● Part Numbering

Chip Monolithic Ceramic Capacitors

(Part Number)

GR	M	18	8	B1	1H	102	K	A01	D
❶	❷	❸	❹	❺	❻	❼	❽	❾	❿

❶Product ID

❷Series

Product ID	Code	Series
GR	J	Soft Termination Type
	M	Tin Plated Layer
	4	Only for Information Devices / Tip & Ring
	7	Only for Camera Flash Circuit
ER	B	High Frequency Type
GQ	M	High Frequency for Flow/Reflow Soldering
GM	A	Monolithic Microchip
	D	for Bonding
GN	M	Capacitor Array
LL	L	Low ESL Wide Width Type
	A	Eight-termination Low ESL Type
	M	Ten-termination Low ESL Type
GJ	M	High Frequency Low Loss Type
GA	2	for AC250V (r.m.s.)
	3	Safety Standard Recognized Type

❸Dimension (L×W)

Code	Dimension (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
0M	0.9×0.6mm	0302
11	1.25×1.0mm	0504
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

❹Dimension (T)

Code	Dimension (T)
2	0.2mm
2	2-elements (Array Type)
3	0.3mm
4	4-elements (Array Type)
5	0.5mm
6	0.6mm
7	0.7mm
8	0.8mm
9	0.85mm
A	1.0mm
B	1.25mm
C	1.6mm
D	2.0mm
E	2.5mm
F	3.2mm
M	1.15mm
N	1.35mm
Q	1.5mm
R	1.8mm
S	2.8mm
X	Depends on individual standards.

With the array type GNM series, "Dimension(T)" indicates the number of elements.

Continued on the following page.

Continued from the preceding page.

❺Temperature Characteristics

Temperature Characteristic Codes			Temperature Characteristics			Operating Temperature Range
Code	Public STD Code		Reference Temperature	Temperature Range	Capacitance Change or Temperature Coefficient	
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	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	B	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	±15%	-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
W0	-	-	25°C	-55 to 125°C	±10% *4 +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.

Continued from the preceding page.

●Capacitance Change from each temperature

JIS Code

Murata Code	Capacitance Change from 20°C (%)					
	–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
3T	–	–	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

Murata Code	Capacitance Change from 25°C (%)					
	–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
6T	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

❻Rated 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
GB	X2; AC250V (Safety Standard Recognized Type GB)
GC	X1/Y2; AC250V (Safety Standard Recognized Type GC)
GD	Y3; AC250V (Safety Standard Recognized Type GD)
GF	Y2, X1/Y2; AC250V (Safety Standard Recognized Type GF)

❼Capacitance

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

Ex.)

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

Continued on the following page.

Continued from the preceding page.

❽Capacitance Tolerance

Code	Capacitance Tolerance	TC	Series	Capacitance Step	
W	±0.05pF	CΔ	**GRM/GJM**	≦9.9pF	0.1pF
B	±0.1pF	CΔ	**GRM/GJM**	≦9.9pF	0.1pF
			GQM	≦1pF	0.1pF
				1.1 to 9.9pF	1pF Step and E24 Series
			ERB	≦9.9pF	1pF Step and E24 Series
C	±0.25pF	CΔ	**GRM/GJM**	≦9.9pF	0.1pF
		except CΔ	**GRM**	≦5pF	* 1pF
		CΔ	**ERB**	≦9.9pF	1pF Step and E24 Series
			GQM	≦1pF	0.1pF
				1.1 to 9.9pF	1pF Step and E24 Series
D	±0.5pF	CΔ	**GRM/GJM**	5.1 to 9.9pF	0.1pF
		except CΔ	**GRM**	5.1 to 9.9pF	* 1pF
		CΔ	**ERB/GQM**	5.1 to 9.9pF	1pF Step and E24 Series
G	±2%	CΔ	**GJM**	≧10pF	E12 Series
		CΔ	**GQM/ERB**	≧10pF	E24 Series
J	±5%	CΔ–SL	**GRM/GA3**	≧10pF	E12 Series
		CΔ	**ERB/GQM/GJM**	≧10pF	E24 Series
K	±10%	B, R, X7R, X5R, ZLM	**GRJ/GRM/GR7/GA3**	E6 Series	
		C0G	**GNM**	E6 Series	
		B, R, X7R, X5R, ZLM	**GR4, GMD**	E12 Series	
M	±20%	B, R, X7R, X7S	**GRM/GMA**	E6 Series	
		X5R, X7R, X7S	**GNM**	E3 Series	
		X7R	**GA2**	E3 Series	
		X5R, X7R, X7S, X6S	**LLL/LLA/LLM**	E3 Series	
Z	+80%, -20%	F, Y5V	**GRM**	E3 Series	
R	Depends on individual standards.				

***** E24 series is also available.

❾Individual Specification Code

Expressed by three figures.

❿Packaging

Code	Packaging
L	ø180mm Embossed Taping
D	ø180mm Paper Taping
E	ø180mm Paper Taping (LLL15)
K	ø330mm Embossed Taping
J	ø330mm Paper Taping
F	ø330mm Paper Taping (LLL15)
B	Bulk
C	Bulk Case
T	Bulk Tray

GRM Series Specifications and Test Methods (2)

<table>
<tr><th>No.</th><th>Item</th><th>Specifications</th><th>Test Method</th></tr>
<tr><td>1</td><td>Operating Temperature Range</td><td>B1, B3, F1: –25°C to +85°C
R1, R7, D7: –55°C to +125°C
C6, R6: –55°C to +85°C
C7, E7: –55°C to +125°C
C8, D8: –55°C to +105°C
F5: –30°C to +85°C</td><td>Reference Temperature: 20°C
(R6, R7, C6, C7, C8, D7, D8, E7, F5: 25°C)</td></tr>
<tr><td>2</td><td>Rated Voltage</td><td>See the previous pages.</td><td>The rated voltage is defined as the maximum voltage which 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.</td></tr>
<tr><td>3</td><td>Appearance</td><td>No defects or abnormalities</td><td>Visual inspection</td></tr>
<tr><td>4</td><td>Dimensions</td><td>Within the specified dimensions</td><td>Using calipers (GRM02 size is based on Microscope)</td></tr>
<tr><td>5</td><td>Dielectric Strength</td><td>No defects or abnormalities</td><td>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.</td></tr>
<tr><td>6</td><td>Insulation Resistance</td><td>More than 50Ω · F</td><td>The insulation resistance should be measured with a DC voltage not exceeding the rated voltage at Standard Temperature and 75%RH max. and within 1 minute of charging, provided the charge/discharge current is less than 50mA.</td></tr>
<tr><td>7</td><td>Capacitance</td><td>Within the specified tolerance.
*Table 1
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 R7/C8 1A 225
GRM188 B3/R6 1A 335
GRM219 B3/R6 1C/1A 475, 106
GRM219 C8 1A 475
GRM21B B3/R6 1C/1A 106
GRM21B R7/C8 1A 106
GRM319 B3/R6 1C/1A 106</td><td>The capacitance should be measured at Standard Temperature at the frequency and voltage shown in the table.
Capacitance | Frequency | Voltage
*1 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
*1 However the voltage is 0.5±0.1Vrms about Table 1 items on the left side.</td></tr>
<tr><td>8</td><td>Dissipation Factor (D.F.)</td><td>B1, R1, B3, R6, R7, C7, C8, E7, D7: 0.1 max.
C6, GRM31CR71E106 : 0.125 max.
D8, GRM31CR60J107 : 0.15 max.
F1, F5: 0.2 max.
*Table 1
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 R7/C8 1A 225
GRM188 B3/R6 1A 335
GRM219 B3/R6 1C/1A 475, 106
GRM219 C8 1A 475
GRM21B B3/R6 1C/1A 106
GRM21B R7/C8 1A 106
GRM319 B3/R6 1C/1A 106</td><td>The D.F. should be measured at Standard Temperature at the Frequency and voltage shown in the table.
Capacitance | Frequency | Voltage
*1 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
*1 However the voltage is 0.5±0.1Vrms about Table 1 items on the left side.</td></tr>
</table>

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GRM Series Specifications and Test Methods (2)

Continued from the preceding page.

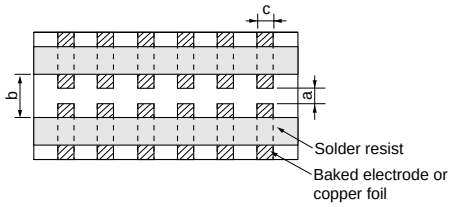
<table>
<tr><th>No.</th><th colspan="2">Item</th><th>Specifications</th><th>Test Method</th></tr>
<tr><td rowspan="2">9</td><td rowspan="2">Capacitance Temperature Characteristics</td><td>No bias</td><td>B1, B3: Within +/–10% (–25°C to +85°C)
R1, R7: Withn +/–15% (–55°C to +125°C)
R6: Within +/–15% (–55°C to +85°C)
F1: Within +30/–80% (–25°C to +85°C)
C6: Within +/–22% (–55°C to +85°C)
C7: Within +/–22% (–55°C to +125°C)
C8: Within +/–22% (–55°C to +105°C)
E7: Within +22/–56% (–55°C to +125°C)
D7: Within +22/–33% (–55°C to +125°C)
D8: Within +22/–33% (–55°C to +105°C)
F5: Within +22/–82% (–30°C to +85°C)</td><td rowspan="2">The capacitance change should be measured after 5min. 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.*
In case of applying voltage, the capacitance change should be measured after 1 more min. with applying voltage in equilibration of each temp. stage.
* GRM32DB10J226, GRM43 B1/B3/R6 0J/1A 336/476 only: 1.0±0.2Vrms
Step | Temperature (°C) | Applying Voltage (V)
1 | 20±2* | No bias * R6, R7, C6, C7, C8, D7, D8, E7, F5: 25±2°C
2 | –55±3 (for R1, R6, R7, C6, C7, C8, E7, D7, D8) –25±3 (for B1, B3, F1, F5) | No bias * R6, R7, C6, C7, C8, D7, D8, E7, F5: 25±2°C
3 | 20±2* | No bias * R6, R7, C6, C7, C8, D7, D8, E7, F5: 25±2°C
4 | 85±3 (for B1, B3, F1, F5, R6, C6) 125±3 (for R1, R7, C7, E7, D7) 105±3 (for C8, D8) | No bias * R6, R7, C6, C7, C8, D7, D8, E7, F5: 25±2°C
5 | 20±2 | 50% of the rated voltage
6 | –55±3 (for R1) –25±3 (for B1, F1) | 50% of the rated voltage
7 | 20±2 | 50% of the rated voltage
8 | 125±3 (for R1) 85±3 (for B1, F1) | 50% of the rated voltage
•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.</td></tr>
<tr><td>50% of the Rated Voltage</td><td>B1: Within +10/–30%
R1: Within +15/–40%
F1: Within +30/–95%</td></tr>
<tr><td>10</td><td colspan="2">Adhesive Strength of Termination</td><td>No removal of the terminations or other defects should occur.
 

Fig. 1a</td><td>Solder the capacitor on the test jig (glass epoxy board) shown in Fig.1a using an 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 reflow method and should be conducted with care so that the soldering is uniform and free of defects such as heat shock.
*1N: GRM02, 2N: GRM03, 5N: GRM15/18
Type | a | b | c
GRM02 | 0.2 | 0.56 | 0.23
GRM03 | 0.3 | 0.9 | 0.3
GRM15 | 0.4 | 1.5 | 0.5
GRM18 | 1.0 | 3.0 | 1.2
GRM21 | 1.2 | 4.0 | 1.65
GRM31 | 2.2 | 5.0 | 2.0
GRM32 | 2.2 | 5.0 | 2.9
GRM43 | 3.5 | 7.0 | 3.7
GRM55 | 4.5 | 8.0 | 5.6
(in mm)</td></tr>
<tr><td rowspan="3">11</td><td rowspan="3">Vibration</td><td>Appearance</td><td>No defects or abnormalities</td><td rowspan="3">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 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 3 mutually perpendicular directions (total of 6 hours).</td></tr>
<tr><td>Capacitance</td><td>Within the specified tolerance</td></tr>
<tr><td>D.F.</td><td>B1, R1, B3, R6, R7, C7, C8, E7, D7: 0.1 max.
C6, GRM31CR71E106: 0.125 max.
D8, GRM31CR60J107: 0.15 max.
F1, F5: 0.2 max.</td></tr>
</table>

Continued on the following page.

GRM Series Specifications and Test Methods (2)

Continued from the preceding page.

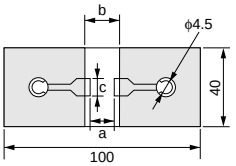
<table>
<tr><th>No.</th><th colspan="2">Item</th><th>Specifications</th><th>Test Method</th></tr>
<tr><td rowspan="3">12</td><td rowspan="3">Deflection</td><td>Appearance</td><td>No marking defects</td><td rowspan="3">Solder the capacitor on the test jig (glass epoxy board) shown in Fig.2a using an eutectic 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 shock.
 

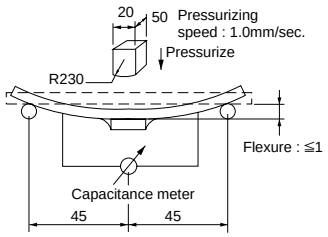
Fig. 2a
t: 1.6mm (GRM02/03/15: t: 0.8mm)
<table><tr><th>Type</th><th>a</th><th>b</th><th>c</th></tr><tr><td>GRM02</td><td>0.2</td><td>0.56</td><td>0.23</td></tr><tr><td>GRM03</td><td>0.3</td><td>0.9</td><td>0.3</td></tr><tr><td>GRM15</td><td>0.4</td><td>1.5</td><td>0.5</td></tr><tr><td>GRM18</td><td>1.0</td><td>3.0</td><td>1.2</td></tr><tr><td>GRM21</td><td>1.2</td><td>4.0</td><td>1.65</td></tr><tr><td>GRM31</td><td>2.2</td><td>5.0</td><td>2.0</td></tr><tr><td>GRM32</td><td>2.2</td><td>5.0</td><td>2.9</td></tr><tr><td>GRM43</td><td>3.5</td><td>7.0</td><td>3.7</td></tr><tr><td>GRM55</td><td>4.5</td><td>8.0</td><td>5.6</td></tr></table>(in mm)</td></tr>
<tr><td>Capacitance Change</td><td>Within ±10%</td></tr>
<tr><td colspan="2"> 

Fig. 3a</td></tr>
<tr><td>13</td><td colspan="2">Solderability of Termination</td><td>75% of the terminations is to be soldered evenly and continuously.</td><td>Immerse the capacitor in a solution of ethanol (JIS-K-8101) and rosin (JIS-K-5902) (25% rosin in weight propotion).
Preheat at 80 to 120°C for 10 to 30 seconds.
After preheating, immerse in an eutectic solder solution for 2±0.5 seconds at 230±5°C or Sn-3.0Ag-0.5 Cu solder solution for 2±0.5 seconds at 245±5°C.</td></tr>
<tr><td rowspan="5">14</td><td rowspan="5">Resistance to Soldering Heat</td><td>Appearance</td><td>No defects or abnormalities</td><td rowspan="5">Preheat the capacitor at 120 to 150°C for 1 minute.
Immerse the capacitor in an eutectic solder solution* or Sn-3.0Ag-0.5Cu solder solution at 270±5°C for 10±0.5 seconds.
Set at room temperature for 24±2 hours, then measure.
*Not apply to GRM02
•Initial measurement
Perform a heat treatment at 150+0/–10°C for one hour and then set at room temperature for 24±2 hours.
Perform the initial measurement.
*Preheating for GRM32/43/55
<table><tr><th>Step</th><th>Temperature</th><th>Time</th></tr><tr><td>1</td><td>100 to 120°C</td><td>1 min.</td></tr><tr><td>2</td><td>170 to 200°C</td><td>1 min.</td></tr></table></td></tr>
<tr><td>Capacitance Change</td><td>B1, R1, B3, R6, R7, C6, C7, C8, E7, D7, D8: Within ±7.5%
GRM188R60J106M: Within ±12.5%
F1, F5: Within ±20%</td></tr>
<tr><td>D.F.</td><td>B1, R1, B3, R6, R7, C7, C8, E7, D7: 0.1 max.
C6, GRM31CR71E106: 0.125 max.
D8, GRM31CR60J107: 0.15 max.
F1, F5: 0.2 max.</td></tr>
<tr><td>I.R.</td><td>More than 50Ω · F</td></tr>
<tr><td>Dielectric Strength</td><td>No defects</td></tr>
<tr><td rowspan="5">15</td><td rowspan="5">Temperature Sudden Change</td><td>Appearance</td><td>No defects or abnormalities</td><td rowspan="5">Fix the capacitor to the supporting jig in the same manner and under the same conditions as (10).
Perform the five cycles according to the four heat treatments shown in the following table.
Set for 24±2 hours at room temperature, then measure.
<table><tr><th>Step</th><th>1</th><th>2</th><th>3</th><th>4</th></tr><tr><td>Temp. (°C)</td><td>Min. Operating Temp. +0/–3</td><td>Room Temp.</td><td>Max. Operating Temp. +3/–0</td><td>Room Temp.</td></tr><tr><td>Time (min.)</td><td>30±3</td><td>2 to 3</td><td>30±3</td><td>2 to 3</td></tr></table>•Initial measurement
Perform a heat treatment at 150 +0/–10°C for one hour and then set at room temperature for 24±2 hours.
Perform the initial measurement.
GRM188R60J106M:
Measurement after test
Perform a heat treatment and then let sit for 24±2 hours at room temperature, then measure.</td></tr>
<tr><td>Capacitance Change</td><td>B1, R1, B3, R6, R7, C6, C7, C8, D7, D8: Within ±7.5%
E7: Within ±30%
F1, F5: Within ±20%</td></tr>
<tr><td>D.F.</td><td>B1, R1, B3, R6, R7, C7, C8, E7, D7: 0.1 max.
C6, GRM31CR71E106: 0.125 max.
D8, GRM31CR60J107: 0.15 max.
F1, F5: 0.2 max.</td></tr>
<tr><td>I.R.</td><td>More than 50Ω · F</td></tr>
<tr><td>Dielectric Strength</td><td>No defects</td></tr>
</table>

Continued on the following page.

GRM Series Specifications and Test Methods (2)

Continued from the preceding page.

No.	Item		Specifications	Test Method
16	High Temperature High Humidity (Steady)	Appearance	No defects or abnormalities	Apply the rated voltage at 40±2°C and 90 to 95% humidity for 500±12 hours. The charge/discharge current is less than 50mA. •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 and then let sit for 24±2 hours at room temperature, then measure.
		Capacitance Change	B1, R1, B3, R6, R7, C6, C7, C8, E7, D7, D8: Within ±12.5% F1, F5: Within ±30%	
		D.F.	B1, R1, B3, R6, R7, C6, C7, C8, E7, D7, D8: 0.2 max. F1, F5: 0.4 max.	
		I.R.	More than 12.5Ω · F	
17	Durability	Appearance	No defects or abnormalities	Apply 150% of the rated voltage for 1000±12 hours at the maximum operating temperature ±3°C. The charge/discharge current is less than 50mA. •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 and then let sit for 24±2 hours at room temperature, then measure.
		Capacitance Change	B1, R1, B3, R6, R7, C6, C7, C8, E7, D7, D8: Within ±12.5% F1, F5: Within ±30%	
		D.F.	B1, R1, B3, R6, R7, C6, C7, C8, E7, D7, D8: 0.2 max. F1, F5: 0.4 max.	
		I.R.	More than 25Ω · F	