

GJM Product Summary

GJM Series: The Murata GJM series is a High Q, ultra-small capacitor series for high frequency applications in the 500MHz to 10GHz range. They are suitable for applications such as VCO and PA modules. The GJM series is made with copper electrodes as a cost effective solution for low ESR and power consumption due to the high Q (low loss) performance. A variety of tight tolerance versions are available, offered in EIA sizes 0201 and 0402 with a capacitance range of 0.1 to 33pF.



Features:

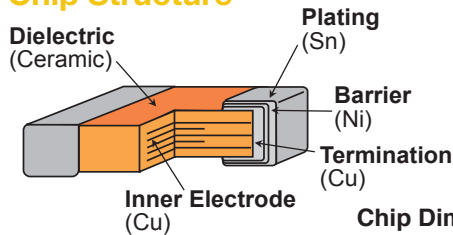
- Size: 0201, 0402
- Voltage: 6.3, 25 and 50VDC
- Cap Range: 0.1 - 20pF 25 - 50VDC and 22 - 33pF in 6.3VDC
- Internal Electrode: Cu
- Termination: Cu + Ni/Sn plating
- ESR: Very Low
- Power: Low ($\leq 5W$)
- Frequency Range: 500MHz - 10GHz, High Q and Low ESR at VHF, UHF and Microwave Frequencies
- Tolerance: Tight Tolerance Available ([W]= ± 0.05 pF for under 10pF, [B]= ± 0.1 pF for under 10 pF, [C]= ± 0.25 pF for under 10pF, [G]= $\pm 2\%$ for 10pF and over
- Temp. Characteristics: C0G (0 ± 30 ppm/ $^{\circ}C$ -55 to 125 $^{\circ}C$) and C0H (0 ± 60 ppm/ $^{\circ}C$ -55 to 125 $^{\circ}C$)



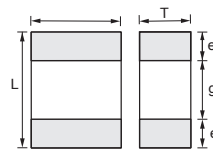
Applications: Handheld and Cellular, Bluetooth®, VCO, WLAN, PA Modules, Wireless Modems, RKE, Wireless PDAs, Antenna Tuning and GPS

GJM Data Sheet

Chip Structure



Chip Dimensions

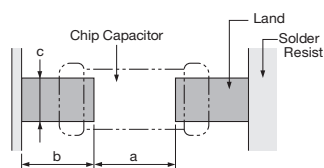


Chip Dimensions Table

Unit: mm

Series	EIA size	L	W	T	e	g min.
GJM03	0201	0.6+/-0.03	0.3+/-0.03	0.3+/-0.03	0.1 to 0.2	0.2
GJM15	0402	1.0+/-0.05	0.5+/-0.05	0.5+/-0.05	0.15 to 0.3	0.4

Land Pattern Dimensions



Re-Flow Soldering

Series	a	b	c
GJM03	0.2 ~ 0.3	0.2 ~ 0.35	0.2 ~ 0.4
GJM15	0.3 ~ 0.5	0.35 ~ 0.45	0.4 ~ 0.6

Capacitance Range

Mass Production

Series	TC	WV	Capacitance Range			
			1pF	10pF	100pF	pF
GJM03	C0G	25	■	■	■	0.2 - 6.8pF
	C0H	25		■	■	7 - 20pF
	C0G	6.3			■	22 - 33pF
GJM15	C0G	50	■	■	■	0.1 - 20pF

Global Part Numbering

GJ	M	03	3	5C	1E	1R0	C	B01	D
1	2	3	4	5	6	7	8	9	10

1 Product ID

Code	Product
GJ	High Frequency Low Loss Type

2 Series

Code	Product
M	Tin Plated Termination

3 Dimension (LxW)

Code	Dimension (LxW)
03	0.6x0.3mm
15	1.0x0.5mm

4 Dimension (T)

Code	Dimension (T)
3	0.3mm
5	0.5mm

5 Temperature Characteristics

Code	TC	Temp.Coefficient	Operating Temp. Range
5C	C0G	0+/-30ppm/°C	-55 to 125°C
6C	C0H	0+/-60ppm/°C	-55 to 125°C

6 Rated Voltage

Code	Rated Voltage
0J	DC 6.3V
1E	DC 25V
1H	DC 50V

7 Capacitance

Code	Capacitance
R10	0.1pF
1R0	1pF
100	10pF

8 Capacitance Tolerance

Code	Cap. Tol.	TC
W	+/-0.05pF	C0G, C0H (under 10pF)
B	+/-0.1pF	C0G, C0H (under 10pF)
C	+/-0.25pF	C0G, C0H (under 10pF)
D	+/-0.5pF	C0G, C0H (5.1pF - 9.9pF)
G	+/-2%	C0G, C0H (10pF & over)
J	+/-5%	C0G, C0H (10pF & over)

9 Individual Specification Code

10 Packaging

Code	Packaging
B	Bulk in nylon bag
D	φ180mm Paper Taping

GJM Product Offering

GJM03 Series

Size	TC	WV	Cap	Cap Tol	Murata Global P/N
0201	C0G	25V	0.2pF	+/-0.1pF	GJM0335C1ER20BB01D
0201	C0G	25V	0.3pF	+/-0.1pF	GJM0335C1ER30BB01D
0201	C0G	25V	0.4pF	+/-0.1pF	GJM0335C1ER40BB01D
0201	C0G	25V	0.5pF	+/-0.1pF	GJM0335C1ER50BB01D
0201	C0G	25V	0.6pF	+/-0.1pF	GJM0335C1ER60BB01D
0201	C0G	25V	0.7pF	+/-0.1pF	GJM0335C1ER70BB01D
0201	C0G	25V	0.8pF	+/-0.1pF	GJM0335C1ER80BB01D
0201	C0G	25V	0.9pF	+/-0.1pF	GJM0335C1ER90BB01D
0201	C0G	25V	1.0pF	+/-0.25pF	GJM0335C1E1R0CB01D
0201	C0G	25V	1.1pF	+/-0.25pF	GJM0335C1E1R1CB01D
0201	C0G	25V	1.2pF	+/-0.25pF	GJM0335C1E1R2CB01D
0201	C0G	25V	1.3pF	+/-0.25pF	GJM0335C1E1R3CB01D
0201	C0G	25V	1.5pF	+/-0.25pF	GJM0335C1E1R5CB01D
0201	C0G	25V	1.6pF	+/-0.25pF	GJM0335C1E1R6CB01D
0201	C0G	25V	1.8pF	+/-0.25pF	GJM0335C1E1R8CB01D
0201	C0G	25V	2.0pF	+/-0.25pF	GJM0335C1E2R0CB01D
0201	C0G	25V	2.2pF	+/-0.25pF	GJM0335C1E2R2CB01D
0201	C0G	25V	2.4pF	+/-0.25pF	GJM0335C1E2R4CB01D
0201	C0G	25V	2.7pF	+/-0.25pF	GJM0335C1E2R7CB01D
0201	C0G	25V	3.0pF	+/-0.25pF	GJM0335C1E3R0CB01D
0201	C0G	25V	3.3pF	+/-0.25pF	GJM0335C1E3R3CB01D
0201	C0G	25V	3.6pF	+/-0.25pF	GJM0335C1E3R6CB01D
0201	C0G	25V	3.9pF	+/-0.25pF	GJM0335C1E3R9CB01D
0201	C0G	25V	4.0pF	+/-0.25pF	GJM0335C1E4R0CB01D
0201	C0G	25V	4.3pF	+/-0.25pF	GJM0335C1E4R3CB01D
0201	C0G	25V	4.7pF	+/-0.25pF	GJM0335C1E4R7CB01D
0201	C0G	25V	5.0pF	+/-0.25pF	GJM0335C1E5R0CB01D
0201	C0G	25V	5.1pF	+/-0.5pF	GJM0335C1E5R1DB01D
0201	C0G	25V	5.6pF	+/-0.5pF	GJM0335C1E5R6DB01D
0201	C0G	25V	6.0pF	+/-0.5pF	GJM0335C1E6R0DB01D
0201	C0G	25V	6.2pF	+/-0.5pF	GJM0335C1E6R2DB01D
0201	C0G	25V	6.8pF	+/-0.5pF	GJM0335C1E6R8DB01D
0201	C0H	25V	7.0pF	+/-0.5pF	GJM0336C1E7R0DB01D
0201	C0H	25V	7.5pF	+/-0.5pF	GJM0336C1E7R5DB01D
0201	C0H	25V	8.0pF	+/-0.5pF	GJM0336C1E8R0DB01D
0201	C0H	25V	8.2pF	+/-0.5pF	GJM0336C1E8R2DB01D
0201	C0H	25V	9.0pF	+/-0.5pF	GJM0336C1E9R0DB01D
0201	C0H	25V	9.1pF	+/-0.5pF	GJM0336C1E9R1DB01D
0201	C0H	25V	10pF	+/-5%	GJM0336C1E100JB01D
0201	C0H	25V	12pF	+/-5%	GJM0336C1E120JB01D
0201	C0H	25V	15pF	+/-5%	GJM0336C1E150JB01D
0201	C0H	25V	18pF	+/-5%	GJM0336C1E180JB01D
0201	C0H	25V	20pF	+/-5%	GJM0336C1E200JB01D
0201	C0G	6.3V	22pF	+/-5%	GJM0335C0J220JB01D
0201	C0G	6.3V	27pF	+/-5%	GJM0335C0J270JB01D
0201	C0G	6.3V	33pF	+/-5%	GJM0335C0J330JB01D

GJM Series

GJM Product Offering

GJM15 Series

Size	TC	WV	Cap	Cap Tol	Murata Global P/N
0402	C0G	50V	0.1pF	+/-0.1pF	GJM1555C1HR10BB01D
0402	C0G	50V	0.2pF	+/-0.1pF	GJM1555C1HR20BB01D
0402	C0G	50V	0.3pF	+/-0.1pF	GJM1555C1HR30BB01D
0402	C0G	50V	0.4pF	+/-0.1pF	GJM1555C1HR40BB01D
0402	C0G	50V	0.5pF	+/-0.1pF	GJM1555C1HR50BB01D
0402	C0G	50V	0.6pF	+/-0.1pF	GJM1555C1HR60BB01D
0402	C0G	50V	0.7pF	+/-0.1pF	GJM1555C1HR70BB01D
0402	C0G	50V	0.8pF	+/-0.1pF	GJM1555C1HR80BB01D
0402	C0G	50V	0.9pF	+/-0.1pF	GJM1555C1HR90BB01D
0402	C0G	50V	1.0pF	+/-0.25pF	GJM1555C1H1R0CB01D
0402	C0G	50V	1.1pF	+/-0.25pF	GJM1555C1H1R1CB01D
0402	C0G	50V	1.2pF	+/-0.25pF	GJM1555C1H1R2CB01D
0402	C0G	50V	1.3pF	+/-0.25pF	GJM1555C1H1R3CB01D
0402	C0G	50V	1.5pF	+/-0.25pF	GJM1555C1H1R5CB01D
0402	C0G	50V	1.6pF	+/-0.25pF	GJM1555C1H1R6CB01D
0402	C0G	50V	1.8pF	+/-0.25pF	GJM1555C1H1R8CB01D
0402	C0G	50V	2.0pF	+/-0.25pF	GJM1555C1H2R0CB01D
0402	C0G	50V	2.2pF	+/-0.25pF	GJM1555C1H2R2CB01D
0402	C0G	50V	2.4pF	+/-0.25pF	GJM1555C1H2R4CB01D
0402	C0G	50V	2.7pF	+/-0.25pF	GJM1555C1H2R7CB01D
0402	C0G	50V	3.0pF	+/-0.25pF	GJM1555C1H3R0CB01D
0402	C0G	50V	3.3pF	+/-0.25pF	GJM1555C1H3R3CB01D
0402	C0G	50V	3.6pF	+/-0.25pF	GJM1555C1H3R6CB01D
0402	C0G	50V	3.9pF	+/-0.25pF	GJM1555C1H3R9CB01D
0402	C0G	50V	4.0pF	+/-0.25pF	GJM1555C1H4R0CB01D
0402	C0G	50V	4.3pF	+/-0.25pF	GJM1555C1H4R3CB01D
0402	C0G	50V	4.7pF	+/-0.25pF	GJM1555C1H4R7CB01D
0402	C0G	50V	5.0pF	+/-0.25pF	GJM1555C1H5R0CB01D
0402	C0G	50V	5.1pF	+/-0.5pF	GJM1555C1H5R1DB01D
0402	C0G	50V	5.6pF	+/-0.5pF	GJM1555C1H5R6DB01D
0402	C0G	50V	6.0pF	+/-0.5pF	GJM1555C1H6R0DB01D
0402	C0G	50V	6.2pF	+/-0.5pF	GJM1555C1H6R2DB01D
0402	C0G	50V	6.8pF	+/-0.5pF	GJM1555C1H6R8DB01D
0402	C0G	50V	7.0pF	+/-0.5pF	GJM1555C1H7R0DB01D
0402	C0G	50V	7.5pF	+/-0.5pF	GJM1555C1H7R5DB01D
0402	C0G	50V	8.0pF	+/-0.5pF	GJM1555C1H8R0DB01D
0402	C0G	50V	8.2pF	+/-0.5pF	GJM1555C1H8R2DB01D
0402	C0G	50V	9.0pF	+/-0.5pF	GJM1555C1H9R0DB01D
0402	C0G	50V	9.1pF	+/-0.5pF	GJM1555C1H9R1DB01D
0402	C0G	50V	10pF	+/-5%	GJM1555C1H100JB01D
0402	C0G	50V	12pF	+/-5%	GJM1555C1H120JB01D
0402	C0G	50V	15pF	+/-5%	GJM1555C1H150JB01D
0402	C0G	50V	18pF	+/-5%	GJM1555C1H180JB01D
0402	C0G	50V	20pF	+/-5%	GJM1555C1H200JB01D

GJM Specifications and Test Methods

Item	Specifications	Test Methods												
Operating Temperature	-55°C to 125°C	Reference temperature: 25°C												
Appearance	No defects or abnormalities.	Visual inspection.												
Dimension	Within the specified dimensions.	Using calipers.												
Dielectric Strength	No defects or abnormalities.	300% of the rated voltage												
Insulation Resistance	More than 10,000MΩ or 500Ω·F (Whichever is smaller)	DC voltage not exceeding the rated voltage at 25°C and 75%RH max. and within 2 minutes of charging.												
Q	30pFmin.: Q ≥ 1000 30pFmax.: Q ≥ 400+20C C: Nominal Capacitance(pF)	Frequency 1±0.1MHz Voltage 0.5 to 5Vrms												
Capacitance Temperature Characteristics	Temperature Coefficient: Within the specified tolerance. (Table A-1) Capacitance Change: Within ±0.2% or ±0.05pF (Whichever is larger)	The capacitance change should be measured after 5 min. at each specified temperature stage. The temperature coefficient is determined using the capacitance measured in step 3 as a reference. When cycling the temperature sequentially from step 1 through 5 the capacitance should be within the specified tolerance for the temperature coefficient and capacitance change as in Table A-1. The capacitance drift is calculated by dividing the differences between the maximum and minimum measured values in steps 1, 3 and 5 by the cap. value in step 3.												
		<table border="1"> <thead> <tr> <th>Step</th> <th>Temperature (°C)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>25±2</td> </tr> <tr> <td>2</td> <td>-55±3</td> </tr> <tr> <td>3</td> <td>25±2</td> </tr> <tr> <td>4</td> <td>125±3</td> </tr> <tr> <td>5</td> <td>25±2</td> </tr> </tbody> </table>	Step	Temperature (°C)	1	25±2	2	-55±3	3	25±2	4	125±3	5	25±2
Step	Temperature (°C)													
1	25±2													
2	-55±3													
3	25±2													
4	125±3													
5	25±2													
Adhesive Strength of Termination	No removal of the terminations or other defect should occur.	Solder the capacitor to the test jig (glass epoxy board) shown in Fig.1a using a eutectic solder. Then apply 5N* force in parallel with the test jig for 10±1sec. *2N(GJM03)												
Vibration Resistance	Appearance: No defects or abnormalities. Capacitance: Within the specified tolerance. 30pFmin.: Q ≥ 1000 30pFmax.: Q ≥ 400+20C C: Nominal Capacitance(pF)	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).												
Deflection	No crack or marked defect should occur.	Flexure:1mm												
Solderability of Termination	75% of the terminations are to be soldered evenly and continuously.	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 .												
Resistance to Soldering Heat	Appearance: No marking defects. Capacitance Change: Within ±2.5% or ± 0.25 pF (Whichever is larger) 30pFmin.: Q ≥ 1000 30pFmax.: Q ≥ 400+20C C: Nominal Capacitance(pF)	Immerse the capacitor in a eutectic solder solution or Sn-3.0 Ag-0.5Cu solder solution at 270±5°C for 10±0.5 seconds. Let sit at room temperature for 24±2 hours.												
Temperature Cycle	Appearance: No marking defects. Capacitance Change: Within ±2.5% or ± 0.25 pF (Whichever is larger) 30pFmin.: Q ≥ 1000 30pFmax.: Q ≥ 400+20C C: Nominal Capacitance (pF)	-55°C to 125°C Five cycles												
Humidity Steady State	Appearance: No marking defects. Capacitance Change: Within ±5% or ± 0.5pF (Whichever is larger) 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)	40±2°C and 90 to 95% humidity for 500±12 hours.												

GJM Specifications and Test Methods

Item	Specifications	Test Methods
Humidity Load	Appearance: No marking defects. Capacitance Change: Within $\pm 7.5\%$ or $\pm 0.75\text{pF}$ (Whichever is larger) 30pF and over: $Q \geq 200$ 30pF and below: $Q \geq 100+10C/3$ C: Nominal Capacitance(pF)	Apply the rated voltage at $40\pm 2^\circ\text{C}$ and 90 to 95% humidity for 500 ± 12 hours.
High Temperature Load	Appearance: No marking defects. Capacitance Change: Within $\pm 3\%$ or $\pm 0.3\text{pF}$ (Whichever is larger) 30pF and over: $Q \geq 350$ 10pF and over, 30pF and below: $Q \geq 275+5C/2$ 10pF and below: $Q \geq 200+10C$ C: Nominal Capacitance(pF)	Apply 200% of the rated voltage for 1000 ± 12 hours at the maximum operating temperature $\pm 3^\circ\text{C}$. Let sit for 24 ± 2 hours (temperature compensating type) at room temperature, then measure. The charge/discharge current is less than 50mA
ESR	0.1pF $\leq C \leq$ 1pF: $350\text{m}\Omega \cdot \text{pF}$ below 1pF $< C \leq$ 5pF: $300\text{m}\Omega$ below 5pF $< C \leq$ 10pF: $250\text{m}\Omega$ below	The ESR should be measured at room temperature, and frequency $1\pm 0.2\text{GHz}$ with the equivalent of BOONTON Model 34A.
	10pF $< C \leq$ 33pF: $400\text{m}\Omega$ below	The ESR should be measured at room temperature, and frequency $500\pm 50\text{MHz}$ with the equivalent of HP8753B.

Table A-1

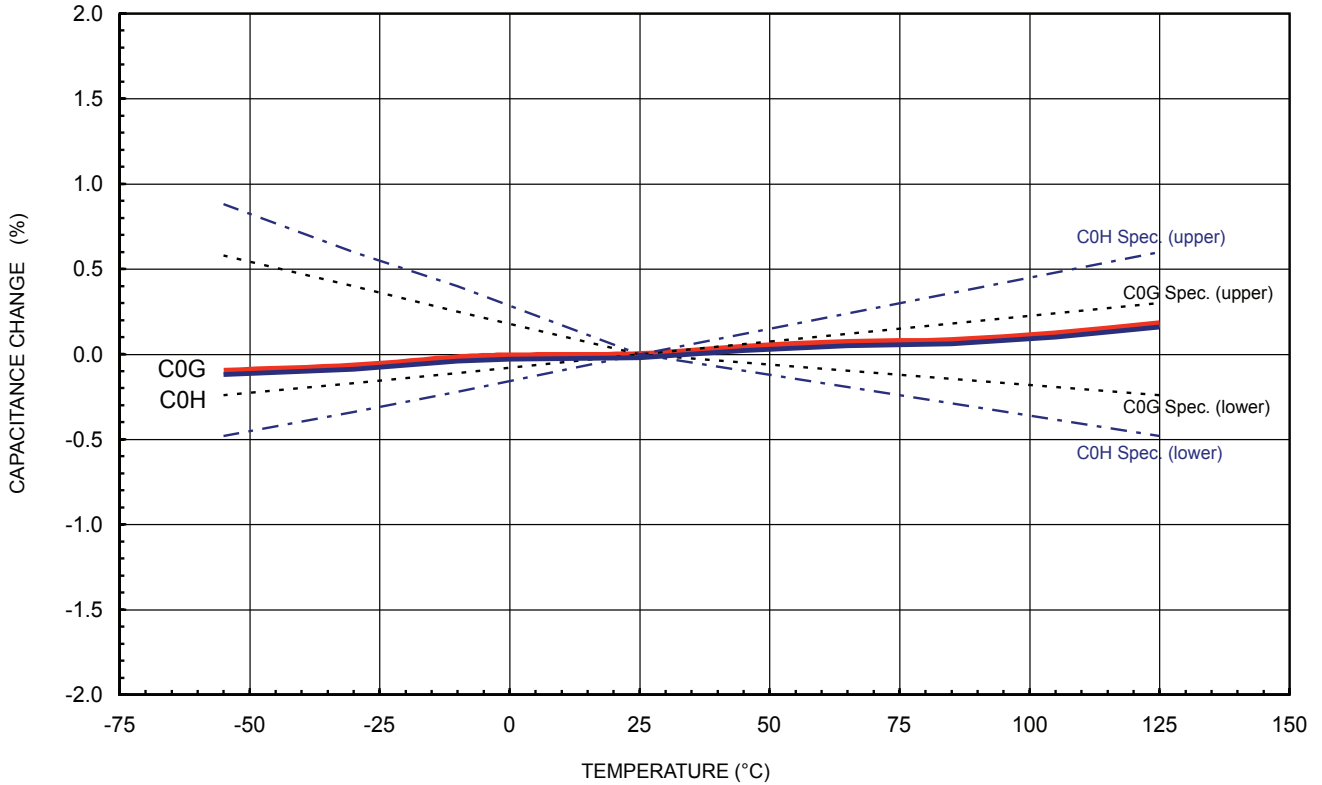
Char.	Nominal Values (ppm/ $^\circ\text{C}$) Note	Capacitance Change from 25°C (%)					
		- 55		- 30		- 10	
		Max.	Min.	Max.	Min.	Max.	Min.
5C	0 ± 30	0.58	-0.24	0.40	-0.17	0.25	-0.11
6C	0 ± 60	0.87	-0.48	0.60	-0.33	0.38	-0.21

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

GJM Technical Data (Typical)

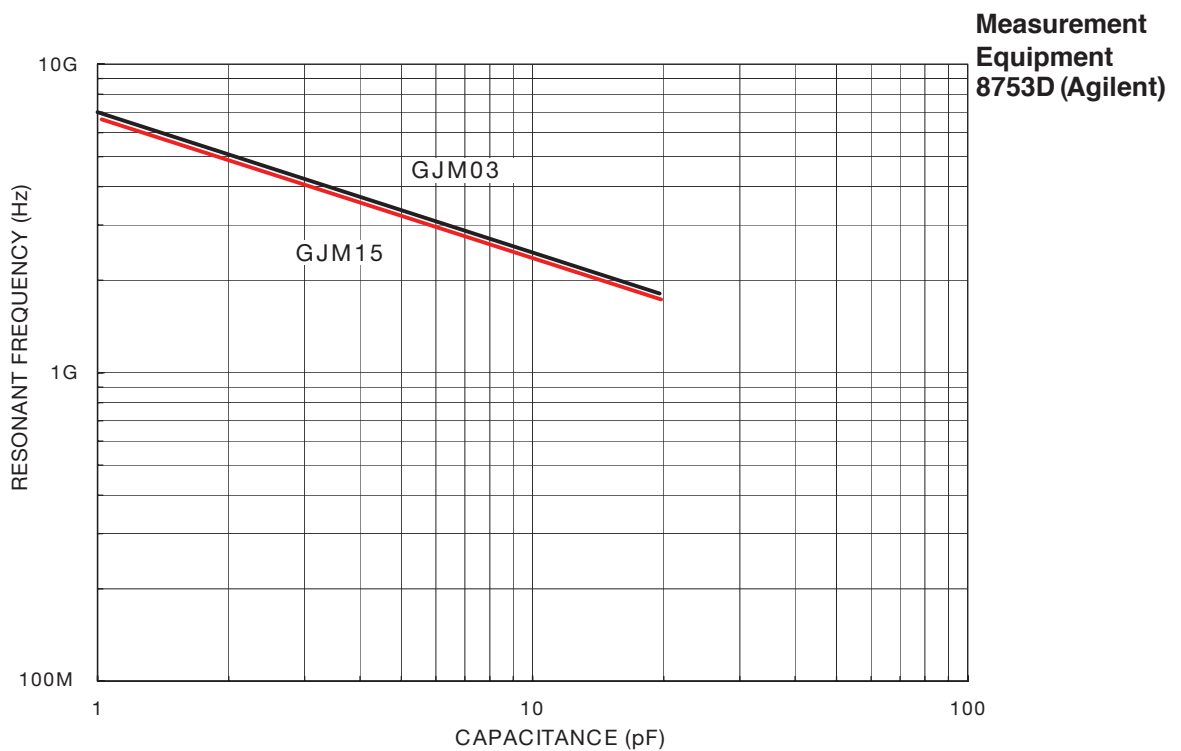
Capacitance - Temperature Characteristics

C0G and C0H Characteristics (GJM)



Resonant Frequency - Capacitance

GJM Series

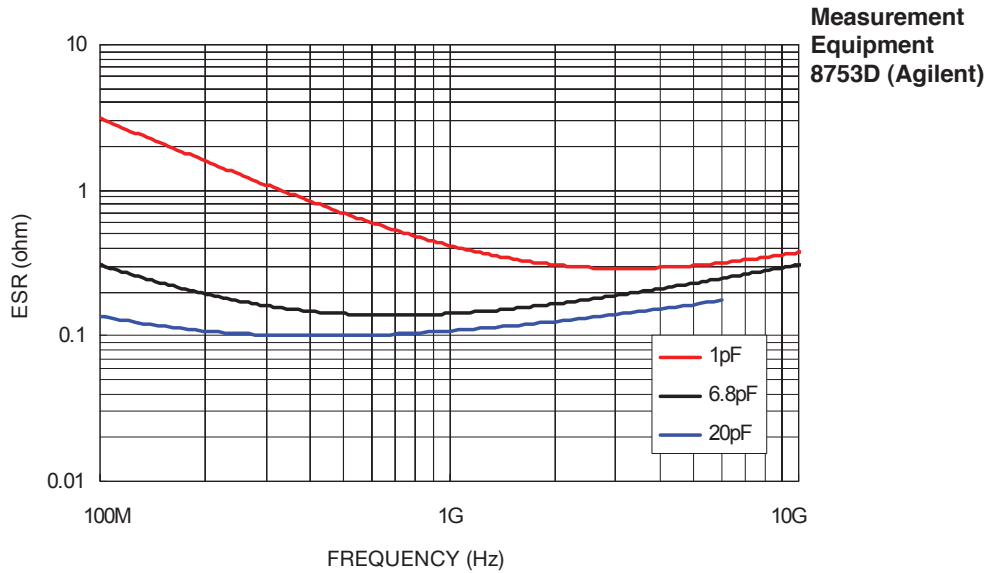


GJM Series

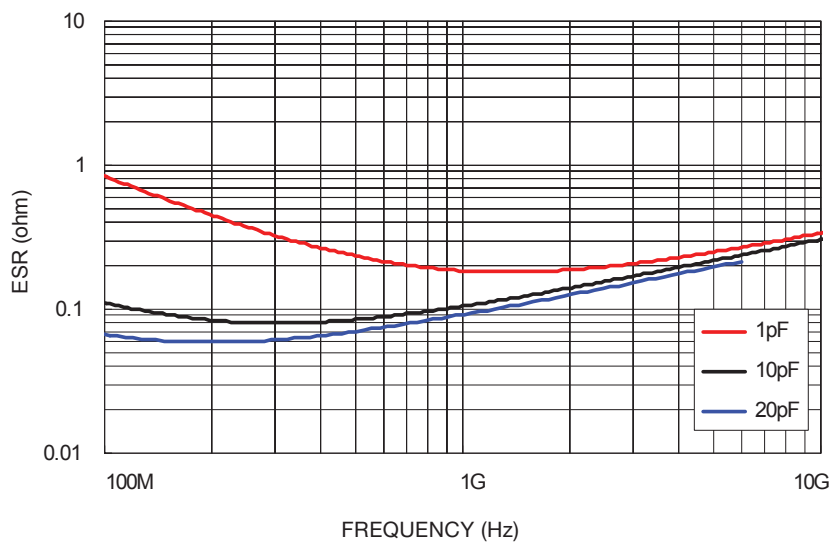
GJM Technical Data (Typical)

ESR - Frequency Characteristics

GJM03 Series



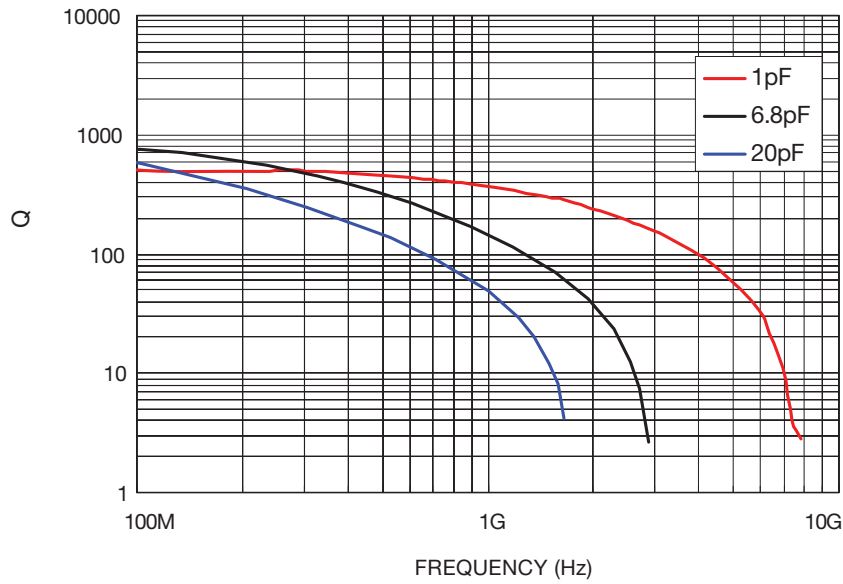
GJM15 Series



GJM Technical Data (Typical)

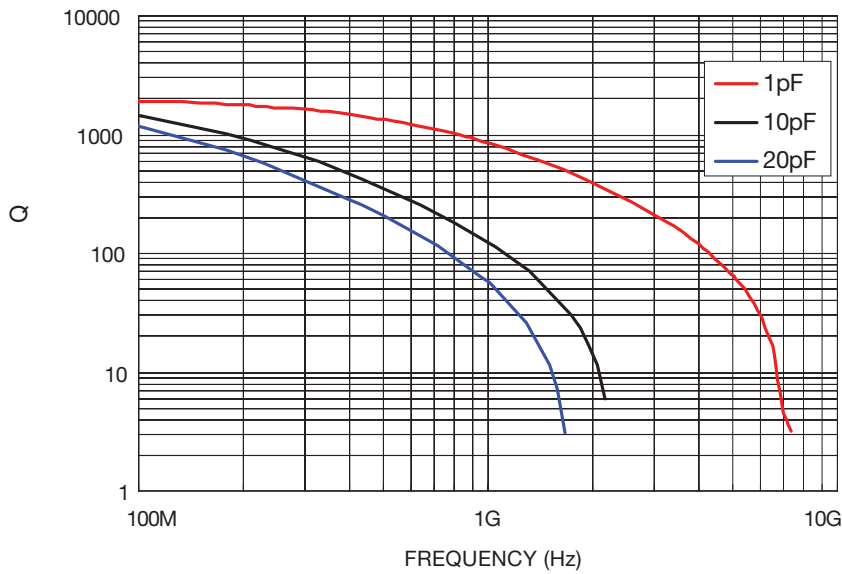
Q - Frequency Characteristics

GJM03 Series



Measurement
Equipment
8753D (Agilent)

GJM15 Series

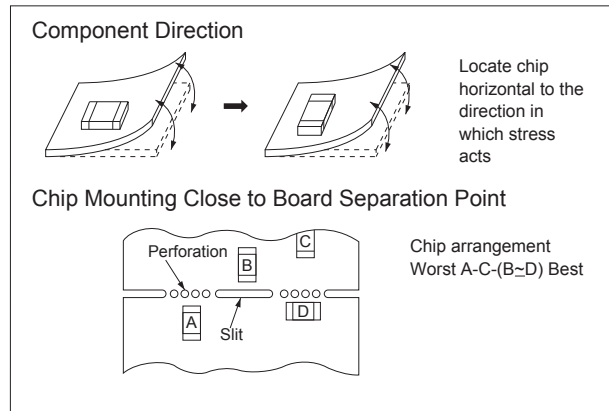


GJM Soldering and Mounting

■ ⚠ Caution (Soldering and Mounting)

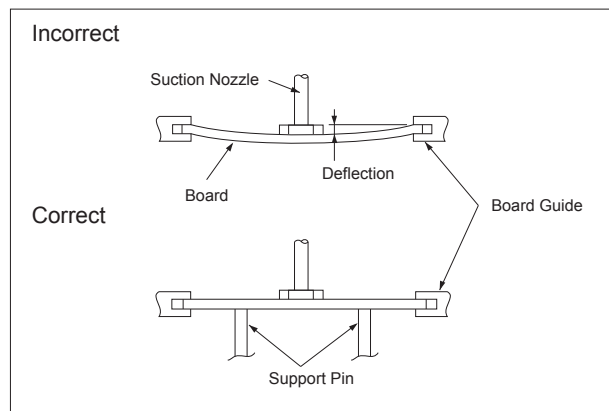
1. Mounting Position


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



2. Chip Placing

- An excessively low bottom dead point of the suction nozzle imposes great force on the chip during mounting, causing cracked chips. So adjust the suction nozzle's bottom dead point by correcting warp in the board. Normally, the suction nozzle's bottom dead point must be set on the upper surface of the board. Nozzle pressure for chip mounting must be a 1 to 3N static load.
- Dirt particles and dust accumulated between the suction nozzle and the cylinder inner wall prevent the nozzle from moving smoothly. This imposes great force on the chip during mounting, causing cracked chips. And 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. 

GJM Soldering and Mounting

3. Reflow Soldering

- When sudden heat is applied to the components, the mechanical strength of the components should go down because remarkable temperature change causes deformity inside 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 1. It is required to keep temperature differential between the soldering and the components surface (ΔT) as small as possible.
- 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.
- 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
GJM03/15	$\Delta T \leq 190^\circ\text{C}$

Recommended Conditions

	Pb-Sn Solder		Lead Free Solder
	Infrared Reflow	Vapor Reflow	
Peak Temperature	230-250°C	230-240°C	240-260°C
Atmosphere	Air	Air	Air or N ₂

Pb-Sn Solder: Sn-37Pb
Lead Free Solder: Sn-3.0Ag-0.5Cu

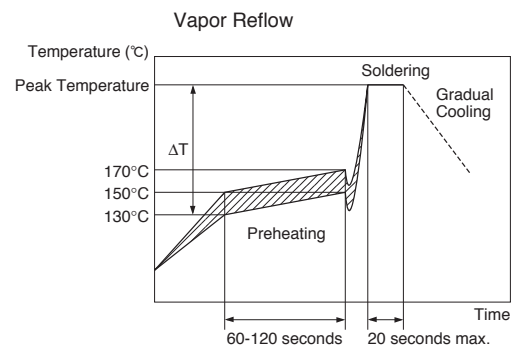
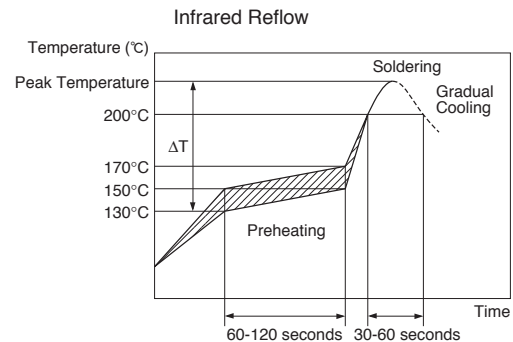
● Optimum Solder Amount for Reflow Soldering

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

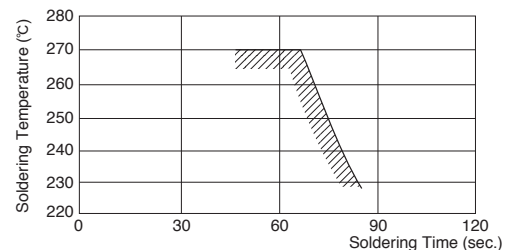
Inverting the PCB

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

Standard Conditions for Reflow Soldering

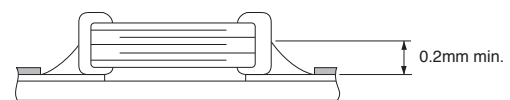


Allowable Soldering Temperature and Time



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

Optimum Solder Amount for Reflow Soldering



Continued on the following page.

GJM Soldering and Mounting

■ Correction with a Soldering Iron

(1) For Chip Type Capacitors

- When sudden heat is applied to the components by use of a soldering iron, the mechanical strength of the components will go down because the extreme temperature change causes 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 2. 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, and that will cause a reduction of the adhesive strength of the terminations.

Table 2

Part Number	Temperature of Soldering Iron Tip	Preheating Temperature	Temperature Differential ΔT	Atmosphere
GJM03/15	350°C max.	150°C min.	$\Delta T \leq 190^\circ\text{C}$	Air

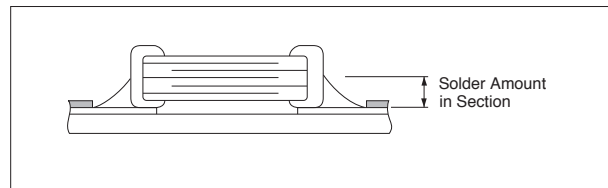
Applicable for both Pb-Sn and Lead Free Solder.

Pb-Sn Solder: Sn-37Pb

Lead Free Solder: Sn-3.0Ag-0.5Cu

- Optimum Solder Amount when Re-working Using a Soldering Iron

In case of smaller sizes than 0603, (GJM03/15), 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. If the solder amount is excessive, the risk of cracking is higher during board bending or under any other stressful conditions. A Soldering iron $\phi 3\text{mm}$ 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 $\phi 0.5\text{mm}$ or smaller is required for soldering.



■ 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.

GJM Design Engineering Kits

General Ceramic Chip Capacitors

0201 (6.3 to 25 VDC)

- Better Q and low ESR at VHF, UHF and microwave frequencies.
- 0201 size with Copper inner electrode.
- Tight tolerance available.
 [W] = +/-0.05pF for 5pF & under [B] = +/-0.1pF for under 10pF
 [C] = +/-0.25pF for under 10pF
 [F] = +/-1% for 10pF & over [G] = +/-2% for 10pF & over
- Low power consumption, yield ratio improvement due to the better Q or lower ESR.
- GJM series is suited to VCO or PA module applications.
- GJM series is offered with a Ni barrier termination plated with Matte Tin (Sn), and is RoHS compliant.

GJM03-KIT-----E (Standard Tolerance)

No.	Description	Murata Global P/N	Qty.
1	0201/C0G/0.20pF/25V	GJM0335C1ER20BB01	20
2	0201/C0G/0.30pF/25V	GJM0335C1ER30BB01	20
3	0201/C0G/0.40pF/25V	GJM0335C1ER40BB01	20
4	0201/C0G/0.50pF/25V	GJM0335C1ER50BB01	20
5	0201/C0G/0.60pF/25V	GJM0335C1ER60BB01	20
6	0201/C0G/0.70pF/25V	GJM0335C1ER70BB01	20
7	0201/C0G/0.80pF/25V	GJM0335C1ER80BB01	20
8	0201/C0G/0.90pF/25V	GJM0335C1ER90BB01	20
9	0201/C0G/1.0pF/25V	GJM0335C1E1R0CB01	20
10	0201/C0G/1.1pF/25V	GJM0335C1E1R1CB01	20
11	0201/C0G/1.2pF/25V	GJM0335C1E1R2CB01	20
12	0201/C0G/1.3pF/25V	GJM0335C1E1R3CB01	20
13	0201/C0G/1.5pF/25V	GJM0335C1E1R5CB01	20
14	0201/C0G/1.6pF/25V	GJM0335C1E1R6CB01	20
15	0201/C0G/1.8pF/25V	GJM0335C1E1R8CB01	20
16	0201/C0G/2.0pF/25V	GJM0335C1E2R0CB01	20
17	0201/C0G/2.2pF/25V	GJM0335C1E2R2CB01	20
18	0201/C0G/2.4pF/25V	GJM0335C1E2R4CB01	20
19	0201/C0G/2.7pF/25V	GJM0335C1E2R7CB01	20
20	0201/C0G/3.0pF/25V	GJM0335C1E3R0CB01	20
21	0201/C0G/3.3pF/25V	GJM0335C1E3R3CB01	20
22	0201/C0G/3.6pF/25V	GJM0335C1E3R6CB01	20
23	0201/C0G/3.9pF/25V	GJM0335C1E3R9CB01	20
24	0201/C0G/4.0pF/25V	GJM0335C1E4R0CB01	20
25	0201/C0G/4.3pF/25V	GJM0335C1E4R3CB01	20
26	0201/C0G/4.7pF/25V	GJM0335C1E4R7CB01	20
27	0201/C0G/5.0pF/25V	GJM0335C1E5R0CB01	20
28	0201/C0G/5.1pF/25V	GJM0335C1E5R1DB01	20
29	0201/C0G/5.6pF/25V	GJM0335C1E5R6DB01	20
30	0201/C0G/6.0pF/25V	GJM0335C1E6R0DB01	20
31	0201/C0G/6.2pF/25V	GJM0335C1E6R2DB01	20
32	0201/C0G/6.8pF/25V	GJM0335C1E6R8DB01	20
33	0201/C0H/7.0pF/25V	GJM0336C1E7R0DB01	20
34	0201/C0H/7.5pF/25V	GJM0336C1E7R5DB01	20
35	0201/C0H/8.0pF/25V	GJM0336C1E8R0DB01	20
36	0201/C0H/8.2pF/25V	GJM0336C1E8R2DB01	20
37	0201/C0H/9.0pF/25V	GJM0336C1E9R0DB01	20
38	0201/C0H/9.1pF/25V	GJM0336C1E9R1DB01	20
39	0201/C0H/10pF/25V	GJM0336C1E100JB01	20
40	0201/C0H/12pF/25V	GJM0336C1E120JB01	20
41	0201/C0H/15pF/25V	GJM0336C1E150JB01	20
42	0201/C0H/18pF/25V	GJM0336C1E180JB01	20
43	0201/C0H/20pF/25V	GJM0336C1E200JB01	20
44	0201/C0G/22pF/6.3V	GJM0335C0J220JB01	20
45	0201/C0G/27pF/6.3V	GJM0335C0J270JB01	20
46	0201/C0G/33pF/6.3V	GJM0335C0J330JB01	20

GJM03-KIT-TTOL----E (Tight Tolerance)

No.	Description	Murata Global P/N	Qty.
1	0201/C0G/0.20pF/25V	GJM0335C1ER20WB01	20
2	0201/C0G/0.30pF/25V	GJM0335C1ER30WB01	20
3	0201/C0G/0.40pF/25V	GJM0335C1ER40WB01	20
4	0201/C0G/0.50pF/25V	GJM0335C1ER50WB01	20
5	0201/C0G/0.60pF/25V	GJM0335C1ER60WB01	20
6	0201/C0G/0.70pF/25V	GJM0335C1ER70WB01	20
7	0201/C0G/0.80pF/25V	GJM0335C1ER80WB01	20
8	0201/C0G/0.90pF/25V	GJM0335C1ER90WB01	20
9	0201/C0G/1.0pF/25V	GJM0335C1E1R0BB01	20
10	0201/C0G/1.1pF/25V	GJM0335C1E1R1BB01	20
11	0201/C0G/1.2pF/25V	GJM0335C1E1R2BB01	20
12	0201/C0G/1.3pF/25V	GJM0335C1E1R3BB01	20
13	0201/C0G/1.5pF/25V	GJM0335C1E1R5BB01	20
14	0201/C0G/1.6pF/25V	GJM0335C1E1R6BB01	20
15	0201/C0G/1.8pF/25V	GJM0335C1E1R8BB01	20
16	0201/C0G/2.0pF/25V	GJM0335C1E2R0BB01	20
17	0201/C0G/2.2pF/25V	GJM0335C1E2R2BB01	20
18	0201/C0G/2.4pF/25V	GJM0335C1E2R4BB01	20
19	0201/C0G/2.7pF/25V	GJM0335C1E2R7BB01	20
20	0201/C0G/3.0pF/25V	GJM0335C1E3R0BB01	20
21	0201/C0G/3.3pF/25V	GJM0335C1E3R3BB01	20
22	0201/C0G/3.6pF/25V	GJM0335C1E3R6BB01	20
23	0201/C0G/3.9pF/25V	GJM0335C1E3R9BB01	20
24	0201/C0G/4.0pF/25V	GJM0335C1E4R0BB01	20
25	0201/C0G/4.3pF/25V	GJM0335C1E4R3BB01	20
26	0201/C0G/4.7pF/25V	GJM0335C1E4R7BB01	20
27	0201/C0G/5.0pF/25V	GJM0335C1E5R0BB01	20
28	0201/C0G/5.1pF/25V	GJM0335C1E5R1CB01	20
29	0201/C0G/5.6pF/25V	GJM0335C1E5R6CB01	20
30	0201/C0G/6.0pF/25V	GJM0335C1E6R0CB01	20
31	0201/C0G/6.2pF/25V	GJM0335C1E6R2CB01	20
32	0201/C0G/6.8pF/25V	GJM0335C1E6R8CB01	20
33	0201/C0H/7.0pF/25V	GJM0336C1E7R0CB01	20
34	0201/C0H/7.5pF/25V	GJM0336C1E7R5CB01	20
35	0201/C0H/8.0pF/25V	GJM0336C1E8R0CB01	20
36	0201/C0H/8.2pF/25V	GJM0336C1E8R2CB01	20
37	0201/C0H/9.0pF/25V	GJM0336C1E9R0CB01	20
38	0201/C0H/9.1pF/25V	GJM0336C1E9R1CB01	20
39	0201/C0H/10pF/25V	GJM0336C1E100GB01	20
40	0201/C0H/12pF/25V	GJM0336C1E120GB01	20
41	0201/C0H/15pF/25V	GJM0336C1E150GB01	20
42	0201/C0H/18pF/25V	GJM0336C1E180GB01	20
43	0201/C0H/20pF/25V	GJM0336C1E200GB01	20
44	0201/C0G/22pF/6.3V	GJM0335C0J220GB01	20
45	0201/C0G/27pF/6.3V	GJM0335C0J270GB01	20
46	0201/C0G/33pF/6.3V	GJM0335C0J330GB01	20

NOTE: For Ceramic Chip Capacitors, dashes are part of the part number and must be included when placing an order.

GJM Design Engineering Kits

General Ceramic Chip Capacitors

0402 (50 VDC)

- Better Q and low ESR at VHF, UHF and microwave frequencies.
- 0402 size with Copper inner electrode.
- Tight tolerance available.
[W] = +/-0.05pF for 5pF & under [B] = +/-0.1pF for under 10pF
[C] = +/-0.25pF for under 10pF
[F] = +/-1% for 10pF & over [G] = +/-2% for 10pF & over
- Low power consumption, yield ratio improvement due to the better Q or lower ESR.
- GJM series is suited to VCO or PA module applications.
- GJM series is offered with a Ni barrier termination plated with Matte Tin (Sn), and is RoHS compliant.

GJM15-KIT-----E (Standard Tolerance)

No.	Description	Murata Global P/N	Qty.
1	0402/C0G/0.10pF/50V	GJM1555C1HR10BB01	20
2	0402/C0G/0.20pF/50V	GJM1555C1HR20BB01	20
3	0402/C0G/0.30pF/50V	GJM1555C1HR30BB01	20
4	0402/C0G/0.40pF/50V	GJM1555C1HR40BB01	20
5	0402/C0G/0.50pF/50V	GJM1555C1HR50BB01	20
6	0402/C0G/0.60pF/50V	GJM1555C1HR60BB01	20
7	0402/C0G/0.70pF/50V	GJM1555C1HR70BB01	20
8	0402/C0G/0.80pF/50V	GJM1555C1HR80BB01	20
9	0402/C0G/0.90pF/50V	GJM1555C1HR90BB01	20
10	0402/C0G/1.0pF/50V	GJM1555C1H1R0CB01	20
11	0402/C0G/1.1pF/50V	GJM1555C1H1R1CB01	20
12	0402/C0G/1.2pF/50V	GJM1555C1H1R2CB01	20
13	0402/C0G/1.3pF/50V	GJM1555C1H1R3CB01	20
14	0402/C0G/1.5pF/50V	GJM1555C1H1R5CB01	20
15	0402/C0G/1.6pF/50V	GJM1555C1H1R6CB01	20
16	0402/C0G/1.8pF/50V	GJM1555C1H1R8CB01	20
17	0402/C0G/2.0pF/50V	GJM1555C1H2R0CB01	20
18	0402/C0G/2.2pF/50V	GJM1555C1H2R2CB01	20
19	0402/C0G/2.4pF/50V	GJM1555C1H2R4CB01	20
20	0402/C0G/2.7pF/50V	GJM1555C1H2R7CB01	20
21	0402/C0G/3.0pF/50V	GJM1555C1H3R0CB01	20
22	0402/C0G/3.3pF/50V	GJM1555C1H3R3CB01	20
23	0402/C0G/3.6pF/50V	GJM1555C1H3R6CB01	20
24	0402/C0G/3.9pF/50V	GJM1555C1H3R9CB01	20
25	0402/C0G/4.0pF/50V	GJM1555C1H4R0CB01	20
26	0402/C0G/4.3pF/50V	GJM1555C1H4R3CB01	20
27	0402/C0G/4.7pF/50V	GJM1555C1H4R7CB01	20
28	0402/C0G/5.0pF/50V	GJM1555C1H5R0CB01	20
29	0402/C0G/5.1pF/50V	GJM1555C1H5R1DB01	20
30	0402/C0G/5.6pF/50V	GJM1555C1H5R6DB01	20
31	0402/C0G/6.0pF/50V	GJM1555C1H6R0DB01	20
32	0402/C0G/6.2pF/50V	GJM1555C1H6R2DB01	20
33	0402/C0G/6.8pF/50V	GJM1555C1H6R8DB01	20
34	0402/C0G/7.0pF/50V	GJM1555C1H7R0DB01	20
35	0402/C0G/7.5pF/50V	GJM1555C1H7R5DB01	20
36	0402/C0G/8.0pF/50V	GJM1555C1H8R0DB01	20
37	0402/C0G/8.2pF/50V	GJM1555C1H8R2DB01	20
38	0402/C0G/9.0pF/50V	GJM1555C1H9R0DB01	20
39	0402/C0G/9.1pF/50V	GJM1555C1H9R1DB01	20
40	0402/C0G/10pF/50V	GJM1555C1H100JB01	20
41	0402/C0G/12pF/50V	GJM1555C1H120JB01	20
42	0402/C0G/15pF/50V	GJM1555C1H150JB01	20
43	0402/C0G/18pF/50V	GJM1555C1H180JB01	20
44	0402/C0G/20pF/50V	GJM1555C1H200JB01	20

GJM15-KIT-TTOL---E (Tight Tolerance)

No.	Description	Murata Global P/N	Qty.
1	0402/C0G/0.10pF/50V	GJM1555C1HR10WB01	20
2	0402/C0G/0.20pF/50V	GJM1555C1HR20WB01	20
3	0402/C0G/0.30pF/50V	GJM1555C1HR30WB01	20
4	0402/C0G/0.40pF/50V	GJM1555C1HR40WB01	20
5	0402/C0G/0.50pF/50V	GJM1555C1HR50WB01	20
6	0402/C0G/0.60pF/50V	GJM1555C1HR60WB01	20
7	0402/C0G/0.70pF/50V	GJM1555C1HR70WB01	20
8	0402/C0G/0.80pF/50V	GJM1555C1HR80WB01	20
9	0402/C0G/0.90pF/50V	GJM1555C1HR90WB01	20
10	0402/C0G/1.0pF/50V	GJM1555C1H1R0BB01	20
11	0402/C0G/1.1pF/50V	GJM1555C1H1R1BB01	20
12	0402/C0G/1.2pF/50V	GJM1555C1H1R2BB01	20
13	0402/C0G/1.3pF/50V	GJM1555C1H1R3BB01	20
14	0402/C0G/1.5pF/50V	GJM1555C1H1R5BB01	20
15	0402/C0G/1.6pF/50V	GJM1555C1H1R6BB01	20
16	0402/C0G/1.8pF/50V	GJM1555C1H1R8BB01	20
17	0402/C0G/2.0pF/50V	GJM1555C1H2R0BB01	20
18	0402/C0G/2.2pF/50V	GJM1555C1H2R2BB01	20
19	0402/C0G/2.4pF/50V	GJM1555C1H2R4BB01	20
20	0402/C0G/2.7pF/50V	GJM1555C1H2R7BB01	20
21	0402/C0G/3.0pF/50V	GJM1555C1H3R0BB01	20
22	0402/C0G/3.3pF/50V	GJM1555C1H3R3BB01	20
23	0402/C0G/3.6pF/50V	GJM1555C1H3R6BB01	20
24	0402/C0G/3.9pF/50V	GJM1555C1H3R9BB01	20
25	0402/C0G/4.0pF/50V	GJM1555C1H4R0BB01	20
26	0402/C0G/4.3pF/50V	GJM1555C1H4R3BB01	20
27	0402/C0G/4.7pF/50V	GJM1555C1H4R7BB01	20
28	0402/C0G/5.0pF/50V	GJM1555C1H5R0BB01	20
29	0402/C0G/5.1pF/50V	GJM1555C1H5R1CB01	20
30	0402/C0G/5.6pF/50V	GJM1555C1H5R6CB01	20
31	0402/C0G/6.0pF/50V	GJM1555C1H6R0CB01	20
32	0402/C0G/6.2pF/50V	GJM1555C1H6R2CB01	20
33	0402/C0G/6.8pF/50V	GJM1555C1H6R8CB01	20
34	0402/C0G/7.0pF/50V	GJM1555C1H7R0CB01	20
35	0402/C0G/7.5pF/50V	GJM1555C1H7R5CB01	20
36	0402/C0G/8.0pF/50V	GJM1555C1H8R0CB01	20
37	0402/C0G/8.2pF/50V	GJM1555C1H8R2CB01	20
38	0402/C0G/9.0pF/50V	GJM1555C1H9R0CB01	20
39	0402/C0G/9.1pF/50V	GJM1555C1H9R1CB01	20
40	0402/C0G/10pF/50V	GJM1555C1H100GB01	20
41	0402/C0G/12pF/50V	GJM1555C1H120GB01	20
42	0402/C0G/15pF/50V	GJM1555C1H150GB01	20
43	0402/C0G/18pF/50V	GJM1555C1H180GB01	20
44	0402/C0G/20pF/50V	GJM1555C1H200GB01	20

NOTE: For Ceramic Chip Capacitors, dashes are part of the part number and must be included when placing an order.