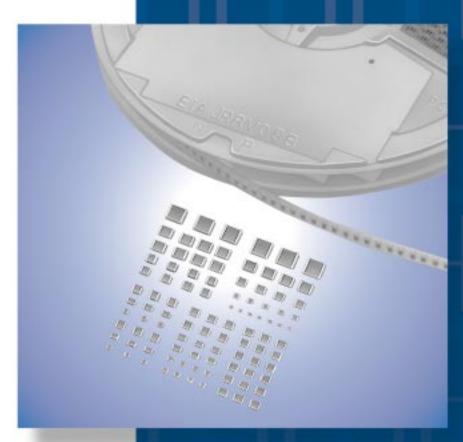
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Chip Monolithic Ceramic Capacitors





Innovator in Electronics

Murata Manufacturing Co., Ltd.

Cat.No.C02E-16

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Chip Monolithic Ceramic Capacitors

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for EU RoHS Compliant

- \cdot All the products in this catalog comply with EU RoHS.
- EU RoHS is "the European Directive 2002/95/EC on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment".
- For more details, please refer to our website 'Murata's Approach for EU RoHS' (http://www.murata.com/info/rohs.html).

Product Information

Only for Applications

AC250V Type GA2 Series

Chip Monolithic Ceramic Capacitors (Medium Voltage)

For General Purpose GRM/GRJ Series

1

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Part Numbering Chip Monolithic Ceramic Capacitors GR M 18 8 B1 1H 102 K A01 D (Part Number) Ð 0 6 4 6 6 Ø 8 9 D Product ID 2 Series Product ID Code Series J Soft Termination Type Μ Tin Plated Layer GR 4 Only for Information Devices / Tip & Ring 7 Only for Camera Flash Circuit High Frequency for М GQ Flow/Reflow Soldering Α Monolithic Microchip GM D For Bonding GN Μ Capacitor Array L Low ESL Type R Controlled ESR Low ESL Type LL Α 8-termination Low ESL Type М 10-termination Low ESL Type GJ Μ High Frequency Low Loss Type 2 For AC250V (r.m.s.) GA 3 Safety Standard Certified Type

Object Stress (LXW)

Code	Dimensions (L×W)	EIA
02	0.4×0.2mm	01005
03	0.6×0.3mm	0201
05	0.5×0.5mm	0202
08	0.8×0.8mm	0303
0D	0.38×0.38mm	015015
OM	0.9×0.6mm	0302
15	1.0×0.5mm	0402
18	1.6×0.8mm	0603
1M	1.37×1.0mm	0504
21	2.0×1.25mm	0805
22	2.8×2.8mm	1111
31	3.2×1.6mm	1206
32	3.2×2.5mm	1210
42	4.5×2.0mm	1808
43	4.5×3.2mm	1812
52	5.7×2.8mm	2211
55	5.7×5.0mm	2220

④Dimension (T) (Except GNM)

Code	Dimension (T)
2	0.2mm
3	0.3mm
5	0.5mm
6	0.6mm
7	0.7mm
8	0.8mm
9	0.85mm
Α	1.0mm
В	1.25mm
С	1.6mm
D	2.0mm
E	2.5mm
F	3.2mm
М	1.15mm
N	1.35mm
Q	1.5mm
R	1.8mm
S	2.8mm
Х	Depends on individual standards.

Elements (GNM Only)

Code	Elements
2	2-elements
4	4-elements

Continued on the following page.



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Temperatur	e Characteristic	Codes				
Code Public STD Code		ReferenceTemperatureTemperatureRange		Capacitance Change or Temperature Coefficient	Operating Temperature Range	
1X	SL *1	JIS	20°C	20 to 85°C	+350 to -1000ppm/°C	-55 to 125°C
2C	CH *1	JIS	20°C	20 to 125°C	0±60ppm/°C	-55 to 125°C
2P	PH *1	JIS	20°C	20 to 85°C	-150±60ppm/°C	-25 to 85°C
2R	RH *1	JIS	20°C	20 to 85°C	-220±60ppm/°C	-25 to 85°C
2S	SH *1	JIS	20°C	20 to 85°C	-330±60ppm/°C	-25 to 85°C
2T	TH *1	JIS	20°C	20 to 85°C	-470±60ppm/°C	-25 to 85°C
3C	CJ *1	JIS	20°C	20 to 125°C	0±120ppm/°C	-55 to 125°C
3P	PJ *1	JIS	20°C	20 to 85°C	-150±120ppm/°C	-25 to 85°C
3R	RJ *1	JIS	20°C	20 to 85°C	-220±120ppm/°C	-25 to 85°C
3S	SJ *1	JIS	20°C	20 to 85°C	-330±120ppm/°C	-25 to 85°C
3T	TJ *1	JIS	20°C	20 to 85°C	-470±120ppm/°C	-25 to 85°C
3U	UJ *1	JIS	20°C	20 to 85°C	-750±120ppm/°C	-25 to 85°C
4C	CK *1	JIS	20°C	20 to 125°C	0±250ppm/°C	-55 to 125°C
5C	C0G *1	EIA	25°C	25 to 125°C	0±30ppm/°C	-55 to 125°C
5G	X8G *1	EIA	25°C	25 to 150°C	0±30ppm/°C	-55 to 150°C
6C	C0H *1	EIA	25°C	25 to 125°C	0±60ppm/°C	-55 to 125°C
6P	P2H *1	EIA	25°C	25 to 85°C	-150±60ppm/°C	-55 to 125°C
6R	R2H *1	EIA	25°C	25 to 85°C	-220±60ppm/°C	-55 to 125°C
6S	S2H *1	EIA	25°C	25 to 85°C	-330±60ppm/°C	-55 to 125°C
6T	T2H *1	EIA	25°C	25 to 85°C	-470±60ppm/°C	-55 to 125°C
7U	U2J *1	EIA	25°C	°C 25 to 125°C *6 -750±120ppm/°C		-55 to 125°C
B1	B *2	JIS	20°C	-25 to 85°C ±10%		-25 to 85°C
B3	В	JIS	20°C	-25 to 85°C	±10%	-25 to 85°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
D8	X6T	EIA	25°C	-55 to 105°C	+22, -33%	-55 to 105°C
E7	X7U	EIA	25°C	-55 to 125°C	+22, -56%	-55 to 125°C
F1	F *2	JIS	20°C	-25 to 85°C	+30, -80%	-25 to 85°C
F5	Y5V	EIA	25°C	-30 to 85°C	+22, -82%	-30 to 85°C
L8	X8L	*3	25°C	-55 to 150°C	+15, -40%	-55 to 150°C
R1	R *2	JIS	20°C	-55 to 125°C	±15%	-55 to 125°C
R3	R	JIS	20°C			-55 to 125°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
					±10% *4	
WO	-	-	25°C	-55 to 125°C	+22, -33% *5	-55 to 125°C

*1 Please refer to table for Capacitance Change under reference temperature. *2 Capacitance change is specified with 50% rated voltage applied.

*3 Murata Temperature Characteristic Code.

*4 Apply DC350V bias. *5 No DC bias.

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

Continued on the following page. $\boxed{\circlel{A}}$



Continued from the preceding page.

•Capacitance Change from each temperature

JIS Code

	Capacitance Change from 20°C (%)					
Murata Code	–55°C		–25°C		–10°C	
	Max.	Min.	Max.	Min.	Max.	Min.
1X	-	-	-	-	-	-
2C	0.82	-0.45	0.49	-0.27	0.33	-0.18
2P	-	-	1.32	0.41	0.88	0.27
2R	-	-	1.70	0.72	1.13	0.48
2S	-	-	2.30	1.22	1.54	0.81
2T	-	-	3.07	1.85	2.05	1.23
3C	1.37	-0.90	0.82	-0.54	0.55	-0.36
3P	_	-	1.65	0.14	1.10	0.09
3R	_	-	2.03	0.45	1.35	0.30
3S	_	-	2.63	0.95	1.76	0.63
3Т	_	-	3.40	1.58	2.27	1.05
3U	_	-	4.94	2.84	3.29	1.89
4C	2.56	-1.88	1.54	-1.13	1.02	-0.75

EIA Code

	Capacitance Change from 25°C (%)						
Murata Code	–55°C		–30°C		–10°C		
	Max.	Min.	Max.	Min.	Max.	Min.	
5C/5G	0.58	-0.24	0.40	-0.17	0.25	-0.11	
6C	0.87	-0.48	0.59	-0.33	0.38	-0.21	
6P	2.33	0.72	1.61	0.50	1.02	0.32	
6R	3.02	1.28	2.08	0.88	1.32	0.56	
6S	4.09	2.16	2.81	1.49	1.79	0.95	
6Т	5.46	3.28	3.75	2.26	2.39	1.44	
7U	8.78	5.04	6.04	3.47	3.84	2.21	

6Rated Voltage

Code	Rated Voltage			
0E	DC2.5V			
0G	DC4V			
0J	DC6.3V			
1A	DC10V			
1C	DC16V			
1E	DC25V			
YA	DC35V			
1H	DC50V			
2A	DC100V			
2D	DC200V			
2E	DC250V			
YD	DC300V			
2H	DC500V			
2J	DC630V			
3A	DC1kV			
3D	DC2kV			
3F	DC3.15kV			
BB	DC350V (for Camera Flash Circuit)			
E2	AC250V			
GC	X1/Y2; AC250V (Safety Standard Certified Type GC)			
GF	Y2, X1/Y2; AC250V (Safety Standard Certified Type GF)			
GD	Y3; AC250V (Safety Standard Certified Type GD)			
GB	X2; AC250V (Safety Standard Certified Type GB)			

Capacitance

Expressed by three-digit alphanumerics. The unit is picofarad (pF). The first and second figures are significant digits, and the third figure expresses the number of zeros which follow the two numbers. If there is a decimal point, it is expressed by the capital letter " \mathbf{R} ." In this case, all figures are significant digits.

Ex.)	Code	Capacitance
	R50	0.5pF
	1R0	1.0pF
	100	10pF
	103	10000pF

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Code	Capacitance Tolerance	TC	Series	Capacitance Step					
₩ ±0.05pF		СΔ	GRM/GJM	≦9.9pF	0.1pF				
			GRM/GJM	≦9.9pF	0.1pF				
в	±0.1pF	CΔ	GQM	≦1pF	0.1pF				
			GGW	1.1 to 9.9pF	1pF Step and E24 Serie				
		CΔ	GRM/GJM	≦9.9pF	0.1pF				
с	±0.25pF	except C∆	GRM	≦5pF	* 1pF				
C	±0.25рг	Сд	GQM	≦1pF	0.1pF				
		CΔ	GOM	1.1 to 9.9pF	1pF Step and E24 Serie				
		CΔ	GRM/GJM	5.1 to 9.9pF	0.1pF				
D	±0.5pF	except C∆	GRM	5.1 to 9.9pF	* 1pF				
		CΔ	GQM	5.1 to 9.9pF	1pF Step and E24 Seri				
G	±2%	CΔ	GJM	≧10pF	E12 Series				
9	12 /0	CΔ	GQM	≧10pF	E24 Series				
J	±5%	CΔ, SL, U2J	GRM/GA3	≧10pF	E12 Series				
J	1070	CΔ	GQM/GJM	≧10pF	E24 Series				
		B, R, X7R, X5R, ZLM	GRJ/GRM/GR7/GA3		E6 Series				
к	±10%	C0G	GNM		E6 Series				
		B, R, X7R, X5R, ZLM	GR4, GMD		E12 Series				
		B, R, X7R, X7S	GRM/GMA		E6 Series				
м	±20%	X5R, X7R, X7S	GNM		E3 Series				
IVI	±20 <i>%</i>	X7R	GA2		E3 Series				
		X5R, X7R, X7S, X6S	LLL/LLR/LLA/LLM		E3 Series				
Z	+80%, -20%	F, Y5V	GRM		E3 Series				
R		Depends	s on individual standards.						

* E24 series is also available.

Individual Specification Code (Except LLR) Expressed by three figures.

9ESR (LLR Only)

Code	ESR
E01	100mΩ
E03	220mΩ
E05	470mΩ
E07	1000mΩ

Packaging

Code	Packaging
L	ø180mm Embossed Taping
D	ø180mm Paper Taping
E	ø180mm Paper Taping (LLL15)
к	ø330mm Embossed Taping
J	ø330mm Paper Taping
F	ø330mm Paper Taping (LLL15)
В	Bulk
С	Bulk Case
т	Bulk Tray



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Selection Guide For Chip Monolithic Ceramic Capacitors

Function	Туре	Series
Decoupling, Smoothing	High Capacitance	GRM (X5R, X7R, Y5V etc.) 68pF-100μF
Decoupling, smoothing	Array (2 or 4 Elements)	GNM 10pF–2.2μF
Frequency Control/Tuning,	Class 1 TC's	GRM (C0G) 0.1pF-0.1μF
Impedance Matching		GRM (U2J etc.)
	Low Inductance (Reverse Geometry)	LLL 2200pF–10μF
High Speed Decoupling	Low Inductance (Controlled ESR)	LLR 1.0µF
	Low Inductance (Multi-Termination)	LLA/LLM (From 1GHz) 0.01μF–4.7μF
	Low ESR, Ultra Small	GJM (500MHz to 10GHz) 0.1pF-33pF
High Frequency	Lowest ESR	GQM (500MHz to 10GHz) 0.1pF-100pF
Optical Communications	Wire-Die-Bonding	GMA 100pF–0.47μF GMD 100pF–1μF
Medium Voltage High Frequency Snubber	250V/630V/1kV/2kV/3.15kV Low Dissipation	GRM (C0G, U2J) 10pF-10000pF
Medium Voltage LCD Backlight Inverter	3.15kV Low Dissipation	GRM (C0G) 5pF–47pF
Medium Voltage	250V/630V/1kV High Capacitance	GRM (X7R) 220pF-1μF
Decoupling, Smoothing	250V/630V/1kV Soft Termination Type	GRJ (X7R) 470pF-1μF
Medium Voltage Only for Camera Flash Circuit	350V High Capacitance	GR7 10000pF-47000pF
Medium Voltage	2kV High Capacitance	GR4 100pF-10000pF
Only for Information Devices	Safety Standard Certified	Type GD 10pF–4700pF Type GF 10pF–4700pF
AC Lines Noise Demonst	Safety Standard Certified	Type GC 100pF-330pF Type GF 470pF-4700pF Type GB 10000pF-56000pF
AC Lines Noise Removal	AC250V which meets Japanese Law	GA2 470pF–0.1μF
Automotive	High Capacitance	GCM (X7R etc.) 100pF-47μF
(Powertrain, Safety Equipment)	Class 1 TC's	GCM (C0G etc.) 1.0pF-56000pF
Medium Voltage for Automotive	250V/630V Low Dissipation	GCM (U2J) 10pF-10000pF
(Powertrain, Safety Equipment)	250V/630V Soft Termination Type	GCJ (X7R) 1000pF–0.47μF

Applications?



Chip Monolithic Ceramic Capacitors

1	For General Purpose GRM Series Specifications and Test Methods Reference Data	
2	Capacitor Array GNM Series Specifications and Test Methods	64 70
3	Low ESL LLL/LLR/LLA/LLM Series Specifications and Test Methods	76 83
4	High-Q Type GJM Series Specifications and Test Methods	87 97
5	High Frequency GQM Series Specifications and Test Methods Reference Data	108
6	Monolithic Microchip GMA Series Specifications and Test Methods	
7	For Bonding GMD Series Specifications and Test Methods	
∆C Not	aution	128 132 144 151

Array GNM Series



Chip Monolithic Ceramic Capacitors



For General Purpose GRM Series

Features

For General GRM Series

Array GNM Series

Low ESL L Series

High-Q GJM Series

- Higher resistance of solder-leaching due to the Ni-barriered termination, applicable for reflow-soldering, and flow-soldering (GRM18/21/31 type only).
- 2. The GRM series is a lead free product.
- 3. Smaller size and higher capacitance value.
- 4. High reliability and no polarity.
- 5. Excellent pulse response and noise reduction due to the low impedance at high frequency.
- The GRM series is available in paper or embossed tape and reel packaging for automatic placement. Bulk case packaging is also available for GRM15/ 18/21(T=0.6,1.25).
- 7. TA replacement.

Applications

General electronic equipment

Dort Number		Din	nensions	(mm)		
Part Number	L	W	Т	e	g min.	
GRM022	0.4 ±0.02	0.2 ±0.02	0.2 ±0.02	0.07 to 0.14	0.13	
GRM033	0.6 ±0.03	0.3 ±0.03	0.3 ±0.03	0.1 to 0.2	0.2	
GRM15X			0.25 ±0.05	0.1 to 0.3	0.4	1000
GRM153	1.0 ±0.05	0.5 ±0.05	0.3 ±0.03	0.1 10 0.3	0.4	
GRM155			0.5 ±0.05	0.15 to 0.35	0.3	
GRM185	1.6 ±0.1	0.8 ±0.1	0.5 +0/-0.1	0.2 to 0.5	0.5	
GRM188*	1.0 <u>±</u> 0.1	U.0 ±U.1	0.8 ±0.1	0.2 10 0.5	0.5	
GRM216			0.6 ±0.1			
GRM219	2.0 ±0.1	1.25 ±0.1	0.85 ±0.1	0.2 to 0.7	0.7	
GRM21A	2.0 ±0.1	1.20 ±0.1	1.0 +0/-0.2	0.2 10 0.7	0.7	
GRM21B	1		1.25 ±0.1			
GRM316			0.6 ±0.1			
GRM319	3.2 ±0.15	1.6 ±0.15	0.85 ±0.1	0.3 to 0.8	1.5	
GRM31M	1		1.15 ±0.1	0.3 10 0.6	1.5	e g e
GRM31C	3.2 ±0.2	1.6 ±0.2	1.6 ±0.2			
GRM329			0.85 +0.15/-0.05			
GRM32A]		1.0 +0/-0.2			
GRM32M			1.15 ±0.1			
GRM32N	3.2 ±0.2	2.5 +0.2	1.35 ±0.15	0.3 min.	1.0	
GRM32C		2.3 ±0.2	1.6 ±0.2	U.S MIN.	1.0	
GRM32R			1.8 ±0.2			l+ L + I +
GRM32D			2.0 ±0.2			
GRM32E			2.5 ±0.2			

* Bulk Case: 1.6 ±0.07(L)×0.8 ±0.07(W)×0.8 ±0.07(T) The figures indicate typical specification.



Capacitance Table

For General GRM Series

Array GNM Series

Low ESL LL Series

High-Q GJM Series

High Frequency GOM Series

Monolithic Microchip GMA Series

For Bonding GMD Series

Product Information

Temperature Compensating Type C0G(5C),U2J(7U) Characteristics

6 ex.6: T Dimension [mi

\mathbb{N}	TC						0G(5C)								2J(7U				
	LxW	C).4x0 (02)	.2	0.6x0.3	1.0x0.5	1.6x0.8 (18)	2.0x1 (21		3.2x1.6 (31)	0.6) (0)	(0.3 3)		x0.5 5)	1.6x (18			1.25 1)	3.2x1.6 (31)
	[mm]		0100		(03) <0201>			<080>	5>	<1206>	<02	01>	<04	02>	<060)3>	<08		<1206>
	ed Voltage	16	10	6.3	50	50	100 50		50	100 50	50	25	50	10	50	10	50	10	50
Capacitance		(10)) (03)	_		(1E) (1H)		III)		(11)		(10)		(11)	(1A)	(11)	(1A)	(11)
	1pF(R10)	0	1		3	3,5					Ì								
	2pF(R20)	2			3	3,5							 		1		 		1
	3pF(R30)	2			3	3,5					-		 		1 1 1		 		1
	4pF(R40)	2			3	3, 5 3, 5					-		1		1 1 1		1		
	.5pF(R50) .6pF(R60)	2			3	3, 5 3, 5					i.								
	7pF(R70)	2			3	3, 5					-		1		1 1 1		1		1
	.8pF(R80)	2			3	3, 5							1		1				
	.9pF(R90)	2			3	3, 5							, , ,		, , , ,		, , , ,		
	.0pF(1R0)	2			3	3, 5					3		5	1	- - -				
	1pF(1R1)	2			3	3, 5									1 1 1		 		1
	2pF(1R2)	2			3	3, 5					1		 		1 		1		
	.3pF(1R3)	2			3	3, 5							1 1 1				1 		
	4pF(1R4)	2	1		3	3, 5							1		1		1 1 1		-
	.5pF(1R5)	2			3	3, 5					-		1		1 1 1		 		
	.6pF(1R6)	2	1		3	3, 5							, , ,		1 1 1		1 1 1		
	7pF(1R7)	2			3	3, 5													
	.8pF(1R8)	2			3	3, 5			1				 		1		 		
	.9pF(1R9)	2			3	3, 5					1		 		1 1 1		 		
	0pF(2R0)	2			3	3, 5					3		5		L				
	1pF(2R1)	2			3	3, 5								1	, , ,		, 1 1		1
	2pF(2R2)	2			3	3, 5			1		1		 		1		 		i 1 1
2.	3pF(2R3)	2			3	3, 5													1
2.	4pF(2R4)	2			3	3, 5					-		 		1		 		
2.	5pF(2R5)	2			3	3, 5													
2.	.6pF(2R6)	2			3	3, 5					-		1 1 1		1		 		
2.	7pF(2R7)	2			3	3, 5									1				
2.	8pF(2R8)	2			3	3, 5					i.								
2.	9pF(2R9)	2			3	3, 5							i i		L				
3.	0pF(3R0)	2			3	3, 5					3		5				1		
	1pF(3R1)	2			3	3, 5							, , ,		, , , ,		, , ,		
	2pF(3R2)	2			3	3, 5				1			1 1 1		1		1 1		1
	3pF(3R3)	2			3	3, 5					1		1						1
	4pF(3R4)	2			3	3, 5					-				1 1 1		1 		
	5pF(3R5)	2			3	3, 5							I I		1 1		 		
	6pF(3R6)	2			3	3, 5					1								1
	7pF(3R7)	2	-		3	3,5			1		-								
	8pF(3R8)	2	-		3	3,5									1 1				
	9pF(3R9)	2			3	3,5					-		F	1	 		 		
	0pF(4R0)	2			3	3,5			1		3		5						1
	1pF(4R1)	2			3	3,5					-		1 1 1		1 1 1		1 1 1		
	2pF(4R2)	2	-		3	3,5					; ; ;				1 1				
	3pF(4R3)	2			3	3,5							1		1		1		
	4pF(4R4)	2			3	3, 5 3, 5					-		1		1		1		1
	.5pF(4R5) .6pF(4R6)	2			3	3, 5 3, 5					1				1 1 1				
	7pF(4R7)	2	-		3	3, 5 3, 5					1		I I		1 1		 		- - - -
	.8pF(4R8)	2	1		3	3, 5 3, 5							1		1 1				1
	.9pF(4R9)	2			3	3, 5 3, 5					1		1						1
-+.	~~· (-···)	-					[]. <>:E	IA [inch]										nued o	

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Capacitance Table

Continued from the preceding page. 6 ex.6: T Dimension [mm]

Ge M S		Dimen	sion [mm]										
For Ge GRM S	TC			1		0G(5C)				L			
	LxW).4x0.2 (02)	0.6x0.3	1.0x0.5 (15)	1.6x0.8 (18)	2.0x1.25 (21)	3.2x1.6 (31)	0.6x0.3 (03)	1.0x0.5 (15)	1.6x0.8 (18)	2.0x1.25 (21)	3.2x1.6 (31)
	[mm]	<	01005>	<0201:	<0402>	<0603>	<0805>	<1206>	<0201>	<0402>	<0603>	<0805>	(31) <1206>
	Rated Voltage	16	10 6.3		50	100 50	100 50	100 50	50 25	50 10	50 10	50 10	50
	Capacitance [Vdc]	(1C)	(1A) (0J) (1H)		(1E) (1H)	(1E) (1H)	(1E) (1H)			(1H) (1A)	(1H) (1A)	(1H)
Array GNM Series	5.0pF(5R0)	2		3	3, 5			1 1 1	3	5	1	1 1 1	1
Array IM Ser	5.1pF(5R1)	2		3	3, 5			1 1 1	1	1 1 1	1 1 1	1 1 1	1
NMA	5.2pF(5R2)	2		3	3, 5								1
G	5.3pF(5R3)	2		3	3, 5						1		1
	5.4pF(5R4)	2		3	3, 5								
	5.5pF(5R5)	2		3	3, 5			 				 	
	5.6pF(5R6)	2		3	3, 5			1 1 1	1	1	1	1 1 1	
- S	5.7pF(5R7)	2		3	3, 5			 	1 1 1	1	1 1 1	 	
Low ESL LL Series	5.8pF(5R8)	2		3	3, 5			1					1
≥ □	5.9pF(5R9)	2		3	3, 5			, , , 			, , , , ,	, , ,	
	6.0pF(6R0)	2		3	3, 5				3	5	1		
	6.1pF(6R1)	2		3	3, 5			 			1	 	
	6.2pF(6R2)	2		3	3, 5			1 1 1	1	1 1 1	1 1 1	1 1 1	1
	6.3pF(6R3)	2		3	3, 5			1 1 1	1 1 1	1	1 1 1	1 1 1	1
Ś	6.4pF(6R4)	2		3	3, 5			1	1			1	1
High-Q GJM Series	6.5pF(6R5)	2		3	3, 5								1
High-Q JM Serie	6.6pF(6R6)	2		3	3, 5			 				 	1
H AL	6.7pF(6R7)	2		3	3, 5			1 1 1	1	1	1	1 1 1	1
-	6.8pF(6R8)	2		3	3, 5			1 1 1	1 1 1	1	1	1 1 1	
	6.9pF(6R9)	2		3	3, 5			 			 	 	
	7.0pF(7R0)	2		3	3, 5				3	5			1
Ň	7.1pF(7R1)	2		3	3, 5			 				 	
High Frequency GQM Series	7.2pF(7R2)	2		3	3, 5			1 1 1	1		1 1 1	1 1 1	1
equ	7.3pF(7R3)	2		3	3, 5			1 1 1	1	1 1 1	1 1 1	1 1 1	1
D Fr	7.4pF(7R4)	2		3	3, 5								1
Hig	7.5pF(7R5)	2		3	3, 5								1
	7.6pF(7R6)	2		3	3, 5			 				 	
	7.7pF(7R7)	2		3	3, 5			1 1 1	1	1	1	1 1 1	1
chip	7.8pF(7R8)	2		3	3, 5			 	1 1 1	1	1 1 1	 	1
es	7.9pF(7R9)	2		3	3, 5			 			1 1 1	! ! !	
Mic	8.0pF(8R0)	2		3	3, 5				3	5			1
olithic Micro GMA Series	8.1pF(8R1)	2		3	3, 5			1 1	1	1	1	1 1	1
GN	8.2pF(8R2)	2		3	3, 5				1 1 1	1 1 1	1 1 1		
Monolithic Micro GMA Series	8.3pF(8R3)	2		3	3, 5				1	1	1		
	8.4pF(8R4)	2		3	3, 5			1 1			 	1 1	
	8.5pF(8R5)	2		3	3, 5				1	1	1		1
g s	8.6pF(8R6)	2		3	3, 5			1 1 1	1	1	1	1 1 1	1
For Bonding GMD Series	8.7pF(8R7)	2		3	3, 5			1 1 1	1	1		1 1 1	1
Boi D S	8.8pF(8R8)	2		3	3, 5								1
GM	8.9pF(8R9)	2		3	3, 5			; 	; }			; }	
_	9.0pF(9R0)	2		3	3, 5				3	5	1		1
	9.1pF(9R1)	2		3	3, 5				1 1 1	1 1 1	1 1 1		
F	9.2pF(9R2)	2		3	3, 5				1		1		
atio	9.3pF(9R3)	2		3	3, 5						1		
rmé	9.4pF(9R4)	2		3	3, 5							1 	
Info	9.5pF(9R5)	2		3	3, 5			 			 	 	
rct	9.6pF(9R6)	2		3	3, 5			1 1 1	1	1	1	1 1	1
Product Information	9.7pF(9R7)	2		3	3, 5			1 1 1	1	1	1 1 1		-
Ē.	9.8pF(9R8)	2		3	3, 5				1		1		1
	9.9pF(9R9)	2		3	3, 5			1	1	 	1 1 1	1	

< >: EIA [inch] Code The part number code is shown in () and Unit is shown in [].



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Capacitance Table

For General GRM Series

Array GNM Series

Low ESL LL^[] Series

High-Q GJM Series

High Frequency GOM Series

Monolithic Microchip GMA Series

For Bonding GMD Series

Product Information

Continued from the preceding page.

6 ex.6: T Dimension [mm]

TC	0	140	2	0 640 0		0G(5		2.0	1.05	2.0	(1.6	0.0	(0.2	1.0-		2J(7	· ·	2.0	1.05	2 244 0
LxW [mm]).4x0. (02) 01005		(03)	1.0x0.5 (15) <0402>	(1	8)	2.0x (2 <08	1)	3.2) (3 <12	1)	0.6> (0 <02	3)	1.0x (1 <04	5)	(1	x0.8 8) 603>	2.0x (2 <08	1)	3.2x1.6 (31) <1206>
Rated Voltage	16	10	6.3	50	50	100	50	100	50	100	50	50	25	50	10	50	10	50	10	50
Capacitance [Vdc]	(1C)	(1 A)	(0J)	(1H)		(1E)	(1H)	(1E)	(1H)	(1E)	(1H)		(1E)		(1A)	(1H)	(1A)	(1H)	(1A)	(1H)
10pF(100)	2			3	3, 5	8	8					3		5						1
12pF(120)	2			3	3, 5	8	8	-				3		5						
15pF(150)	2	-		3	3, 5	8	8	-		1 		3		5						1
18pF(180)	2	-		3	3, 5	8	8	-					3	5						1
22pF(220)	2	-		3	3, 5	8	8	-		1		1	3	5				1		1
27pF(270)	2			3	3, 5	8	8	-		1			3	5				1		
33pF(330)	2	-		3	3, 5	8	8	-					3	5						
39pF(390)	2			3	3, 5	8	8	-		1			3	5				1		1
47pF(470)	2			3	3, 5	8	8	-		1 1 1		1	3	5				1 1 1		1
56pF(560)	-	2	2	3	3, 5	8	8	-					3	5						
68pF(680)	-	2	2	3	3, 5	8	8	-					3	5						
82pF(820)		2	2	3	3,5	8	8	<u> </u>		; +			3	5						
100pF(101)		2	2	3	3,5	8	8	6		1			3	5				1		
120pF(121)	-				3,5	8	8	6 6						5 5						
150pF(151) 180pF(181)	-				3, 5 3, 5	8 8	8	6 6		 				5 5				 		
220pF(221)	1			1	3, 5	о 8	0 8	6				1		5						1
270pF(221)	-				3, 5	8	8	6		1 1 1		1			1			1		1
330pF(331)	1			1	3, 5	о 8	о 8	6												1
390pF(391)	1				3, 5	8	8	6		1										
470pF(471)	-				3, 5	8	8	6												i i i
560pF(561)	1			1	3, 5	8	8	6							1					1
680pF(681)	1			1	3, 5	8	8	6		1 1 1		1			1			1 1 1		1
820pF(821)	1				5	8	8	6												
1000pF(102)	1				5	8	8	6								8	1			
1200pF(122)	1					8	8	6	6						5	8				1
1500pF(152)	1			1		8	8	6	6						5	8				1
1800pF(182)	1			1		Ū	8	6	6	9					5	8		 		
2200pF(222)	1						8	6	6	9					5	5, 8		 		
2700pF(272)	1						8	6	6	9					5	5, 8				
3300pF(332)	-						8	6	6	9					5	5, 8				1
3900pF(392)	-			1			8		6	9					5	5, 8				
4700pF(472)							-	-	6	9	9	İ			5	5, 8				
5600pF(562)	1			1				1	9	9	9					8	5			1
6800pF(682)	1			1				1	9	9	9					8	5			
8200pF(822)	1							1	9	9	9					8	5			1
10000pF(103)	†			 '					9	9	9					8	5	6		; ; ;
12000pF(123)	1			1				1	9	9	9						8	6		1
15000pF(153)	1							1	9	9	9						8	6		
18000pF(183)	1								В	9	9						8	6		
22000pF(223)	1			1				1	В	9	9						8	9		1
27000pF(273)	1			1				1 1 1 1			9							9		1
33000pF(333)	1							1			9				1			Α		1
39000pF(393)]							1 			9							В		1 1 1
47000pF(473)]										М							В		
56000pF(563)]			1				 			М								9	9
68000pF(683)											С								В	М
				1				1		:	С	1							P	м
82000pF(823)								i i			C								В	

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code



Capacitance Table

Temperature Compensating Type P2H(6P),R2H(6R),S2H(6S),T2H(6T) Characteristics ex.6: T Dimension [mm]

For General GRM Series

The part number code is shown in () and Unit is shown in [].

56pF(560)

68pF(680)

82pF(820)

100pF(101)

3 3 5 3 3 5

< >: EIA [inch] Code

3 5



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Capacitance Table

For General GRM Series

Array GNM Series

Low ESL LL Series

High-Q GJM Series

High Frequency GOM Series

Continued from the preceding page.

High Dielectric Constant Type X7R(R7)/X7S(C7)/X7T(D7)/X7U(E7) Characteristics

5 ex.5: T	Dimen	sion [m	nm]				•			•	•	•					
LxW	0.4x0.2			x0.3			1	.0x0.	5				1	.6x0.	8		
[mm]	(02) <01005>		<02	3) 01>			<	(15) 0402	>				<	(18) (0603	>		
Rated Voltage		25	16	10	6.3	100		25	16	10	100	50	25	16	10	6.3	4
Capacitance [Vdc]		(1E)	(1C)	(1 A)	(0J)	(2A)	(1H)	(1E)	(1 C)	(1A)	(2A)	(1H)	(1E)	(1C)	(1A)	(0 J)	(0G)
68pF(680)	2																
100pF(101)	2	3	3			1 1 1											
150pF(151)	2	3	3														
220pF(221)	2	3	3			5	X, 5				8	8					
330pF(331)	2	3	3			5	X, 5				8	8					
470pF(471)	2	3	3			5	X, 5				8	8					
680pF(681)		3	3			5	X, 5				8	8					
1000pF(102)		3	3			5	X, 5				8	8					
1500pF(152)		3	3			5	X, 5				8	8		-			
2200pF(222)		 	3	3		5	5	Х			8	8	8				
3300pF(332)		1	3	3		5	5		Х		8	8	8				
4700pF(472)				3	3	5	5	5	Х		8	8	8				
6800pF(682)				3	3		5	5	Х		8	8	8				
10000pF(103)		1		3	3		5	5	Х		8	8	8				
15000pF(153)		1 1 1				1	5	5	5		1	8	8				
22000pF(223)		 				1	5	5	5		1	8	8				
33000pF(333)		 				1		5	5			8	8				
47000pF(473)		1				 		5	5			8	8				
68000pF(683)									5	5		8	8				
0.10μF(104)									5	5	8	8	8				
0.15μF(154)		1 1 1				 			5				8	8			
0.22μF(224)		1 1 1				1 1 1			5		1		8	8			
0.33μF(334)	1	1 				 								8	8		
0.47µF(474)	1												8	8	8		
0.68μF(684)	1													8	8		
1.0μF(105)		 - -				 							8	8	5, 8		
2.2μF(225)		 				1						1			8	8	8

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

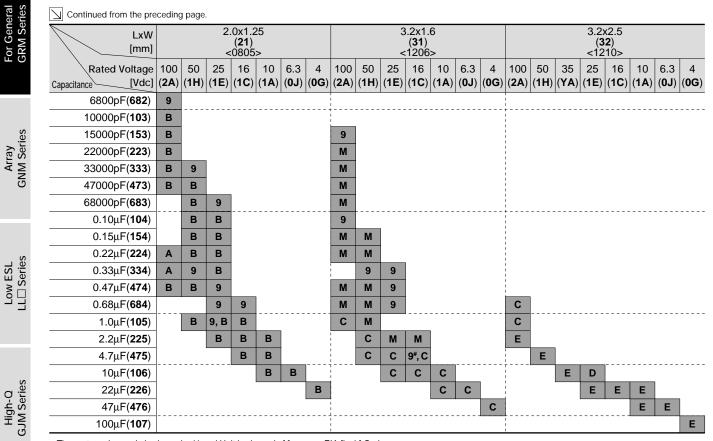
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Capacitance Table

Continued from the preceding page



The part number code is shown in () and Unit is shown in []. < >: EIA [inch] Code

[#] These Part Numbers have individual testing conditions on Durability of GRM Series Specifications and Test Methods (2). Please refer to P60.

High Dielectric Constant Type X6S(C8)/X6T(D8) Characteristics

	High Dielectric C				e X6:	5(C8)/X6	I (Di	8) CI	nara	cteri
s ncy	5 ex.5: T	Dimen	sion [m	nm]							
High Frequency GQM Series	LxW [mm]	0.6) (0 <02	<0.3 3) 01>	1	.0x0. (15) 0402	5 >					
High GQI	Rated Voltage Capacitance [Vdc]	6.3 (0J)	4 (0G)	25 (1E)	6.3 (0J)	4 (0G)					
	15000pF(153)	3	3								
٩	22000pF(223)	3	3								
chi	33000pF(333)	3	3								
icrc ries	47000pF(473)	3	3								
c M Se	68000pF(683)			5							
Monolithic Microchip GMA Series	0.10μF(104)			5							
ono	0.15μF(154)				5	5					
ĕ	0.22μF(224)			1	5	5					
	0.33μF(334)				5	5					
	0.47µF(474)				5	5					
ng es	0.68µF(684)			1	5#	5					
For Bonding GMD Series	LxW [mm]			.6x0. (18) :0603				2.	.0x1.2 (21) :0805	25 >	
шО	Rated Voltage		10	6.3	4	2.5	25	16	10	6.3	4
	Capacitance [Vdc]	(1E)	(1 A)	(0 J)	(0G)	(0E)	(1E)	(1C)	(1 A)	(0 J)	(0G)
_	1.0μF(105)	8	5	5				6			
tion	2.2μF(225)		8	8				9			
ma	4.7μF(475)				8		в	В	9	9	
nfoi	10μF(106)				8#	8			В	9, B	
Product Information	22μF(226)									B [#]	в
npo	47μF(476)										
P	100μF(107)										

The part number code is shown in () and Unit is shown in []. < >: EIA [inch] Code

[#] These Part Numbers have individual testing conditions on Durability of GRM Series Specifications and Test Methods (2). Please refer to P60.



3.2x1.6 (**31**) <1206>

9 9

С С

С

25 16

С М

6 9 10 6.3

4 25

(1E) |(1C)|(1A)|(0J)|(0G)|(1E)|(1A)|(0J)|(0G)

С

С

D

Е Ν

3.2x2.5 (**32**) <1210>

4

10 6.3

Е

Е

Е Е

Capacitance Table

Continued from the preceding page.

High Dielectric Constant Type X5R(R6) Characteristics

5 ex.5: T Dimension [mm] : Please refer to X7R(R7) etc. Characteristics.

5	ex.5: T I		-	nmJ				: P	lease r			₹7) etc	c. Char	acteris	stics.					
	LxW [mm]	0.4) (0 <010	2)		0.6) (0 <02	3)				1.0) (1 <04	x0.5 5) ∙02>					1	1.6x0. (18) <0603	8		
Rated V Capacitance	/oltage [Vdc]	10 (1A)	6.3 (0J)	25 (1E)	16 (1C)	10 (1A)	6.3 (0J)	100 (2A)		25	16	10 (1A)	6.3 (0J)	100 (2A)		25	16 (1C)	10	6.3 (0J)	4 (0G)
68pF	(680)	2		1										1						
100pF	-(101)	2												 						
150pF	-(151)	2																		
220pF	-(221)	2																		
330pF	-(331)	2																		
470pF	-(471)	2																		
680pF	-(681)	2	2]				
1000pF	F(102)	2	2						5	[8					
1500pF	-(152)	2	2			3														
2200pF	-(222)	2	2			3			5						8					
3300pF	-(332)	2	2			3														
4700pF	-(472)	2	2			3			5						8					
6800pF	-(682)	2	2			3														
10000pF	-(103)	2	2			3	3								8					
15000pF	-(153)			1			3							1						
22000pF	-(223)			1			3				5			1	8					
33000pF	-(333)						3				5	5								
47000pF	-(473)						3				5	5								
68000pF	-(683)									5	5	5		1						
0.10µF	-(104)			 ! !						5	5	5	[8				
0.15µF	-(154)			1								5	5							
0.22µF	(224)											5	5			8	8			
0.33µF	(334)											5	5							
0.47µF	(474)											5	5			8	8			
0.68µF	(684)							 				5	5					8		
1.0µF	-(105)											5		 ! !		8	5, 8	5		
2.2µF	-(225)												-				8	8		
4.7µF	-(475)																		8	
10µF	-(106)																		8	8
22µF	-(226)	1																		8

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

Continued on the following page.



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 • This PDF catalog has only typical specifications because there is no space for detailed specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.
 10.12.20

Capacitance Table

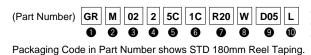
ral ies	Continued from the pre	cedina	n page.																				
For General GRM Series	LxW [mm]				0x1.2 (21) 0805						3	.2x1. (31) :1206	6 >							x2.5 2) 10>			
ш	Rated Voltage Capacitance [Vdc]		50 (1H)	25	16	10	6.3 (0J)	4 (0G)	100 (2A)	50 (1H)	25	16	10	6.3 (0J)	4 (0G)	100 (2A)	50 (1H)	35 (YA)	25	16	10 (1A)	6.3 (0J)	4 (0G)
	6800pF(682)																						
	10000pF(103)																						
ies	15000pF(153)															1							
Array GNM Series	22000pF(223)															1 1 1							
NM NM	33000pF(333)																						
G	47000pF(473)															1							
	68000pF(683)																						
	0.10μF(104)															1							
	0.15µF(154)															 							
, s	0.22µF(224)															1 1 1							
Low ESL LL ^[] Series	0.33μF(334)															1							
_ S □	0.47µF(474)																						
EF	0.68µF(684)																						
	1.0μF(105)			6	6, B																		
	2.2μF(225)			9, B	9, B	В				С	6							_					
	4.7μF(475)			в	9, B	9, B	в				9,C	9,C				 							
	10μF(106)				В	9, B	9, B				С	9, C	9			 ! !		Е	D				
D eries	22μF(226)						В	9				С	С	С		1 1			Е				
High-Q GJM Series	47μF(476)												С	С						Е	Е		
E Z	100μF(107)													С	С							Е	

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code



LxW [mm]		0.4x0.2(02)<01005>	0.6x0.3(03)<0201>	1.0x0.5(15)<0402>
Rated Volt. [Vdc		16(1C)	50(1H)	50(1H)
Capacitance	Tolerance		Part Number	
0.1pF(R10)	±0.05pF(W)		GRM0335C1HR10WD01D	GRM1555C1HR10WA01D
	±0.1pF(B)		GRM0335C1HR10BD01D	GRM1555C1HR10BA01D
0.2pF(R20)	±0.05pF(W)	GRM0225C1CR20WD05L	GRM0335C1HR20WD01D	GRM1555C1HR20WA01D
	±0.1pF(B)	GRM0225C1CR20BD05L	GRM0335C1HR20BD01D	GRM1555C1HR20BA01D
0.3pF(R30)	±0.05pF(W)	GRM0225C1CR30WD05L	GRM0335C1HR30WD01D	GRM1555C1HR30WA01D
	±0.1pF(B)	GRM0225C1CR30BD05L	GRM0335C1HR30BD01D	GRM1555C1HR30BA01D
0.4pF(R40)	±0.05pF(W)	GRM0225C1CR40WD05L	GRM0335C1HR40WD01D	GRM1555C1HR40WA01D
	±0.1pF(B)	GRM0225C1CR40BD05L	GRM0335C1HR40BD01D	GRM1555C1HR40BA01D
0.5pF(R50)	±0.05pF(W)	GRM0225C1CR50WD05L	GRM0335C1HR50WD01D	GRM1555C1HR50WA01D
	±0.1pF(B)	GRM0225C1CR50BD05L	GRM0335C1HR50BD01D	GRM1555C1HR50BA01D
0.6pF(R60)	±0.05pF(W)	GRM0225C1CR60WD05L	GRM0335C1HR60WD01D	GRM1555C1HR60WA01D
	±0.1pF(B)	GRM0225C1CR60BD05L	GRM0335C1HR60BD01D	GRM1555C1HR60BA01D
0.7pF(R70)	±0.05pF(W)	GRM0225C1CR70WD05L	GRM0335C1HR70WD01D	GRM1555C1HR70WA01D
	±0.1pF(B)	GRM0225C1CR70BD05L	GRM0335C1HR70BD01D	GRM1555C1HR70BA01D
0.8pF(R80)	±0.05pF(W)	GRM0225C1CR80WD05L	GRM0335C1HR80WD01D	GRM1555C1HR80WA01D
	±0.1pF(B)	GRM0225C1CR80BD05L	GRM0335C1HR80BD01D	GRM1555C1HR80BA01D
0.9pF(R90)	±0.05pF(W)	GRM0225C1CR90WD05L	GRM0335C1HR90WD01D	GRM1555C1HR90WA01D
	±0.1pF(B)	GRM0225C1CR90BD05L	GRM0335C1HR90BD01D	GRM1555C1HR90BA01D
1.0pF(1R0)	±0.05pF(W)	GRM0225C1C1R0WD05L	GRM0335C1H1R0WD01D	GRM1555C1H1R0WA01D
	±0.1pF(B)	GRM0225C1C1R0BD05L	GRM0335C1H1R0BD01D	GRM1555C1H1R0BA01D
	±0.25pF(C)	GRM0225C1C1R0CD05L	GRM0335C1H1R0CD01D	GRM1555C1H1R0CA01D
1.1pF(1R1)	±0.05pF(W)	GRM0225C1C1R1WD05L	GRM0335C1H1R1WD01D	GRM1555C1H1R1WA01D
	±0.1pF(B)	GRM0225C1C1R1BD05L	GRM0335C1H1R1BD01D	GRM1555C1H1R1BA01D
	±0.25pF(C)	GRM0225C1C1R1CD05L	GRM0335C1H1R1CD01D	GRM1555C1H1R1CA01D
1.2pF(1R2)	±0.05pF(W)	GRM0225C1C1R2WD05L	GRM0335C1H1R2WD01D	GRM1555C1H1R2WA01D
p. ()	±0.1pF(B)	GRM0225C1C1R2BD05L	GRM0335C1H1R2BD01D	GRM1555C1H1R2BA01D
	±0.25pF(C)	GRM0225C1C1R2CD05L	GRM0335C1H1R2CD01D	GRM1555C1H1R2CA01D
1.3pF(1R3)	±0.05pF(W)	GRM0225C1C1R3WD05L	GRM0335C1H1R3WD01D	GRM1555C1H1R3WA01D
1.5pr (113)	±0.1pF(B)	GRM0225C1C1R3BD05L	GRM0335C1H1R3BD01D	GRM1555C1H1R3BA01D
	±0.25pF(C)	GRM0225C1C1R3CD05L	GRM0335C1H1R3CD01D	GRM1555C1H1R3CA01D
1.4pF(1R4)	±0.25pF(W)	GRM0225C1C1R4WD05L	GRM0335C1H1R4WD01D	GRM1555C1H1R4WA01D
1.4pt (11.4)		GRM0225C1C1R4BD05L		
	±0.1pF(B)	GRM0225C1C1R4CD05L	GRM0335C1H1R4BD01D	GRM1555C1H1R4BA01D
1.5pF(1R5)	±0.25pF(C)	GRM0225C1C1R4CD05L	GRM0335C1H1R4CD01D	GRM1555C1H1R4CA01D
т.эрг(ткэ)	±0.05pF(W)	GRM0225C1C1R5BD05L	GRM0335C1H1R5WD01D	GRM1555C1H1R5WA01D
	±0.1pF(B)	GRM0225C1C1R5BD05L	GRM0335C1H1R5BD01D GRM0335C1H1R5CD01D	GRM1555C1H1R5BA01D GRM1555C1H1R5CA01D
1 (mE(4 DC)	±0.25pF(C)	GRM0225C1C1R6WD05L		
1.6pF(1R6)	±0.05pF(W)		GRM0335C1H1R6WD01D	GRM1555C1H1R6WA01D
	±0.1pF(B)	GRM0225C1C1R6BD05L	GRM0335C1H1R6BD01D	GRM1555C1H1R6BA01D
1 7. E(4 D7)	±0.25pF(C)	GRM0225C1C1R6CD05L	GRM0335C1H1R6CD01D	GRM1555C1H1R6CA01D
1.7pF(1R7)	±0.05pF(W)	GRM0225C1C1R7WD05L	GRM0335C1H1R7WD01D	GRM1555C1H1R7WA01D
	±0.1pF(B)	GRM0225C1C1R7BD05L	GRM0335C1H1R7BD01D	GRM1555C1H1R7BA01D
4	±0.25pF(C)	GRM0225C1C1R7CD05L	GRM0335C1H1R7CD01D	GRM1555C1H1R7CA01D
1.8pF(1R8)	±0.05pF(W)	GRM0225C1C1R8WD05L	GRM0335C1H1R8WD01D	GRM1555C1H1R8WA01D
	±0.1pF(B)	GRM0225C1C1R8BD05L	GRM0335C1H1R8BD01D	GRM1555C1H1R8BA01D
	±0.25pF(C)	GRM0225C1C1R8CD05L	GRM0335C1H1R8CD01D	GRM1555C1H1R8CA01D
1.9pF(1R9)	±0.05pF(W)	GRM0225C1C1R9WD05L	GRM0335C1H1R9WD01D	GRM1555C1H1R9WA01D
	±0.1pF(B)	GRM0225C1C1R9BD05L	GRM0335C1H1R9BD01D	GRM1555C1H1R9BA01D
	±0.25pF(C)	GRM0225C1C1R9CD05L	GRM0335C1H1R9CD01D	GRM1555C1H1R9CA01D

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code



Product ID
Series
Temperature Characteristics
Capacitance Tolerance

Dimensions (LxW)Rated VoltageIndividual Specification Code

ODimension (T)
 OCapacitance
 Ocde
 OPackaging*
 *GRM022: D is applicable.

For General GRM Series

> Array GNM Series

Low ESL LL^[] Series

High-Q GJM Series

High Frequency GOM Series

Monolithic Microchip GMA Series

For Bonding GMD Series

Product Information



LxW [mm]		0.4x0.2(02)<01005>	0.6x0.3(03)<0201>	1.0x0.5(15)<0402>
Rated Volt. [Vdc]	-	16(1C)	50(1H)	50(1H)
Capacitance	Tolerance		Part Number	I
2.0pF(2R0)	±0.05pF(W)	GRM0225C1C2R0WD05L	GRM0335C1H2R0WD01D	GRM1555C1H2R0WA0
	±0.1pF(B)	GRM0225C1C2R0BD05L	GRM0335C1H2R0BD01D	GRM1555C1H2R0BA01
	±0.25pF(C)	GRM0225C1C2R0CD05L	GRM0335C1H2R0CD01D	GRM1555C1H2R0CA01
2.1pF(2R1)	±0.05pF(W)	GRM0225C1C2R1WD05L	GRM0335C1H2R1WD01D	GRM1555C1H2R1WA0
	±0.1pF(B)	GRM0225C1C2R1BD05L	GRM0335C1H2R1BD01D	GRM1555C1H2R1BA01
	±0.25pF(C)	GRM0225C1C2R1CD05L	GRM0335C1H2R1CD01D	GRM1555C1H2R1CA01
2.2pF(2R2)	±0.05pF(W)	GRM0225C1C2R2WD05L	GRM0335C1H2R2WD01D	GRM1555C1H2R2WA0
	±0.1pF(B)	GRM0225C1C2R2BD05L	GRM0335C1H2R2BD01D	GRM1555C1H2R2BA01
	±0.25pF(C)	GRM0225C1C2R2CD05L	GRM0335C1H2R2CD01D	GRM1555C1H2R2CA01
2.3pF(2R3)	±0.05pF(W)	GRM0225C1C2R3WD05L	GRM0335C1H2R3WD01D	GRM1555C1H2R3WA0 [,]
	±0.1pF(B)	GRM0225C1C2R3BD05L	GRM0335C1H2R3BD01D	GRM1555C1H2R3BA0
	±0.25pF(C)	GRM0225C1C2R3CD05L	GRM0335C1H2R3CD01D	GRM1555C1H2R3CA01
2.4pF(2R4)	±0.05pF(W)	GRM0225C1C2R4WD05L	GRM0335C1H2R4WD01D	GRM1555C1H2R4WA0
	±0.1pF(B)	GRM0225C1C2R4BD05L	GRM0335C1H2R4BD01D	GRM1555C1H2R4BA01
	±0.25pF(C)	GRM0225C1C2R4CD05L	GRM0335C1H2R4CD01D	GRM1555C1H2R4CA0 ²
2.5pF(2R5)	±0.05pF(W)	GRM0225C1C2R5WD05L	GRM0335C1H2R5WD01D	GRM1555C1H2R5WA0
• • •	±0.1pF(B)	GRM0225C1C2R5BD05L	GRM0335C1H2R5BD01D	GRM1555C1H2R5BA01
	±0.25pF(C)	GRM0225C1C2R5CD05L	GRM0335C1H2R5CD01D	GRM1555C1H2R5CA01
2.6pF(2R6)	±0.05pF(W)	GRM0225C1C2R6WD05L	GRM0335C1H2R6WD01D	GRM1555C1H2R6WA0
	±0.1pF(B)	GRM0225C1C2R6BD05L	GRM0335C1H2R6BD01D	GRM1555C1H2R6BA01
	±0.25pF(C)	GRM0225C1C2R6CD05L	GRM0335C1H2R6CD01D	GRM1555C1H2R6CA01
2.7pF(2R7)	±0.05pF(W)	GRM0225C1C2R7WD05L	GRM0335C1H2R7WD01D	GRM1555C1H2R7WA0
	±0.1pF(B)	GRM0225C1C2R7BD05L	GRM0335C1H2R7BD01D	GRM1555C1H2R7BA01
	±0.25pF(C)	GRM0225C1C2R7CD05L	GRM0335C1H2R7CD01D	GRM1555C1H2R7CA01
2.8pF(2R8)	±0.05pF(W)	GRM0225C1C2R8WD05L	GRM0335C1H2R8WD01D	GRM1555C1H2R8WA0
	±0.1pF(B)	GRM0225C1C2R8BD05L	GRM0335C1H2R8BD01D	GRM1555C1H2R8BA01
	±0.25pF(C)	GRM0225C1C2R8CD05L	GRM0335C1H2R8CD01D	GRM1555C1H2R8CA01
2.9pF(2R9)	±0.05pF(W)	GRM0225C1C2R9WD05L	GRM0335C1H2R9WD01D	GRM1555C1H2R9WA0
2.7pr (210)	±0.1pF(B)	GRM0225C1C2R9BD05L	GRM0335C1H2R9BD01D	GRM1555C1H2R9BA01
	±0.25pF(C)	GRM0225C1C2R9CD05L	GRM0335C1H2R9CD01D	GRM1555C1H2R9CA0
3.0pF(3R0)	±0.25pF(W)	GRM0225C1C3R0WD05L	GRM0335C1H3R0WD01D	GRM1555C1H3R0WA07
5.0pr (51.0)				
	±0.1pF(B)	GRM0225C1C3R0BD05L	GRM0335C1H3R0BD01D	GRM1555C1H3R0BA01
3.1pF(3R1)	±0.25pF(C)	GRM0225C1C3R0CD05L	GRM0335C1H3R0CD01D	GRM1555C1H3R0CA0
3.10F(3K1)	±0.05pF(W)	GRM0225C1C3R1WD05L	GRM0335C1H3R1WD01D	GRM1555C1H3R1WA0
	±0.1pF(B)	GRM0225C1C3R1BD05L	GRM0335C1H3R1BD01D	GRM1555C1H3R1BA0
2 20 E /2 B 0	±0.25pF(C)	GRM0225C1C3R1CD05L	GRM0335C1H3R1CD01D	GRM1555C1H3R1CA0
3.2pF(3R2)	±0.05pF(W)	GRM0225C1C3R2WD05L	GRM0335C1H3R2WD01D	GRM1555C1H3R2WA0
	±0.1pF(B)	GRM0225C1C3R2BD05L	GRM0335C1H3R2BD01D	GRM1555C1H3R2BA0
2.2. 5/282	±0.25pF(C)	GRM0225C1C3R2CD05L	GRM0335C1H3R2CD01D	GRM1555C1H3R2CA01
3.3pF(3R3)	±0.05pF(W)	GRM0225C1C3R3WD05L	GRM0335C1H3R3WD01D	GRM1555C1H3R3WA0
	±0.1pF(B)	GRM0225C1C3R3BD05L	GRM0335C1H3R3BD01D	GRM1555C1H3R3BA0
	±0.25pF(C)	GRM0225C1C3R3CD05L	GRM0335C1H3R3CD01D	GRM1555C1H3R3CA0
3.4pF(3R4)	±0.05pF(W)	GRM0225C1C3R4WD05L	GRM0335C1H3R4WD01D	GRM1555C1H3R4WA0
	±0.1pF(B)	GRM0225C1C3R4BD05L	GRM0335C1H3R4BD01D	GRM1555C1H3R4BA01
	±0.25pF(C)	GRM0225C1C3R4CD05L	GRM0335C1H3R4CD01D	GRM1555C1H3R4CA01
3.5pF(3R5)	±0.05pF(W)	GRM0225C1C3R5WD05L	GRM0335C1H3R5WD01D	GRM1555C1H3R5WA0
	±0.1pF(B)	GRM0225C1C3R5BD05L	GRM0335C1H3R5BD01D	GRM1555C1H3R5BA01
	±0.25pF(C)	GRM0225C1C3R5CD05L	GRM0335C1H3R5CD01D	GRM1555C1H3R5CA01

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

(Part Number) **GR M 02 2 5C 1C 2R0 W D05 L** 0 00000 08 90

Packaging Code in Part Number shows STD 180mm Reel Taping.

Product ID 2 Series **5**Temperature Characteristics 8Capacitance Tolerance

3Dimensions (LxW) ORated Voltage
Old Distribution Code
Opackaging*

4Dimension (T) *GRM022: D is applicable.

Array

Monolithic Microchip

For Bonding

18



		0.4x0.2(02)<01005>	0.6x0.3(03)<0201>	1.0x0.5(15)<0402>
Rated Volt. [Vdc]		16(1C)	50(1H)	50(1H)
	Tolerance		Part Number	
3.6pF(3R6)	±0.05pF(W)	GRM0225C1C3R6WD05L	GRM0335C1H3R6WD01D	GRM1555C1H3R6WA01D
	±0.1pF(B)	GRM0225C1C3R6BD05L	GRM0335C1H3R6BD01D	GRM1555C1H3R6BA01D
	±0.25pF(C)	GRM0225C1C3R6CD05L	GRM0335C1H3R6CD01D	GRM1555C1H3R6CA01D
3.7pF(3R7)	±0.05pF(W)	GRM0225C1C3R7WD05L	GRM0335C1H3R7WD01D	GRM1555C1H3R7WA01D
	±0.1pF(B)	GRM0225C1C3R7BD05L	GRM0335C1H3R7BD01D	GRM1555C1H3R7BA01D
	±0.25pF(C)	GRM0225C1C3R7CD05L	GRM0335C1H3R7CD01D	GRM1555C1H3R7CA01D
3.8pF(3R8)	±0.05pF(W)	GRM0225C1C3R8WD05L	GRM0335C1H3R8WD01D	GRM1555C1H3R8WA01D
	±0.1pF(B)	GRM0225C1C3R8BD05L	GRM0335C1H3R8BD01D	GRM1555C1H3R8BA01D
	±0.25pF(C)	GRM0225C1C3R8CD05L	GRM0335C1H3R8CD01D	GRM1555C1H3R8CA01D
3.9pF(3R9)	±0.05pF(W)	GRM0225C1C3R9WD05L	GRM0335C1H3R9WD01D	GRM1555C1H3R9WA01D
	±0.1pF(B)	GRM0225C1C3R9BD05L	GRM0335C1H3R9BD01D	GRM1555C1H3R9BA01D
	±0.25pF(C)	GRM0225C1C3R9CD05L	GRM0335C1H3R9CD01D	GRM1555C1H3R9CA01D
4.0pF(4R0)	±0.05pF(W)	GRM0225C1C4R0WD05L	GRM0335C1H4R0WD01D	GRM1555C1H4R0WA01D
,	±0.1pF(B)	GRM0225C1C4R0BD05L	GRM0335C1H4R0BD01D	GRM1555C1H4R0BA01D
	±0.25pF(C)	GRM0225C1C4R0CD05L	GRM0335C1H4R0CD01D	GRM1555C1H4R0CA01D
4.1pF(4R1)	±0.05pF(W)	GRM0225C1C4R1WD05L	GRM0335C1H4R1WD01D	GRM1555C1H4R1WA01D
	±0.1pF(B)	GRM0225C1C4R1BD05L	GRM0335C1H4R1BD01D	GRM1555C1H4R1BA01D
	±0.25pF(C)	GRM0225C1C4R1CD05L	GRM0335C1H4R1CD01D	GRM1555C1H4R1CA01D
4.2pF(4R2)	±0.25pF(W)	GRM0225C1C4R2WD05L	GRM0335C1H4R2WD01D	GRM1555C1H4R2WA01D
4.2pr(4rz)				
	±0.1pF(B)	GRM0225C1C4R2BD05L	GRM0335C1H4R2BD01D	GRM1555C1H4R2BA01D
	±0.25pF(C)	GRM0225C1C4R2CD05L	GRM0335C1H4R2CD01D	GRM1555C1H4R2CA01D
4.3pF(4R3)	±0.05pF(W)	GRM0225C1C4R3WD05L	GRM0335C1H4R3WD01D	GRM1555C1H4R3WA01D
	±0.1pF(B)	GRM0225C1C4R3BD05L	GRM0335C1H4R3BD01D	GRM1555C1H4R3BA01D
	±0.25pF(C)	GRM0225C1C4R3CD05L	GRM0335C1H4R3CD01D	GRM1555C1H4R3CA01D
4.4pF(4R4)	±0.05pF(W)	GRM0225C1C4R4WD05L	GRM0335C1H4R4WD01D	GRM1555C1H4R4WA01D
	±0.1pF(B)	GRM0225C1C4R4BD05L	GRM0335C1H4R4BD01D	GRM1555C1H4R4BA01D
	±0.25pF(C)	GRM0225C1C4R4CD05L	GRM0335C1H4R4CD01D	GRM1555C1H4R4CA01D
4.5pF(4R5)	±0.05pF(W)	GRM0225C1C4R5WD05L	GRM0335C1H4R5WD01D	GRM1555C1H4R5WA01D
	±0.1pF(B)	GRM0225C1C4R5BD05L	GRM0335C1H4R5BD01D	GRM1555C1H4R5BA01D
	±0.25pF(C)	GRM0225C1C4R5CD05L	GRM0335C1H4R5CD01D	GRM1555C1H4R5CA01D
4.6pF(4R6)	±0.05pF(W)	GRM0225C1C4R6WD05L	GRM0335C1H4R6WD01D	GRM1555C1H4R6WA01D
	±0.1pF(B)	GRM0225C1C4R6BD05L	GRM0335C1H4R6BD01D	GRM1555C1H4R6BA01D
	±0.25pF(C)	GRM0225C1C4R6CD05L	GRM0335C1H4R6CD01D	GRM1555C1H4R6CA01D
4.7pF(4R7)	±0.05pF(W)	GRM0225C1C4R7WD05L	GRM0335C1H4R7WD01D	GRM1555C1H4R7WA01D
	±0.1pF(B)	GRM0225C1C4R7BD05L	GRM0335C1H4R7BD01D	GRM1555C1H4R7BA01D
	±0.25pF(C)	GRM0225C1C4R7CD05L	GRM0335C1H4R7CD01D	GRM1555C1H4R7CA01D
4.8pF(4R8)	±0.05pF(W)	GRM0225C1C4R8WD05L	GRM0335C1H4R8WD01D	GRM1555C1H4R8WA01D
	±0.1pF(B)	GRM0225C1C4R8BD05L	GRM0335C1H4R8BD01D	GRM1555C1H4R8BA01D
	±0.25pF(C)	GRM0225C1C4R8BD05L	GRM0335C1H4R8CD01D	GRM1555C1H4R8CA01D
4.9pF(4R9)	±0.25pF(C) ±0.05pF(W)	GRM0225C1C4R8CD05L	GRM0335C1H4R9WD01D	GRM1555C1H4R9WA01D
ч.эрг(4К9)				
	±0.1pF(B)	GRM0225C1C4R9BD05L	GRM0335C1H4R9BD01D	GRM1555C1H4R9BA01D
	±0.25pF(C)	GRM0225C1C4R9CD05L	GRM0335C1H4R9CD01D	GRM1555C1H4R9CA01D
5.0pF(5R0)	±0.05pF(W)	GRM0225C1C5R0WD05L	GRM0335C1H5R0WD01D	GRM1555C1H5R0WA01D
	±0.1pF(B)	GRM0225C1C5R0BD05L	GRM0335C1H5R0BD01D	GRM1555C1H5R0BA01D
	±0.25pF(C)	GRM0225C1C5R0CD05L	GRM0335C1H5R0CD01D	GRM1555C1H5R0CA01D
5.1pF(5R1)	±0.05pF(W)	GRM0225C1C5R1WD05L	GRM0335C1H5R1WD01D	GRM1555C1H5R1WA01D
	±0.1pF(B)	GRM0225C1C5R1BD05L	GRM0335C1H5R1BD01D	GRM1555C1H5R1BA01D
	±0.25pF(C)	GRM0225C1C5R1CD05L	GRM0335C1H5R1CD01D	GRM1555C1H5R1CA01D
	±0.5pF(D)	GRM0225C1C5R1DD05L	GRM0335C1H5R1DD01D	GRM1555C1H5R1DA01D

The part number code is shown in () and Unit is shown in []. $\hfill <>:$ EIA [inch] Code





LxW [mm]		0.4x0.2(02)<01005>	0.6x0.3(03)<0201>	1.0x0.5(15)<0402>
Rated Volt. [Vdc]	-	16(1C)	50(1H)	50(1H)
Capacitance	Tolerance		Part Number	
5.2pF(5R2)	±0.05pF(W)	GRM0225C1C5R2WD05L	GRM0335C1H5R2WD01D	GRM1555C1H5R2WA01
	±0.1pF(B)	GRM0225C1C5R2BD05L	GRM0335C1H5R2BD01D	GRM1555C1H5R2BA01
	±0.25pF(C)	GRM0225C1C5R2CD05L	GRM0335C1H5R2CD01D	GRM1555C1H5R2CA01
	±0.5pF(D)	GRM0225C1C5R2DD05L	GRM0335C1H5R2DD01D	GRM1555C1H5R2DA01
5.3pF(5R3)	±0.05pF(W)	GRM0225C1C5R3WD05L	GRM0335C1H5R3WD01D	GRM1555C1H5R3WA01
	±0.1pF(B)	GRM0225C1C5R3BD05L	GRM0335C1H5R3BD01D	GRM1555C1H5R3BA01
	±0.25pF(C)	GRM0225C1C5R3CD05L	GRM0335C1H5R3CD01D	GRM1555C1H5R3CA01
	±0.5pF(D)	GRM0225C1C5R3DD05L	GRM0335C1H5R3DD01D	GRM1555C1H5R3DA01
5.4pF(5R4)	±0.05pF(W)	GRM0225C1C5R4WD05L	GRM0335C1H5R4WD01D	GRM1555C1H5R4WA0
	±0.1pF(B)	GRM0225C1C5R4BD05L	GRM0335C1H5R4BD01D	GRM1555C1H5R4BA01
	±0.25pF(C)	GRM0225C1C5R4CD05L	GRM0335C1H5R4CD01D	GRM1555C1H5R4CA01
	±0.5pF(D)	GRM0225C1C5R4DD05L	GRM0335C1H5R4DD01D	GRM1555C1H5R4DA01
5.5pF(5R5)	±0.05pF(W)	GRM0225C1C5R5WD05L	GRM0335C1H5R5WD01D	GRM1555C1H5R5WA07
	±0.1pF(B)	GRM0225C1C5R5BD05L	GRM0335C1H5R5BD01D	GRM1555C1H5R5BA01
	±0.25pF(C)	GRM0225C1C5R5CD05L	GRM0335C1H5R5CD01D	GRM1555C1H5R5CA01
	±0.5pF(D)	GRM0225C1C5R5DD05L	GRM0335C1H5R5DD01D	GRM1555C1H5R5DA01
5.6pF(5R6)	±0.05pF(W)	GRM0225C1C5R6WD05L	GRM0335C1H5R6WD01D	GRM1555C1H5R6WA0
	±0.1pF(B)	GRM0225C1C5R6BD05L	GRM0335C1H5R6BD01D	GRM1555C1H5R6BA01
	±0.25pF(C)	GRM0225C1C5R6CD05L	GRM0335C1H5R6CD01D	GRM1555C1H5R6CA01
	±0.5pF(D)	GRM0225C1C5R6DD05L	GRM0335C1H5R6DD01D	GRM1555C1H5R6DA01
5.7pF(5R7)	±0.05pF(W)	GRM0225C1C5R7WD05L	GRM0335C1H5R7WD01D	GRM1555C1H5R7WA0 ²
	±0.1pF(B)	GRM0225C1C5R7BD05L	GRM0335C1H5R7BD01D	GRM1555C1H5R7BA01
-	±0.25pF(C)	GRM0225C1C5R7CD05L	GRM0335C1H5R7CD01D	GRM1555C1H5R7CA01
	±0.5pF(D)	GRM0225C1C5R7DD05L	GRM0335C1H5R7DD01D	GRM1555C1H5R7DA01
5.8pF(5R8)	±0.05pF(W)	GRM0225C1C5R8WD05L	GRM0335C1H5R8WD01D	GRM1555C1H5R8WA0 ²
	±0.1pF(B)	GRM0225C1C5R8BD05L	GRM0335C1H5R8BD01D	GRM1555C1H5R8BA01
	±0.25pF(C)	GRM0225C1C5R8CD05L	GRM0335C1H5R8CD01D	GRM1555C1H5R8CA01
	±0.5pF(D)	GRM0225C1C5R8DD05L	GRM0335C1H5R8DD01D	GRM1555C1H5R8DA01
5.9pF(5R9)	±0.05pF(W)	GRM0225C1C5R9WD05L	GRM0335C1H5R9WD01D	GRM1555C1H5R9WA0
	±0.1pF(B)	GRM0225C1C5R9BD05L	GRM0335C1H5R9BD01D	GRM1555C1H5R9BA01
	±0.25pF(C)	GRM0225C1C5R9CD05L	GRM0335C1H5R9CD01D	GRM1555C1H5R9CA01
	±0.5pF(D)	GRM0225C1C5R9DD05L	GRM0335C1H5R9DD01D	GRM1555C1H5R9DA01
6.0pF(6R0)	±0.05pF(W)	GRM0225C1C6R0WD05L	GRM0335C1H6R0WD01D	GRM1555C1H6R0WA01
0.0pr (010)	±0.1pF(B)	GRM0225C1C6R0BD05L	GRM0335C1H6R0BD01D	GRM1555C1H6R0BA01
		GRM0225C1C6R0CD05L	GRM0335C1H6R0CD01D	GRM1555C1H6R0CA01
	±0.25pF(C) +0.5pF(D)	GRM0225C1C6R0DD05L	GRM0335C1H6R0DD01D	GRM1555C1H6R0DA01
6 1nE/604	±0.5pF(D)		GRM0335C1H6R1WD01D	
6.1pF(6R1)	±0.05pF(W)	GRM0225C1C6R1WD05L		GRM1555C1H6R1WA01
	±0.1pF(B)	GRM0225C1C6R1BD05L	GRM0335C1H6R1BD01D	GRM1555C1H6R1BA01
	±0.25pF(C)	GRM0225C1C6R1CD05L	GRM0335C1H6R1CD01D	GRM1555C1H6R1CA01
	±0.5pF(D)	GRM0225C1C6R1DD05L	GRM0335C1H6R1DD01D	GRM1555C1H6R1DA01
6.2pF(6R2)	±0.05pF(W)	GRM0225C1C6R2WD05L	GRM0335C1H6R2WD01D	GRM1555C1H6R2WA0
	±0.1pF(B)	GRM0225C1C6R2BD05L	GRM0335C1H6R2BD01D	GRM1555C1H6R2BA01
	±0.25pF(C)	GRM0225C1C6R2CD05L	GRM0335C1H6R2CD01D	GRM1555C1H6R2CA01
	±0.5pF(D)	GRM0225C1C6R2DD05L	GRM0335C1H6R2DD01D	GRM1555C1H6R2DA01
6.3pF(6R3)	±0.05pF(W)	GRM0225C1C6R3WD05L	GRM0335C1H6R3WD01D	GRM1555C1H6R3WA0
	±0.1pF(B)	GRM0225C1C6R3BD05L	GRM0335C1H6R3BD01D	GRM1555C1H6R3BA01
	±0.25pF(C)	GRM0225C1C6R3CD05L	GRM0335C1H6R3CD01D	GRM1555C1H6R3CA01
	±0.5pF(D)	GRM0225C1C6R3DD05L	GRM0335C1H6R3DD01D	GRM1555C1H6R3DA01

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

0

(Part Number) **GR M 02 2 5C 1C 5R2 W D05 L** 00000 08 90

Product ID 2 Series **5**Temperature Characteristics 8Capacitance Tolerance

3Dimensions (LxW) ORated Voltage
Old Distribution Code
Opackaging*

4Dimension (T) *GRM022: D is applicable.

Packaging Code in Part Number shows STD 180mm Reel Taping.

20

For General

Array

Low ESL

High-Q

High Frequency

Monolithic Microchip

For Bonding

Product Information



LxW [mm]		0.4x0.2(02)<01005>	0.6x0.3(03)<0201>	1.0x0.5(15)<0402>
Rated Volt. [Vdc]		16(1C)	50(1H)	50(1H)
Capacitance	Tolerance		Part Number	
6.4pF(6R4)	±0.05pF(W)	GRM0225C1C6R4WD05L	GRM0335C1H6R4WD01D	GRM1555C1H6R4WA01D
	±0.1pF(B)	GRM0225C1C6R4BD05L	GRM0335C1H6R4BD01D	GRM1555C1H6R4BA01D
	±0.25pF(C)	GRM0225C1C6R4CD05L	GRM0335C1H6R4CD01D	GRM1555C1H6R4CA01D
	±0.5pF(D)	GRM0225C1C6R4DD05L	GRM0335C1H6R4DD01D	GRM1555C1H6R4DA01D
6.5pF(6R5)	±0.05pF(W)	GRM0225C1C6R5WD05L	GRM0335C1H6R5WD01D	GRM1555C1H6R5WA01D
	±0.1pF(B)	GRM0225C1C6R5BD05L	GRM0335C1H6R5BD01D	GRM1555C1H6R5BA01D
	±0.25pF(C)	GRM0225C1C6R5CD05L	GRM0335C1H6R5CD01D	GRM1555C1H6R5CA01D
	±0.5pF(D)	GRM0225C1C6R5DD05L	GRM0335C1H6R5DD01D	GRM1555C1H6R5DA01D
6.6pF(6R6)	±0.05pF(W)	GRM0225C1C6R6WD05L	GRM0335C1H6R6WD01D	GRM1555C1H6R6WA01D
	±0.1pF(B)	GRM0225C1C6R6BD05L	GRM0335C1H6R6BD01D	GRM1555C1H6R6BA01D
	±0.25pF(C)	GRM0225C1C6R6CD05L	GRM0335C1H6R6CD01D	GRM1555C1H6R6CA01D
	±0.5pF(D)	GRM0225C1C6R6DD05L	GRM0335C1H6R6DD01D	GRM1555C1H6R6DA01D
6.7pF(6R7)	±0.05pF(W)	GRM0225C1C6R7WD05L	GRM0335C1H6R7WD01D	GRM1555C1H6R7WA01D
	±0.1pF(B)	GRM0225C1C6R7BD05L	GRM0335C1H6R7BD01D	GRM1555C1H6R7BA01D
	±0.25pF(C)	GRM0225C1C6R7CD05L	GRM0335C1H6R7CD01D	GRM1555C1H6R7CA01D
	±0.5pF(D)	GRM0225C1C6R7DD05L	GRM0335C1H6R7DD01D	GRM1555C1H6R7DA01D
6.8pF(6R8)	±0.05pF(W)	GRM0225C1C6R8WD05L	GRM0335C1H6R8WD01D	GRM1555C1H6R8WA01D
	±0.1pF(B)	GRM0225C1C6R8BD05L	GRM0335C1H6R8BD01D	GRM1555C1H6R8BA01D
	±0.25pF(C)	GRM0225C1C6R8CD05L	GRM0335C1H6R8CD01D	GRM1555C1H6R8CA01D
6.9pF(6R9)	±0.5pF(D)	GRM0225C1C6R8DD05L	GRM0335C1H6R8DD01D	GRM1555C1H6R8DA01D
	±0.05pF(W)	GRM0225C1C6R9WD05L	GRM0335C1H6R9WD01D	GRM1555C1H6R9WA01D
	±0.1pF(B)	GRM0225C1C6R9BD05L	GRM0335C1H6R9BD01D	GRM1555C1H6R9BA01D
	±0.25pF(C)	GRM0225C1C6R9CD05L	GRM0335C1H6R9CD01D	GRM1555C1H6R9CA01D
	±0.5pF(D)	GRM0225C1C6R9DD05L	GRM0335C1H6R9DD01D	GRM1555C1H6R9DA01D
7.0pF(7R0)	±0.05pF(W)	GRM0225C1C7R0WD05L	GRM0335C1H7R0WD01D	GRM1555C1H7R0WA01D
7.0pr (710)				
	±0.1pF(B)	GRM0225C1C7R0BD05L	GRM0335C1H7R0BD01D	GRM1555C1H7R0BA01D
	±0.25pF(C)	GRM0225C1C7R0CD05L	GRM0335C1H7R0CD01D	GRM1555C1H7R0CA01D
	±0.5pF(D)	GRM0225C1C7R0DD05L	GRM0335C1H7R0DD01D	GRM1555C1H7R0DA01D
7.1pF(7R1)	±0.05pF(W)	GRM0225C1C7R1WD05L	GRM0335C1H7R1WD01D	GRM1555C1H7R1WA01D
	±0.1pF(B)	GRM0225C1C7R1BD05L	GRM0335C1H7R1BD01D	GRM1555C1H7R1BA01D
	±0.25pF(C)	GRM0225C1C7R1CD05L	GRM0335C1H7R1CD01D	GRM1555C1H7R1CA01D
	±0.5pF(D)	GRM0225C1C7R1DD05L	GRM0335C1H7R1DD01D	GRM1555C1H7R1DA01D
7.2pF(7R2)	±0.05pF(W)	GRM0225C1C7R2WD05L	GRM0335C1H7R2WD01D	GRM1555C1H7R2WA01D
	±0.1pF(B)	GRM0225C1C7R2BD05L	GRM0335C1H7R2BD01D	GRM1555C1H7R2BA01D
	±0.25pF(C)	GRM0225C1C7R2CD05L	GRM0335C1H7R2CD01D	GRM1555C1H7R2CA01D
	±0.5pF(D)	GRM0225C1C7R2DD05L	GRM0335C1H7R2DD01D	GRM1555C1H7R2DA01D
7.3pF(7R3)	±0.05pF(W)	GRM0225C1C7R3WD05L	GRM0335C1H7R3WD01D	GRM1555C1H7R3WA01D
	±0.1pF(B)	GRM0225C1C7R3BD05L	GRM0335C1H7R3BD01D	GRM1555C1H7R3BA01D
	±0.25pF(C)	GRM0225C1C7R3CD05L	GRM0335C1H7R3CD01D	GRM1555C1H7R3CA01D
	±0.5pF(D)	GRM0225C1C7R3DD05L	GRM0335C1H7R3DD01D	GRM1555C1H7R3DA01D
7.4pF(7R4)	±0.05pF(W)	GRM0225C1C7R4WD05L	GRM0335C1H7R4WD01D	GRM1555C1H7R4WA01D
	±0.1pF(B)	GRM0225C1C7R4BD05L	GRM0335C1H7R4BD01D	GRM1555C1H7R4BA01D
	±0.25pF(C)	GRM0225C1C7R4CD05L	GRM0335C1H7R4CD01D	GRM1555C1H7R4CA01D
	±0.5pF(D)	GRM0225C1C7R4DD05L	GRM0335C1H7R4DD01D	GRM1555C1H7R4DA01D
7.5pF(7R5)	±0.05pF(W)	GRM0225C1C7R5WD05L	GRM0335C1H7R5WD01D	GRM1555C1H7R5WA01D
	±0.1pF(B)	GRM0225C1C7R5BD05L	GRM0335C1H7R5BD01D	GRM1555C1H7R5BA01D
	±0.25pF(C)	GRM0225C1C7R5CD05L	GRM0335C1H7R5CD01D	GRM1555C1H7R5CA01D
	±0.5pF(D)	GRM0225C1C7R5DD05L	GRM0335C1H7R5DD01D	GRM1555C1H7R5DA01D

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code



LxW [mm]		0.4x0.2(02)<01005>	0.6x0.3(03)<0201>	1.0x0.5(15)<0402>
Rated Volt. [Vdc]	-	16(1C)	50(1H)	50(1H)
Capacitance	Tolerance		Part Number	
7.6pF(7R6)	±0.05pF(W)	GRM0225C1C7R6WD05L	GRM0335C1H7R6WD01D	GRM1555C1H7R6WA01
	±0.1pF(B)	GRM0225C1C7R6BD05L	GRM0335C1H7R6BD01D	GRM1555C1H7R6BA01
	±0.25pF(C)	GRM0225C1C7R6CD05L	GRM0335C1H7R6CD01D	GRM1555C1H7R6CA01
	±0.5pF(D)	GRM0225C1C7R6DD05L	GRM0335C1H7R6DD01D	GRM1555C1H7R6DA01
7.7pF(7R7)	±0.05pF(W)	GRM0225C1C7R7WD05L	GRM0335C1H7R7WD01D	GRM1555C1H7R7WA01
	±0.1pF(B)	GRM0225C1C7R7BD05L	GRM0335C1H7R7BD01D	GRM1555C1H7R7BA01
	±0.25pF(C)	GRM0225C1C7R7CD05L	GRM0335C1H7R7CD01D	GRM1555C1H7R7CA01
	±0.5pF(D)	GRM0225C1C7R7DD05L	GRM0335C1H7R7DD01D	GRM1555C1H7R7DA01
7.8pF(7R8)	±0.05pF(W)	GRM0225C1C7R8WD05L	GRM0335C1H7R8WD01D	GRM1555C1H7R8WA01
	±0.1pF(B)	GRM0225C1C7R8BD05L	GRM0335C1H7R8BD01D	GRM1555C1H7R8BA01
	±0.25pF(C)	GRM0225C1C7R8CD05L	GRM0335C1H7R8CD01D	GRM1555C1H7R8CA01
	±0.5pF(D)	GRM0225C1C7R8DD05L	GRM0335C1H7R8DD01D	GRM1555C1H7R8DA01
7.9pF(7R9)	±0.05pF(W)	GRM0225C1C7R9WD05L	GRM0335C1H7R9WD01D	GRM1555C1H7R9WA01
	±0.1pF(B)	GRM0225C1C7R9BD05L	GRM0335C1H7R9BD01D	GRM1555C1H7R9BA01
	±0.25pF(C)	GRM0225C1C7R9CD05L	GRM0335C1H7R9CD01D	GRM1555C1H7R9CA01
	±0.5pF(D)	GRM0225C1C7R9DD05L	GRM0335C1H7R9DD01D	GRM1555C1H7R9DA01
8.0pF(8R0)	±0.05pF(W)	GRM0225C1C8R0WD05L	GRM0335C1H8R0WD01D	GRM1555C1H8R0WA01
0.0pr (0110)	±0.1pF(B)	GRM0225C1C8R0BD05L	GRM0335C1H8R0BD01D	GRM1555C1H8R0BA01
	±0.25pF(C)	GRM0225C1C8R0CD05L	GRM0335C1H8R0CD01D	GRM1555C1H8R0CA01
		GRM0225C1C8R0DD05L	GRM0335C1H8R0DD01D	GRM1555C1H8R0DA01
0.1pF/ 0D1)	±0.5pF(D) ±0.05pF(W)			
8.1pF(8R1)		GRM0225C1C8R1WD05L	GRM0335C1H8R1WD01D	GRM1555C1H8R1WA01
-	±0.1pF(B)	GRM0225C1C8R1BD05L	GRM0335C1H8R1BD01D	GRM1555C1H8R1BA01
	±0.25pF(C)	GRM0225C1C8R1CD05L	GRM0335C1H8R1CD01D	GRM1555C1H8R1CA01
	±0.5pF(D)	GRM0225C1C8R1DD05L	GRM0335C1H8R1DD01D	GRM1555C1H8R1DA01
8.2pF(8R2)	±0.05pF(W)	GRM0225C1C8R2WD05L	GRM0335C1H8R2WD01D	GRM1555C1H8R2WA01
	±0.1pF(B)	GRM0225C1C8R2BD05L	GRM0335C1H8R2BD01D	GRM1555C1H8R2BA01
	±0.25pF(C)	GRM0225C1C8R2CD05L	GRM0335C1H8R2CD01D	GRM1555C1H8R2CA01
	±0.5pF(D)	GRM0225C1C8R2DD05L	GRM0335C1H8R2DD01D	GRM1555C1H8R2DA01
8.3pF(8R3)	±0.05pF(W)	GRM0225C1C8R3WD05L	GRM0335C1H8R3WD01D	GRM1555C1H8R3WA01
	±0.1pF(B)	GRM0225C1C8R3BD05L	GRM0335C1H8R3BD01D	GRM1555C1H8R3BA01
	±0.25pF(C)	GRM0225C1C8R3CD05L	GRM0335C1H8R3CD01D	GRM1555C1H8R3CA01
	±0.5pF(D)	GRM0225C1C8R3DD05L	GRM0335C1H8R3DD01D	GRM1555C1H8R3DA01
8.4pF(8R4)	±0.05pF(W)	GRM0225C1C8R4WD05L	GRM0335C1H8R4WD01D	GRM1555C1H8R4WA01
	±0.1pF(B)	GRM0225C1C8R4BD05L	GRM0335C1H8R4BD01D	GRM1555C1H8R4BA01
	±0.25pF(C)	GRM0225C1C8R4CD05L	GRM0335C1H8R4CD01D	GRM1555C1H8R4CA01
	±0.5pF(D)	GRM0225C1C8R4DD05L	GRM0335C1H8R4DD01D	GRM1555C1H8R4DA01
8.5pF(8R5)	±0.05pF(W)	GRM0225C1C8R5WD05L	GRM0335C1H8R5WD01D	GRM1555C1H8R5WA01
	±0.1pF(B)	GRM0225C1C8R5BD05L	GRM0335C1H8R5BD01D	GRM1555C1H8R5BA01
	±0.25pF(C)	GRM0225C1C8R5CD05L	GRM0335C1H8R5CD01D	GRM1555C1H8R5CA01
	±0.5pF(D)	GRM0225C1C8R5DD05L	GRM0335C1H8R5DD01D	GRM1555C1H8R5DA01
8.6pF(8R6)	±0.05pF(W)	GRM0225C1C8R6WD05L	GRM0335C1H8R6WD01D	GRM1555C1H8R6WA01
	±0.1pF(B)	GRM0225C1C8R6BD05L	GRM0335C1H8R6BD01D	GRM1555C1H8R6BA01
	±0.25pF(C)	GRM0225C1C8R6CD05L	GRM0335C1H8R6CD01D	GRM1555C1H8R6CA01
	±0.5pF(D)	GRM0225C1C8R6DD05L	GRM0335C1H8R6DD01D	GRM1555C1H8R6DA01
8.7pF(8R7)	±0.05pF(W)	GRM0225C1C8R7WD05L	GRM0335C1H8R7WD01D	GRM1555C1H8R7WA01
0.7 pr (01.7)				
	±0.1pF(B)	GRM0225C1C8R7BD05L	GRM0335C1H8R7BD01D	GRM1555C1H8R7BA01
	±0.25pF(C)	GRM0225C1C8R7CD05L	GRM0335C1H8R7CD01D	GRM1555C1H8R7CA01
	±0.5pF(D)	GRM0225C1C8R7DD05L	GRM0335C1H8R7DD01D	GRM1555C1H8R7DA01

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

(Part Number) **GR M 02 25 C 1C 7R6 W D05 L** 000000 08 90

Packaging Code in Part Number shows STD 180mm Reel Taping.

Product ID 2 Series **5**Temperature Characteristics 8Capacitance Tolerance

3Dimensions (LxW) ORated Voltage
Old Distribution Code
Opackaging*

4Dimension (T) *GRM022: D is applicable.

Array

High-Q

Monolithic Microchip

For Bonding



LxW [mm]		0.4x0.2(02)<01005>	0.6x0.3(03)<0201>	1.0x0.5(15)<0402>
Rated Volt. [Vdc]		16(1C)	50(1H)	50(1H)
Capacitance	Tolerance		Part Number	F
8.8pF(8R8)	±0.05pF(W)	GRM0225C1C8R8WD05L	GRM0335C1H8R8WD01D	GRM1555C1H8R8WA01D
	±0.1pF(B)	GRM0225C1C8R8BD05L	GRM0335C1H8R8BD01D	GRM1555C1H8R8BA01D
	±0.25pF(C)	GRM0225C1C8R8CD05L	GRM0335C1H8R8CD01D	GRM1555C1H8R8CA01D
	±0.5pF(D)	GRM0225C1C8R8DD05L	GRM0335C1H8R8DD01D	GRM1555C1H8R8DA01D
8.9pF(8R9)	±0.05pF(W)	GRM0225C1C8R9WD05L	GRM0335C1H8R9WD01D	GRM1555C1H8R9WA01D
	±0.1pF(B)	GRM0225C1C8R9BD05L	GRM0335C1H8R9BD01D	GRM1555C1H8R9BA01D
	±0.25pF(C)	GRM0225C1C8R9CD05L	GRM0335C1H8R9CD01D	GRM1555C1H8R9CA01D
	±0.5pF(D)	GRM0225C1C8R9DD05L	GRM0335C1H8R9DD01D	GRM1555C1H8R9DA01D
9.0pF(9R0)	±0.05pF(W)	GRM0225C1C9R0WD05L	GRM0335C1H9R0WD01D	GRM1555C1H9R0WA01D
	±0.1pF(B)	GRM0225C1C9R0BD05L	GRM0335C1H9R0BD01D	GRM1555C1H9R0BA01D
	±0.25pF(C)	GRM0225C1C9R0CD05L	GRM0335C1H9R0CD01D	GRM1555C1H9R0CA01D
	±0.5pF(D)	GRM0225C1C9R0DD05L	GRM0335C1H9R0DD01D	GRM1555C1H9R0DA01D
9.1pF(9R1)	±0.05pF(W)	GRM0225C1C9R1WD05L	GRM0335C1H9R1WD01D	GRM1555C1H9R1WA01D
	±0.1pF(B)	GRM0225C1C9R1BD05L	GRM0335C1H9R1BD01D	GRM1555C1H9R1BA01D
	±0.25pF(C)	GRM0225C1C9R1CD05L	GRM0335C1H9R1CD01D	GRM1555C1H9R1CA01D
	±0.5pF(D)	GRM0225C1C9R1DD05L	GRM0335C1H9R1DD01D	GRM1555C1H9R1DA01D
9.2pF(9R2)	±0.05pF(W)	GRM0225C1C9R2WD05L	GRM0335C1H9R2WD01D	GRM1555C1H9R2WA01D
	±0.1pF(B)	GRM0225C1C9R2BD05L	GRM0335C1H9R2BD01D	GRM1555C1H9R2BA01D
	±0.25pF(C)	GRM0225C1C9R2CD05L	GRM0335C1H9R2CD01D	GRM1555C1H9R2CA01D
	±0.5pF(D)	GRM0225C1C9R2DD05L	GRM0335C1H9R2DD01D	GRM1555C1H9R2DA01D
9.3pF(9R3)	±0.05pF(W)	GRM0225C1C9R3WD05L	GRM0335C1H9R3WD01D	GRM1555C1H9R3WA01D
• • •	±0.1pF(B)	GRM0225C1C9R3BD05L	GRM0335C1H9R3BD01D	GRM1555C1H9R3BA01D
	±0.25pF(C)	GRM0225C1C9R3CD05L	GRM0335C1H9R3CD01D	GRM1555C1H9R3CA01D
	±0.5pF(D)	GRM0225C1C9R3DD05L	GRM0335C1H9R3DD01D	GRM1555C1H9R3DA01D
9.4pF(9R4)	±0.05pF(W)	GRM0225C1C9R4WD05L	GRM0335C1H9R4WD01D	GRM1555C1H9R4WA01D
	±0.1pF(B)	GRM0225C1C9R4BD05L	GRM0335C1H9R4BD01D	GRM1555C1H9R4BA01D
	±0.25pF(C)	GRM0225C1C9R4CD05L	GRM0335C1H9R4CD01D	GRM1555C1H9R4CA01D
	±0.5pF(D)	GRM0225C1C9R4DD05L	GRM0335C1H9R4DD01D	GRM1555C1H9R4DA01D
9.5pF(9R5)	±0.05pF(W)	GRM0225C1C9R5WD05L	GRM0335C1H9R5WD01D	GRM1555C1H9R5WA01D
7.0pt (0110)	±0.1pF(B)	GRM0225C1C9R5BD05L	GRM0335C1H9R5BD01D	GRM1555C1H9R5BA01D
	±0.25pF(C)	GRM0225C1C9R5CD05L	GRM0335C1H9R5CD01D	GRM1555C1H9R5CA01D
	±0.5pF(D)	GRM0225C1C9R5DD05L	GRM0335C1H9R5DD01D	GRM1555C1H9R5DA01D
9.6pF(9R6)			GRM0335C1H9R6WD01D	
7.0pr (3r0)	±0.05pF(W)	GRM0225C1C9R6WD05L GRM0225C1C9R6BD05L	GRM0335C1H9R6BD01D	GRM1555C1H9R6WA01D GRM1555C1H9R6BA01D
	±0.1pF(B)			
	±0.25pF(C)	GRM0225C1C9R6CD05L	GRM0335C1H9R6CD01D	GRM1555C1H9R6CA01D
0.7~5/007	±0.5pF(D)	GRM0225C1C9R6DD05L	GRM0335C1H9R6DD01D	GRM1555C1H9R6DA01D
9.7pF(9R7)	±0.05pF(W)	GRM0225C1C9R7WD05L	GRM0335C1H9R7WD01D	GRM1555C1H9R7WA01D
	±0.1pF(B)	GRM0225C1C9R7BD05L	GRM0335C1H9R7BD01D	GRM1555C1H9R7BA01D
	±0.25pF(C)	GRM0225C1C9R7CD05L	GRM0335C1H9R7CD01D	GRM1555C1H9R7CA01D
	±0.5pF(D)	GRM0225C1C9R7DD05L	GRM0335C1H9R7DD01D	GRM1555C1H9R7DA01D
9.8pF(9R8)	±0.05pF(W)	GRM0225C1C9R8WD05L	GRM0335C1H9R8WD01D	GRM1555C1H9R8WA01D
	±0.1pF(B)	GRM0225C1C9R8BD05L	GRM0335C1H9R8BD01D	GRM1555C1H9R8BA01D
	±0.25pF(C)	GRM0225C1C9R8CD05L	GRM0335C1H9R8CD01D	GRM1555C1H9R8CA01D
	±0.5pF(D)	GRM0225C1C9R8DD05L	GRM0335C1H9R8DD01D	GRM1555C1H9R8DA01D
9.9pF(9R9)	±0.05pF(W)	GRM0225C1C9R9WD05L	GRM0335C1H9R9WD01D	GRM1555C1H9R9WA01D
	±0.1pF(B)	GRM0225C1C9R9BD05L	GRM0335C1H9R9BD01D	GRM1555C1H9R9BA01D
	±0.25pF(C)	GRM0225C1C9R9CD05L	GRM0335C1H9R9CD01D	GRM1555C1H9R9CA01D
	±0.5pF(D)	GRM0225C1C9R9DD05L	GRM0335C1H9R9DD01D	GRM1555C1H9R9DA01D

The part number code is shown in () and Unit is shown in []. $\hfill <>:$ EIA [inch] Code

muRata

1 Se	LxW [mm]			0.4x0.2(02)<01005>		0.6x0.3(03)<0201>
GRM Seri	Rated Volt. [Vdc]	16(1C)	10(1A)	6.3(0J)	50(1H)
. 0	Capacitance	Tolerance		Part N	lumber	•
	10pF(100)	±2%(G)	GRM0225C1C100GD05L			GRM0335C1H100GD01D
		±5%(J)	GRM0225C1C100JD05L			GRM0335C1H100JD01D
	12pF(120)	±2%(G)	GRM0225C1C120GD05L			GRM0335C1H120GD01D
ies		±5%(J)	GRM0225C1C120JD05L			GRM0335C1H120JD01D
GNM Series	15pF(150)	±2%(G)	GRM0225C1C150GD05L			GRM0335C1H150GD01D
VM Ser		±5%(J)	GRM0225C1C150JD05L			GRM0335C1H150JD01D
G	18pF(180)	±2%(G)	GRM0225C1C180GD05L			GRM0335C1H180GD01D
		±5%(J)	GRM0225C1C180JD05L			GRM0335C1H180JD01D
	22pF(220)	±2%(G)	GRM0225C1C220GD05L			GRM0335C1H220GD01D
		±5%(J)	GRM0225C1C220JD05L			GRM0335C1H220JD01D
ŝ	27pF(270)	±2%(G)	GRM0225C1C270GD05L			GRM0335C1H270GD01E
LL Series		±5%(J)	GRM0225C1C270JD05L			GRM0335C1H270JD01D
S	33pF(330)	±2%(G)	GRM0225C1C330GD05L			GRM0335C1H330GD01D
E		±5%(J)	GRM0225C1C330JD05L			GRM0335C1H330JD01D
	39pF(390)	±2%(G)	GRM0225C1C390GD05L			GRM0335C1H390GD01E
		±5%(J)	GRM0225C1C390JD05L			GRM0335C1H390JD01D
	47pF(470)	±2%(G)	GRM0225C1C470GD05L			GRM0335C1H470GD01E
		±5%(J)	GRM0225C1C470JD05L			GRM0335C1H470JD01D
ries	56pF(560)	±2%(G)		GRM0225C1A560GD05L	GRM0225C0J560GD05L	GRM0335C1H560GD01E
1 Se		±5%(J)		GRM0225C1A560JD05L	GRM0225C0J560JD05L	GRM0335C1H560JD01D
GJM Series	68pF(680)	±2%(G)		GRM0225C1A680GD05L	GRM0225C0J680GD05L	GRM0335C1H680GD01E
0		±5%(J)		GRM0225C1A680JD05L	GRM0225C0J680JD05L	GRM0335C1H680JD01D
	82pF(820)	±2%(G)		GRM0225C1A820GD05L	GRM0225C0J820GD05L	GRM0335C1H820GD01D
		±5%(J)		GRM0225C1A820JD05L	GRM0225C0J820JD05L	GRM0335C1H820JD01D
	100pF(101)	±2%(G)		GRM0225C1A101GD05L	GRM0225C0J101GD05L	GRM0335C1H101GD01E
eries		±5%(J)		GRM0225C1A101JD05L	GRM0225C0J101JD05L	GRM0335C1H101JD01D

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

(Part Number) **GR M 02 2 5C 1C 100 G D05 L** 00000 0 1 8 9 Packaging Code in Part Number shows STD 180mm Reel Taping.

Product ID 2 Series **5**Temperature Characteristics 8Capacitance Tolerance

3 Dimensions (LxW) Rated Voltage
Individual Specification Code
Packaging*

4 Dimension (T) *GRM022: D is applicable.



D

LxW [mm]		1.0x0.5(15)<0402>
Rated Volt. [Vdc]		50(1H)
тс		C0G(5C)
Capacitance	Tolerance	Part Number
10pF(100)	±2%(G)	GRM1555C1H100GA01D
	±5%(J)	GRM1555C1H100JA01D
12pF(120)	±2%(G)	GRM1555C1H120GA01D
	±5%(J)	GRM1555C1H120JA01D
15pF(150)	±2%(G)	GRM1555C1H150GA01D
	±5%(J)	GRM1555C1H150JA01D
18pF(180)	±2%(G)	GRM1555C1H180GA01D
	±5%(J)	GRM1555C1H180JA01D
22pF(220)	±2%(G)	GRM1555C1H220GA01D
	±5%(J)	GRM1555C1H220JA01D
27pF(270)	±2%(G)	GRM1555C1H270GA01D
	±5%(J)	GRM1555C1H270JA01D
33pF(330)	±2%(G)	GRM1555C1H330GA01D
	±5%(J)	GRM1555C1H330JA01D
39pF(390)	±2%(G)	GRM1555C1H390GA01D
	±5%(J)	GRM1555C1H390JA01D
47pF(470)	±2%(G)	GRM1555C1H470GA01D
	±5%(J)	GRM1555C1H470JA01D
56pF(560)	±2%(G)	GRM1555C1H560GA01D
	±5%(J)	GRM1555C1H560JA01D
68pF(680)	±2%(G)	GRM1555C1H680GA01D
oop: (••••)	±5%(J)	GRM1555C1H680JA01D
82pF(820)	±2%(G)	GRM1555C1H820GA01D
02pi (020)	±5%(J)	GRM1555C1H820JA01D
100pF(101)	±2%(G)	GRM1555C1H101GA01D
	±5%(J)	GRM1555C1H101JA01D
120pF(121)	±3%(G)	GRM1555C1H121GA01D
120p1 (121)	±5%(J)	GRM1555C1H121JA01D
150pF(151)	±3 %(3) ±2%(G)	GRM1555C1H151GA01D
150pF(151)		GRM1555C1H151JA01D
190pF(191)	±5%(J) ±2%(G)	GRM1555C1H181GA01D
180pF(181)		
220-5(204)	±5%(J)	GRM1555C1H181JA01D
220pF(221)	±2%(G)	GRM1555C1H221GA01D
	±5%(J)	GRM1555C1H221JA01D
270pF(271)	±2%(G)	GRM1555C1H271GA01D
	±5%(J)	GRM1555C1H271JA01D
330pF(331)	±2%(G)	GRM1555C1H331GA01D
	±5%(J)	GRM1555C1H331JA01D
390pF(391)	±2%(G)	GRM1555C1H391GA01D
	±5%(J)	GRM1555C1H391JA01D
470pF(471)	±2%(G)	GRM1555C1H471GA01D
	±5%(J)	GRM1555C1H471JA01D
560pF(561)	±2%(G)	GRM1555C1H561GA01D
	±5%(J)	GRM1555C1H561JA01D
680pF(681)	±2%(G)	GRM1555C1H681GA01D
	±5%(J)	GRM1555C1H681JA01D
820pF(821)	±2%(G)	GRM1555C1H821GA01D
	±5%(J)	GRM1555C1H821JA01D
1000pF(102)	±2%(G)	GRM1555C1H102GA01D
	±5%(J)	GRM1555C1H102JA01D

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

For General GRM Series



For Gene GRM Seri	LxW [mm]		1.6x0.8(18)<0603>				
or (iRN	Rated Volt. [Vdc]	100(2A)	50(1H)			
шÖ	Capacitance	Tolerance	Part N	umber			
	10pF(100)	±5%(J)	GRM1885C2A100JA01D	GRM1885C1H100JA01D			
	12pF(120)	±5%(J)	GRM1885C2A120JA01D	GRM1885C1H120JA01D			
	15pF(150)	±5%(J)	GRM1885C2A150JA01D	GRM1885C1H150JA01D			
ies	18pF(180)	±5%(J)	GRM1885C2A180JA01D	GRM1885C1H180JA01D			
Ser	22pF(220)	±5%(J)	GRM1885C2A220JA01D	GRM1885C1H220JA01D			
Array GNM Series	27pF(270)	±5%(J)	GRM1885C2A270JA01D	GRM1885C1H270JA01D			
G	33pF(330)	±5%(J)	GRM1885C2A330JA01D	GRM1885C1H330JA01D			
	39pF(390)	±5%(J)	GRM1885C2A390JA01D	GRM1885C1H390JA01D			
	47pF(470)	±5%(J)	GRM1885C2A470JA01D	GRM1885C1H470JA01D			
	56pF(560)	±5%(J)	GRM1885C2A560JA01D	GRM1885C1H560JA01D			
- S	68pF(680)	±5%(J)	GRM1885C2A680JA01D	GRM1885C1H680JA01D			
Low ESL LL ^[] Series	82pF(820)	±5%(J)	GRM1885C2A820JA01D	GRM1885C1H820JA01D			
≥ S	100pF(101)	±5%(J)	GRM1885C2A101JA01D	GRM1885C1H101JA01D			
Ξ	120pF(121)	±5%(J)	GRM1885C2A121JA01D	GRM1885C1H121JA01D			
	150pF(151)	±5%(J)	GRM1885C2A151JA01D	GRM1885C1H151JA01D			
	180pF(181)	±5%(J)	GRM1885C2A181JA01D	GRM1885C1H181JA01D			
	220pF(221)	±5%(J)	GRM1885C2A221JA01D	GRM1885C1H221JA01D			
Ś	270pF(271)	±5%(J)	GRM1885C2A271JA01D	GRM1885C1H271JA01D			
erie.	330pF(331)	±5%(J)	GRM1885C2A331JA01D	GRM1885C1H331JA01D			
High-Q GJM Series	390pF(391)	±5%(J)	GRM1885C2A391JA01D	GRM1885C1H391JA01D			
H S	470pF(471)	±5%(J)	GRM1885C2A471JA01D	GRM1885C1H471JA01D			
Ū	560pF(561)	±5%(J)	GRM1885C2A561JA01D	GRM1885C1H561JA01D			
	680pF(681)	±5%(J)	GRM1885C2A681JA01D	GRM1885C1H681JA01D			
	820pF(821)	±5%(J)	GRM1885C2A821JA01D	GRM1885C1H821JA01D			
2	1000pF(102)	±5%(J)	GRM1885C2A102JA01D	GRM1885C1H102JA01D			
High Frequency GQM Series	1200pF(122)	±5%(J)	GRM1885C2A122JA01D	GRM1885C1H122JA01D			
equ	1500pF(152)	±5%(J)	GRM1885C2A152JA01D	GRM1885C1H152JA01D			
D Fr	1800pF(182)	±5%(J)		GRM1885C1H182JA01D			
Higl	2200pF(222)	±5%(J)		GRM1885C1H222JA01D			
_	2700pF(272)	±5%(J)		GRM1885C1H272JA01D			
	3300pF(332)	±5%(J)		GRM1885C1H332JA01D			
hip	3900pF(392)	±5%(J)		GRM1885C1H392JA01D			
Monolithic Microch GMA Series	The part number of	ode is shown in () and Unit is shown in []. <>: E	IA [inch] Code			

Product Information

For Bonding GMD Series

For General GRM Series



Packaging Code in Part Number shows STD 180mm Reel Taping.

5Temperature Characteristics 8Capacitance Tolerance

2 Series

3 Dimensions (LxW) 6 Rated Voltage Individual Specification Code

4 Dimension (T) Capacitance Packaging

Product ID

_xW [mm]		2.0x1.25(21)<0805>		3.2x1.6(31)<1206>			
Rated Volt. [Vdc	:]	100(2A)	50(1H)	100(2A)	50(1H)		
Capacitance	Tolerance		Part N	lumber			
100pF(101)	±5%(J)	GRM2165C2A101JA01D					
120pF(121)	±5%(J)	GRM2165C2A121JA01D					
150pF(151)	±5%(J)	GRM2165C2A151JA01D					
180pF(181)	±5%(J)	GRM2165C2A181JA01D					
220pF(221)	±5%(J)	GRM2165C2A221JA01D					
270pF(271)	±5%(J)	GRM2165C2A271JA01D					
330pF(331)	±5%(J)	GRM2165C2A331JA01D					
390pF(391)	±5%(J)	GRM2165C2A391JA01D					
470pF(471)	±5%(J)	GRM2165C2A471JA01D					
560pF(561)	±5%(J)	GRM2165C2A561JA01D					
680pF(681)	±5%(J)	GRM2165C2A681JA01D					
820pF(821)	±5%(J)	GRM2165C2A821JA01D					
1000pF(102)	±5%(J)	GRM2165C2A102JA01D					
1200pF(122)	±5%(J)	GRM2165C2A122JA01D	GRM2165C1H122JA01D				
1500pF(152)	±5%(J)	GRM2165C2A152JA01D	GRM2165C1H152JA01D				
1800pF(182)	±5%(J)	GRM2165C2A182JA01D	GRM2165C1H182JA01D	GRM3195C2A182JA01D			
2200pF(222)	±5%(J)	GRM2165C2A222JA01D	GRM2165C1H222JA01D	GRM3195C2A222JA01D			
2700pF(272)	±5%(J)	GRM2165C2A272JA01D	GRM2165C1H272JA01D	GRM3195C2A272JA01D			
3300pF(332)	±5%(J)	GRM2165C2A332JA01D	GRM2165C1H332JA01D	GRM3195C2A332JA01D			
3900pF(392)	±5%(J)		GRM2165C1H392JA01D	GRM3195C2A392JA01D			
4700pF(472)	±5%(J)		GRM2165C1H472JA01D	GRM3195C2A472JA01D	GRM3195C1H472JA01D		
5600pF(562)	±5%(J)		GRM2195C1H562JA01D	GRM3195C2A562JA01D	GRM3195C1H562JA01D		
6800pF(682)	±5%(J)		GRM2195C1H682JA01D	GRM3195C2A682JA01D	GRM3195C1H682JA01D		
8200pF(822)	±5%(J)		GRM2195C1H822JA01D	GRM3195C2A822JA01D	GRM3195C1H822JA01D		
10000pF(103)	±5%(J)		GRM2195C1H103JA01D	GRM3195C2A103JA01D	GRM3195C1H103JA01D		
12000pF(123)	±5%(J)		GRM2195C1H123JA01D	GRM3195C2A123JA01D	GRM3195C1H123JA01D		
15000pF(153)	±5%(J)		GRM2195C1H153JA01D	GRM3195C2A153JA01D	GRM3195C1H153JA01D		
18000pF(183)	±5%(J)		GRM21B5C1H183JA01L	GRM3195C2A183JA01D	GRM3195C1H183JA01D		
22000pF(223)	±5%(J)		GRM21B5C1H223JA01L	GRM3195C2A223JA01D	GRM3195C1H223JA01D		
27000pF(273)	±5%(J)				GRM3195C1H273JA01D		
33000pF(333)	±5%(J)				GRM3195C1H333JA01D		
39000pF(393)	±5%(J)				GRM3195C1H393JA01D		
47000pF(473)	±5%(J)				GRM31M5C1H473JA01L		
56000pF(563)	±5%(J)				GRM31M5C1H563JA01L		
68000pF(683)	±5%(J)				GRM31C5C1H683JA01L		
82000pF(823)	±5%(J)				GRM31C5C1H823JA01L		
100000pF(104)	±5%(J)				GRM31C5C1H104JA01L		

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

muRata

Temperature Compensating Type C0G(5C) Characteristics-Low Profile

LxW [mm]		1.0x0.5(15)<0402>	LxW [mm]		1.0x0.5(15)<0402
Rated Volt. [Vdc]]	50(1H)	Rated Volt. [Vdc]	50(1H)
Capacitance	Tolerance	Part Number	Capacitance	Tolerance	Part Number
0.1pF(R10)	±0.1pF(B)	GRM1535C1HR10BDD5D	4.9pF(4R9)	±0.25pF(C)	GRM1535C1H4R9CD
0.2pF(R20)	±0.1pF(B)	GRM1535C1HR20BDD5D	5.0pF(5R0)	±0.25pF(C)	GRM1535C1H5R0CD
0.3pF(R30)	±0.1pF(B)	GRM1535C1HR30BDD5D	5.1pF(5R1)	±0.5pF(D)	GRM1535C1H5R1DD
0.4pF(R40)	±0.1pF(B)	GRM1535C1HR40BDD5D	5.2pF(5R2)	±0.5pF(D)	GRM1535C1H5R2DD
0.5pF(R50)	±0.1pF(B)	GRM1535C1HR50BDD5D	5.3pF(5R3)	±0.5pF(D)	GRM1535C1H5R3DD
0.6pF(R60)	±0.1pF(B)	GRM1535C1HR60BDD5D	5.4pF(5R4)	±0.5pF(D)	GRM1535C1H5R4DD
0.7pF(R70)	±0.1pF(B)	GRM1535C1HR70BDD5D	5.5pF(5R5)	±0.5pF(D)	GRM1535C1H5R5DE
0.8pF(R80)	±0.1pF(B)	GRM1535C1HR80BDD5D	5.6pF(5R6)	±0.5pF(D)	GRM1535C1H5R6DD
0.9pF(R90)	±0.1pF(B)	GRM1535C1HR90BDD5D	5.7pF(5R7)	±0.5pF(D)	GRM1535C1H5R7DD
1.0pF(1R0)	±0.25pF(C)	GRM1535C1H1R0CDD5D	5.8pF(5R8)	±0.5pF(D)	GRM1535C1H5R8DD
1.1pF(1R1)	±0.25pF(C)	GRM1535C1H1R1CDD5D	5.9pF(5R9)	±0.5pF(D)	GRM1535C1H5R9DD
1.2pF(1R2)	±0.25pF(C)	GRM1535C1H1R2CDD5D	6.0pF(6R0)	±0.5pF(D)	GRM1535C1H6R0DE
1.3pF(1R3)	±0.25pF(C)	GRM1535C1H1R3CDD5D	6.1pF(6R1)	±0.5pF(D)	GRM1535C1H6R1DE
1.4pF(1R4)	±0.25pF(C)	GRM1535C1H1R4CDD5D	6.2pF(6R2)	±0.5pF(D)	GRM1535C1H6R2DD
1.5pF(1R5)	±0.25pF(C)	GRM1535C1H1R5CDD5D	6.3pF(6R3)	±0.5pF(D)	GRM1535C1H6R3DD
1.6pF(1R6)	±0.25pF(C)	GRM1535C1H1R6CDD5D	6.4pF(6R4)	±0.5pF(D)	GRM1535C1H6R4DD
1.7pF(1R7)	±0.25pF(C)	GRM1535C1H1R7CDD5D	6.5pF(6R5)	±0.5pF(D)	GRM1535C1H6R5DD
1.8pF(1R8)	±0.25pF(C)	GRM1535C1H1R8CDD5D	6.6pF(6R6)	±0.5pF(D)	GRM1535C1H6R6DE
1.9pF(1R9)	±0.25pF(C)	GRM1535C1H1R9CDD5D	6.7pF(6R7)	±0.5pF(D)	GRM1535C1H6R7DD
2.0pF(2R0)	±0.25pF(C)	GRM1535C1H2R0CDD5D	6.8pF(6R8)	±0.5pF(D)	GRM1535C1H6R8DD
2.1pF(2R1)	±0.25pF(C)	GRM1535C1H2R1CDD5D	6.9pF(6R9)	±0.5pF(D)	GRM1535C1H6R9DD
2.2pF(2R2)	±0.25pF(C)	GRM1535C1H2R2CDD5D	7.0pF(7R0)	±0.5pF(D)	GRM1535C1H7R0DD
2.3pF(2R3)	±0.25pF(C)	GRM1535C1H2R3CDD5D	7.1pF(7R1)	±0.5pF(D)	GRM1535C1H7R1DE
2.4pF(2R4)	±0.25pF(C)	GRM1535C1H2R4CDD5D	7.2pF(7R2)	±0.5pF(D)	GRM1535C1H7R2DD
2.5pF(2R5)	±0.25pF(C)	GRM1535C1H2R5CDD5D	7.3pF(7R3)	±0.5pF(D)	GRM1535C1H7R3DE
2.6pF(2R6)	±0.25pF(C)	GRM1535C1H2R6CDD5D	7.4pF(7R4)	±0.5pF(D)	GRM1535C1H7R4DE
2.7pF(2R7)	±0.25pF(C)	GRM1535C1H2R7CDD5D	7.5pF(7R5)	±0.5pF(D)	GRM1535C1H7R5D
2.8pF(2R8)	±0.25pF(C)	GRM1535C1H2R8CDD5D	7.6pF(7R6)	±0.5pF(D)	GRM1535C1H7R6DE
2.9pF(2R9)	±0.25pF(C)	GRM1535C1H2R9CDD5D	7.7pF(7R7)	±0.5pF(D)	GRM1535C1H7R7DI
3.0pF(3R0)	±0.25pF(C)	GRM1535C1H3R0CDD5D	7.8pF(7R8)	±0.5pF(D)	GRM1535C1H7R8DE
3.1pF(3R1)	±0.25pF(C)	GRM1535C1H3R1CDD5D	7.9pF(7R9)	±0.5pF(D)	GRM1535C1H7R9DE
3.2pF(3R2)	±0.25pF(C)	GRM1535C1H3R2CDD5D	8.0pF(8R0)	±0.5pF(D)	GRM1535C1H8R0DE
3.3pF(3R3)	±0.25pF(C)	GRM1535C1H3R3CDD5D	8.1pF(8R1)	±0.5pF(D)	GRM1535C1H8R1DD
3.4pF(3R4)	±0.25pF(C)	GRM1535C1H3R4CDD5D	8.2pF(8R2)	±0.5pF(D)	GRM1535C1H8R2DE
3.5pF(3R5)	±0.25pF(C)	GRM1535C1H3R5CDD5D	8.3pF(8R3)	±0.5pF(D)	GRM1535C1H8R3DE
3.6pF(3R6)	±0.25pF(C)	GRM1535C1H3R6CDD5D	8.4pF(8R4)	±0.5pF(D)	GRM1535C1H8R4DD
3.7pF(3R7)	±0.25pF(C)	GRM1535C1H3R7CDD5D	8.5pF(8R5)	±0.5pF(D)	GRM1535C1H8R5DE
3.8pF(3R8)	±0.25pF(C)	GRM1535C1H3R8CDD5D	8.6pF(8R6)	±0.5pF(D)	GRM1535C1H8R6DE
3.9pF(3R9)	±0.25pF(C)	GRM1535C1H3R9CDD5D	8.7pF(8R7)	±0.5pF(D)	GRM1535C1H8R7DD
4.0pF(4R0)	±0.25pF(C)	GRM1535C1H4R0CDD5D	8.8pF(8R8)	±0.5pF(D)	GRM1535C1H8R8DD
4.1pF(4R1)	±0.25pF(C)	GRM1535C1H4R1CDD5D	8.9pF(8R9)	±0.5pF(D)	GRM1535C1H8R9DD
4.2pF(4R2)	±0.25pF(C)	GRM1535C1H4R2CDD5D	9.0pF(9R0)	±0.5pF(D)	GRM1535C1H9R0DE
4.3pF(4R3)	±0.25pF(C)	GRM1535C1H4R3CDD5D	9.1pF(9R1)	±0.5pF(D)	GRM1535C1H9R1DE
4.4pF(4R4)	±0.25pF(C)	GRM1535C1H4R4CDD5D	9.2pF(9R2)	±0.5pF(D)	GRM1535C1H9R2DD
4.5pF(4R5)	±0.25pF(C)	GRM1535C1H4R5CDD5D	9.3pF(9R3)	±0.5pF(D)	GRM1535C1H9R3DD
4.6pF(4R6)	±0.25pF(C)	GRM1535C1H4R6CDD5D	9.4pF(9R4)	±0.5pF(D)	GRM1535C1H9R4DD
4.7pF(4R7)	±0.25pF(C)	GRM1535C1H4R7CDD5D	9.5pF(9R5)	±0.5pF(D)	GRM1535C1H9R5DD
4.8pF(4R8)	±0.25pF(C)	GRM1535C1H4R8CDD5D	9.6pF(9R6)	±0.5pF(D)	GRM1535C1H9R6DD

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

Product ID 2 Series (Part Number) **GR M 15 3 5C H R10 B DD5 D 5**Temperature Characteristics 9 D 8 Capacitance Tolerance

3 Dimensions (LxW) 6 Rated Voltage Individual Specification Code

4 Dimension (T) Capacitance Packaging

0 00000 0 8 Packaging Code in Part Number shows STD 180mm Reel Taping.



Product Information

(1) Note • This PDF catalog is downloaded from the website of Murata Manufacturing co., ltd. Therefore, it's specifications 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.	C02E.pdf
• This PDF catalog has only typical specifications because there is no space for detailed specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.	10.12.20

Temperature Compensating Type C0G(5C) Characteristics-Low Profile

LxW [mm]		1.0x0.5(15)<0402>
Rated Volt. [Vdc]	50(1H)
Capacitance	Tolerance	Part Number
9.7pF(9R7)	±0.5pF(D)	GRM1535C1H9R7DDD5D
9.8pF(9R8)	±0.5pF(D)	GRM1535C1H9R8DDD5D
9.9pF(9R9)	±0.5pF(D)	GRM1535C1H9R9DDD5D
10pF(100)	±5%(J)	GRM1535C1H100JDD5D
12pF(120)	±5%(J)	GRM1535C1H120JDD5D
15pF(150)	±5%(J)	GRM1535C1H150JDD5D
18pF(180)	±5%(J)	GRM1535C1H180JDD5D
22pF(220)	±5%(J)	GRM1535C1H220JDD5D
27pF(270)	±5%(J)	GRM1535C1H270JDD5D
33pF(330)	±5%(J)	GRM1535C1H330JDD5D
39pF(390)	±5%(J)	GRM1535C1H390JDD5D
47pF(470)	±5%(J)	GRM1535C1H470JDD5D
56pF(560)	±5%(J)	GRM1535C1H560JDD5D
68pF(680)	±5%(J)	GRM1535C1H680JDD5D
82pF(820)	±5%(J)	GRM1535C1H820JDD5D
100pF(101)	±5%(J)	GRM1535C1H101JDD5D
120pF(121)	±5%(J)	GRM1535C1H121JDD5D
150pF(151)	±5%(J)	GRM1535C1H151JDD5D
180pF(181)	±5%(J)	GRM1535C1H181JDD5D
220pF(221)	±5%(J)	GRM1535C1H221JDD5D
270pF(271)	±5%(J)	GRM1535C1H271JDD5D
330pF(331)	±5%(J)	GRM1535C1H331JDD5D
390pF(391)	±5%(J)	GRM1535C1H391JDD5D
470pF(471)	±5%(J)	GRM1535C1H471JDD5D
560pF(561)	±5%(J)	GRM1535C1H561JDD5D
680pF(681)	±5%(J)	GRM1535C1H681JDD5D

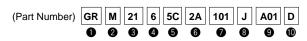
The part number code is shown in () and Unit is shown in []. $\hfill <>:$ EIA [inch] Code

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Temperature Compensating Type C0G(5C) Characteristics-Low Profile

LxW [mm]		2.0x1.25(2	21)<0805>	3.2x1.6(31)<1206>		
Rated Volt. [Vdc]		100(2A)	50(1H)	100(2A)	50(1H)	
Capacitance Tolerance						
100pF(101)	±5%(J)	GRM2165C2A101JA01D				
120pF(121)	±5%(J)	GRM2165C2A121JA01D				
150pF(151)	±5%(J)	GRM2165C2A151JA01D				
180pF(181)	±5%(J)	GRM2165C2A181JA01D				
220pF(221)	±5%(J)	GRM2165C2A221JA01D				
270pF(271)	±5%(J)	GRM2165C2A271JA01D				
330pF(331)	±5%(J)	GRM2165C2A331JA01D				
390pF(391)	±5%(J)	GRM2165C2A391JA01D				
470pF(471)	±5%(J)	GRM2165C2A471JA01D				
560pF(561)	±5%(J)	GRM2165C2A561JA01D				
680pF(681)	±5%(J)	GRM2165C2A681JA01D				
820pF(821)	±5%(J)	GRM2165C2A821JA01D				
1000pF(102)	±5%(J)	GRM2165C2A102JA01D				
1200pF(122)	±5%(J)	GRM2165C2A122JA01D	GRM2165C1H122JA01D			
1500pF(152)	±5%(J)	GRM2165C2A152JA01D	GRM2165C1H152JA01D			
1800pF(182)	±5%(J)	GRM2165C2A182JA01D	GRM2165C1H182JA01D	GRM3195C2A182JA01D		
2200pF(222)	±5%(J)	GRM2165C2A222JA01D	GRM2165C1H222JA01D	GRM3195C2A222JA01D		
2700pF(272)	±5%(J)	GRM2165C2A272JA01D	GRM2165C1H272JA01D	GRM3195C2A272JA01D		
3300pF(332)	±5%(J)	GRM2165C2A332JA01D	GRM2165C1H332JA01D	GRM3195C2A332JA01D		
3900pF(392)	±5%(J)		GRM2165C1H392JA01D	GRM3195C2A392JA01D		
4700pF(472)	±5%(J)		GRM2165C1H472JA01D	GRM3195C2A472JA01D	GRM3195C1H472JA01	
5600pF(562)	±5%(J)		GRM2195C1H562JA01D	GRM3195C2A562JA01D	GRM3195C1H562JA01	
6800pF(682)	±5%(J)		GRM2195C1H682JA01D	GRM3195C2A682JA01D	GRM3195C1H682JA01	
8200pF(822)	±5%(J)		GRM2195C1H822JA01D	GRM3195C2A822JA01D	GRM3195C1H822JA01	
10000pF(103)	±5%(J)		GRM2195C1H103JA01D	GRM3195C2A103JA01D	GRM3195C1H103JA01	
12000pF(123)	±5%(J)		GRM2195C1H123JA01D		GRM3195C1H123JA01	
15000pF(153)	±5%(J)		GRM2195C1H153JA01D		GRM3195C1H153JA01	
18000pF(183)	±5%(J)				GRM3195C1H183JA01	
22000pF(223)	±5%(J)				GRM3195C1H223JA01	
27000pF(273)	±5%(J)				GRM3195C1H273JA01	
33000pF(333)	±5%(J)				GRM3195C1H333JA01	
39000pF(393)	±5%(J)				GRM3195C1H393JA01	
47000pF(473)	±5%(J)				GRM31M5C1H473JA01	
56000pF(563)	±5%(J)				GRM31M5C1H563JA01	

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code



Packaging Code in Part Number shows STD 180mm Reel Taping.

Product ID 2 Series **5**Temperature Characteristics 8Capacitance Tolerance

3 Dimensions (LxW) 6 Rated Voltage Individual Specification Code

4 Dimension (T) Capacitance Packaging





Low ESL LL^[] Series

High-Q GJM Series

High Frequency GOM Series

Monolithic Microchip GMA Series

For Bonding GMD Series

LxW [mm]		0.6x0.3(0	3)<0201>	1.0x0.5(1	5)<0402>	Gel
Rated Volt. [Vdc]	50(1H)	25(1E)	50(1H)	10(1A)	For General
Capacitance	Tolerance		Part N	lumber		
1.0pF(1R0)	±0.25pF(C)	GRM0337U1H1R0CD01D		GRM1557U1H1R0CZ01D		
2.0pF(2R0)	±0.25pF(C)	GRM0337U1H2R0CD01D		GRM1557U1H2R0CZ01D		
3.0pF(3R0)	±0.25pF(C)	GRM0337U1H3R0CD01D		GRM1557U1H3R0CZ01D		
4.0pF(4R0)	±0.25pF(C)	GRM0337U1H4R0CD01D		GRM1557U1H4R0CZ01D		
5.0pF(5R0)	±0.25pF(C)	GRM0337U1H5R0CD01D		GRM1557U1H5R0CZ01D		Arrav
6.0pF(6R0)	±0.5pF(D)	GRM0337U1H6R0DD01D		GRM1557U1H6R0DZ01D		۸r
7.0pF(7R0)	±0.5pF(D)	GRM0337U1H7R0DD01D		GRM1557U1H7R0DZ01D		
8.0pF(8R0)	±0.5pF(D)	GRM0337U1H8R0DD01D		GRM1557U1H8R0DZ01D		
9.0pF(9R0)	±0.5pF(D)	GRM0337U1H9R0DD01D		GRM1557U1H9R0DZ01D		
10pF(100)	±5%(J)	GRM0337U1H100JD01D		GRM1557U1H100JZ01D		
12pF(120)	±5%(J)	GRM0337U1H120JD01D		GRM1557U1H120JZ01D		
15pF(150)	±5%(J)	GRM0337U1H150JD01D		GRM1557U1H150JZ01D		0
18pF(180)	±5%(J)		GRM0337U1E180JD01D	37U1E180JD01D GRM1557U1H180JZ01D		Low ESL
22pF(220)	±5%(J)		GRM0337U1E220JD01D	U1E220JD01D GRM1557U1H220JZ01D		-
27pF(270)	±5%(J)		GRM0337U1E270JD01D	GRM1557U1H270JZ01D		
33pF(330)	±5%(J)		GRM0337U1E330JD01D	GRM1557U1H330JZ01D		
39pF(390)	±5%(J)		GRM0337U1E390JD01D	GRM1557U1H390JZ01D		
47pF(470)	±5%(J)		GRM0337U1E470JD01D	GRM1557U1H470JZ01D		
56pF(560)	±5%(J)		GRM0337U1E560JD01D	GRM1557U1H560JZ01D		c
68pF(680)	±5%(J)		GRM0337U1E680JD01D	GRM1557U1H680JZ01D		् व्या
82pF(820)	±5%(J)		GRM0337U1E820JD01D	GRM1557U1H820JZ01D		=
100pF(101)	±5%(J)		GRM0337U1E101JD01D	GRM1557U1H101JZ01D		
120pF(121)	±5%(J)			GRM1557U1H121JZ01D		
150pF(151)	±5%(J)			GRM1557U1H151JZ01D		
180pF(181)	±5%(J)			GRM1557U1H181JZ01D		>
1200pF(122)	±5%(J)				GRM1557U1A122JA01D	High Fragmency
1500pF(152)	±5%(J)				GRM1557U1A152JA01D	
1800pF(182)	±5%(J)				GRM1557U1A182JA01D	
2200pF(222)	±5%(J)			GRM1557U1A222JA0		4017
2700pF(272)	±5%(J)				GRM1557U1A272JA01D	
3300pF(332)	±5%(J)				GRM1557U1A332JA01D	
3900pF(392)	±5%(J)				GRM1557U1A392JA01D	icrochin
4700pF(472)	±5%(J)				GRM1557U1A472JA01D	4

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code



LxW [mm]		1.6x0.8(1	8)<0603>
Rated Volt. [Vdc]	50(1H)	10(1A)
Capacitance	Tolerance	Part N	umber
1000pF(102)	±5%(J)	GRM1887U1H102JA01D	
1200pF(122)	±5%(J)	GRM1887U1H122JA01D	
1500pF(152)	±5%(J)	GRM1887U1H152JA01D	
1800pF(182)	±5%(J)	GRM1887U1H182JA01D	
2200pF(222)	±5%(J)	GRM1887U1H222JA01D	
2700pF(272)	±5%(J)	GRM1887U1H272JA01D	
3300pF(332)	±5%(J)	GRM1887U1H332JA01D	
3900pF(392)	±5%(J)	GRM1887U1H392JA01D	
4700pF(472)	±5%(J)	GRM1887U1H472JA01D	
5600pF(562)	±5%(J)	GRM1887U1H562JA01D	
6800pF(682)	±5%(J)	GRM1887U1H682JA01D	
8200pF(822)	±5%(J)	GRM1887U1H822JA01D	
10000pF(103)	±5%(J)	GRM1887U1H103JA01D	
12000pF(123)	±5%(J)		GRM1887U1A123JA01D
15000pF(153)	±5%(J)		GRM1887U1A153JA01D
18000pF(183)	±5%(J)		GRM1887U1A183JA01D
22000pF(223)	±5%(J)		GRM1887U1A223JA01D

rie;	LxW [mm]		2.0x1.25(2	21)<0805>	3.2x1.6(31)<1206>
High-Q M Seri	Rated Volt. [Vdc]		50(1H)	10(1A)	50(1H)
High-Q GJM Series	Capacitance	Tolerance		Part Number	
0	10000pF(103)	±5%(J)	GRM2167U1H103JA01D		
	12000pF(123)	±5%(J)	GRM2167U1H123JA01D		
	15000pF(153)	±5%(J)	GRM2167U1H153JA01D		
2	18000pF(183)	±5%(J)	GRM2167U1H183JA01D		
High Frequency GQM Series	22000pF(223)	±5%(J)	GRM2197U1H223JA01D		
gh Frequenc GQM Series	27000pF(273)	±5%(J)	GRM2197U1H273JA01D		
DM	33000pF(333)	±5%(J)	GRM21A7U1H333JA39L		
digh G	39000pF(393)	±5%(J)	GRM21B7U1H393JA01L		
-	47000pF(473)	±5%(J)	GRM21B7U1H473JA01L		
	56000pF(563)	±5%(J)		GRM2197U1A563JA01D	GRM3197U1H563JA01D
hip	68000pF(683)	±5%(J)		GRM21B7U1A683JA01L	GRM31M7U1H683JA01L
rocl	82000pF(823)	±5%(J)		GRM21B7U1A823JA01L	GRM31M7U1H823JA01L
c Micro Series	100000pF(104)	±5%(J)		GRM21B7U1A104JA01L	GRM31M7U1H104JA01L
Monolithic Microchip GMA Series	The part number co	ode is shown in (() and Unit is shown in []. < >: E	IA [inch] Code	
olithic GMA					
lon					

For General GRM Series

Array GNM Series

Low ESL LL Series

(Part Number)	GR	М	18	8	7U	1H	102	J	A01	D
	0	2	8	4	6	6	0	8	9	O

Packaging Code in Part Number shows STD 180mm Reel Taping.

Product ID 2 Series Temperature CharacteristicsCapacitance Tolerance 3Dimensions (LxW) 6 Rated Voltage Individual Specification Code

4Dimension (T) Capacitance Packaging



Temperature Compensating Type U2J(7U) Characteristics-Low Profile

LxW [mm]		1.6x0.8(18)<0603>		
Rated Volt. [Vdc]	50(1H)	10(1A)	
Capacitance	Tolerance	Part N	umber	
2200pF(222)	±5%(J)	GRM1857U1H222JA44D		
2700pF(272)	±5%(J)	GRM1857U1H272JA44D		
3300pF(332)	±5%(J)	GRM1857U1H332JA44D		
3900pF(392)	±5%(J)	GRM1857U1H392JA44D		
4700pF(472)	±5%(J)	GRM1857U1H472JA44D		
5600pF(562)	±5%(J)		GRM1857U1A562JA44D	
6800pF(682)	±5%(J)		GRM1857U1A682JA44D	
8200pF(822)	±5%(J)		GRM1857U1A822JA44D	
10000pF(103)	±5%(J)		GRM1857U1A103JA44D	

LxW [mm]		2.0x1.25(21)<0805>		3.2x1.6(31)<1206>	
Rated Volt. [Vdc]		50(1H)	10(1A)	50(1H)	
Capacitance	Tolerance	Part Number			
10000pF(103)	±5%(J)	GRM2167U1H103JA01D			
12000pF(123)	±5%(J)	GRM2167U1H123JA01D			
15000pF(153)	±5%(J)	GRM2167U1H153JA01D			
18000pF(183)	±5%(J)	GRM2167U1H183JA01D			
22000pF(223)	±5%(J)	GRM2197U1H223JA01D			
27000pF(273)	±5%(J)	GRM2197U1H273JA01D			
33000pF(333)	±5%(J)	GRM21A7U1H333JA39L			
56000pF(563)	±5%(J)		GRM2197U1A563JA01D	GRM3197U1H563JA01D	
68000pF(683)	±5%(J)			GRM31M7U1H683JA01L	
82000pF(823)	±5%(J)			GRM31M7U1H823JA01L	
100000pF(104)	±5%(J)			GRM31M7U1H104JA01L	

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code



Temperature Compensating Type P2H(6P), R2H(6R) Characteristics

TC LxW [mm]		P2H R2H		2H	
		1.0x0.5(15)<0402>	0.6x0.3(03)<0201>	1.0x0.5(15)<0402>	
Rated Volt. [Vdc]		50(1H)	25(1E)	50(1H)	
Capacitance	Tolerance	Part Number			
1.0pF(1R0)	±0.25pF(C)	GRM1556P1H1R0CZ01D	GRM0336R1E1R0CD01D	GRM1556R1H1R0CD01	
2.0pF(2R0)	±0.25pF(C)	GRM1556P1H2R0CZ01D	GRM0336R1E2R0CD01D	GRM1556R1H2R0CZ01	
3.0pF(3R0)	±0.25pF(C)	GRM1556P1H3R0CZ01D	GRM0336R1E3R0CD01D	GRM1556R1H3R0CZ01	
4.0pF(4R0)	±0.25pF(C)	GRM1556P1H4R0CZ01D	GRM0336R1E4R0CD01D	GRM1556R1H4R0CZ01	
5.0pF(5R0)	±0.25pF(C)	GRM1556P1H5R0CZ01D	GRM0336R1E5R0CD01D	GRM1556R1H5R0CZ01	
6.0pF(6R0)	±0.5pF(D)	GRM1556P1H6R0DZ01D	GRM0336R1E6R0DD01D	GRM1556R1H6R0DZ01	
7.0pF(7R0)	±0.5pF(D)	GRM1556P1H7R0DZ01D	GRM0336R1E7R0DD01D	GRM1556R1H7R0DZ01	
8.0pF(8R0)	±0.5pF(D)	GRM1556P1H8R0DZ01D	GRM0336R1E8R0DD01D	GRM1556R1H8R0DZ01	
9.0pF(9R0)	±0.5pF(D)	GRM1556P1H9R0DZ01D	GRM0336R1E9R0DD01D	GRM1556R1H9R0DZ01	
10pF(100)	±5%(J)	GRM1556P1H100JZ01D	GRM0336R1E100JD01D	GRM1556R1H100JZ01	
12pF(120)	±5%(J)	GRM1556P1H120JZ01D	GRM0336R1E120JD01D	GRM1556R1H120JZ01	
15pF(150)	±5%(J)	GRM1556P1H150JZ01D	GRM0336R1E150JD01D	GRM1556R1H150JZ01	
18pF(180)	±5%(J)	GRM1556P1H180JZ01D	GRM0336R1E180JD01D	GRM1556R1H180JZ01	
22pF(220)	±5%(J)	GRM1556P1H220JZ01D	GRM0336R1E220JD01D	GRM1556R1H220JZ01I	
27pF(270)	±5%(J)	GRM1556P1H270JZ01D	GRM0336R1E270JD01D	GRM1556R1H270JZ01	
33pF(330)	±5%(J)		GRM0336R1E330JD01D	GRM1556R1H330JZ01	
39pF(390)	±5%(J)		GRM0336R1E390JD01D		
47pF(470)	±5%(J)		GRM0336R1E470JD01D		
56pF(560)	±5%(J)		GRM0336R1E560JD01D		
68pF(680)	±5%(J)		GRM0336R1E680JD01D		
82pF(820)	±5%(J)		GRM0336R1E820JD01D		
100pF(101)	±5%(J)		GRM0336R1E101JD01D		

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

For General GRM Series



Packaging Code in Part Number shows STD 180mm Reel Taping.

Product ID @Series
Temperature Characteristics
Capacitance Tolerance

Dimensions (LxW)Rated VoltageIndividual Specification Code

Dimension (T)CapacitancePackaging



Temperature Compensating Type S2H(6S), T2H(6T) Characteristics

тс		Sź	2H	T	2H
LxW [mm]		0.6x0.3(03)<0201>	1.0x0.5(15)<0402>	0.6x0.3(03)<0201>	1.0x0.5(15)<0402>
Rated Volt. [Vdc]	25(1E)	50(1H)	25(1E)	50(1H)
Capacitance	Tolerance		Part N	lumber	
1.0pF(1R0)	±0.25pF(C)	GRM0336S1E1R0CD01D	GRM1556S1H1R0CD01D	GRM0336T1E1R0CD01D	GRM1556T1H1R0CD01D
2.0pF(2R0)	±0.25pF(C)	GRM0336S1E2R0CD01D	GRM1556S1H2R0CZ01D	GRM0336T1E2R0CD01D	GRM1556T1H2R0CD01D
3.0pF(3R0)	±0.25pF(C)	GRM0336S1E3R0CD01D	GRM1556S1H3R0CZ01D	GRM0336T1E3R0CD01D	GRM1556T1H3R0CD01D
4.0pF(4R0)	±0.25pF(C)	GRM0336S1E4R0CD01D	GRM1556S1H4R0CZ01D	GRM0336T1E4R0CD01D	GRM1556T1H4R0CD01D
5.0pF(5R0)	±0.25pF(C)	GRM0336S1E5R0CD01D	GRM1556S1H5R0CZ01D	GRM0336T1E5R0CD01D	GRM1556T1H5R0CD01D
6.0pF(6R0)	±0.5pF(D)	GRM0336S1E6R0DD01D	GRM1556S1H6R0DZ01D	GRM0336T1E6R0DD01D	GRM1556T1H6R0DD01D
7.0pF(7R0)	±0.5pF(D)	GRM0336S1E7R0DD01D	GRM1556S1H7R0DZ01D	GRM0336T1E7R0DD01D	GRM1556T1H7R0DD01D
8.0pF(8R0)	±0.5pF(D)	GRM0336S1E8R0DD01D	GRM1556S1H8R0DZ01D	GRM0336T1E8R0DD01D	GRM1556T1H8R0DD01D
9.0pF(9R0)	±0.5pF(D)	GRM0336S1E9R0DD01D	GRM1556S1H9R0DZ01D	GRM0336T1E9R0DD01D	GRM1556T1H9R0DD01D
10pF(100)	±5%(J)	GRM0336S1E100JD01D	GRM1556S1H100JZ01D	GRM0336T1E100JD01D	GRM1556T1H100JD01D
12pF(120)	±5%(J)	GRM0336S1E120JD01D	GRM1556S1H120JZ01D	GRM0336T1E120JD01D	GRM1556T1H120JD01D
15pF(150)	±5%(J)	GRM0336S1E150JD01D	GRM1556S1H150JZ01D	GRM0336T1E150JD01D	GRM1556T1H150JD01D
18pF(180)	±5%(J)	GRM0336S1E180JD01D	GRM1556S1H180JZ01D	GRM0336T1E180JD01D	GRM1556T1H180JD01D
22pF(220)	±5%(J)	GRM0336S1E220JD01D	GRM1556S1H220JZ01D	GRM0336T1E220JD01D	GRM1556T1H220JD01D
27pF(270)	±5%(J)	GRM0336S1E270JD01D	GRM1556S1H270JZ01D	GRM0336T1E270JD01D	GRM1556T1H270JD01D
33pF(330)	±5%(J)	GRM0336S1E330JD01D	GRM1556S1H330JZ01D	GRM0336T1E330JD01D	GRM1556T1H330JD01D
39pF(390)	±5%(J)	GRM0336S1E390JD01D	GRM1556S1H390JZ01D	GRM0336T1E390JD01D	GRM1556T1H390JD01D
47pF(470)	±5%(J)	GRM0336S1E470JD01D		GRM0336T1E470JD01D	GRM1556T1H470JD01D
56pF(560)	±5%(J)	GRM0336S1E560JD01D		GRM0336T1E560JD01D	GRM1556T1H560JD01D
68pF(680)	±5%(J)	GRM0336S1E680JD01D		GRM0336T1E680JD01D	GRM1556T1H680JD01D
82pF(820)	±5%(J)	GRM0336S1E820JD01D		GRM0336T1E820JD01D	GRM1556T1H820JD01D
100pF(101)	±5%(J)	GRM0336S1E101JD01D		GRM0336T1E101JD01D	GRM1556T1H101JD01D

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

muRata

LxW [mm]		0.4x0.2(02)<01005>
Rated Volt. [Vdc]]	10(1A)
Capacitance	Tolerance	Part Number
68pF(680)	±10%(K)	GRM022R71A680KA01L
100pF(101)	±10%(K)	GRM022R71A101KA01L
150pF(151)	±10%(K)	GRM022R71A151KA01L
220pF(221)	±10%(K)	GRM022R71A221KA01L
330pF(331)	±10%(K)	GRM022R71A331KA01L
470pF(471)	±10%(K)	GRM022R71A471KA01L

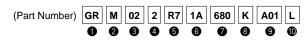
Array GNM Series

For General GRM Series

LxW [mm]		0.6x0.3 (03) <0201>					
Rated Volt. [Vdc]	25(1E)	16(1C)	10(1A)	6.3(0J)		
Capacitance	Tolerance		Part Number				
100pF(101)	±10%(K)	GRM033R71E101KA01D	GRM033R71C101KA01D				
150pF(151)	±10%(K)	GRM033R71E151KA01D	GRM033R71C151KA01D				
220pF(221)	±10%(K)	GRM033R71E221KA01D	GRM033R71C221KA01D				
330pF(331)	±10%(K)	GRM033R71E331KA01D	GRM033R71C331KA01D				
470pF(471)	±10%(K)	GRM033R71E471KA01D	GRM033R71C471KA01D				
680pF(681)	±10%(K)	GRM033R71E681KA01D	GRM033R71C681KA01D				
1000pF(102)	±10%(K)	GRM033R71E102KA01D	GRM033R71C102KA01D				
1500pF(152)	±10%(K)	GRM033R71E152KA01D	GRM033R71C152KA01D				
2200pF(222)	±10%(K)		GRM033R71C222KA88D	GRM033R71A222KA01D			
3300pF(332)	±10%(K)		GRM033R71C332KA88D	GRM033R71A332KA01D			
4700pF(472)	±10%(K)			GRM033R71A472KA01D	GRM033R70J472KA01		
6800pF(682)	±10%(K)			GRM033R71A682KA01D	GRM033R70J682KA01		
10000pF(103)	±10%(K)			GRM033R71A103KA01D	GRM033R70J103KA01		

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

High Frequency GOM Series



Packaging Code in Part Number shows STD 180mm Reel Taping.

Product ID
Series
Temperature Characteristics
Capacitance Tolerance

Dimensions (LxW)Rated VoltageIndividual Specification Code

Dimension (T)CapacitancePackaging



LxW [mm]			1.0x0.5(1	5)<0402>	
Rated Volt. [Vdc]		100(2A)	50(1H)	25(1E)	16(1C)
Capacitance	Tolerance		Part N	umber	
220pF(221)	±10%(K)	GRM155R72A221KA01D	GRM155R71H221KA01D		
330pF(331)	±10%(K)	GRM155R72A331KA01D	GRM155R71H331KA01D		
470pF(471)	±10%(K)	GRM155R72A471KA01D	GRM155R71H471KA01D		
680pF(681)	±10%(K)	GRM155R72A681KA01D	GRM155R71H681KA01D		
1000pF(102)	±10%(K)	GRM155R72A102KA01D	GRM155R71H102KA01D		
1500pF(152)	±10%(K)	GRM155R72A152KA01D	GRM155R71H152KA01D		
2200pF(222)	±10%(K)	GRM155R72A222KA01D	GRM155R71H222KA01D		
3300pF(332)	±10%(K)	GRM155R72A332KA01D	GRM155R71H332KA01D		
4700pF(472)	±10%(K)	GRM155R72A472KA01D	GRM155R71H472KA01D	GRM155R71E472KA01D	
6800pF(682)	±10%(K)		GRM155R71H682KA88D	GRM155R71E682KA01D	
10000pF(103)	±10%(K)		GRM155R71H103KA88D	GRM155R71E103KA01D	
15000pF(153)	±10%(K)		GRM155R71H153KA12D	GRM155R71E153KA61D	GRM155R71C153KA01D
22000pF(223)	±10%(K)		GRM155R71H223KA12D	GRM155R71E223KA61D	GRM155R71C223KA01D
33000pF(333)	±10%(K)			GRM155R71E333KA88D	GRM155R71C333KA01D
47000pF(473)	±10%(K)			GRM155R71E473KA88D	GRM155R71C473KA01D
68000pF(683)	±10%(K)				GRM155R71C683KA88D
0.10μF(104)	±10%(K)				GRM155R71C104KA88D
0.15µF(154)	±10%(K)				GRM155R71C154KA12D
0.22μF(224)	±10%(K)				GRM155R71C224KA12D

LxW [mm]		1.0x0.5(15)<0402>
Rated Volt. [Vdc]	10(1A)
Capacitance	Tolerance	Part Number
68000pF(683)	±10%(K)	GRM155R71A683KA01D
0.10μF(104)	±10%(K)	GRM155R71A104KA01D

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

* Please refer to GRM Series Specifications and Test Method (2).

For General GRM Series

Array GNM Series

Low ESL LL□ Series

High-Q GJM Series



High Dielectric Constant Type X7R(R7)/X7S(C7) Characteristics

1 Se	LxW [mm]		1.6x0.8(18)<0603>				
GRM Series	Rated Volt. [Vdc]	100(2A)	50(1H)	25(1E)	16(1C)	
Ċ	Capacitance	Tolerance		Part N	lumber		
	220pF(221)	±10%(K)	GRM188R72A221KA01D	GRM188R71H221KA01D			
	330pF(331)	±10%(K)	GRM188R72A331KA01D	GRM188R71H331KA01D			
	470pF(471)	±10%(K)	GRM188R72A471KA01D	GRM188R71H471KA01D			
ies	680pF(681)	±10%(K)	GRM188R72A681KA01D	GRM188R71H681KA01D			
Ser	1000pF(102)	±10%(K)	GRM188R72A102KA01D	GRM188R71H102KA01D			
GNM Series	1500pF(152)	±10%(K)	GRM188R72A152KA01D	GRM188R71H152KA01D			
G	2200pF(222)	±10%(K)	GRM188R72A222KA01D	GRM188R71H222KA01D	GRM188R71E222KA01D		
	3300pF(332)	±10%(K)	GRM188R72A332KA01D	GRM188R71H332KA01D	GRM188R71E332KA01D		
	4700pF(472)	±10%(K)	GRM188R72A472KA01D	GRM188R71H472KA01D	GRM188R71E472KA01D		
	6800pF(682)	±10%(K)	GRM188R72A682KA01D	GRM188R71H682KA01D	GRM188R71E682KA01D		
s	10000pF(103)	±10%(K)	GRM188R72A103KA01D	GRM188R71H103KA01D	GRM188R71E103KA01D		
LL Series	15000pF(153)	±10%(K)		GRM188R71H153KA01D	GRM188R71E153KA01D		
Š	22000pF(223)	±10%(K)		GRM188R71H223KA01D	GRM188R71E223KA01D		
	33000pF(333)	±10%(K)		GRM188R71H333KA61D	GRM188R71E333KA01D		
	47000pF(473)	±10%(K)		GRM188R71H473KA61D	GRM188R71E473KA01D		
	68000pF(683)	±10%(K)		GRM188R71H683KA93D	GRM188R71E683KA01D		
	0.10μF(104)	±10%(K)	GRM188R72A104KA35D	GRM188R71H104KA93D	GRM188R71E104KA01D		
	0.15μF(154)	±10%(K)			GRM188R71E154KA01D	GRM188R71C154KA01	
GJM Series	0.22µF(224)	±10%(K)			GRM188R71E224KA88D	GRM188R71C224KA01	
Se	0.33µF(334)	±10%(K)				GRM188R71C334KA01	
MC	0.47µF(474)	±10%(K)			GRM188R71E474KA12D*	GRM188R71C474KA88	
	0.68µF(684)	±10%(K)				GRM188C71C684KA12I	
	1.0μF(105)	±10%(K)			GRM188R71E105KA12D*	GRM188R71C105KA120	

LxW [mm]		1.6x0.8(18)<0603>			
Rated Volt. [Vdc]	10(1A)	6.3 (0J)	4(0G)	
Capacitance Tolerance		Part Number			
0.33µF(334)	±10%(K)	GRM188R71A334KA61D			
0.47µF(474)	±10%(K)	GRM188R71A474KA61D			
0.68µF(684)	±10%(K)	GRM188R71A684KA61D			
1.0μF(105)	±10%(K)	GRM188R71A105KA61D*			
2.2μF(225)	±10%(K)	GRM188R71A225KE15D*	GRM188C70J225KE20D*	GRM188C70G225KE20D*	

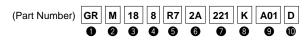
The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

* Please refer to GRM Series Specifications and Test Method (2).

High Frequency GQM Series

Monolithic Microchip GMA Series

For Bonding GMD Series



Packaging Code in Part Number shows STD 180mm Reel Taping.

Product ID
Series
Temperature Characteristics
Capacitance Tolerance

Dimensions (LxW)Rated VoltageIndividual Specification Code

Dimension (T)CapacitancePackaging

High Dielectric Constant Type X7R(R7)/X7U(E7) Characteristics

LxW [mm]			2.0x1.25(2	21)<0805>	
Rated Volt. [Vdc]	100(2A)	50(1H)	25(1E)	16(1C)
Capacitance	Tolerance		Part N	lumber	
6800pF(682)	±10%(K)	GRM219R72A682KA01D			
10000pF(103)	±10%(K)	GRM21BR72A103KA01L			
15000pF(153)	±10%(K)	GRM21BR72A153KA01L			
22000pF(223)	±10%(K)	GRM21BR72A223KA01L			
33000pF(333)	±10%(K)	GRM21BR72A333KA01L	GRM219R71H333KA01D		
47000pF(473)	±10%(K)	GRM21BR72A473KA01L	GRM21BR71H473KA01L		
68000pF(683)	±10%(K)		GRM21BR71H683KA01L	GRM219R71E683KA01D	
0.10μF(104)	±10%(K)		GRM21BR71H104KA01L	GRM21BR71E104KA01L	
0.15μF(154)	±10%(K)		GRM21BR71H154KA01L	GRM21BR71E154KA01L	
0.22µF(224)	±10%(K)	GRM21AR72A224KAC5L	GRM21BR71H224KA01L	GRM21BR71E224KA01L	
0.33µF(334)	±10%(K)	GRM21AR72A334KAC5L	GRM219R71H334KA88D	GRM21BR71E334KA01L	
0.47µF(474)	±10%(K)	GRM21BR72A474KA73L	GRM21BR71H474KA88L	GRM219R71E474KA88D	
0.68µF(684)	±10%(K)			GRM219R71E684KA88D	GRM219R71C684KA01D
1.0μF(105)	±10%(K)		GRM21BR71H105KA12L	GRM21BR71E105KA99L	GRM21BR71C105KA01L
				GRM219R71E105KA88D	
2.2μF(225)	±10%(K)			GRM21BR71E225KA73L*	GRM21BR71C225KA12L
4.7μF(475)	±10%(K)				GRM21BR71C475KA73L

LxW [mm]		2.0x1.25(21)<0805>			
Rated Volt. [Vdc]	10(1A) 6.3(0J)		4(0G)	
Capacitance	Tolerance				
2.2μF(225)	±10%(K)	GRM21BR71A225KA01L			
4.7μF(475)	±10%(K)	GRM21BR71A475KA73L*			
10μF(106)	±10%(K)	GRM21BR71A106KE51L*	GRM21BR70J106KE76L*		
22μF(226)	±20%(M)			GRM21BE70G226ME51L*	

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

* Please refer to GRM Series Specifications and Test Method (2).



High Dielectric Constant Type X7R(R7)/X7U(E7) Characteristics

LxW [mm]			3.2x1.6(3	1)<1206>			
Rated Volt. [Vdc]		100(2A)	50(1H)	25(1E)	16(1C)		
Capacitance	Tolerance		Part Number				
15000pF(153)	±10%(K)	GRM319R72A153KA01L					
22000pF(223)	±10%(K)	GRM31MR72A223KA01L					
33000pF(333)	±10%(K)	GRM31MR72A333KA01L					
47000pF(473)	±10%(K)	GRM31MR72A473KA01L					
68000pF(683)	±10%(K)	GRM31MR72A683KA01L					
0.10μF(104)	±10%(K)	GRM319R72A104KA01D					
0.15µF(154)	±10%(K)	GRM31MR72A154KA01L	GRM31MR71H154KA01L				
0.22µF(224)	±10%(K)	GRM31MR72A224KA01L	GRM31MR71H224KA01L				
0.33μF(334)	±10%(K)		GRM319R71H334KA01D	GRM319R71E334KA01D			
0.47µF(474)	±10%(K)	GRM31MR72A474KA35L	GRM31MR71H474KA01L	GRM319R71E474KA01D			
0.68µF(684)	±10%(K)	GRM31MR72A684KA35L	GRM31MR71H684KA88L	GRM319R71E684KA01D			
1.0μF(105)	±10%(K)	GRM31CR72A105KA01L	GRM31MR71H105KA88L				
2.2μF(225)	±10%(K)		GRM31CR71H225KA88L	GRM31MR71E225KA93L	GRM31MR71C225KA35		
4.7μF(475)	±10%(K)		GRM31CR71H475KA12L	GRM31CR71E475KA88L	GRM31CR71C475KA01		
10μF(106)	±10%(K)			GRM31CR71E106KA12L*	GRM31CR71C106KAC7		

LxW [mm]		3.2x1.6(31)<1206>		
Rated Volt. [Vdc]		10(1A)	6.3 (0J)	4(0G)
Capacitance Tolerance		Part Number		
10μF(106)	±10%(K)	GRM31CR71A106KA01L		
22μF(226)	±20%(M)	GRM31CR71A226ME15L*	GRM31CR70J226ME19L*	
47μF(476)	±20%(M)			GRM31CE70G476ME15L*

LxW [mm]		3.2x2.5(32)<1210>				
Rated Volt. [Vdc]		100(2A)	50(1H)	35(YA)	25(1E)	
Capacitance	Tolerance	Part Number				
0.68µF(684)	±10%(K)	GRM32CR72A684KA01L				
1.0μF(105)	±10%(K)	GRM32CR72A105KA35L				
2.2μF(225)	±10%(K)	GRM32ER72A225KA35L				
4.7μF(475)	±10%(K)		GRM32ER71H475KA88L			
10μF(106)	±10%(K)			GRM32ER7YA106KA12L	GRM32DR71E106KA12L	
22μF(226)	±20%(M)				GRM32ER71E226ME15L*	

LxW [mm]		3.2x2.5(32)<1210>				
Rated Volt. [Vdc]	16(1C)	10(1A)	6.3 (0J)	4(0G)	
Capacitance	Tolerance		Part Number			
22µF(226)	±20%(M)	GRM32ER71C226MEA8L*	GRM32ER71A226ME20L*			
47μF(476)	±20%(M)		GRM32ER71A476ME15L*	GRM32ER70J476ME20L*		
100μF(107)	±20%(M)				GRM32EE70G107ME19L*	

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

* Please refer to GRM Series Specifications and Test Method (2).

(Part Number)	GR	М	31	9	R7	2A	153	κ	A01	L	
	0	2	6	4	6	6	0	8	9	0	

Packaging Code in Part Number shows STD 180mm Reel Taping.

Capacitance Tolerance

5Temperature Characteristics

2 Series

Dimensions (LxW)Rated VoltageIndividual Specification Code

Dimension (T)CapacitancePackaging



Product ID

Array GNM Series

Low ESL LL Series

High-Q GJM Series

For Bonding GMD Series

High Dielectric Constant Type X7R(R7)/X7T(D7) Characteristics-Low Profile

LxW [mm]			1.0x0.5(15)<0402>		
Rated Volt. [Vdc]]	50(1H)	25(1E)	16(1C)	10(1A)
Capacitance	Tolerance		Part N	lumber	
220pF(221)	±10%(K)	GRM15XR71H221KA86D			
330pF(331)	±10%(K)	GRM15XR71H331KA86D			
470pF(471)	±10%(K)	GRM15XR71H471KA86D			
680pF(681)	±10%(K)	GRM15XR71H681KA86D			
1000pF(102)	±10%(K)	GRM15XR71H102KA86D			
1500pF(152)	±10%(K)	GRM15XR71H152KA86D			
2200pF(222)	±10%(K)		GRM15XR71E222KA86D		
3300pF(332)	±10%(K)			GRM15XR71C332KA86D	
4700pF(472)	±10%(K)			GRM15XR71C472KA86D	
6800pF(682)	±10%(K)			GRM15XR71C682KA86D	
10000pF(103)	±10%(K)			GRM15XR71C103KA86D	
1.0μF(105)	±10%(K)				GRM185D71A105KE36D*

LxW [mm]		2.0x1.25(21)<0805>				
Rated Volt. [Vdc	.]	100(2A)	50(1H)	25(1E)	16(1C)	
Capacitance	Tolerance		Part N	umber	•	
6800pF(682)	±10%(K)	GRM219R72A682KA01D				
33000pF(333)	±10%(K)		GRM219R71H333KA01D			
68000pF(683)	±10%(K)			GRM219R71E683KA01D		
0.22μF(224)	±10%(K)	GRM21AR72A224KAC5L				
0.33µF(334)	±10%(K)	GRM21AR72A334KAC5L	GRM219R71H334KA88D			
0.47µF(474)	±10%(K)			GRM219R71E474KA88D		
0.68µF(684)	±10%(K)			GRM219R71E684KA88D	GRM219R71C684KA01D	
1.0μF(105)	±10%(K)			GRM219R71E105KA88D		

LxW [mm]			3.2x1.6(3	1)<1206>	
Rated Volt. [Vdc]		100(2A)	50(1H)	25(1E)	16(1C)
Capacitance	Tolerance		Part N	umber	·
15000pF(153)	±10%(K)	GRM319R72A153KA01L			
22000pF(223)	±10%(K)	GRM31MR72A223KA01L			
33000pF(333)	±10%(K)	GRM31MR72A333KA01L			
47000pF(473)	±10%(K)	GRM31MR72A473KA01L			
68000pF(683)	±10%(K)	GRM31MR72A683KA01L			
0.10μF(104)	±10%(K)	GRM319R72A104KA01D			
0.15μF(154)	±10%(K)	GRM31MR72A154KA01L	GRM31MR71H154KA01L		
0.22μF(224)	±10%(K)	GRM31MR72A224KA01L	GRM31MR71H224KA01L		
0.33µF(334)	±10%(K)		GRM319R71H334KA01D		
0.47µF(474)	±10%(K)	GRM31MR72A474KA35L	GRM31MR71H474KA01L		
0.68µF(684)	±10%(K)	GRM31MR72A684KA35L	GRM31MR71H684KA88L		
1.0μF(105)	±10%(K)		GRM31MR71H105KA88L		
2.2µF(225)	±10%(K)			GRM31MR71E225KA93L	GRM31MR71C225KA35L
4.7μF(475)	±10%(K)				GRM319D71C475KA12D*#

LxW [mm]		3.2x2.5(32)<1210>		
Rated Volt. [Vdc]		100(2A)	50(1H)	
Capacitance	Tolerance	Part Number		
0.68μF(684)	±10%(K)	GRM32CR72A684KA01L	GRM32NR71H684KA01L	
1.0μF(105)	±10%(K)	GRM32CR72A105KA35L		

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

* Please refer to GRM Series Specifications and Test Method (2).

[#] These Part Numbers have individual testing conditions on Durability of GRM Series Specifications and Test Methods (2). Please refer to P60.



1.0x0.5(15)<0402>

High Dielectric Constant Type X6S(C8) Characteristics

LxW [mm]		0.6x0.3(03)<0201>		
Rated Volt. [Vdc	:]	6.3(0J)	4(0G)	
Capacitance	Tolerance	Part Number		
15000pF(153)	±10%(K)	GRM033C80J153KE01D*	GRM033C80G153KE01D*	
22000pF(223)	±10%(K)	GRM033C80J223KE01D*	GRM033C80G223KE01D*	
33000pF(333)	±10%(K)	GRM033C80J333KE01D*	GRM033C80G333KE01D*	
47000pF(473)	±10%(K)	GRM033C80J473KE19D*	GRM033C80G473KE01D*	

Array GNM Series

High-Q GJM Series

High Frequency GQM Series

Monolithic Microchip GMA Series

For Bonding GMD Series

LxW [mm]

For General GRM Series

ß	Rated Volt. [Vdc]		25(1E)	6.3 (0J)	4(0G)
	Capacitance	Tolerance		Part Number	
	68000pF(683)	±10%(K)	GRM155C81E683KA12D		
	0.10μF(104)	±10%(K)	GRM155C81E104KA12D		
s.	0.15μF(154)	±10%(K)		GRM155C80J154KE01D*	GRM155C80G154KE01D*
v ESL Series	0.22µF(224)	±10%(K)		GRM155C80J224KE01D*	GRM155C80G224KE01D*
	0.33µF(334)	±10%(K)		GRM155C80J334KE01D*	GRM155C80G334KE01D*
	0.47µF(474)	±10%(K)		GRM155C80J474KE19D*	GRM155C80G474KE01D*
	0.68μF(684)	±10%(K)		GRM155C80J684KE15D*#	GRM155C80G684KE19D*

LxW [mm]		1.6x0.8(18)<0603>			
Rated Volt. [Vdc]		25(1E)	10(1A)	6.3(0J)	4(0G)
Capacitance	Tolerance		Part Number		
1.0μF(105)	±10%(K)	GRM188C81E105KAADD			
2.2μF(225)	±10%(K)		GRM188C81A225KE34D*	GRM188C80J225KE19D*	
4.7μF(475)	±10%(K)				GRM188C80G475KE19D*
10μF(106)	±20%(M)				GRM188C80G106ME47D*#

LxW [mm]		1.6x0.8(18)<0603>	
Rated Volt. [Vdc]]	2.5(0E)	
Capacitance	Tolerance	Part Number	
10μF(106)	±20%(M)	GRM188C80E106ME47D*	

LxW [mm]		2.0x1.25(21)<0805>				
Rated Volt. [Vdc]		25(1E)	16(1C)	10(1A)	6.3(0J)	
Capacitance	Tolerance	Part Number				
1.0μF(105)	±10%(K)		GRM216C81C105KA12D*			
2.2μF(225)	±10%(K)		GRM219C81C225KA12D*			
4.7μF(475)	±10%(K)	GRM21BC81E475KA12L*	GRM21BC81C475KA88L*	GRM219C81A475KE34D*	GRM219C80J475KE19D*	
10μF(106)	±10%(K)			GRM21BC81A106KE18L*	GRM21BC80J106KE19L*	
					GRM219C80J106KE39D*	
22μF(226)	±20%(M)				GRM21BC80J226ME51L*#	

LxW [mm]		2.0x1.25(21)<0805>
Rated Volt. [Vdc]]	4(0G)
Capacitance	Tolerance	Part Number
22µF(226)	±20%(M)	GRM21BC80G226ME39L*

The part number code is shown in () and Unit is shown in []. < >: EIA [inch] Code

* Please refer to GRM Series Specifications and Test Method (2).

[#] These Part Numbers have individual testing conditions on Durability of GRM Series Specifications and Test Methods (2). Please refer to P60.

t Information	
Product	(F

Part Number)	GR	М	03	3	C 8	0J	153	κ	E01	D	(
	0	2	8	4	6	6	0	8	9	Ð	Ì

Product ID 2 Series **5**Temperature Characteristics 8 Capacitance Tolerance

3 Dimensions (LxW) 6Rated Voltage Individual Specification Code

4 Dimension (T) Capacitance Packaging

Packaging Code in Part Number shows STD 180mm Reel Taping.

High Dielectric Constant Type X6S(C8)/X6T(D8) Characteristics

LxW [mm]			3.2x1.6(31)<1206>					
Rated Volt. [Vdc]		25(1E)	16(1C)	10(1A)	6.3(0J)			
Capacitance	Tolerance		Part Number					
2.2μF(225)	±10%(K)		GRM316C81C225KA12D*					
4.7μF(475)	±10%(K)		GRM319C81C475KA12D*					
10μF(106)	±10%(K)	GRM31CC81E106KE15L*	GRM31MC81C106KA12L	GRM319C81A106KA12D	GRM319C80J106KE19D*			
22μF(226)	±20%(M)			GRM31CC81A226ME19L*	GRM31CC80J226ME19L*			
47μF(476)	±20%(M)				GRM31CC80J476ME18L*			

LxW [mm]		3.2x1.6(31)<1206>		
Rated Volt. [Vdc]		4(0G)		
Capacitance	Tolerance	Part Number		
47μF(476)	±20%(M)	GRM31CC80G476ME19L*		
100μF(107)	±20%(M)	GRM31CD80G107ME39L*		

LxW [mm]			3.2x2.5(32)<1210>						
Rated Volt. [Vdc] 25(1E)		25(1E)	10(1A)	6.3(0J)	4(0G)				
Capacitance	Tolerance		Part Number						
10μF(106)	±10%(K)	GRM32DC81E106KA12L							
22μF(226)	±20%(M)	GRM32EC81E226ME15L*	GRM32NC81A226ME19L*						
47μF(476)	±20%(M)		GRM32EC81A476ME19L*	GRM32EC80J476ME64L*					
100μF(107)	±20%(M)			GRM32EC80J107ME20L*	GRM32EC80G107ME20L*				

muRata

The part number code is shown in () and Unit is shown in []. $\hfill <>:$ EIA [inch] Code

*: Please refer to GRM Series Specifications and Test Method(2).

High Dielectric Constant Type X6S(C8) Characteristics-Low Profile

LxW [mm]		1.6x0.8(18)<0603>				
Rated Volt. [Vdc]		10(1A) 6.3(0J)				
Capacitance	Tolerance	Part Number				
1.0μF(105)	±10%(K)	GRM185C81A105KE36D*	GRM185C80J105KE26D*			

LxW [mm]			2.0x1.25(21)<0805>			
Rated Volt. [Vdc]		16(1C)	6.3(0J)			
Capacitance	Tolerance		Part Number			
1.0μF(105)	±10%(K)	GRM216C81C105KA12D*				
2.2μF(225)	±10%(K)	GRM219C81C225KA12D*				
4.7μF(475)	±10%(K)		GRM219C81A475KE34D*	GRM219C80J475KE19D*		
10μF(106)	±10%(K)			GRM219C80J106KE39D*		

LxW [mm]		3.2x1.6(31)<1206>
Rated Volt. [Vdc]		16(1C)
Capacitance	Tolerance	Part Number
2.2μF(225)	±10%(K)	GRM316C81C225KA12D*
4.7μF(475)	±10%(K)	GRM319C81C475KA12D*

LxW [mm]		3.2x2.5(32)<1210>
Rated Volt. [Vdc]	25(1E)
Capacitance	Tolerance	Part Number
10μF(106)	±10%(K)	GRM32DC81E106KA12L

The part number code is shown in () and Unit is shown in []. $\hfill <>:$ EIA [inch] Code

* Please refer to GRM Series Specifications and Test Method (2).

Array GNM Series

LxW [mm]		0.4x0.2(0 2	2)<01005>
Rated Volt. [Vdc]		10(1A)	6.3(0J)
Capacitance	Tolerance	Part N	umber
68pF(680)	±10%(K)	GRM022R61A680KA01L	
100pF(101)	±10%(K)	GRM022R61A101KA01L	
150pF(151)	±10%(K)	GRM022R61A151KA01L	
220pF(221)	±10%(K)	GRM022R61A221KA01L	
330pF(331)	±10%(K)	GRM022R61A331KA01L	
470pF(471)	±10%(K)	GRM022R61A471KA01L	
680pF(681)	±10%(K)	GRM022R61A681KE19L*	GRM022R60J681KE19L
1000pF(102)	±10%(K)	GRM022R61A102KE19L*	GRM022R60J102KE19L
1500pF(152)	±10%(K)	GRM022R61A152KE19L*	GRM022R60J152KE19L
2200pF(222)	±10%(K)	GRM022R61A222KE19L*	GRM022R60J222KE19L
3300pF(332)	±10%(K)	GRM022R61A332KE19L*	GRM022R60J332KE19L
4700pF(472)	±10%(K)	GRM022R61A472KE19L*	GRM022R60J472KE19L
6800pF(682)	±10%(K)	GRM022R61A682KE19L*	GRM022R60J682KE19L
10000pF(103)	±10%(K)	GRM022R61A103KE19L*	GRM022R60J103KE19L

LxW [mm]			0.6x0.3 (03)<0201>					
Rated Volt. [Vdc]		25(1E)	16(1C)	10(1A)	6.3(0J)			
Capacitance	Tolerance		Part Number					
100pF(101)	±10%(K)							
150pF(151)	±10%(K)							
220pF(221)	±10%(K)							
330pF(331)	±10%(K)							
470pF(471)	±10%(K)							
680pF(681)	±10%(K)							
1000pF(102)	±10%(K)							
1500pF(152)	±10%(K)			GRM033R61A152KA01D				
2200pF(222)	±10%(K)			GRM033R61A222KA01D				
3300pF(332)	±10%(K)			GRM033R61A332KA01D				
4700pF(472)	±10%(K)			GRM033R61A472KA01D				
6800pF(682)	±10%(K)			GRM033R61A682KA01D				
10000pF(103)	±10%(K)			GRM033R61A103KA01D	GRM033R60J103KA01I			
15000pF(153)	±10%(K)				GRM033R60J153KE01D			
22000pF(223)	±10%(K)				GRM033R60J223KE01D			
33000pF(333)	±10%(K)				GRM033R60J333KE01D			
47000pF(473)	±10%(K)				GRM033R60J473KE19E			

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

: Please refer to X7R(R7) etc. Characteristics.

* Please refer to GRM Series Specifications and Test Method (2).

For General GRM Series

Array GNM Series

Low ESL LL Series

High-Q GJM Series

High Frequency GQM Series

Monolithic Microchip GMA Series

(Part Number)	GR	М	02	2	R6	1A	680	κ	A01	L	
	0	2	8	4	6	6	0	8	9	Ð	

Packaging Code in Part Number shows STD 180mm Reel Taping.

Product ID 2 Series **5**Temperature Characteristics 8Capacitance Tolerance

3 Dimensions (LxW) Rated Voltage
Individual Specification Code
Packaging*

4Dimension (T) *GRM022: D is applicable.





LxW [mm] 1.0x0.5(15)<0402>					
Rated Volt. [Vdc]	100(2A)	50(1H)	25(1E)	16(1C)
Capacitance	Tolerance		Part N	lumber	
220pF(221)	±10%(K)				
330pF(331)	±10%(K)				
470pF(471)	±10%(K)				
680pF(681)	±10%(K)				
1000pF(102)	±10%(K)		GRM155R61H102KA01D		
1500pF(152)	±10%(K)				
2200pF(222)	±10%(K)		GRM155R61H222KA01D		
3300pF(332)	±10%(K)				
4700pF(472)	±10%(K)		GRM155R61H472KA01D		
6800pF(682)	±10%(K)				
10000pF(103)	±10%(K)				
15000pF(153)	±10%(K)				
22000pF(223)	±10%(K)				GRM155R61C223KA01D
33000pF(333)	±10%(K)				GRM155R61C333KA01D
47000pF(473)	±10%(K)				GRM155R61C473KA01D
68000pF(683)	±10%(K)			GRM155R61E683KA87D	GRM155R61C683KA88D
0.10μF(104)	±10%(K)			GRM155R61E104KA87D	GRM155R61C104KA88D

LxW [mm]		1.0x0.5(15)<0402>		
Rated Volt. [Vdc]	10(1A)	6.3 (0J)	
Capacitance	Tolerance	Part N	umber	
33000pF(333)	±10%(K)	GRM155R61A333KA01D		
47000pF(473)	±10%(K)	GRM155R61A473KA01D		
68000pF(683)	±10%(K)	GRM155R61A683KA01D		
0.10μF(104)	±10%(K)	GRM155R61A104KA01D		
0.15μF(154)	±10%(K)	GRM155R61A154KE19D*	GRM155R60J154KE01D*	
0.22μF(224)	±10%(K)	GRM155R61A224KE19D*	GRM155R60J224KE01D*	
0.33μF(334)	±10%(K)	GRM155R61A334KE15D*	GRM155R60J334KE01D*	
0.47μF(474)	±10%(K)	GRM155R61A474KE15D*	GRM155R60J474KE19D*	
0.68µF(684)	±10%(K)	GRM155R61A684KE15D*	GRM155R60J684KE19D*	
1.0μF(105)	±10%(K)	GRM155R61A105KE15D*		

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

: Please refer to X7R(R7) etc. Characteristics.

* Please refer to GRM Series Specifications and Test Method (2).

For General GRM Series



GRM Series	LxW [mm]	W [mm] 1.6x0.8(18)<0603>					
SRN	Rated Volt. [Vdc]	100(2A)	50(1H)	25(1E)	16(1C)	
	Capacitance	Tolerance		Part N	umber		
	220pF(221)	±10%(K)					
	330pF(331)	±10%(K)					
	470pF(471)	±10%(K)					
ies	680pF(681)	±10%(K)					
GNM Series	1000pF(102)	±10%(K)		GRM188R61H102KA01D			
Σ	1500pF(152)	±10%(K)					
2200pF(222) 3300pF(332)	±10%(K)		GRM188R61H222KA01D				
	±10%(K)						
	4700pF(472)	±10%(K)		GRM188R61H472KA01D			
	6800pF(682)	±10%(K)					
S	10000pF(103)	±10%(K)		GRM188R61H103KA01D			
erie	15000pF(153)	±10%(K)					
LL Series	22000pF(223)	±10%(K)		GRM188R61H223KA01D			
E	33000pF(333)	±10%(K)					
	47000pF(473)	±10%(K)					
	68000pF(683)	±10%(K)					
	0.10μF(104)	±10%(K)			GRM188R61E104KA01D		
	0.15µF(154)	±10%(K)					
	0.22µF(224)	±10%(K)			GRM188R61E224KA88D	GRM188R61C224KA88E	
	0.33µF(334)	±10%(K)					
N	0.47µF(474)	±10%(K)			GRM188R61E474KA12D*	GRM188R61C474KA93D	
0	1.0μF(105)	±10%(K)			GRM188R61E105KA12D*	GRM188R61C105KA93D	
	2.2μF(225)	±10%(K)				GRM188R61C225KE15D	

LxW [mm]		1.6x0.8(18)<0603>				
Rated Volt. [Vdc]	10(1A)	10(1A) 6.3(0J) 4(0			
Capacitance	Tolerance	Part Number				
0.68μF(684)	±10%(K)	GRM188R61A684KA61D				
2.2μF(225)	±10%(K)	GRM188R61A225KE34D*				
4.7μF(475)	±10%(K)		GRM188R60J475KE19D*			
10μF(106)	±20%(M)		GRM188R60J106ME47D*	GRM188R60G106ME47D*		
22μF(226)	±20%(M)			GRM188R60G226MEA0L*		

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

: Please refer to X7R(R7) etc. Characteristics.

* Please refer to GRM Series Specifications and Test Method (2).

High Frequency GQM Series

Monolithic Microchip GMA Series

(Part Number)	GR	М	18	8	R6	1H	102	κ	A01	D
	0	2	6	4	6	6	0	8	9	0

Packaging Code in Part Number shows STD 180mm Reel Taping.

Product ID 2 Series **5**Temperature Characteristics 8 Capacitance Tolerance

3 Dimensions (LxW) 6 Rated Voltage Individual Specification Code

4Dimension (T) Capacitance Packaging



LxW [mm]			2.0x1.25(21)<0805>	
Rated Volt. [Vdc]	100(2A)	50(1H)	25(1E)	16(1C)
Capacitance	Tolerance		Part N	lumber	
6800pF(682)	±10%(K)				
10000pF(103)	±10%(K)				
15000pF(153)	±10%(K)				
22000pF(223)	±10%(K)				
33000pF(333)	±10%(K)				
47000pF(473)	±10%(K)				
68000pF(683)	±10%(K)				
0.10μF(104)	±10%(K)				
0.15μF(154)	±10%(K)				
0.22μF(224)	±10%(K)				
0.33μF(334)	±10%(K)				
0.47μF(474)	±10%(K)				
0.68μF(684)	±10%(K)				
1.0μF(105)	±10%(K)			GRM216R61E105KA12D	GRM21BR61C105KA01L
					GRM216R61C105KA88D*
2.2μF(225)	±10%(K)			GRM21BR61E225KA12L	GRM21BR61C225KA88L*
				GRM219R61E225KA12D*	GRM219R61C225KA88D*
4.7μF(475)	±10%(K)			GRM21BR61E475KA12L*	GRM21BR61C475KA88L*
					GRM219R61C475KE15D*
10μF(106)	±10%(K)				GRM21BR61C106KE15L*

LxW [mm]		2.0x1.25(21)<0805>				
Rated Volt. [Vdc]	10(1A) 6.3(0J) 4(0G)				
Capacitance	Tolerance	Part Number				
2.2µF(225)	±10%(K)	GRM21BR61A225KA01L				
4.7μF(475)	±10%(K)	GRM21BR61A475KA73L*	GRM21BR60J475KA11L*			
		GRM219R61A475KE34D*				
10μF(106)	±10%(K)	GRM21BR61A106KE19L*	GRM21BR60J106KE19L*			
		GRM219R61A106KE44D*	GRM219R60J106KE19D*			
22µF(226)	±20%(M)		GRM21BR60J226ME39L*	GRM219R60G226ME66D*		

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

: Please refer to X7R(R7) etc. Characteristics.

* Please refer to GRM Series Specifications and Test Method (2).

For Bonding GMD Series



LxW [mm]		3.2x1.6(31)<1206>					
Rated Volt. [Vdc]	100(2A)	50(1H)	25(1E)	16(1C)		
Capacitance	Tolerance		Part N	lumber			
15000pF(153)	±10%(K)						
22000pF(223)	±10%(K)						
33000pF(333)	±10%(K)						
47000pF(473)	±10%(K)						
68000pF(683)	±10%(K)						
0.10μF(104)	±10%(K)						
0.15μF(154)	±10%(K)						
0.22µF(224)	±10%(K)						
0.33µF(334)	±10%(K)						
0.47µF(474)	±10%(K)						
0.68μF(684)	±10%(K)						
1.0μF(105)	±10%(K)						
2.2μF(225)	±10%(K)		GRM31CR61H225KA88L	GRM316R61E225KA12D*			
4.7μF(475)	±10%(K)			GRM31CR61E475KA88L	GRM31CR61C475KA01L		
				GRM319R61E475KA12D*	GRM319R61C475KA88D		
10μF(106)	±10%(K)			GRM31CR61E106KA12L*	GRM31CR61C106KA88L		
					GRM319R61C106KE15D		
22μF(226)	±20%(M)				GRM31CR61C226ME15L		

LxW [mm]		3.2x1.6(31)<1206>			
Rated Volt. [Vdc]	10(1A) 6.3(0J)		4(0G)	
Capacitance	Tolerance	Part Number			
10μF(106)	±10%(K)	GRM319R61A106KE19L*			
22μF(226)	±20%(M)	GRM31CR61A226ME19L*	GRM31CR60J226ME19L*		
47μF(476)	±20%(M)	GRM31CR61A476ME15L*	GRM31CR60J476ME19L*		
100μF(107)	±20%(M)		GRM31CR60J107ME39L*	GRM31CR60G107ME39L*	

LxW [mm]		3.2x2.5 (32)<1210>				
Rated Volt. [Vdc] 100(2A)			50(1H)	35(YA)	25(1E)	
Capacitance	Tolerance		Part Number			
0.68µF(684)	±10%(K)					
1.0μF(105)	±10%(K)					
2.2μF(225)	±10%(K)					
4.7μF(475)	±10%(K)					
10μF(106)	±10%(K)			GRM32ER6YA106KA12L	GRM32DR61E106KA12L	
22μF(226)	±20%(M)				GRM32ER61E226ME15L*	

LxW [mm]		3.2x2.5(32)<1210>				
Rated Volt. [Vdc]	16(1C) 10(1A) 6.3(0J)				
Capacitance	Tolerance	Part Number				
22μF(226)	±20%(M)					
47μF(476)	±20%(M)	GRM32ER61C476ME15L*	GRM32ER61A476ME20L*			
100μF(107)	±20%(M)			GRM32ER60J107ME20L*		

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

: Please refer to X7R(R7) etc. Characteristics.

* Please refer to GRM Series Specifications and Test Method (2).

Product ID
Series
Temperature Characteristics
Capacitance Tolerance

Dimensions (LxW)Rated VoltageIndividual Specification Code

Dimension (T)CapacitancePackaging

Packaging Code in Part Number shows STD 180mm Reel Taping.

For General GRM Series

Array GNM Series

Low ESL LL^[] Series

High-Q GJM Series

High Frequency GQM Series

Monolithic Microchip GMA Series

For Bonding GMD Series

High Dielectric Constant Type X5R(R6) Characteristics-Low Profile

LxW [mm]		1.0x0.5(15)<0402>		
Rated Volt. [Vdc]	16(1C)	16(1C)	
Capacitance	Tolerance		Part Number	
220pF(221)	±10%(K)			
330pF(331)	±10%(K)			
470pF(471)	±10%(K)			
680pF(681)	±10%(K)			
1000pF(102)	±10%(K)			
1500pF(152)	±10%(K)			
2200pF(222)	±10%(K)			
3300pF(332)	±10%(K)			
4700pF(472)	±10%(K)			
6800pF(682)	±10%(K)			
10000pF(103)	±10%(K)			

LxW [mm]		1.6x0.8(1	8)<0603>	
Rated Volt. [Vdc]	16(1C) 10(1A)		
Capacitance	Tolerance	Part N	umber	
1.0μF(105)	±10%(K)	GRM185R61C105KE44D*	GRM185R61A105KE36D*	

LxW [mm]			2.0x1.25	(21)<0805>	
Rated Volt. [Vdc]	100(2A)	50(1H)	25(1E)	16(1C)
Capacitance	Tolerance		Part	Number	
6800pF(682)	±10%(K)				
33000pF(333)	±10%(K)				
68000pF(683)	±10%(K)				
0.22µF(224)	±10%(K)				
0.33µF(334)	±10%(K)				
0.47µF(474)	±10%(K)				
0.68µF(684)	±10%(K)				
1.0μF(105)	±10%(K)			GRM216R61E105KA12D	GRM216R61C105KA88D
2.2μF(225)	±10%(K)			GRM219R61E225KA12D*	GRM219R61C225KA88D*
4.7μF(475)	±10%(K)				GRM219R61C475KE15D*

LxW [mm]		2.0x1.25(21)<0805>				
Rated Volt. [Vdc]	10(1A)	10(1A) 6.3(0J) 4(0G)			
Capacitance Tolerance		Part Number				
4.7μF(475)	±10%(K)	GRM219R61A475KE34D*				
10μF(106) ±10%(K)		GRM219R61A106KE44D*	GRM219R60J106KE19D*			
22μF(226)	±20%(M)			GRM219R60G226ME66D*		

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

: Please refer to X7R(R7) etc. Characteristics.

* Please refer to GRM Series Specifications and Test Method (2).

For General GRM Series



High Dielectric Constant Type X5R(R6) Characteristics-Low Profile

LxW [mm]			3.2x1.6(31)<1206>	
Rated Volt. [Vdc]		100(2A)	50(1H)	25(1E)	16(1C)
Capacitance	Tolerance		Part N	lumber	
15000pF(153)	±10%(K)				
22000pF(223)	±10%(K)				
33000pF(333)	±10%(K)				
47000pF(473)	±10%(K)				
68000pF(683)	±10%(K)				
0.10μF(104)	±10%(K)				
0.15μF(154)	±10%(K)				
0.22μF(224)	±10%(K)				
0.33μF(334)	±10%(K)				
0.47μF(474)	±10%(K)				
0.68μF(684)	±10%(K)				
1.0μF(105)	±10%(K)				
2.2µF(225)	±10%(K)			GRM316R61E225KA12D*	
4.7μF(475)	±10%(K)			GRM319R61E475KA12D*	GRM319R61C475KA88D*
10μF(106)	±10%(K)				GRM319R61C106KE15D*

3.2x2.5(32)<1210>

50(**1H**)

Part Number

< >: EIA [inch] Code

25(1E)

GRM32DR61E106KA12L

LxW [mm]		3.2x1.6(31)<1206>
Rated Volt. [Vdc]]	10(1A)
Capacitance	Tolerance	Part Number
10μF(106)	±10%(K)	GRM319R61A106KE19D*

Tolerance

±10%(**K**)

±10%(**K**) ±10%(**K**)

The part number code is shown in () and Unit is shown in [].

* Please refer to GRM Series Specifications and Test Method (2).

: Please refer to X7R(R7) etc. Characteristics.

100(**2A**)

LxW [mm]

Rated Volt. [Vdc]

0.68µF(**684**)

1.0µF(105)

10μF(**106**)

Capacitance

For General GRM Series

Array GNM Series

Low ESL LL Series



Product ID
Series
Temperature Characteristics
Capacitance Tolerance

Dimensions (LxW)Rated VoltageIndividual Specification Code

Dimension (T)CapacitancePackaging



lo.				ease refer to GRM Series Specifications and Test Methods (2).
	Item	Specifi Temperature	cations	Test Method
	nom	Compensating Type	High Dielectric Type	lost monou
1 Te	Operating Temperature Range	–55 to +125°C (2P/R/S/T, 3P/R/S/T/U, 4P/R/S/T/U: –25 to +85°C)	B1, B3, F1: -25 to +85°C R1, R7: -55 to +125°C R6: -55 to +85°C C8: -55 to +105°C E4: +10 to +85°C F5: -30 to +85°C	Reference temperature: 25° C (2Δ , 3Δ , 4Δ , B1, B3, F1, R1: 20° C)
2 R	Rated Voltage	See the previous pages.		The rated voltage is defined as the maximum voltage that may be applied continuously to the capacitor. When AC voltage is superimposed on DC voltage, V ^{P-P} or V ^{O-P} , whichever is larger, should be maintained within the rated voltage range.
3 A	ppearance	No defects or abnormalities		Visual inspection
4 D	Dimensions	Within the specified dimensions	i	Using calipers (GRM02 size is based on Microscope)
5 D	Dielectric Strength	No defects or abnormalities		No failure should be observed when 300%* of the rated voltage (temperature compensating type) or 250% of the rated voltage (high dielectric constant type) is applied between the terminations for 1 to 5 seconds, provided the charge/discharge current is less than 50mA. *200% for 500V
6	nsulation Resistance	C≦0.047μF: More than 10,000N C>0.047μF: More than 500Ω · I		The insulation resistance should be measured with a DC voltage not exceeding the rated voltage at 20/25°C and 75%RH max. and within 2 minutes of charging, provided the charge/ discharge current is less than 50mA.
7 C	Capacitance	Within the specified tolerance		
			[R6, R7, C8] W.V.: 100V : 0.025 max. (C<0.068μF) : 0.05 max. (C≧0.068μF) W.V.: 50/35/25V:	The capacitance/Q/D.F. should be measured at 20/25°C at the
)/ Dissipation Factor D.F.)	30pF and over: Q≧1000 30pF and below: Q≧400+20C C: Nominal Capacitance (pF)	: 0.025 max.* *GRM32D R7/R6/C8 1E106: 0.035 max. W.V.: 16/10V: 0.035 max. W.V.: 6.3/4V : 0.05 max. (C<3.3μF) : 0.1 max. (C≥3.3μF) [E4] W.V.: 25Vmin: 0.025 max. [F1, F5] W.V.: 25V min.	$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$
			 0.05 max. (C<0.1μF) 0.09 max. (C≥0.1μF) W.V.: 16/10V: 0.125 max. W.V.: 6.3V: 0.15 max. 	

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For General GRM Series	[om the prec	When r	(Note 1) These Please refer to individual spe o "*" is added in PNs table, ple en "*" is added in PNs table, ple	e Specification ecifications (ou ease refer to G	s and Test Method r product specific RM Series Specific	Is indicate ations or f cations ar	e typical inspection. the approval sheet). id Test Methods (1).							
Fol GR		No.	lte	em	Specifi Temperature	cations High Dielectric Type	_	Test M	ethod								
Array GNM Series	No bias Within the specified tolerance (Table A-1)		B1, B3: Within ±10% (-25 to +85°C) R1, R7: Within ±15% (-55 to +125°C) R6: Within ±15% (-55 to +85°C) E4: Within +22/-56% (+10 to +85°C) F1: Within +30/-80% (-25 to +85°C) F5: Within +22/-82% (-30 to +85°C)	each specified (1)Temperatu The temperatu capacitance n When cycling through 5 (5C coeffs.: +25 to within the spe and capacitar The capacitar between the n	0 +85°C/+20 to +85 cified tolerance for ice change as in Ta ice drift is calculate naximum and minir	ype as a reference equentially C: +20 to + °C) the ca the temperable A-1. Ind by dividing num meas	using the ence. from steps 1 .125°C: other temp. pacitance should be rrature coefficient ing the differences sured values in the										
Ś						C8: Within ±22% (–55 to +105°C)		1 5 by the cap. valu	•								
SL				50% of		B1: Within +10/–30%	_ <u>Step</u> 1		emperatu	perature ±2							
Low ESL LL Series				the Rated Voltage		R1: Within +15/–40% F1: Within +30/–95%	2	-30±3 -2	(for F5), 1 5±3 (for of	,							
							3			perature ± 2							
			Capacitance					4	85	5±3 (for ot	105±3 (for C8) her TC) perature ±2						
High-Q GJM Series		9 Temperature Characteristics				*Initial measurement for high dielectric constant type	The ranges of Reference Te shown in the t When applyin measured afte	ctric Constant Type f capacitance chang mperature value ov table should be with g voltage, the capa er 1 more min. with of each temp. stage	ge compar ver the tem nin the spe citance ch applying v	nperature ranges cified ranges.* aange should be							
				Capacitance	Within ±0.2% or ±0.05pF (whichever is larger.)	Perform a heat treatment at 150+0/-10°C for one hour	Step 1 F	Temperature (Reference Tempera		Applying Voltage (V)							
High Frequency GQM Series		Capa Drift									Drift	*Do not apply to 1X/25V	and then set for 24±2 hours at room temperature. Perform the initial measurement.	2 3 F 4	 4.55±3 (for C8, R1, I –25±3 (for B1, B3 30±3 (for F5)/10±3 Reference Tempera 125±3 (for R1, F 85±3 (for R1, B3 F1, F5, E4)/105±3 (Reference Tempera 	R7, R6) 8, F1) (for E4) ature ±2 R7)/ , R6 (for C8)	No bias
-													6	–55±3 (for R1 –25±3 (for B1, I		50% of the rated	
ochip									Reference Tempera 125±3 (for R1	ture ±2	voltage						
Micro							8	85±3 (for B1, F									
Monolithic Microchip GMA Series			No removal of the terminations or other defect show		or other defect should occur.	Fig. 1a using parallel with th The soldering reflow method soldering is u	pacitor to the test ji a eutectic solder. T he test jig for 10±1 should be done ei d and should be cor hiform and free of c , 2N (GRM03), 5N	hen apply sec. her with a nducted wi lefects suc	n iron or using the ith care so that the ch as heat shock.								
b ss										(in mm)							
erie		10	Adhesive	Strength			Туре	а	b	С							
For Bonding GMD Series		10	of Termin	ation			GRM02	0.2	0.56								
P N						Solder resist	GRM03	0.3	0.9	0.3							
ШÜ						Baked electrode or	GRM15	0.4	1.5	0.5							
						copper foil	GRM18	1.0	3.0	1.2							
					Fig	. 1a	GRM21 GRM31	1.2	4.0	1.65							
E							GRM31 GRM32	2.2	5.0	2.0							
tio							GRM32 GRM43	3.5	7.0	3.7							
ma							GRM55	4.5	8.0	5.6							
Ifor								ł	1								
Product Information								C	ontinued or	n the following page. 🛛							

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(Note 1) These Specifications and Test Methods indicate typical inspection. Please refer to individual specifications (our product specifications or the approval sheet).

"*" is added in PNs table, please refer to GRM Series Specifications and Test Methods (1). When no When "*" is added in PNs table, please refer to GRM Series Specifications and Test Methods (2).

Continued from the preceding page.

	Nia litera		Specif				For GRI		
No.			Temperature Compensating Type	High Dielectric Type		Test Me	ethod		— 0
		Appearance	No defects or abnormalities						
		Capacitance	Within the specified tolerance						
11	Vibration		30pF and over: Q≧1000	[B1, B3, R6, R7, C8] W.V.: 100V : 0.025 max. (C<0.068μF) : 0.05 max. (C≧0.068μF) W.V.: 50/35/25V: : 0.025 max.* *GRM32D R7/R6/C8 1E106: 0.035 max. Q≥1000 W.V.: 16/10V: 0.035 max.		Solder the capacitor on the test jig (glass epoxy board) in the same manner and under the same conditions as (10). The capacitor should be subjected to a simple harmonic motion having a total amplitude of 1.5mm, the frequency being varied			Array GNM Series
	Resistance	Q/D.F.	30pF and below: Q≧400+20C C: Nominal Capacitance (pF)	 W.V.: 6.3/4V : 0.05 max. (C<3.3µF) : 0.1 max. (C≥3.3µF) [E4] W.V.: 25Vmin: 0.025 max. [F1, F5] W.V.: 25V min. : 0.05 max. (C<0.1µF) : 0.09 max. (C≥0.1µF) W.V.: 16/10V: 0.125 max. W.V.: 6.3V: 0.15 max. 	uniformly between frequency range, f be traversed in ap applied for a perio perpendicular dire	rom 10 to 55Hz proximately 1 n d of 2 hours in	and return to ninute. This me each of 3 mute	10Hz, should ption should be	Low ESL LL ^{CI} Series
		Appearance	No marking defects		Solder the capacit	or on the test ji	q (glass epoxy	board) shown	
		Capacitance Change	Within ±5% or ±0.5pF (whichever is larger)	Within ±10%	in Fig. 2a using a eutectic solder. Then apply a force in the direction shown in Fig. 3a for 5±1 sec. The soldering should be done by the reflow method and should be conducted with care so that the soldering is uniform and free of defects such as heat			force in the ering should be ucted with care	High-Q GJM Series
12	12 Deflection		R230	50 Pressurizing speed: 1.0mm/sec. Pressurize Flexure : ≤1	shock. Type GRM02	Fig. 2	¢4.5	/03/15: t: 0.8mm) C 0.23	High Frequency GQM Series GJ
			45	nce meter <u>45</u> 9. 3a	GRM03 GRM15 GRM18 GRM21 GRM31 GRM32 GRM43 GRM55	0.3 0.4 1.0 2.2 2.2 3.5 4.5	0.9 1.5 3.0 4.0 5.0 5.0 7.0 8.0	0.3 0.5 1.2 1.65 2.0 2.9 3.7 5.6 (in mm)	Monolithic Microchip GMA Series
13	13 Solderability of Termination		75% of the terminations are to l continuously.	Immerse the capa rosin (JIS-K-5902) Preheat at 80 to 1 After preheating, ii 2±0.5 seconds at 3 for 2±0.5 seconds	(25% rosin in 20°C for 10 to 3 mmerse in a eu 230±5°C or Sn- at 245±5°C.	weight proport 30 seconds. Itectic solder s 3.0Ag-0.5Cu s	on). olution for solder solution	For Bonding GMD Series	
						Co	ontinued on the	following page. 🖊	GI GI

For General GRM Series

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No. Temperature Composition Composition (1) High Delecticit Type Text Method (2) 89 00 1 10 00 1 10 10 00 1 10 10 10 10 10 10 10 10 10 10 10 10 10	For General GRM Series		Continued fr	rom the prec		Please refer to individual spe no "*" is added in PNs table, ple	e Specifications and Test Methods inc cifications (our product specification ease refer to GRM Series Specification ease refer to GRM Series Specification	s or the approval sheet). ns and Test Methods (1).
No. Temperature Composition Compositio	For GRI	NI -				ications	T M. H	
Open Participation Image: specification in the following table. Very Participation Winhin +2.5% or +0.25pF Quintipation Winhin +2.5% or +0.25pF Winhin +2.5% Or +0.5% or +0.25pF Winhin +2.5% Or +0.25pF Winhin +2.5% Or +0.25pF Winhin +2.5% Or +0.25pF Winhin		NO	. 10	em		High Dielectric Type		1
Note The Performance Statistics Market Mar								
Section 0 14 Resistance In 0 (0) 30pF and over: O2: 1000 30pF and beatwr: 20: 2007 20C 30pF and over: O2: 1000 30pF and beatwr: 20: 2007 20C 30pF and beatwr: 20: 20: 20: 20; 20; 20; 20; 20; 20; 20; 20; 2	6			Appearance	No defects or abnormalities			
Search V M V: 100V Corr OW (M) (C) COV (M) (C) C) COV (M) (C) COV (M) (C) C) COV (M) (C) COV (M) (C) C) C	Array M Serie:			1 ·		Within ±7.5%	-	
Segurd Guidence of Soldering Heat The Restance is the solution of the solution the solution of the solution of the solution of the sol	GN					W.V.: 100V : 0.025 max. (C<0.068μF) : 0.05 max. (C≧0.068μF)	Immerse the capacitor in a eutectic so solder solution at 270±5°C for 10±0.5	older or Sn-3.0Ag-0.5Cu seconds. Set at room
Notesting Image: Second state (p) Image: Second state (p) <thimage: (p)<="" second="" state="" th=""></thimage:>	_ow ESL _□ Series	14	to Soldering		30pF and below:	*GRM32D R7/R6/C8 1E106: 0.035 max. W.V.: 16/10V: 0.035 max. W.V.: 6.3/4V	Perform a heat treatment at 150+0/-1 then set at room temperature for 24±2	0°C for one hour and
Notes Image: Second Seco								
Selection (F) [F, F5] (W.V.: 250 min. : 0.05 max. (C<0.1µF) W.V.: 16/10V: 0.125 max. W.V.: 6.3V: 0.15 max. W.V.: 6.3V: 0.15 max. W.V.: 6.3V: 0.15 max. W.V.: 6.3V: 0.15 max. []					C. Nominal Capacitance (pF)			Time 1 min.
Note Image: Researce in the following table. Section (C < 0.1 μF) (M, Signal (C < 0.1 μF) (M, Signal (C < 0.1 μF)) (M, Signal (C < 0.1 μF)								1 min.
Image: Properties Within 12.5% Dielectric Strength No defects Image: Within 12.5% or ±0.25pF B1, B3, R1, R6, R7, C8: Within 12.5% Within 12.5% Image: Within 12.5% or ±0.25pF B1, B3, R1, R6, R7, C8: Within 12.5% F1, F5, E4: Within 12.5% Image: Within 12.5% Image: Within 12.5% B1, B3, R1, R6, R7, C8: Within 12.5% F1, F5, E4: Within 12.5% Image: Within 12.5% Image: Within 12.5% Image: Within 12.5% F1, F5, E4: Within 12.5% Image: Within 12.5% Image: Within 12.5% B1, B3, R1, R6, R7, C8: Within 12.5% F1, F5, E4: Within 12.5% Image: Within 12.5% Image: Within 12.5% Image: Within 12.5% F1, F5, E4: Within 12.5% Image: Within 12.5% Image: Within 12.5% Image: Within 12.5% F1, F5, E4: Within 12.5% Image: Within 12.5% Image: Within 12.5% Image: Within 12.5% F1, F5, E4: Within 12.5% Image: Within 12.5% Image: Within 12.5% Image: Within 12.5% F1, F5, E4: Within 12.5% Image: Within 12.5% Image: Within 12.5% Image: Within 12.5% F1, F5, E4: Within 12.5% Image: Within 12.5% Image: Within 12.5% Image: Within 12.5% Image: Within 12.5% Image: Within 12.5%	gh-Q Series					: 0.05 max. (C<0.1μF) : 0.09 max. (C≧0.1μF) W.V.: 16/10V: 0.125 max.		
Image: Strength No defects The measured and observed characteristics should satisfy the specifications in the following table. Monor Micro Mark Appearance No defects or abnormalities Within ±2.5% or ±0.25pF B1, B3, R1, R6, R7, C8: Within ±2.0% F1, F5, E4: Within ±2.0% F1, F5, F1, F1, F1, F1, F1, F1, F1, F1, F1, F1	Ξ, Hi			I.R.	More than 10,000M Ω or 500 Ω \cdot	F (whichever is smaller)	-	
No defects or abnormalities 0 group of 000 group	0				No defects		-	
No defects or abnormalities Capatiance No defects or abnormalities Capatiance Within ±2.5% or ±0.25pF B1, B3, R1, R6, R7, C8: Within ±2.0% Vithin ±2.5% or ±0.25pF B1, B3, R6, R7, C8: Within ±2.0% Is K the capacitor to the supporting jig in the same maner and under the same conditions as (10). ±0.05 max. (C>0.068µF) V.V: 6007 0.025 max. (C>0.068µF) W.V. 100V 0.025 max. (C>0.068µF) W.V. 5035/25V: ±0.025 max.* Condemonder O/D.F. 30pF and over: Q≥1000 30pF and below: Q≥400+20C O/D.F. 30pF and over: Q≥1000 30pF and below: Q≥400+20C W.V. 5037/25V: ±0.10 max. (C<3.3µF) E4 W.V. 25Vmin: 0.05 max. (C<3.3µF) W.V. 25Vmin: 0.005 max. (C<0.1µF) W.V. 25Vmin: 0.009 max. (C>0.01µF) W.V. 25Vmin: 0.009 max. (C>0.1µF) W.V. 25Vmin: 0.009 max. (C>0.1µF) W.V. 26.3V: 0.15 max. I.R. More than 10,000MΩ or 500Ω · F (whichever is smaller) Dielectric Strength No defects								
15 Temperature Cycle 30pF and over: Q≥1000 30pF and below: Q/D.F. 30pF and over: Q≥1000 30pF and below: Q/D.F. 30pF and over: Q≥1000 30pF and below: Q≥400+20C W.V.: 16/10V: 0.035 max. W.V.: 16/10V: 0.035 max. Step 1 2 3 30pF and over: Q≥1000 30pF and below: Q≥400+20C 0/D.F. 30pF and over: Q≥1000 30pF and below: Q≥400+20C W.V.: 16/10V: 0.035 max. W.V.: 6.3/4V Step 1 2 3 30±3 2 to 3 30±3 16 I.R. More than 10,000MΩ or 500Ω · F (whichever is smaller) 10 Dielectric Strength No defects	ۍ در			Annoaranco			-	
15 Temperature Cycle 30pF and over: Q≥1000 30pF and below: Q/D.F. 30pF and over: Q≥1000 30pF and below: Q/D.F. 30pF and over: Q≥1000 30pF and below: Q≥400+20C W.V.: 16/10V: 0.035 max. W.V.: 16/10V: 0.035 max. Step 1 2 3 30pF and over: Q≥1000 30pF and below: Q≥400+20C 0/D.F. 30pF and over: Q≥1000 30pF and below: Q≥400+20C W.V.: 16/10V: 0.035 max. W.V.: 6.3/4V Step 1 2 3 30±3 2 to 3 30±3 16 I.R. More than 10,000MΩ or 500Ω · F (whichever is smaller) 10 Dielectric Strength No defects	requen A Series			Capacitance	Within ±2.5% or ±0.25pF			
Image: Sign of the second	High F GON					[B1, B3, R6, R7, C8]	Fix the capacitor to the supporting jig	in the same
Dipose W.V.: 25Vmin: 0.05 max. [F1, F5] Perform a heat treatment at 150+0/-10°C for one then set at room temperature for 24±2 hours. W.V.: 25V min. : 0.05 max. (C<0.1µF)	<u>a</u>					: 0.025 max. (C<0.068μF) : 0.05 max. (C≧0.068μF)	Perform the five cycles according to the	
Diposition I.R. More than 10,000MΩ or 500Ω · F (whichever is smaller) Dielectric Strength Dielectric Strength No defects	ochi						Set for 24±2 hours at room temperatu	re, then measure.
Diposition I.R. More than 10,000MΩ or 500Ω · F (whichever is smaller) Dielectric Strength Dielectric Strength No defects	nic Micr A Serie	15				W.V.: 16/10V: 0.035 max.	Temp. (°C) Min. Room	Max. Operating
Dipose W.V.: 25Vmin: 0.05 max. [F1, F5] Perform a heat treatment at 150+0/-10°C for one then set at room temperature for 24±2 hours. W.V.: 25V min. : 0.05 max. (C<0.1µF)	GM GM			Q/D.F.	Q≧400+20C		Temp. +0/-3	Temp. +3/-0
Bigging Bigg	Mon				C: Nominal Capacitance (pF)	[E4] W.V.: 25Vmin: 0.05 max.	Initial measurement for high dielectric	c constant type
Dielectric Strength No defects	Bonding D Series					W.V.: 25V min. : 0.05 max. (C<0.1μF)		hours.
Dielectric Strength No defects	For GM			I.R.	More than 10,000M Ω or 500 Ω ·	F (whichever is smaller)		
Continued on the fol					No defects			
t Informatio	Ę						Continu	ied on the following page. 🖊
Product of the second se	Product Information							

	Continued fr	om the prec	eding page. Wh	Please refer to individual spe no "*" is added in PNs table, ple en "*" is added in PNs table, ple	e Specifications and Test Methods indicate typical inspection. ecifications (our product specifications or the approval sheet). ease refer to GRM Series Specifications and Test Methods (1). ease refer to GRM Series Specifications and Test Methods (2).	For General GRM Series
No.	lte	m	Specifi Temperature Compensating Type	Lations High Dielectric Type	Test Method	Fo GF
			The measured and observed ch specifications in the following ta	•		
		Appearance	No defects or abnormalities			
		Capacitance Change	Within ±5% or ±0.5pF (whichever is larger)	B1, B3, R1, R6, R7, C8: Within ±12.5% F1, F5, E4: Within ±30%		Array GNM Series
16	Humidity (Steady State)	Q/D.F.	30pF and over: Q≧350 10pF and over 30pF and below: Q≧275+2.5C 10pF and below: Q≧200+10C C: Nominal Capacitance (pF)	$\begin{array}{l} [\text{R6, R7, C8]} \\ \text{W.V.: 100V} \\ &: 0.05 \text{ max. } (\text{C}{<}0.068\mu\text{F}) \\ &: 0.075 \text{ max. } (\text{C}{\geq}0.068\mu\text{F}) \\ \text{W.V.: 50/35/25/16/10V} \\ &: 0.05 \text{ max.} \\ \text{W.V.: 6.3/4V} \\ &: 0.075 \text{ max. } (\text{C}{<}3.3\mu\text{F}) \\ &: 0.125 \text{ max. } (\text{C}{\geq}3.3\mu\text{F}) \\ \text{[E4]} \\ \text{W.V.: 25Vmin: } 0.05 \text{ max.} \\ [\text{F1, F5]} \\ \text{W.V.: 25V min.} \\ &: 0.075 \text{ max. } (\text{C}{<}0.1\mu\text{F}) \end{array}$	Set the capacitor at 40±2°C and in 90 to 95% humidity for 500±12 hours. Remove and set for 24±2 hours at room temperature, then measure.	Low ESL LLD Series G1
		I.R.	More than 1,000M Ω or 50 Ω · F	: 0.125 max. (C≧0.1µF) W.V.: 16/10V: 0.15 max. W.V.: 6.3V: 0.2 max. (whichever is smaller)	-	High-Q GJM Series
			The measured and observed ch specifications in the following ta			,Hi N
		Appearance	No defects or abnormalities		-	U
		Capacitance Change	Within ±7.5% or ±0.75pF (whichever is larger)	B1, B3, R1, R6, R7, C8: Within ±12.5% F1, F5, E4: Within ±30% [W.V.: 10V max.] F1, F5: Within +30/-40%		luency eries
1/ .	Humidity Load			[B1, B3, R6, R7, C8] W.V.: 100V : 0.05 max. (C<0.068μF) : 0.075 max. (C≥0.068μF) W.V.: 50/35/25/16/10V	Apply the rated voltage at 40±2°C and 90 to 95% humidity for 500±12 hours. Remove and set for 24±2 hours at room temperature, then measure. The charge/discharge current is less than 50mA. •Initial measurement for F1, F5/10V max.	High Frequency GOM Series
		Q/D.F.	30pF and over: Q≧200 30pF and below: Q≧100+10C/3 C: Nominal Capacitance (pF)	: 0.05 max. W.V.: 6.3/4V : 0.075 max. (C<3.3μF) : 0.125 max. (C≥3.3μF) [E4] W.V.: 25Vmin: 0.05 max. [F1, F5] W.V.: 25V min. : 0.075 max. (C<0.1μF) : 0.125 max. (C≥0.1μF)	Apply the rated DC voltage for 1 hour at 40±2°C. Remove and set for 24±2 hours at room temperature. Perform initial measurement.	Monolithic Microchip GMA Series
				W.V.: 16/10V: 0.15 max. W.V.: 6.3V: 0.2 max.		
		I.R.	More than 500M Ω or 25 $\Omega \cdot F$ (w	/hichever is smaller)		ling

Continued on the following page. \square



(Note 1) These Specifications and Test Methods indicate typical inspection. Please refer to individual specifications (our product specifications or the approval sheet). When no "*" is added in PNs table, please refer to GRM Series Specifications and Test Methods (1). When "*" is added in PNs table, please refer to GRM Series Specifications and Test Methods (2).

			Specif	ications	
No.	Ite	em	Temperature Compensating Type	High Dielectric Type	Test Method
			The measured and observed characteristics should satisfy the specifications in the following table.		
		Appearance	No defects or abnormalities		
		Capacitance Change	Within ±3% or ±0.3pF (whichever is larger)	B1, B3, R1, R6, R7, C8: Within ±12.5% F1, F5, E4: Within ±30% [Except 10V max. and. C≧1.0μF] F1, F5: Within +30/–40% [10V max. and C≧1.0μF]	Apply 200%* of the rated voltage at the maximum operating temperature ±3°C for 1000±12 hours. Set for 24±2 hours at room temperature, then measure. The charge/discharge current is less than 50mA.
18	High Temperature Load	Q/D.F.	30pF and over: Q≥350 10pF and over 30pF and below: Q≥275+2.5C 10pF and below: Q≥200+10C C: Nominal Capacitance (pF)	$\begin{tabular}{lllllllllllllllllllllllllllllllllll$	 Initial measurement for high dielectric constant type. Apply 200% of the rated voltage* at the maximum operating temperature ±3°C for one hour. Remove and set for 24±2 hours at room temperature. Perform initial measurement. *GRM155C81E 683/104, GRM188C81E105, GRM21BR72A474, GRM21BR71C225, GRM31CR71H475, GRM21BR71C225, GRM31CR71H475, GRM32E R6/R7 YA106, GRM32D R7/R6/C8 1E106 : 150% of the rated voltage
		I.R.	More than 1,000M Ω or 50 $\Omega \cdot F$	(whichever is smaller)	

Table A-1

			(Capacitance Cha	nge from 25°C (%	6)	
Char.	Nominal Values (ppm/°C)*1	-	·55	-	30	-	10
		Max.	Min.	Max.	Min.	Max.	Min.
5C	0±30	0.58	-0.24	0.40	-0.17	0.25	-0.11
6C	0±60	0.87	-0.48	0.59	-0.33	0.38	-0.21
6P	-150±60	2.33	0.72	1.61	0.50	1.02	0.32
6R	-220±60	3.02	1.28	2.08	0.88	1.32	0.56
6S	-330±60	4.09	2.16	2.81	1.49	1.79	0.95
6T	-470±60	5.46	3.28	3.75	2.26	2.39	1.44
7U	-750±120	8.78	5.04	6.04	3.47	3.84	2.21
1X	+350 to -1000	-	-	-	-	-	_

*1: Nominal values denote the temperature coefficient within a range of 25°C to 125°C (for Δ C)/85°C (for other TC).

				Capacitance Cha	ange from 20°C (%	5)	
Char.	Nominal Values (ppm/°C)*2	-	55	-	-25	-	·10
		Max.	Min.	Max.	Min.	Max.	Min.
2C	0±60	0.82	-0.45	0.49	-0.27	0.33	-0.18
3C	0±120	1.37	-0.90	0.82	-0.54	0.55	-0.36
4C	0±250	2.56	-1.88	1.54	-1.13	1.02	-0.75
2P	-150±60	-	-	1.32	0.41	0.88	0.27
3P	-150±120	-	-	1.65	0.14	1.10	0.09
4P	-150±250	_	-	2.36	-0.45	1.57	-0.30
2R	-220±60	-	-	1.70	0.72	1.13	0.48
3R	-220±120	-	-	2.03	0.45	1.35	0.30
4R	-220±250	-	-	2.74	-0.14	1.83	-0.09
2S	-330±60	-	-	2.30	1.22	1.54	0.81
3S	-330±120	_	-	2.63	0.95	1.76	0.63
4S	-330±250	-	-	3.35	0.36	2.23	0.24
2T	-470±60	_	-	3.07	1.85	2.05	1.23
3T	-470±120	-	-	3.40	1.58	2.27	1.05
4T	-470±250	_	-	4.12	0.99	2.74	0.66
3U	-750±120	-	-	4.94	2.84	3.29	1.89
4U	-750±250	_	_	5.65	2.25	3.77	1.50

*2: Nominal values denote the temperature coefficient within a range of 20°C to 125°C (for Δ C)/85°C (for other TC).

For General GRM Series

For Bonding GMD Series



		Please refer to individual spe When no "*" is added in PNs table, ple	e Specifications and Test Methods indicate typical inspection. cifications (our product specifications or the approval sheet). ease refer to GRM Series Specifications and Test Methods (1). ease refer to GRM Series Specifications and Test Methods (2).	For General GDM Series
No.	Item	Specifications	Test Method	Fol
1	Operating Temperature Range	B1, B3, F1: -25 to +85°C R1, R7, C7, D7, E7: -55 to +125°C C6, R6: -55 to +85°C F5: -30 to +85°C C8, D8: -55 to +105°C,	Reference temperature: 25°C (B1, B3, R1, F1: 20°C)	es
2	Rated Voltage	See the previous pages.	The rated voltage is defined as the maximum voltage that may be applied continuously to the capacitor. When AC voltage is superimposed on DC voltage, V ^{P-P} or V ^{O-P} , whichever is larger, should be maintained within the rated voltage range.	Array GNM Series
3	Appearance	No defects or abnormalities	Visual inspection	
4	Dimensions	Within the specified dimensions	Using calipers (GRM02 size is based on Microscope)	
5	Dielectric Strength	No defects or abnormalities	No failure should be observed when 250% of the rated voltage is applied between the terminations for 1 to 5 seconds, provided the charge/discharge current is less than 50mA.	Low ESL LL ^[] Series
6	Insulation Resistance	More than $50\Omega \cdot F$	The insulation resistance should be measured with a DC voltage not exceeding the rated voltage at reference temperature and 75%RH max. and within 1 minutes of charging, provided the charge/discharge current is less than 50mA.	
7	Capacitance	Within the specified tolerance *Table 1 GRM022 B3/R6 1A 681 to 103 GRM155 B3/R6 1A 124 to 105 GRM185 B3/R6 1C/1A 105 GRM185 C8/D7 1A 105 GRM188 B3/R6 1C/1A 225 GRM188 B3/R6 1A 335 GRM188 B3/R6 1C/1A 475	The capacitance/D.F. should be measured at reference temperature at the measuring frequency and voltage shown in the table. Nominal Capacitance Measuring Frequency Measuring Voltage $C \leq 10 \mu F (10V min.)^* = 1\pm 0.1 kHz = 1.0 \pm 0.2 V rms$	High-Q GJM Series
	Dissipation Factor	GRM219 B3/R6 1C/1A 475 GRM219 C8 1A 475 GRM219 B3/R6 1A 106 GRM21B B3/R6 1C/1A 106 GRM21B B3/R6 1C/1A 106 GRM319 B3/R6 1C/1A 106 GRM319 B3/R6 1C/1A 106 GRM319 B3/R6 1C/1A 106 GRM319 B3/R6 1C/1A 106 B1, B3, R1, *R6, *R7, C7, C8, E7, D7: 0.1 max. C6: 0.125 max. D8: 0.15 max.	$\label{eq:constraint} \begin{array}{ c c c c c c c c c c c c c c c c c c c$	High Frequency GQM Series
8	(D.F.)	F1, F5: 0.2 max. *GRM31CR71E106: 0.125 max. GRM31CR6 0J/0G 107: 0.15 max.		hip

Continued on the following page.

For Bonding GMD Series

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(Note 1) These Specifications and Test Methods indicate typical inspection. For General Please refer to individual specifications (our product specifications or the approval sheet). *" is added in PNs table, please refer to GRM Series Specifications and Test Methods (1). When no When "*" is added in PNs table, please refer to GRM Series Specifications and Test Methods (2). Continued from the preceding page No Item Specifications Test Method B1, B3 : Within ±10% (-25 to +85°C) The capacitance change should be measured after 5 min. at Within +30/-80% (-25 to +85°C) each specified temp. stage. The ranges of capacitance change compared with the : Within ±15% (-55 to +85°C) R6 R1, R7 : Within ±15% (-55 to +125°C) reference temperature value over the temperature ranges Within +22/-82% (-30 to +85°C) F5 shown in the table should be within the specified ranges." No bias Within ±22% (-55 to +85°C) In case of applying voltage, the capacitance change should be C6 : Within ±22% (-55 to +125°C) C7 measured after 1 more min. with applying voltage in C8 : Within ±22% (-55 to +105°C) equilibration of each temp. stage. D7 Within +22/-33% (-55 to +125°C) *GRM32DR60J226, GRM43 B1/B3/R6 0J/1A 336/476: 1.0±0.2Vrms Within +22/-56% (-55 to +125°C) E7 GRM155B30G475, GRM155B30J 225, GRM21BB30J476, D8 : Within +22/-33% (-55 to +105°C) GRM155R60E106, GRM188 B3/R6 0E/0G/0J 226: 0.2±0.05Vrms Step Temperature (°C) Applying Voltage (V) 25±2 (for R6, R7, C6, C7, C8, D7, D8, E7, F5) 1 20±2 (for B1, B3, F1, R1) Low ESL L Series -55±3 (for R1, R6, R7, C6, C7, C8, D7, D8, E7) Capacitance 2 -30±3 (for F5) 9 Temperature -25±3 (for B1, B3, F1) Characteristics No bias 25±2 (for R6, R7, C6, C7, C8, D7, D8, E7, F5) 3 20±2 (for B1, B3, F1, R1) 125±3 (for R1, R7, C7, D7, E7) B1. Within +10/-30% 50% of Δ 105±3 (for C8. D8) 85±3 (for B1, B3, F1, F5, R6, C6) the Rated R1: Within +15/-40% Voltage F1: Within +30/-95% 20±2 (for B1, F1, R1) 5 -55±3 (for R1) 6 -25±3 (for B1, F1) 50% of the 7 rated voltage 20±2 (for B1, F1, R1) 125±3 (for R1) 8 85±3 (for B1, F1) Initial measurement for high dielectric constant type Perform a heat treatment at 150 +0/-10°C for one hour and then set for 24±2 hours at room temperature. Perform the initial measurement. Solder the capacitor on the test jig (glass epoxy board) shown High Frequency GOM Series in Fig. 1a using a eutectic solder. Then apply 10N* force in parallel with the test jig for 10±1sec. The soldering should be done either with an iron or using the No removal of the terminations or other defects should occur. reflow method and should be conducted with care so that the soldering is uniform and free of defects such as heat shock. \mathbb{V} *1N: GRM02, 2N: GRM03, 5N: GRM15/GRM18 \overline{V} \overline{V} Туре а b С Adhesive Strength GRM02 10 0.56 0.23 0.2 ∇ 17 of Termination GRM03 0.3 0.9 0.3 older resist GRM15 0.4 1.5 0.5 Baked electrode or GRM18 **GMA Series** 1.0 3.0 1.2 copper foil GRM21 1.2 4.0 1.65 Fig. 1a GRM31 22 5.0 2.0 2.2 GRM32 5.0 2.9 GRM43 3.5 7.0 3.7 GRM55 4.5 8.0 5.6 Solder the capacitor on the test jig (glass epoxy board) in the Appearance No defects or abnormalities same manner and under the same conditions as (10) Capacitance Within the specified tolerance The capacitor should be subjected to a simple harmonic motion B1, B3, R1, *R6, *R7, C7, C8, E7, D7: 0.1 max. having a total amplitude of 1.5mm, the frequency being varied 11 Vibration C6: 0.125 max. uniformly between the approximate limits of 10 and 55Hz. The D8: 0.15 max. frequency range, from 10 to 55Hz and return to 10Hz, should D.F. be traversed in approximately 1 minute. This motion should be F1, F5: 0.2 max. *GRM31CR71E106: 0.125 max. applied for a period of 2 hours in each of 3 mutually GRM31CR6 0J/0G 107: 0.15 max. perpendicular directions (total of 6 hours)

Continued on the following page.

Monolithic Microchip

For Bonding GMD Series

Product Information



(Note 1) These Specifications and Test Methods indicate typical inspection. Please refer to individual specifications (our product specifications or the approval sheet).

When no "*" is added in PNs table, please refer to GRM Series Specifications and Test Methods (1). When "*" is added in PNs table, please refer to GRM Series Specifications and Test Methods (2).

70	Continued fr	om the prec	eding page. When "*" is added in PNs table, ple	ease refer to GR	M Series Spec	ification	ns and Test Me	ethods (2).
No.	lte	m	Specifications		Test	Method	1	
		Appearance Capacitance Change	No marking defects Within ±10%	Solder the capa in Fig. 2a using direction showr done by the ref so that the sold shock.	a eutectic solo n in Fig. 3a for flow method an	der. Ther 5±1 sec. d should	n apply a force The soldering be conducted	in the should be with care
12	Deflection	ı	20 50 Pressurizing speed: 1.0mm/sec. Pressurize Flexure : ≤1		• F	b c a 100 ig. 2a	04.5	t: 1.6mm 5: t: 0.8mm)
			Capacitance meter	Туре	a		b	C
				GRM02 GRM03	0.2		0.56 0	0.23
				GRM15	0.4			0.5
			Fig.3a	GRM18	1.0			1.2
				GRM21	1.2			1.65
				GRM31	2.2			2.0
				GRM32 GRM43	2.2		5.0 7.0	2.9 3.7
				GRM45 GRM55	3.5			5.6
							0.0	(in mm)
	Terminati	Appearance	continuously. No defects or abnormalities	After preheating 2±0.5 seconds for 2±0.5 seconds	at 230±5°C or	Sn-3.0A		
	Resistance	Capacitance Change	B1, B3, R1, *R6, R7, C6, C7, *C8, E7, D7, D8: Within ±7.5% F1, F5: Within ±20% *GRM188R6 0J/0G 106, GRM188C8 0E/0G 106, GRM219R60G226: Within ±12.5% GRM155R60G475, GRM155R60E106, GRM188R60G226: Within ±15%	Preheat the cap Immerse the ca solder solution temperature for *Do not apply to	apacitor in a eu at 270±5°C for r 24±2 hours, tl o GRM02.	tectic so 10±0.5 nen mea	lder* or Sn-3.0 seconds. Set a sure.	•
4	to Soldering Heat	D.F.	B1, B3, R1, *R6, *R7, C7, C8, E7, D7: 0.1 max. C6: 0.125 max. D8: 0.15 max. F1, F5: 0.2 max.	 Initial measure Perform a heat then set at roor Perform the initial 	treatment at 1 m temperature tial measureme	50+0/–10 for 24±2 ent.	0°C for one ho	ur and
			*GRM31CR71E106: 0.125 max. GRM31CR6 0J/0G 107: 0.15 max.	*Preheating for				
				Step 1	Tempera 100 to 12		Tim 1 m	
		I.R.	More than 50Ω · F	2	170 to 2		1 m	
		Dielectric Strength	No defects					
		Appearance	No defects or abnormalities	Fix the capacito		0.0	n the same ma	anner and
		Capacitance Change	B1, B3, R1, R6, R7, C6, C7, C8, D7, D8: Within ±7.5% E7: Within ±30% F1, F5: Within ±20%	under the same Perform the five shown in the fo Set for 24±2 ho	e cycles accord Ilowing table.	ding to th		
5	Temperature Sudden Change	D.F.	B1, B3, R1, *R6, *R7, C7, C8, E7, D7: 0.1 max. C6: 0.125 max. D8: 0.15 max. F1, F5: 0.2 max. *GRM31CR71E106: 0.125 max. GRM31CR6 0J/0G 107: 0.15 max.	Step Temp. (°C) Time (min.)	1 Min. Operating Temp. +0/-3 30±3	2 Room Temp. 2 to 3	3 Max. Operating Temp. +3/-0 30±3	4 Room Temp. 2 to 3
		I.R.	More than $50\Omega \cdot F$	Perform a heat	0			ur and
		Dielectric Strength	No defects	then set at roor Perform the init GRM188R60J1 treatment and t then measure.	m temperature tial measureme 106 only Measu	for 24±2 ent. urement	hours. after test Perfo	rm a heat

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Continued on the following page.

For General GRM Series

Array GNM Series

Low ESL LL□ Series

High-Q GJM Series

High Frequency GOM Series

Monolithic Microchip GMA Series

For Bonding GMD Series

Product Information



When no

(Note 1) These Specifications and Test Methods indicate typical inspection. Please refer to individual specifications (our product specifications or the approval sheet). "*" is added in PNs table, please refer to GRM Series Specifications and Test Methods (1). When "*" is added in PNs table, please refer to GRM Series Specifications and Test Methods (2).

Continued from the preceding page.

No.	Ite	m	Specifications	Test Method
		Appearance	No defects or abnormalities	Apply the rated voltage at $40\pm2^{\circ}$ C and 90 to 95% humidity for 500±12 hours. The charge/discharge current is less than 50mA.
	High	Capacitance Change	B1, B3, R1, R6, R7, C6, C7, C8, E7, D7, D8: Within ±12.5% F1, F5: Within ±30%	•Initial measurement
16	Temperature High Humidity (Steady)	D.F.	B1, B3, R1, R6, R7, C6, C7, *C8, E7, D7, D8: 0.2 max. F1, F5: 0.4 max. *GRM319C81A106, GRM31MC81A106: 0.125 max.	Perform a heat treatment at 150+0/–10°C for one hour and then let sit for 24±2 hours at room temperature. Perform the initial measurement.
	(Steauy)	I.R.	More than $12.5\Omega \cdot F$	 Measurement after test Perform a heat treatment at 150+0/–10°C for one hour and then let sit for 24±2 hours at room temperature, then measure.
		Appearance	No defects or abnormalities	Apply 150%* of the rated voltage for 1000±12 hours at the
		Capacitance Change	B1, B3, R1, *R6, R7, C6, C7, *C8, E7, D7, D8: Within ±12.5% F1, F5: Within ±30% *GRM188C8 0E/0G 106, GRM219R60G226: within ±15%	 maximum operating temperature ±3°C. Let sit for 24±2 hours at room temperature, then measure. The charge/discharge current is less than 50mA. * Part Numbers with # have individual specification.
17	Durability	D.F.	B1, B3, R1, R6, R7, C6, C7, *C8, E7, D7, D8: 0.2 max. F1, F5: 0.4 max. *GRM319C81A106, GRM31MC81A106: 0.125 max.	As for these Part Numbers, please refer to table A. •Initial measurement Perform a heat treatment at 150+0/–10°C for one hour and
				then let sit for 24±2 hours at room temperature. Perform the initial measurement.
		I.R.	More than $25\Omega \cdot F$	•Measurement after test Perform a heat treatment at 150+0/–10°C for one hour and then let sit for 24±2 hours at room temperature, then measure.

Table A

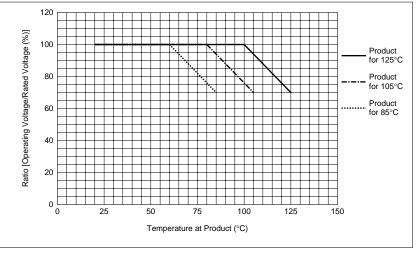
Part Number	Dimension L×W (mm)	Temp. Char.	Rated Volt. (Vdc)	Capacitance (F)	Cap. Tol (%)	Spec. Test Methods	Applied Testing Voltage at Durability
GRM155C80J684KE15D	1.0×0.5	X6S	6.3	0.68µ	±10%	(2)	Rated Volt. ×100%
GRM155C80J684ME15D	1.0×0.5	X6S	6.3	0.68µ	±20%	(2)	Rated Volt. ×100%
GRM188C80G106ME47D	1.6×0.8	X6S	4	10μ	±20%	(2)	Rated Volt. ×100%
GRM21BC80J226ME51L	2.0×1.25	X6S	6.3	22μ	±20%	(2)	Rated Volt. ×100%
GRM319D71C475KA12D	3.2×1.6	X7T	16	4.7μ	±10%	(2)	Rated Volt. ×100%
GRM319D71C475MA12D	3.2×1.6	X7T	16	4.7μ	±20%	(2)	Rated Volt. ×100%

Part Numbers of table A are designed for use in the circuits where continuous applied voltage to the capacitor is derated than rated voltage. These Part Numbers guarantee Durability Test with

100% x rated voltage as testing voltage at the maximum operating temperature.

The following voltage and temperature derating conditions are recommended for use to ensure the same reliability level as normal specification.

• Recommended Derating Conditions on Voltage and Temperature





Low ESL LL^[] Series

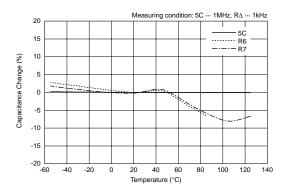
High-Q GJM Series

High Frequency GOM Series

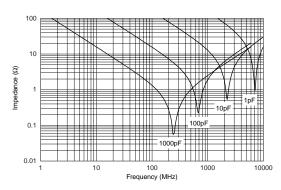


GRM Series Data

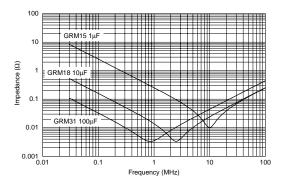
Capacitance - Temperature Characteristics



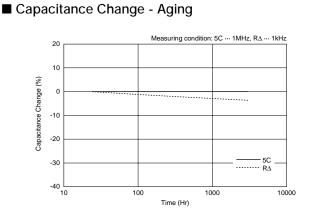
■ Impedance - Frequency Characteristics 5C: GRM15



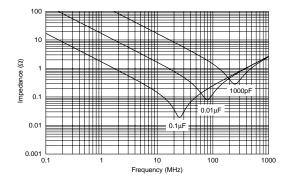




The data herein are given in typical values, not guaranteed ratings. Please refer to our Web site or contact our sales representatives for individual Part Number's data. Our Web Site: http://www.murata.com/products/capacitor/tech_data/



R∆: GRM15



For General GRM Series

Array GNM Series



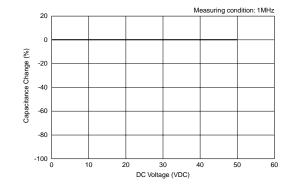
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GRM Series Data

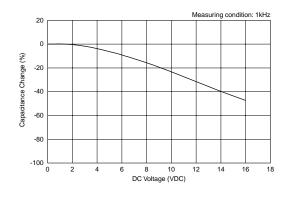
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■ Capacitance - DC Voltage Characteristics

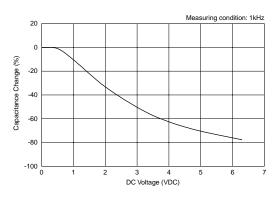
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High Dielectric Constant Type: GRM155R71C104KA88

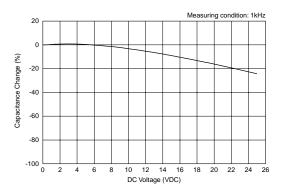


High Dielectric Constant Type: GRM188R60J106ME47

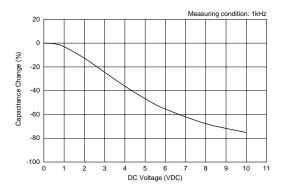


The data herein are given in typical values, not guaranteed ratings. Please refer to our Web site or contact our sales representatives for individual Part Number's data. Our Web Site: http://www.murata.com/products/capacitor/tech_data/

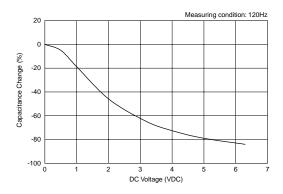
High Dielectric Constant Type: GRM155R71E103KA01



High Dielectric Constant Type: GRM155R61A105KE15



High Dielectric Constant Type: GRM31CR60J107ME39



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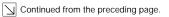
For General GRM Series

Array GNM Series

Low ESL LL□ Series

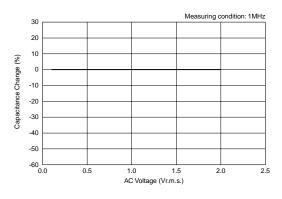


GRM Series Data

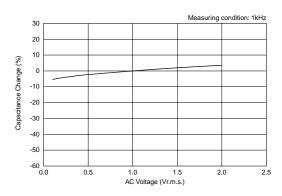


■ Capacitance - AC Voltage Characteristics

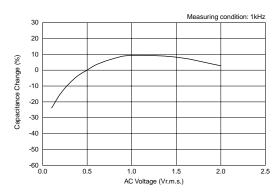
Temperature Compensating Type: GRM1555C1H102JA01



High Dielectric Constant Type: GRM155R71C104KA88

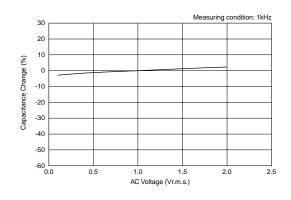


High Dielectric Constant Type: GRM188R60J106ME47



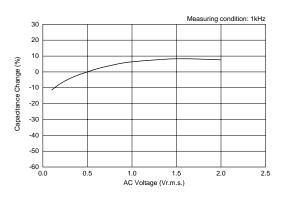
The data herein are given in typical values, not guaranteed ratings.

Please refer to our Web site or contact our sales representatives for individual Part Number's data. Our Web Site: http://www.murata.com/products/capacitor/tech_data/

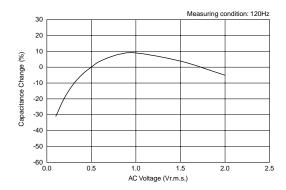


High Dielectric Constant Type: GRM155R71E103KA01

High Dielectric Constant Type: GRM155R61A105KE15



High Dielectric Constant Type: GRM31CR60J107ME39





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Chip Monolithic Ceramic Capacitors



Capacitor Array GNM Series

Low ESL LL□ Series

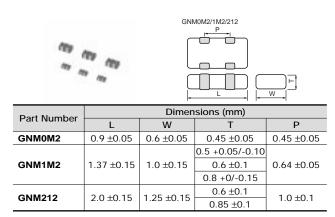
High-Q GJM Series

Features

- 1. High density mounting due to mounting space saving
- 2. Mounting cost saving

Applications

General electronic equipment



	1777 (1777 (1777)			
Part Number		Dimensi	ons (mm)	
Fait Number	L	W	Т	Р
			0.5 +0.05/-0.1	
GNM214	2.0 ±0.15	1.25 ±0.15	0.6 ±0.1	0.5 ±0.05
			0.85 ±0.1	
			0.8 ±0.1	
GNM314	3.2 +0.15	1.6 ±0.15	0.85 ±0.1	0.8 ±0.1
GININI314	3.∠ <u>±</u> 0.15	1.0 ±0.15	1.0 ±0.1	0.0 <u>E</u> 0.1
			1.15 ±0.1	

GNM214/314





Capacitance Table

Temperature Compensating Type C0G(5C) Characteristics

ex.0.6: T Dimension [mm] 0.6 3.2x1.6 (**31**) <1206> 1.37x1.0 2.0x1.25 LxW (**21**) <0805> (1M) [mm] Ò504: Number of Elements 4(**4**) 2(2) Rated Voltage 50 100 50 50 (**1H**) (**1H**) (1H) (2A) Capacitance [Vdc] 10pF(100) 0.6 0.8 0.6 0.8 15pF(150) 0.6 0.6 0.8 0.8 22pF(220) 0.6 0.8 0.8 0.6 33pF(330) 0.6 0.6 0.8 0.8 47pF(470) 0.6 0.6 0.8 0.8 68pF(680) 0.6 0.6 0.8 0.8 100pF(101) 0.6 0.6 0.8 0.8 150pF(151) 0.6 0.6 0.8 0.8 220pF(221) 0.6 0.6 0.8 330pF(331) 0.8

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

High Dielectric Constant Type X7R(R7)/X7S(C7) Characteristics

0.6 ex.0.6:	T Dimens	ion [mm]									
LxW [mm]		(1 <05	(x1.0 M) 04>			2.0x1.25 (21) <0805>			(3	(1.6 1) 06>	
Number of Elements		2(2)				1	4(4)		1	
Rated Voltage	50	25	16	10	50	25	16	50	25	16	6.3
Capacitance [Vdc]	(1 H)	(1E)	(1C)	(1 A)	(1H)	(1E)	(1C)	(1H)	(1E)	(1C)	(0 J)
470pF(471)					0.6						
1000pF(102)	0.6				0.6						
2200pF(222)		0.6				0.6					
4700pF(472)		0.6			!	0.6					
10000pF(103)		0.6				0.6					
22000pF(223)			0.6	0.6			0.85				
47000pF(473)]		0.6	0.6			0.85	0.85		1.0	
0.10μF(104)			0.6	0.6			0.85	0.85	0.85	1.0	
1.0μF(105)											1.15

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

High Dielectric Constant Type X7R(R7) Characteristics-Low Profile

0.5 e.	x.0.5: 1	r Dimensi	on [mm]
	LxW [mm]	1.37x1.0 (1M) <0504>	2.0x1.25 (21) <0805>
Number of Ele	ements	2(2)	4(4)
Rated Vo	ltage [Vdc]	16 (1C)	16 (1C)
0.10µF(104)	0.5	0.5

For General GRM Series



Capacitance Table

High Dielectric Constant Type X5R(R6) Characteristics

0.6 ex.0.6: T Dimension [mm]

LxW [mm]			(0.6 M) 02>				1.37x1.((1M) <0504>				2.0x1.25 (21) <0805>		2.0x (2 <08	1)	(3	x1.6 (1) 206>
Number of Elements						2	(2)							4((4)	
Rated Voltage Capacitance [Vdc]	16 (1C)	10 (1A)	6.3 (0J)	4 (0G)	50 (1H)	25 (1E)	16 (1C)	10 (1A)	6.3 (0J)	16 (1C)	10 (1A)	6.3 (0J)	10 (1A)	6.3 (0J)	16 (1C)	10 (1A)
1000pF(102)					0.6											
2200pF(222)						0.6				1					1	
4700pF(472)						0.6										
10000pF(103)	0.45	0.45	0.45	[0.6									 - 	
22000pF(223)	0.45	0.45	0.45		1 1 1		0.6	0.6		 					1 1 1	
47000pF(473)	0.45	0.45	0.45		 		0.6	0.6		 					 	
0.10μF(104)	0.45	0.45	0.45		 			0.6							 ! !	
0.22μF(224)				-			0.8									
0.47µF(474)					 			_		0.85					1 1	
1.0μF(105)				0.45			0.8	0.8	0.8	0.85	0.85		0.85	0.85	0.85	0.85
2.2μF(225)					1 			0.8	0.8		0.85	0.85		0.85		

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

High Dielectric Constant Type X5R(R6) Characteristics-Low Profile

0.5 ex.0).5: 1	Dimensi	on [mm]	
	xW nm]	1.37 (1 <05	M)	2.0x1.25 (21) <0805>
Number of Elem	ents	2(2)	4(4)
Rated Volta	age dc]	16 (1C)	10 (1A)	10 (1A)
1.0μF(10)5)	0.5	0.5	0.5

The part number code is shown in () and Unit is shown in []. < >: EIA [inch] Code

For General GRM Series

66



Temperature Compensating Type C0G(5C) Characteristics

LxW [mm]		1.37x1.0(1M)<0504>	2.0x1.25(21)<0805>	3.2x1.6(3	1)<1206>
Number of Elem	ents	2(2)		4(4)	
Rated Volt. [Vdc	[Vdc] 50(1H)		50(1H)	100(2A)	50(1H)
Capacitance	Tolerance		Part N	lumber	•
10pF(100)	±10%(K)	GNM1M25C1H100KD01D	GNM2145C1H100KD01D	GNM3145C2A100KD01D	GNM3145C1H100KD01D
15pF(150)	±10%(K)	GNM1M25C1H150KD01D	GNM2145C1H150KD01D	GNM3145C2A150KD01D	GNM3145C1H150KD01D
22pF(220)	±10%(K)	GNM1M25C1H220KD01D	GNM2145C1H220KD01D	GNM3145C2A220KD01D	GNM3145C1H220KD01D
33pF(330)	±10%(K)	GNM1M25C1H330KD01D	GNM2145C1H330KD01D	GNM3145C2A330KD01D	GNM3145C1H330KD01D
47pF(470)	±10%(K)	GNM1M25C1H470KD01D	GNM2145C1H470KD01D	GNM3145C2A470KD01D	GNM3145C1H470KD01D
68pF(680)	±10%(K)	GNM1M25C1H680KD01D	GNM2145C1H680KD01D	GNM3145C2A680KD01D	GNM3145C1H680KD01D
100pF(101)	±10%(K)	GNM1M25C1H101KD01D	GNM2145C1H101KD01D	GNM3145C2A101KD01D	GNM3145C1H101KD01D
150pF(151)	±10%(K)	GNM1M25C1H151KD01D	GNM2145C1H151KD01D	GNM3145C2A151KD01D	GNM3145C1H151KD01D
220pF(221)	±10%(K)	GNM1M25C1H221KD01D	GNM2145C1H221KD01D		GNM3145C1H221KD01D
330pF(331)	±10%(K)				GNM3145C1H331KD01D

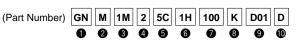
High Dielectric Constant Type X7R(R7)/X7S(C7) Characteristics

LxW [mm]			1.37x1.0(1M)<0504>			
Number of Elem	ents	2(2)				
Rated Volt. [Vdc]	50(1H) 25(1E) 16(1C) 10(1A)			10(1A)	
Capacitance	Tolerance	Part Number				
1000pF(102)	±20%(M)	GNM1M2R71H102MA01D				
2200pF(222)	±20%(M)		GNM1M2R71E222MA01D			
4700pF(472)	±20%(M)		GNM1M2R71E472MA01D			
10000pF(103)	±20%(M)		GNM1M2R71E103MA01D			
22000pF(223)	±20%(M)			GNM1M2R71C223MA01D	GNM1M2R71A223MA01D	
47000pF(473)	±20%(M)			GNM1M2R71C473MA01D	GNM1M2R71A473MA01D	
0.10μF(104)	±20%(M)			GNM1M2R71C104MA01D	GNM1M2C71A104MA01D	

LxW [mm]			2.0x1.25(21)<0805>		
Number of Elem	ents				
Rated Volt. [Vdc]	50(1H)	25(1E)	16(1C)	
Capacitance	Tolerance		Part Number		
470pF(471)	±20%(M)	GNM214R71H471MA01D			
1000pF(102)	±20%(M)	GNM214R71H102MA01D			
2200pF(222)	±20%(M)		GNM214R71E222MA01D		
4700pF(472)	±20%(M)		GNM214R71E472MA01D		
10000pF(103)	±20%(M)		GNM214R71E103MA01D		
22000pF(223)	±20%(M)			GNM214R71C223MA01D	
47000pF(473)	±20%(M)			GNM214R71C473MA01D	
0.10μF(104)	±20%(M)			GNM214R71C104MA01D	

LxW [mm]		3.2x1.6 (31) <1206>				
Number of Elem	ents	4(4)				
Rated Volt. [Vdc	.]	50(1H) 25(1E) 16(1C) 6.3(0J)				
Capacitance	Tolerance	Part Number				
47000pF(473)	±20%(M)	GNM314R71H473MA11D		GNM314R71C473MA01L		
0.10μF(104)	±20%(M)	GNM314R71H104MA11D	GNM314R71E104MA11D	GNM314R71C104MA01L		
1.0μF(105)	±20%(M)				GNM314R70J105MA01L	

The part number code is shown in () and Unit is shown in []. < >: EIA [inch] Code * Please refer to GNM series Specifications and Test Method (2).



Packaging Code in Part Number shows STD 180mm Reel Taping.

Product ID 2 Series 5 Temperature Characteristics 8 Capacitance Tolerance

3 Dimensions (LxW) 6Rated Voltage Individual Specification Code

4 Number of Elements Capacitance Packaging

High-Q GJM Series

For General GRM Series



High Dielectric Constant Type X7R(R7) Characteristics-Low Profile

LxW [mm]		1.37x1.0(1M)<0504>	2.0x1.25(21)<0805>
Number of Elements		2(2)	4(4)
Rated Volt. [Vdc]		16(1C)	16(1C)
Capacitance Tolerance		Part N	umber
0.10µF(104)	±20%(M)	GNM1M2R71C104MAA1D	GNM214R71C104MAA1D

The part number code is shown in () and Unit is shown in []. < >: EIA [inch] Code

High Dielectric Constant Type X5R(R6) Characteristics

LxW [mm]		0.9x0.6(0M)<0302>				
Number of Elements		2(2)				
Rated Volt. [Vdc]	16(1C) 10(1A) 6.3(0J) 4(0G)				
Capacitance	Tolerance	Part Number				
10000pF(103)	±20%(M)	GNM0M2R61C103ME18D*	GNM0M2R61A103ME17D*	GNM0M2R60J103ME17D*		
22000pF(223)	±20%(M)	GNM0M2R61C223ME18D*	GNM0M2R61A223ME17D*	GNM0M2R60J223ME17D*		
47000pF(473)	±20%(M)	GNM0M2R61C473ME18D*	GNM0M2R61A473ME17D*	GNM0M2R60J473ME17D*		
0.10μF(104)	±20%(M)	GNM0M2R61C104ME18D*	GNM0M2R61A104ME17D*	GNM0M2R60J104ME17D*		
1.0μF(105)	±20%(M)				GNM0M2R60G105ME17D*	

LxW [mm]			1.37x1.0(1M)<0504>	
Number of Elements			2(2)	
Rated Volt. [Vdc]	50(1H)	25(1E)	16(1C)
Capacitance	Tolerance		Part Number	•
1000pF(102)	±20%(M)	GNM1M2R61H102MA01D		
2200pF(222)	±20%(M)		GNM1M2R61E222MA01D	
4700pF(472)	±20%(M)		GNM1M2R61E472MA01D	
10000pF(103)	±20%(M)		GNM1M2R61E103MA01D	
22000pF(223)	±20%(M)			GNM1M2R61C223MA01D
47000pF(473)	±20%(M)			GNM1M2R61C473MA01D
0.22µF(224)	±20%(M)			GNM1M2R61C224ME18D*
1.0μF(105)	±20%(M)			GNM1M2R61C105ME18D*

LxW [mm]		1.37x1.0(1	M)<0504>
Number of Elem	ents	20	(2)
Rated Volt. [Vdc]	10(1A) 6.3(0 J)	
Capacitance	Tolerance	Part Number	
22000pF(223)	±20%(M)	GNM1M2R61A223MA01D	
47000pF(473)	±20%(M)	GNM1M2R61A473MA01D	
0.10μF(104)	±20%(M)	GNM1M2R61A104MA01D	
1.0μF(105)	±20%(M)	GNM1M2R61A105ME17D*	GNM1M2R60J105ME12D*
2.2μF(225)	±20%(M)	GNM1M2R61A225ME18D*	GNM1M2R60J225ME18D*

LxW [mm]		2.0x1.25(21)<0805>			
Number of Elements			2(2)		
Rated Volt. [Vdc]		16(1C)	10(1A)	6.3(0J)	
Capacitance	Tolerance				
0.47µF(474)	±20%(M)	GNM212R61C474MA16D			
1.0μF(105)	±20%(M)	GNM212R61C105MA16D	GNM212R61A105MA13D		
2.2μF(225)	±20%(M)		GNM212R61A225ME16D*	GNM212R60J225ME16D	

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The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code * Please refer to GNM series Specifications and Test Method (2).

AA1 D (Part Number) **GN M 1M 2 R7 1C 104 M** 0 2 8 4 5 6 0 9 8

Product ID 2 Series **5**Temperature Characteristics 8 Capacitance Tolerance

3 Dimensions (LxW) 6 Rated Voltage Individual Specification Code

4 Number of Elements Capacitance Packaging

Packaging Code in Part Number shows STD 180mm Reel Taping.

For Bonding GMD Series

Product Information

LxW [mm]		2.0x1.25(21)<0805>	
Number of Elements		4(4)	
Rated Volt. [Vdc]		10(1A)	6.3(0J)
Capacitance	Tolerance	Part Number	
1.0μF(105)	±20%(M)	GNM214R61A105ME17D*	GNM214R60J105ME17D*
2.2μF(225)	±20%(M)		GNM214R60J225ME18D*

LxW [mm]		3.2x1.6(31)<1206>	
Number of Elem	ents	4(4)	
Rated Volt. [Vdc]		16(1C)	10(1A)
Capacitance Tolerance		Part Number	
1.0μF(105)	±20%(M)	GNM314R61C105MA15D	GNM314R61A105MA13D

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

* Please refer to GNM series Specifications and Test Method (2).

High Dielectric Constant Type X5R(R6) Characteristics-Low Profile

LxW [mm]		1.37x1.0(1M)<0504>		2.0x1.25(21)<0805>
Number of Elements		2(2)		4(4)
Rated Volt. [Vdc]		16(1C)	10(1A)	10(1A)
Capacitance	Tolerance	Part Number		
1.0μF(105)	±20%(M)	GNM1M2R61C105MEA2D*	GNM1M2R61A105MEA4D*	GNM214R61A105MEA2D*

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

* Please refer to GNM series Specifications and Test Method (2).



GNM Series Specifications and Test Methods (1) When no "*" is added in PNs table, please refer to GNM Series Specifications and Test Methods (1). For General GRM Series When "*" is added in PNs table, please refer to GNM Series Specifications and Test Methods (2). Specifications Test Method No Item Temperature **High Dielectric Type** Compensating Type Operating R7, C7: -55 to +125°C 5C: -55 to +125°C 1 Temperature R6: -55 to +85°C Range The rated voltage is defined as the maximum voltage that may be applied continuously to the capacitor. When AC voltage is superimposed on DC voltage, VP-P or VO-P, 2 **Rated Voltage** See the previous pages. whichever is larger, should be maintained within the rated voltage range 3 No defects or abnormalities Visual inspection Appearance 4 Dimensions Within the specified dimensions Using calipers No failure should be observed when 300% of the rated voltage (5C) or 250% of the rated voltage (R7) is applied between the 5 **Dielectric Strength** No defects or abnormalities terminations for 1 to 5 seconds, provided the charge/discharge Low ESL L Series current is less than 50mA. The insulation resistance should be measured with a DC More than $10.000M\Omega$ or $500\Omega \cdot F$ Insulation 6 voltage not exceeding the rated voltage at 25°C and 75%RH Resistance (whichever is smaller) max. and within 2 minutes of charging. 7 Capacitance Within the specified tolerance The capacitance/Q/D.F. should be measured at 25°C at the 30pF min.: Q≧1000 frequency and voltage shown in the table. 30pF max .: Char 0/ Char. 25V min. 16V 10V 6.3V 5C R7 Q≧400+20C Item 8 **Dissipation Factor** R7, R6, 0.025 0.035 0.035 0.05 Frequency 1±0.1MHz 1±0.1kHz (D.F.) C7 max max. max max. High-Q C: Nominal Voltage 0.5 to 5Vrms 1.0±0.2Vrms Capacitance (pF) The capacitance change should be measured after 5 min. at Reference Temp Cap. Char each specified temperature stage. Range Temp Change (1) Temperature Compensating Type -55°C The temperature coefficient is determined using the capaci-Within the R7 Capacitance to +125°C Within specified tolerance tance measured in step 3 as a reference. When cycling the -55°C ±15% Change (Table A) R6 25°C temperature sequentially from steps 1 through 5, the to +85°C High Frequency GOM Series capacitance should be within the specified tolerance for the –55°C Within C7 temperature coefficient and capacitance change as in Table A. to +125°C ±22% The capacitance drift is calculated by dividing the differences between the maximum and minimum measured values in the Within the Temperature steps 1, 3 and 5 by the cap. value in step 3. specified tolerance Coefficient Step Temperature (°C) (Table A) Capacitance 1 25+29 Temperature 2 -55±3 (for 5C/R7/C7), -30±3 (for F5) Characteristics 3 25+2Monolithic Microchip 125±3 (for 5C/R7/C7), 85±3 (for F5) 4 5 25±2 **GMA Series** (2) High Dielectric Constant Type Within +0.2% The ranges of capacitance change compared with the above or ±0.05pF Capacitance 25°C value over the temperature ranges shown in the table (whichever is Drift should be within the specified ranges. larger.) Initial measurement for high dielectric constant type. Perform a heat treatment at 150+0/-10°C for one hour and then set for 24±2 hours at room temperature. Perform the initial measurement For Bonding GMD Series Solder the capacitor to the test jig (glass epoxy board) shown in No removal of the terminations or other defect should occur. Fig.1 using a eutectic solder. Then apply 5N force in parallel with GNM GNM the test jig for 10±1 sec. The soldering should be done either with an iron or using the reflow method and should be conducted with care so that the soldering is uniform and free of defects such as heat shock. Adhesive Strength d Type b С 10 а of Termination GNM1M2 0.5 1.6 0.32 0.32 GNM212 Copper foi 0.6 1.8 0.5 0.5 Solder resist Product Information GNM214 2.0 0.25 0.25 0.6 -Copper foil GNM314 0.8 2.5 0.4 0.4 (in mm)

Continued on the following page. |

Fig. 1



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					pecifications and Test Methods (1)									
	Continued fr	om the prec	eding page.		ease refer to GNM Series Specifications and Test Methods (1). ease refer to GNM Series Specifications and Test Methods (2)	ieral eries								
				Specifications		For General GRM Series								
No.	Ite	em	Temperature Compensating Type	High Dielectric Type	- Test Method	For GR								
		Appearance	No defects or abnorn	nalities	Solder the capacitor to the test jig (glass epoxy board) in the									
		Capacitance	Within the specified t	olerance	same manner and under the same conditions as (10). The capacitor should be subjected to a simple harmonic motion									
11	Vibration Resistance	Q/D.F.	30pF min.: Q≥1000 30pF max.: Q≥400+20C C: Nominal Capacitance (pF)	Char. 25V min. 16V 10V 6.3V R7, R6, 0.025 0.035 0.035 0.05 C7 max. max. max. max.	having a total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 55Hz. The frequency range, from 10 to 55Hz and return to 10Hz, should be traversed in approximately 1 minute. This motion should be applied for a period of 2 hours in each of 3 mutually perpendic- ular directions (total of 6 hours).	Array GNM Series								
		Appearance	No marking defects	No marking defects Solder the capacitor on the test jig (glass epoxy b										
		Capacitance Change	Within ±5% or ±0.5pf (whichever is larger)	= Within ±10%	 in Fig. 2 using a eutectic solder. Then apply a force in the direction shown in Fig. 3 for 5±1 sec. The soldering should be done by the reflow method and should 									
			•GNM□□4	•GNM□□2	be conducted with care so that the soldering is uniform and free of defects such as heat shock.	sL ies								
12	Deflection	n			50 Pressurizing speed: 1.0mm/sec.	Low ESL LL ^[] Series								
			GNM212 2 GNM214 2	a b c d 0:0±0.05 0.5±0.05 0.32±0.05 0.32±0.05 0:0±0.05 0.6±0.05 0.5±0.05 0.5±0.05 0:0±0.05 0.7±0.05 0.3±0.05 0.2±0.05 0:0±0.05 0.8±0.05 0.4±0.05 0.4±0.05	R230 Pressurize Flexure : ≤1 Capacitance meter 45 45 Fig. 3	High-O GJM Series								
				Fig. 2		h Frequency QM Series								
13	Solderabi Terminati	2	75% of the terminatic continuously.	ons are to be soldered evenly and	Immerse the capacitor in a solution of ethanol (JIS-K-8101) and rosin (JIS-K-5902) (25% rosin in weight proportion). Preheat at 80 to 120°C for 10 to 30 seconds. After preheating, immerse in eutectic solder solution for 2±0.5 seconds at 230±5°C or Sn-3.0Ag-0.5Cu solder solution for 2±0.5 seconds at 245±5°C.									
	Resistand Soldering		The measured and o specifications in the f	bserved characteristics should satisfy the old satisfy the old satisfy the old satisfy the old satisfy the satisfy		Higl G								
		Appearance	No marking defects		-									
		Canadi	Within ±2.5%		Preheat the capacitor at 120 to 150°C for 1 minute. Immerse	chip								
		Capacitance Change	or ±0.25pF (whichever is larger)	R7, R6, C7: Within ±7.5%	the capacitor in a eutectic solder or Sn-3.0Ag-0.5Cu solder solution at 270 \pm 5°C for 10 \pm 0.5 seconds. Let sit at room	olithic Microo GMA Series								
14		Q/D.F.	30pF min.: Q≥1000 30pF max.: Q≥400+20C	Char. 25V min. 16V 10V 6.3V R7, R6, 0.025 0.035 0.035 0.05 C7 max. max. max. max.	 temperature for 24±2 hours, then measure. Initial measurement for high dielectric constant type Perform a heat treatment at 150+0/-10°C for one hour and then let sit for 24±2 hours at room temperature. 	Monolithic Microchip GMA Series								
			C: Nominal Capacitance (pF)		Perform the initial measurement.									
		I.R.	More than 10,000MΩ	Ω or 500 $\Omega \cdot F$ (whichever is smaller)]	b s								
		Dielectric Strength	No failure			or Bonding MD Series								
					Continued on the following page.	≒ ≥								

Continued on the following page.



		G	NM S	eries S	Specificatio											
For General GRM Series	[2	Continued fr	om the prec	eding page.						ease refer to GNM Series Specifications and Test Methods (1). ease refer to GNM Series Specifications and Test Methods (2).					
r Ge		No.	lte	m		Speci	fications				Test Method					
G F			ne		Temperature Compensating Type		High D	ielectric	Туре							
			Temperat Cycle	ure	The measured and o specifications in the f			istics sho	ould sati	sfy the	Fix the capacitor to the supporting jig in the same manner and					
				Appearance	No marking defects						under the same conditions as (10). Perform the five cycles					
Array GNM Series				Capacitance Change	Within ±2.5% or ±0.25pF (whichever is larger)	R7, R6,	R7, R6, C7: Within ±7.5%				 according to the four heat treatments listed in the following table. Let sit for 24±2 hours (temperature compensating type) or 48±4 hours (high dielectric constant type) at room temperature, then measure. 					
GN		15		Q/D.F.	30pF min.: Q≧1000						- <u>Step 1 2 3 4</u> Min. <u>- Max.</u>					
		15			30pF max.: Q≧400+20C	Char. R7, R6,	25V min. 0.025	16V 0.035	10V 0.035	6.3V 0.05	Temp. (°C) Operating Temp. +0/-3 Room Temp. +3/-0 Room Temp.					
					C:Nominal Capacitance (pF)	<u>C7</u>	max.	max.	max.	max.	Time (min.) 30±3 2 to 3 30±3 2 to 3 • Initial measurement for high dielectric constant type					
sL ies				I.R.	More than 10,000MΩ	or 500Ω	· F (whic	hever is	smaller)		Perform a heat treatment at 150+0/-10°C for one hour and then let sit for 24±2 hours at room temperature.					
Low ESL LL Series			Humidity	Dielectric Strength	No failure						Perform the initial measurement.					
	1		Humidity Steady The measured and observed characteristics should satisfy the specifications in the following table.							sfy the						
				Appearance	No marking defects						-					
High-Q GJM Series				Capacitance Change	Within ±5% or ±0.5pF (whichever is larger)	R7, R6,	C7: With	in ±12.59	%		Set the capacitor at 40 \pm 2°C and 90 to 95% humidity for 500 \pm 12					
GJM		16			30pF and over: Q≧350 10pF and over, 30pF and below:	Char.	25V min	ı. 16V	10V	/6.3V	hours. Remove and let sit for 24±2 hours at room temperature, then measure.					
ligh Frequency GOM Series				Q/D.F.	Q≥275+5C/2 10pF and below: Q≥200+10C C: Nominal Capacitance (pF)	:275+5C/2 R7, R6, 0.05 0.05 0.05 I below: ≥200+10C al										
Freq VI Se				I.R.	More than 1,000M Ω	or 50Ω · F	(whiche	ver is sm	naller)		-					
High F GQN			Humidity	Load	The measured and o specifications in the f			istics sho	ould sati	sfy the						
				Appearance	No marking defects											
Monolithic Microchip GMA Series				Capacitance Change	Within ±7.5% or ±0.75pF (whichever is larger)	R7, R6,	C7: With	in ±12.59	%		Apply the rated voltage at 40±2°C and 90 to 95% humidity for 500±12 hours.					
olithic Micro GMA Series		17			30pF and over: Q≧200 30pF and below:	Char.	25V min	ı. 16V	10V	/6.3V	Remove and let sit for 24±2 hours at room temperature, then measure. The charge/discharge current is less than 50mA.					
Mone				Q/D.F.	Q≧100+10C/3	R7, R6, C7	0.05 max.	0.05 max.	0	.05 ax.						
					C: Nominal Capacitance (pF)											
s d				I.R.	More than 500M Ω or	25Ω · F (whicheve	er is sma	ller)		-					
For Bonding GMD Series										Continued on the following page.						

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GNM Series Specifications and Test Methods When no "*" is added in PNs table, please refer to GNM Series Specifications and Test Methods (1). For General GRM Series Continued from the preceding page. When "*" is added in PNs table, please refer to GNM Series Specifications and Test Methods (2). Specifications No Item Test Method Temperature **High Dielectric Type** Compensating Type The measured and observed characteristics should satisfy the **High Temperature** specifications in the following table. Load No marking defects Appearance Array GNM Series Within ±3% Apply 200% of the rated voltage for 1000±12 hours at the Capacitance or ±0.3pF R7, R6, C7: Within ±12.5% maximum operating temperature $\pm 3^{\circ}$ C. Let sit for 24 ± 2 hours (whichever is Change at room temperature, then measure. larger) The charge/discharge current is less than 50mA. 30pF and over: 18 Q≧350 Initial measurement for high dielectric constant type. 10pF and over, Apply 200% of the rated DC voltage for one hour at the 30pF and below: 10V/6.3V maximum operating temperature ±3°C. Remove and let sit for Char. 25V min. 16V Q/D.F. 24±2 hours at room temperature. Perform initial Q≧275+5C/2 R7, R6, 0.04 0.05 0.05 10pF and below: C7 max. max max measurement.

Table A

LR

Ohan	Nominal Values		Capacitance Change from 25°C (%)									
Char.		-55	5°C	-30	0°C	–10°C						
	(ppm/°C) *1	Max.	Min.	Max.	Min.	Max.	Min.					
5C	0±30	0.58	-0.24	0.40	-0.17	0.25	-0.11					

*1: Nominal values denote the temperature coefficient within a range of 25 to 125°C.

Q≧200+10C

More than 1,000M Ω or 50 $\Omega \cdot F$ (whichever is smaller)

C: Nominal Capacitance (pF)

High-Q GJM Series

Low ESL ⊔L□ Series

For Bonding GMD Series

muRata

GNM Series Specifications and Test Methods (2)

	G	NM Se	eries S	Specific			Methods (2	-				
eral ries					Whe V	n no "*" is ado Nhen "*" is ado	ded in PNs table, pl ded in PNs table, pl	ease refer to GNM ease refer to GNM	l Series Spe I Series Spe	ecifications ecifications	and Test	Methods (1). Methods (2).
For General GRM Series	No.	Ite	em		Spee	cifications			Te	st Method		
For GR	1	Operating Temperatu		R6: –55°C to	o +85°C							
Array GNM Series	2	Rated Vol	Itage	See the prev	vious pages.			The rated voltage be applied contir When AC voltage whichever is larg voltage range.	nuously to th e is superim	ne capacitor. Iposed on D	C voltage,	V ^{P-P} or V ^{O-P} ,
Array M Ser	3	Appearan	ice	No defects o	or abnormalities			Visual inspection	۱			
ANN	4	Dimensio	ns	Within the sp	pecified dimensio	n		Using calipers				
0	5	Dielectric	Strength	No defects c	or abnormalities			No failure should is applied betwee provided the cha	en the termi	nations for 1	to 5 seco	nds,
sL ies	6	Insulation F	Resistance	50Ω · F min.				The insulation re voltage not exce max. and within	eding the ra	ted voltage		
Seri	7	Capacitar	nce	Within the sp	pecified tolerance	9		The capacitance	D.F. should	d be measur	ed at 25°C	at the
Low ESL LL Series			Dissipation Factor D.F.)	0.1 max.*3 <u>Table 3</u> GNM0M2 R6 103/223/473/104				$\begin{tabular}{ c c c c c }\hline frequency and voltage & \hline \end{tabular} \\ \hline \begin{tabular}{ c c c c c c c }\hline Nominal Cap & \hline \end{tabular} \\ \hline \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	acitance M OV min.) .3V max.) n Table1		ency Measu 1.0± 0.5± 0.5±	0.2Vrms 0.1Vrms 0.1Vrms 0.1Vrms 0.1Vrms
High-Q GJM Series	8	Dissipatic (D.F.)		GNM1M GNM1M GNM21 GNM21 GNM21	M2 R6 OJ 105 M2 R6 1A 105 M2 R6 1A 225 M2 R6 OJ 225 M2 R6 IA 225 M2 R6 OJ 225 M2 R6 OJ 225 M2 R6 OJ 225 M2 R125 max. for	MEA4		GNM0M2 GNM1M2 GNM1M2 Table 2		4 5/225 4/105 3/223/473 5		
Monolithic Microchip High Frequency GMA Series GOM Series	9	Capacitar Temperat Character	ure	Char. R6	Temp. Range –55 to +85°C	Cap. Change Within ±15%	The capacitance change should be measured after 5 min.at each specified temperature stage.StepTemperature (°C)1 25 ± 2 2 -55 ± 3 3 25 ± 2 4 85 ± 3 5 25 ± 2 The ranges of capacitance change compared with the 25°C value over the temperature ranges shown in the table should within the specified ranges.• Initial measurement for high dielectric constant type.					
lonolithic Micro GMA Series	_			No removal	of the terminatior	ns or other defe	cts should occur.	Perform a heat then set for 24± Perform the init	2 hours at r al measure	oom tempe ment.	rature.	
For Bonding M GMD Series	10	Adhesive Strength of Termination				GNM 22		I Fig. 1 using a eu Then apply 5N (0 10±1 sec. The so using the reflow n the soldering is u Type GNM0M2 GNM1M2	GNM0M2: 21 oldering sho nethod and s	N) force in pa ould be done should be co	either with	h an iron or h care so that
G							Solder resist	GNM212	0.6	1.8	0.5	0.5
					Copper foil		Copper foil	GNM214	0.6	2.0	0.25	0.25
						Fig. 1		GNM314	0.8	2.5	0.4	0.4 (in mm)
c						i iy. i		1				(in mm)
Product Information	11	Vibration	Appearance Capacitance D.F.		or abnormalities pecified tolerance	•		Solder the capac the same manne The capacitor sh having a total an uniformly betwee The frequency ra	er and under hould be sub hplitude of 1 en the appro	the same c jected to a s .5mm, the fi oximate limit	onditions a simple harr equency b s of 10 and	is (10). nonic motion eing varied I 55Hz.
Proc			D.F.	0.1 max.* ³ * ³ However 0.125 max. for Table 3 items.			The frequency range, from 10 to 55Hz and return to 10Hz, should be traversed in approximately 1 minute. This motion should be applied for a period of 2 hours in each of 3 mutually perpendicular directions (total of 6 hours).				s motion	



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				pecifications and Test Methods (2)	
J (Continued fr	om the prece		ease refer to GNM Series Specifications and Test Methods (1). ease refer to GNM Series Specifications and Test Methods (2).	For General
lo.	Ite	em	Specifications	Test Method	Gen
		Appearance	No marking defects	Solder the capacitor to the test jig (glass epoxy board) shown in	For
		Capacitance Change	Within ±10%	Fig. 2 using a eutectic solder. Then apply a force in the direction shown in Fig. 3. The soldering should be done by the reflow method and should be conducted with care so that the	
2 Deflection		ı	•GNM ↓ •GNM	soldering is uniform and free of defects such as heat shock. $\begin{array}{c} & & \\ & & $	Low ESL Array
	Caldarahi	like of	(in mm) Fig. 2	Immerse the capacitor in a solution of ethanol (JIS-K-8101) and rosin (JIS-K-5902) (25% rosin in weight proportion). Preheat at	Lo
13	Solderabi Terminati	5	75% of the terminations are to be soldered evenly and continuously.	80 to 120°C for 10 to 30 seconds. After preheating, immerse in eutectic solder solution for 2±0.5 seconds at 230±5°C or Sn-3.0Ag-0.5Cu solder solution for 2±0.5 seconds at 245±5°C.	High-Q
		Appearance	No marking defects	Preheat the capacitor at 120 to 150°C for 1 minute. Immerse	q
		Capacitance Change	R6*4: Within ±7.5% *4 GNM0M2R60G105: Within +15/-7.5%	the capacitor in a eutectic solder or Sn-3.0Ag-0.5Cu solder	High-O
4	Resistance to Soldering Heat	D.F.	0.1 max. * ³ * ³ However 0.125 max. for Table 3 items.	solution at 270±5°C for 10±0.5 seconds. Let sit at room temperature for 24±2 hours, then measure. • Initial measurement	
		I.R.	50Ω · F min.	Perform a heat treatment at 150 +0/-10°C for one hour and then let sit for 24±2 hours at room temperature. Perform	
		Dielectric Strength	No failure	the initial measurement.	کر
		Appearance	No marking defects	Fix the capacitor to the supporting jig in the same manner and	Frequency
		Capacitance Change	R6*5: Within ±12.5% *5GNM0M2R60G105, GNM0M2R60J103/223/473/104, GNM0M2R61A103/223/473/104, GNM0M2R61C103/223/473/104, GNM1M2R61A105:	under the same conditions as (10). Perform the five cycles according to the four heat treatments listed in the following table. Let sit for 24±2 hours at room temperature, then measure. Step 1 2 3 4	High Fre
15	Temperature Cycle	D.F.	0.1 max. *3	Temp. (°C) Min. Operating Room Temp. Temp. Room Temp.	dir
		I.R.	* ³ However 0.125 max. for Table 3 items. 50Ω · F min.	Time (min.) 30±3 2 to 3 30±3 2 to 3 • Initial measurement	crock
		Dielectric	No failure	Perform a heat treatment at 150 +0/-10 °C for one hour and then let sit for 24±2 hours at room temperature.	Monolithic Microchip
		Strength Appearance	No marking defects	Perform the initial measurement. Apply the rated voltage at 40±2°C and 90 to 95% humidity for	4 ilouc
	High	Capacitance Change	R6: Within ±12.5%	500±12 hours. The charge/discharge current is less than 50mA. • Initial measurement	M
6	Temperature High	D.F.	0.2 max.	Perform a heat treatment at $150 + 0/-10^{\circ}$ C for one hour and then let sit for 24 ± 2 hours at room temperature.	
	Humidity (Steady)	I.R.	12.5Ω · F min.	 Perform the initial measurement. Measurement after test Perform a heat treatment at 150 +0/-10°C for one hour and then let sit for 24±2 hours at room temperature, then measure. 	For Ronding
		Appearance	No marking defects	Apply 150% (GNM1M2R61A225/1C105: 125% of the rated	
		Capacitance Change	R6: Within ±12.5%	voltage) of the rated voltage for 1000 ± 12 hours at the maximum operating temperature ±3 °C. Let sit for 24±2 hours	
		D.F.	0.2 max.	at room temperature, then measure. The charge/discharge current is less than 50mA.	ation
7	Durability	I.R.	$25\Omega \cdot F$ min.	 Initial measurement Perform a heat treatment at 150 +0/-10°C for one hour and then let sit for 24±2 hours at room temperature. Perform the initial measurement. Measurement after test Perform a heat treatment at 150 +0/-10°C for one hour and 	Droduct Information



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Chip Monolithic Ceramic Capacitors

Low ESL LLL/LLR/LLA/LLM Series

Reversed Geometry Low ESL Type

For General GRM Series

Applications Decoupling soluti

Features

frequency 2. Small, high cap

Decoupling solution for "chip sets", such as Mobile/FPD TV

1. Low ESL, good for noise reduction for high

Controlled ESR Low ESL Type

Features

- 1. Good solution for anti resonance reduction with Controlled ESR.
- 2. Suitable for high speed IC decoupling due to low inductance type.
- 3. 4 types of ESR are available.

Applications

- 1. All kind of IC package (network processor, media processor, etc)
- 2. Circuit that has anti-resonance

Eight Terminals Low ESL Type

Features

1. Low ESL (100pH), suitable to decoupling capacitor for 1GHz clock speed IC.

2. Small, high cap

Applications

High speed IC package (FPGA, network processor, etc)

For Bonding GMD Series

Product Information

Ten Terminals Low ESL Type

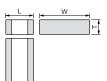
Features

- 1. Low ESL (45pH), suitable to decoupling capacitor for 2GHz clock speed IC.
- 2. Small, high cap

Applications

High speed IC package (FPGA, network processor, etc)

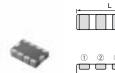




		<u> </u>			
Part Number		Dimensions (mm)			
Fart Number	L	W	Т		
LLL153	0.5 ±0.05	1.0 ±0.05	0.3 ±0.05		
LLL185	0.8 ±0.1	1.6 ±0.1	0.6 max.		
LLL215			0.5 +0/-0.15		
LLL216	1.25 ±0.1	2.0 ±0.1	0.6 ±0.1		
LLL219			0.85 ±0.1		
LLL315			0.5 +0/-0.15		
LLL317	1.6 ±0.15	3.2 ±0.15	0.7 ±0.1		
LLL31M			1.15 ±0.1		
LLR185	0.8 ±0.15	1.6 ±0.15	0.5 +0.05/-0.1		

	11		<u> </u>	Equivalent Circuit			
		876	5 2 C				
Part Number		Dime	nsions (mm)				
Part Number	L	W	Т	P			
II A185	16+01	08+01	0.5 +0.05/-0.1	04+01			

Part Number	L	W	Т	P
LLA185	1.6 ±0.1	0.8 ±0.1	0.5 +0.05/-0.1	0.4 ±0.1
LLA215	2.0 ±0.1	1.25 ±0.1	0.5 +0.05/-0.1	0.5 ±0.05
LLA219	2.0 ±0.1	1.25 ±0.1	0.85 ±0.1	0.5 ±0.05
LLA315	3.2 ±0.15	1.6 ±0.15	0.5 +0.05/-0.1	0.8 ±0.1
LLA319	3.2 ±0.15	1.6 ±0.15	0.85 ±0.1	0.8 ±0.1
LLA31M	3.2 ±0.15	1.6 ±0.15	1.15 ±0.1	0.8 ±0.1





Part Number	Dimensions (mm)								
Part Number	L	W	W T						
LLM215	2.0 ±0.1	1.25 ±0.1	0.5 +0.05/-0.1	0.5 ±0.05					
LLM315	3.2 ±0.15	1.6 ±0.15	0.5 +0.05/-0.1	0.8 ±0.1					

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Low ESL

High Frequency GOM Series

Monolithic Microchip

GMA Series

Capacitance Table

Reversed Geometry Low ESL Type X7R(R7)/X7S(C7)/X6S(C8)/X5R(R6) Characteristics

5 ex.5: T Dimension [mm]

LxW [mm]	(1	x1.0 5) 204>			0.8x1.6 (18) <0306>					.25x2. (21) <0508>					1.6x3.2 (31) <0612>		-
Rated Voltage Capacitance [Vdc]		4 (0G)	50 (1H)	25 (1E)	16 (1C)	10 (1A)	4 (0G)	50 (1H)	25 (1E)	16 (1C)	10 (1A)	4 (0G)	50 (1H)	25 (1E)	16 (1C)	10 (1A)	6.3 (0J)
2200pF(222)			5					1									
4700pF(472)]		5														
10000pF(103)]			5				6					7				
22000pF(223)				5				6					7				
47000pF(473)					5				6				7				
0.10μF(104)	3					5		 	6				М	7		_	
0.22μF(224)	3					5				9	6			М	7		
0.47µF(474)		3					5				9			М	7		
1.0μF(105)			 				5				9				М	7	
2.2μF(225)							5					9				М	7
4.7μF(475)	L		, , , ,					, , ,					 				М
10μF(106)																	М

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

Reversed Geometry Low ESL Type X7R(R7)/X7S(C7) Characteristics-Low Profile

5	ex.5: T D	imensio	on [mm]												
	LxW [mm]		0.8) (1 <03	8)				(2	x2.0 1) 08>				1.6) (3 <06		
Rated Vo	oltage [Vdc]	25 (1E)	16 (1C)	10 (1A)	4 (0G)	50 (1H)	25 (1E)	16 (1C)	10 (1A)	6.3 (0J)	4 (0G)	50 (1H)	25 (1E)	16 (1C)	10 (1A)
10000pF	(103)	5				5		_				5			
22000pF	(223)		5				5					5			
47000pF	(473)		5					5					5		
0.10µF	(104)			5				5					5		
0.22µF	(224)				5				5					5	
0.47µF	(474)									5					5
1.0μF	(105)										5				

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

Controlled ESR Low ESL Type X7S(C7) Characteristics

5	ex.5: T l	ex.5: T Dimension [mm]									
	LxW [mm]	(18)									
Rated	Voltage [Vdc]		(0	1 G)							
Capacitance	ESR [mΩ]	100 (E01)	220 (E03)	470 (E05)	1000 (E07)						
1.0	μF(105)	5	5	5	5						

The part number code is shown in () and Unit is shown in [].

< >: EIA [inch] Code



Capacitance Table

Eight Terminals Low ESL Type X7S(C7)/X7R(R7) Characteristics sex.5: T Dimension [mm]

2.0x1.25 (**21**) <0805> 1.6x0.8 3.2x1.6 LxW (**31**) 1206: (18)[mm])603: Rated Voltage 4 10 6.3 10 4 25 16 4 16 (**0G**) (1E) (1C) (0G) (**0G**) Capacitance [Vdc] (1A) (0J) (1C) (1A) 10000pF(103) 9 22000pF(223) 9 47000pF(473) 9 0.10µF(104) 5 9 9 0.22µF(224) 5 9 9 5 9 0.47µF(474) 9 1.0µF(105) 5 9 М 9 2.2µF(225) 5 Μ 9 9 4.7μF(**475**) 9

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

Eight Terminals Low ESL Type X7R(R7)/X7S(C7) Characteristics-Low Profile

5 ex.5: T l	Dimensio	on [mm]						
LxW [mm]			2.0x1.2 (21) <0805>		3.2x1.6 (31) <1206>			
Rated Voltage Capacitance [Vdc]	25 (1E)	16 (1C)	10 (1A)	6.3 (0J)	4 (0G)	16 (1C)	10 (1A)	6.3 (0J)
10000pF(103)	5							
22000pF(223)	5							
47000pF(473)		5						
0.10μF(104)		5						
0.22μF(224)			5			5		
0.47µF(474)				5			5	
1.0μF(105)					5			5
2.2μF(225)					5			5
4.7μF(475)					5			

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

Ten Terminals Low ESL Type X7R(R7)/X7S(C7) Characteristics-Low Profile

5 ex.5: T	Dimensio	on [mm]					
LxW [mm]		(2	1.25 1) 05>			3.2x1.6 (31) <1206>	
Rated Voltage Capacitance [Vdc]	25 (1 E)	16 (1C)	6.3 (0J)	4 (0G)	16 (1C)	10 (1A)	6.3 (0J)
10000pF(103)	5						
22000pF(223)	5						
47000pF(473)		5					
0.10μF(104)		5			5		
0.22µF(224)			5		5		
0.47µF(474)			5		1	5	
1.0μF(105)]			5			
2.2μF(225)]			5			5

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

For Bonding GMD Series



Reversed Geometry Low ESL Type X7R(R7)/X7S(C7)/X6S(C8) Characteristics

LxW [mm]		0.5x1.0(15)<0204>			
Rated Volt. [Vdc	blt. [Vdc] 6.3(0J) 4(0G)				
Capacitance	Tolerance	Part Number			
0.10μF(104)	±20%(M)	LLL153C80J104ME01E*			
0.22μF(224)	±20%(M)	LLL153C80J224ME14E*			
0.47µF(474)	±20%(M)		LLL153C70G474ME17E*		

LLL153 Series 4V/0.47µF(L: 0.5+0.07/-0.03mm)

LxW [mm]		0.8x1.6(18)<0306>				
Rated Volt. [Vdc]	50(1H)	16(1C)	10(1A)		
Capacitance	Tolerance	Part Number				
2200pF(222)	±20%(M)	LLL185R71H222MA01L				
4700pF(472)	±20%(M)	LLL185R71H472MA01L				
10000pF(103)	±20%(M)		LLL185R71E103MA01L			
22000pF(223)	±20%(M)		LLL185R71E223MA01L			
47000pF(473)	±20%(M)			LLL185R71C473MA01L		
0.10μF(104)	±20%(M)				LLL185R71A104MA01L	
0.22μF(224)	±20%(M)				LLL185R71A224MA01L	

LxW [mm]		0.8x1.6(18)<0306>
Rated Volt. [Vdc]	4(0G)
Capacitance Tolerance		Part Number
0.47μF(474)	±20%(M)	LLL185C70G474MA01L
1.0μF(105)	±20%(M)	LLL185C70G105ME02L*
2.2µF(225)	±20%(M)	LLL185C70G225ME01L*

LxW [mm]			1.25x2.0(21)<0508>				
Rated Volt. [Vdc]	50(1H)	16(1C)	10(1A)			
Capacitance	Tolerance	Part Number			•		
10000pF(103)	±20%(M)	LLL216R71H103MA01L					
22000pF(223)	±20%(M)	LLL216R71H223MA01L					
47000pF(473)	±20%(M)		LLL216R71E473MA01L				
0.10μF(104)	±20%(M)		LLL216R71E104MA01L				
0.22μF(224)	±20%(M)			LLL219R71C224MA01L	LLL216R71A224MA01L		
0.47µF(474)	±20%(M)				LLL219R71A474MA01L		
1.0μF(105)	±20%(M)				LLL219R71A105MA01L		

LxW [mm]		1.25x2.0(21)<0508>	
Rated Volt. [Vdc]]	4(0G)	
Capacitance	Tolerance	Part Number	
2.2µF(225)	±20%(M)	LLL219C70G225MA01L	

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code * Please refer to LLL/LLR/LLA/LLM Series Specifications and Test Method (2).

Packaging Code in Part Number shows STD 180mm Reel Taping.

Product ID
Series
Temperature Characteristics
Capacitance Tolerance

Dimensions (LxW)Rated VoltageIndividual Specification Code

Dimension (T)CapacitancePackaging

Array GNM Series

Product Information



Reversed Geometry Low ESL Type X7R(R7)/X5R(R6) Characteristics

General M Series	LxW [mm]	LxW [mm] 1.6x3.2(31)<0612>					
For G GRM	Rated Volt. [Vdc]		50(1H)	25(1E)	16(1C)	10(1A)	
шO	Capacitance	Tolerance		Part Number			
	10000pF(103)	±20%(M)	LLL317R71H103MA01L				
	22000pF(223)	±20%(M)	LLL317R71H223MA01L				
	47000pF(473)	±20%(M)	LLL317R71H473MA01L				
Array GNM Series	0.10μF(104)	±20%(M)	LLL31MR71H104MA01L	LLL317R71E104MA01L			
ray Ser	0.22μF(224)	±20%(M)		LLL31MR71E224MA01L	LLL317R71C224MA01L		
NM IM	0.47µF(474)	±20%(M)		LLL31MR71E474MA01L	LLL317R71C474MA01L		
ۍ ۲	1.0μF(105)	±20%(M)			LLL31MR71C105MA01L	LLL317R71A105MA01L	
	2.2μF(225)	±20%(M)				LLL31MR71A225MA01L	

LxW [mm]		1.6x3.2(31)<0612>		
Rated Volt. [Vdc]]	6.3(0J)		
Capacitance Tolerance		Part Number		
2.2μF(225)	±20%(M)	LLL317R70J225MA01L		
4.7μF(475)	±20%(M)	LLL31MR70J475MA01L		
10μF(106)	±20%(M)	LLL31MR60J106ME01L*		

The part number code is shown in () and Unit is shown in []. < >: EIA [inch] Code * Please refer to LLL/LLR/LLA/LLM Series Specifications and Test Method (2).

Reversed Geometry Low ESL Type X7R(R7)/X7S(C7) Characteristics-Low Profile

LxW [mm]		0.8x1.6(18)<0306>				
Rated Volt. [Vdc]	25(1E) 16(1C) 10(1A) 4(
Capacitance	Tolerance		Part N	umber		
10000pF(103)	±20%(M)	LLL185R71E103MA11L				
22000pF(223)	±20%(M)		LLL185R71C223MA11L			
47000pF(473)	±20%(M)		LLL185R71C473MA11L			
0.10μF(104)	±20%(M)			LLL185R71A104MA11L		
0.22µF(224)	±20%(M)				LLL185C70G224MA111	

LxW [mm]		1.25x2.0(21)<0508>				
Rated Volt. [Vdc]	50(1H) 25(1E) 16(1C) 10(
Capacitance	Tolerance	Part Number				
10000pF(103)	±20%(M)	LLL215R71H103MA11L				
22000pF(223)	±20%(M)		LLL215R71E223MA11L			
47000pF(473)	±20%(M)			LLL215R71C473MA11L		
0.10μF(104)	±20%(M)			LLL215R71C104MA11L		
0.22μF(224)	±20%(M)				LLL215R71A224MA1	

LxW [mm]		1.25x2.0(21)<0508>		
Rated Volt. [Vdc]		6.3 (0J)	4(0G)	
Capacitance	Tolerance	Part Number		
0.47µF(474)	±20%(M)	LLL215R70J474MA11L		
1.0μF(105)	±20%(M)		LLL215C70G105MA11L	

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code



Product ID 2 Series **5**Temperature Characteristics 8 Capacitance Tolerance

3 Dimensions (LxW) 6 Rated Voltage Individual Specification Code

4 Dimension (T) Capacitance Packaging

Packaging Code in Part Number shows STD 180mm Reel Taping.

For Bonding GMD Series

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Reversed Geometry Low ESL Type X7R(R7) Characteristics-Low Profile

Reversed	d Geome	try Low ESL Type	X7R(R7) Characte	eristics-Low Profil	le				
LxW [mm]		1.6x3.2 (31) <0612>							
Rated Volt. [Vdc	:]	50(1H)	25(1E)	16(1C)	10(1A)				
Capacitance	Tolerance		Part N	lumber	·				
10000pF(103)	±20%(M)	LLL315R71H103MA11L							
22000pF(223)	±20%(M)	LLL315R71H223MA11L							
47000pF(473)	±20%(M)		LLL315R71E473MA11L						
0.10μF(104)	±20%(M)		LLL315R71E104MA11L						
0.22μF(224)	±20%(M)			LLL315R71C224MA11L					
0.47µF(474)	±20%(M)				LLL315R71A474MA11L				

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

Controlled ESR Low ESL Type X7S(C7) Characteristics

LxW [mm]		0.8x1.6(18)<0306>				
Rated Volt. [Vdc]	4(0G)				
ESR [mΩ]		100(E01)	100(E01) 220(E03)		1000(E07)	
Capacitance	Tolerance		Part N	Part Number		
1.0μF(105) ±20%(M)		LLR185C70G105ME01L*	LLR185C70G105ME03L*	LLR185C70G105ME05L*	LLR185C70G105ME07L*	

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

* Please refer to LLL/LLR/LLA/LLM Series Specifications and Test Method (2).

Eight Terminals Low ESL Type X7R(R7)/X7S(C7) Characteristics

LxW [mm]		1.6x0.8(18)<0603>
Rated Volt. [Vdc]	4(0G)
Capacitance	Tolerance	Part Number
0.10μF(104)	±20%(M)	LLA185C70G104MA01L
0.22μF(224)	±20%(M)	LLA185C70G224MA01L
0.47μF(474)	±20%(M)	LLA185C70G474MA01L
1.0μF(105)	±20%(M)	LLA185C70G105ME01L*
2.2μF(225)	±20%(M)	LLA185C70G225ME16L*

LxW [mm]		2.0x1.25(21)<0805>					
Rated Volt. [Vdc	:]	25(1E)	16(1C)	10(1A)	6.3(0J)		
Capacitance	Tolerance	Part Number					
10000pF(103)	±20%(M)	LLA219R71E103MA01L					
22000pF(223)	±20%(M)	LLA219R71E223MA01L					
47000pF(473)	±20%(M)	LLA219R71E473MA01L					
0.10μF(104)	±20%(M)		LLA219R71C104MA01L				
0.22μF(224)	±20%(M)		LLA219R71C224MA01L				
0.47µF(474)	±20%(M)			LLA219R71A474MA01L			
1.0μF(105)	±20%(M)				LLA219R70J105MA01L		

LxW [mm]		2.0x1.25(21)<0805>
Rated Volt. [Vdc]	4(0G)
Capacitance	Tolerance	Part Number
2.2μF(225)	±20%(M)	LLA219C70G225MA01L
4.7μF(475)	±20%(M)	LLA219C70G475ME01L*

The part number code is shown in () and Unit is shown in []. < >: EIA [inch] Code

* Please refer to LLL/LLR/LLA/LLM Series Specifications and Test Method (2).



Eight Terminals Low ESL Type X7R(R7) Characteristics

LxW [mm]		3.2x1.6(31)<1206>				
Rated Volt. [Vdc]	16(1C)	10(1A)	4(0G)		
Capacitance	Tolerance	Part Number				
0.10μF(104)	±20%(M)	LLA319R71C104MA01L				
0.22μF(224)	±20%(M)	LLA319R71C224MA01L				
0.47µF(474)	±20%(M)	LLA319R71C474MA01L				
1.0μF(105)	±20%(M)	LLA31MR71C105MA01L	LLA319R71A105MA01L			
2.2μF(225)	±20%(M)		LLA31MR71A225MA01L	LLA319R70G225MA01L		

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

Eight Terminals Low ESL Type X7R(R7)/X7S(C7) Characteristics-Low Profile

LxW [mm]			2.0x1.25(21)<0805>			
Rated Volt. [Vdc	;]	25(1E)	16(1C)	10(1A)	6.3(0J)		
Capacitance	Tolerance		Part Number				
10000pF(103)	±20%(M)	LLA215R71E103MA14L					
22000pF(223)	±20%(M)	LLA215R71E223MA14L					
47000pF(473)	±20%(M)		LLA215R71C473MA14L				
0.10μF(104)	±20%(M)		LLA215R71C104MA14L				
0.22µF(224)	±20%(M)			LLA215R71A224MA14L			
0.47µF(474)	±20%(M)				LLA215R70J474MA14		
LxW [mm]		2.0x1.25(21)<0805> 3.2x1.6(31)<1206>					
Rated Volt. [Vdc	:]	4(0G)	16(1C)	10(1A)	6.3(0J)		
Capacitance	Tolerance	Part Number					
0.22μF(224)	±20%(M)		LLA315R71C224MA14L				
0.47µF(474)	±20%(M)			LLA315R71A474MA14L			
1.0μF(105)	±20%(M)	LLA215C70G105MA14L			LLA315R70J105MA14		
2.2μF(225)	±20%(M)	LLA215C70G225ME11L*			LLA315R70J225MA14		
4.7μF(475)	±20%(M)	LLA215C70G475ME19L*					

Ten Terminals Low ESL Type X7R(R7)/X7S(C7) Characteristics-Low Profile

LxW [mm]		2.0x1.25(21)<0805>					
Rated Volt. [Vdc]	25(1E)	16(1C)	6.3(0J)	4(0G)		
Capacitance	Tolerance		Part Number				
10000pF(103)	±20%(M)	LLM215R71E103MA11L					
22000pF(223)	±20%(M)	LLM215R71E223MA11L					
47000pF(473)	±20%(M)		LLM215R71C473MA11L				
0.10μF(104)	±20%(M)		LLM215R71C104MA11L				
0.22μF(224)	±20%(M)			LLM215R70J224MA11L			
0.47µF(474)	±20%(M)			LLM215R70J474MA11L			
1.0μF(105)	±20%(M)				LLM215C70G105MA11		
2.2μF(225)	±20%(M)				LLM215C70G225ME11L		
LxW [mm]			3.2x1.6(31)<1206>				
Rated Volt. [Vdc]	16(1C)	10(1A)	6.3(0J)	-		
Capacitance	Tolerance	Part Number					
0.10μF(104)	±20%(M)	LLM315R71C104MA11L			-		
0.22μF(224)	±20%(M)	LLM315R71C224MA11L			-		
0.47µF(474)	±20%(M)		LLM315R71A474MA11L		-		
2.2μF(225)	±20%(M)			LLM315R70J225MA11L	-		
		() and Unit is shown in []. <>: E Series Specifications and Test Metl	IA [inch] Code nod (2).		-		

(Part Number) LL A 31 9 R7 1C 104 M A01 L 1 2 3 3 5 6 7 3 6 0

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3 Dimensions (LxW)6 Rated Voltage9 Individual Specification Code

Dimension (T)CapacitancePackaging

Packaging Code in Part Number shows STD 180mm Reel Taping.

Low ESL

For General GRM Series

Array GNM Series

For Bonding GMD Series

Product Information

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 10.12.20

								A/LLM Series Specifications and Test Methods (2).	
	Ite	m		Spe	cifications			Test Method	
	Operating Temperat Range		R7, C7: –55	to +125°C					
2	Rated Vol	tage	See the pre	vious pages.			be applied When AC v	voltage is defined as the maximum voltage that may continuously to the capacitor. voltage is superimposed on DC voltage, V ^{P,P} or V ^{O,P} , is larger, should be maintained within the rated nge.	
;	Appearan	се	No defects	or abnormalities			Visual insp	ection	
	Dimensio	ns	Within the s	pecified dimension	on		Using calip	iers	
	Dielectric	Strength	No defects of	or abnormalities			is applied b	should be observed when 250% of the rated voltage between the terminations for 1 to 5 seconds, he charge/discharge current is less than 50mA.	
5	Insulation Resistanc			: More than 10,00 : More than 5000 Capacitance			not exceed	tion resistance should be measured with a DC voltage ling the rated voltage at 25°C and 75%RH max. and nutes of charging.	
;	Capacitance Within the specified tolerance Dissipation Factor (D.F.) W.V.: 25V min.; 0.025 max. W.V.: 16V/10V max.; 0.035 max. W.V.: 6.3V max.; 0.05 max.					frequency a Frequency Voltage: 1 *For LLA18			
9	Capacitance Temperature Characteristics		Char. R7	Temp. Range (°C) -55 to +125	Reference Temp. 25°C	Cap.Change Within ±15%	each speci Step 1 2 3 4 5	itance change should be measured after 5 min. at fied temperature stage. Temperature (°C) 25±2 -55±3 25±2 125±2 125±3 25±2	
			C7 –55 to +125 25°C Within ±22%			value over be within th • Initial mea Perform a	s of capacitance change compared with the 25°C the temperature ranges shown in the table should he specified ranges. asurement. heat treatment at 150+0/-10°C for one hour and then 2 hours at room temperature. Perform the initial ent.		
D	Adhesive of Termin	•	No removal of the terminations or other defect should occur.				Solder the capacitor to the test jig (glass epoxy board) using a eutectic solder. Then apply 10N* force in parallel with the test jig for 10±1 sec. The soldering should be done either with an iron or using the reflow method and should be conducted with		
							care so that the soldering is uniform and free of defects such a heat shock. *5N (LLL18 and LLA/LLM Series		
		Appearance	No defects	or abnormalities			Solder the	capacitor to the test jig (glass epoxy board) in	
1	Vibration Resistance	Capacitance Within the specified tolerance				 capacitor s having a to uniformly b frequency 	nanner and under the same conditions as (10). The should be subjected to a simple harmonic motion otal amplitude of 1.5mm, the frequency being varied between the approximate limits of 10 and 55Hz. The range, from 10 to 55Hz and return to 10Hz, should bed in approximately 1 minute. This motion should be		
2	Solderability of Termination			max.; 0.05 max. terminations are t ously.	to be soldered e	venly	Immerse th rosin (JIS-F 80 to 120°0	a period of 2 hours in each of 3 mutually lar directions (total of 6 hours). The capacitor in a solution of ethanol (JIS-K-8101) and K-5902) (25% rosin in weight proportion). Preheat at C for 10 to 30 seconds. After preheating, immerse in Ider solution for 2±0.5 seconds at 230±5°C, or	
								0.5Cu solder solution for 2 ± 0.5 seconds at $245\pm5^{\circ}$ C.	
		Appearance	No marking	defects			Prohest the	e capacitor at 120 to 150°C for 1 minute. Immerse	
	Resistance to Soldering	Capacitance Change D.F.		% nin.; 0.025 max. 0V max.; 0.035 r	nax.		the capacit solution at	tor in a eutectic solder or Sn-3.0Ag-0.5Cu solder $270\pm5^{\circ}$ C for 10 ± 0.5 seconds. Let sit at room re for 24 ± 2 hours, then measure.	
	Heat			max.; 0.05 max.					
							er) entrial measurement. Perform a heat treatment at 150+0/–10°C for one ho		
		I.R.	More than 1	0,000MΩ or 500	$\Omega \cdot F$ (whichever	r is smaller)		it for 24 ± 2 hours at room temperature. Perform the	

Continued on the following page.



For General GRM Series

Array GNM Series

LL Series

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	L	LL/LL	R/LLA	/LLM Series Specifications and Te	st Methods (1)			
eral		Continued fr	om the prec		LLL/LLR/LLA/LLM Series Specifications and Test Methods (1). LLL/LLR/LLA/LLM Series Specifications and Test Methods (2).			
For General GRM Series	No.	lte	em	Specifications	Test Method			
			Appearance	No marking defects	Fix the capacitor to the supporting jig in the same manner and			
			Capacitance Change	Within ±7.5%	under the same conditions as (10). Perform the five cycles according to the four heat treatments listed in the following table. Let sit for 24±2 hours at room			
s	14	Temperature	D.F.	W.V.: 25V min.; 0.025 max. W.V.: 16V/10V max.; 0.035 max. W.V.: 6.3V max.; 0.05 max.	temperature, then measure.			
ay Serie		Cycle	I.R.	More than 10,000M Ω or 500 $\Omega \cdot F$ (whichever is smaller)	Temp. (°C) Temp. +0/–3 Temp. Temp. +3/–0 Temp.			
Array GNM Series			Dielectric Strength	No failure	Time (min.) 30±3 2 to 3 30±3 2 to 3 • Initial measurement. Perform a heat treatment at 150+0/–10°C for one hour and then let sit for 24±2 hours at room temperature. Perform the initial measurement.			
Low ESL .L⊟ Series		Humidity (Steady State)	Appearance	No marking defects				
	15		Capacitance Change	Within ±12.5%	Set the capacitor at $40\pm2^{\circ}$ C and 90 to 95% humidity for 500 ±12 hours. Remove and let sit for 24 ±2 hours at room temperature,			
	15		D.F.	W.V.: 10V min.; 0.05 max. W.V.: 6.3V max.; 0.075 max.	then measure.			
			I.R.	More than 1,000M Ω or 50 Ω \cdot F (whichever is smaller)				
			Appearance	No marking defects				
		Humidity Load	Capacitance Change	Within ±12.5%	Apply the rated voltage at $40\pm2^{\circ}$ C and 90 to 95% humidity for 500 ± 12 hours. Remove and let sit for 24 ± 2 hours at room			
Q	16		D.F.	W.V.: 10V min.; 0.05 max. W.V.: 6.3V max.; 0.075 max.	temperature, then measure. The charge/discharge current is less than 50mA.			
High-Q GJM Series			I.R.	More than 500M Ω or 25 Ω · F (whichever is smaller)				
9			Appearance	No marking defects	Apply 200% of the rated voltage for 1000±12 hours at the			
High Frequency GQM Series			Capacitance Change	Within ±12.5%	maximum operating temperature ±3°C. Let sit for 24±2 hours at room temperature, then measure. The charge/discharge current is less than 50mA.			
	17	High Temperature Load	D.F.	W.V.: 10V min.; 0.05 max. W.V.: 6.3V max.; 0.075 max.	•Initial measurement.			
			I.R.	More than 1,000M Ω or 50 $\Omega \cdot F$ (whichever is smaller)	Apply 200% of the rated DC voltage for one hour at the maximum operating temperature ±3°C. Remove and let sit for 24±2 hours at room temperature. Perform initial measurement.			



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				pecifications and Test Methods (2)		
_				LLL/LLR/LLA/LLM Series Specifications and Test Methods (1). LLL/LLR/LLA/LLM Series Specifications and Test Methods (2).		
0.	Ite	em	Specifications	Test Method		
1	Operating Temperat Range	,	R6: -55 to +85°C R7, C7: -55 to +125°C C8: -55 to +105°C			
2	Rated Vo	ltage	See the previous pages.	The rated voltage is defined as the maximum voltage that may be applied continuously to the capacitor. When AC voltage is superimposed on DC voltage, $V^{p,p}$ or $V^{o,p}$, whichever is larger, should be maintained within the rated voltage range.		
3	Appearan	ice	No defects or abnormalities	Visual inspection		
1	Dimensio	ns	Within the specified dimension	Using calipers		
5	Dielectric	Strength	No defects or abnormalities	No failure should be observed when 250% of the rated voltage is applied between the terminations for 1 to 5 seconds, provided the charge/discharge current is less than 50mA.		
6	Insulation Resistanc		$50\Omega \cdot F$ min.	The insulation resistance should be measured with a DC voltage not exceeding the rated voltage at 25°C and 75%RH max. and within 1 minute of charging.		
7	Capacitar	nce	Within the specified tolerance	The capacitance/D.F. should be measured at 25°C at the frequency and voltage shown in the table.		
8	Dissipation Factor (D.F.)		R6, R7, C7, C8: 0.120 max.	Capacitance Frequency Voltage C≤10µF (10V min.) 1±0.1kHz 1.0±0.2Vrms C≤10µF (6.3V max.) 1±0.1kHz 0.5±0.1Vrms C>10µF 120±24Hz 0.5±0.1Vrms		
9	Capacitance Temperature Characteristics		Char. Temp. Range (°C) Reference Temp. Cap. Change R6 -55 to +85 Within ±15% R7 -55 to +125 25°C C7 -55 to +125 Within ±22% C8 -55 to +105 Within ±22%	 each specified temperature stage. The ranges of capacitance change compared with the 25°C value over the temperature ranges shown in the table should be within the specified ranges. Initial measurement. Perform a heat treatment at 150+0/-10°C for one hour and then set for 24±2 hours at room temperature. Perform the initial measurement. 		
0	Adhesive Strength of Termination		No removal of the terminations or other defect should occur.	Solder the capacitor to the test jig (glass epoxy board) using a eutectic solder. Then apply 10N* force in parallel with the test jig for 10±1 sec. The soldering should be done either with an iron or using the reflow method and should be conducted with care so that the soldering is uniform and free of defects such as heat shock. *5N (LLL15, LLL18, LLR18, LLA, LLM Series)		
		Appearance	No defects or abnormalities	Solder the capacitor to the test jig (glass epoxy board) in		
		Capacitance	Within the specified tolerance	the same manner and under the same conditions as (10). The capacitor should be subjected to a simple harmonic motion		
1	Vibration D.F.		R6, R7, C7, C8: 0.120 max.	having a total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 55Hz. The frequency range, from 10 to 55Hz and return to 10Hz, should be traversed in approximately 1 minute. This motion should be applied for a period of 2 hours in each of 3 mutually perpendicular directions (total of 6 hours).		
2	Solderability of Termination		75% of the terminations are to be soldered evenly and continuously.	Immerse the capacitor in a solution of ethanol (JIS-K-8101) and rosin (JIS-K-5902) (25% rosin in weight proportion). Preheat at 80 to 120°C for 10 to 30 seconds. After preheating, immerse in eutectic solder solution for 2±0.5 seconds at 230±5°C, or Sn-3.0Ag-0.5Cu solder solution for 2±0.5 seconds at 245±5°C.		
		Appearance	No marking defects	Preheat the capacitor at 120 to 150°C for 1 minute. Immerse		
	Resistance	Capacitance Change	R6, R7, C7, C8: Within ±7.5%	the capacitor in a eutectic solder or Sn-3.0Ag-0.5Cu solder solution at 270±5°C for 10±0.5 seconds.		
3	to Soldering	D.F.	R6, R7, C7, C8: 0.120 max.	Let sit at room temperature for 24±2 hours, then measure.		
	Heat	I.R.	50Ω · F min.	• Initial measurement.		
		Dielectric Strength	No failure	Perform a heat treatment at 150+0/–10°C for one hour and then let sit for 24±2 hours at room temperature. Perform the initial measurement.		

Continued on the following page. \square



For General GRM Series

Array GNM Series

Low ESL LL⊟ Series

High-Q GJM Series

High Frequency GOM Series

Monolithic Microchip GMA Series

For Bonding GMD Series

Product Information

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 This PDF catalog has only typical specifications because there is no space for detailed specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.

When no "*" is added in PNs table, please refer to LLL/LLR/LLA/LLM Series Specifications and Test Methods (1).

When "*" is added in PNs table, please refer to LLL/LLR/LLA/LLM Series Specifications and Test Methods (2).

Test Method

LLL/LLR/LLA/LLM Series Specifications and Test Methods (2)

Specifications

eneral	Series
or G	RM
1	5

No

Continued from the preceding page.

Item

		Appearance	No marking defects					in the same ma	
		Capacitance Change	R6, R7, C7, C8: Within ±12.5%	a	ccording to		eatments	erform the five on listed in the fol emperature.	,
		D.F.	R6, R7, C7, C8: 0.120 max.		ien measur		ut room t	omporataro,	
	Temperature	I.R.	$50\Omega \cdot F$ min.		Step	1	2	3	4
14	Sudden Change				-) Min. Operating Temp. +0/-3	-	Min. Operating Temp. +0/–3	Room Temp.
		Dielectric Strength	No failure	1		urement eat treatment or 24±2 hours		30±3 -10°C for one h emperature. Pe	
		Appearance	No marking defects	Apply the rated voltage at 40±2°C and 90 to 95% humidity for					
		Capacitance Change	R6, R7, C7, C8: Within ±12.5%	500±12 hours. The charge/discharge current is less than 50mA. Apply the rated DC voltage.					
	High Temperature	D.F.	R6, R7, C7, C8: 0.2 max.						
15	High	I.R.	12.5Ω · F min.	 Initial measurement Perform a heat treatment at 150+0/–10°C for one l then let sit for 24±2 hours at room temperature. Per initial measurement. Measurement after test Perform a heat treatment at 150+0/–10°C for one l then let sit for 24±2 hours at room temperature, the 				form the our and	
		Appearance	No marking defects		Apply 150% of the rated voltage for 1000±12 hours at the				
		Capacitance Change	R6, R7, C7, C8: Within ±12.5% * LLL153C70G474: Within ±20%		maximum operating temperature ±3°C. The charge/discharge current is less than 50mA.				
		D.F.	R6, R7, C7, C8: 0.2 max.	•	Initial measurement				
16	Durability	I.R.	25Ω · F min.	1 i •N	 Perform a heat treatment at 150+0/-10°C for one hour and then let sit for 24±2 hours at room temperature. Perform the initial measurement. •Measurement after test Perform a heat treatment at 150+0/-10°C for one hour and then let sit for 24±2 hours at room temperature, then measurement. 			form the our and	
* 17	ESR		Within below ESR value at Frequency: 10 ± 0.1 MHz 100mΩ: Within 70 to 130 mΩ 220mΩ: Within 154 to 286 mΩ 470mΩ: Within 329 to 611 mΩ	The ESR should be measured at room temperature with the Equivalent of HP4294A.				with the	

* LLR: This specification is only for LLR Type

470mΩ: Within 329 to 611mΩ1000mΩ: Within 700 to 1300mΩ



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Chip Monolithic Ceramic Capacitors



High-Q Type GJM Series

Features

- 1. Mobile Telecommunication and RF module, mainly
- 2. Improvement of telephone call quality, Low power Consumption, yield ratio improvement.

Applications

VCO, PA, Mobile Telecommunication



Part Number	Dimensions (mm)						
Part Number	L	W	Т	е	g min.		
GJM03	0.6 ±0.03	0.3 ±0.03	0.3 ±0.03	0.1 to 0.2	0.2		
GJM15	1.0 ±0.05	0.5 ±0.05	0.5 ±0.05	0.15 to 0.35	0.3		

Array GNM Series

For General GRM Series



1.0x0.5

(**15**) <0402>

50

(1H)

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Capacitance Table

For General GRM Series

Array GNM Series

Low ESL LL^[] Series

High-Q

GJIM

High Frequency GOM Series

Monolithic Microchip

GMA Series

Temperature Compensating Type C0G(5C)/C0H(6C) Characteristics

3 ex.3: T Dimension [mm]

[mm]

[Vdc] (1

Rated Voltage

0.1pF(R10)

0.2pF(R20)

0.3pF(R30)

0.4pF(**R40**) 0.5pF(**R50**)

0.6pF(R60)

0.7pF(**R70**) 0.8pF(**R80**)

0.9pF(**R90**)

1.0pF(1R0)

1.1pF(1R1)

1.2pF(1R2)

1.3pF(1R3)

1.4pF(1R4)

1.5pF(**1R5**) 1.6pF(**1R6**)

1.7pF(1R7)

1.8pF(1R8)

1.9pF(1R9)

2.0pF(2R0)

2.1pF(2R1)

2.2pF(2R2) 2.3pF(2R3)

2.4pF(2R4) 2.5pF(2R5)

2.6pF(**2R6**) 2.7pF(**2R7**)

2.8pF(2R8)

2.9pF(2R9)

3.0pF(3R0)

3.1pF(3R1)

3.2pF(3R2)

3.3pF(3R3)

3.4pF(3R4)

3.5pF(**3R5**) 3.6pF(**3R6**)

3.7pF(3R7)

3.8pF(3R8)

3.9pF(**3R9**) 4.0pF(**4R0**)

4.1pF(4R1)

4.2pF(4R2)

4.3pF(4R3)

4.4pF(**4R4**) 4.5pF(**4R5**)

4.6pF(**4R6**) 4.7pF(**4R7**)

4.8pF(4R8)

4.9pF(4R9)

Capacitance

imensio	n [mm]					
0.6) (0 <02	3)	1.0x0.5 (15) <0402>	LxW [mm]	0.6× (0 : <02	3)	
25	6.3	50	Rated Voltage	25	6.3	ŀ
(1E)	(0 J)	(1H)	Capacitance [Vdc]	(1E)	(0 J)	
		5	5.0pF(5R0)	3		
3		5	5.1pF(5R1)	3		
3		5	5.2pF(5R2)	3		
3		5	5.3pF(5R3)	3		
3		5	5.4pF(5R4)	3		
3		5	5.5pF(5R5)	3		
3		5	5.6pF(5R6)	3		
3		5	5.7pF(5R7)	3		
3		5	5.8pF(5R8)	3		
3		5	5.9pF(5R9)	3		
3		5	6.0pF(6R0)	3		
3		5	6.1pF(6R1)	3		
3		5	6.2pF(6R2)	3		
3		5	6.3pF(6R3)	3		
3		5	6.4pF(6R4)	3		
3		5	6.5pF(6R5)	3		
3		5	6.6pF(6R6)	3		
3		5	6.7pF(6R7)	3		
3		5	6.8pF(6R8)	3		
3		5	6.9pF(6R9)	3		
3		5	7.0pF(7R0)	3		
3		5	7.1pF(7R1)	3		
3		5	7.2pF(7R2)	3		
3		5	7.3pF(7R3)	3		
3		5	7.4pF(7R4)	3		
3		5	7.5pF(7R5)	3		
3		5	7.6pF(7R6)	3		
3		5	7.7pF(7R7)	3		
3		5	7.8pF(7R8)	3		
3		5	7.9pF(7R9)	3		
3		5	8.0pF(8R0)	3		
3		5	8.1pF(8R1)	3		
3		5	8.2pF(8R2)	3		
3		5	8.3pF(8R3)	3		
3		5	8.4pF(8R4)	3		
3		5	8.5pF(8R5)	3		
3		5	8.6pF(8R6)	3		
3		5	8.7pF(8R7)	3		
3		5	8.8pF(8R8)	3		
3		5	8.9pF(8R9)	3		
3		5	9.0pF(9R0)	3		
3		5	9.1pF(9R1)	3		
3		5	9.2pF(9R2)	3		
3		5	9.3pF(9R3)	3		F
3		5	9.4pF(9R4)	3		
3		5	9.5pF(9R5)	3		
3		5	9.6pF(9R6)	3		F
3		5	9.7pF(9R7)	3		
3		5	9.8pF(9R8)	3		Ĺ

LxW [mm]	(0	<0.3 3) 01>	1.0x0.5 (15) <0402>
Rated Voltage Capacitance [Vdc]	25 (1E)	6.3 (0J)	50 (1H)
9.9pF(9R9)	3		5
10pF(100)	3		5
11pF(110)	3		5
12pF(120)	3		5
13pF(130)	3		5
15pF(150)	3		5
16pF(160)	3		5
18pF(180)	3		5
20pF(200)	3		5
22pF(220)		3	
24pF(240)		3	
27pF(270)		3	
30pF(300)		3	
33pF(330)		3	

on For Bonding GMD Series

Product Information

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code



LxW [mm]		0.6x0.3(03)<0201>	1.0x0.5(15)<0402>
Rated Volt. [Vdc]]	25(1E)	50(1H)
Capacitance	Tolerance	Part N	umber
0.1pF(R10)	±0.05pF(W)		GJM1555C1HR10WB01D
	±0.1pF(B)		GJM1555C1HR10BB01D
0.2pF(R20)	±0.05pF(W)	GJM0335C1ER20WB01D	GJM1555C1HR20WB01D
	±0.1pF(B)	GJM0335C1ER20BB01D	GJM1555C1HR20BB01D
0.3pF(R30)	±0.05pF(W)	GJM0335C1ER30WB01D	GJM1555C1HR30WB01D
	±0.1pF(B)	GJM0335C1ER30BB01D	GJM1555C1HR30BB01D
0.4pF(R40)	±0.05pF(W)	GJM0335C1ER40WB01D	GJM1555C1HR40WB01D
	±0.1pF(B)	GJM0335C1ER40BB01D	GJM1555C1HR40BB01D
0.5pF(R50)	±0.05pF(W)	GJM0335C1ER50WB01D	GJM1555C1HR50WB01D
	±0.1pF(B)	GJM0335C1ER50BB01D	GJM1555C1HR50BB01D
0.6pF(R60)	±0.05pF(W)	GJM0335C1ER60WB01D	GJM1555C1HR60WB01D
	±0.1pF(B)	GJM0335C1ER60BB01D	GJM1555C1HR60BB01D
0.7pF(R70)	±0.05pF(W)	GJM0335C1ER70WB01D	GJM1555C1HR70WB01D
	±0.1pF(B)	GJM0335C1ER70BB01D	GJM1555C1HR70BB01D
0.8pF(R80)	±0.05pF(W)	GJM0335C1ER80WB01D	GJM1555C1HR80WB01D
	±0.1pF(B)	GJM0335C1ER80BB01D	GJM1555C1HR80BB01D
0.9pF(R90)	±0.05pF(W)	GJM0335C1ER90WB01D	GJM1555C1HR90WB01D
	±0.1pF(B)	GJM0335C1ER90BB01D	GJM1555C1HR90BB01D
1.0pF(1R0)	±0.05pF(W)	GJM0335C1E1R0WB01D	GJM1555C1H1R0WB01D
	±0.1pF(B)	GJM0335C1E1R0BB01D	GJM1555C1H1R0BB01D
	±0.25pF(C)	GJM0335C1E1R0CB01D	GJM1555C1H1R0CB01D
1.1pF(1R1)	±0.05pF(W)	GJM0335C1E1R1WB01D	GJM1555C1H1R1WB01D
• • •	±0.1pF(B)	GJM0335C1E1R1BB01D	GJM1555C1H1R1BB01D
	±0.25pF(C)	GJM0335C1E1R1CB01D	GJM1555C1H1R1CB01D
1.2pF(1R2)	±0.05pF(W)	GJM0335C1E1R2WB01D	GJM1555C1H1R2WB01D
• • •	±0.1pF(B)	GJM0335C1E1R2BB01D	GJM1555C1H1R2BB01D
	±0.25pF(C)	GJM0335C1E1R2CB01D	GJM1555C1H1R2CB01D
1.3pF(1R3)	±0.05pF(W)	GJM0335C1E1R3WB01D	GJM1555C1H1R3WB01D
,	±0.1pF(B)	GJM0335C1E1R3BB01D	GJM1555C1H1R3BB01D
	±0.25pF(C)	GJM0335C1E1R3CB01D	GJM1555C1H1R3CB01D
1.4pF(1R4)	±0.05pF(W)	GJM0335C1E1R4WB01D	GJM1555C1H1R4WB01D
. 、 /	±0.1pF(B)	GJM0335C1E1R4BB01D	GJM1555C1H1R4BB01D
	±0.25pF(C)	GJM0335C1E1R4CB01D	GJM1555C1H1R4CB01D
1.5pF(1R5)	±0.05pF(W)	GJM0335C1E1R5WB01D	GJM1555C1H1R5WB01D
	±0.1pF(B)	GJM0335C1E1R5BB01D	GJM1555C1H1R5BB01D
	±0.25pF(C)	GJM0335C1E1R5CB01D	GJM1555C1H1R5CB01D
1.6pF(1R6)	±0.05pF(W)	GJM0335C1E1R6WB01D	GJM1555C1H1R6WB01D
	±0.1pF(B)	GJM0335C1E1R6BB01D	GJM1555C1H1R6BB01D
	±0.25pF(C)	GJM0335C1E1R6CB01D	GJM1555C1H1R6CB01D
1.7pF(1R7)	±0.05pF(W)	GJM0335C1E1R7WB01D	GJM1555C1H1R7WB01D
· [- · (····)	±0.1pF(B)	GJM0335C1E1R7BB01D	GJM1555C1H1R7BB01D
	±0.25pF(C)	GJM0335C1E1R7CB01D	GJM1555C1H1R7CB01D
1.8pF(1R8)	±0.05pF(W)	GJM0335C1E1R8WB01D	GJM1555C1H1R8WB01D
	±0.1pF(B)	GJM0335C1E1R8BB01D	GJM1555C1H1R8BB01D
	±0.25pF(C)	GJM0335C1E1R8BB01D	GJM1555C1H1R8CB01D
1.9pF(1R9)	±0.25pf (C) ±0.05pF(W)	GJM0335C1E1R9WB01D	GJM1555C1H1R9WB01D
1.7pr(1.3)			
The part number of	±0.1pF(B) ±0.25pF(C)	GJM0335C1E1R9BB01D GJM0335C1E1R9CB01D) and Unit is shown in []. <>: E	GJM1555C1H1R9 GJM1555C1H1R9

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

(Part Number) GJ M 03 3 5C 1E R20 W B01 D 0 0 0 0 0 0 0 0 0 Packaging Code in Part Number shows STD 180mm Reel Taping.

Product ID
Series
Temperature Characteristics
Capacitance Tolerance

Dimensions (LxW)Rated VoltageIndividual Specification Code

Dimension (T)CapacitancePackaging

muRata

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es a	Tempera	ture Com	pensating Type C	OG(5C) Characte
GRM Series	LxW [mm]		0.6x0.3(03)<0201>	1.0x0.5(15)<0402>
ž	Rated Volt. [Vdc	1	25(1E)	50(1H)
5 15	Capacitance	Tolerance	. ,	umber
	2.0pF(2R0)	±0.05pF(W)	GJM0335C1E2R0WB01D	GJM1555C1H2R0WB01E
	2.001 (21(0)	±0.1pF(B)	GJM0335C1E2R0BB01D	GJM1555C1H2R0BB01D
		±0.25pF(C)	GJM0335C1E2R0CB01D	GJM1555C1H2R0CB01E
s	2.1pF(2R1)	±0.25pf (C) ±0.05pF(W)	GJM0335C1E2R1WB01D	GJM1555C1H2R1WB01E
GNM Series	2.1pr(2R1)		GJM0335C1E2R1WB01D	
N Si		±0.1pF(B)		GJM1555C1H2R1BB01D
NN5	2.2-F(2D2)	±0.25pF(C)	GJM0335C1E2R1CB01D	GJM1555C1H2R1CB01E
Ŭ	2.2pF(2R2)	±0.05pF(W)	GJM0335C1E2R2WB01D	GJM1555C1H2R2WB01I
		±0.1pF(B)	GJM0335C1E2R2BB01D	GJM1555C1H2R2BB01E
		±0.25pF(C)	GJM0335C1E2R2CB01D	GJM1555C1H2R2CB01E
	2.3pF(2R3)	±0.05pF(W)	GJM0335C1E2R3WB01D	GJM1555C1H2R3WB01
es		±0.1pF(B)	GJM0335C1E2R3BB01D	GJM1555C1H2R3BB01D
L Series		±0.25pF(C)	GJM0335C1E2R3CB01D	GJM1555C1H2R3CB01E
	2.4pF(2R4)	±0.05pF(W)	GJM0335C1E2R4WB01D	GJM1555C1H2R4WB01I
' 🚽		±0.1pF(B)	GJM0335C1E2R4BB01D	GJM1555C1H2R4BB01E
		±0.25pF(C)	GJM0335C1E2R4CB01D	GJM1555C1H2R4CB01E
	2.5pF(2R5)	±0.05pF(W)	GJM0335C1E2R5WB01D	GJM1555C1H2R5WB01I
		±0.1pF(B)	GJM0335C1E2R5BB01D	GJM1555C1H2R5BB01[
		±0.25pF(C)	GJM0335C1E2R5CB01D	GJM1555C1H2R5CB01E
ries	2.6pF(2R6)	±0.05pF(W)	GJM0335C1E2R6WB01D	GJM1555C1H2R6WB01I
Se		±0.1pF(B)	GJM0335C1E2R6BB01D	GJM1555C1H2R6BB01D
NC		±0.25pF(C)	GJM0335C1E2R6CB01D	GJM1555C1H2R6CB01[
0	2.7pF(2R7)	±0.05pF(W)	GJM0335C1E2R7WB01D	GJM1555C1H2R7WB01I
		±0.1pF(B)	GJM0335C1E2R7BB01D	GJM1555C1H2R7BB01E
		±0.25pF(C)	GJM0335C1E2R7CB01D	GJM1555C1H2R7CB01E
	2.8pF(2R8)	±0.05pF(W)	GJM0335C1E2R8WB01D	GJM1555C1H2R8WB01I
es	• • •	±0.1pF(B)	GJM0335C1E2R8BB01D	GJM1555C1H2R8BB01D
GOM Series		±0.25pF(C)	GJM0335C1E2R8CB01D	GJM1555C1H2R8CB01D
Ξ	2.9pF(2R9)	±0.05pF(W)	GJM0335C1E2R9WB01D	GJM1555C1H2R9WB01I
gg		±0.1pF(B)	GJM0335C1E2R9BB01D	GJM1555C1H2R9BB01[
		±0.25pF(C)	GJM0335C1E2R9CB01D	GJM1555C1H2R9CB01[
	3.0pF(3R0)	±0.05pF(W)	GJM0335C1E3R0WB01D	GJM1555C1H3R0WB01I
2	3.0pt (51(0)	±0.1pF(B)	GJM0335C1E3R0BB01D	GJM1555C1H3R0BB01E
			GJM0335C1E3R0BB01D	
ries	2.1mF(2D4)	±0.25pF(C)		GJM1555C1H3R0CB01E
GMA Serie	3.1pF(3R1)	±0.05pF(W)	GJM0335C1E3R1WB01D	GJM1555C1H3R1WB01I
GMA Series		±0.1pF(B)	GJM0335C1E3R1BB01D	GJM1555C1H3R1BB01D
G		±0.25pF(C)	GJM0335C1E3R1CB01D	GJM1555C1H3R1CB01E
	3.2pF(3R2)	±0.05pF(W)	GJM0335C1E3R2WB01D	GJM1555C1H3R2WB01I
		±0.1pF(B)	GJM0335C1E3R2BB01D	GJM1555C1H3R2BB01D
		±0.25pF(C)	GJM0335C1E3R2CB01D	GJM1555C1H3R2CB01E
ς Ω	3.3pF(3R3)	±0.05pF(W)	GJM0335C1E3R3WB01D	GJM1555C1H3R3WB01I
GMD Series		±0.1pF(B)	GJM0335C1E3R3BB01D	GJM1555C1H3R3BB01E
DS		±0.25pF(C)	GJM0335C1E3R3CB01D	GJM1555C1H3R3CB01E
M	3.4pF(3R4)	±0.05pF(W)	GJM0335C1E3R4WB01D	GJM1555C1H3R4WB01I
. 0		±0.1pF(B)	GJM0335C1E3R4BB01D	GJM1555C1H3R4BB01E
		±0.25pF(C)	GJM0335C1E3R4CB01D	GJM1555C1H3R4CB01E
	3.5pF(3R5)	±0.05pF(W)	GJM0335C1E3R5WB01D	GJM1555C1H3R5WB01D
		+0.1pE(B)	GJM0335C1E3R5BB01D	GJM1555C1H3R5BB01D
		±0.1pF(B)	COMPOSED FEETED	

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

(Part Number) **GJ M 03 3 5C 1E 2R0 W B01 D** 0 0 0 0 0 0 **7**8 9

Packaging Code in Part Number shows STD 180mm Reel Taping.

Product ID 2 Series **5**Temperature Characteristics 8Capacitance Tolerance

3Dimensions (LxW) 6 Rated Voltage Individual Specification Code

4 Dimension (T) Dimension (1)CapacitancePackaging

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Product Information

LxW [mm]		0.6x0.3(03)<0201>	1.0x0.5(15)<0402>
Rated Volt. [Vdc]	-	25(1E)	50(1H)
Capacitance	Tolerance		umber
3.6pF(3R6)	±0.05pF(W)	GJM0335C1E3R6WB01D	GJM1555C1H3R6WB01D
	±0.1pF(B)	GJM0335C1E3R6BB01D	GJM1555C1H3R6BB01D
	±0.25pF(C)	GJM0335C1E3R6CB01D	GJM1555C1H3R6CB01D
3.7pF(3R7)	±0.05pF(W)	GJM0335C1E3R7WB01D	GJM1555C1H3R7WB01D
	±0.1pF(B)	GJM0335C1E3R7BB01D	GJM1555C1H3R7BB01D
	±0.25pF(C)	GJM0335C1E3R7CB01D	GJM1555C1H3R7CB01D
3.8pF(3R8)	±0.05pF(W)	GJM0335C1E3R8WB01D	GJM1555C1H3R8WB01D
	±0.1pF(B)	GJM0335C1E3R8BB01D	GJM1555C1H3R8BB01D
	±0.25pF(C)	GJM0335C1E3R8CB01D	GJM1555C1H3R8CB01D
3.9pF(3R9)	±0.05pF(W)	GJM0335C1E3R9WB01D	GJM1555C1H3R9WB01D
	±0.1pF(B)	GJM0335C1E3R9BB01D	GJM1555C1H3R9BB01D
	±0.25pF(C)	GJM0335C1E3R9CB01D	GJM1555C1H3R9CB01D
4.0pF(4R0)	±0.05pF(W)	GJM0335C1E4R0WB01D	GJM1555C1H4R0WB01D
	±0.1pF(B)	GJM0335C1E4R0BB01D	GJM1555C1H4R0BB01D
	±0.25pF(C)	GJM0335C1E4R0CB01D	GJM1555C1H4R0CB01D
4.1pF(4R1)	±0.05pF(W)	GJM0335C1E4R1WB01D	GJM1555C1H4R1WB01D
	±0.1pF(B)	GJM0335C1E4R1BB01D	GJM1555C1H4R1BB01D
	±0.25pF(C)	GJM0335C1E4R1CB01D	GJM1555C1H4R1CB01D
4.2pF(4R2)	±0.05pF(W)	GJM0335C1E4R2WB01D	GJM1555C1H4R2WB01D
	±0.1pF(B)	GJM0335C1E4R2BB01D	GJM1555C1H4R2BB01D
	±0.25pF(C)	GJM0335C1E4R2CB01D	GJM1555C1H4R2CB01D
4.3pF(4R3)	±0.05pF(W)	GJM0335C1E4R3WB01D	GJM1555C1H4R3WB01D
	±0.1pF(B)	GJM0335C1E4R3BB01D	GJM1555C1H4R3BB01D
	±0.25pF(C)	GJM0335C1E4R3CB01D	GJM1555C1H4R3CB01D
4.4pF(4R4)	±0.05pF(W)	GJM0335C1E4R4WB01D	GJM1555C1H4R4WB01D
	±0.1pF(B)	GJM0335C1E4R4BB01D	GJM1555C1H4R4BB01D
	±0.25pF(C)	GJM0335C1E4R4CB01D	GJM1555C1H4R4CB01D
4.5pF(4R5)	±0.05pF(W)	GJM0335C1E4R5WB01D	GJM1555C1H4R5WB01D
	±0.1pF(B)	GJM0335C1E4R5BB01D	GJM1555C1H4R5BB01D
	±0.25pF(C)	GJM0335C1E4R5CB01D	GJM1555C1H4R5CB01D
4.6pF(4R6)	±0.05pF(W)	GJM0335C1E4R6WB01D	GJM1555C1H4R6WB01D
	±0.1pF(B)	GJM0335C1E4R6BB01D	GJM1555C1H4R6BB01D
	±0.25pF(C)	GJM0335C1E4R6CB01D	GJM1555C1H4R6CB01D
4.7pF(4R7)	±0.05pF(W)	GJM0335C1E4R7WB01D	GJM1555C1H4R7WB01D
	±0.1pF(B)	GJM0335C1E4R7BB01D	GJM1555C1H4R7BB01D
	±0.25pF(C)	GJM0335C1E4R7CB01D	GJM1555C1H4R7CB01D
4.8pF(4R8)	±0.05pF(W)	GJM0335C1E4R8WB01D	GJM1555C1H4R8WB01D
	±0.1pF(B)	GJM0335C1E4R8BB01D	GJM1555C1H4R8BB01D
	±0.25pF(C)	GJM0335C1E4R8CB01D	GJM1555C1H4R8CB01D
4.9pF(4R9)	±0.05pF(W)	GJM0335C1E4R9WB01D	GJM1555C1H4R9WB01D
	±0.1pF(B)	GJM0335C1E4R9BB01D	GJM1555C1H4R9BB01D
	±0.25pF(C)	GJM0335C1E4R9CB01D	GJM1555C1H4R9CB01D
5.0pF(5R0)	±0.05pF(W)	GJM0335C1E5R0WB01D	GJM1555C1H5R0WB01D
	±0.1pF(B)	GJM0335C1E5R0BB01D	GJM1555C1H5R0BB01D
	±0.25pF(C)	GJM0335C1E5R0CB01D	GJM1555C1H5R0CB01D
5.1pF(5R1)	±0.05pF(W)	GJM0335C1E5R1WB01D	GJM1555C1H5R1WB01D
	±0.1pF(B)	GJM0335C1E5R1BB01D	GJM1555C1H5R1BB01D
	±0.25pF(C)	GJM0335C1E5R1CB01D	GJM1555C1H5R1CB01D
	⊾		

The part number code is shown in () and Unit is shown in []. $\hfill <>:$ EIA [inch] Code





ies	Tempera	ture Com	pensating Type C	0G(5C) Characte
GRM Series	LxW [mm]		0.6x0.3(03)<0201>	1.0x0.5(15)<0402>
SRN	Rated Volt. [Vdc]	25(1E)	50(1H)
0	Capacitance	Tolerance	Part N	umber
	5.2pF(5R2)	±0.05pF(W)	GJM0335C1E5R2WB01D	GJM1555C1H5R2WB010
		±0.1pF(B)	GJM0335C1E5R2BB01D	GJM1555C1H5R2BB01D
		±0.25pF(C)	GJM0335C1E5R2CB01D	GJM1555C1H5R2CB01D
es		±0.5pF(D)	GJM0335C1E5R2DB01D	GJM1555C1H5R2DB01D
GNM Series	5.3pF(5R3)	±0.05pF(W)	GJM0335C1E5R3WB01D	GJM1555C1H5R3WB010
Σ		±0.1pF(B)	GJM0335C1E5R3BB01D	GJM1555C1H5R3BB01E
5		±0.25pF(C)	GJM0335C1E5R3CB01D	GJM1555C1H5R3CB01
		±0.5pF(D)	GJM0335C1E5R3DB01D	GJM1555C1H5R3DB010
	5.4pF(5R4)	±0.05pF(W)	GJM0335C1E5R4WB01D	GJM1555C1H5R4WB01I
		±0.1pF(B)	GJM0335C1E5R4BB01D	GJM1555C1H5R4BB01[
(0		±0.25pF(C)	GJM0335C1E5R4CB01D	GJM1555C1H5R4CB01E
L Series		±0.5pF(D)	GJM0335C1E5R4DB01D	GJM1555C1H5R4DB01D
]Se	5.5pF(5R5)	±0.05pF(W)	GJM0335C1E5R5WB01D	GJM1555C1H5R5WB010
		±0.1pF(B)	GJM0335C1E5R5BB01D	GJM1555C1H5R5BB01E
_		±0.25pF(C)	GJM0335C1E5R5CB01D	GJM1555C1H5R5CB01D
		±0.5pF(D)	GJM0335C1E5R5DB01D	GJM1555C1H5R5DB01E
	5.6pF(5R6)	±0.05pF(W)	GJM0335C1E5R6WB01D	GJM1555C1H5R6WB010
		±0.1pF(B)	GJM0335C1E5R6BB01D	GJM1555C1H5R6BB010
ies		±0.25pF(C)	GJM0335C1E5R6CB01D	GJM1555C1H5R6CB010
Ser		±0.5pF(D)	GJM0335C1E5R6DB01D	GJM1555C1H5R6DB010
MU	5.7pF(5R7)	±0.05pF(W)	GJM0335C1E5R7WB01D	GJM1555C1H5R7WB01
വ്	on pr (erri)	±0.1pF(B)	GJM0335C1E5R7BB01D	GJM1555C1H5R7BB01I
		±0.25pF(C)	GJM0335C1E5R7CB01D	GJM1555C1H5R7CB01I
		±0.5pF(D)	GJM0335C1E5R7DB01D	GJM1555C1H5R7DB01I
	5.8pF(5R8)	±0.05pF(W)	GJM0335C1E5R8WB01D	GJM1555C1H5R8WB01
S		±0.1pF(B)	GJM0335C1E5R8BB01D	GJM1555C1H5R8BB01I
erie		±0.25pF(C)	GJM0335C1E5R8CB01D	GJM1555C1H5R8CB01I
GOM Series		±0.5pF(D)	GJM0335C1E5R8DB01D	GJM1555C1H5R8DB01I
GQM Series	5.9pF(5R9)	±0.05pF(W)	GJM0335C1E5R9WB01D	GJM1555C1H5R9WB01
-	5.7pr (610)	±0.1pF(B)	GJM0335C1E5R9BB01D	GJM1555C1H5R9BB01I
		±0.25pF(C)	GJM0335C1E5R9CB01D	GJM1555C1H5R9CB01
			GJM0335C1E5R9DB01D	GJM1555C1H5R9DB01I
	6.0pF(6R0)	±0.5pF(D) ±0.05pF(W)	GJM0335C1E6R0WB01D	GJM1555C1H6R0WB01
ries	0.0pr (01.0)	±0.1pF(B)	GJM0335C1E6R0BB01D	GJM1555C1H6R0BB01E
Se				
GMA Series		±0.25pF(C)	GJM0335C1E6R0CB01D	GJM1555C1H6R0CB01
G	6.1pF(6R1)	±0.5pF(D)	GJM0335C1E6R0DB01D	GJM1555C1H6R0DB011 GJM1555C1H6R1WB011
	0. TPF(0K I)	±0.05pF(W)	GJM0335C1E6R1WB01D	
		±0.1pF(B)	GJM0335C1E6R1BB01D	GJM1555C1H6R1BB01I
		±0.25pF(C)	GJM0335C1E6R1CB01D	GJM1555C1H6R1CB01
SS	()mF(CD 2)	±0.5pF(D)	GJM0335C1E6R1DB01D	GJM1555C1H6R1DB01
Serie	6.2pF(6R2)	±0.05pF(W)	GJM0335C1E6R2WB01D	GJM1555C1H6R2WB01I
D S		±0.1pF(B)	GJM0335C1E6R2BB01D	GJM1555C1H6R2BB01E
GMD Series		±0.25pF(C)	GJM0335C1E6R2CB01D	GJM1555C1H6R2CB01E
		±0.5pF(D)	GJM0335C1E6R2DB01D	GJM1555C1H6R2DB01D
	6.3pF(6R3)	±0.05pF(W)	GJM0335C1E6R3WB01D	GJM1555C1H6R3WB01I
		±0.1pF(B)	GJM0335C1E6R3BB01D	GJM1555C1H6R3BB01
		±0.25pF(C)	GJM0335C1E6R3CB01D	GJM1555C1H6R3CB01
		±0.5pF(D)	GJM0335C1E6R3DB01D	GJM1555C1H6R3DB01E

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Product ID 2 Series **5**Temperature Characteristics 8Capacitance Tolerance

3 Dimensions (LxW) 6 Rated Voltage Individual Specification Code

4 Dimension (T) Dimension (1)CapacitancePackaging

0 0 0 0 0 0 Packaging Code in Part Number shows STD 180mm Reel Taping.

(Part Number) **GJ M 03 3 5C 1E 5R2 W B01 D**

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LxW [mm]		0.6x0.3(03)<0201>	1.0x0.5(15)<0402>
Rated Volt. [Vdc]	-	25(1E)	50(1H)
Capacitance	Tolerance	Part N	
6.4pF(6R4)	±0.05pF(W)	GJM0335C1E6R4WB01D	GJM1555C1H6R4WB01D
	±0.1pF(B)	GJM0335C1E6R4BB01D	GJM1555C1H6R4BB01D
	±0.25pF(C)	GJM0335C1E6R4CB01D	GJM1555C1H6R4CB01D
	±0.5pF(D)	GJM0335C1E6R4DB01D	GJM1555C1H6R4DB01D
6.5pF(6R5)	±0.05pF(W)	GJM0335C1E6R5WB01D	GJM1555C1H6R5WB01D
	±0.1pF(B)	GJM0335C1E6R5BB01D	GJM1555C1H6R5BB01D
	±0.25pF(C)	GJM0335C1E6R5CB01D	GJM1555C1H6R5CB01D
	±0.5pF(D)	GJM0335C1E6R5DB01D	GJM1555C1H6R5DB01D
6.6pF(6R6)	±0.05pF(W)	GJM0335C1E6R6WB01D	GJM1555C1H6R6WB01D
	±0.1pF(B)	GJM0335C1E6R6BB01D	GJM1555C1H6R6BB01D
	±0.25pF(C)	GJM0335C1E6R6CB01D	GJM1555C1H6R6CB01D
	±0.5pF(D)	GJM0335C1E6R6DB01D	GJM1555C1H6R6DB01D
6.7pF(6R7)	±0.05pF(W)	GJM0335C1E6R7WB01D	GJM1555C1H6R7WB01D
	±0.1pF(B)	GJM0335C1E6R7BB01D	GJM1555C1H6R7BB01D
	±0.25pF(C)	GJM0335C1E6R7CB01D	GJM1555C1H6R7CB01D
	±0.5pF(D)	GJM0335C1E6R7DB01D	GJM1555C1H6R7DB01D
6.8pF(6R8)	±0.05pF(W)	GJM0335C1E6R8WB01D	GJM1555C1H6R8WB01D
0.80F(0K8)			
	±0.1pF(B)	GJM0335C1E6R8BB01D	GJM1555C1H6R8BB01D
	±0.25pF(C)	GJM0335C1E6R8CB01D	GJM1555C1H6R8CB01D
	±0.5pF(D)	GJM0335C1E6R8DB01D	GJM1555C1H6R8DB01D
6.9pF(6R9)	±0.05pF(W)	GJM0336C1E6R9WB01D	GJM1555C1H6R9WB01D
	±0.1pF(B)	GJM0336C1E6R9BB01D	GJM1555C1H6R9BB01D
	±0.25pF(C)	GJM0336C1E6R9CB01D	GJM1555C1H6R9CB01D
	±0.5pF(D)	GJM0336C1E6R9DB01D	GJM1555C1H6R9DB01D
7.0pF(7R0)	±0.05pF(W)	GJM0336C1E7R0WB01D	GJM1555C1H7R0WB01D
	±0.1pF(B)	GJM0336C1E7R0BB01D	GJM1555C1H7R0BB01D
	±0.25pF(C)	GJM0336C1E7R0CB01D	GJM1555C1H7R0CB01D
	±0.5pF(D)	GJM0336C1E7R0DB01D	GJM1555C1H7R0DB01D
7.1pF(7R1)	±0.05pF(W)	GJM0336C1E7R1WB01D	GJM1555C1H7R1WB01D
	±0.1pF(B)	GJM0336C1E7R1BB01D	GJM1555C1H7R1BB01D
	±0.25pF(C)	GJM0336C1E7R1CB01D	GJM1555C1H7R1CB01D
	±0.5pF(D)	GJM0336C1E7R1DB01D	GJM1555C1H7R1DB01D
7.2pF(7R2)	±0.05pF(W)	GJM0336C1E7R2WB01D	GJM1555C1H7R2WB01D
,	±0.1pF(B)	GJM0336C1E7R2BB01D	GJM1555C1H7R2BB01D
	±0.25pF(C)	GJM0336C1E7R2CB01D	GJM1555C1H7R2CB01D
	±0.5pF(D)	GJM0336C1E7R2DB01D	GJM1555C1H7R2DB01D
7.3pF(7R3)	±0.05pF(W)	GJM0336C1E7R3WB01D	GJM1555C1H7R3WB01D
7.3pr (713)	±0.1pF(B)	GJM0336C1E7R3BB01D	GJM1555C1H7R3BB01D
		GJM0336C1E7R3CB01D	GJM1555C1H7R3CB01D
	±0.25pF(C)		
7 400 / 70 /	±0.5pF(D)	GJM0336C1E7R3DB01D	GJM1555C1H7R3DB01D
7.4pF(7R4)	±0.05pF(W)	GJM0336C1E7R4WB01D	GJM1555C1H7R4WB01D
	±0.1pF(B)	GJM0336C1E7R4BB01D	GJM1555C1H7R4BB01D
	±0.25pF(C)	GJM0336C1E7R4CB01D	GJM1555C1H7R4CB01D
	±0.5pF(D)	GJM0336C1E7R4DB01D	GJM1555C1H7R4DB01D
7.5pF(7R5)	±0.05pF(W)	GJM0336C1E7R5WB01D	GJM1555C1H7R5WB01D
	±0.1pF(B)	GJM0336C1E7R5BB01D	GJM1555C1H7R5BB01D
	±0.25pF(C)	GJM0336C1E7R5CB01D	GJM1555C1H7R5CB01D
	±0.5pF(D)	GJM0336C1E7R5DB01D	GJM1555C1H7R5DB01D
7.6pF(7R6)	±0.05pF(W)	GJM0336C1E7R6WB01D	GJM1555C1H7R6WB01D
	±0.1pF(B)	GJM0336C1E7R6BB01D	GJM1555C1H7R6BB01D
	±0.25pF(C)	GJM0336C1E7R6CB01D	GJM1555C1H7R6CB01D
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The part number code is shown in () and Unit is shown in []. $\hfill <>:$ EIA [inch] Code

muRata

For General GRM Series

Array GNM Series

Low ESL LL□ Series

SS	Tempera	ture Com	pensating Type C	0G(5C)/C0H(6C)
GRM Series	LxW [mm]		0.6x0.3(03)<0201>	1.0x0.5(15)<0402>
Ž	Rated Volt. [Vdc]	1	25(1E)	50(1H)
5	Capacitance	Tolerance	. ,	umber
	7.7pF(7R7)	±0.05pF(W)	GJM0336C1E7R7WB01D	GJM1555C1H7R7WB01I
	7.7 pr (111)	±0.1pF(B)	GJM0336C1E7R7BB01D	GJM1555C1H7R7BB01I
		±0.25pF(C)	GJM0336C1E7R7CB01D	GJM1555C1H7R7CB01I
s		±0.5pF(D)	GJM0336C1E7R7DB01D	GJM1555C1H7R7DB011
GNM Series	7.8pF(7R8)		GJM0336C1E7R8WB01D	GJM1555C1H7R8WB01
N S	7.opr(7KO)	±0.05pF(W)	GJM0336C1E7R8BB01D	GJM1555C1H7R8BB01I
NN		±0.1pF(B)		
0		±0.25pF(C)	GJM0336C1E7R8CB01D	GJM1555C1H7R8CB01I
	7.0	±0.5pF(D)	GJM0336C1E7R8DB01D	GJM1555C1H7R8DB01
	7.9pF(7R9)	±0.05pF(W)	GJM0336C1E7R9WB01D	GJM1555C1H7R9WB01
		±0.1pF(B)	GJM0336C1E7R9BB01D	GJM1555C1H7R9BB01I
es		±0.25pF(C)	GJM0336C1E7R9CB01D	GJM1555C1H7R9CB01I
L		±0.5pF(D)	GJM0336C1E7R9DB01D	GJM1555C1H7R9DB01
	8.0pF(8R0)	±0.05pF(W)	GJM0336C1E8R0WB01D	GJM1555C1H8R0WB01
1		±0.1pF(B)	GJM0336C1E8R0BB01D	GJM1555C1H8R0BB01I
		±0.25pF(C)	GJM0336C1E8R0CB01D	GJM1555C1H8R0CB01I
		±0.5pF(D)	GJM0336C1E8R0DB01D	GJM1555C1H8R0DB01I
	8.1pF(8R1)	±0.05pF(W)	GJM0336C1E8R1WB01D	GJM1555C1H8R1WB01
		±0.1pF(B)	GJM0336C1E8R1BB01D	GJM1555C1H8R1BB01I
ries		±0.25pF(C)	GJM0336C1E8R1CB01D	GJM1555C1H8R1CB01I
Se		±0.5pF(D)	GJM0336C1E8R1DB01D	GJM1555C1H8R1DB011
MU	8.2pF(8R2)	±0.05pF(W)	GJM0336C1E8R2WB01D	GJM1555C1H8R2WB01
G		±0.1pF(B)	GJM0336C1E8R2BB01D	GJM1555C1H8R2BB01I
		±0.25pF(C)	GJM0336C1E8R2CB01D	GJM1555C1H8R2CB01I
		±0.5pF(D)	GJM0336C1E8R2DB01D	GJM1555C1H8R2DB01I
	8.3pF(8R3)	±0.05pF(W)	GJM0336C1E8R3WB01D	GJM1555C1H8R3WB01
es		±0.1pF(B)	GJM0336C1E8R3BB01D	GJM1555C1H8R3BB01I
GOM Series		±0.25pF(C)	GJM0336C1E8R3CB01D	GJM1555C1H8R3CB01I
Σ		±0.5pF(D)	GJM0336C1E8R3DB01D	GJM1555C1H8R3DB01I
g	8.4pF(8R4)	±0.05pF(W)	GJM0336C1E8R4WB01D	GJM1555C1H8R4WB01
	- 1 ⁻ (-)	±0.1pF(B)	GJM0336C1E8R4BB01D	GJM1555C1H8R4BB01I
		±0.25pF(C)	GJM0336C1E8R4CB01D	GJM1555C1H8R4CB01I
		±0.5pF(D)	GJM0336C1E8R4DB01D	GJM1555C1H8R4DB01I
	8.5pF(8R5)	±0.05pF(W)	GJM0336C1E8R5WB01D	GJM1555C1H8R5WB01
ries	0.5pr (013)	±0.1pF(B)	GJM0336C1E8R5BB01D	GJM1555C1H8R5BB01E
GMA Serie				GJM1555C1H8R5CB01E
MA		±0.25pF(C)	GJM0336C1E8R5CB01D	
G		±0.5pF(D)	GJM0336C1E8R5DB01D	GJM1555C1H8R5DB01
	8.6pF(8R6)	±0.05pF(W)	GJM0336C1E8R6WB01D	GJM1555C1H8R6WB01I
		±0.1pF(B)	GJM0336C1E8R6BB01D	GJM1555C1H8R6BB01I
		±0.25pF(C)	GJM0336C1E8R6CB01D	GJM1555C1H8R6CB01I
S		±0.5pF(D)	GJM0336C1E8R6DB01D	GJM1555C1H8R6DB01
GMD Series	8.7pF(8R7)	±0.05pF(W)	GJM0336C1E8R7WB01D	GJM1555C1H8R7WB01
DS		±0.1pF(B)	GJM0336C1E8R7BB01D	GJM1555C1H8R7BB01[
M		±0.25pF(C)	GJM0336C1E8R7CB01D	GJM1555C1H8R7CB01I
0		±0.5pF(D)	GJM0336C1E8R7DB01D	GJM1555C1H8R7DB011
	8.8pF(8R8)	±0.05pF(W)	GJM0336C1E8R8WB01D	GJM1555C1H8R8WB01
		±0.1pF(B)	GJM0336C1E8R8BB01D	GJM1555C1H8R8BB01I
		±0.25pF(C)	GJM0336C1E8R8CB01D	GJM1555C1H8R8CB01D
		±0.20pr (0)		

(Part Number) **GJ M 03 3 6C 1E 7R7 W B01 D** 0 0 0 0 0 0 08 90 Product ID 2 Series **5**Temperature Characteristics 8Capacitance Tolerance

3 Dimensions (LxW) 6 Rated Voltage Individual Specification Code

4Dimension (T) Dimension (1)CapacitancePackaging

Packaging Code in Part Number shows STD 180mm Reel Taping.

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Product Information

LxW [mm]		0.6x0.3(03)<0201>	1.0x0.5(15)<0402>
Rated Volt. [Vdc	-	25(1E)	50(1H)
Capacitance	Tolerance	Part N	umber
8.9pF(8R9)	±0.05pF(W)	GJM0336C1E8R9WB01D	GJM1555C1H8R9WB01D
	±0.1pF(B)	GJM0336C1E8R9BB01D	GJM1555C1H8R9BB01D
	±0.25pF(C)	GJM0336C1E8R9CB01D	GJM1555C1H8R9CB01D
	±0.5pF(D)	GJM0336C1E8R9DB01D	GJM1555C1H8R9DB01D
9.0pF(9R0)	±0.05pF(W)	GJM0336C1E9R0WB01D	GJM1555C1H9R0WB01D
	±0.1pF(B)	GJM0336C1E9R0BB01D	GJM1555C1H9R0BB01D
	±0.25pF(C)	GJM0336C1E9R0CB01D	GJM1555C1H9R0CB01D
	±0.5pF(D)	GJM0336C1E9R0DB01D	GJM1555C1H9R0DB01D
9.1pF(9R1)	±0.05pF(W)	GJM0336C1E9R1WB01D	GJM1555C1H9R1WB01D
	±0.1pF(B)	GJM0336C1E9R1BB01D	GJM1555C1H9R1BB01D
	±0.25pF(C)	GJM0336C1E9R1CB01D	GJM1555C1H9R1CB01D
	±0.5pF(D)	GJM0336C1E9R1DB01D	GJM1555C1H9R1DB01D
9.2pF(9R2)	±0.05pF(W)	GJM0336C1E9R2WB01D	GJM1555C1H9R2WB01D
,	±0.1pF(B)	GJM0336C1E9R2BB01D	GJM1555C1H9R2BB01D
	±0.25pF(C)	GJM0336C1E9R2CB01D	GJM1555C1H9R2CB01D
	±0.5pF(D)	GJM0336C1E9R2DB01D	GJM1555C1H9R2DB01D
9.3pF(9R3)	±0.05pF(W)	GJM0336C1E9R3WB01D	GJM1555C1H9R3WB01D
(erre)	±0.1pF(B)	GJM0336C1E9R3BB01D	GJM1555C1H9R3BB01D
	±0.25pF(C)	GJM0336C1E9R3CB01D	GJM1555C1H9R3CB01D
	±0.5pF(D)	GJM0336C1E9R3DB01D	GJM1555C1H9R3DB01D
9.4pF(9R4)	±0.05pF(W)	GJM0336C1E9R4WB01D	GJM1555C1H9R4WB01D
7.4pi (31(4)	±0.1pF(B)	GJM0336C1E9R4BB01D	GJM1555C1H9R4BB01D
	±0.25pF(C)	GJM0336C1E9R4CB01D	GJM1555C1H9R4CB01D
		GJM0336C1E9R4DB01D	GJM1555C1H9R4DB01D
9.5pF(9R5)	±0.5pF(D)		
9.5pr(9R5)	±0.05pF(W)	GJM0336C1E9R5WB01D	GJM1555C1H9R5WB01D
	±0.1pF(B)	GJM0336C1E9R5BB01D	GJM1555C1H9R5BB01D
	±0.25pF(C)	GJM0336C1E9R5CB01D	GJM1555C1H9R5CB01D
	±0.5pF(D)	GJM0336C1E9R5DB01D	GJM1555C1H9R5DB01D
9.6pF(9R6)	±0.05pF(W)	GJM0336C1E9R6WB01D	GJM1555C1H9R6WB01D
	±0.1pF(B)	GJM0336C1E9R6BB01D	GJM1555C1H9R6BB01D
	±0.25pF(C)	GJM0336C1E9R6CB01D	GJM1555C1H9R6CB01D
	±0.5pF(D)	GJM0336C1E9R6DB01D	GJM1555C1H9R6DB01D
9.7pF(9R7)	±0.05pF(W)	GJM0336C1E9R7WB01D	GJM1555C1H9R7WB01D
	±0.1pF(B)	GJM0336C1E9R7BB01D	GJM1555C1H9R7BB01D
	±0.25pF(C)	GJM0336C1E9R7CB01D	GJM1555C1H9R7CB01D
	±0.5pF(D)	GJM0336C1E9R7DB01D	GJM1555C1H9R7DB01D
9.8pF(9R8)	±0.05pF(W)	GJM0336C1E9R8WB01D	GJM1555C1H9R8WB01D
	±0.1pF(B)	GJM0336C1E9R8BB01D	GJM1555C1H9R8BB01D
	±0.25pF(C)	GJM0336C1E9R8CB01D	GJM1555C1H9R8CB01D
	±0.5pF(D)	GJM0336C1E9R8DB01D	GJM1555C1H9R8DB01D
9.9pF(9R9)	±0.05pF(W)	GJM0336C1E9R9WB01D	GJM1555C1H9R9WB01D
	±0.1pF(B)	GJM0336C1E9R9BB01D	GJM1555C1H9R9BB01D
	±0.25pF(C)	GJM0336C1E9R9CB01D	GJM1555C1H9R9CB01D
	±0.5pF(D)	GJM0336C1E9R9DB01D	GJM1555C1H9R9DB01D

The part number code is shown in () and Unit is shown in []. $\hfill <>:$ EIA [inch] Code



	LxW [mm]		0.6x0.3(03)<0201>		1.0x0.5(15)<0402>		
GRM Series	Rated Volt. [Vdc]		25(1E)	6.3 (0J)	50(1H)		
	Capacitance	Tolerance	Part Number				
	10pF(100)	±2%(G)	GJM0336C1E100GB01D		GJM1555C1H100GB01		
		±5%(J)	GJM0336C1E100JB01D		GJM1555C1H100JB01		
	11pF(110)	±2%(G)	GJM0336C1E110GB01D		GJM1555C1H110GB01		
		±5%(J)	GJM0336C1E110JB01D		GJM1555C1H110JB01		
	12pF(120)	±2%(G)	GJM0336C1E120GB01D		GJM1555C1H120GB01		
		±5%(J)	GJM0336C1E120JB01D		GJM1555C1H120JB01		
	13pF(130)	±2%(G)	GJM0336C1E130GB01D		GJM1555C1H130GB01		
		±5%(J)	GJM0336C1E130JB01D		GJM1555C1H130JB01		
	15pF(150)	±2%(G)	GJM0336C1E150GB01D		GJM1555C1H150GB01		
		±5%(J)	GJM0336C1E150JB01D		GJM1555C1H150JB01		
	16pF(160)	±2%(G)	GJM0336C1E160GB01D		GJM1555C1H160GB01		
		±5%(J)	GJM0336C1E160JB01D		GJM1555C1H160JB01		
	18pF(180)	±2%(G)	GJM0336C1E180GB01D		GJM1555C1H180GB01		
		±5%(J)	GJM0336C1E180JB01D		GJM1555C1H180JB01		
	20pF(200)	±2%(G)	GJM0336C1E200GB01D		GJM1555C1H200GB01		
		±5%(J)	GJM0336C1E200JB01D		GJM1555C1H200JB01		
	22pF(220)	±2%(G)		GJM0335C0J220GB01D			
		±5%(J)	1	GJM0335C0J220JB01D			
	24pF(240)	±2%(G)		GJM0335C0J240GB01D			
		±5%(J)	1	GJM0335C0J240JB01D			
	27pF(270)	±2%(G)		GJM0335C0J270GB01D			
		±5%(J)		GJM0335C0J270JB01D			
	30pF(300)	±2%(G)		GJM0335C0J300GB01D			
		±5%(J)		GJM0335C0J300JB01D			
	33pF(330)	±2%(G)		GJM0335C0J330GB01D			
		±5%(J)	1	GJM0335C0J330JB01D]		



Packaging Code in Part Number shows STD 180mm Reel Taping.

Product ID 2 Series **5**Temperature Characteristics 8 Capacitance Tolerance

3 Dimensions (LxW) 6 Rated Voltage Individual Specification Code

4Dimension (T) Capacitance Packaging

Monolithic Microchip GMA Series

For Bonding GMD Series

Product Information

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 This PDF catalog has only typical specifications because there is no space for detailed specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.
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GJM Series Specifications and Test Methods

			Specifications				
lo.	lte	em	Temperature Compensating Type	Test Method			
1	Operating Temperat	ure Range	−55 to +125℃	Reference Tempera (2C, 3C, 4C: 20℃)	ture: 25°C		
2	Rated Vo	oltage	See the previous pages.	The rated voltage is defined as the maximum voltage that be applied continuously to the capacitor. When AC voltage is superimposed on DC voltage, V ^{P,P} or V whichever is larger, should be maintained within the rated voltage range.			
3	Appeara	nce	No defects or abnormalities	Visual inspection			
4	Dimensio	ons	Within the specified dimensions	Using calipers			
5	Dielectric	c Strength	No defects or abnormalities	is applied between the	observed when 300% of the rated voltage he terminations for 1 to 5 seconds, /discharge current is less than 50mA.	Ì	
6	Insulation (I.R.)	Resistance	10,000M Ω min. or 500 Ω · F min. (whichever is smaller)		ance should be measured with a DC ng the rated voltage at 25°C and 75%RH inutes of charging.		
7	Capacita	nce	Within the specified tolerance		should be measured at 25℃ at the		
			30pF and over: Q≧1000		ge shown in the table.		
8	Q		30pF and below: Q≧400+20C	Frequency	1±0.1MHz		
			C: Nominal Capacitance (pF)	Voltage	0.5 to 5Vrms		
		Temperature Coefficient	Within the specified tolerance (Table A)	The capacitance cha each specified temp Temperature Compe			
9	Capacitance Temperature Characteristics	Capacitance Drift	Within ±0.2% or ±0.05pF (whichever is larger.)	capacitance measur When cycling the ter 5, (5C: +25 to 125°C capacitance should temperature coefficie The capacitance drif between the maximu 1, 3 and 5 by the cap	efficient is determined using the red in step 3 as a reference. mperature sequentially from step 1 through to ther temp. coeffs.: +20 to 125°C) the be within the specified tolerance for the ent and capacitance change as in Table A. it is calculated by dividing the differences um and minimum measured values in steps pacitance value in step 3.		
				Step	Temperature (°C)		
				<u> </u>	Reference Temp. ±2 -55±3		
				3	Reference Temp. ±2		
				4	125±3		
				5	Reference Temp. ±2		
		1		Fig. 1 using a eutective with the test jig for 10 with an iron or using the test big for test b	to the test jig (glass epoxy board) shown in c solder. Then apply a 5N* force in parallel 0±1 sec. The soldering should be done either the reflow method and should be conducted soldering is uniform and free of defects such *2N (GJM03)		
10	Adhesive of Termir	Strength nation	No removal of the terminations or other defect should occur.	Type GJM03 GJM15	Solder resist Baked electrode or copper foil a b c 0.3 0.9 0.3 0.4 1.5 0.5		
					(in mm)		
					Fig. 1		
					Continued on the following page.		

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GJM Series Specifications and Test Methods

Continued from the preceding page

				pecification				
		Continued fr	om the prec	eding page.				
					Specifica	ations		
	No.	Ite	m	Temperature Compensating Type			ype	Test Method
			Appearance	No defects or abnorm	alities			Solder the capacitor to the test jig (glass epoxy board) in the
			Capacitance Within the		lerance			same manner and under the same conditions as (10). The capacitor should be subjected to a simple harmonic motio
	11	Vibration Resistance	Q	30pF and over: Q≥1000 30pF and below: Q≥400+20C C: Nominal Capacitance (pF)			having a total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 55Hz. The frequency range, from 10 to 55Hz and return to 10Hz, should be traversed in approximately 1 minute. This motion should be applied for a period of 2 hours in each of 3 mutually perpendicular directions (total of 6 hours).	
			Appearance	No marking defects	marking defects			Solder the capacitor to the test jig (glass epoxy boards) shown
			Capacitance	Within ±5% or ±0.5pF			in Fig. 2 using a eutectic solder. Then apply a force in the direction shown in Fig. 3.	
		Change		(whichever is larger)	b	+4.5		The soldering should be done by the reflow method and shou be conducted with care so that the soldering is uniform and fre of defects such as heat shock.
12 Deflection		n	Type GJM03	100 a 0.3	¢4.5	t: 0.8mm	20 50 Pressurizing speed: 1.0mm/sec. Pressurize Flexure : ≤1	
				GJM03 GJM15	0.3	1.5	0.5	Capacitance meter
					Fig	2	(in mm) <u>45 45 45</u> (in mm)
GJM Series					Fig. :	2		Fig. 3
		Solderabi Terminati	2	75% of the terminations are to be soldered evenly and continuously.		ly and	Immerse the capacitor in a solution of ethanol (JIS-K-8101) and rosin (JIS-K-5902) (25% rosin in weight proportion). Preheat at 80 to 120°C for 10 to 30 seconds. After preheating, immerse in eutectic solder solution for 2±0.5 seconds at 230±5° or Sn-3.0Ag-0.5Cu solder solution for 2±0.5 seconds at 245±5°C	
				The measured and ob specifications in the fo			hould satisfy th	e
		Resistance	Appearance	No marking defects				
			Capacitance Change	Within $\pm 2.5\%$ or ± 0.2 (whichever is larger)	5pF			Preheat the capacitor at 120 to 150°C for 1 minute.
	14	to Soldering Heat	Q	30pF and over: Q≧10 30pF and below: Q≧4 C: Nominal Capacitan	00+20C			Immerse the capacitor in a eutectic solder or Sn-3.0Ag-0.5Cu solder solution at 270±5℃ for 10±0.5 seconds. Let sit at room temperature for 24±2 hours.
		-	I.R.	More than 10,000MΩ	,	(whichever i	s smaller)	
			Dielectric Strength	No failure			,	
			ouongui	The measured and ob			hould satisfy th	e
			Appearance	specifications in the for No marking defects	nowing tabi	е.		Fix the capacitor to the supporting jig in the same manner and
			Capacitance	Within $\pm 2.5\%$ or ± 0.2	5pF			under the same conditions as (10). Perform the five cycles according to the four heat treatments listed in the following table
	15	Temperature	Change	(whichever is larger)				Let sit for 24±2 hours at room temperature, then measure.
	15	Cycle	Q	30pF and over: Q≥10 30pF and below: Q≥4				Step 1 2 3 4
				C: Nominal Capacitan	,			Temp. (C) Temp.+0/-3 Temp. Temp.+3/-0 Temp.
			I.R.	More than 10,000MΩ	or 500Ω · F	(whichever i	s smaller)	Time (min.) 30±3 2 to 3 30±3 2 to 3
			Dielectric Strength	No failure				
				The measured and ob specifications in the fo			hould satisfy th	e
			Appearance	No marking defects				
	16	Humidity, Steady	Capacitance Change	Within $\pm 5\%$ or ± 0.5 pl (whichever is larger)	=			Let the capacitor sit at $40\pm2^{\circ}$ and 90 to 95% humidity for 500±12 hours.
	10	State	Q	30pF and below: 10pF and over, 30pF 10pF and below: C: Nominal Capacitan	and below: (Q≧350 Q≧275+		Remove and let sit for 24±2 hours (temperature compensatin type) at room temperature, then measure.
			I.R.	More than 10,000MΩ	or 5000 . E	(whichever i	s smaller)	



GJM Series Specifications and Test Methods

Continued from the preceding page

	Continued fr		Specifications		For General GRM Series
No.	lt€	em	Temperature Compensating Type	- Test Method	For (GRN
			The measured and observed characteristics should satisfy the specifications in the following table.		
		Appearance	No marking defects		
17	Humidity Load	Capacitance Change	Within $\pm 7.5\%$ or ± 0.75 pF (whichever is larger)	Apply the rated voltage at 40±2℃ and 90 to 95% humidity for 500±12 hours. Remove and let sit for 24±2 hours at room temperature, then	y eries
	Loud	Q	30pF and over: Q≥200 30pF and below: Q≥100+ 10 C C: Nominal Capacitance (pF)	measure. The charge/discharge current is less than 50mA.	Array GNM Series
		I.R.	More than 500M\Omega or $25\Omega \cdot F$ (whichever is smaller)		
			The measured and observed characteristics should satisfy the specifications in the following table.		
		Appearance	No marking defects		(0
18	High Temperature	Capacitance Change	Within ±3% or ±0.3pF (whichever is larger)	Apply 200% of the rated voltage for 1000±12 hours at the maximum operating temperature ±3°C. Let sit for 24±2 hours (temperature compensating type) at room temperature, then	Low ESL LL□ Series
10	Load	Q	30pF and over: $Q \ge 350$ 10pF and over, 30pF and below: $Q \ge 275 + \frac{5}{2}$ C10pF and below: $Q \ge 200 + 10$ CC: Nominal Capacitance (pF)	The charge/discharge current is less than 50mA.	
		I.R.	More than 1,000M Ω or 50 $\Omega \cdot F$ (whichever is smaller)		
19	ESR	·	0.1pF≦C≦1pF: 350mΩ · pF below 1pF <c≦5pf: 300mω="" below<br="">5pF<c≦10pf: 250mω="" below<="" td=""><td>The ESR should be measured at room temperature, and frequency 1±0.2GHz with the equivalent of BOONTON Model 34A.</td><td>I-Q eries</td></c≦10pf:></c≦5pf:>	The ESR should be measured at room temperature, and frequency 1±0.2GHz with the equivalent of BOONTON Model 34A.	I-Q eries
			10pF <c≦33pf: 400mω="" below<="" td=""><td>The ESR should be measured at room temperature, and frequency 500±50MHz with the equivalent of HP8753B.</td><td>High-Q GJM Series</td></c≦33pf:>	The ESR should be measured at room temperature, and frequency 500±50MHz with the equivalent of HP8753B.	High-Q GJM Series

Table A

(1) Capacitance Change from 25℃ Value (%) Temp. Coeff. _55℃ _30℃ _10℃ Char. Code . (ppm/℃) *1 Max. Min. Max. Min. Max. Min. 5C 0±30 0.58 -0.24 0.40 -0.17 0.25 -0.11 -0.21 0.38 6C 0 ± 60 0.87 -0.48 0.60 -0.33

*1: Nominal values denote the temperature coefficient within a range of 25 to 125°C.

(2)

			Ca	pacitance Chang	e from 20℃ Value	(%)		
Char.	Nominal Values (ppm/℃) *2	-!	−55℃		−25°C		10℃	
	(ppin/c) · 2	Max.	Min.	Max.	Min.	Max.	Min.	
2C	0±60	0.82	-0.45	0.49	-0.27	0.33	-0.18	
3C	0±120	1.37	-0.90	0.82	-0.54	0.55	-0.36	
4C	0±250	2.56	-1.88	1.54	-1.13	1.02	-0.75	

High Frequency GOM Series



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Chip Monolithic Ceramic Capacitors



High Frequency GQM Series

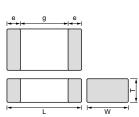
Features

- 1. HiQ and low ESR at VHF, UHF, Microwave
- Feature improvement, low power consumption for mobile telecommunication. (Base station, terminal, etc.)

Applications

High frequency circuit (Mobile telecommunication, etc.)





Part Number		Dime	ensions (mm	ı)	
Part Number	L	W	Т	е	g min.
GQM187	1.6 ±0.15	0.8 ±0.15	0.7 ±0.1	0.2 to 0.5	0.5
GQM188	1.6 ±0.1	0.8 ±0.1	0.8 ±0.1	0.2 to 0.5	0.5
GQM219 (50,100V)	2.0 ±0.1	1.25 ±0.1	0.85 ±0.1	0.2 to 0.7	0.7
GQM219 (250V)	2.0 ±0.15	1.25 ±0.15	0.85 ±0.15	0.2 to 0.7	0.7
GQM22M	2.8 ±0.5	2.8 ±0.4	1.15 ±0.2	0.3 min.	1.0

For General GRM Series



ANote • This PDF catalog is downloaded from the website of Murata Manufacturing co., ltd. Therefore, it's specifications 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. • This PDF catalog has only typical specifications because there is no space for detailed specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering. 10.12.20

Capacitance Table

Temperature Compensating Type C0G(5C) Characteristics

7 ex.7: T Dimension [mm]

LxW 1.6x0.8 (18) 2.0x1.25 2.8x2.8 (20805> 2.0x1.25 2.8x2.8 (20805> Rated Voltage 250 100 50 250 100 50 50 0.10pF(R10) 7 (2E) (2A) (1H) (2E) (2A) (1H) (2E) 0.10pF(R20) 7 0.30pF(R30) 7 8 9 9 M 0.50pF(R50) 7 8 9 9 M M 0.75pF(R75) 7 8 9 9 M M 1.5pF(1R5) 7 8 9 9 M M 1.6pF(1R6) 7 8 9 9 M M 2.0pF(2R0) 7 8 9 9 M M 2.0pF(2R0) 7 8 9 9 M M 2.0pF(2R0) 7 8 9 9 M M 3.0pF(3R0) 7 8 9 9	7 ex.7: 1	Dimensi	ion [mm]		-			
Capacitance [Vdc] (2A) (1H) (2E) (2A) (1H) (2H) (2H)		1	(18)			(21)		(22)
0.20pF(R20) 7 0.30pF(R30) 7 0.40pF(R40) 7 0.50pF(R50) 7 8 9 9 1.0pF(1R0) 7 8 9 9 1.1pF(1R1) 7 8 9 9 1.1pF(1R1) 7 8 9 9 1.2pF(1R2) 7 8 9 9 1.3pF(1R3) 7 8 9 9 1.3pF(1R3) 7 8 9 9 1.3pF(1R3) 7 8 9 9 1.4pF(1R4) 7 8 9 9 1.3pF(1R3) 7 8 9 9 1.4pF(2R4) 7 8 9 9 2.4pF(2R2) 7 8 9 9 3.0pF(3R0) 7 8 9 9 3.3pF(3R3) 7 8 9 9 3.3pF(4R3) 7 8 9 9 4.0pF(4R0) 7 8 9 9 4.0pF(6R0)								
0.30pF(R30) 7 0.40pF(R40) 7 0.50pF(R50) 7 8 9 9 0.75pF(R75) 7 8 9 9 1.0pF(1R0) 7 8 9 9 1.1pF(1R1) 7 8 9 9 1.3pF(1R3) 7 8 9 9 1.5pF(1R5) 7 8 9 9 1.5pF(1R6) 7 8 9 9 1.5pF(1R6) 7 8 9 9 1.6pF(1R6) 7 8 9 9 1.6pF(2R0) 7 8 9 9 2.2pF(2R2) 7 8 9 9 3.0pF(3R0) 7 8 9 9 3.3pF(3R3) 7 8 9 9 3.3pF(3R3) 7 8 9 9 4.0pF(4R0) 7 8 9 9 4.3pF(4R3) 7 8 9 9 5.0pF(5R0) 7 8 9 9<	0.10pF(R10)	7			 		1	
0.40pF(R40) 7 0.50pF(R50) 7 8 9 9 0.75pF(R75) 7 8 9 9 1.0pF(1R0) 7 8 9 9 1.1pF(1R1) 7 8 9 9 1.3pF(1R3) 7 8 9 9 1.5pF(1R5) 7 8 9 9 1.6pF(1R6) 7 8 9 9 1.6pF(1R6) 7 8 9 9 1.6pF(1R6) 7 8 9 9 2.0pF(2R0) 7 8 9 9 3.0pF(3R3) 7 8 9 9 3.3pF(3R3) 7 8 9 9 3.3pF(3R3) 7 8 9 9 4.0pF(4R0) 7 8 9 9 4.3pF(4R3) 7 8 9 9 5.0pF(5R0) 7 8 9 9 5.0pF(6R0) 7 8 9 9 6.0pF(R0) 7 <td>0.20pF(R20)</td> <td>7</td> <td></td> <td></td> <td>1</td> <td></td> <td></td> <td>1</td>	0.20pF(R20)	7			1			1
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	0.30pF(R30)	7			1			1
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	0.40pF(R40)	7						
1.0pF(1R0) 7 8 9 9 M $1.1pF(1R1)$ 7 8 9 9 M $1.2pF(1R2)$ 7 8 9 9 M $1.3pF(1R3)$ 7 8 9 9 M $1.5pF(1R5)$ 7 8 9 9 M $1.5pF(1R6)$ 7 8 9 9 M $1.6pF(1R6)$ 7 8 9 9 M $2.0pF(2R0)$ 7 8 9 9 M $2.2pF(2R2)$ 7 8 9 9 M $2.2pF(2R1)$ 7 8 9 9 M $3.0pF(3R3)$ 7 8 9 9 M $3.0pF(3R4)$ 7 8 9 9 M $3.0pF(3R4)$ 7 8 9 9 M $4.0pF(4R0)$ 7 8 9 9 M $4.0pF(4R0)$ 7 8 9 9 M $5.0pF(5R0)$ 7	0.50pF(R50)	7	8		9	9		М
1.1pF(1R1) 7 8 9 9 M 1.2pF(1R2) 7 8 9 9 M 1.3pF(1R3) 7 8 9 9 M 1.5pF(1R5) 7 8 9 9 M 1.6pF(1R6) 7 8 9 9 M 1.6pF(1R8) 7 8 9 9 M 2.0pF(2R0) 7 8 9 9 M 2.2pF(2R2) 7 8 9 9 M 3.0pF(3R0) 7 8 9 9 M 3.0pF(3R0) 7 8 9 9 M 3.3pF(3R3) 7 8 9 9 M 3.3pF(3R3) 7 8 9 9 M 3.3pF(3R3) 7 8 9 9 M 4.0pF(4R0) 7 8 9 9 M 5.0pF(5R0) 7 8 9 9 M 6.0pF(6R0) 7 8 9 <td>0.75pF(R75)</td> <td>7</td> <td>8</td> <td></td> <td>9</td> <td>9</td> <td></td> <td>М</td>	0.75pF(R75)	7	8		9	9		М
1.2pF(1R2) 7 8 9 9 M $1.3pF(1R3)$ 7 8 9 9 M $1.6pF(1R6)$ 7 8 9 9 M $1.8pF(1R8)$ 7 8 9 9 M $2.0pF(2R0)$ 7 8 9 9 M $2.2pF(2R2)$ 7 8 9 9 M $2.2pF(2R7)$ 7 8 9 9 M $3.0pF(3R0)$ 7 8 9 9 M $3.0pF(3R3)$ 7 8 9 9 M $3.3pF(3R3)$ 7 8 9 9 M $3.3pF(3R3)$ 7 8 9 9 M $3.4pF(4R3)$ 7 8 9 9 M $4.0pF(4R0)$ 7 8 9 9 M $5.0pF(5R0)$ 7 8 9 9 M $6.0pF(6R0)$ 7 8 9 9 M $6.2pF(6R2)$ 7	1.0pF(1R0)	7	8		9	9		м
1.3pF(1R) 7 8 9 9 M 1.5pF(1R5) 7 8 9 9 M 1.6pF(1R6) 7 8 9 9 M 1.6pF(1R6) 7 8 9 9 M 2.0pF(2R0) 7 8 9 9 M 2.2pF(2R2) 7 8 9 9 M 2.2pF(2R7) 7 8 9 9 M 3.0pF(3R0) 7 8 9 9 M 3.3pF(3R3) 7 8 9 9 M 3.3pF(4R3) 7 8 9 9 M 4.0pF(4R0) 7 8 9 9 M 5.0pF(5R0) 7 8 9 9 M 6.0pF(6R0) 7 8 9 <td>1.1pF(1R1)</td> <td>7</td> <td>8</td> <td> </td> <td>9</td> <td>9</td> <td></td> <td>м</td>	1.1pF(1R1)	7	8		9	9		м
1.5pF(1R5) 7 8 9 9 9 M 1.6pF(1R6) 7 8 9 9 9 M 2.0pF(2R0) 7 8 9 9 M 2.2pF(2R2) 7 8 9 9 M 3.0pF(3R0) 7 8 9 9 M 3.3pF(3R3) 7 8 9 9 M 3.3pF(3R3) 7 8 9 9 M 4.0pF(4R0) 7 8 9 9 M 5.0pF(5R0) 7 8 9 9 M 6.0pF(6R0) 7 8 9 9 M 6.2pF(6R2) 7 8 9 9 M 6.2pF(6R0) 7 <td>1.2pF(1R2)</td> <td>7</td> <td>8</td> <td> </td> <td>9</td> <td>9</td> <td></td> <td>м</td>	1.2pF(1R2)	7	8		9	9		м
1.6pF(1R6) 7 8 9 9 M 1.8pF(1R8) 7 8 9 9 9 2.0pF(2R0) 7 8 9 9 M 2.2pF(2R2) 7 8 9 9 M 3.0pF(3R0) 7 8 9 9 M 3.3pF(3R3) 7 8 9 9 M 3.3pF(3R9) 7 8 9 9 M 4.0pF(4R0) 7 8 9 9 M 4.3pF(4R3) 7 8 9 9 M 5.0pF(5R0) 7 8 9 9 M 6.0pF(6R0) 7 8 9 9 M 6.2pF(6R2) 7 8 9 9 M 6.3pF(6R8) 7 8 9 <td>1.3pF(1R3)</td> <td>7</td> <td>8</td> <td> </td> <td>9</td> <td>9</td> <td></td> <td>м</td>	1.3pF(1R3)	7	8		9	9		м
1.8pF(1R8) 7 8 9 9 M 2.0pF(2R0) 7 8 9 9 M 2.2pF(2R2) 7 8 9 9 M 3.0pF(3R0) 7 8 9 9 M 3.3pF(3R3) 7 8 9 9 M 4.0pF(4R0) 7 8 9 9 M 4.3pF(4R3) 7 8 9 9 M 5.0pF(5R0) 7 8 9 9 M 6.0pF(6R0) 7 8 9 9 M 6.2pF(6R2) 7 8 9 <td>1.5pF(1R5)</td> <td>7</td> <td>8</td> <td> </td> <td>9</td> <td>9</td> <td></td> <td>м</td>	1.5pF(1R5)	7	8		9	9		м
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1.6pF(1R6)	7	8		9	9		М
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1.8pF(1R8)	7	8		9	9		М
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	2.0pF(2R0)	7	8		9	9		М
2.7pF(2R7) 7 8 9 9 M $3.0pF(3R0)$ 7 8 9 9 M $3.3pF(3R3)$ 7 8 9 9 M $3.0pF(3R0)$ 7 8 9 9 M $4.0pF(4R0)$ 7 8 9 9 M $4.3pF(4R3)$ 7 8 9 9 M $5.0pF(5R0)$ 7 8 9 9 M $5.0pF(5R6)$ 7 8 9 9 M $6.0pF(6R0)$ 7 8 9 9 M $6.2pF(6R2)$ 7 8 9 9 M $7.0pF(7R0)$ 7 8 9 9 M $9.0pF(9R0)$ 7	2.2pF(2R2)	7	8		9	9		М
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	2.4pF(2R4)	7	8		9	9		М
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	2.7pF(2R7)	7	8		9	9		М
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	3.0pF(3R0)	7	8		9	9		М
3.9pF(3R9) 7 8 9 9 M $4.0pF(4R0)$ 7 8 9 9 M $4.3pF(4R3)$ 7 8 9 9 M $4.3pF(4R3)$ 7 8 9 9 M $4.3pF(4R7)$ 7 8 9 9 M $4.3pF(4R7)$ 7 8 9 9 M $5.0pF(5R0)$ 7 8 9 9 M $5.6pF(5R6)$ 7 8 9 9 M $6.0pF(6R0)$ 7 8 9 9 M $6.2pF(6R2)$ 7 8 9 9 M $6.3pF(6R8)$ 7 8 9 9 M $7.5pF(7R5)$ 7 8 9 9 M $8.0pF(8R0)$ 7 8 9 9 M $9.0pF(9R0)$ 7 8 9 9 M $10pF(100)$ 7 8 9 9 M $10pF(130)$ 7	3.3pF(3R3)	7	8		9	9		М
4.0pF(4R0) 7 8 9 9 M $4.3pF(4R3)$ 7 8 9 9 M $4.3pF(4R3)$ 7 8 9 9 M $4.7pF(4R7)$ 7 8 9 9 M $5.0pF(5R0)$ 7 8 9 9 M $5.0pF(5R0)$ 7 8 9 9 M $5.6pF(5R6)$ 7 8 9 9 M $6.0pF(6R0)$ 7 8 9 9 M $6.2pF(6R2)$ 7 8 9 9 M $7.5pF(7R5)$ 7 8 9 9 M $7.5pF(7R5)$ 7 8 9 9 M $8.2pF(8R2)$ 7 8 9 9 M $9.0pF(9R0)$ 7 8 9 9 M $9.1pF(9R1)$ 7 8 9 9 M $10pF(100)$ 7 8 9 9 M $11pF(110)$ 7	3.6pF(3R6)	7	8		9	9		М
A.3pF(4R3)7899 $4.3pF(4R3)$ 7899 $4.7pF(4R7)$ 7899 $5.0pF(5R0)$ 7899 $5.6pF(5R6)$ 7899 $6.0pF(6R0)$ 7899 $6.0pF(6R2)$ 7899 $6.2pF(6R2)$ 7899 $6.2pF(6R2)$ 7899 $6.2pF(6R2)$ 7899 $7.0pF(7R0)$ 7899 $7.5pF(7R5)$ 7899 $8.2pF(8R2)$ 7899 $9.0pF(9R0)$ 7899 $9.0pF(9R0)$ 7899 $9.1pF(9R1)$ 7899 $10pF(100)$ 7899 $10pF(120)$ 7899 $11pF(110)$ 7899 $13pF(130)$ 7899 $13pF(180)$ 7899 $12pF(200)$ 7899 $12pF(20)$ 7899 $12pF(20)$ 7899 9 M20pF(20)78 9 9M20pF(20)9 9 9M9 9 99 9 99	3.9pF(3R9)	7	8		9	9		М
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	4.0pF(4R0)	7	8		9	9		М
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	4.3pF(4R3)	7	8		9	9		М
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	4.7pF(4R7)	7	8	 	9	9		М
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	5.0pF(5R0)	7	8		9	9		М
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	5.1pF(5R1)	7	8		9	9		М
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	5.6pF(5R6)	7	8		9	9		М
6.8pF(6R8) 7 8 9 9 M 7.0pF(7R0) 7 8 9 9 M 7.5pF(7R5) 7 8 9 9 M 8.0pF(8R0) 7 8 9 9 M 8.0pF(8R0) 7 8 9 9 M 8.0pF(8R0) 7 8 9 9 M 8.0pF(8R2) 7 8 9 9 M 9.0pF(9R0) 7 8 9 9 M 9.1pF(9R1) 7 8 9 9 M 10pF(100) 7 8 9 9 M 11pF(110) 7 8 9 9 M 12pF(120) 7 8 9 9 M 13pF(130) 7 8 9 9 M 12pF(120) 7 8 9 9 M 20pF(200) 7 8 9 9 M 22pF(220) 7 8 9		_	8		9	9		М
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	6.2pF(6R2)	7	8		9	9		М
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$,		8		9	9		М
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	7.0pF(7R0)	7		8	9	9		М
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	7.5pF(7R5)	7		8	9	9		
9.0pF(9R0) 7 8 9 9 9.1pF(9R1) 7 8 9 9 10pF(100) 7 8 9 9 11pF(110) 7 8 9 9 11pF(120) 7 8 9 9 12pF(120) 7 8 9 9 13pF(130) 7 8 9 9 15pF(150) 7 8 9 9 16pF(160) 7 8 9 9 20pF(200) 7 8 9 9 22pF(220) 7 8 9 9 24pF(240) 7 8 9 9 30pF(300) 7 8 9 9	,			8	9	9		
9.1pF(9R1) 7 8 9 9 M 10pF(100) 7 8 9 9 M 11pF(110) 7 8 9 9 M 11pF(110) 7 8 9 9 M 12pF(120) 7 8 9 9 M 13pF(130) 7 8 9 9 M 15pF(150) 7 8 9 9 M 16pF(160) 7 8 9 9 M 20pF(200) 7 8 9 9 M 22pF(220) 7 8 9 9 M 22pF(240) 7 8 9 9 M 27pF(270) 7 8 9 9 M 30pF(300) 7 8 9 9 M		_		8				
10pF(100) 7 11pF(110) 7 11pF(110) 7 12pF(120) 7 13pF(130) 7 15pF(150) 7 16pF(160) 7 18pF(180) 7 20pF(200) 7 22pF(220) 7 24pF(240) 7 30pF(300) 7	9.0pF(9R0)	7		8	9	9		
11pF(110) 7 11pF(110) 7 12pF(120) 7 13pF(130) 7 15pF(150) 7 16pF(160) 7 18pF(180) 7 20pF(200) 7 22pF(220) 7 24pF(240) 7 30pF(300) 7								
12pF(120) 7 13pF(130) 7 13pF(130) 7 15pF(150) 7 16pF(160) 7 18pF(180) 7 20pF(200) 7 22pF(220) 7 24pF(240) 7 30pF(300) 7	10pF(100)	7		8	9	9		
13pF(130) 7 15pF(150) 7 15pF(160) 7 16pF(160) 7 18pF(180) 7 20pF(200) 7 22pF(220) 7 24pF(240) 7 27pF(270) 7 30pF(300) 7				8		9	4	
15pF(150) 7 16pF(160) 7 18pF(180) 7 20pF(200) 7 22pF(220) 7 24pF(240) 7 27pF(270) 7 30pF(300) 7	-		-				-	
16pF(160) 7 18pF(180) 7 20pF(200) 7 22pF(220) 7 24pF(240) 7 27pF(270) 7 30pF(300) 7	,		-				-	
18pF(180) 7 8 9 9 M 20pF(200) 7 8 9 9 M 22pF(220) 7 8 9 9 M 22pF(220) 7 8 9 9 M 24pF(240) 7 8 9 9 M 30pF(300) 7 8 9 9 M			-					
20pF(200) 7 22pF(220) 7 8 9 24pF(240) 7 8 9 27pF(270) 7 8 9 30pF(300) 7	-						+	
22pF(220) 7 8 9 M 24pF(240) 7 8 9 9 M 27pF(270) 7 8 9 9 M 30pF(300) 7 8 9 9 M						9		
24pF(240) 7 8 9 M 27pF(270) 7 8 9 9 M 30pF(300) 7 8 9 9 M			-			-		
27pF(270) 7 8 9 9 M 30pF(300) 7 8 9 9 M	,					-		
30pF(300) 7 8 9 M		_				-		
						-		
33p⊢(330) 7 8 9 9 M			-			-		
	33pF(330)	7		8	9		9	M

s	LxW [mm]		1.6x0.8 (18) <0603>			0x1.2 (21) <0805>		2.8x2.8 (22) <1111>	For General GRM Series
	Rated Voltage Capacitance [Vdc]	250 (2E)	100 (2A)	50 (1H)	250 (2E)	100 (2A)	50 (1H)	500 (2H)	
	36pF(360)	7		8	9		9	м	ies
	39pF(390)	7		8	9		9	м	Array GNM Series
	43pF(430)	7		8	9		9	м	ľΑ
	47pF(470)	7		8	9		9	м	ß
	51pF(510)			8	9		9	м	
	56pF(560)			8	9		9	м	
	62pF(620)			8	9		9	м	
	68pF(680)			8	9		9	м	ŝ
	75pF(750)			8	9		9	м	Low ESL LL⊟ Series
	82pF(820)			8	9		9	м	Low ESI L⊟ Seri∈
	91pF(910)			8	9		9	м	ĽĽ
	100pF(101)			8	9		9	м	

High-Q GJM Series

> High Frequency GQM Series

Monolithic Microchip GMA Series

For Bonding GMD Series

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code



ries	•		pensating Type C	× /
GRM Series	LxW [mm]		1.6x0.8(1	8)<0603>
RM	Rated Volt. [Vdc]]	250(2E)	100(2A)
9	Capacitance	Tolerance	Part N	lumber
	0.10pF(R10)	±0.1pF(B)	GQM1875C2ER10BB12D	
	0.20pF(R20)	±0.1pF(B)	GQM1875C2ER20BB12D	
	0.30pF(R30)	±0.1pF(B)	GQM1875C2ER30BB12D	
es		±0.25pF(C)	GQM1875C2ER30CB12D	
GNM Series	0.40pF(R40)	±0.1pF(B)	GQM1875C2ER40BB12D	
Σ		±0.25pF(C)	GQM1875C2ER40CB12D	
G	0.50pF(R50)	±0.1pF(B)	GQM1875C2ER50BB12D	GQM1885C2AR50BB01
		±0.25pF(C)	GQM1875C2ER50CB12D	GQM1885C2AR50CB01
	0.75pF(R75)	±0.1pF(B)	GQM1875C2ER75BB12D	GQM1885C2AR75BB01
		±0.25pF(C)	GQM1875C2ER75CB12D	GQM1885C2AR75CB01
S	1.0pF(1R0)	±0.1pF(B)	GQM1875C2E1R0BB12D	GQM1885C2A1R0BB01
erie	-	±0.25pF(C)	GQM1875C2E1R0CB12D	GQM1885C2A1R0CB01
L Series	1.1pF(1R1)	±0.1pF(B)	GQM1875C2E1R1BB12D	GQM1885C2A1R1BB01
Ľ		±0.25pF(C)	GQM1875C2E1R1CB12D	GQM1885C2A1R1CB01
	1.2pF(1R2)	±0.1pF(B)	GQM1875C2E1R2BB12D	GQM1885C2A1R2BB01
	-	±0.25pF(C)	GQM1875C2E1R2CB12D	GQM1885C2A1R2CB01
	1.3pF(1R3)	±0.1pF(B)	GQM1875C2E1R3BB12D	GQM1885C2A1R3BB01
		±0.25pF(C)	GQM1875C2E1R3CB12D	GQM1885C2A1R3CB01
GJM Series	1.5pF(1R5)	±0.1pF(B)	GQM1875C2E1R5BB12D	GQM1885C2A1R5BB01
Sel		±0.25pF(C)	GQM1875C2E1R5CB12D	GQM1885C2A1R5CB01
MU	1.6pF(1R6)	±0.1pF(B)	GQM1875C2E1R6BB12D	GQM1885C2A1R6BB01
0		±0.25pF(C)	GQM1875C2E1R6CB12D	GQM1885C2A1R6CB01
	1.8pF(1R8)	±0.1pF(B)	GQM1875C2E1R8BB12D	GQM1885C2A1R8BB01
		±0.25pF(C)	GQM1875C2E1R8CB12D	GQM1885C2A1R8CB01
	2.0pF(2R0)	±0.1pF(B)	GQM1875C2E2R0BB12D	GQM1885C2A2R0BB01
ies		±0.25pF(C)	GQM1875C2E2R0CB12D	GQM1885C2A2R0CB01
GOM Series	2.2pF(2R2)	±0.1pF(B)	GQM1875C2E2R2BB12D	GQM1885C2A2R2BB01
MC		±0.25pF(C)	GQM1875C2E2R2CB12D	GQM1885C2A2R2CB01
с Ю	2.4pF(2R4)	±0.1pF(B)	GQM1875C2E2R4BB12D	GQM1885C2A2R4BB01
		±0.25pF(C)	GQM1875C2E2R4CB12D	GQM1885C2A2R4CB01
	2.7pF(2R7)	±0.1pF(B)	GQM1875C2E2R7BB12D	GQM1885C2A2R7BB01
		±0.25pF(C)	GQM1875C2E2R7CB12D	GQM1885C2A2R7CB01
S	3.0pF(3R0)	±0.1pF(B)	GQM1875C2E3R0BB12D	GQM1885C2A3R0BB01
erie		±0.25pF(C)	GQM1875C2E3R0CB12D	GQM1885C2A3R0CB01
GMA Series	3.3pF(3R3)	±0.1pF(B)	GQM1875C2E3R3BB12D	GQM1885C2A3R3BB01
GM		±0.25pF(C)	GQM1875C2E3R3CB12D	GQM1885C2A3R3CB01
	3.6pF(3R6)	±0.1pF(B)	GQM1875C2E3R6BB12D	GQM1885C2A3R6BB01
		±0.25pF(C)	GQM1875C2E3R6CB12D	GQM1885C2A3R6CB01
	3.9pF(3R9)	±0.1pF(B)	GQM1875C2E3R9BB12D	GQM1885C2A3R9BB01
		±0.25pF(C)	GQM1875C2E3R9CB12D	GQM1885C2A3R9CB01
ries	4.0pF(4R0)	±0.1pF(B)	GQM1875C2E4R0BB12D	GQM1885C2A4R0BB01
) Se		±0.25pF(C)	GQM1875C2E4R0CB12D	GQM1885C2A4R0CB01
GMD Series	4.3pF(4R3)	±0.1pF(B)	GQM1875C2E4R3BB12D	GQM1885C2A4R3BB01
Ċ		±0.25pF(C)	GQM1875C2E4R3CB12D	GQM1885C2A4R3CB01
	4.7pF(4R7)	±0.1pF(B)	GQM1875C2E4R7BB12D	GQM1885C2A4R7BB01
		±0.25pF(C)	GQM1875C2E4R7CB12D	GQM1885C2A4R7CB01
	5.0pF(5R0)	±0.1pF(B)	GQM1875C2E5R0BB12D	GQM1885C2A5R0BB01
			1	

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

(Part Number) **GQ M 18 7 5C 2E R10 B** B12 D 00000 0 **7**8 9 Ð Product ID 2 Series **5**Temperature Characteristics 8 Capacitance Tolerance

3 Dimensions (LxW) 6 Rated Voltage Individual Specification Code

4 Dimension (T) Capacitance Packaging

Packaging Code in Part Number shows STD 180mm Reel Taping.



LxW [mm]	1	250/25)	1.6x0.8(18)<0603>	
Rated Volt. [Vdc	-	250(2E)	100(2A)	50(1H)
Capacitance	Tolerance		Part Number	
5.1pF(5R1)	±0.25pF(C)	GQM1875C2E5R1CB12D	GQM1885C2A5R1CB01D	
	±0.5pF(D)	GQM1875C2E5R1DB12D	GQM1885C2A5R1DB01D	
5.6pF(5R6)	±0.25pF(C)	GQM1875C2E5R6CB12D	GQM1885C2A5R6CB01D	
	±0.5pF(D)	GQM1875C2E5R6DB12D	GQM1885C2A5R6DB01D	
6.0pF(6R0)	±0.25pF(C)	GQM1875C2E6R0CB12D	GQM1885C2A6R0CB01D	
	±0.5pF(D)	GQM1875C2E6R0DB12D	GQM1885C2A6R0DB01D	
6.2pF(6R2)	±0.25pF(C)	GQM1875C2E6R2CB12D	GQM1885C2A6R2CB01D	
	±0.5pF(D)	GQM1875C2E6R2DB12D	GQM1885C2A6R2DB01D	
6.8pF(6R8)	±0.25pF(C)	GQM1875C2E6R8CB12D	GQM1885C2A6R8CB01D	
	±0.5pF(D)	GQM1875C2E6R8DB12D	GQM1885C2A6R8DB01D	
7.0pF(7R0)	±0.25pF(C)	GQM1875C2E7R0CB12D		GQM1885C1H7R0CB011
	±0.5pF(D)	GQM1875C2E7R0DB12D		GQM1885C1H7R0DB011
7.5pF(7R5)	±0.25pF(C)	GQM1875C2E7R5CB12D		GQM1885C1H7R5CB011
	±0.5pF(D)	GQM1875C2E7R5DB12D		GQM1885C1H7R5DB01
8.0pF(8R0)	±0.25pF(C)	GQM1875C2E8R0CB12D		GQM1885C1H8R0CB01
	±0.5pF(D)	GQM1875C2E8R0DB12D		GQM1885C1H8R0DB01I
8.2pF(8R2)	±0.25pF(C)	GQM1875C2E8R2CB12D		GQM1885C1H8R2CB011
	±0.5pF(D)	GQM1875C2E8R2DB12D		GQM1885C1H8R2DB011
9.0pF(9R0)	±0.25pF(C)	GQM1875C2E9R0CB12D		GQM1885C1H9R0CB01I
	±0.5pF(D)	GQM1875C2E9R0DB12D		GQM1885C1H9R0DB01I
9.1pF(9R1)	±0.25pF(C)	GQM1875C2E9R1CB12D		GQM1885C1H9R1CB01
• • •	±0.5pF(D)	GQM1875C2E9R1DB12D		GQM1885C1H9R1DB011
10pF(100)	±2%(G)	GQM1875C2E100GB12D		GQM1885C1H100GB01I
,	±5%(J)	GQM1875C2E100JB12D		GQM1885C1H100JB010
11pF(110)	±2%(G)	GQM1875C2E110GB12D		GQM1885C1H110GB01I
	±5%(J)	GQM1875C2E110JB12D		GQM1885C1H110JB010
12pF(120)	±2%(G)	GQM1875C2E120GB12D		GQM1885C1H120GB01I
	±5%(J)	GQM1875C2E120JB12D		GQM1885C1H120JB01[
13pF(130)	±2%(G)	GQM1875C2E130GB12D		GQM1885C1H130GB01I
.op: ()	±5%(J)	GQM1875C2E130JB12D		GQM1885C1H130JB01E
15pF(150)	±3%(G)	GQM1875C2E150GB12D		GQM1885C1H150GB01I
13pr (130)	±5%(J)	GQM1875C2E150JB12D		GQM1885C1H150JB01E
16pF(160)	±3%(G)	GQM1875C2E160GB12D		GQM1885C1H160GB011
10pi (100)	±5%(J)	GQM1875C2E160JB12D		GQM1885C1H160JB01E
18pF(180)	±3 %(G)	GQM1875C2E180GB12D		GQM1885C1H180GB011
10pr(100)		GQM1875C2E180JB12D		GQM1885C1H180JB01E
20pF(200)	±5%(J)	GQM1875C2E1805B12D		
20μ۳(200)	±2%(G)	GQM1875C2E200GB12D		GQM1885C1H200GB01I
11-E/000	±5%(J)			GQM1885C1H200JB01E
22pF(220)	±2%(G)	GQM1875C2E220GB12D		GQM1885C1H220GB01
24-5/040	±5%(J)	GQM1875C2E220JB12D		GQM1885C1H220JB01E
24pF(240)	±2%(G)	GQM1875C2E240GB12D		GQM1885C1H240GB01I
on = =:::	±5%(J)	GQM1875C2E240JB12D		GQM1885C1H240JB01E
27pF(270)	±2%(G)	GQM1875C2E270GB12D		GQM1885C1H270GB01I
	±5%(J)	GQM1875C2E270JB12D		GQM1885C1H270JB01D
30pF(300)	±2%(G)	GQM1875C2E300GB12D		GQM1885C1H300GB01E
	±5%(J)	GQM1875C2E300JB12D		GQM1885C1H300JB01E

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code



s a	Tempera	ture Con	npensating Type C	OG(5C) Characte
For General GRM Series	LxW [mm]		1.6v0.9(1	8)<0603>
N N S	Rated Volt. [Vdc	1	250(2E)	50(1H)
G R		Tolerance	. ,	umber
	Capacitance			
	33pF(330)	±2%(G)	GQM1875C2E330GB12D	GQM1885C1H330GB01D
	36pF(360)	±5%(J) ±2%(G)	GQM1875C2E330JB12D GQM1875C2E360GB12D	GQM1885C1H330JB01D GQM1885C1H360GB01D
s	30pr(300)	+	GQM1875C2E360JB12D	GQM1885C1H360JB01D
y erie	20mE(200)	±5%(J)	GQM1875C2E390GB12D	GQM1885C1H390GB01D
Arra VI S	39pF(390)	±2%(G)		
Array GNM Series	42mE(420)	±5%(J)	GQM1875C2E390JB12D	GQM1885C1H390JB01D
Ŭ	43pF(430)	±2%(G)	GQM1875C2E430GB12D	GQM1885C1H430GB01D
		±5%(J)	GQM1875C2E430JB12D	GQM1885C1H430JB01D
	47pF(470)	±2%(G)	GQM1875C2E470GB12D	GQM1885C1H470GB01D
		±5%(J)	GQM1875C2E470JB12D	GQM1885C1H470JB01D
ies	51pF(510)	±2%(G)		GQM1885C1H510GB01D
Ser		±5%(J)		GQM1885C1H510JB01D
Low ESL _L Series	56pF(560)	±2%(G)		GQM1885C1H560GB01D
		±5%(J)		GQM1885C1H560JB01D
	62pF(620)	±2%(G)		GQM1885C1H620GB01D
		±5%(J)		GQM1885C1H620JB01D
	68pF(680)	±2%(G)		GQM1885C1H680GB01D
s		±5%(J)		GQM1885C1H680JB01D
High-Q GJM Series	75pF(750)	±2%(G)		GQM1885C1H750GB01D
I Si		±5%(J)		GQM1885C1H750JB01D
± ≤	82pF(820)	±2%(G)		GQM1885C1H820GB01D
•		±5%(J)		GQM1885C1H820JB01D
	91pF(910)	±2%(G)		GQM1885C1H910GB01D
		±5%(J)		GQM1885C1H910JB01D
Ś	100pF(101)	±2%(G)		GQM1885C1H101GB01D
uency ries		±5%(J)		GQM1885C1H101JB01D

The part number code is shown in () and Unit is shown in []. < >: EIA [inch] Code

(Part Number) **GQ M 18 7 5C 2E 330 G** B12 D 6 0 0000 0 8 9

Packaging Code in Part Number shows STD 180mm Reel Taping.

Product ID 2 Series **5**Temperature Characteristics 8Capacitance Tolerance

3 Dimensions (LxW) 6 Rated Voltage Individual Specification Code

4 Dimension (T) Capacitance Packaging

High Frequency GOM Se

Monolithic Microchip GMA Series



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		,	2.8x2.8(22)<1111>
]	250(2E)	100(2A)	500(2H)
Tolerance		Part Number	I
±0.1pF(B)	GQM2195C2ER50BB12D	GQM2195C2AR50BB01D	GQM22M5C2HR50BB01L
±0.25pF(C)	GQM2195C2ER50CB12D	GQM2195C2AR50CB01D	GQM22M5C2HR50CB01L
±0.1pF(B)	GQM2195C2ER75BB12D	GQM2195C2AR75BB01D	GQM22M5C2HR75BB01L
±0.25pF(C)	GQM2195C2ER75CB12D	GQM2195C2AR75CB01D	GQM22M5C2HR75CB01L
±0.1pF(B)	GQM2195C2E1R0BB12D	GQM2195C2A1R0BB01D	GQM22M5C2H1R0BB01L
±0.25pF(C)	GQM2195C2E1R0CB12D	GQM2195C2A1R0CB01D	GQM22M5C2H1R0CB01L
±0.1pF(B)	GQM2195C2E1R1BB12D	GQM2195C2A1R1BB01D	GQM22M5C2H1R1BB01L
±0.25pF(C)	GQM2195C2E1R1CB12D	GQM2195C2A1R1CB01D	GQM22M5C2H1R1CB01L
±0.1pF(B)	GQM2195C2E1R2BB12D	GQM2195C2A1R2BB01D	GQM22M5C2H1R2BB01L
	GQM2195C2E1R2CB12D	GQM2195C2A1R2CB01D	GQM22M5C2H1R2CB01L
			GQM22M5C2H1R3BB01L
			GQM22M5C2H1R3CB01L
• • •			GQM22M5C2H1R5BB01L
			GQM22M5C2H1R5CB01L
• • •			GQM22M5C2H1R6BB01L
			GQM22M5C2H1R6CB01L
1 1 7			GQM22M5C2H1R8BB01L
			GQM22M5C2H1R8CB01L
			GQM22M5C2H2R0BB01L
• • •			GQM22M5C2H2R0CB01L
			GQM22M5C2H2R2BB01L
• • • •			GQM22M5C2H2R2CB01L
			GQM22M5C2H2R4BB01L
• • • •			GQM22M5C2H2R4CB01L
	GQM2195C2E2R7BB12D		GQM22M5C2H2R7BB01L
±0.25pF(C)	GQM2195C2E2R7CB12D	GQM2195C2A2R7CB01D	GQM22M5C2H2R7CB01L
±0.1pF(B)	GQM2195C2E3R0BB12D	GQM2195C2A3R0BB01D	GQM22M5C2H3R0BB01L
±0.25pF(C)	GQM2195C2E3R0CB12D	GQM2195C2A3R0CB01D	GQM22M5C2H3R0CB01L
±0.1pF(B)	GQM2195C2E3R3BB12D	GQM2195C2A3R3BB01D	GQM22M5C2H3R3BB01L
±0.25pF(C)	GQM2195C2E3R3CB12D	GQM2195C2A3R3CB01D	GQM22M5C2H3R3CB01L
±0.1pF(B)	GQM2195C2E3R6BB12D	GQM2195C2A3R6BB01D	GQM22M5C2H3R6BB01L
±0.25pF(C)	GQM2195C2E3R6CB12D	GQM2195C2A3R6CB01D	GQM22M5C2H3R6CB01L
±0.1pF(B)	GQM2195C2E3R9BB12D	GQM2195C2A3R9BB01D	GQM22M5C2H3R9BB01L
±0.25pF(C)	GQM2195C2E3R9CB12D	GQM2195C2A3R9CB01D	GQM22M5C2H3R9CB01L
±0.1pF(B)	GQM2195C2E4R0BB12D	GQM2195C2A4R0BB01D	GQM22M5C2H4R0BB01L
±0.25pF(C)	GQM2195C2E4R0CB12D	GQM2195C2A4R0CB01D	GQM22M5C2H4R0CB01L
±0.1pF(B)	GQM2195C2E4R3BB12D	GQM2195C2A4R3BB01D	GQM22M5C2H4R3BB01L
±0.25pF(C)	GQM2195C2E4R3CB12D	GQM2195C2A4R3CB01D	GQM22M5C2H4R3CB01L
±0.1pF(B)	GQM2195C2E4R7BB12D	GQM2195C2A4R7BB01D	GQM22M5C2H4R7BB01L
±0.25pF(C)	GQM2195C2E4R7CB12D	GQM2195C2A4R7CB01D	GQM22M5C2H4R7CB01L
			GQM22M5C2H5R0BB01L
	GQM2195C2E5R0CB12D		GQM22M5C2H5R0CB01L
			GQM22M5C2H5R1CB01L
			GQM22M5C2H5R1DB01L
			GQM22M5C2H5R1DB01L
±0.5pF(D)	GQM2195C2E5R6DB12D	GQM2195C2A5R6DB01D	GQM22M5C2H5R6DB01L
±0.25pF(C)	GQM2195C2E6R0CB12D	GQM2195C2A6R0CB01D	GQM22M5C2H6R0CB01L
	±0.1pF(B) ±0.25pF(C) ±0.25pF(C) ±0.25pF(C	1 250(2E) Tolerance 40.1pF(B) GQM2195C2ER50BB12D ±0.25pF(C) GQM2195C2ER50CB12D ±0.1pF(B) GQM2195C2ER75CB12D ±0.25pF(C) GQM2195C2ER75CB12D ±0.25pF(C) GQM2195C2E1R0CB12D ±0.25pF(C) GQM2195C2E1R0BB12D ±0.25pF(C) GQM2195C2E1R1CB12D ±0.25pF(C) GQM2195C2E1R2B12D ±0.25pF(C) GQM2195C2E1R2B12D ±0.1pF(B) GQM2195C2E1R3CB12D ±0.25pF(C) GQM2195C2E1R3CB12D ±0.25pF(C) GQM2195C2E1R3CB12D ±0.25pF(C) GQM2195C2E1R8B12D ±0.25pF(C) GQM2195C2E1R8CB12D ±0.25pF(C) GQM2195C2E1R8CB12D ±0.25pF(C) GQM2195C2E2R0CB12D ±0.1pF(B) GQM2195C2E2R0CB12D ±0.25pF(C) GQM2195C2E2R7CB12D ±0.25pF(C) GQM2195C2E2R7CB12D ±0.25pF(C) GQM2195C2E2R7CB12D ±0.25pF(C) GQM2195C2E2R7CB12D ±0.1pF(B) GQM2195C2E2R7CB12D ±0.25pF(C) GQM2195C2E2R7CB12D ±0.1pF(B) GQM21	Tolerance Part Number ±0.1pF(B) GQM2195C2ER50BB12D GQM2195C2AR50BB01D ±0.25pF(C) GQM2195C2ER75BB12D GQM2195C2AR75BB01D ±0.1pF(B) GQM2195C2ER75B12D GQM2195C2AR75BB01D ±0.25pF(C) GQM2195C2ER75B12D GQM2195C2AR75CB12D GQM2195C2AR75CB1D ±0.25pF(C) GQM2195C2E1R0BB12D GQM2195C2A1R0EB01D ±0.25pF(C) GQM2195C2E1R1CB12D GQM2195C2A1R1B01D ±0.25pF(C) GQM2195C2E1R2B12D GQM2195C2A1R2B01D ±0.25pF(C) GQM2195C2E1R3CB12D GQM2195C2A1R3CB01D ±0.1pF(B) GQM2195C2E1R3CB12D GQM2195C2A1R3CB01D ±0.25pF(C) GQM2195C2E1R3CB12D GQM2195C2A1R3CB01D ±0.25pF(C) GQM2195C2E1R3CB12D GQM2195C2A1R3CB01D ±0.25pF(C) GQM2195C2E1R6CB12D GQM2195C2A1R8CB01D ±0.25pF(C) GQM2195C2E1R8CB12D GQM2195C2A1R8CB01D ±0.25pF(C) GQM2195C2E1R8CB12D GQM2195C2A1R8CB01D ±0.25pF(C) GQM2195C2E1R8CB12D GQM2195C2A1R8CB01D ±0.25pF(C) GQM2195C2E1R8CB12D GQM2195C2A1R8CB01D ±0.1pF(B) GQM2195C2E1R8CB12D GQM2195C2A1R8CB01D ±0.25pF(C) GQM2

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code



	LxW [mm]			2.0x1.25(21)<0805>		2.8x2.8(22)<1111>
	Rated Volt. [Vdc	1	250(2E)	100(2A)	50(1H)	500(2H)
	Capacitance	Tolerance			lumber	
	6.2pF(6R2)	±0.25pF(C)	GQM2195C2E6R2CB12D	GQM2195C2A6R2CB01D		GQM22M5C2H6R2CB01
		±0.5pF(D)	GQM2195C2E6R2DB12D	GQM2195C2A6R2DB01D		GQM22M5C2H6R2DB01
	6.8pF(6R8)	±0.25pF(C)	GQM2195C2E6R8CB12D	GQM2195C2A6R8CB01D		GQM22M5C2H6R8CB01
		±0.5pF(D)	GQM2195C2E6R8DB12D	GQM2195C2A6R8DB01D		GQM22M5C2H6R8DB01
GNM Series	7.0pF(7R0)	±0.25pF(C)	GQM2195C2E7R0CB12D	GQM2195C2A7R0CB01D		GQM22M5C2H7R0CB01
		±0.5pF(D)	GQM2195C2E7R0DB12D	GQM2195C2A7R0DB01D		GQM22M5C2H7R0DB01
	7.5pF(7R5)	±0.25pF(C)	GQM2195C2E7R5CB12D	GQM2195C2A7R5CB01D		GQM22M5C2H7R5CB0
		±0.5pF(D)	GQM2195C2E7R5DB12D	GQM2195C2A7R5DB01D		GQM22M5C2H7R5DB0
	8.0pF(8R0)	±0.25pF(C)	GQM2195C2E8R0CB12D	GQM2195C2A8R0CB01D		GQM22M5C2H8R0CB0
		±0.5pF(D)	GQM2195C2E8R0DB12D	GQM2195C2A8R0DB01D		GQM22M5C2H8R0DB0
	8.2pF(8R2)	±0.25pF(C)	GQM2195C2E8R2CB12D	GQM2195C2A8R2CB01D		GQM22M5C2H8R2CB0 ²
	0.2pt (0112)	±0.5pF(D)	GQM2195C2E8R2DB12D	GQM2195C2A8R2DB01D		GQM22M5C2H8R2DB0
	9.0pF(9R0)	±0.25pF(C)	GQM2195C2E9R0CB12D	GQM2195C2A9R0CB01D		GQM22M5C2H9R0CB0
		±0.5pF(D)	GQM2195C2E9R0DB12D	GQM2195C2A9R0DB01D		GQM22M5C2H9R0DB0
	9.1pF(9R1)	±0.25pF(C)	GQM2195C2E9R1CB12D	GQM2195C2A9R1CB01D		GQM22M5C2H9R1CB0
	7. ipi (51. i)	±0.5pF(D)	GQM2195C2E9R1DB12D	GQM2195C2A9R1DB01D		GQM22M5C2H9R1DB0
	10pF(100)	±0:0µ1 (B) ±2%(G)	GQM2195C2E100GB12D	GQM2195C2A100GB01D		GQM22M5C2H100GB0
	10p1 (100)	±2 %(C) ±5%(J)	GQM2195C2E100JB12D	GQM2195C2A100GB01D		GQM22M5C2H100JB0
	11pF(110)	±3%(G)	GQM2195C2E110GB12D	GQM2195C2A110GB01D		GQM22M5C2H110GB0
	11p1 (110)	±5%(J)	GQM2195C2E110JB12D	GQM2195C2A110JB01D		GQM22M5C2H110JB0
	12pF(120)	±3 %(G)	GQM2195C2E120GB12D	GQM2195C2A120GB01D		GQM22M5C2H120GB0
	12pt (120)	±5%(J)	GQM2195C2E120GB12D	GQM2195C2A120GB01D		GQM22M5C2H120JB0
	13pF(130)	±3%(G)	GQM2195C2E1205B12D	GQM2195C2A1205B01D		GQM22M5C2H130GB0
	13pi (130)	±5%(J)	GQM2195C2E130JB12D	GQM2195C2A130GB01D		GQM22M5C2H130JB0
	15pF(150)	±3 %(G)	GQM2195C2E150GB12D	GQM2195C2A1505B01D		GQM22M5C2H1505B0
	13pi (130)	±5%(J)	GQM2195C2E150JB12D	GQM2195C2A150GB01D		GQM22M5C2H150JB0
	16pF(160)	±3 %(G)	GQM2195C2E1505B12D			
	10pr(100)	±5%(J)	GQM2195C2E160GB12D	GQM2195C2A160GB01D		GQM22M5C2H160GB0
	18pF(180)	±3 %(G)	GQM2195C2E180GB12D	GQM2195C2A160JB01D GQM2195C2A180GB01D		GQM22M5C2H160JB0 ⁻ GQM22M5C2H180GB0 ⁻
	τορε(του)					
	20mE/200)	±5%(J)	GQM2195C2E180JB12D	GQM2195C2A180JB01D	COM2105C1H200CB01D	GQM22M5C2H180JB01
	20pF(200)	±2%(G)	GQM2195C2E200GB12D		GQM2195C1H200GB01D GQM2195C1H200JB01D	GQM22M5C2H200GB0
	22mE/220)	±5%(J)	GQM2195C2E200JB12D			GQM22M5C2H200JB01
	22pF(220)	±2%(G)	GQM2195C2E220GB12D		GQM2195C1H220GB01D GQM2195C1H220JB01D	GQM22M5C2H220GB0
	24pE/240	±5%(J)	GQM2195C2E220JB12D			GQM22M5C2H220JB01
	24pF(240)	±2%(G)	GQM2195C2E240GB12D		GQM2195C1H240GB01D	GQM22M5C2H240GB0
	27mE/270)	±5%(J)	GQM2195C2E240JB12D GQM2195C2E270GB12D		GQM2195C1H240JB01D	GQM22M5C2H240JB0
	27pF(270)	±2%(G)			GQM2195C1H270GB01D	GQM22M5C2H270GB0
	20pF/ 200)	±5%(J)	GQM2195C2E270JB12D		GQM2195C1H270JB01D	GQM22M5C2H270JB01
	30pF(300)	±2%(G)	GQM2195C2E300GB12D		GQM2195C1H300GB01D	GQM22M5C2H300GB0
	20~F/ 200 \	±5%(J)	GQM2195C2E300JB12D		GQM2195C1H300JB01D	GQM22M5C2H300JB01
	33pF(330)	±2%(G)	GQM2195C2E330GB12D		GQM2195C1H330GB01D	GQM22M5C2H330GB0
	2/ 5/000	±5%(J)	GQM2195C2E330JB12D		GQM2195C1H330JB01D	GQM22M5C2H330JB01
	36pF(360)	±2%(G)	GQM2195C2E360GB12D		GQM2195C1H360GB01D	GQM22M5C2H360GB0
		±5%(J)	GQM2195C2E360JB12D		GQM2195C1H360JB01D	GQM22M5C2H360JB01
	39pF(390)	±2%(G)	GQM2195C2E390GB12D		GQM2195C1H390GB01D	GQM22M5C2H390GB01

The part number code is shown in () and Unit is shown in []. < >: EIA [inch] Code

(Part Number) **GQ M 21 9 5C 2E 6R2 C B12 D**

Product ID 2 Series **5**Temperature Characteristics 8Capacitance Tolerance

3 Dimensions (LxW) 6 Rated Voltage Individual Specification Code

4 Dimension (T) Capacitance Packaging

O 00000 0 9 Ð 8 Packaging Code in Part Number shows STD 180mm Reel Taping.



Temperature Compensating Type C0G(5C) Characteristics

LxW [mm]		2.0x1.25(2	21)<0805>	2.8x2.8(22)<1111>
Rated Volt. [Vdc]	250(2E)	50(1H)	500(2H)
Capacitance	Tolerance			
43pF(430)	±2%(G)	GQM2195C2E430GB12D	GQM2195C1H430GB01D	GQM22M5C2H430GB01L
	±5%(J)	GQM2195C2E430JB12D	GQM2195C1H430JB01D	GQM22M5C2H430JB01L
47pF(470)	±2%(G)	GQM2195C2E470GB12D	GQM2195C1H470GB01D	GQM22M5C2H470GB01L
	±5%(J)	GQM2195C2E470JB12D	GQM2195C1H470JB01D	GQM22M5C2H470JB01L
51pF(510)	±2%(G)	GQM2195C2E510GB12D	GQM2195C1H510GB01D	GQM22M5C2H510GB01L
	±5%(J)	GQM2195C2E510JB12D	GQM2195C1H510JB01D	GQM22M5C2H510JB01L
56pF(560)	±2%(G)	GQM2195C2E560GB12D	GQM2195C1H560GB01D	GQM22M5C2H560GB01L
	±5%(J)	GQM2195C2E560JB12D	GQM2195C1H560JB01D	GQM22M5C2H560JB01L
62pF(620)	±2%(G)	GQM2195C2E620GB12D	GQM2195C1H620GB01D	GQM22M5C2H620GB01L
	±5%(J)	GQM2195C2E620JB12D	GQM2195C1H620JB01D	GQM22M5C2H620JB01L
68pF(680)	±2%(G)	GQM2195C2E680GB12D	GQM2195C1H680GB01D	GQM22M5C2H680GB01L
	±5%(J)	GQM2195C2E680JB12D	GQM2195C1H680JB01D	GQM22M5C2H680JB01L
75pF(750)	±2%(G)	GQM2195C2E750GB12D	GQM2195C1H750GB01D	GQM22M5C2H750GB01L
	±5%(J)	GQM2195C2E750JB12D	GQM2195C1H750JB01D	GQM22M5C2H750JB01L
82pF(820)	±2%(G)	GQM2195C2E820GB12D	GQM2195C1H820GB01D	GQM22M5C2H820GB01L
	±5%(J)	GQM2195C2E820JB12D	GQM2195C1H820JB01D	GQM22M5C2H820JB01L
91pF(910)	±2%(G)	GQM2195C2E910GB12D	GQM2195C1H910GB01D	GQM22M5C2H910GB01L
	±5%(J)	GQM2195C2E910JB12D	GQM2195C1H910JB01D	GQM22M5C2H910JB01L
100pF(101)	±2%(G)	GQM2195C2E101GB12D	GQM2195C1H101GB01D	GQM22M5C2H101GB01L
	±5%(J)	GQM2195C2E101JB12D	GQM2195C1H101JB01D	GQM22M5C2H101JB01L

The part number code is shown in () and Unit is shown in []. $\hfill <>:$ EIA [inch] Code



GQM Series Specifications and Test Methods

0 5		No.	lte	em	Specifications		Test Me	ethod	
For General GRM Series		1	Operating Temperati		55 to 125℃	Reference Tempera	ature: 25℃		
Array GNM Series	2 Rated Voltage				See the previous page.	The rated voltage is defined as the maximum voltage that may be applied continuously to the capacitor. When AC voltage is superimposed on DC voltage, V ^{p,p} or V ^{0,p} whichever is larger, should be maintained within the rated voltage range.			
rray 1 Se		3	Appearar	nce	No defects or abnormalities	Visual inspection			
A NN		4	Dimensio	on	Within the specified dimensions	Using calipers			
0		5 Dielectric Strength No defects or abnormalities				No failure should be is applied between provided the charge *GQM187, GQM	the terminatio e/discharge cu	ns for 1 to 5 se irrent is less th	econds, an 50mA.
Low ESL LL□ Series		6	Insulation	Resistance	More than 10,000MΩ	The insulation resis voltage not exceedi max. and within 2 n charge/discharge c	ing the rated v ninutes of cha	oltage at 25℃ rging, provided	and 75%RH
Ľ Č		7	Capacita	nce	Within the specified tolerance	The capacitance/Q			at the
	Ī				30pF and over: Q≧1400	frequency and volta	age shown in t	he table.	
		8	Q		30pF and below: Q≧800+20C	Frequency		1±0.1MHz	
		Ũ	-		C: Nominal Capacitance (pF)			0.5 to 5Vrm	S
2 ies				Temperature Coefficient	Within the specified tolerance (Table A)	The capacitance ch each specified temp	•	e measured af	ter 5 min. at
High Frequency GQM Series GJM Series		9	Capacitance Temperature Characteristics	Capacitance Drift	Within ±0.2% or ±0.05pF (whichever is larger)	measured in step 3 When cycling the ter the capacitance sho temperature coeffici The capacitance dr between the maxim steps 1, 3 and 5 by Step 1 2 3 4	mperature seq build be within t ient and capaci ift is calculate num and minin the capacitan T Rei	uentially from s the specified to sitance change d by dividing th num measured	lerance for the as in Table A. the differences values in the p 3. the differences values in the p 2.
						5	Re	ference Temp.	±2
Monolithic Microchip GMA Series		10	Adhesive of Termir	Strength nation	No removal of the terminations or other defect should occur.	Solder the capacitor Fig. 1 using a eutect with the test jig for 1 The soldering shoul reflow method and s soldering is uniform	tic solder. There 0±1 sec. d be done eith should be cond and free of de	n apply 10N* fo er with an iron o ducted with care fects such as ho b	rce in parallel or using the e so that the eat shock. *5N (GQM188)
						GQM18 GQM21	1.0	3.0 4.0	<u> </u>
					Solder resist	GQM21 GQM22	2.2	5.0	2.9
ing					Baked electrode or copper foil				(in mm)
Seri							Fig.		
For Bonding GMD Series				Appearance	No defects or abnormalities	Solder the capacito			
G D				Capacitance	Within the specified tolerance	 The capacitor shou 			. ,
		11	Vibration Resistance	on 30pF and over: Q≥1400	•	having a total ampli uniformly between t frequency range, fre be traversed in app	the approxima om 10 to 55Hz	te limits of 10 a z and return to	and 55Hz. The
t Information					C: Nominal Capacitance (pF)	This motion should			



GQM Series Specifications and Test Methods

э.	lte	em	Specifications	Test Method		
		Appearance	No defects or abnormalities.	Solder the capacitor on the test jig (glass epoxy board) shown		
		Capacitance	Within $\pm 5\%$ or ± 0.5 pF	in Fig. 2 using a eutectic solder. Then apply a force in the direction shown in Fig. 3.		
		Change	(whichever is larger)	The soldering should be done by the reflow method and should		
				be conducted with care so that the soldering is uniform and free of defects such as heat shock. $20 \\ 150 $ Pressurizing		
12	Deflectio	n		speed: 1.0mm/sec.		
12	Denection		100 t: 1.6mm	R230		
			Type a b c	Flexure : ≦1		
			GQM18 1.0 3.0 1.2 GQM21 1.2 4.0 1.65	Capacitance meter		
			GQM22 2.2 5.0 2.9			
			(in mm)	Fig. 3		
_			Fig. 2			
13	Solderabi Terminati		75% of the terminations are to be soldered evenly and continuously.	Immerse the capacitor in a solution of ethanol (JIS-K-8101) and rosin (JIS-K-5902) (25% rosin in weight proportion). Preheat at 80 to 120°c for 10 to 30 seconds. After preheating, immerse in eutectic solder solution for 2±0.5 seconds at 230±5°c or Sn-3.0Ag-0.5Cu solder solution for 2±0.5 seconds at 245±5°C.		
			The measured and observed characteristics should satisfy the specifications in the following table.			
		Appearance	No defects or abnormalities.	-		
		Capacitance	Within ±2.5% or ±0.25 pF	-		
	Resistance		(whichever is larger)	Preheat the capacitor at 120 to 150°C for 1 minute. Immerse the		
14	4 to Soldering Heat Q	30pF and over: Q≧1400	capacitor in a eutectic solder or Sn-3.0Ag-0.5Cu solder solution at $270\pm5^{\circ}$ for 10 ± 0.5 seconds. Let sit at room temperature for			
		30pF and below: Q≧800+20C	24±2 hours, then measure.			
			C: Nominal Capacitance (pF)	_		
		I.R.	More than 10,000MΩ	_		
		Dielectric Strength	No defects.			
			The measured and observed characteristics should satisfy the specifications in the following table.			
		Appearance	No defects or abnormalities.	Fix the capacitor to the supporting jig in the same manner and		
		Capacitance	Within ±2.5% or ±0.25pF	under the same conditions as (10). Perform the five cycles according to the four heat treatments		
	Temperature	Change	(whichever is larger)	listed in the following table. Let sit for 24±2 hours at room temperature, then measure.		
15	Cycle		30pF and over: Q≧1400 30pF and below: Q≧800+20C	$\begin{array}{c c c c c c c c c c c c c c c c c c c $		
		Q	C: Nominal Canacitance (nE)	Temp. (°C) Min. Operating Room Max. Operating Room		
		I.R.	C: Nominal Capacitance (pF) More than 10,000MΩ	Temp. (c) Temp. +0/-3 Temp. Temp. +3/-0 Temp. Time (min.) 30±3 2 to 3 30±3 2 to 3		
		Dielectric				
		Strength	No defects.			
			The measured and observed characteristics should satisfy the specifications in the following table.			
		Appearance	No defects or abnormalities.	-		
		Capacitance	Within ±5% or ±0.5pF			
1/	Humidity Change		(whichever is larger)	Set the capacitor at 40±2°C and in 90 to 95% humidity for 500±12 hours.		
16	Steady State	Q	30pF and over: Q≧350 10pF and over, 30pF and below: Q≧275+5C/2 10pF and below: Q≧200+10C	Remove and set for 24±2 hours at room temperature, then measure.		
			C: Nominal Capacitance (pF)			
		I.R.	More than 1,000M Ω	-		
		1.1X.				
				Continued on the following page.		



GQM Series Specifications and Test Methods

Nominal Values

(ppm/℃) *1

0±30

*1: Nominal values denote the temperature coefficient within a range of 25 to 125°C.

Continued from the preceding page.

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Table A

Char.

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No.	Ite	m	Specifications	Test Method		
			The measured and observed characteristics should satisfy the specifications in the following table.			
		Appearance	No defects or abnormalities.			
17 Humidity Load	Humidity	Capacitance Change	Within ±7.5% or ±0.75pF (whichever is larger)	Apply the rated voltage at 40 ± 2 °C and 90 to 95% humidity for 500±12 hours. Remove and let sit for 24±2 hours at room		
	Load	Q	30pF and over: $Q \ge 200$ 30pF and below: $Q \ge 100+10C/3$	temperature then measure. The charge/discharge current is less than 50mA.		
			C: Nominal Capacitance (pF)			
		I.R.	More than 500MΩ			
			The measured and observed characteristics should satisfy the specifications in the following table.			
		Appearance	No defects or abnormalities.			
	High	Capacitance Change	Within $\pm 3\%$ or ± 0.3 pF (whichever is larger)	Apply 200%* of the rated voltage for 1000 \pm 12 hours at the maximum operating temperature \pm 3°C.		
18	Temperature Load	Q	30pF and over: Q≥350 10pF and over, 30pF and below: Q≥275+5C/2 10pF and below: Q≥200+10C C: Nominal Capacitance (pF)	Set for 24±2 hours at room temperature, then measure. The charge/discharge current is less than 50mA. *GQM22: 150% of the rated voltage		
		I.R.	More than 1,000M Ω			
		I.K.				

Capacitance Change from 25℃ (%)

-30℃

Min.

-0.17

Max.

0.40

-10℃

Min.

-0.11

Max.

0.25

Max

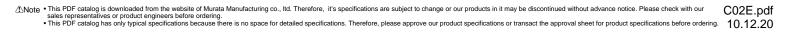
0.58

–55℃

Min.

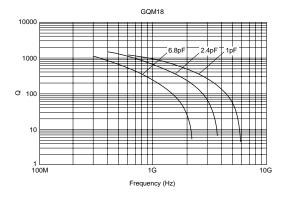
-0.24



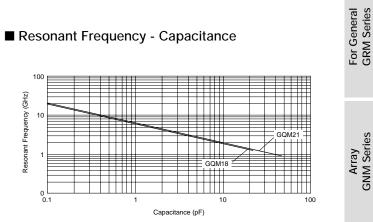


GQM Series Data

Q - Frequency Characteristics



Resonant Frequency - Capacitance



Low ESL LL□ Series



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Chip Monolithic Ceramic Capacitors

muRata

Monolithic Microchip GMA Series

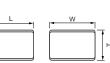
Features

- 1. Better microwave characteristics
- 2. Suitable for by passing
- 3. High density mounting

Applications

- 1. Optical device for telecommunication
- 2. IC, built-in IC packaging
- 3. Measuring equipment





Outer electrode: Au plated

Dort Number		Dimensions (mm)	I
Part Number	L	W	Т
GMA0D3	0.38 ±0.05	0.38 ±0.05	0.3 ±0.05
GMA05X	0.5 ±0.05	0.5 ±0.05	0.35 ±0.05
GMA085	0.8 ±0.05	0.8 ±0.05	0.5 ±0.1

Array GNM Series

For General GRM Series



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Capacitance Table

High Dielectric Constant Type X7R(R7)/X5R(R6) Characteristics

LxW [mm]	0.38x0.38 (0D) <015015>		0.5> (0 <02	<0.5 5) 02>			0.8> (0 <03	<0.8 8) 03>	
Rated Voltage Capacitance [Vdc]	10 (1A)	100 (2A)	25 (1E)	10 (1A)	6.3 (0J)	100 (2A)	25 (1E)	10 (1A)	6.3 (0J)
100pF(101)		Х							
150pF(151)		Х							
220pF(221)		Х							
330pF(331)		Х				1 1 1			
470pF(471)		Х				1 1 1			
680pF(681)		Х							
1000pF(102)		Х							
1500pF(152)			Х			5			
2200pF(222)			Х			5			
3300pF(332)			Х			5			
4700pF(472)			Х			5			
6800pF(682)				Х		5			
10000pF(103)	3			Х		1	5		
15000pF(153)				Х			5		
22000pF(223)				Х		1	5		
33000pF(333)					-	1 1		5	
47000pF(473)								5	
68000pF(683)								5	
0.10μF(104)					Х			5	
0.47µF(474)									5

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

Low ESL LL Series

For General GRM Series



High Dielectric Constant Type X7R(R7)/X5R(R6) Characteristics

LxW [mm]		0.38x0.38(0D)<015015>	
Rated Volt. [Vdc]]	10(1A)	
Capacitance	Tolerance	Part Number	
10000pF(103)	±20%(M)	GMA0D3R71A103MA01T	

For General GRM Series

Array GNM Series

Low ESL LL^[] Series

High-Q GJM Series

High Frequency GQM Series

> Monolithic Microchip GMA Series

LxW [mm]			0.5x0.5(0	5)<0202>					
Rated Volt. [Vdc	.]	100(2A)	25(1E)	10(1A)	6.3(0J)				
Capacitance	Tolerance		Part Number						
100pF(101)	±20%(M)	GMA05XR72A101MA01T							
150pF(151)	±20%(M)	GMA05XR72A151MA01T							
220pF(221)	±20%(M)	GMA05XR72A221MA01T							
330pF(331)	±20%(M)	GMA05XR72A331MA01T							
470pF(471)	±20%(M)	GMA05XR72A471MA01T							
680pF(681)	±20%(M)	GMA05XR72A681MA01T							
1000pF(102)	±20%(M)	GMA05XR72A102MA01T							
1500pF(152)	±20%(M)		GMA05XR71E152MA11T						
2200pF(222)	±20%(M)		GMA05XR71E222MA11T						
3300pF(332)	±20%(M)		GMA05XR71E332MA11T						
4700pF(472)	±20%(M)		GMA05XR71E472MA11T						
6800pF(682)	±20%(M)			GMA05XR71A682MA01T					
10000pF(103)	±20%(M)			GMA05XR71A103MA01T					
15000pF(153)	±20%(M)			GMA05XR71A153MA01T					
22000pF(223)	±20%(M)			GMA05XR71A223MA01T					
33000pF(333)	±20%(M)								
47000pF(473)	±20%(M)								
68000pF(683)	±20%(M)								
0.10μF(104)	±20%(M)				GMA05XR60J104ME12T				

LxW [mm]			0.8x0.8(08)<0303>						
Rated Volt. [Vdc	.]	100(2A)	25(1E)	10(1A)	6.3(0J)				
Capacitance	Tolerance		Part N	lumber					
1500pF(152)	±20%(M)	GMA085R72A152MA01T							
2200pF(222)	±20%(M)	GMA085R72A222MA01T							
3300pF(332)	±20%(M)	GMA085R72A332MA01T							
4700pF(472)	±20%(M)	GMA085R72A472MA01T							
6800pF(682)	±20%(M)	GMA085R72A682MA01T							
10000pF(103)	±20%(M)		GMA085R71E103MA11T						
15000pF(153)	±20%(M)		GMA085R71E153MA11T						
22000pF(223)	±20%(M)		GMA085R71E223MA11T						
33000pF(333)	±20%(M)			GMA085R71A333MA01T					
47000pF(473)	±20%(M)			GMA085R71A473MA01T					
68000pF(683)	±20%(M)			GMA085R71A683MA01T					
0.10μF(104)	±20%(M)			GMA085R71A104MA01T					
0.47µF(474)	±20%(M)				GMA085R60J474ME12T				

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

* Please refer to GMA series Specifications and Test Method (2).

For Bonding GMD Series

(Part Number)	GM A	0D	3 R7	1A	103	М	A01	Т	
	00	8	4 5	6	0	8	9	0	Ì
Packaging Co	de in Parl	Num	per shows	s STE	Tray.				

Product ID
Series
Temperature Characteristics
Capacitance Tolerance

Dimensions (LxW)Rated VoltageIndividual Specification Code



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GMA Series Specifications and Test Methods (1)

When no "*" is added in PNs table, please refer to GMA Series Specifications and Test Methods (1). When "*" is added in PNs table, please refer to GMA Series Specifications and Test Methods (2).

No	li -	m		please refer to GMA Series Specifications and Test Methods (2).				
No.	Ite		Specifications	Test Method				
1	Operating Temperature Range		R7: –55 to +125°C	Reference Temperature: 25°C				
2	Rated Vol	ltage	See the previous pages.	The rated voltage is defined as the maximum voltage that may be applied continuously to the capacitor. When AC voltage is superimposed on DC voltage, V ^{P-P} or V ^{O-P} , whichever is larger, should be maintained within the rated voltage range.				
3	Appearan	ice	No defects or abnormalities	Visual inspection				
4	Dimensio	ns	Within the specified dimensions	Using calipers				
5	Dielectric	Strength	No defects or abnormalities	No failure should be observed when a voltage of 250% of the rated voltage is applied between the both terminations for 1 to 5 seconds, provided the charge/discharge current is less than 50mA.				
6	Insulation F	Resistance	More than 10,000M Ω or 500 Ω F (whichever is smaller)	The insulation resistance should be measured with a DC voltage not exceeding the rated voltage at normal temperature and humidity and within 2 minutes of charging.				
7	Capacitar	nce	Within the specified tolerance	The capacitance/D.F. should be measured at reference				
	Dissipatio	n Factor	R7: W.V.: 25V min.; 0.025 max.	temperature at the frequency and voltage shown in the table.				
8	(D.F.)	ni i actor	W.V.: 16V/10V; 0.035 max.	Frequency 1±0.1kHz Voltage 1±0.2Vrms				
9	Capacitance Temperature Characteristics	No bias	R7: Within +/–15% (–55 to +125°C)	each specified temp. stage. •The ranges of capacitance change compared with the Reference Temperature value over the temperature ranges shown in the table should be within the specified ranges.* $ \hline Step \qquad Temperature (°C) \\ 1 \qquad 25\pm2 \\ 2 \qquad -55\pm3 \\ 3 \qquad 25\pm2 \\ 4 \qquad 125\pm3 \\ *Initial measurement for high dielectric constant type Perform a heat treatment at 150 +0/-10°C for one hour and then let sit for 24\pm2 hours at room temperature. Perform the initial measurement.$				
10	Mechanical	Bond Strength	Pull force: 0.03N min.	MIL-STD-883 Method 2011 Condition D Mount the capacitor on a gold metallized alumina substrate with Au-Sn (80/20) and bond a 25μ m (0.001 inch) gold wire to the capacitor terminal using an ultrasonic ball bond. Then, pull wire.				
	Strength	Strength Die Shear Strength Die Shear force: 2N min.		MIL-STD-883 Method 2019 Mount the capacitor on a gold metallized alumina substrate with Au-Sn (80/20). Apply the force parallel to the substrate.				
		Appearance	No defects or abnormalities	Ramp frequency from 10 to 55Hz then return to 10Hz all within				
11	Vibration	Capacitance	Within the specified tolerance	1 minute. Amplitude: 1.5 mm (0.06 inch) max. total excursion.				
	Resistance	D.F.	R7: W.V.: 25V min.; 0.025 max. W.V.: 16V/10V; 0.035 max.	Apply this motion for a period of 2 hours in each of 3 mutually perpendicular directions (total 6 hours).				
		Appearance	No defects or abnormalities	The capacitor should be set for 24 ± 2 hours at room				
	Temperature	Capacitance Change	R7: Within ±7.5%	temperature after one hour of heat treatment at 150+0/–10°C, then measure for the initial measurement. Fix the capacitor to the supporting jig in the same manner and under the same				
12		D.F.	R7: W.V.: 25V min.; 0.025 max. W.V.: 16V/10V; 0.035 max.	conditions as (11) and conduct the five cycles according to the temperatures and time shown in the following table. Set it for				
	Cycle	I.R.	More than 10,000M Ω or 500 Ω F (whichever is smaller)	24±2 hours at room temperature, then measure. Step 1 2 3 4 Tampe (%C) Min. Operating Room Max. Operating Room				
		Dielectric Strength	No defects	$\frac{\text{Temp. (°C)}}{\text{Time (min.)}} \xrightarrow[\text{Nin. Operating}] \text{Room} \xrightarrow[\text{Nin. Operating}] \text{Room} \xrightarrow[\text{Nin. Operating}] \text{Room} \xrightarrow[\text{Nin. Operating}] \text{Room} \xrightarrow[\text{Temp. +3/-0}] \xrightarrow[\text{Temp. +3/-0]} \xrightarrow[T$				

Mounting for testing: The capacitors should be mounted on the substrate as shown below using die bonding and wire bonding when tests No. 11 to 15 are performed.

Continued on the following page. $\boxed{\circlel{A}}$

For General GRM Series

Array GNM Series

Low ESL LL□ Series

High-Q GJM Series

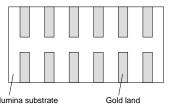
For Bonding GMD Series

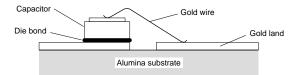


GMA Series Specifications and Test Methods (1)

7	Continued fr	om the prece		ease refer to GMA Series Specifications and Test Methods (1 ease refer to GMA Series Specifications and Test Methods (2			
No.	lo. Item		Specifications	Test Method			
		Appearance	No defects or abnormalities				
13	Humidity	Capacitance Change	R7: Within ±12.5%	Set the capacitor for 500±12 hours at 40±2°C, in 90 to 95% humidity.			
13	(Steady State)	D.F.	R7: W.V.: 10V min.; 0.05 max.	Take it out and set it for 24±2 hours at room temperature, ther measure.			
		I.R.	More than 1,000M Ω or 50 Ω F (whichever is smaller)				
		Appearance	No defects or abnormalities				
14	Humidity	Capacitance Change	R7: Within ±12.5%	Apply the rated voltage for 500 ± 12 hours at $40\pm2^{\circ}$ C, in 90 to			
14	Load	D.F.	R7: W.V.: 10V min.; 0.05 max.	 95% humidity and set it for 24±2 hours at room temperature, then measure. The charge/discharge current is less than 50m 			
		I.R.	More than $500M\Omega$ or $25\Omega F$ (whichever is smaller)				
		Appearance	No defects or abnormalities	A voltage treatment should be given to the capacitor, in which			
	High	Capacitance Change	R7: Within ±12.5%	DC voltage of 200% the rated voltage is applied for one hour a the maximum operating temperature; ±3°C then it should be s for 24±2 hours at room temperature and the initial measureme			
15	Temperature	D.F.	R7: W.V.: 10V min.; 0.05 max.	should be conducted.			
	Load	I.R.	More than 1,000M Ω or 50 Ω F (whichever is smaller)	Then apply the above mentioned voltage continuously for 1000±12 hours at the same temperature, remove it from the bath, and set it for 24±2 hours at room temperature, then measure. The charge/discharge current is less than 50mA.			

Mounting for testing: The capacitors should be mounted on the substrate as shown below using die bonding and wire bonding when tests No. 11 to 15 are performed.





Alumina substrate

For General GRM Series

Array GNM Series

Low ESL LL□ Series

High-Q GJM Series



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GMA Series Specifications and Test Methods (2)

When no "*" is added in PNs table, please refer to GMA Series Specifications and Test Methods (1). When "*" is added in PNs table, please refer to GMA Series Specifications and Test Methods (2).

lo.	Ite	m	Specifications	Test Method		
1 T	Operating Temperature Range		R6 :55°C to 85°C	Reference Temperature : 25°C		
2 R	Rated Vol	tage	See the previous pages.	The rated voltage is defined as the maximum voltage that may be applied continuously to the capacitor. When AC voltage is superimposed on DC voltage, V ^{P,P} or V ^{O,P} , whichever is larger, should be maintained within the rated volt- age range.		
3 A	Appearan	се	No defects or abnormalities.	Visual inspection.		
4 D	Dimensio	ns	Within the specified dimensions.	Using calipers.		
5 D	Dielectric	Strength	No defects or abnormalities.	No failure should be observed when 250% of the rated voltage is applied between the terminations for 1 to 5 seconds, provid- ed the charge/discharge current is less than 50mA.		
6	nsulation Resistanc		More than $50\Omega \cdot F$	The insulation resistance should be measured with a DC voltage not exceeding the rated voltage at normal temperature and humidity and within 1 minutes of charging.		
7 C	Capacitar	nce	Within the specified tolerance.	The capacitance/D.F. should be measured at reference		
XI	Dissipatio Factor (D.		R6 : 0.1 max.	temperature at the frequency and voltage shown in the table. Capacitance Frequency Voltage C≦10µF (6.3Vmax.) 1±0.1kHz 0.5±0.1Vrms		
9 Te	apacitance emperature haracteristics	No bias	R6 : Within ±15% (–55°C to +85°C)	each specified temp. stage. The ranges of capacitance change compared with the Reference Temperature value over the temperature ranges shown in the table should be within the specified ranges.* $ \hline Step \ Temperature (°C) \ 1 \ 25\pm2 \ 2 \ -55\pm3 \ 3 \ 25\pm2 \ 4 \ 85\pm3 \ 125\pm2 \ 4 \ 85\pm3 \ 125\pm2 \ 4 \ 85\pm3 \ 1155\pm2 \ 125\pm2 \ 125$		
0	lechanical	Bond Strength	Pull force : 0.03N min.	MIL-STD-883 Method 2011 Condition D Mount the capacitor on a gold metallized alumina substrate w Au-Sn (80/20) and bond a 25μm (0.001 inch) gold wire to the capacitor terminal using an ultrasonic ball bond. Then, pull wire		
51	trength -	th Die Shear Strength Die Shear force : 2N min.		MIL-STD-883 Method 2019 Mount the capacitor on a gold metallized alumina substrate with Au-Sn (80/20). Apply the force parallel to the substrate.		
		Appearance	No defects or abnormalities.			
Vi	ibration	Capacitance	Within the specified tolerance.	Ramp frequency from 10 to 55Hz then return to 10Hz all within 1 minute. Amplitude: 1.5 mm (0.06 inch) max. total excursion.		
1 R	Resistance	D.F.	R6 : 0.1 max.	Apply this motion for a period of 2 hours in each of 3 mutually perpendicular directions (total 6 hours).		
		Appearance	No defects or abnormalities.	The capacitor should be set for 24±2 hours at room		
	Tomporatura	Capacitance Change	R6 : Within ±7.5%	temperature after one hour of heat treatment at 150+0/–10°C, then measure for the initial measurement. Fix the capacitor to the supporting jig in the same manner and under the same		
Te		D.F.	R6 : 0.1 max.	conditions as (11) and conduct the five cycles according to the		
	emperature - udden	I.R.	More than $50\Omega \cdot F$	temperatures and time shown in the following table. Set it for 48±4 hours at room temperature, then measure.		
Cł	Change		Dielectric Strength	No defects	Step 1 2 3 4 Temp. (°C) Operating Temp.+0/-3 Room Temp. Max. Operating Temp10/-3 Room Temp10/-3 Time (min.) 30±3 2 to 3 30±3 2 to 3	

Mounting for testing: The capacitors should be mounted on the substrate as shown below using die bonding and wire bonding when tests No. 11 to 14 are performed.

Continued on the following page.

For General GRM Series

Array GNM Series

Low ESL LL□ Series

High-Q GJM Series

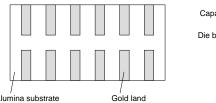


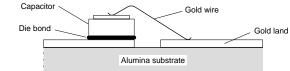


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GMA Series Specifications and Test Methods (2)

eries		Continued fr	om the prec		When no "*" is added in PNs table, please refer to GMA Series Specifications and Test Methods (1). 9 ^{e.} When "*" is added in PNs table, please refer to GMA Series Specifications and Test Methods (2).				
For General GRM Series	No	lte	em	Specifications	Test Method				
GR			Appearance	No defects or abnormalities.	Apply the rated voltage for 500±12 hours at 40±2°C, in 90 to				
			Capacitance Change	R6 : Within ±12.5%	95% humidity and set it for 24±2 hours at room temperature, then measure. The charge/discharge current is less than 50mA.				
		High	D.F.	R6 : 0.2 max.					
GNM Series	13 Temperature High Humidity (Steady) I.R. More than 12.5Ω · F • Initial measurement Perform a heat treatment let sit for 24±2 hours a measurement. • More than 12.5Ω · F • Measurement after te Perform a heat treatment		Perform a heat treatment at $150+0/-10^{\circ}$ C for one hour and there let sit for 24 ± 2 hours at room temperature. Perform the initial						
			Appearance	No defects or abnormalities.	Apply 150% of the rated voltage for 1000±12 hours at the				
. s			Capacitance Change	R6 : Within ±12.5%	 maximum operating temperature ±3°C. Let sit for 24±2 hours at room temperature, then measure. The charge/ discharge current is less than 50mA. 				
erie			D.F.	R6 : 0.2 max.					
		More than $25\Omega \cdot F$	 Initial measurement Perform a heat treatment at 150+0/–10°C for one hour and there let sit for 24±2 hours at room temperature. Perform the initial measurement. Measurement after test Perform a heat treatment at 150+0/–10°C for one hour and there 						
					let sit for 24±2 hours at room temperature, then measure.				
GJM Series	Mo	ounting for te	sting: The c	apacitors should be mounted on the substrate as shown below using	die bonding and wire bonding when tests No. 11 to 14 are performed.				





Alumina substrate

High Frequency GOM Series



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Chip Monolithic Ceramic Capacitors



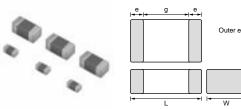
for Bonding GMD Series

Features

- 1. Small chip size (LxWxT: 0.6x0.3x0.3, 1.0x0.5x0.5mm)
- 2. Available for Wire/Die bonding due to Gold termination.
- 3. Suitable for Optical device for telecommunication, built-in IC packaging.

Applications

- 1. Optical device for telecommunication
- 2. IC, built-in IC packaging



Outer electrode: Au

Part Number		Dim	nensions (n	nm)	
Fait Number	Ĺ	W	Т	e	g min.
GMD033	0.6±0.03	0.3±0.03	0.3±0.03	0.12 to 0.22	0.16
GMD155	1.0±0.05	0.5±0.05	0.5±0.05	0.15 to 0.35	0.3
GIVIDT55	1.0±0.05	0.5±0.05	0.5±0.05	0.15 (0 0.35	0.3

Array GNM Series

For General GRM Series



Capacitance Table

High Dielectric Constant Type X7R(R7)/X5R(R6) Characteristics

3 ex.3: T Dimension [mm]

GRI	3 ex.3: T t	Dimension (mm	0.6x0.3			1.0x0.5		0.6x0.3	1.0x0.5
	[mm]		(03) <0201>			(15) <0402>		(03) <0201>	(15) <0402>
	Rated Voltage	25	16	10	50	25	16	6.3	10
	Capacitance [Vdc]	(1E)	(1C)	(1A)	(1H)	(1E)	(1 C)	(0J)	(1A)
ries	100pF(101)	3							
Sel	120pF(121)	3			1 1 1			1 1 1	
GNM Series	150pF(151)	3						1	
G	180pF(181)	3							
	220pF(221)	3			5	_			
	270pF(271)	3			5	_		1 1 1	
	330pF(331)	3			5	_		1 1 1	
es	390pF(391)	3			5	_		1	
LL Series	470pF(471)	3			5	_			
	560pF(561)	3			5	_		 	
1	680pF(681)	3			5	_		1 1 1	
	820pF(821)	3			5			 	
	1000pF(102)	3			5	-			
	1200pF(122)	3			5	-		, , ,	
S	1500pF(152)	3		1	5	-		1 1 1	
erie	1800pF(182)		3		5	-		1 1 1	
GJM Series	2200pF(222)		3		5			1	
GJI	2700pF(272)		3		5			1 1 1	
	3300pF(332)		3		5			 	
	3900pF(392)			3	5	-		1 1 1	
	4700pF(472)			3	5				
·	5600pF(562)			3	-	5			
erie	6800pF(682)			3		5		 	
1 Se	8200pF(822)			3		5		 	
GOM Series	10000pF(103)			3		5			
0	12000pF(123)				1	5		1	
	15000pF(153)					5			
	18000pF(183)				1 1 1	5		1 1 1	
	22000pF(223)				1	5		1 1 1	
ries	27000pF(273)				1	5			
Se	33000pF(333) 39000pF(393)					5		1 1	
GMA Series	47000pF(473)				1 1 1	5		1 1 1	
G	56000pF(563)					5	5	3	
	68000pF(683)						5	3	
	82000pF(823)				 		5	3	
	0.10μF(104)						5	3	
ies	0.12μF(124)								5
Ser	0.15μF(154)							1	5
GMD Series	0.18μF(184)							1 1	5
G	0.22μF(224)							I I	5
	0.27μF(274)				1 1 1			1 1 1	5
	0.33μF(334)							1 1 1	5
	0.39μF(394)								5
	0.47μF(474)								5
	The part number code is s	have in () an		in [1]	: =IA [inch] Code			I	

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

Array



LxW [mm]			0.6x0.3(03)<0201>	
Rated Volt. [Vdc	.]	25(1E)	16(1C)	10(1A)
Capacitance	Tolerance		Part Number	
100pF(101)	±10%(K)	GMD033R71E101KA01D		
120pF(121)	±10%(K)	GMD033R71E121KA01D		
150pF(151)	±10%(K)	GMD033R71E151KA01D		
180pF(181)	±10%(K)	GMD033R71E181KA01D		
220pF(221)	±10%(K)	GMD033R71E221KA01D		
270pF(271)	±10%(K)	GMD033R71E271KA01D		
330pF(331)	±10%(K)	GMD033R71E331KA01D		
390pF(391)	±10%(K)	GMD033R71E391KA01D		
470pF(471)	±10%(K)	GMD033R71E471KA01D		
560pF(561)	±10%(K)	GMD033R71E561KA01D		
680pF(681)	±10%(K)	GMD033R71E681KA01D		
820pF(821)	±10%(K)	GMD033R71E821KA01D		
1000pF(102)	±10%(K)	GMD033R71E102KA01D		
1200pF(122)	±10%(K)	GMD033R71E122KA01D		
1500pF(152)	±10%(K)	GMD033R71E152KA01D		
1800pF(182)	±10%(K)		GMD033R71C182KA11D	
2200pF(222)	±10%(K)		GMD033R71C222KA11D	
2700pF(272)	±10%(K)		GMD033R71C272KA11D	
3300pF(332)	±10%(K)		GMD033R71C332KA11D	
3900pF(392)	±10%(K)			GMD033R71A392KA01D
4700pF(472)	±10%(K)			GMD033R71A472KA01D
5600pF(562)	±10%(K)			GMD033R71A562KA01D
6800pF(682)	±10%(K)			GMD033R71A682KA01D
8200pF(822)	±10%(K)			GMD033R71A822KA01D
10000pF(103)	±10%(K)			GMD033R71A103KA01D

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

Packaging Code in Part Number shows STD 180mm Reel Taping.

Product ID
Series
Temperature Characteristics
Capacitance Tolerance

Dimensions (LxW)Rated VoltageIndividual Specification Code

Dimension (T)CapacitancePackaging

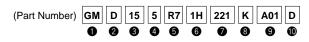
Array GNM Series

Product Information



High Dielectric Constant Type X7R(R7) Characteristics

Se	LxW [mm]		1.0x0.5(15)<0402>						
For General GRM Series	Rated Volt. [Vdc]]	50(1H)	25(1E)	16(1C)				
щО	Capacitance	Tolerance		Part Number					
	220pF(221)	±10%(K)	GMD155R71H221KA01D						
	270pF(271)	±10%(K)	GMD155R71H271KA01D						
	330pF(331)	±10%(K)	GMD155R71H331KA01D						
ies	390pF(391)	±10%(K)	GMD155R71H391KA01D						
Array M Ser	470pF(471)	±10%(K)	GMD155R71H471KA01D						
Array GNM Series	560pF(561)	±10%(K)	GMD155R71H561KA01D						
G	680pF(681)	±10%(K)	GMD155R71H681KA01D						
	820pF(821)	±10%(K)	GMD155R71H821KA01D						
	1000pF(102)	±10%(K)	GMD155R71H102KA01D						
	1200pF(122)	±10%(K)	GMD155R71H122KA01D						
S	1500pF(152)	±10%(K)	GMD155R71H152KA01D						
Low ESL LL Series	1800pF(182)	±10%(K)	GMD155R71H182KA01D						
S □	2200pF(222)	±10%(K)	GMD155R71H222KA01D						
	2700pF(272)	±10%(K)	GMD155R71H272KA01D						
	3300pF(332)	±10%(K)	GMD155R71H332KA01D						
	3900pF(392)	±10%(K)	GMD155R71H392KA01D						
	4700pF(472)	±10%(K)	GMD155R71H472KA01D						
s	5600pF(562)	±10%(K)		GMD155R71E562KA01D					
erie.	6800pF(682)	±10%(K)		GMD155R71E682KA01D					
igh. /I Se	8200pF(822)	±10%(K)		GMD155R71E822KA01D					
High-Q GJM Series	10000pF(103)	±10%(K)		GMD155R71E103KA01D					
-	12000pF(123)	±10%(K)		GMD155R71E123KA01D					
	15000pF(153)	±10%(K)		GMD155R71E153KA01D					
	18000pF(183)	±10%(K)		GMD155R71E183KA01D					
2	22000pF(223)	±10%(K)		GMD155R71E223KA01D					
ries	27000pF(273)	±10%(K)		GMD155R71E273KA11D					
High Frequency GOM Series	33000pF(333)	±10%(K)		GMD155R71E333KA11D					
h Fi OM	39000pF(393)	±10%(K)		GMD155R71E393KA11D					
Hig	47000pF(473)	±10%(K)		GMD155R71E473KA11D					
	56000pF(563)	±10%(K)			GMD155R71C563KA11D				
	68000pF(683)	±10%(K)			GMD155R71C683KA11D				
chip	82000pF(823)	±10%(K)			GMD155R71C823KA11D				
es	0.10μF(104)	±10%(K)			GMD155R71C104KA11D				
Monolithic Microchip GMA Series	The part number of	ode is shown in () and Unit is shown in []. <>: E	IA [inch] Code					



Packaging Code in Part Number shows STD 180mm Reel Taping.

Product ID 2 Series **5**Temperature Characteristics 8Capacitance Tolerance

3 Dimensions (LxW) 6 Rated Voltage Individual Specification Code

4 Dimension (T) Capacitance Packaging



High Dielectric Constant Type X5R(R6) Characteristics

LxW [mm]		0.6x0.3(03)<0201>	1.0x0.5(15)<0402>
Rated Volt. [Vdc]	6.3(0J)	10(1A)
Capacitance	Tolerance	Part N	umber
56000pF(563)	±10%(K)	GMD033R60J563KE11D*	
68000pF(683)	±10%(K)	GMD033R60J683KE11D*	
82000pF(823)	±10%(K)	GMD033R60J823KE11D*	
0.10μF(104)	±10%(K)	GMD033R60J104KE11D*	
0.12μF(124)	±10%(K)		GMD155R61A124KE12D*
0.15μF(154)	±10%(K)		GMD155R61A154KE12D*
0.18μF(184)	±10%(K)		GMD155R61A184KE12D*
0.22μF(224)	±10%(K)		GMD155R61A224KE12D*
0.27μF(274)	±10%(K)		GMD155R61A274KE11D*
0.33µF(334)	±10%(K)		GMD155R61A334KE11D*
0.39µF(394)	±10%(K)		GMD155R61A394KE11D*
0.47µF(474)	±10%(K)		GMD155R61A474KE11D*

The part number code is shown in () and Unit is shown in []. <>: EIA [inch] Code

* Please refer to GMD series Specifications and Test Method (2).

For General GRM Series



GMD Series Specifications and Test Methods (1)

						table, please refer to GMD Series Specifications and Test Methods (1)				
GRM Series						table, please refer to GMD Series Specifications and Test Methods (2)				
N N N	N	0.	lte	m	Specifications	Test Method				
GF	1	1	Operating Temperat Range	,	R7 : –55°C to 125°C	Reference Temperature : 25°C				
GNM Series	2	2	Rated Voltage		See the previous pages.	The rated voltage is defined as the maximum voltage that may be applied continuously to the capacitor. When AC voltage is superimposed on DC voltage, V ^{p.p} or V ^{O.p} , whichever is larger, should be maintained within the rated volt- age range.				
Σ	З	3	Appearan	ice	No defects or abnormalities.	Visual inspection.				
G	4	4	Dimensio	ns	Within the specified dimensions.	Using calipers.				
	5	5	Dielectric	Strength	No defects or abnormality.	No failure should be observed when 250% of the rated voltage is applied between the terminations for 1 to 5 seconds, provid- ed the charge/discharge current is less than 50mA.				
LL Series	e	5	Insulation Resistanc		More than 10,000M Ω or 500 $\Omega \cdot F$ (whichever is smaller)	The insulation resistance should be measured with a DC voltage not exceeding the rated voltage at normal temperature and humidity and within 2 minutes of charging.				
L S	7	7	Capacitar	nce	Within the specified tolerance.	The capacitance/D.F. should be measured at reference temperature at the frequency and voltage shown in the table.				
	ε	в	Dissipatio Factor (D		R7 : W.V. 25Vmin. : 0.025 max. W.V. 16/10V : 0.035 max.	Frequency1±0.1kHzVoltage1±0.2Vrms				
GJM Series	Series				The capacitance change should be measured after 5 min. at each specified temp. stage. The ranges of capacitance change compared with the Reference Temperature value over the temperature ranges shown in the table should be within the specified ranges.*					
GJN	9		9	9	9	9 '	Capacitance Temperature Characteristics	No bias	R7 : Within ±15% (–55°C to +125°C)	Step Temperature (°C) 1 25±2 2 -55±3 3 25±2 4 125±3
GQM Series						*Initial measurement for high dielectric constant type Perform a heat treatment at 150 +0/–10°C for one hour and then let sit for 24±2 hours at room temperature. Perform the initial measurement.				
CO	1	0	Mechanical	Bond Strength	Pull force : 0.03N min.	MIL-STD-883 Method 2011 Condition D Mount the capacitor on a gold metallized alumina substrate wi Au-Sn (80/20) and bond a 25mm (0.001 inch) gold wire to the capacitor terminal using an ultrasonic ball bond. Then, pull wir				
ies			Strength	Die Shear Strength	Die Shear force : 2N min.	MIL-STD-883 Method 2019 Mount the capacitor on a gold metallized alumina substrate with Au-Sn (80/20). Apply the force parallel to the substrate.				
GMA Series				Appearance	No defects or abnormalities.					
IMA	11 Vibration Resistar		Vibration	Capacitance	Within the specified tolerance.	Ramp frequency from 10 to 55Hz then return to 10Hz all within 1 minute. Amplitude: 1.5 mm (0.06 inch) max. total excursion.				
0			Resistance	D.F.	R7 : W.V. 25Vmin. : 0.025 max. W.V. 16/10V : 0.035 max.	Apply this motion for a period of 2 hours in each of 3 mutually perpendicular directions (total 6 hours).				
				Appearance	No defects or abnormalities.	The capacitor should be set for 24±2 hours at room				
ries				Capacitance Change	R7 : Within ±7.5%	temperature after one hour of heat treatment at 150+0/-10°C, then measure for the initial measurement. Fix the capacitor to the supporting jig in the same manner and under the same				
GMD Series	1	2	Temperature Cycle	D.F.	R7 : W.V. 25Vmin. : 0.025 max. W.V. 16/10V : 0.035 max.	conditions as (11) and conduct the five cycles according to the temperatures and time shown in the following table. Set it for 24±2 hours at room temperature, then measure.				
			5,0.0	I.R.	More than 10,000M Ω or 500 $\Omega \cdot F$ (whichever is smaller)	Step 1 2 3 4 Min. Min. Room Max. Room				
				Dielectric		Temp. (°C) Operating Temp. +0/-3 Temp. Departing Temp. +3/-0				

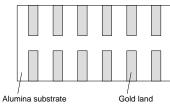
Mounting for testing: The capacitors should be mounted on the substrate as shown below using die bonding. when tests No. 11 to 15 are performed.

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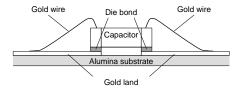


GMD Series Specifications and Test Methods (1)								
) 	Continued from the preceding page. When no "*" is added in PNs table, please refer to GMD Series Specifications and Test Methods (1). When "*" is added in PNs table, please refer to GMD Series Specifications and Test Methods (2).							
No.	Ite	m	Specifications	Test Method				
		Appearance	No defects or abnormalities.					
		Capacitance Change	R7 : Within ±12.5%	Set the capacitor for 500±12 hours at 40±2°C, in 90 to 95%				
13	Humidity (Steady State)	D.F.	R7: W.V. 25Vmin.:0.05 max. W.V. 16/10V:0.05 max.	humidity. Take it out and set it for 24±2 hours at room temperature, then measure.				
		I.R.	More than 1,000M Ω or 50 $\Omega \cdot F$ (whichever is smaller)					
		Appearance	No defects or abnormalities.					
		Capacitance Change	R7 : Within ±12.5%	Apply the rated voltage for 500±12 hours at 40±2°C, in 90 to				
14	Humidity Load	D.F.	R7 : W.V. 25Vmin. : 0.05 max. W.V. 16/10V : 0.05 max.	95% humidity and set it for 24 ± 2 hours at room temperature, then measure. The charge/discharge current is less than 50mA.				
	-	I.R.	More than 500M Ω or 25 $\Omega \cdot F$ (whichever is smaller)					
		Appearance	No defects or abnormalities.	A voltage treatment should be given to the capacitor, in which a				
		Capacitance Change	R7 : Within ±12.5%	DC voltage of 200% the rated voltage is applied for one hour at the maximum operating temperature; ±3°C then it should be set for 24±2 hours at room temperature and the initial measurement				
15	High Temperature Load	D.F.	R7 : W.V. 25Vmin. : 0.05 max. W.V. 16/10V : 0.05 max.	 Tor 24±2 hours at room temperature and the initial measurement should be conducted. Then apply the above-mentioned voltage continuously for 1000±12 hours at the same temperature, remove it from the 				
	-	I.R.	More than 1,000M Ω or 50 $\Omega \cdot F$ (whichever is smaller)	bath, and set it for 24±2 hours at room temperature, then measure. The charge/discharge current is less than 50mA.				

Mounting for testing: The capacitors should be mounted on the substrate as shown below using die bonding. when tests No. 11 to 15 are performed.









GMD Series Specifications and Test Methods (2) When no "*" is added in PNs table, please refer to GMD Series Specifications and Test Methods (1). For General GRM Series When "*" is added in PNs table, please refer to GMD Series Specifications and Test Methods (2). No Item Test Method Specifications Operating 1 R6 : -55°C to 85°C Temperature Reference Temperature : 25°C Range The rated voltage is defined as the maximum voltage that may be applied continuously to the capacitor. 2 Rated Voltage When AC voltage is superimposed on DC voltage, VP-P or VO-P, See the previous pages. Array GNM Series whichever is larger, should be maintained within the rated voltage range. 3 Appearance No defects or abnormalities. Visual inspection. 4 Dimensions Within the specified dimensions. Using calipers. No failure should be observed when 250% of the rated voltage 5 **Dielectric Strength** No defects or abnormalities. is applied between the terminations for 1 to 5 seconds, provided the charge/discharge current is less than 50mA. The insulation resistance should be measured with a DC Insulation More than $50\Omega \cdot F$ voltage not exceeding the rated voltage at normal temperature 6 Resistance Low ESL and humidity and within 1 minutes of charging. 7 Within the specified tolerance. The capacitance/D.F. should be measured at reference Capacitance temperature at the frequency and voltage shown in the table. Capacitance Frequency Voltage Dissipation C≦10µF (10Vmin.)*1 1±0.1kHz 1.0±0.2Vrms 8 R6:0.1 max. Factor (D.F.) C≦10µF (6.3Vmax.) 1±0.1kHz 0.5±0.1Vrms *1 GMD155 R6 1A 124 to 224 are applied to 0.5±0.1 Vrms. The capacitance change should be measured after 5 min. at High-O each specified temp. stage. The ranges of capacitance change compared with the Reference Temperature value over the temperature ranges shown in the table should be within the specified ranges." Temperature (°C) Capacitance Step 9 Temperature No bias R6 : Within ±15% (-55°C to +85°C) 1 25±2 2 -55±3 Characteristics 3 25±2 High Frequency GOM Series 4 85 + 3*Initial measurement for high dielectric constant type Perform a heat treatment at 150 +0/-10°C for one hour and then let sit for 24±2 hours at room temperature. Perform the initial measurement. MIL-STD-883 Method 2011 Condition D Bond Mount the capacitor on a gold metallized alumina substrate with Pull force : 0.03N min. Monolithic Microchip Strength Au-Sn (80/20) and bond a 25µm (0.001 inch) gold wire to the Mechanical capacitor terminal using an ultrasonic ball bond. Then, pull wire. 10 Strength **GMA Series** MIL-STD-883 Method 2019 Die Shear Die Shear force : 2N min. Mount the capacitor on a gold metallized alumina substrate Strength with Au-Sn (80/20). Apply the force parallel to the substrate. No defects or abnormalities. Appearance Ramp frequency from 10 to 55Hz then return to 10Hz all within Capacitance Within the specified tolerance. Vibration 1 minute. Amplitude: 1.5 mm (0.06 inch) max. total excursion. 11 Resistance Apply this motion for a period of 2 hours in each of 3 mutually D.F. R6:0.1 max. perpendicular directions (total 6 hours). For Bonding Appearance No defects or abnormalities. The capacitor should be set for 24±2 hours at room temperature after one hour of heat treatment at 150+0/-10°C, Capacitance R6 : Within ±7.5% then measure for the initial measurement. Fix the capacitor to Change the supporting jig in the same manner and under the same D.F R6:0.1 max. conditions as (11) and conduct the five cycles according to the Temperature temperatures and time shown in the following table. Set it for I.R. More than 50Q · F 12 Sudden 24±2 hours at room temperature, then measure. Change Step 3 4 2 Min. Max. Dielectric Room Room No defects Operating Operating Temp. (°C) Strength Temp. Temp. Temp.+0/-3 Temp. +3/-0 Time (min.) 30 + 32 to 3 30 + 32 to 3

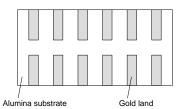
Mounting for testing: The capacitors should be mounted on the substrate as shown below using die bonding. when tests No. 11 to 14 are performed.

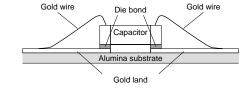
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Continued	from the prece	eding page. When "*" is added in F	PNs table, please refer to GMD Series Specifications and Test Methods (2).	nera erie
o.	tem	Specifications	Test Method	For General GRM Series
	Appearance	No defects or abnormalities.	Apply the rated voltage for 500±12 hours at 40±2°C, in 90 to	For
	Capacitance Change	R6 : Within ±12.5%	95% humidity and set it for 24±2 hours at room temperature, then measure. The charge/discharge current is less than 50mA.	
High	D.F.	R6 : 0.2 max.		
Temperature 13 High Humidity (Steady)	I.R.	More than $12.5\Omega \cdot F$	 Initial measurement Perform a heat treatment at 150+0/–10°C for one hour and then let sit for 24±2 hours at room temperature. Perform the initial measurement. Measurement after test Perform a heat treatment at 150+0/–10°C for one hour and then let sit for 24±2 hours at room temperature, then measure. 	Array GNM Series
	Appearance	No defects or abnormalities.	Apply 150%* ² of the rated voltage for 1000 \pm 12 hours at the	
	Capacitance Change	R6 : Within ±12.5%	maximum operating temperature ±3°C. Let sit for 24±2 hours at room temperature, then measure. The charge/ discharge current is less than 50mA.	
	D.F.	R6 : 0.2 max.		ESL
4 Durability	Durability I.R. More than 25Ω · F	 *2 GMD155 R6 1A 274 to 474 are applied to 120%. • Initial measurement Perform a heat treatment at 150+0/–10°C for one hour and then let sit for 24±2 hours at room temperature. Perform the initial measurement. 	Low ESL	
			 Measurement after test Perform a heat treatment at 150+0/–10°C for one hour and then let sit for 24±2 hours at room temperature, then measure. 	High-Q GJM Series





High Frequency GOM Series

muRata

Package

For General GRM Series

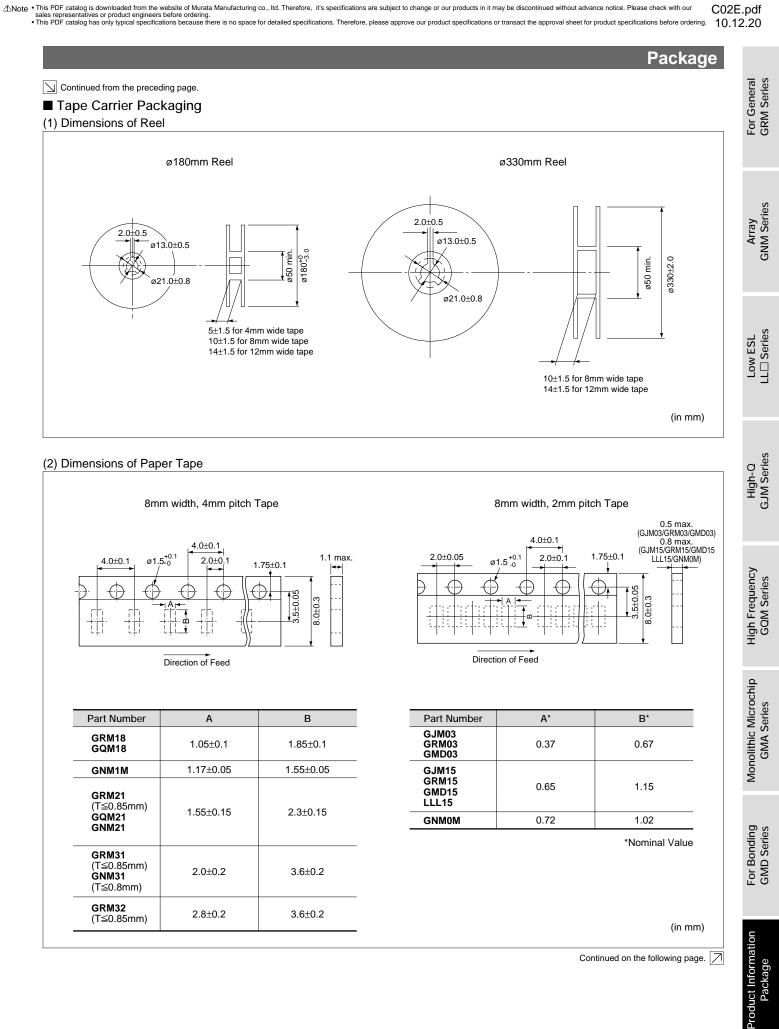
■ Minimum Quantity Guide

GRM S	Part Number		Dimensions (mm)					ty (pcs.)			
- 0					. ,	ø180mm Reel		ø330mm Reel		Bulk Case	Bulk Bag
			L	W	Т	Paper Tape	Embossed Tape	Paper Tape	Embossed Tape		
	Packaging	g Code				D	L	J	к	С	Bulk : B
Array GNM Series		ODMOO	0.4	0.0	0.0		40,000,1)				Tray : T
		GRM02	0.4	0.2	0.2	-	40,000 1)	-	-	-	1,000
		GRM03	0.6	0.3	0.3	15,000	-	50,000	-	-	1,000
Sei		GRM15	1.0	0.5	0.25/0.3	10,000	-	50,000	-	-	1,000
Σ					0.5	10,000	-	50,000	-	50,000 ²⁾	1,000
ß		GRM18	1.6	0.8	0.5	4,000	-	10,000	-	-	1,000
-					0.8	4,000	+	10,000		15,000 ²⁾	1,000
		GRM21	2.0	1.25	0.6 0.85	4,000 4,000	-	10,000	-	10,000	1,000
		GRIVIZI	2.0	1.25	1.0/1.25	4,000	3,000	10,000	-	- 5,000 ²⁾	1,000
						- 1 000	3,000	- 10.000	10,000	5,000 -/	
		CDM24	2.2	1.6	0.6/0.85 1.15	4,000	-	10,000	-	-	1,000
ies		GRM31	3.2	1.6		-	3,000	-	10,000		1,000
Ser	For General Purpose				1.6 0.85	- 1 000	2,000	- 10,000	6,000	-	1,000
	i uipose				1.15	4,000	3,000	-	10,000	-	1,000 1,000
LL Series		GRM32	3.2	2.5	1.15	-	2,000	-		-	
		GRIVIJZ	3.Z	2.5	1.35	-	2,000	-	8,000 6,000	-	1,000
					1.6 1.8/2.0 2.5	-	2,000	-	6,000	-	1,000
						-		-	· · · · · · · · · · · · · · · · · · ·	-	
					1.15 1.35/1.6 1.8/2.0	-	1,000	-	5,000	-	1,000
		GRM43	4.5	3.2		-	1,000	-	4,000		1,000
es					2.5	-	500	-	2,000	-	1,000
GJM Series					2.8	-	500	-	1,500	-	500
5					1.15	-	1,000	-	5,000	-	1,000
		GRM55	5.7	5.0	1.35/1.6 1.8/2.0	-	1,000	-	4,000	-	1,000
0					2.5	-	500	-	2,000	-	500
		0 11/02	0.0	0.0	3.2	-	300	-	1,500	-	500
H	High Power Type	GJM03	0.6	0.3	0.3	15,000	-	50,000	-	-	1,000
	High Frequency	GJM15	1.0	0.5	0.5	10,000	-	50,000	-	50,000	1,000
		GQM18	1.6	0.8	0.7/0.8	4,000	-	10,000	-	-	1,000
GOM Series		GQM21	2.0	1.25	0.85	4,000	-	10,000	-	-	1,000
eri		GQM22	2.8	2.8	1.15	-	1,000	-	4,000	-	1,000
۷S		GMA0D	0.38	0.38	0.3	-	-	-	-	-	400 3)
ð	N di sus statu	GMA05	0.5	0.5	0.35	-	-	-	-	-	400 3)
0	Microchip	GMA08	0.8	0.8	0.5	-	-	-	-	-	400 3)
		GMD03	0.6	0.3	0.3	15,000	-	50,000	-	-	1,000
		GMD15 GNM0M	1.0 0.9	0.5 0.6	0.5 0.45	10,000	-	50,000 50,000	-	-	1,000
							-		-		1,000
	Arrow	GNM1M	1.37 2.0	1.0	0.5/0.6/0.8	4,000	-	10,000	-	-	1,000
es	Array	GNM21	2.0	1.25	0.5/0.6/0.85	4,000	-	10,000	-	-	,
GMA Series		GNM31	3.2	1.6	0.8/0.85	4,000	- 2 000	10,000	-	-	1,000
A S		11115	05	1.0		-	3,000	-	10,000	-	1,000
Ň		LLL15	0.5	1.0	0.3	10,000 4)	+	50,000 4)	++		1,000
0		LLL18/LLR18	0.8	1.6	0.5	-	4,000	-	10,000	-	1,000
		LLL21	1.25	2.0	0.5/0.6	-	4,000	-	10,000	-	1,000
					0.85		3,000	-	10,000	-	1,000
		LLL31	1.6	3.2	0.5/0.7	-	4,000	-	10,000	-	1,000
				0.0	1.15	-	3,000	-	10,000	-	1,000
S	Low ESL	LLA18	1.6	0.8	0.5	-	4,000	-	10,000	-	1,000
erie		LLA21	2.0	1.25	0.5	-	4,000	-	10,000	-	1,000
š		-			0.85	-	3,000	-	10,000	-	1,000
ЧD					0.5	-	4,000	-	10,000	-	1,000
GMD Series		LLA31	3.2	1.6	0.85	-	3,000	-	10,000	-	1,000
					1.15	-	3,000	-	10,000	-	1,000
		LLM21	2.0	1.25	0.5	-	4,000	-	10,000	-	1,000
		LLM31	3.2	1.6	0.5	-	4,000	-	10,000	-	1,000

1) 4mm width, 1mm pitch Embossed Taping. 2) There are parts without bulk case package.

3) Tray

4) LLL15: ø180mm Reel Paper Taping Packaging Code: E, ø330mm Reel Paper Taping Packaging Code: F



Continued on the following page.

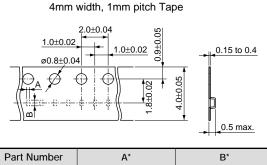


Package

GRM02

Continue	d from th	e prec	eding p	age.

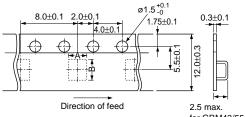
(3) Dimensions of Embossed Tape



0.43 *Nominal Value

12mm width, 8mm pitch Tape

0.23



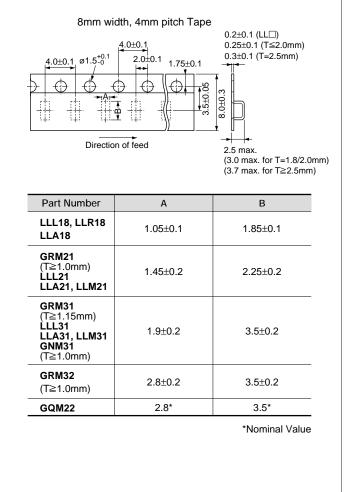
for GRM43/55 (3.7 max. for T=2.5mm) (4.7 max. for T≧3.0mm)

Part Number	A*	В*
GRM43	3.6	4.9
GRM55	5.2	6.1
		*Nominal Value

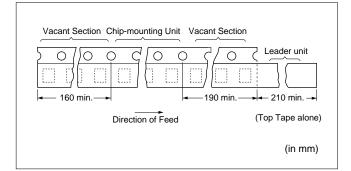
(4) Taping Method

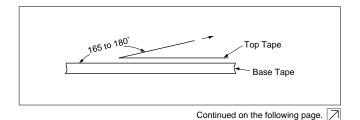
- Tapes for capacitors are wound clockwise. The sprocket holes are to the right as the tape is pulled toward the user.
- ② Part of the leader and part of the empty tape should be attached to the end of the tape as follows.
- ③ The top tape and base tape are not attached at the end of the tape for a minimum of 5 pitches.
- ④ Missing capacitors number within 0.1% of the number per reel or 1 pc, whichever is greater, and are not continuous.
- (5) The top tape and bottom tape should not protrude beyond the edges of the tape and should not cover sprocket holes.
- (6) Cumulative tolerance of sprocket holes, 10 pitches: ± 0.3 mm.
- Peeling off force: 0.1 to 0.6N* in the direction shown at right. *GRM02)

GRM03 GJM03 GMD03



(in mm)







High Frequency GQM Series

Monolithic Microchip

For Bonding GMD Series

GMA Series



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Low ESL LL^[] Series

(in mm)

High-Q GJM Series

Monolithic Microchip GMA Series

For Bonding GMD Series

Product Information Package



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• This PDF catalog has only typical specifications because there is no space for detailed specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.
10.12.20

- Storage and Operation conditions
- 1. The performance of chip monolithic ceramic capacitors may be affected by the storage conditions.
 - 1-1. Store capacitors in the following conditions: Temperature of +5°C to +40°C and a Relative Humidity of 20% to 70%.
 - (1) Sunlight, dust, rapid temperature changes, corrosive gas atmosphere or high temperature and humidity conditions during storage may affect the solderability and the packaging performance. Please use product within six months of receipt.
 - (2) Please confirm solderability before using after six months. Store the capacitors without opening the original bag. Even if the storage period is short, do not exceed the specified atmospheric conditions.
- 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.



For General GRM Series

For Bonding GMD Series

Array GNM Series

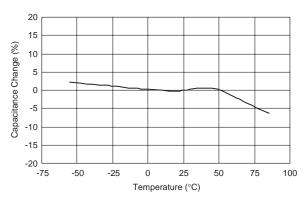
Rating

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

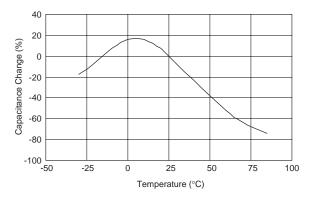
The following actions are recommended in order to ensure suitable capacitance values.

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

Typical Temperature Characteristics R6(X5R)



Typical Temperature Characteristics F5(Y5V)

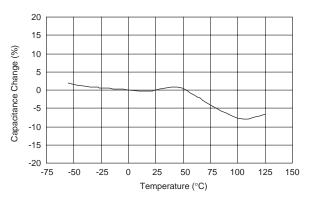


- 2. Measurement of Capacitance
- 1. Measure capacitance with the voltage and the frequency specified in the product specifications.
 - 1-1. The output voltage of the measuring equipment may decrease occasionally when capacitance is high.Please confirm whether a prescribed measured voltage is impressed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

(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 characteristics of these capacitors, such as their aging, voltage, and temperature characteristics. And check capacitors using your actual appliances at the intended environment and operating conditions.

Typical Temperature Characteristics R7(X7R)



Low ESL



Continued from the preceding page.

3. Applied Voltage

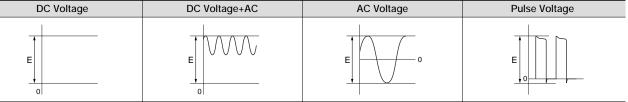
For General GRM Series

> Array GNM Series

Low ESL L Series

- 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



(E: Maximum possible applied voltage.)

1-2. Influence of overvoltage

Overvoltage 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.

- 4. Applied Voltage and Self-heating Temperature
- 1. When the capacitor is used in a high-frequency voltage, pulse voltage, application, be sure to take into account self-heating may be caused by resistant factors of the capacitor.
 - 1-1. The load should be contained to the level such that when measuring at atmospheric temperature of 25°C, the product's self-heating remains below 20°C and surface temperature of the capacitor in the actual circuit remains within the maximum operating temperature.

Continued on the following page.

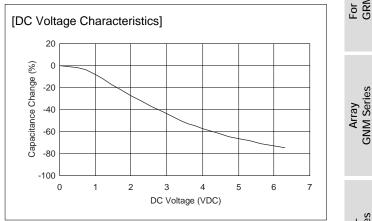
High-Q GJM Series

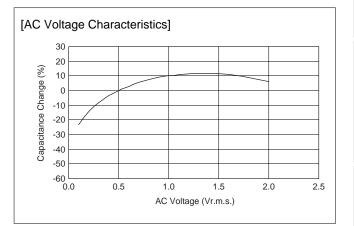


- 5. DC Voltage and AC Voltage Characteristics
- 1. The capacitance value of a high dielectric constant type capacitor changes depending on the DC voltage applied. Please consider the DC voltage characteristics when a capacitor is selected for use in a DC circuit.
 - 1-1. The capacitance of ceramic capacitors may change sharply depending on the applied voltage (see figure).

Please confirm the following in order to secure the capacitance.

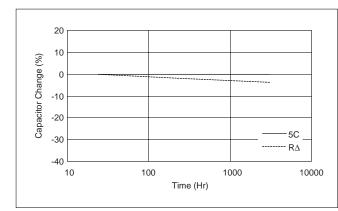
- (1) Whether the capacitance change caused by the applied voltage is within the range allowed or not.
- (2) In the DC voltage characteristics, the rate of capacitance change becomes larger as voltage increases, even if the applied voltage is below the rated voltage. When a high dielectric constant type capacitor is 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.
- 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.





- 6. Capacitance Aging
- 1. The high dielectric constant type capacitors have the characteristic in which the capacitance value decreases with passage of time.

When you use a 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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7. Vibration and Shock

For General GRM Series

> Array GNM Series

Low ESL LL^[] Series

High-Q GJM Series

High Frequency GOM Series

Monolithic Microchip GMA Series

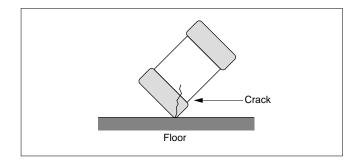
For Bonding GMD Series

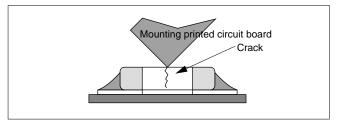
Product Information

- The capacitor's mechanical stress (vibration and shock) shall be specified for the use environment. 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.
 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.

 When printed circuit boards are piled up or handled, the corners 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.







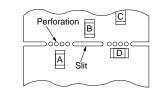
Soldering and Mounting

- 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.

[Component Direction]

Locate chip horizontal to the direction in which stress acts

[Chip Mounting Close to Board Separation Point]



Chip arrangement

Worst A-C-(B~D) Best

-L Series

GNM Series

Array

Low ESL

High-Q GJM Series

High Frequency

Monolithic Microchip

GMA Series

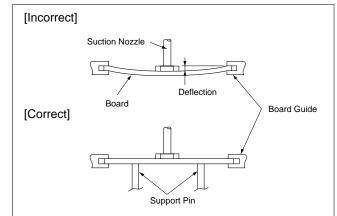
GOM Series

- 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.

- 2. Information before Mounting
- 1. Do not reuse 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.

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

- 1. Make sure that the following excessive forces are not applied to the capacitors.
 - 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 bending 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) Adjust the nozzle pressure within a static load of 1N to 3N during mounting.
- 2. Dirt particles and dust accumulated between the suction nozzle and the cylinder inner wall prevent the nozzle from moving smoothly. This imposes greater force upon the chip 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.



Continued on the following page.

Continued from the preceding page.

4-1. Reflow Soldering

- 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 board. Preheating conditions are shown in table 1. It is required to keep the temperature differential between the solder and the component's surface (ΔT) as small as possible.
- Solderability of Tin plating termination chips might be deteriorated when a low temperature soldering profile where the peak solder temperature is below the melting point of Tin is used. Please confirm the Solderability of Tin plated termination chips before use.
- When components are immersed in solvent after mounting, be sure to maintain the temperature difference (ΔT) between the component and the solvent within the range shown in the table 1.

Table 1

Part Number	Temperature Differential
GRM02/03/15/18/21/31	
GJM03/15	
LLL15/18/21/31	Δ T ≦190°C
LLR18	
GQM18/21	
GRM32/43/55	
LLA18/21/31	
LLM21/31	Δ Τ ≦130°C
GNM	
GQM22	

Recommended Conditions

	Pb-Sn S	Lead Free Solder			
	Infrared Reflow Vapor Reflow		Lead Free Solder		
Peak Temperature	230 to 250°C	230 to 240°C	240 to 260°C		
Atmosphere	Air	Air	Air or N2		
Pb-Sn Solder: Sn-37Pb					

Lead Free Solder: Sn-3.0Ag-0.5Cu

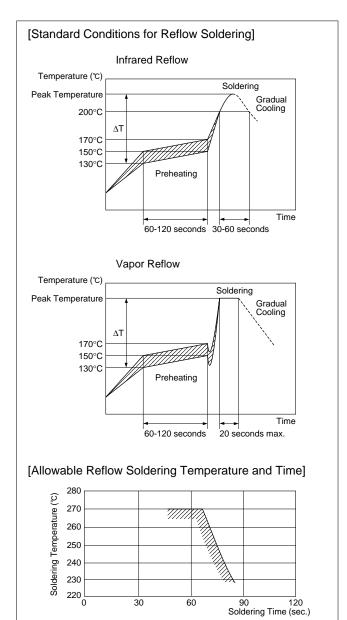
4-1. Overly thick application of solder paste results in a excessive solder fillet height.

This makes the chip more susceptible to mechanical and thermal stress on the board and may cause the chips to crack.

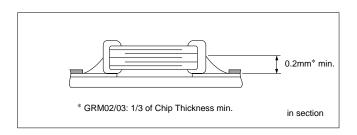
- 4-2. Too little solder paste results in a lack of adhesive strength on the outer electrode, which may result in chips breaking loose from the PCB.
- 4-3. Make sure the solder has been applied smoothly to the end surface to a height of 0.2mm* min.

Inverting the PCB

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



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





For General GRM Series

Array GNM Series

Low ESL L Series

For Bonding GMD Series

^{4.} Optimum Solder Amount for Reflow Soldering

Array GNM Series

Low ESL L Series

High-Q GJM Series

Continued from the preceding page.

4-2. Flow Soldering

 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 in the components, preheating should be required for both of the components and the PCB board.

Preheating conditions are shown in table 2. It is required to keep the temperature differential between the solder and the component's surface (ΔT) as small as possible.

- 2. Excessively long soldering time or high soldering temperature can result in leaching of the outer electrodes, causing poor adhesion or a reduction in capacitance value due to loss of contact between electrodes and end termination.
- When components are immersed in solvent after mounting, be sure to maintain the temperature difference (ΔT) between the component and solvent within the range shown in the table 2.
- 4. Do not apply flow soldering to chips not listed in table 2.

Table 2

Part Number	Temperature Differential
GRM18/21/31	
LLL21/31	∆T≦150°C
GQM18/21	

Recommended Conditions

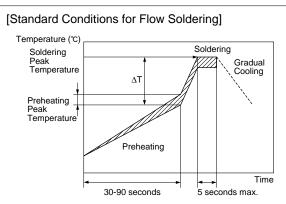
	Pb-Sn Solder	Lead Free Solder
Preheating Peak Temperature	90 to 110°C	100 to 120°C
Soldering Peak Temperature	240 to 250°C	250 to 260°C
Atmosphere	Air	N2

Pb-Sn Solder: Sn-37Pb

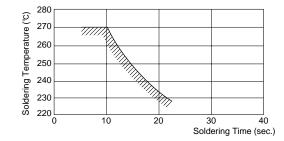
Lead Free Solder: Sn-3.0Ag-0.5Cu

5. Optimum Solder Amount for Flow Soldering

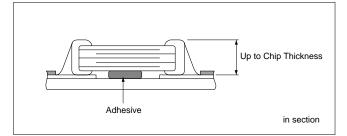
5-1. The top of the solder fillet should be lower than the thickness of components. If the solder amount is excessive, the risk of cracking is higher during board bending or any other stressful condition.



[Allowable Flow Soldering Temperature and Time]



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



Continued on the following page.



For General GRM Series

For Bonding GMD Series Continued from the preceding page.

- 4-3. Correction with a Soldering Iron
- When sudden heat is applied to the components when using a soldering iron, the mechanical strength of the components will decrease because the extreme temperature change can cause deformations inside the components. In order to prevent mechanical damage to the components, preheating is required for both the components and the PCB board. Preheating conditions, (The "Temperature of the Soldering Iron Tip", "Preheating Temperature," "Temperature Differential" between the iron tip and the components and the PCB), should be within the conditions of table 3. It is required to keep the temperature differential between the soldering iron and the component surfaces (ΔT) as small as possible.
- 2. After soldering, do not allow the component/PCB to rapidly cool down.
- 3. The operating time for the re-working should be as short as possible. When re-working time is too long, it may cause solder leaching, in turn causing a reduction in the adhesive strength of the terminations.
- 4. Optimum Solder amount when re-working with a Soldering Iron
 - 4-1. For sizes smaller than 0603, (GRM03/15/18, GJM03/15, GQM18), the top of the solder fillet should be lower than 2/3's of the thickness of the component or 0.5mm whichever is smaller. For 0805 and larger sizes, (GRM21/31/32/43/55, GQM21/22), the top of the solder fillet should be lower than 2/3's of the thickness of the component. If the solder amount is excessive, the risk of cracking is higher during board bending or under any other stressful condition.
 - 4-2. 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.
 - 4-3. Solder wire with Ø0.5mm or smaller is required for soldering.

4-4. Leaded Component Insertion

1. If the PCB is flexed when leaded components (such as transformers and ICs) are being mounted, chips may crack and solder joints may break.

Before mounting leaded components, support the PCB using backup pins or special jigs to prevent warping.

5. Washing

Excessive ultrasonic oscillation during cleaning can cause the PCBs to resonate, resulting in cracked chips or broken solder joints. Take note not to vibrate PCBs.

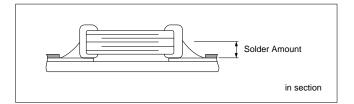
Table 3

Part Number	Temperature of Soldering Iron Tip	Preheating Temperature	Temperature Differential (∆T)	Atmosphere
GRM03/15/18/21/31				
GJM03/15	350°C max.	150°C min.	∆T≦190°C	Air
GQM18/21				
GRM32/43/55	280°C max.	150°C min	AT<130°C	Air
GQM22	200 C max.			

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

Pb-Sn Solder: Sn-37Pb

Lead Free Solder: Sn-3.0Ag-0.5Cu





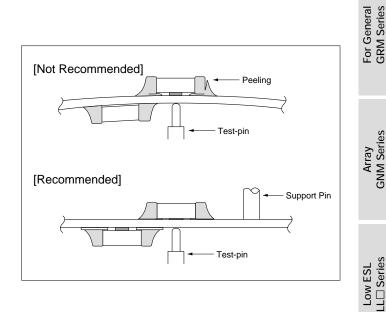
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Caution

- 6. Electrical Test on Printed Circuit Board
- 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 printed circuit board by the pressure of a test pin, etc.

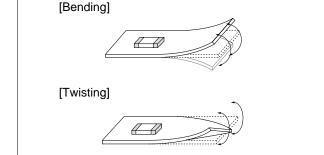
The thrusting force of the test probe can flex the PCB, resulting in cracked chips or open solder joints. Provide support pins on the back side of the PCB to prevent warping or flexing.

1-2. Avoid vibration of the board by shock when a test pin 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 is caused by bending or twisting the board.
 - 1-1. In cropping the board, the stress as shown right may cause the capacitor to crack.

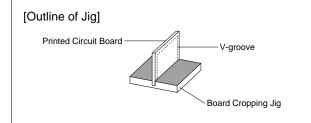
Try not to apply this type of stress to a capacitor.

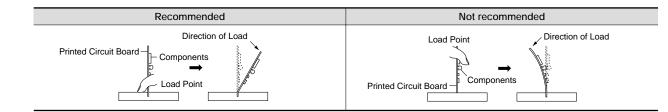


- 2. Ascertain of the cropping method for the printed circuit board in advance.
 - 2-1. Printed circuit board cropping shall be carried out by using a jig or an apparatus to prevent the mechanical stress that can occur to the board.
 - (1) Example of a suitable jig

Recommended example: the board should be pushed as close to the cropping jig as possible and from the back side of board in order to minimize the compressive stress applied to capacitor.

Not recommended example: when the board is pushed at a point far from the cropping jig and from the front side of board as below, the capacitor may form a crack caused by the tensile stress applied to capacitor.





Continued on the following page. \nearrow



GJM Series

High-O

High Frequency GOM Series

Monolithic Microchip

GMA Series

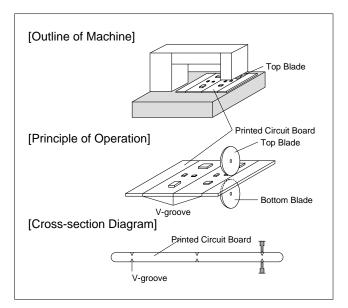
For Bonding GMD Series

∆Caution

roduct

Continued from the preceding page.

- (2) Example of a suitable machine
 - An outline of a printed circuit board cropping machine is shown as follows. Along the lines with the V-grooves on the printed circuit board, the top and bottom blades are aligned to one another when cropping the board.
 - The misalignment of the position between top and bottom blades may cause the capacitor to crack.



Recommended	Not Recommended					
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			



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For General GRM Series

For Bonding GMD Series

Caution

- 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. Others
 - 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.
- 2-2. Disposal of Waste
 - When capacitors are disposed, they must be burned or buried by an industrial waste vendor with the appropriate licenses.
- 2-3. Circuit Design

GRM, GCM, GMA/D, LLL/A/M, GQM, GJM, GNM Series capacitors in this catalog are not safety 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.



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10.12.20

Notice

E Rating C B Rating 1. Operating 1. Operating

Array GNM Series

Low ESL LL□ 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.
 - Also it is necessary to consider the temperature distribution in equipment and the seasonal temperature variable factor.
 - 1-2. Consider the self-heating of the capacitor. The surface temperature of the capacitor shall be the upper operating temperature or less when including the self-heating factors.
- 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.
- 3. Piezo-electric Phenomenon
 - 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.



■ Soldering and Mounting

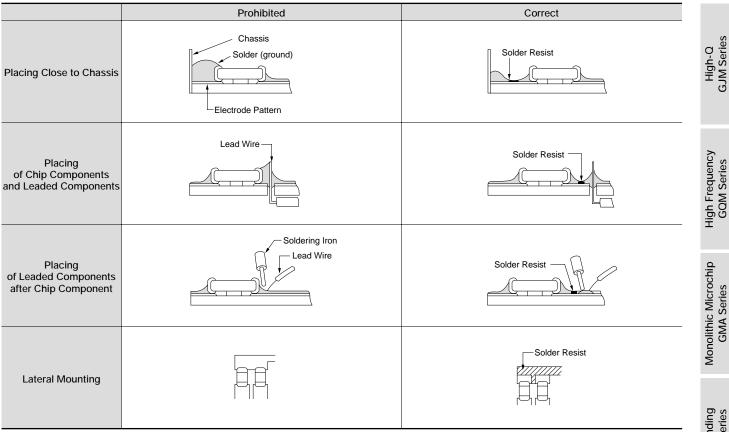
1. PCB Design

- 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. It is possible for the chip to crack by the expansion and shrinkage of a metal board. Please contact us if you want to use our ceramic capacitors on a metal board such as Aluminum.

Pattern Forms



Continued on the following page.

Array GNM Series



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Notice

Continued from the preceding page.

2. Land Dimensions

2-1. A chip capacitor can be cracked due to the stress of PCB bending / etc if the land area is larger than needed and has an excess amount of solder.
Please refer to the land dimensions in table 1 for flow soldering, table 2 for reflow soldering, table 3 for GNM & LLA, and table 4 for LLM.
Please confirm the suitable land dimension by evaluating the actual SET / PCB.

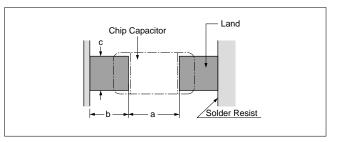


Table 1 Flow Soldering Method

Dimensions Part Number			b	с	
			0.8 to 0.9	0.6 to 0.8	
GRM21 GQM21	2.0×1.25	1.0 to 1.2	0.9 to 1.0	0.8 to 1.1	
GRM31 3.2×1.6		2.2 to 2.6 1.0 to 1.1		1.0 to 1.4	
LLL21 1.25×2.0 LLL31 1.6×3.2		0.4 to 0.7	0.5 to 0.7	1.4 to 1.8	
		0.6 to 1.0	0.8 to 0.9	2.6 to 2.8	
				(in mm)	

Table 2 Reflow Soldering Method

Dimensions Part Number	Chip (L×W)	а	b	с
GRM02	0.4×0.2	0.16 to 0.2	0.12 to 0.18	0.2 to 0.23
GRM03 GJM03	0.6×0.3	0.2 to 0.3	0.2 to 0.35	0.2 to 0.4
GRM15 GJM15	1.0×0.5	0.3 to 0.5	0.35 to 0.45	0.4 to 0.6
GRM18 GQM18	1.6×0.8	0.6 to 0.8	0.6 to 0.7	0.6 to 0.8
GRM21 GQM21	2.0×1.25	1.0 to 1.2	0.6 to 0.7	0.8 to 1.1
GRM31	3.2×1.6	2.2 to 2.4	0.8 to 0.9	1.0 to 1.4
GRM32	3.2×2.5	2.0 to 2.4	1.0 to 1.2	1.8 to 2.3
GRM43	4.5×3.2	3.0 to 3.5	1.2 to 1.4	2.3 to 3.0
GRM55	5.7×5.0	4.0 to 4.6	1.4 to 1.6	3.5 to 4.8
LLL15	0.5×1.0	0.15 to 0.2	0.2 to 0.25	0.7 to 1.0
LLL18 LLR18	0.8×1.6	0.2 to 0.3	0.3 to 0.4	1.4 to 1.6
LLL21	1.25×2.0	0.4 to 0.6	0.4 to 0.5	1.4 to 1.8
LLL31	1.6×3.2	0.6 to 0.8	0.6 to 0.7	2.6 to 2.8
GQM22	3.2×2.5	2.2 to 2.5	0.8 to 1.0	1.9 to 2.3

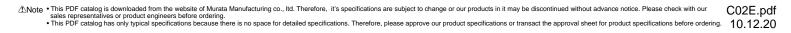
(in mm)

Continued on the following page.

Array GNM Series

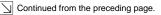
High-Q GJM Series

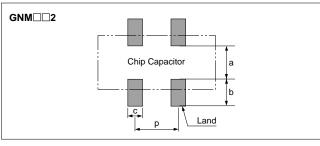




LLA

Notice





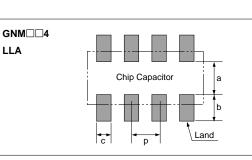


Table 3 GNM, LLA Series for Reflow Soldering Land Dimensions

Part Number		Dimensions (mm)								
Part Number	L	W	а	b	с	р				
GNM0M2	0.9	0.6	0.12 to 0.20*	0.35 to 0.40*	0.3	0.45				
GNM1M2	1.37	1.0	0.4 to 0.5	0.35 to 0.45	0.3 to 0.35	0.64				
GNM212	2.0	1.25	0.6 to 0.7	0.5 to 0.7	0.4 to 0.5	1.0				
GNM214	2.0	1.25	0.6 to 0.7	0.5 to 0.7	0.25 to 0.35	0.5				
GNM314	3.2	1.6	0.8 to 1.0	0.7 to 0.9	0.3 to 0.4	0.8				
LLA18	1.6	0.8	0.3 to 0.4	0.25 to 0.35	0.15 to 0.25	0.4				
LLA21	2.0	1.25	0.5 to 0.7	0.35 to 0.6	0.2 to 0.3	0.5				
LLA31	3.2	1.6	0.7 to 0.9	0.4 to 0.7	0.3 to 0.4	0.8				



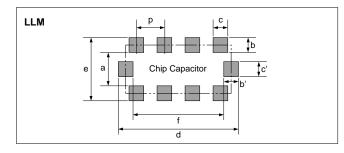


Table 4 LLM Series for Reflow Soldering Land Dimensions

Part Number	Dimensions (mm)							
Part Number	а	b, b'	c, c'	d	е	f	р	
LLM21	0.6 to 0.8	(0.3 to 0.5)	0.3	2.0 to 2.6	1.3 to 1.8	1.4 to 1.6	0.5	
LLM31	1.0	(0.3 to 0.5)	0.4	3.2 to 3.6	1.6 to 2.0	2.6	0.8	

b=(c-e)/2, b'=(d-f)/2

2. Adhesive Application

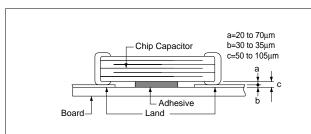
1. Thin or insufficient adhesive can cause the chips to loosen or become disconnected during flow soldering. The amount of adhesive must be more than dimension c, shown in the drawing at right, to obtain the correct bonding strength.

The chip's electrode thickness and land thickness must also be taken into consideration.

- 2. Low viscosity adhesive can cause chips to slip after mounting. The adhesive must have a viscosity of 5000Pa • s (500ps) min. (at 25°C).
- 3. Adhesive Coverage

Part Number	Adhesive Coverage*	
GRM18, GQM18	0.05mg min.	
GRM21, LLL21, GQM21	0.1mg min.	
GRM31, LLL31	0.15mg min.	

*Nominal Value



Notice



Notice

For General GRM Series

> Array GNM Series

Low ESL L
 Series Continued from the preceding page.

- 3. Adhesive Curing
- Insufficient curing of the adhesive can cause chips to disconnect during flow soldering and deterioration in the insulation resistance between the outer electrodes due to moisture absorption.

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

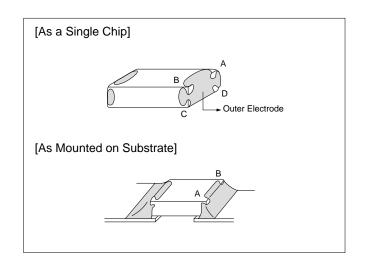
4. Flux Application

- An excessive amount of flux generates a large quantity of flux gas, which can cause a deterioration of Solderability. Therefore 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 outer electrodes unless there is sufficient cleaning. Use flux with a halide content of 0.2% max.

5. Flow Soldering

 Set temperature and time to ensure that leaching of the outer electrode does not exceed 25% of the chip end area as a single chip (full length of the edge A-B-C-D shown right) and 25% of the length A-B shown below as mounted on substrate.

- 3. Do not use strong acidic flux.
- 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. Washing

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

capacitors.

- 3. Select the proper cleaning conditions.
 - 3-1. Improper cleaning conditions (excessive or insufficient) may result in the deterioration of the performance of the capacitors.

Continued on the following page.

High Frequency

Monolithic Microchip GMA Series



Notice

- 7. Coating
- 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 small 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.

8. Die Bonding/Wire Bonding (GMA or GMD Series)

- 1. Die Bonding of Capacitors
 - Use the following materials for the Brazing alloys: Au-Sn (80/20) 300 to 320 °C in N₂ atmosphere
 - Mounting
 - (1) Control the temperature of the substrate so it matches the temperature of the brazing alloy.
 - (2) Place the brazing alloy on the substrate and place the capacitor on the alloy. Hold the capacitor and gently apply the load. Be sure to complete the operation within 1 minute.

Select a resin for which the thermal expansion coefficient is as close to that of 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.

- 2. Wire Bonding
 - Wire
 - Gold wire: 25 micro m (0.001 inch) diameter • Bonding
 - onding
 - Thermo compression, ultrasonic ball bonding.
 Required stage temperature: 150 to 200 °C
 - (3) Required wedge or capillary weight: 0.2N to 0.5N
 - (3) Required wedge of capitally weight. 0.2N to 0.5N
 - (4) Bond the capacitor and base substrate or other devices with gold wire.



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Notice

For General GRM Series

Array GNM Series

Low ESL LL^[] Series Others1. 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, and 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 capacitor, the capacitor may crack and short-circuit.
- 1-3. Do not use a capacitor to which excessive shock was applied by dropping, etc.The capacitor dropped accidentally during processing may be damaged.



Array GNM Series

Low ESL L Series

1. Solderability

(1) Test Method

Subject the chip capacitor to the following conditions. Then apply flux (an ethanol solution of 25% rosin) to the chip and dip it in 230°C eutectic solder for 2 seconds. Conditions:

Expose prepared at room temperature (for 6 months and 12 months, respectively)

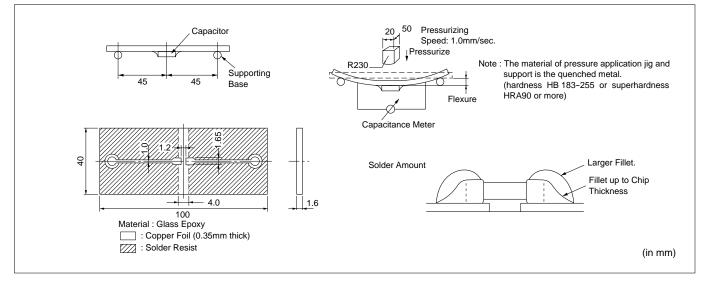
Prepared at high temperature (for 100 hours at 85°C) Prepared left at high humidity (for 100 hours under 90%RH to 95%RH at 40°C)

Table 1

Sample	Initial State	Prepared at Room Temperature		Prepared at High Temperature for	Prepared at High Humidity for 100 Hours at 90 to	
Sample		6 months	12 months	100 Hours at 85℃	95% RH and 40°C	
GRM21 for flow/reflow soldering	95 to 100%	95 to 100%	95%	90 to 95%	95%	

- 2. Board Bending Strength for Solder Fillet Height
- (1) Test Method

Solder the chip capacitor to the test PCB with the amount of solder paste necessary to achieve the fillet heights. Then bend the PCB using the method illustrated and measure capacitance.



(2) Test Samples

GRM21: 5C/R7/F5 Characteristics T=0.6mm

(3) Acceptance Criteria

Products should be determined to be defective if the change in capacitance has exceeded the values specified in Table 2.

Table 2	2
---------	---

Characteristics	Change in Capacitance
5C	Within $\pm 5\%$ or ± 0.5 pF, whichever is greater
R7	Within ±12.5%
F5	Within ±20%

(2) Test Samples

GRM21 : Products for flow/reflow soldering.

(3) Acceptance Criteria

With a 60-power optical microscope, measure the surface area of the outer electrode that is covered with solder.

(4) Results

Refer to Table 1.

High-Q GJM Series

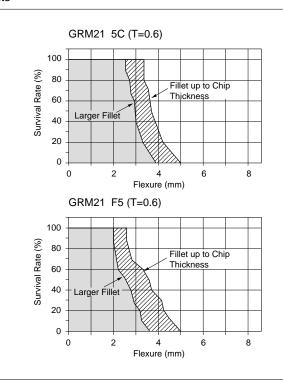


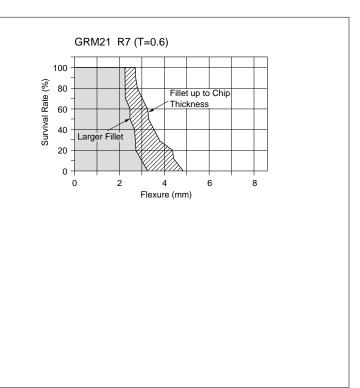
Continued from the preceding page.

(4) Results

Array GNM Series

High Frequency GOM Series





Temperature Cycling for Solder Fillet Height Test Method

Solder the chips to the substrate of various test fixtures using sufficient amounts of solder to achieve the required fillet height. Then subject the fixtures to the cycle illustrated at right 200 times.

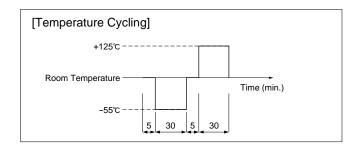
Alumina substrates are typically designed for reflow

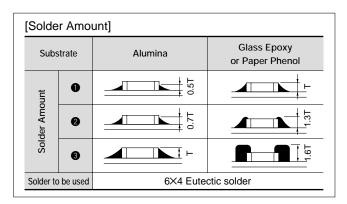
Glass epoxy or paper phenol substrates are typically

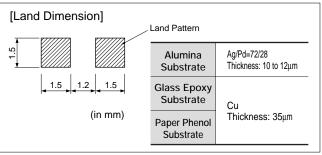
(Thickness: 0.64mm)

(Thickness: 1.64mm)

(Thickness: 1.64mm)







③ Land Dimension

soldering.

2 Material

Alumina

Glass epoxy

Paper phenol

used for flow soldering.

For General GRM Series

Array GNM Series

GMA Series

GMD Series

Continued from the preceding page.

(2) Test Samples

GRM21 5C/R7/F5 Characteristics T=0.6mm

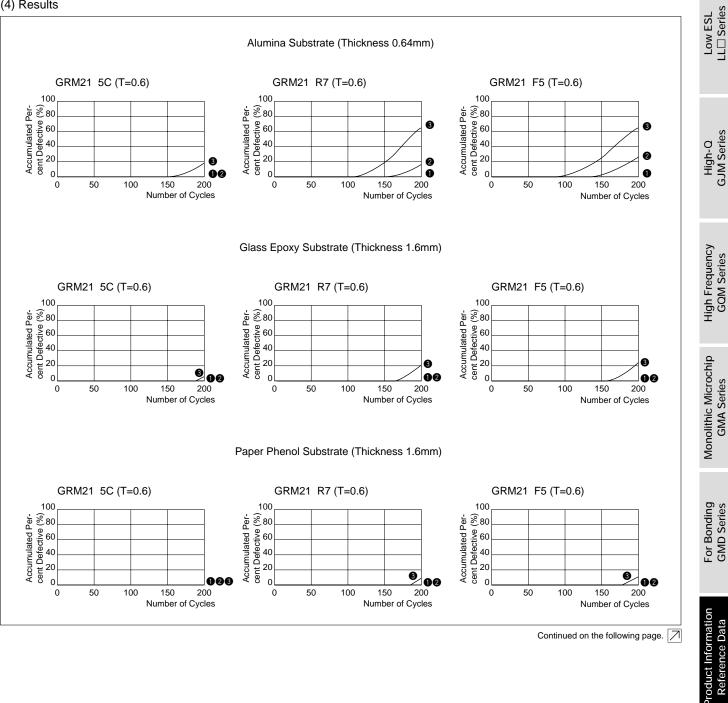
(3) Acceptance Criteria

Products are determined to be defective if the change in capacitance has exceeded the values specified in Table 3.

Table 3

Characteristics	Change in Capacitance
5C	Within $\pm 2.5\%$ or ± 0.25 pF, whichever is greater
R7	Within ±7.5%
F5	Within ±20%

(4) Results



muRata

Continued on the following page.

Array GNM Series

High-Q GJM Series

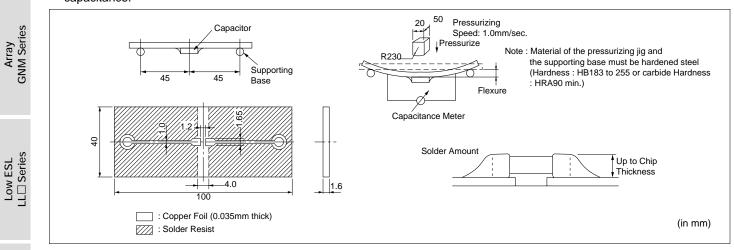
High Frequency GOM Series

Continued from the preceding page.

4. Board Bending Strength for Board Material

(1) Test Method

Solder the chip to the test board. Then bend the board using the method illustrated below, to measure capacitance.



(2) Test Samples

GRM21 5C/R7/F5 Characteristics T=0.6mm typical

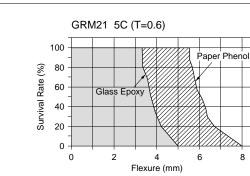
(3) Acceptance Criteria

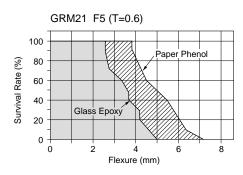
Products should be determined to be defective if the change in capacitance has exceeded the values specified in Table 4.

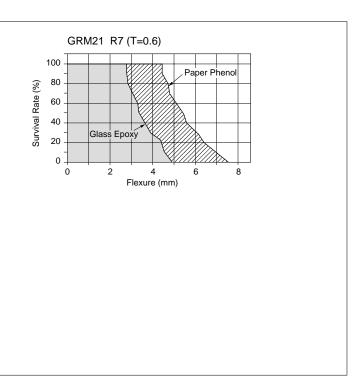
Table 4

Change in Capacitance
Within \pm 5% or \pm 0.5pF, whichever is greater
Within ±12.5%
Within ±20%

(4) Results









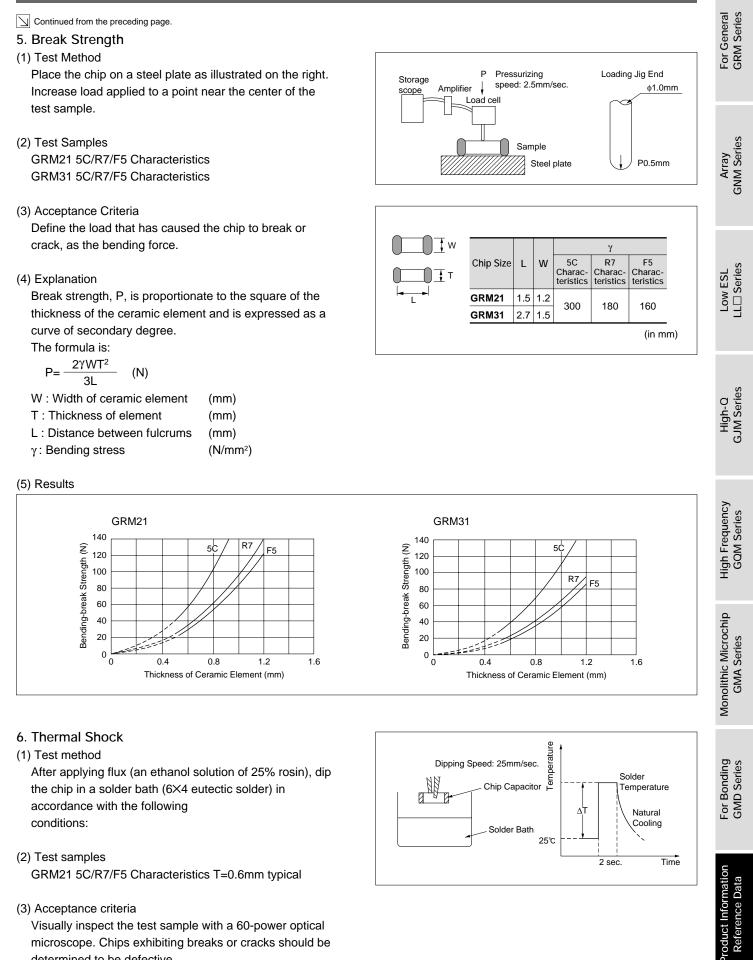
Monolithic Microchip

GMA Series

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Reference Data



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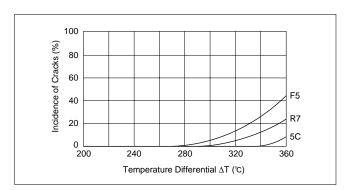


Visually inspect the test sample with a 60-power optical microscope. Chips exhibiting breaks or cracks should be

determined to be defective.

Continued from the preceding page.

(4) Results



7. Solder Heat Resistance

(1) Test Method

- ① Reflow soldering:
- Apply about 300 µm of solder paste over the alumina substrate. After reflow soldering, remove the chip and check for leaching that may have occurred on the outer electrode.

2 Flow soldering:

After dipping the test sample with a pair of tweezers in wave solder (eutectic solder), check for leaching that may have occurred on the outer electrode.

(2) Test samples

GRM21: For flow/reflow soldering T=0.6mm

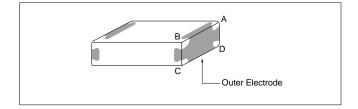
(3) Acceptance criteria

The starting time of leaching should be defined as the time when the outer electrode has lost 25% of the total edge length of A-B-C-D as illustrated:

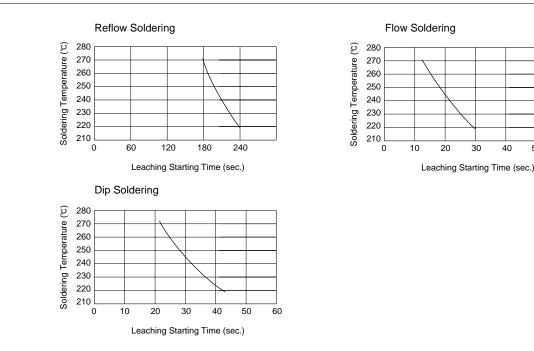
3 Dip soldering:

After dipping the test sample with a pair of tweezers in static solder (eutectic solder), check for leaching that may have occurred on the outer electrode.

(4) Flux to be used: An ethanol solution of 25% rosin.



(4) Results



50

40

20

30

60



Array GNM Series

Low ESL

High-Q GJM Series

High Frequency GOM Series

For General GRM Series

Continued from the preceding page.

8. Thermal Shock when Making Corrections with a Soldering Iron

(1) Test Method

Apply a soldering iron meeting the conditions below to the soldered joint of a chip that has been soldered to a paper phenol board, while supplying wire solder. (Note: the soldering iron tip should not directly touch the ceramic element of the chip.)

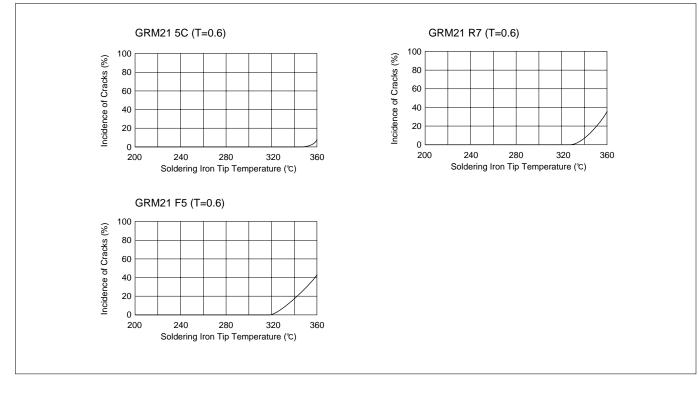
(2) Test Samples

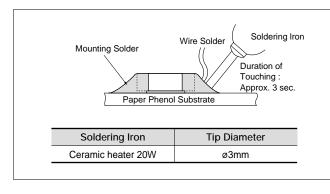
GRM21 5C/R7/F5 Characteristics T=0.6mm

(3) Acceptance Criteria for Defects

Observe the appearance of the test sample with a 60-power optical microscope. Those units displaying any breaks or cracks are determined to be defective.







Chip Monolithic Ceramic Capacitors (Medium Voltage)

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Chip Monolithic Ceramic Capacitors (Medium Voltage)



Low Dissipation Factor GRM Series

Features

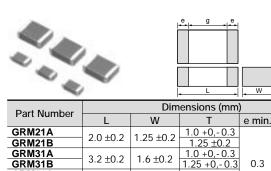
- 1. Low-loss and suitable for high frequency circuits
- 2. Murata's original internal electrode structure provides high flash-over voltage.
- 3. A new monolithic structure for small, surfacemountable devices capable of operating at high voltage levels
- 4. Sn-plated external electrodes provides good solderability.
- 5. Use the GRM21/31 type with flow or reflow soldering, and other types with reflow soldering only.

Applications

Ideal for use on high frequency pulse circuits such as snubber circuits for switching power supplies, DC-DC converters, ballasts (inverter fluorescent lamps), etc.

Do not use these products in any Automotive Power train or Safety equipment including Battery chargers for Electric Vehicles and Plug-in Hybrids. Only Murata products clearly stipulated as "for Automotive use" can be used for automobile applications such as Power train and Safety equipment.

C0G Characteristics



4.5<u>±0.3</u> 2.0 ±0.2 GRM31A7U3D, GRM32A7U3D, GRM32B7U3D; 1.8mm min

2.5 ±0.2

3.2 ±0.2

GRM32A

GRM42A

RM32B

Part Number	Rated Voltage (V)	TC Code (Standard)	Capacitance (pF)	Length L (mm)	Width W (mm)	Thickness T (mm)	Electrode g min. (mm)	Electrode e (mm)
GRM21A5C2E100JW01D	DC250	COG (EIA)	10 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A5C2E120JW01D	DC250	COG (EIA)	12 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A5C2E150JW01D	DC250	COG (EIA)	15 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A5C2E180JW01D	DC250	COG (EIA)	18 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A5C2E220JW01D	DC250	COG (EIA)	22 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A5C2E270JW01D	DC250	COG (EIA)	27 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A5C2E330JW01D	DC250	COG (EIA)	33 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A5C2E390JW01D	DC250	COG (EIA)	39 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A5C2E470JW01D	DC250	COG (EIA)	47 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A5C2E560JW01D	DC250	COG (EIA)	56 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A5C2E680JW01D	DC250	COG (EIA)	68 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A5C2E820JW01D	DC250	COG (EIA)	82 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A5C2E101JW01D	DC250	COG (EIA)	100 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM31A5C2J100JW01D	DC630	COG (EIA)	10 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C2J120JW01D	DC630	COG (EIA)	12 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C2J150JW01D	DC630	COG (EIA)	15 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C2J180JW01D	DC630	COG (EIA)	18 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C2J220JW01D	DC630	COG (EIA)	22 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C2J270JW01D	DC630	COG (EIA)	27 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C2J330JW01D	DC630	COG (EIA)	33 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C2J390JW01D	DC630	COG (EIA)	39 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C2J470JW01D	DC630	COG (EIA)	47 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C2J560JW01D	DC630	COG (EIA)	56 ±5%	3.2	1.6	1.0	1.5	0.3 min.



g min.

0.7

1.5'

29

0.3

25 +0.-0.3

.0 +0.-0.3

10 + 0



AC250V Type GA2 Series

For General Purpose **GRM/GRJ Series**

Part Number	Rated Voltage (V)	TC Code (Standard)	Capacitance (pF)	Length L (mm)	Width W (mm)	Thickness T (mm)	Electrode g min. (mm)	Electrode e (mm)
GRM31A5C2J680JW01D	DC630	COG (EIA)	68 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C2J820JW01D	DC630	COG (EIA)	82 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C2J101JW01D	DC630	COG (EIA)	100 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C2J121JW01D	DC630	COG (EIA)	120 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C2J151JW01D	DC630	COG (EIA)	150 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C2J181JW01D	DC630	COG (EIA)	180 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C2J221JW01D	DC630	COG (EIA)	220 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C2J271JW01D	DC630	COG (EIA)	270 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C2J331JW01D	DC630	COG (EIA)	330 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C2J391JW01D	DC630	COG (EIA)	390 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C2J471JW01D	DC630	COG (EIA)	470 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C2J561JW01D	DC630	COG (EIA)	560 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31B5C2J681JW01L	DC630	COG (EIA)	680 ±5%	3.2	1.6	1.25	1.5	0.3 min.
GRM31B5C2J821JW01L	DC630	COG (EIA)	820 ±5%	3.2	1.6	1.25	1.5	0.3 min.
GRM31B5C2J102JW01L	DC630	COG (EIA)	1000 ±5%	3.2	1.6	1.25	1.5	0.3 min.
GRM31A5C3A100JW01D	DC1000	COG (EIA)	10 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C3A120JW01D	DC1000	COG (EIA)	12 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C3A150JW01D	DC1000	COG (EIA)	15 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C3A180JW01D	DC1000	COG (EIA)	18 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C3A220JW01D	DC1000	COG (EIA)	22 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C3A270JW01D	DC1000	COG (EIA)	27 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C3A330JW01D	DC1000	COG (EIA)	33 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C3A390JW01D	DC1000	COG (EIA)	39 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C3A470JW01D	DC1000	COG (EIA)	47 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C3A560JW01D	DC1000	COG (EIA)	56 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C3A680JW01D	DC1000	COG (EIA)	68 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C3A820JW01D	DC1000	COG (EIA)	82 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31A5C3A101JW01D	DC1000	COG (EIA)	100 ±5%	3.2	1.6	1.0	1.5	0.3 min.
U2J Characteris	tics							

U2J Characteristics

Part Number	Rated Voltage (V)	TC Code (Standard)	Capacitance (pF)	Length L (mm)	Width W (mm)	Thickness T (mm)	Electrode g min. (mm)	Electrode e (mm)
GRM21A7U2E101JW31D	DC250	U2J (EIA)	100 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A7U2E121JW31D	DC250	U2J (EIA)	120 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A7U2E151JW31D	DC250	U2J (EIA)	150 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A7U2E181JW31D	DC250	U2J (EIA)	180 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A7U2E221JW31D	DC250	U2J (EIA)	220 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A7U2E271JW31D	DC250	U2J (EIA)	270 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A7U2E331JW31D	DC250	U2J (EIA)	330 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A7U2E391JW31D	DC250	U2J (EIA)	390 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A7U2E471JW31D	DC250	U2J (EIA)	470 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A7U2E561JW31D	DC250	U2J (EIA)	560 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A7U2E681JW31D	DC250	U2J (EIA)	680 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A7U2E821JW31D	DC250	U2J (EIA)	820 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A7U2E102JW31D	DC250	U2J (EIA)	1000 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A7U2E122JW31D	DC250	U2J (EIA)	1200 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A7U2E152JW31D	DC250	U2J (EIA)	1500 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A7U2E182JW31D	DC250	U2J (EIA)	1800 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21A7U2E222JW31D	DC250	U2J (EIA)	2200 ±5%	2.0	1.25	1.0	0.7	0.3 min.
GRM21B7U2E272JW32L	DC250	U2J (EIA)	2700 ±5%	2.0	1.25	1.25	0.7	0.3 min.
GRM31A7U2E272JW31D	DC250	U2J (EIA)	2700 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM21B7U2E332JW32L	DC250	U2J (EIA)	3300 ±5%	2.0	1.25	1.25	0.7	0.3 min.
GRM31A7U2E332JW31D	DC250	U2J (EIA)	3300 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM21B7U2E392JW32L	DC250	U2J (EIA)	3900 ±5%	2.0	1.25	1.25	0.7	0.3 min.
GRM31A7U2E392JW31D	DC250	U2J (EIA)	3900 ±5%	3.2	1.6	1.0	1.5	0.3 min.

muRata

Continued on the following page. \square

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 10.12.20

For General Purpose GRM/GRJ Series

Only for Applications

AC250V Type GA2 Series

Safety Standard Certified GA3 Series

Product Information

Part Number	Rated Voltage (V)	TC Code (Standard)	Capacitance (pF)	Length L (mm)	Width W (mm)	Thickness T (mm)	Electrode g min. (mm)	Electrode (mm)
GRM21B7U2E472JW32L	DC250	U2J (EIA)	4700 ±5%	2.0	1.25	1.25	0.7	0.3 min.
GRM31A7U2E472JW31D	DC250	U2J (EIA)	4700 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM21B7U2E562JW32L	DC250	U2J (EIA)	5600 ±5%	2.0	1.25	1.25	0.7	0.3 min.
GRM31A7U2E562JW31D	DC250	U2J (EIA)	5600 ±5%	3.2	1.6	1.0	1.5	0.3 min.
GRM31B7U2E682JW31L	DC250	U2J (EIA)	6800 ±5%	3.2	1.6	1.25	1.5	0.3 min.
GRM31B7U2E822JW31L	DC250	U2J (EIA)	8200 ±5%	3.2	1.6	1.25	1.5	0.3 min
GRM31B7U2E103JW31L	DC250	U2J (EIA)	10000 ±5%	3.2	1.6	1.25	1.5	0.3 min
GRM31A7U2J100JW31D	DC630	U2J (EIA)	10 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U2J120JW31D	DC630	U2J (EIA)	12 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U2J150JW31D	DC630	U2J (EIA)	15 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U2J180JW31D	DC630	U2J (EIA)	18 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U2J220JW31D	DC630	U2J (EIA)	22 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U2J270JW31D	DC630	U2J (EIA)	27 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U2J330JW31D	DC630	U2J (EIA)	33 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U2J390JW31D	DC630	U2J (EIA)	39 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U2J470JW31D	DC630	U2J (EIA)	47 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U2J560JW31D	DC630	U2J (EIA)	56 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U2J680JW31D	DC630	U2J (EIA)	68 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U2J820JW31D	DC630	U2J (EIA)	82 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U2J101JW31D	DC630	U2J (EIA)	100 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U2J121JW31D	DC630	U2J (EIA)	120 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U2J151JW31D	DC630	U2J (EIA)	150 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U2J181JW31D	DC630	U2J (EIA)	180 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U2J221JW31D	DC630	U2J (EIA)	220 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U2J271JW31D	DC630	U2J (EIA)	270 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U2J331JW31D	DC630	U2J (EIA)	330 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U2J391JW31D	DC630	U2J (EIA)	390 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U2J471JW31D	DC630	U2J (EIA)	470 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U2J561JW31D	DC630	U2J (EIA)	560 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U2J681JW31D	DC630	U2J (EIA)	680 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U2J821JW31D	DC630	U2J (EIA)	820 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U2J102JW31D	DC630	U2J (EIA)	1000 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM32A7U2J122JW31D	DC630	U2J (EIA)	1200 ±5%	3.2	2.5	1.0	1.5	0.3 min
GRM32A7U2J152JW31D	DC630	U2J (EIA)	1500 ±5%	3.2	2.5	1.0	1.5	0.3 min
GRM32A7U2J182JW31D	DC630	U2J (EIA)	1800 ±5%	3.2	2.5	1.0	1.5	0.3 min
GRM32A7U2J222JW31D	DC630	U2J (EIA)	2200 ±5%	3.2	2.5	1.0	1.5	0.3 min
GRM31A7U3A100JW31D	DC1000	U2J (EIA)	10 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U3A120JW31D	DC1000	U2J (EIA)	12 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U3A150JW31D	DC1000	U2J (EIA)	15 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U3A180JW31D	DC1000	U2J (EIA)	18 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U3A220JW31D	DC1000	U2J (EIA)	22 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U3A270JW31D	DC1000	U2J (EIA)	27 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U3A330JW31D	DC1000	U2J (EIA)	33 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U3A390JW31D	DC1000	U2J (EIA)	39 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U3A470JW31D	DC1000	U2J (EIA)	47 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U3A560JW31D	DC1000	U2J (EIA)	56 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U3A680JW31D	DC1000	U2J (EIA)	68 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U3A820JW31D	DC1000	U2J (EIA)	82 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U3A101JW31D	DC1000	U2J (EIA)	100 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U3A121JW31D	DC1000	U2J (EIA)	120 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U3A151JW31D	DC1000	U2J (EIA)	150 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U3A181JW31D	DC1000	U2J (EIA)	180 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U3A221JW31D	DC1000	U2J (EIA)	220 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U3A271JW31D	DC1000	U2J (EIA)	270 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31A7U3A331JW31D	DC1000	U2J (EIA)	330 ±5%	3.2	1.6	1.0	1.5	0.3 min
GRM31B7U3A391JW31L	DC1000	U2J (EIA)	390 ±5%	3.2	1.6	1.25	1.5	0.3 min
	DC1000	U2J (EIA)	470 ±5%	3.2	1.6	1.25	1.5	0.3 min

Continued on the following page.



Part Number	Rated Voltage (V)	TC Code (Standard)	Capacitance (pF)	Length L (mm)	Width W (mm)	Thickness T (mm)	Electrode g min. (mm)	Electrode e (mm)
GRM31A7U3D100JW31D	DC2000	U2J (EIA)	10 ±5%	3.2	1.6	1.0	1.8	0.3 min.
GRM31A7U3D120JW31D	DC2000	U2J (EIA)	12 ±5%	3.2	1.6	1.0	1.8	0.3 min.
GRM31A7U3D150JW31D	DC2000	U2J (EIA)	15 ±5%	3.2	1.6	1.0	1.8	0.3 min.
GRM31A7U3D180JW31D	DC2000	U2J (EIA)	18 ±5%	3.2	1.6	1.0	1.8	0.3 min.
GRM31A7U3D220JW31D	DC2000	U2J (EIA)	22 ±5%	3.2	1.6	1.0	1.8	0.3 min.
GRM31A7U3D270JW31D	DC2000	U2J (EIA)	27 ±5%	3.2	1.6	1.0	1.8	0.3 min.
GRM31A7U3D330JW31D	DC2000	U2J (EIA)	33 ±5%	3.2	1.6	1.0	1.8	0.3 min.
GRM31A7U3D390JW31D	DC2000	U2J (EIA)	39 ±5%	3.2	1.6	1.0	1.8	0.3 min.
GRM31A7U3D470JW31D	DC2000	U2J (EIA)	47 ±5%	3.2	1.6	1.0	1.8	0.3 min.
GRM31A7U3D560JW31D	DC2000	U2J (EIA)	56 ±5%	3.2	1.6	1.0	1.8	0.3 min.
GRM31A7U3D680JW31D	DC2000	U2J (EIA)	68 ±5%	3.2	1.6	1.0	1.8	0.3 min.
GRM32A7U3D820JW31D	DC2000	U2J (EIA)	82 ±5%	3.2	2.5	1.0	1.8	0.3 min.
GRM32A7U3D101JW31D	DC2000	U2J (EIA)	100 ±5%	3.2	2.5	1.0	1.8	0.3 min.
GRM32A7U3D121JW31D	DC2000	U2J (EIA)	120 ±5%	3.2	2.5	1.0	1.8	0.3 min.
GRM32A7U3D151JW31D	DC2000	U2J (EIA)	150 ±5%	3.2	2.5	1.0	1.8	0.3 min.
GRM32B7U3D181JW31L	DC2000	U2J (EIA)	180 ±5%	3.2	2.5	1.25	1.8	0.3 min.
GRM32B7U3D221JW31L	DC2000	U2J (EIA)	220 ±5%	3.2	2.5	1.25	1.8	0.3 min.
GRM42A7U3F270JW31L	DC3150	U2J (EIA)	27 ±5%	4.5	2.0	1.0	2.9	0.3 min.
GRM42A7U3F330JW31L	DC3150	U2J (EIA)	33 ±5%	4.5	2.0	1.0	2.9	0.3 min.
GRM42A7U3F390JW31L	DC3150	U2J (EIA)	39 ±5%	4.5	2.0	1.0	2.9	0.3 min.
GRM42A7U3F470JW31L	DC3150	U2J (EIA)	47 ±5%	4.5	2.0	1.0	2.9	0.3 min.
GRM42A7U3F560JW31L	DC3150	U2J (EIA)	56 ±5%	4.5	2.0	1.0	2.9	0.3 min.
GRM42A7U3F680JW31L	DC3150	U2J (EIA)	68 ±5%	4.5	2.0	1.0	2.9	0.3 min.
GRM42A7U3F820JW31L	DC3150	U2J (EIA)	82 ±5%	4.5	2.0	1.0	2.9	0.3 min.
GRM42A7U3F101JW31L	DC3150	U2J (EIA)	100 ±5%	4.5	2.0	1.0	2.9	0.3 min.



GRM Series Specifications and Test Methods

No.	Ite	m	Specifications		Test Method		
1	Operating Temperatu	re Range	-55 to +125℃		-		
2	Appearan	се	No defects or abnormalities	Visual inspection			
3	Dimensio	ns	Within the specified dimension	Using calipers and mic	rometers		
4	Dielectric	Strength	No defects or abnormalities	No failure should be ob applied between the ter charge/discharge curre Rated Voltage DC250V DC630V	rminations for 1 to ent is less than 50r Tes 200% of th	5 sec., provided th	
5	Insulation F (I.R.)	Resistance	More than 10,000MΩ	DC1kV, DC2kV, DC3.15kV 130% of the rated voltage The insulation resistance should be measured with DC500±5 (DC250±25V in case of rated voltage: DC250V) and within 6			
	(I.R.)			sec. of charging.			
6	Capacitar	nce	Within the specified tolerance	The capacitance/Q sho		at the frequency a	
_	-		4 999	Capacitance	Frequency	Voltage	
7	Q		1,000 min.	C<1,000pF C≧1,000pF	1±0.2MHz 1±0.2kHz	AC0.5 to 5V(r.m.s AC1±0.2V(r.m.s.)	
8	Capacitar Temperat Character	ure	Temp. Coefficient COG char. : 0±30ppm/°C (Temp. Range : +25 to +125°C) 0+30, -72ppm/°C (Temp. Range : -55 to +25°C) U2J char. : -750±120ppm/°C (Temp. Range : +25 to +125°C) -750+120, -347ppm/°C (Temp. Range : -55 to +25°C)	Solder the capacitor to	Tempera 25: Min. Operatii 25: Max. Operati 25: the testing jig (glas	±2 ng Temp.±3 ±2 ng Temp.±2 ±2	
9	9 Adhesive Strength of Termination		No removal of the terminations or other defect should occur.	in Fig. 1. Then apply 10N force in the direction of the arrow. The soldering should be done using the reflow method and should be conducted with care so that the soldering is uniforr and free of defects such as heat shock.			
		Appearance	No defects or abnormalities	Solder the capacitor to t			
10	Vibration Resistance	Capacitance Q	Within the specified tolerance	The capacitor should be having a total amplitude uniformly between the a frequency range, from 1 traversed in approximat for a period of 2 hrs. in e directions (total of 6 hrs.	e of 1.5mm, the free approximate limits of 10 to 55Hz and retu- ely 1 min. This mo each of 3 mutually	quency being varied of 10 and 55Hz. Th urn to 10Hz, should tion should be appl	

Continued on the following page.



GRM Series Specifications and Test Methods

Continued from the preceding page.

۷o.	Ite	m	Specifications	Test Method
11	Deflection	ı	No marking defects No marking defects $f = \frac{b}{0} + \frac{0}{0} + \frac{1}{0} + $	Solder the capacitor to the testing jig (glass epoxy board) shown in Fig. 2. Then apply a force in the direction shown in Fig. 3. The soldering should be done using the reflow method and should be conducted with care so that the soldering is uniform and free of defects such as heat shock. $\underbrace{\begin{array}{c} \begin{array}{c} & \\ & \\ & \\ & \\ & \\ & \\ & \\ & \\ & \\ & $
12	Solderabi Terminati	-	75% of the terminations are to be soldered evenly and continuously.	Immerse the capacitor in a solution of ethanol (JIS-K-8101) and rosin (JIS-K-5902) (25% rosin in weight proportion). Immerse in solder solution for 2±0.5 sec. Immersing speed: 25±2.5mm/s Temp. of solder: 245±5°C Lead Free Solder (Sn-3.0Ag-0.5Cu) 235±5°C H60A or H63A Eutectic Solder
	Resistance	Appearance Capacitance Change	No marking defects Within ±2.5%	 Preheat the capacitor at 120 to 150℃* for 1 min. Immerse the capacitor in solder solution at 260±5℃ for 10±1 sec Let sit at room condition* for 24±2 hrs., then measure. Immersing speed: 25±2.5mm/s
13	to Soldering	Q	1,000 min.	*Preheating for more than 3.2×2.5mm
	Heat	I.R.	More than 10,000MΩ	
		Dielectric Strength	In accordance with item No.4	Step Temperature Time 1 100 to 120°C 1 min. 2 170 to 200°C 1 min.
		Appearance	No marking defects	Fix the capacitor to the supporting jig (glass epoxy board) shown
		Capacitance Change	Within ±2.5%	in Fig. 4. Perform the 5 cycles according to the 4 heat treatments listed in the following table.
		Q	500 min.	Let sit for 24±2 hrs. at room condition,* then measure.
		I.R.	More than 10,000MΩ	Step Temperature (℃) Time (min.) 1 Min. Operating Temp.±3 30±3
14	Temperature Cycle	Dielectric Strength	In accordance with item No.4	2 Room Temp. 2 to 3 3 Max. Operating Temp.±2 30±3 4 Room Temp. 2 to 3 4 Room Temp. 2 to 3 5 F2 F2 6 F3 F3 6 F3 F3
		Appearance	No marking defects	· · · · · ·
	Lines 1.00	Capacitance Change	Within ±5.0%	Let the capacitor sit at 40±2℃ and relative humidity of 90 to 95%
15	Humidity (Steady	Q	350 min.	for 500^{+2} hrs.
	State)	I.R.	More than 1,000MΩ	Remove and let sit for 24±2 hrs. at room condition,* then measure.
		Dielectric Strength	In accordance with item No.4	
		Appearance	No marking defects	Apply voltage as in Table for 1,000 ⁺⁴⁸ hrs. at maximum
		Capacitance Change	Within ±3.0%	operating temperature ±3℃. Remove and let sit for 24±2 hrs. at room condition,* then measure.
16	Life	Q	350 min.	Rated Voltage Applied Voltage
		I.R. Dielectric	More than 1,000MΩ	DC250V 150% of the rated voltage DC630V, DC1kV, DC2kV, DC3.15kV 120% of the rated voltage
		Strength	In accordance with item No.4	

* "Room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

Chip Monolithic Ceramic Capacitors (Medium Voltage)



High Capacitance for General Use GRM Series

Features

For General Purpose GRM/GR J Series

Only for Applications

AC250V Type GA2 Series

- 1. A new monolithic structure for small, high capacitance capable of operating at high voltage levels.
- 2. Sn-plated external electrodes provide good solderability.
- 3. Use the GRM18/21/31 types with flow or reflow soldering, and other types with reflow soldering only.

Applications

- 1. Ideal for use on diode-snubber circuits for switching power supplies.
- 2. Ideal for use as primary-secondary coupling for DC-DC converters.
- 3. Ideal for use on line filters and ringer detectors for telephones, facsimiles and modems.

Do not use these products in any Automotive Power train or Safety equipment including Battery chargers for Electric Vehicles and Plug-in Hybrids. Only Murata products clearly stipulated as "for Automotive use" can be used for automobile applications such as Power train and Safety equipment.



~		- L								
Part Number	Dimensions (mm)									
Fait Number	L	W	Т	е	g min.					
GRM188	1.6 ±0.1	0.8 ±0.1	0.8 ±0.1	0.2 to 0.5	0.4					
GRM21A	2.0 ±0.2	1.25 ±0.2	1.0 +0,-0.3		0.7					
GRM21B	2.0 ±0.2	1.25 ±0.2	1.25 ±0.2		0.7					
GRM31B	3.2 ±0.2	1.6 ±0.2	1.25 +0,-0.3							
GRM31C	3.Z <u>1</u> 0.Z	1.0 ±0.2	1.6 ±0.2		1.2					
GRM32Q	3.2 ±0.3	2.5 ±0.2	1.5 +0,-0.3	0.3 min.	1.2					
GRM32D	3.2 ±0.3	2.5 ±0.2	2.0 +0,-0.3							
GRM43Q	4.5 ±0.4	3.2 ±0.3	1.5 +0,-0.3		2.2					
GRM43D	4.5 <u>1</u> 0.4	3.2 IU.3	2.0 +0,-0.3		Z.Z					
GRM55D	5.7 ±0.4	5.0 ±0.4	2.0 +0,-0.3		3.2					

Part Number	Rated Voltage (V)	TC Code (Standard)	Capacitance	Length L (mm)	Width W (mm)	Thickness T (mm)	Electrode g min. (mm)	Electrode e (mm)
GRM188R72E221KW07D	DC250	X7R (EIA)	220pF ±10%	1.6	0.8	0.8	0.4	0.2 to 0.5
GRM188R72E331KW07D	DC250	X7R (EIA)	330pF ±10%	1.6	0.8	0.8	0.4	0.2 to 0.5
GRM188R72E471KW07D	DC250	X7R (EIA)	470pF ±10%	1.6	0.8	0.8	0.4	0.2 to 0.5
GRM188R72E681KW07D	DC250	X7R (EIA)	680pF ±10%	1.6	0.8	0.8	0.4	0.2 to 0.5
GRM188R72E102KW07D	DC250	X7R (EIA)	1000pF ±10%	1.6	0.8	0.8	0.4	0.2 to 0.5
GRM21AR72E102KW01D	DC250	X7R (EIA)	1000pF ±10%	2.0	1.25	1.0	0.7	0.3 min.
GRM188R72E152KW07D	DC250	X7R (EIA)	1500pF ±10%	1.6	0.8	0.8	0.4	0.2 to 0.5
GRM21AR72E152KW01D	DC250	X7R (EIA)	1500pF ±10%	2.0	1.25	1.0	0.7	0.3 min.
GRM188R72E222KW07D	DC250	X7R (EIA)	2200pF ±10%	1.6	0.8	0.8	0.4	0.2 to 0.5
GRM21AR72E222KW01D	DC250	X7R (EIA)	2200pF ±10%	2.0	1.25	1.0	0.7	0.3 min.
GRM21AR72E332KW01D	DC250	X7R (EIA)	3300pF ±10%	2.0	1.25	1.0	0.7	0.3 min.
GRM21AR72E472KW01D	DC250	X7R (EIA)	4700pF ±10%	2.0	1.25	1.0	0.7	0.3 min.
GRM21AR72E682KW01D	DC250	X7R (EIA)	6800pF ±10%	2.0	1.25	1.0	0.7	0.3 min.
GRM21BR72E103KW03L	DC250	X7R (EIA)	10000pF ±10%	2.0	1.25	1.25	0.7	0.3 min.
GRM31BR72E153KW01L	DC250	X7R (EIA)	15000pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
GRM31BR72E223KW01L	DC250	X7R (EIA)	22000pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
GRM31CR72E333KW03L	DC250	X7R (EIA)	33000pF ±10%	3.2	1.6	1.6	1.2	0.3 min.
GRM31CR72E473KW03L	DC250	X7R (EIA)	47000pF ±10%	3.2	1.6	1.6	1.2	0.3 min.
GRM31BR72E683KW01L	DC250	X7R (EIA)	68000pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
GRM32QR72E683KW01L	DC250	X7R (EIA)	68000pF ±10%	3.2	2.5	1.5	1.2	0.3 min.
GRM31CR72E104KW03L	DC250	X7R (EIA)	0.10μF ±10%	3.2	1.6	1.6	1.2	0.3 min.
GRM32DR72E104KW01L	DC250	X7R (EIA)	0.10μF ±10%	3.2	2.5	2.0	1.2	0.3 min.
GRM32QR72E154KW01L	DC250	X7R (EIA)	0.15μF ±10%	3.2	2.5	1.5	1.2	0.3 min.
GRM43QR72E154KW01L	DC250	X7R (EIA)	0.15μF ±10%	4.5	3.2	1.5	2.2	0.3 min.
GRM32DR72E224KW01L	DC250	X7R (EIA)	0.22μF ±10%	3.2	2.5	2.0	1.2	0.3 min.

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Part Number	Rated Voltage (V)	TC Code (Standard)	Capacitance	Length L (mm)	Width W (mm)	Thickness T (mm)	Electrode g min. (mm)	Electrode e (mm)
RM43DR72E224KW01L	DC250	X7R (EIA)	0.22µF ±10%	4.5	3.2	2.0	2.2	0.3 min.
RM43DR72E334KW01L	DC250	X7R (EIA)	0.33µF ±10%	4.5	3.2	2.0	2.2	0.3 min.
RM55DR72E334KW01L	DC250	X7R (EIA)	0.33µF ±10%	5.7	5.0	2.0	3.2	0.3 min.
RM43DR72E474KW01L	DC250	X7R (EIA)	0.47µF ±10%	4.5	3.2	2.0	2.2	0.3 min.
RM55DR72E474KW01L	DC250	X7R (EIA)	0.47µF ±10%	5.7	5.0	2.0	3.2	0.3 min.
RM55DR72E105KW01L	DC250	X7R (EIA)	1.0μF ±10%	5.7	5.0	2.0	3.2	0.3 min.
RM31BR72J102KW01L	DC630	X7R (EIA)	1000pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
RM31BR72J152KW01L	DC630	X7R (EIA)	1500pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
RM31BR72J222KW01L	DC630	X7R (EIA)	2200pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
RM31BR72J332KW01L	DC630	X7R (EIA)	3300pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
RM31BR72J472KW01L	DC630	X7R (EIA)	4700pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
RM31BR72J682KW01L	DC630	X7R (EIA)	6800pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
RM31BR72J103KW01L	DC630	X7R (EIA)	10000pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
RM31CR72J153KW03L	DC630	X7R (EIA)	15000pF ±10%	3.2	1.6	1.6	1.2	0.3 min.
RM32QR72J223KW01L	DC630	X7R (EIA)	22000pF ±10%	3.2	2.5	1.5	1.2	0.3 min.
RM32DR72J333KW01L	DC630	X7R (EIA)	33000pF ±10%	3.2	2.5	2.0	1.2	0.3 min.
RM32DR72J473KW01L	DC630	X7R (EIA)	47000pF ±10%	3.2	2.5	2.0	1.2	0.3 min.
RM43QR72J683KW01L	DC630	X7R (EIA)	68000pF ±10%	4.5	3.2	1.5	2.2	0.3 min.
RM43DR72J104KW01L	DC630	X7R (EIA)	0.10µF ±10%	4.5	3.2	2.0	2.2	0.3 min.
RM55DR72J154KW01L	DC630	X7R (EIA)	0.15µF ±10%	5.7	5.0	2.0	3.2	0.3 min.
RM55DR72J224KW01L	DC630	X7R (EIA)	0.22µF ±10%	5.7	5.0	2.0	3.2	0.3 min.
RM31BR73A471KW01L	DC1000	X7R (EIA)	470pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
RM31BR73A102KW01L	DC1000	X7R (EIA)	1000pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
RM31BR73A152KW01L	DC1000	X7R (EIA)	1500pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
RM31BR73A222KW01L	DC1000	X7R (EIA)	2200pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
RM31BR73A332KW01L	DC1000	X7R (EIA)	3300pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
RM31BR73A472KW01L	DC1000	X7R (EIA)	4700pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
RM32QR73A682KW01L	DC1000	X7R (EIA)	6800pF ±10%	3.2	2.5	1.5	1.2	0.3 min.
RM32QR73A103KW01L	DC1000	X7R (EIA)	10000pF ±10%	3.2	2.5	1.5	1.2	0.3 min.
RM32DR73A153KW01L	DC1000	X7R (EIA)	15000pF ±10%	3.2	2.5	2.0	1.2	0.3 min.
RM32DR73A223KW01L	DC1000	X7R (EIA)	22000pF ±10%	3.2	2.5	2.0	1.2	0.3 min.
RM43DR73A333KW01L	DC1000	X7R (EIA)	33000pF ±10%	4.5	3.2	2.0	2.2	0.3 min.
RM43DR73A473KW01L	DC1000	X7R (EIA)	47000pF ±10%	4.5	3.2	2.0	2.2	0.3 min.
RM55DR73A104KW01L	DC1000	X7R (EIA)	0.10µF ±10%	5.7	5.0	2.0	3.2	0.3 min.

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GRM Series Specifications and Test Methods

No.	Ite	m	Specifications		Test Method		
1	Operating Temperatu	ire Range	–55 to +125°C		-		
2	Appearan	ce	No defects or abnormalities	Visual inspection			
3	Dimensio	ns	Within the specified dimensions	Using calipers and	d micrometers		
4	Dielectric	Strength	No defects or abnormalities	(200% of the rated 120% of the rated applied between t	be observed when 150% of the rated voltage d voltage in case of rated voltage: DC250V, voltage in case of rated voltage: DC1kV) is he terminations for 1 to 5 sec., provided the current is less than 50mA.		
5	Insulation F (I.R.)	Resistance	C≧0.01μF: More than 100MΩ • μF C<0.01μF: More than 10,000MΩ		istance should be measured with DC500±50\ ase of rated voltage: DC250V) and within 60±4		
6	Capacitar	nce	Within the specified tolerance				
7	Dissipatio Factor (D.		0.025 max.	· ·	D.F. should be measured at a frequency of oltage of AC1±0.2V(r.m.s.)		
				The capacitance r specified in the Ta	neasurement should be made at each step able.		
				Step	Temperature (°C)		
	Concelter		Car Change	1	25±2		
8	Capacitar Temperat		Cap. Change Within ±15%	2 3	Min. Operating Temp.±3 25±2		
0	Character		(Temp. Range: -55 to $+125^{\circ}$ C)	4	Max. Operating Temp.±2		
			(5	25±2		
					reatment at $150\pm_{Po}^{\circ}$ C for 60 ± 5 min. and then 's. at room condition.*		
9	Adhesive Strength of Termination		No removal of the terminations or other defect should occur.	Solder the capacitor to the testing jig (glass epoxy board) sho in Fig. 1. Then apply 10N force in the direction of the arrow. The soldering should be done using the reflow method and should be conducted with care so that the soldering is unifor and free of defects such as heat shock.			
		Appearance	No defects or abnormalities		tor to the test jig (glass epoxy board).		
		Capacitance	Within the specified tolerance		uld be subjected to a simple harmonic motior blitude of 1.5mm, the frequency being varied		
10 Vibration Resistance D.F.		D.F.	0.025 max.	uniformly between frequency range, t traversed in appro	n the approximate limits of 10 and 55Hz. The from 10 to 55Hz and return to 10Hz, should be eximately 1 min. This motion should be applied rs. in each of 3 mutually perpendicular		

* "Room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

Continued on the following page. \square



Only for Applications For General Purpose GRM/GRJ Series

AC250V Type GA2 Series

Safety Standard Certified GA3 Series

Product Information

GRM Series Specifications and Test Methods

Continued from the preceding page.

0.	Item		S	pecificatior	IS			Test Method	
1 Deflec	Deflection $\begin{array}{c ccccccccccccccccccccccccccccccccccc$					^J in Fig. 2. Then apply a The soldering should be cor	pacitor to the testing jig (glass force in the direction shown i g should be done using the rel nducted with care so that the effects such as heat shock. $\begin{array}{c} 20 & 50 \\ \hline \\ 20 & 50 \\ \hline \\ 50 \\ \hline \\ 9 \\ 1.0n \\ 9 \\ 9 \\ 1.$	n Fig. 3. flow method and soldering is uniform _g	
2 Solder Termir	ability of nation	75% of the termin			1	d continuously.	rosin (JIS-K-5 Immerse in so Immersing sp	capacitor in a solution of etha 5902) (25% rosin in weight pro- older solution for 2±0.5 sec. reed: 25±2.5mm/s ler: 245±5°C Lead Free Solder 235±5°C H60A or H63A E	oportion). er (Sn-3.0Ag-0.5Cu)
	Appearance Capacitance Change	No marking defo	ects				Immerse the sec. Let sit at	apacitor at 120 to 150°C* for capacitor in solder solution at room condition* for 24±2 hrs speed: 25±2.5mm/s	260±5°C for 10±1
3 Resistant 3 to Solder Heat		0.025 max. C≧0.01μF: Mor C<0.01μF: Mor		•				nt eat treatment at 150±1°C fol ±2 hrs. at room condition.*	r 60±5 min. and then
	Dielectric Strength	In accordance v	vith item No	0.4			*Preheating t Step 1 2	for more than 3.2×2.5mm Temperature 100 to 120°C 170 to 200°C	Time 1 min. 1 min.
	Appearance Capacitance Change	No marking defe	ects				in Fig. 4. Perform the 5 the following	itor to the supporting jig (glass cycles according to the 4 heatable.	at treatments listed in
	D.F.	0.025 max. C≧0.01μF: Mor C<0.01μF: Mor		•			Let sit for 24±	2 hrs. at room condition,* the Temperature (°C) Min. Operating Temp.±3	Time (min.) 30±3
4 Temperatu Cycle	Dielectric Strength	In accordance v						eat treatment at 150 [±] 18°C foi ±2 hrs. at room condition.*	2 to 3 30±3 2 to 3 r 60±5 min. and then er resist
	Appearance	No marking defe	acts					Fig. 4	
	Capacitance Change						Let the capac for 500^{+24}_{-0} hrs	itor sit at $40\pm2^{\circ}$ C and relative ls.	humidity of 90 to 95%
Humidi 5 (Steady		0.05 max.					Remove and measure.	let sit for 24±2 hrs. at room co	ondition,* then
State)	I.R.	C≧0.01µF: Mor C<0.01µF: Mor						nt eat treatment at 150 ⁺ 1 ⁰ °C for ±2 hrs. at room condition.*	r 60±5 min. and then
	Dielectric Strength In accordance with item No.4								

* "Room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

Continued on the following page.



GRM Series Specifications and Test Methods

Continued from the preceding page.

No.	lte	em	Specifications	Test Method
		Appearance	No marking defects	Apply 120% of the rated voltage (150% of the rated voltage in
		Capacitance Change	Within ±15% (rated voltage: DC250V, DC630V) Within ±20% (rated voltage: DC1kV)	case of rated voltage: DC250V, 110% of the rated voltage in case of rated voltage: DC1kV) for 1,000 ^{±48} hrs. at maximum
16	Life D	D.F.	0.05 max.	operating temperature ±3°C. Remove and let sit for 24±2hrs. at room condition,* then measure.
	2	I.R. $C \ge 0.01 \mu F$: More than $10M\Omega \cdot \mu F$ C<0.01 μF : More than $1,000M\Omega$	The charge/discharge current is less than 50mA. •Pretreatment	
		Dielectric Strength In accordance with item No.4		Apply test voltage for 60±5 min. at test temperature. Remove and let sit for 24±2 hrs. at room condition.*
		Appearance	No marking defects	
	Humidity Loading	Capacitance Change	Within ±15%	Apply the rated voltage at 40±2°C and relative humidity of 90 to 95% for 500 ⁺² ₀ ⁺² hrs.
17	(Application:	D.F.	0.05 max.	Remove and let sit for 24±2 hrs. at room condition,* then measure.
.,	DC250V, DC630V item)	I.R.	C≧0.01μF: More than 10MΩ • μF C<0.01μF: More than 1,000MΩ	Pretreatment Apply test voltage for 60±5 min. at test temperature.
	,	Dielectric Strength	In accordance with item No.4	Remove and let sit for 24±2 hrs. at room condition.*

* "Room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa



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Chip Monolithic Ceramic Capacitors (Medium Voltage)

Soft Termination Type GRJ series

Features

- 1. Improves endurance against Board Bending Stress.
- 2. Reduces the board bending stress by the conductive polymer termination.
- 3. Use the GRJ21/31 types with flow or reflow soldering, and other types with reflow soldering only.

Applications

Part Number

GRJ21AR72E102KWJ1D

GRJ21AR72E152KWJ1D

GRJ21AR72E222KWJ1D

GRJ21AR72E332KWJ1D

GRJ21AR72E472KWJ1D

GRJ21AR72E682KWJ1D

GRJ21BR72E103KWJ3L

GRJ31BR72E153KWJ1L

GRJ31BR72E223KWJ1L

GRJ31CR72E333KWJ3L

GRJ31CR72E473KWJ3L

GRJ31BR72E683KWJ1L

GRJ32QR72E683KWJ1L

GRJ31CR72E104KWJ3L

GRJ32DR72E104KWJ1L

GRJ32QR72E154KWJ1L

GRJ43QR72E154KWJ1L

GRJ32DR72E224KWJ1L

GRJ43DR72E224KWJ1L

GRJ43DR72E334KWJ1L

GRJ55DR72E334KWJ1L

GRJ43DR72E474KWJ1L

GRJ55DR72E474KWJ1L

GRJ55DR72E105KWJ1L

GRJ31BR72J102KWJ1L

GRJ31BR72J152KWJ1L

GRJ31BR72J222KWJ1L

- 1. Ideal for use on diode-snubber circuits for switching power supplies.
- Ideal for use as primary-secondary coupling for DC-DC converters.
- Ideal for use on line filters and ringer detectors for telephones, facsimiles and modems.

Do not use these products in any Automotive Power train or Safety equipment including Battery chargers for Electric Vehicles and Plug-in Hybrids. Only Murata products clearly stipulated as "for Automotive use" can be used for automobile applications such as Power train and Safety equipment.

Rated Voltage

(V)

DC250

DC630

DC630

DC630

TC Code

(Standard)

X7R (EIA)

|--|

L ***									
Part Number		Dir	nensions (mm	ı)					
Fait Number	L W T		е	g min.					
GRJ21A	2.0 ±0.2	1.25 ±0.2	1.0 +0,-0.3		0.7				
GRJ21B	2.0 ±0.2	1.25 ±0.2	1.25 ±0.2		0.7				
GRJ31B	3.2 ±0.2	1.6 ±0.2	1.25 +0,-0.3						
GRJ31C	3.2 <u>1</u> 0.2	1.0 ±0.2	1.6 ±0.2		1.2				
GRJ32Q	3.2 ±0.3	2.5 ±0.2	1.5 +0,-0.3	0.3 min.					
GRJ32D	3.2 ±0.3	2.5 ±0.2	2.0 +0,-0.3						
GRJ43Q	4.5 ±0.4	3.2 ±0.3	1.5 +0,-0.3		2.2				
GRJ43D	4.5 <u>±</u> 0.4	3.2 ±0.3	2.0 +0,-0.3		2.2				
GRJ55D	5.7 ±0.4	5.0 ±0.4	2.0 +0,-0.3		3.2				

Capacitance	Length L (mm)	Width W (mm)	Thickness T (mm)	Electrode g min. (mm)	Electrode e (mm)
1000pF ±10%	2.0	1.25	1.0	0.7	0.3 min.
1500pF ±10%	2.0	1.25	1.0	0.7	0.3 min.
2200pF ±10%	2.0	1.25	1.0	0.7	0.3 min.
3300pF ±10%	2.0	1.25	1.0	0.7	0.3 min.
4700pF ±10%	2.0	1.25	1.0	0.7	0.3 min.
6800pF ±10%	2.0	1.25	1.0	0.7	0.3 min.
10000pF ±10%	2.0	1.25	1.25	0.7	0.3 min.
15000pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
22000pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
33000pF ±10%	3.2	1.6	1.6	1.2	0.3 min.
47000pF ±10%	3.2	1.6	1.6	1.2	0.3 min.
68000pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
68000pF ±10%	3.2	2.5	1.5	1.2	0.3 min.
0.10μF ±10%	3.2	1.6	1.6	1.2	0.3 min.
0.10μF ±10%	3.2	2.5	2.0	1.2	0.3 min.
0.15μF ±10%	3.2	2.5	1.5	1.2	0.3 min.
0.15μF ±10%	4.5	3.2	1.5	2.2	0.3 min.
0.22µF ±10%	3.2	2.5	2.0	1.2	0.3 min.
0.22µF ±10%	4.5	3.2	2.0	2.2	0.3 min.
0.33μF ±10%	4.5	3.2	2.0	2.2	0.3 min.

2.0

2.0

2.0

2.0

1.25

1.25

1.25



 $0.33 \mu F \pm 10\%$

0.47µF ±10%

0.47µF ±10%

1.0µF ±10%

1000pF ±10%

1500pF ±10%

2200pF ±10%

5.7

4.5

5.7

5.7

3.2

3.2

3.2

5.0

3.2

5.0

5.0

1.6

1.6

1.6

3.2

2.2

3.2

3.2

1.2

1.2

1.2

0.3 min.

0.3 min.

0.3 min.

0.3 min.

0.3 min.

0.3 min.

0.3 min

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For General Purpose GRM/GRJ Series	Part Number	Rated Voltage (V)	TC Code (Standard)	Capacitance	Length L (mm)	Width W (mm)	Thickness T (mm)	Electrode g min. (mm)	Electrode e (mm)
Pur	GRJ31BR72J332KWJ1L	DC630	X7R (EIA)	3300pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
I al l	GRJ31BR72J472KWJ1L	DC630	X7R (EIA)	4700pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
ene M/G	GRJ31BR72J682KWJ1L	DC630	X7R (EIA)	6800pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
GRI GRI	GRJ31BR72J103KWJ1L	DC630	X7R (EIA)	10000pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
Ч Ч	GRJ31CR72J153KWJ3L	DC630	X7R (EIA)	15000pF ±10%	3.2	1.6	1.6	1.2	0.3 min.
	GRJ32QR72J223KWJ1L	DC630	X7R (EIA)	22000pF ±10%	3.2	2.5	1.5	1.2	0.3 min.
suo	GRJ32DR72J333KWJ1L	DC630	X7R (EIA)	33000pF ±10%	3.2	2.5	2.0	1.2	0.3 min.
cati	GRJ32DR72J473KWJ1L	DC630	X7R (EIA)	47000pF ±10%	3.2	2.5	2.0	1.2	0.3 min.
ildo	GRJ43QR72J683KWJ1L	DC630	X7R (EIA)	68000pF ±10%	4.5	3.2	1.5	2.2	0.3 min.
Only for Applications	GRJ43DR72J104KWJ1L	DC630	X7R (EIA)	0.10μF ±10%	4.5	3.2	2.0	2.2	0.3 min.
y fo	GRJ55DR72J154KWJ1L	DC630	X7R (EIA)	0.15µF ±10%	5.7	5.0	2.0	3.2	0.3 min.
Onl	GRJ55DR72J224KWJ1L	DC630	X7R (EIA)	0.22µF ±10%	5.7	5.0	2.0	3.2	0.3 min.
	GRJ31BR73A471KWJ1L	DC1000	X7R (EIA)	470pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
	GRJ31BR73A102KWJ1L	DC1000	X7R (EIA)	1000pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
s pe	GRJ31BR73A152KWJ1L	DC1000	X7R (EIA)	1500pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
AC250V Type GA2 Series	GRJ31BR73A222KWJ1L	DC1000	X7R (EIA)	2200pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
50V 2 S	GRJ31BR73A332KWJ1L	DC1000	X7R (EIA)	3300pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
C2 GA	GRJ31BR73A472KWJ1L	DC1000	X7R (EIA)	4700pF ±10%	3.2	1.6	1.25	1.2	0.3 min.
4	GRJ32QR73A682KWJ1L	DC1000	X7R (EIA)	6800pF ±10%	3.2	2.5	1.5	1.2	0.3 min.
	GRJ32QR73A103KWJ1L	DC1000	X7R (EIA)	10000pF ±10%	3.2	2.5	1.5	1.2	0.3 min.
s	GRJ32DR73A153KWJ1L	DC1000	X7R (EIA)	15000pF ±10%	3.2	2.5	2.0	1.2	0.3 min.
erie	GRJ32DR73A223KWJ1L	DC1000	X7R (EIA)	22000pF ±10%	3.2	2.5	2.0	1.2	0.3 min.
Safety Standard Certified GA3 Series	GRJ43DR73A333KWJ1L	DC1000	X7R (EIA)	33000pF ±10%	4.5	3.2	2.0	2.2	0.3 min.
Sta GA	GRJ43DR73A473KWJ1L	DC1000	X7R (EIA)	47000pF ±10%	4.5	3.2	2.0	2.2	0.3 min.
ety ied	GRJ55DR73A104KWJ1L	DC1000	X7R (EIA)	0.10μF ±10%	5.7	5.0	2.0	3.2	0.3 min.



GRJ Series Specifications and Test Methods

No.	Ite	m	Specifications		Test Method		
1	Operating Temperatu	ire Range	-55 to +125°C		-		
2	Appearan	ice	No defects or abnormalities	Visual inspection			
3	Dimensio	ns	Within the specified dimensions	Using calipers and micrometers			
4	Dielectric	Strength	No defects or abnormalities	applied between the	observed when voltage in the Table is terminations for 1 to 5 sec., provided the rrent is less than 50mA. Test Voltage 200% of the rated voltage 150% of the rated voltage 120% of the rated voltage		
5	Insulation R (I.R.)	Resistance	C≧0.01μF: More than 100MΩ • μF C<0.01μF: More than 10,000MΩ		ance should be measured with DC500±50V a of rated voltage: DC250V) and within 60±5		
6	Capacitar	nce	Within the specified tolerance				
7	Dissipatio Factor (D.		0.025 max.	· ·	 should be measured at a frequency of age of AC1±0.2V(r.m.s.) 		
8	Capacitance 8 Temperature Characteristics		erature Within ±15%		asurement should be made at each step e. Temperature (°C) 25±2 Min. Operating Temp.±3 25±2 Max. Operating Temp.±2 25±2 atment at 150^{+0}_{-0} °C for 60±5 min. and then at room condition.*		
9	Adhesive of Termin		No removal of the terminations or other defect should occur.	in Fig. 1. Then apply 10N forc The soldering should	to the testing jig (glass epoxy board) shown e in the direction of the arrow. d be done using the reflow method and d with care so that the soldering is uniform such as heat shock.		
		Appearance	No defects or abnormalities	Solder the capacitor	to the test jig (glass epoxy board).		
		Capacitance	Within the specified tolerance	1 .	d be subjected to a simple harmonic motion ude of 1.5mm, the frequency being varied		
10	Vibration Resistance	D.F.	0.025 max.	uniformly between th frequency range, fro traversed in approxin for a period of 2 hrs. directions (total of 6	ne approximate limits of 10 and 55Hz. The m 10 to 55Hz and return to 10Hz, should be mately 1 min. This motion should be applied in each of 3 mutually perpendicular hrs.).		

* "Room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

Continued on the following page. \checkmark



GRJ Series Specifications and Test Methods

Continued from the preceding page.

	Ite	em	Specifications	Test Method			
		Appearance	No marking defects	Solder the capacitor to the testing jig (glass epoxy board) show			
		Capacitance Change	Within ±12.5%	 in Fig. 2. Then apply a force in the direction shown in Fig. 3. The soldering should be done using the reflow method and should be conducted with care so that the soldering is uniform and free of defects such as heat shock. 20 ⁵⁰ Pressurizing speed: 1.0mm/s 			
11	Deflection	n	$\begin{array}{c c} & & & & \\ \hline \hline & & & \\ \hline \hline & & & \\ \hline \hline & & & \\ \hline \hline & & \\ \hline \hline & & & \\ \hline \hline & & & \\ \hline \hline & & & \\ \hline \hline \\ \hline & & & \\ \hline \hline \hline \hline \hline \\ \hline \hline \hline \hline \hline \hline \hline \hline \hline \\ \hline	R230 Flexure=3 Capacitance meter			
			2.0×1.25 1.2 4.0 1.65 3.2×1.6 2.2 5.0 2.0 3.2×2.5 2.2 5.0 2.9 4.5×3.2 3.5 7.0 3.7 5.7×5.0 4.5 8.0 5.6	Fig. 3			
12	Solderabi Terminati	2	75% of the terminations are to be soldered evenly and continuously.	Immerse the capacitor in a solution of ethanol (JIS-K-8101) ar rosin (JIS-K-5902) (25% rosin in weight proportion). Immerse in solder solution for 2±0.5 sec. Immersing speed: 25±2.5mm/s Temp. of solder: 245±5°C Lead Free Solder (Sn-3.0Ag-0.5Cu) 235±5°C H60A or H63A Eutectic Solder			
		Appearance	No marking defects	Preheat the capacitor at 120 to 150°C* for 1 min.			
		Capacitance Change	Within ±10%	Immerse the capacitor in solder solution at 260±5°C for 10±1 sec. Let sit at room condition* for 24±2 hrs., then measure. •Immersing speed: 25±2.5mm/s			
	Resistance	D.F.	0.025 max.	•Pretreatment			
13	to Soldering Heat	I.R.	C≧0.01μF: More than 100MΩ • μF C<0.01μF: More than 10,000MΩ	Perform a heat treatment at 150 [±] 1 [°] ₃ °C for 60±5 min. and the let sit for 24±2 hrs. at room condition.*			
				*Preheating for more than 3.2×2.5mm			
		Dielectric Strength	In accordance with item No.4	Step Temperature Time 1 100 to 120°C 1 min.			
				2 170 to 200°C 1 min.			
		Appearance	No marking defects	Fix the capacitor to the supporting jig (glass epoxy board) show			
		Capacitance Change	Within ±7.5%	Perform the 5 cycles according to the 4 heat treatments listed i the following table.			
		D.F.	0.025 max.	Let sit for 24 ± 2 hrs. at room condition,* then measure.			
			C≧0.01μF: More than 100MΩ • μF	Step Temperature (°C) Time (min.)			
		I.R.	C<0.01 μ F: More than 10,000M Ω	1 Min. Operating Temp.±3 30±3 2 Room Temp. 2 to 3			
				2 Room remp. 2 to 3 3 Max. Operating Temp.±2 30±3			
	Temperature			4 Room Temp. 2 to 3			
14	Cycle	Dielectric		Pretreatment Perform a heat treatment at 150 [±] ₁ 8°C for 60±5 min. and the let sit for 24±2 hrs. at room condition.*			
		Strength In accordance with item No.4	In accordance with item No.4				
				Glass Epoxy Board Fig. 4			
		Appearance	No marking defects	Glass Epoxy Board			
		Appearance Capacitance Change	No marking defects Within ±15%	Glass Epoxy Board Fig. 4			
15	Humidity	Capacitance		Glass Epoxy Board Fig. 4 Let the capacitor sit at 40±2°C and relative humidity of 90 to 95 for 500±2°dhrs. Remove and let sit for 24±2 hrs. at room condition,* then			
15	Humidity (Steady State)	Capacitance Change	Within ±15%	Glass Epoxy Board Fig. 4 Let the capacitor sit at 40±2°C and relative humidity of 90 to 95° for 500±2°dhrs.			

* "Room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa



Only for Applications

GRJ Series Specifications and Test Methods

Continued from the preceding page.

No.	Ite	em	Specifications		Test Method			
		Appearance	No marking defects	Apply voltage as in Table for 1,000 ^{±4} 8 th hrs. at maximum				
		Capacitance Change	Within ±15% (rated voltage: DC250V, DC630V) Within ±20% (rated voltage: DC1kV)	operating temperature room condition,* then	±3°C. Remove and let sit for 24±2 hrs. at measure.			
		D.F.	0.05 max.	Rated Voltage DC250V	Applied Voltage 150% of the rated voltage			
16	Life	I.R.	C≧0.01μF: More than 10MΩ ∙ μF C<0.01μF: More than 1,000MΩ	DC630V DC1kV	120% of the rated voltage 110% of the rated voltage			
		Dielectric Strength	In accordance with item No.4	Pretreatment Apply test voltage for	current is less than 50mA. 60±5 min. at test temperature. r 24±2 hrs. at room condition.*			
		Appearance	No marking defects					
	Humidity Loading	Capacitance Change	Within ±15%	95% for 500 ⁺² 6 ^{thrs.}	Remove and let sit for 24±2 hrs. at room condition,* then			
17	(Application:	D.F.	0.05 max.	Remove and let sit for measure.				
.,	DC250V, DC630V item)	(2) (2) (1) (1) (2) (1)		Pretreatment Apply test voltage for				
		Dielectric Strength	In accordance with item No.4	Remove and let sit fo	r 24±2 hrs. at room condition.*			

* "Room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

Chip Monolithic Ceramic Capacitors (Medium Voltage)



For LCD Backlight Inverter Circuit GRM/DC3.15kV Series

Features

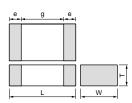
- 1. Low-loss and suitable for high frequency circuits
- 2. Murata's original internal electrode structure realizes high flash-over voltage.
- 3. A new monolithic structure for small, surfacemountable devices capable of operating at high voltage levels.
- 4. Sn-plated external electrodes realize good solderability.
- 5. Only for reflow soldering
- Capacitance values less than 22pF can be used in LCD backlight inverter circuits as long as the applied voltage, peak to peak, is less than 4.0kV at 100kHz or less.

Applications

Ideal for use as the ballast in LCD backlight inverter.

Do not use these products in any Automotive Power train or Safety equipment including Battery chargers for Electric Vehicles and Plug-in Hybrids. Only Murata products clearly stipulated as "for Automotive use" can be used for automobile applications such as Power train and Safety equipment.





Part Number		Dimensions (mm)						
Part Number	L	W	Т	e min.	g min.			
GRM42A	4.5 ±0.3	2.0 ±0.2	1.0 +0, -0.3	0.3	2.9			

Part Number	Rated Voltage (V)	TC Code (Standard)	Capacitance (pF)	Length L (mm)	Width W (mm)	Thickness T (mm)	Electrode g min. (mm)	Electrode e (mm)
GRM42A5C3F050DW01L	DC3150	COG (EIA)	5.0 ±0.5pF	4.5	2.0	1.0	2.9	0.3 min.
GRM42A5C3F100JW01L	DC3150	COG (EIA)	10 ±5%	4.5	2.0	1.0	2.9	0.3 min.
GRM42A5C3F120JW01L	DC3150	COG (EIA)	12 ±5%	4.5	2.0	1.0	2.9	0.3 min.
GRM42A5C3F150JW01L	DC3150	COG (EIA)	15 ±5%	4.5	2.0	1.0	2.9	0.3 min.
GRM42A5C3F180JW01L	DC3150	COG (EIA)	18 ±5%	4.5	2.0	1.0	2.9	0.3 min.
GRM42A5C3F220JW01L	DC3150	COG (EIA)	22 ±5%	4.5	2.0	1.0	2.9	0.3 min.
GRM42A5C3F270JW01L	DC3150	COG (EIA)	27 ±5%	4.5	2.0	1.0	2.9	0.3 min.
GRM42A5C3F330JW01L	DC3150	COG (EIA)	33 ±5%	4.5	2.0	1.0	2.9	0.3 min.
GRM42A5C3F390JW01L	DC3150	COG (EIA)	39 ±5%	4.5	2.0	1.0	2.9	0.3 min.
GRM42A5C3F470JW01L	DC3150	COG (EIA)	47 ±5%	4.5	2.0	1.0	2.9	0.3 min.

Only for Applications GRM/DC3.15kV Series



GRM/DC3.15kV Series Specifications and Test Methods

	m	Specifications	Test Method
Operating Temperatu	re Range	-55 to +125℃	-
Appearan	ce	No defects or abnormalities	Visual inspection
Dimensio	ns	Within the specified dimension	Using calipers and micrometers
Dielectric Strength		No defects or abnormalities	No failure should be observed when DC4095V is applied between the terminations for 1 to 5 sec., provided the charge/ discharge current is less than 50mA.
Insulation Resistance (I.R.)		More than 10,000 M\Omega	The insulation resistance should be measured with DC500 \pm 50V and within 60 \pm 5 sec. of charging.
Capacitar	nce	Within the specified tolerance	The capacitance/Q should be measured at a frequency of
Q		1,000 min.	1±0.2MHz and a voltage of AC0.5 to 5V(r.m.s.)
Capacitance Temperature Characteristics		Temp. Coefficient 0±30ppm/℃ (Temp. Range: +25 to +125℃) 0+30, -72ppm/℃ (Temp. Range: -55 to +25℃)	The capacitance measurement should be made at each step specified in the Table. Step Temperature (°C) 1 25±2 2 Min. Operating Temp.±3 3 25±2 4 Max. Operating Temp.±2
			$\frac{4}{5}$ $\frac{25\pm2}{25}$
Adhesive Strength of Termination		No removal of the terminations or other defect should occur.	Solder the capacitor to the testing jig (glass epoxy board) shown in Fig. 1. Then apply 10N force in the direction of the arrow. The soldering should be done using the reflow method and should be conducted with care so that the soldering is uniform and free of defects such as heat shock. $\underbrace{10N, 10\pm1s}_{Glass Epoxy Board}$ Fig. 1
	Appearance	No defects or abnormalities	Solder the capacitor to the test jig (glass epoxy board).
Vibration Resistance	Q	Within the specified tolerance	The capacitor should be subjected to a simple harmonic motion having a total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 55Hz. The frequency range, from 10 to 55Hz and return to 10Hz, should be traversed in approximately 1 min. This motion should be applied for a period of 2 hrs. in each of 3 mutually perpendicular directions (total of 6 hrs.).
			Glass Epoxy Board
		No marking defects	Solder the capacitor to the testing jig (glass epoxy board) shown in Fig. 2.
Deflectior	Deflection $ \begin{array}{c c} \hline & & & & & \\ \hline $		Then apply a force in the direction shown in Fig. 3. The soldering should be done using the reflow method and should be conducted with care so that the soldering is uniform and free of defects such as heat shock. $20^{50} \frac{\text{Pressurizing}}{\text{Pressurize}}$
			Capacitance meter 45 45 (in mm)
	Temperatu Appearan Dimensio Dielectric Insulation F (I.R.) Capacitar Capacitar Character Adhesive of Termin	Temperature Range Appearance Dimension Dielectric Strength Insulation Resistance (I.R.) Capacitance Q Gapacitance Capacitance Vibration Resistance	Temperature Range →D 10 + 1/2 °C Appearance No defects or abnormalities Dimensions Within the specified dimension Dielectric Strength No defects or abnormalities Insulation Resistance (IR) More than 10,000 MΩ Capacitance Within the specified tolerance Q 1,000 min. Capacitance Characteristics Temp. Coefficient 0±30pm/°C (Temp. Range: +25 to +125°C) 0+30, -72ppm/°C (Temp. Range: -55 to +25°C) Adhesive Characteristics No defects or abnormalities Adhesive Characteristics No defects or abnormalities Adhesive Characteristics No defects or abnormalities Vibration Resistance No defects or abnormalities Ubration Resistance No defects or abnormalities Vibration Resistance No marking defects Defection: No marking defects Vibration Resistance No marking defects Vibration Resistance No marking defects Vibration Resistance No marking defects



For General Purpose GRM/GRJ Series

Only for Applications GRM/DC3.15kV Series

AC250V Type GA2 Series

Safety Standard Certified GA3 Series

Product Information

GRM/DC3.15kV Series Specifications and Test Methods

Continued from the preceding page.

No.	lte	m	Specifications		Test Method				
12	Solderability of Termination 75% of the terminations are to be soldered evenly and continuously.		Immerse the capacitor in a solution of ethanol (JIS-K-8101) an rosin (JIS-K-5902) (25% rosin in weight proportion). Immerse i solder solution for 2±0.5 sec. Immersing speed: 25±2.5mm/s Temp. of solder: 245±5°C Lead Free Solder (Sn-3.0Ag-0.5Cu) 235±5°C H60A or H63A Eutectic Solder						
		Appearance	No marking defects	Preheat the c	apacitor as in table.				
		Capacitance Change	Within ±2.5%	Let sit at roor	capacitor in solder solution at 2 n condition* for 24±2 hrs., the speed: 25±2.5mm/s				
13	Resistance to Soldering	Q	1,000 min.						
13	Heat	I.R.	More than 10,000M Ω	*Preheating					
	Tical	Dielectric Strength	In accordance with item No.4	Step 1 2	Temperature 100 to 120°C 170 to 200°C	Time 1 min. 1 min.			
		Appoaranco	No marking defects	Fix the capac	itor to the supporting jig (glass	opovy board) show			
		Appearance		in Fig. 4.	nor to the supporting jig (glass	epoxy board) show			
		Capacitance Change	Within ±2.5%	Perform the 5 the following					
		Q	1,000 min.	Let sit for 24:	±2 hrs. at room condition,* the	en measure.			
		I.R.	More than 10,000M Ω	Step	Temperature (°C)	Time (min.)			
14	Temperature Cycle			$ \begin{array}{c c} 1 \\ \hline 2 \\ \hline 3 \\ 4 \end{array} $	Min. Operating Temp.±3 Room Temp. Max. Operating Temp.±2 Room Temp.	30±3 2 to 3 30±3 2 to 3			
		Dielectric Strength	In accordance with item No.4	Fig. 4					
		Appearance	No marking defects						
	Humidity	Capacitance Change	Within ±5.0%	Let the capac	Let the capacitor sit at 40±2°C and relative humidity of 90 to 95%				
15	(Steady	Q	350 min.		for 500^{+2} for s. Remove and let sit for 24±2 hrs. at room condition,* then				
	State)	I.R.	More than 1,000M Ω	measure.	101 511 101 27-2 1113. at 100111 0				
		Dielectric Strength	In accordance with item No.4						
		Appearance	No marking defects						
		Capacitance Change	Within ±3.0%	1	Apply 120% of the rated voltage for 1,000 ⁺⁴ ⁸ hrs. at maximum operating temperature ±3℃. Remove and let sit for 24±2 hrs. at room condition,* then				
16	Life	Q	350 min.						
		I.R.	More than 1,000M Ω	measure.	lischarge current is less than	50m4			
	-		IR More than 1 000MO		The charge/d	ischarge current is less (nan :	JUIIIA.		

* "Room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa



AC250V Type GA2 Series

Chip Monolithic Ceramic Capacitors (Medium Voltage)

For General Purpose GRM/GRJ Series

For Information Devices GR4 Series

Features

- These items are designed specifically for telecommunications devices (IEEE802.3) in Ethernet LAN and primary-secondary coupling for DC-DC converters.
- 2. A new monolithic structure for small, high capacitance capable of operating at high voltage levels
- 3. Sn-plated external electrodes realize good solderability.
- 4. Only for reflow soldering

Applications

- 1. Ideal for use on telecommunications devices in Ethernet LAN
- 2. Ideal for use as primary-secondary coupling for DC-DC converters

Do not use these products in any Automotive Power train or Safety equipment including Battery charger for Electric Vehicles and Plug-in Hybrid. Only Murata products clearly stipulated as "for Automotive use" can be used for automobile applications such as Power train and Safety equipment.

Part Number	Rated Voltage (V)	TC Code (Standard)	Capacitance (pF)	Length L (mm)	Width W (mm)	Thickness T (mm)	Electrode g min. (mm)	Electrode e (mm)
GR442QR73D101KW01L	DC2000	X7R (EIA)	100 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D121KW01L	DC2000	X7R (EIA)	120 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D151KW01L	DC2000	X7R (EIA)	150 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D181KW01L	DC2000	X7R (EIA)	180 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D221KW01L	DC2000	X7R (EIA)	220 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D271KW01L	DC2000	X7R (EIA)	270 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D331KW01L	DC2000	X7R (EIA)	330 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D391KW01L	DC2000	X7R (EIA)	390 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D471KW01L	DC2000	X7R (EIA)	470 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D561KW01L	DC2000	X7R (EIA)	560 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D681KW01L	DC2000	X7R (EIA)	680 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D821KW01L	DC2000	X7R (EIA)	820 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D102KW01L	DC2000	X7R (EIA)	1000 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D122KW01L	DC2000	X7R (EIA)	1200 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR442QR73D152KW01L	DC2000	X7R (EIA)	1500 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GR443QR73D182KW01L	DC2000	X7R (EIA)	1800 ±10%	4.5	3.2	1.5	2.5	0.3 min.
GR443QR73D222KW01L	DC2000	X7R (EIA)	2200 ±10%	4.5	3.2	1.5	2.5	0.3 min.
GR443QR73D272KW01L	DC2000	X7R (EIA)	2700 ±10%	4.5	3.2	1.5	2.5	0.3 min.
GR443QR73D332KW01L	DC2000	X7R (EIA)	3300 ±10%	4.5	3.2	1.5	2.5	0.3 min.
GR443QR73D392KW01L	DC2000	X7R (EIA)	3900 ±10%	4.5	3.2	1.5	2.5	0.3 min.
GR443DR73D472KW01L	DC2000	X7R (EIA)	4700 ±10%	4.5	3.2	2.0	2.5	0.3 min.
GR455DR73D103KW01L	DC2000	X7R (EIA)	10000 ±10%	5.7	5.0	2.0	3.2	0.3 min.



Part Number	Dimensions (mm)				
	L	W	Т	e min.	g min.
GR442Q	4.5 ±0.3	2.0 ±0.2	1.5 +0, -0.3	0.3	2.5
GR443D	4.5 ±0.4	3.2 ±0.3	2.0 +0, -0.3		
GR443Q			1.5 +0, -0.3		
GR455D	5.7 ±0.4	5.0 ±0.4	2.0 +0, -0.3		3.2



GR4 Series Specifications and Test Methods

GRJ	No	. Ite	em	Specifications		Test Method			
GRM/GRJ Se	1	Operating Temperati		−55 to +125℃		_			
Ĕ	2	Appearar	nce	No defects or abnormalities	Visual inspection				
D	3	Dimensio	ons	Within the specified dimensions	Using calipers and	micrometers			
GR4 Series	4	Dielectric	ic Strength	No defects or abnormalities	applied between the current is less than		harge/discharg		
2. Č					Rated Voltage	Test Voltage 120% of the rated voltage	Time 60±1 sec.		
, Ŭ					DC2kV	AC1500V(r.m.s.)	60±1 sec.		
GA2 Series	5	Insulation Resistance		No self healing breakdowns or flash-overs have taken place in the capacitor.	(5 impulses for eacl	en impulses is 60 sec. 50μs			
A2 Se	6			More than $6,000M\Omega$	The insulation resistance should be measured with DC500 \pm 50 and within 60 \pm 5 sec. of charging.				
0	7	Capacita	nce	Within the specified tolerance	The conceiterer /D				
	8	Dissipatio Factor (D		0.025 max.	· ·	F. should be measured at a f Itage of AC1±0.2V(r.m.s.)	requency of		
Certified GA3 Series	9	Capacitance		Temperature within ±15%		The capacitance measurement should be made at each step specified in the Table.			
	10	Adhesive of Termir	e Strength nation	No removal of the terminations or other defect should occur.	in Fig. 1. Then apply 10N for The soldering shou should be conducted	r to the testing jig (glass epox ce in the direction of the arro ld be done using the reflow n ed with care so that the solder such as heat shock.	w. nethod and ring is uniform		
			Appearance	No defects or abnormalities	Solder the capacito	r to the test jig (glass epoxy b	ooard).		
			Capacitance	Within the specified tolerance	· ·	Id be subjected to a simple h tude of 1.5mm, the frequenc			
	11	Vibration Resistance	D.F.	0.025 max.	uniformly between the frequency range, from traversed in approxi- for a period of 2 hrs- directions (total of 6	the approximate limits of 10 a om 10 to 55Hz and return to 1 imately 1 min. This motion sh a in each of 3 mutually perpe	nd 55Hz. The OHz, should be ould be applied ndicular		

* "Room condition" Temperature: 15 to 35°c, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

Continued on the following page. \square



For General Purpose GRM/GRJ Series

Only for Applications GR4 Series

AC250V Type GA2 Series

Safety Standard Certified GA3 Series

Product Information

GR4 Series Specifications and Test Methods

lo.	Ite	m	Specifications	5		Test Method	
12	Deflection		No marking defects Deflection Image: specific constraints Image: specific constraints		Solder the capacitor to the testing jig (glass epoxy board) show in Fig. 2. Then apply a force in the direction shown in Fig. 3. The soldering should be done using the reflow method and should be conducted with care so that the soldering is uniform and free of defects such as heat shock. $u = \frac{20^{50} \text{ Pressurizing}}{\text{Pressurize}} + \frac{20^{200} \text{ Pressurize}}{\text{Flexure=1}} + \frac{10^{10} \text{ Flexure=1}}{(\text{in mm})}$		
			5.7×5.0 4.5 8.0	5.6	1	Fig. 3	
13		Solderability of Fermination 75% of the terminations are to be soldered evenly and continu			rosin (JIS-K-5 Immerse in so Immersing spe	apacitor in a solution of ethan 902) (25% rosin in weight pro- Ider solution for 2±0.5 sec. eed: 25±2.5mm/s er: 245±5°C Lead Free Solde 235±5°C H60A or H63A B	pportion). er (Sn-3.0Ag-0.5Cu)
	Appearance No marking defects			Preheat the capacitor as in table.			
	Resistance to Soldering	Capacitance Change	Within ±10%		 Immerse the capacitor in solder solution at 260±5℃ for 10±1 sec. Let sit at room condition* for 24±2 hrs., then measure. Immersing speed: 25±2.5mm/s 		
		D.F. 0.025 max.		●Pretreatment Perform a heat treatment at 150 ⁺ 1 ^o ^o ^o ^c for 60±5 min. and ther			
4		I.R.	More than 1,000M Ω		let sit for 24±	60±5 min. and then	
		Dielectric Strength	In accordance with item No.4		*Preheating Step 1 2	Temperature 100 to 120°C 170 to 200°C	Time 1 min. 1 min.
		Appearance	No marking defects			tor to the supporting jig (glass	epoxy board) shown
		Capacitance Change	Within ±15%		in Fig. 4. Perform the 5 the following t	cycles according to the 4 hear able.	t treatments listed in
		D.F.	0.05 max.		Let sit for 24±	2 hrs. at room condition,* the	n measure.
		I.R.	More than 3,000MΩ		Step 1	Temperature (℃) Min. Operating Temp.±3	Time (min.) 30±3
					2	Room Temp.	2 to 3
					3	Max. Operating Temp.±2 Room Temp.	30±3 2 to 3
15	Temperature Cycle	Dielectric Strength	In accordance with item No.4				60±5 min. and then
		Appearance	No marking defects			· '3' '	
		Capacitance Change	Within ±15%		for 500 ⁺² ⁴		
16	Humidity (Steady	D.F.	0.05 max.		Remove and I measure.	et sit for 24±2 hrs. at room co	ondition,* then
	State)	I.R.	More than 1,000MΩ		•Pretreatmen		
100	Sidle)	нх. -	1000 C 11011 1,00010122		Perform a he	at treatment at 150 [±] 18℃ for	60±5 min. and then

* "Room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

Continued on the following page.



GR4 Series Specifications and Test Methods

Continued from the preceding page.

_	_					
r	No.	Ite	m	Specifications	Test Method	
			Appearance	No marking defects		
			Capacitance Change	Within ±20%	Apply 110% of the rated voltage for 1,000 ^{±4} 8 ^h rs. at maximum operating temperature ±3°c. Remove and let sit for 24±2 hrs. at room condition,* then measure.	
	17	Life	D.F.	0.05 max.	The charge/discharge current is less than 50mA.	
			I.R.	More than 2,000MΩ	Pretreatment Apply test voltage for 60±5 min. at test temperature.	
			Dielectric Strength	In accordance with item No.4	Remove and let sit for 24 ± 2 hrs. at room condition.*	

* "Room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

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Chip Monolithic Ceramic Capacitors (Medium Voltage)

For Camera Flash Circuit GR7 Series

Features

- 1. Suitable for the trigger of the flash circuit, because real capacitance is stable during operating voltage.
- 2. The thin type fits thinner cameras.
- Sn-plated external electrodes realize good solderability.
- 4. For flow and reflow soldering

Applications

For strobe circuit

Do not use these products in any Automotive Power train or Safety equipment including Battery chargers for Electric Vehicles and Plug-in Hybrids. Only Murata products clearly stipulated as "for Automotive use" can be used for automobile applications such as Power train and Safety equipment.

Part Number	Rated Voltage (V)	TC Code (Standard)	Capacitance (pF)	Length L (mm)	Width W (mm)	Thickness T (mm)	Electrode g min. (mm)	Electrode e (mm)
GR721AW0BB103KW01D	DC350	-	10000 ±10%	2.0	1.25	1.0	0.7	0.3 min.
GR731AW0BB103KW01D	DC350	-	10000 ±10%	3.2	1.6	1.0	1.2	0.3 min.
GR721AW0BB153KW01D	DC350	-	15000 ±10%	2.0	1.25	1.0	0.7	0.3 min.
GR731AW0BB153KW01D	DC350	-	15000 ±10%	3.2	1.6	1.0	1.2	0.3 min.
GR721BW0BB223KW03L	DC350	-	22000 ±10%	2.0	1.25	1.25	0.7	0.3 min.
GR731AW0BB223KW01D	DC350	-	22000 ±10%	3.2	1.6	1.0	1.2	0.3 min.
GR731BW0BB223KW01L	DC350	-	22000 ±10%	3.2	1.6	1.25	1.2	0.3 min.
GR721BW0BB273KW03L	DC350	-	27000 ±10%	2.0	1.25	1.25	0.7	0.3 min.
GR731AW0BB273KW01D	DC350	-	27000 ±10%	3.2	1.6	1.0	1.2	0.3 min.
GR731AW0BB333KW01D	DC350	-	33000 ±10%	3.2	1.6	1.0	1.2	0.3 min.
GR731BW0BB333KW01L	DC350	-	33000 ±10%	3.2	1.6	1.25	1.2	0.3 min.
GR731CW0BB473KW03L	DC350	-	47000 ±10%	3.2	1.6	1.6	1.2	0.3 min.



		· ·					
Part Number	Dimensions (mm)						
Part Number	L	W	Т	e min.	g min.		
GR721A	2.0 +0.2	1.25 ±0.2	1.0 +0, -0.3		0.7		
GR721B	2.0 <u>1</u> 0.2	1.25 <u>1</u> 0.2	1.25 ±0.2		0.7		
GR731A			1.0 +0, -0.3	0.3			
GR731B	3.2 ±0.2	1.6 ±0.2	1.25 +0, -0.3		1.2		
GR731C			1.6 ±0.2				

maRata

Only for Applications GR7 Series



GR7 Series Specifications and Test Methods

No.	Ite	em	Specifications	Test Method
1	Operating Temperatu	ire Range	-55 to +125℃	-
2	Appearan	ice	No defects or abnormalities	Visual inspection
3	Dimensio	ns	Within the specified dimensions	Using calipers and micrometers
4	Dielectric	Strength	No defects or abnormalities	No failure should be observed when DC500V is applied betwee the terminations for 1 to 5 sec., provided the charge/discharge current is less than 50mA.
5	Insulation F (I.R.)	nsulation ResistanceC \geq 0.01μF: More than 100MΩ • μF C<0.01μF: More than 10,000MΩCapacitanceWithin the specified tolerance		The insulation resistance should be measured with DC250 \pm 50 and within 60 \pm 5 sec. of charging.
6	Capacitar			
7	Dissipation Factor (D.F.)		0.025 max.	 The capacitance/D.F. should be measured at a frequency of 1±0.2kHz and a voltage of AC1±0.2V(r.m.s.)
8	Capacitance Temperature Characteristics		Cap. Change Within ±10% (Apply DC350V bias) Within ±33% (No DC bias) (Temp. Range : −55 to +125℃)	The capacitance measurement should be made at each step specified in the Table.StepTemperature (°C)1 25 ± 2 2Min. Operating Temp. ± 3 3 25 ± 2 4Max. Operating Temp. ± 2 5 25 ± 2 •PretreatmentPerform a heat treatment at $150^{+0.0}_{-1.0}$ °C for 60 ± 5 min. and the let sit for 24 ± 2 hrs. at room condition.*Solder the capacitor to the testing jig (glass epoxy board) sho
9	Adhesive of Termin	•	No removal of the terminations or other defect should occur.	The apply 10N force in the direction of the arrow. The soldering should be done using the reflow method and should be conducted with care so that the soldering is uniforr and free of defects such as heat shock.
		Appearance	No defects or abnormalities	Solder the capacitor to the test jig (glass epoxy board).
		Capacitance	Within the specified tolerance	The capacitor should be subjected to a simple harmonic moti having a total amplitude of 1.5mm, the frequency being varie
10 Vibration Resistance		D.F.	0.025 max.	uniformly between the approximate limits of 10 and 55Hz. Th frequency range, from 10 to 55Hz and return to 10Hz, should traversed in approximately 1 min. This motion should be applie for a period of 2 hrs. in each of 3 mutually perpendicular directions (total of 6 hrs.).

* "Room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

Continued on the following page.

Product Information



For General Purpose GRM/GRJ Series

Only for Applications GR7 Series

AC250V Type GA2 Series

Safety Standard Certified GA3 Series

Product Information

GR7 Series Specifications and Test Methods

No.	Deflection		Specifications	Test Method		
11			No marking defects 4.5 4.5 4.5 4.5 4.5 6 100 1:1.6 Fig. 2 100 1:1.6 1.0 1.0 1.0	Solder the capacitor to the testing jig (glass epoxy board) shown in Fig. 2. Then apply a force in the direction shown in Fig. 3. The soldering should be done using the reflow method and should be conducted with care so that the soldering is uniform and free of defects such as heat shock. $\underbrace{20}_{\text{Fressurize}}^{50 \text{ Pressurizing}}_{\text{Speed: 1.0mm/s}}_{\text{Flexure=1}}_{\text{Flexure=1}}_{\text{(in mm)}}_{\text{Fig. 3}}$		
12			75% of the terminations are to be soldered evenly and continuously.	Immerse the capacitor in a solution of ethanol (JIS-K-8101) and rosin (JIS-K-5902) (25% rosin in weight proportion). Immerse in solder solution for 2±0.5 sec. Immersing speed: 25±2.5mm/s Temp. of solder: 245±5°C Lead Free Solder (Sn-3.0Ag-0.5Cu) 235±5°C H60A or H63A Eutectic Solder		
13	Resistance	$ \mathbf{D} \mathbf{F} = 0 0 25 \text{ max}$		Preheat the capacitor at 120 to 150°C for 1 min. Immerse the capacitor in solder solution at 260±5°C for 10±1 sec. Let sit at room condition* for 24±2 hrs., then measure.		
J	to Soldering _ Heat	I.R. Dielectric Strength	C≥0.01μF: More than 100MΩ • μF C<0.01μF: More than 10,000MΩ In accordance with item No.4	 Immersing speed: 25±2.5mm/s Pretreatment Perform a heat treatment at 150[±]₁8 °C for 60±5 min. and then let sit for 24±2 hrs. at room condition.* 		
		Appearance Capacitance Change D.F.	No marking defects Within ±7.5% 0.025 max.	Fix the capacitor to the supporting jig (glass epoxy board) shown in Fig. 4. Perform the 5 cycles according to the 4 heat treatments listed in the following table. Let sit for 24±2 hrs. at room condition,* then measure.		
	Temperature	I.R.	C≧0.01μF: More than 100MΩ • μF C<0.01μF: More than 10,000MΩ	StepTemperature (°C)Time (min.)1Min. Operating Temp.±330±32Room Temp.2 to 33Max. Operating Temp.±230±34Room Temp.2 to 3		
4	4 Cycle	Dielectric Strength	In accordance with item No.4	Pretreatment Perform a heat treatment at 150 ⁺ ₁ % ^o C for 60±5 min. and then let sit for 24±2 hrs. at room condition.*		
		Appearance	No marking defects			
		Capacitance Change	Within ±15%	Let the capacitor sit at $40\pm2^{\circ}$ and relative humidity of 90 to 95% for 500^{+24}_{-2} hrs.		
5	Humidity (Steady	D.F.	0.05 max.	Remove and let sit for 24±2 hrs. at room condition,* then measure.		
5	(Steady State)	I.R.	C≥0.01µF: More than 10MΩ • µF C<0.01µF: More than 1,000MΩ	Pretreatment Perform a heat treatment at 150 [±] ₁8 °C for 60±5 min. and ther let sit for 24±2 hrs. at room condition.*		

Continued on the following page.



GR7 Series Specifications and Test Methods

Continued from the preceding page.

No.	lt∈	em	Specifications	Test Method
		Appearance	No marking defects	
		Capacitance Change	Within ±15%	Apply DC350V for $1,000^{\pm48}_{\circ}$ hrs. at maximum operating temperature $\pm3^{\circ}$ C. Remove and let sit for 24 ± 2 hrs. at room
16	Life	D.F.	0.05 max.	condition,* then measure. The charge/discharge current is less than 50mA.
		I.R.	C≥0.01µF: More than 10MΩ • µF C<0.01µF: More than 1,000MΩ	•Pretreatment Apply test voltage for 60±5 min. at test temperature.
		Dielectric Strength	In accordance with item No.4	Remove and let sit for 24±2 hrs. at room condition.*
		Appearance	No marking defects	
		Capacitance Change	Within ±15%	Apply the rated voltage at $40\pm2^{\circ}$ and relative humidity of 90 to 95% for $500^{\pm24}_{-0}$ hrs.
17	Humidity	D.F.	0.05 max.	Remove and let sit for 24±2 hrs. at room condition,* then measure.
.,	Loading	Loading I.R. $C \ge 0.01 \mu F$: More than $10M\Omega \bullet \mu F$ C<0.01 μF : More than 1,000M Ω		•Pretreatment Apply test voltage for 60±5 min. at test temperature.
		Dielectric Strength	In accordance with item No.4	Remove and let sit for 24±2 hrs. at room condition.*

* "Room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

Only for Applications GR7 Series



Chip Monolithic Ceramic Capacitors

muRata

AC250V Type (Which Meet Japanese Law) GA2 Series

Features

- 1. Chip monolithic ceramic capacitor for AC lines.
- A new monolithic structure for small, high capacitance capable of operating at high voltage levels.
- 3. Sn-plated external electrodes realize good solderability.
- 4. Only for reflow soldering
- 5. Capacitance 0.01 to 0.1uF for connecting lines and 470 to 4700pF for connecting lines to earth.

Applications

Noise suppression filters for switching power supplies, telephones, facsimiles, modems.

Do not use these products in any Automotive Power train or Safety equipment including Battery chargers for Electric Vehicles and Plug-in Hybrids. Only Murata products clearly stipulated as "for Automotive use" can be used for automobile applications such as Power train and Safety equipment.

Reference Standard

GA2 series obtains no safety approval. This series is based on the standards of the electrical appliance and material safety law of Japan (separated table 4).

Part Number	Rated Voltage (V)	TC Code (Standard)	Capacitance	Length L (mm)	Width W (mm)	Thickness T (mm)	Electrode g min. (mm)	Electrode e (mm)
GA242QR7E2471MW01L	AC250 (r.m.s.)	X7R (EIA)	470pF ±20%	4.5	2.0	1.5	2.5	0.3 min.
GA242QR7E2102MW01L	AC250 (r.m.s.)	X7R (EIA)	1000pF ±20%	4.5	2.0	1.5	2.5	0.3 min.
GA243QR7E2222MW01L	AC250 (r.m.s.)	X7R (EIA)	2200pF ±20%	4.5	3.2	1.5	2.5	0.3 min.
GA243QR7E2332MW01L	AC250 (r.m.s.)	X7R (EIA)	3300pF ±20%	4.5	3.2	1.5	2.5	0.3 min.
GA243DR7E2472MW01L	AC250 (r.m.s.)	X7R (EIA)	4700pF ±20%	4.5	3.2	2.0	2.5	0.3 min.
GA243QR7E2103MW01L	AC250 (r.m.s.)	X7R (EIA)	10000pF ±20%	4.5	3.2	1.5	2.5	0.3 min.
GA243QR7E2223MW01L	AC250 (r.m.s.)	X7R (EIA)	22000pF ±20%	4.5	3.2	1.5	2.5	0.3 min.
GA243DR7E2473MW01L	AC250 (r.m.s.)	X7R (EIA)	47000pF ±20%	4.5	3.2	2.0	2.5	0.3 min.
GA255DR7E2104MW01L	AC250 (r.m.s.)	X7R (EIA)	0.10µF ±20%	5.7	5.0	2.0	3.2	0.3 min.



		-	L	• w •				
Part Number		Dimensions (mm)						
Part Number	L	W	Т	e min.	g min.			
GA242Q	4.5 ±0.3	2.0 ±0.2	1.5 +0, -0.3					
GA243D	4.5 ±0.4	3.2 +0.3	2.0 +0, -0.3	0.3	2.5			
GA243Q	4.5 ±0.4	3.2 ±0.3	1.5 +0, -0.3	0.3				
GA255D	5.7 ±0.4	5.0 ±0.4	2.0 +0, -0.3		3.2			

Only for Applications

GA2 Series Specifications and Test Methods

No.	Ite	em	Specifications	Test Method			
1	Operating Temperatu	ire Range	-55 to +125℃	-			
2	Appearan	ice	No defects or abnormalities	Visual inspection			
3	Dimensio	isions Within the specified dimensions		Using calipers and micrometers			
4	Dielectric Strength Insulation Resistance (I.R.) Capacitance		Dielectric Strength		No defects or abnormalities	No failure should be observed when voltage in the table is applied between the terminations for 60 ± 1 sec., provided charge/discharge current is less than 50mA.Nominal CapacitanceTest Voltage C $\geq 10,000$ FC $\geq 10,000$ FAC575V (r.m.s.) C <10,000 F	
5			More than 2,000MΩ	The insulation resistance should be measured with DC500± and within 60±5 sec. of charging.			
6			Within the specified tolerance				
7	Dissipatio Factor (D	on	0.025 max.	The capacitance/D.F. should be measured at a frequency 1±0.2kHz and a voltage of AC1±0.2V (r.m.s.)			
8	Factor (D.F.) Capacitance Temperature Characteristics		Cap. Change Within ±15% (Temp. Range: −55 to +125℃)	The capacitance measurement should be made at each stress specified in the Table. $\begin{array}{c c c c c c c c c c c c c c c c c c c $			
9	Discharge Test (Application: Nominal Capacitance C<10,000pF)	Appearance	No defects or abnormalities	As in Fig., discharge is made 50 times at 5 sec. intervals f the capacitor (Cd) charged at DC voltage of specified. $\begin{array}{c} R_{3} \\ \hline \\ $			
10	Adhesive of Termin		No removal of the terminations or other defects should occur.	Solder the capacitor to the testing jig (glass epoxy board) sh in Fig. 1. Then apply 10N force in the direction of the arrow. The sold should be done using the reflow method and should be conducted with care so that the soldering is uniform and free defects such as heat shock.			
		Appearance	No defects or abnormalities	Solder the capacitor to the test jig (glass epoxy board).			
		Capacitance	Within the specified tolerance	The capacitor should be subjected to a simple harmonic model. A having a total amplitude of 1.5mm, the frequency being variables of the statement of the statem			
11	Vibration Resistance	D.F.	0.025 max.	uniformly between the approximate limits of 10 and 55Hz. T frequency range, from 10 to 55Hz and return to 10Hz, shou traversed in approximately 1 min. This motion should be ap for a period of 2 hrs. in each of 3 mutually perpendicular directions (total of 6 hrs.).			

* "Room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

Continued on the following page.



AC250V Type GA2 Series

Only for Applications

on Safety Standard Certified GA3 Series

For General Purpose GRM/GRJ Series

Only for Applications

AC250V Type GA2 Series

Safety Standard Certified GA3 Series

Product Information

GA2 Series Specifications and Test Methods

lo.	Ite	m	Specifications	Test Method			
v0.				Solder the capacitor to the testing jig (glass epoxy board) shown			
12	Solderability of		No marking defects $f = \frac{b}{4.5}$ $f = \frac{c}{4.5}$ $f = \frac{c}{4.5}$ f	in Fig. 2. Then apply a force in the direction shown in Fig. 3. The soldering should be done using the reflow method and should be conducted with care so that the soldering is uniform and free or defects such as heat shock. $ \begin{array}{c} 20 & 50 \\ \hline & Pressurize \\ \hline & Pressurize \\ \hline & Gapacitance meter \\ \hline & (in mm) \\ \hline & Fig. 3 \\ \end{array} $			
13			75% of the terminations are to be soldered evenly and continuously.	Immerse the capacitor in a solution of ethanol (JIS-K-8101) and rosin (JIS-K-5902) (25% rosin in weight proportion). Immerse in solder solution for 2±0.5 sec. Immersing speed: 25±2.5mm/s Temp. of solder: 245±5°C Lead Free Solder (Sn-3.0Ag-0.5Cu) 235±5°C H60A or H63A Eutectic Solder			
		Appearance	No marking defects				
	Humidity Insulation	Capacitance Change	Within ±15%	The capacitor should be subjected to $40\pm2^{\circ}$, relative humidity of			
4		D.F.	0.05 max.	90 to 98% for 8 hrs., and then removed in room condition* for 16			
		I.R.	More than 1,000MΩ	hrs. until 5 cycles.			
		Dielectric Strength	In accordance with item No.4				
		Appearance	No marking defects	Preheat the capacitor as in table.			
		Capacitance Change	Within ±10%	 Immerse the capacitor in solder solution at 260±5℃ for 10±1 sec. Let sit at room condition* for 24±2 hrs., then measure. Immersing speed: 25±2.5mm/s 			
	Resistance	D.F.	0.025 max.	Pretreatment Perform a heat treatment at 150 ⁺ 1 ^o ℃ for 60±5 min. and ther			
15	to Soldering Heat	I.R.	More than 2,000MΩ	let sit for 24±2 hrs. at room condition.* *Preheating			
		Dielectric	In accordance with item No.4	Step Temperature Time			
		Strength		1 100 to 120°C 1 min. 2 170 to 200°C 1 min.			
		Appearance	No marking defects	Fix the capacitor to the supporting jig (glass epoxy board) shown in Fig. 4.			
		Capacitance Change	Within ±15%	Perform the 5 cycles according to the 4 heat treatments listed in			
		D.F.	0.05 max.	the following table. Let sit for 24 ± 2 hrs. at room condition,* then measure.			
		I.R.	More than 2,000MΩ	Step Temperature (°C) Time (min.)			
				1 Min. Operating Temp.±3 30±3			
				2 Room Temp. 2 to 3 3 Max. Operating Temp.±2 30±3			
	Temperature			4 Room Temp. 2 to 3			
6	Cycle	Dielectric Strength	In accordance with item No.4	•Pretreatment Perform a heat treatment at 150 [±] ₁ %c for 60±5 min. and then let sit for 24±2 hrs. at room condition.*			

Continued on the following page.



GA2 Series Specifications and Test Methods

For General Purpose GRM/GRJ Series		Item		Crestinations	Test Mathed				
1/6	No	. 116	1	Specifications	Test Method				
SRN SRN			Appearance	No marking defects	Let the capacitor sit at 40±2°C and relative humidity of 90 to 95				
0		Humidity	Capacitance Change	Within ±15%	for $500^{\pm 2}$ dhrs. Remove and let sit for 24 ± 2 hrs. at room condition,* then				
us		(Steady	D.F.	0.05 max.	measure.				
		State)	I.R.	More than 1,000MΩ	●Pretreatment Perform a heat treatment at 150 [±] 1 [⊗] C for 60±5 min. and ther				
			Dielectric Strength	In accordance with item No.4	let sit for 24±2 hrs. at room condition.*				
			Appearance	No marking defects	Apply voltage and time as in Table at maximum operating				
AC250V Type Only for Applications GA2 Series			Capacitance Change	Within ±20%	temperature ±3°C. Remove and let sit for 24±2 hrs. at room condition,* then measure. The charge / discharge current is less than 50mA.				
			D.F.	0.05 max.	Nominal Capacitance Test Time Test Voltage				
			I.R.	More than 1,000MΩ	C≧10,000pF 1,000 ⁺⁴⁸ / _☉ hrs. AC300V (r.m.s.)				
	18	Life	Dielectric Strength	In accordance with item No.4	C<10,000pF 1,500 ⁺⁴⁸ hrs. AC500V (r.m.s.) * Except that once each hour the voltage is increased to AC1,000V (r.m.s.) for 0.1 sec. Pretreatment Apply test voltage for 60±5 min. at test temperature. Remove and let sit for 24±2 hrs. at room condition.*				
			Appearance	No marking defects					
Series			Capacitance Change	Within ±15%	Apply the rated voltage at 40±2℃ and relative humidity of 90 95% for 500 ⁺² ⁴ hrs. Remove and let sit for 24±2 hrs. at room condition,* then				
5A3	19	Humidity Loading	D.F.	0.05 max.	measure.				
		Louding	I.R.	More than 1,000MΩ	•Pretreatment Apply test voltage for 60±5 min. at test temperature.				
Safety Standard Certified GA3 Series			Dielectric Strength	In accordance with item No.4	Remove and let sit for 24±2 hrs. at room condition.*				

* "Room condition" Temperature: 15 to 35°C, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa



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Chip Monolithic Ceramic Capacitors



Safety Standard Certified GA3 Series UL, IEC60384-14 Class X1/Y2 Type GC

Features

- 1. Chip monolithic ceramic capacitor (certified as conforming to safety standards) for AC lines.
- 2. A new monolithic structure for small, high capacitance capable of operating at high voltage levels.
- 3. Compared to lead type capacitors, this new capacitor is greatly downsized and low-profiled to 1/10 or less in volume, and 1/4 or less in height.
- 4. Type GC can be used as an X1-class and Y2-class capacitor, line-by-pass capacitor of UL1414.
- 5. +125 degree C guaranteed
- 6. Only for reflow soldering

Applications

- 1. Ideal for use as Y capacitor or X capacitor for various switching power supplies
- 2. Ideal for modem applications

Do not use these products in any Automotive Power train or Safety equipment including Battery chargers for Electric Vehicles and Plug-in Hybrids. Only Murata products clearly stipulated as "for Automotive use" can be used for automobile applications such as Power train and Safety equipment.



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ĺ	Part Number		Din	nensions (m	ım)	
	Part Number	L	W	Т	e min.	g min.
	GA355D	5.7 ±0.4	5.0 ±0.4	2.0 ±0.3	0.3	4.0

Standard Certification

	Standard No.	Class	Rated Voltage	
UL	UL1414	Line By-pass		
VDE	IEC 60384-14 EN 60384-14			
BSI	EN 60065 (14.2) IEC 60384-14 EN 60384-14	X1, Y2	AC250V (r.m.s.)	
SEMKO	IEC 60384-14 EN 60384-14			
ESTI	EN 60065 IEC 60384-14			

Part Number	Rated Voltage (V)	TC Code (Standard)	Capacitance (pF)	Length L (mm)	Width W (mm)	Thickness T (mm)	Electrode g min. (mm)	Electrode e (mm)
GA355DR7GC101KY02L	AC250 (r.m.s.)	X7R (EIA)	100 ±10%	5.7	5.0	2.0	4.0	0.3 min.
GA355DR7GC151KY02L	AC250 (r.m.s.)	X7R (EIA)	150 ±10%	5.7	5.0	2.0	4.0	0.3 min.
GA355DR7GC221KY02L	AC250 (r.m.s.)	X7R (EIA)	220 ±10%	5.7	5.0	2.0	4.0	0.3 min.
GA355DR7GC331KY02L	AC250 (r.m.s.)	X7R (EIA)	330 ±10%	5.7	5.0	2.0	4.0	0.3 min.



Chip Monolithic Ceramic Capacitors



Safety Standard Certified GA3 Series IEC60384-14 Class Y2, X1/Y2 Type GF

Features

- 1. Available for equipment based on IEC/EN60950 and UL1950. Besides, the GA352/355 types are available for equipment based on IEC/EN60065, UL1492, and UL6500.
- 2. Type GF can be used as a Y2-class capacitor.
- 3. A new monolithic structure for small, high capacitance capable of operating at high voltage levels.
- 4. +125 degree C guaranteed
- 5. Only for reflow soldering

Applications

- 1. Ideal for use on line filters and couplings for DAA modems without transformers
- 2. Ideal for use on line filters for information equipment
- Ideal for use as Y capacitor or X capacitor for various switching power supplies (GA352/355 types only)

Do not use these products in any Automotive Power train or Safety equipment including Battery chargers for Electric Vehicles and Plug-in Hybrids. Only Murata products clearly stipulated as "for Automotive use" can be used for automobile applications such as Power train and Safety equipment.



Part Number		Dir	mensions (mm)		
Part Number	L	W	Т	e min.	g min.
GA342A			1.0 +0, -0.3		
GA342D	4.5 ±0.3	2.0 ±0.2	2.0 ±0.2		2.5
GA342Q	1		1.5 +0, -0.3	0.3	
GA352Q		2.8 ±0.3	1.5 +0, -0.3	0.5	
GA355D	5.7 ±0.4	5.0 ±0.4	2.0 +0, -0.3		4.0
GA355Q		5.0 <u>1</u> 0.4	1.5 +0, -0.3		

Standard Certification

$\overline{\ }$	Standard		Status of Certification			
	No.	Class	Size : 4.5×2.0mm	Size: 5.7×2.8mm and over	Rated Voltage	
UL	UL1414	X1, Y2	-	0		
UL	UL 60950-1	-	0	_	AC250V	
VDE	IEC 60384-14	X1, Y2	_	0	(r.m.s.)	
SEMKO	EN 60384-14	Y2	0	0		

Applications

Size	Switching power supplies	Communication network devices such as a modem
4.5×2.0mm	—	0
5.7×2.8mm and over	0	0

Part Number	Rated Voltage (V)	TC Code (Standard)	Capacitance (pF)	Length L (mm)	Width W (mm)	Thickness T (mm)	Electrode g min. (mm)	Electrode e (mm)
GA342D1XGF100JY02L	AC250 (r.m.s.)	SL (JIS)	10 ±5%	4.5	2.0	2.0	2.5	0.3 min.
GA342D1XGF120JY02L	AC250 (r.m.s.)	SL (JIS)	12 ±5%	4.5	2.0	2.0	2.5	0.3 min.
GA342D1XGF150JY02L	AC250 (r.m.s.)	SL (JIS)	15 ±5%	4.5	2.0	2.0	2.5	0.3 min.
GA342D1XGF180JY02L	AC250 (r.m.s.)	SL (JIS)	18 ±5%	4.5	2.0	2.0	2.5	0.3 min.
GA342D1XGF220JY02L	AC250 (r.m.s.)	SL (JIS)	22 ±5%	4.5	2.0	2.0	2.5	0.3 min.
GA342A1XGF270JW31L	AC250 (r.m.s.)	SL (JIS)	27 ±5%	4.5	2.0	1.0	2.5	0.3 min.
GA342A1XGF330JW31L	AC250 (r.m.s.)	SL (JIS)	33 ±5%	4.5	2.0	1.0	2.5	0.3 min.
GA342A1XGF390JW31L	AC250 (r.m.s.)	SL (JIS)	39 ±5%	4.5	2.0	1.0	2.5	0.3 min.
GA342A1XGF470JW31L	AC250 (r.m.s.)	SL (JIS)	47 ±5%	4.5	2.0	1.0	2.5	0.3 min.
GA342A1XGF560JW31L	AC250 (r.m.s.)	SL (JIS)	56 ±5%	4.5	2.0	1.0	2.5	0.3 min.
GA342A1XGF680JW31L	AC250 (r.m.s.)	SL (JIS)	68 ±5%	4.5	2.0	1.0	2.5	0.3 min.
GA342A1XGF820JW31L	AC250 (r.m.s.)	SL (JIS)	82 ±5%	4.5	2.0	1.0	2.5	0.3 min.
GA342QR7GF101KW01L	AC250 (r.m.s.)	X7R (EIA)	100 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GA342QR7GF151KW01L	AC250 (r.m.s.)	X7R (EIA)	150 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GA342DR7GF221KW02L	AC250 (r.m.s.)	X7R (EIA)	220 ±10%	4.5	2.0	2.0	2.5	0.3 min.
GA342DR7GF331KW02L	AC250 (r.m.s.)	X7R (EIA)	330 ±10%	4.5	2.0	2.0	2.5	0.3 min.
GA342QR7GF471KW01L	AC250 (r.m.s.)	X7R (EIA)	470 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GA352QR7GF471KW01L	AC250 (r.m.s.)	X7R (EIA)	470 ±10%	5.7	2.8	1.5	4.0	0.3 min.
GA342QR7GF681KW01L	AC250 (r.m.s.)	X7R (EIA)	680 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GA352QR7GF681KW01L	AC250 (r.m.s.)	X7R (EIA)	680 ±10%	5.7	2.8	1.5	4.0	0.3 min.
GA342DR7GF102KW02L	AC250 (r.m.s.)	X7R (EIA)	1000 ±10%	4.5	2.0	2.0	2.5	0.3 min.
GA352QR7GF102KW01L	AC250 (r.m.s.)	X7R (EIA)	1000 ±10%	5.7	2.8	1.5	4.0	0.3 min.

GA3 Series

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Part Number	Rated Voltage (V)	TC Code (Standard)	Capacitance (pF)	Length L (mm)	Width W (mm)	Thickness T (mm)	Electrode g min. (mm)	Electrode e (mm)
GA352QR7GF152KW01L	AC250 (r.m.s.)	X7R (EIA)	1500 ±10%	5.7	2.8	1.5	4.0	0.3 min.
GA355QR7GF182KW01L	AC250 (r.m.s.)	X7R (EIA)	1800 ±10%	5.7	5.0	1.5	4.0	0.3 min.
GA355QR7GF222KW01L	AC250 (r.m.s.)	X7R (EIA)	2200 ±10%	5.7	5.0	1.5	4.0	0.3 min.
GA355QR7GF332KW01L	AC250 (r.m.s.)	X7R (EIA)	3300 ±10%	5.7	5.0	1.5	4.0	0.3 min.
GA355DR7GF472KW01L	AC250 (r.m.s.)	X7R (EIA)	4700 ±10%	5.7	5.0	2.0	4.0	0.3 min.



Chip Monolithic Ceramic Capacitors



Safety Standard Certified GA3 Series IEC60384-14 Class Y3 Type GD

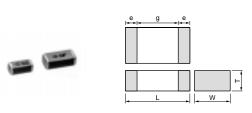
Features

- 1. Available for equipment based on IEC/EN60950 and UL1950.
- 2. Type GD can be used as a Y3-class capacitor.
- 3. A new monolithic structure for small, high capacitance capable of operating at high voltage levels.
- 4. +125 degree C guaranteed
- 5. Only for reflow soldering

Applications

- 1. Ideal for use on line filters and couplings for DAA modems without transformers
- 2. Ideal for use on line filters for information equipment

Do not use these products in any Automotive Power train or Safety equipment including Battery chargers for Electric Vehicles and Plug-in Hybrids. Only Murata products clearly stipulated as "for Automotive use" can be used for automobile applications such as Power train and Safety equipment.



Part Number		Dir	mensions (mm)		
Part Number	L	W	Т	e min.	g min.
GA342A			1.0 +0, -0.3		
GA342D	4.5 ±0.3	2.0 ±0.2	2.0 ±0.2		
GA342Q			1.5 +0, -0.3	0.3	2.5
GA343D	4.5 ±0.4	3.2 +0.3	2.0 +0, -0.3		
GA343Q	4.5 ±0.4	3.2 ±0.5	1.5 +0, -0.3		

Standard Certification

	Standard No.		Class	Ra	ated Voltage		
UL	UL 60950-1				AC250V(r.m.s.)		
SEMKO	D IEC 60384-14 EN 60384-14		Y3	AC			
Applications							
Size Sv		Sw	itching power supplies	Communication network devices such as a modem			
4.5×3.2mm and under		_		0			

Part Number	Rated Voltage (V)	TC Code (Standard)	Capacitance (pF)	Length L (mm)	Width W (mm)	Thickness T (mm)	Electrode g min. (mm)	Electrode e (mm)
GA342D1XGD100JY02L	AC250 (r.m.s.)	SL (JIS)	10 ±5%	4.5	2.0	2.0	2.5	0.3 min.
GA342D1XGD120JY02L	AC250 (r.m.s.)	SL (JIS)	12 ±5%	4.5	2.0	2.0	2.5	0.3 min.
GA342D1XGD150JY02L	AC250 (r.m.s.)	SL (JIS)	15 ±5%	4.5	2.0	2.0	2.5	0.3 min.
GA342D1XGD180JY02L	AC250 (r.m.s.)	SL (JIS)	18 ±5%	4.5	2.0	2.0	2.5	0.3 min.
GA342D1XGD220JY02L	AC250 (r.m.s.)	SL (JIS)	22 ±5%	4.5	2.0	2.0	2.5	0.3 min.
GA342A1XGD270JW31L	AC250 (r.m.s.)	SL (JIS)	27 ±5%	4.5	2.0	1.0	2.5	0.3 min.
GA342A1XGD330JW31L	AC250 (r.m.s.)	SL (JIS)	33 ±5%	4.5	2.0	1.0	2.5	0.3 min.
GA342A1XGD390JW31L	AC250 (r.m.s.)	SL (JIS)	39 ±5%	4.5	2.0	1.0	2.5	0.3 min.
GA342A1XGD470JW31L	AC250 (r.m.s.)	SL (JIS)	47 ±5%	4.5	2.0	1.0	2.5	0.3 min.
GA342A1XGD560JW31L	AC250 (r.m.s.)	SL (JIS)	56 ±5%	4.5	2.0	1.0	2.5	0.3 min.
GA342A1XGD680JW31L	AC250 (r.m.s.)	SL (JIS)	68 ±5%	4.5	2.0	1.0	2.5	0.3 min.
GA342A1XGD820JW31L	AC250 (r.m.s.)	SL (JIS)	82 ±5%	4.5	2.0	1.0	2.5	0.3 min.
GA342QR7GD101KW01L	AC250 (r.m.s.)	X7R (EIA)	100 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GA342QR7GD151KW01L	AC250 (r.m.s.)	X7R (EIA)	150 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GA342QR7GD221KW01L	AC250 (r.m.s.)	X7R (EIA)	220 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GA342QR7GD331KW01L	AC250 (r.m.s.)	X7R (EIA)	330 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GA342QR7GD471KW01L	AC250 (r.m.s.)	X7R (EIA)	470 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GA342QR7GD681KW01L	AC250 (r.m.s.)	X7R (EIA)	680 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GA342QR7GD102KW01L	AC250 (r.m.s.)	X7R (EIA)	1000 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GA342QR7GD152KW01L	AC250 (r.m.s.)	X7R (EIA)	1500 ±10%	4.5	2.0	1.5	2.5	0.3 min.
GA343QR7GD182KW01L	AC250 (r.m.s.)	X7R (EIA)	1800 ±10%	4.5	3.2	1.5	2.5	0.3 min.
GA343QR7GD222KW01L	AC250 (r.m.s.)	X7R (EIA)	2200 ±10%	4.5	3.2	1.5	2.5	0.3 min.
GA343DR7GD472KW01L	AC250 (r.m.s.)	X7R (EIA)	4700 ±10%	4.5	3.2	2.0	2.5	0.3 min.



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Chip Monolithic Ceramic Capacitors



Safety Standard Certified GA3 Series IEC60384-14 Class X2 Type GB

Features

- 1. Type GB can be used as an X2-class capacitor.
- 2. Chip monolithic ceramic capacitor (certified as conforming to safety standards) for AC lines.
- 3. A new monolithic structure for small, high capacitance capable of operating at high voltage levels.
- Compared to lead type capacitors, this new capacitor is greatly downsized and low-profiled to 1/10 or less in volume, and 1/4 or less in height.
- 5. +125 degree C guaranteed
- 6. Only for reflow soldering

Applications

Ideal for use as X capacitor for various switching power supplies

Do not use these products in any Automotive Power train or Safety equipment including Battery chargers for Electric Vehicles and Plug-in Hybrids. Only Murata products clearly stipulated as "for Automotive use" can be used for automobile applications such as Power train and Safety equipment.



			-				
Part Number	Dimensions (mm)						
Part Number	L	W	Т	e min.	g min.		
GA355Q			1.5 +0,-0.3				
GA355D	5.7 ±0.4	5.0 ±0.4	2.0 +0,-0.3	0.3	3.0		
GA355E			2.5 +0,-0.3				
GA355X			2.9 +0,-0.4				

Standard Certification

	Standard No.	Class	Rated Voltage
VDE			
SEMKO	IEC 60384-14 EN 60384-14	X2	AC250V (r.m.s.)
ESTI			

Part Number	Rated Voltage (V)	TC Code (Standard)	Capacitance (pF)	Length L (mm)	Width W (mm)	Thickness T (mm)	Electrode g min. (mm)	Electrode e (mm)
GA355QR7GB103KW01L	AC250 (r.m.s.)	X7R (EIA)	10000 ±10%	5.7	5.0	1.5	3.0	0.3 min.
GA355QR7GB153KW01L	AC250 (r.m.s.)	X7R (EIA)	15000 ±10%	5.7	5.0	1.5	3.0	0.3 min.
GA355DR7GB223KW01L	AC250 (r.m.s.)	X7R (EIA)	22000 ±10%	5.7	5.0	2.0	3.0	0.3 min.
GA355ER7GB333KW01L	AC250 (r.m.s.)	X7R (EIA)	33000 ±10%	5.7	5.0	2.5	3.0	0.3 min.
GA355ER7GB473KW01L	AC250 (r.m.s.)	X7R (EIA)	47000 ±10%	5.7	5.0	2.5	3.0	0.3 min.
GA355XR7GB563KW06L	AC250 (r.m.s.)	X7R (EIA)	56000 ±10%	5.7	5.0	2.9	3.0	0.3 min.



GA3 Series Specifications and Test Methods

No.	Iten	n	Specifications	Test Method		
1	Operating Temperature	e Range	-55 to +125℃			
2	Appearanc	e	No defects or abnormalities	Visual inspection		
3	Dimension	s	Within the specified dimensions	Using calipers and micrometers		
4	Dielectric S	Strength	No defects or abnormalities	No failure should be observed when voltage in the table is applied between the terminations for 60±1 sec., provided the charge/discharge current is less than 50mA.		
•		Juengur		Test Voltage Type GB DC1075V Type GC/GD AC1500V (r.m.s.) Type GF AC2000V (r.m.s.)		
5	Pulse Voltage (Application: Type GD/GF)		No self healing breakdowns or flash-overs have taken place in the capacitor.	10 impulses of alternating polarity are subjected. (5 impulses for each polarity) The interval between impulses is 60 sec. Applied Pulse: 1.2/50µs Applied Voltage: 2.5kVo-p		
6	Insulation Re (I.R.)	esistance	More than $6,000M\Omega$	The insulation resistance should be measured with DC500±5 and within 60±5 sec. of charging.		
7	Capacitand	ce	Within the specified tolerance			
8	Dissipation		$\begin{tabular}{ c c c c c } \hline Char. & Specification \\ \hline X7R & D.F. \le 0.025 \\ \hline SL & Q \ge 400 + 20C^{*2} \ (C < 30pF) \\ \hline Q \ge 1000 & (C \ge 30pF) \\ \hline \end{tabular}$	The capacitance/Q/D.F. should be measured at a frequency (1±0.2kHz (SL char.: 1±0.2MHz) and a voltage of AC1±0.2V (r.m.s.)		
9			Char. Capacitance Change X7R Within ±15% Temperature characteristic guarantee is -55 to +125°C Char. Temperature Coefficient SL +350 to -1000ppm/°C Temperature characteristic guarantee is +20 to +85°C	Step Temperature (°C) 1 25±2 (20±2 for SL char.) 2 Min. Operating Temp.±3 3 25±2 (20±2 for SL char.) 4 Max. Operating Temp.±2 5 25±2 (20±2 for SL char.) SL char. : The capacitance should be measured at even 85°C between stand step 4. • Pretreatment for X7R char. Perform a heat treatment at 150±18°C for 60±5 min. and the let sit for 24±2 hrs. at room condition.*1		
		Appearance	No defects or abnormalities	As in Fig., discharge is made 50 times at 5 sec. intervals from the capacitor (Cd) charged at DC voltage of specified.		
10	10 Discharge Test (Application: Type GC) Dielectric Strength		More than 1,000MΩ In accordance with item No.4	$\begin{array}{c c} R3 & R1 \\ \hline \\ $		
11 Adhesive Strength of Termination				Solder the capacitor to the testing jig (glass epoxy board) sho in Fig. 1. Then apply 10N force in the direction of the arrow. The solder should be done using the reflow method and should be conducted with care so that the soldering is uniform and free defects such as heat shock.		

*2 "C" expresses nominal capacitance value (pF).

Continued on the following page. \square



Only for Applications

AC250V Type GA2 Series

GA3 Series Specifications and Test Methods

Test Method

Purpose	Series
For General	GRM/GR J

12	Vibration Resistance	Capacitance	Within the specified tolerance	The capacitor should be subjected to a simple harmonic motion having a total amplitude of 1.5mm, the frequency being varied uniformly between the approximate limits of 10 and 55Hz. The
12				uniformly between the approximate limits of 10 and 55Hz. The
		D.F. Q	$\begin{tabular}{ c c c c c c } \hline Char. & Specification \\ \hline X7R & D.F. \leq 0.025 \\ \hline SL & Q \geq 400 + 20C^{*2} & (C < 30pF) \\ \hline Q \geq 1000 & (C \geq 30pF) \\ \hline \end{tabular}$	frequency range, from 10 to 55Hz and return to 10Hz, should be traversed in approximately 1 min. This motion should be applied for a period of 2 hrs. in each of 3 mutually perpendicular directions (total of 6 hrs.).
			No marking defects	Solder the capacitor to the testing jig (glass epoxy board) shown
13 [Deflectior	ı	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	in Fig. 2. Then apply a force in the direction shown in Fig. 3. The soldering should be done using the reflow method and should be conducted with care so that the soldering is uniform and free of defects such as heat shock. $\begin{array}{c} & & \\ &$
1/1	Solderabi Terminati		75% of the terminations are to be soldered evenly and contin	Immerse the capacitor in a solution of ethanol (JIS-K-8101) and rosin (JIS-K-5902) (25% rosin in weight proportion). Immerse in solder solution for 2±0.5 sec. Immersing speed: 25±2.5mm/s Temp. of solder: 245±5°C Lead Free Solder (Sn-3.0Ag-0.5Cu) 235±5°C H60A or H63A Eutectic Solder
		Appearance	No marking defects	Preheat the capacitor as in table. Immerse the capacitor in
	Capacitance Change Char. Capacitance Change Resistance Change X7R Within ±10% SL Within ±2.5% or ±0.25pF (Whichever is larger)			solder solution at 260±5℃ for 10±1 sec. Let sit at room condition* ¹ for 24±2 hrs., then measure. •Immersing speed: 25±2.5mm/s •Pretreatment for X7R char. Perform a heat treatment at 150 [±] 1 ⁰ ℃ for 60±5 min. and then
	to Soldering Heat	I.R.	More than 1,000MΩ	let sit for 24±2 hrs. at room condition.*1
		Dielectric Strength	In accordance with item No.4	Step Temperature Time 1 100 to 120°C 1 min. 2 170 to 200°C 1 min.

*1 "Room condition" Temperature: 15 to 35°c, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

Specifications

*2 "C" expresses nominal capacitance value (pF).

Continued from the preceding page

Item

No.

Continued on the following page.



GA3 Series Specifications and Test Methods

Continued from the preceding page.

No. It	em	Specifications	Test Method			
	Appearance Capacitance Change	No marking defects Char. Capacitance Change X7R Within ±15% SL Within ±2.5% or ±0.25pF (Whichever is larger)	Fix the capacitor to the supporting jig (glass epoxy board) sho in Fig. 4. Perform the 5 cycles according to the 4 heat treatments listed the following table. Let sit for 24±2 hrs. at room condition,*1 then measure.			
16 Temperature	D.F. Q	Char.SpecificationX7RD.F. ≤ 0.05 SLQ \geq 400+20C*2 (C<30pF)	StepTemperature (°C)Time (min.)1Min. Operating Temp.±330±32Room Temp.2 to 33Max. Operating Temp.±230±34Room Temp.2 to 3			
Cycle	I.R.	More than 3,000MΩ	•Pretreatment for X7R char. Perform a heat treatment at 150 [±] ₁8°C for 60±5 min. and th let sit for 24±2 hrs. at room condition.*1			
	Dielectric Strength	In accordance with item No.4	Glass Epoxy Board Fig. 4			
	Appearance	No marking defects				
	Capacitance Change	Char. Capacitance Change X7R Within ±15% SL Within ±5.0% or ±0.5pF (Whichever is larger)	Before this test, the test shown in the following is performed. -Item 11 Adhesive Strength of Termination (applied force is 5 -Item 13 Deflection			
Humidity 17 (Steady State)	D.F. Q	Char.SpecificationX7RD.F. ≤ 0.05 SLQ $\geq 275+5/2C^{*2}$ (C<30pF)	Let the capacitor sit at 40±2°C and relative humidity of 90 to 95 for 500 ^{±2} ° ⁴ hrs. Remove and let sit for 24±2 hrs. at room condition,* ¹ then measure. •Pretreatment for X7R char. Perform a heat treatment at 150 ^{±1} °°C for 60±5 min. and the let sit for 24±2 hrs. at room condition.* ¹			
	I.R.	More than 3,000MΩ				
	Dielectric Strength	In accordance with item No.4				
	Appearance	No marking defects	Before this test, the test shown in the following is performed. Item 11 Adhesive Strength of Termination (apply force is 5N			
	Capacitance Change	Char. Capacitance Change X7R Within ±20% SL Within ±3.0% or ±0.3pF (Whichever is larger)	Impulse Voltage Each individual capacitor should			
	D.F. Q	$\begin{tabular}{ c c c c c } \hline \hline Char. & Specification \\ \hline $X7R$ & D.F. \le 0.05 \\ \hline SL & $Q\ge 275+5/2C^{*2}$ (C<30pF)$ \\ $Q\ge 350$ & $(C\ge 30pF)$ \\ \hline \end{tabular}$	be subjected to a 2.5kV (Type GC/GF: 5kV) Impulse (the voltage value means zero to peak) for three times. Then the capacitors are applied to life test. T_2			
18 Life	I.R.	More than 3,000MΩ	Apply voltage as in Table for 1,000 hrs. at 125 ⁺ 3 [°] €, relative humidity 50% max.			
	Dielectric Strength	In accordance with item No.4	Type Applied Voltage GB AC312.5V (r.m.s.), except that once each hour the voltage is increased to AC1,000V (r.m.s.) for 0.1 sec. GC GF GD AC425V (r.m.s.), except that once each hour the voltage is increased to AC1,000V (r.m.s.) for 0.1 sec. Let sit for 24±2 hrs. at room condition,*1 then measure.			
			•Pretreatment for X7R char. Perform a heat treatment at 150 [±] ₁ %C for 60±5 min. and th let sit for 24±2 hrs. at room condition.* ¹			

*1 "Room condition" Temperature: 15 to 35℃, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

*2 "C" expresses nominal capacitance value (pF).

Continued on the following page.



For General Purpose GRM/GRJ Series

Only for Applications

AC250V Type GA2 Series

Safety Standard Certified GA3 Series

Product Information

GA3 Series Specifications and Test Methods

o.	tem	Specifications	Test Method	
	Appearance	No marking defects		
	$ \begin{array}{c} \hline \text{Char.} & \text{Capacitance Change} \\ \hline \text{Capacitance Change} & X7R & \text{Within } \pm 15\% \\ \hline \text{SL} & \text{Within } \pm 5.0\% \text{ or } \pm 0.5\text{pF} \\ \hline \text{(Whichever is larger)} \end{array} $		Before this test, the test shown in the following is performed. Item 11 Adhesive Strength of Termination (apply force is 5N) Item 13 Deflection	
9 Humidity Loading	D.F. Q	$\begin{tabular}{ c c c c c } \hline Char. & Specification \\ \hline X7R & D.F. \le 0.05 \\ \hline SL & Q \ge 275 + 5/2C^{*2} (C < 30 pF) \\ \hline Q \ge 350 & (C \ge 30 pF) \\ \hline \end{tabular}$	Apply the rated voltage at 40±2°C and relative humidity of 90 to 95% for 500 ^{±2} ° ⁴ hrs. Remove and let sit for 24±2 hrs. at room condition, ^{*1} then measure. •Pretreatment for X7R char. Perform a heat treatment at 150 [±] 1°° C for 60±5 min. and then	
	I.R.	More than $3,000M\Omega$	let sit for 24±2 hrs. at room condition.*1	
	Dielectric Strength	In accordance with item No.4		
		The cheesecloth should not be on fire.	The capacitor should be individually wrapped in at least one but not more than two complete layers of cheesecloth. The capacitor should be subjected to 20 discharges. The interval between successive discharges should be 5 sec. The UAc should be maintained for 2 min. after the last discharge. $I_1 + I_2 + I_1 + I_2	
1 Passive Flammability		The burning time should not exceed 30 sec. The tissue paper should not ignite.	The capacitor under test should be held in the flame in the position which best promotes burning. Each specimen shoul be exposed to the flame only once. Time of exposure to flam 30 sec. Length of flame : 12±1mm Gas burner : Length 35mm min. Inside Dia. 0.5±0.1mm Outside Dia. 0.9mm max. Gas : Butane gas Purity 95% min Test Specimen	

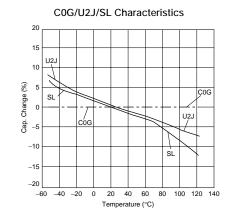
*1 "Room condition" Temperature: 15 to 35°c, Relative humidity: 45 to 75%, Atmospheric pressure: 86 to 106kPa

*2 "C" expresses nominal capacitance value (pF).



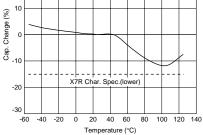
GRM/GRJ/GR4/GR7/GA2/GA3 Series Reference Data (Typical Example)

Capacitance - Temperature Characteristics

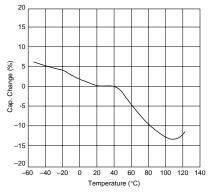


30 20 X7R Char. Spec.(upper) 10 0

X7R Characteristics

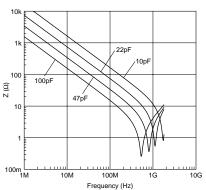


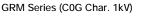


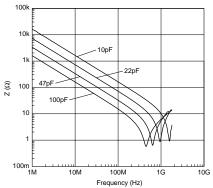


■ Impedance - Frequency Characteristics

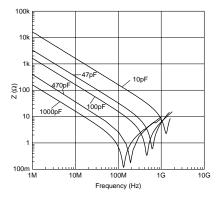
GRM Series (C0G Char. 250V)



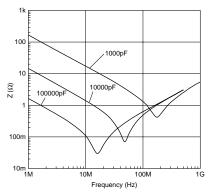




GRM Series (C0G Char. 630V)



GRM Series (X7R Char. 250V)





Only for Applications

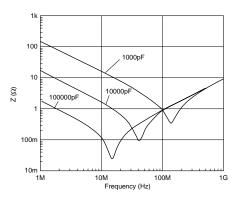
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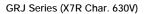
GRM/GRJ/GR4/GR7/GA2/GA3 Series Reference Data (Typical Example)

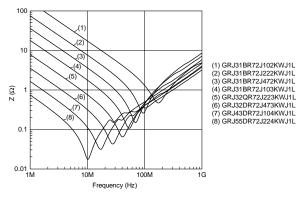
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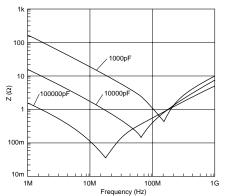
GRM Series (X7R Char. 630V)



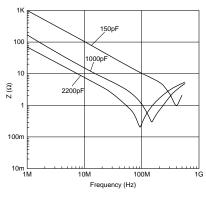




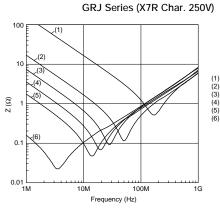
GA2 Series



GA3 Series (Type GD)

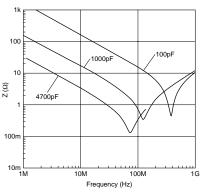


muRata

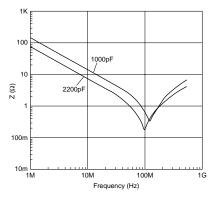


(1) GRJ21AR72E102KWJ1D (2) GRJ21BR72E103KWJ3L (3) GRJ31BR72E223KWJ1L (4) GRJ31CR72E473KWJ3L (5) GRJ31CR72E104KWJ3L (6) GRJ55DR72E105KWJ1L

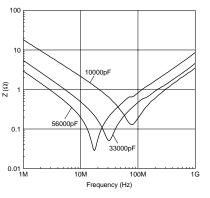
GR4 Series



GA3 Series (Type GF)



GA3 Series (Type GB)



For General Purpose GRM/GRJ Series

Only for Applications

AC250V Type GA2 Series

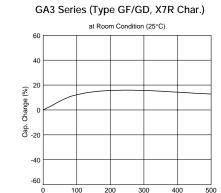
Certified GA3 Series Safety Standard

Product Information Reference Data

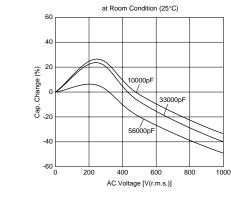
GRM/GRJ/GR4/GR7/GA2/GA3 Series Reference Data (Typical Example)

Continued from the preceding page.

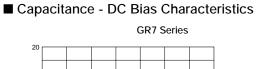
■ Capacitance - AC Voltage Characteristics

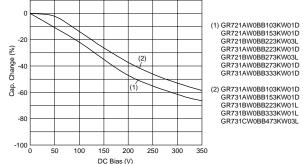


AC Voltage [V(r.m.s.)]



GA3 Series (Type GB)





Only for Applications

For General Purpose GRM/GRJ Series

AC250V Type GA2 Series

Safety Standard Certified GA3 Series



Package

For General Purpose GRM/GRJ Series

Only for Applications

AC250V Type GA2 Series

Safety Standard Certified GA3 Series

Product Information Package

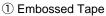
Taping is the standard packaging method.

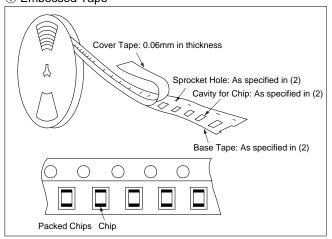
Minimum Quantity Guide

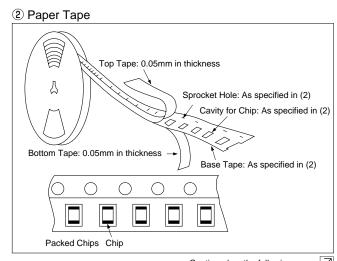
	Part Number		Dimensions (mn	ן)	Quantity (pcs.) ø180mm Reel		
			W	Т	Paper Tape	Embossed Tape	
	GRM18	1.6	0.8	0.8	4,000	-	
	CD 104/CDM04/CD704	0.0	4.05	1.0	4,000	-	
	GRJ21/GRM21/GR721	2.0	1.25	1.25	-	3,000	
				1.0	4,000	-	
	GRJ31/GRM31/GR731	3.2	1.6	1.25	-	3,000	
				1.6	-	2,000	
				1.0	4,000	-	
Medium				1.25	-	3,000	
Voltage	GRJ32/GRM32	3.2	2.5	1.5	-	2,000	
				2.0	-	1,000	
		4.5	2.0	1.0	-	3,000	
	GRM42/GR442	4.5		1.5	-	2,000	
	GRJ43/GRM43/GR443	4.5	3.2	1.5	-	1,000	
				2.0	-	1,000	
				2.5	-	500	
	GRJ55/GRM55/GR455	5.7	5.0	2.0	-	1,000	
	GA242	4.5	2.0	1.5	-	2,000	
100501/		4.5	3.2	1.5	-	1,000	
AC250V	GA243			2.0	-	1,000	
	GA255	5.7	5.0	2.0	-	1,000	
				1.0	-	3,000	
	GA342	4.5	2.0	1.5	-	2,000	
				2.0	-	2,000	
	GA343	4.5	3.2	1.5	-	1,000	
	GA343	4.0	3.2	2.0	-	1,000	
Safety Std. Certification	GA352	5.7	2.8	1.5	-	1,000	
or anouton				1.5	-	1,000	
				2.0	-	1,000	
	GA355	5.7	5.0	2.5	-	500	
				2.7	-	500	
				2.9	-	500	

■ Tape Carrier Packaging

(1) Appearance of Taping







Continued on the following page.

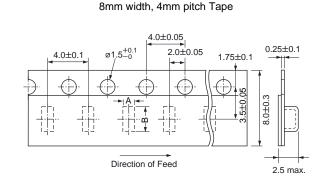


Package

Continued from the preceding page.

(2) Dimensions of Tape

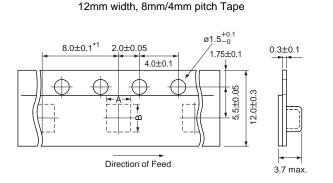
① Embossed Tape



Part Number	A*	B*
GRJ21/GRM21/GR721 (T≧1.25mm)	1.45	2.25
GRJ31/GRM31/GR731 (T≧1.25mm)	2.0	3.6
GRJ32/GRM32 (T≧1.25mm)	2.9	3.6

*Nominal Value

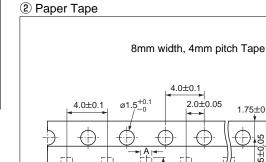
1.1 max.



Part Number	A*	B*
GRM42/GR442/GA242/GA342	2.5	5.1
GRJ43/GRM43/GR443/GA243/GA343	3.6	4.9
GA352	3.2	6.1
GRJ55/GRM55/GR455/GA255/GA355	5.4	6.1

*1 4.0±0.1mm in case of GRM42/GR442/GA242/GA342 *Nominal Value

(in mm)



Direction of Feed

4.0±0.1

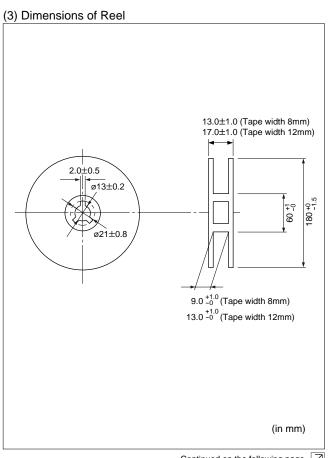
2.0±0.05

1.75±0.1

02

8.0±0.3 3.5±0.

Part Number	A*	B*
GRM18	1.05	1.85
GRJ21/GRM21/GR721 (T=1.0mm)	1.45	2.25
GRM31/GR731 (T=1.0mm)	2.0	3.6
GRM32 (T=1.0mm)	2.9	3.6
		*Nominal Value (in mr



Continued on the following page.



AC250V Type GA2 Series

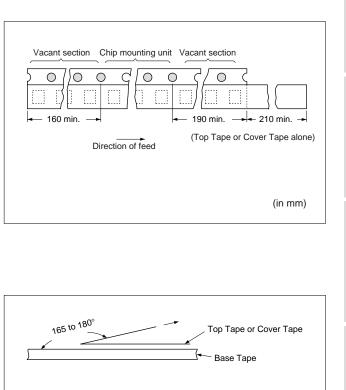
For General Purpose GRM/GRJ Series

Only for Applications

For General Purpose GRM/GRJ Series

Only for Applications

- Continued from the preceding page.
- (4) Taping Method
 - Tapes for capacitors are wound clockwise. The sprocket holes are to the right as the tape is pulled toward the user.
 - ② Part of the leader and part of the empty tape should be attached to the end of the tape as shown at right.
 - ③ The top tape or cover tape and base tape are not attached at the end of the tape for a minimum of 5 pitches.
 - ④ Missing capacitors number within 0.1% of the number per reel or 1 pc, whichever is greater, and are not continuous.
 - (5) The top tape or cover tape and bottom tape should not protrude beyond the edges of the tape and should not cover sprocket holes.
 - (6) Cumulative tolerance of sprocket holes, 10 pitches: ± 0.3 mm.
 - $\ensuremath{\overline{\mathcal{O}}}$ Peeling off force: 0.1 to 0.6N in the direction shown at right.





■ Storage and Operating Conditions Operating and storage environment

Do not use or store capacitors in a corrosive atmosphere, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are present. In addition, avoid exposure to moisture. Before cleaning, bonding or molding this product, verify that these processes do not affect product quality by testing the performance of a cleaned, bonded or molded product in the intended equipment. Store the capacitors where the temperature and relative humidity do not exceed 5 to 40 degrees centigrade and 20 to 70%.

Handling

- 1. Vibration and impact
 - Do not expose a capacitor to excessive shock or vibration during use.
- 2. Do not directly touch the chip capacitor, especially the ceramic body. Residue from hands/fingers may create a short circuit environment.

FAILURE TO FOLLOW THE ABOVE CAUTIONS MAY RESULT, WORST CASE, IN A SHORT CIRCUIT AND CAUSE FUMING OR PARTIAL DISPERSION WHEN THE PRODUCT IS USED. Use capacitors within 6 months of delivery. Check the solderability after 6 months or more.

FAILURE TO FOLLOW THE ABOVE CAUTIONS MAY RESULT, WORST CASE, IN A SHORT CIRCUIT AND CAUSE FUMING OR PARTIAL DISPERSION WHEN THE PRODUCT IS USED.

AC250V Type GA2 Series

C02E.pdf 10.12.20

Caution (Rating)

1. Operating Voltage

When DC-rated capacitors are to be used in AC or ripple current circuits, be sure to maintain the Vp-p value of the applied voltage or the Vo-p which contains DC bias within the rated voltage range.

When the voltage is applied to the circuit, starting or stopping may generate irregular voltage for a transit period because of resonance or switching. Be sure to use a capacitor with a rated voltage range that includes these irregular voltages.

When DC-rated capacitors are to be used in input circuits from a commercial power source (AC filter), be sure to use Safety Certified Capacitors because various regulations for withstanding voltage or impulses, established for all equipment, should be taken into consideration.

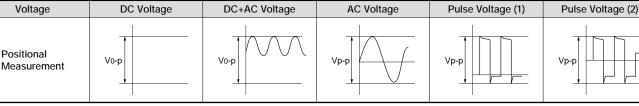
2. Operating Temperature, Self-generated Heat, and Load Reduction at High-frequency Voltage Condition Keep the surface temperature of a capacitor below the upper limit of its rated operating temperature range. Be sure to take into account the heat generated by the capacitor itself. When the capacitor is used in a highfrequency voltage, pulse voltage, it may self-generate

heat due to dielectric loss.

(1) In the case of X7R char.

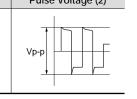
Applied voltage should be the load such as selfgenerated heat is within 20°C on the condition of atmosphere temperature 25°C. When measuring, use a thermocouple of small thermal capacity -K of ø0.1mm in conditions where the capacitor is not affected by radiant heat from other components or surrounding ambient fluctuations. Excessive heat may lead to deterioration of the capacitor's characteristics and reliability. (Never attempt to perform measurement with the cooling fan running. Otherwise, accurate measurement cannot be ensured.)

Continued on the following page. \square



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Continued from the preceding page.

(2) In case of C0G, U2J char.

Due to the low self-heating characteristics of lowdissipation capacitors, the allowable electric power of these capacitors is generally much higher than that of X7R characteristic capacitors.

When a high frequency voltage that causes 20°C selfheating to the capacitor is applied, it will exceed the capacitor's allowable electric power.

The frequency of the applied sine wave voltage should be less than 500kHz (less than 100kHz in the case of rated voltage: DC3.15kV). The applied voltage should be less than the value shown in figure below.

In the case of non-sine wave that includes a harmonic frequency, please contact our sales representatives or product engineers. Excessive heat may lead to deterioration of the capacitor's characteristics and reliability. (Never attempt to perform measurement with the cooling fan running. Otherwise, accurate measurement cannot be ensured.)

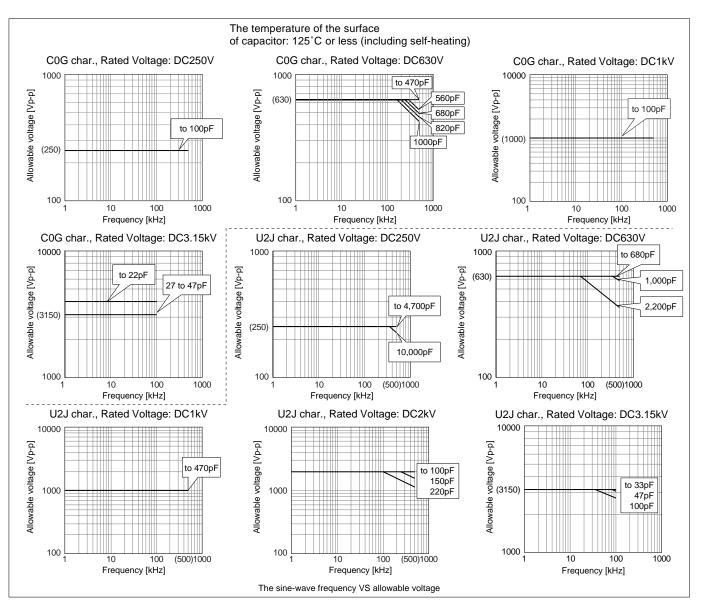
<C0G char., Rated Voltage: DC3.15kV>

The capacitors less than 22pF can be applied maximum 4.0kV peak to peak at 100kHz or less only for the ballast or the resonance usage in the LCD backlight inverter circuit.

<Capacitor Selection Tool>

We are also offering free software/the capacitor selection tool: "Murata Medium Voltage Capacitors Selection Tool by Voltage Form," which will assist you in selecting a suitable capacitor.

The software can be downloaded from Murata's Website. (http://www.murata.com/designlib/mmcsv/index.html). By inputting capacitance values and the applied voltage waveform of the specific capacitor series, this software will calculate the capacitor's power consumption and list suitable capacitors (non-sine wave is also available).



Continued on the following page. \square



Continued from the preceding page.

3. Fail-safe

Failure of a capacitor may result in a short circuit. Be sure to provide an appropriate fail-safe function such as a fuse on your product to help eliminate possible electric shock, fire, or fumes.

Please consider using fuses on each AC line if the capacitors are used between the AC input lines and earth (line bypass capacitors), to prepare for the worst case, such as a short circuit.

4. Test Condition for AC Withstanding Voltage

(1) Test Equipment

Tests for AC withstanding voltage should be made with equipment capable of creating a wave similar to a 50/60 Hz sine wave.

If the distorted sine wave or overload exceeding the specified voltage value is applied, a defect may be caused.

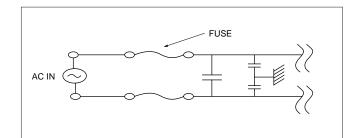
(2) Voltage Applied Method

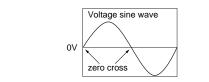
The capacitor's leads or terminals should be firmly connected to the output of the withstanding voltage test equipment, and then the voltage should be raised from near zero to the test voltage. If the test voltage is applied directly to the capacitor without raising it from near zero, it should be applied with the zero cross.* At the end of the test time, the test voltage should be reduced to near zero, and then the capacitor's leads or terminals should be taken off the output of the withstanding voltage test equipment. If the test voltage is applied directly to the capacitor without raising it from near zero, surge voltage may occur and cause a defect.

*ZERO CROSS is the point where voltage sine wave passes 0V.

- See the figure at right -

FAILURE TO FOLLOW THE ABOVE CAUTIONS MAY RESULT, WORST CASE, IN A SHORT CIRCUIT AND CAUSE FUMING OR PARTIAL DISPERSION WHEN THE PRODUCT IS USED.







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Choose a mounting position that minimizes the stress imposed on the chip during flexing or bending of the board.

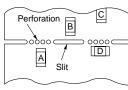
[Component Direction]

<Example to be avoided>

<Example of improvement>



[Chip Mounting Close to Board Separation Point]



Chip arrangement Worst A>C>B~D Best

Continued on the following page. \square

AC250V Type GA2 Series



Soldering

30-60 seconds

Soldering

Gradual Cooling

Time

Gradual Cooling

Time

20 seconds max.

90 Soldering Time (sec.)

0.2mm min.

in section

[Standard Conditions for Reflow Soldering]

Temperature (℃)

200°C

170°C

150°C

130°C

٨Т

Peak Temperature

Infrared Reflow

Preheating

60-120 seconds Vapor Reflow Temperature (℃) Peak Temperature ΔT 170°C 150°C 130°C Preheating 60-120 seconds [Allowable Soldering Temperature and Time] Soldering Temperature (°C) 270 7/// 260 250 240 230 30 60 0 In the case of repeated soldering, the accumulated soldering time must be within the range shown above. [Optimum Solder Amount for Reflow Soldering]

Continued from the preceding page.

- 4. Reflow Soldering
- When components are exposed to sudden heat, their mechanical strength can be decreased due to the extreme temperature changes which can cause flexing and result in internal mechanical damage, which will cause the parts to fail. In order to prevent mechanical damage, preheating is required for both the components and the PCB board. Preheating conditions are shown in Table 1. It is required to keep the temperature differential between the soldering and the components surface (ΔT) as small as possible.
- Solderability of Tin plating termination chips might be deteriorated when low temperature soldering profile where peak solder temperature is below the Tin melting point is used. Please confirm the solderability of Tin plating termination chips before use.
- When components are immersed in solvent after mounting, be sure to maintain the temperature difference (ΔT) between the component and solvent within the range shown in the Table 1.

Table 1

Part Number	Temperature Differential
G18/21/31	∆T≦190℃
G32/42/43/52/55	∆T≦130℃

Recommended Conditions

	Pb-Sn S	Solder	Lead Free Solder
	Infrared Reflow	Vapor Reflow	Leau Fiee Soluei
Peak Temperature	230-250°C	230-240°C	240-260°C
Atmosphere	Air	Air	Air or N2

Pb-Sn Solder: Sn-37Pb

Lead Free Solder: Sn-3.0Ag-0.5Cu

Optimum Solder Amount for Reflow Soldering

- Overly thick application of solder paste results in excessive solder fillet height. This makes the chip more susceptible to mechanical and
 - thermal stress on the board and may cause cracked chips.
- Too little solder paste results in a lack of adhesive strength on the outer electrode, which may result in chips breaking loose from the PCB.
- Make sure the solder has been applied smoothly to the end surface to a height of 0.2mm min.

Inverting the PCB

Make sure not to impose an abnormal mechanical shock on the PCB.



Caution

Continued from the preceding page.

- 5. Flow Soldering
- When components are exposed to sudden heat, their mechanical strength can be decreased due to the extreme temperature changes which can cause flexing and result in internal mechanical damage, which will cause the parts to fail. Additionally, an excessively long soldering time or high soldering temperature results in leaching by the outer electrodes, causing poor adhesion or a reduction in capacitance value due to loss of contact between electrodes and end termination.
- In order to prevent mechanical damage, preheating is required for both the components and the PCB board.
 Preheating conditions are shown in Table 2. It is required to keep temperature differential between the soldering and the components surface (ΔT) as small as possible.
- When components are immersed in solvent after mounting, be sure to maintain the temperature difference between the component and solvent within the range shown in Table 2.

Do not apply flow soldering to chips not listed in Table 2.

Table 2

40.0 -	
Part Number	Temperature Differential
G18/21/31	∆T≦150℃

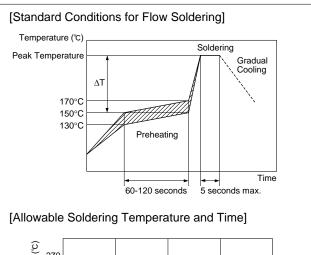
Recommended Conditions

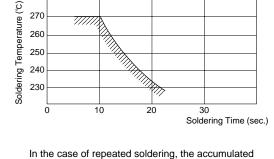
	Pb-Sn Solder	Lead Free Solder
Peak Temperature	240-250°C	250-260°C
Atmosphere	Air	N2

Pb-Sn Solder: Sn-37Pb

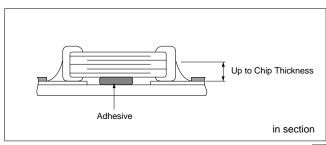
Lead Free Solder: Sn-3.0Ag-0.5Cu

Optimum Solder Amount for Flow Soldering The top of the solder fillet should be lower than the thickness of components. If the solder amount is excessively large, the risk of cracking is higher during board bending or under any other stressful conditions.





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



Continued on the following page.



For General Purpose GRM/GRJ Series

C02E.pdf

AC250V Type GA2 Series

Certified GA3 Series Safety Standard

Continued from the preceding page.

- 6. Correction with a Soldering Iron
- When sudden heat is applied to the components by use of a soldering iron, the mechanical strength of the components will decrease because the extreme temperature change causes deformations inside the components.

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In order to prevent mechanical damage to the components, preheating is required for both the components and the PCB board.

Preheating conditions, (The "Temperature of the Soldering Iron Tip", "Preheating Temperature,"

"Temperature Differential" between iron tip and the

Table 3

Part Number	Temperature of Soldering Iron tip	Preheating Temperature	Temperature Differential (∆T)	Atmosphere
G18/21/31	350°C max.	150°C min.	∆T≦190℃	air
G32/42/43/ 52/55	280°C max.	150°C min.	∆T≦130℃	air

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

Pb-Sn Solder: Sn-37Pb

Lead Free Solder: Sn-3.0Ag-0.5Cu

Optimum Solder Amount when re-working Using a Soldering Iron

For sizes smaller than $G\square$ 18, the top of the solder fillet should be lower than 2/3 of the thickness of the component or 0.5mm whichever is smaller.

For sizes larger than $G \square \square 21$, the top of the solder fillet should be lower than 2/3 of the thickness of the component.

If the solder amount is excessive, the risk of cracking is higher during board bending or under any other stressful conditions.

A Soldering iron ø3mm or smaller should be used. It is also necessary to keep the soldering iron from touching the components during the re-work.

Solder wire with Ø0.5mm or smaller is required for soldering.

7. Washing

Excessive output of ultrasonic oscillation during cleaning causes PCBs to resonate, resulting in cracked chips or broken solder. Take note not to vibrate PCBs.

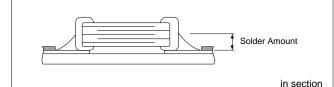
FAILURE TO FOLLOW THE ABOVE CAUTIONS MAY RESULT, WORST CASE, IN A SHORT CIRCUIT AND FUMING WHEN THE PRODUCT IS USED.

components and the PCB), should be within the conditions of table 3.

It is required to keep the temperature differential between the soldering Iron and the component's surface (ΔT) as small as possible.

After soldering, do not allow the component/PCB to cool down rapidly.

The operating time for the re-working should be as short as possible. When re-working time is too long, it may cause solder leaching, in turn causing a reduction of the adhesive strength of the terminations.



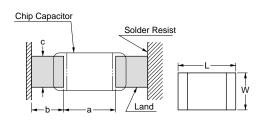


Notice

Notice (Soldering and Mounting)

 Construction of Board Pattern After installing chips, if solder is excessively applied to the circuit board, mechanical stress will cause destruction resistance characteristics to lower. To prevent this, be extremely careful in determining shape and dimension before designing the circuit board diagram.

Construction and Dimensions of Pattern (Example)



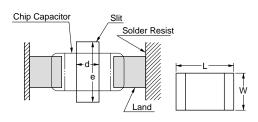
Flow Solder	ing		
L×W	а	b	С
1.6×0.8	0.6-1.0	0.8-0.9	0.6-0.8
2.0×1.25	1.0-1.2	0.9-1.0	0.8-1.1
3.2×1.6	2.2-2.6	1.0-1.1	1.0-1.4

Flow soldering : 3.2×1.6 or less available.

Reflow Soldering

	g		
L×W	а	b	С
1.6×0.8	0.6-0.8	0.6-0.7	0.6-0.8
2.0×1.25	1.0-1.2	0.6-0.7	0.8-1.1
3.2×1.6	2.2-2.4	0.8-0.9	1.0-1.4
3.2×2.5	2.0-2.4	1.0-1.2	1.8-2.3
4.5×2.0	2.8-3.4	1.2-1.4	1.4-1.8
4.5×3.2	2.8-3.4	1.2-1.4	2.3-3.0
5.7×2.8	4.0-4.6	1.4-1.6	2.1-2.6
5.7×5.0	4.0-4.6	1.4-1.6	3.5-4.8
			(in mm)

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.

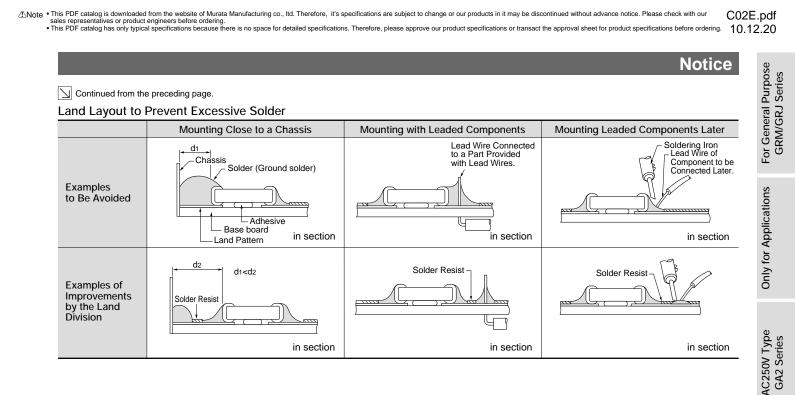
214

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

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(in mm)

Continued on the following page. \square



- 2. Mounting of Chips
- Thickness of adhesives applied

Keep thickness of adhesives applied ($50-105\mu$ m or more) to reinforce the adhesive contact considering the thickness of the termination or capacitor ($20-70\mu$ m) and the land pattern ($30-35\mu$ m).

Mechanical shock of the chip placer

When the positioning claws and pick-up nozzle are worn,
the load is applied to the chip while positioning is
concentrated in one position, thus causing cracks,
breakage, faulty positioning accuracy, etc.
Careful checking and maintenance are necessary to
prevent unexpected trouble.
An excessively low bottom dead point of the suction
nozzle imposes great force on the chip during mounting,
causing cracked chips. Please set the suction nozzle's

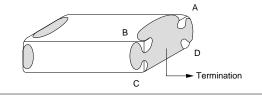
3. Soldering

(1) Limit of losing effective area of the terminations and conditions needed for soldering.

bottom dead point on the upper surface of the board.

Depending on the conditions of the soldering temperature and/or immersion (melting time), effective areas may be lost in some parts of the terminations.

To prevent this, be careful in soldering so that any possible loss of the effective area on the terminations will securely remain at a maximum of 25% on all edge length A-B-C-D-A of part with A, B, C, D, shown in the Figure below.



(2) Flux Application

- An excessive amount of flux generates a large quantity of flux gas, causing deteriorated solderability. So apply flux thinly and evenly throughout. (A foaming system is generally used for flow soldering.)
- Flux containing too high a percentage of halide may cause corrosion of the outer electrodes without sufficient cleaning. Use flux with a halide content of 0.2% max.
- Do not use strong acidic 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.)
 (3) Solder
 (3) Solder
 (3) Solder
 (4) Solder
 (5) Solder
 (6) Solder
 (7) Solder

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.

Continued on the following page.



Certified GA3 Series

Safety Standard

Product Information

Notice

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Notice

Continued from the preceding page.

4. Cleaning

Please confirm there is no problem in the reliability of the product beforehand when cleaning it with the intended equipment.

The residue after cleaning it might cause a decrease in the surface resistance of the chip and the corrosion of the electrode part, etc. As a result it might cause reliability to deteriorate. Please confirm beforehand that there is no problem with the intended equipment in ultrasonic cleansing.

5. Resin Coating

Please use it after confirming there is no influence on the product with the intended equipment before the resin coating and molding.

A cracked chip might be caused at the cooling/heating cycle by the amount of resin spreading and/or bias thickness.

The resin for coating and molding must be selected as the stress is small when stiffening and the hygroscopic is low as possible.

Rating

- Capacitance change of capacitor
 In the case of X7R char.
- Capacitors have an aging characteristic, whereby the capacitor continually decreases its capacitance slightly if the capacitor is left on for a long time. Moreover, capacitance might change greatly depending on the surrounding temperature or an applied voltage. Therefore, it is not likely to be suitable for use in a time constant circuit.
- Please contact us if you need detailed information. (2) In the case of any char. except X7R
- Capacitance might change a little depending on the surrounding temperature or an applied voltage. Please contact us if you intend to use this product in a strict time constant circuit.

2. Performance check by equipment Before using a capacitor, check that there is no problem in the equipment's performance and the specifications.

Generally speaking, CLASS 2 (X7R char.) ceramic capacitors have voltage dependence characteristics and temperature dependence characteristics in capacitance. Therefore, the capacitance value may change depending on the operating condition in the equipment.

Accordingly, be sure to confirm the apparatus performance of receiving influence in a capacitance value change of a capacitor, such as leakage current and noise suppression characteristics. Moreover, check the surge-proof ability of a capacitor in the equipment, if needed, because the surge voltage may exceed the specific value by the

inductance of the circuit.



For General Purpose

GRM/GRJ Series

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ISO 9001 Certifications

Qualified Standards

The products listed here have been produced by ISO 9001 certified factory.

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Izumo Murata Mfg. Co., Ltd.
Okayama Murata Mfg. Co., Ltd.
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Design assistant tool SimSurfing SimSurfing

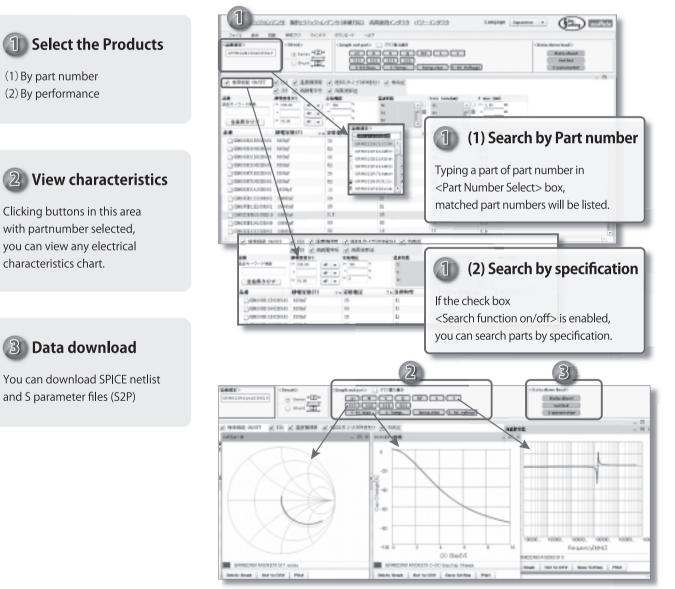


MLCC is now available !

Design assistant tool "SimSurfing" has been updated and you can now find and view any kind of characteristics of MLCCs.

Available function for MLCCs.

- ① Products search
- ② View frequency characteristics (S parameters, Z, R, X, Q, DF, L, C)
- ③ DC voltage bias characteristics (Absolute capacitance/change rate)
- ④ Temperature characteristics (Absolute capacitance/change rate)
- (5) AC voltage bias characteristics (Absolute capacitance/change rate)
- 6 Download SPICE netlist/ S parameter



These images are captured at August/2010. Be sure that this software will be updated frequently.

http://ds.murata.com/software/simsurfing/en-us/mlcc/



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Note: Export Control

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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.

- Aircraft equipment
- ② Aerospace equipment
- ③ Undersea equipment
- ⑤ Medical equipment
- ⑦ Traffic signal equipment
- Power plant equipment
 - 6 Transportation equipment (vehicles, trains, ships, etc.)
 - B Disaster prevention / crime prevention equipment
- 9 Data-processing equipment
 - uipment (1) Application of similar complexity and/or reliability requirements to the applications listed above
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- 4. 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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- 7. No ozone depleting substances (ODS) under the Montreal Protocol are used in our manufacturing process.

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