MPR 12

RF/Microwave Porcelain Multilayer Capacitors

Features

- Capacitance Range: 0.1pF to 1000pF
- High Q Low ESR/ESL
- High Power
- Ultra Stable Performance
- High Self-Resonance
- Operating Voltages
  - DC Voltage: 50V to 500V
- Extended WVDC up to 1500VDC

Applications

Typical Functional Applications: Bypass, Coupling, Tuning, Feedback, Impedance Matching and DC Blocking in Circuits Such as RF Amplifiers, Filters and Timing Circuits.

AFM Part Number Code

M	P	R	12	W	101	J	B	C	B	B

Product Series:
M: High Frequency

Dielectrics:
P: Porcelain

Product Type:
R: Chip

Chip Size:
12: 1111

Termination Code:
A: Axial Wire;
AN: Non-Mag Axial Wire
B: Axial Ribbon
BN: Non-Mag Axial Ribbon
C: Pd/Ag Term
G: Ag Term, Ni/Au Plated
M: Microstrip
MN: Non-Mag Microstrip
N: Non Magnetic Term (Ag Term., Cu/Sn Plated)
P: Solder Dipped W Term in 60/40 Sn/Pb
Q: Radial Wire
QN: Non-Mag Radial Wire
T: Ag Term, Ni/100% Sn Plated (Pb Free)
W: Ag Term, Ni Barrier, 90/10 Sn/Pb Plated

Capacitance Code:
1st two digits are significant: Third digit denotes number of zero(s);
R=Decimal point
2R0=2.0pF
101=100pF

Tolerance:
B: ±0.1pF
C: ±0.25pF
D: ±0.5pF
F: ±1%
G: ±2%
J: ±5%
K: ±10%
M: ±20%

Voltage:
B: 50 Vdc
D: 100 Vdc
F: 200 Vdc
H: 300 Vdc
J: 500 Vdc
L: 1000Vdc
N:1500Vdc
P: 2500Vdc

Test Code:
C: Commercial Test
S: Special (Customer Defined)
M: Hi-Rel

Marking:
B: Not Marked
M: Marked (Cap code and tolerance)
S: Special Marking

Packaging:
B: Bulk
T: Tape & Reel
W: Waffle Pack

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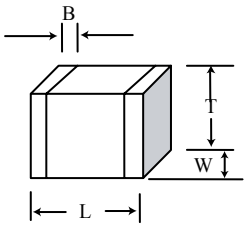
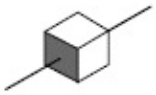
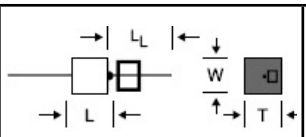
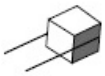
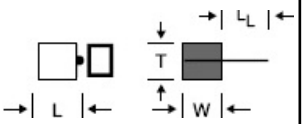
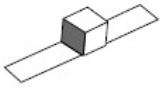
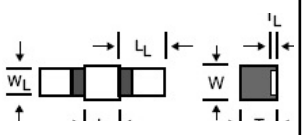
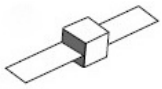
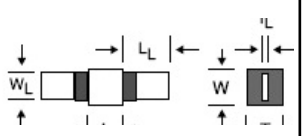
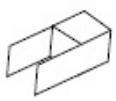
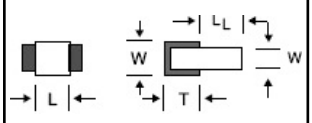
Chip Dimensions and Termination Options

Term Code	Type	MIL-PRF-55681	Outlines	Body Dimensions Inches (mm)			Lead and Termination Dimensions and Materials		
				Length (L)	Width (W)	Thickness (T)	B	Materials	
W	Solder Plate	CDR14BG		.110 +.020-.010 (2.79 +0.51-0.25)	.110±.015 (2.79±0.38)	.102 (2.59) max	.015 (0.38) ±.010 (0.25) max	Solder Plated Over Nickel Barrier Termination 90 Sn/10 Pb	
P	Pellet	CDR14BG		.110 +.035-.010 (2.79 +0.89-0.25)	.110±.015 (2.79±0.38)			W Termination with Sn/Pb Solder Dip	
T	Lead Free Solder Plated	N/A		.110 +.020-.010 (2.79 +0.51-0.25)	.110±.015 (2.79±0.38)			Lead-Free and RoHS Compliant Tin Plated Over Nickel Barrier Termination	
G	Gold Plated	CDR13BG						Lead-Free and RoHS Compliant Gold Plated Over Nickel Barrier Termination	
C	Pd/Ag	CDR13BG						Palladium/Silver Termination	
N	Non Magnetic Term.(Ag Term, Cu/Sn Plated)	N/A						Cu/Sn Plated Over Silver Termination	
							Length (L_1)	Width (W_1)	Thickness (T_1)
A/ AN	 Axial Wire/Non-Magnetic	CDR25BG		.145±.020 (3.68±0.51)	.110±.015 (2.79±0.38)	.102 (2.59) max.	.500 (12.7) min.	#26 AWG., .016(.406) dia. nominal	
Q/ QN	 Radial Wire/Non-Magnetic	CDR23BG							
M/ MN	 Microstrip/Non-Magnetic	CDR21GB		.135±.015 (3.43±0.38)		.120 (3.05) max.	.250 inches (6.35 mm) min.	.093 ±.0 05 inches (2.36 ±.0 13 mm)	.004 ±.0 01 inches (0.102 ±.0.025 mm)
B/ BN	 Axial Ribbon/Non-Magnetic	CDR22BG				102 (2.59) max.			
R	 Radial Ribbon	CDR24BG							

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Standard Capacitance Values

CAP CODE	CAP (pF)	TOL	RATED WVdc		CAP CODE	CAP (pF)	TOL	RATED WVdc		CAP CODE	CAP (pF)	TOL	RATED WVdc		CAP CODE	CAP (pF)	TOL	RATED WVdc	
			STD.*	EXT.*				STD.	EXT.				STD.	EXT.				STD.	EXT.
0R1	0.1	B	500	1500	2R4	2.4	B, C, D	500	1500	200	20	F, G, J, K, M	500	1500	151	150	F, G, J, K, M	300	1000
0R2	0.2				2R7	2.7				220	22				161	160			
0R3	0.3	B, C			3R0	3.0				240	24				181	180			
0R4	0.4				3R3	3.3				270	27				201	200			
0R5	0.5	B, C, D			3R6	3.6				300	30				221	220		200	N/A
0R6	0.6				3R9	3.9				330	33				241	240			
0R7	0.7				4R3	4.3				360	36				271	270			
0R8	0.8				4R7	4.7				390	39				301	300			
0R9	0.9				5R1	5.1				430	43				331	330			
1R0	1.0				5R6	5.6				470	47				361	360			
1R1	1.1				6R2	6.2				510	51		500	1000	391	390			
1R2	1.2				6R8	6.8	B, C, J, K, M			560	56				431	430			
1R3	1.3				7R5	7.5				620	62				471	470			
1R4	1.4				8R2	8.2				680	68				511	510		100	
1R5	1.5				9R1	9.1				750	75				561	560			
1R6	1.6				100	10	F, G, J, K, M			820	82				621	620			
1R7	1.7				110	11				910	91				681	680		50	
1R8	1.8				120	12				101	100				751	750			
1R9	1.9				130	13				111	110		300		821	820			
2R0	2.0				150	15				121	120				911	910			
2R1	2.1				160	16				131	130				102	1000			
2R2	2.2				180	18													

*STD.:Standard Voltage; EXT.: Extended Voltage

Specification and Performance

Piezoelectric and Aging Effect:	None
Temperature Range:	0.1pF~330pF: -55°C to +175°C 360pF~1000pF: -55°C to +125°C
Temperature Coefficient of Capacitance(TCC):	+90±20ppm/°C (-55°C to +125°C) +90±30ppm/°C (125°C to +175°C)
Quality Factor (Q) :	>10,000 at 1MHz
Insulation Resistance (IR, at Rated Voltage):	0.1pF~470pF: 10^6MΩ min. at +25°C at rated WVDC 10^5MΩ min. at +125°C at rated WVDC 510pF~1000pF:10^5MΩ min. at +25°C at rated WVDC 10^4MΩ min. at +125°C at rated WVDC
Dielectric Withstand Voltage (DWV):	250% of rated WVDC for 5 secs
Capacitance Drift:	±0.02% or ±0.02pF, whichever is greater

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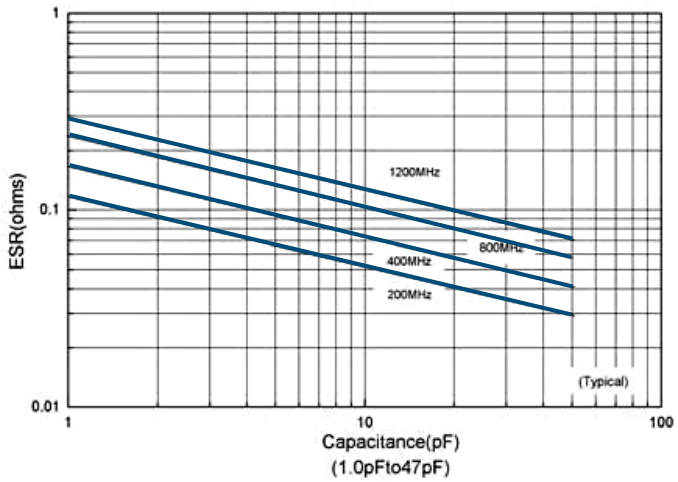
Environmental Tests

MPR12 Series Capacitors are designed and manufactured to meet and exceed the requirements of EIA-198, MIL-PRF-55681 and MIL-PRF-123.

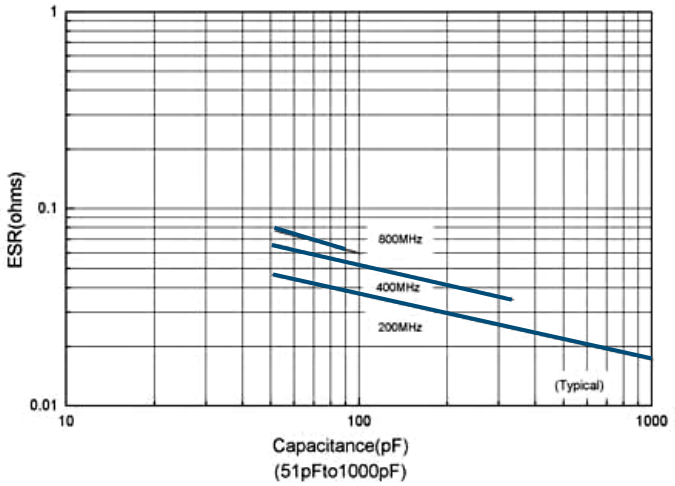
Item	Specifications	Method
Thermal Shock	DWV: the initial value IR: shall be not less than 30% the initial value Capacitance Change: no more than 0.5% or 0.5pF	MIL-STD-202, Method 107, Condition A. At the maximum rated temperature (-55°C and +125°C) stay 30 minutes, the time of removing shall be not more than 3 minutes. Perform the five cycles.
Moisture Resistance		MIL-STD-202, Method 106
Humidity (steady state)	DWV: the initial value IR: the initial value Capacitance Change: no more than 0.3% or 0.3pF	MIL-STD-202, Method 103, Condition A, with 1.5 volts D.C. applied while subjected to an environment of 85°C with 85% relative humidity for 240 hours min.
Life	IR: shall be not less than 30% the initial value Capacitance Change: no more than 0.2%	MIL-STD-202, Method 108, for 2000 hours, at 125°C. Rated voltage≤500V: 200% Rated Voltage D.C. applied. 500V≤Rated Voltage≤1250V: 120% Rated Volatge D.C. applied. Rated voltage >1250V: 100% Rated Voltage D.C. applied.

Performance Curve

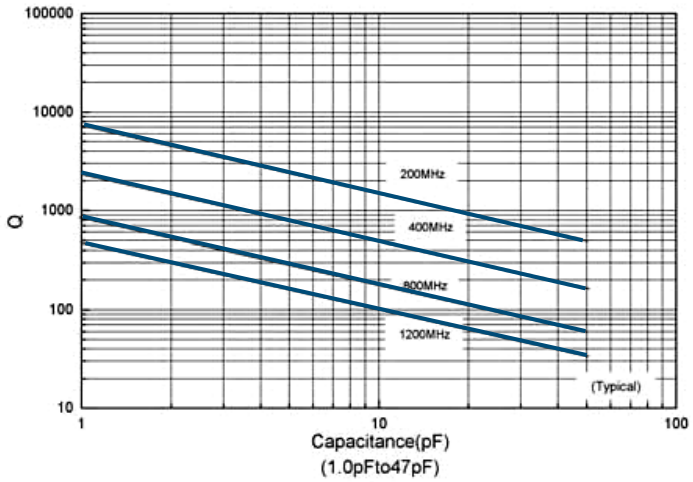
ESR vs.Capacitance



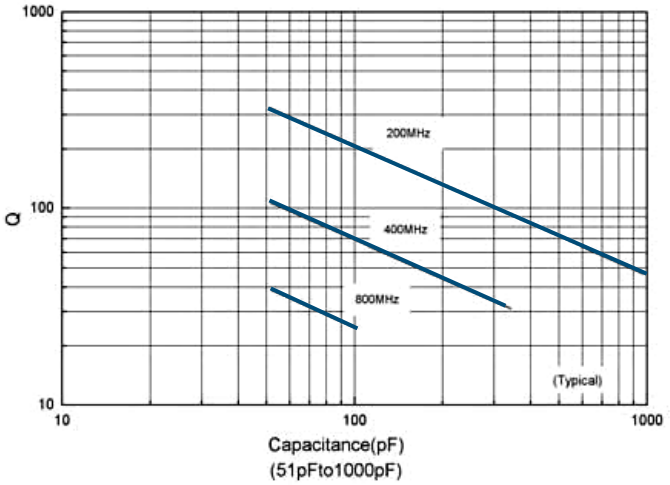
ESR vs.Capacitance



Q vs.Capacitance



Q vs.Capacitance



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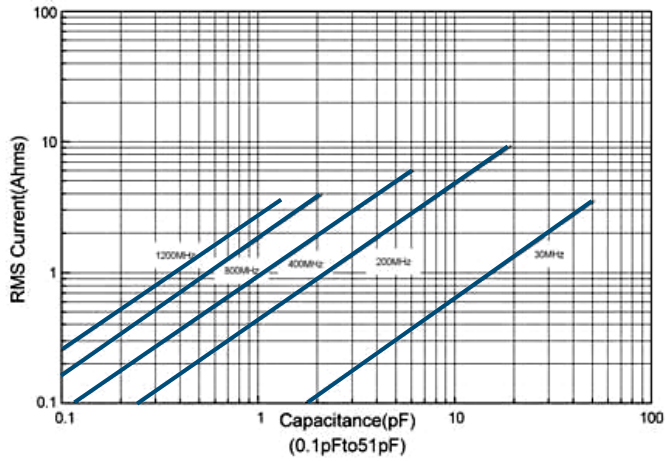
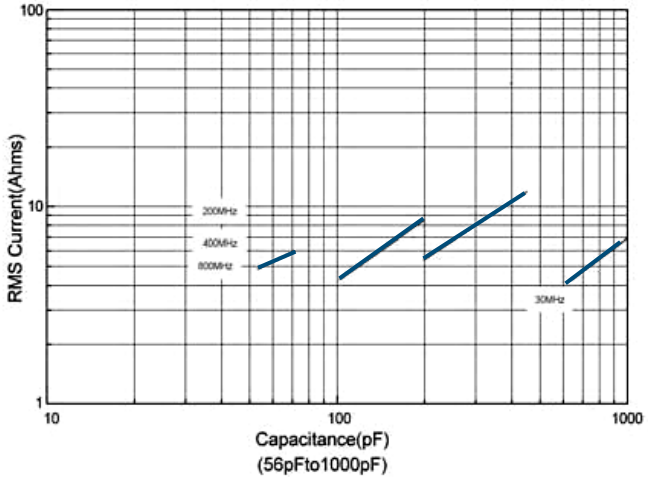
Performance Curve

Current Rating vs. Capacitance



Current Rating vs. Capacitance



Resonance vs.Capacitance