

Chip Multilayer Ceramic Capacitors for Automotive



2017

Explanation of Symbols in This Catalog



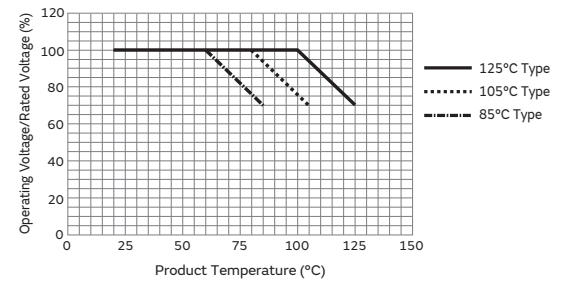
Links are provided to the latest information from the PDF version of the catalog, which is available on the web.

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.
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.
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.
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.
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.
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.
Effective Cap	No DC bias characteristics Polymer capacitor is no capacitance change with DC bias due to aluminum oxidized film for dielectric.
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 capacitor can be mounted by conductive adhesive.

Derating 1
 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.

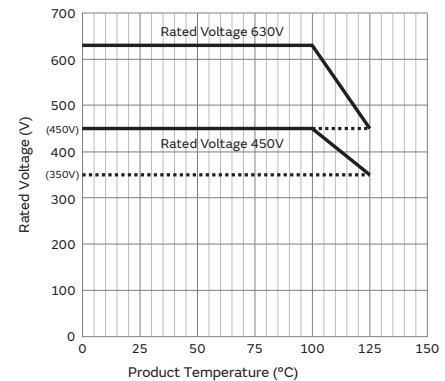
D1
 Derating 1

Recommended Conditions of the Derating Operating Voltage and Temperature



Derating 2
 When the product temperature exceeds 105°C, please use this product within the voltage and temperature derated conditions in the figure below.

D2
 Derating 2

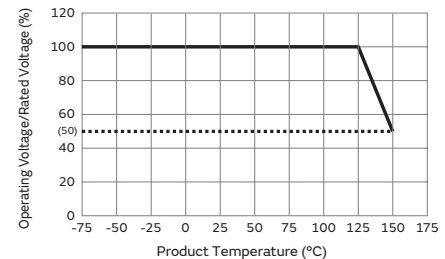


Derating 3
 Please apply the derating curve according to the operating temperature.
 Please refer to detailed specifications sheet for details.

D3
 Derating 3

Derating 4
 When the product temperature exceeds 125°C, please use this product within the voltage and temperature derated conditions in the figure below.

D4
 Derating 4



Derating 5
 Please apply the rated voltage derating over 150°C. Please refer to detailed specifications sheet for details.

D5
 Derating 5

Selection Guide for Capacitors

Infotainment for automotive

SMD

Solder mounting

Chip type

	GRT		P23
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Powertrain/Safety for automotive

SMD

Solder mounting

Chip type

	GCM		P29
	GC3	Anti-noise	High effective capacitance & high ripple current P37
	GCJ	Fail safe	Soft termination P39
	GGM	Water Resistant	WEB
	GCQ	High Q	WEB
	GCD	Fail safe	MLSC design P45
	GCE	Fail safe	Soft termination MLSC design P47
	GGD	Fail safe	MLSC design WEB
	NFM	Low ESL	3 terminals P49

Metal terminal type

	KCM	Anti-noise	Deflecting crack	Soldering crack	P51	
	KC3	Anti-noise	Deflecting crack	Soldering crack	High effective capacitance & high ripple current P54	
	KCA	Safety standard	Anti-noise	Deflecting crack	Soldering crack	P57

Limited to Conductive Glue Mounting

Chip type

	GCB	Deflecting crack	Soldering crack	Ni plating + Pd plating termination conductive glue mounting	WEB
	GCG	Deflecting crack	Soldering crack	AgPd termination conductive glue mounting	P60

Lead type

Solder mounting

	RCE	Anti-noise	Deflecting crack	Soldering crack	WEB
	RHE	Anti-noise	Deflecting crack	Soldering crack	150°C operation leaded WEB
	RHS	Anti-noise	Deflecting crack	Soldering crack	200°C operation leaded WEB
	DE6	Safety standard			WEB

Medical-grade products for implanted medical devices

SMD

Solder mounting

Chip type

	GCH		WEB
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For general

General SMD

Solder mounting

Chip type

	GRM		WEB
	GRM		For LCD backlight inverter circuit only WEB
	GR3	Anti-noise	High effective capacitance & high ripple current WEB
	GRJ	Deflecting crack	Soft termination WEB
	GXM	Water Resistant	WEB
	GR4		For information devices only WEB
	GR7		For camera flash circuit only WEB
	GJM	High Q	WEB
	GQM	High Q	High power WEB
	GA2		Based on the Electrical Appliance and Material Safety Law of Japan WEB
	GA3	Safety standard	WEB
	LLL	Low ESL	LW reversed WEB
	LLA	Low ESL	8 terminals WEB
	LLM	Low ESL	10 terminals WEB
	LLR	Low ESL	LW reversed controlled ESR WEB
	NFM	Low ESL	3 terminals WEB
	GJ4	Anti-noise	Low distortion WEB
	GJ8	Anti-noise	Low acoustic noise WEB

On interposer board

	ZRA	Anti-noise	WEB
	ZRB	Anti-noise	WEB

Metal terminal type

	KRM	Anti-noise	Deflecting crack	Soldering crack	WEB
	KR3	Anti-noise	Deflecting crack	Soldering crack	High effective capacitance & high ripple current WEB

Resin molding SMD type

	DK1	Safety standard	WEB
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Wire bonding mounting

Chip type

	GMA		Microchip WEB
	GMD		WEB

Lead type

Solder mounting

	RDE	Anti-noise	Deflecting crack	Soldering crack	WEB
	DEH				High temperature low loss WEB
	DEA				High temperature Class 1 WEB
	DEB				Class 2 WEB
	DEC				WEB
	DEF				For LCD backlight inverter circuit only WEB
	DHR	Ultra-high-voltage	Deflecting crack	Soldering crack	WEB
	DEJ				Based on the Electrical Appliance and Material Safety Law of Japan WEB
	DE1	Safety standard			X1/Y1 Class certified product WEB
	DE2	Safety standard			X1/Y2 Class certified product WEB

Screw termination mounting

	DHS	Ultra-high-voltage			WEB
	DHK	Ultra-high-voltage			High voltage AC rated WEB

● Part Numbering

Chip Multilayer Ceramic Capacitors for Automotive



(Part Number)



① Product ID

② Series

Product ID	Code	Series
GC	3	High effective capacitance & High allowable ripple current
	D	Specially designed product to reduce shorts
	E	Specially designed product to reduce shorts & resin electrode product
	G	Limited to conductive glue mounting
	J	Soft termination type
	M	For automotive
GR	T	Meet AEC-Q200 for infotainment
KC	3	Metal terminal type/High effective capacitance & High allowable ripple current
	A	Metel terminal type/ Safety standard certified product
	M	Metal terminal type

③ 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

⑤ Temperature Characteristics

Temperature Characteristic Codes			Temperature Characteristics			Operating Temperature Range	Capacitance Change Each Temperature (%)					
Code	Public STD Code	Reference Temperature	Temperature Range	Capacitance Change or Temperature Coefficient	-55°C		*4		-10°C			
					Max.		Min.	Max.	Min.	Max.	Min.	
5C	C0G	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
9E	ZLM	*2	20°C	-55 to -40°C	-4700+1000/-2500ppm/°C	-55 to 125°C	-	-	-	-	-	-
				-40 to 20°C	-5350±750ppm/°C		-	-	-	-	-	
				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	X7T	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)

④ Height Dimension (T) (Except KC□)

Code	Dimension (T)
3	0.3mm
5	0.5mm
6	0.6mm
8	0.8mm
9	0.85mm
A	1.0mm
B	1.25mm
C	1.6mm
D	2.0mm
E	2.5mm
M	1.15mm
Q	1.5mm
X	Depends on individual standards.

④ Height Dimension (T) (KC□ Only)

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

Continued on the following page. ↗

(Part Number)

GC	M	18	8	R7	1H	102	K	A37	D
1	2	3	4	5	6	7	8	9	10

Continued from the preceding page. ↘

⑥ Rated Voltage

Code		Rated Voltage
Standard Product	Voltage Derated Product	
0E	-	DC2.5V
0G	-	DC4V
0J	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
3A	-	DC1kV
MF	-	X1/Y2: AC250V (Safety Standard Certified Type MF)

⑦ 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 "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

⑧ Capacitance Tolerance

Code	Capacitance Tolerance
C	±0.25pF
D	±0.5pF (Less than 10pF)
	±0.5% (10pF and over)
J	±5%
K	±10%
M	±20%

⑨ Individual Specification Code

Expressed by three figures.

⑩ Package

Code	Package
L	ø180mm Embossed Taping
D/W	ø180mm Paper Taping
K	ø330mm Embossed Taping
J	ø330mm Paper Taping

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

3 Terminal Low ESL Multilayer Ceramic Capacitors



(Part Number)

NF	M	3D	CC	102	R	1H	3	L
1	2	3	4	5	6	7	8	9

1 Product ID 2 Series

Product ID	Series
NFM	3 Terminal Low ESL Type

3 Dimensions (LxW)

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

4 Features

Code	Features	
HC	Powertrain/Safety for Automotive	For Signal Lines / For Large Current
HK		For Very Large Current

5 Capacitance

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.

6 Characteristics

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

7 Rated Voltage

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

8 Electrode

Code	Electrode
3	Sn Plating

9 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.

AEC-Q200 Compliant Chip Multilayer Ceramic Capacitors for Infotainment

GRT Series



Capacitor meet AEC-Q200 (Grade2 or Grade3).

Features

① This product has cleared test conditions meet AEC-Q200.

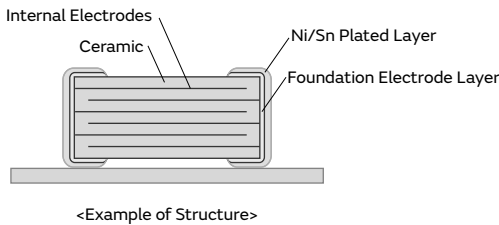
This series is designed for use in Car Multimedia, Car Interior, Car Comfort application and General Electronic equipment. It is not appropriate for use in applications critical to passenger safety and car driving function (e.g. ABS, AIRBAG, etc.). Please use the GCM series is in critical applications.

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

② Meet AEC-Q200 (Grade2 or Grade3).

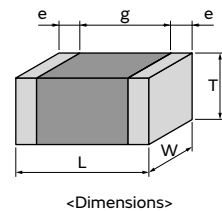
105°C product: Grade2.
 85°C product: Grade3.

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



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



GRT Series

GCM Series

GC3 Series

GCJ Series

GCD Series

GCE Series

NMF Series

KCM Series

KC3 Series

KCA Series

GCG Series

⚠Caution / Notice

23

GRT Series

GCM Series

GC3 Series

G CJ Series

GCD Series

GCE Series

NMF Series

KCM Series

KC3 Series

KCA Series

GCG Series

⚠Caution/
 Notice

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	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	GRT1555C2A9R0DA02#
			10pF	±5%	GRT1555C2A100JA02#
			12pF	±5%	GRT1555C2A120JA02#
			15pF	±5%	GRT1555C2A150JA02#
			18pF	±5%	GRT1555C2A180JA02#
			22pF	±5%	GRT1555C2A220JA02#
			27pF	±5%	GRT1555C2A270JA02#
			33pF	±5%	GRT1555C2A330JA02#
			39pF	±5%	GRT1555C2A390JA02#
			47pF	±5%	GRT1555C2A470JA02#
			56pF	±5%	GRT1555C2A560JA02#
			68pF	±5%	GRT1555C2A680JA02#
			82pF	±5%	GRT1555C2A820JA02#
	100pF	±5%	GRT1555C2A101JA02#		
	50Vdc	COG	1.0pF	±0.25pF	GRT1555C1H1R0CA02#
			2.0pF	±0.25pF	GRT1555C1H2R0CA02#
			3.0pF	±0.25pF	GRT1555C1H3R0CA02#
			4.0pF	±0.25pF	GRT1555C1H4R0CA02#
			5.0pF	±0.25pF	GRT1555C1H5R0CA02#
			6.0pF	±0.5pF	GRT1555C1H6R0DA02#
			7.0pF	±0.5pF	GRT1555C1H7R0DA02#
			8.0pF	±0.5pF	GRT1555C1H8R0DA02#
			9.0pF	±0.5pF	GRT1555C1H9R0DA02#
			10pF	±5%	GRT1555C1H100JA02#
			12pF	±5%	GRT1555C1H120JA02#
			15pF	±5%	GRT1555C1H150JA02#
			18pF	±5%	GRT1555C1H180JA02#
			22pF	±5%	GRT1555C1H220JA02#
			27pF	±5%	GRT1555C1H270JA02#
			33pF	±5%	GRT1555C1H330JA02#
			39pF	±5%	GRT1555C1H390JA02#
			47pF	±5%	GRT1555C1H470JA02#
			56pF	±5%	GRT1555C1H560JA02#
			68pF	±5%	GRT1555C1H680JA02#
82pF			±5%	GRT1555C1H820JA02#	
100pF	±5%	GRT1555C1H101JA02#			
120pF	±5%	GRT1555C1H121JA02#			
150pF	±5%	GRT1555C1H151JA02#			
180pF	±5%	GRT1555C1H181JA02#			
220pF	±5%	GRT1555C1H221JA02#			
270pF	±5%	GRT1555C1H271JA02#			
330pF	±5%	GRT1555C1H331JA02#			
390pF	±5%	GRT1555C1H391JA02#			
470pF	±5%	GRT1555C1H471JA02#			

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	±5%	GRT1555C1E820JA02#
			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#	
560pF			±5%	GRT1555C1E561JA02#	
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.

GRT Series Temperature Compensating Type Info-tainment AEC-Q200 Part Number List

(→ 1.6×0.8mm)

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	±0.5pF	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		
0.9mm	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	TC Code	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#		
			0.12μF	±5%	GRT31C5C1E124JA02#		
	25Vdc	COG	0.10μF	±5%	GRT31C5C1E104JA02#		
			0.12μF	±5%	GRT31C5C1E124JA02#		
			16Vdc	COG	0.12μF	±5%	GRT31C5C1C124JA02#

Part number # indicates the package specification code.

GRT Series
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 GCE Series
 NMF Series
 KCM Series
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GRT Series High Dielectric Constant Type Part Number List

0.6×0.3mm

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	±10%	GRT033R60J683KE01#		
			0.10μF	±10%	GRT033R60J104KE01#			
			0.22μF	±10%	GRT033R60J224KE01#	D1		
				0.47μF	±10%	GRT033R60J474KE01#		
				0.22μF	±20%	GRT033C80G224ME01#	D1	
0.35mm	6.3Vdc	X5R	1.0μF	±20%	GRT033R60J105ME13#			
	4Vdc	X5R	1.0μF	±20%	GRT033R60G105ME13#			

1.0×0.5mm

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#				
			10000pF	±10%	GRT155R71H103KE01#				
			22000pF	±10%	GRT155R71H223KE01#				
			47000pF	±10%	GRT155R71H473KE01#				
			0.10μF	±10%	GRT155R71H104KE01#				
			35Vdc	X6S	0.22μF	±10%	GRT155C8YA224KE01#	D1	
				X5R		0.22μF	±10%	GRT155R6YA224KE01#	D1
						0.47μF	±10%	GRT155R6YA474KE01#	D1
			25Vdc	X7R		10000pF	±10%	GRT155R71E103KE01#	
		22000pF			±10%	GRT155R71E223KE01#			
		47000pF			±10%	GRT155R71E473KE01#			
		0.10μF			±10%	GRT155R71E104KE01#			
	X6S	0.22μF		±10%	GRT155C81E224KE01#				
	X5R			0.22μF	±10%	GRT155R61E224KE01#			
				0.47μF	±10%	GRT155R61E474KE01#			
				1.0μF	±10%	GRT155R61E105KE01#	D1		
	16Vdc	X7R		10000pF	±10%	GRT155R71C103KE01#			
				22000pF	±10%	GRT155R71C223KE01#			
				47000pF	±10%	GRT155R71C473KE01#			
				0.10μF	±10%	GRT155R71C104KE01#			
				0.22μF	±10%	GRT155R71C224KE01#			
				0.47μF	±10%	GRT155C81C474KE01#			
		X6S	0.47μF	±10%	GRT155C81C474KE01#				
		X5R		0.22μF	±10%	GRT155R61C224KE01#			
				0.47μF	±10%	GRT155R61C474KE01#			
				1.0μF	±10%	GRT155R61C105KE01#			
	10Vdc	X7R		0.22μF	±10%	GRT155R71A224KE01#			
				0.47μF	±10%	GRT155R71A474KE01#			
			X6S	1.0μF	±10%	GRT155C81A105KE01#			
			X5R		0.22μF	±10%	GRT155R61A224KE01#		
				0.47μF	±10%	GRT155R61A474KE01#			
				1.0μF	±10%	GRT155R61A105KE01#			
				2.2μF	±10%	GRT155R61A225KE01#	D1		
		6.3Vdc	X7R		22000pF	±10%	GRT155R70J223KE01#		
				1.0μF	±10%	GRT155R70J105KE01#	D1		
	X6S			0.22μF	±10%	GRT155C80J224KE01#			
				0.47μF	±10%	GRT155C80J474KE01#			
				1.0μF	±10%	GRT155C80J105KE01#	D1		
			2.2μF	±10%	GRT155C80J225KE01#	D1			
X5R				0.22μF	±10%	GRT155R60J224KE01#			
				0.47μF	±10%	GRT155R60J474KE01#			
		1.0μF	±10%	GRT155R60J105KE01#					
		2.2μF	±10%	GRT155R60J225KE01#					
4Vdc	X7R	1.0μF	±10%	GRT155R70G105KE01#					
0.6mm	35Vdc	X5R	1.0μF	±10%	GRT155R6YA105KE13#	D1			
	25Vdc	X6S	1.0μF	±10%	GRT155C81E105KE13#	D1			
	16Vdc	X6S	1.0μF	±10%	GRT155C81C105KE13#				
	10Vdc	X7S	1.0μF	±10%	GRT155C71A105KE13#				
	6.3Vdc	X5R	4.7μF	±20%	GRT155R60J475ME13#	D1			

Part number # indicates the package specification code.

GRT Series High Dielectric Constant Type Info-tainment AEC-Q200 Part Number List

(→ 1.0×0.5mm)

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#	
		X6S	1.0µF	±10%	GRT188C8YA105KE13#	
			X5R	1.0µF	±10%	GRT188R6YA105KE13#
	25Vdc	X7R	1.0µF	±10%	GRT188R71E105KE13#	
			X6S	1.0µF	±10%	GRT188C81E105KE13#
		X5R	1.0µF	±10%	GRT188R61E105KE13#	
	16Vdc	X7R	1.0µF	±10%	GRT188R71C105KE13#	
			X6S	1.0µF	±10%	GRT188C81C105KE13#
		X5R	1.0µF	±10%	GRT188R61C105KE13#	
			2.2µF	±10%	GRT188R61C225KE13#	D1
			10µF	±20%	GRT188R60J106ME13#	D1
	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#		
	X5R	10µF	±20%	GRT188C80G106ME13#	D1	
0.95mm	25Vdc	X5R	4.7µF	±10%	GRT188R61E475KE13#	
		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#	
		X6S	2.2µF	±10%	GRT188C8YA225KE13#	
	35Vdc	X5R	4.7µF	±10%	GRT188R6YA475KE13#	
		X6S	2.2µF	±10%	GRT188C81E225KE13#	
	25Vdc	X6S	2.2µF	±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	TC Code	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#		
			X6S	2.2µF	±10%	GRT21BC81E225KA02#	
		X5R	4.7µF	±10%	GRT21BC81E475KA02#		
			2.2µF	±10%	GRT21BR61E225KA02#		
	16Vdc	X7R	2.2µF	±10%	GRT21BR71C225KE01#		
			X6S	2.2µF	±10%	GRT21BC81C225KA02#	
			X5R	2.2µF	±10%	GRT21BR61C225KA02#	
		X6S	4.7µF	±10%	GRT21BC81C475KA02#		
			10µF	±10%	GRT21BC81C106KE01#	D1	
			X5R	2.2µF	±10%	GRT21BR61C225KA02#	
	10Vdc	X6S	10µF	±10%	GRT21BC81A106KE01#		
			X5R	10µF	±10%	GRT21BR61A106KE01#	
X5R		4.7µF	±10%	GRT21BR61C475KA02#			
		10µF	±10%	GRT21BR61C106KE01#			
1.4mm	50Vdc	X5R	2.2µF	±10%	GRT21BR61H225KE13#		
			X6S	2.2µF	±10%	GRT21BC8YA225KE13#	
		X5R	4.7µF	±10%	GRT21BC8YA475KE13#		
	35Vdc	X6S	2.2µF	±10%	GRT21BC81E225KE13#		
			4.7µF	±10%	GRT21BC81E475KE13#		
	25Vdc	X7R	2.2µF	±10%	GRT21BR71E225KE13#		
			X5R	10µF	±10%	GRT21BR61E106KE13#	
	16Vdc	X7R	4.7µF	±10%	GRT21BR71C475KE13#		
			X6S	4.7µF	±10%	GRT21BC81C475KE13#	
	10Vdc	X7R	4.7µF	±10%	GRT21BR71A475KE13#		
			X6S	4.7µF	±10%	GRT21BC81A475KE13#	
		X5R	4.7µF	±10%	GRT21BR61A475KE13#		
6.3Vdc	X7R	10µF	±10%	GRT21BR70J106KE13#			
		X5R	4.7µF	±10%	GRT21BR60J475KE13#		
	X5R	22µF	±20%	GRT21BR61A226ME13#	D1		
		22µF	±20%	GRT21BR60J226ME13#			
1.45mm	25Vdc	X7S	10µF	±10%	GRT21BC71E106KE13#	D1	
			X5R	22µF	±20%	GRT21BR61E226ME13#	
	16Vdc	X5R	22µF	±20%	GRT21BR61C226ME13#		
			X6S	22µF	±20%	GRT21BC81A226ME13#	
	10Vdc	X6S	22µF	±20%	GRT21BC81A226ME13#		
			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.

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⚠Caution / Notice

GRT Series

GCM Series

GC3 Series

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KCA Series

GCG Series

⚠Caution/
 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#	
		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%
	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%
	X5R	100μF	±20%	GRT32ER60J107ME13#	

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