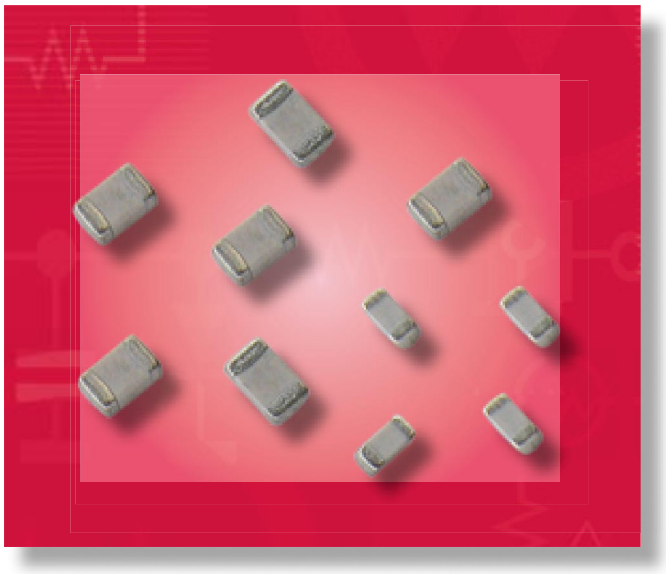
GQM Series

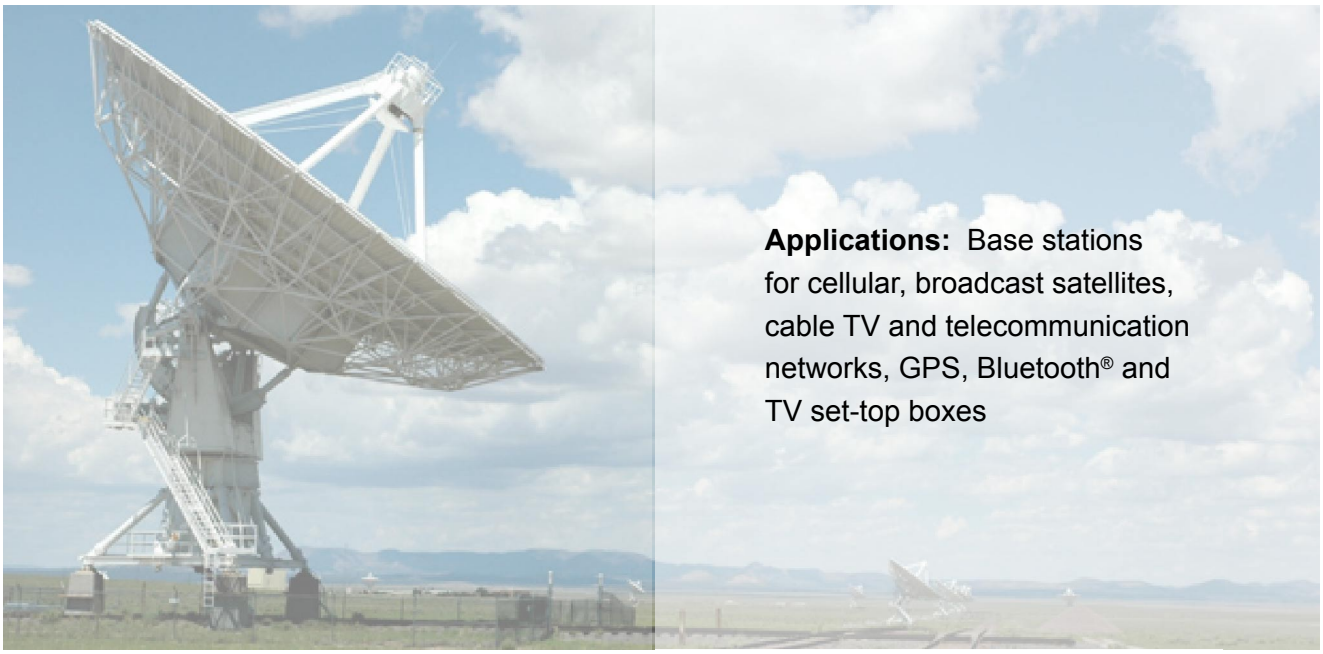
GQM Product Summary

GQM Series: Featuring improved low power consumption for mobile telecommunications, the GQM Series is typically used in frequencies from 500MHz to 10GHz. The copper electrodes allow for ultra low ESR, high Q in the GHz frequencies and high RF current handling capability. This series is the best choice for high performance, high power RF designs requiring voltages up to 500VDC. Offered in EIA sizes 0603, 0805 and the new 1111 size with a capacitance range of 0.1 to 100pF, there are a variety of tight tolerance versions available.



Features:

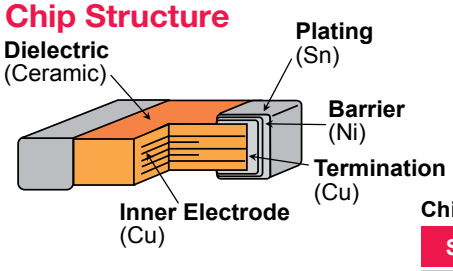
- **Size**: 0603, 0805 and 1111
- **Voltage**: 50, 100, 250 and 500VDC
- **Cap Range**: 0.1 to 100pF
- **Internal Electrode**: Cu
- **Termination**: Cu + Ni/Sn plating
- **ESR**: Ultra Low
- **Power**: High Power (>15W)
- **Frequency Range**: 500MHz –10GHz. High Q and Low ESR at VHF, UHF, and Microwave Frequencies
- **Tolerance**: Tight Tolerance Available ([W]=+/-0.05pF for <=5pF, [B]=+/-0.1pF for 5 - 9.1pF, [C]=+/-0.25pF for 5 - 9.1pF, [F]=+/-1% for 10 - 20pF)
- **Temp. Characteristics**: C0G (-55°C to 125°C with 0 ±30ppm/ °C)



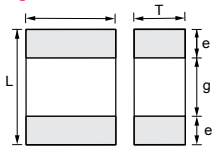
Applications: Base stations for cellular, broadcast satellites, cable TV and telecommunication networks, GPS, Bluetooth® and TV set-top boxes

GQM Data Sheet

Chip Structure



Chip Dimensions

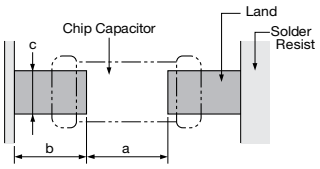


Chip Dimensions Table

Unit: mm

	Series	EIA size	L	W	T	e	g min.
	GQM187	0603	1.6+/-0.15	0.8+/-0.15	0.7+/-0.1	0.2 to 0.5	0.5
	GQM188	0603	1.6+/-0.1	0.8+/-0.1	0.8+/-0.1		
	GQM219	0805	2.0+/-0.15	1.25+/-0.15	0.85+/-0.15	0.2 to 0.7	0.7
NEW	GQM22M	1111	2.8+/-0.5	2.8+/-0.4	1.15+/-0.2	0.3 min.	1.0

Land Pattern Dimensions



Flow Soldering

Series	a	b	c
GQM18	0.6 ~ 1.0	0.8 ~ .0.9	0.6 ~ 0.8
GQM21	1.0 ~ 1.2	0.9 ~ 1.0	0.8 ~ 1.1
GQM22	n/a	n/a	n/a

Re-Flow Soldering

Series	a	b	c
GQM18	0.6 ~ 1.0	0.8 ~ .0.9	0.6 ~ 0.8
GQM21	1.0 ~ 1.2	0.9 ~ 1.0	0.8 ~ 1.1
GQM22	2.2 ~ 2.5	0.8 ~ 1.0	1.9 ~ 2.3

Capacitance Range

Series	TC	WV	Capacitance Range
GQM187	C0G	250V	0.1 to 47 pF
GQM188	C0G	100V	0.1 to 6.8 pF
		50V	7.0 to 100 pF
GQM219	C0G	250V	0.2 to 100 pF
		100V	0.2 to 18 pF
		50V	20 to 100 pF
GQM22M	C0G	500V	0.5 to 100 pF

Global Part Numbering

GQ	M	18	8	5C	2A	120	J	B01	D
❶	❷	❸	❹	❺	❻	❼	❽	❾	❿

❶ Product ID

Code	Product
GQ	High Q

❷ Series

Code	Product
M	Tin Plated Termination

❸ Dimension (LxW)

Code	Dimension (LxW)
18	1.6x0.8mm
21	2.0x1.25mm
22	2.8x2.8mm

❹ Dimension (T)

Code	Dimension (T)
7	0.7mm
8	0.8mm
9	0.85mm
M	1.15mm

❺ Temperature Characteristics

Code	TC	Cap. Change	Operating Temp.Range
5C	C0G	0+/-30ppm/°C	-55 to 125°C

❻ Rated Voltage

Code	Rated Voltage
1H	DC 50V
2A	DC 100V
2E	DC 250V
2H	DC 500V

❼ Capacitance

Code	Capacitance
R50	0.5pF
1R0	1.0pF
5R6	5.6pF
100	10pF

❽ Capacitance Tolerance

Code	Cap. Tol.	TC
W	+/-0.05pF	C0G (<=5pF)
B	+/-0.1pF	C0G (<=5pF)
C	+/-0.25pF	C0G (<=9pF)
D	+/-0.5pF	C0G (6 to 9pF)
F	+/-1%	C0G (>=10pF)
G	+/-2%	
J	+/-5%	

❾ Individual Specification Code

❿ Packaging

Code	Packaging
B	Bulk in nylon bag
D	ϕ180mm Paper Taping
L	ϕ180mm Paper Taping
J	ϕ330mm Paper Taping
K	ϕ330mm Paper Taping

GQM Product Offering

GQM18 Series

Size	TC	WV	Cap	Cap Tol	Murata Global P/N
0603	C0G	250V	0.1pF	+/-0.1pF	GQM1875C2ER10BB12D
0603	C0G	250V	0.2pF	+/-0.1pF	GQM1875C2ER20BB12D
0603	C0G	250V	0.3pF	+/-0.1pF	GQM1875C2ER30BB12D
0603	C0G	250V	0.4pF	+/-0.1pF	GQM1875C2ER40BB12D
0603	C0G	250V	0.5pF	+/-0.1pF	GQM1875C2ER50BB12D
0603	C0G	250V	0.5pF	+/-0.25pF	GQM1875C2ER50CB12D
0603	C0G	250V	0.75pF	+/-0.1pF	GQM1875C2ER75BB12D
0603	C0G	250V	0.75pF	+/-0.25pF	GQM1875C2ER75CB12D
0603	C0G	250V	1pF	+/-0.1pF	GQM1875C2E1R0BB12D
0603	C0G	250V	1pF	+/-0.25pF	GQM1875C2E1R0CB12D
0603	C0G	250V	1.1pF	+/-0.1pF	GQM1875C2E1R1BB12D
0603	C0G	250V	1.2pF	+/-0.1pF	GQM1875C2E1R2BB12D
0603	C0G	250V	1.3pF	+/-0.1pF	GQM1875C2E1R3BB12D
0603	C0G	250V	1.5pF	+/-0.1pF	GQM1875C2E1R5BB12D
0603	C0G	250V	1.5pF	+/-0.25pF	GQM1875C2E1R5CB12D
0603	C0G	250V	1.6pF	+/-0.1pF	GQM1875C2E1R6BB12D
0603	C0G	250V	1.8pF	+/-0.1pF	GQM1875C2E1R8BB12D
0603	C0G	250V	2pF	+/-0.1pF	GQM1875C2E2R0BB12D
0603	C0G	250V	2pF	+/-0.25pF	GQM1875C2E2R0CB12D
0603	C0G	250V	2.2pF	+/-0.1pF	GQM1875C2E2R2BB12D
0603	C0G	250V	2.4pF	+/-0.1pF	GQM1875C2E2R4BB12D
0603	C0G	250V	2.7pF	+/-0.1pF	GQM1875C2E2R7BB12D
0603	C0G	250V	3pF	+/-0.1pF	GQM1875C2E3R0BB12D
0603	C0G	250V	3pF	+/-0.25pF	GQM1875C2E3R0CB12D
0603	C0G	250V	3.3pF	+/-0.1pF	GQM1875C2E3R3BB12D
0603	C0G	250V	3.6pF	+/-0.1pF	GQM1875C2E3R6BB12D
0603	C0G	250V	3.9pF	+/-0.1pF	GQM1875C2E3R9BB12D
0603	C0G	250V	4pF	+/-0.1pF	GQM1875C2E4R0BB12D
0603	C0G	250V	4pF	+/-0.25pF	GQM1875C2E4R0CB12D
0603	C0G	250V	4.3pF	+/-0.1pF	GQM1875C2E4R3BB12D
0603	C0G	250V	4.7pF	+/-0.1pF	GQM1875C2E4R7BB12D
0603	C0G	250V	5pF	+/-0.1pF	GQM1875C2E5R0BB12D
0603	C0G	250V	5pF	+/-0.25pF	GQM1875C2E5R0CB12D
0603	C0G	250V	5.1pF	+/-0.25pF	GQM1875C2E5R1CB12D
0603	C0G	250V	5.6pF	+/-0.25pF	GQM1875C2E5R6CB12D

GQM Product Offering

GQM18 Series

Size	TC	WV	Cap	Cap Tol	Murata Global P/N
0603	C0G	250V	6pF	+/-0.25pF	GQM1875C2E6R0CB12D
0603	C0G	250V	6pF	+/-0.5pF	GQM1875C2E6R0DB12D
0603	C0G	250V	6.2pF	+/-0.25pF	GQM1875C2E6R2CB12D
0603	C0G	250V	6.8pF	+/-0.25pF	GQM1875C2E6R8CB12D
0603	C0G	250V	7pF	+/-0.25pF	GQM1875C2E7R0CB12D
0603	C0G	250V	7pF	+/-0.5pF	GQM1875C2E7R0DB12D
0603	C0G	250V	7.5pF	+/-0.25pF	GQM1875C2E7R5CB12D
0603	C0G	250V	8pF	+/-0.25pF	GQM1875C2E8R0CB12D
0603	C0G	250V	8pF	+/-0.5pF	GQM1875C2E8R0DB12D
0603	C0G	250V	8.2pF	+/-0.25pF	GQM1875C2E8R2CB12D
0603	C0G	250V	9pF	+/-0.25pF	GQM1875C2E9R0CB12D
0603	C0G	250V	9pF	+/-0.5pF	GQM1875C2E9R0DB12D
0603	C0G	250V	9.1pF	+/-0.25pF	GQM1875C2E9R1CB12D
0603	C0G	250V	10pF	+/-2%	GQM1875C2E100GB12D
0603	C0G	250V	10pF	+/-5%	GQM1875C2E100JB12D
0603	C0G	250V	12pF	+/-2%	GQM1875C2E120GB12D
0603	C0G	250V	12pF	+/-5%	GQM1875C2E120JB12D
0603	C0G	250V	15pF	+/-2%	GQM1875C2E150GB12D
0603	C0G	250V	15pF	+/-5%	GQM1875C2E150JB12D
0603	C0G	250V	18pF	+/-2%	GQM1875C2E180GB12D
0603	C0G	250V	18pF	+/-5%	GQM1875C2E180JB12D
0603	C0G	250V	20pF	+/-2%	GQM1875C2E200GB12D
0603	C0G	250V	20pF	+/-5%	GQM1875C2E200JB12D
0603	C0G	250V	22pF	+/-2%	GQM1875C2E220GB12D
0603	C0G	250V	22pF	+/-5%	GQM1875C2E220JB12D
0603	C0G	250V	27pF	+/-2%	GQM1875C2E270GB12D
0603	C0G	250V	27pF	+/-5%	GQM1875C2E270JB12D
0603	C0G	250V	33pF	+/-2%	GQM1875C2E330GB12D
0603	C0G	250V	33pF	+/-5%	GQM1875C2E330JB12D
0603	C0G	250V	39pF	+/-2%	GQM1875C2E390GB12D
0603	C0G	250V	39pF	+/-5%	GQM1875C2E390JB12D
0603	C0G	250V	47pF	+/-2%	GQM1875C2E470GB12D
0603	C0G	250V	47pF	+/-5%	GQM1875C2E470JB12D

GQM Product Offering

GQM18 Series

Size	TC	WV	Cap	Cap Tol	Murata Global P/N
0603	C0G	100V	0.1pF	+/-0.1pF	GQM1885C2AR10BB01D
0603	C0G	100V	0.2pF	+/-0.1pF	GQM1885C2AR20BB01D
0603	C0G	100V	0.3pF	+/-0.1pF	GQM1885C2AR30BB01D
0603	C0G	100V	0.4pF	+/-0.1pF	GQM1885C2AR40BB01D
0603	C0G	100V	0.5pF	+/-0.1pF	GQM1885C2AR50BB01D
0603	C0G	100V	0.5pF	+/-0.25pF	GQM1885C2AR50CB01D
0603	C0G	100V	0.75pF	+/-0.1pF	GQM1885C2AR75BB01D
0603	C0G	100V	0.75pF	+/-0.25pF	GQM1885C2AR75CB01D
0603	C0G	100V	1pF	+/-0.1pF	GQM1885C2A1R0BB01D
0603	C0G	100V	1pF	+/-0.25pF	GQM1885C2A1R0CB01D
0603	C0G	100V	1.1pF	+/-0.1pF	GQM1885C2A1R1BB01D
0603	C0G	100V	1.2pF	+/-0.1pF	GQM1885C2A1R2BB01D
0603	C0G	100V	1.3pF	+/-0.1pF	GQM1885C2A1R3BB01D
0603	C0G	100V	1.5pF	+/-0.1pF	GQM1885C2A1R5BB01D
0603	C0G	100V	1.5pF	+/-0.25pF	GQM1885C2A1R5CB01D
0603	C0G	100V	1.6pF	+/-0.1pF	GQM1885C2A1R6BB01D
0603	C0G	100V	1.8pF	+/-0.1pF	GQM1885C2A1R8BB01D
0603	C0G	100V	2pF	+/-0.1pF	GQM1885C2A2R0BB01D
0603	C0G	100V	2pF	+/-0.25pF	GQM1885C2A2R0CB01D
0603	C0G	100V	2.2pF	+/-0.1pF	GQM1885C2A2R2BB01D
0603	C0G	100V	2.4pF	+/-0.1pF	GQM1885C2A2R4BB01D
0603	C0G	100V	2.7pF	+/-0.1pF	GQM1885C2A2R7BB01D
0603	C0G	100V	3pF	+/-0.1pF	GQM1885C2A3R0BB01D
0603	C0G	100V	3pF	+/-0.25pF	GQM1885C2A3R0CB01D
0603	C0G	100V	3.3pF	+/-0.1pF	GQM1885C2A3R3BB01D
0603	C0G	100V	3.6pF	+/-0.1pF	GQM1885C2A3R6BB01D
0603	C0G	100V	3.9pF	+/-0.1pF	GQM1885C2A3R9BB01D
0603	C0G	100V	4pF	+/-0.1pF	GQM1885C2A4R0BB01D
0603	C0G	100V	4pF	+/-0.25pF	GQM1885C2A4R0CB01D
0603	C0G	100V	4.3pF	+/-0.1pF	GQM1885C2A4R3BB01D
0603	C0G	100V	4.7pF	+/-0.1pF	GQM1885C2A4R7BB01D
0603	C0G	100V	5pF	+/-0.1pF	GQM1885C2A5R0BB01D
0603	C0G	100V	5pF	+/-0.25pF	GQM1885C2A5R0CB01D
0603	C0G	100V	5.1pF	+/-0.25pF	GQM1885C2A5R1CB01D
0603	C0G	100V	5.6pF	+/-0.25pF	GQM1885C2A5R6CB01D
0603	C0G	100V	6pF	+/-0.25pF	GQM1885C2A6R0CB01D
0603	C0G	100V	6pF	+/-0.5pF	GQM1885C2A6R0DB01D
0603	C0G	100V	6.2pF	+/-0.25pF	GQM1885C2A6R2CB01D
0603	C0G	100V	6.8pF	+/-0.25pF	GQM1885C2A6R8CB01D

GQM Product Offering

GQM18 Series

Size	TC	WV	Cap	Cap Tol	Murata Global P/N
0603	C0G	50V	7pF	+/-0.25pF	GQM1885C1H7R0CB01D
0603	C0G	50V	7pF	+/-0.5pF	GQM1885C1H7R0DB01D
0603	C0G	50V	7.5pF	+/-0.25pF	GQM1885C1H7R5CB01D
0603	C0G	50V	8pF	+/-0.25pF	GQM1885C1H8R0CB01D
0603	C0G	50V	8pF	+/-0.5pF	GQM1885C1H8R0DB01D
0603	C0G	50V	8.2pF	+/-0.25pF	GQM1885C1H8R2CB01D
0603	C0G	50V	9pF	+/-0.25pF	GQM1885C1H9R0CB01D
0603	C0G	50V	9pF	+/-0.5pF	GQM1885C1H9R0DB01D
0603	C0G	50V	9.1pF	+/-0.25pF	GQM1885C1H9R1CB01D
0603	C0G	50V	10pF	+/-2%	GQM1885C1H100GB01D
0603	C0G	50V	10pF	+/-5%	GQM1885C1H100JB01D
0603	C0G	50V	12pF	+/-2%	GQM1885C1H120GB01D
0603	C0G	50V	12pF	+/-5%	GQM1885C1H120JB01D
0603	C0G	50V	15pF	+/-2%	GQM1885C1H150GB01D
0603	C0G	50V	15pF	+/-5%	GQM1885C1H150JB01D
0603	C0G	50V	18pF	+/-2%	GQM1885C1H180GB01D
0603	C0G	50V	18pF	+/-5%	GQM1885C1H180JB01D
0603	C0G	50V	20pF	+/-2%	GQM1885C1H200GB01D
0603	C0G	50V	20pF	+/-5%	GQM1885C1H200JB01D
0603	C0G	50V	22pF	+/-2%	GQM1885C1H220GB01D
0603	C0G	50V	22pF	+/-5%	GQM1885C1H220JB01D
0603	C0G	50V	27pF	+/-2%	GQM1885C1H270GB01D
0603	C0G	50V	27pF	+/-5%	GQM1885C1H270JB01D
0603	C0G	50V	33pF	+/-2%	GQM1885C1H330GB01D
0603	C0G	50V	33pF	+/-5%	GQM1885C1H330JB01D
0603	C0G	50V	39pF	+/-2%	GQM1885C1H390GB01D
0603	C0G	50V	39pF	+/-5%	GQM1885C1H390JB01D
0603	C0G	50V	47pF	+/-2%	GQM1885C1H470GB01D
0603	C0G	50V	47pF	+/-5%	GQM1885C1H470JB01D
0603	C0G	50V	56pF	+/-2%	GQM1885C1H560GB01D
0603	C0G	50V	56pF	+/-5%	GQM1885C1H560JB01D
0603	C0G	50V	68pF	+/-2%	GQM1885C1H680GB01D
0603	C0G	50V	68pF	+/-5%	GQM1885C1H680JB01D
0603	C0G	50V	82pF	+/-2%	GQM1885C1H820GB01D
0603	C0G	50V	82pF	+/-5%	GQM1885C1H820JB01D
0603	C0G	50V	100pF	+/-2%	GQM1885C1H101GB01D
0603	C0G	50V	100pF	+/-5%	GQM1885C1H101JB01D

GQM Product Offering

GQM21 Series

Size	TC	WV	Cap	Cap Tol	Murata Global P/N
0805	C0G	250V	0.2pF	+/-0.1pF	GQM2195C2ER20BB12D
0805	C0G	250V	0.3pF	+/-0.1pF	GQM2195C2ER30BB12D
0805	C0G	250V	0.4pF	+/-0.1pF	GQM2195C2ER40BB12D
0805	C0G	250V	0.5pF	+/-0.1pF	GQM2195C2ER50BB12D
0805	C0G	250V	0.5pF	+/-0.25pF	GQM2195C2ER50CB12D
0805	C0G	250V	0.75pF	+/-0.1pF	GQM2195C2ER75BB12D
0805	C0G	250V	0.75pF	+/-0.25pF	GQM2195C2ER75CB12D
0805	C0G	250V	1pF	+/-0.1pF	GQM2195C2E1R0BB12D
0805	C0G	250V	1pF	+/-0.25pF	GQM2195C2E1R0CB12D
0805	C0G	250V	1.1pF	+/-0.1pF	GQM2195C2E1R1BB12D
0805	C0G	250V	1.2pF	+/-0.1pF	GQM2195C2E1R2BB12D
0805	C0G	250V	1.3pF	+/-0.1pF	GQM2195C2E1R3BB12D
0805	C0G	250V	1.5pF	+/-0.1pF	GQM2195C2E1R5BB12D
0805	C0G	250V	1.5pF	+/-0.25pF	GQM2195C2E1R5CB12D
0805	C0G	250V	1.6pF	+/-0.1pF	GQM2195C2E1R6BB12D
0805	C0G	250V	1.8pF	+/-0.1pF	GQM2195C2E1R8BB12D
0805	C0G	250V	2pF	+/-0.1pF	GQM2195C2E2R0BB12D
0805	C0G	250V	2pF	+/-0.25pF	GQM2195C2E2R0CB12D
0805	C0G	250V	2.2pF	+/-0.1pF	GQM2195C2E2R2BB12D
0805	C0G	250V	2.4pF	+/-0.1pF	GQM2195C2E2R4BB12D
0805	C0G	250V	2.7pF	+/-0.1pF	GQM2195C2E2R7BB12D
0805	C0G	250V	3pF	+/-0.1pF	GQM2195C2E3R0BB12D
0805	C0G	250V	3pF	+/-0.25pF	GQM2195C2E3R0CB12D
0805	C0G	250V	3.3pF	+/-0.1pF	GQM2195C2E3R3BB12D
0805	C0G	250V	3.6pF	+/-0.1pF	GQM2195C2E3R6BB12D
0805	C0G	250V	3.9pF	+/-0.1pF	GQM2195C2E3R9BB12D
0805	C0G	250V	4pF	+/-0.1pF	GQM2195C2E4R0BB12D
0805	C0G	250V	4pF	+/-0.25pF	GQM2195C2E4R0CB12D
0805	C0G	250V	4.3pF	+/-0.1pF	GQM2195C2E4R3BB12D
0805	C0G	250V	4.7pF	+/-0.1pF	GQM2195C2E4R7BB12D
0805	C0G	250V	5pF	+/-0.1pF	GQM2195C2E5R0BB12D
0805	C0G	250V	5pF	+/-0.25pF	GQM2195C2E5R0CB12D
0805	C0G	250V	5.1pF	+/-0.25pF	GQM2195C2E5R1CB12D
0805	C0G	250V	5.6pF	+/-0.25pF	GQM2195C2E5R6CB12D
0805	C0G	250V	6pF	+/-0.25pF	GQM2195C2E6R0CB12D
0805	C0G	250V	6pF	+/-0.5pF	GQM2195C2E6R0DB12D
0805	C0G	250V	6.2pF	+/-0.25pF	GQM2195C2E6R2CB12D
0805	C0G	250V	6.8pF	+/-0.25pF	GQM2195C2E6R8CB12D

GQM Product Offering

GQM21 Series

Size	TC	WV	Cap	Cap Tol	Murata Global P/N
0805	C0G	250V	7pF	+/-0.25pF	GQM2195C2E7R0CB12D
0805	C0G	250V	7pF	+/-0.5pF	GQM2195C2E7R0DB12D
0805	C0G	250V	7.5pF	+/-0.25pF	GQM2195C2E7R5CB12D
0805	C0G	250V	8pF	+/-0.25pF	GQM2195C2E8R0CB12D
0805	C0G	250V	8pF	+/-0.5pF	GQM2195C2E8R0DB12D
0805	C0G	250V	8.2pF	+/-0.25pF	GQM2195C2E8R2CB12D
0805	C0G	250V	9pF	+/-0.25pF	GQM2195C2E9R0CB12D
0805	C0G	250V	9pF	+/-0.5pF	GQM2195C2E9R0DB12D
0805	C0G	250V	9.1pF	+/-0.25pF	GQM2195C2E9R1CB12D
0805	C0G	250V	10pF	+/-2%	GQM2195C2E100GB12D
0805	C0G	250V	10pF	+/-5%	GQM2195C2E100JB12D
0805	C0G	250V	12pF	+/-2%	GQM2195C2E120GB12D
0805	C0G	250V	12pF	+/-5%	GQM2195C2E120JB12D
0805	C0G	250V	15pF	+/-2%	GQM2195C2E150GB12D
0805	C0G	250V	15pF	+/-5%	GQM2195C2E150JB12D
0805	C0G	250V	18pF	+/-2%	GQM2195C2E180GB12D
0805	C0G	250V	18pF	+/-5%	GQM2195C2E180JB12D
0805	C0G	250V	20pF	+/-2%	GQM2195C2E200GB12D
0805	C0G	250V	20pF	+/-5%	GQM2195C2E200JB12D
0805	C0G	250V	22pF	+/-2%	GQM2195C2E220GB12D
0805	C0G	250V	22pF	+/-5%	GQM2195C2E220JB12D
0805	C0G	250V	27pF	+/-2%	GQM2195C2E270GB12D
0805	C0G	250V	27pF	+/-5%	GQM2195C2E270JB12D
0805	C0G	250V	33pF	+/-2%	GQM2195C2E330GB12D
0805	C0G	250V	33pF	+/-5%	GQM2195C2E330JB12D
0805	C0G	250V	39pF	+/-2%	GQM2195C2E390GB12D
0805	C0G	250V	39pF	+/-5%	GQM2195C2E390JB12D
0805	C0G	250V	47pF	+/-2%	GQM2195C2E470GB12D
0805	C0G	250V	47pF	+/-5%	GQM2195C2E470JB12D
0805	C0G	250V	56pF	+/-2%	GQM2195C2E560GB12D
0805	C0G	250V	56pF	+/-5%	GQM2195C2E560JB12D
0805	C0G	250V	68pF	+/-2%	GQM2195C2E680GB12D
0805	C0G	250V	68pF	+/-5%	GQM2195C2E680JB12D
0805	C0G	250V	82pF	+/-2%	GQM2195C2E820GB12D
0805	C0G	250V	82pF	+/-5%	GQM2195C2E820JB12D
0805	C0G	250V	100pF	+/-2%	GQM2195C2E101GB12D
0805	C0G	250V	100pF	+/-5%	GQM2195C2E101JB12D

GQM Product Offering

GQM21 Series

Size	TC	WV	Cap	Cap Tol	Murata Global P/N
0805	C0G	100V	0.2pF	+/-0.1pF	GQM2195C2AR20BB01D
0805	C0G	100V	0.3pF	+/-0.1pF	GQM2195C2AR30BB01D
0805	C0G	100V	0.4pF	+/-0.1pF	GQM2195C2AR40BB01D
0805	C0G	100V	0.5pF	+/-0.1pF	GQM2195C2AR50BB01D
0805	C0G	100V	0.5pF	+/-0.25pF	GQM2195C2AR50CB01D
0805	C0G	100V	0.75pF	+/-0.1pF	GQM2195C2AR75BB01D
0805	C0G	100V	0.75pF	+/-0.25pF	GQM2195C2AR75CB01D
0805	C0G	100V	1pF	+/-0.1pF	GQM2195C2A1R0BB01D
0805	C0G	100V	1pF	+/-0.25pF	GQM2195C2A1R0CB01D
0805	C0G	100V	1.1pF	+/-0.1pF	GQM2195C2A1R1BB01D
0805	C0G	100V	1.2pF	+/-0.1pF	GQM2195C2A1R2BB01D
0805	C0G	100V	1.3pF	+/-0.1pF	GQM2195C2A1R3BB01D
0805	C0G	100V	1.5pF	+/-0.1pF	GQM2195C2A1R5BB01D
0805	C0G	100V	1.5pF	+/-0.25pF	GQM2195C2A1R5CB01D
0805	C0G	100V	1.6pF	+/-0.1pF	GQM2195C2A1R6BB01D
0805	C0G	100V	1.8pF	+/-0.1pF	GQM2195C2A1R8BB01D
0805	C0G	100V	2pF	+/-0.1pF	GQM2195C2A2R0BB01D
0805	C0G	100V	2pF	+/-0.25pF	GQM2195C2A2R0CB01D
0805	C0G	100V	2.2pF	+/-0.1pF	GQM2195C2A2R2BB01D
0805	C0G	100V	2.4pF	+/-0.1pF	GQM2195C2A2R4BB01D
0805	C0G	100V	2.7pF	+/-0.1pF	GQM2195C2A2R7BB01D
0805	C0G	100V	3pF	+/-0.1pF	GQM2195C2A3R0BB01D
0805	C0G	100V	3pF	+/-0.25pF	GQM2195C2A3R0CB01D
0805	C0G	100V	3.3pF	+/-0.1pF	GQM2195C2A3R3BB01D
0805	C0G	100V	3.6pF	+/-0.1pF	GQM2195C2A3R6BB01D
0805	C0G	100V	3.9pF	+/-0.1pF	GQM2195C2A3R9BB01D
0805	C0G	100V	4pF	+/-0.1pF	GQM2195C2A4R0BB01D
0805	C0G	100V	4pF	+/-0.25pF	GQM2195C2A4R0CB01D
0805	C0G	100V	4.3pF	+/-0.1pF	GQM2195C2A4R3BB01D
0805	C0G	100V	4.7pF	+/-0.1pF	GQM2195C2A4R7BB01D
0805	C0G	100V	5pF	+/-0.1pF	GQM2195C2A5R0BB01D
0805	C0G	100V	5pF	+/-0.25pF	GQM2195C2A5R0CB01D
0805	C0G	100V	5.1pF	+/-0.25pF	GQM2195C2A5R1CB01D
0805	C0G	100V	5.6pF	+/-0.25pF	GQM2195C2A5R6CB01D
0805	C0G	100V	6pF	+/-0.25pF	GQM2195C2A6R0CB01D
0805	C0G	100V	6pF	+/-0.5pF	GQM2195C2A6R0DB01D
0805	C0G	100V	6.2pF	+/-0.25pF	GQM2195C2A6R2CB01D
0805	C0G	100V	6.8pF	+/-0.25pF	GQM2195C2A6R8CB01D

GQM Product Offering

GQM21 Series

Size	TC	WV	Cap	Cap Tol	Murata Global P/N
0805	C0G	100V	7pF	+/-0.25pF	GQM2195C2A7R0CB01D
0805	C0G	100V	7pF	+/-0.5pF	GQM2195C2A7R0DB01D
0805	C0G	100V	7.5pF	+/-0.25pF	GQM2195C2A7R5CB01D
0805	C0G	100V	8pF	+/-0.25pF	GQM2195C2A8R0CB01D
0805	C0G	100V	8pF	+/-0.5pF	GQM2195C2A8R0DB01D
0805	C0G	100V	8.2pF	+/-0.25pF	GQM2195C2A8R2CB01D
0805	C0G	100V	9pF	+/-0.25pF	GQM2195C2A9R0CB01D
0805	C0G	100V	9pF	+/-0.5pF	GQM2195C2A9R0DB01D
0805	C0G	100V	9.1pF	+/-0.25pF	GQM2195C2A9R1CB01D
0805	C0G	100V	10pF	+/-2%	GQM2195C2A100GB01D
0805	C0G	100V	10pF	+/-5%	GQM2195C2A100JB01D
0805	C0G	100V	12pF	+/-2%	GQM2195C2A120GB01D
0805	C0G	100V	12pF	+/-5%	GQM2195C2A120JB01D
0805	C0G	100V	15pF	+/-2%	GQM2195C2A150GB01D
0805	C0G	100V	15pF	+/-5%	GQM2195C2A150JB01D
0805	C0G	100V	18pF	+/-2%	GQM2195C2A180GB01D
0805	C0G	100V	18pF	+/-5%	GQM2195C2A180JB01D
0805	C0G	50V	20pF	+/-2%	GQM2195C1H200GB01D
0805	C0G	50V	20pF	+/-5%	GQM2195C1H200JB01D
0805	C0G	50V	22pF	+/-2%	GQM2195C1H220GB01D
0805	C0G	50V	22pF	+/-5%	GQM2195C1H220JB01D
0805	C0G	50V	27pF	+/-2%	GQM2195C1H270GB01D
0805	C0G	50V	27pF	+/-5%	GQM2195C1H270JB01D
0805	C0G	50V	33pF	+/-2%	GQM2195C1H330GB01D
0805	C0G	50V	33pF	+/-5%	GQM2195C1H330JB01D
0805	C0G	50V	39pF	+/-2%	GQM2195C1H390GB01D
0805	C0G	50V	39pF	+/-5%	GQM2195C1H390JB01D
0805	C0G	50V	47pF	+/-2%	GQM2195C1H470GB01D
0805	C0G	50V	47pF	+/-5%	GQM2195C1H470JB01D
0805	C0G	50V	56pF	+/-2%	GQM2195C1H560GB01D
0805	C0G	50V	56pF	+/-5%	GQM2195C1H560JB01D
0805	C0G	50V	68pF	+/-2%	GQM2195C1H680GB01D
0805	C0G	50V	68pF	+/-5%	GQM2195C1H680JB01D
0805	C0G	50V	82pF	+/-2%	GQM2195C1H820GB01D
0805	C0G	50V	82pF	+/-5%	GQM2195C1H820JB01D
0805	C0G	50V	100pF	+/-2%	GQM2195C1H101GB01D
0805	C0G	50V	100pF	+/-5%	GQM2195C1H101JB01D

GQM Product Offering

GQM22 Series

Size	TC	WV	Cap	Cap Tol	Murata Global P/N
1111	C0G	500V	0.5pF	+/-0.1pF	GQM22M5C2HR50BB01L
1111	C0G	500V	0.5pF	+/-0.25pF	GQM22M5C2HR50CB01L
1111	C0G	500V	0.75pF	+/-0.1pF	GQM22M5C2HR75BB01L
1111	C0G	500V	0.75pF	+/-0.25pF	GQM22M5C2HR75CB01L
1111	C0G	500V	1pF	+/-0.1pF	GQM22M5C2H1R0BB01L
1111	C0G	500V	1pF	+/-0.25pF	GQM22M5C2H1R0CB01L
1111	C0G	500V	1.1pF	+/-0.1pF	GQM22M5C2H1R1BB01L
1111	C0G	500V	1.2pF	+/-0.1pF	GQM22M5C2H1R2BB01L
1111	C0G	500V	1.3pF	+/-0.1pF	GQM22M5C2H1R3BB01L
1111	C0G	500V	1.5pF	+/-0.1pF	GQM22M5C2H1R5BB01L
1111	C0G	500V	1.5pF	+/-0.25pF	GQM22M5C2H1R5CB01L
1111	C0G	500V	1.6pF	+/-0.1pF	GQM22M5C2H1R6BB01L
1111	C0G	500V	1.8pF	+/-0.1pF	GQM22M5C2H1R8BB01L
1111	C0G	500V	2pF	+/-0.1pF	GQM22M5C2H2R0BB01L
1111	C0G	500V	2pF	+/-0.25pF	GQM22M5C2H2R0CB01L
1111	C0G	500V	2.2pF	+/-0.1pF	GQM22M5C2H2R2BB01L
1111	C0G	500V	2.4pF	+/-0.1pF	GQM22M5C2H2R4BB01L
1111	C0G	500V	2.7pF	+/-0.1pF	GQM22M5C2H2R7BB01L
1111	C0G	500V	3pF	+/-0.1pF	GQM22M5C2H3R0BB01L
1111	C0G	500V	3pF	+/-0.25pF	GQM22M5C2H3R0CB01L
1111	C0G	500V	3.3pF	+/-0.1pF	GQM22M5C2H3R3BB01L
1111	C0G	500V	3.6pF	+/-0.1pF	GQM22M5C2H3R6BB01L
1111	C0G	500V	3.9pF	+/-0.1pF	GQM22M5C2H3R9BB01L
1111	C0G	500V	4pF	+/-0.1pF	GQM22M5C2H4R0BB01L
1111	C0G	500V	4pF	+/-0.25pF	GQM22M5C2H4R0CB01L
1111	C0G	500V	4.3pF	+/-0.1pF	GQM22M5C2H4R3BB01L
1111	C0G	500V	4.7pF	+/-0.1pF	GQM22M5C2H4R7BB01L
1111	C0G	500V	5pF	+/-0.1pF	GQM22M5C2H5R0BB01L
1111	C0G	500V	5pF	+/-0.25pF	GQM22M5C2H5R0CB01L
1111	C0G	500V	5.1pF	+/-0.25pF	GQM22M5C2H5R1CB01L
1111	C0G	500V	5.6pF	+/-0.25pF	GQM22M5C2H5R6CB01L
1111	C0G	500V	6pF	+/-0.25pF	GQM22M5C2H6R0CB01L
1111	C0G	500V	6pF	+/-0.5pF	GQM22M5C2H6R0DB01L
1111	C0G	500V	6.2pF	+/-0.25pF	GQM22M5C2H6R2CB01L
1111	C0G	500V	6.8pF	+/-0.25pF	GQM22M5C2H6R8CB01L
1111	C0G	500V	7pF	+/-0.25pF	GQM22M5C2H7R0CB01L
1111	C0G	500V	7pF	+/-0.5pF	GQM22M5C2H7R0DB01L
1111	C0G	500V	7.5pF	+/-0.25pF	GQM22M5C2H7R5CB01L
1111	C0G	500V	8pF	+/-0.25pF	GQM22M5C2H8R0CB01L
1111	C0G	500V	8pF	+/-0.5pF	GQM22M5C2H8R0DB01L
1111	C0G	500V	8.2pF	+/-0.25pF	GQM22M5C2H8R2CB01L
1111	C0G	500V	9pF	+/-0.25pF	GQM22M5C2H9R0CB01L
1111	C0G	500V	9pF	+/-0.5pF	GQM22M5C2H9R0DB01L
1111	C0G	500V	9.1pF	+/-0.25pF	GQM22M5C2H9R1CB01L

GQM Product Offering

GQM22 Series

Size	TC	WV	Cap	Cap Tol	Murata Global P/N
1111	C0G	500V	10pF	+/-2%	GQM22M5C2H100GB01L
1111	C0G	500V	10pF	+/-5%	GQM22M5C2H100JB01L
1111	C0G	500V	12pF	+/-2%	GQM22M5C2H120GB01L
1111	C0G	500V	12pF	+/-5%	GQM22M5C2H120JB01L
1111	C0G	500V	15pF	+/-2%	GQM22M5C2H150GB01L
1111	C0G	500V	15pF	+/-5%	GQM22M5C2H150JB01L
1111	C0G	500V	18pF	+/-2%	GQM22M5C2H180GB01L
1111	C0G	500V	18pF	+/-5%	GQM22M5C2H180JB01L
1111	C0G	500V	20pF	+/-2%	GQM22M5C2H200GB01L
1111	C0G	500V	20pF	+/-5%	GQM22M5C2H200JB01L
1111	C0G	500V	22pF	+/-2%	GQM22M5C2H220GB01L
1111	C0G	500V	22pF	+/-5%	GQM22M5C2H220JB01L
1111	C0G	500V	27pF	+/-2%	GQM22M5C2H270GB01L
1111	C0G	500V	27pF	+/-5%	GQM22M5C2H270JB01L
1111	C0G	500V	33pF	+/-2%	GQM22M5C2H330GB01L
1111	C0G	500V	33pF	+/-5%	GQM22M5C2H330JB01L
1111	C0G	500V	39pF	+/-2%	GQM22M5C2H390GB01L
1111	C0G	500V	39pF	+/-5%	GQM22M5C2H390JB01L
1111	C0G	500V	47pF	+/-2%	GQM22M5C2H470GB01L
1111	C0G	500V	47pF	+/-5%	GQM22M5C2H470JB01L
1111	C0G	500V	56pF	+/-2%	GQM22M5C2H560GB01L
1111	C0G	500V	56pF	+/-5%	GQM22M5C2H560JB01L
1111	C0G	500V	68pF	+/-2%	GQM22M5C2H680GB01L
1111	C0G	500V	68pF	+/-5%	GQM22M5C2H680JB01L
1111	C0G	500V	82pF	+/-2%	GQM22M5C2H820GB01L
1111	C0G	500V	82pF	+/-5%	GQM22M5C2H820JB01L
1111	C0G	500V	100pF	+/-2%	GQM22M5C2H101GB01L
1111	C0G	500V	100pF	+/-5%	GQM22M5C2H101JB01L

GQM Specifications and Test Methods

Item	Specification	Test Method
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.	250% of the rated voltage
Insulation Resistance	More than 10,000MΩ or 500Ω·F .	DC voltage not exceeding the rated voltage at 25°C and 75%RH max. and within 2 minutes of charging.
Q	30pFmin.: Q≧1400 30pFmax.: Q≧800+20C C:Nominal Capacitance (pF)	Frequency 1±0.1MHz Voltage 0.5 to 5Vrms
Capacitance Temperature Characteristics	Capacitance Change: Within the specified tolerance. (Table A-1) Temperature Coefficent: Within the specified tolerance. (Table A-1) Capacitance Drift: Within ±0.2% or ±0.5pF (Whichever is larger)	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.
Adhesive Strength of Termination	No removal of the terminations or other defect should occur.	Solder the capacitor to the test jig (glass epoxy board) then apply10N force in parallel with the test jig for 10±1sec.
Vibration Resistance	Appearance: No defects or abnormalities. Capacitance: Within the specified tolerance. 30pFmin.: Q≧1400 30pFmax.: Q≧800+20C C: Nominal Capacitance (pF)	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).
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≧1400 30pFmax.: Q≧800+20C C: Nominal Capacitance (pF)	Immerse the capacitor in a eutectic solder solution or Sn-3.0Ag-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≧1400 30pFmax.: Q≧800+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) 30pFmin.: Q≧350 10pF - 30pF: Q≧275+5C/2 10pFmax.: Q≧200+10C C: Nominal Capacitance (pF)	40±2°C and 90 to 95% humidity for 500±12 hours.

Step	Temperature (°C)
1	25±2
2	-55±3
3	25±2
4	125±3
5	25±2

GQM Specifications and Test Methods

Item	Specification	Test Method
Humidity Load	Appearance: No marking defects Capacitance Change Within ±7.5% or ±0.75 pF (Whichever is larger) 30pFmin.: Q≧200 30pFmax.: Q≧100+10C/3 C: Nominal Capacitance (puff)	Apply the rated voltage at 40±2°C and 90 to 95% humidity for 500±12 hours.
High Temperature Load	Appearance: No marking defects Capacitance Change Within ±3% or ±0.3pF (Whichever is larger) 30pFmin.: Q≧350 10pF - 30pF: Q≧275+5C/2 10pFmax.: Q≧200+10C C: Nominal Capacitance (pF)	Apply 150% of the rated voltage for 1000±12 hours at the maximum operating temperature ±3°C.

Table A-1

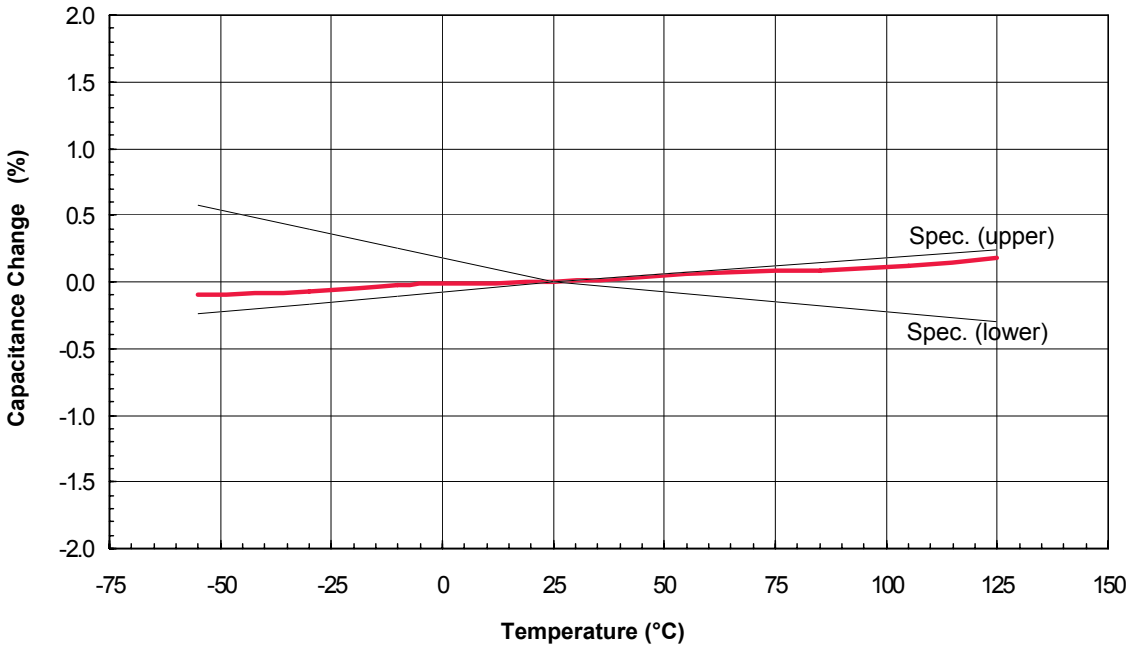
Char.	Nominal Values (ppm/°C) Note	Capacitance Change from 25°C (%)					
		– 55C		—30C		—10C	
		Max.	Min.	Max.	Min.	Max.	Min.
5C	0 ± 30	0.58	-0.24	0.4C	-0.17	0.25	-0.11

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

GQM Technical Data (Typical)

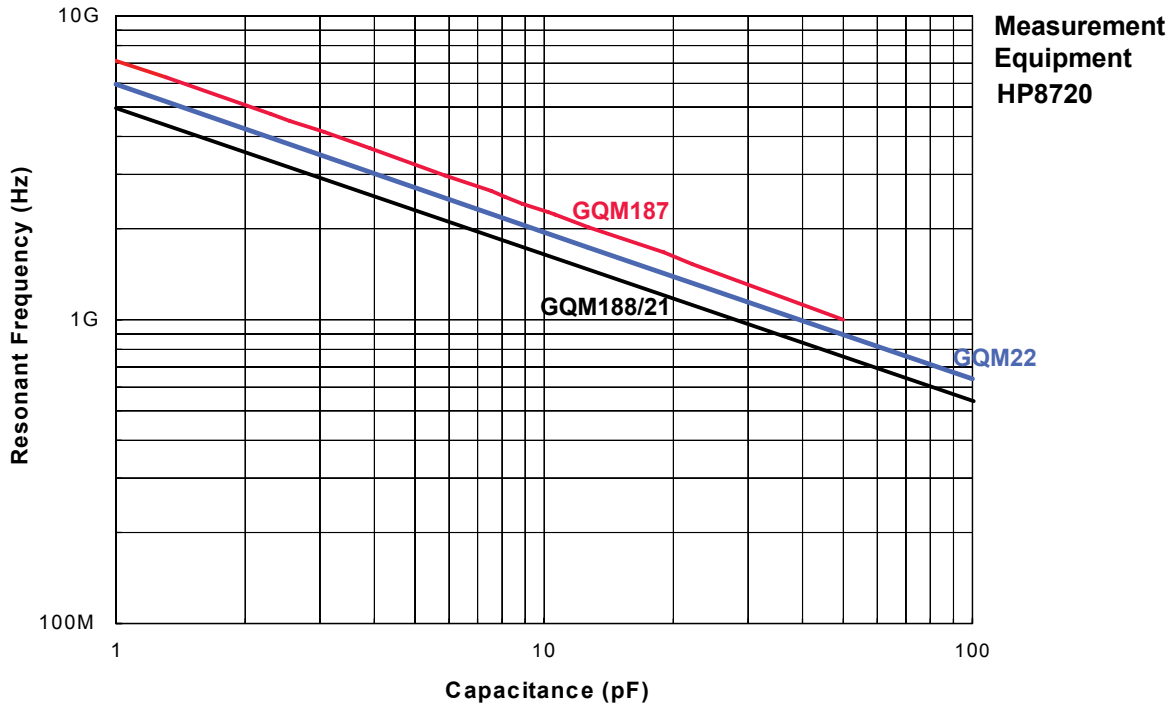
Capacitance - Temperature Characteristics

C0G Characteristics (GQM)



Resonant Frequency Characteristics

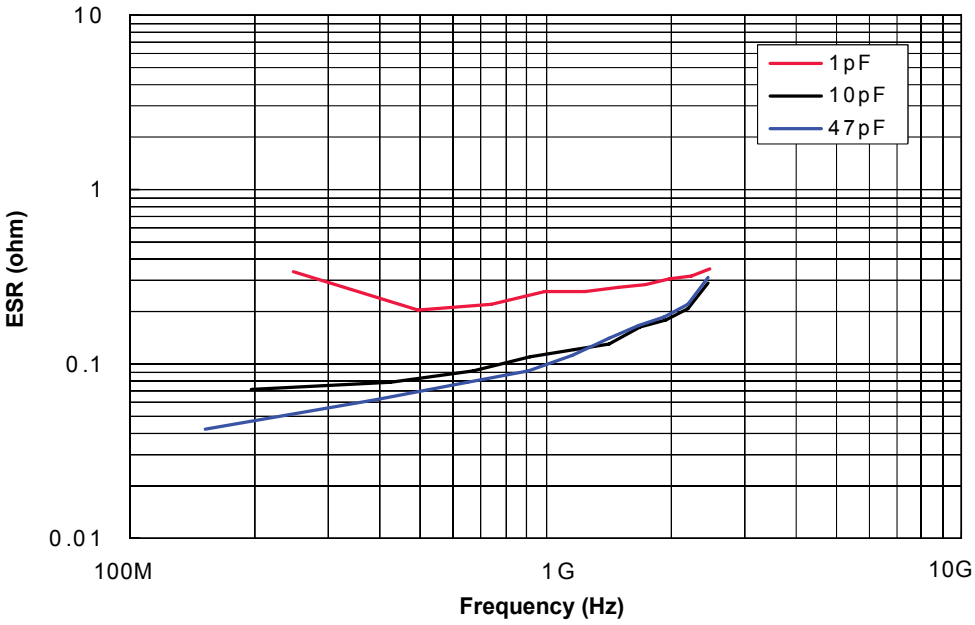
GQM Series



GQM Technical Data (Typical)

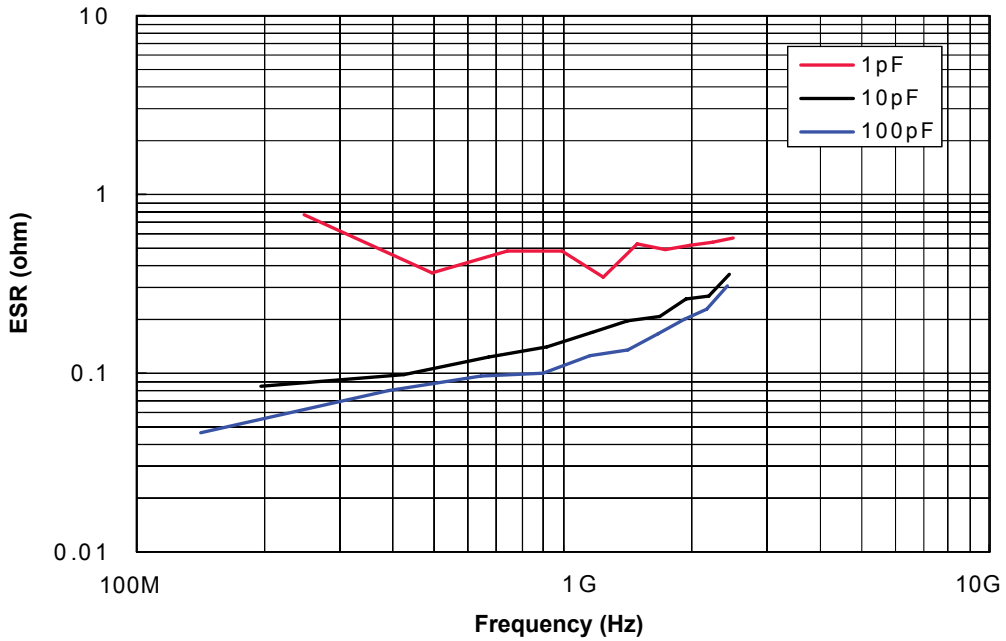
ESR - Frequency Characteristics

GQM187 Series



Measurement Equipment
Boonton Resonant Coaxial-Line 34A

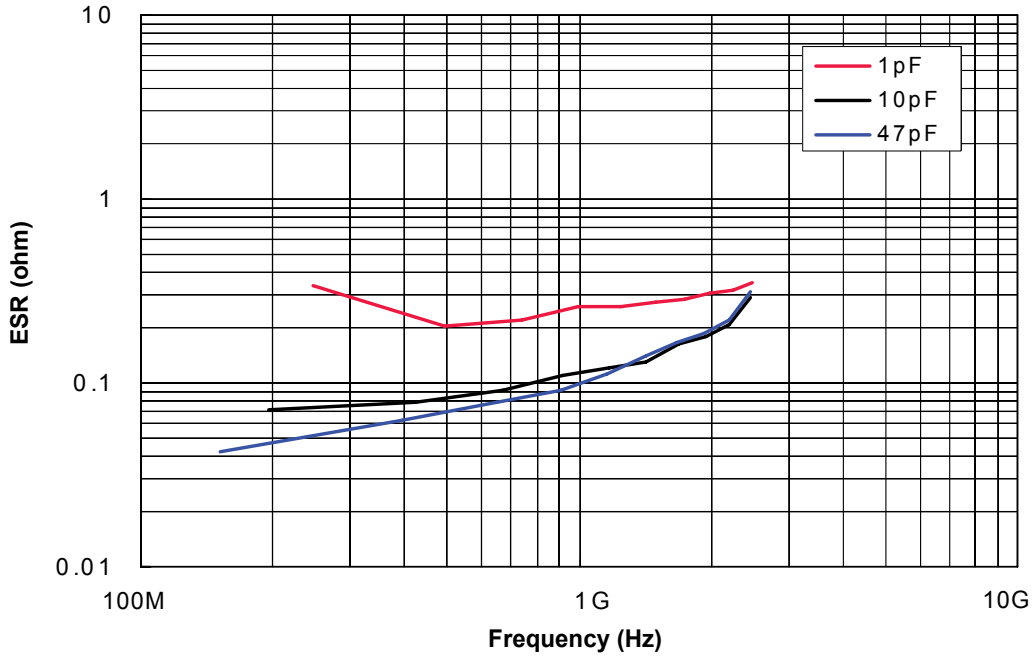
GQM188 Series



GQM Technical Data (Typical)

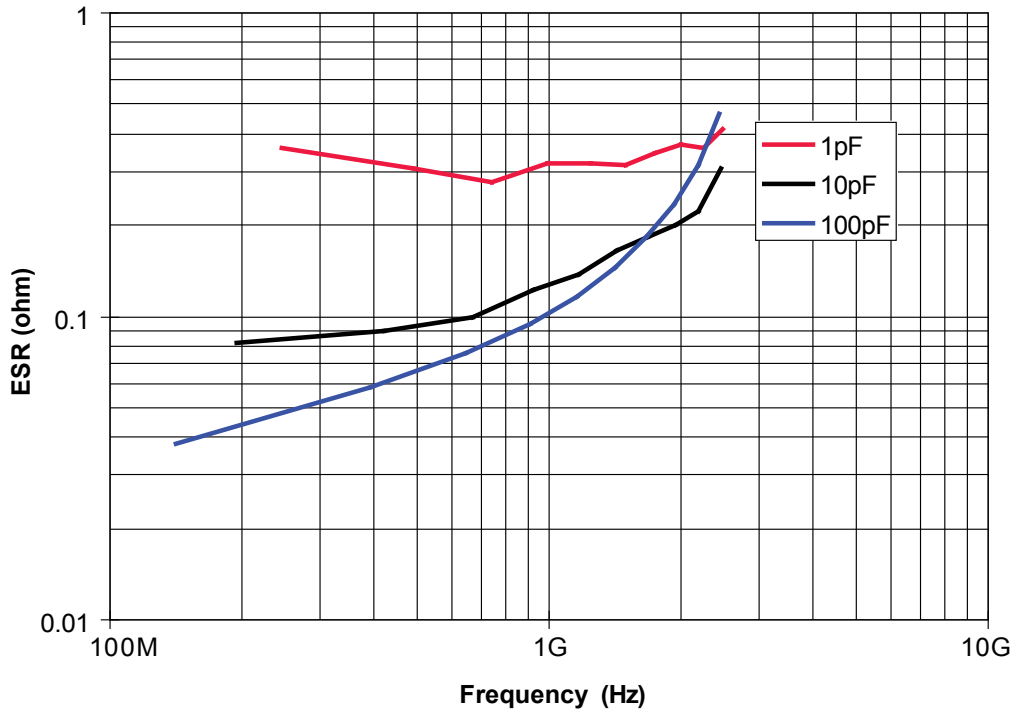
ESR - Frequency Characteristics

GQM21 Series (50V/100V)



Measurement Equipment
Boonton Resonant Coaxial-Line 34A

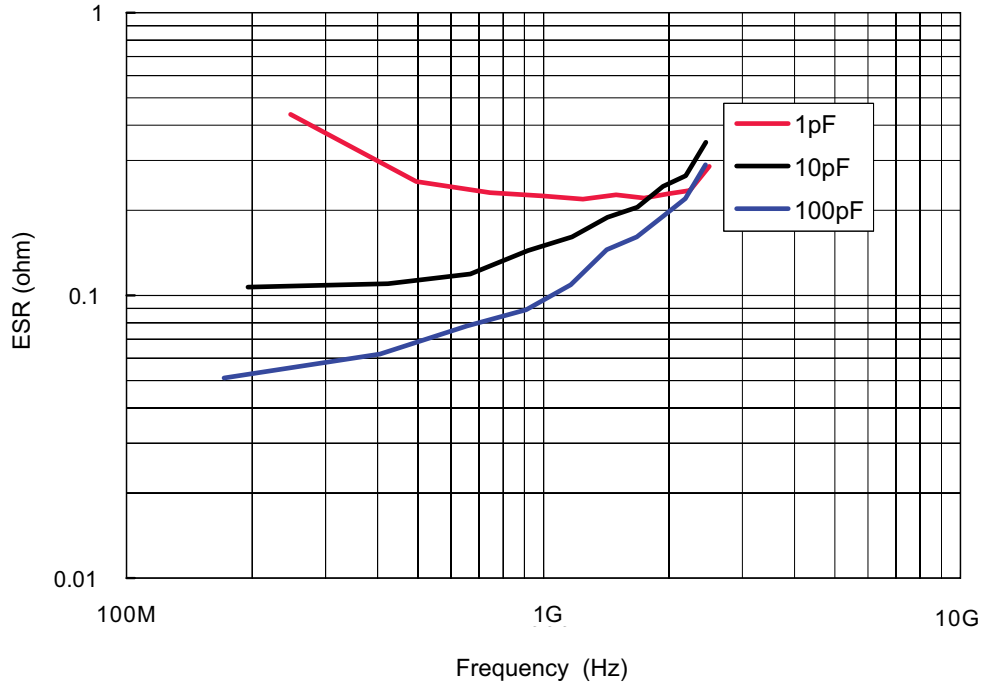
GQM21 Series (250V)



GQM Technical Data (Typical)

ESR Frequency Characteristics

GQM22 Series (500V)

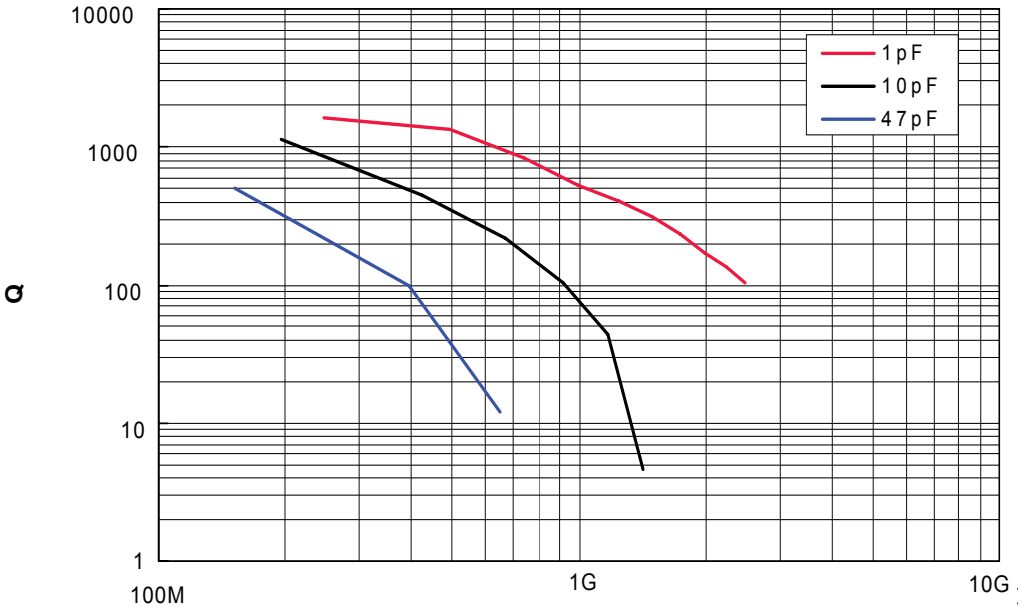


Measurement Equipment
Boonton Resonant Coaxial-Line 34A

GQM Technical Data (Typical)

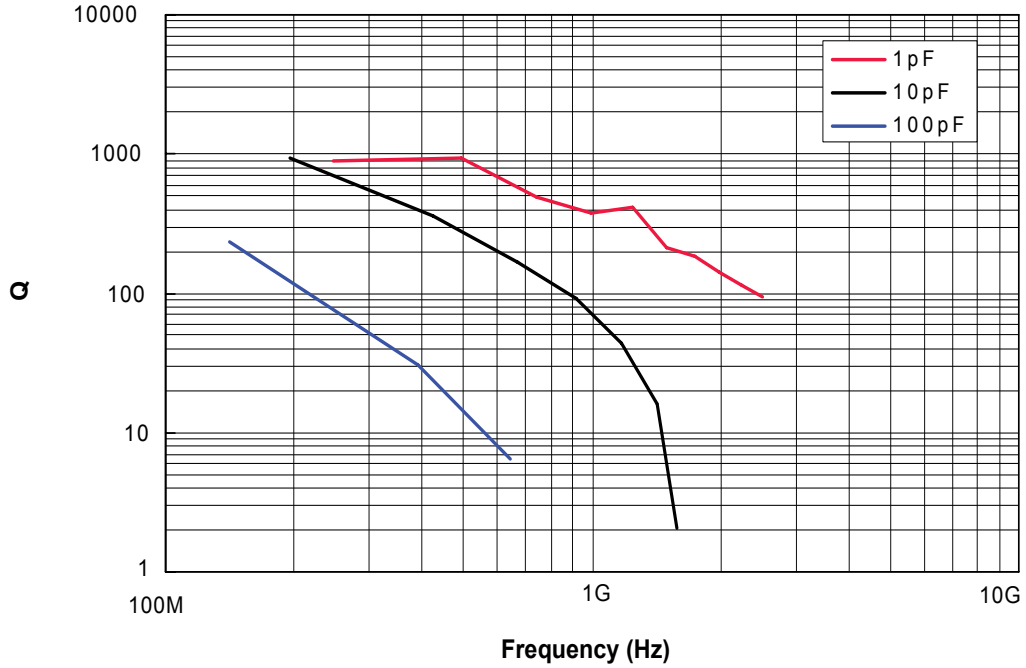
Q - Frequency Characteristics

GQM187 Series



Measurement Equipment
Boonton Resonant Coaxial-Line 34A

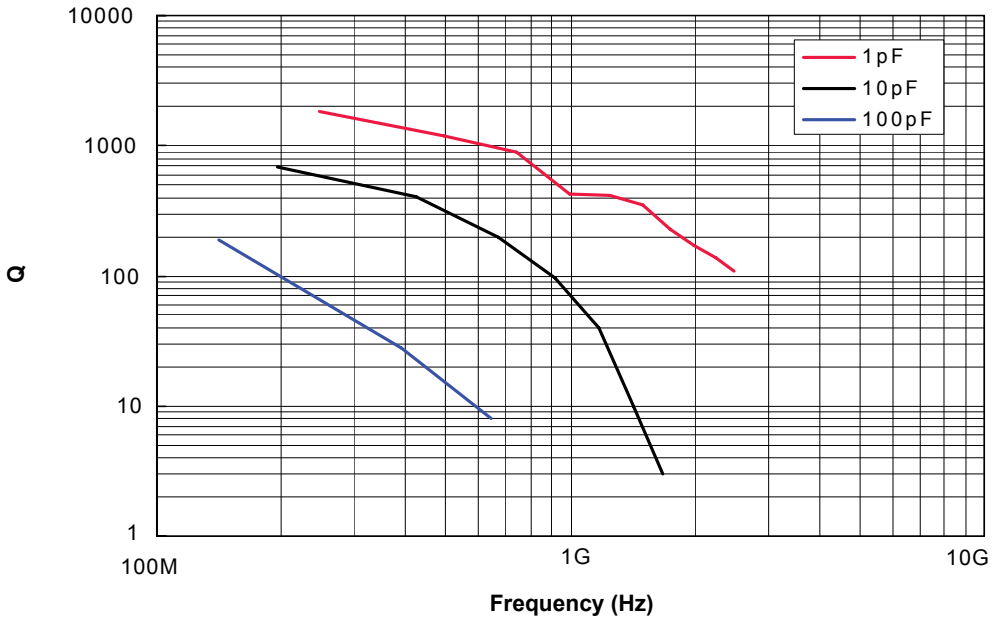
GQM188 Series



GQM Technical Data (Typical)

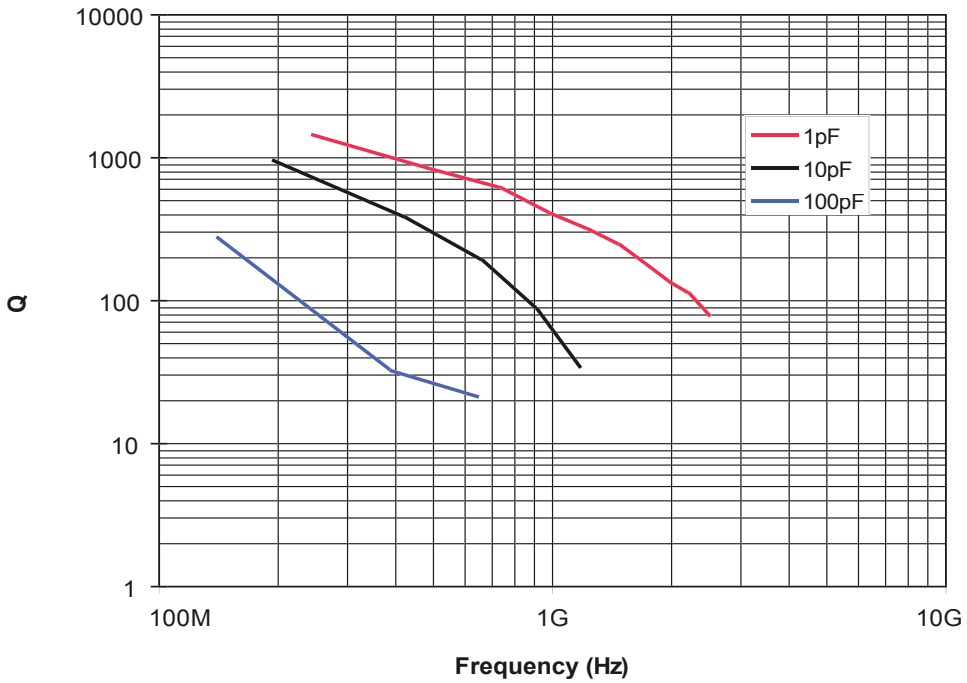
Q - Frequency Characteristics

GQM21 Series (50V/100V)



Measurement Equipment
Boonton Resonant Coaxial-Line 34A

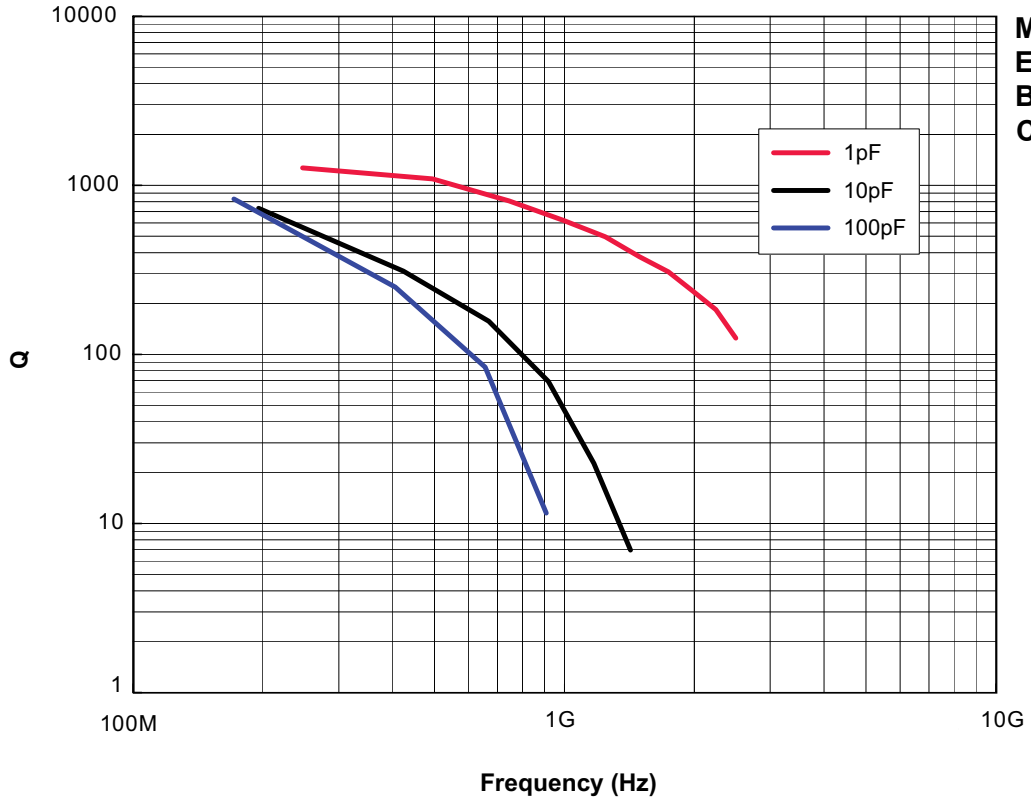
GQM21 Series (250V)



GQM Technical Data (Typical)

Q - Frequency Characteristics

GQM22 Series (500V)

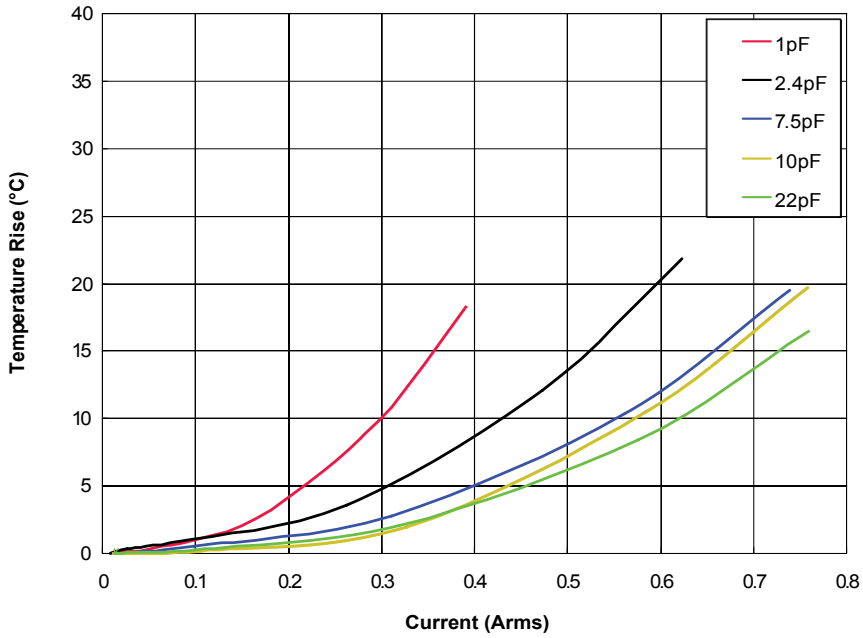


Measurement Equipment
Boonton Resonant Coaxial-Line 34A

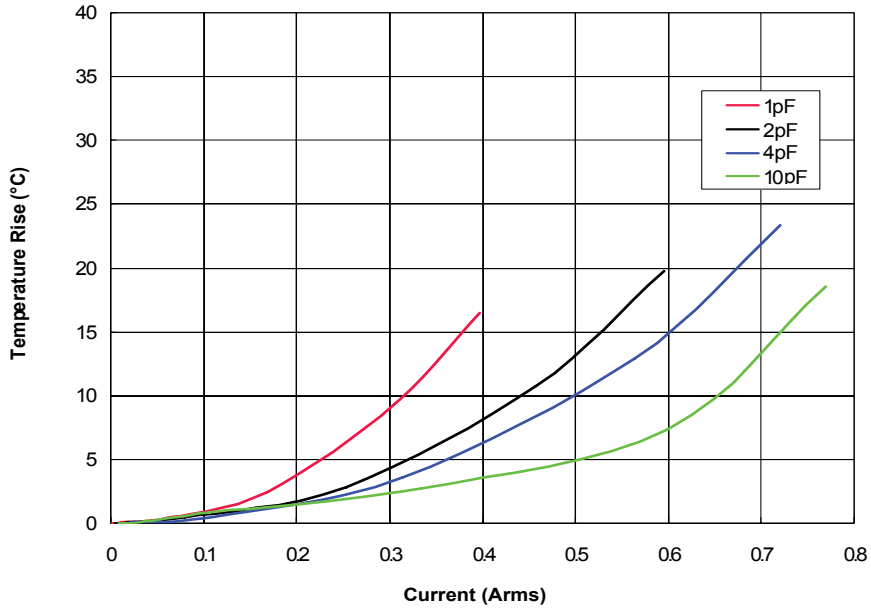
GQM Technical Data (Typical)

Temperature Rise - Current Characteristics

GQM187 Series (1GHz)

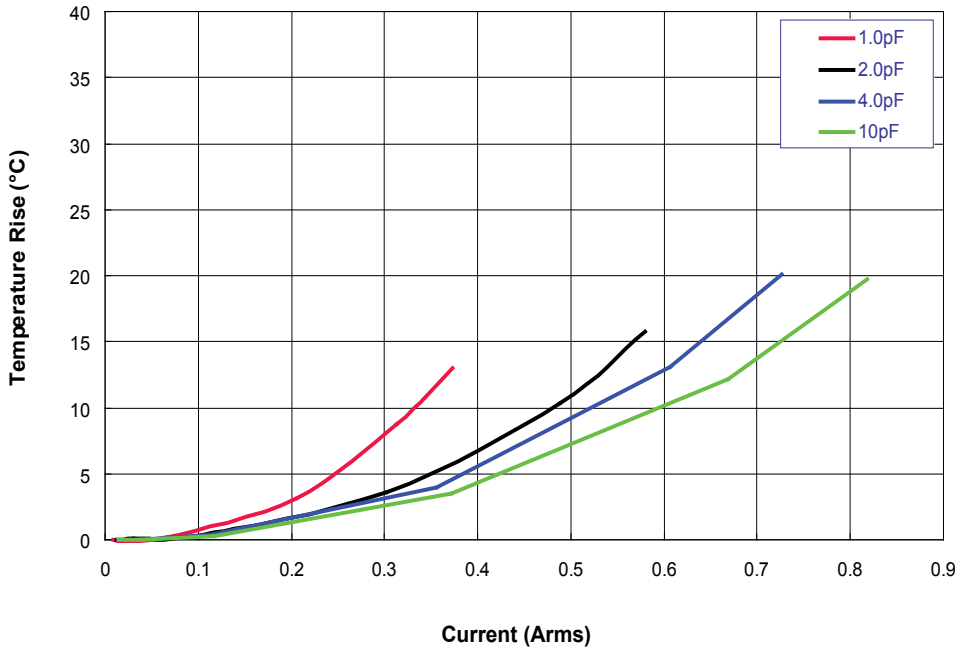


GQM188 Series (1GHZ)

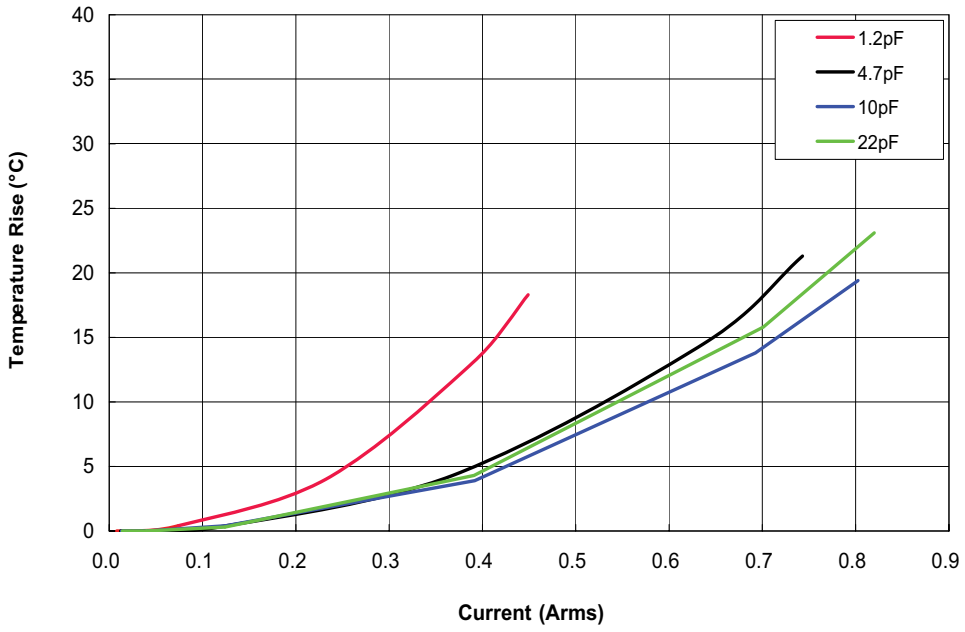


GQM Technical Data (Typical)

GQM21 Series (1GHz)



GQM22 Series (1GHz)

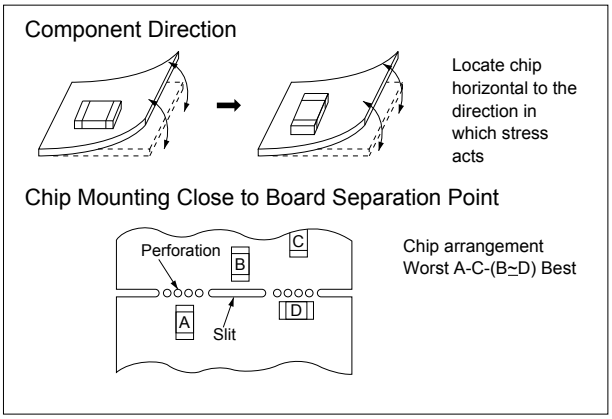


GQM Soldering and Mounting

⚠ CAUTION (Soldering and Mounting)

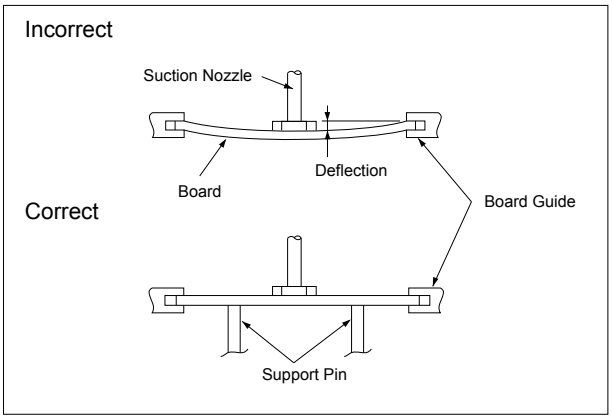
1. Mounting Position

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.

GQM Soldering and Mounting

Continued from the preceding page.

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 a 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 the solvent within the range shown in the Table 1.

Table 1

Part Number	Temperature Differential
GQM18/21	ΔT≦190°C
GQM22	ΔT≦130°C

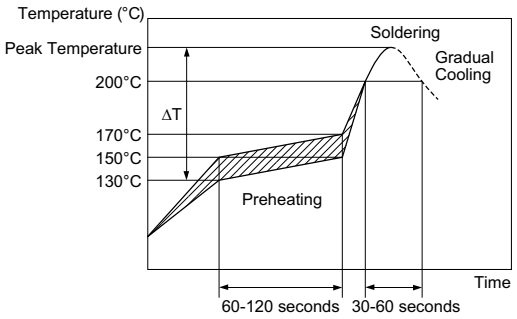
Recommended Conditions

	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

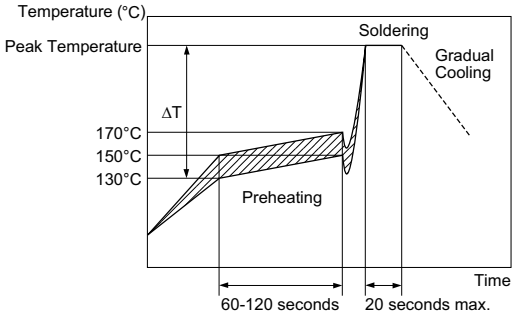
Pb-Sn Solder: Sn-37Pb
Lead Free Solder: Sn-3.0Ag-0.5Cu

Standard Conditions for Reflow Soldering

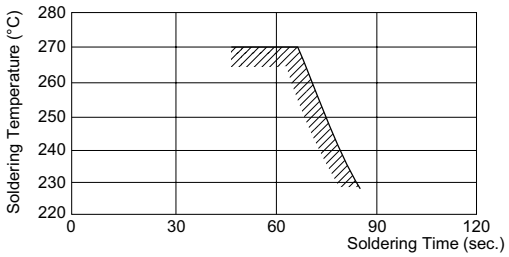
Infrared Reflow



Vapor Reflow



Allowable Soldering Temperature and Time

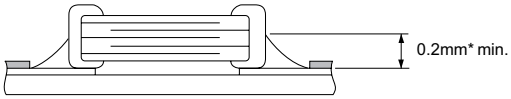


In case of repeated soldering, the accumulated soldering time must be within the range shown above.

● Optimum Solder Amount for Reflow Soldering

- 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 the chips to crack
- 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.

Optimum Solder Amount for Reflow Soldering



*GRM 02/03: 1/3 of Chip Thickness min.

Inverting the PCB

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

Continued on the following page.

GQM Soldering and Mounting

Continued from the preceding page.

5. Flow 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. And an excessively long soldering time or high soldering temperature results 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.
- In order to prevent mechanical damage in the components, preheating shoud be required for the both 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

Part Number	Temperature Differential
GQM18/21	ΔT≦150℃

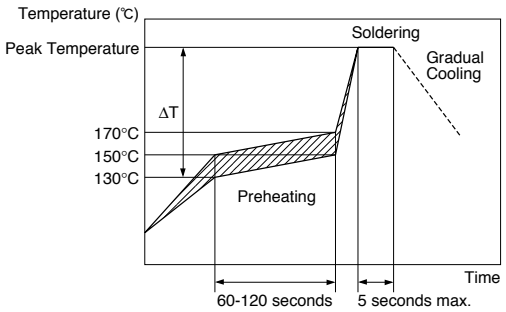
Recommended Conditions

	Pb-Sn Solder	Lead Free Solder
Peak Temperature	240-250°C	250-260°C
Atmosphere	Air	N_2

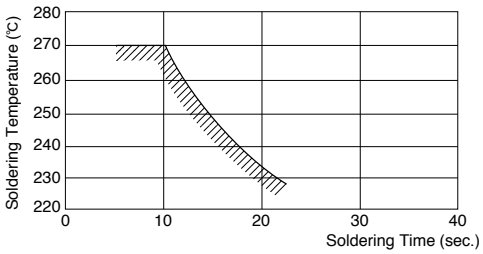
Pb-Sn Solder: Sn-37Pb
Lead Free Solder: Sn-3.0Ag-0.5Cu

- 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 big, the risk of cracking is higher during board bending or under any other stressful conditions.

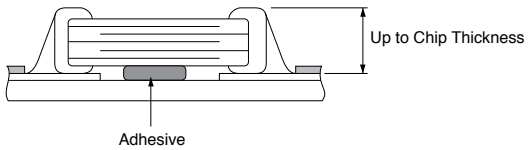
Standard Conditions for Flow Soldering



Allowable Soldering Temperature and Time



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



Continued on the following page.

GQM Soldering and Mounting

6. Correction with a Soldering Iron

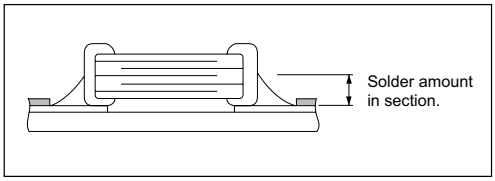
- When sudden heat is applied to the components when using a soldering iron, the mechanical strength of the components will decrease because the extreme temperature change can cause deformations inside the components. In order to prevent mechanical damage to the components, preheating is required for 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.
- After soldering, do not allow the component/PCB to rapidly cool down.
- 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 in the adhesive strength of the terminations.

Table 3

Part Number	Temperature of Soldering Iron tip	Preheating Temperature	Temperature Differential (ΔT)	Atmosphere
GQM18/21	350℃ max.	150℃ min.	ΔT≦190℃	Air
GQM22	280℃ max.	150℃ min.	ΔT≦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 with a Soldering Iron
- In case of sizes smaller than 0603, (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. In case of 0805 and larger sizes (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.



- 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.
- 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.

GQM Design Engineering Kits

CERAMIC CHIP CAPACITORS

ASCAP Hi-Frequency

0603 (50 to 100 VDC)

- High Q and Low ESR at VHF, UHF, and Microwave Frequencies
- 0603 and 0805 sizes with Copper Inner Electrode
- Tight Tolerance Available ([W]=+/-0.05pF for <=5pF, [C]=+/-0.25pF for 5 - 9pF, [F]=+/-1% for 10 - 20pF)
- Low Power Consumption for Mobile Telecommunication
- Base Stations, Broadcast Satellite and Special Radios

GQM18-HIQ0603KIT-E

No.	Description	Murata Global P/N	Qty.
1	0603/C0G/0.50pF/100V	GQM1885C2AR50CB01	20
2	0603/C0G/0.60pF/100V	GQM1885C2AR60CB01	20
3	0603/C0G/0.70pF/100V	GQM1885C2AR70CB01	20
4	0603/C0G/0.80pF/100V	GQM1885C2AR80CB01	20
5	0603/C0G/0.90pF/100V	GQM1885C2AR90CB01	20
6	0603/C0G/1.0pF/100V	GQM1885C2A1R0CB01	20
7	0603/C0G/1.1pF/100V	GQM1885C2A1R1CB01	20
8	0603/C0G/1.2pF/100V	GQM1885C2A1R2CB01	20
9	0603/C0G/1.3pF/100V	GQM1885C2A1R3CB01	20
10	0603/C0G/1.5pF/100V	GQM1885C2A1R5CB01	20
11	0603/C0G/1.6pF/100V	GQM1885C2A1R6CB01	20
12	0603/C0G/1.8pF/100V	GQM1885C2A1R8CB01	20
13	0603/C0G/2.0pF/100V	GQM1885C2A2R0CB01	20
14	0603/C0G/2.2pF/100V	GQM1885C2A2R2CB01	20
15	0603/C0G/2.4pF/100V	GQM1885C2A2R4CB01	20
16	0603/C0G/2.7pF/100V	GQM1885C2A2R7CB01	20
17	0603/C0G/3.0pF/100V	GQM1885C2A3R0CB01	20
18	0603/C0G/3.3pF/100V	GQM1885C2A3R3CB01	20
19	0603/C0G/3.6pF/100V	GQM1885C2A3R6CB01	20
20	0603/C0G/3.9pF/100V	GQM1885C2A3R9CB01	20
21	0603/C0G/4.3pF/100V	GQM1885C2A4R3CB01	20
22	0603/C0G/4.7pF/100V	GQM1885C2A4R7CB01	20
23	0603/C0G/5.1pF/100V	GQM1885C2A5R1DB01	20
24	0603/C0G/5.6pF/100V	GQM1885C2A5R6DB01	20
25	0603/C0G/6.2pF/100V	GQM1885C2A6R2DB01	20
26	0603/C0G/6.8pF/100V	GQM1885C2A6R8DB01	20
27	0603/C0G/7.5pF/50V	GQM1885C1H7R5DB01	20
28	0603/C0G/8.2pF/50V	GQM1885C1H8R2DB01	20
29	0603/C0G/9.1pF/50V	GQM1885C1H9R1DB01	20
30	0603/C0G/10pF/50V	GQM1885C1H100JB01	20
31	0603/C0G/12pF/50V	GQM1885C1H120JB01	20
32	0603/C0G/15pF/50V	GQM1885C1H150JB01	20
33	0603/C0G/18pF/50V	GQM1885C1H180JB01	20
34	0603/C0G/22pF/50V	GQM1885C1H220JB01	20
35	0603/C0G/27pF/50V	GQM1885C1H270JB01	20
36	0603/C0G/33pF/50V	GQM1885C1H330JB01	20
37	0603/C0G/39pF/50V	GQM1885C1H390JB01	20
38	0603/C0G/47pF/50V	GQM1885C1H470JB01	20
39	0603/C0G/68pF/50V	GQM1885C1H680JB01	20
40	0603/C0G/100pF/50V	GQM1885C1H101JB01	20

0603 (250 VDC)

- High Q and Low ESR at VHF, UHF, and Microwave Frequencies
- 0603 size with Copper Inner Electrode
- Tight Tolerance Available ([W]=+/-0.05pF for <=5pF, [F]=+/-1% for 10 - 20pF)
- Low Power Consumption for Mobile Telecommunication
- Base Stations, Broadcast Satellite and Special Radios

GQM18-HIQ250VKIT-E

No.	Description	Murata Global P/N	Qty.
1	0603/C0G/0.10pF/250V	GQM1875C2ER10BB12	20
2	0603/C0G/0.30pF/250V	GQM1875C2ER30BB12	20
3	0603/C0G/0.50pF/250V	GQM1875C2ER50BB12	20
4	0603/C0G/0.60pF/250V	GQM1875C2ER60BB12	20
5	0603/C0G/0.70pF/250V	GQM1875C2ER70BB12	20
6	0603/C0G/0.80pF/250V	GQM1875C2ER80BB12	20
7	0603/C0G/0.90pF/250V	GQM1875C2ER90BB12	20
8	0603/C0G/1.0pF/250V	GQM1875C2E1R0BB12	20
9	0603/C0G/1.1pF/250V	GQM1875C2E1R1BB12	20
10	0603/C0G/1.2pF/250V	GQM1875C2E1R2BB12	20
11	0603/C0G/1.3pF/250V	GQM1875C2E1R3BB12	20
12	0603/C0G/1.6pF/250V	GQM1875C2E1R6BB12	20
13	0603/C0G/1.8pF/250V	GQM1875C2E1R8BB12	20
14	0603/C0G/2.2pF/250V	GQM1875C2E2R2BB12	20
15	0603/C0G/2.4pF/250V	GQM1875C2E2R4BB12	20
16	0603/C0G/3.0pF/250V	GQM1875C2E3R0BB12	20
17	0603/C0G/3.3pF/250V	GQM1875C2E3R3BB12	20
18	0603/C0G/3.6pF/250V	GQM1875C2E3R6BB12	20
19	0603/C0G/3.9pF/250V	GQM1875C2E3R9BB12	20
20	0603/C0G/4.3pF/250V	GQM1875C2E4R3BB12	20
21	0603/C0G/4.7pF/250V	GQM1875C2E4R7BB12	20
22	0603/C0G/5.1pF/250V	GQM1875C2E5R1BB12	20
23	0603/C0G/5.6pF/250V	GQM1875C2E5R6BB12	20
24	0603/C0G/6.2pF/250V	GQM1875C2E6R2BB12	20
25	0603/C0G/6.8pF/250V	GQM1875C2E6R8BB12	20
26	0603/C0G/7.5pF/250V	GQM1875C2E7R5BB12	20
27	0603/C0G/9.1pF/250V	GQM1875C2E9R1BB12	20
28	0603/C0G/10pF/250V	GQM1875C2E100JB12	20
29	0603/C0G/12pF/250V	GQM1875C2E120JB12	20
30	0603/C0G/15pF/250V	GQM1875C2E150JB12	20
31	0603/C0G/22pF/250V	GQM1875C2E220JB12	20
32	0603/C0G/27pF/250V	GQM1875C2E270JB12	20
33	0603/C0G/33pF/250V	GQM1875C2E330JB12	20
34	0603/C0G/39pF/250V	GQM1875C2E390JB12	20
35	0603/C0G/47pF/250V	GQM1875C2E470JB12	20

GQM Design Engineering Kits

CERAMIC CHIP CAPACITORS

ASCAP Hi-Frequency

0805 (50 to 100 VDC)

- High Q and Low ESR at VHF, UHF, and Microwave Frequencies
- 0603 and 0805 sizes with Copper Inner Electrode
- Tight Tolerance Available ([W]=+/-0.05pF for <=5pF, [C]=+/-0.25pF for 5 - 9pF, [F]=+/-1% for 10 - 20pF)
- Low Power Consumption for Mobile Telecommunication
- Base Stations, Broadcast Satellite and Special Radios

GQM21-HIQ0805KIT-E

No.	Description	Murata Global P/N	Qty.
1	0805/C0G/0.50pF/100V	GQM2195C2AR50CB01	20
2	0805/C0G/0.60pF/100V	GQM2195C2AR60CB01	20
3	0805/C0G/0.70pF/100V	GQM2195C2AR70CB01	20
4	0805/C0G/0.80pF/100V	GQM2195C2AR80CB01	20
5	0805/C0G/0.90pF/100V	GQM2195C2AR90CB01	20
6	0805/C0G/1.0pF/100V	GQM2195C2A1R0CB01	20
7	0805/C0G/1.1pF/100V	GQM2195C2A1R1CB01	20
8	0805/C0G/1.2pF/100V	GQM2195C2A1R2CB01	20
9	0805/C0G/1.3pF/100V	GQM2195C2A1R3CB01	20
10	0805/C0G/1.5pF/100V	GQM2195C2A1R5CB01	20
11	0805/C0G/1.6pF/100V	GQM2195C2A1R6CB01	20
12	0805/C0G/1.8pF/100V	GQM2195C2A1R8CB01	20
13	0805/C0G/2.0pF/100V	GQM2195C2A2R0CB01	20
14	0805/C0G/2.2pF/100V	GQM2195C2A2R2CB01	20
15	0805/C0G/2.4pF/100V	GQM2195C2A2R4CB01	20
16	0805/C0G/2.7pF/100V	GQM2195C2A2R7CB01	20
17	0805/C0G/3.0pF/100V	GQM2195C2A3R0CB01	20
18	0805/C0G/3.3pF/100V	GQM2195C2A3R3CB01	20
19	0805/C0G/3.6pF/100V	GQM2195C2A3R6CB01	20
20	0805/C0G/3.9pF/100V	GQM2195C2A3R9CB01	20
21	0805/C0G/4.3pF/100V	GQM2195C2A4R3CB01	20
22	0805/C0G/4.7pF/100V	GQM2195C2A4R7CB01	20
23	0805/C0G/5.1pF/100V	GQM2195C2A5R1DB01	20
24	0805/C0G/5.6pF/100V	GQM2195C2A5R6DB01	20
25	0805/C0G/6.2pF/100V	GQM2195C2A6R2DB01	20
26	0805/C0G/6.8pF/100V	GQM2195C2A6R8DB01	20
27	0805/C0G/7.5pF/100V	GQM2195C2A7R5DB01	20
28	0805/C0G/8.2pF/100V	GQM2195C2A8R2DB01	20
29	0805/C0G/9.1pF/100V	GQM2195C2A9R1DB01	20
30	0805/C0G/10pF/100V	GQM2195C2A100JB01	20
31	0805/C0G/12pF/100V	GQM2195C2A120JB01	20
32	0805/C0G/15pF/100V	GQM2195C2A150JB01	20
33	0805/C0G/18pF/100V	GQM2195C2A180JB01	20
34	0805/C0G/22pF/50V	GQM2195C1H220JB01	20
35	0805/C0G/27pF/50V	GQM2195C1H270JB01	20
36	0805/C0G/33pF/50V	GQM2195C1H330JB01	20
37	0805/C0G/39pF/50V	GQM2195C1H390JB01	20
38	0805/C0G/47pF/50V	GQM2195C1H470JB01	20
39	0805/C0G/68pF/50V	GQM2195C1H680JB01	20
40	0805/C0G/100pF/50V	GQM2195C1H101JB01	20

0805 (250 VDC)

- High Q and Low ESR at VHF, UHF, and Microwave Frequencies
- 0805 size (250 VDC) with Copper Inner Electrode
- Tight Tolerance Available ([W]=+/-0.05pF for <=5pF, [C]=+/-0.25pF for 5 - 9pF, [F]=+/-1% for 10 - 20pF)
- Low Power Consumption for Mobile Telecommunication
- Base Stations, Broadcast Satellite and Special Radios

GQM21-HIQ250VKIT-E

No.	Description	Murata Global P/N	Qty.
1	0805/C0G/0.50pF/250V	GQM2195C2ER50BB12	20
2	0805/C0G/0.60pF/250V	GQM2195C2ER60BB12	20
3	0805/C0G/0.70pF/250V	GQM2195C2ER70BB12	20
4	0805/C0G/0.80pF/250V	GQM2195C2ER80BB12	20
5	0805/C0G/0.90pF/250V	GQM2195C2ER90BB12	20
6	0805/C0G/1.0pF/250V	GQM2195C2E1R0BB12	20
7	0805/C0G/1.1pF/250V	GQM2195C2E1R1BB12	20
8	0805/C0G/1.2pF/250V	GQM2195C2E1R2BB12	20
9	0805/C0G/1.3pF/250V	GQM2195C2E1R3BB12	20
10	0805/C0G/1.5pF/250V	GQM2195C2E1R5BB12	20
11	0805/C0G/1.6pF/250V	GQM2195C2E1R6BB12	20
12	0805/C0G/1.8pF/250V	GQM2195C2E1R8BB12	20
13	0805/C0G/2.0pF/250V	GQM2195C2E2R0BB12	20
14	0805/C0G/2.2pF/250V	GQM2195C2E2R2BB12	20
15	0805/C0G/2.4pF/250V	GQM2195C2E2R4BB12	20
16	0805/C0G/2.7pF/250V	GQM2195C2E2R7BB12	20
17	0805/C0G/3.0pF/250V	GQM2195C2E3R0BB12	20
18	0805/C0G/3.3pF/250V	GQM2195C2E3R3BB12	20
19	0805/C0G/3.6pF/250V	GQM2195C2E3R6BB12	20
20	0805/C0G/3.9pF/250V	GQM2195C2E3R9BB12	20
21	0805/C0G/4.3pF/250V	GQM2195C2E4R3BB12	20
22	0805/C0G/4.7pF/250V	GQM2195C2E4R7BB12	20
23	0805/C0G/5.1pF/250V	GQM2195C2E5R1BB12	20
24	0805/C0G/5.6pF/250V	GQM2195C2E5R6BB12	20
25	0805/C0G/6.2pF/250V	GQM2195C2E6R2BB12	20
26	0805/C0G/6.8pF/250V	GQM2195C2E6R8BB12	20
27	0805/C0G/7.5pF/250V	GQM2195C2E7R5BB12	20
28	0805/C0G/8.2pF/250V	GQM2195C2E8R2BB12	20
29	0805/C0G/9.1pF/250V	GQM2195C2E9R1BB12	20
30	0805/C0G/10pF/250V	GQM2195C2E100JB12	20
31	0805/C0G/12pF/250V	GQM2195C2E120JB12	20
32	0805/C0G/15pF/250V	GQM2195C2E150JB12	20
33	0805/C0G/18pF/250V	GQM2195C2E180JB12	20
34	0805/C0G/22pF/250V	GQM2195C2E220JB12	20
35	0805/C0G/27pF/250V	GQM2195C2E270JB12	20
36	0805/C0G/33pF/250V	GQM2195C2E330JB12	20
37	0805/C0G/39pF/250V	GQM2195C2E390JB12	20
38	0805/C0G/47pF/250V	GQM2195C2E470JB12	20
39	0805/C0G/68pF/250V	GQM2195C2E680JB12	20
40	0805/C0G/100pF/250V	GQM2195C2E101JB12	20

GQM Design Engineering Kits

CERAMIC CHIP CAPACITORS

ASCAP Hi-Frequency

1111 (500 VDC)

- High Q and Low ESR at VHF, UHF, and Microwave Frequencies
- 1111 size (500 VDC) with Copper Inner Electrode
- Tight Tolerance Available ([W]=+/-0.05pF for <=5pF, [C]=+/-0.25pF for 5 - 9pF, [F]=+/-1% for 10 - 20pF)
- Low Power Consumption for Mobile Telecommunication
- Base Stations, Broadcast Satellite and Special Radios

GQM22-HIQ1111KIT-E

No.	Description	Murata Global P/N	Qty.
1	1111/C0G/0.50pF/500V	GQM22M5C2HR50BB01L	20
2	1111/C0G/0.60pF/500V	GQM22M5C2HR60BB01L	20
3	1111/C0G/0.70pF/500V	GQM22M5C2HR70BB01L	20
4	1111/C0G/0.80pF/500V	GQM22M5C2HR80BB01L	20
5	1111/C0G/0.90pF/500V	GQM22M5C2HR90BB01L	20
6	1111/C0G/1.0pF/500V	GQM22M5C2H1R0BB01L	20
7	1111/C0G/1.1pF/500V	GQM22M5C2H1R1BB01L	20
8	1111/C0G/1.2pF/500V	GQM22M5C2H1R2BB01L	20
9	1111/C0G/1.3pF/500V	GQM22M5C2H1R3BB01L	20
10	1111/C0G/1.5pF/500V	GQM22M5C2H1R5BB01L	20
11	1111/C0G/1.6pF/500V	GQM22M5C2H1R6BB01L	20
12	1111/C0G/1.8pF/500V	GQM22M5C2H1R8BB01L	20
13	1111/C0G/2.0pF/500V	GQM22M5C2H2R0BB01L	20
14	1111/C0G/2.2pF/500V	GQM22M5C2H2R2BB01L	20
15	1111/C0G/2.4pF/500V	GQM22M5C2H2R4BB01L	20
16	1111/C0G/2.7pF/500V	GQM22M5C2H2R7BB01L	20
17	1111/C0G/3.0pF/500V	GQM22M5C2H3R0BB01L	20
18	1111/C0G/3.3pF/500V	GQM22M5C2H3R3BB01L	20
19	1111/C0G/3.6pF/500V	GQM22M5C2H3R6BB01L	20
20	1111/C0G/3.9pF/500V	GQM22M5C2H3R9BB01L	20
21	1111/C0G/4.3pF/500V	GQM22M5C2H4R3BB01L	20
22	1111/C0G/4.7pF/500V	GQM22M5C2H4R7BB01L	20
23	1111/C0G/5.1pF/500V	GQM22M5C2H5R1BB01L	20
24	1111/C0G/5.6pF/500V	GQM22M5C2H5R6BB01L	20
25	1111/C0G/6.2pF/500V	GQM22M5C2H6R2BB01L	20
26	1111/C0G/6.8pF/500V	GQM22M5C2H6R8BB01L	20
27	1111/C0G/7.5pF/500V	GQM22M5C2H7R5BB01L	20
28	1111/C0G/8.2pF/500V	GQM22M5C2H8R2BB01L	20
29	1111/C0G/9.1pF/500V	GQM22M5C2H9R1BB01L	20
30	1111/C0G/10pF/500V	GQM22M5C2H100JB01L	20
31	1111/C0G/12pF/500V	GQM22M5C2H120JB01L	20
32	1111/C0G/15pF/500V	GQM22M5C2H150JB01L	20
33	1111/C0G/18pF/500V	GQM22M5C2H180JB01L	20
34	1111/C0G/22pF/500V	GQM22M5C2H220JB01L	20
35	1111/C0G/27pF/500V	GQM22M5C2H270JB01L	20
36	1111/C0G/33pF/500V	GQM22M5C2H330JB01L	20
37	1111/C0G/39pF/500V	GQM22M5C2H390JB01L	20
38	1111/C0G/47pF/500V	GQM22M5C2H470JB01L	20
39	1111/C0G/68pF/500V	GQM22M5C2H680JB01L	20
40	1111/C0G/100pF/500V	GQM22M5C2H101JB01L	20