MNR 12

RF/Microwave COG (NPO) Multilayer Capacitors

Features

- Capacitance Range: 0.1pF to 5100pF
- High Q Low ESR/ESL
- High Power
- Ultra Stable Performance
- High Self-Resonance
- Operating Voltages
  - DC Voltage: 50V to 500V
- Extended WVDC up to 1500 Vdc
- Available with Encapsulation Option

Applications

Typical Functional Applications: Bypass, Coupling, Tuning, Feedback, Impedance Matching and DC Blocking. Devices such as RF oscillators and precision timing circuits requiring a predictable temperature coefficient are examples of devices utilizing these capacitors.

AFM Part Number Code

M	N	R	12	W	101	J	B	C	B	B
Product Series: M: High Frequency	**Dielectrics:** N: NPO	**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: 1000 Vdc N:1500 Vdc	**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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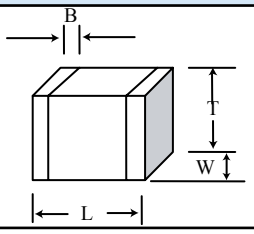
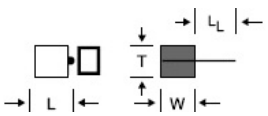
Chip Dimensions and Termination Options

AFM Series	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	
MNR12	W	Solder Plate	CDR14BP		.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	CDR14BP						W Termination with Sn/Pb Solder Dip	
	T	Lead Free Solder Plated	N/A						Lead-Free and RoHS CompliantTin Plated Over Nickel Barrier Termination	
								Length(L_1)	Width(W_1)	Thickness(T_1)
	Q/ QN	Radial Wire/ Non-Magnetic	CDR23BP		.145±.020 (3.68±0.51)			.500 (12.7) min.	#26 AWG., .016 (0.406) dia. nominal	
	R	Radial Ribbon	CDR24BP		.135±.015 (3.43±0.38)			.025 (6.35) min.	.093±.005 (2.36±0.13)	.004±.001 (0.102±0.25)

Standard Capacitance Values

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

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	3R3	3.3	B, C, D	500	1500	360	36	F, G, J, K, M	500	1500	391	390	F, G, J, K, M	200	N/A
0R2	0.2				3R6	3.6				390	39				431	430			
0R3	0.3	B, C			3R9	3.9				430	43				471	470			
0R4	0.4				4R3	4.3				470	47				511	510		100	
0R5	0.5	B, C, D			4R7	4.7				510	51			1000	561	560			
0R6	0.6				5R1	5.1				560	56				621	620			
0R7	0.7				5R6	5.6				620	62				681	680		50	
0R8	0.8				6R2	6.2				680	68				751	750			
0R9	0.9				6R8	6.8	B, C, J, K, M			750	75				821	820			
1R0	1.0				7R5	7.5				820	82				911	910			
1R1	1.1				8R2	8.2				910	91				102	1000			
1R2	1.2				9R1	9.1				101	100				112	1100			
1R3	1.3				100	10	F, G, J, K, M			111	110		300		122	1200			
1R4	1.4				110	11				121	120				152	1500			
1R5	1.5				120	12				131	130				182	1800			
1R6	1.6				130	13				151	150				222	2200			
1R7	1.7				150	15				161	160				272	2700			
1R8	1.8				160	16				181	180				302	3000			
1R9	1.9				180	18				201	200				332	3300			
2R0	2.0				200	20				221	220		200	N/A	392	3900			
2R1	2.1				220	22				241	240				472	4700			
2R2	2.2				240	24				271	270				512	5100			
2R4	2.4				270	27				301	300								
2R7	2.7				300	30				331	330								
3R0	3.0				330	33				361	360								

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Specification and Performance

Piezoelectric and Aging Effect:	None
Temperature Range:	-55°C to +125°C
Temperature Coefficient of Capacitance:	0±30ppm/°C
Quality Factor (Q) :	>10,000 (1pF~200pF) at 1MHz >2000 (220pF~1000pF) at 1MHz >2000 (1100pF~5100pF) at 1KHz
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~5100pF: 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

Environmental Tests

MNR12 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.

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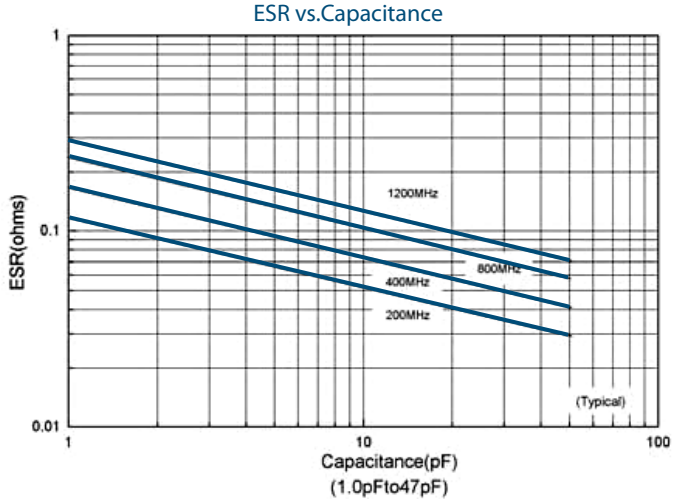
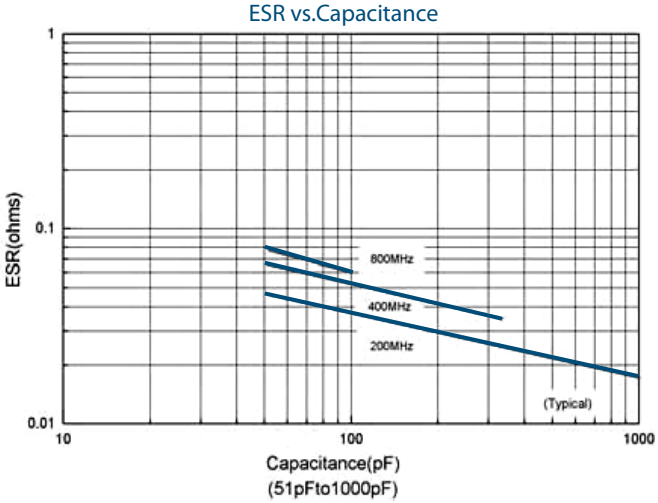
Performance Curve

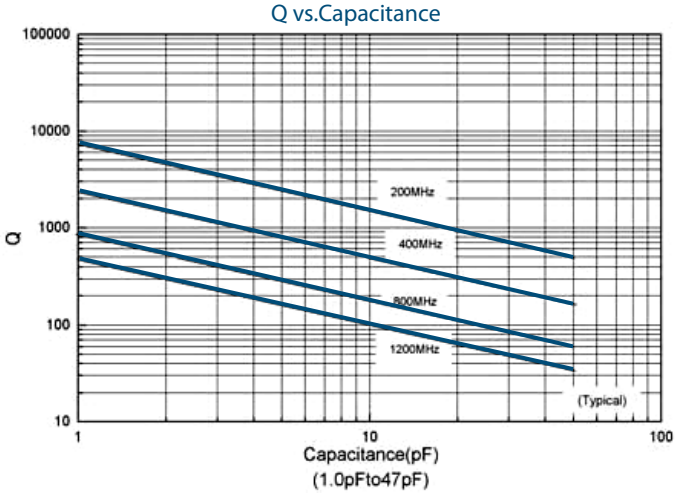
ESR vs.Capacitance



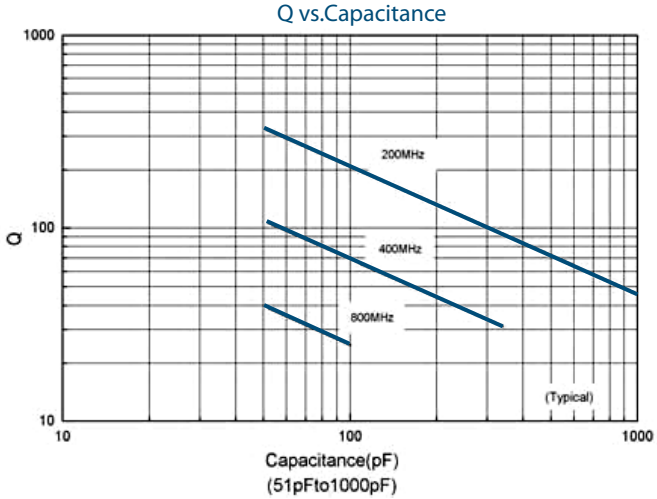
ESR vs.Capacitance



Q vs.Capacitance



Q vs.Capacitance



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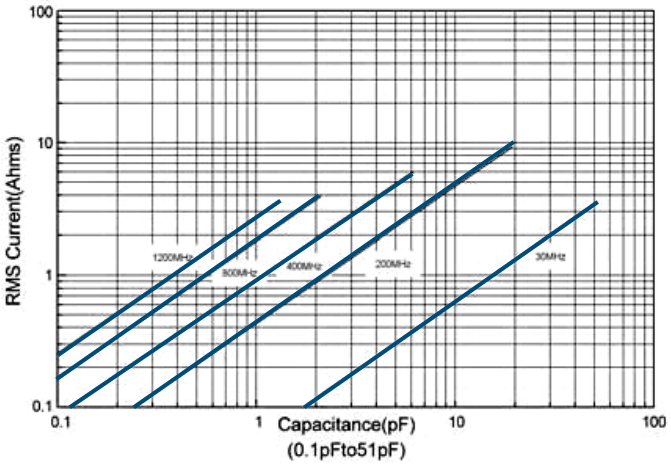
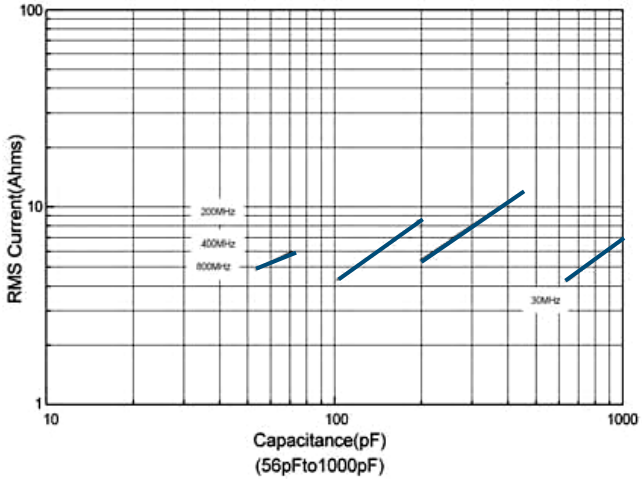
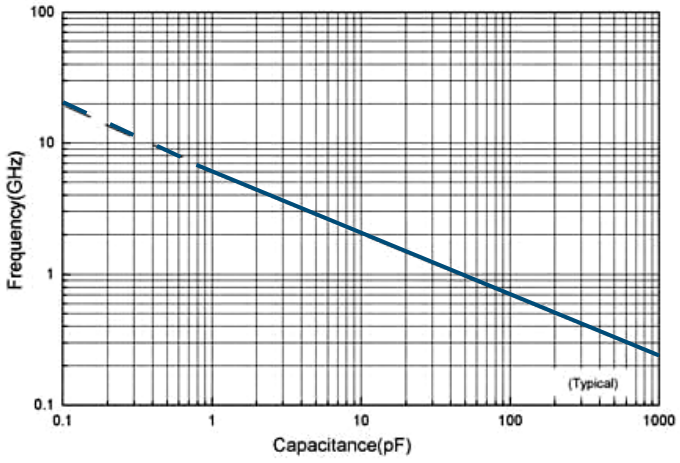
Current Rating vs.Capacitance



Current Rating vs.Capacitance



Resonance vs.Capacitance



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