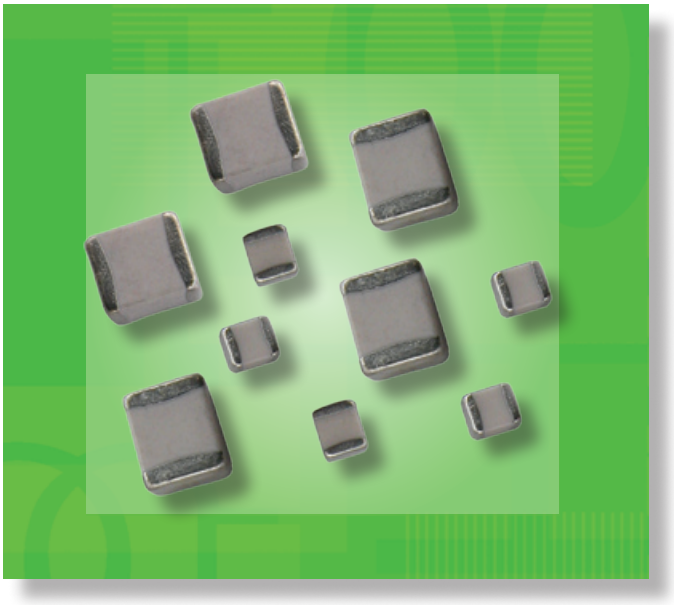
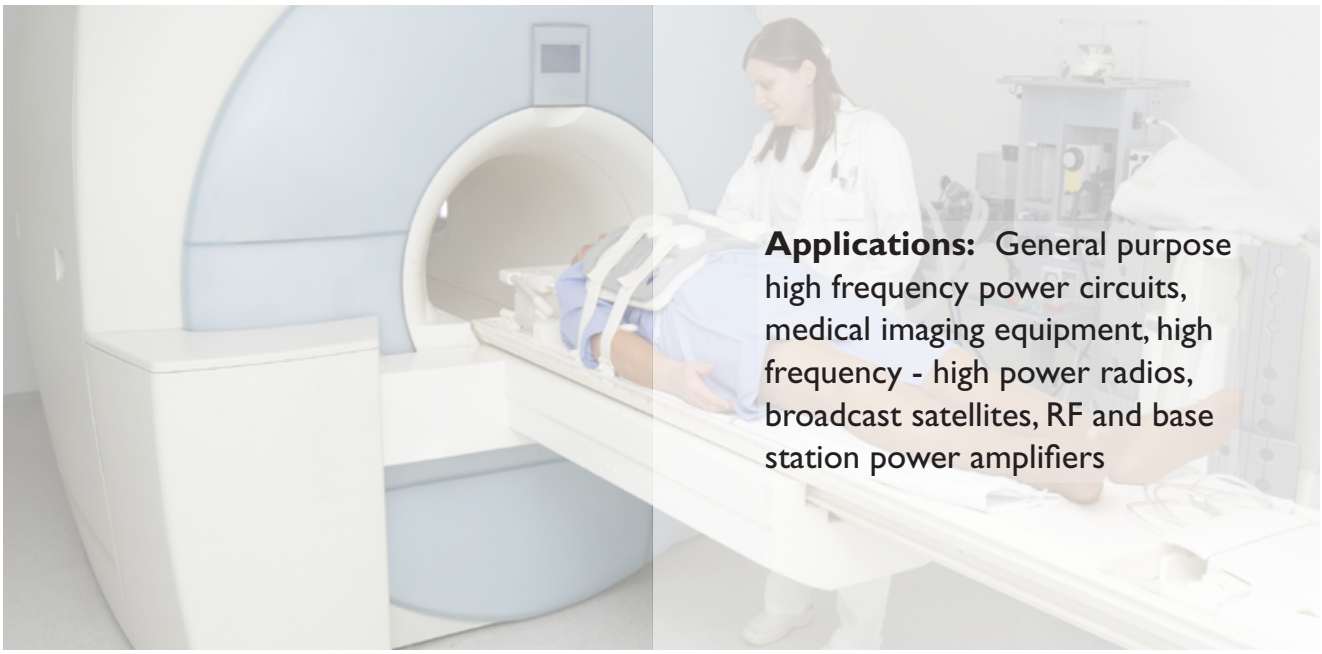
MA Product Summary

MA Series: The MA series highlights performance in a wide range of rated voltage from 50 to 500V. These high Q capacitors are ideal for applications in the 1MHz to 1GHz range because they are designed with palladium/silver electrodes for low ESR and high Qs in this range. Constructed with a very low dielectric loss ceramic, this series is offered in P90 and C0G dielectrics in a cap range from 0.5 to 1000pF. Available in both 0505 and 1111 sizes. To meet medical imaging market standards, we offer nonmagnetic terminations with laser markings.



Features:

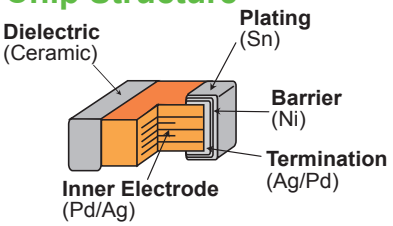
- Size: 0505 and 1111
- Voltage: 50, 100, 150, 200, 300, 500VDC
- Cap Range: 0.5 to 1000pF
- Internal Electrode: Pd/Ag
- Termination: Pd/Ag + Ni/Sn plating
- ESR: Ultra Low
- Power: High Power (>5W)
- Frequency Range: 1MHz –1GHz.
- Tolerance: Tight Tolerance Available ([A]=+/-0.05pF for <=5pF, [B]=+/-0.1pF 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) and P90 (-55°C to 125°C with 90 ±20ppm/°C)



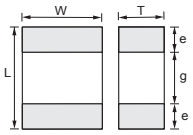
Applications: General purpose high frequency power circuits, medical imaging equipment, high frequency - high power radios, broadcast satellites, RF and base station power amplifiers

MA Data Sheet

Chip Structure



Chip Dimensions

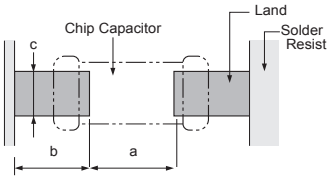


Chip Dimensions Unit: mm

Series	EIA size	L	W	T max.	e max.	g min.
MA10*/19	0505	1.4+/-0.4	1.4+/-0.3	1.4	0.25+0.25/-0.15	0.5
MA20*/29	1111	2.8 +/- 0.5	2.8 +/- 0.4	2.54	0.38+/-0.25	0.7
MA59	0505	1.4+/-0.3	1.4+/-0.3	1.4	0.25+0.25/-0.15	0.5
MA69	1111	2.8+/-0.4	2.8+/-0.4	2.54	0.38+/-0.25	0.7

*Nonmagnetic

Land Pattern Dimensions



Flow Soldering

Series	a	b	c
MA10*/19	0.5 ~ 0.8	0.8 ~ 0.9	1.0 ~ 1.2
MA59	0.5 ~ 0.8	0.8 ~ 0.9	1.0 ~ 1.2

*Nonmagnetic

Re-Flow Soldering

Series	a	b	c
MA10*/MA19	0.4 ~ 0.8	0.6 ~ 0.8	1.0 ~ 1.2
MA59	0.4 ~ 0.8	0.6 ~ 0.8	1.0 ~ 1.2
MA20*/MA29	1.8 ~ 2.1	0.7 ~ 0.9	2.2 ~ 2.6
MA69	1.8 ~ 2.1	0.7 ~ 0.9	2.2 ~ 2.6

*Nonmagnetic

Capacitance Range

Series	TC	WV	Capacitance Range
MA1*	P90	150V	0.5 to 82 pF
MA2**	P90	500V	0.5 to 100 pF
		300V	110 to 200 pF
		200V	210 to 470 pF
		100V	510 to 620 pF
		50V	680 to 1000 pF
MA59	C0G	150V	0.5 to 100 pF
MA69	C0G	500V	0.5 to 100 pF
		300V	110 to 200 pF
		200V	220 to 470 pF
		100V	510 to 620 pF
		50V	680 to 1000 pF

*MA10/MA19 **MA20/MA29

Global Part Numbering

MA	2	9	100	J	A	N
1	2	3	4	5	6	7

1 Product ID

Code	Product
MA	Hi-Freq Type

2 Dimensions & Temperature Characteristics

Code	Dimension (LxWxT)	TC	Cap. Change	Temp. Range
1	1.4x1.4x1.4 mm	P90	P90+/-20ppm/C	-55 to 125C
2	2.8x2.8x2.5 mm	P90	P90+/-20ppm/C	-55 to 125C
5	1.4x1.4x1.4 mm	C0G	0+/-30ppm/C	-55 to 125C
6	2.8x2.8x2.5 mm	C0G	0+/-30ppm/C	-55 to 125C

3 Termination

Code	Termination
9	Pd/Ag, Ni+Sn plating
0	Pd/Ag, Non-Magnetic

4 Capacitance

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

5 Capacitance Tolerance

Code	Cap. Tol.	TC
A	+/-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%	

6 Marking

Code	Marking
A	No Marking
B	Laser Marking for Medical Apps

7 Packaging

Code	Packaging
B	Bulk in nylon bag
N	ϕ180mm Plastic Taping

MA Product Offering

MA10 Series (TC: P90)

Nonmagnetic Type for MRI Applications

Size	TC	WV	Cap	Cap Tol	Murata Global P/N
0505	P90	150V	1pF	+/-0.25pF	MA101R0CBN
0505	P90	150V	2pF	+/-0.25pF	MA102R0CBN
0505	P90	150V	3pF	+/-0.25pF	MA103R0CBN
0505	P90	150V	4pF	+/-0.25pF	MA104R0CBN
0505	P90	150V	5pF	+/-0.25pF	MA105R0CBN
0505	P90	150V	6pF	+/-0.5pF	MA106R0DBN
0505	P90	150V	7pF	+/-0.5pF	MA107R0DBN
0505	P90	150V	8pF	+/-0.5pF	MA108R0DBN
0505	P90	150V	9pF	+/-0.5pF	MA109R0DBN
0505	P90	150V	10pF	+/-5%	MA10100JBN
0505	P90	150V	12pF	+/-5%	MA10120JBN
0505	P90	150V	15pF	+/-5%	MA10150JBN
0505	P90	150V	18pF	+/-5%	MA10180JBN
0505	P90	150V	22pF	+/-5%	MA10220JBN
0505	P90	150V	27pF	+/-5%	MA10270JBN
0505	P90	150V	33pF	+/-5%	MA10330JBN
0505	P90	150V	39pF	+/-5%	MA10390JBN
0505	P90	150V	47pF	+/-5%	MA10470JBN
0505	P90	150V	56pF	+/-5%	MA10560JBN
0505	P90	150V	68pF	+/-5%	MA10680JBN
0505	P90	150V	82pF	+/-5%	MA10820JBN

MA Product Offering

MA20 Series (TC: P90)

Nonmagnetic Type for MRI Applications

Size	TC	WV	Cap	Cap Tol	Murata Global P/N
1111	P90	500V	1pF	+/-0.25pF	MA201R0CBN
1111	P90	500V	2pF	+/-0.25pF	MA202R0CBN
1111	P90	500V	3pF	+/-0.25pF	MA203R0CBN
1111	P90	500V	4pF	+/-0.25pF	MA204R0CBN
1111	P90	500V	5pF	+/-0.25pF	MA205R0CBN
1111	P90	500V	6pF	+/-0.5pF	MA206R0DBN
1111	P90	500V	7pF	+/-0.5pF	MA207R0DBN
1111	P90	500V	8pF	+/-0.5pF	MA208R0DBN
1111	P90	500V	9pF	+/-0.5pF	MA209R0DBN
1111	P90	500V	10pF	+/-5%	MA20100JBN
1111	P90	500V	12pF	+/-5%	MA20120JBN
1111	P90	500V	15pF	+/-5%	MA20150JBN
1111	P90	500V	18pF	+/-5%	MA20180JBN
1111	P90	500V	22pF	+/-5%	MA20220JBN
1111	P90	500V	27pF	+/-5%	MA20270JBN
1111	P90	500V	33pF	+/-5%	MA20330JBN
1111	P90	500V	39pF	+/-5%	MA20390JBN
1111	P90	500V	47pF	+/-5%	MA20470JBN
1111	P90	500V	56pF	+/-5%	MA20560JBN
1111	P90	500V	68pF	+/-5%	MA20680JBN
1111	P90	500V	82pF	+/-5%	MA20820JBN
1111	P90	500V	100pF	+/-5%	MA20101JBN
1111	P90	300V	120pF	+/-5%	MA20121JBN
1111	P90	300V	150pF	+/-5%	MA20151JBN
1111	P90	300V	180pF	+/-5%	MA20181JBN
1111	P90	200V	220pF	+/-5%	MA20221JBN
1111	P90	200V	270pF	+/-5%	MA20271JBN
1111	P90	200V	330pF	+/-5%	MA20331JBN
1111	P90	200V	390pF	+/-5%	MA20391JBN
1111	P90	200V	470pF	+/-5%	MA20471JBN
1111	P90	100V	560pF	+/-5%	MA20561JBN
1111	P90	50V	680pF	+/-5%	MA20681JBN
1111	P90	50V	820pF	+/-5%	MA20821JBN
1111	P90	50V	1000pF	+/-5%	MA20102JBN

MA Product Offering

MA19 Series (TC: P90)

Size	TC	WV	Cap	Cap Tol	Murata Global P/N
0505	P90	150V	0.5pF	+/-0.1pF	MA190R5BAN
0505	P90	150V	0.5pF	+/-0.25pF	MA190R5CAN
0505	P90	150V	0.75pF	+/-0.1pF	MA19R75BAN
0505	P90	150V	0.75pF	+/-0.25pF	MA19R75CAN
0505	P90	150V	1pF	+/-0.1pF	MA191R0BAN
0505	P90	150V	1pF	+/-0.25pF	MA191R0CAN
0505	P90	150V	1.1pF	+/-0.1pF	MA191R1BAN
0505	P90	150V	1.2pF	+/-0.1pF	MA191R2BAN
0505	P90	150V	1.3pF	+/-0.1pF	MA191R3BAN
0505	P90	150V	1.5pF	+/-0.1pF	MA191R5BAN
0505	P90	150V	1.5pF	+/-0.25pF	MA191R5CAN
0505	P90	150V	1.6pF	+/-0.1pF	MA191R6BAN
0505	P90	150V	1.8pF	+/-0.1pF	MA191R8BAN
0505	P90	150V	2pF	+/-0.1pF	MA192R0BAN
0505	P90	150V	2pF	+/-0.25pF	MA192R0CAN
0505	P90	150V	2.2pF	+/-0.1pF	MA192R2BAN
0505	P90	150V	2.4pF	+/-0.1pF	MA192R4BAN
0505	P90	150V	2.7pF	+/-0.1pF	MA192R7BAN
0505	P90	150V	3pF	+/-0.1pF	MA193R0BAN
0505	P90	150V	3pF	+/-0.25pF	MA193R0CAN
0505	P90	150V	3.3pF	+/-0.1pF	MA193R3BAN
0505	P90	150V	3.6pF	+/-0.1pF	MA193R6BAN
0505	P90	150V	3.9pF	+/-0.1pF	MA193R9BAN
0505	P90	150V	4pF	+/-0.1pF	MA194R0BAN
0505	P90	150V	4pF	+/-0.25pF	MA194R0CAN
0505	P90	150V	4.3pF	+/-0.1pF	MA194R3BAN
0505	P90	150V	4.7pF	+/-0.1pF	MA194R7BAN
0505	P90	150V	5pF	+/-0.1pF	MA195R0BAN
0505	P90	150V	5pF	+/-0.25pF	MA195R0CAN
0505	P90	150V	5.1pF	+/-0.25pF	MA195R1CAN
0505	P90	150V	5.6pF	+/-0.25pF	MA195R6CAN
0505	P90	150V	6pF	+/-0.25pF	MA196R0CAN
0505	P90	150V	6pF	+/-0.5pF	MA196R0DAN
0505	P90	150V	6.2pF	+/-0.25pF	MA196R2CAN
0505	P90	150V	6.8pF	+/-0.25pF	MA196R8CAN

MA Product Offering

MA19 Series (TC: P90)

Size	TC	WV	Cap	Cap Tol	Murata Global P/N
0505	P90	150V	7pF	+/-0.25pF	MA197R0CAN
0505	P90	150V	7pF	+/-0.5pF	MA197R0DAN
0505	P90	150V	7.5pF	+/-0.25pF	MA197R5CAN
0505	P90	150V	8pF	+/-0.25pF	MA198R0CAN
0505	P90	150V	8pF	+/-0.5pF	MA198R0DAN
0505	P90	150V	8.2pF	+/-0.25pF	MA198R2CAN
0505	P90	150V	9pF	+/-0.25pF	MA199R0CAN
0505	P90	150V	9pF	+/-0.5pF	MA199R0DAN
0505	P90	150V	9.1pF	+/-0.25pF	MA199R1CAN
0505	P90	150V	10pF	+/-2%	MA19100GAN
0505	P90	150V	10pF	+/-5%	MA19100JAN
0505	P90	150V	12pF	+/-2%	MA19120GAN
0505	P90	150V	12pF	+/-5%	MA19120JAN
0505	P90	150V	15pF	+/-2%	MA19150GAN
0505	P90	150V	15pF	+/-5%	MA19150JAN
0505	P90	150V	18pF	+/-2%	MA19180GAN
0505	P90	150V	18pF	+/-5%	MA19180JAN
0505	P90	150V	22pF	+/-2%	MA19220GAN
0505	P90	150V	22pF	+/-5%	MA19220JAN
0505	P90	150V	27pF	+/-2%	MA19270GAN
0505	P90	150V	27pF	+/-5%	MA19270JAN
0505	P90	150V	33pF	+/-2%	MA19330GAN
0505	P90	150V	33pF	+/-5%	MA19330JAN
0505	P90	150V	39pF	+/-2%	MA19390GAN
0505	P90	150V	39pF	+/-5%	MA19390JAN
0505	P90	150V	47pF	+/-2%	MA19470GAN
0505	P90	150V	47pF	+/-5%	MA19470JAN
0505	P90	150V	56pF	+/-2%	MA19560GAN
0505	P90	150V	56pF	+/-5%	MA19560JAN
0505	P90	150V	68pF	+/-2%	MA19680GAN
0505	P90	150V	68pF	+/-5%	MA19680JAN
0505	P90	150V	82pF	+/-2%	MA19820GAN
0505	P90	150V	82pF	+/-5%	MA19820JAN

MA Product Offering

MA29 Series (TC: P90)

Size	TC	WV	Cap	Cap Tol	Murata Global P/N
1111	P90	500V	0.5pF	+/-0.1pF	MA290R5BAN
1111	P90	500V	0.5pF	+/-0.25pF	MA290R5CAN
1111	P90	500V	0.75pF	+/-0.1pF	MA29R75BAN
1111	P90	500V	0.75pF	+/-0.25pF	MA29R75CAN
1111	P90	500V	1pF	+/-0.1pF	MA291R0BAN
1111	P90	500V	1pF	+/-0.25pF	MA291R0CAN
1111	P90	500V	1.1pF	+/-0.1pF	MA291R1BAN
1111	P90	500V	1.2pF	+/-0.1pF	MA291R2BAN
1111	P90	500V	1.3pF	+/-0.1pF	MA291R3BAN
1111	P90	500V	1.5pF	+/-0.1pF	MA291R5BAN
1111	P90	500V	1.5pF	+/-0.25pF	MA291R5CAN
1111	P90	500V	1.6pF	+/-0.1pF	MA291R6BAN
1111	P90	500V	1.8pF	+/-0.1pF	MA291R8BAN
1111	P90	500V	2pF	+/-0.1pF	MA292R0BAN
1111	P90	500V	2pF	+/-0.25pF	MA292R0CAN
1111	P90	500V	2.2pF	+/-0.1pF	MA292R2BAN
1111	P90	500V	2.4pF	+/-0.1pF	MA292R4BAN
1111	P90	500V	2.7pF	+/-0.1pF	MA292R7BAN
1111	P90	500V	3pF	+/-0.1pF	MA293R0BAN
1111	P90	500V	3pF	+/-0.25pF	MA293R0CAN
1111	P90	500V	3.3pF	+/-0.1pF	MA293R3BAN
1111	P90	500V	3.6pF	+/-0.1pF	MA293R6BAN
1111	P90	500V	3.9pF	+/-0.1pF	MA293R9BAN
1111	P90	500V	4pF	+/-0.1pF	MA294R0BAN
1111	P90	500V	4pF	+/-0.25pF	MA294R0CAN
1111	P90	500V	4.3pF	+/-0.1pF	MA294R3BAN
1111	P90	500V	4.7pF	+/-0.1pF	MA294R7BAN
1111	P90	500V	5pF	+/-0.1pF	MA295R0BAN
1111	P90	500V	5pF	+/-0.25pF	MA295R0CAN
1111	P90	500V	5.1pF	+/-0.25pF	MA295R1CAN
1111	P90	500V	5.6pF	+/-0.25pF	MA295R6CAN
1111	P90	500V	6pF	+/-0.25pF	MA296R0CAN
1111	P90	500V	6pF	+/-0.5pF	MA296R0DAN
1111	P90	500V	6.2pF	+/-0.25pF	MA296R2CAN
1111	P90	500V	6.8pF	+/-0.25pF	MA296R8CAN
1111	P90	500V	7pF	+/-0.25pF	MA297R0CAN
1111	P90	500V	7pF	+/-0.5pF	MA297R0DAN
1111	P90	500V	7.5pF	+/-0.25pF	MA297R5CAN
1111	P90	500V	8pF	+/-0.25pF	MA298R0CAN
1111	P90	500V	8pF	+/-0.5pF	MA298R0DAN
1111	P90	500V	8.2pF	+/-0.25pF	MA298R2CAN

MA Product Offering

MA29 Series (TC: P90)

Size	TC	WV	Cap	Cap Tol	Murata Global P/N
1111	P90	500V	9pF	+/-0.25pF	MA299R0CAN
1111	P90	500V	9pF	+/-0.5pF	MA299R0DAN
1111	P90	500V	9.1pF	+/-0.25pF	MA299R1CAN
1111	P90	500V	10pF	+/-2%	MA29100GAN
1111	P90	500V	10pF	+/-5%	MA29100JAN
1111	P90	500V	12pF	+/-2%	MA29120GAN
1111	P90	500V	12pF	+/-5%	MA29120JAN
1111	P90	500V	15pF	+/-2%	MA29150GAN
1111	P90	500V	15pF	+/-5%	MA29150JAN
1111	P90	500V	18pF	+/-2%	MA29180GAN
1111	P90	500V	18pF	+/-5%	MA29180JAN
1111	P90	500V	22pF	+/-2%	MA29220GAN
1111	P90	500V	22pF	+/-5%	MA29220JAN
1111	P90	500V	27pF	+/-2%	MA29270GAN
1111	P90	500V	27pF	+/-5%	MA29270JAN
1111	P90	500V	33pF	+/-2%	MA29330GAN
1111	P90	500V	33pF	+/-5%	MA29330JAN
1111	P90	500V	39pF	+/-2%	MA29390GAN
1111	P90	500V	39pF	+/-5%	MA29390JAN
1111	P90	500V	47pF	+/-2%	MA29470GAN
1111	P90	500V	47pF	+/-5%	MA29470JAN
1111	P90	500V	56pF	+/-2%	MA29560GAN
1111	P90	500V	56pF	+/-5%	MA29560JAN
1111	P90	500V	68pF	+/-2%	MA29680GAN
1111	P90	500V	68pF	+/-5%	MA29680JAN
1111	P90	500V	82pF	+/-2%	MA29820GAN
1111	P90	500V	82pF	+/-5%	MA29820JAN
1111	P90	500V	100pF	+/-2%	MA29101GAN
1111	P90	500V	100pF	+/-5%	MA29101JAN
1111	P90	300V	120pF	+/-5%	MA29121JAN
1111	P90	300V	150pF	+/-5%	MA29151JAN
1111	P90	300V	180pF	+/-5%	MA29181JAN
1111	P90	200V	220pF	+/-5%	MA29221JAN
1111	P90	200V	270pF	+/-5%	MA29271JAN
1111	P90	200V	330pF	+/-5%	MA29331JAN
1111	P90	200V	390pF	+/-5%	MA29391JAN
1111	P90	200V	470pF	+/-5%	MA29471JAN
1111	P90	100V	560pF	+/-5%	MA29561JAN
1111	P90	50V	680pF	+/-5%	MA29681JAN
1111	P90	50V	820pF	+/-5%	MA29821JAN
1111	P90	50V	1000pF	+/-5%	MA29102JAN

MA Product Offering

MA59 Series (TC: C0G)

Size	TC	WV	Cap	Cap Tol	Murata Global P/N
0505	C0G	150V	0.5pF	+/-0.1pF	MA590R5BAN
0505	C0G	150V	0.5pF	+/-0.25pF	MA590R5CAN
0505	C0G	150V	0.75pF	+/-0.1pF	MA59R75BAN
0505	C0G	150V	0.75pF	+/-0.25pF	MA59R75CAN
0505	C0G	150V	1pF	+/-0.1pF	MA591R0BAN
0505	C0G	150V	1pF	+/-0.25pF	MA591R0CAN
0505	C0G	150V	1.1pF	+/-0.1pF	MA591R1BAN
0505	C0G	150V	1.2pF	+/-0.1pF	MA591R2BAN
0505	C0G	150V	1.3pF	+/-0.1pF	MA591R3BAN
0505	C0G	150V	1.5pF	+/-0.1pF	MA591R5BAN
0505	C0G	150V	1.5pF	+/-0.25pF	MA591R5CAN
0505	C0G	150V	1.6pF	+/-0.1pF	MA591R6BAN
0505	C0G	150V	1.8pF	+/-0.1pF	MA591R8BAN
0505	C0G	150V	2pF	+/-0.1pF	MA592R0BAN
0505	C0G	150V	2pF	+/-0.25pF	MA592R0CAN
0505	C0G	150V	2.2pF	+/-0.1pF	MA592R2BAN
0505	C0G	150V	2.4pF	+/-0.1pF	MA592R4BAN
0505	C0G	150V	2.7pF	+/-0.1pF	MA592R7BAN
0505	C0G	150V	3pF	+/-0.1pF	MA593R0BAN
0505	C0G	150V	3pF	+/-0.25pF	MA593R0CAN
0505	C0G	150V	3.3pF	+/-0.1pF	MA593R3BAN
0505	C0G	150V	3.6pF	+/-0.1pF	MA593R6BAN
0505	C0G	150V	3.9pF	+/-0.1pF	MA593R9BAN
0505	C0G	150V	4pF	+/-0.1pF	MA594R0BAN
0505	C0G	150V	4pF	+/-0.25pF	MA594R0CAN
0505	C0G	150V	4.3pF	+/-0.1pF	MA594R3BAN
0505	C0G	150V	4.7pF	+/-0.1pF	MA594R7BAN
0505	C0G	150V	5pF	+/-0.1pF	MA595R0BAN
0505	C0G	150V	5pF	+/-0.25pF	MA595R0CAN
0505	C0G	150V	5.1pF	+/-0.25pF	MA595R1CAN
0505	C0G	150V	5.6pF	+/-0.25pF	MA595R6CAN
0505	C0G	150V	6pF	+/-0.25pF	MA596R0CAN
0505	C0G	150V	6pF	+/-0.5pF	MA596R0DAN
0505	C0G	150V	6.2pF	+/-0.25pF	MA596R2CAN
0505	C0G	150V	6.8pF	+/-0.25pF	MA596R8DAN

MA Product Offering

MA59 Series (TC: C0G)

Size	TC	WV	Cap	Cap Tol	Murata Global P/N
0505	C0G	150V	7pF	+/-0.25pF	MA597R0CAN
0505	C0G	150V	7pF	+/-0.5pF	MA597R0DAN
0505	C0G	150V	7.5pF	+/-0.25pF	MA597R5CAN
0505	C0G	150V	8pF	+/-0.25pF	MA598R0CAN
0505	C0G	150V	8pF	+/-0.5pF	MA598R0DAN
0505	C0G	150V	8.2pF	+/-0.25pF	MA598R2CAN
0505	C0G	150V	9pF	+/-0.25pF	MA599R0CAN
0505	C0G	150V	9pF	+/-0.5pF	MA599R0DAN
0505	C0G	150V	9.1pF	+/-0.25pF	MA599R1CAN
0505	C0G	150V	10pF	+/-2%	MA59100GAN
0505	C0G	150V	10pF	+/-5%	MA59100JAN
0505	C0G	150V	12pF	+/-2%	MA59120GAN
0505	C0G	150V	12pF	+/-5%	MA59120JAN
0505	C0G	150V	15pF	+/-2%	MA59150GAN
0505	C0G	150V	15pF	+/-5%	MA59150JAN
0505	C0G	150V	18pF	+/-2%	MA59180GAN
0505	C0G	150V	18pF	+/-5%	MA59180JAN
0505	C0G	150V	22pF	+/-2%	MA59220GAN
0505	C0G	150V	22pF	+/-5%	MA59220JAN
0505	C0G	150V	27pF	+/-2%	MA59270GAN
0505	C0G	150V	27pF	+/-5%	MA59270JAN
0505	C0G	150V	33pF	+/-2%	MA59330GAN
0505	C0G	150V	33pF	+/-5%	MA59330JAN
0505	C0G	150V	39pF	+/-2%	MA59390GAN
0505	C0G	150V	39pF	+/-5%	MA59390JAN
0505	C0G	150V	47pF	+/-2%	MA59470GAN
0505	C0G	150V	47pF	+/-5%	MA59470JAN
0505	C0G	150V	56pF	+/-2%	MA59560GAN
0505	C0G	150V	56pF	+/-5%	MA59560JAN
0505	C0G	150V	68pF	+/-2%	MA59680GAN
0505	C0G	150V	68pF	+/-5%	MA59680JAN
0505	C0G	150V	82pF	+/-2%	MA59820GAN
0505	C0G	150V	82pF	+/-5%	MA59820JAN
0505	C0G	150V	100pF	+/-2%	MA59101GAN
0505	C0G	150V	100pF	+/-5%	MA59101JAN

MA Product Offering

MA69 Series (TC: C0G)

Size	TC	WV	Cap	Cap Tol	Murata Global P/N
1111	C0G	500V	0.5pF	+/-0.1pF	MA690R5BAN
1111	C0G	500V	0.5pF	+/-0.25pF	MA690R5CAN
1111	C0G	500V	0.75pF	+/-0.1pF	MA69R75BAN
1111	C0G	500V	0.75pF	+/-0.25pF	MA69R75CAN
1111	C0G	500V	1pF	+/-0.1pF	MA691R0BAN
1111	C0G	500V	1pF	+/-0.25pF	MA691R0CAN
1111	C0G	500V	1.1pF	+/-0.1pF	MA691R1BAN
1111	C0G	500V	1.2pF	+/-0.1pF	MA691R2BAN
1111	C0G	500V	1.3pF	+/-0.1pF	MA691R3BAN
1111	C0G	500V	1.5pF	+/-0.1pF	MA691R5BAN
1111	C0G	500V	1.5pF	+/-0.25pF	MA691R5CAN
1111	C0G	500V	1.6pF	+/-0.1pF	MA691R6BAN
1111	C0G	500V	1.8pF	+/-0.1pF	MA691R8BAN
1111	C0G	500V	2pF	+/-0.1pF	MA692R0BAN
1111	C0G	500V	2pF	+/-0.25pF	MA692R0CAN
1111	C0G	500V	2.2pF	+/-0.1pF	MA692R2BAN
1111	C0G	500V	2.4pF	+/-0.1pF	MA692R4BAN
1111	C0G	500V	2.7pF	+/-0.1pF	MA692R7BAN
1111	C0G	500V	3pF	+/-0.1pF	MA693R0BAN
1111	C0G	500V	3pF	+/-0.25pF	MA693R0CAN
1111	C0G	500V	3.3pF	+/-0.1pF	MA693R3BAN
1111	C0G	500V	3.6pF	+/-0.1pF	MA693R6BAN
1111	C0G	500V	3.9pF	+/-0.1pF	MA693R9BAN
1111	C0G	500V	4pF	+/-0.1pF	MA694R0BAN
1111	C0G	500V	4pF	+/-0.25pF	MA694R0CAN
1111	C0G	500V	4.3pF	+/-0.1pF	MA694R3BAN
1111	C0G	500V	4.7pF	+/-0.1pF	MA694R7BAN
1111	C0G	500V	5pF	+/-0.1pF	MA695R0BAN
1111	C0G	500V	5pF	+/-0.25pF	MA695R0CAN
1111	C0G	500V	5.1pF	+/-0.25pF	MA695R1CAN
1111	C0G	500V	5.6pF	+/-0.25pF	MA695R6CAN
1111	C0G	500V	6pF	+/-0.25pF	MA696R0CAN
1111	C0G	500V	6pF	+/-0.5pF	MA696R0DAN
1111	C0G	500V	6.2pF	+/-0.25pF	MA696R2CAN
1111	C0G	500V	6.8pF	+/-0.25pF	MA696R8DAN
1111	C0G	500V	7pF	+/-0.25pF	MA697R0CAN
1111	C0G	500V	7pF	+/-0.5pF	MA697R0DAN
1111	C0G	500V	7.5pF	+/-0.25pF	MA697R5CAN
1111	C0G	500V	8pF	+/-0.25pF	MA698R0CAN
1111	C0G	500V	8pF	+/-0.5pF	MA698R0DAN
1111	C0G	500V	8.2pF	+/-0.25pF	MA698R2CAN

MA Product Offering

MA69 Series (TC: C0G)

Size	TC	WV	Cap	Cap Tol	Murata Global P/N
1111	C0G	500V	9pF	+/-0.25pF	MA699R0CAN
1111	C0G	500V	9pF	+/-0.5pF	MA699R0DAN
1111	C0G	500V	9.1pF	+/-0.25pF	MA699R1CAN
1111	C0G	500V	10pF	+/-2%	MA69100GAN
1111	C0G	500V	10pF	+/-5%	MA69100JAN
1111	C0G	500V	12pF	+/-2%	MA69120GAN
1111	C0G	500V	12pF	+/-5%	MA69120JAN
1111	C0G	500V	15pF	+/-2%	MA69150GAN
1111	C0G	500V	15pF	+/-5%	MA69150JAN
1111	C0G	500V	18pF	+/-2%	MA69180GAN
1111	C0G	500V	18pF	+/-5%	MA69180JAN
1111	C0G	500V	22pF	+/-2%	MA69220GAN
1111	C0G	500V	22pF	+/-5%	MA69220JAN
1111	C0G	500V	27pF	+/-2%	MA69270GAN
1111	C0G	500V	27pF	+/-5%	MA69270JAN
1111	C0G	500V	33pF	+/-2%	MA69330GAN
1111	C0G	500V	33pF	+/-5%	MA69330JAN
1111	C0G	500V	39pF	+/-2%	MA69390GAN
1111	C0G	500V	39pF	+/-5%	MA69390JAN
1111	C0G	500V	47pF	+/-2%	MA69470GAN
1111	C0G	500V	47pF	+/-5%	MA69470JAN
1111	C0G	500V	56pF	+/-2%	MA69560GAN
1111	C0G	500V	56pF	+/-5%	MA69560JAN
1111	C0G	500V	68pF	+/-2%	MA69680GAN
1111	C0G	500V	68pF	+/-5%	MA69680JAN
1111	C0G	500V	82pF	+/-2%	MA69820GAN
1111	C0G	500V	82pF	+/-5%	MA69820JAN
1111	C0G	500V	100pF	+/-2%	MA69101GAN
1111	C0G	500V	100pF	+/-5%	MA69101JAN
1111	C0G	300V	120pF	+/-5%	MA69121JAN
1111	C0G	300V	150pF	+/-5%	MA69151JAN
1111	C0G	300V	180pF	+/-5%	MA69181JAN
1111	C0G	200V	220pF	+/-5%	MA69221JAN
1111	C0G	200V	270pF	+/-5%	MA69271JAN
1111	C0G	200V	330pF	+/-5%	MA69331JAN
1111	C0G	200V	390pF	+/-5%	MA69391JAN
1111	C0G	200V	470pF	+/-5%	MA69471JAN
1111	C0G	100V	560pF	+/-5%	MA69561JAN
1111	C0G	50V	680pF	+/-5%	MA69681JAN
1111	C0G	50V	820pF	+/-5%	MA69821JAN
1111	C0G	50V	1000pF	+/-5%	MA69102JAN

MA Specifications and Test Methods

No	Item		Specifications	Test Methods
1	Operating Temperature		C0G, P090: -55°C to 125°C	
2	Rated Voltage		See the previous page.	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.
3	Appearance		No defects or abnormalities.	Visual inspection.
4	Dimension		Within the specified dimensions.	Using calipers.
5	Dielectric Strength		No defects or abnormalities.	No failure should be observed when 250% of the rated voltage is applied between the terminations for 1 to 5 seconds, provided the charge/discharge current is less than 50mA.
6	Insulation Resistance (I.R.)	25°C	1,000,000MΩ min.	The insulation resistance should be measured with a DC voltage not exceeding the rated voltage at 25°C and 125°C, standard humidity and within 2 minutes of charging.
		125°C	100,000MΩ min.	
7	Capacitance		Within the specified tolerance.	The capacitance/Q should be measured at 25°C at the frequency and voltage shown in the table.
8	Q		C0G: Q≧667 P090: Q≧2000	
9	Capacitance Temperature Characteristics	Capactance Change	Within the specified tolerance (Table A-1)	The capacitance change should be measured after 5 min. at each specified temp. 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 Table A-1. The capacitance drift is calculated by dividing the differences between the maximum and minimum measured values in the step 1, 3 and 5 by the cap. value in step 3.
		Temperature Coefficent	Within the specified tolerance (Table A-1)	
		Capacitance Drift	Within ±0.2% or ±0.05pF (whichever is larger)	
10	Terminal strength	Adhesive Strength of Termination (for chip type)	No removal of the terminations or other defect should occur.	Solder the capacitor to the test jig (alumina substrate) shown in Fig.1 using solder containing 2.5% silver. The soldering should be done either with an iron or in a furnace and be conducted with care the soldering is uniform and free of defects such as heat shock. Then apply 10N* force in the direction of the arrow.
		Tensile Strength (for microstrip type)	Capacitor should not be broken or damaged.	The capacitor body is fixed and a load is applied gradually in the axial direction until its value reaches 5N.
		Bending Strength of Lead Wire Terminal (for microstrip type)	Lead wire should not be cut or broken.	Position the main body of the capacitor so the lead wire terminal is perpendicular, and load 2.5N to lead wire terminal. Bend the main body by 90 degrees, bend back to original position, bend 90 degrees in the reverse direction, and then bend back to original position.

Item \ Char.	1000pF and below	More than 1000pF
Frequency	1±0.1MHz	1±0.1kHz
Voltage	1±0.2Vrms	1±0.2Vrms

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

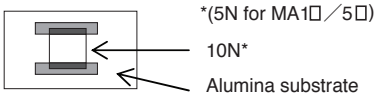
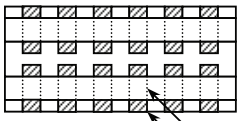


Fig. 1

MA Series

MA Specifications and Test Methods

No	Item		Specifications	Test Methods
11	Vibration Resistance	Appearance	No defects or abnormalities.	Solder the capacitor to the test jig (alumina substrate) shown in Fig.2 using solder containing 2.5% silver. The soldering should be done either with an iron or using the reflow method and should be conducted with care so the soldering is uniform and free of defects such as heat shock. 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 2000Hz. The frequency range, from 10 to 2000Hz and return to 10Hz, should be traversed in approximately 20 minute. This motion should be applied for a period of 4 hours in each of 3 mutually perpendicular directions (total of 12 hours).  Solder resist Baked electrode or copper foil Fig. 2
		Capacitance	Within the specified tolerance.	
		Q	C0G: Q≧667 P090: Q≧2000	
12	Solderability of Termination		95% of the terminations are to be soldered evenly and continuously.	Immerse the capacitor in a solution of isopropyl alcohol and rosin (25% rosin in weight propotion). Preheat at 80 to 120°C for 10 to 30 seconds. After preheating , immerse in eutectic solder solution or Sn-3.0Ag-0.5Cu solder solution for 5±0.5 seconds at 245±5°C. The dipping depth for microstrip type capacitors is up to 1mm from the root of the terminal.
13	Resistance to Soldering Heat		The measured and observed characteristics should satisfy the specifications in the following table.	Preheat the capacitor at 80 to 100°C for 2 minutes and then at 150 to 200°C for 5 minutes. Immerse the capacitor in solder containing 2.5% silver or Sn-3.0Ag-0.5Cu solder solution for 3±0.5 seconds at 270±5°C. Set at room temperature for 24±2 hours, then measure. The dipping depth for microstrip type capacitors is up to 2mm from the root of the terminal.
		Appearance	No marking defects.	
		Capacitance Change	Within ±2.5% or ±0.25 pF (whichever is larger)	
		Q	C0G: Q≧667 P090: Q≧2000	
		I.R.	More than 30% of the initial specification value at 25°C	
		Dielectric Strength	No failure	
14	Temperature Cycle		The measured and observed characteristics should satisfy the specifications in the following table.	Fix the capacitor to the supporting jig in the same manner and under the same conditions as (11). Perform the five cycles according to the four heat treatments isted in the following table. Let sit for 24±2 hours at room temperature, then measure. Step 1: Temp (°C) -55 +0/-3, Time (min.) 30±3 Step 2: Temp (°C) Room Temp, Time (min.) 5max Step 3: Temp (°C) 85 +3/-0, Time (min.) 30±3 Step 4: Temp (°C) Room Temp, Time (min.) 5max
		Appearance	No marking defects.	
		Capacitance Change	Within ±1% or ±0.25pF (whichever is larger)	
		Q	C0G: Q≧667 P090: Q≧2000	
		I.R.	More than 30% of the initial specification value at 25°C	
		Dielectric Strength	No failure	
15	Humidity		The measured and observed characteristics should satisfy the specifications in the following table.	Apply the 24-hour heat (-10 to +65°C) and humidity (80 to 100%) treatment shown below, 10 consecutive times. Remove and set for 24±2 hours at room temperature, then measure. It is based on Fig 3 for details.
		Appearance	No marking defects.	
		Capacitance Change	Within ±5% or ±0.5pF (whichever is larger)	
		Q	C0G: Q≧667 P090: Q≧2000	
		I.R.	More than 30% of the initial specification value at 25°C	

MA Specifications and Test Methods

No	Item		Specifications	Test Methods
16	High Temperature Load		The measured and observed characteristics should satisfy the specifications in the following table.	Apply 150% of the rated voltage for 2000±12 hours at 125±3°C. Remove and set for 24±2 hours at room temperature, then measure. The charge/discharge current is less than 50mA.
		Appearance	No marking defects.	
		Capacitance Change	Within ±2.5% or ±0.25pF (whichever is larger)	
		Q	C0G: Q≧667 P090: Q≧2000	
		I.R.	More than 30% of the initial specification value at 25°C	

Table A-1

Char.	Nominal Values (ppm/℃) Note 1	Capacitance Change from 25°C (%)					
		−55		−30		−10	
		Max.	Min.	Max.	Min.	Max.	Min.
C0G	0 ± 30	0.58	-0.24	0.40	-0.17	0.25	-0.11
P90	P90 ± 20	-0.56	-0.88	-0.38	-0.61	-0.24	-0.39

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

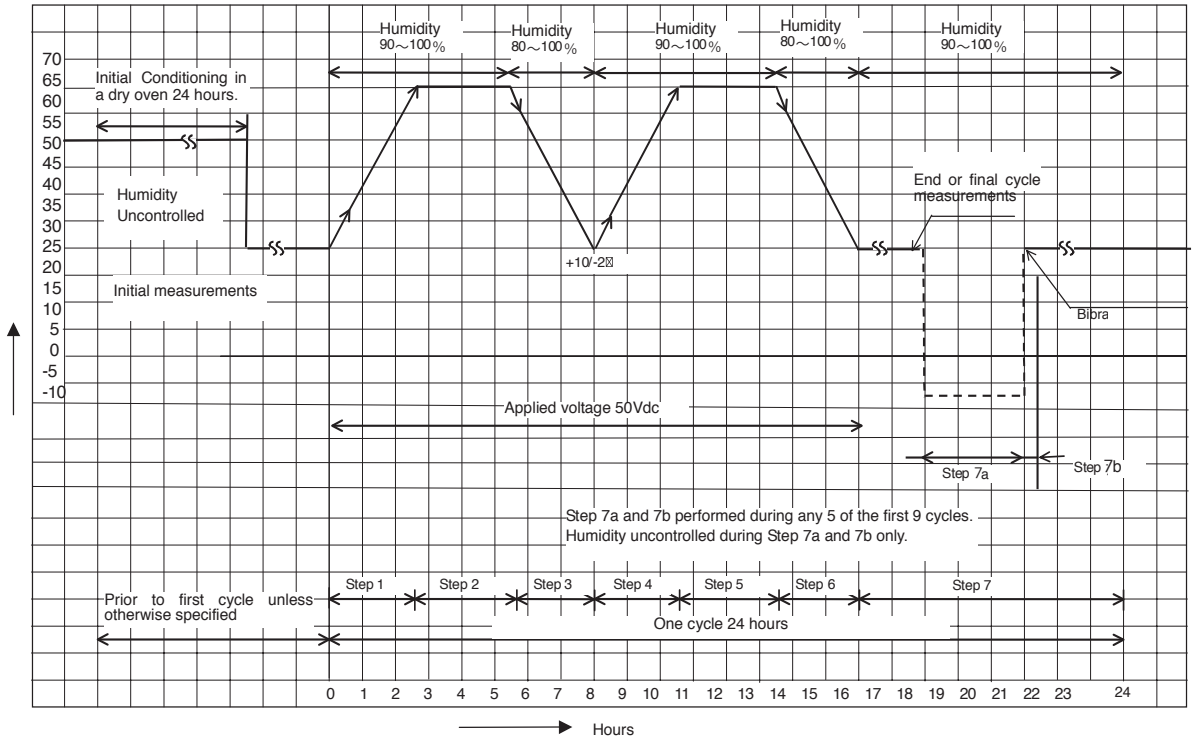
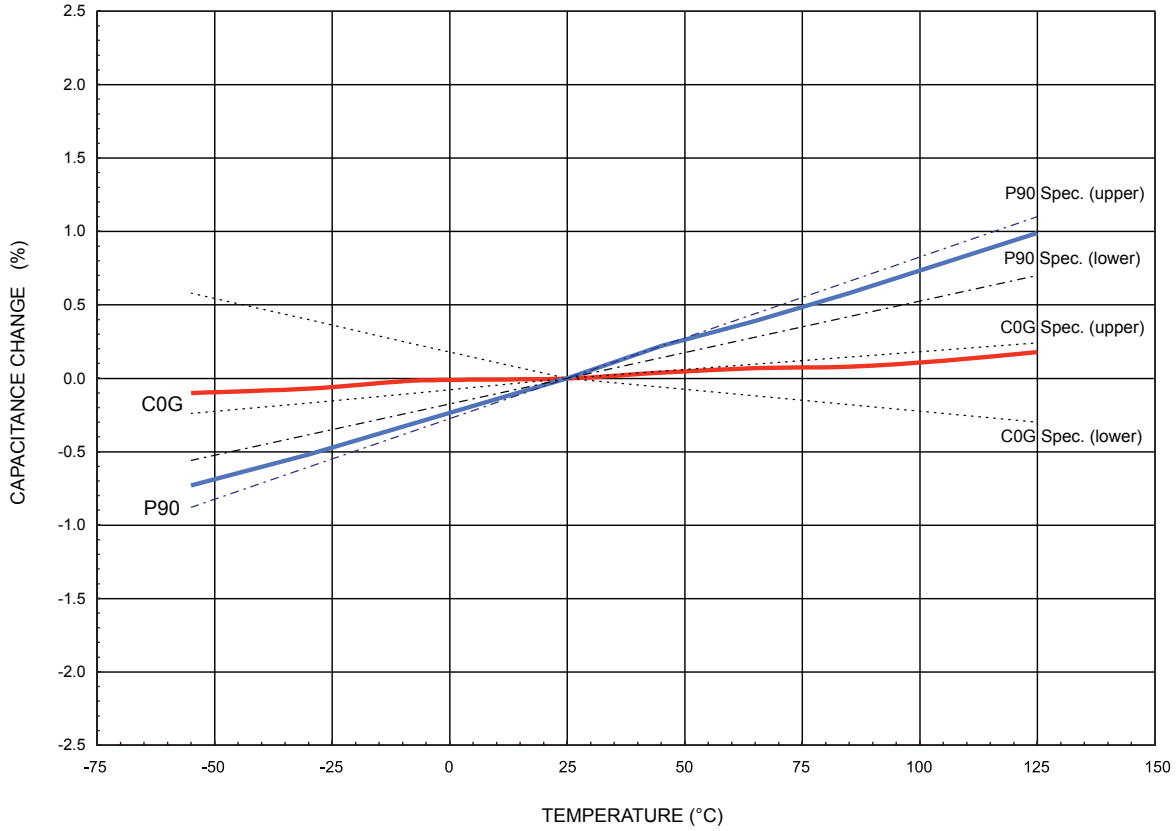


Fig 3

MA Technical Data (Typical)

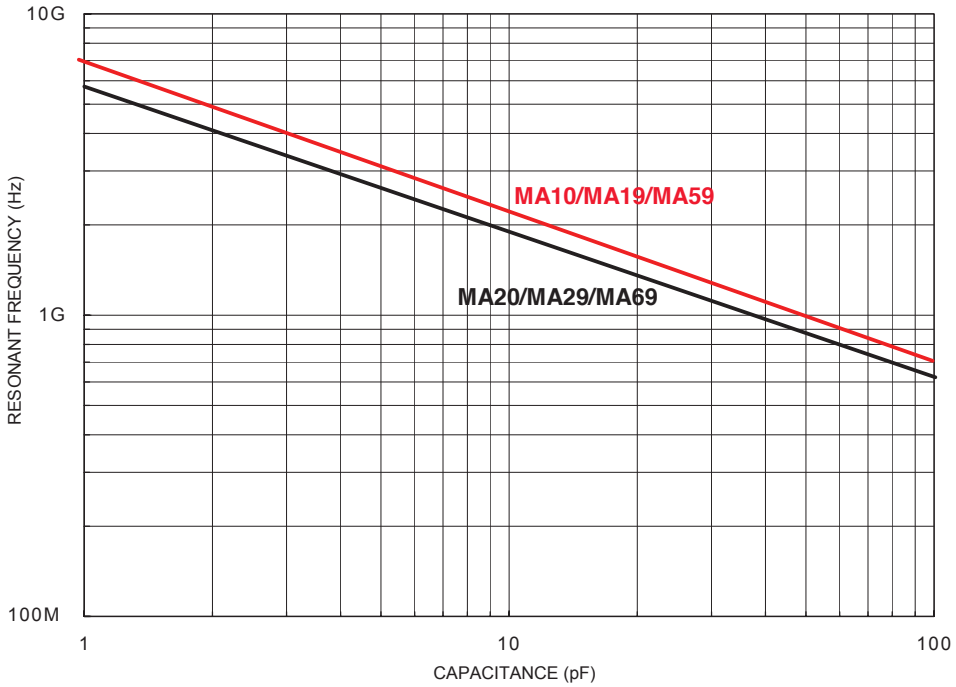
Capacitance - Temperature Characteristics

C0G and P90 Characteristics



Resonant Frequency Characteristics

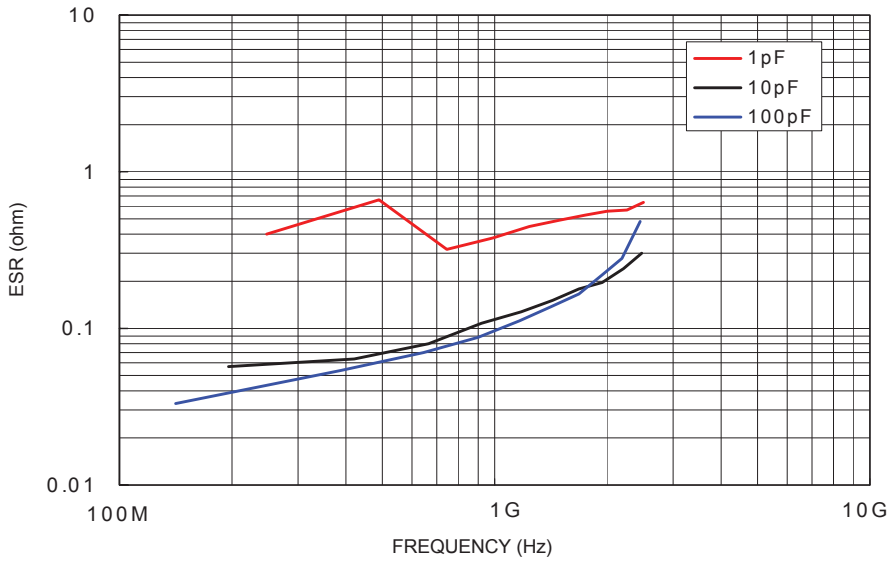
MA Series



MA Technical Data (Typical)

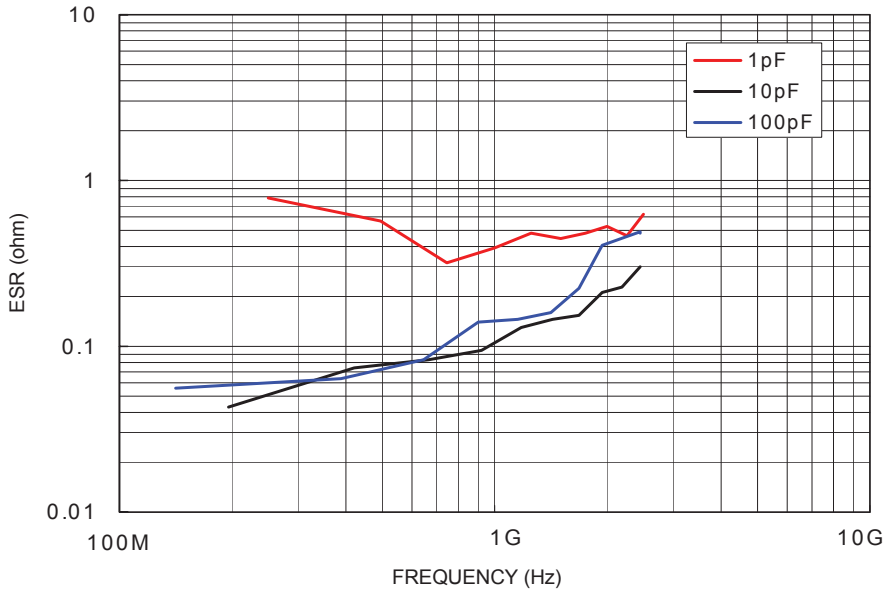
ESR - Frequency Characteristics

MA10/MA19 Series



Measurement Equipment
Boonton Resonant Coaxial-Line 34A

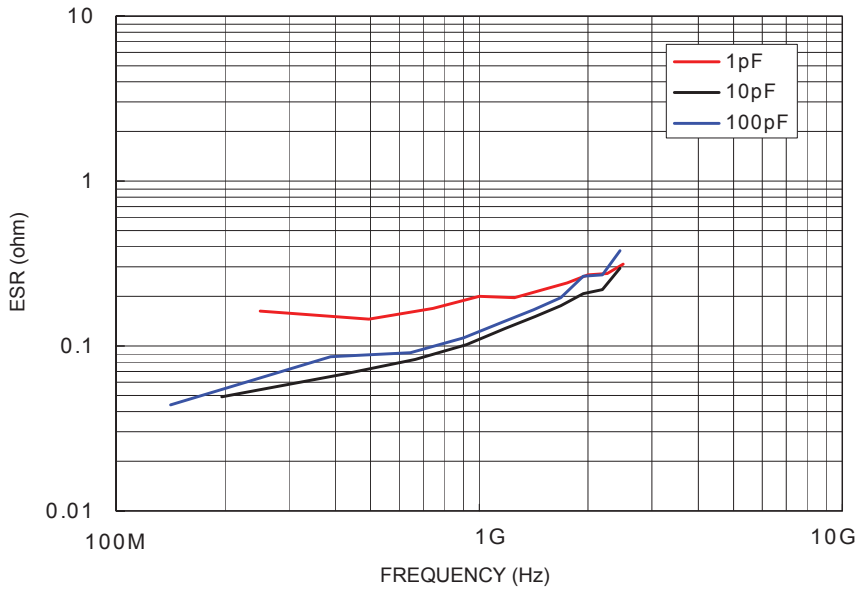
MA20/MA29 Series



MA Technical Data (Typical)

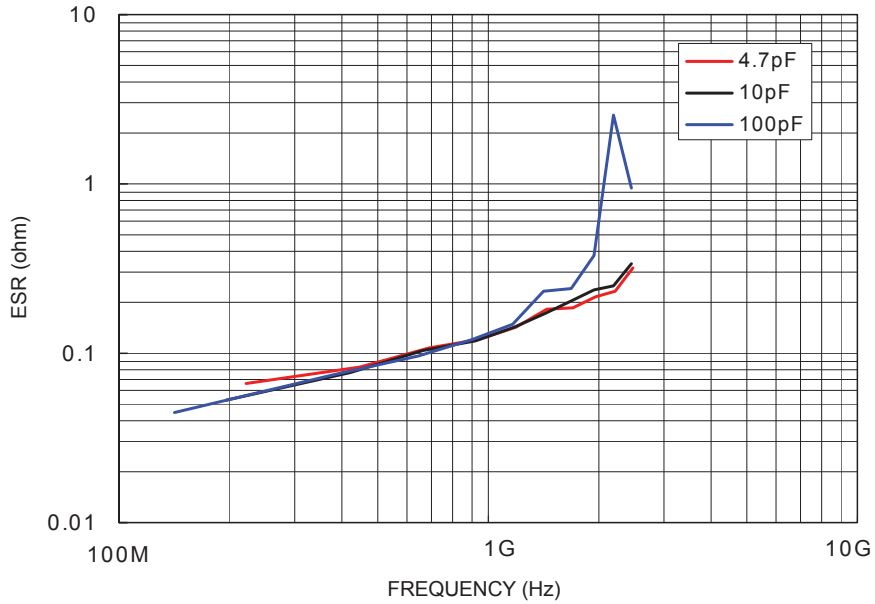
ESR - Frequency Characteristics

MA59 Series



Measurement Equipment
Boonton Resonant Coaxial-Line 34A

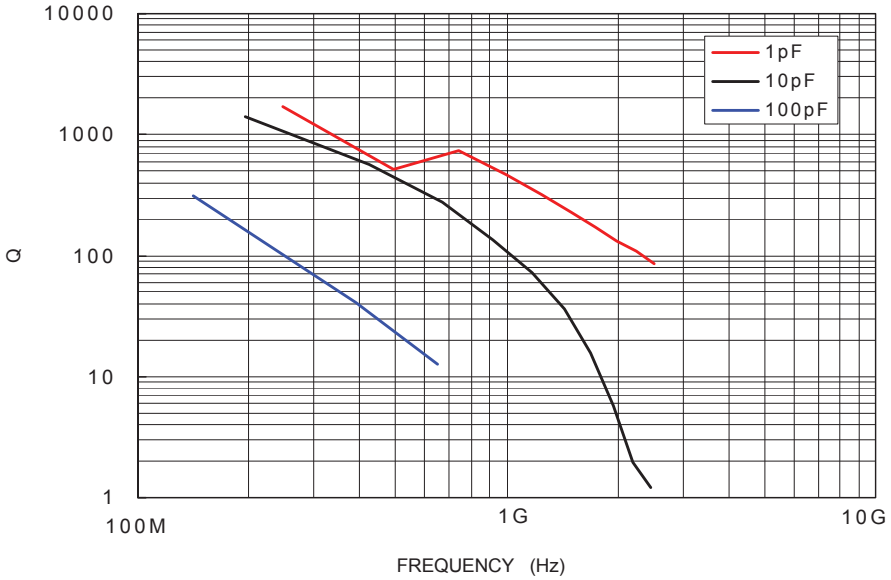
MA69 Series



MA Technical Data (Typical)

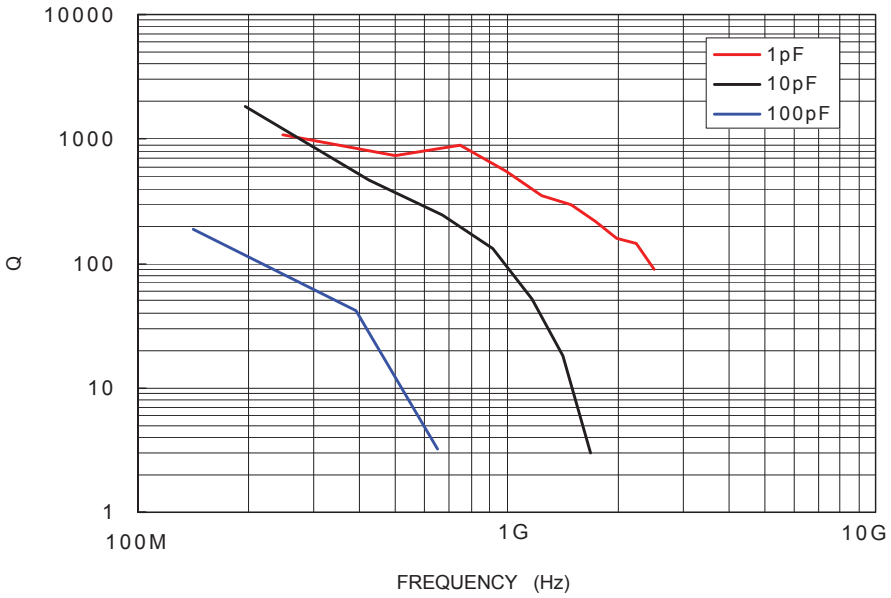
Q - Frequency Characteristics

MA10/MA19 Series



Measurement Equipment Boonton Resonant Coaxial-Line 34A

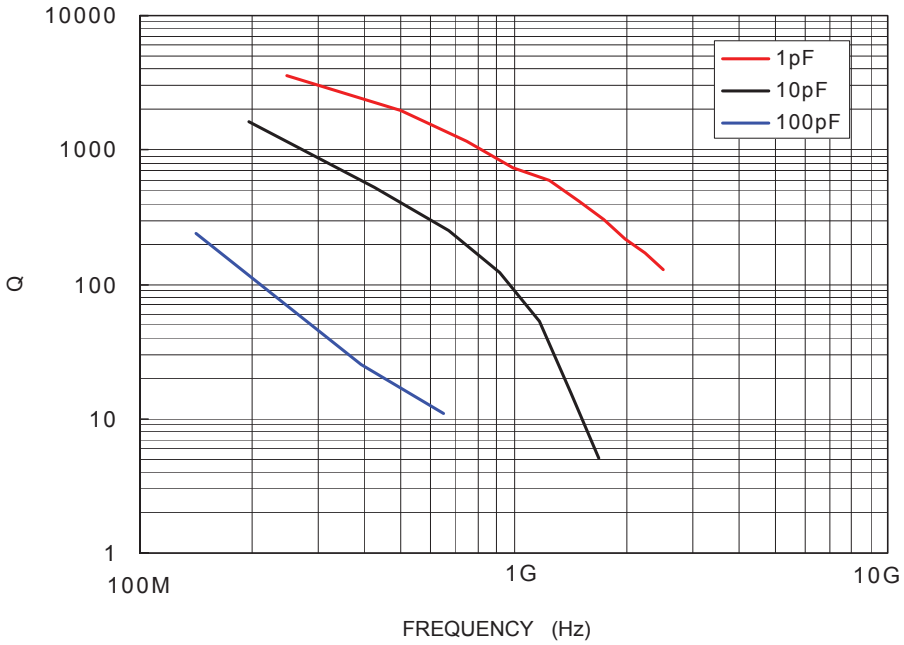
MA20/MA29 Series



MA Technical Data (Typical)

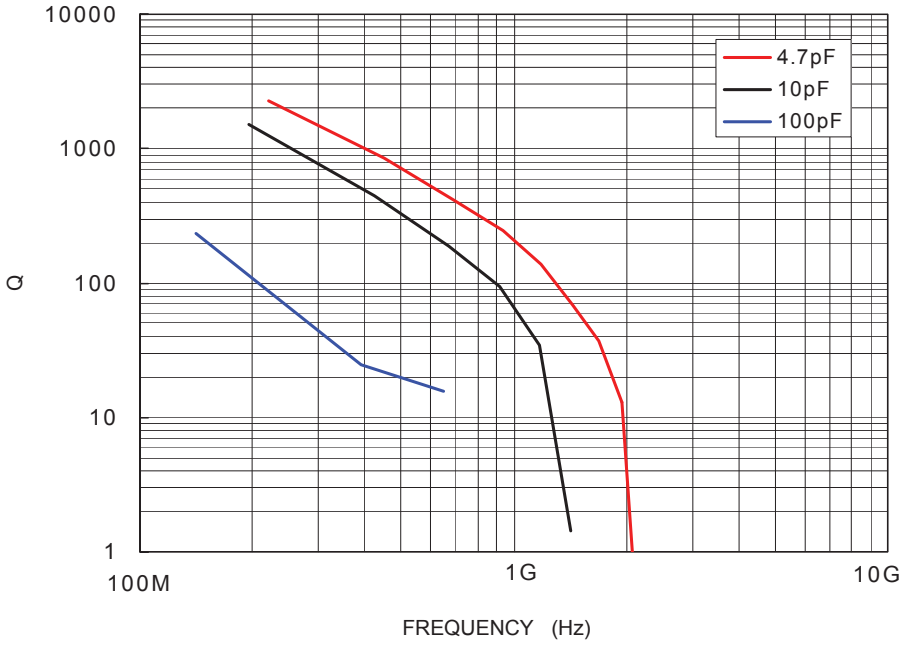
Q - Frequency Characteristics

MA59 Series



Measurement Equipment
Boonton Resonant Coaxial-Line 34A

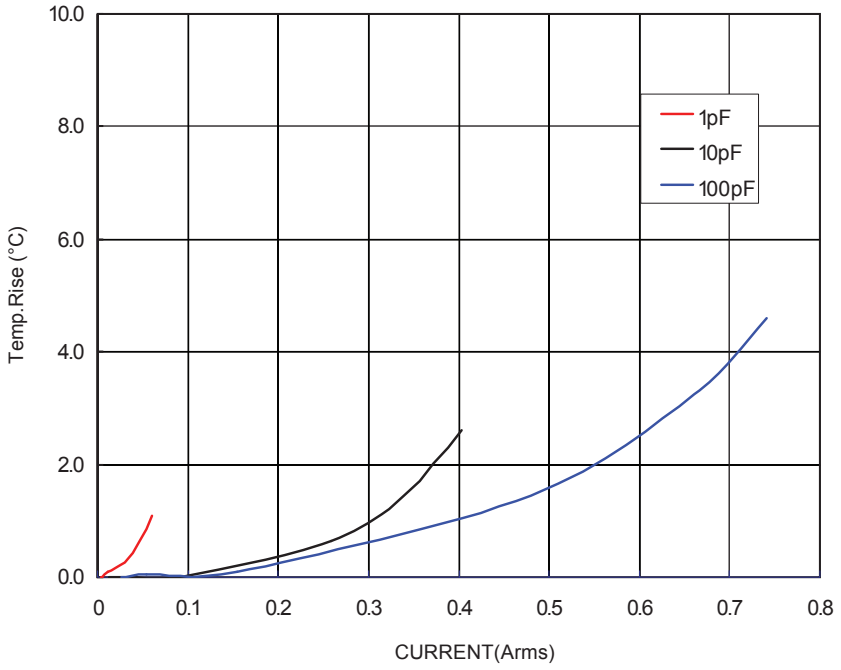
MA69 Series



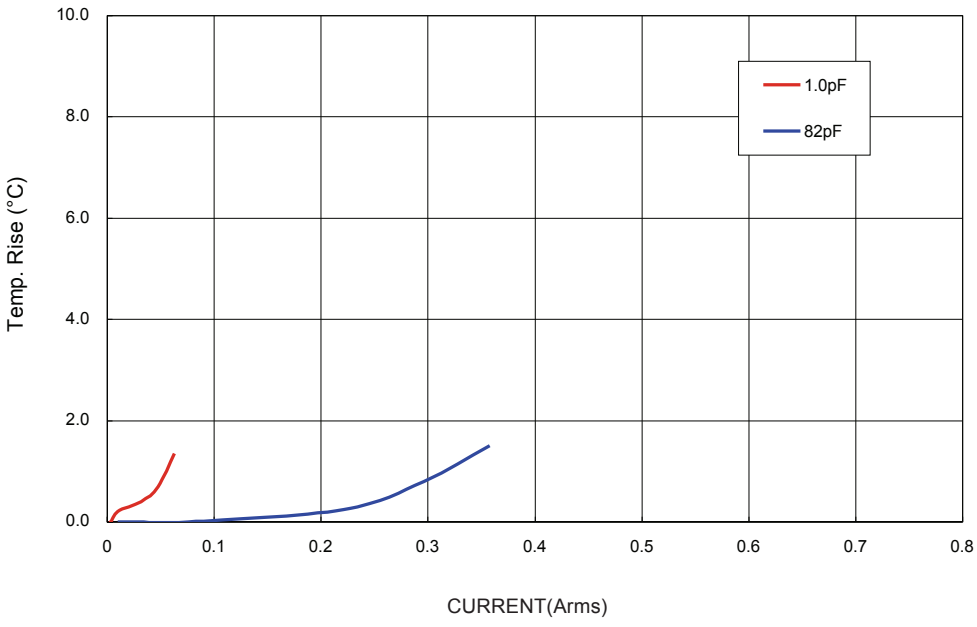
MA Technical Data (Typical)

Temperature Rise - Current Characteristics

MA20/MA29 Series (100MHz)



MA10/MA19 Series (100MHz)



MA Soldering and Mounting

⚠CAUTION

■ Limitation of use

Please contact our sales representatives or product engineers before using our products for the applications listed below which require use of our products for other applications than specified in this listing.
①Aircraft equipment ②Aerospace equipment ③Undersea equipment ④Power plant control equipment
⑤Medical equipment ⑥Transportation equipment (vehicles, trains, ships, etc.) ⑦Traffic signal equipment
⑧Disaster prevention / crime prevention equipment ⑨Data-processing equipment
⑩Application of similar complexity and / or reliability requirements to the applications listed above.

⚠CAUTION

■ Storage and Operating Conditions

1. Chip monolithic ceramic capacitors (chips) can experience degradation of termination solderability when subjected to high temperature or humidity, or if exposed to sulfur or chlorine gases.
   Storage environment must be at an ambient temperatureof 5-40° C. and an ambient humidity of 20-70%RH. Use chip within 6 months. If 6 months or more have elapsed, check solderability before use. (Reference Data 1/ Solderability)
   Insulation Resistance shall be deteriorated in specific condition of high humidity or in corrosive gas such as hydrogen sulfide, sulfurous acid gas, cholorine. Those conditions are not suitable for use.
2. Use of Sn-Zn based solder will deteriorate reliability of MLCC. Please contact Murata factory for the use of Sn-Zn based solder in advance.

⚠CAUTION

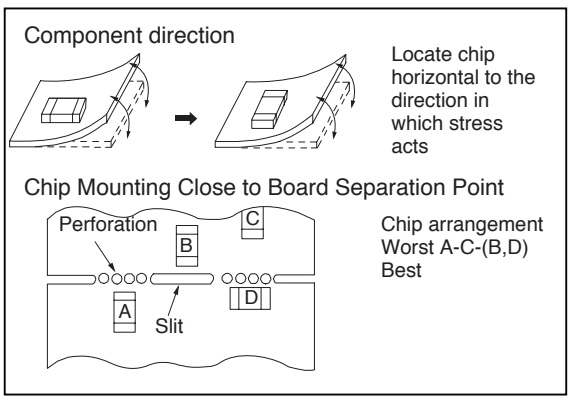
■ Handling

1. Inspection
   - Thrusting force of the test probe can flex the PCB, resulting in cracked chips or open solder joints. Provide support pins on the back side of the PCB to prevent warping or flexing.
2. Board Separation (or Depanelization)
   - Board flexing at the time of separation causes cracked chips or broken solder.
   - Severity of stresses imposed on the chip at the time of board break is in the order of: Pushback<Slitter<V Slot<Perforator.
   - Board separation must be performed using special jigs, not with hands.
3. Reel and bulk case
   - In the handling of reel and case, please pay attention not to drop it. Please do not use chip which has been dropped.

⚠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.



Continued on the following page.

MA Soldering and Mounting

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.

3.Caution for Soldering

(1) Reflow Soldering

When the sudden heat is given to the components, the mechanical strength of the components should go down because remarkable temperature change causes deformity of components inside. 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 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 Table 1.

Table 1

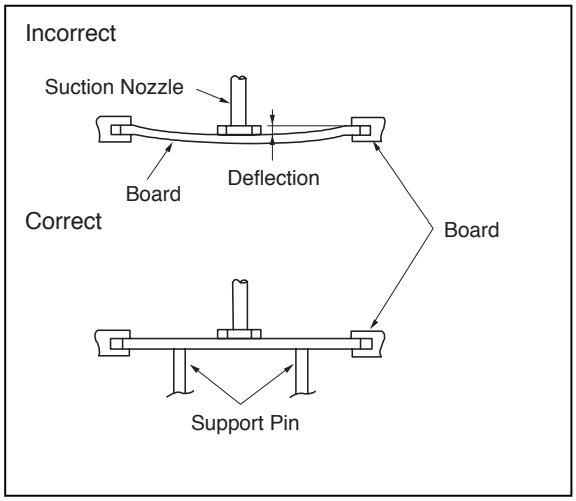
Part Number	Temperature Differential
MA1*/MA5*	ΔT≦190°C
MA2*/MA6*	ΔT≦130°C

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 N2

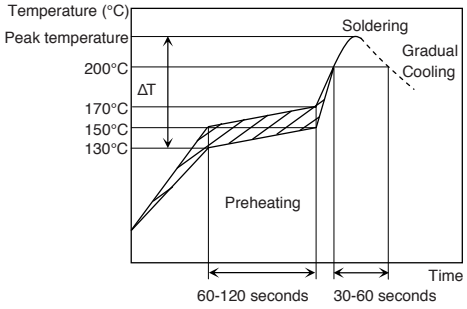
Pb-Sn Solder: Sn-37Pb

Lead Free Solder: Sn-3.0Ag-0.5Cu

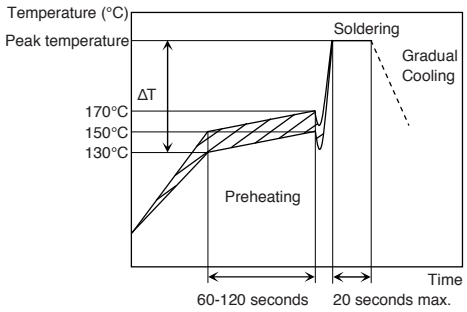


Standard Conditions for Reflow Soldering

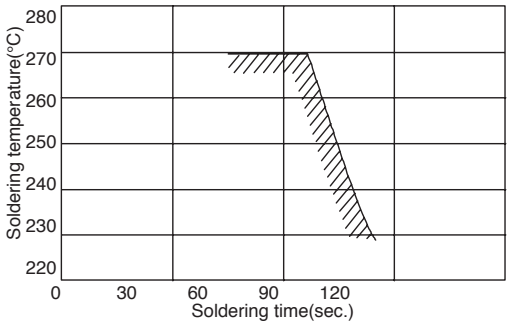
Infrared Reflow



Vapor Reflow



Allowable Soldering Temperature and Time



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

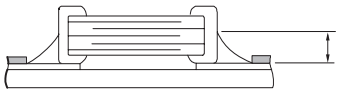
Continued on the following page.

MA Soldering and Mounting

■ 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.

Optimum Solder Amount for Reflow soldering



Inverting the PCB

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

(2) Leaded Component Insertion

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

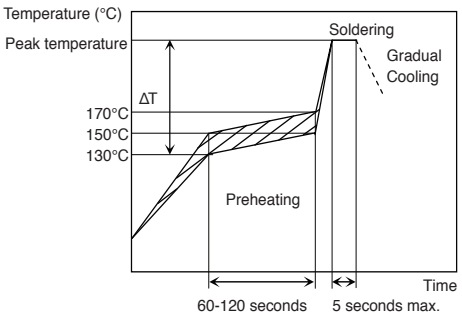
Before mounting leaded components, support the PCB using backup pins or special jigs to prevent warping.

(3) Flow Soldering

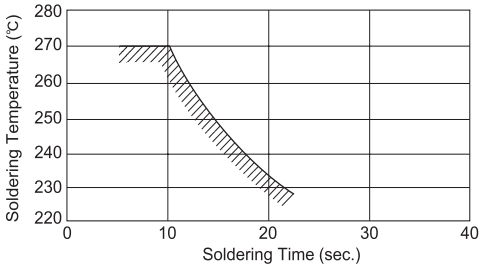
- When the sudden heat is given to the components, the mechanical strength of the components should go down because remarkable temperature change causes deformity of components inside. And an excessively long soldering time or high soldering temperature results in leaching of the outer electrodes, causing 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 should be required for both of the components and the PCB board. Preheating conditions are shown in Table 2. It is required to keep temperature differential between the soldering and the components surface (ΔT) as small as possible.

When components are immersed in solvent after mounting, be sure to maintain the temperature difference between the component and solvent within the range shown in Table 2.
Do not apply flow soldering to chips not listed in Table 2.

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.

Table 2

Part Number	Temperature Differential
MA1*/MA5* (MA10/50 type: Not apply)	ΔT≦150°C

Recommended Conditions

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

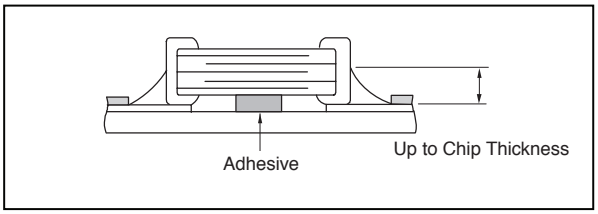
Pb-Sn Solder: Sn-37Pb
Lead Free Solder: Sn-3.0Ag-0.5Cu

Continued on the following page.

MA Soldering and Mounting

■ 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.



(4) Correction with a Soldering Iron

• When the sudden heat is given to the components by soldering iron, the mechanical strength of the components should go down because remarkable temperature change causes deformity of components inside. 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 3. It is required to keep temperature differential between the soldering and the components surface (ΔT) as small as possible. After soldering, it is not allowed to cool it down rapidly.

Table 3

Part Number	Temperature Differential	Peak Temperature	Atmosphere
MA1*/MA5*	ΔT≦190°C	300°C max. 3 seconds max./ termination	Air
MA2*/MA6*	ΔT≦130°C	270°C max. 3 seconds max./ termination	Air

*Applicable for both Pb-Sn and Lead Free Solder

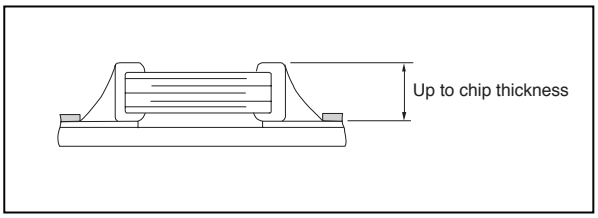
Pb-Sn Solder: Sn-37Pb

Lead Free Solder: Sn-3.0Ag-0.5Cu

■ Optimum Solder Amount when Corrections Are Made Using a Soldering Iron

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.

Soldering iron ϕ3mm or smaller should be required. And it is necessary to keep a distance between the soldering iron and the components without direct touch. Thread solder with ϕ0.5mm 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/OR FUMING WHEN THE PRODUCT IS IN USE.

MA Soldering and Mounting

NOTICE

■ Soldering and Mounting

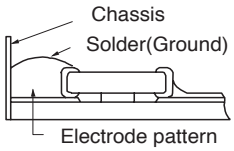
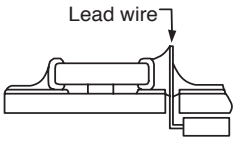
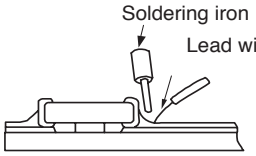
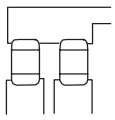
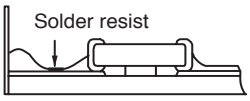
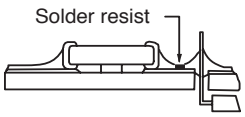
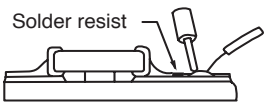
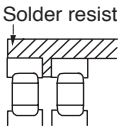
1.PCB Design

● Notice for Pattern Forms

Unlike leaded components, chip components are susceptible to flexing stresses since they are mounted directly on the substrate.
They are also more sensitive to mechanical and thermal stresses than leaded components.
Excess solder fillet height can multiply these stresses and cause chip cracking. When designing substrates, take land patterns and dimensions into consideration to eliminate the possibility of excess solder fillet height.

- There is a possibility the chip may crack by the expansion and shrinkage of metal board. Please contact us if you want to use the ceramic capacitor on metal board such as Aluminum.

Pattern Forms

	Placing Close to Chassis	Placing of Chip Components and Leaded Components	Placing of Leaded Components after Chip Component	Lateral Mounting
prohibited				
Correct				

(2) Land Dimensions

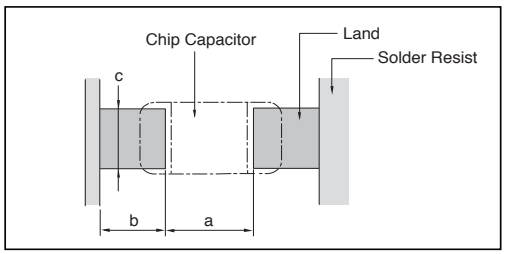


Table 1 Flow Soldering Method

in: mm

Dimensions / Part Number	Dimensions (L×W)	a	b	c
MA1*/MA5*	1.4×1.4	0.5～0.8	0.8～0.9	1.0～1.2

Table 2 Reflow Soldering Method

in: mm

Dimensions / Part Number	Dimensions (L×W)	a	b	c
MA1*/MA5*	1.4×1.4	0.4～0.8	0.6～0.8	1.0～1.2
MA2*/MA6*	2.8×2.8	1.8～2.1	0.7～0.9	2.2～2.6

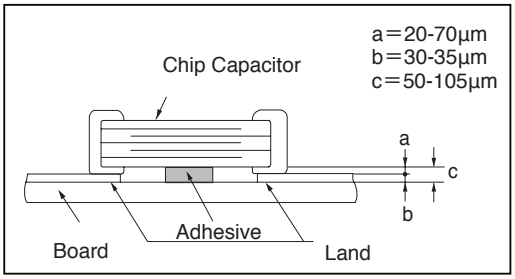
Continued on the following page.

MA Soldering and Mounting

2. Adhesive Application

- Thin or insufficient adhesive causes chips to loosen or become disconnected when flow soldered. The amount of adhesive must be more than dimension c shown in the drawing below to obtain enough bonding strength.

  The chip's electrode thickness and land thickness must be taken into consideration.
- Low viscosity adhesive causes chips to slip after mounting. Adhesive must have a viscosity of 5000pa-s(500ps)min. (at 25°C)



3. Adhesive Curing

Insufficient curing of the adhesive causes chips to disconnect during flow soldering and causes deteriorated insulation resistance between outer electrodes due to moisture absorption.

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

Inverting the PCB

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

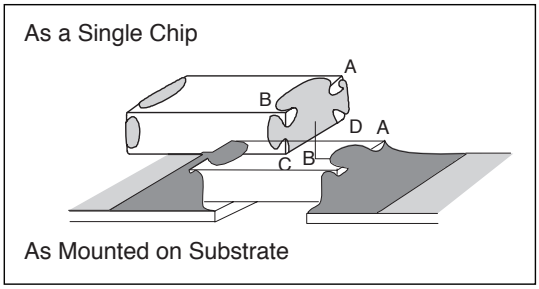
4. Flux Application

- An excessive amount of flux generates a large quantity of flux gas, causing deteriorated solderability. So apply flux thinly and evenly throughout. (A foaming system is generally used for flow soldering).
- Flux containing too high a percentage of halide may cause corrosion of the outer electrodes unless sufficiently cleaned. Use flux with a halide content of 0.2% max. But do not use strongly acidic flux.

Wash thoroughly because water-soluble flux causes deteriorated insulation resistance between outer electrodes unless sufficiently cleaned.

5. Flow Soldering

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



■ Others

1. Resin Coating
   When selecting resin materials, select those with low contraction.
2. Circuit Design
   These capacitors in this catalog are not safety recognized products.
3. Remarks
   The above notices are for standard applications and conditions. Contact us when the products are used in special mounting conditions. Select optimum conditions for operation as they determine the reliability of the product after assembly.

⚠NOTE

1. Please make sure that your product has been evaluated in view of your specifications with our product being mounted to your product.
2. Your are requested not to use our product deviating from this product specificaiotn.
3. Please return one copy of these specifications upon your acceptance. If the copy is not returned by a day mentioned, the specifications will be deemed to have been accepted.
4. We consider it not appropriate to include any terms and conditions with regard to the business transaction in the product specifications, drawings or other technical documents. Therefore, if your technical documents as above include such terms and conditions such as warranty clause, product liability clause, or intellectual property infringement liability clause, they will be deemed to be invalid.

MA Design Engineering Kits

CERAMIC CHIP CAPACITORS

ASCAP Hi-Frequency 0505 (150 VDC)

- Miniature sizes (0505 and 1111)
- Very high Q at high frequency
- High RF power capabilities
- Impervious to environmental conditions
- Low noise
- Base stations and RF power supplies

MA19-HIQ0505KIT-E-

No.	Description	Murata Global P/N	Qty.
1	0505/P090/0.3pF/150V	MA190R3BAB	5
2	0505/P090/0.5pF/150V	MA190R5BAB	5
3	0505/P090/0.7pF/150V	MA190R7BAB	5
4	0505/P090/1.0pF/150V	MA191R0BAB	5
5	0505/P090/1.2pF/150V	MA191R2CAB	5
6	0505/P090/1.5pF/150V	MA191R5CAB	5
7	0505/P090/1.8pF/150V	MA191R8CAB	5
8	0505/P090/2.2pF/150V	MA192R2CAB	5
9	0505/P090/2.7pF/150V	MA192R7CAB	5
10	0505/P090/3.3pF/150V	MA193R3CAB	5
11	0505/P090/3.9pF/150V	MA193R9CAB	5
12	0505/P090/4.7pF/150V	MA194R7CAB	5
13	0505/P090/5.6pF/150V	MA195R6DAB	5
14	0505/P090/6.8pF/150V	MA196R8DAB	5
15	0505/P090/8.2pF/150V	MA198R2DAB	5
16	0505/P090/10pF/150V	MA19100JAB	5
17	0505/P090/12pF/150V	MA19120JAB	5
18	0505/P090/15pF/150V	MA19150JAB	5
19	0505/P090/18pF/150V	MA19180JAB	5
20	0505/P090/22pF/150V	MA19220JAB	5
21	0505/P090/27pF/150V	MA19270JAB	5
22	0505/P090/33pF/150V	MA19330JAB	5
23	0505/P090/39pF/150V	MA19390JAB	5
24	0505/P090/47pF/150V	MA19470JAB	5
25	0505/P090/56pF/150V	MA19560JAB	5
26	0505/P090/68pF/150V	MA19680JAB	5
27	0505/P090/82pF/150V	MA19820JAB	5

1111 (50 to 500 VDC)

- Miniature sizes (0505 and 1111)
- Very high Q at high frequency
- High RF power capabilities
- Impervious to environmental conditions
- Low noise
- Base stations and RF power supplies

MA29-HIQ1111KIT-E-

No.	Description	Murata Global P/N	Qty.
1	1111/P090/0.3pF/500V	MA290R3BAB	5
2	1111/P090/0.5pF/500V	MA290R5BAB	5
3	1111/P090/0.7pF/500V	MA290R7BAB	5
4	1111/P090/1.0pF/500V	MA291R0BAB	5
5	1111/P090/1.2pF/500V	MA291R2CAB	5
6	1111/P090/1.5pF/500V	MA291R5CAB	5
7	1111/P090/1.8pF/500V	MA291R8CAB	5
8	1111/P090/2.2pF/500V	MA292R2CAB	5
9	1111/P090/2.7pF/500V	MA292R7CAB	5
10	1111/P090/3.3pF/500V	MA293R3CAB	5
11	1111/P090/3.9pF/500V	MA293R9CAB	5
12	1111/P090/4.7pF/500V	MA294R7CAB	5
13	1111/P090/5.6pF/500V	MA295R6DAB	5
14	1111/P090/6.8pF/500V	MA296R8DAB	5
15	1111/P090/8.2pF/500V	MA298R2DAB	5
16	1111/P090/10pF/500V	MA29100JAB	5
17	1111/P090/12pF/500V	MA29120JAB	5
18	1111/P090/15pF/500V	MA29150JAB	5
19	1111/P090/18pF/500V	MA29180JAB	5
20	1111/P090/22pF/500V	MA29220JAB	5
21	1111/P090/27pF/500V	MA29270JAB	5
22	1111/P090/33pF/500V	MA29330JAB	5
23	1111/P090/39pF/500V	MA29390JAB	5
24	1111/P090/47pF/500V	MA29470JAB	5
25	1111/P090/56pF/500V	MA29560JAB	5
26	1111/P090/68pF/500V	MA29680JAB	5
27	1111/P090/82pF/500V	MA29820JAB	5
28	1111/P090/100pF/500V	MA29101JAB	5
29	1111/P090/150pF/300V	MA29151JAB	5
30	1111/P090/220pF/200V	MA29221JAB	5
31	1111/P090/330pF/200V	MA29331JAB	5
32	1111/P090/470pF/200V	MA29471JAB	5
33	1111/P090/680pF/50V	MA29681JAB	5
34	1111/P090/1000pF/50V	MA29102JAB	5

NOTE: Custom MA20 (non-magnetic) kits are available for MRI and other Medical applications. For availability, check with your Murata Sales Contact.

MA Design Engineering Kits

CERAMIC CHIP CAPACITORS

ASCAP Hi-Frequency 0505 (150 VDC)

- Miniature sizes (0505 and 1111)
- Very high Q at high frequency
- High RF power capabilities
- Impervious to environmental conditions
- Low noise
- Base stations, MRI systems and RF power supplies

MA59-HIQ0505KIT-E-

No.	Description	Murata Global P/N	Qty.
1	0505/C0G/1pF/150V	MA591R0BAB	5
2	0505/C0G/1.5pF/150V	MA591R5CAB	5
3	0505/C0G/2.2pF/150V	MA592R2CAB	5
4	0505/C0G/3.3pF/150V	MA593R3CAB	5
5	0505/C0G/4.7pF/150V	MA594R7CAB	5
6	0505/C0G/6.8pF/150V	MA596R8DAB	5
7	0505/C0G/10pF/150V	MA59100JAB	5
8	0505/C0G/15pF/150V	MA59150JAB	5
9	0505/C0G/22pF/150V	MA59220JAB	5
10	0505/C0G/33pF/150V	MA59330JAB	5
11	0505/C0G/47pF/150V	MA59470JAB	5
12	0505/C0G/68pF/150V	MA59680JAB	5
13	0505/C0G/100pF/150V	MA59101JAB	5

1111 (50 to 500 VDC)

- Miniature sizes (0505 and 1111)
- Very high Q at high frequency
- High RF power capabilities
- Impervious to environmental conditions
- Low noise
- Base stations, MRI systems and RF power supplies

MA69-HIQ1111KIT-E-

No.	Description	Murata Global P/N	Qty.
1	1111/C0G/1.5pF/500V	MA691R5CAB	5
2	1111/C0G/2.2pF/500V	MA692R2CAB	5
3	1111/C0G/3.3pF/500V	MA693R3CAB	5
4	1111/C0G/4.7pF/500V	MA694R7CAB	5
5	1111/C0G/6.8pF/500V	MA696R8DAB	5
6	1111/C0G/10pF/500V	MA69100JAB	5
7	1111/C0G/15pF/500V	MA69150JAB	5
8	1111/C0G/22pF/500V	MA69220JAB	5
9	1111/C0G/33pF/500V	MA69330JAB	5
10	1111/C0G/47pF/500V	MA69470JAB	5
11	1111/C0G/68pF/500V	MA69680JAB	5
12	1111/C0G/100pF/500V	MA69101JAB	5
13	1111/C0G/220pF/200V	MA69221JAB	5
14	1111/C0G/470pF/200V	MA69471JAB	5
15	1111/C0G/1000pF/50V	MA69102JAB	5

MA Notes