R0.22µF10%GRT155R61A224KE01#I10VdcX7R0.22µF10%GRT155R61A224KE01#I10µF10µF10%GRT155R61A224KE01#II10µF10%GRT155R61A224KE01#II10µF10%GRT155R61A224KE01#II10µF10%GRT155R61A224KE01#II10µF10%GRT155R61A225KE01#II10µF10%GRT155R61A225KE01#II10µF10%GRT155R61A25KE01#II10µF10%GRT155R61A25KE01#II10µF10%GRT155R61A225KE01#				0.10µF	±10%	GRT155R71E104KE01#	
0.47µF         10%         GRT155R61E474KE01#         I           16Vdc         X7R         10000pF         110%         GRT155R61E105KE01#         I           16Vdc         X7R         10000pF         110%         GRT155R71C103KE01#         I           22000pF         110%         GRT155R71C23KE01#         I         I           0.10µF         110%         GRT155R71C23KE01#         I           0.22µF         100%         GRT155R61C274KE01#         I           0.22µF         10%         GRT155R61C274KE01#         I           X6S         0.47µF         10%         GRT155R61C274KE01#         I           10Vdc         X7R         0.22µF         10%         GRT155R61C374KE01#         I           10Vfc         X7R         0.22µF         10%         GRT155R61C374KE01#         I           10Vfc         X7R         0.22µF         10%         GRT155R61A3254KE01#         I           10Vfc         X7R         0.22µF         10%         GRT155R61A3254KE01#         I           10µF         10µF         10%         GRT155R61A3254KE01#         I         I           22µF         10%         GRT155R61A3254KE01#         I         I         I			X6S	0.22µF	±10%	GRT155C81E224KE01#	
InuInuInuInuInuInuInuInu1.01.01.01.0GRT155R61E105KE01#Image: State S			X5R	0.22µF	±10%	GRT155R61E224KE01#	
16VdcX7R 2000pF10000pF10% 10%GRT15SR71C103KE01#22000pF10% 10%GRT15SR71C23KE01#047000pF10% 10%GRT15SR71C24KE01#00.10µF10% 10%GRT15SR71C24KE01#00.22µF10% 10%GRT15SR71C24KE01#0X6S0.47µF10% 10µFGRT15SR1C224KE01#0X6S0.47µF10% 10µFGRT15SR61C24KE01#010VdcX7R 0.22µF0.22µF10% 407µFGRT15SR61C05KE01#010VdcX7R 0.22µF0.22µF10% 407µFGRT15SR1A224KE01#010VdcX7R 0.22µF0.22µF10% 407µFGRT15SR61A224KE01#010µF10µF10% 407µFGRT15SR61A224KE01#010µF10µF10% 407µFGRT15SR61A224KE01#010µF10µF10% 407µFGRT15SR61A224KE01#010µF10µF10% 407µFGRT15SR61A225KE01#010µF10µF10% 407µFGRT15SR01224KE01#010µF10% 410% 407µFGRT15SR01224KE01#010µF10% 410% 407µFGRT15SR01225KE01#010µF10% 410% 4RT15SR0105KE01#0010µF10% 410% 4RT15SR0105KE01#000.6mm35VdcXSR 40.47µF10% 410% 4RT15SR0105KE01#010µF10µF 410% 4RT15SR0105KE01#000.6mm35VdcXSR 40% <br< td=""><td></td><td></td><td></td><td>0.47µF</td><td>±10%</td><td>GRT155R61E474KE01#</td><td></td></br<>				0.47µF	±10%	GRT155R61E474KE01#	
Normal StructureNormal StructureNorma				1.0µF	±10%	GRT155R61E105KE01#	D1
Normal StateNormal StateNormal StateNormal StateNormal StateNormal State0.10µF100µ		16Vdc	X7R	10000pF	±10%	GRT155R71C103KE01#	
0.10µF±10%GRT155R71C104KE01#0.22µF±10%GRT155R71C224KE01#X6S0.47µF±10%GRT155R61C224KE01#X5R0.22µF±10%GRT155R61C24KE01#0.47µF±10%GRT155R61C05KE01#10VdcX7R0.22µF±10%A7PµF±10%GRT155R71A224KE01#10VdcX7R0.22µF±10%A7PµF±10%GRT155R61A05KE01#X6S1.0µF±10%GRT155R61A224KE01#X6S1.0µF±10%GRT155R61A224KE01#2.2µF±10%GRT155R61A224KE01#1.0µF±10%GRT155R61A224KE01#2.2µF±10%GRT155R61A224KE01#1.0µF±10%GRT155R61A225KE01#1.0µF±10%GRT155R61A225KE01#1.0µF±10%GRT155R61A225KE01#1.0µF±10%GRT155R61A225KE01#1.0µF±10%GRT155C80J224KE01#1.0µF±10%GRT155C80J224KE01#2.2µF±10%GRT155C80J224KE01#1.0µF±10%GRT155R60J05KE01#1.0µF±10%GRT155R60J224KE01#2.2µF±10%GRT155R60J224KE01#1.0µF±10%GRT155R60J224KE01#2.2µF±10%GRT155R60J224KE01#1.0µF±10%GRT155R60J25KE01#1.0µF±10%GRT155R60J25KE01#2.2µF±10%GRT155R60J25KE01#1.0µF±10%GRT155R60J25KE01#1.0µF±10%GRT155R6125KE13# <t< td=""><td></td><td></td><td></td><td>22000pF</td><td>±10%</td><td>GRT155R71C223KE01#</td><td></td></t<>				22000pF	±10%	GRT155R71C223KE01#	
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X6S0.47µF±10%GRT155C81C474KE01#X5R0.22µF±10%GRT155R61C224KE01#0.47µF±10%GRT155R61C105KE01#1.0µF±10%GRT155R61C105KE01#10VdcX7R0.22µF±10%GRT155R71A224KE01#10VdcX7R0.22µF±10%GRT155R61A224KE01#X6S1.0µF±10%GRT155R61A224KE01#X6S1.0µF±10%GRT155R61A224KE01#X6S0.22µF±10%GRT155R61A224KE01#1.0µF±10%GRT155R61A224KE01#1.0µF±10%GRT155R61A224KE01#1.0µF±10%GRT155R61A224KE01#1.0µF±10%GRT155R61A225KE01#6.3VdcX7R22000PF±10%GRT155R61A225KE01#1.0µF±10%GRT155R60J224KE01#1.0µF±10%GRT155C80J224KE01#1.0µF±10%GRT155R60J224KE01#1.0µF±10%GRT155R60J224KE01#1.0µF±10%GRT155R60J224KE01#1.0µF±10%GRT155R60J225KE01#1.0µF±10%GRT155R60J225KE01#1.0µF±10%GRT155R60J225KE01#2.2µF±10%GRT155R60J225KE01#1.0µF±10%GRT155R61A105KE13#1.0µF±10%GRT155R61A105KE13#<				0.10µF	±10%	GRT155R71C104KE01#	
Normal Normal				0.22µF	±10%	GRT155R71C224KE01#	
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Index1.0µF±10%GRT155R61C105KE01#10VdcX7R0.22µF±10%GRT155R71A224KE01#10VdcX7R0.22µF±10%GRT155R61A224KE01#X6S1.0µF±10%GRT155R61A224KE01#IX5R0.22µF±10%GRT155R61A224KE01#I1.0µF±10%GRT155R61A224KE01#I2.2µF±10%GRT155R61A224KE01#I1.0µF±10%GRT155R61A225KE01#I6.3VdcX7R22000pF±10%GRT155R70J223KE01#I1.0µF±10%GRT155R70J223KE01#I1.0µF±10%GRT155C80J224KE01#I1.0µF±10%GRT155C80J224KE01#I1.0µF±10%GRT155C80J225KE01#I1.0µF±10%GRT155R60J225KE01#I1.0µF±10%GRT155R60J225KE01#I2.2µF±10%GRT155R60J225KE01#I1.0µF±10%GRT155R60J225KE01#I1.0µF±10%GRT155R60J225KE01#I1.0µF±10%GRT155R60J225KE01#I1.0µF±10%GRT155R60J225KE01#I1.0µF±10%GRT155R60J225KE01#I1.0µF±10%GRT155R60J225KE01#I1.0µF±10%GRT155R6J105KE13#I1.0µF±10%GRT155R6J105KE13#I1.0µF±10%GRT155R6J105KE13#I1.0µF±10%GRT155C81105KE13#I1.0µF±10%GRT155C81105KE13#			X5R	0.22µF	±10%	GRT155R61C224KE01#	
10VdcX7R 0.47µF0.22µF±10%GRT155R71A224KE01#0.47µF±10%GRT155R71A474KE01#X6S1.0µF±10%GRT155R61A224KE01#X5R0.22µF±10%GRT155R61A224KE01#0.47µF±10%GRT155R61A105KE01#1.0µF±10%GRT155R61A105KE01#6.3VdcX7R22000pF±10%GRT155R61A225KE01#16.3VdcX7R22000pF±10%GRT155R61A225KE01#16.3VdcX7R22000pF±10%GRT155R60J224KE01#11.0µF±10%GRT155C80J224KE01#111.0µF±10%GRT155C80J225KE01#111.0µF±10%GRT155C80J225KE01#111.0µF±10%GRT155R60J225KE01#111.0µF±10%GRT155R60J225KE01#111.0µF±10%GRT155R60J225KE01#111.0µF±10%GRT155R60J225KE01#111.0µF±10%GRT155R60J225KE01#111.0µF±10%GRT155R60J225KE01#111.0µF±10%GRT155R60J225KE01#111.0µF±10%GRT155R60J225KE01#111.0µF±10%GRT155R60J225KE01#111.0µF±10%GRT155R60J225KE01#111.0µF±10%GRT155R60J225KE01#111.0µF±10%GRT155R60J225KE01#111.0µF <td></td> <td></td> <td></td> <td>0.47µF</td> <td>±10%</td> <td>GRT155R61C474KE01#</td> <td></td>				0.47µF	±10%	GRT155R61C474KE01#	
Normal 0.47µF±10%CRT155R71A474KE01#X6S1.0µF±10%GRT155C81A105KE01#X6S1.0µF±10%GRT155C81A105KE01#0.47µF±10%GRT155R61A224KE01#00.47µF±10%GRT155R61A105KE01#01.0µF±10%GRT155R61A105KE01#06.3VdcX7R22000pF±10%GRT155R61A225KE01#06.3VdcX7R22000pF±10%GRT155R61A225KE01#06.3VdcX7R22000pF±10%GRT155C80J224KE01#07.0µF±10%GRT155C80J224KE01#007.0µF±10%GRT155C80J224KE01#007.2µF±10%GRT155C80J225KE01#007.2µF±10%GRT155R60J224KE01#007.2µF±10%GRT155R60J224KE01#007.2µF±10%GRT155R60J225KE01#007.2µF±10%GRT155R60J225KE01#007.1µF±10%GRT155R60J225KE01#007.1µF±10%GRT155R60J225KE01#007.2µF±10%GRT155R60J225KE01#007.1µF±10%GRT155R60J225KE01#007.1µF±10%GRT155R60J225KE01#007.1µF±10%GRT155R60J225KE01#007.1µF±10%GRT155R60J225KE01#007.1µF±10%GRT155R61A105KE13#007.1µF±10%GRT155				1.0µF	±10%	GRT155R61C105KE01#	
X6S1.0µF±10%GRT155C81A105KE01#X5R0.22µF±10%GRT155R61A224KE01#0.47µF±10%GRT155R61A105KE01#1.0µF±10%GRT155R61A105KE01#2.2µF±10%GRT155R61A225KE01#6.3VdcX7R22000pF±10%GRT155R70J223KE01#6.3VdcX7R22000pF±10%GRT155R70J223KE01#①11.0µF±10%GRT155R70J0223KE01#①1X6S0.22µF±10%GRT155C80J224KE01#①11.0µF±10%GRT155C80J224KE01#①12.2µF±10%GRT155C80J225KE01#①12.2µF±10%GRT155C80J224KE01#①12.2µF±10%GRT155R60J224KE01#①11.0µF±10%GRT155R60J224KE01#①11.0µF±10%GRT155R60J225KE01#①11.0µF±10%GRT155R60J225KE01#①10.6mm35VdcX5R1.0µF±10%GRT155C81105KE13#25VdcX6S1.0µF±10%GRT155C81105KE13#①116VdcX6S1.0µF±10%GRT155C81105KE13#①110VdcX7S1.0µF±10%GRT155C81105KE13#①1		10Vdc	X7R	0.22µF	±10%	GRT155R71A224KE01#	
Normal NormalNormal Normal Normal NormalNormal <br< td=""><td></td><td></td><td></td><td>0.47µF</td><td>±10%</td><td>GRT155R71A474KE01#</td><td></td></br<>				0.47µF	±10%	GRT155R71A474KE01#	
$ \begin{array}{ c c c c c c } \hline 0.47 \mu F & \pm 10\% & \mbox{GRT155R61A474KE01} & \mbox{I} $			X6S	1.0µF	±10%	GRT155C81A105KE01#	
$ \begin{array}{c c c c c c c } \hline 1.0 \mu F & \pm 10\% & \end{figure} \end{figure} \end{figure} \\ \hline 1.0 \mu F & \pm 10\% & \end{figure} \end{figure} \end{figure} \end{figure} \\ \hline 1.0 \mu F & \pm 10\% & \end{figure} figure$			X5R	0.22µF	±10%	GRT155R61A224KE01#	
$ \begin{array}{ c c c c c c } \hline \begin{tabular}{ c c c c } \hline & $2.2 \mu F$ & $\pm 10\%$ & $$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$				0.47µF	±10%	GRT155R61A474KE01#	
$ \begin{array}{ c c c c c } \hline \mbox{Acc} & X7R & 22000 \mbox{BC} & \pm 10\% & \mbox{BC} & \$				1.0µF	±10%	GRT155R61A105KE01#	
$ \begin{array}{ c c c c c c } \hline 1.0 \mu F & \pm 10\% & \mbox{GRT155R70J105KE01} & \begin{tabular}{ c c c } \hline 1.0 \mu F & \pm 10\% & \mbox{GRT155C80J224KE01} & \end{tabular} & \end{tabular} \\ \hline NGP & \end{tabular} & tabula$				2.2µF	±10%	GRT155R61A225KE01#	D1
$ \begin{array}{ c c c c c } \hline \begin{tabular}{ c c c c } \hline & & & & & & & & & & & & & & & & & & $		6.3Vdc	X7R	22000pF	±10%	GRT155R70J223KE01#	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $				1.0µF	±10%	GRT155R70J105KE01#	D1
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $			X6S	0.22µF	±10%	GRT155C80J224KE01#	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$				0.47µF	±10%	GRT155C80J474KE01#	
$ \begin{array}{c} & \\ & \\ & \\ & \\ & \\ & \\ & \\ & \\ & \\ & $				1.0µF	±10%	GRT155C80J105KE01#	D1
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$				2.2µF	±10%	GRT155C80J225KE01#	D1
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			X5R	0.22µF	±10%	GRT155R60J224KE01#	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $				0.47µF	±10%	GRT155R60J474KE01#	
4Vdc         X7R         1.0μF         ±10%         GRT155R70G105KE01#           0.6mm         35Vdc         X5R         1.0μF         ±10%         GRT155R6VA105KE13#         ①1           25Vdc         X6S         1.0μF         ±10%         GRT155C81E105KE13#         ①1           16Vdc         X6S         1.0μF         ±10%         GRT155C81C105KE13#         ①1           10Vdc         X7S         1.0μF         ±10%         GRT155C71A105KE13#         ①1				1.0µF	±10%	GRT155R60J105KE01#	
0.6mm         35Vdc         X5R         1.0μF         ±10%         GRT155R6YA105KE13#         )           25Vdc         X6S         1.0μF         ±10%         GRT155C81E105KE13#         )           16Vdc         X6S         1.0μF         ±10%         GRT155C81C105KE13#         )           10Vdc         X7S         1.0μF         ±10%         GRT155C71A105KE13#         )				2.2µF	±10%	GRT155R60J225KE01#	
25Vdc         X6S         1.0μF         ±10%         GRT155C81E105KE13#         ①           16Vdc         X6S         1.0μF         ±10%         GRT155C81C105KE13#         ○           10Vdc         X7S         1.0μF         ±10%         GRT155C71A105KE13#         ○		4Vdc	X7R	1.0µF	±10%	GRT155R70G105KE01#	
16Vdc         X6S         1.0μF         ±10%         GRT155C81C105KE13#           10Vdc         X7S         1.0μF         ±10%         GRT155C71A105KE13#	0.6mm	35Vdc	X5R	1.0µF	±10%	GRT155R6YA105KE13#	D1
10Vdc X7S 1.0μF ±10% <b>GRT155C71A105KE13#</b>		25Vdc	X6S	1.0µF	±10%	GRT155C81E105KE13#	D1
		16Vdc	X6S	1.0µF	±10%	GRT155C81C105KE13#	
6.3Vdc X5R 4.7μF ±20% <b>GRT155R60J475ME13# Δ</b>		10Vdc	X7S	1.0µF	±10%	GRT155C71A105KE13#	
		6.3Vdc	X5R	4.7µF	±20%	GRT155R60J475ME13#	D1

Part number # indicates the package specification code.



**GRT** Series

**GCM** Series

GC3 Series

**GCJ** Series

**GCD** Series

**GCE** Series

NMF Series

KCM Series

KC3 Series

KCA Series

**GCG** Series

# GRT Series High Dielectric Constant Type 📰 🐯 Part Number List

#### (→ 1.0×0.5mm)

( / 1/0 / 0/0/1/1/)							
T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number		
0.6mm	4Vdc	X5R	4.7µF	±20%	GRT155R60G475ME13#		
0.65mm	10Vdc	X5R	4.7µF	±20%	GRT155R61A475ME13#	D1	
	6.3Vdc	X6S	4.7µF	±20%	GRT155C80J475ME13#	D1	
0.7mm	25Vdc	X5R	2.2µF	±10%	GRT155R61E225KE13#		
	16Vdc	X6S	2.2µF	±10%	GRT155C81C225KE13#		
		X5R	2.2µF	±10%	GRT155R61C225KE13#		
	10Vdc	X7S	2.2µF	±10%	GRT155C71A225KE13#		
		X6S	2.2µF	±10%	GRT155C81A225KE13#		
	2.5Vdc	X6S	10µF	±20%	GRT155C80E106ME13#		

#### 1.6×0.8mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
0.9mm	50Vdc	X5R	1.0µF	±10%	GRT188R61H105KE13#	
	35Vdc	X6S	1.0µF	±10%	GRT188C8YA105KE13#	
		X5R	1.0µF	±10%	GRT188R6YA105KE13#	
			2.2µF	±10%	GRT188R6YA225KE13#	D1
	25Vdc	X7R	1.0µF	±10%	GRT188R71E105KE13#	
		X6S	1.0µF	±10%	GRT188C81E105KE13#	
		X5R	1.0µF	±10%	GRT188R61E105KE13#	
			2.2µF	±10%	GRT188R61E225KE13#	
	16Vdc	X7R	1.0µF	±10%	GRT188R71C105KE13#	
		X6S	1.0µF	±10%	GRT188C81C105KE13#	
			2.2µF	±10%	GRT188C81C225KE13#	
		X5R	1.0µF	±10%	GRT188R61C105KE13#	
	10Vdc	X6S	1.0µF	±10%	GRT188C81A105KE13#	
		X5R	1.0µF	±10%	GRT188R61A105KE01#	
			2.2µF	±10%	GRT188R61A225KE13#	
	6.3Vdc	X7R	2.2µF	±10%	GRT188R70J225KE13#	
		X6S	4.7µF	±10%	GRT188C80J475KE01#	D1
		X5R	1.0µF	±10%	GRT188R60J105KE01#	
			2.2µF	±10%	GRT188R60J225KE13#	
			4.7µF	±10%	GRT188R60J475KE01#	
			10µF	±20%	GRT188R60J106ME13#	
	4Vdc	X6S	1.0µF	±20%	GRT188C80G105ME01#	
			4.7µF	±10%	GRT188C80G475KE01#	
			10µF	±20%	GRT188C80G106ME13#	D1
		X5R	10µF	±20%	GRT188R60G106ME13#	
0.95mm	25Vdc	X5R	4.7µF	±10%	GRT188R61E475KE13#	
	16Vdc	X6S	4.7µF	±10%	GRT188C81C475KE13#	
		X5R	4.7µF	±10%	GRT188R61C475KE13#	
			10µF	±10%	GRT188R61C106KE13#	
	10Vdc	X5R	10µF	±10%	GRT188R61A106KE13#	D1
	2.5Vdc	X5R	22µF	±20%	GRT188R60E226ME13#	
1.0mm	50Vdc	X5R	2.2µF	±10%	GRT188R61H225KE13#	
	35Vdc	X6S	2.2µF	±10%	GRT188C8YA225KE13#	
		X5R	4.7µF	±10%	GRT188R6YA475KE13#	
	25Vdc	X6S	2.2µF	±10%	GRT188C81E225KE13#	
			4.7µF	±10%	GRT188C81E475KE13#	
		X5R	10µF	±20%	GRT188R61E106ME13#	
	16Vdc	X6S	10µF	±20%	GRT188C81C106ME13#	
	10Vdc	X6S	10µF	±20%	GRT188C81A106ME13#	
	6.3Vdc	X5R	22µF	±20%	GRT188R60J226ME13#	D1

T max.	Rated Voltage		Cap.	Tol.	Part Number	
1.0mm	4Vdc	X6S	22µF	±20%	GRT188C80G226ME13#	

#### 2.0×1.25mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
1.35mm	50Vdc	X7R	1.0µF	±10%	GRT21BR71H105KE01#	
	25Vdc	X6S	2.2µF	±10%	GRT21BC81E225KA02#	
			4.7µF	±10%	GRT21BC81E475KA02#	
		X5R	2.2µF	±10%	GRT21BR61E225KA02#	
			4.7µF	±10%	GRT21BR61E475KA02#	
	16Vdc	X7R	2.2µF	±10%	GRT21BR71C225KE01#	
		X6S	2.2µF	±10%	GRT21BC81C225KA02#	
			4.7µF	±10%	GRT21BC81C475KA02#	
			10µF	±10%	GRT21BC81C106KE01#	D1
		X5R	2.2µF	±10%	GRT21BR61C225KA02#	
			4.7µF	±10%	GRT21BR61C475KA02#	
			10µF	±10%	GRT21BR61C106KE01#	
	10Vdc	X6S	10µF	±10%	GRT21BC81A106KE01#	
		X5R	10µF	±10%	GRT21BR61A106KE01#	
	6.3Vdc	X5R	10µF	±10%	GRT21BR60J106KE01#	
1.4mm	50Vdc	X5R	2.2µF	±10%	GRT21BR61H225KE13#	
			4.7µF	±10%	GRT21BR61H475KE13#	
	35Vdc	X6S	2.2µF	±10%	GRT21BC8YA225KE13#	
			4.7µF	±10%	GRT21BC8YA475KE13#	
	25Vdc	X7R	2.2µF	±10%	GRT21BR71E225KE13#	
		X5R	10µF	±10%	GRT21BR61E106KE13#	
	16Vdc	X7R	4.7µF	±10%	GRT21BR71C475KE13#	
	10Vdc	X7R	4.7µF	±10%	GRT21BR71A475KE13#	
			10µF	±10%	GRT21BR71A106KE13#	
		X5R	4.7µF	±10%	GRT21BR61A475KE13#	
			22µF	±20%	GRT21BR61A226ME13#	D1
	6.3Vdc	X7R	10µF	±10%	GRT21BR70J106KE13#	
		X5R	4.7µF	±10%	GRT21BR60J475KE13#	
			22µF	±20%	GRT21BR60J226ME13#	
1.45mm	25Vdc	X7S	10µF	±10%	GRT21BC71E106KE13#	D1
		X5R	22µF	±20%	GRT21BR61E226ME13#	
	16Vdc	X5R	22µF	±20%	GRT21BR61C226ME13#	
	10Vdc	X6S	22µF	±20%	GRT21BC81A226ME13#	
	6.3Vdc	X5R	47µF	±20%	GRT21BR60J476ME13#	D1
	4Vdc	X5R	47µF	±20%	GRT21BR60G476ME13#	

#### 3.2×1.6mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
1.8mm	50Vdc	X7R	2.2µF	±10%	GRT31CR71H225KE13#	
		X6S	2.2µF	±10%	GRT31CC81H225KE01#	
		X5R	10µF	±10%	GRT31CR61H106KE01#	
	35Vdc	X6S	10µF	±10%	GRT31CC8YA106KE01#	
		X5R	10µF	±10%	GRT31CR6YA106KE01#	
	25Vdc	X7R	10µF	±10%	GRT31CR71E106KE13#	
		X6S	10µF	±10%	GRT31CC81E106KE01#	
		X5R	10µF	±10%	GRT31CR61E106KE01#	

Part number # indicates the package specification code.

①Caution
/Notice



# GRT Series High Dielectric Constant Type 🐘 🐯 Part Number List

### (→ 3.2×1.6mm)

(								
T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number			
1.8mm	25Vdc	X5R	22µF	±10%	GRT31CR61E226KE01#			
	16Vdc	X6S	22µF	±10%	GRT31CC81C226KE01#			
		X5R	22µF	±10%	GRT31CR61C226KE01#			
	10Vdc	X6S	22µF	±10%	GRT31CC81A226KE01#			
		X5R	22µF	±10%	GRT31CR61A226KE01#			
			47µF	±10%	GRT31CR61A476KE13#			
	6.3Vdc	X7R	22µF	±10%	GRT31CR70J226KE13#			
		X6S	22µF	±10%	GRT31CC80J226KE01#			
					47µF	±10%	GRT31CC80J476KE13#	
		X5R	22µF	±10%	GRT31CR60J226KE01#			
			47µF	±10%	GRT31CR60J476KE13#			
	4Vdc	X6S	22µF	±10%	GRT31CC80G226KE01#			
			47µF	±20%	GRT31CC80G476ME01#			

#### 3.2×2.5mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
2.2mm	25Vdc	X6S	10µF	±10%	GRT32DC81E106KE01#	
		X5R	10µF	±10%	GRT32DR61E106KE01#	
	6.3Vdc	X5R	33µF	±20%	GRT32DR60J336ME01#	
2.7mm	50Vdc	X7R	4.7µF	±10%	GRT32ER71H475KE01#	
		X6S	4.7µF	±10%	GRT32EC81H475KE01#	
	16Vdc	X6S	47µF	±10%	GRT32EC81C476KE13#	D1
	10Vdc	X6S	47µF	±10%	GRT32EC81A476KE13#	
	6.3Vdc	X7R	47µF	±10%	GRT32ER70J476KE13#	
		X6S	47µF	±10%	GRT32EC80J476KE13#	
		X5R	100µF	±20%	GRT32ER60J107ME13#	



**GRT** Series

**GCM** Series

GC3 Series

**GCJ** Series

GCD Series

**GCE** Series

NMF Series

KCM Series

KC3 Series

KCA Series

#### Chip Multilayer Ceramic Capacitors for Automotive





## Capacitor for automotive applications such as power train and safety equipment.

#### Features

#### (1) Ideal for powertrains and safety devices in automotive.

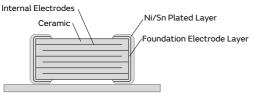
This product can be used for safety devices, such as the drive system control for engine ECU, air bags, and ABS. This product has cleared test conditions more severe than that of general products (GRM Series) even in temperature cycle and humidity load tests.

	General Purpose GRM Series Maximum operating temperature: <b>125°C</b>	GCM Series for Automotive Maximum operating temperature: <b>150°C</b>
Items	Test Method	Test Method
Temperature Cycle	Temperature Cycle: <b>5 cycles</b>	Temperature Cycle: <b>100 cycles</b> (1,000 cycles for AEC-Q200 conforming products)
Humidity Loading	Test temperature: <b>40±2°C</b> Test humidity: <b>90 to 95%RH</b> Test time: 500 hours	Test temperature: <b>85±2°C</b> Test humidity: <b>80 to 85%RH</b> Test time: 500 hours (1,000 hours for AEC-Q200 conforming products)

#### (2) Can be used at 125°C and 150°C temperatures.

We also offer a lineup for 150°C that can be used in the engine room.

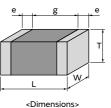
#### 3 Sn plating is applied to the external electrodes; excellent solderability.



<Example of Structure>

#### Specifications

Size	0.6×0.3mm to 5.7×5.0mm
Rated Voltage	4Vdc to 1000Vdc
Capacitance	0.10pF to 47µF
Main Applications	Safety equipment, such as drive system control, air bags, and ABS of engine ECU



## muRata

# GCM Series Temperature Compensating Type 🚟 🐯 Part Number List

0

#### 1.0×0.5mm

**GRT** Series

**GCM** Series

GC3 Series

**GCJ** Series

**GCD** Series

**GCE** Series

NMF Series

KCM Series

KC3 Series

KCA Series

GCG Series

①Caution/ Notice

1.0×0.5mm								
T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number			
0.55mm	50Vdc	COG	1.0pF	±0.25pF	GCM1555C1H1R0CA16#			
			2.0pF	±0.25pF	GCM1555C1H2R0CA16#			
			3.0pF	±0.25pF	GCM1555C1H3R0CA16#			
			4.0pF	±0.25pF	GCM1555C1H4R0CA16#			
			5.0pF	±0.25pF	GCM1555C1H5R0CA16#			
			6.0pF	±0.5pF	GCM1555C1H6R0DA16#			
			7.0pF	±0.5pF	GCM1555C1H7R0DA16#			
			8.0pF	±0.5pF	GCM1555C1H8R0DA16#			
			9.0pF	±0.5pF	GCM1555C1H9R0DA16#			
			10pF	±5%	GCM1555C1H100JA16#			
			12pF	±5%	GCM1555C1H120JA16#			
			15pF	±5%	GCM1555C1H150JA16#			
			18pF	±5%	GCM1555C1H180JA16#			
			22pF	±5%	GCM1555C1H220JA16#			
			27pF	±5%	GCM1555C1H270JA16#			
			33pF	±5%	GCM1555C1H330JA16#			
			39pF	±5%	GCM1555C1H390JA16#			
			47pF	±5%	GCM1555C1H470JA16#			
			56pF	±5%	GCM1555C1H560JA16#			
			68pF	±5%	GCM1555C1H680JA16#			
			82pF	±5%	GCM1555C1H820JA16#			
			100pF	±5%	GCM1555C1H101JA16#			
			120pF	±5%	GCM1555C1H121JA16#			
			150pF	±5%	GCM1555C1H151JA16#			
			180pF	±5%	GCM1555C1H181JA16#			
			220pF	±5%	GCM1555C1H221JA16#			
			270pF	±5%	GCM1555C1H271JA16#			
			330pF	±5%	GCM1555C1H331JA16#			
			390pF	±5%	GCM1555C1H391JA16#			
			470pF	±5%	GCM1555C1H471JA16#			
			560pF	±5%	GCM1555C1H561JA16#			
			680pF	±5%	GCM1555C1H681JA16#			
			820pF	±5%	GCM1555C1H821JA16#			
			1000pF	±5%	GCM1555C1H102JA16#			
		X8G	1.0pF	±0.25pF	GCM1555G1H1R0CA16#			
			2.0pF	±0.25pF	GCM1555G1H2R0CA16#			
			3.0pF	±0.25pF	GCM1555G1H3R0CA16#			
			4.0pF	±0.25pF	GCM1555G1H4R0CA16#			
			5.0pF	±0.25pF	GCM1555G1H5R0CA16#			
			12pF	±5%	GCM1555G1H120JA16#			
			15pF	±5%	GCM1555G1H150JA16#			
			18pF	±5%	GCM1555G1H180JA16#			
			22pF	±5%	GCM1555G1H220JA16#			
			27pF	±5%	GCM1555G1H270JA16#			
			33pF	±5%	GCM1555G1H330JA16#			
			39pF	±5%	GCM1555G1H390JA16#			
			47pF	±5%	GCM1555G1H470JA16#			
			56pF	±5%	GCM1555G1H560JA16#			
			68pF	±5%	GCM1555G1H680JA16#			
			82pF	±5%	GCM1555G1H820JA16#			
			100pF	±5%	GCM1555G1H101JA16#			
			120pF	±5%	GCM1555G1H121JA16#			

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
).55mm	50Vdc	X8G	150pF	±5%	GCM1555G1H151JA16#	
			180pF	±5%	GCM1555G1H181JA16#	
			220pF	±5%	GCM1555G1H221JA16#	
			270pF	±5%	GCM1555G1H271JA16#	
			330pF	±5%	GCM1555G1H331JA16#	
			390pF	±5%	GCM1555G1H391JA16#	
			470pF	±5%	GCM1555G1H471JA16#	
			560pF	±5%	GCM1555G1H561JA16#	
			680pF	±5%	GCM1555G1H681JA16#	
			820pF	±5%	GCM1555G1H821JA16#	
			1000pF	±5%	GCM1555G1H102JA16#	

#### 1.6×0.8mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
0.9mm	100Vdc	COG	1.0pF	±0.25pF	GCM1885C2A1R0CA16#	
			2.0pF	±0.25pF	GCM1885C2A2R0CA16#	
			3.0pF	±0.25pF	GCM1885C2A3R0CA16#	
			4.0pF	±0.25pF	GCM1885C2A4R0CA16#	
			5.0pF	±0.25pF	GCM1885C2A5R0CA16#	
			6.0pF	±0.5pF	GCM1885C2A6R0DA16#	
			7.0pF	±0.5pF	GCM1885C2A7R0DA16#	
			8.0pF	±0.5pF	GCM1885C2A8R0DA16#	
			9.0pF	±0.5pF	GCM1885C2A9R0DA16#	
			10pF	±5%	GCM1885C2A100JA16#	
			12pF	±5%	GCM1885C2A120JA16#	
			15pF	±5%	GCM1885C2A150JA16#	
			18pF	±5%	GCM1885C2A180JA16#	
			22pF	±5%	GCM1885C2A220JA16#	
			27pF	±5%	GCM1885C2A270JA16#	
			ЗЗрF	±5%	GCM1885C2A330JA16#	
			39pF	±5%	GCM1885C2A390JA16#	
			47pF	±5%	GCM1885C2A470JA16#	
			56pF	±5%	GCM1885C2A560JA16#	
			68pF	±5%	GCM1885C2A680JA16#	
			82pF	±5%	GCM1885C2A820JA16#	
			100pF	±5%	GCM1885C2A101JA16#	
			120pF	±5%	GCM1885C2A121JA16#	
			150pF	±5%	GCM1885C2A151JA16#	
			180pF	±5%	GCM1885C2A181JA16#	
			220pF	±5%	GCM1885C2A221JA16#	
			270pF	±5%	GCM1885C2A271JA16#	
			330pF	±5%	GCM1885C2A331JA16#	
			390pF	±5%	GCM1885C2A391JA16#	
			470pF	±5%	GCM1885C2A471JA16#	
			560pF	±5%	GCM1885C2A561JA16#	
			680pF	±5%	GCM1885C2A681JA16#	
			820pF	±5%	GCM1885C2A821JA16#	
			1000pF	±5%	GCM1885C2A102JA16#	
			1200pF	±5%	GCM1885C2A122JA16#	
			1500pF	±5%	GCM1885C2A152JA16#	
		U2J	1000pF	±5%	GCM1887U2A102JA16#	
			1200pF	±5%	GCM1887U2A122JA16#	

Part number # indicates the package specification code.



**GCM** Series

GC3 Series

**GCJ** Series

**GCD** Series

**GCE** Series

NMF Series

KCM Series

KC3 Series

KCA Series

**GCG** Series

①Caution
/Notice

## GCM Series Temperature Compensating Type 🚟 🐯 Part Number List

0.

#### (→ 1.6×0.8mm)

(→ 1.6 <b>×</b>	«0.8mm	I)			
T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
0.9mm	100Vdc	U2J	1500pF	±5%	GCM1887U2A152JA16#
			1800pF	±5%	GCM1887U2A182JA16#
			2200pF	±5%	GCM1887U2A222JA16#
			2700pF	±5%	GCM1887U2A272JA16#
			3300pF	±5%	GCM1887U2A332JA16#
			3900pF	±5%	GCM1887U2A392JA16#
			4700pF	±5%	GCM1887U2A472JA16#
			5600pF	±5%	GCM1887U2A562JA16#
			6800pF	±5%	GCM1887U2A682JA16#
			8200pF	±5%	GCM1887U2A822JA16#
			10000pF	±5%	GCM1887U2A103JA16#
	50Vdc	COG	1.0pF	±0.25pF	GCM1885C1H1R0CA16#
			2.0pF		GCM1885C1H2R0CA16#
			3.0pF		GCM1885C1H3R0CA16#
			4.0pF	±0.25pF	GCM1885C1H4R0CA16#
			5.0pF		GCM1885C1H5R0CA16#
			6.0pF		GCM1885C1H6R0DA16#
			7.0pF		GCM1885C1H7R0DA16#
			8.0pF		GCM1885C1H8R0DA16#
			9.0pF		GCM1885C1H9R0DA16#
			10pF	±5%	GCM1885C1H100JA16#
			12pF	±5%	GCM1885C1H120JA16#
				±5%	GCM1885C1H120JA16#
			15pF	±5%	GCM1885C1H180JA16#
			18pF	±5%	GCM1885C1H180JA16#
			22pF	±5%	GCM1885C1H270JA16#
			27pF		
			33pF	±5%	GCM1885C1H330JA16#
			39pF	±5%	GCM1885C1H390JA16#
			47pF	±5%	GCM1885C1H470JA16#
			56pF	±5%	GCM1885C1H560JA16#
			68pF	±5%	GCM1885C1H680JA16#
			82pF	±5%	GCM1885C1H820JA16#
			100pF		GCM1885C1H101JA16#
			120pF	±5%	GCM1885C1H121JA16#
			150pF	±5%	GCM1885C1H151JA16#
			180pF	±5%	GCM1885C1H181JA16#
			220pF	±5%	GCM1885C1H221JA16#
			270pF	±5%	GCM1885C1H271JA16#
			330pF	±5%	GCM1885C1H331JA16#
			390pF	±5%	GCM1885C1H391JA16#
			470pF	±5%	GCM1885C1H471JA16#
			560pF	±5%	GCM1885C1H561JA16#
			680pF	±5%	GCM1885C1H681JA16#
			820pF	±5%	GCM1885C1H821JA16#
			1000pF	±5%	GCM1885C1H102JA16#
			1200pF	±5%	GCM1885C1H122JA16#
			1500pF	±5%	GCM1885C1H152JA16#
			1800pF	±5%	GCM1885C1H182JA16#
			2200pF	±5%	GCM1885C1H222JA16#
			2700pF	±5%	GCM1885C1H272JA16#
			3300pF	±5%	GCM1885C1H332JA16#
			3900pF	±5%	GCM1885C1H392JA16#
		U2J	1000pF	±5%	GCM1887U1H102JA16#
			1200pF	±5%	GCM1887U1H122JA16#

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
.9mm	50Vdc	U2J	1500pF	±5%	GCM1887U1H152JA16#	
			1800pF	±5%	GCM1887U1H182JA16#	
			2200pF	±5%	GCM1887U1H222JA16#	
			2700pF	±5%	GCM1887U1H272JA16#	
			3300pF	±5%	GCM1887U1H332JA16#	
			3900pF	±5%	GCM1887U1H392JA16#	
			4700pF	±5%	GCM1887U1H472JA16#	
			5600pF	±5%	GCM1887U1H562JA16#	
			6800pF	±5%	GCM1887U1H682JA16#	
			8200pF	±5%	GCM1887U1H822JA16#	
			10000pF	±5%	GCM1887U1H103JA16#	

#### 2.0×1.25mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
0.7mm	100Vdc	COG	100pF	±5%	GCM2165C2A101JA16#	
			120pF	±5%	GCM2165C2A121JA16#	
			150pF	±5%	GCM2165C2A151JA16#	
			180pF	±5%	GCM2165C2A181JA16#	
			220pF	±5%	GCM2165C2A221JA16#	
			270pF	±5%	GCM2165C2A271JA16#	
			330pF	±5%	GCM2165C2A331JA16#	
			390pF	±5%	GCM2165C2A391JA16#	
			470pF	±5%	GCM2165C2A471JA16#	
			560pF	±5%	GCM2165C2A561JA16#	
			680pF	±5%	GCM2165C2A681JA16#	
			820pF	±5%	GCM2165C2A821JA16#	
			1000pF	±5%	GCM2165C2A102JA16#	
			1200pF	±5%	GCM2165C2A122JA16#	
			1500pF	±5%	GCM2165C2A152JA16#	
			1800pF	±5%	GCM2165C2A182JA16#	
			2200pF	±5%	GCM2165C2A222JA16#	
			2700pF	±5%	GCM2165C2A272JA16#	
			3300pF	±5%	GCM2165C2A332JA16#	
	50Vdc	COG	4700pF	±5%	GCM2165C1H472JA16#	
0.95mm	100Vdc	ZLM	1000pF	±10%	GCM2199E2A102KA05#	
				±20%	GCM2199E2A102MA05#	
			1100pF	±10%	GCM2199E2A112KA05#	
				±20%	GCM2199E2A112MA05#	
			1200pF	±10%	GCM2199E2A122KA05#	
				±20%	GCM2199E2A122MA05#	
			1300pF	±10%	GCM2199E2A132KA05#	
				±20%	GCM2199E2A132MA05#	
			1500pF	±10%	GCM2199E2A152KA05#	
				±20%	GCM2199E2A152MA05#	
	80Vdc	C0G	15000pF	±5%	GCM2195C1K153JA16#	
	63Vdc	COG	15000pF	±5%	GCM2195C1J153JA16#	
	50Vdc	COG	5600pF	±5%	GCM2195C1H562JA16#	
			6800pF	±5%	GCM2195C1H682JA16#	
			8200pF	±5%	GCM2195C1H822JA16#	
			10000pF	±5%	GCM2195C1H103JA16#	
			12000pF	±5%	GCM2195C1H123JA16#	
			15000pF	±5%	GCM2195C1H153JA16#	

Part number # indicates the package specification code.



## GCM Series Temperature Compensating Type 🚟 🐯 Part Number List

## (→ 2.0×1.25mm)

**GRT** Series

**GCM** Series

GC3 Series

**GCJ** Series

**GCD** Series

**GCE** Series

NMF Series

KCM Series

KC3 Series

KCA Series

GCG Series

①Caution/ Notice

(→ 2.0 <b>›</b>	<1.25m	m)			
T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
1.0mm	630Vdc	COG	10pF	±5%	GCM21A5C2J100JX01#
			12pF	±5%	GCM21A5C2J120JX01#
			15pF	±5%	GCM21A5C2J150JX01#
			18pF	±5%	GCM21A5C2J180JX01#
			22pF	±5%	GCM21A5C2J220JX01#
			27pF	±5%	GCM21A5C2J270JX01#
			33pF	±5%	GCM21A5C2J330JX01#
			39pF	±5%	GCM21A5C2J390JX01#
			47pF	±5%	GCM21A5C2J470JX01#
			56pF	±5%	GCM21A5C2J560JX01#
			68pF	±5%	GCM21A5C2J680JX01#
			82pF	±5%	GCM21A5C2J820JX01#
			100pF	±5%	GCM21A5C2J101JX01#
			120pF	±5%	GCM21A5C2J121JX01#
			150pF	±5%	GCM21A5C2J151JX01#
			180pF	±5%	GCM21A5C2J181JX01#
			220pF	±5%	GCM21A5C2J221JX01#
			270pF	±5 %	GCM21A5C2J221JX01#
				±5%	GCM21A5C2J331JX01#
			330pF		
			390pF	±5%	GCM21A5C2J391JX01#
			470pF	±5%	GCM21A5C2J471JX01#
	25011		560pF	±5%	GCM21A5C2J561JX01#
	250Vdc	COG	10pF	±5%	GCM21A5C2E100JX01#
			12pF	±5%	GCM21A5C2E120JX01#
			15pF	±5%	GCM21A5C2E150JX01#
			18pF	±5%	GCM21A5C2E180JX01#
			22pF	±5%	GCM21A5C2E220JX01#
			27pF	±5%	GCM21A5C2E270JX01#
			33pF	±5%	GCM21A5C2E330JX01#
			39pF	±5%	GCM21A5C2E390JX01#
			47pF	±5%	GCM21A5C2E470JX01#
			56pF	±5%	GCM21A5C2E560JX01#
			68pF	±5%	GCM21A5C2E680JX01#
			82pF	±5%	GCM21A5C2E820JX01#
			100pF	±5%	GCM21A5C2E101JX01#
			120pF	±5%	GCM21A5C2E121JX01#
			150pF	±5%	GCM21A5C2E151JX01#
			180pF	±5%	GCM21A5C2E181JX01#
			220pF	±5%	GCM21A5C2E221JX01#
			270pF	±5%	GCM21A5C2E271JX01#
			330pF	±5%	GCM21A5C2E331JX01#
			390pF	±5%	GCM21A5C2E391JX01#
			470pF	±5%	GCM21A5C2E471JX01#
			560pF	±5%	GCM21A5C2E561JX01#
			680pF	±5%	GCM21A5C2E681JX01#
			820pF	±5%	GCM21A5C2E821JX01#
			1000pF	±5%	GCM21A5C2E102JX01#
			1200pF	±5%	GCM21A5C2E122JX01#
			1500pF	±5%	GCM21A5C2E152JX01#
			1800pF	±5%	GCM21A5C2E182JX01#
			2200pF	±5%	GCM21A5C2E222JX01#
			2700pF	±5%	GCM21A5C2E272JX01#
		U2J	100pF	±5%	GCM21A3C2E272JX01#
			120pF	±5%	GCM21A7U2E121JX01#

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
1.0mm	250Vdc	U2J	150pF	±5%	GCM21A7U2E151JX01#	
			180pF	±5%	GCM21A7U2E181JX01#	
			220pF	±5%	GCM21A7U2E221JX01#	
			270pF	±5%	GCM21A7U2E271JX01#	
			330pF	±5%	GCM21A7U2E331JX01#	
			390pF	±5%	GCM21A7U2E391JX01#	
			470pF	±5%	GCM21A7U2E471JX01#	
			560pF	±5%	GCM21A7U2E561JX01#	
			680pF	±5%	GCM21A7U2E681JX01#	
			820pF	±5%	GCM21A7U2E821JX01#	
			1000pF	±5%	GCM21A7U2E102JX01#	
			1200pF	±5%	GCM21A7U2E122JX01#	
			1500pF	±5%	GCM21A7U2E152JX01#	
			1800pF	±5%	GCM21A7U2E182JX01#	
			2200pF	±5%	GCM21A7U2E222JX01#	
1.4mm	80Vdc	C0G	18000pF	±5%	GCM21B5C1K183JA16#	
			20000pF	±5%	GCM21B5C1K203JA16#	
			22000pF	±5%	GCM21B5C1K223JA16#	
	63Vdc	C0G	18000pF	±5%	GCM21B5C1J183JA16#	
			20000pF	±5%	GCM21B5C1J203JA16#	
			22000pF	±5%	GCM21B5C1J223JA16#	
	50Vdc	C0G	18000pF	±5%	GCM21B5C1H183JA16#	
			22000pF	±5%	GCM21B5C1H223JA16#	
1.45mm	630Vdc	COG	680pF	±5%	GCM21B5C2J681JX03#	
			820pF	±5%	GCM21B5C2J821JX03#	
			1000pF	±5%	GCM21B5C2J102JX03#	
			1200pF	±5%	GCM21B5C2J122JX03#	
	250Vdc	COG	3300pF	±5%	GCM21B5C2E332JX01#	
			3900pF	±5%	GCM21B5C2E392JX01#	
			4700pF	±5%	GCM21B5C2E472JX01#	
		U2J	2700pF	±5%	GCM21B7U2E272JX03#	
			3300pF	±5%	GCM21B7U2E332JX03#	
			3900pF	±5%	GCM21B7U2E392JX03#	
			4700pF	±5%	GCM21B7U2E472JX03#	
			5600pF	±5%	GCM21B7U2E562JX03#	

#### 3.2×1.6mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
0.95mm	100Vdc	COG	3900pF	±5%	GCM3195C2A392JA16#
			4700pF	±5%	GCM3195C2A472JA16#
			5600pF	±5%	GCM3195C2A562JA16#
			6800pF	±5%	GCM3195C2A682JA16#
			8200pF	±5%	GCM3195C2A822JA16#
			10000pF	±5%	GCM3195C2A103JA16#
	80Vdc	COG	33000pF	±5%	GCM3195C1K333JA16#
1.0mm	1000Vdc	COG	10pF	±5%	GCM31A5C3A100JX01#
			12pF	±5%	GCM31A5C3A120JX01#
			15pF	±5%	GCM31A5C3A150JX01#
			18pF	±5%	GCM31A5C3A180JX01#
			22pF	±5%	GCM31A5C3A220JX01#
			27pF	±5%	GCM31A5C3A270JX01#
			33pF	±5%	GCM31A5C3A330JX01#

Part number # indicates the package specification code.



**GCM** Series

GC3 Series

**GCJ** Series

**GCD** Series

**GCE** Series

NMF Series

KCM Series

KC3 Series

KCA Series

GCG Series

## GCM Series Temperature Compensating Type 🚟 🐯 Part Number List

ma>

1.0mr

muRata

#### (→ 3.2×1.6mm)

(→ 3.2×	×1.6mm	)			
T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
1.0mm	1000Vdc	COG	39pF	±5%	GCM31A5C3A390JX01#
			47pF	±5%	GCM31A5C3A470JX01#
			56pF	±5%	GCM31A5C3A560JX01#
			68pF	±5%	GCM31A5C3A680JX01#
			82pF	±5%	GCM31A5C3A820JX01#
			100pF	±5%	GCM31A5C3A101JX01#
			120pF	±5%	GCM31A5C3A121JX01#
			150pF	±5%	GCM31A5C3A151JX01#
			180pF	±5%	GCM31A5C3A181JX01#
			220pF	±5%	GCM31A5C3A221JX01#
			270pF	±5%	GCM31A5C3A271JX01#
			330pF	±5%	GCM31A5C3A331JX01#
				±5%	GCM31A5C3A391JX01#
			390pF	±5%	GCM31A5C3A471JX01#
			470pF		
		U2J	10pF	±5%	GCM31A7U3A100JX01#
			12pF	±5%	GCM31A7U3A120JX01#
			15pF	±5%	GCM31A7U3A150JX01#
			18pF	±5%	GCM31A7U3A180JX01#
			22pF	±5%	GCM31A7U3A220JX01#
			27pF	±5%	GCM31A7U3A270JX01#
			33pF	±5%	GCM31A7U3A330JX01#
			39pF	±5%	GCM31A7U3A390JX01#
			47pF	±5%	GCM31A7U3A470JX01#
			56pF	±5%	GCM31A7U3A560JX01#
			68pF	±5%	GCM31A7U3A680JX01#
			82pF	±5%	GCM31A7U3A820JX01#
			100pF	±5%	GCM31A7U3A101JX01#
			120pF	±5%	GCM31A7U3A121JX01#
			150pF	±5%	GCM31A7U3A151JX01#
			180pF	±5%	GCM31A7U3A181JX01#
			220pF	±5%	GCM31A7U3A221JX01#
			270pF	±5%	GCM31A7U3A271JX01#
			330pF	±5%	GCM31A7U3A331JX01#
	630Vdc	COG	-		GCM31A5C2J100JX01#
	030740	COG	10pF	±5%	
			12pF	±5%	GCM31A5C2J120JX01#
			15pF	±5%	GCM31A5C2J150JX01#
			18pF	±5%	GCM31A5C2J180JX01#
			22pF	±5%	GCM31A5C2J220JX01#
			27pF	±5%	GCM31A5C2J270JX01#
			33pF	±5%	GCM31A5C2J330JX01#
			39pF	±5%	GCM31A5C2J390JX01#
			47pF	±5%	GCM31A5C2J470JX01#
			56pF	±5%	GCM31A5C2J560JX01#
			68pF	±5%	GCM31A5C2J680JX01#
			82pF	±5%	GCM31A5C2J820JX01#
			100pF	±5%	GCM31A5C2J101JX01#
			120pF	±5%	GCM31A5C2J121JX01#
			150pF	±5%	GCM31A5C2J151JX01#
			180pF	±5%	GCM31A5C2J181JX01#
			220pF	±5%	GCM31A5C2J221JX01#
			270pF	±5%	GCM31A5C2J271JX01#
			270pF 330pF	±5%	GCM31A5C2J271JX01#
			390pF	±5%	GCM31A5C2J391JX01#
			470pF	±5%	GCM31A5C2J471JX01#

<ul> <li>Martian Sampa Para Para Para Para Para Para Para Pa</li></ul>		Rated Voltage	TC Code	Cap.	Tol.	Part Number	
820pf         ±5%         GCM31A5C2J82JX01#           1000pF         ±5%         GCM31A5C2J102JX01#           1200pF         ±5%         GCM31A5C2J122JX01#           1800pF         ±5%         GCM31A5C2J122JX01#           1800pF         ±5%         GCM31A7C2J100JX01#           12pF         ±5%         GCM31A7U2J10JX01#           12pF         ±5%         GCM31A7U2J20JX01#           12pF         ±5%         GCM31A7U2J20JX01#           12pF         ±5%         GCM31A7U2J30JX01#           12pF         ±5%         GCM31A7U2J30JX01#           22pF         ±5%         GCM31A7U2J30JX01#           33pF         ±5%         GCM31A7U2J30JX01#           33pF         ±5%         GCM31A7U2J30JX01#           47pF         ±5%         GCM31A7U2J30JX01#           56pF         ±5%         GCM31A7U2J30JX01#           100pF         ±5%         GCM31A7U2J30JX01#           100pF         ±5%         GCM31A7U2J31JX01#           120pF         ±5%         GCM31A7U2J31JX01#           30pF         ±5%         GCM31A7U2J33JX01#           30pF         ±5%         GCM31A7U2J33JX01#           30pF         ±5%         GCM31A7U2J33JX01#	m	630Vdc	COG	560pF	±5%	GCM31A5C2J561JX01#	
1000pF         ±5%         GCM31A5C2J102JX01#           1200pF         ±5%         GCM31A5C2J152JX01#           1800pF         ±5%         GCM31A5C2J152JX01#           122         10pF         ±5%         GCM31A7U2J100JX01#           12pF         ±5%         GCM31A7U2J120JX01#         1           12pF         ±5%         GCM31A7U2J20JX01#         1           12pF         ±5%         GCM31A7U2J20JX01#         1           22pF         ±5%         GCM31A7U2J30JX01#         1           22pF         ±5%         GCM31A7U2J30JX01#         1           33pF         ±5%         GCM31A7U2J30JX01#         1           33pF         ±5%         GCM31A7U2J30JX01#         1           47pF         ±5%         GCM31A7U2J30JX01#         1           56pF         ±5%         GCM31A7U2J15UX01#         1           100pF         ±5%         GCM31A7U2J15UX01#         1           120pF         ±5%         GCM31A7U2J15UX01#         1           120pF         ±5%         GCM31A7U2J33UX01#         1           130pF         ±5%         GCM31A7U2J33UX01#         1           120pF         ±5%         GCM31A7U2J33UX01#         1     <				680pF	±5%	GCM31A5C2J681JX01#	
1200pF±5%GCM31A5C2J12JX01#1500pF±5%GCM31A5C2J152JX01#1800pF±5%GCM31A7U2J100JX01#12pF±5%GCM31A7U2J120JX01#15pF±5%GCM31A7U2J120JX01#15pF±5%GCM31A7U2J20JX01#22pF±5%GCM31A7U2J30JX01#33pF±5%GCM31A7U2J30JX01#33pF±5%GCM31A7U2J30JX01#33pF±5%GCM31A7U2J30JX01#47pF±5%GCM31A7U2J30JX01#100pF±5%GCM31A7U2J30JX01#100pF±5%GCM31A7U2J30JX01#100pF±5%GCM31A7U2J30JX01#100pF±5%GCM31A7U2J30JX01#120pF±5%GCM31A7U2J30JX01#120pF±5%GCM31A7U2J31JX01#120pF±5%GCM31A7U2J31JX01#120pF±5%GCM31A7U2J31JX01#130pF±5%GCM31A7U2J33JX01#300pF±5%GCM31A7U2J33JX01#300pF±5%GCM31A7U2J361JX01#1000pF±5%GCM31A7U2J32JX01#1000pF±5%GCM31A7U2J32JX01#1200pF±5%GCM31A7U2J32JX01#1200pF±5%GCM31A7U2J32JX01#1200pF±5%GCM31A7U2J32JX01#1200pF±5%GCM31A7U2J32JX01#1200pF±5%GCM31A7U2J32JX01#1200pF±5%GCM31A7U2J32JX01#1200pF±5%GCM31A7U2J32JX01#1200pF±5%GCM31A7U2J32JX01#120pF±5%GCM31A7U2J32JX01#13pF <td></td> <td></td> <td></td> <td>820pF</td> <td>±5%</td> <td>GCM31A5C2J821JX01#</td> <td></td>				820pF	±5%	GCM31A5C2J821JX01#	
<ul> <li>ISOOpF</li> <li>1500pF</li> /ul>				1000pF	±5%	GCM31A5C2J102JX01#	
1800pF±5%GCM31ASC2J182JX01#U2J10pF±5%GCM31A7U2J100JX01#12pF±5%GCM31A7U2J150JX01#18pF±5%GCM31A7U2J180JX01#22pF±5%GCM31A7U2J20JX01#23pF±5%GCM31A7U2J20JX01#33pF±5%GCM31A7U2J30JX01#33pF±5%GCM31A7U2J30JX01#33pF±5%GCM31A7U2J30JX01#47pF±5%GCM31A7U2J60JX01#56pF±5%GCM31A7U2J60JX01#100pF±5%GCM31A7U2J60JX01#120pF±5%GCM31A7U2J10JX01#150pF±5%GCM31A7U2J10JX01#150pF±5%GCM31A7U2J10JX01#130pF±5%GCM31A7U2J10JX01#130pF±5%GCM31A7U2J13JX01#30pF±5%GCM31A7U2J33JX01#30pF±5%GCM31A7U2J33JX01#30pF±5%GCM31A7U2J33JX01#30pF±5%GCM31A7U2J351JX01#30pF±5%GCM31A7U2J351JX01#30pF±5%GCM31A7U2J351JX01#1000pF±5%GCM31A7U2J162JX01#1000pF±5%GCM31A7U2J12ZJX01#1000pF±5%GCM31A7U2J12ZJX01#1200pF±5%GCM31A7U2J12ZJX01#1200pF±5%GCM31A7U2J12ZJX01#1200pF±5%GCM31A7U2J12ZJX01#1200pF±5%GCM31A7U2J12ZJX01#1200pF±5%GCM31A7U2J12ZJX01#1200pF±5%GCM31A7U2J12ZJX01#1200pF±5%GCM31A7U2J12ZJX01#<				1200pF	±5%	GCM31A5C2J122JX01#	
U2J10pF±5%GCM31A7U2J100JX01#12pF±5%GCM31A7U2J120JX01#18pF±5%GCM31A7U2J130JX01#22pF±5%GCM31A7U2J20JX01#23pF±5%GCM31A7U2J20JX01#33pF±5%GCM31A7U2J30JX01#33pF±5%GCM31A7U2J30JX01#47pF±5%GCM31A7U2J30JX01#68pF±5%GCM31A7U2J60JX01#100pF±5%GCM31A7U2J60JX01#100pF±5%GCM31A7U2J160JX01#120pF±5%GCM31A7U2J10JX01#120pF±5%GCM31A7U2J10JX01#130pF±5%GCM31A7U2J10JX01#130pF±5%GCM31A7U2J10JX01#130pF±5%GCM31A7U2J10JX01#130pF±5%GCM31A7U2J10JX01#30pF±5%GCM31A7U2J33JX01#30pF±5%GCM31A7U2J33JX01#30pF±5%GCM31A7U2J33JX01#30pF±5%GCM31A7U2J351JX01#30pF±5%GCM31A7U2J351JX01#30pF±5%GCM31A7U2J351JX01#1000pF±5%GCM31A7U2J32JX01#1000pF±5%GCM31A7U2J32JX01#1200pF±5%GCM31A7U2J32JX01#1200pF±5%GCM31A7U2J32JX01#1200pF±5%GCM31A7U2J32JX01#1200pF±5%GCM31A7U2J32JX01#1200pF±5%GCM31A7U2J32JX01#1200pF±5%GCM31A7U2J32JX01#1200pF±5%GCM31A7U2J32JX01#1200pF±5%GCM31A7U2J32JX01#120				1500pF	±5%	GCM31A5C2J152JX01#	
<ul> <li>I2pF</li> <li>15pF</li> <li< td=""><td></td><td></td><td></td><td>1800pF</td><td>±5%</td><td>GCM31A5C2J182JX01#</td><td></td></li<></ul>				1800pF	±5%	GCM31A5C2J182JX01#	
15pF ±5% GCM31A7U2J150JX01#   18pF ±5% GCM31A7U2J150JX01#   12pF ±5% GCM31A7U2J20JX01#   27pF ±5% GCM31A7U2J30JX01#   33pF ±5% GCM31A7U2J30JX01#   33pF ±5% GCM31A7U2J30JX01#   33pF ±5% GCM31A7U2J30JX01#   33pF ±5% GCM31A7U2J30JX01#   39pF ±5% GCM31A7U2J60JX01#   47pF ±5% GCM31A7U2J60JX01#   56pF ±5% GCM31A7U2J60JX01#   100pF ±5% GCM31A7U2J101JX01#   120pF ±5% GCM31A7U2J101JX01#   120pF ±5% GCM31A7U2J101JX01#   130pF ±5% GCM31A7U2J211JX01#   130pF ±5% GCM31A7U2J211JX01#   130pF ±5% GCM31A7U2J31JX01#   130pF ±5% GCM31A7U2J31X01#   120pF ±5% GCM31A7U2J31X01#   100pF ±5% GCM31A7U2J32X01#   100pF ±5% GCM31A7U2J32X01#   120pF ±5% GCM31A7U2J32X01#   120pF ±5% GCM31A7U2J32X01#   120pF ±5% GCM31A7U2J32X01#   120pF ±5% GCM31A5C2E10JX01#   120pF ±5% GCM31A5C2E10JX01#   13pF ±5% GCM3			U2J	10pF	±5%	GCM31A7U2J100JX01#	
18pF         15%         GCM31A7U2J180JX01#           22pF         15%         GCM31A7U2J220JX01#           27pF         15%         GCM31A7U2J270JX01#           33pF         15%         GCM31A7U2J30JX01#           33pF         15%         GCM31A7U2J30JX01#           33pF         15%         GCM31A7U2J30JX01#           47pF         15%         GCM31A7U2J60JX01#           56pF         15%         GCM31A7U2J60JX01#           100pF         15%         GCM31A7U2J820JX01#           120pF         15%         GCM31A7U2J101JX01#           120pF         15%         GCM31A7U2J101JX01#           180pF         15%         GCM31A7U2J101JX01#           180pF         15%         GCM31A7U2J101JX01#           220pF         15%         GCM31A7U2J331JX01#           330pF         15%         GCM31A7U2J331JX01#           300pF         15%         GCM31A7U2J331JX01#           300pF         15%         GCM31A7U2J331JX01#           300pF         15%         GCM31A7U2J331JX01#           1000pF         15%         GCM31A7U2J331JX01#           1200pF         15%         GCM31A7U2J30JX01#           1200pF         15%         GCM31A7U2J				12pF	±5%	GCM31A7U2J120JX01#	_
22pF         15%         GCM31A7U2J220JX01#         1           27pF         15%         GCM31A7U2J270JX01#         1           33pF         15%         GCM31A7U2J330JX01#         1           33pF         15%         GCM31A7U2J30JX01#         1           47pF         15%         GCM31A7U2J30JX01#         1           47pF         15%         GCM31A7U2J680JX01#         1           68pF         15%         GCM31A7U2J820JX01#         1           100pF         15%         GCM31A7U2J820JX01#         1           120pF         15%         GCM31A7U2J820JX01#         1           120pF         15%         GCM31A7U2J820JX01#         1           120pF         15%         GCM31A7U2J820JX01#         1           120pF         15%         GCM31A7U2J820JX01#         1           130pF         15%         GCM31A7U2J820JX01#         1           330pF         15%         GCM31A7U2J30JX01#         1           300pF         15%         GCM31A7U2J30JX01#         1           300pF         15%         GCM31A7U2J30JX01#         1           1000pF         15%         GCM31A7U2J30JX01#         1           1000pF         15% </td <td></td> <td></td> <td></td> <td>15pF</td> <td>±5%</td> <td>GCM31A7U2J150JX01#</td> <td></td>				15pF	±5%	GCM31A7U2J150JX01#	
27pF         15%         GCM31A7U2J270JX01#         1           33pF         15%         GCM31A7U2J330JX01#         1           33pF         15%         GCM31A7U2J30JX01#         1           47pF         15%         GCM31A7U2J30JX01#         1           47pF         15%         GCM31A7U2J680JX01#         1           68pF         15%         GCM31A7U2J820JX01#         1           100pF         15%         GCM31A7U2J101JX01#         1           120pF         15%         GCM31A7U2J101JX01#         1           120pF         15%         GCM31A7U2J211JX01#         1           120pF         15%         GCM31A7U2J211JX01#         1           120pF         15%         GCM31A7U2J31JX01#         1           130pF         15%         GCM31A7U2J31JX01#         1           330pF         15%         GCM31A7U2J31JX01#         1           330pF         15%         GCM31A7U2J31X01#         1           300pF         15%         GCM31A7U2J31X01#         1           1000pF         15%         GCM31A7U2J31X01#         1           1000pF         15%         GCM31A7U2J32JX01#         1           1200pF         15%				18pF	±5%	GCM31A7U2J180JX01#	
133PF 15% 33PF 15% 33PF 15% 39PF 15% 39PF 15% 39PF 15% 30PF 15% <td></td> <td></td> <td></td> <td>22pF</td> <td>±5%</td> <td>GCM31A7U2J220JX01#</td> <td></td>				22pF	±5%	GCM31A7U2J220JX01#	
1907 15% GCM31A7U2J390JX01#       39pF     15%     GCM31A7U2J390JX01#       47pF     15%     GCM31A7U2J60JX01#       56pF     15%     GCM31A7U2J60JX01#       68pF     15%     GCM31A7U2J820JX01#       100pF     15%     GCM31A7U2J820JX01#       120pF     15%     GCM31A7U2J12JX01#       120pF     15%     GCM31A7U2J12JX01#       150pF     15%     GCM31A7U2J13JX01#       180pF     15%     GCM31A7U2J13JX01#       220pF     15%     GCM31A7U2J31JX01#       220pF     15%     GCM31A7U2J31JX01#       330pF     15%     GCM31A7U2J31JX01#       330pF     15%     GCM31A7U2J31JX01#       390pF     15%     GCM31A7U2J31JX01#       390pF     15%     GCM31A7U2J31JX01#       390pF     15%     GCM31A7U2J31JX01#       300pF     15%     GCM31A7U2J31JX01#       1000pF     15%     GCM31A7U2J32JX01#       1000pF     15%     GCM31A7U2J32JX01#       1200pF				27pF	±5%	GCM31A7U2J270JX01#	
47pF         15%         GCM31A7U2J470JX01#           56pF         15%         GCM31A7U2J560JX01#           68pF         15%         GCM31A7U2J680JX01#           100pF         15%         GCM31A7U2J1630JX01#           120pF         15%         GCM31A7U2J11X01#           120pF         15%         GCM31A7U2J31JX01#           130pF         15%         GCM31A7U2J31JX01#           330pF         15%         GCM31A7U2J31JX01#           390pF         15%         GCM31A7U2J31JX01#           300pF         15%         GCM31A7U2J31JX01#           1000pF         15%         GCM31A7U2J31X01#           1000pF         15%         GCM31A7U2J31X01#           1200pF         15%         GCM31A7U2J32JX01#           1200pF         15%         GCM31A7U2J32JX01#           1200pF         15%         GCM31A7U2J32JX01#           1200pF         15%         GCM31A7U2J32JX01# </td <td></td> <td></td> <td></td> <td>33pF</td> <td>±5%</td> <td>GCM31A7U2J330JX01#</td> <td></td>				33pF	±5%	GCM31A7U2J330JX01#	
Sop         15%         GCM31A7U2J560JX01#         1           68PF         ±5%         GCM31A7U2J680JX01#         1           82pF         ±5%         GCM31A7U2J680JX01#         1           100pF         ±5%         GCM31A7U2J101JX01#         1           120pF         ±5%         GCM31A7U2J112JX01#         1           120pF         ±5%         GCM31A7U2J11X01#         1           120pF         ±5%         GCM31A7U2J11X01#         1           120pF         ±5%         GCM31A7U2J11X01#         1           120pF         ±5%         GCM31A7U2J31JX01#         1           220pF         ±5%         GCM31A7U2J31JX01#         1           330pF         ±5%         GCM31A7U2J31JX01#         1           330pF         ±5%         GCM31A7U2J31JX01#         1           300pF         ±5%         GCM31A7U2J31JX01#         1           680pF         ±5%         GCM31A7U2J31X01#         1           1000pF         ±5%         GCM31A7U2J32JX01#         1           1200pF         ±5%         GCM31A7U2J32JX01#         1           1200pF         ±5%         GCM31A7U2J32JX01#         1           1200pF         ±5%				39pF	±5%	GCM31A7U2J390JX01#	
68pF±5%GCM31A7U2J680JX01#82pF±5%GCM31A7U2J820JX01#100pF±5%GCM31A7U2J101JX01#120pF±5%GCM31A7U2J121JX01#150pF±5%GCM31A7U2J121JX01#180pF±5%GCM31A7U2J211JX01#220pF±5%GCM31A7U2J31JX01#200pF±5%GCM31A7U2J31JX01#300pF±5%GCM31A7U2J31JX01#300pF±5%GCM31A7U2J31JX01#300pF±5%GCM31A7U2J31JX01#470pF±5%GCM31A7U2J31JX01#560pF±5%GCM31A7U2J681JX01#1000pF±5%GCM31A7U2J681JX01#1000pF±5%GCM31A7U2J102JX01#1000pF±5%GCM31A7U2J122JX01#1000pF±5%GCM31A7U2J122JX01#1000pF±5%GCM31A7U2J122JX01#1200pF±5%GCM31A7U2J122JX01#1200pF±5%GCM31A7U2J122JX01#1200pF±5%GCM31A7U2J122JX01#1200pF±5%GCM31A7U2J122JX01#1200pF±5%GCM31A5C2E10JX01#1200pF±5%GCM31A5C2E10JX01#120pF±5%GCM31A5C2E10JX01#120pF±5%GCM31A5C2E30JX01#130pF±5%GCM31A5C2E30JX01#120pF±5%GCM31A5C2E30JX01#120pF±5%GCM31A5C2E30JX01#120pF±5%GCM31A5C2E30JX01#120pF±5%GCM31A5C2E30JX01#120pF±5%GCM31A5C2E30JX01#120pF±5%GCM31A5C2E10JX01#				47pF	±5%	GCM31A7U2J470JX01#	
82pF         ±5%         GCM31A7U2J820JX01#         1           100pF         ±5%         GCM31A7U2J101JX01#         1           120pF         ±5%         GCM31A7U2J151JX01#         1           150pF         ±5%         GCM31A7U2J151JX01#         1           180pF         ±5%         GCM31A7U2J151JX01#         1           220pF         ±5%         GCM31A7U2J21X01#         1           220pF         ±5%         GCM31A7U2J27JX01#         1           330pF         ±5%         GCM31A7U2J331JX01#         1           330pF         ±5%         GCM31A7U2J391JX01#         1           330pF         ±5%         GCM31A7U2J391JX01#         1           470pF         ±5%         GCM31A7U2J391JX01#         1           680pF         ±5%         GCM31A7U2J301JX1#         1           1000pF         ±5%         GCM31A7U2J20X1#         1           1200pF         ±5%         GCM31A7U2J102JX01#         1           1200pF         ±5%         GCM31A7U2J122JX01#         1           1200pF         ±5%         GCM31A7U2J122JX01#         1           1200pF         ±5%         GCM31A7U2J122JX01#         1           1200pF				56pF	±5%	GCM31A7U2J560JX01#	
100pF         ±5%         GCM31A7U2J101JX01#         1           120pF         ±5%         GCM31A7U2J121JX01#         1           150pF         ±5%         GCM31A7U2J151JX01#         1           180pF         ±5%         GCM31A7U2J151JX01#         1           220pF         ±5%         GCM31A7U2J21JX01#         1           220pF         ±5%         GCM31A7U2J31JX01#         1           270pF         ±5%         GCM31A7U2J31JX01#         1           330pF         ±5%         GCM31A7U2J31JX01#         1           330pF         ±5%         GCM31A7U2J31JX01#         1           390pF         ±5%         GCM31A7U2J31JX01#         1           470pF         ±5%         GCM31A7U2J31JX01#         1           680pF         ±5%         GCM31A7U2J301X01#         1           1000pF         ±5%         GCM31A7U2J102JX01#         1           1200pF         ±5%         GCM31A7U2J102JX01#         1           1200pF         ±5%         GCM31A7U2J122XJX01#         1           1200pF         ±5%         GCM31A7U2J122JX01#         1           1200pF         ±5%         GCM31A7U2J122ZJX01#         1           1200pF				68pF	±5%	GCM31A7U2J680JX01#	
120pF ±5% GCM31A7U2J121JX01# 150pF ±5% GCM31A7U2J151JX01# 180pF ±5% GCM31A7U2J151JX01# 220pF ±5% GCM31A7U2J21JX01# 220pF ±5% GCM31A7U2J27JJX01# 330pF ±5% GCM31A7U2J31JX01# 330pF ±5% GCM31A7U2J31JX01# 470pF ±5% GCM31A7U2J31JX01# 560pF ±5% GCM31A7U2J61JX01# 820pF ±5% GCM31A7U2J61JX01# 1000pF ±5% GCM31A7U2J631JX01# 1200pF ±5% GCM31A7U2J631JX01# 1200pF ±5% GCM31A7U2J162JX01# 1200pF ±5% GCM31A7U2J162JX01# 1200pF ±5% GCM31A7U2J122JX01# 1200pF ±5% GCM31A7U2J122JX01# 1200pF ±5% GCM31A7U2J122JX01# 1200pF ±5% GCM31A7U2J122JX01# 1500pF ±5% GCM31A7U2J122JX01# 1200pF ±5% GCM31A7U2J122JX01# 1200pF ±5% GCM31A5C2E10JX01# 12pF ±5% GCM31A5C2E10JX01# 13pF ±5% GCM31A5C2E10JX01# 13pF ±5% GCM31A5C2E10JX01# 33pF ±5% GCM31A5C2E30JX01# 33pF ±5% GCM31A5C2E30JX01# 34pF ±5% GCM31A5C2E30JX01# 34pF ±5% GCM31A5C2E30JX01#				82pF	±5%	GCM31A7U2J820JX01#	
150pF         ±5%         GCM31A7U2J151JX01#           180pF         ±5%         GCM31A7U2J181JX01#           220pF         ±5%         GCM31A7U2J21X01#           220pF         ±5%         GCM31A7U2J21X01#           270pF         ±5%         GCM31A7U2J31JX01#           330pF         ±5%         GCM31A7U2J31JX01#           390pF         ±5%         GCM31A7U2J391JX01#           390pF         ±5%         GCM31A7U2J391JX01#           470pF         ±5%         GCM31A7U2J361JX01#           560pF         ±5%         GCM31A7U2J681JX01#           680pF         ±5%         GCM31A7U2J02JX01#           1000pF         ±5%         GCM31A7U2J102JX01#           1200pF         ±5%         GCM31A7U2J122JX01#           1200pF         ±5%         GCM31A7U2J182JX01#           1200pF         ±5%         GCM31A7U2J182JX01#           1200pF         ±5%         GCM31A7U2J182JX01#           1200pF         ±5%         GCM31A7U2J182JX01#           1200pF         ±5%         GCM31A5C2E10JX01#           120pF         ±5%         GCM31A5C2E10JX01#           120pF         ±5%         GCM31A5C2E30JX01#           12pF         ±5%         GCM				100pF	±5%	GCM31A7U2J101JX01#	
180pF         ±5%         GCM31A7U2J181JX01#           220pF         ±5%         GCM31A7U2J221JX01#           270pF         ±5%         GCM31A7U2J221JX01#           330pF         ±5%         GCM31A7U2J331JX01#           330pF         ±5%         GCM31A7U2J391JX01#           390pF         ±5%         GCM31A7U2J391JX01#           470pF         ±5%         GCM31A7U2J681JX01#           560pF         ±5%         GCM31A7U2J681JX01#           680pF         ±5%         GCM31A7U2J821JX01#           1000pF         ±5%         GCM31A7U2J821JX01#           1200pF         ±5%         GCM31A7U2J182JX01#           1200pF         ±5%         GCM31A5C2E100JX01#           120pF         ±5%         GCM31A5C2E100JX01#           120pF         ±5%         GCM31A5C2E300JX01#           12pF         ±5%				120pF	±5%	GCM31A7U2J121JX01#	
220pF         ±5%         GCM31A7U2J221JX01#           270pF         ±5%         GCM31A7U2J271JX01#           330pF         ±5%         GCM31A7U2J331JX01#           390pF         ±5%         GCM31A7U2J391JX01#           390pF         ±5%         GCM31A7U2J391JX01#           470pF         ±5%         GCM31A7U2J681JX01#           560pF         ±5%         GCM31A7U2J681JX01#           680pF         ±5%         GCM31A7U2J821JX01#           1000pF         ±5%         GCM31A7U2J821JX01#           1200pF         ±5%         GCM31A7U2J122JX01#           1200pF         ±5%         GCM31A5C2E100JX01#           1200pF         ±5%         GCM31A5C2E100JX01#           120pF         ±5%         GCM31A5C2E100JX01#           120pF         ±5%         GCM31A5C2E100JX01#           12pF         ±5%         GCM31A5C2E100JX01#           12pF         ±5%         GCM31A5C2E300JX01#           33pF         ±5%				150pF	±5%	GCM31A7U2J151JX01#	
250Vdc         CCG         270pF         ±5%         GCM31A7U2J271JX01#				180pF	±5%	GCM31A7U2J181JX01#	
330pF         ±5%         GCM31A7U2J331JX01#           390pF         ±5%         GCM31A7U2J391JX01#           390pF         ±5%         GCM31A7U2J391JX01#           470pF         ±5%         GCM31A7U2J471JX01#           560pF         ±5%         GCM31A7U2J681JX01#           680pF         ±5%         GCM31A7U2J681JX01#           1000pF         ±5%         GCM31A7U2J821JX01#           1000pF         ±5%         GCM31A7U2J122JX01#           1200pF         ±5%         GCM31A7U2J152JX01#           1200pF         ±5%         GCM31A7U2J122JX01#           1200pF         ±5%         GCM31A7U2J122JX01#           1200pF         ±5%         GCM31A7U2J122JX01#           1200pF         ±5%         GCM31A7U2J122JX01#           1200pF         ±5%         GCM31A5C2E100JX01#           1200pF         ±5%         GCM31A5C2E100JX01#           12pF         ±5%         GCM31A5C2E130JX01#           12pF         ±5%         GCM31A5C2E30JX01#           13pF         ±5%         GCM31A5C2E30JX01#           33pF         ±5%         GCM31A5C2E30JX01#           33pF         ±5%         GCM31A5C2E470JX01#           33pF         ±5% <td< td=""><td></td><td></td><td></td><td>220pF</td><td>±5%</td><td>GCM31A7U2J221JX01#</td><td></td></td<>				220pF	±5%	GCM31A7U2J221JX01#	
390pF         ±5%         GCM31A7U2J391JX01#           470pF         ±5%         GCM31A7U2J471JX01#           560pF         ±5%         GCM31A7U2J681JX01#           560pF         ±5%         GCM31A7U2J681JX01#           680pF         ±5%         GCM31A7U2J681JX01#           1000pF         ±5%         GCM31A7U2J821JX01#           1000pF         ±5%         GCM31A7U2J12JX01#           1200pF         ±5%         GCM31A7U2J12JX01#           1200pF         ±5%         GCM31A7U2J12JX01#           1200pF         ±5%         GCM31A7U2J12JX01#           1200pF         ±5%         GCM31A7U2J182JX01#           1200pF         ±5%         GCM31A7U2J182JX01#           1200pF         ±5%         GCM31A5C2E100JX01#           120pF         ±5%         GCM31A5C2E100JX01#           12pF         ±5%         GCM31A5C2E10JX01#           12pF         ±5%         GCM31A5C2E30JX01#           18pF         ±5%         GCM31A5C2E30JX01#           18pF         ±5%         GCM31A5C2E30JX01#           33pF         ±5%         GCM31A5C2E30JX01#           39pF         ±5%         GCM31A5C2E470JX01#           56pF         ±5%         GCM31A5				270pF	±5%	GCM31A7U2J271JX01#	
470pF         ±5%         GCM31A7U2J471JX01#           560pF         ±5%         GCM31A7U2J561JX01#           680pF         ±5%         GCM31A7U2J681JX01#           820pF         ±5%         GCM31A7U2J821JX01#           1000pF         ±5%         GCM31A7U2J02JX01#           1200pF         ±5%         GCM31A7U2J102JX01#           1200pF         ±5%         GCM31A7U2J12JX01#           1200pF         ±5%         GCM31A7U2J152JX01#           1200pF         ±5%         GCM31A7U2J152JX01#           1200pF         ±5%         GCM31A7U2J152JX01#           1200pF         ±5%         GCM31A7U2J152JX01#           1200pF         ±5%         GCM31A7U2J222JX01#           1200pF         ±5%         GCM31A5C2E10JX01#           12pF         ±5%         GCM31A5C2E10JX01#           12pF         ±5%         GCM31A5C2E30JX01#           12pF         ±5%         GCM31A5C2E30JX01#           13pF         ±5%         GCM31A5C2E30JX01#           33pF         ±5%         GCM31A5C2E30JX01#           33pF         ±5%         GCM31A5C2E30JX01#           32pF         ±5%         GCM31A5C2E470JX01#           68pF         ±5%         GCM31A5				330pF	±5%	GCM31A7U2J331JX01#	
S60pF         ±5%         GCM31A7U2J561JX01#           680pF         ±5%         GCM31A7U2J681JX01#           820pF         ±5%         GCM31A7U2J681JX01#           1000pF         ±5%         GCM31A7U2J821JX01#           1200pF         ±5%         GCM31A7U2J12JX01#           1200pF         ±5%         GCM31A7U2J12JX01#           1200pF         ±5%         GCM31A7U2J152JX01#           1800pF         ±5%         GCM31A7U2J152JX01#           1200pF         ±5%         GCM31A7U2J152JX01#           1200pF         ±5%         GCM31A7U2J152JX01#           1200pF         ±5%         GCM31A7U2J152JX01#           1200pF         ±5%         GCM31A5C2E100JX01#           120pF         ±5%         GCM31A5C2E10JX01#           12pF         ±5%         GCM31A5C2E10JX01#           15pF         ±5%         GCM31A5C2E30JX01#           18pF         ±5%         GCM31A5C2E30JX01#           33pF         ±5%         GCM31A5C2E30JX01#           33pF         ±5%         GCM31A5C2E30JX01#           39pF         ±5%         GCM31A5C2E470JX01#           56pF         ±5%         GCM31A5C2E30JX01#           68pF         ±5%         GCM31A5				390pF	±5%	GCM31A7U2J391JX01#	
680pF         ±5%         GCM31A7U2J681JX01#           820pF         ±5%         GCM31A7U2J821JX01#           1000pF         ±5%         GCM31A7U2J821JX01#           1200pF         ±5%         GCM31A7U2J12JX01#           1200pF         ±5%         GCM31A7U2J152JX01#           1500pF         ±5%         GCM31A7U2J152JX01#           1500pF         ±5%         GCM31A7U2J152JX01#           1800pF         ±5%         GCM31A7U2J182JX01#           2200pF         ±5%         GCM31A7U2J182JX01#           1800pF         ±5%         GCM31A7U2J182JX01#           2200pF         ±5%         GCM31A5C2E100JX01#           110pF         ±5%         GCM31A5C2E10JX01#           12pF         ±5%         GCM31A5C2E10JX01#           15pF         ±5%         GCM31A5C2E30JX01#           18pF         ±5%         GCM31A5C2E30JX01#           33pF         ±5%         GCM31A5C2E30JX01#           39pF         ±5%         GCM31A5C2E30JX01#           39pF         ±5%         GCM31A5C2E680JX01#           68pF         ±5%         GCM31A5C2E101JX01#           100pF         ±5%         GCM31A5C2E10JX01#           100pF         ±5%         GCM31				470pF	±5%	GCM31A7U2J471JX01#	
820pF         ±5%         GCM31A7U2J821JX01#           1000pF         ±5%         GCM31A7U2J102JX01#           1200pF         ±5%         GCM31A7U2J102JX01#           1200pF         ±5%         GCM31A7U2J122JX01#           1500pF         ±5%         GCM31A7U2J152JX01#           1800pF         ±5%         GCM31A7U2J182JX01#           2200pF         ±5%         GCM31A7U2J182JX01#           2200pF         ±5%         GCM31A7U2J182JX01#           2200pF         ±5%         GCM31A5C2E100JX01#           12pF         ±5%         GCM31A5C2E10JX01#           12pF         ±5%         GCM31A5C2E10JX01#           12pF         ±5%         GCM31A5C2E10JX01#           12pF         ±5%         GCM31A5C2E30JX01#           18pF         ±5%         GCM31A5C2E30JX01#           22pF         ±5%         GCM31A5C2E30JX01#           33pF         ±5%         GCM31A5C2E30JX01#           39pF         ±5%         GCM31A5C2E30JX01#           56pF         ±5%         GCM31A5C2E60JX01#           68pF         ±5%         GCM31A5C2E101JX01#           100pF         ±5%         GCM31A5C2E101JX01#           120pF         ±5%         GCM31A5C2E				560pF	±5%	GCM31A7U2J561JX01#	
1000pF         ±5%         GCM31A7U2J102JX01#           1200pF         ±5%         GCM31A7U2J122JX01#           1200pF         ±5%         GCM31A7U2J152JX01#           1500pF         ±5%         GCM31A7U2J152JX01#           1800pF         ±5%         GCM31A7U2J152JX01#           2200pF         ±5%         GCM31A7U2J152JX01#           250Vdc         COG         10pF         ±5%           12pF         ±5%         GCM31A5C2E10JX01#           12pF         ±5%         GCM31A5C2E150JX01#           12pF         ±5%         GCM31A5C2E180JX01#           15pF         ±5%         GCM31A5C2E180JX01#           12pF         ±5%         GCM31A5C2E30JX01#           12pF         ±5%         GCM31A5C2E30JX01#           13pF         ±5%         GCM31A5C2E30JX01#           33pF         ±5%         GCM31A5C2E30JX01#           33pF         ±5%         GCM31A5C2E30JX01#           56pF         ±5%         GCM31A5C2E30JX01#           68pF         ±5%         GCM31A5C2E60JX01#           100pF         ±5%         GCM31A5C2E101JX01#           100pF         ±5%         GCM31A5C2E101JX01#           120pF         ±5%         GCM3				680pF	±5%	GCM31A7U2J681JX01#	
1200pF         ±5%         GCM31A7U2J122JX01#           1500pF         ±5%         GCM31A7U2J152JX01#           1500pF         ±5%         GCM31A7U2J152JX01#           1800pF         ±5%         GCM31A7U2J182JX01#           2200pF         ±5%         GCM31A7U2J182JX01#           2200pF         ±5%         GCM31A7U2J222JX01#           250Vdc         COG         10pF         ±5%           12pF         ±5%         GCM31A5C2E100JX01#           15pF         ±5%         GCM31A5C2E120JX01#           15pF         ±5%         GCM31A5C2E120JX01#           12pF         ±5%         GCM31A5C2E120JX01#           12pF         ±5%         GCM31A5C2E20JX01#           12pF         ±5%         GCM31A5C2E30JX01#           22pF         ±5%         GCM31A5C2E30JX01#           33pF         ±5%         GCM31A5C2E30JX01#           39pF         ±5%         GCM31A5C2E60JX01#           56pF         ±5%         GCM31A5C2E60JX01#           68pF         ±5%         GCM31A5C2E101JX01#           100pF         ±5%         GCM31A5C2E101JX01#           120pF         ±5%         GCM31A5C2E11JX01#           120pF         ±5%         GCM				820pF	±5%	GCM31A7U2J821JX01#	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$				1000pF	±5%	GCM31A7U2J102JX01#	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$				1200pF	±5%	GCM31A7U2J122JX01#	
2200pF         ±5%         GCM31A7U2J222JX01#           250Vdc         COG         10pF         ±5%         GCM31A5C2E100JX01#           12pF         ±5%         GCM31A5C2E120JX01#         1           15pF         ±5%         GCM31A5C2E150JX01#         1           15pF         ±5%         GCM31A5C2E180JX01#         1           18pF         ±5%         GCM31A5C2E180JX01#         1           22pF         ±5%         GCM31A5C2E20JX01#         1           27pF         ±5%         GCM31A5C2E30JX01#         1           33pF         ±5%         GCM31A5C2E30JX01#         1           33pF         ±5%         GCM31A5C2E30JX01#         1           39pF         ±5%         GCM31A5C2E30JX01#         1           56pF         ±5%         GCM31A5C2E30JX01#         1           56pF         ±5%         GCM31A5C2E60JX01#         1           82pF         ±5%         GCM31A5C2E10JX01#         1           100pF         ±5%         GCM31A5C2E10JX01#         1           120pF         ±5%         GCM31A5C2E151JX01#         1           180pF         ±5%         GCM31A5C2E181JX01#         1				1500pF	±5%	GCM31A7U2J152JX01#	
250Vdc         COG         10pF         ±5%         GCM31A5C2E100JX01#           12pF         ±5%         GCM31A5C2E120JX01#         1           15pF         ±5%         GCM31A5C2E150JX01#         1           15pF         ±5%         GCM31A5C2E180JX01#         1           18pF         ±5%         GCM31A5C2E180JX01#         1           22pF         ±5%         GCM31A5C2E20JX01#         1           27pF         ±5%         GCM31A5C2E30JX01#         1           33pF         ±5%         GCM31A5C2E30JX01#         1           39pF         ±5%         GCM31A5C2E30JX01#         1           39pF         ±5%         GCM31A5C2E30JX01#         1           56pF         ±5%         GCM31A5C2E470JX01#         1           56pF         ±5%         GCM31A5C2E60JX01#         1           68pF         ±5%         GCM31A5C2E60JX01#         1           100pF         ±5%         GCM31A5C2E10JX01#         1           120pF         ±5%         GCM31A5C2E11JX01#         1           120pF         ±5%         GCM31A5C2E181JX01#         1				1800pF	±5%	GCM31A7U2J182JX01#	
12pF       ±5%       GCM31A5C2E120JX01#         15pF       ±5%       GCM31A5C2E150JX01#         18pF       ±5%       GCM31A5C2E180JX01#         22pF       ±5%       GCM31A5C2E20JX01#         22pF       ±5%       GCM31A5C2E270JX01#         23pF       ±5%       GCM31A5C2E30JX01#         33pF       ±5%       GCM31A5C2E30JX01#         39pF       ±5%       GCM31A5C2E30JX01#         47pF       ±5%       GCM31A5C2E30JX01#         56pF       ±5%       GCM31A5C2E60JX01#         68pF       ±5%       GCM31A5C2E680JX01#         82pF       ±5%       GCM31A5C2E101JX01#         100pF       ±5%       GCM31A5C2E101JX01#         120pF       ±5%       GCM31A5C2E151JX01#         150pF       ±5%       GCM31A5C2E151JX01#				2200pF	±5%	GCM31A7U2J222JX01#	
15pF       ±5%       GCM31A5C2E150JX01#         18pF       ±5%       GCM31A5C2E180JX01#         22pF       ±5%       GCM31A5C2E220JX01#         27pF       ±5%       GCM31A5C2E270JX01#         33pF       ±5%       GCM31A5C2E330JX01#         39pF       ±5%       GCM31A5C2E390JX01#         47pF       ±5%       GCM31A5C2E390JX01#         56pF       ±5%       GCM31A5C2E470JX01#         56pF       ±5%       GCM31A5C2E60JX01#         82pF       ±5%       GCM31A5C2E680JX01#         100pF       ±5%       GCM31A5C2E101JX01#         120pF       ±5%       GCM31A5C2E101JX01#         150pF       ±5%       GCM31A5C2E151JX01#         180pF       ±5%       GCM31A5C2E181JX01#		250Vdc	COG	10pF	±5%	GCM31A5C2E100JX01#	
18pF         ±5%         GCM31A5C2E180JX01#           22pF         ±5%         GCM31A5C2E220JX01#           27pF         ±5%         GCM31A5C2E270JX01#           33pF         ±5%         GCM31A5C2E330JX01#           39pF         ±5%         GCM31A5C2E390JX01#           47pF         ±5%         GCM31A5C2E390JX01#           56pF         ±5%         GCM31A5C2E470JX01#           56pF         ±5%         GCM31A5C2E60JX01#           68pF         ±5%         GCM31A5C2E60JX01#           100pF         ±5%         GCM31A5C2E10JX01#           120pF         ±5%         GCM31A5C2E10JX01#           120pF         ±5%         GCM31A5C2E11JX01#           150pF         ±5%         GCM31A5C2E151JX01#           180pF         ±5%         GCM31A5C2E181JX01#				12pF	±5%	GCM31A5C2E120JX01#	
22pF       ±5%       GCM31A5C2E220JX01#         27pF       ±5%       GCM31A5C2E270JX01#         33pF       ±5%       GCM31A5C2E330JX01#         39pF       ±5%       GCM31A5C2E390JX01#         47pF       ±5%       GCM31A5C2E390JX01#         56pF       ±5%       GCM31A5C2E470JX01#         56pF       ±5%       GCM31A5C2E60JX01#         68pF       ±5%       GCM31A5C2E60JX01#         82pF       ±5%       GCM31A5C2E820JX01#         100pF       ±5%       GCM31A5C2E101JX01#         120pF       ±5%       GCM31A5C2E11JX01#         150pF       ±5%       GCM31A5C2E151JX01#         180pF       ±5%       GCM31A5C2E181JX01#				15pF	±5%	GCM31A5C2E150JX01#	
27pF       ±5%       GCM31A5C2E270JX01#         33pF       ±5%       GCM31A5C2E330JX01#         39pF       ±5%       GCM31A5C2E390JX01#         39pF       ±5%       GCM31A5C2E390JX01#         47pF       ±5%       GCM31A5C2E470JX01#         56pF       ±5%       GCM31A5C2E60JX01#         68pF       ±5%       GCM31A5C2E680JX01#         82pF       ±5%       GCM31A5C2E820JX01#         100pF       ±5%       GCM31A5C2E101JX01#         120pF       ±5%       GCM31A5C2E151JX01#         150pF       ±5%       GCM31A5C2E181JX01#         180pF       ±5%       GCM31A5C2E181JX01#				18pF	±5%	GCM31A5C2E180JX01#	
33pF       ±5%       GCM31A5C2E330JX01#         39pF       ±5%       GCM31A5C2E390JX01#         47pF       ±5%       GCM31A5C2E470JX01#         56pF       ±5%       GCM31A5C2E470JX01#         68pF       ±5%       GCM31A5C2E680JX01#         82pF       ±5%       GCM31A5C2E820JX01#         100pF       ±5%       GCM31A5C2E101JX01#         120pF       ±5%       GCM31A5C2E121JX01#         150pF       ±5%       GCM31A5C2E151JX01#         180pF       ±5%       GCM31A5C2E181JX01#				22pF	±5%	GCM31A5C2E220JX01#	
39pF       ±5%       GCM31A5C2E390JX01#         47pF       ±5%       GCM31A5C2E470JX01#         56pF       ±5%       GCM31A5C2E560JX01#         68pF       ±5%       GCM31A5C2E680JX01#         82pF       ±5%       GCM31A5C2E680JX01#         100pF       ±5%       GCM31A5C2E820JX01#         120pF       ±5%       GCM31A5C2E101JX01#         150pF       ±5%       GCM31A5C2E151JX01#         180pF       ±5%       GCM31A5C2E181JX01#				27pF	±5%	GCM31A5C2E270JX01#	
47pF       ±5%       GCM31A5C2E470JX01#         56pF       ±5%       GCM31A5C2E560JX01#         68pF       ±5%       GCM31A5C2E680JX01#         82pF       ±5%       GCM31A5C2E820JX01#         100pF       ±5%       GCM31A5C2E101JX01#         120pF       ±5%       GCM31A5C2E101JX01#         150pF       ±5%       GCM31A5C2E151JX01#         180pF       ±5%       GCM31A5C2E181JX01#				33pF	±5%	GCM31A5C2E330JX01#	
56pF         ±5%         GCM31A5C2E560JX01#           68pF         ±5%         GCM31A5C2E680JX01#           82pF         ±5%         GCM31A5C2E820JX01#           100pF         ±5%         GCM31A5C2E101JX01#           120pF         ±5%         GCM31A5C2E101JX01#           150pF         ±5%         GCM31A5C2E121JX01#           180pF         ±5%         GCM31A5C2E181JX01#				39pF	±5%	GCM31A5C2E390JX01#	
68pF         ±5%         GCM31A5C2E680JX01#           82pF         ±5%         GCM31A5C2E820JX01#           100pF         ±5%         GCM31A5C2E101JX01#           120pF         ±5%         GCM31A5C2E121JX01#           150pF         ±5%         GCM31A5C2E151JX01#           180pF         ±5%         GCM31A5C2E181JX01#				47pF	±5%	GCM31A5C2E470JX01#	
82pF         ±5%         GCM31A5C2E820JX01#           100pF         ±5%         GCM31A5C2E101JX01#           120pF         ±5%         GCM31A5C2E121JX01#           150pF         ±5%         GCM31A5C2E151JX01#           180pF         ±5%         GCM31A5C2E181JX01#				56pF	±5%	GCM31A5C2E560JX01#	
100pF         ±5%         GCM31A5C2E101JX01#           120pF         ±5%         GCM31A5C2E121JX01#           150pF         ±5%         GCM31A5C2E151JX01#           180pF         ±5%         GCM31A5C2E181JX01#				68pF	±5%	GCM31A5C2E680JX01#	
120pF         ±5%         GCM31A5C2E121JX01#           150pF         ±5%         GCM31A5C2E151JX01#           180pF         ±5%         GCM31A5C2E181JX01#				82pF	±5%	GCM31A5C2E820JX01#	
150pF         ±5%         GCM31A5C2E151JX01#           180pF         ±5%         GCM31A5C2E181JX01#				100pF	±5%	GCM31A5C2E101JX01#	
180pF ±5% GCM31A5C2E181JX01#				120pF	±5%	GCM31A5C2E121JX01#	
				150pF	±5%	GCM31A5C2E151JX01#	
220pF ±5% GCM31A5C2E221JX01#				180pF	±5%	GCM31A5C2E181JX01#	
				220pF	±5%	GCM31A5C2E221JX01#	
270pF ±5% GCM31A5C2E271JX01#				270pF	±5%	GCM31A5C2E271JX01#	

Part number # indicates the package specification code.

ACaution /Notice

# GCM Series Temperature Compensating Type 🚟 🍪 Part Number List

(→ 3.2:	×1.6mm	)	•		•
T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
1.0mm	250Vdc	COG	330pF	±5%	GCM31A5C2E331JX01#
			390pF	±5%	GCM31A5C2E391JX01#
			470pF	±5%	GCM31A5C2E471JX01#
			560pF	±5%	GCM31A5C2E561JX01#
			680pF	±5%	GCM31A5C2E681JX01#
			820pF	±5%	GCM31A5C2E821JX01#
			1000pF	±5%	GCM31A5C2E102JX01#
			1200pF	±5%	GCM31A5C2E122JX01#
			1500pF	±5%	GCM31A5C2E152JX01#
			1800pF	±5%	GCM31A5C2E182JX01#
			2200pF	±5%	GCM31A5C2E222JX01#
			2700pF	±5%	GCM31A5C2E272JX01#
			3300pF	±5%	GCM31A5C2E332JX01#
			3900pF	±5%	GCM31A5C2E392JX01#
			4700pF	±5%	GCM31A5C2E472JX01#
			5600pF	±5%	GCM31A5C2E562JX01#
			6800pF	±5%	GCM31A5C2E682JX01#
		U2J	2700pF	±5%	GCM31A7U2E272JX01#
			3300pF	±5%	GCM31A7U2E332JX01#
			3900pF	±5%	GCM31A7U2E392JX01#
			4700pF	±5%	GCM31A7U2E472JX01#
			5600pF	±5%	GCM31A7U2E562JX01#
1.25mm	1000Vdc	COG	560pF	±5%	GCM31B5C3A561JX01#
			680pF	±5%	GCM31B5C3A681JX01#
		U2J	390pF	±5%	GCM31B7U3A391JX01#
			470pF	±5%	GCM31B7U3A471JX01#
			560pF	±5%	GCM31B7U3A561JX01#
			680pF	±5%	GCM31B7U3A681JX01#
	630Vdc	COG	2200pF	±5%	GCM31B5C2J222JX01#
			2700pF	±5%	GCM31B5C2J272JX01#
		U2J	2700pF	±5%	GCM31B7U2J272JX01#
			3300pF	±5%	GCM31B7U2J332JX01#
	250Vdc	COG	8200pF	±5%	GCM31B5C2E822JX01#
			10000pF	±5%	GCM31B5C2E103JX01#
			12000pF	±5%	GCM31B5C2E123JX01#
		U2J	6800pF	±5%	GCM31B7U2E682JX01#
			8200pF	±5%	GCM31B7U2E822JX01#
			10000pF	±5%	GCM31B7U2E103JX01#
1.8mm	1000Vdc	COG	820pF	±5%	GCM31C5C3A821JX03#
			1000pF	±5%	GCM31C5C3A102JX03#
		U2J	820pF	±5%	GCM31C7U3A821JX03#
			1000pF	±5%	GCM31C7U3A102JX03#
	630Vdc	C0G	3300pF	±5%	GCM31C5C2J332JX03#
		U2J	3900pF	±5%	GCM31C7U2J392JX03#
			4700pF	±5%	GCM31C7U2J472JX03#
	250Vdc	COG	15000pF	±5%	GCM31C5C2E153JX03#

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
1.0mm	630Vdc	U2J	2200pF	±5%	GCM32A7U2J222JX01#	
1.25mm	1000Vdc	U2J	1200pF	±5%	GCM32B7U3A122JX01#	
	630Vdc	U2J	5600pF	±5%	GCM32B7U2J562JX01#	
1.5mm	1000Vdc	U2J	1500pF	±5%	GCM32Q7U3A152JX01#	
	630Vdc	U2J	6800pF	±5%	GCM32Q7U2J682JX01#	
2.0mm	1000Vdc	U2J	1800pF	±5%	GCM32D7U3A182JX01#	
			2200pF	±5%	GCM32D7U3A222JX01#	
	630Vdc	U2J	8200pF	±5%	GCM32D7U2J822JX01#	
			10000pF	±5%	GCM32D7U2J103JX01#	

#### 4.5×3.2mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
1.5mm	1000Vdc	U2J	2700pF	±5%	GCM43Q7U3A272JX01#	
			3300pF	±5%	GCM43Q7U3A332JX01#	
	630Vdc	U2J	12000pF	±5%	GCM43Q7U2J123JX01#	
2.0mm	1000Vdc	U2J	3900pF	±5%	GCM43D7U3A392JX01#	
			4700pF	±5%	GCM43D7U3A472JX01#	
	630Vdc	U2J	15000pF	±5%	GCM43D7U2J153JX01#	
			18000pF	±5%	GCM43D7U2J183JX01#	
			22000pF	±5%	GCM43D7U2J223JX01#	

#### 5.7×5.0mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
1.5mm	1000Vdc	U2J	5600pF	±5%	GCM55Q7U3A562JX01#	
			6800pF	±5%	GCM55Q7U3A682JX01#	
	630Vdc	U2J	27000pF	±5%	GCM55Q7U2J273JX01#	
2.0mm	1000Vdc	U2J	8200pF	±5%	GCM55D7U3A822JX01#	
			10000pF	±5%	GCM55D7U3A103JX01#	
	630Vdc	U2J	33000pF	±5%	GCM55D7U2J333JX01#	
			39000pF	±5%	GCM55D7U2J393JX01#	
			47000pF	±5%	GCM55D7U2J473JX01#	

#### 3.2×2.5mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
1.0mm	630Vdc	U2J	1200pF	±5%	GCM32A7U2J122JX01#
			1500pF	±5%	GCM32A7U2J152JX01#
			1800pF	±5%	GCM32A7U2J182JX01#

**GRT** Series

GC3 Series

**GCJ** Series

**GCD** Series

**GCE** Series

NMF Series

KCM Series

KC3 Series

KCA Series

GCG Series

①Caution/ Notice

**GCM** Series

GC3 Series

**GCJ** Series

**GCD** Series

**GCE** Series

NMF Series

KCM Series

KC3 Series

KCA Series

**GCG** Series

①Caution
/Notice

## GCM Series High Dielectric Constant Type 🚟 🚵 Part Number List

#### 0.6×0.3mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
0.33mm	25Vdc	X7R	100pF	±10%	GCM033R71E101KA03#	
			150pF	±10%	GCM033R71E151KA03#	
			220pF	±10%	GCM033R71E221KA03#	
			330pF	±10%	GCM033R71E331KA03#	
			470pF	±10%	GCM033R71E471KA03#	
			680pF	±10%	GCM033R71E681KA03#	
			1000pF	±10%	GCM033R71E102KA03#	
			1500pF	±10%	GCM033R71E152KA03#	
			2200pF	±10%	GCM033R71E222KE02#	
			3300pF	±10%	GCM033R71E332KE02#	
	16Vdc	X7R	330pF	±10%	GCM033R71C331KA03#	
			680pF	±10%	GCM033R71C681KA03#	
			2200pF	±10%	GCM033R71C222KA55#	
			3300pF	±10%	GCM033R71C332KA55#	
	10Vdc	X7R	4700pF	±10%	GCM033R71A472KA03#	
			6800pF	±10%	GCM033R71A682KA03#	
			10000pF	±10%	GCM033R71A103KA03#	

#### 1.0×0.5mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
0.55mm	100Vdc	X7R	220pF	±10%	GCM155R72A221KA37#	
			330pF	±10%	GCM155R72A331KA37#	
			470pF	±10%	GCM155R72A471KA37#	
			680pF	±10%	GCM155R72A681KA37#	
			1000pF	±10%	GCM155R72A102KA37#	
			1500pF	±10%	GCM155R72A152KA37#	
			2200pF	±10%	GCM155R72A222KA37#	
			3300pF	±10%	GCM155R72A332KA37#	
			4700pF	±10%	GCM155R72A472KA37#	
	50Vdc	X8L	33000pF	±10%	GCM155L8EH333KE07#	
			47000pF	±10%	GCM155L8EH473KE07#	
			68000pF	±10%	GCM155L8EH683KE07#	
			0.10µF	±10%	GCM155L8EH104KE07#	
		X7R	220pF	±10%	GCM155R71H221KA37#	
			330pF	±10%	GCM155R71H331KA37#	
			470pF	±10%	GCM155R71H471KA37#	
			680pF	±10%	GCM155R71H681KA37#	
			1000pF	±10%	GCM155R71H102KA37#	
			1500pF	±10%	GCM155R71H152KA37#	
			2200pF	±10%	GCM155R71H222KA37#	
			3300pF	±10%	GCM155R71H332KA37#	
			4700pF	±10%	GCM155R71H472KA37#	
			6800pF	±10%	GCM155R71H682KA55#	
			10000pF	±10%	GCM155R71H103KA55#	
			15000pF	±10%	GCM155R71H153KA55#	
			22000pF	±10%	GCM155R71H223KA55#	
			33000pF	±10%	GCM155R71H333KE02#	
			47000pF	±10%	GCM155R71H473KE02#	
			68000pF	±10%	GCM155R71H683KE02#	
			0.10µF	±10%	GCM155R71H104KE02#	

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
0.55mm	25Vdc	X8L	0.10µF	±10%	GCM155L81E104KE02#	
		X7R	10000pF	±10%	GCM155R71E103KA37#	
			15000pF	±10%	GCM155R71E153KA55#	
			22000pF	±10%	GCM155R71E223KA55#	
			33000pF	±10%	GCM155R71E333KA55#	
			47000pF	±10%	GCM155R71E473KA55#	
	16Vdc	X7R	33000pF	±10%	GCM155R71C333KA37#	
			47000pF	±10%	GCM155R71C473KA37#	
			68000pF	±10%	GCM155R71C683KA55#	
			0.10µF	±10%	GCM155R71C104KA55#	
			0.15µF	±10%	GCM155R71C154KE02#	
			0.22µF	±10%	GCM155R71C224KE02#	
0.6mm	10Vdc	X7S	0.47µF	±10%	GCM155C71A474KE36#	
0.7mm	10Vdc	X7S	0.68µF	±10%	GCM155C71A684KE38#	
			1.0µF	±10%	GCM155C71A105KE38#	

#### 1.6×0.8mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
0.9mm	100Vdc	X7R	1000pF	±10%	GCM188R72A102KA37#	
			1500pF	±10%	GCM188R72A152KA37#	
			2200pF	±10%	GCM188R72A222KA37#	
			3300pF	±10%	GCM188R72A332KA37#	
			4700pF	±10%	GCM188R72A472KA37#	
			6800pF	±10%	GCM188R72A682KA37#	
			10000pF	±10%	GCM188R72A103KA37#	
			15000pF	±10%	GCM188R72A153KA37#	
			22000pF	±10%	GCM188R72A223KA37#	
	50Vdc	X7R	0.22µF	±10%	GCM188R71H224KA64#	
	25Vdc	X7R	0.22µF	±10%	GCM188R71E224KA55#	
			0.47µF	±10%	GCM188R71E474KA64#	
			1.0µF	±10%	GCM188R71E105KA64#	
	16Vdc	X7R	0.33µF	±10%	GCM188R71C334KA37#	
			0.47µF	±10%	GCM188R71C474KA55#	
			1.0µF	±10%	GCM188R71C105KA64#	
	6.3Vdc	X7R	2.2µF	±10%	GCM188R70J225KE22#	

#### 2.0×1.25mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
0.7mm	100Vdc	X7R	6800pF	±10%	GCM216R72A682KA37#
			10000pF	±10%	GCM216R72A103KA37#
			15000pF	±10%	GCM216R72A153KA37#
			22000pF	±10%	GCM216R72A223KA37#
0.95mm	100Vdc	X7R	33000pF	±10%	GCM219R72A333KA37#
	50Vdc	X7R	0.33µF	±10%	GCM219R71H334KA55#
	25Vdc	X7R	0.47µF	±10%	GCM219R71E474KA55#
	16Vdc	X7R	0.68µF	±10%	GCM219R71C684KA37#
			1.0µF	±10%	GCM219R71C105KA37#
1.4mm	100Vdc	X7R	47000pF	±10%	GCM21BR72A473KA37#
			68000pF	±10%	GCM21BR72A683KA37#
			0.10µF	±10%	GCM21BR72A104KA37#

Part number # indicates the package specification code.



## GCM Series High Dielectric Constant Type ☆ AES Part Number List (→ 2.0×1.25mm)

(7 2.07	1.25m				
T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
1.4mm	50Vdc	X7R	0.22µF	±10%	GCM21BR71H224KA37#
			0.47µF	±10%	GCM21BR71H474KA55#
			1.0µF	±10%	GCM21BR71H105KA03#
	35Vdc	X8L	2.2µF	±10%	GCM21BL8EG225KE07#
		X7R	0.68µF	±10%	GCM21BR7YA684KA55#
			1.0µF	±10%	GCM21BR7YA105KA55#
			1.5µF	±10%	GCM21BR7YA155KA54#
		X7S	2.2µF	±10%	GCM21BC7YA225KE02#
	25Vdc	X8L	1.5µF	±10%	GCM21BL8EF155KA07#
		X7R	0.15µF	±10%	GCM21BR71E154KA37#
			0.22µF	±10%	GCM21BR71E224KA37#
			0.33µF	±10%	GCM21BR71E334KA37#
			0.68µF	±10%	GCM21BR71E684KA55#
			1.0µF	±10%	GCM21BR71E105KA56#
			1.5µF	±10%	GCM21BR71E155KA54#
			2.2µF	±10%	GCM21BR71E225KA73#
	16Vdc	X7R	2.2µF	±10%	GCM21BR71C225KA64#
			4.7µF	±10%	GCM21BR71C475KA73#
	10Vdc	X7R	2.2µF	±10%	GCM21BR71A225KA37#
			10µF	±10%	GCM21BR71A106KE22#
		X7S	4.7µF	±10%	GCM21BC71A475KA73#
	6.3Vdc	X7R	10µF	±10%	GCM21BR70J106KE22#
1.45mm	100Vdc	X7S	1.0µF	±10%	GCM21BC72A105KE36#
	35Vdc	X8L	4.7µF	±10%	GCM21BL8EG475KE08#
		X7S	4.7µF	±10%	GCM21BC7YA475KE36#
	25Vdc	X8L	4.7µF	±10%	GCM21BL8EF475KE08#
		X7S	4.7µF	±10%	GCM21BC71E475KE36#
	16Vdc	X7S	10µF	±10%	GCM21BC71C106KE36#

#### 3.2×2.5mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
2.2mm	100Vdc	X8L	4.7µF	±10%	GCM32DL8EL475KE07#
		X7S	4.7µF	±10%	GCM32DC72A475KE02#
	16Vdc	X7R	10µF	±10%	GCM32DR71C106KA37#
2.7mm	50Vdc	X8L	10µF	±10%	GCM32EL8EH106KA07#
		X7R	4.7µF	±10%	GCM32ER71H475KA55#
		X7S	10µF	±10%	GCM32EC71H106KA03#
	35Vdc	X7S	10µF	±10%	GCM32EC7YA106KA03#
	25Vdc	X7R	10µF	±10%	GCM32ER71E106KA57#
	16Vdc	X7R	22µF	±20%	GCM32ER71C226ME19#
	10Vdc	X7R	22µF	±20%	GCM32ER71A226ME12#
	6.3Vdc	X7R	47µF	±20%	GCM32ER70J476ME19#
2.85mm	25Vdc	X8L	22µF	±10%	GCM32EL8EF226KE08#
		X7S	22µF	±10%	GCM32EC71E226KE36#

#### 3.2×1.6mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
25mm	100Vdc	X7R	0.22µF	±10%	GCM31MR72A224KA37#
	50Vdc	X7R	0.33µF	±10%	GCM31MR71H334KA37#
			0.47µF	±10%	GCM31MR71H474KA37#
			0.68µF	±10%	GCM31MR71H684KA55#
1.8mm	100Vdc	X8L	2.2µF	±10%	GCM31CL8EL225KE07#
		X7R	1.0µF	±10%	GCM31CR72A105KA03#
		X7S	2.2µF	±10%	GCM31CC72A225KE02#
	50Vdc	X7R	2.2µF	±10%	GCM31CR71H225KA55#
		X7S	4.7µF	±10%	GCM31CC71H475KA03#
	25Vdc	X7R	4.7µF	±10%	GCM31CR71E475KA55#
	16Vdc	X7R	4.7µF	±10%	GCM31CR71C475KA37#
			10µF	±10%	GCM31CR71C106KA64#
	10Vdc	X7R	10µF	±10%	GCM31CR71A106KA64#
			22µF	±10%	GCM31CR71A226KE02#
	6.3Vdc	X7R	22µF	±20%	GCM31CR70J226ME23#
1.9mm	25Vdc	X7S	10µF	±10%	GCM31CC71E106KA03#

**GRT** Series

GC3 Series

**GCJ** Series

**GCD** Series

**GCE** Series

**GCM** Series

GC3 Series

**GCJ** Series

GCD Series

**GCE** Series

NMF Series

KCM Series

KC3 Series

KCA Series

**GCG** Series

①Caution
/Notice

High Effective Capacitance & High Ripple Current Chip Multilayer Ceramic Capacitors for Automotive





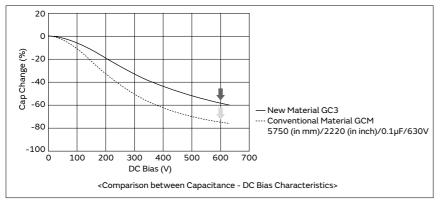
e WEB

This is a high ripple resistance product for automotive excellent in DC bias characteristics.

#### Features

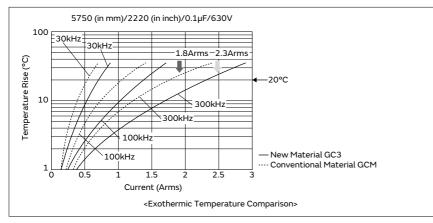
1 When a DC bias is applied, a capacitance higher than conventional products (X7R characteristics) can be acquired.

When DC600V is applied, about twice the capacitance can be secured.



#### 2 Improved ripple resistance performance compared to conventional products (X7R characteristics).

In the case of a product with a capacitance of  $0.1\mu$ F, when the exothermic temperature reaches 20°C at frequency f=300kHz, the amount of resistance of a product with conventional material is 1.8Arms; however, the new material is 2.3Arms.

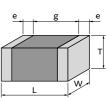


#### 3 This product has a noise reduction effect.

Since dielectric materials that enable a reduction of noise are used, this product is more effective for reducing noise compared to the GCM series for automotive.

#### Specifications

Size	2.0×1.25mm to 5.7×5.0mm	
Rated Voltage	250Vdc to 630Vdc	ſ
Capacitance	10000pF to 1.0µF	
Main Applications	For PFC (Power Factor Correction) Circuits of Power Supplies, EMI Suppression and Smoothing Circuits of automotive	



<Dimensions>

muRata

## GC3 Series High Dielectric Constant Type 🚟 🚵 Ass Part Number List

#### 2.0×1.25mm

**GRT** Series

**GCM** Series

**GCJ** Series

GCD Series

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
1.0mm	250Vdc	X7T	10000pF	±10%	GC321AD72E103KX01#	
			15000pF	±10%	GC321AD72E153KX01#	
1.45mm	250Vdc	X7T	22000pF	±10%	GC321BD72E223KX03#	

#### 3.2×1.6mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
1.0mm	450Vdc	X7T	10000pF	±10%	GC331AD72W103KX01#
			15000pF	±10%	GC331AD72W153KX01#
	250Vdc	X7T	33000pF	±10%	GC331AD72E333KX01#
1.25mm	630Vdc	X7T	10000pF	±10%	GC331BD72J103KX01#
	450Vdc	X7T	22000pF	±10%	GC331BD72W223KX01#
			33000pF	±10%	GC331BD72W333KX01#
	250Vdc	X7T	47000pF	±10%	GC331BD72E473KX01#
1.8mm	630Vdc	X7T	15000pF	±10%	GC331CD72J153KX03#
	450Vdc	X7T	47000pF	±10%	GC331CD72W473KX03#
	250Vdc	X7T	68000pF	±10%	GC331CD72E683KX03#

#### 3.2×2.5mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
1.5mm	630Vdc	X7T	22000pF	±10%	GC332QD72J223KX01#	
	250Vdc	X7T	0.10µF	±10%	GC332QD72E104KX01#	
2.0mm	630Vdc	X7T	33000pF	±10%	GC332DD72J333KX01#	
			47000pF	±10%	GC332DD72J473KX01#	
	450Vdc	X7T	68000pF	±10%	GC332DD72W683KX01#	
			0.10µF	±10%	GC332DD72W104KX01#	
	250Vdc	X7T	0.15µF	±10%	GC332DD72E154KX01#	

#### 4.5×3.2mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
1.5mm	250Vdc	X7T	0.22µF	±10%	GC343QD72E224KX01#	
2.0mm	630Vdc	X7T	68000pF	±10%	GC343DD72J683KX01#	
	450Vdc	X7T	0.15µF	±10%	GC343DD72W154KX01#	
	250Vdc	X7T	0.33µF	±10%	GC343DD72E334KX01#	

#### 5.7×5.0mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
2.0mm	630Vdc	X7T	0.10µF	±10%	GC355DD72J104KX01#
			0.15µF	±10%	GC355DD72J154KX01#
	450Vdc	X7T	0.22µF	±10%	GC355DD72W224KX01#
			0.33µF	±10%	GC355DD72W334KX01#
			0.47µF	±10%	GC355DD72W474KX01#
	250Vdc	X7T	0.47µF	±10%	GC355DD72E474KX01#
			0.68µF	±10%	GC355DD72E684KX01#
2.7mm	630Vdc	X7T	0.22µF	±10%	GC355XD72J224KX05#

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
2.7mm	250Vdc	X7T	1.0µF	±10%	GC355XD72E105KX05#	



Soft Termination Chip Multilayer Ceramic Capacitors for Automotive



Power- train	AEC-	Fail	De
	Q200	sate	C

Cracking caused by flexing stress after board mounting is minimized due to resin external electrodes!

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#### Features

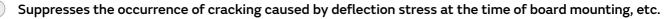
1 The resin external electrodes suppress cracks by board deflection.

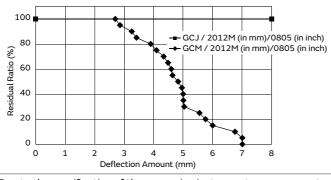
Cracking of the ceramic element is suppressed by the resin of the external electrodes, which releases the stress.

Sector us getter us ge

Note: Cracks may occur in the capacitor body if excessive stress beyond the "guaranteed range of board bending strength (\*) " provided in the specifications is applied. Capacitors with cracks in them may cause a drop in insulation resistance, which could lead to a short circuit. (\*) For details on the guaranteed range of board bending strength, check the "Detailed Specification Sheet" on the Product Details Page.

(2)





Due to the specification of the measuring instrument, measurements can be performed up to 8mm.

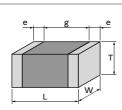
#### 3 Ideal for automotive.

This AEC-Q200 conforming product is ideal for the ECU, control circuits of headlights, etc. of automotive.

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#### Specifications

Size	1.6×0.8mm to 5.7×5.0mm			
Rated Voltage	6.3Vdc to 1000Vdc			
Capacitance	220pF to 47µF			
Main Applications	Battery Lines and Powertrains for automotive			





KCA Series

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## GCJ Series High Dielectric Constant Type 📅 🏭 🎬 Part Number List

0.9n

#### 1.6×0.8mm

T max.Rated VoltageTC CodeCap.Tol.Part Number0.9mm100VdcX8L0.10μF±10%GCJ188R92A102KX8R1000pF±10%GCJ188R92A102K1200pF±10%GCJ188R92A122K1500pF±10%GCJ188R92A122K1800pF±10%GCJ188R92A122K2200pF±10%GCJ188R92A122K2200pF±10%GCJ188R92A222K	A07#
X8R         1000pF         ±10%         GCJ188R92A102K           1200pF         ±10%         GCJ188R92A122K           1500pF         ±10%         GCJ188R92A152K           1800pF         ±10%         GCJ188R92A152K           2200pF         ±10%         GCJ188R92A182K	
1200pF         ±10%         GCJ188R92A122k           1500pF         ±10%         GCJ188R92A152k           1800pF         ±10%         GCJ188R92A152k           2200pF         ±10%         GCJ188R92A182k	(A01#
1500pF         ±10%         GCJ188R92A152k           1800pF         ±10%         GCJ188R92A182k           2200pF         ±10%         GCJ188R92A222k	
1800pF         ±10%         GCJ188R92A182K           2200pF         ±10%         GCJ188R92A222K	(A01#
2200pF ±10% GCJ188R92A222k	(A01#
	(A01#
	(A01#
2700pF ±10% GCJ188R92A272k	(A01#
3300pF ±10% GCJ188R92A332K	(A01#
3900pF ±10% GCJ188R92A392K	(A01#
4700pF ±10% GCJ188R92A472K	(A01#
5600pF ±10% GCJ188R92A562K	(A01#
6800pF ±10% GCJ188R92A682k	(A01#
8200pF ±10% GCJ188R92A822k	(A01#
10000pF ±10% GCJ188R92A103k	(A01#
12000pF ±10% GCJ188R92A123K	(A01#
15000pF ±10% GCJ188R92A153K	(A01#
18000pF ±10% GCJ188R92A183K	(A01#
22000pF ±10% GCJ188R92A223k	(A01#
27000pF ±10% GCJ188R92A273K	(A01#
33000pF ±10% GCJ188R92A333K	(A01#
39000pF ±10% GCJ188R92A393K	(A01#
47000pF ±10% GCJ188R92A473k	(A01#
56000pF ±10% GCJ188R92A563K	(A01#
68000pF ±10% GCJ188R92A683K	(A01#
X7R 1000pF ±10% GCJ188R72A102k	
1200pF ±10% GCJ188R72A122k	(A01#
1500pF ±10% GCJ188R72A152k	
1800pF ±10% GCJ188R72A182k	
2200pF ±10% GCJ188R72A222k	
2700pF ±10% GCJ188R72A272k	
3300pF ±10% GCJ188R72A332k	
3900pF ±10% GCJ188R72A392k	
4700pF ±10% GCJ188R72A472k	
5600pF ±10% GCJ188R72A562k	
6800pF ±10% GCJ188R72A682k	
8200pF ±10% GCJ188R72A822K 10000pF ±10% GCJ188R72A103K	
12000pF ±10% GCJ188R72A123K	
15000pF ±10% GCJ188R72A153K	
18000pF ±10% GCJ188R72A183K	
22000pF ±10% GCJ188R72A223k	
0.10µF ±10% GCJ188R72A104k	
50Vdc X8L 1000pF ±10% GCJ188L81H102K	
1200pF ±10% GCJ188L81H122K	
1500pF ±10% GCJ188L81H152K	
1800pF ±10% GCJ188L81H182K	
2200pF ±10% GCJ188L81H222K	
2700pF ±10% GCJ188L81H272K	A01#
3300pF ±10% GCJ188L81H332K	A01#
3900pF ±10% GCJ188L81H392K	A01#
4700pF ±10% GCJ188L81H472K	A01#
5600pF ±10% GCJ188L81H562K	A01#

- 1X.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
nm	50Vdc	X8L	6800pF	±10%	GCJ188L81H682KA01#	
			8200pF	±10%	GCJ188L81H822KA01#	
			10000pF	±10%	GCJ188L81H103KA01#	
			12000pF	±10%	GCJ188L81H123KA01#	
			15000pF	±10%	GCJ188L81H153KA01#	
			18000pF	±10%	GCJ188L81H183KA01#	
			22000pF	±10%	GCJ188L81H223KA01#	
			0.15µF	±10%	GCJ188L8EH154KA07#	
			0.22µF	±10%	GCJ188L8EH224KA07#	
		X8R	4700pF	±10%	GCJ188R91H472KA01#	
			10000pF	±10%	GCJ188R91H103KA01#	
			0.10µF	±10%	GCJ188R91H104KA01#	
			0.12µF	±10%	GCJ188R91H124KA01#	
			0.15µF	±10%	GCJ188R91H154KA01#	
			0.18µF	±10%	GCJ188R91H184KA01#	
			0.22µF	±10%	GCJ188R91H224KA01#	
		X7R	1000pF	±10%	GCJ188R71H102KA01#	
			1200pF	±10%	GCJ188R71H122KA01#	
			1500pF	±10%	GCJ188R71H152KA01#	
			1800pF	±10%	GCJ188R71H182KA01#	
			2200pF	±10%	GCJ188R71H222KA01#	
			2700pF	±10%	GCJ188R71H272KA01#	
			3300pF	±10%	GCJ188R71H332KA01#	
			3900pF	±10%	GCJ188R71H392KA01#	
			4700pF	±10%	GCJ188R71H472KA01#	
			5600pF	±10%	GCJ188R71H562KA01#	
			6800pF	±10%	GCJ188R71H682KA01#	
			8200pF 10000pF	±10%	GCJ188R71H822KA01# GCJ188R71H103KA01#	
			12000pF	±10%	GCJ188R71H103KA01#	<u> </u>
			12000pF	±10%	GCJ188R71H153KA01#	<u> </u>
			18000pF	±10%	GCJ188R71H183KA01#	
			22000pF		GCJ188R71H223KA01#	
			33000pF	±10%	GCJ188R71H333KA12#	
			39000pF	±10%	GCJ188R71H393KA12#	
			47000pF	±10%	GCJ188R71H473KA12#	<u> </u>
			56000pF	±10%	GCJ188R71H563KA12#	<u> </u>
			68000pF	±10%	GCJ188R71H683KA12#	<u> </u>
			82000pF	±10%	GCJ188R71H823KA12#	<u> </u>
			0.10µF	±10%	GCJ188R71H104KA12#	<u> </u>
			0.15µF	±10%	GCJ188R71H154KA01#	<u> </u>
			0.22µF	±10%	GCJ188R71H224KA01#	<u> </u>
	35Vdc	X8L	33000pF	±10%	GCJ188L8YA333KA01#	
			39000pF	±10%	GCJ188L8YA393KA01#	
			56000pF	±10%	GCJ188L8YA563KA01#	
			68000pF	±10%	GCJ188L8YA683KA01#	<u> </u>
	25Vdc	X8L	33000pF	±10%	GCJ188L81E333KA01#	
			39000pF	±10%	GCJ188L81E393KA01#	
			56000pF	±10%	GCJ188L81E563KA01#	
			68000pF	±10%	GCJ188L81E683KA01#	
			82000pF	±10%	GCJ188L81E823KA01#	
			0.15µF	±10%	GCJ188L81E154KA01#	
			0.18µF	±10%	GCJ188L81E184KA01#	
			0.22µF	±10%	GCJ188L81E224KA01#	
					·	

Part number # indicates the package specification code.



**GRT** Series

GCD Series

KCA Series

**GCG** Series

①Caution/ Notice

**GCM** Series

GC3 Series

**GCJ** Series

**GCD** Series

**GCE** Series

## GCJ Series High Dielectric Constant Type Former AEC Fall Constant Part Number List

#### (→ 1.6×0.8mm)

(→ 1.6 <sup>,</sup>	«U.8mm	)			
T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
0.9mm	25Vdc	X8R	0.33µF	±10%	GCJ188R91E334KA01#
			0.39µF	±10%	GCJ188R91E394KA01#
			0.47µF	±10%	GCJ188R91E474KA01#
		X7R	1000pF	±10%	GCJ188R71E102KA01#
			1200pF	±10%	GCJ188R71E122KA01#
			1500pF	±10%	GCJ188R71E152KA01#
			1800pF	±10%	GCJ188R71E182KA01#
			2200pF	±10%	GCJ188R71E222KA01#
					GCJ188R71E272KA01#
			2700pF	±10%	
			3300pF	±10%	GCJ188R71E332KA01#
			3900pF	±10%	GCJ188R71E392KA01#
			4700pF	±10%	GCJ188R71E472KA01#
			5600pF	±10%	GCJ188R71E562KA01#
			6800pF	±10%	GCJ188R71E682KA01#
			8200pF	±10%	GCJ188R71E822KA01#
			10000pF	±10%	GCJ188R71E103KA01#
			12000pF	±10%	GCJ188R71E123KA01#
			15000pF	±10%	GCJ188R71E153KA01#
			18000pF	±10%	GCJ188R71E183KA01#
			22000pF	±10%	GCJ188R71E223KA01#
			27000pF	±10%	GCJ188R71E273KA01#
			33000pF	±10%	GCJ188R71E333KA01#
			39000pF	±10%	GCJ188R71E393KA01#
			47000pF	±10%	GCJ188R71E473KA01#
			56000pF	±10%	GCJ188R71E563KA12#
			68000pF	±10%	GCJ188R71E683KA12#
			82000pF	±10%	GCJ188R71E823KA12#
			0.10µF	±10%	GCJ188R71E104KA12#
			0.12µF	±10%	GCJ188R71E124KA01#
			0.15µF	±10%	GCJ188R71E154KA01#
			0.18µF	±10%	GCJ188R71E184KA12#
			0.22µF	±10%	GCJ188R71E224KA12#
			1.0µF	±10%	GCJ188R71E105KA01#
	16Vdc	X8L	33000pF	±10%	GCJ188L81C333KA01#
			39000pF	±10%	GCJ188L81C393KA01#
			47000pF	±10%	GCJ188L81C473KA01#
			56000pF	±10%	GCJ188L81C563KA01#
			68000pF	±10%	GCJ188L81C683KA01#
			82000pF	±10%	GCJ188L81C823KA01#
			0.10µF	±10%	GCJ188L81C104KA01#
			0.12µF	±10%	GCJ188L81C124KA01#
			0.15µF	±10%	GCJ188L81C154KA01#
			0.13µF	±10%	GCJ188L81C184KA01#
			0.22µF		GCJ188L81C224KA01#
		X7R	0.22µF	±10% ±10%	GCJ188L81C224KA01#
			27000pF		GCJ188R71C273KA01#
			27000pF 33000pF		GCJ188R71C273KA01#
				±10%	
			39000pF	±10%	GCJ188R71C393KA01#
			47000pF	±10%	GCJ188R71C473KA01#
			56000pF	±10%	GCJ188R71C563KA01#
			68000pF	±10%	GCJ188R71C683KA01#
			82000pF	±10%	GCJ188R71C823KA01#
			0.10µF	±10%	GCJ188R71C104KA01#
			0.12µF	±10%	GCJ188R71C124KA01#

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
0.9mm	16Vdc	X7R	0.15µF	±10%	GCJ188R71C154KA01#	
			0.18µF	±10%	GCJ188R71C184KA01#	
			0.22µF	±10%	GCJ188R71C224KA01#	
			0.27µF	±10%	GCJ188R71C274KA01#	
			0.33µF	±10%	GCJ188R71C334KA01#	
			0.39µF	±10%	GCJ188R71C394KA12#	
			0.47µF	±10%	GCJ188R71C474KA12#	
	10Vdc	X7R	0.12µF	±10%	GCJ188R71A124KA01#	
			0.15µF	±10%	GCJ188R71A154KA01#	
			0.18µF	±10%	GCJ188R71A184KA01#	
			0.22µF	±10%	GCJ188R71A224KA01#	
	6.3Vdc	X7R	2.2µF	±10%	GCJ188R70J225KE01#	
1.0mm	6.3Vdc	X8L	3.3µF	±10%	GCJ188L8EC335KE08#	
		X8M	4.7µF	±10%	GCJ188M8EC475KE08#	
		X7S	3.3µF	±10%	GCJ188C70J335KE02#	
			4.7µF	±10%	GCJ188C70J475KE02#	
					· · ·	

#### 2.0×1.25mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
0.7mm	100Vdc	X7R	1000pF	±10%	GCJ216R72A102KA01#	
			1200pF	±10%	GCJ216R72A122KA01#	
			1500pF	±10%	GCJ216R72A152KA01#	
			1800pF	±10%	GCJ216R72A182KA01#	
			2200pF	±10%	GCJ216R72A222KA01#	
			2700pF	±10%	GCJ216R72A272KA01#	
			3300pF	±10%	GCJ216R72A332KA01#	
			3900pF	±10%	GCJ216R72A392KA01#	
			4700pF	±10%	GCJ216R72A472KA01#	
			5600pF	±10%	GCJ216R72A562KA01#	
			6800pF	±10%	GCJ216R72A682KA01#	
			8200pF	±10%	GCJ216R72A822KA01#	
			10000pF	±10%	GCJ216R72A103KA01#	
			12000pF	±10%	GCJ216R72A123KA01#	
			15000pF	±10%	GCJ216R72A153KA01#	
			18000pF	±10%	GCJ216R72A183KA01#	
			22000pF	±10%	GCJ216R72A223KA01#	
	50Vdc	X7R	330pF	±10%	GCJ216R71H331KA01#	
			390pF	±10%	GCJ216R71H391KA01#	
			470pF	±10%	GCJ216R71H471KA01#	
			560pF	±10%	GCJ216R71H561KA01#	
			680pF	±10%	GCJ216R71H681KA01#	
			820pF	±10%	GCJ216R71H821KA01#	
	25Vdc	X7R	470pF	±10%	GCJ216R71E471KA01#	
			560pF	±10%	GCJ216R71E561KA01#	
			680pF	±10%	GCJ216R71E681KA01#	
			820pF	±10%	GCJ216R71E821KA01#	
0.95mm	100Vdc	X7R	220pF	±10%	GCJ219R72A221KA01#	
			270pF	±10%	GCJ219R72A271KA01#	
			330pF	±10%	GCJ219R72A331KA01#	
			390pF	±10%	GCJ219R72A391KA01#	
			470pF	±10%	GCJ219R72A471KA01#	
			560pF	±10%	GCJ219R72A561KA01#	

KCM Series NMF Series

KC3 Series

KCA Series

GCG Series

①Caution
/Notice

Part number # indicates the package specification code.



# GCJ Series High Dielectric Constant Type For AEC Fail Prese Part Number List

(→ 2.0×1.25mm)								
T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number			
0.95mm	100Vdc	X7R	680pF	±10%	GCJ219R72A681KA01#			
			820pF	±10%	GCJ219R72A821KA01#			
			27000pF	±10%	GCJ219R72A273KA01#			
			33000pF	±10%	GCJ219R72A333KA01#			
			39000pF	±10%	GCJ219R72A393KA01#			
	50Vdc	X7R	27000pF	±10%	GCJ219R71H273KA01#			
			33000pF	±10%	GCJ219R71H333KA01#			
			39000pF	±10%	GCJ219R71H393KA01#			
			0.33µF	±10%	GCJ219R71H334KA12#			
	25Vdc	X7R	0.33µF	±10%	GCJ219R71E334KA01#			
			0.47µF	±10%	GCJ219R71E474KA12#			
	16Vdc	X7R	0.68µF	±10%	GCJ219R71C684KA01#			
			0.82µF	±10%	GCJ219R71C824KA01#			
			1.0µF	±10%	GCJ219R71C105KA01#			
1.0mm	250Vdc	X7R	1000pF	±10%	GCJ21AR72E102KXJ1#			
			1500pF	±10%	GCJ21AR72E152KXJ1#			
			2200pF	±10%	GCJ21AR72E222KXJ1#			
			3300pF	±10%	GCJ21AR72E332KXJ1#			
			4700pF	±10%	GCJ21AR72E472KXJ1#			
			6800pF	±10%	GCJ21AR72E682KXJ1#			
1.45mm	250Vdc	X7R	10000pF	±10%	GCJ21BR72E103KXJ3#			
			15000pF	±10%	GCJ21BR72E153KXJ3#			
			22000pF	±10%	GCJ21BR72E223KXJ3#			
	100Vdc	X7R	47000pF	±10%	GCJ21BR72A473KA01#			
			56000pF	±10%	GCJ21BR72A563KA01#			
			68000pF	±10%	GCJ21BR72A683KA01#			
			82000pF	±10%	GCJ21BR72A823KA01#			
			0.10µF	±10%	GCJ21BR72A104KA01#			
	50Vdc	X8L	27000pF	±10%	GCJ21BL81H273KA01#			
			33000pF	±10%	GCJ21BL81H333KA01#			
			39000pF	±10%	GCJ21BL81H393KA01#			
			47000pF	±10%	GCJ21BL81H473KA01#			
			56000pF	±10%	GCJ21BL81H563KA01#			
			68000pF	±10%	GCJ21BL81H683KA01#			
			82000pF	±10%	GCJ21BL81H823KA01#			
			0.10µF	±10%	GCJ21BL81H104KA01#			
		X7R	47000pF	±10%	GCJ21BR71H473KA01#			
			56000pF	±10%	GCJ21BR71H563KA01#			
			68000pF	±10%	GCJ21BR71H683KA01#			
			82000pF	±10%	GCJ21BR71H823KA01#			
			0.10µF	±10%	GCJ21BR71H104KA01#			
			0.12µF	±10%	GCJ21BR71H124KA01#			
			0.15µF	±10%	GCJ21BR71H154KA01#			
			0.18µF	±10%	GCJ21BR71H184KA01#			
			0.22µF	±10%	GCJ21BR71H224KA01#			
			0.47µF	±10%	GCJ21BR71H474KA12#			
			1.0µF	±10%	GCJ21BR71H105KA01#			
	35Vdc	X8L	0.12µF	±10%	GCJ21BL8YA124KA01#			
			0.15µF	±10%	GCJ21BL8YA154KA01#			
			0.18µF	±10%	GCJ21BL8YA184KA01#			
			0.22µF	±10%	GCJ21BL8YA224KA01#			
			0.33µF	±10%	GCJ21BL8YA334KA01#			
			0.47µF	±10%	GCJ21BL8YA474KA01#			
	25Vdc	X8L	0.12µF	±10%	GCJ21BL81E124KA01#			

1.45mm         25Vdc         X8L         0.15µF         ±10%         GCJ21BL81E154KA01#           0.18µF         ±10%         GCJ21BL81E384KA01#         0.22µF         ±10%         GCJ21BL81E324KA01#         0.33µF         ±10%         GCJ21BL81E334KA01#         0.32µF         ±10%         GCJ21BL81E334KA01#         0.32µF         ±10%         GCJ21BR71E37KA01#         0.32µF         ±10%         GCJ21BR71E334KA01#         0.32µF         ±10%         GCJ2	T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
$ \left  \begin{array}{c c c c c c c c c c c c c c c c c c c $	1.45mm	25Vdc	X8L	0.15µF	±10%	GCJ21BL81E154KA01#	
$ \left  \begin{array}{c c c c c c c c c c c c c c c c c c c $				0.18µF	±10%	GCJ21BL81E184KA01#	
$ \begin{vmatrix} 0.33\muF & \pm 10\% & GCJ21BL81E334KA01# \\ 0.39\muF & \pm 10\% & GCJ21BL81E394KA01# \\ 0.47\muF & \pm 10\% & GCJ21BL81E394KA01# \\ 0.68\muF & \pm 10\% & GCJ21BL81E684KA01# \\ 0.82\muF & \pm 10\% & GCJ21BL81E684KA01# \\ 1.0\muF & \pm 10\% & GCJ21BL81E05KA01# \\ 1.0\muF & \pm 10\% & GCJ21BR71E273KA01# \\ \hline \\ 56000pF & \pm 10\% & GCJ21BR71E273KA01# \\ \hline \\ 68000pF & \pm 10\% & GCJ21BR71E334KA01# \\ \hline \\ 68000pF & \pm 10\% & GCJ21BR71E334KA01# \\ \hline \\ 0.0\muF & \pm 10\% & GCJ21BR71E334KA01# \\ \hline \\ 0.27\muF & \pm 10\% & GCJ21BR71E394KA01# \\ \hline \\ 0.56\muF & \pm 10\% & GCJ21BR71E394KA01# \\ \hline \\ 0.56\muF & \pm 10\% & GCJ21BR71E394KA01# \\ \hline \\ 0.68\muF & \pm 10\% & GCJ21BR71E354KA12# \\ \hline \\ 1.0\muF & \pm 10\% & GCJ21BR71E354KA12# \\ \hline \\ 1.0\muF & \pm 10\% & GCJ21BR71E354KA12# \\ \hline \\ 1.0\muF & \pm 10\% & GCJ21BR71E354KA12# \\ \hline \\ 1.5\muF & \pm 10\% & GCJ21BR71E354KA12# \\ \hline \\ 1.5\muF & \pm 10\% & GCJ21BR71E354KA12# \\ \hline \\ 1.6\muF & \pm 10\% & GCJ21BR71E354KA01# \\ \hline \\ 0.68\muF & \pm 10\% & GCJ21BR71E354KA01# \\ \hline \\ 0.68\muF & \pm 10\% & GCJ21BR71E354KA01# \\ \hline \\ 0.82\muF & \pm 10\% & GCJ21BR71E354KA01# \\ \hline \\ 0.82\muF & \pm 10\% & GCJ21BR71C334KA01# \\ \hline \\ 0.39\muF & \pm 10\% & GCJ21BR71C334KA01# \\ \hline \\ 0.39\muF & \pm 10\% & GCJ21BR71C334KA01# \\ \hline \\ 0.39\muF & \pm 10\% & GCJ21BR71C334KA01# \\ \hline \\ 0.39\muF & \pm 10\% & GCJ21BR71C334KA01# \\ \hline \\ 0.39\muF & \pm 10\% & GCJ21BR71C334KA01# \\ \hline \\ 0.39\muF & \pm 10\% & GCJ21BR71C334KA01# \\ \hline \\ 1.0\muF & \pm 10\% & GCJ21BR71C334KA01# \\ \hline \\ 1.0\muF & \pm 10\% & GCJ21BR71C334KA01# \\ \hline \\ 1.0\muF & \pm 10\% & GCJ21BR71C334KA01# \\ \hline \\ 1.0\muF & \pm 10\% & GCJ21BR71C334KA01# \\ \hline \\ 1.0\muF & \pm 10\% & GCJ21BR71C334KA01# \\ \hline \\ 1.0\muF & \pm 10\% & GCJ21BR71C334KA01# \\ \hline \\ 1.0\muF & \pm 10\% & GCJ21BR71C334KA01# \\ \hline \\ 1.0\muF & \pm 10\% & GCJ21BR71C334KA01# \\ \hline \\ 1.0\muF & \pm 10\% & GCJ21BR71C334KA01# \\ \hline \\ 1.0\muF & \pm 10\% & GCJ21BR71C334KA01# \\ \hline \\ 1.0\muF & \pm 10\% & GCJ21BR71C354KA01# \\ \hline \\ 1.0\muF & \pm 10\% & GCJ21BR71C354KA01# \\ \hline \\ \hline \\ 1.0\muF & \pm 10\% & GCJ21BR71C475KA01# \\ \hline \\ \hline \\ \hline \\ \hline \\ 1.0\muF & \pm 10\% & GCJ21BR71A225KA01# \\ \hline \\ $				0.22µF	±10%	GCJ21BL81E224KA01#	
$ \left  \begin{array}{c c c c c c c c c c c c c c c c c c c $				0.27µF	±10%	GCJ21BL81E274KA01#	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$				0.33µF	±10%	GCJ21BL81E334KA01#	
				0.39µF	±10%	GCJ21BL81E394KA01#	
				0.47µF	±10%	GCJ21BL81E474KA01#	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$				0.68µF	±10%	GCJ21BL81E684KA01#	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$				0.82µF	±10%	GCJ21BL81E824KA01#	
1         56000pF         ±10%         GCJ21BR71E563KA01#           68000pF         ±10%         GCJ21BR71E683KA01#           82000pF         ±10%         GCJ21BR71E623KA01#           0.10µF         ±10%         GCJ21BR71E04KA01#           0.27µF         ±10%         GCJ21BR71E394KA01#           0.39µF         ±10%         GCJ21BR71E394KA01#           0.56µF         ±10%         GCJ21BR71E394KA01#           0.68µF         ±10%         GCJ21BR71E394KA12#           0.68µF         ±10%         GCJ21BR71E394KA12#           1.0µF         ±10%         GCJ21BR71E394KA12#           1.0µF         ±10%         GCJ21BR71E35KA01#           1.0µF         ±10%         GCJ21BR71E35KA01#           1.0µF         ±10%         GCJ21BR71E25KA01#           1.0µF         ±10%         GCJ21BR71E35KA01#           0.68µF         ±10%         GCJ21BR71E35KA01#           0.82µF         ±10%         GCJ21BR71E34KA01#           0.82µF         ±10%         GCJ21BR71C334KA01#           0.33µF         ±10%         GCJ21BR71C334KA01#           0.33µF         ±10%         GCJ21BR71C334KA01#           0.47µF         ±10%         GCJ21BR71C474KA01#				1.0µF	±10%	GCJ21BL81E105KA01#	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$			X7R	27000pF	±10%	GCJ21BR71E273KA01#	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$				56000pF	±10%	GCJ21BR71E563KA01#	
$ \begin{vmatrix} 0.10 \mu F & \pm 10\% & GCJ21BR71E104KA01# \\ 0.27 \mu F & \pm 10\% & GCJ21BR71E274KA01# \\ 0.39 \mu F & \pm 10\% & GCJ21BR71E394KA01# \\ 0.39 \mu F & \pm 10\% & GCJ21BR71E394KA01# \\ 0.56 \mu F & \pm 10\% & GCJ21BR71E564KA12# \\ 0.68 \mu F & \pm 10\% & GCJ21BR71E684KA12# \\ 0.82 \mu F & \pm 10\% & GCJ21BR71E324KA12# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71E105KA12# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71E105KA12# \\ 1.5 \mu F & \pm 10\% & GCJ21BR71E225KA01# \\ 2.2 \mu F & \pm 10\% & GCJ21BL81C564KA01# \\ 0.68 \mu F & \pm 10\% & GCJ21BL81C684KA01# \\ 0.68 \mu F & \pm 10\% & GCJ21BL81C684KA01# \\ 0.68 \mu F & \pm 10\% & GCJ21BL81C684KA01# \\ 0.82 \mu F & \pm 10\% & GCJ21BL81C05KA01# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71C274KA01# \\ 0.33 \mu F & \pm 10\% & GCJ21BR71C274KA01# \\ 0.39 \mu F & \pm 10\% & GCJ21BR71C334KA01# \\ 0.39 \mu F & \pm 10\% & GCJ21BR71C334KA01# \\ 0.56 \mu F & \pm 10\% & GCJ21BR71C334KA01# \\ 0.56 \mu F & \pm 10\% & GCJ21BR71C394KA01# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71C35KA01# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71C25KA01# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71C25KA01# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71C25KA01# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71C25KA01# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71C25KA01# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71C25KA01# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71C25KA01# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71C25KA01# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71C25KA01# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71C25KA01# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71C25KA01# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71C25KA01# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71C25KA01# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71C475KA01# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71C475KA01# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71A225KA01# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71A225KA01# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71A225KA01# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71A225KA01# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71A225KA01# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71A225KA01# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71A225KA01# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71A225KA01# \\ 1.0 \mu F & \pm 10\% & GCJ21BR71A106KE01# \\ 1.0 \mu F & \pm 0\% & GCJ21BR71A106KE01# \\ 1.0 \mu F & \pm 0\% & GCJ21BR71A225KA01# \\ 1.0 \mu F & \pm 0\% & GCJ21BR71A225KA01# \\ 1.0 \mu F & \pm 0\% & GCJ21BR71A225KA01# \\ 1.0 \mu F & \pm 0\% & GCJ21BR71A225KA01# \\ 1.0 \mu F & \pm 0\% & GCJ21BR71A225KA01# \\ 1.0 \mu F & \pm 0\% & G$				68000pF	±10%	GCJ21BR71E683KA01#	
$ \left  \begin{array}{c c c c c c c c c c c c c c c c c c c $				82000pF	±10%	GCJ21BR71E823KA01#	
$ \begin{array}{ c c c c c c } & 0.39 \mu F & \pm 10\% & {\bf GCJ21BR71E394KA01} & \\ \hline 0.39 \mu F & \pm 10\% & {\bf GCJ21BR71E564KA12} & \\ \hline 0.56 \mu F & \pm 10\% & {\bf GCJ21BR71E564KA12} & \\ \hline 0.68 \mu F & \pm 10\% & {\bf GCJ21BR71E324KA12} & \\ \hline 0.82 \mu F & \pm 10\% & {\bf GCJ21BR71E105KA12} & \\ \hline 1.0 \mu F & \pm 10\% & {\bf GCJ21BR71E105KA12} & \\ \hline 1.5 \mu F & \pm 10\% & {\bf GCJ21BR71E155KA01} & \\ \hline 1.5 \mu F & \pm 10\% & {\bf GCJ21BR71E255KA01} & \\ \hline 1.5 \mu F & \pm 10\% & {\bf GCJ21BR71E225KA01} & \\ \hline 1.6 V dc & X8L & 0.56 \mu F & \pm 10\% & {\bf GCJ21BL81C564KA01} & \\ \hline 0.68 \mu F & \pm 10\% & {\bf GCJ21BL81C684KA01} & \\ \hline 0.68 \mu F & \pm 10\% & {\bf GCJ21BL81C684KA01} & \\ \hline 0.68 \mu F & \pm 10\% & {\bf GCJ21BL81C05KA01} & \\ \hline 0.82 \mu F & \pm 10\% & {\bf GCJ21BR71C274KA01} & \\ \hline 0.33 \mu F & \pm 10\% & {\bf GCJ21BR71C274KA01} & \\ \hline 0.33 \mu F & \pm 10\% & {\bf GCJ21BR71C334KA01} & \\ \hline 0.39 \mu F & \pm 10\% & {\bf GCJ21BR71C334KA01} & \\ \hline 0.56 \mu F & \pm 10\% & {\bf GCJ21BR71C394KA01} & \\ \hline 0.56 \mu F & \pm 10\% & {\bf GCJ21BR71C334KA01} & \\ \hline 0.56 \mu F & \pm 10\% & {\bf GCJ21BR71C274KA01} & \\ \hline 1.0 \mu F & \pm 10\% & {\bf GCJ21BR71C255KA01} & \\ \hline 1.0 \mu F & \pm 10\% & {\bf GCJ21BR71C2255KA01} & \\ \hline 10 V dc & X7R & 2.2 \mu F & \pm 10\% & {\bf GCJ21BR71A2255KA01} & \\ \hline 10 \mu F & \pm 10\% & {\bf GCJ21BR71A2255KA01} & \\ \hline 10 \mu F & \pm 10\% & {\bf GCJ21BR71A2255KA01} & \\ \hline \end{array}$				0.10µF	±10%	GCJ21BR71E104KA01#	
$ \begin{array}{ c c c c c c } & 0.56 \mu F & \pm 10\% & {\bf GCJ21BR71E564KA12\#} & \\ \hline 0.68 \mu F & \pm 10\% & {\bf GCJ21BR71E684KA12\#} & \\ \hline 0.68 \mu F & \pm 10\% & {\bf GCJ21BR71E324KA12\#} & \\ \hline 0.82 \mu F & \pm 10\% & {\bf GCJ21BR71E105KA12\#} & \\ \hline 1.0 \mu F & \pm 10\% & {\bf GCJ21BR71E155KA01\#} & \\ \hline 1.5 \mu F & \pm 10\% & {\bf GCJ21BR71E225KA01\#} & \\ \hline 1.5 \mu F & \pm 10\% & {\bf GCJ21BR71E225KA01\#} & \\ \hline 1.6 V dc & X8L & 0.56 \mu F & \pm 10\% & {\bf GCJ21BL81C684KA01\#} & \\ \hline 0.68 \mu F & \pm 10\% & {\bf GCJ21BL81C684KA01\#} & \\ \hline 0.82 \mu F & \pm 10\% & {\bf GCJ21BL81C684KA01\#} & \\ \hline 0.82 \mu F & \pm 10\% & {\bf GCJ21BL81C684KA01\#} & \\ \hline 0.82 \mu F & \pm 10\% & {\bf GCJ21BR71C274KA01\#} & \\ \hline 0.82 \mu F & \pm 10\% & {\bf GCJ21BR71C274KA01\#} & \\ \hline 0.33 \mu F & \pm 10\% & {\bf GCJ21BR71C334KA01\#} & \\ \hline 0.39 \mu F & \pm 10\% & {\bf GCJ21BR71C394KA01\#} & \\ \hline 0.47 \mu F & \pm 10\% & {\bf GCJ21BR71C474KA01\#} & \\ \hline 0.56 \mu F & \pm 10\% & {\bf GCJ21BR71C255KA13\#} & \\ \hline 1.0 \mu F & \pm 10\% & {\bf GCJ21BR71C255KA01\#} & \\ \hline 10 V dc & X7R & 2.2 \mu F & \pm 10\% & {\bf GCJ21BR71A2255KA01\#} & \\ \hline 10 \mu F & \pm 10\% & {\bf GCJ21BR71A2255KA01\#} & \\ \hline 10 \mu F & \pm 10\% & {\bf GCJ21BR71A2255KA01\#} & \\ \hline \end{array}$				0.27µF	±10%	GCJ21BR71E274KA01#	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$				0.39µF	±10%	GCJ21BR71E394KA01#	
$ \begin{array}{ c c c c c c c } & 0.82 \mu F & \pm 10\% & {\bf GCJ21BR71E824KA12\#} \\ \hline 0.82 \mu F & \pm 10\% & {\bf GCJ21BR71E105KA12\#} \\ \hline 1.0 \mu F & \pm 10\% & {\bf GCJ21BR71E155KA01\#} \\ \hline 1.5 \mu F & \pm 10\% & {\bf GCJ21BR71E225KA01\#} \\ \hline 1.5 \mu F & \pm 10\% & {\bf GCJ21BL81C564KA01\#} \\ \hline 1.6 Vdc & X8L & 0.56 \mu F & \pm 10\% & {\bf GCJ21BL81C684KA01\#} \\ \hline 0.68 \mu F & \pm 10\% & {\bf GCJ21BL81C684KA01\#} \\ \hline 0.82 \mu F & \pm 10\% & {\bf GCJ21BL81C05KA01\#} \\ \hline 0.82 \mu F & \pm 10\% & {\bf GCJ21BL81C05KA01\#} \\ \hline 0.82 \mu F & \pm 10\% & {\bf GCJ21BL81C05KA01\#} \\ \hline 0.3 \mu F & \pm 10\% & {\bf GCJ21BR71C274KA01\#} \\ \hline 0.3 \mu F & \pm 10\% & {\bf GCJ21BR71C334KA01\#} \\ \hline 0.3 \mu F & \pm 10\% & {\bf GCJ21BR71C334KA01\#} \\ \hline 0.47 \mu F & \pm 10\% & {\bf GCJ21BR71C394KA01\#} \\ \hline 0.56 \mu F & \pm 10\% & {\bf GCJ21BR71C3564KA01\#} \\ \hline 1.0 \mu F & \pm 10\% & {\bf GCJ21BR71C255KA01\#} \\ \hline 10 Vdc & X7R & {\bf 2.2 \mu F } \pm 10\% & {\bf GCJ21BR71A2255KA01\#} \\ \hline 10 \mu F & \pm 10\% & {\bf GCJ21BR71A2255KA01\#} \\ \hline \end{array} $				0.56µF	±10%	GCJ21BR71E564KA12#	
$ \begin{array}{ c c c c c c c } \hline 1.0 \mu F & \pm 10\% & {\bf GCJ21BR71E105KA12\#} \\ \hline 1.5 \mu F & \pm 10\% & {\bf GCJ21BR71E155KA01\#} \\ \hline 1.5 \mu F & \pm 10\% & {\bf GCJ21BR71E225KA01\#} \\ \hline 2.2 \mu F & \pm 10\% & {\bf GCJ21BL81C564KA01\#} \\ \hline 1.6 Vdc & X8L & 0.56 \mu F & \pm 10\% & {\bf GCJ21BL81C564KA01\#} \\ \hline 0.68 \mu F & \pm 10\% & {\bf GCJ21BL81C684KA01\#} \\ \hline 0.82 \mu F & \pm 10\% & {\bf GCJ21BL81C05KA01\#} \\ \hline 0.82 \mu F & \pm 10\% & {\bf GCJ21BL81C05KA01\#} \\ \hline 0.82 \mu F & \pm 10\% & {\bf GCJ21BL81C05KA01\#} \\ \hline 0.82 \mu F & \pm 10\% & {\bf GCJ21BR71C274KA01\#} \\ \hline 0.3 \mu F & \pm 10\% & {\bf GCJ21BR71C334KA01\#} \\ \hline 0.3 \mu F & \pm 10\% & {\bf GCJ21BR71C394KA01\#} \\ \hline 0.3 \mu F & \pm 10\% & {\bf GCJ21BR71C394KA01\#} \\ \hline 0.56 \mu F & \pm 10\% & {\bf GCJ21BR71C474KA01\#} \\ \hline 0.56 \mu F & \pm 10\% & {\bf GCJ21BR71C105KA01\#} \\ \hline 1.0 \mu F & \pm 10\% & {\bf GCJ21BR71C225KA13\#} \\ \hline 10 Vdc & X7R & 2.2 \mu F & \pm 10\% & {\bf GCJ21BR71A225KA01\#} \\ \hline 10 \mu F & \pm 10\% & {\bf GCJ21BR71A225KA01\#} \\ \hline \end{array} $				0.68µF	±10%	GCJ21BR71E684KA12#	
$ \begin{array}{ c c c c c c } \hline 1.5 \mu F & \pm 10\% & {\tt GCJ21BR71E155KA01\#} \\ \hline 1.5 \mu F & \pm 10\% & {\tt GCJ21BR71E225KA01\#} \\ \hline 2.2 \mu F & \pm 10\% & {\tt GCJ21BL81C564KA01\#} \\ \hline 16 Vdc & X8L & 0.56 \mu F & \pm 10\% & {\tt GCJ21BL81C684KA01\#} \\ \hline 0.68 \mu F & \pm 10\% & {\tt GCJ21BL81C684KA01\#} \\ \hline 0.82 \mu F & \pm 10\% & {\tt GCJ21BL81C824KA01\#} \\ \hline 0.82 \mu F & \pm 10\% & {\tt GCJ21BL81C05KA01\#} \\ \hline 1.0 \mu F & \pm 10\% & {\tt GCJ21BR71C274KA01\#} \\ \hline 0.33 \mu F & \pm 10\% & {\tt GCJ21BR71C334KA01\#} \\ \hline 0.33 \mu F & \pm 10\% & {\tt GCJ21BR71C334KA01\#} \\ \hline 0.39 \mu F & \pm 10\% & {\tt GCJ21BR71C334KA01\#} \\ \hline 0.47 \mu F & \pm 10\% & {\tt GCJ21BR71C474KA01\#} \\ \hline 0.56 \mu F & \pm 10\% & {\tt GCJ21BR71C474KA01\#} \\ \hline 1.0 \mu F & \pm 10\% & {\tt GCJ21BR71C25KA01\#} \\ \hline 1.0 \mu F & \pm 10\% & {\tt GCJ21BR71C225KA13\#} \\ \hline 10 Vdc & X7R & {\tt 2.2 \mu F} & \pm 10\% & {\tt GCJ21BR71A225KA01\#} \\ \hline 10 \mu F & \pm 10\% & {\tt GCJ21BR71A225KA01\#} \\ \hline \end{array}$				0.82µF	±10%	GCJ21BR71E824KA12#	
$ \begin{array}{ c c c c c c c } \hline & & & & & & & & & & & & & & & & & & $				1.0µF	±10%	GCJ21BR71E105KA12#	
$ \begin{array}{ c c c c c c c } 16 \text{Vdc} & X8 \text{L} & 0.56 \mu \text{F} & \pm 10\% & \text{GCJ21BL81C564KA01#} \\ \hline 0.68 \mu \text{F} & \pm 10\% & \text{GCJ21BL81C684KA01#} \\ \hline 0.82 \mu \text{F} & \pm 10\% & \text{GCJ21BL81C684KA01#} \\ \hline 0.82 \mu \text{F} & \pm 10\% & \text{GCJ21BL81C05KA01#} \\ \hline 1.0 \mu \text{F} & \pm 10\% & \text{GCJ21BL81C05KA01#} \\ \hline 0.32 \mu \text{F} & \pm 10\% & \text{GCJ21BR71C274KA01#} \\ \hline 0.33 \mu \text{F} & \pm 10\% & \text{GCJ21BR71C334KA01#} \\ \hline 0.39 \mu \text{F} & \pm 10\% & \text{GCJ21BR71C394KA01#} \\ \hline 0.39 \mu \text{F} & \pm 10\% & \text{GCJ21BR71C394KA01#} \\ \hline 0.47 \mu \text{F} & \pm 10\% & \text{GCJ21BR71C474KA01#} \\ \hline 0.56 \mu \text{F} & \pm 10\% & \text{GCJ21BR71C564KA01#} \\ \hline 1.0 \mu \text{F} & \pm 10\% & \text{GCJ21BR71C255KA01#} \\ \hline 1.0 \mu \text{F} & \pm 10\% & \text{GCJ21BR71C2255KA01#} \\ \hline 10 \text{Vdc} & X7 \text{R} & 2.2 \mu \text{F} & \pm 10\% & \text{GCJ21BR71A2255KA01#} \\ \hline 10 \mu \text{F} & \pm 10\% & \text{GCJ21BR71A1066E01#} \\ \hline \end{array}$				1.5µF	±10%	GCJ21BR71E155KA01#	
$ \begin{array}{ c c c c c c } \hline & & & & & & & & & & & & & & & & & & $				2.2µF	±10%	GCJ21BR71E225KA01#	
$ \begin{array}{ c c c c c c c } \hline 0.82 \mu F & \pm 10\% & \mbox{GCJ21BL81C824KA01#} & \\ \hline 0.82 \mu F & \pm 10\% & \mbox{GCJ21BL81C105KA01#} & \\ \hline 1.0 \mu F & \pm 10\% & \mbox{GCJ21BR71C274KA01#} & \\ \hline 0.32 \mu F & \pm 10\% & \mbox{GCJ21BR71C334KA01#} & \\ \hline 0.33 \mu F & \pm 10\% & \mbox{GCJ21BR71C394KA01#} & \\ \hline 0.33 \mu F & \pm 10\% & \mbox{GCJ21BR71C394KA01#} & \\ \hline 0.33 \mu F & \pm 10\% & \mbox{GCJ21BR71C474KA01#} & \\ \hline 0.47 \mu F & \pm 10\% & \mbox{GCJ21BR71C394KA01#} & \\ \hline 1.0 \mu F & \pm 10\% & \mbox{GCJ21BR71C394KA01#} & \\ \hline 1.0 \mu F & \pm 10\% & \mbox{GCJ21BR71C255KA01#} & \\ \hline 10 V dc & X7R & \mbox{2.2} \mu F & \pm 10\% & \mbox{GCJ21BR71C475KA01#} & \\ \hline 10 \mu F & \pm 10\% & \mbox{GCJ21BR71A225KA01#} & \\ \hline 10 \mu F & \pm 10\% & \mbox{GCJ21BR71A106KE01#} & \\ \hline \end{array} $		16Vdc	X8L	0.56µF	±10%	GCJ21BL81C564KA01#	
$ \begin{array}{ c c c c c c c } \hline 1.0 \mu F & \pm 10\% & \mbox{GCJ21BL81C105KA01#} & \mbox{I} \\ \hline $X7R & 0.27 \mu F & \pm 10\% & \mbox{GCJ21BR71C274KA01#} & \mbox{I} \\ \hline $0.33 \mu F & \pm 10\% & \mbox{GCJ21BR71C334KA01#} & \mbox{I} \\ \hline $0.39 \mu F & \pm 10\% & \mbox{GCJ21BR71C394KA01#} & \mbox{I} \\ \hline $0.39 \mu F & \pm 10\% & \mbox{GCJ21BR71C474KA01#} & \mbox{I} \\ \hline $0.47 \mu F & \pm 10\% & \mbox{GCJ21BR71C564KA01#} & \mbox{I} \\ \hline $0.56 \mu F & \pm 10\% & \mbox{GCJ21BR71C3564KA01#} & \mbox{I} \\ \hline $1.0 \mu F & \pm 10\% & \mbox{GCJ21BR71C255KA13#} & \mbox{I} \\ \hline $2.2 \mu F & \pm 10\% & \mbox{GCJ21BR71C4755KA01#} & \mbox{I} \\ \hline $10 V dc & \mbox{X7R} & \mbox{2.2 } \mu F & \pm 10\% & \mbox{GCJ21BR71A2255KA01#} & \mbox{I} \\ \hline $10 \mu F & \pm 10\% & \mbox{GCJ21BR71A106KE01#} & \mbox{I} \\ \hline $10 \mu F & \pm 10\% & \mbox{GCJ21BR71A106KE01#} & \mbox{I} \\ \hline \end{tabular} $				0.68µF	±10%	GCJ21BL81C684KA01#	
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$				0.82µF	±10%	GCJ21BL81C824KA01#	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$				1.0µF	±10%	GCJ21BL81C105KA01#	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$			X7R	0.27µF	±10%	GCJ21BR71C274KA01#	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$				0.33µF	±10%	GCJ21BR71C334KA01#	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$				0.39µF	±10%	GCJ21BR71C394KA01#	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$				0.47µF	±10%	GCJ21BR71C474KA01#	
$ \begin{array}{ c c c c c c c c } \hline & 2.2 \mu F & \pm 10\% & \mbox{GCJ21BR71C225KA13#} & \\ \hline & 2.2 \mu F & \pm 10\% & \mbox{GCJ21BR71C475KA01#} & \\ \hline & 10 V dc & X7R & 2.2 \mu F & \pm 10\% & \mbox{GCJ21BR71A225KA01#} & \\ \hline & 10 \mu F & \pm 10\% & \mbox{GCJ21BR71A106KE01#} & \\ \hline \end{array} $				0.56µF	±10%	GCJ21BR71C564KA01#	
$ \begin{array}{ c c c c c c c c } \hline & & & & & & & & & & & & & & & & & & $				1.0µF	±10%	GCJ21BR71C105KA01#	
10Vdc         X7R         2.2μF         ±10%         GCJ21BR71A225KA01#           10μF         ±10%         GCJ21BR71A106KE01#				2.2µF	±10%	GCJ21BR71C225KA13#	
10µF ±10% GCJ21BR71A106KE01#				4.7µF	±10%	GCJ21BR71C475KA01#	
		10Vdc	X7R	2.2µF	±10%	GCJ21BR71A225KA01#	
				10µF	±10%	GCJ21BR71A106KE01#	
1.5mm 100Vac X/S 1.0µF ±10% GCJ21BC/2A105KE02#	1.5mm	100Vdc	X7S	1.0µF	±10%	GCJ21BC72A105KE02#	

#### 3.2×1.6mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
0.95mm	100Vdc	X7R	0.10µF	±10%	GCJ319R72A104KA01#	
1.25mm	1000Vdc	X7R	1000pF	±10%	GCJ31BR73A102KXJ1#	
			1500pF	±10%	GCJ31BR73A152KXJ1#	
			2200pF	±10%	GCJ31BR73A222KXJ1#	
			3300pF	±10%	GCJ31BR73A332KXJ1#	
			4700pF	±10%	GCJ31BR73A472KXJ1#	
	630Vdc	X7R	1000pF	±10%	GCJ31BR72J102KXJ1#	
			1500pF	±10%	GCJ31BR72J152KXJ1#	
			2200pF	±10%	GCJ31BR72J222KXJ1#	
			3300pF	±10%	GCJ31BR72J332KXJ1#	
			4700pF	±10%	GCJ31BR72J472KXJ1#	

Part number # indicates the package specification code.

NMF Series

KCM Series

①Caution/ Notice

**GCG** Series



## GCJ Series High Dielectric Constant Type 🞬 🍪 🖬 Part Number List

#### $(\rightarrow 3.2 \times 1.6 \text{mm})$

(→ 3.2	(→ 3.2×1.6mm)							
T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number			
1.25mm	630Vdc	X7R	6800pF	±10%	GCJ31BR72J682KXJ1#			
			10000pF	±10%	GCJ31BR72J103KXJ1#			
	250Vdc	X7R	15000pF	±10%	GCJ31BR72E153KXJ1#			
			22000pF	±10%	GCJ31BR72E223KXJ1#			
			68000pF	±10%	GCJ31BR72E683KXJ1#			
1.35mm	100Vdc	X7R	0.15µF	±10%	GCJ31MR72A154KA01#			
			0.18µF	±10%	GCJ31MR72A184KA01#			
			0.22µF	±10%	GCJ31MR72A224KA01#			
	50Vdc	X7R	0.27µF	±10%	GCJ31MR71H274KA01#			
			0.39µF	±10%	GCJ31MR71H394KA01#			
			0.47µF	±10%	GCJ31MR71H474KA01#			
			0.56µF	±10%	GCJ31MR71H564KA12#			
			0.68µF	±10%	GCJ31MR71H684KA12#			
			0.82µF	±10%	GCJ31MR71H824KA12#			
			1.0µF	±10%	GCJ31MR71H105KA12#			
	25Vdc	X7R	0.12µF	±10%	GCJ31MR71E124KA01#			
			0.15µF	±10%	GCJ31MR71E154KA01#			
			0.18µF	±10%	GCJ31MR71E184KA01#			
			0.22µF	±10%	GCJ31MR71E224KA01#			
			1.5µF	±10%	GCJ31MR71E155KA12#			
			2.2µF	±10%	GCJ31MR71E225KA12#			
			3.3µF	±10%	GCJ31MR71E335KA12#			
	16Vdc	X7R	1.5µF	±10%	GCJ31MR71C155KA01#			
1.8mm	1000Vdc	X7R	6800pF	±10%	GCJ31CR73A682KXJ3#			
			10000pF	±10%	GCJ31CR73A103KXJ3#			
	630Vdc	X7R	15000pF	±10%	GCJ31CR72J153KXJ3#			
			22000pF	±10%	GCJ31CR72J223KXJ3#			
	250Vdc	X7R	33000pF	±10%	GCJ31CR72E333KXJ3#			
			47000pF	±10%	GCJ31CR72E473KXJ3#			
			0.10µF	±10%	GCJ31CR72E104KXJ3#			
1.9mm	100Vdc	X8L	1.0µF	±10%	GCJ31CL8EL105KA07#			
2.5	100140	X7R	1.0µF	±10%	GCJ31CR72A105KA01#			
	50Vdc	X7R	1.5µF	±10%	GCJ31CR71H155KA12#			
	50140		2.2µF	±10%	GCJ31CR71H225KA12#			
		X7S	4.7µF	±10%	GCJ31CC71H475KA01#			
	35Vdc	X8L	0.56µF	±10%	GCJ31CL8YA564KA01#			
	55740	XOL	0.68µF	±10%	GCJ31CL8YA684KA01#			
			0.82µF	±10%	GCJ31CL8YA824KA01#			
					GCJ31CL8YA105KA01#			
	25Vdc	X8L	1.0µF	±10%				
	25000	1 NOL	0.56µF	±10%	GCJ31CL81E564KA01#			
			0.68µF	±10%	GCJ31CL81E684KA01#			
		V75	0.82µF	±10%	GCJ31CL81E824KA01#			
	1011	X7R	4.7µF	±10%	GCJ31CR71E475KA12#			
	16Vdc	X8L	3.3µF	±10%	GCJ31CL81C335KA01#			
		×=-	4.7µF	±10%	GCJ31CL81C475KA01#			
		X7R	3.3µF	±10%	GCJ31CR71C335KA01#			
			4.7µF	±10%	GCJ31CR71C475KA01#			
			10µF	±10%	GCJ31CR71C106KA15#			
	10Vdc	X8L	22µF	±10%	GCJ31CL8ED226KE07#			
		X7R	6.8µF	±10%	GCJ31CR71A685KA13#			
			10µF	±10%	GCJ31CR71A106KA13#			
			22µF	±10%	GCJ31CR71A226KE01#			
	6.3Vdc	X7R	22µF	±10%	GCJ31CR70J226KE01#			
2.0mm	25Vdc	X8L	10µF	±10%	GCJ31CL8EF106KA08#			

T max.	Rated Voltage		Cap.	Tol.	Part Number	
2.0mm	25Vdc	X7S	10µF	±10%	GCJ31CC71E106KA15#	

#### 3.2×2.5mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
1.5mm	630Vdc	X7R	6800pF	±10%	GCJ32QR72J682KXJ1#	
			10000pF	±10%	GCJ32QR72J103KXJ1#	
	250Vdc	X7R	68000pF	±10%	GCJ32QR72E683KXJ1#	
			0.15µF	±10%	GCJ32QR72E154KXJ1#	
2.0mm	1000Vdc	X7R	15000pF	±10%	GCJ32DR73A153KXJ1#	
			22000pF	±10%	GCJ32DR73A223KXJ1#	
	630Vdc	X7R	15000pF	±10%	GCJ32DR72J153KXJ1#	
			22000pF	±10%	GCJ32DR72J223KXJ1#	
			33000pF	±10%	GCJ32DR72J333KXJ1#	_
			47000pF	±10%	GCJ32DR72J473KXJ1#	_
	250Vdc	X7R	0.10µF	±10%	GCJ32DR72E104KXJ1#	
			0.22µF	±10%	GCJ32DR72E224KXJ1#	
2.3mm	100Vdc	X8L	2.2µF	±10%	GCJ32DL8EL225KA07#	_
		X7R	2.2µF	±10%	GCJ32DR72A225KA01#	_
		X7S	4.7µF	±10%	GCJ32DC72A475KE01#	
2.8mm	50Vdc	X7R	4.7µF	±10%	GCJ32ER71H475KA12#	_
		X7S	10µF	±10%	GCJ32EC71H106KA01#	_
	25Vdc	X8L	4.7µF	±10%	GCJ32EL81E475KA01#	_
	16Vdc	X8R	6.8µF	±10%	GCJ32ER91C685KE01#	_
			10µF	±10%	GCJ32ER91C106KE01#	_
		X7R	22µF	±10%	GCJ32ER71C226KE01#	_
	6.3Vdc	X7R	47µF	±10%	GCJ32ER70J476KE01#	_
2.85mm	25Vdc	X8L	22µF	±10%	GCJ32EL8EF226KE08#	_
		X7S	22µF	±10%	GCJ32EC71E226KE02#	_

#### 4.5×3.2mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
1.5mm	630Vdc	X7R	68000pF	±10%	GCJ43QR72J683KXJ1#	
	250Vdc	X7R	0.15µF	±10%	GCJ43QR72E154KXJ1#	
2.0mm	1000Vdc	X7R	33000pF	±10%	GCJ43DR73A333KXJ1#	
			47000pF	±10%	GCJ43DR73A473KXJ1#	
	630Vdc	X7R	33000pF	±10%	GCJ43DR72J333KXJ1#	
			47000pF	±10%	GCJ43DR72J473KXJ1#	
			0.10µF	±10%	GCJ43DR72J104KXJ1#	
	250Vdc	X7R	0.22µF	±10%	GCJ43DR72E224KXJ1#	
			0.33µF	±10%	GCJ43DR72E334KXJ1#	
			0.47µF	±10%	GCJ43DR72E474KXJ1#	

#### 5.7×5.0mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
2.0mm	1000Vdc	X7R	68000pF	±10%	GCJ55DR73A683KXJ1#	
			0.10µF	±10%	GCJ55DR73A104KXJ1#	
	630Vdc	X7R	0.10µF	±10%	GCJ55DR72J104KXJ1#	
			0.15µF	±10%	GCJ55DR72J154KXJ1#	

**GCM** Series GC3 Series

Part number # indicates the package specification code.



# GCJ Series High Dielectric Constant Type Part Number List

(→ 5.7×5.0mm)									
T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number				
2.0mm	630Vdc	X7R	0.22µF	±10%	GCJ55DR72J224KXJ1#				
	250Vdc	X7R	0.33µF	±10%	GCJ55DR72E334KXJ1#				
			0.47µF	±10%	GCJ55DR72E474KXJ1#				
			0.68µF	±10%	GCJ55DR72E684KXJ1#				
			1.0µF	±10%	GCJ55DR72E105KXJ1#				

**GRT** Series

**GCM** Series

GC3 Series

GCD Series // GCJ Series

**GCE** Series

NMF Series

KCM Series

KC3 Series

KCA Series

**GCG** Series

①Caution/ Notice



**GCM** Series

MLSC Design Chip Multilayer Ceramic Capacitors for Automotive



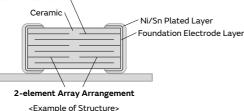
## Prevents momentary dielectric breakdown by a 2-element array structure!

#### Features

#### 1 Prevents momentary dielectric breakdown by a 2-element array structure!

This product consists of 2 elements arranged in 1 capacitor. It is structured so that even when 1 element is shorted, the other capacitor element will not short.

Internal Electrodes

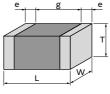


2 This AEC-Q200 conforming product is ideal for the battery lines of automotive.

Space can be reduced in battery lines where 2 capacitors are arranged in an array.

#### Specifications

Size	1.6×0.8mm to 2.0×1.25mm
Rated Voltage	16Vdc to 100Vdc
Capacitance	1000pF to 0.50µF
Main Applications	Battery Lines and Powertrains for automotive



<Dimensions>

**GCD** Series

KCA Series

## muRata

Part Number

GCD216R72A562KA01#

GCD219R72A682KA01#

GCD21BR72A822KA01# GCD21BR72A103KA01#

GCD21BR72A123KA01#

GCD21BR72A153KA01#

GCD21BR72A183KA01# GCD21BR72A223KA01#

GCD21BR72A273KA01#

GCD21BR72A333KA01#

## GCD Series High Dielectric Constant Type 🚟 🏍 🚮 🏫 Part Number List

Rated

/oltage

100Vdc

100Vdc

100Vdc

Т

max

0.7mm

0.95mm

1.4mm

TC Cod

X7R

X7R

X7R

Cap.

5600pF

6800pF

8200pF

10000pF

12000pF

15000pF

18000pF

22000pF

27000pF

33000pF

±10%

±10%

±10%

±10%

±10%

±10%

±10%

±10%

±10%

±10%

#### 1.6×0.8mm

**GRT** Series

**GCM** Series

1.0×0.	.011111				
T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
0.9mm	100Vdc	X7R	1000pF	±10%	GCD188R72A102KA01#
			1200pF	±10%	GCD188R72A122KA01#
			1500pF	±10%	GCD188R72A152KA01#
			1800pF	±10%	GCD188R72A182KA01#
			2200pF	±10%	GCD188R72A222KA01#
			2700pF	±10%	GCD188R72A272KA01#
			3300pF	±10%	GCD188R72A332KA01#
			3900pF	±10%	GCD188R72A392KA01#
			4700pF	±10%	GCD188R72A472KA01#
			5600pF	±10%	GCD188R72A562KA01#
			6800pF	±10%	GCD188R72A682KA01#
			8200pF	±10%	GCD188R72A822KA01#
			10000pF	±10%	GCD188R72A103KA01#
			12000pF	±10%	GCD188R72A123KA01#
			15000pF	±10%	GCD188R72A153KA01#
			18000pF	±10%	GCD188R72A183KA01#
			22000pF	±10%	GCD188R72A223KA01#
	50Vdc	X7R	1000pF	±10%	GCD188R71H102KA01#
			1200pF	±10%	GCD188R71H122KA01#
			1500pF	±10%	GCD188R71H152KA01#
			1800pF	±10%	GCD188R71H182KA01#
			2200pF	±10%	GCD188R71H222KA01#
			2700pF	±10%	GCD188R71H272KA01#
			3300pF	±10%	GCD188R71H332KA01#
			3900pF	±10%	GCD188R71H392KA01#
			4700pF	±10%	GCD188R71H472KA01#
			5600pF	±10%	GCD188R71H562KA01#
			6800pF	±10%	GCD188R71H682KA01#
			8200pF	±10%	GCD188R71H822KA01#
			10000pF	±10%	GCD188R71H103KA01#
			12000pF	±10%	GCD188R71H123KA01#
			15000pF	±10%	GCD188R71H153KA01#
			18000pF	±10%	GCD188R71H183KA01#
			22000pF	±10%	GCD188R71H223KA01#
	25Vdc	X7R	27000pF	±10%	GCD188R71E273KA01#
			33000pF	±10%	GCD188R71E333KA01#
			39000pF	±10%	GCD188R71E393KA01#
			47000pF	±10%	GCD188R71E473KA01#

#### GCD21BR72A393KA01# 39000pF ±10% GCD21BR72A473KA01# 47000pF ±10% 56000pF ±10% GCD21BR72A563KA01# 68000pF ±10% GCD21BR72A683KA01# 82000pF ±10% GCD21BR72A823KA01# 0.10µF ±10% GCD21BR72A104KA01# 50Vdc X7R 15000pF GCD21BR71H153KA01# ±10% 18000pF ±10% GCD21BR71H183KA01# GCD21BR71H223KA01# 22000pF ±10% 27000pF ±10% GCD21BR71H273KA01# 33000pF GCD21BR71H333KA01# ±10% 39000pF ±10% GCD21BR71H393KA01# GCD21BR71H473KA01# 47000pF ±10% GCD21BR71H563KA01# 56000pF ±10% 68000pF ±10% GCD21BR71H683KA01# 82000pF ±10% GCD21BR71H823KA01# 0.10µF ±10% GCD21BR71H104KA01#

#### 2.0×1.25mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
0.7mm	100Vdc	X7R	1000pF	±10%	GCD216R72A102KA01#
			1200pF	±10%	GCD216R72A122KA01#
			1500pF	±10%	GCD216R72A152KA01#
			1800pF	±10%	GCD216R72A182KA01#
			2200pF	±10%	GCD216R72A222KA01#
			2700pF	±10%	GCD216R72A272KA01#
			3300pF	±10%	GCD216R72A332KA01#
			3900pF	±10%	GCD216R72A392KA01#
			4700pF	±10%	GCD216R72A472KA01#

KC3 Series

**KCA** Series



**GCM** Series

Soft Termination MLSC Design Chip Multilayer Ceramic Capacitors for Automotive



Power- train Q2	C- Fail	Deflecting crack
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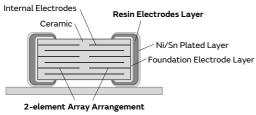
WEB

#### Further improved safety performance with a combination of a 2-element array structure & resin external electrodes!

#### Features

#### (1) Avoid instantaneous dielectric breakdown with the 2-element array structure

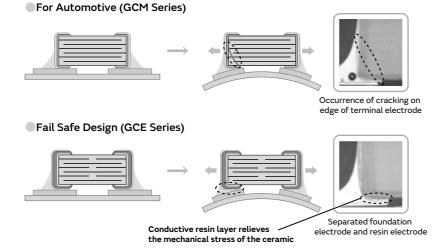
This product is configured with 2 elements arranged in one capacitor. Even if one element short circuits, the other element in the capacitor does not short.



<Example of Structure>

2 Provides additional safety performance in combination with resin electrodes

Adopting resin electrodes as the external electrodes will suppress the occurrence of cracking in the capacitor by mechanical stress.



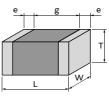
Note: Cracks may occur in the capacitor body if excessive stress beyond the "guaranteed range of board bending strength (\*) " provided in the specifications is applied. Capacitors with cracks in them may cause a drop in insulation resistance, which could lead to a short circuit. (\*) For details on the guaranteed range of board bending strength, check the "Detailed Specification Sheet" on the Product Details Page.

(3) Ideal for battery lines of on-board applications

Space can be reduced for battery lines, when 2 capacitors are configured in an array.

#### Specifications

Size	1.6×0.8mm to 2.0×1.25mm
Rated Voltage	25Vdc to 100Vdc
Capacitance	220pF to 0.10µF
Main Applications	For automotive, Battery lines, power trains



<Dimensions>

muRata

∆Caution /Notice

## GCE Series High Dielectric Constant Type 🔐 🖧 🚮 Part Number List

#### 1.6×0.8mm

**GRT** Series

**GCM** Series

GC3 Series

**GCJ** Series

**GCD** Series

**GCE** Series

NMF Series

KCM Series

KC3 Series

KCA Series

GCG Series

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
0.9mm	100Vdc	X7R	1000pF	±10%	GCE188R72A102KA01#
			1200pF	±10%	GCE188R72A122KA01#
			1500pF	±10%	GCE188R72A152KA01#
			1800pF	±10%	GCE188R72A182KA01#
			2200pF	±10%	GCE188R72A222KA01#
			2700pF	±10%	GCE188R72A272KA01#
			3300pF	±10%	GCE188R72A332KA01#
			3900pF	±10%	GCE188R72A392KA01#
			4700pF	±10%	GCE188R72A472KA01#
			5600pF	±10%	GCE188R72A562KA01#
			6800pF	±10%	GCE188R72A682KA01#
			8200pF	±10%	GCE188R72A822KA01#
			10000pF	±10%	GCE188R72A103KA01#
			12000pF	±10%	GCE188R72A123KA01#
			15000pF	±10%	GCE188R72A153KA01#
			18000pF	±10%	GCE188R72A183KA01#
	50Vdc X7R		22000pF	±10%	GCE188R72A223KA01#
		X7R	1000pF	±10%	GCE188R71H102KA01#
			1200pF	±10%	GCE188R71H122KA01#
			1500pF	±10%	GCE188R71H152KA01#
			1800pF	±10%	GCE188R71H182KA01#
			2200pF	±10%	GCE188R71H222KA01#
			2700pF	±10%	GCE188R71H272KA01#
			3300pF	±10%	GCE188R71H332KA01#
			3900pF	±10%	GCE188R71H392KA01#
			4700pF	±10%	GCE188R71H472KA01#
			5600pF	±10%	GCE188R71H562KA01#
			6800pF	±10%	GCE188R71H682KA01#
			8200pF	±10%	GCE188R71H822KA01#
			10000pF	±10%	GCE188R71H103KA01#
			12000pF	±10%	GCE188R71H123KA01#
			15000pF	±10%	GCE188R71H153KA01#
			18000pF	±10%	GCE188R71H183KA01#
			22000pF	±10%	GCE188R71H223KA01#
	25Vdc	X7R	27000pF	±10%	GCE188R71E273KA01#
			33000pF	±10%	GCE188R71E333KA01#
			39000pF	±10%	GCE188R71E393KA01#
			47000pF	±10%	GCE188R71E473KA01#

2.0×1.25mm	
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T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
0.7mm	100Vdc	X7R	1000pF	±10%	GCE216R72A102KA01#
			1200pF	±10%	GCE216R72A122KA01#
			1500pF	±10%	GCE216R72A152KA01#
			1800pF	±10%	GCE216R72A182KA01#
			2200pF	±10%	GCE216R72A222KA01#
			2700pF	±10%	GCE216R72A272KA01#
			3300pF ±10% GCE216R		GCE216R72A332KA01#
			3900pF	±10%	GCE216R72A392KA01#
			4700pF	±10%	GCE216R72A472KA01#

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
0.7mm	100Vdc	X7R	5600pF	±10%	GCE216R72A562KA01#
0.95mm	100Vdc	X7R	220pF	±10%	GCE219R72A221KA01#
			270pF	±10%	GCE219R72A271KA01#
			330pF	±10%	GCE219R72A331KA01#
			390pF	±10%	GCE219R72A391KA01#
			470pF	±10%	GCE219R72A471KA01#
			560pF	±10%	GCE219R72A561KA01#
			680pF	±10%	GCE219R72A681KA01#
			820pF	±10%	GCE219R72A821KA01#
			6800pF	±10%	GCE219R72A682KA01#
1.45mm	100Vdc	X7R	8200pF	±10%	GCE21BR72A822KA01#
			10000pF	±10%	GCE21BR72A103KA01#
			12000pF	±10%	GCE21BR72A123KA01#
			15000pF	±10%	GCE21BR72A153KA01#
			18000pF	±10%	GCE21BR72A183KA01#
			22000pF	±10%	GCE21BR72A223KA01#
			27000pF	±10%	GCE21BR72A273KA01#
			33000pF	±10%	GCE21BR72A333KA01#
			39000pF	±10%	GCE21BR72A393KA01#
			47000pF	±10%	GCE21BR72A473KA01#
			56000pF	±10%	GCE21BR72A563KA01#
			68000pF	±10%	GCE21BR72A683KA01#
			82000pF	±10%	GCE21BR72A823KA01#
			0.10µF	±10%	GCE21BR72A104KA01#
	50Vdc	X7R	15000pF	±10%	GCE21BR71H153KA01#
			18000pF	±10%	GCE21BR71H183KA01#
			22000pF	±10%	GCE21BR71H223KA01#
			27000pF	±10%	GCE21BR71H273KA01#
			33000pF	±10%	GCE21BR71H333KA01#
			39000pF	±10%	GCE21BR71H393KA01#
			47000pF	±10%	GCE21BR71H473KA01#
			56000pF	±10%	GCE21BR71H563KA01#
			68000pF	±10%	GCE21BR71H683KA01#
			82000pF	±10%	GCE21BR71H823KA01#
			0.10µF	±10%	GCE21BR71H104KA01#



**GCM** Series

GC3 Series

Very Large Current 3 Terminals Low ESL Chip Multilayer Ceramic Capacitors for Automotive (EMIFIL®)



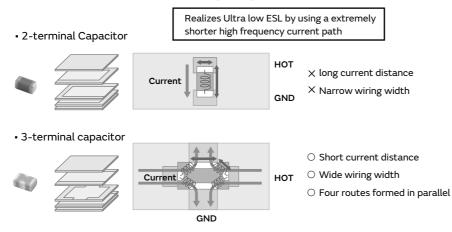
Powertrain Q200 ESL WEB 🖢

This is the most suitable Low ESL capacitors for noise measurement and power decoupling of highspeed electrical devices.

#### Features

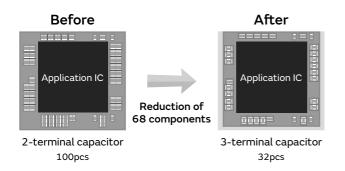
#### 1 Low ESL

Since the equivalent series inductance (ESL) is low and excellent in high frequency characteristics, this capacitor is suitable for power supply decoupling of high-speed operation electronic equipment.



#### 2 Contributes to a reduction in the number of components.

The number of components can be reduced by using low ESL capacitors, while maintaining functions equivalent to 2-terminal capacitor.

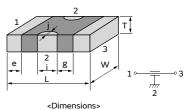


3 Contributes to noise suppression

Example of noise suppression effect WEB

#### Specifications

Size	2.0×1.25mm to 3.2×1.6mm	1 j,
Rated Voltage	10Vdc to 100Vdc	
Capacitance	220pF to 1.0µF	e $\downarrow$ $\downarrow$ $\downarrow$ $\downarrow$ $\downarrow$ $\downarrow$ $\downarrow$
Main Applications	Safety equipment, Drive system control, Information and Comfort equipment	<din< td=""></din<>



GCG Series

## muRata

## NFM Series 🚟 🍪 🔛 Part Number List

#### 2.0×1.25mm

T max.	Rated Voltage	Cap.	Tol.	Part Number
0.95mm	50Vdc	220pF	±20%	NFM21HC221R1H3#
		470pF	±20%	NFM21HC471R1H3#
		1000pF	±20%	NFM21HC102R1H3#
		2200pF	±20%	NFM21HC222R1H3#
		22000pF	±20%	NFM21HC223R1H3#
	16Vdc	1.0µF	±20%	NFM21HC105R1C3#
	10Vdc	0.10µF	±20%	NFM21HC104R1A3#
		0.22µF	±20%	NFM21HC224R1A3#
		0.47µF	±20%	NFM21HC474R1A3#

#### 3.2×1.6mm

T max.	Rated Voltage	Cap.	Tol.	Part Number	
1.5mm	100Vdc	10000pF	±20%	NFM31HK103R2A3#	D3
	50Vdc	10000pF	±20%	NFM31HK103R1H3#	D3
		15000pF	±20%	NFM31HK153R1H3#	D3
		22000pF	±20%	NFM31HK223R1H3#	D3
		0.10µF	±20%	NFM31HK104R1H3#	



**GCM** Series

GC3 Series

**GCJ** Series

GCD Series

**GCE** Series

NMF Series

KCM Series

KC3 Series

KCA Series

GCG Series

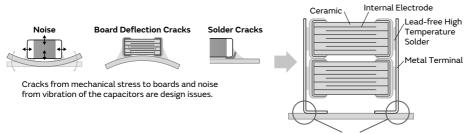


Bonding the metal terminals to external electrodes solves design issues by mounting large size MLCC!

#### Features

1 Bond metal terminals to the external electrodes of chips.

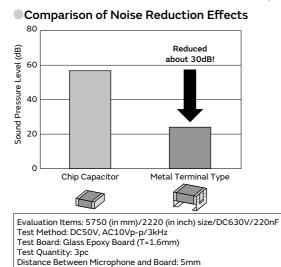
The stress applied to the chip is relieved by the elastic action of the metal terminal.



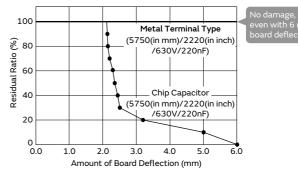
Reduces stress by the elastic action of the metal terminals!

#### 2 Substantially reduces noise, board deflection cracks and soldering cracks.

This product is not damaged even with a board deflection of 6 mm. Solder cracks do not occur even with 2,000 cycles of heat stress.



#### Reduces Stress Caused by Board Deflection



Suppresses Solder Cracks Caused by Heat Stress

Note: Results Using Murata's Evaluation Board

Suppresses 50	the orders eaused by near stre	55
Chip Size	Chip Only (5750 (in mm)/2220 (in inch) size)	Metal Terminal Type (5750 (in mm)/2220 (in inch) size)
1000 Cycles	<b>∱</b> Solder Crack	
2000 Cycles	ÎSolder Crack	

Test Condition: -55 to +125°C, 5min., (Liquid Phase) Board Used: Glass Epoxy Board (FR-4)

## muRata

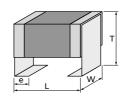
Note • Please read rating and ①CAUTION (for storage, operating, rating, soldering, mounting and handling) in this catalog to prevent smoking and/or burning, etc.
• This catalog has only typical specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.

#### 3 2 chips can be stacked.

Realize large capacity by stacking 2 capacitors.

#### Specifications

Size	6.1×5.3mm
Rated Voltage	25Vdc to 100Vdc
Capacitance	4.7μF to 100μF
Main Applications	For drive system control of engine ECU For other drive system controls and safety devices



<Dimensions>

Note • Please read rating and ①CAUTION (for storage, operating, rating, soldering, mounting and handling) in this catalog to prevent smoking and/or burning, etc.
• This catalog has only typical specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.

## KCM Series High Dielectric Constant Type Former A200 Anti- Officiate Soldering Part Number List

#### 6.1×5.3mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
3.0mm	100Vdc	X7R	4.7µF	±10%	KCM55LR72A475KH01#
	63Vdc	X7R	4.7µF	±10%	KCM55LR71J475KH01#
	50Vdc	X7R	4.7µF	±10%	KCM55LR71H475KH01#
			10µF	±10%	KCM55LR71H106KH01#
	35Vdc	X7R	10µF	±10%	KCM55LR7YA106KH01#
			15µF	±10%	KCM55LR7YA156KH01#
	25Vdc	X7R	15µF	±10%	KCM55LR71E156KH01#
3.9mm	100Vdc	X7R	6.8µF	±10%	KCM55QR72A685KH01#
			10µF	±10%	KCM55QR72A106KH01#
	63Vdc	X7R	10µF	±10%	KCM55QR71J106KH01#
	50Vdc	X7R	17µF	±10%	KCM55QR71H176KH01#
	35Vdc	X7R	17µF	±10%	KCM55QR7YA176KH01#
			22µF	±10%	KCM55QR7YA226KH01#
	25Vdc	X7R	22µF	±10%	KCM55QR71E226KH01#
			33µF	±10%	KCM55QR71E336KH01#
		X7S	47µF	±10%	KCM55QC71E476KH13#
5.0mm	100Vdc	X7R	10µF	±20%	KCM55TR72A106MH01#
	50Vdc	X7R	22µF	±20%	KCM55TR71H226MH01#
	35Vdc	X7R	22µF	±20%	KCM55TR7YA226MH01#
			33µF	±20%	KCM55TR7YA336MH01#
	25Vdc	X7R	33µF	±20%	KCM55TR71E336MH01#
6.7mm	100Vdc	X7R	15µF	±20%	KCM55WR72A156MH01#
			22µF	±20%	KCM55WR72A226MH01#
	63Vdc	X7R	22µF	±20%	KCM55WR71J226MH01#
	50Vdc	X7R	33µF	±20%	KCM55WR71H336MH01#
	35Vdc	X7R	47µF	±20%	KCM55WR7YA476MH01#
	25Vdc	X7R	47µF	±20%	KCM55WR71E476MH01#
			68µF	±20%	KCM55WR71E686MH01#
		X7S	100µF	±20%	KCM55WC71E107MH13#

**GRT** Series **GCM** Series GC3 Series **GCJ** Series GCD Series **GCE** Series NMF Series KCM Series KC3 Series

53

KCA Series



High Effective Capacitance & High Allowable Ripple Current Metal Terminal Type Multilayer Ceramic Capacitors for Automotive









#### Bonding the metal terminals to external electrodes solves design issues by mounting large size MLCC!

Features

**GCM** Series

GC3 Series

**GCJ** Series

GCD Series

**GCE** Series

NMF Series

KCM Series

KC3 Series

**KCA** Series

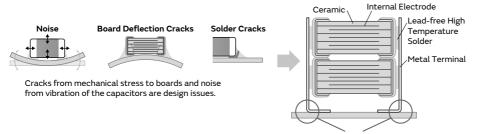
GCG Series

∆Caution/ Notice

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#### $(\mathbf{1})$ Bond Metal Terminals to External Electrodes of Chips

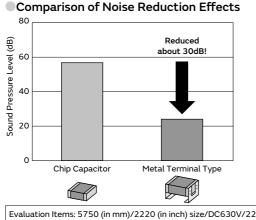
This product has high resistance to heat and mechanical impact and greatly reduces acoustic noise of boards by ceramics.



Reduces stress by the elastic action of the metal terminals!

#### Stacking of Chips (2)

Achieve high capacity by stacking 2 capacitors.



Evaluation Items: 5750 (in mm)/2220 (in inch) size/DC630V/220nF Test Method: DC50V, AC10Vp-p/3kHz Test Board: Glass Epoxy Board (T=1.6mm) Test Quantity: 3pc Distance Between Microphone and Board: 5mm

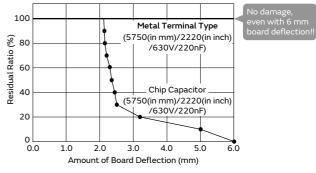
Note: Results Using Murata's Evaluation Board

#### Suppresses Solder Cracks Caused by Heat Stress

## Chip Only Metal Terminal Type Chip Size (5750 (in mm)/2220 (in inch) size) (5750 (in mm)/2220 (in inch) size) 1000 Cycles 2000 Cycles Solder Crack

Test Condition: -55 to +125°C, 5min., (Liquid Phase) Board Used: Glass Epoxy Board (FR-4)

### Reduces Stress Caused by Board Deflection



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C03E.pdf Jun 22,2017

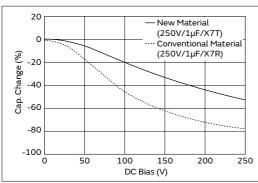
**GRT** Series

**GCM** Series

GC3 Series

#### 3 Adopted Low Dielectric Constant Materials

Improved effective capacity and ripple resistant performance, compared to conventional products (X7R characteristics).

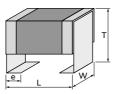


#### 4 2 chips can be stacked

Realize large capacity by stacking 2 capacitors.

#### Specifications

Size	6.1×5.3mm
Rated Voltage	250Vdc to 630Vdc
Capacitance	0.10µF to 2.2µF
Main Applications	For drive system control of engine ECU For other drive system controls and safety devices



<Dimensions>

①Caution /Notice

## muRata

## KC3 Series High Dielectric Constant Type Constant Type Constant Press Press Press Part Number List

#### 6.1×5.3mm

**GRT** Series

**GCM** Series

GC3 Series

**GCJ** Series

**GCD** Series

**GCE** Series

NMF Series

/ KCM Series

KC3 Series

KCA Series

**GCG** Series

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
3.0mm	630Vdc	X7T	0.10µF	±10%	KC355LD72J104KH01#
			0.15µF	±10%	KC355LD72J154KH01#
			0.33µF	±10%	KC355LD7LQ334KV01#
			0.47µF	±10%	KC355LD7LQ474KV01#
	450Vdc	X7T	0.22µF	±10%	KC355LD72W224KH01#
			0.33µF	±10%	KC355LD72W334KH01#
			0.47µF	±10%	KC355LD72W474KH01#
			0.68µF	±10%	KC355LD7LP684KV01#
	250Vdc	X7T	0.47µF	±10%	KC355LD72E474KH01#
			0.68µF	±10%	KC355LD72E684KH01#
3.9mm	630Vdc	X7T	0.22µF	±10%	KC355QD72J224KH01#
			0.27µF	±10%	KC355QD72J274KH01#
			0.56µF	±10%	KC355QD7LQ564KV01#
	450Vdc	X7T	0.56µF	±10%	KC355QD72W564KH01#
			1µF	±10%	KC355QD7LP105KV01#
	250Vdc	X7T	1.0µF	±10%	KC355QD72E105KH01#
5.0mm	630Vdc	X7T	0.68µF	±20%	KC355TD7LQ684MV01#
			1µF	±20%	KC355TD7LQ105MV01#
	450Vdc	X7T	0.68µF	±20%	KC355TD72W684MH01#
			1.0µF	±20%	KC355TD72W105MH01#
			1.5µF	±20%	KC355TD7LP155MV01#
	250Vdc	X7T	1.5µF	±20%	KC355TD72E155MH01#
6.7mm	630Vdc	X7T	0.47µF	±20%	KC355WD72J474MH01#
			0.56µF	±20%	KC355WD72J564MH01#
			1.2µF	±20%	KC355WD7LQ125MV01#
	450Vdc	X7T	1.2µF	±20%	KC355WD72W125MH01#
			2.2µF	±20%	KC355WD7LP225MV01#
	250Vdc	X7T	2.2µF	±20%	KC355WD72E225MH01#

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①Caution/ Notice



**GCM** Series

GC3 Series

GCJ Series

Safety Standard Certified Metal Terminal Type Multilayer Ceramic Capacitors for Automotive Anti-noise





WEB

For Automotive IEC60384-14 X1/Y2 Class Certified Product (Basic insulation product)

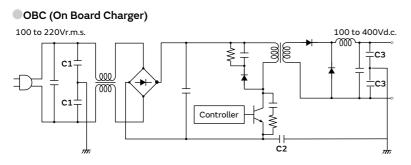
crack

#### Features

(1) International Standard (IEC60384-14) certified product: Rated voltage AC250V (r.m.s.). Please down load Safety Standard Certification (Type MF: X1,Y2) from Web site.

#### 2 Best suitable for class Y2 capacitors.

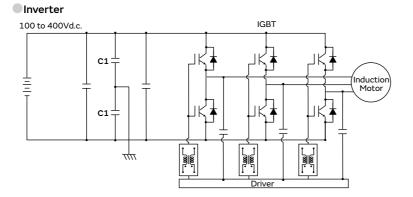
AC250V (r.m.s.)-rated voltage, withstand voltage of AC2000V (r.m.s.) guaranteed for 60 seconds.



No.	Application
C1	Y Cap (Primary)
C2	Primary-Secondary Coupling
С3	Y Cap (Secondary)

#### (3) Best suitable for DC input common mode noise filters.

DC630V-rated voltage, withstand voltage of DC2700V guaranteed for 60 seconds.



Controller

No.	Application
C1	Common mode noise filters

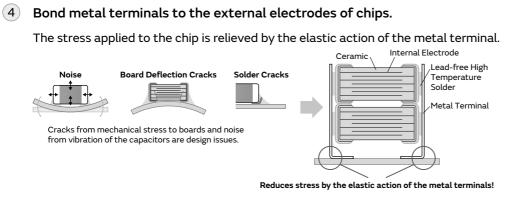
#### DC-DC Converter -WH 000 ale ş C1 C1 C2

 $\frac{1}{1}$ 

No	).	Application
C1		Common mode noise filters
C2	2	Primary-Secondary Coupling

# **GCD** Series **GCE** Series

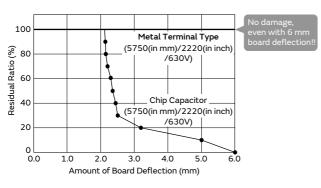
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#### Substantially reduces board deflection cracks and soldering cracks.

This product is not damaged even with a board deflection of 6 mm. Solder cracks do not occur even with 2,000 cycles of heat stress.

Reduces Stress Caused by Board Deflection



#### Suppresses Solder Cracks Caused by Heat Stress

Chip Size	Chip Only (5750 (in mm)/2220 (in inch) size)	Metal Terminal Type (5750 (in mm)/2220 (in inch) size)	
1000 Cycles	Û Solder Crack		
2000 Cycles	ÎSolder Crack		Compared with chips only, this product is excellent in solder cracking resistanc

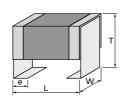
Test Condition: -55 to +125°C, 5min., (Liquid Phase) Board Used: Glass Epoxy Board (FR-4)

#### 6 2 chips can be stacked.

Realize large capacity by stacking 2 capacitors.

#### Specifications

Size	6.1×5.3mm
Rated Voltage	250Vac (r.m.s.)
Capacitance	100pF to 10000pF
Main Applications	Battery chargers, Inverter, DC-DC converters



<Dimensions>

<u>
①Caution/</u>
Notice

**GRT** Series

**GCM** Series

GC3 Series

**GCJ** Series

GCD Series

**GCE** Series

NMF Series

KCM Series

KC3 Series

GCG Series / KCA Series

(5)

GCM Series

GC3 Series

**GCJ** Series

GCD Series

**GCE** Series

NMF Series

KCM Series

## KCA Series Temperature Compensating Type Part Action Action States States Part Number List

#### 6.1×5.3mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
3.0mm	250Vac(r.m.s.)	U2J	100pF	±10%	KCA55L7UMF101KH01#
			150pF	±10%	KCA55L7UMF151KH01#
			220pF	±10%	KCA55L7UMF221KH01#
			330pF	±10%	KCA55L7UMF331KH01#
			470pF	±10%	KCA55L7UMF471KH01#
			680pF	±10%	KCA55L7UMF681KH01#
			1000pF	±10%	KCA55L7UMF102KH01#
			1500pF	±10%	KCA55L7UMF152KH01#
			2200pF	±10%	KCA55L7UMF222KH01#
			3300pF	±10%	KCA55L7UMF332KH01#
3.9mm	250Vac(r.m.s.)	U2J	4700pF	±10%	KCA55Q7UMF472KH01#
5.0mm	250Vac(r.m.s.)	U2J	6800pF	±20%	KCA55T7UMF682MH01#
6.7mm	250Vac(r.m.s.)	U2J	10000pF	±20%	KCA55W7UMF103MH01#

**GCG** Series



AgPd Termination Conductive Glue Mounting Chip Multilayer Ceramic Capacitors for Automotive









Improved mechanical and thermal strength by adopting AgPd external electrodes, which can be mounted with a conductive glue!

Features

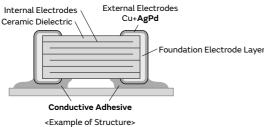
**GRT** Series

**GCM** Series

GC3 Series

#### $(\mathbf{1})$ Limited to Conductive Glue Mounting

This capacitor can be mounted with a conductive adhesive\* in powertrains and safety devices of automotive.



#### (2) Adopted AgPd external electrodes

Adopted AgPd, which is excellent in bonding strength with a conductive adhesive.

#### 3 Compatible up to 150°C

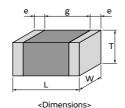
This capacitor lineup with X8L and X8R characteristics can be used in high temperature environments, such as in ABS and transmission control.

\* This product is for use exclusively with conductive glue mounting. It cannot be used with any mounting methods other than conductive glue mounting.

Using solder to mount the product can result in insufficient wetting, insufficient bonding strength, and/or leaching of the Ag/Pd External Electrodes (terminations), which can cause quality problems such as the chip coming loose.

#### Specifications

Size	1.0×0.5mm to 3.2×2.5mm
Rated Voltage	6.3Vdc to 100Vdc
Capacitance	1.0pF to 47µF
Main Applications	For automotive, power trains, sensors



## muRata

**GCM** Series

GC3 Series

**GCJ** Series

**GCD** Series

**GCE** Series

NMF Series

KCM Series

KC3 Series

KCA Series

## GCG Series Temperature Compensating Type 🚟 🏍 🕬 🕬 🕬 Part Number List

#### 1.0×0.5mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
0.55mm	50Vdc	X8G	120pF	±5%	GCG1555G1H121JA01#	
			150pF	±5%	GCG1555G1H151JA01#	
			180pF	±5%	GCG1555G1H181JA01#	
			220pF	±5%	GCG1555G1H221JA01#	
			270pF	±5%	GCG1555G1H271JA01#	
			330pF	±5%	GCG1555G1H331JA01#	
			390pF	±5%	GCG1555G1H391JA01#	
			470pF	±5%	GCG1555G1H471JA01#	

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
0.7mm	50Vdc	X8G	2700pF	±5%	GCG2165G1H272JA01#	
			3300pF	±5%	GCG2165G1H332JA01#	
			3900pF	±5%	GCG2165G1H392JA01#	
			4700pF	±5%	GCG2165G1H472JA01#	
0.95mm	50Vdc	X8G	5600pF	±5%	GCG2195G1H562JA01#	
			6800pF	±5%	GCG2195G1H682JA01#	
			8200pF	±5%	GCG2195G1H822JA01#	
			10000pF	±5%	GCG2195G1H103JA01#	

#### 1.6×0.8mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
0.9mm	50Vdc	X8G	10pF	±5%	GCG1885G1H100JA01#
			12pF	±5%	GCG1885G1H120JA01#
			15pF	±5%	GCG1885G1H150JA01#
			18pF	±5%	GCG1885G1H180JA01#
			22pF	±5%	GCG1885G1H220JA01#
			27pF	±5%	GCG1885G1H270JA01#
			33pF	±5%	GCG1885G1H330JA01#
			39pF	±5%	GCG1885G1H390JA01#
			47pF	±5%	GCG1885G1H470JA01#
			56pF	±5%	GCG1885G1H560JA01#
			68pF	±5%	GCG1885G1H680JA01#
			82pF	±5%	GCG1885G1H820JA01#
			100pF	±5%	GCG1885G1H101JA01#
			120pF	±5%	GCG1885G1H121JA01#
			150pF	±5%	GCG1885G1H151JA01#
			180pF	±5%	GCG1885G1H181JA01#
			220pF	±5%	GCG1885G1H221JA01#
			270pF	±5%	GCG1885G1H271JA01#
			330pF	±5%	GCG1885G1H331JA01#
			390pF	±5%	GCG1885G1H391JA01#
			470pF	±5%	GCG1885G1H471JA01#
			560pF	±5%	GCG1885G1H561JA01#
			680pF	±5%	GCG1885G1H681JA01#
			820pF	±5%	GCG1885G1H821JA01#
			1000pF	±5%	GCG1885G1H102JA01#
			1200pF	±5%	GCG1885G1H122JA01#
			1500pF	±5%	GCG1885G1H152JA01#
			1800pF	±5%	GCG1885G1H182JA01#
			2200pF	±5%	GCG1885G1H222JA01#

#### 2.0×1.25mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
0.7mm	50Vdc	X8G	1000pF	±5%	GCG2165G1H102JA01#	
			1200pF	±5%	GCG2165G1H122JA01#	
			1500pF	±5%	GCG2165G1H152JA01#	
			1800pF	±5%	GCG2165G1H182JA01#	
			2200pF	±5%	GCG2165G1H222JA01#	

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## GCG Series High Dielectric Constant Type 🔐 🏡 Part Number List

T na

0.9m

#### 1.0×0.5mm

**GRT** Series

**GCM** Series

GC3 Series

#### 1.6×0.8mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
0.9mm	100Vdc	X8R	1000pF	±10%	GCG188R92A102KA01#	
			1200pF	±10%	GCG188R92A122KA01#	
			1500pF	±10%	GCG188R92A152KA01#	
			1800pF	±10%	GCG188R92A182KA01#	

m100VdX882200210%CCG188R92A222KA01#2700110%CCG188R92A32XKA01#3300110%CCG188R92A32XKA01#4700210%CCG188R92A32XKA01#4700210%CCG188R92A52XKA01#5600110%CCG188R92A62XKA01#10000110%CCG188R92A13KKA01#10000110%CCG188R92A13KKA01#10000110%CCG188R92A13KKA01#10000110%CCG188R92A13KKA01#10000110%CCG188R92A13KKA01#10000110%CCG188R92A13KKA01#10000110%CCG188R92A33KKA01#27000110%CCG188R92A33KKA01#27000110%CCG188R92A33KKA01#10000110%CCG188R92A33KKA01#27000110%CCG188R92A33KKA01#10000110%CCG188R92A33KKA01#27000110%CCG188R92A33KKA01#27000110%CCG188R92A33KKA01#10000110%CCG188R92A33KKA01#10000110%CCG188R92A33KKA01#10000110%CCG188R92A33KKA01#10000110%CCG188R92A33KKA01#10000110%CCG188R92A33KKA01#10000110%CCG188R92A33KKA01#10000110%CCG188R91A12KKA0#10000110%CCG188R91A12KKA0#10000110%CCG188R91A12KKA0#10000110%CCG188R91A12KKA0#10000110%CCG188R91A12KKA0#10000110%CCG188R91A12KKA0# <th>x.</th> <th>Rated Voltage</th> <th>TC Code</th> <th>Cap.</th> <th>Tol.</th> <th>Part Number</th> <th></th>	x.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
3300pf10%GCG188R92A332KA01#3900pf10%GCG188R92A322KA01#4700pf10%GCG188R92A52KA01#5600pf10%GCG188R92A52KA01#8000pf10%GCG188R92A52KA01#10000pf10%GCG188R92A32XA01#12000pf10%GCG188R92A133KA01#12000pf10%GCG188R92A133KA01#12000pf10%GCG188R92A133KA01#12000pf10%GCG188R92A333KA01#22000pf10%GCG188R92A333KA01#2000pf10%GCG188R92A333KA01#2000pf10%GCG188R92A333KA01#3000pf10%GCG188R92A333KA01#7000pf10%GCG188R92A333KA01#7000pf10%GCG188R92A333KA01#7000pf10%GCG188R92A333KA01#7000pf10%GCG188R92A333KA01#7000pf10%GCG188R92A333KA01#7000pf10%GCG188R92A333KA01#7000pf10%GCG188R92A333KA01#7000pf10%GCG188R92A333KA01#7000pf10%GCG188R92A333KA01#7000pf10%GCG188R92A333KA01#7000pf10%GCG188R92A333KA01#7000pf10%GCG188R92A333KA01#7000pf10%GCG188R92A333KA01#7000pf10%GCG188R92A333KA01#7000pf10%GCG188R92A333KA01#7000pf10%GCG188R92A333KA01#7000pf10%GCG188R92A333KA01#7000pf10%GCG188L91423KA01#7000pf <t< th=""><th>٦m</th><th>100Vdc</th><th>X8R</th><th>2200pF</th><th>±10%</th><th>GCG188R92A222KA01#</th><th></th></t<>	٦m	100Vdc	X8R	2200pF	±10%	GCG188R92A222KA01#	
3900pf10%CCG188R92A392KA01#4700pf10%GCG188R92A562KA01#5600pf10%GCG188R92A622KA01#8200pf10%GCG188R92A123KA01#10000pf10%GCG188R92A123KA01#12000pf10%GCG188R92A123KA01#12000pf10%GCG188R92A123KA01#12000pf10%GCG188R92A123KA01#12000pf10%GCG188R92A133KA01#12000pf10%GCG188R92A133KA01#22000pf10%GCG188R92A133KA01#2000pf10%GCG188R92A333KA01#2000pf10%GCG188R92A333KA01#3000pf10%GCG188R92A53KA01#3000pf10%GCG188R92A53KA01#47000pf10%GCG188R92A53KA01#010µf10%GCG188R92A53KA01#010µf10%GCG188R92A53KA01#330pf10%GCG188L81H21KA01#330pf10%GCG188L81H31KA0#330pf10%GCG188L81H31KA0#330pf10%GCG188L81H31KA0#300pf10%GCG188L81H61KA0#1000pf10%GCG188L81H621KA0#1000pf10%GCG188L81H621KA0#1000pf10%GCG188L81H12KA0#1000pf10%GCG188L81H22KA0#1000pf10%GCG188L81H22KA0#1000pf10%GCG188L81H22KA0#1000pf10%GCG188L81H32KA0#1000pf10%GCG188L81H32KA0#1000pf10%GCG188L81H32KA0#1000pf10%GCG188L81H32KA0#				2700pF	±10%	GCG188R92A272KA01#	
4700pf±10%GCG188R92A472KA01#5600pf±10%GCG188R92A562KA01#8200pf±10%GCG188R92A562KA01#10000pf±10%GCG188R92A123KA01#12000pf±10%GCG188R92A123KA01#12000pf±10%GCG188R92A133KA01#12000pf±10%GCG188R92A133KA01#12000pf±10%GCG188R92A133KA01#22000pf±10%GCG188R92A333KA01#2000pf±10%GCG188R92A333KA01#3000pf±10%GCG188R92A333KA01#3000pf±10%GCG188R92A53KA01#47000pf±10%GCG188R92A53KA01#50VdcX8L220pf±10%68000pf±10%GCG188R92A53KA01#101µf±10%GCG188R92A53KA01#300pf±10%GCG188R92A53KA01#300pf±10%GCG188R92A53KA01#300pf±10%GCG188L81H21KA01#330pf±10%GCG188L81H31KA0#330pf±10%GCG188L81H31KA0#300pf±10%GCG188L81H31KA0#1000pf±10%GCG188L81H621KA0#1200pf±10%GCG188L81H621KA0#1200pf±10%GCG188L81H12KA0#1300pf±10%GCG188L81H32KA0#1200pf±10%GCG188L81H32KA0#1300pf±10%GCG188L81H32KA0#1300pf±10%GCG188L81H32KA0#1300pf±10%GCG188L81H32KA0#1300pf±10%GCG188L81H32KA0#12000pf±10%GCG188L81H33KA0#12000pf<				3300pF	±10%	GCG188R92A332KA01#	
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270pF         ±10%         GCG188L81H271KA01#           330pF         ±10%         GCG188L81H331KA01#           390pF         ±10%         GCG188L81H331KA01#           470pF         ±10%         GCG188L81H391KA01#           470pF         ±10%         GCG188L81H391KA01#           560pF         ±10%         GCG188L81H561KA01#           680pF         ±10%         GCG188L81H681KA01#           1000pF         ±10%         GCG188L81H02KA01#           1200pF         ±10%         GCG188L81H122KA01#           1200pF         ±10%         GCG188L81H32KA01#           1200pF         ±10%         GCG188L81H32KA01#           1200pF         ±10%         GCG188L81H32KA01#           1300pF         ±10%         GCG188L81H32KA01#           1300pF         ±10%         GCG188L81H32KA01#           3300pF         ±10%         GCG188L81H32KA01#           3900pF         ±10%         GCG188L81H32KA01#           1300pF         ±10%         GCG188L81H32KA01#           1000pF         ±10%         GCG188L81H32KA01#           1000pF         ±10%         GCG188L81H32KA01#           12000pF         ±10%         GCG188L81H32KA01#           12000pF		50Vdc	X8I				
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390pF         ±10%         GCG188L81H391KA01#           470pF         ±10%         GCG188L81H471KA01#           560pF         ±10%         GCG188L81H561KA01#           680pF         ±10%         GCG188L81H681KA01#           820pF         ±10%         GCG188L81H621KA01#           1000pF         ±10%         GCG188L81H02KA01#           1200pF         ±10%         GCG188L81H12KA01#           1200pF         ±10%         GCG188L81H12KA01#           1200pF         ±10%         GCG188L81H12KA01#           1200pF         ±10%         GCG188L81H12KA01#           1200pF         ±10%         GCG188L81H32KA01#           1200pF         ±10%         GCG188L81H32KA01#           1300pF         ±10%         GCG188L81H32KA01#           1300pF         ±10%         GCG188L81H32KA01#           1300pF         ±10%         GCG188L81H32KA01#           1300pF         ±10%         GCG188L81H32KA01#           1000pF         ±10%         GCG188L81H32KA01#           12000pF         ±10%         GCG188L81H32KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF							
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560pF         ±10%         GCG188L81H561KA01#           680pF         ±10%         GCG188L81H681KA01#           820pF         ±10%         GCG188L81H681KA01#           1000pF         ±10%         GCG188L81H321KA01#           1200pF         ±10%         GCG188L81H122KA01#           1200pF         ±10%         GCG188L81H122KA01#           1200pF         ±10%         GCG188L81H122KA01#           1200pF         ±10%         GCG188L81H122KA01#           1800pF         ±10%         GCG188L81H32KA01#           2200pF         ±10%         GCG188L81H32KA01#           3300pF         ±10%         GCG188L81H32KA01#           3900pF         ±10%         GCG188L81H32KA01#           5600pF         ±10%         GCG188L81H32KA01#           5600pF         ±10%         GCG188L81H32KA01#           6800pF         ±10%         GCG188L81H32KA01#           10000pF         ±10%         GCG188L81H32KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF         ±10%         GCG188L81H123KA01#               10000							
680pF         ±10%         GCG188L81H681KA01#           820pF         ±10%         GCG188L81H821KA01#           1000pF         ±10%         GCG188L81H102KA01#           1200pF         ±10%         GCG188L81H122KA01#           1200pF         ±10%         GCG188L81H122KA01#           1500pF         ±10%         GCG188L81H122KA01#           1200pF         ±10%         GCG188L81H32KA01#           2200pF         ±10%         GCG188L81H32KA01#           2200pF         ±10%         GCG188L81H32KA01#           3300pF         ±10%         GCG188L81H32KA01#           3900pF         ±10%         GCG188L81H32KA01#           300pF         ±10%         GCG188L81H32KA01#           5600pF         ±10%         GCG188L81H32KA01#           6800pF         ±10%         GCG188L81H32KA01#           10000pF         ±10%         GCG188L81H123KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF<							
820pF         ±10%         GCG188L81H821KA01#           1000pF         ±10%         GCG188L81H102KA01#           1200pF         ±10%         GCG188L81H122KA01#           1500pF         ±10%         GCG188L81H122KA01#           1800pF         ±10%         GCG188L81H122KA01#           2200pF         ±10%         GCG188L81H122KA01#           2700pF         ±10%         GCG188L81H22KA01#           3300pF         ±10%         GCG188L81H22KA01#           3300pF         ±10%         GCG188L81H32KA01#           3900pF         ±10%         GCG188L81H32KA01#           3900pF         ±10%         GCG188L81H32KA01#           5600pF         ±10%         GCG188L81H32KA01#           5600pF         ±10%         GCG188L81H62KA01#           6800pF         ±10%         GCG188L81H62KA01#           10000pF         ±10%         GCG188L81H63KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF         ±10%         GCG188L81H133KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF							
1000pF         ±10%         GCG188L81H102KA01#           1200pF         ±10%         GCG188L81H122KA01#           1500pF         ±10%         GCG188L81H122KA01#           1800pF         ±10%         GCG188L81H152KA01#           2200pF         ±10%         GCG188L81H132KA01#           2700pF         ±10%         GCG188L81H222KA01#           3300pF         ±10%         GCG188L81H32KA01#           3900pF         ±10%         GCG188L81H32KA01#           3900pF         ±10%         GCG188L81H32KA01#           4700pF         ±10%         GCG188L81H32KA01#           5600pF         ±10%         GCG188L81H32KA01#           6800pF         ±10%         GCG188L81H62KA01#           10000pF         ±10%         GCG188L81H63KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF         ±10%         GCG188R91H122KA03#           12							
1200pF         ±10%         GCG188L81H122KA01#           1500pF         ±10%         GCG188L81H152KA01#           1800pF         ±10%         GCG188L81H152KA01#           2200pF         ±10%         GCG188L81H22XA01#           2700pF         ±10%         GCG188L81H22XA01#           3300pF         ±10%         GCG188L81H272KA01#           3300pF         ±10%         GCG188L81H32KA01#           3900pF         ±10%         GCG188L81H32KA01#           3900pF         ±10%         GCG188L81H32KA01#           5600pF         ±10%         GCG188L81H32KA01#           5600pF         ±10%         GCG188L81H32KA01#           8200pF         ±10%         GCG188L81H32KA01#           12000pF         ±10%         GCG188L81H3XA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF         ±10%         GCG188L81H23KA01#           12000pF         ±10%         GCG188L81H23KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF							
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1800pF         ±10%         GCG188L81H182KA01#           2200pF         ±10%         GCG188L81H222KA01#           2700pF         ±10%         GCG188L81H222KA01#           3300pF         ±10%         GCG188L81H32KA01#           3900pF         ±10%         GCG188L81H32KA01#           3900pF         ±10%         GCG188L81H32KA01#           3900pF         ±10%         GCG188L81H32KA01#           4700pF         ±10%         GCG188L81H472KA01#           5600pF         ±10%         GCG188L81H472KA01#           6800pF         ±10%         GCG188L81H682KA01#           8200pF         ±10%         GCG188L81H682KA01#           10000pF         ±10%         GCG188L81H103KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF         ±10%         GCG188L81H153KA01#           12000pF         ±10%         GCG188L81H23KA01#           0.15µF         ±10%         GCG188L81H23KA01#           0.22µF         ±10%         GCG188L81H223KA01#           0.22µF         ±10%         GCG188R91H122KA03#           1500pF         ±10%         GCG188R91H122KA03#           2200pF         ±10%         GCG188R91H122KA03#           2200p				· ·			
2200pF         ±10%         GCG188L81H222KA01#           2700pF         ±10%         GCG188L81H272KA01#           3300pF         ±10%         GCG188L81H32KA01#           3900pF         ±10%         GCG188L81H32KA01#           3900pF         ±10%         GCG188L81H32KA01#           4700pF         ±10%         GCG188L81H32KA01#           5600pF         ±10%         GCG188L81H472KA01#           5600pF         ±10%         GCG188L81H52KA01#           6800pF         ±10%         GCG188L81H62KA01#           10000pF         ±10%         GCG188L81H62KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF         ±10%         GCG188L81H23KA01#           0.15µF         ±10%         GCG188L81H23KA01#           0.22µF         ±10%         GCG188R91H122KA03#           1500pF         ±10%         GCG188R91H122KA03#           1500pF         ±10%         GCG188R91H122KA03#           2200pF         ±10%         GCG188R91H122KA03#           2200pF				· ·			
2700pF         ±10%         GCG188L81H272KA01#           3300pF         ±10%         GCG188L81H332KA01#           3900pF         ±10%         GCG188L81H392KA01#           3900pF         ±10%         GCG188L81H392KA01#           4700pF         ±10%         GCG188L81H392KA01#           5600pF         ±10%         GCG188L81H472KA01#           5600pF         ±10%         GCG188L81H562KA01#           6800pF         ±10%         GCG188L81H682KA01#           8200pF         ±10%         GCG188L81H632KA01#           10000pF         ±10%         GCG188L81H123KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF         ±10%         GCG188L81H23KA01#           12000pF         ±10%         GCG188L81H23KA01#           0.15µF         ±10%         GCG188L81H23KA01#           0.22µF         ±10%         GCG188R91H122KA03#           1500pF         ±10%         GCG188R91H122KA03#           2200pF         ±10%         GCG188R91H32KA03#           2200pF         ±10%         GCG188R91H32KA03#           33				· ·			
3300pF         ±10%         GCG188L81H332KA01#           3900pF         ±10%         GCG188L81H392KA01#           4700pF         ±10%         GCG188L81H392KA01#           4700pF         ±10%         GCG188L81H472KA01#           5600pF         ±10%         GCG188L81H472KA01#           5600pF         ±10%         GCG188L81H52KA01#           6800pF         ±10%         GCG188L81H682KA01#           10000pF         ±10%         GCG188L81H682KA01#           10000pF         ±10%         GCG188L81H03KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF         ±10%         GCG188L81H23KA01#           0.15µF         ±10%         GCG188L81H23KA01#           0.22µF         ±10%         GCG188R91H122KA03#           1500pF         ±10%         GCG188R91H122KA03#           1500pF         ±10%         GCG188R91H122KA03#           2200pF         ±10%         GCG188R91H32KA03#           2700pF         ±10%         GCG188R91H332KA03#           3							
3900pF         ±10%         GCG188L81H392KA01#           4700pF         ±10%         GCG188L81H472KA01#           5600pF         ±10%         GCG188L81H472KA01#           5600pF         ±10%         GCG188L81H682KA01#           6800pF         ±10%         GCG188L81H682KA01#           8200pF         ±10%         GCG188L81H682KA01#           10000pF         ±10%         GCG188L81H632KA01#           12000pF         ±10%         GCG188L81H103KA01#           12000pF         ±10%         GCG188L81H123KA01#           15000pF         ±10%         GCG188L81H153KA01#           22000pF         ±10%         GCG188L81H23KA01#           0.15µF         ±10%         GCG188L81H23KA01#           0.22µF         ±10%         GCG188L81H23KA07#           0.22µF         ±10%         GCG188L8H154KA07#           0.22µF         ±10%         GCG188R91H122KA03#           1500pF         ±10%         GCG188R91H122KA03#           2200pF         ±10%         GCG188R91H122KA03#           2200pF         ±10%         GCG188R91H322KA03#           3300pF         ±10%         GCG188R91H332KA03#							
4700pF       ±10%       GCG188L81H472KA01#         5600pF       ±10%       GCG188L81H562KA01#         6800pF       ±10%       GCG188L81H682KA01#         8200pF       ±10%       GCG188L81H822KA01#         10000pF       ±10%       GCG188L81H82XA01#         12000pF       ±10%       GCG188L81H103KA01#         12000pF       ±10%       GCG188L81H123KA01#         12000pF       ±10%       GCG188L81H133KA01#         12000pF       ±10%       GCG188L81H153KA01#         18000pF       ±10%       GCG188L81H153KA01#         22000pF       ±10%       GCG188L81H153KA01#         0.15µF       ±10%       GCG188L81H153KA01#         0.22µF       ±10%       GCG188L81H154KA07#         0.22µF       ±10%       GCG188R91H122KA03#         1500pF       ±10%       GCG188R91H122KA03#         2200pF       ±10%       GCG188R91H122KA03#         2200pF       ±10%       GCG188R91H32KA03#         2200pF       ±10%       GCG188R91H332KA03#         3300pF       ±10%       GCG188R91H332KA03#				· ·			
5600pF         ±10%         GCG188L81H562KA01#           6800pF         ±10%         GCG188L81H682KA01#           8200pF         ±10%         GCG188L81H682KA01#           10000pF         ±10%         GCG188L81H32KA01#           12000pF         ±10%         GCG188L81H103KA01#           12000pF         ±10%         GCG188L81H123KA01#           15000pF         ±10%         GCG188L81H133KA01#           15000pF         ±10%         GCG188L81H133KA01#           12000pF         ±10%         GCG188L81H133KA01#           12000pF         ±10%         GCG188L81H133KA01#           13000pF         ±10%         GCG188L81H153KA01#           0.15µF         ±10%         GCG188L81H154KA07#           0.22µF         ±10%         GCG188L81H122KA03#           1200pF         ±10%         GCG188R91H122KA03#           1200pF         ±10%         GCG188R91H122KA03#           2200pF         ±10%         GCG188R91H22KA03#           2200pF         ±10%         GCG188R91H32KA03#           3300pF         ±10%         GCG188R91H332KA03#				-			
6800pF         ±10%         GCG188L81H682KA01#           8200pF         ±10%         GCG188L81H822KA01#           10000pF         ±10%         GCG188L81H32KA01#           12000pF         ±10%         GCG188L81H123KA01#           12000pF         ±10%         GCG188L81H123KA01#           15000pF         ±10%         GCG188L81H153KA01#           18000pF         ±10%         GCG188L81H23KA01#           22000pF         ±10%         GCG188L81H23KA01#           0.15µF         ±10%         GCG188L81H23KA01#           0.22µF         ±10%         GCG188L81H23KA07#           0.22µF         ±10%         GCG188L81H22KA03#           1500pF         ±10%         GCG188R91H122KA03#           1500pF         ±10%         GCG188R91H122KA03#           2200pF         ±10%         GCG188R91H122KA03#           2200pF         ±10%         GCG188R91H22KA03#           2700pF         ±10%         GCG188R91H32KA03#           3300pF         ±10%         GCG188R91H332KA03#				· ·			
8200pF         ±10%         GCG188L81H822KA01#           10000pF         ±10%         GCG188L81H103KA01#           12000pF         ±10%         GCG188L81H103KA01#           12000pF         ±10%         GCG188L81H123KA01#           15000pF         ±10%         GCG188L81H123KA01#           18000pF         ±10%         GCG188L81H123KA01#           22000pF         ±10%         GCG188L81H23KA01#           0.15µF         ±10%         GCG188L8H154KA07#           0.22µF         ±10%         GCG188L8H154KA07#           0.22µF         ±10%         GCG188R91H122KA03#           1500pF         ±10%         GCG188R91H122KA03#           2200pF         ±10%         GCG188R91H122KA03#           2200pF         ±10%         GCG188R91H122KA03#           2200pF         ±10%         GCG188R91H22KA03#           2700pF         ±10%         GCG188R91H32KA03#           3300pF         ±10%         GCG188R91H332KA03#				· ·			<u> </u>
10000pF         ±10%         GCG188L81H103KA01#           12000pF         ±10%         GCG188L81H123KA01#           15000pF         ±10%         GCG188L81H123KA01#           15000pF         ±10%         GCG188L81H153KA01#           18000pF         ±10%         GCG188L81H153KA01#           22000pF         ±10%         GCG188L81H123KA01#           0.15µF         ±10%         GCG188L8H154KA07#           0.22µF         ±10%         GCG188L8EH154KA07#           0.22µF         ±10%         GCG188R91H122KA03#           1500pF         ±10%         GCG188R91H122KA03#           2200pF         ±10%         GCG188R91H122KA03#           2200pF         ±10%         GCG188R91H122KA03#           2200pF         ±10%         GCG188R91H32KA03#           3300pF         ±10%         GCG188R91H332KA03#				· ·			<u> </u>
12000pF         ±10%         GCG188L81H123KA01#           15000pF         ±10%         GCG188L81H153KA01#           15000pF         ±10%         GCG188L81H153KA01#           18000pF         ±10%         GCG188L81H133KA01#           22000pF         ±10%         GCG188L81H23KA01#           0.15µF         ±10%         GCG188L81H23KA01#           0.15µF         ±10%         GCG188L8H223KA07#           0.22µF         ±10%         GCG188L8H154KA07#           0.22µF         ±10%         GCG188R91H122KA03#           1500pF         ±10%         GCG188R91H122KA03#           2200pF         ±10%         GCG188R91H122KA03#           2200pF         ±10%         GCG188R91H22KA03#           2700pF         ±10%         GCG188R91H322KA03#           3300pF         ±10%         GCG188R91H332KA03#							<u> </u>
15000pF         ±10%         GCG188L81H153KA01#           18000pF         ±10%         GCG188L81H183KA01#           22000pF         ±10%         GCG188L81H183KA01#           22000pF         ±10%         GCG188L81H223KA01#           0.15µF         ±10%         GCG188L8H154KA07#           0.22µF         ±10%         GCG188L8EH224KA07#           X8R         1200pF         ±10%         GCG188R91H122KA03#           1500pF         ±10%         GCG188R91H152KA03#         2200pF           2700pF         ±10%         GCG188R91H122KA03#         3300pF           3300pF         ±10%         GCG188R91H332KA03#         3900pF				· ·			
18000pF       ±10%       GCG188L81H183KA01#         22000pF       ±10%       GCG188L81H223KA01#         0.15µF       ±10%       GCG188L8H154KA07#         0.22µF       ±10%       GCG188L8EH224KA07#         X8R       1200pF       ±10%       GCG188R91H122KA03#         1500pF       ±10%       GCG188R91H152KA03#          2200pF       ±10%       GCG188R91H122KA03#          3300pF       ±10%       GCG188R91H22KA03#          3300pF       ±10%       GCG188R91H332KA03#							
22000pF       ±10%       GCG188L81H223KA01#         0.15µF       ±10%       GCG188L8EH154KA07#         0.22µF       ±10%       GCG188L8EH224KA07#         X8R       1200pF       ±10%       GCG188R91H122KA03#         1500pF       ±10%       GCG188R91H152KA03#       2200pF         2200pF       ±10%       GCG188R91H122KA03#       3300pF         2700pF       ±10%       GCG188R91H222KA03#       3300pF         3300pF       ±10%       GCG188R91H332KA03#       3900pF							
0.15µF         ±10%         GCG188L8EH154KA07#           0.22µF         ±10%         GCG188L8EH224KA07#           X8R         1200pF         ±10%         GCG188R91H122KA03#           1500pF         ±10%         GCG188R91H122KA03#           2200pF         ±10%         GCG188R91H122KA03#           2700pF         ±10%         GCG188R91H222KA03#           3300pF         ±10%         GCG188R91H322KA03#           3900pF         ±10%         GCG188R91H332KA03#							
0.22µF         ±10%         GCG188L8EH224KA07#           X8R         1200pF         ±10%         GCG188R91H122KA03#           1500pF         ±10%         GCG188R91H152KA03#           2200pF         ±10%         GCG188R91H122KA03#           2700pF         ±10%         GCG188R91H222KA03#           3300pF         ±10%         GCG188R91H272KA03#           3900pF         ±10%         GCG188R91H332KA03#				· ·			L
X8R         1200pF         ±10%         GCG188R91H122KA03#           1500pF         ±10%         GCG188R91H152KA03#           2200pF         ±10%         GCG188R91H222KA03#           2700pF         ±10%         GCG188R91H272KA03#           3300pF         ±10%         GCG188R91H332KA03#           3900pF         ±10%         GCG188R91H332KA03#							
1500pF       ±10%       GCG188R91H152KA03#         2200pF       ±10%       GCG188R91H222KA03#         2700pF       ±10%       GCG188R91H272KA03#         3300pF       ±10%       GCG188R91H332KA03#         3900pF       ±10%       GCG188R91H392KA03#							L
2200pF       ±10%       GCG188R91H222KA03#         2700pF       ±10%       GCG188R91H272KA03#         3300pF       ±10%       GCG188R91H332KA03#         3900pF       ±10%       GCG188R91H392KA03#			X8R				
2700pF         ±10%         GCG188R91H272KA03#           3300pF         ±10%         GCG188R91H332KA03#           3900pF         ±10%         GCG188R91H392KA03#					±10%	GCG188R91H152KA03#	
3300pF         ±10%         GCG188R91H332KA03#           3900pF         ±10%         GCG188R91H392KA03#				2200pF	±10%	GCG188R91H222KA03#	
3900pF ±10% GCG188R91H392KA03#				2700pF	±10%	GCG188R91H272KA03#	
				3300pF	±10%	GCG188R91H332KA03#	
4700pF ±10% GCG188R91H472KA03#				3900pF	±10%	GCG188R91H392KA03#	
				4700pF	±10%	GCG188R91H472KA03#	

Part number # indicates the package specification code.



**GCM** Series

GC3 Series

**GCJ** Series

**GCD** Series

**GCE** Series

NMF Series

KCM Series

KC3 Series

KCA Series

**GCG** Series

# GCG Series High Dielectric Constant Type Fair Actor Reaction Sector Actor Part Number List

#### (→ 1.6×0.8mm)

(→ 1.6×	0.8mm،	)			
T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
0.9mm	50Vdc	X8R	5600pF	±10%	GCG188R91H562KA03#
			6800pF	±10%	GCG188R91H682KA03#
			8200pF	±10%	GCG188R91H822KA03#
			10000pF	±10%	GCG188R91H103KA03#
			15000pF	±10%	GCG188R91H153KA03#
			22000pF	±10%	GCG188R91H223KA03#
			33000pF	±10%	GCG188R91H333KA03#
			47000pF	±10%	GCG188R91H473KA03#
			0.10µF	±10%	GCG188R91H104KA01#
			0.12µF	±10%	GCG188R91H124KA01#
			0.15µF	±10%	GCG188R91H154KA01#
			0.18µF	±10%	GCG188R91H184KA01#
			0.22µF	±10%	GCG188R91H224KA01#
		X7R	10000pF	±10%	GCG188R71H103KA01#
			15000pF	±10%	GCG188R71H153KA01#
			22000pF	±10%	GCG188R71H223KA01#
			27000pF	±10%	GCG188R71H273KA12#
			33000pF	±10%	GCG188R71H333KA12#
			39000pF	±10%	GCG188R71H393KA12#
			47000pF	±10%	GCG188R71H473KA12#
			56000pF	±10%	GCG188R71H563KA12#
			68000pF	±10%	GCG188R71H683KA12#
			82000pF	±10%	GCG188R71H823KA12#
			0.10µF	±10%	GCG188R71H104KA01#
			0.15µF	±10%	GCG188R71H154KA01#
			0.22µF	±10%	GCG188R71H224KA01#
	25Vdc	X8R	1000pF	±10%	GCG188R91E102KA01#
			1200pF	±10%	GCG188R91E122KA01#
			1500pF	±10%	GCG188R91E152KA01#
			1800pF	±10%	GCG188R91E182KA01#
			2200pF	±10%	GCG188R91E222KA01#
			2700pF	±10%	GCG188R91E272KA01#
			3300pF	±10%	GCG188R91E332KA01#
			3900pF	±10%	GCG188R91E392KA01#
			4700pF	±10%	GCG188R91E472KA01#
			5600pF	±10%	GCG188R91E562KA01#
			6800pF	±10%	GCG188R91E682KA01#
			8200pF	±10%	GCG188R91E822KA01#
			10000pF	±10%	GCG188R91E103KA01#
			15000pF	±10%	GCG188R91E153KA01#
			22000pF	±10%	GCG188R91E223KA01#
			33000pF	±10%	GCG188R91E333KA01#
			47000pF	±10%	GCG188R91E473KA01#
			68000pF	±10%	GCG188R91E683KA03#
			0.33µF	±10%	GCG188R91E334KA01#
			0.39µF	±10%	GCG188R91E394KA01#
			0.47µF	±10%	GCG188R91E474KA01#
		X7R	0.12µF	±10%	GCG188R71E124KA12#
			0.15µF	±10%	GCG188R71E154KA12#
			0.18µF	±10%	GCG188R71E184KA12#
			0.22µF	±10%	GCG188R71E224KA12#
	16Vdc	X8L	0.15µF	±10%	GCG188L81C154KA01#
			0.22µF	±10%	GCG188L81C224KA01#
			1.0µF	±10%	GCG188L8EE105KA07#
			µı		

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number	
0.9mm	16Vdc	X8R	68000pF	±10%	GCG188R91C683KA01#	
			0.10µF	±10%	GCG188R91C104KA01#	
		X7R	1.0µF	±10%	GCG188R71C105KA01#	
	10Vdc	X7S	2.2µF	±10%	GCG188C71A225KE01#	
	6.3Vdc	X7R	2.2µF	±10%	GCG188R70J225KE01#	

#### 2.0×1.25mm

_	-			_	
T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
0.95mm	50Vdc	X8R	18000pF	±10%	GCG219R91H183KA03#
1.45mm	100Vdc	X7R	10000pF	±10%	GCG21BR72A103KA01#
	50Vdc	X8L	27000pF	±10%	GCG21BL81H273KA01#
			33000pF	±10%	GCG21BL81H333KA01#
			39000pF	±10%	GCG21BL81H393KA01#
			47000pF	±10%	GCG21BL81H473KA01#
			0.10µF	±10%	GCG21BL81H104KA03#
			1.0µF	±10%	GCG21BL8EH105KA07#
		X8R	56000pF	±10%	GCG21BR91H563KA03#
			68000pF	±10%	GCG21BR91H683KA03#
			0.10µF	±10%	GCG21BR91H104KA03#
		X7R	0.15µF	±10%	GCG21BR71H154KA01#
			0.18µF	±10%	GCG21BR71H184KA01#
			0.22µF	±10%	GCG21BR71H224KA01#
			0.33µF	±10%	GCG21BR71H334KA01#
			0.47µF	±10%	GCG21BR71H474KA01#
			1.0µF	±10%	GCG21BR71H105KA01#
	35Vdc	X8L	0.68µF	±10%	GCG21BL8EG684KA07#
			1.0µF	±10%	GCG21BL8EG105KA07#
		X7R	0.68µF	±10%	GCG21BR7YA684KA01#
			1.0µF	±10%	GCG21BR7YA105KA01#
	25Vdc	X8L	0.10µF	±10%	GCG21BL81E104KA01#
			0.33µF	±10%	GCG21BL81E334KA01#
		X8R	39000pF	±10%	GCG21BR91E393KA01#
			82000pF	±10%	GCG21BR91E823KA01#
			0.15µF	±10%	GCG21BR91E154KA03#
			0.18µF	±10%	GCG21BR91E184KA03#
			0.22µF	±10%	GCG21BR91E224KA03#
			0.68µF	±10%	GCG21BR91E684KE01#
			1.0µF	±10%	GCG21BR91E105KE01#
		X7R	0.27µF	±10%	GCG21BR71E274KA01#
			0.33µF	±10%	GCG21BR71E334KA01#
			0.39µF	±10%	GCG21BR71E394KA01#
			0.47µF	±10%	GCG21BR71E474KA01#
			0.56µF	±10%	GCG21BR71E564KA01#
			0.68µF	±10%	GCG21BR71E684KA01#
			0.82µF	±10%	GCG21BR71E824KA01#
			1.0µF	±10%	GCG21BR71E105KA12#
	16Vdc	X8L	0.33µF	±10%	GCG21BL81C334KA01#
			0.39µF	±10%	GCG21BL81C394KA01#
			0.47µF	±10%	GCG21BL81C474KA01#
			0.56µF	±10%	GCG21BL81C564KA01#
			0.68µF	±10%	GCG21BL81C684KA01#
			0.82µF	±10%	GCG21BL81C824KA01#

Part number # indicates the package specification code.

①Caution
/Notice



#### GCG Series High Dielectric Constant Type 🔐 🏡 Part Number List $(\rightarrow 2.0 \times 1.25 \text{ mm})$

(→ 2.0×1.25mm)								
T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number			
1.45mm	16Vdc	X7R	4.7µF	±10%	GCG21BR71C475KA12#			
	10Vdc	X7R	10µF	±10%	GCG21BR71A106KE01#			
	6.3Vdc	X8L	10µF	±10%	GCG21BL8EC106KE07#			
		X7R	10µF	±10%	GCG21BR70J106KE01#			

#### 3.2×1.6mm

**GRT** Series

**GCM** Series

GC3 Series

**GCJ** Series

**GCD** Series

**GCE** Series

NMF Series

KCM Series

KC3 Series

KCA Series

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
1.35mm	50Vdc	X8R	0.22µF	±10%	GCG31MR91H224KA03#
			0.33µF	±10%	GCG31MR91H334KA03#
	25Vdc	X8R	0.15µF	±10%	GCG31MR91E154KA01#
			0.22µF	±10%	GCG31MR91E224KA01#
			0.33µF	±10%	GCG31MR91E334KA01#
		X7R	1.0µF	±10%	GCG31MR71E105KA01#
			1.2µF	±10%	GCG31MR71E125KA01#
			1.5µF	±10%	GCG31MR71E155KA01#
			2.2µF	±10%	GCG31MR71E225KA12#
	16Vdc	X8L	1.0µF	±10%	GCG31ML81C105KA01#
			1.5µF	±10%	GCG31ML81C155KA01#
1.9mm	25Vdc	X8R	0.68µF	±10%	GCG31CR91E684KA03#
		X7R	3.3µF	±10%	GCG31CR71E335KA01#
			3.9µF	±10%	GCG31CR71E395KA01#
			4.7µF	±10%	GCG31CR71E475KA01#
	16Vdc	X8L	3.3µF	±10%	GCG31CL81C335KA01#
			4.7µF	±10%	GCG31CL81C475KA01#
		X8R	0.68µF	±10%	GCG31CR91C684KA01#
			1.0µF	±10%	GCG31CR91C105KA01#
	6.3Vdc	X7R	22µF	±10%	GCG31CR70J226KE01#

#### 3.2×2.5mm

T max.	Rated Voltage	TC Code	Cap.	Tol.	Part Number
2.3mm	25Vdc	X7R	3.3µF	±10%	GCG32DR71E335KA01#
2.8mm	50Vdc	X8L	10µF	±10%	GCG32EL8EH106KA07#
		X7S	10µF	±10%	GCG32EC71H106KA01#
	35Vdc	X8L	10µF	±10%	GCG32EL8EG106KA07#
		X7S	10µF	±10%	GCG32EC7YA106KA01#
	25Vdc	X7R	4.7µF	±10%	GCG32ER71E475KA01#
			10µF	±10%	GCG32ER71E106KA12#
	16Vdc	X8R	6.8µF	±10%	GCG32ER91C685KE01#
			10µF	±10%	GCG32ER91C106KE01#
	6.3Vdc	X7R	47µF	±10%	GCG32ER70J476KE01#

 ANote
 • Please read rating and 
 ACAUTION (for storage, operating, rating, soldering, mounting and handling) in this catalog to prevent smoking and/or burning, etc.
 • This catalog has only typical specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.

#### GRT, GCM, GC3, GCJ, GCD, GCE, NFM, KCM, KC3, KCA, GCG

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KCA Series

#### C03E.pdf Jun 22,2017

# **Caution/Notice**

## muRata

GRT Series

**GCM** Series

GC3 Series

**GCJ** Series

**GCD** Series

**GCE** Series

NMF Series

WEB

## Notice

## **A**Caution

#### Storage and Operation Conditions

- The performance of chip multilayer ceramic capacitors and chip EMIFIL<sup>®</sup> NFM series (henceforth just "capacitors") may be affected by the storage conditions.
  - 1-1. Store the capacitors in the following conditions: Room Temperature of +5°C to +40°C and a Relative Humidity of 20% to 70%.
  - (1) High temperature and humidity conditions may accelerate the deterioration of solderability due to oxidation of the terminal electrodes and deterioration of taping/packaging performance. Therefore, maintain the appropriate storage temperature and humidity.
  - (2) Prolonged storage may cause oxidation of the electrodes and deterioration of the packaging materials. If more than six months have elapsed since delivery, check the mounting before use. If more than one year has elapsed since delivery, also check the solderability before use.

- (3) Store the capacitors in the original packaging without opening the smallest packing unit. Do not exceed the above atmospheric conditions for any length of time.
- 1-2. Corrosive gas can react with the termination (external) electrodes or lead wires of capacitors, and result in poor solderability. Do not store the capacitors in an atmosphere consisting of corrosive gas (e.g., hydrogen sulfide, sulfur dioxide, chlorine, ammonia gas, etc.).
- 1-3. Due to moisture condensation caused by rapid humidity changes, or the photochemical change caused by direct sunlight on the terminal electrodes and/or the resin/epoxy coatings, the solderability and electrical performance may deteriorate. Do not store capacitors under direct sunlight or in high humidity conditions.

#### <Applicable to GCG Series>

1-4. After unpacking, immediately reseal, or store in a desiccator containing a desiccant.

#### Rating

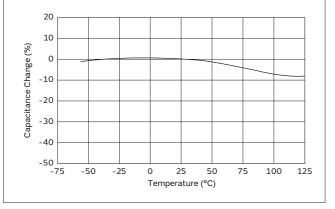
#### 1. Temperature Dependent Characteristics

- 1. The electrical characteristics of a capacitor can change with temperature.
  - 1-1. For capacitors having larger temperature dependency, the capacitance may change with temperature changes.

The following actions are recommended in order to ensure suitable capacitance values.

(1) Select a suitable capacitance for the operating temperature range.

[Example of Temperature Characteristics X7R(R7)] Sample: 0.1µF, Rated Voltage 50VDC



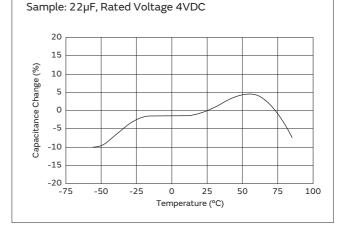
#### 2. Measurement of Capacitance

- 1. Measure capacitance with the voltage and frequency specified in the product specifications.
  - 1-1. The output voltage of the measuring equipment may decrease occasionally when capacitance is high.
     Please confirm whether a prescribed measured voltage is impressed to the capacitor.

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(2) The capacitance may change within the rated temperature.

When you use a high dielectric constant type capacitor in a circuit that needs a tight (narrow) capacitance tolerance (e.g., a time-constant circuit), please carefully consider the temperature characteristics, and carefully confirm the various characteristics in actual use conditions and the actual system.



[Example of Temperature Characteristics X5R (R6)]

1-2. The capacitance values of high dielectric constant type capacitors change depending on the AC voltage applied. Please consider the AC voltage characteristics when selecting a capacitor to be used in an AC circuit. Note • Please read rating and (LCAUTION (for storage, operating, rating, soldering, mounting and handling) in this catalog to prevent smoking and/or burning, etc.
 • This catalog has only typical specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering

Caution

Continued from the preceding page.

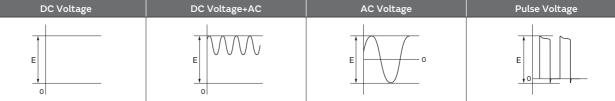
#### 3. Applied Voltage and Applied Current

- 1. Do not apply a voltage to the capacitor that exceeds the rated voltage as called out in the specifications.
  - 1-1. Applied voltage between the terminals of a capacitor shall be less than or equal to the rated voltage.
    - (1) When AC voltage is superimposed on DC voltage, the zero-to-peak voltage shall not exceed the rated DC voltage.

When AC voltage or pulse voltage is applied, the peak-to-peak voltage shall not exceed the rated DC voltage.

(2) Abnormal voltages (surge voltage, static electricity, pulse voltage, etc.) shall not exceed the rated DC voltage.

#### Typical Voltage Applied to the DC Capacitor



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(E: Maximum possible applied voltage.)

#### 1-2. Influence of over voltage

Over voltage that is applied to the capacitor may result in an electrical short circuit caused by the breakdown of the internal dielectric layers. The time duration until breakdown depends on the applied voltage and the ambient temperature.

2. Use a safety standard certified capacitor in a power supply input circuit (AC filter), as it is also necessary to consider the withstand voltage and impulse withstand voltage defined for each device.

#### 4. Type of Applied Voltage and Self-heating Temperature

 Confirm the operating conditions to make sure that no large current is flowing into the capacitor due to the continuous application of an AC voltage or pulse voltage.

When a DC rated voltage product is used in an AC voltage circuit or a pulse voltage circuit, the AC current or pulse current will flow into the capacitor; therefore check the self-heating condition.

Please confirm the surface temperature of the capacitor so that the temperature remains within the upper limits of the operating temperature, including the rise in temperature due to self-heating. When the capacitor is used with a high-frequency voltage or pulse voltage, heat may be generated by dielectric loss.

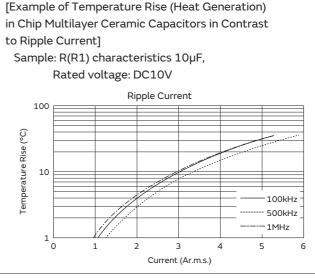
#### <Applicable to Rated Voltage of less than 100VDC>

1-1. The load should be contained so that the self-heating of the capacitor body remains below 20°C, when measuring at an ambient temperature of 25°C.

#### <Applicable to NFM Series>

3. The capacitors also have rated currents.

The current flowing between the terminals of a capacitor shall be less than or equal to the rated current. Using the capacitor beyond this range could lead to excessive heat.



Continued on the following page. earrow

**GRT** Series

**GCM** Series

**GC3** Series

**GCJ** Series

**GCD** Series

**GCE** Series

NMF Series

KCM Series

KC3 Series

KCA Series

GCG Series

ACautior

**GRT** Series

**GCM** Series

**GC3** Series

**GCJ** Series

**GCD** Series

**GCE** Series

NMF Series

**KCM** Series

KC3 Series

**KCA** Series

GCG Series

**ACaution** 

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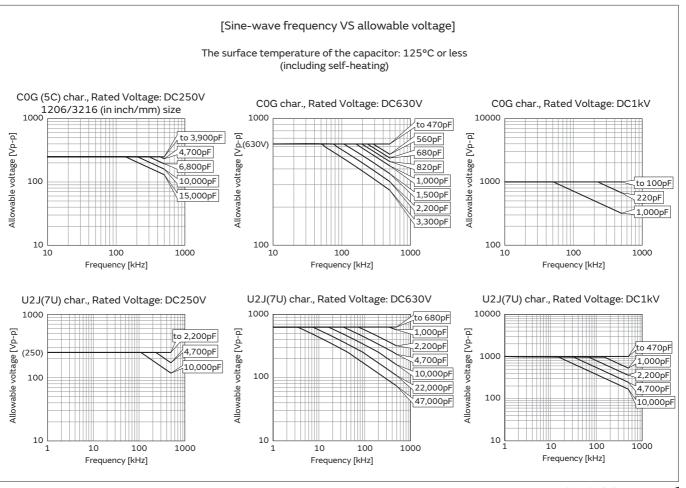
<Applicable to Temperature Characteristics X7R(R7), X7T(D7) beyond Rated Voltage of 250VDC>

1-2. The load should be contained so that the self-heating of the capacitor body remains below 20°C, when measuring at an ambient temperature of 25°C. In addition, use a K thermocouple of Ø0.1mm with less heat capacity when measuring, and measure in a condition where there is no effect from the radiant heat of other components or air flow caused by convection. Excessive generation of heat may cause deterioration of the characteristics and reliability of the capacitor. (Absolutely do not perform measurements while the cooling fan is operating, as an accurate measurement may not be performed.)

# <Applicable to Temperature Characteristics U2J(7U), COG(5C) beyond Rated Voltage of 250VDC>

- 1-3. Since the self-heating is low in the low loss series, the allowable power becomes extremely high compared to the common X7R(R7) characteristics.
  However, when a load with self-heating of 20°C is applied at the rated voltage, the allowable power may be exceeded. When the capacitor is used in a high-frequency voltage circuit of 1kHz or more, the frequency of the applied voltage should be less than 500kHz sine wave (less than 100kHz for a product with rated voltage of DC3.15kV), to limit the voltage load so that the load remains within the derating shown in the following figure. In the case of non-sine wave, high-frequency components exceeding the fundamental frequency may be included. In such a case
  - fundamental frequency may be included. In such a case, please contact Murata. The excessive generation of heat may cause deterioration of the characteristics and reliability of the capacitor.

(Absolutely do not perform measurements while the cooling fan is operating, as an accurate measurement may not be performed.)



Continued on the following page. 🖊

Note • Please read rating and (LCAUTION (for storage, operating, rating, soldering, mounting and handling) in this catalog to prevent smoking and/or burning, etc.
 • This catalog has only typical specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.

**GRT** Series

**GCM** Series

GC3 Series

**GCJ** Series

GCD Series

**GCE** Series

NMF Series

KCM Series

KC3 Series

**KCA** Series

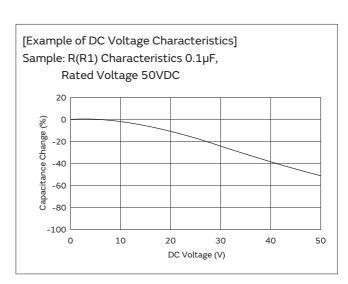
**GCG** Series

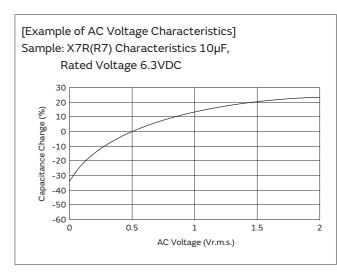
ACaution

# **Caution**

Continued from the preceding page.  $\searrow$ 

- 5. DC Voltage and AC Voltage Characteristics
- 1. The capacitance value of a high dielectric constant type capacitor changes depending on the DC voltage applied. Please consider the DC voltage characteristics when a capacitor is selected for use in a DC circuit.
  - 1-1. The capacitance of ceramic capacitors may change sharply depending on the applied voltage (see figure). Please confirm the following in order to secure the capacitance.
    - (1) Determine whether the capacitance change caused by the applied voltage is within the allowed range.
    - (2) In the DC voltage characteristics, the rate of capacitance change becomes larger as voltage increases, even if the applied voltage is below the rated voltage. When a high dielectric constant type capacitor is used in a circuit that requires a tight (narrow) capacitance tolerance (e.g., a time constant circuit), please carefully consider the voltage characteristics, and confirm the various characteristics in the actual operating conditions of the system.
- 2. The capacitance values of high dielectric constant type capacitors changes depending on the AC voltage applied. Please consider the AC voltage characteristics when selecting a capacitor to be used in an AC circuit.

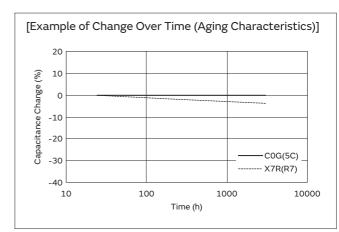




# 6. Capacitance Aging

1. The high dielectric constant type capacitors have the Characteristics in which the capacitance value decreases with the passage of time.

When you use high dielectric constant type capacitors in a circuit that needs a tight (narrow) capacitance tolerance (e.g., a time-constant circuit), please carefully consider the characteristics of these capacitors, such as their aging, voltage, and temperature characteristics. In addition, check capacitors using your actual appliances at the intended environment and operating conditions.



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**GRT** Series

Continued from the preceding page.

- 7. Vibration and Shock
- 1. Please confirm the kind of vibration and/or shock, its condition, and any generation of resonance. Please mount the capacitor so as not to generate resonance, and do not allow any impact on the terminals.
- 2. Mechanical shock due to being dropped may cause damage or a crack in the dielectric material of the capacitor.

Do not use a dropped capacitor because the quality and reliability may be deteriorated.

3. When printed circuit boards are piled up or handled, the corner of another printed circuit board should not be allowed to hit the capacitor, in order to avoid a crack or other damage to the capacitor.

# Soldering and Mounting

# 1. Mounting Position

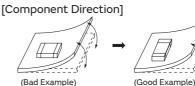
- 1. Confirm the best mounting position and direction that minimizes the stress imposed on the capacitor during flexing or bending the printed circuit board.
  - 1-1. Choose a mounting position that minimizes the stress imposed on the chip during flexing or bending of the board.

# <Applicable to NFM Series>

2. If you mount the capacitor near components that generate heat, take note of the heat from the other components and carefully check the self-heating of the capacitor before using.

If there is significant heat radiation from other components, it could lower the insulation resistance of the capacitor or produce excessive heat.

Crack Flooi Mounting printed circuit board Crack



Locate chip horizontal to the direction in which stress acts

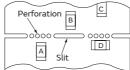
(Bad Example)

# [Chip Mounting Close to Board Separation Point]

It is effective to implement the following measures, to reduce stress in separating the board.

It is best to implement all of the following three measures; however, implement as many measures as possible to reduce stress.

Contents of Measures	Stress Level
(1) Turn the mounting direction of the component parallel to the board separation surface.	A > D *1
(2) Add slits in the board separation part.	A > B
(3) Keep the mounting position of the component away from the board separation surface.	A > C

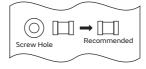


\*1 A > D is valid when stress is added vertically to the perforation as with Hand Separation.

If a Cutting Disc is used, stress will be diagonal to the PCB, therefore A > D is invalid.

# [Mounting Capacitors Near Screw Holes]

When a capacitor is mounted near a screw hole, it may be affected by the board deflection that occurs during the tightening of the screw. Mount the capacitor in a position as far away from the screw holes as possible.



**GCE** Series

NMF Series

KC3 Series

KCA Series

**ACaution** 

**GRT** Series

**GCM** Series

**GC3** Series

**GCJ** Series

# **A**Caution

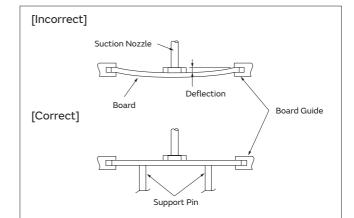
# Continued from the preceding page. $\searrow$

# 2. Information before Mounting

- 1. Do not re-use capacitors that were removed from the equipment.
- 2. Confirm capacitance characteristics under actual applied voltage.
- 3. Confirm the mechanical stress under actual process and equipment use.
- 4. Confirm the rated capacitance, rated voltage and other electrical characteristics before assembly.
- 5. Prior to use, confirm the solderability of capacitors that were in long-term storage.
- 6. Prior to measuring capacitance, carry out a heat treatment for capacitors that were in long-term storage.
- 7. The use of Sn-Zn based solder will deteriorate the reliability of the MLCC.
  Please contact our sales representative or product engineers on the use of Sn-Zn based solder in advance.
- 8. We have also produced a DVD which shows a summary of our recommendations, regarding the precautions for mounting. Please contact our sales representative to request the DVD.

# 3. Maintenance of the Mounting (pick and place) Machine

- 1. Make sure that the following excessive forces are not applied to the capacitors. Check the mounting in the actual device under actual use conditions ahead of time.
  - 1-1. In mounting the capacitors on the printed circuit board, any bending force against them shall be kept to a minimum to prevent them from any damage or cracking. Please take into account the following precautions and recommendations for use in your process.
    - (1) Adjust the lowest position of the pickup nozzle so as not to bend the printed circuit board.
- 2. Dirt particles and dust accumulated in the suction nozzle and suction mechanism prevent the nozzle from moving smoothly. This creates excessive force on the capacitor during mounting, causing cracked chips. Also, the locating claw, when worn out, imposes uneven forces on the chip when positioning, causing cracked chips. The suction nozzle and the locating claw must be maintained, checked, and replaced periodically.



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KCA Series

**GRT** Series

Continued from the preceding page.

# 4-1. Reflow Soldering

- 1. When sudden heat is applied to the components, the mechanical strength of the components will decrease because a sudden temperature change causes deformation inside the components. In order to prevent mechanical damage to the components, preheating is required for both the components and the PCB. Preheating conditions are shown in table 1. It is required to keep the temperature differential between the solder and the components surface ( $\Delta T$ ) as small as possible.
- 2. When components are immersed in solvent after mounting, be sure to maintain the temperature difference ( $\Delta T$ ) between the component and the solvent within the range shown in table 1.

# Table 1

Series	Chip Dimension Code (L/W)	Temperature Differential
GRT/GCM/GC3/GCD/GCE/GCJ/NFM	03/15/18/21/31	∆T≦190°C
GRT/GCM/GCJ	32/43/55	47(12000
КСМ/КСЗ/КСА	55	ΔT≦130°C

# **Recommended Conditions**

240 to 260°C
Air or N2

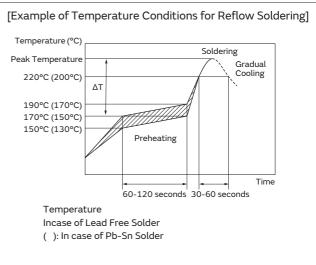
Pb-Sn Solder: Sn-37Pb

Lead Free Solder: Sn-3.0Ag-0.5Cu

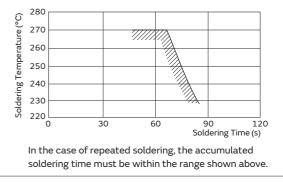
- 3. When a capacitor is mounted at a temperature lower than the peak reflow temperature recommended by the solder manufacturer, the following quality problems can occur. Consider factors such as the placement of peripheral components and the reflow temperature setting to prevent the capacitor's reflow temperature from dropping below the peak temperature specified. Be sure to evaluate the mounting situation beforehand and verify that none of the following problems occur.
  - Drop in solder wettability
  - Solder voids
  - Possible occurrence of whiskering
  - Drop in bonding strength
  - Drop in self-alignment properties
  - Possible occurrence of tombstones and/or shifting on the land patterns of the circuit board
- 4. Optimum Solder Amount for Reflow Soldering
  - 4-1. Overly thick application of solder paste results in a excessive solder fillet height.
    - This makes the chip more susceptible to mechanical and thermal stress on the board and may cause the chips to crack.

# Inverting the PCB

Make sure not to impose any abnormal mechanical shocks to the PCB.

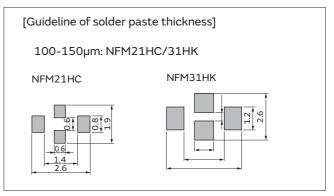


# [Allowable Reflow Soldering Temperature and Time]



- 4-2. Too little solder paste results in a lack of adhesive strength on the termination, which may result in chips breaking loose from the PCB.
- 4-3. Please confirm that solder has been applied smoothly to the termination.

# <Applicable to NFM Series>



**GCE** Series

Series

NMF

KCM Series

Series

KCA

ACaution

GC3 Series

**GCJ** Series

**GCD** Series

**GCE** Series

NMF Series

KCM Series

KC3 Series

**KCA** Series

GCG Series

ACaution

Continued from the preceding page.

# 4-2. Flow Soldering

1. Do not apply flow soldering to chips not listed in table 2.

#### Table 2

Series	Chip Dimension Code (L/W)	Temperature Differential	
GRT/GCM/GC3/GCD (Except for characteristics of X8L(L8), X8G(5G), CHA(0C), X8R(R9))			
GCJ (Rated Voltage 250VDC or more)	18/21/31	∆T≦150°C	
NFM			

- 2. When sudden heat is applied to the components, the mechanical strength of the components will decrease because a sudden temperature change causes deformation inside the components. In order to prevent mechanical damage to the components, preheating is required for both of the components and the PCB. Preheating conditions are shown in table 2. It is required to keep the temperature differential between the solder and the components surface ( $\Delta T$ ) as low as possible.
- 3. Excessively long soldering time or high soldering temperature can result in leaching of the terminations, causing poor adhesion or a reduction in capacitance value due to loss of contact between the inner electrodes and terminations.
- 4. When components are immersed in solvent after mounting, be sure to maintain the temperature differential ( $\Delta T$ ) between the component and solvent within the range shown in the table 2.

# Recommended Conditions

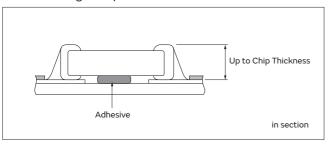
	Pb-Sn Solder	Lead Free Solder
Preheating Peak Temperature	90 to 110°C	100 to 120°C 140 to 160°C ( <b>NFM</b> )
Soldering Peak Temperature	240 to 250°C	250 to 260°C
Atmosphere	Air	Air or N2

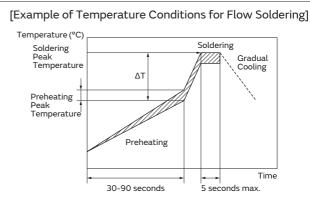
Pb-Sn Solder: Sn-37Pb

Lead Free Solder: Sn-3.0Ag-0.5Cu

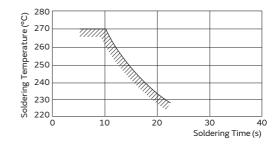
# 5. Optimum Solder Amount for Flow Soldering

5-1. The top of the solder fillet should be lower than the thickness of the components. If the solder amount is excessive, the risk of cracking is higher during board bending or any other stressful condition.



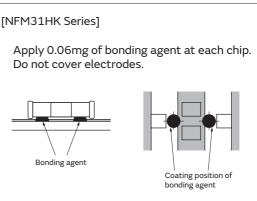


#### [Allowable Flow Soldering Temperature and Time]



In the case of repeated soldering, the accumulated soldering time must be within the range shown above.

# <Applicable to NFM Series>



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# 4-3. Correction of Soldered Portion

When sudden heat is applied to the capacitor, distortion caused by the large temperature difference occurs internally, and can be the cause of cracks. Capacitors also tend to be affected by mechanical and thermal stress depending on the board preheating temperature or the soldering fillet shape, and can be the cause of cracks. Please refer to "1. PCB Design" or "3. Optimum solder amount" for the solder amount and the fillet shapes.

1. Correction with a Soldering Iron

1-1. In order to reduce damage to the capacitor, be sure to preheat the capacitor and the mounting board. Preheat to the temperature range shown in Table 3. A hot plate, hot air type preheater, etc. can be used for preheating.

- 1-2. After soldering, do not allow the component/PCB to cool down rapidly.
- 1-3. Perform the corrections with a soldering iron as quickly as possible. If the soldering iron is applied too long, there is a possibility of causing solder leaching on the terminal electrodes, which will cause deterioration of the adhesive strength and other problems.

# Table 3

Series	Chip Dimension Code (L/W)	Temperature of Soldering Iron Tip	Preheating Temperature	Temperature Differential (ΔT)	Atmosphere
GRT/GCM/GC3/GCD/GCE/GCJ	03/15/18/21/31	350°C max.	150°C min.	∆T≦190°C	Air
GRT/GCM/GCJ	32/43/55	280°C max.	150°C min.	∆T≦130°C	Air
NFM	21/31	350°C max.	150°C min.	ΔT≦190°C	Air

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\*Applicable for both Pb-Sn and Lead Free Solder.

Pb-Sn Solder: Sn-37Pb

Lead Free Solder: Sn-3.0Ag-0.5Cu

\*Please manage  $\Delta T$  in the temperature of soldering iron and the preheating temperature.

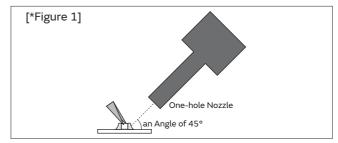
# 2. Correction with Spot Heater

Compared to local heating with a soldering iron, hot air heating by a spot heater heats the overall component and board, therefore, it tends to lessen the thermal shock. In the case of a high density mounted board, a spot heater can also prevent concerns of the soldering iron making direct contact with the component.

- 2-1. If the distance from the hot air outlet of the spot heater to the component is too close, cracks may occur due to thermal shock. To prevent this problem, follow the conditions shown in Table 4.
- 2-2. In order to create an appropriate solder fillet shape, it is recommended that hot air be applied at the angle shown in Figure 1.

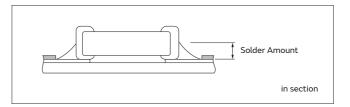
#### Table 4

Distance	5mm or more
Hot Air Application Angle	45° *Figure 1
Hot Air Temperature Nozzle Outlet	400°C max.
Application Time	Less than 10 seconds (1206 (3216 in mm) size or smaller)
	Less than 30 seconds (1210 (3225 in mm) size or larger)



- 3. Optimum solder amount when re-working with a soldering iron 3-1. If the solder amount is excessive, the risk of cracking is
  - higher during board bending or any other stressful condition.

Too little solder amount results in a lack of adhesive strength on the outer electrode termination, which may result in chips breaking loose from the PCB. Please confirm that solder has been applied smoothly is and rising to the end surface of the chip.



Series GRT

**GCM** Series

**GC3** Series

**GCJ** Series

GCD Series

**GCE** Series

NMF Series

KCM Series

KC3 Series

**KCA** Series

GCG Series

**Caution** 

# Continued from the preceding page.

- 3-2. A soldering iron with a tip of ø3mm or smaller should be used. It is also necessary to keep the soldering iron from touching the components during the re-work.
- 3-3. Solder wire with ø0.5mm or smaller is required for soldering.

# <Applicable to KCM/KC3/KCA Series>

4. For the shape of the soldering iron tip, refer to the figure on the right.

Regarding the type of solder, use a wire diameter of ø0.5mm or less (rosin core wire solder).

- 4-1. How to Apply the Soldering Iron Apply the tip of the soldering iron against the lower end of the metal terminal.
  - 1) In order to prevent cracking caused by sudden heating of the ceramic device, do not touch the ceramic base directly.
  - 2) In order to prevent deviations and dislocating of the chip, do not touch the junction of the chip and the metal terminal, and the metal portion on the outside directly.
- 4-2. Appropriate Amount of Solder

The amount of solder for corrections by soldering iron, should be lower than the height of the lower side of the chip.

#### 5. Washing

Excessive ultrasonic oscillation during cleaning can cause the PCBs to resonate, resulting in cracked chips or broken solder joints. Before starting your production process, test your cleaning equipment/process to insure it does not degrade the capacitors.

# 6. Electrical Test on Printed Circuit Board

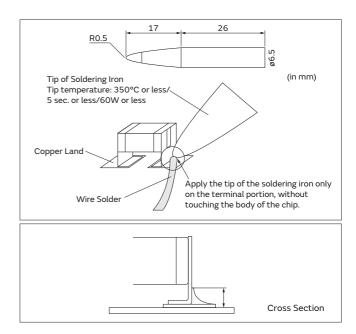
- 1. Confirm position of the support pin or specific jig, when inspecting the electrical performance of a capacitor after mounting on the printed circuit board.
  - 1-1. Avoid bending the printed circuit board by the pressure of a test-probe, etc.

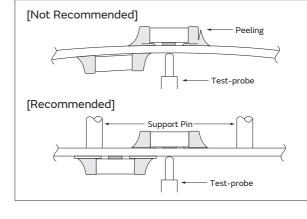
The thrusting force of the test probe can flex the PCB, resulting in cracked chips or open solder joints. Provide support pins on the back side of the PCB to prevent warping or flexing. Install support pins as close to the test-probe as possible.

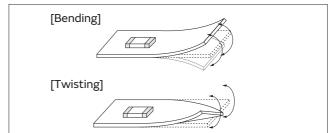
1-2. Avoid vibration of the board by shock when a test-probe contacts a printed circuit board.

# 7. Printed Circuit Board Cropping

- 1. After mounting a capacitor on a printed circuit board, do not apply any stress to the capacitor that causes bending or twisting the board.
  - 1-1. In cropping the board, the stress as shown at right may cause the capacitor to crack. Avoid this type of stress to a capacitor.







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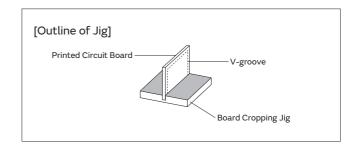
- 2. Check the cropping method for the printed circuit board in advance.
  - 2-1. Printed circuit board cropping shall be carried out by using a jig or an apparatus (Disc separator, router type separator, etc.) to prevent the mechanical stress that can occur to the board.

Deard Conception Mathed	Hand Separation	(1) Decad Conception line	Board Separat	tion Apparatus
Board Separation Method	Nipper Separation	(1) Board Separation Jig	(2) Disc Separator	(3) Router Type Separator
Level of stress on board	High	Medium	Medium	Low
Recommended	×	∆*	∆*	0
			· Board handling	
	Hand and nipper	· Board handling	· Layout of slits	
Notes	separation apply a high level of stress.	· Board bending direction	· Design of V groove	Board handling
	Use another method.	· Layout of capacitors	· Arrangement of blades	
			· Controlling blade life	

\* When a board separation jig or disc separator is used, if the following precautions are not observed, a large board deflection stress will occur and the capacitors may crack. Use router type separator if at all possible.

#### (1) Example of a suitable jig

[In the case of Single-side Mounting] An outline of the board separation jig is shown as follows. Recommended example: Stress on the component mounting position can be minimized by holding the portion close to the jig, and bend in the direction towards the side where the capacitors are mounted. Not recommended example: The risk of cracks occurring in the capacitors increases due to large stress being applied to the component mounting position, if the portion away from the jig is held and bent in the direction opposite the side where the capacitors are mounted.



# Hand Separation



[In the case of Double-sided Mounting]

Since components are mounted on both sides of the board, the risk of cracks occurring can not be avoided with the above method.

Therefore, implement the following measures to prevent stress from being applied to the components.

# (Measures)

- (1) Consider introducing a router type separator.
   If it is difficult to introduce a router type separator, implement the following measures.
   (Refer to item 1. Mounting Position)
- (2) Mount the components parallel to the board separation surface.
- (3) When mounting components near the board separation point, add slits in the separation position near the component.
- (4) Keep the mounting position of the components away from the board separation point.

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**GRT** Series

# **A**Caution

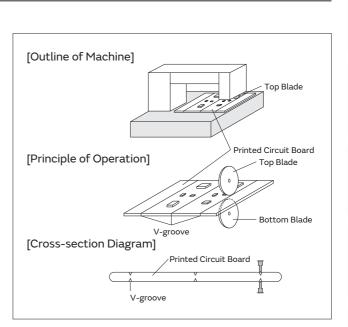
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- (2) Example of a Disc Separator
  - An outline of a disc separator is shown as follows. As shown in the Principle of Operation, the top blade and bottom blade are aligned with the V-grooves on the printed circuit board to separate the board.

In the following case, board deflection stress will be applied and cause cracks in the capacitors.

- (1) When the adjustment of the top and bottom blades are misaligned, such as deviating in the top-bottom, left-right or front-rear directions
- (2) The angle of the V groove is too low, depth of the V groove is too shallow, or the V groove is misaligned top-bottom

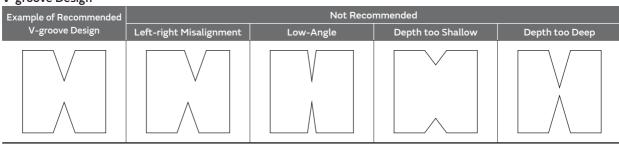
IF V groove is too deep, it is possible to brake when you handle and carry it. Carefully design depth of the V groove with consideration about strength of material of the printed circuit board.



#### Disc Separator

Recommended			Not Recommended				
		Top-bottom Misalignment		Left-right Misalignment		Front-rear Misalignment	
	Top Blade		Top Blade		Top Blade		Top Blade
	Bottom Blade		Bottom Blade		Bottom Blade		Bottom Blade

# V-groove Design

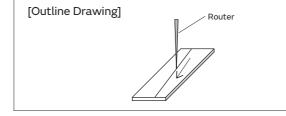


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(3) Example of Router Type Separator

The router type separator performs cutting by a router rotating at a high speed. Since the board does not bend in the cutting process, stress on the board can be suppressed during board separation.

When attaching or removing boards to/from the router type separator, carefully handle the boards to prevent bending.



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ACaution GCG Series

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8. Assembly

**GRT** Series

**GCM** Series

GC3 Series

**GCJ** Series

GCD Series

**GCE** Series

NMF Series

KCM Series

KC3 Series

KCA Series

**GCG** Series

1. Handling

If a board mounted with capacitors is held with one hand, the board may bend. Firmly hold the edges of the board with both hands when handling.

If a board mounted with capacitors is dropped, cracks may occur in the capacitors.

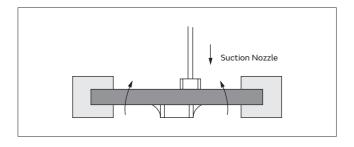
Do not use dropped boards, as there is a possibility that the quality of the capacitors may be impaired.

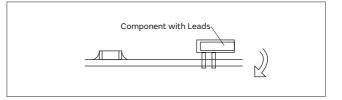
- 2. Attachment of Other Components
  - 2-1. Mounting of Other Components
    - Pay attention to the following items, when mounting other components on the back side of the board after capacitors have been mounted on the opposite side. When the bottom dead point of the suction nozzle is set too low, board deflection stress may be applied to the capacitors on the back side (bottom side), and cracks may occur in the capacitors.
    - After the board is straightened, set the bottom dead point of the nozzle on the upper surface of the board.
    - · Periodically check and adjust the bottom dead point.
  - 2-2. Inserting Components with Leads into Boards
     When inserting components (transformers, IC, etc.)
     into boards, bending the board may cause cracks in
     the capacitors or cracks in the solder.
     Pay attention to the following.
    - Increase the size of the holes to insert the leads, to reduce the stress on the board during insertion.
    - Fix the board with support pins or a dedicated jig before insertion.
    - Support below the board so that the board does not bend. When using support pins on the board, periodically confirm that there is no difference in the height of each support pin.
  - 2-3. Attaching/Removing Sockets and/or Connectors Insertion and removal of sockets and connectors, etc., might cause the board to bend. Please insure that the board does not warp during insertion and removal of sockets and connectors, etc., or the bending may damage mounted components on the board.
  - 2-4. Tightening Screws

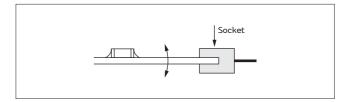
The board may be bent, when tightening screws, etc. during the attachment of the board to a shield or chassis.

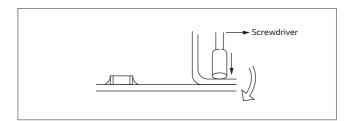
Pay attention to the following items before performing the work.

- $\cdot$  Plan the work to prevent the board from bending.
- Use a torque screwdriver, to prevent over-tightening of the screws.
- The board may bend after mounting by reflow soldering, etc. Please note, as stress may be applied to the chips by forcibly flattening the board when tightening the screws.









GCD Series GCJ Series GCM Series GRT Series

Continued from the preceding page.  $\searrow$ 

<Applicable to GCG Series>

#### 9. Selection of Conductive Adhesive, Mounting Process, and Bonding Strength

The acquired bonding strength may change greatly depending on the conductive adhesive to be used. Be sure to confirm if the desired performance can be acquired in the assumed mounting process with the conductive adhesive to be used.

# 10. Moisture Proof Process

In order to prevent the occurrence of migration, perform a moisture proof process, such as applying a resin coating or enclosing with a dry inert gas.

# Other

# 1. Under Operation of Equipment

- 1-1. Do not touch a capacitor directly with bare hands during operation in order to avoid the danger of an electric shock.
- 1-2. Do not allow the terminals of a capacitor to come in contact with any conductive objects (short-circuit).Do not expose a capacitor to a conductive liquid, including any acid or alkali solutions.
- 1-3. Confirm the environment in which the equipment will operate is under the specified conditions.Do not use the equipment under the following environments.
  - (1) Being spattered with water or oil.
  - (2) Being exposed to direct sunlight.
  - (3) Being exposed to ozone, ultraviolet rays, or radiation.
  - (4) Being exposed to toxic gas (e.g., hydrogen sulfide, sulfur dioxide, chlorine, ammonia gas, etc.)
  - (5) Any vibrations or mechanical shocks exceeding the specified limits.
  - (6) Moisture condensing environments.
- 1-4. Use damp proof countermeasures if using under any conditions that can cause condensation.

# 2. Other

- 2-1. In an Emergency
  - If the equipment should generate smoke, fire, or smell, immediately turn off or unplug the equipment.

If the equipment is not turned off or unplugged, the hazards may be worsened by supplying continuous power.

(2) In this type of situation, do not allow face and hands to come in contact with the capacitor or burns may be caused by the capacitor's high temperature.

# 11. Application

This product is limited to conductive glue mounting. When performing solder mounting, contact Murata in advance.

# 2-2. Disposal of Waste

When capacitors are disposed of, they must be burned or buried by an industrial waste vendor with the appropriate licenses.

- 2-3. Circuit Design
  - (1) Addition of Fail Safe Function
    - Capacitors that are cracked by dropping or bending of the board may cause deterioration of the insulation resistance, and result in a short. If the circuit being used may cause an electrical shock, smoke or fire when a capacitor is shorted, be sure to install fail-safe functions, such as a fuse, to prevent secondary accidents.
  - (2) Capacitors used to prevent electromagnetic interference in the primary AC side circuit, or as a connection/insulation, must be a safety standard certified product, or satisfy the contents stipulated in the Electrical Appliance and Material Safety Law. Install a fuse for each line in case of a short.
  - (3) The GC3, GCD, GCE, GCG, GCJ, GCM, KC3, and KCM series are not safety standard certified products.
- 2-4. Remarks

Failure to follow the cautions may result, worst case, in a short circuit and smoking when the product is used.

The above notices are for standard applications and conditions. Contact us when the products are used in special mounting conditions.

Select optimum conditions for operation as they determine the reliability of the product after assembly.

The data herein are given in typical values, not guaranteed ratings.

Note • Please read rating and (LCAUTION (for storage, operating, rating, soldering, mounting and handling) in this catalog to prevent smoking and/or burning, etc.
 • This catalog has only typical specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.

# Notice

# Rating

**GRT** Series

**GCM** Series

GC3 Series

**GCJ** Series

**GCD** Series

**GCE** Series

NMF Series

**KCM** Series

KC3 Series

KCA Series

**GCG** Series

- 1. Operating Temperature
- 1. The operating temperature limit depends on the capacitor.
  - 1-1. Do not apply temperatures exceeding the upper operating temperature.

It is necessary to select a capacitor with a suitable rated temperature that will cover the operating temperature range.

It is also necessary to consider the temperature distribution in equipment and the seasonal temperature variable factor.

1-2. Consider the self-heating factor of the capacitor. The surface temperature of the capacitor shall not exceed the maximum operating temperature including self-heating.

# 2. Atmosphere Surroundings (gaseous and liquid)

1. Restriction on the operating environment of capacitors.

- 1-1. Capacitors, when used in the above, unsuitable, operating environments may deteriorate due to the corrosion of the terminations and the penetration of moisture into the capacitor.
- 1-2. The same phenomenon as the above may occur when the electrodes or terminals of the capacitor are subject to moisture condensation.
- 1-3. The deterioration of characteristics and insulation resistance due to the oxidization or corrosion of terminal electrodes may result in breakdown when the capacitor is exposed to corrosive or volatile gases or solvents for long periods of time.

# Soldering and Mounting

# 1. PCB Design

- 1. Notice for Pattern Forms
  - 1-1. Unlike leaded components, chip components are susceptible to flexing stresses since they are mounted directly on the substrate.

They are also more sensitive to mechanical and thermal stresses than leaded components. Excess solder fillet height can multiply these stresses and cause chip cracking. When designing substrates, take land patterns and dimensions into consideration to eliminate the possibility of excess solder fillet height.

1-2. There is a possibility of chip cracking caused by PCB expansion/contraction with heat, because stress on a chip is different depending on PCB material and structure. When the thermal expansion coefficient greatly differs between the board used for mounting and the chip, it will cause cracking of the chip due to the thermal expansion and contraction. When capacitors are mounted on a fluorine resin printed circuit board or on a single-layered glass epoxy board, it may also cause cracking of the chip for the same reason.

- 3. Piezo-electric Phenomenon
- 1. When using high dielectric constant type capacitors in AC or pulse circuits, the capacitor itself vibrates at specific frequencies and noise may be generated. Moreover, when the mechanical vibration or shock is added to the capacitor, noise may occur.

# <Applicable to NFM Series>

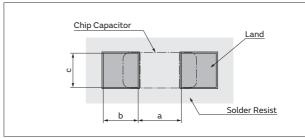
1-3. Because noise is suppressed by shunting unwanted high-frequency components to the ground, when designing a land for the NFM series, design the ground pattern to be as large as possible in order to better bring out this characteristic.

As shown in the figure below, noise countermeasures can be made more effective by using a via to connect the ground pattern on the chip mounting surface to a larger ground pattern on the inner layer.

∕∆Note	• Please read rating and 🖄 CAUTION (for storage, operating, rating, soldering, mounting and handling) in this catalog to prevent smoking and/or burning, etc.
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Notice **GRT** Series Continued from the preceding page.  $\searrow$ Pattern Forms Correct Prohibited **GCM** Series Chassis Solder Resist Solder (ground) Placing Close to Chassis GC3 Series Electrode Pattern in section in section Lead Wire Solder Resist Placing of Chip Components and Leaded Components **GCJ** Series in section in section Soldering Iron Lead Wire Placing **GCD** Series Solder Resist of Leaded Components after Chip Component in section in section **GCE** Series Solder Resist Lateral Mounting NMF Series

- 2. Land Dimensions
  - 2-1. Please refer to the land dimensions in table 1 for flow soldering, table 2 for reflow soldering. Please confirm the suitable land dimension by evaluating of the actual SET / PCB.



#### Table 1 Flow Soldering Method

Series	Chip Dimension Code (L/W)	Chip (L $ imes$ W)	a	b	с
GRT/GCM/GC3/GCD/GCJ (Rated Voltage: above 250VDC (for GCJ alone))	18	1.6×0.8	0.6 to 1.0	0.8 to 0.9	0.6 to 0.8
	21	2.0×1.25	1.0 to 1.2	0.9 to 1.0	0.8 to 1.1
	31	3.2×1.6	2.2 to 2.6	1.0 to 1.1	1.0 to 1.4

Flow soldering can only be used for products with a chip size from 1.6x0.8mm to 3.2x1.6mm.

#### Table 2 Reflow Soldering Method

Series	Chip Dimension Code (L/W)	Chip (L $ imes$ W)	a	b	с
	03	0.6×0.3	0.2 to 0.3	0.2 to 0.35	0.2 to 0.4
	15	1.0×0.5	0.3 to 0.5	0.35 to 0.45	0.4 to 0.6
	18	1.6×0.8	0.6 to 0.8	0.6 to 0.7	0.6 to 0.8
GRT/GCM/GC3/ GCD/GCE/GCJ	21	2.0×1.25	1.0 to 1.2	0.6 to 0.7	0.8 to 1.1
	31	3.2×1.6	2.2 to 2.4	0.8 to 0.9	1.0 to 1.4
	32	3.2×2.5	2.0 to 2.4	1.0 to 1.2	1.8 to 2.3
	43	4.5×3.2	3.0 to 3.5	1.2 to 1.4	2.3 to 3.0
	55	5.7×5.0	4.0 to 4.6	1.4 to 1.6	3.5 to 4.8

KCM Series

KC3 Series

KCA Series

**GCG** Series

(in mm)

(in mm)

Continued on the following page. earrow



# Notice

**GRT** Series

**GCM** Series

Continued from the preceding page.  $\searrow$ 

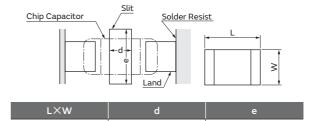
# <Applicable to Part Number KCM/KC3/KCA>

Series	Chip Dimension Code (L/W)	Chip (L $ imes$ W)	a	b	с
КСМ/КСЗ	55	5.7×5.0	2.6	2.7	5.6
КСА	55	5.7×5.0	3.2	2.7	5.6

(in mm)

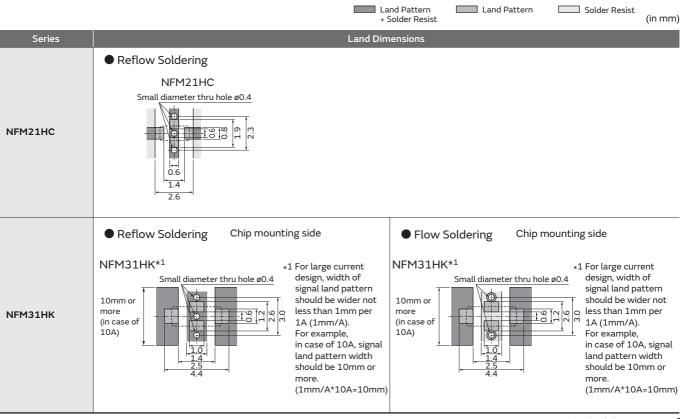
# <Applicable to beyond Rated Voltage of 200VDC>

- 2-2. Dimensions of Slit (Example)
  - Preparing the slit helps flux cleaning and resin coating on the back of the capacitor.
  - However, the length of the slit design should be as short as possible to prevent mechanical damage in the capacitor.
  - A longer slit design might receive more severe mechanical stress from the PCB.
  - Recommended slit design is shown in the Table.



1.6×0.8	-	-
2.0×1.25	-	-
3.2×1.6	1.0 to 2.0	3.2 to 3.7
3.2×2.5	1.0 to 2.0	4.1 to 4.6
4.5×2.0	1.0 to 2.8	3.6 to 4.1
4.5×3.2	1.0 to 2.8	4.8 to 5.3
5.7×2.8	1.0 to 4.0	4.4 to 4.9
5.7×5.0	1.0 to 4.0	6.6 to 7.1
		(in mm)

# <Applicable to NFM Series>



Continued on the following page.  $earrow \earrow \ea$ 

**GRT** Series

**GCM** Series

Series

gC3

**GCJ** Series

**GCD** Series

**GCE** Series

NMF Series

KCM Series

Notice

#### Continued from the preceding page. $\searrow$

#### 3. Board Design

When designing the board, keep in mind that the amount of strain which occurs will increase depending on the size and material of the board.

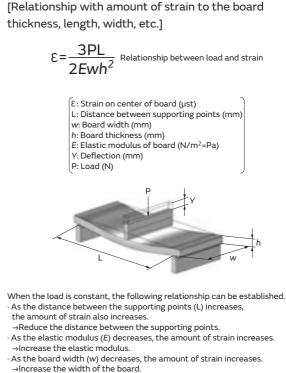
#### 2. Adhesive Application

If you want to temporarily attach the capacitor to the board using an adhesive agent before soldering the capacitor, first be sure that the conditions are appropriate for affixing the capacitor. If the dimensions of the land, the type of adhesive, the amount of coating, the contact surface area, the curing temperature, or other conditions are inappropriate, the characteristics of the capacitor may deteriorate.

#### 1. Selection of Adhesive

- 1-1. Depending on the type of adhesive, there may be a decrease in insulation resistance. In addition, there is a chance that the capacitor might crack from contractile stress due to the difference in the contraction rate of the capacitor and the adhesive.
- 1-2. If there is not enough adhesive, the contact surface area is too small, or the curing temperature or curing time are inadequate, the adhesive strength will be insufficient and the capacitor may loosen or become disconnected during transportation or soldering.
  If there is too much adhesive, for example if it overflows onto the land, the result could be soldering defects, loss of electrical connection, insufficient curing, or slippage after the capacitor is mounted.

Furthermore, if the curing temperature is too high or the curing time is too long, not only will the adhesive



 $\cdot$  As the board thickness (h) decreases, the amount of strain increases.  $\rightarrow$  Increase the thickness of the board.

Since the board thickness is squared, the effect on the amount of strain becomes even greater.

strength be reduced, but solderability may also suffer due to the effects of oxidation on the terminations (outer electrodes) of the capacitor and the land surface on the board.

(1) Selection of Adhesive

Epoxy resins are a typical class of adhesive. To select the proper adhesive, consider the following points.

- There must be enough adhesive strength to prevent the component from loosening or slipping during the mounting process.
- 2) The adhesive strength must not decrease when exposed to moisture during soldering.
- 3) The adhesive must have good coatability and shape retention properties.
- 4) The adhesive must have a long pot life.
- 5) The curing time must be short.
- 6) The adhesive must not be corrosive to the exterior of the capacitor or the board.
- 7) The adhesive must have good insulation properties.
- 8) The adhesive must not emit toxic gases or otherwise be harmful to health.
- 9) The adhesive must be free of halogenated compounds.

Notice



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# Notice

**GRT** Series

**GCM** Series

GC3 Series

**GCJ** Series

**GCD** Series

**GCE** Series

NMF Series

**KCM** Series

KC3 Series

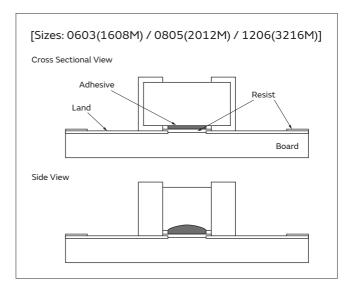
**KCA** Series

GCG Series

Notice

Continued from the preceding page.  $\searrow$ 

(2) Use the following illustration as a guide to the amount of adhesive to apply.



# 3. Adhesive Curing

 Insufficient curing of the adhesive can cause chips to disconnect during flow soldering and causes deterioration in the insulation resistance between the terminations due to moisture absorption.

Control curing temperature and time in order to prevent insufficient hardening.

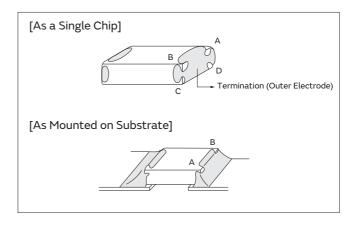
# 4. Flux for Flow Soldering

- 1. An excessive amount of flux generates a large quantity of flux gas, which can cause a deterioration of solderability, so apply flux thinly and evenly throughout. (A foaming system is generally used for flow soldering.)
- 2. Flux containing too high a percentage of halide may cause corrosion of the terminations unless there is sufficient cleaning. Use flux with a halide content of 0.1% max.
- 3. Do not use strong acidic flux.

# 5. Flow Soldering

 Set temperature and time to ensure that leaching of the termination does not exceed 25% of the chip end area as a single chip (full length of the edge A-B-C-D shown at right) and 25% of the length A-B shown as mounted on substrate. 4. Do not use water-soluble flux.\*

(\*Water-soluble flux can be defined as non-rosin type flux including wash-type flux and non-wash-type flux.)



# 6. Reflow Soldering

The halogen system substance and organic acid are included in solder paste, and a chip corrodes by this kind of solder paste.

Do not use strong acid flux.

Do not use water-soluble flux\*.

(\*Water-soluble flux can be defined as non-rosin type flux including wash-type flux and non-wash-type flux.)

Continued on the following page. earrow



**GRT** Series

**GCM** Series

GC3 Series

**GCJ** Series

**GCD** Series

**GCE** Series

NMF Series

KCM Series

KC3 Series

**KCA** Series

**GCG** Series

Notice

# Continued from the preceding page.

# 7. Washing

- 1. Please evaluate the capacitor using actual cleaning equipment and conditions to confirm the quality, and select the solvent for cleaning.
- 2. Unsuitable cleaning solvent may leave residual flux or other foreign substances, causing deterioration of electrical characteristics and the reliability of the capacitors.

# 8. Coating

1. A crack may be caused in the capacitor due to the stress of the thermal contraction of the resin during curing process.

The stress is affected by the amount of resin and curing contraction.

Select a resin with low curing contraction.

The difference in the thermal expansion coefficient between a coating resin or a molding resin and the capacitor may cause the destruction and deterioration of the capacitor such as a crack or peeling, and lead to the deterioration of insulation resistance or dielectric breakdown.

- 3. Select the proper cleaning conditions.
  - 3-1. Improper cleaning conditions (excessive or insufficient) may result in deterioration of the performance of the capacitors.
  - Select a resin for which the thermal expansion coefficient is as close to that of the capacitor as possible.

A silicone resin can be used as an under-coating to buffer against the stress.

2. Select a resin that is less hygroscopic.

Using hygroscopic resins under high humidity conditions may cause the deterioration of the insulation resistance of a capacitor.

An epoxy resin can be used as a less hygroscopic resin.

3. The halogen system substance and organic acid are included in coating material, and a chip corrodes by the kind of Coating material. Do not use strong acid type.

# Other

# 1. Transportation

- 1. The performance of a capacitor may be affected by the conditions during transportation.
  - 1-1. The capacitors shall be protected against excessive temperature, humidity, and mechanical force during transportation.
    - (1) Climatic condition
      - low air temperature: -40°C
      - change of temperature air/air: -25°C/+25°C
      - low air pressure: 30 kPa
      - change of air pressure: 6 kPa/min.
    - (2) Mechanical condition

Transportation shall be done in such a way that the boxes are not deformed and forces are not directly passed on to the inner packaging.

- 1-2. Do not apply excessive vibration, shock, or pressure to the capacitor.
  - (1) When excessive mechanical shock or pressure is applied to a capacitor, chipping or cracking may occur in the ceramic body of the capacitor.
  - (2) When the sharp edge of an air driver, a soldering iron, tweezers, a chassis, etc. impacts strongly on the surface of the capacitor, the capacitor may crack and short-circuit.
- 1-3. Do not use a capacitor to which excessive shock was applied by dropping, etc.

A capacitor dropped accidentally during processing may be damaged.

- 2. Characteristics Evaluation in the Actual System
- 1. Evaluate the capacitor in the actual system, to confirm that there is no problem with the performance and specification values in a finished product before using.
- 2. Since a voltage dependency and temperature dependency exists in the capacitance of high dielectric type ceramic capacitors, the capacitance may change depending on the operating conditions in the actual system. Therefore, be sure to evaluate the various characteristics, such as the leakage current and noise absorptivity, which will affect the capacitance value of the capacitor.
- 3. In addition, voltages exceeding the predetermined surge may be applied to the capacitor by the inductance in the actual system. Evaluate the surge resistance in the actual system as required.

# <Applicable to NFM Series>

4. The effects of noise suppression can vary depending on the usage conditions, including differences in the circuit or IC to be used, the type of noise, the shape of the pattern to be mounted, and the mounting location. Be sure to verify the effect on the actual device in advance.

# MEMO

# Design Support Tool "SimSurfing"

http://www.murata.com/simsurfing/

# This is the latest tool to get the electrical characteristics for Capacitors, Inductors, and EMI Suppression Filters, and to simulate Thermistors' behavior !



#### Characteristics viewer

You can easily search and download the following data for Multilayer Ceramic Capacitors, Polymer Capacitors, EMI Suppression Filters (Three-terminal Capacitors, Ferrite Beads) and Power/RF Inductors.

#### Components performance simulator

You can search by the simulation on simple circuits for Thermistors.

#### Selection tool

You can select Medium voltage Capacitors and Power Inductors according to conditions of use.

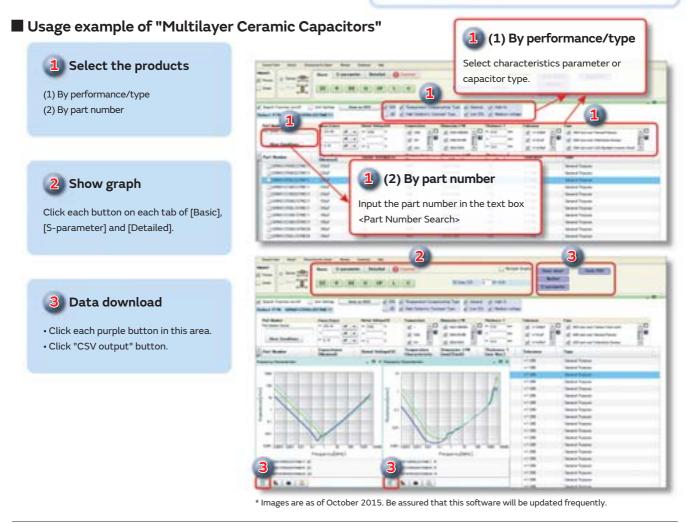
\* Medium voltage: Rated Voltage 250V and over

#### Search tool

You can search the Murata timing device (CERALOCK<sup>®</sup> and crystal units) that is most suitable for your IC and access information about the recommended circuit constant setting.

If you register as a "my Murata" user

(https://my.murata.com/en/web/mymurata/), you can use Enhanced SimSurfing.



# http://www.murata.com/simsurfing/

# Web page Introduction

muRata Product Search



# Search by Part Number

#### (1) http://psearch.en.murata.com/capacitor/partnumber/



You can search for capacitors by specifying the alphanumeric characters in the part number. The packing codes shown contain the substitute character "#". If you enter the official packing code, part numbers that contain that packing code will be matched.

# Search by Specifications http://psearch.en.murata.com/capacitor/spec/smd/ 2

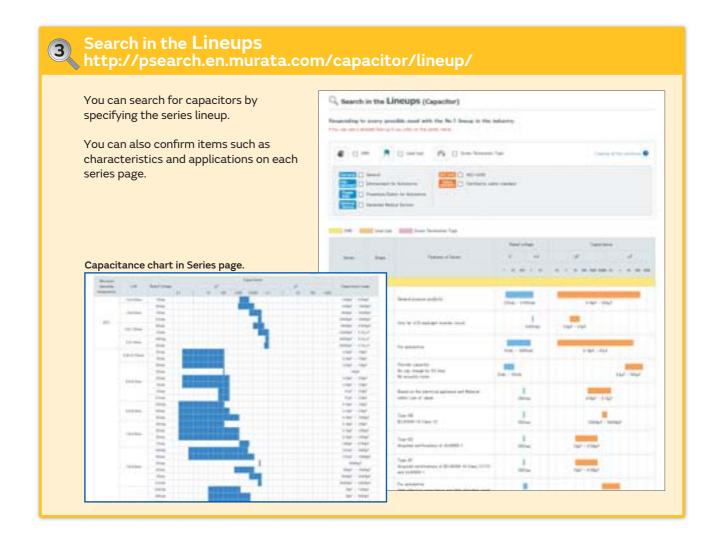
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You can search for SMD, lead type, or screw termination type capacitors by indicating specifications such as application, capacitance, rated voltage, or temperature characteristics.

You can narrow your search by entering values of ranges, and by specifying product characteristics.

The items for narrowing searches are linked, so specifying one condition causes selectable options for the other items to allow input only of conditions that match the relevant part numbers.

C03E.pdf Jun 22,2017



# [Search result]

	C	ompai	es t	he charact	terist	ics of	the	check	ed 🔽	part	numbers.	/	Displays the number of hits for the current search conditions in real time
9 4 E.				MD (Capacitor)	-	antan A	7348-			iner 1			Clicking on each search condition button brings up a menu, allowing yo to narrow the search results to matc the selected condition in real time.
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					10 TTELES 11 TTELES	tillan 100m			-	-			Click a product name to display a details page listing more in-depth information (→ P22).
	1		-		11 110se	i.	ine.		1	-			You can download detailed spec sheets.
		1000			14. +100ee	1100				-	14	$\vdash$	Icons enable you to check the status

# **Global Locations**

For details please visit www.murata.com



#### 1 Export Control

#### For customers outside Japan:

No Murata products should be used or sold, through any channels, for use in the design, development, production, utilization, maintenance or operation of, or otherwise contribution to (1) any weapons (Weapons of Mass Destruction [nuclear, chemical or biological weapons or missiles] or conventional weapons) or (2) goods or systems specially designed or intended for military end-use or utilization by military end-users.

#### For customers in Japan:

For products which are controlled items subject to the "Foreign Exchange and Foreign Trade Law" of Japan, the export license specified by the law is required for export. Please contact our sales representatives or product engineers before using the products in this catalog for the applications listed below, which require especially high reliability for the prevention of defects which might directly damage a third party's life, body or property, or when one of our products is intended for use in applications other than those specified in this catalog.

- (1) Aircraft equipment
- Aerospace equipment
- ③ Undersea equipment
- ④ Power plant equipment
- (5) Medical equipment
- Transportation equipment (vehicles, trains, ships, etc.)
- Traffic signal equipment
- B Disaster prevention / crime prevention equipment
- (9) Data-processing equipment
- Application of similar complexity and/or reliability requirements to the applications listed above

Product specifications in this catalog are as of May 2017. They are subject to change or our products in it may be discontinued without advance notice. Please check with our sales representatives or product engineers before ordering. If there are any questions, please contact our sales representatives or product engineers.

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- 7 No ozone depleting substances (ODS) under the Montreal Protocol are used in our manufacturing process.

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