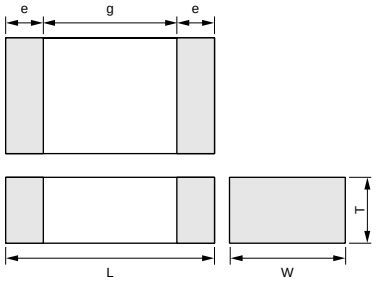
Data Sheet

Monolithic Ceramic Capacitors

GRM32ER60J476ME20□ (1210, X5R, 47µF, 6.3Vdc)

□: packaging code



(in mm)

■ Dimensions

Length L	3.20mm±0.30mm
Width W	2.50mm±0.20mm
Thickness T	2.50mm±0.20mm
Electrode e	0.30mm min.
Electrode Gap g (min.)	1.00mm

■ Rated Value

TC Code	**R6**
TC Code (Standard)	X5R (EIA)
Capacitance Change	±15%
Capacitance	47µF±20%
Rated Voltage	6.3Vdc

■ Packaging

Code	Packaging	Minimum Quantity
L	180mm Plastic Tape	1000
K	330mm Plastic Tape	4000
B	Bulk(Bag)	1000

■ Specifications

Please refer to 'Specification' PDF file.

● This data sheet is applied for CHIP MONOLITHIC CERAMIC CAPACITOR used for General Electronics equipment for your design.

<Notice>

● Solderability of Tin plating termination chip 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 chip before use.

⚠Note:

1. Export Control
   〈For customers outside Japan〉
   Murata products should not be used or sold for use in the development, production, stockpiling or utilization of any conventional weapons or mass-destructive weapons (nuclear weapons, chemical or biological weapons, or missiles), or any other weapons.
   〈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.
2. Please contact our sales representatives or product engineers before using the products in this data sheet for the applications listed below, which require especially high reliability for the prevention of defects which might directly damage to 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 data sheet.
   ① Aircraft equipment ② Aerospace equipment
   ③ Undersea equipment ④ Power plant equipment
   ⑤ Medical equipment ⑥ Transportation equipment (vehicles, trains, ships, etc.)
   ⑦ Traffic signal equipment ⑧ Disaster prevention / crime prevention equipment
   ⑨ Data-processing equipment ⑩ Application of similar complexity and/or reliability requirements to the applications listed in the above
3. They are subject to change or our products in it may be discontinued without advance notice. Please check with our sales representatives or product engineers before ordering. If there are any questions, please contact our sales representatives or product engineers.
4. This data sheet 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. Especially, please read rating and ⚠CAUTION (for storage, operating, rating, soldering, mounting and handling) in them to prevent smoking and/or burning, etc.
5. You are able to read a detailed specification in the website of Search Engine (http://search.murata.co.jp/) or catalog library (http://www.murata.com/catalog/) before to require our product specification or to transact the approval sheet for product specification.
6. Please note that unless otherwise specified, we shall assume no responsibility whatsoever for any conflict or dispute that may occur in connection with the effect of our and/or a third party's intellectual property rights and other related rights in consideration of your use of our products and/or information described or contained in our data sheets. In this connection, no representation shall be made to the effect that any third parties are authorized to use the right mentioned above under licenses without our consent.
7. No ozone depleting substances (ODS) under the Montreal Protocol are used in our manufacturing process.

2004.9.6

<table>
<tr><th>No.</th><th colspan="2">Item</th><th>Specifications</th><th>Test Method</th></tr>
<tr><td>1</td><td colspan="2">Operating Temperature Range</td><td>B1, B3, F1 : −25 to +85℃
R6 : −55 to +85℃
F5 : −30 to +85℃
C8 : −55 to +105℃, C7 : -55 to +125℃</td><td>Reference temperature : 25℃
(B1, B3, F1 : 20℃)</td></tr>
<tr><td>2</td><td colspan="2">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 colspan="2">Appearance</td><td>No defects or abnormalities</td><td>Visual inspection</td></tr>
<tr><td>4</td><td colspan="2">Dimensions</td><td>Within the specified dimensions</td><td>Using calipers</td></tr>
<tr><td>5</td><td colspan="2">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 colspan="2">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 reference temperature and 75%RH max. and within 1 minutes of charging, provided the charge/discharge current is less than 50mA.</td></tr>
<tr><td>7</td><td colspan="2">Capacitance</td><td>Within the specified tolerance
∗Table 1
GRM155 B3/R6 1A 124 to 224
GRM185 B3/R6 1A 105
GRM188 B3/R6 1C/1A 225
GRM219 B3/R6 1A 475
GRM21B B3/R6 1C/1A 106</td><td>The capacitance should be measured at reference temperature at the frequency and voltage shown in the table.
Capacitance | Frequency | Voltage
C≦10μF (10V min.)∗1 | 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 colspan="2">Dissipation Factor (D.F.)</td><td>B1, B3, R6, C7, C8 : 0.1 max.
F1, F5 : 0.2 max.
∗Table 1
GRM155 B3/R6 1A 124 to 224
GRM185 B3/R6 1A 105
GRM188 B3/R6 1C/1A 225
GRM219 B3/R6 1A 475
GRM21B B3/R6 1C/1A 106</td><td>The D.F. should be measured at reference temperature at the frequency and voltage shown in the table.
Capacitance | Frequency | Voltage
C≦10μF (10V min.)∗1 | 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 rowspan="2">9</td><td rowspan="2">Capacitance Temperature Characteristics</td><td>No bias</td><td>B1, B3 : Within ±10% (−25 to +85℃)
F1 : Within +30/−80% (−25 to +85℃)
R6 : Within ±15% (−55 to +85℃)
F5 : Within +22/−82% (−30 to +85℃)
C7 : Within ±22% (−55 to +125℃)
C8 : Within ±22% (−55 to +105℃)</td><td rowspan="2">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.∗
In case of applying voltage, the capacitance change should be measured after 1 more min. with applying voltage in equilibration of each temp. stage.
∗GRM43 B1/R6 0J/1A 336/476 only : 1.0±0.2Vrms
Step | Temperature (°C) | Applying Voltage (V)
1 | Reference tempereture ±2 | No bias
2 | −55±3 (for R6, C7, C8)/ −25±3 (for B1, B3, F1) −30±3 (for F5) | No bias
3 | Reference tempereture ±2 | No bias
4 | 85±3 (for B1, B3, F1, R6, F5) 125±3 (for C7)/ 105±3 (for C8) | No bias
5 | 20±2 | 50% of the rated voltage
6 | −25±3 (for B1, F1) | 50% of the rated voltage
7 | 20±2 | 50% of the rated voltage
8 | 85±3 (for B1, F1) | 50% of the rated voltage
•Initial measurement for high dielectric constant type
Perform a heat treatment at 150 +0/−10°C for one hour and then set for 48±4 hours at room temperature.
Perform the initial measurement.</td></tr>
<tr><td>50% of the Rated Voltage</td><td>B1: Within +10/−30%
F1: Within +30/−95%</td></tr>
</table>

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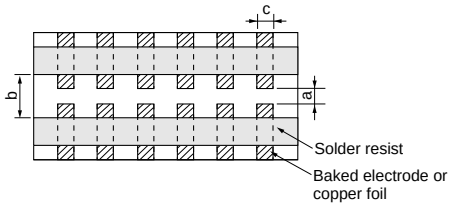
<table>
<tr><th>No.</th><th colspan="2">Item</th><th>Specifications</th><th>Test Method</th></tr>
<tr><td>10</td><td colspan="2">Adhesive Strength of Termination</td><td>No removal of the terminations or other defects should occur
 

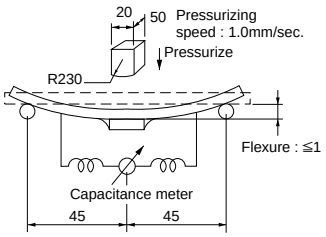
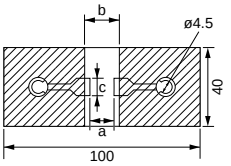
Fig. 1a</td><td>Solder the capacitor on the test jig (glass epoxy board) shown in Fig. 1a using an eutectic solder. Then apply 10N* force in parallel with the test jig for 10±1sec.
The soldering should be done either with an iron or using the reflow method and should be conducted with care so that the soldering is uniform and free of defects such as heat shock.
*5N : GR□15/GRM18, 2N : GR□33
<table>
<tr><th>Type</th><th>a</th><th>b</th><th>c</th></tr>
<tr><td>GR□03</td><td>0.3</td><td>0.9</td><td>0.3</td></tr>
<tr><td>GR□15</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></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, B3, R6, C7, C8 : 0.1 max.
F1, F5 : 0.2 max.</td></tr>
<tr><td rowspan="2">12</td><td rowspan="2" colspan="2">Deflection</td><td>No cracking or marking defects should occur
 

Fig.3a</td><td>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 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.
 

t : 1.6mm
Fig. 2a
(GR□03, GR□15 : t : 0.8mm)
<table>
<tr><th>Type</th><th>a</th><th>b</th><th>c</th></tr>
<tr><td>GR□03</td><td>0.3</td><td>0.9</td><td>0.3</td></tr>
<tr><td>GR□15</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>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 proportion) .
Preheat at 80 to 120℃ for 10 to 30 seconds.
After preheating, immerse in an eutectic solder solution for 2±0.5 seconds at 230±5℃.</td></tr>
</table>

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<table>
<tr><th>No.</th><th colspan="2">Item</th><th>Specifications</th><th>Test Method</th></tr>
<tr><td rowspan="6">14</td><td rowspan="6">Resistance to Soldering Heat</td><td>Appearance</td><td>No defects or abnormalities</td><td rowspan="6">Preheat the capacitor at 120 to 150℃ for 1 minute.
Immerse the capacitor in an eutectic solder solution at 270±5℃ for 10±0.5 seconds. Set at room temperature for 24±2 hours (temperature compensating type) or 48±4 hours (high dielectric constant type), then measure.

•Initial measurement for high dielectric constant type
Perform a heat treatment at 150+0/−10℃ for one hour and then set at room temperature for 48±4 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℃</td><td>1 min.</td></tr><tr><td>2</td><td>170 to 200℃</td><td>1 min.</td></tr></table></td></tr>
<tr><td>Capacitance Change</td><td>B1, B3, R6, C7, C8 : Within ±7.5%
F1, F5 : Within ±20%</td></tr>
<tr><td>Q/D.F.</td><td>B1, B3, R6, C7, C8 : 0.1 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></td><td></td></tr>
<tr><td rowspan="6">15</td><td rowspan="6">Temperature Sudden Change</td><td>Appearance</td><td>No defects or abnormalities</td><td rowspan="6">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. (℃)</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 for high dielectric constant type
Perform a heat treatment at 150+0/−10℃ for one hour and then set at room temperature for 48±4 hours.
Perform the initial measurement.</td></tr>
<tr><td>Capacitance Change</td><td>B1, B3, R6, C7, C8 : Within ±7.5%
F1, F5 : Within ±20%</td></tr>
<tr><td>D.F.</td><td>B1, B3, R6, C7, C8 : 0.1 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></td><td></td></tr>
<tr><td rowspan="5">16</td><td rowspan="5">High Temperature High Humidity (Steady)</td><td>Appearance</td><td>No defects or abnormalities</td><td rowspan="5">Apply the rated voltage at 40±2℃ 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℃ for one hour and then let sit for 48±4 hours at room temperature. Perform the initial measurement.

•Measurement after test
Perform a heat treatment at 150+0/−10℃ for one hour and then let sit for 48±4 hours at room temperature, then measure.</td></tr>
<tr><td>Capacitance Change</td><td>B1, B3, R6, C7, C8 : Within ±12.5%
F1, F5 : Within ±30%</td></tr>
<tr><td>D.F.</td><td>B1, B3, R6, C7, C8 : 0.2 max.
F1, F5 : 0.4 max.</td></tr>
<tr><td>I.R.</td><td>More than 12.5Ω • F</td></tr>
<tr><td></td><td></td></tr>
<tr><td rowspan="5">17</td><td rowspan="5">Durability</td><td>Appearance</td><td>No defects or abnormalities</td><td rowspan="5">Apply 150% of the rated voltage for 1000±12 hours at the maximum operating temperature ±3℃. Let sit for 48±4 hours at room temperature, then measure.
The charge/discharge current is less than 50mA.

•Initial measurement
Perform a heat treatment at 150+0/−10℃ for one hour and then let sit for 48±4 hours at room temperature. Perform the initial measurement.

•Measurement after test
Perform a heat treatment at 150+0/−10℃ for one hour and then let sit for 48±4 hours at room temperature, then measure.</td></tr>
<tr><td>Capacitance Change</td><td>B1, B3, R6, C7, C8 : Within ±12.5%
F1, F5 : Within ±30%</td></tr>
<tr><td>D.F.</td><td>B1, B3, R6, C7, C8 : 0.1 max.
F1, F5 : 0.4 max.</td></tr>
<tr><td>I.R.</td><td>More than 25Ω • F</td></tr>
<tr><td></td><td></td></tr>
</table>

● Part Numbering

Chip Monolithic Ceramic Capacitors

(Part Number)

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

❶Product ID

❷Series

Product ID	Code	Series
GR	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
GN	M	Capacitor Array
LL	L	Low ESL Wide Width Type
	C	Automotive Low ESL Wide Width Type
	A	Eight-termination Low ESL Type
	M	Ten-termination Low ESL Type
GJ	M	High Frequency Low Loss Type Tin Plated Type
	6	High Frequency Low Loss Type
GA	2	for AC250V (r.m.s.)
	3	Safety Standard Recognized Type
GC	P	Automotive Soldering Electrode
	M	Automotive Tin Plated Layer

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
11	1.25×1.0mm	0504
15	1.0×0.5mm	0402
18	1.6×0.8mm	0603
1D	1.4×1.4mm	
1X	Depends on individual standards.	
21	2.0×1.25mm	0805
22	2.8×2.8mm	1111
31	3.2×1.6mm	1206
32	3.2×2.5mm	1210
3X	Depends on individual standards.	
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
R	1.8mm
S	2.8mm
Q	1.5mm
X	Depends on individual standards.

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

Continued on the following page.

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❺Temperature Characteristics

Temperature Characteristic Codes			Temperature Characteristics			Operating Temperature Range
Code	Public STD Code		Referance 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
6C	CH *1,*3	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
7C	CJ *1*3	EIA	25°C	25 to 125°C	0±120ppm/°C	-55 to 125°C
7U	U2J *1	EIA	25°C	25 to 85°C	-750±120ppm/°C	-55 to 125°C
8C	CK *1,*3	EIA	25°C	25 to 125°C	0±250ppm/°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
E4	Z5U	EIA	25°C	10 to 85°C	+22, -56%	10 to 85°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	EIA	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
C8	X6S	EIA	25°C	-55 to 105°C	±22%	-55 to 105°C
9E	ZLM	*4	20°C	-25 to 20°C	-4700+100/-2500ppm/°C	-25 to 85°C
				20 to 85°C	-4700+500/-1000ppm/°C	
W0	-	-	25°C	-55 to 125°C	±10% *5	-55 to 125°C
					+22, -33% *6	

*1 Please refer to table for Capacitance Change under reference temperature.
*2 Capacitance change is specified with 50% rated voltage applied.
*3 ER series only.
*3,*4 Murata Temperature Characteristic Code.
*5 Apply DC350V bias.
*6 No DC bias.

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●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

ER□ Series

Murata Code	Capacitance Change from 25°C (%)					
	–55°C		–30°C		–10°C	
	Max.	Min.	Max.	Min.	Max.	Min.
5C	0.43	–0.22	0.28	–0.16	0.17	–0.11
6C	0.73	–0.44	0.48	–0.32	0.29	–0.20
7C	1.33	–0.93	0.88	–0.64	0.54	–0.42
8C	2.61	–0.97	1.73	–1.36	1.07	–0.86

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❻Rated Voltage

Code	Rated Voltage
0G	DC4V
0J	DC6.3V
1A	DC10V
1C	DC16V
1E	DC25V
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 figures. 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

❽Capacitance Tolerance

Code	Capacitance Tolerance	TC	Series	Capacitance Step	
B	±0.1pF	CΔ	**GJM**	≦5pF	E24 Series,1pF
C	±0.25pF	CΔ–SL	**GRM/ERB/GQM**	≦5pF	* 1pF
		CΔ	**GJM**	<10pF	E24 Series,1pF
D	±0.5pF	CΔ–SL	**GRM**	6.0 to 9.0pF	* 1pF
		CΔ	**ERB/GQM/GJM**	5.1 to 9.1pF	E24 Series
F	±1%	CΔ	**GRM03/15/GJM03/15**	5.0 to 9.9pF	0.1pF
G	±2%	CΔ	**GJM**	≧10pF	E12 Series
		CΔ	**GQM**	≧10pF	E24 Series
		CΔ	**GRM03/15/GJM03/15**	2.0 to 9.9pF	0.1pF
J	±5%	CΔ–SL	**GRM/GA3**	≧10pF	E12 Series
		CΔ	**ERB/GQM/GJM**	≧10pF	E24 Series
		CΔ	**GRM03/15/GJM03/15**	1.0 to 4.9pF	0.1pF
K	±10%	B, R, X7R, X5R, ZLM	**GRM/GR7/GA3**	E6 Series	
			GR4	E12 Series	
		CΔ	**GRM03/15/GJM03/15**	0.2 to 1.9pF	0.1pF
M	±20%	Z5U	**GRM**	E3 Series	
		B, R, X7R, X7S	**GRM/GMA/LLL/LLC/LLA/LLM**	E6 Series	
		X7R	**GA2**	E3 Series	
		CΔ	**GRM03/15/GJM03/15**	0.1 to 0.9pF	0.1pF
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.

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⑩Packaging

Code	Packaging
L	ø178mm Plastic Taping
D	ø178mm Paper Taping
K	ø330mm Plastic Taping
J	ø330mm Paper Taping
E	ø178mm Special Packaging
F	ø330mm Special Packaging
B	Bulk
C	Bulk Case
T	Bulk Tray