Coaxial

Directional Coupler

50Ω 0.2 to 250 MHz

ZMDC-20-3+

Generic photo used for illustration purposes only

CASE STYLE: M21

Connectors	Model
SMA	ZMDC-20-3+
BRACKET (OPTION"B")	
BRACKET (OPTION "BR")	

+RoHS Compliant
The +Suffix identifies RoHS Compliance.
See our website for methodologies and qualifications

Maximum Ratings

Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C

Permanent damage may occur if any of these limits are exceeded.

Coaxial Connections

INPUT	3
OUTPUT	2
COUPLED	1

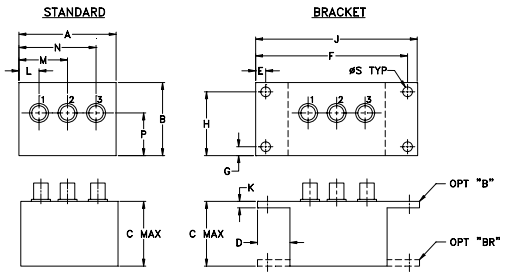
Features

- excellent mainline loss, 0.35 dB typ.
- excellent directivity, 33 dB typ.
- high input power, up to 4W max.
- rugged shielded case

Applications

- HF/VHF
- amateur radio
- instrumentation

Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H
1.50	1.13	1.00	.50	.155	2.345	.138	.987
38.10	28.70	25.40	12.70	3.94	59.56	3.51	25.07

J	K	L	M	N	P	S	wt
2.50	.10	.31	.75	1.19	.66	.150	grams
63.50	2.54	7.87	19.05	30.23	16.76	3.81	40.0

Directional Coupler Electrical Specifications

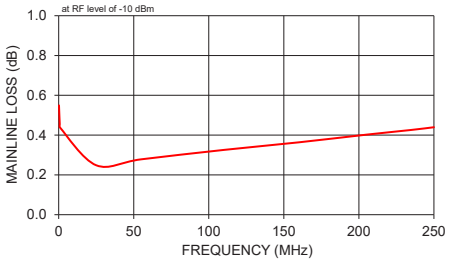
FREQ.	COUPLING (dB)		MAINLINE LOSS[1] (dB)						DIRECTIVITY (dB)							POWER INPUT (W)	
			L*		M		U		L		M		U			L	MU
f_L-f_U	Nom.	Flat-ness	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Max.	Max.
0.2-250	19.5±0.5	±0.5	0.4	0.7	0.35	0.5	0.35	0.6	36	30	33	25	25	20	1.2	1.5	4.0

L = low range [f_L to 10 f_L] M = mid range [10 f_L to f_U/2] U= upper range [f_U/2 to f_U]
1. Mainline loss includes theoretical power loss at coupled port.
*Insertion loss specification in L range may degrade up to 1.3 dB at cold temperature (-55°C)

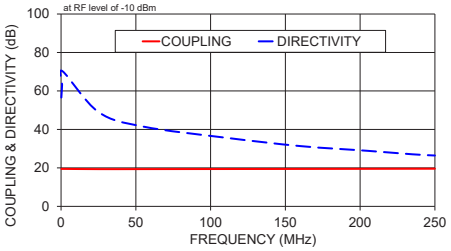
Typical Performance Data

Frequency (MHz)	Mainline Loss (dB) In-Out	Coupling (dB) In-Cpl	Directivity (dB)	Return Loss (dB) In	Return Loss (dB) Out	Return Loss (dB) Cpl
0.20	0.55	19.44	56.58	13.62	13.51	15.46
0.70	0.45	19.48	63.29	22.56	21.82	23.65
1.00	0.44	19.49	70.24	24.20	23.19	24.81
25.00	0.25	19.36	49.06	37.88	32.87	32.35
55.00	0.28	19.37	41.46	37.37	33.05	31.41
110.00	0.33	19.42	35.69	33.20	31.89	29.14
160.00	0.36	19.47	31.34	31.12	31.19	26.99
205.00	0.40	19.52	28.88	29.08	29.95	25.45
235.00	0.43	19.56	27.07	28.20	29.65	24.48
250.00	0.44	19.58	26.44	27.74	29.23	24.00

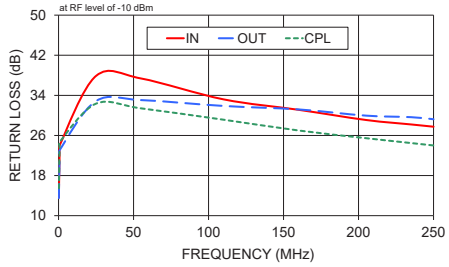
ZMDC-20-3+
MAINLINE LOSS



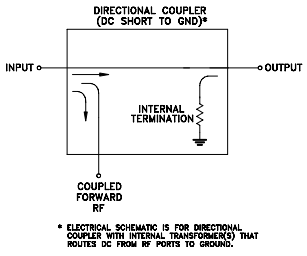
ZMDC-20-3+
COUPLING & DIRECTIVITY



ZMDC-20-3+
RETURN LOSS



Electrical Schematic



Notes
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp

Directional Coupler ZMDC-20-3+

Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS (dB)	COUPLING (dB)	DIRECTIVITY (dB)	RETURN LOSS (dB)		
				IN	OUT	CPL
0.2	0.27	19.30	50.00	21.66	21.23	20.44
0.3	0.28	19.34	49.89	21.42	21.34	20.83
0.9	0.28	19.36	49.51	28.84	28.04	28.38
49.9	0.24	19.33	51.88	36.50	34.32	37.55
101.4	0.29	19.39	45.73	31.41	30.95	34.11
125.2	0.30	19.40	42.05	29.83	29.57	32.57
162.3	0.30	19.42	38.02	27.88	27.75	30.24
216.3	0.33	19.46	35.65	25.38	25.70	27.77
243.1	0.34	19.49	33.18	24.43	24.88	26.47
250.0	0.35	19.50	33.42	24.21	24.67	26.09

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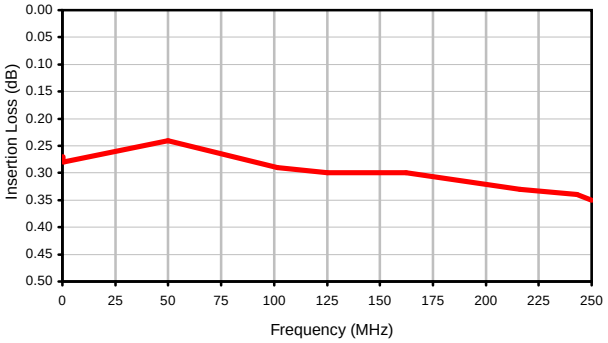
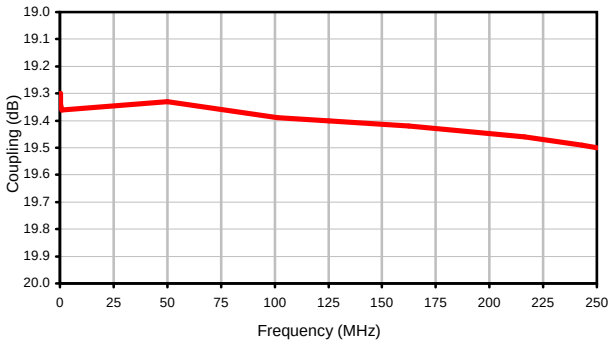
Typical Performance Curves

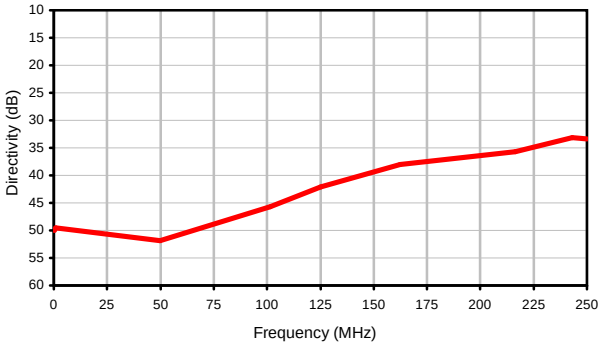
Insertion Loss



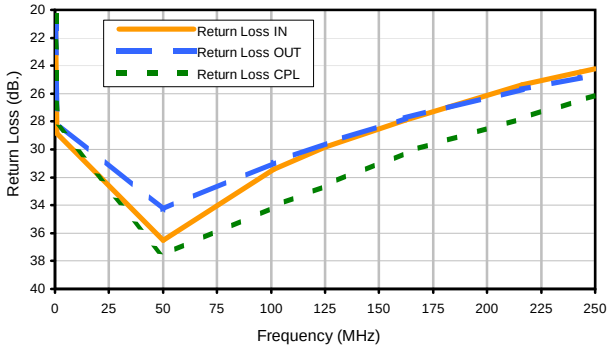
Coupling



Directivity



Return Loss



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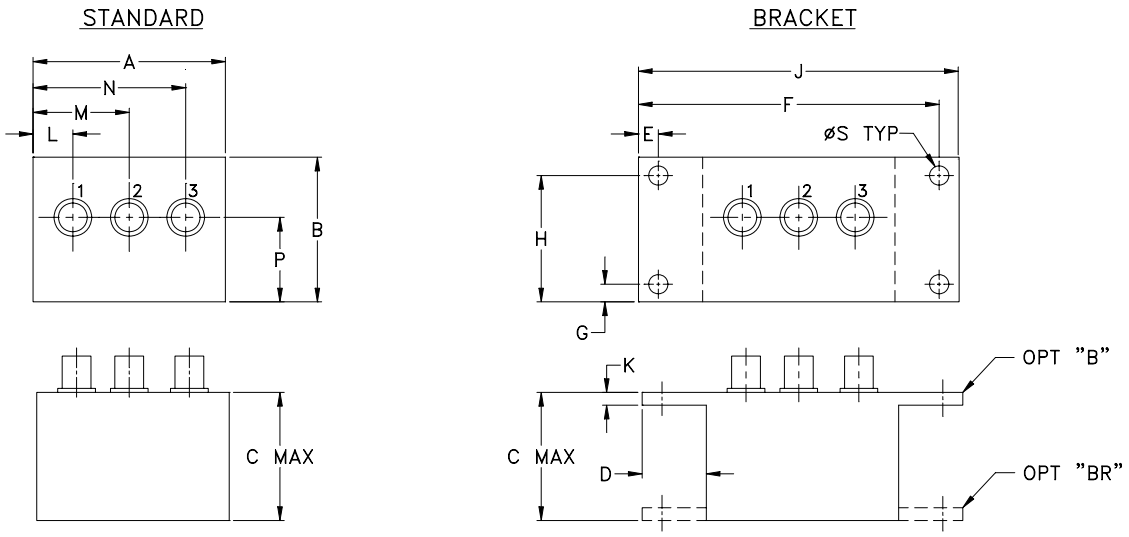
Case Style M

Outline Dimensions

M21
M22
M23



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
M21	1.50 (38.10)	1.13 (28.70)	1.00 (25.40)	.50 (12.70)	.155 (3.94)	2.345 (59.56)	.138 (3.51)	.987 (25.07)	2.50 (63.50)	.10 (2.54)	.31 (7.87)	.75 (19.05)	1.19 (30.23)
M22	2.25 (57.15)	1.38 (35.05)	1.24 (31.50)		.150 (3.81)	3.100 (78.74)		1.238 (31.45)	3.25 (82.55)		.40 (10.16)	1.15 (29.21)	1.86 (47.24)
M23	2.25 (57.15)	1.38 (35.05)	1.24 (31.50)		.150 (3.81)	3.100 (78.74)		1.238 (31.45)	3.25 (82.55)		.63 (16.00)	1.06 (26.92)	1.63 (41.40)

CASE#	P	Q	R	S	WT. GRAMS
M21	.66 (16.76)	-- --	-- --	.150 (3.81)	40.0
M22	.64 (16.26)	-- --	-- --		74.0
M23	.69 (17.53)	-- --	-- --		70.0

Dimensions are in inches (mm). Tolerances: 2 Pl. ± .03; 3 Pl. ± .015

Notes:

1. Case material: Aluminum alloy.
2. Case finish:
   For RoHS Case Styles: Clear chemical conversion coating, non-chrome or trivalent chrome based.

   For Non-RoHS Case Styles: Yellow hexavalent chrome based conversion coating.
   Due to transition from non-RoHS to RoHS, models will be supplied with either case style finish until the non-RoHS case inventory is depleted.
3. Mounting bracket available on request. For bracket mounted on connector end add suffix B to part number and add $5.00 to unit cost. For bracket mounted on the rear, add suffix BR to part number and add $1.50 to unit cost.

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Environmental Specifications ENV28

All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-55° to 100°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Barometric Pressure	100,000 Feet	MIL-STD-202, Method 105, Condition D
Humidity	90% RH, 65°C Units may require bake-out after humidity to restore full performance.	MIL-STD-202, Method 103
Thermal Shock	-65° to 125°C, 5 cycles	MIL-STD-202, Method 107, Condition B
Vibration (High Frequency)	20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)	MIL-STD-202, Method 204, Condition D
Mechanical Shock	100g, 6ms sawtooth, 3 shocks each direction 3 axes (total 18)	MIL-STD-202, Method 213, Condition I

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