

# Coaxial Directional Coupler

50Ω

0.2 to 250 MHz

## ZDC-20-3



Generic photo used for illustration purposes only

CASE STYLE: M22

### 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 directivity, 33 dB typ.
- excellent mainline loss, 0.25 dB typ.
- rugged shielded case

### Applications

- HF/VHF/UHF
- instrumentation
- communication receivers & transmitters
- amateur radio

Connectors Model  
**BNC** ZDC-20-3  
**BRACKET (OPTION "B")**  
**BRACKET (OPTION "BR")**

### Directional Coupler Electrical Specifications

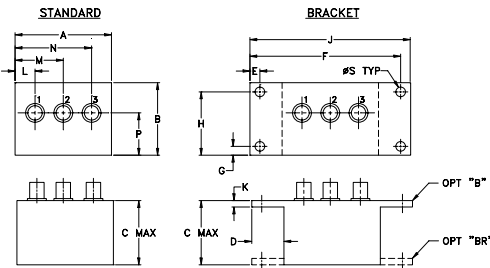
FREQ. RANGE (MHz)	COUPLING (dB)		MAINLINE LOSS <sup>1</sup> (dB)						DIRECTIVITY (dB)						POWER INPUT (W)		
	Nom.	Flatness	L*		M		U		L		M		U		L	MU	
$f_L$ - $f_U$			Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Max.	Max.
0.2-250	19.5±0.5	±0.5	0.4	0.7	0.25	0.5	0.35	0.6	36	30	33	25	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)

### Outline Drawing



### Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H
2.25	1.38	1.24	.50	.150	3.100	.138	1.238
57.15	35.05	31.50	12.70	3.81	78.74	3.51	31.45

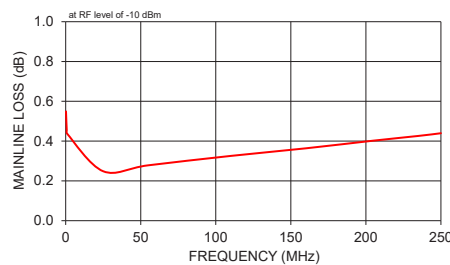
  

J	K	L	M	N	P	S	wt
3.25	.10	.40	1.15	1.86	.64	.150	grams
82.55	2.54	10.16	29.21	47.24	16.26	3.81	74.0

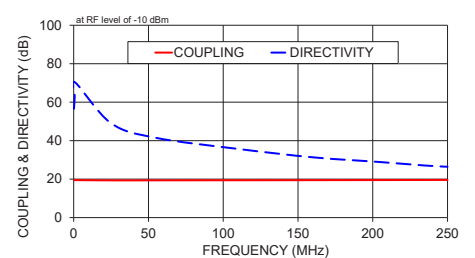
### Typical Performance Data

Frequency (MHz)	Mainline Loss (dB) In-Out	Coupling (dB) In-Cpl	Directivity (dB)	Return Loss (dB)		Cpl
				In	Out	
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

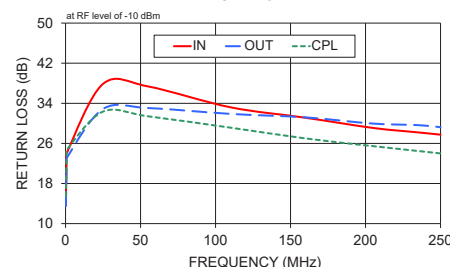
ZDC-20-3 MAINLINE LOSS



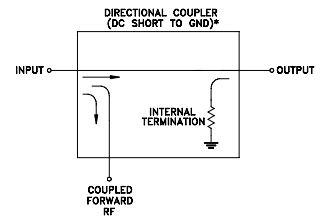
ZDC-20-3 COUPLING & DIRECTIVITY



ZDC-20-3 RETURN LOSS



### Electrical Schematic



\* ELECTRICAL SCHEMATIC IS FOR DIRECTIONAL COUPLER WITH INTERNAL TRANSFORMER(S) THAT ROUTES DC FROM RF PORTS TO GROUND.

### Notes

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- The parts covered by this specification document are subject to Mini-Circuit's 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-Circuit's website at [www.minicircuits.com/WCLStore/terms.jsp](http://www.minicircuits.com/WCLStore/terms.jsp)



[www.minicircuits.com](http://www.minicircuits.com) P.O. Box 350166, Brooklyn, NY 11235-0003 (718) 934-4500 sales@minicircuits.com

REV. C  
 ECO-016932  
 ZDC-20-3  
 IG/CP/AM  
 230220  
 Page 1 of 1

# Directional Coupler

# ZDC-20-3

## Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS (dB)	COUPLING (dB)	DIRECTIVITY (dB)	RETURN LOSS		
				IN	(dB) OUT	CPL
0.2	0.32	19.34	50.22	21.46	21.09	20.80
0.3	0.31	19.36	50.01	24.34	23.62	23.35
0.4	0.31	19.37	50.31	26.07	25.05	24.77
0.5	0.30	19.38	49.82	27.25	25.98	25.70
0.6	0.28	19.37	49.85	28.15	26.69	26.38
0.7	0.28	19.36	49.69	28.94	27.30	26.97
0.8	0.27	19.35	49.46	29.63	27.83	27.46
0.9	0.25	19.34	49.85	30.24	28.30	27.93
1.0	0.25	19.33	50.58	30.85	28.75	28.35
2.0	0.20	19.29	49.74	35.19	31.59	31.05
10.0	0.18	19.26	48.47	43.60	34.46	32.64
19.0	0.18	19.27	47.73	41.05	33.85	30.40
28.0	0.19	19.29	47.42	38.60	33.01	28.36
37.0	0.19	19.28	46.09	36.87	32.25	26.63
46.0	0.19	19.30	45.30	35.37	31.44	25.13
55.0	0.20	19.31	44.50	34.16	30.72	23.86
64.0	0.21	19.31	43.53	33.07	30.00	22.73
73.0	0.21	19.32	42.11	32.06	29.27	21.72
82.0	0.20	19.32	41.35	31.19	28.63	20.83
91.0	0.18	19.30	40.41	30.37	28.02	20.01
100.0	0.19	19.33	39.60	29.61	27.42	19.27
110.0	0.22	19.40	38.54	28.85	26.79	18.52
125.0	0.24	19.43	37.54	27.81	25.91	17.52
130.0	0.23	19.42	36.93	27.49	25.63	17.21
140.0	0.22	19.43	36.11	26.87	25.10	16.62
150.0	0.21	19.41	35.35	26.27	24.59	16.08
160.0	0.21	19.42	34.38	25.72	24.09	15.58
170.0	0.21	19.46	33.54	25.20	23.64	15.11
180.0	0.22	19.54	32.78	24.68	23.18	14.67
190.0	0.29	19.62	32.17	24.19	22.75	14.26
200.0	0.32	19.65	31.50	23.73	22.34	13.88
205.0	0.31	19.64	31.27	23.51	22.14	13.69
210.0	0.28	19.62	30.87	23.28	21.95	13.52
215.0	0.25	19.59	30.41	23.10	21.77	13.34
220.0	0.22	19.55	30.12	22.88	21.60	13.17
225.0	0.20	19.52	29.84	22.67	21.42	13.02
230.0	0.17	19.51	29.52	22.48	21.25	12.86
235.0	0.18	19.56	29.23	22.30	21.09	12.71
240.0	0.21	19.63	28.95	22.10	20.92	12.56
245.0	0.26	19.72	28.56	21.91	20.76	12.42
250.0	0.32	19.82	28.26	21.75	20.60	12.29

REV. X1  
ZDC-20-3  
060718  
Page 1 of 1



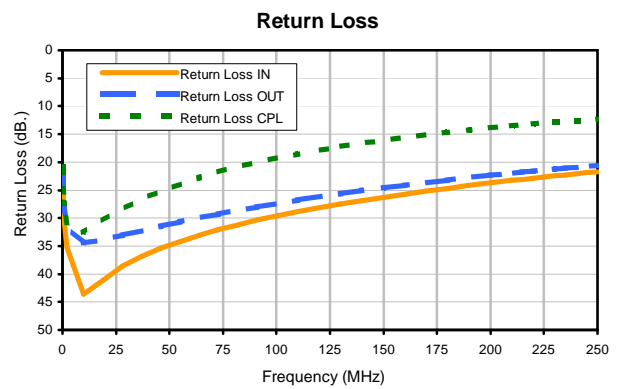
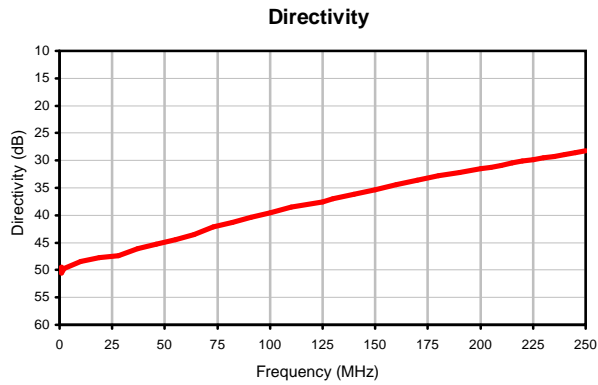
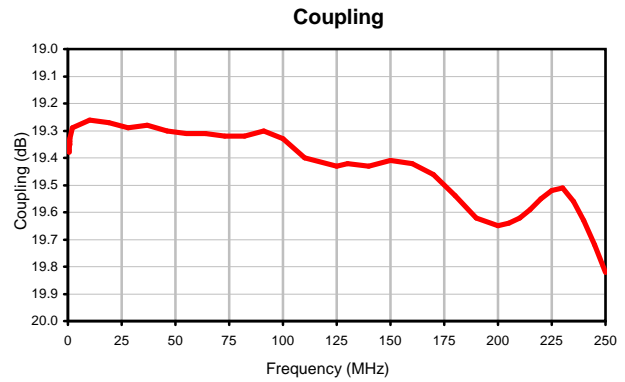
IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED • RoHS compliant  
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661



The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see

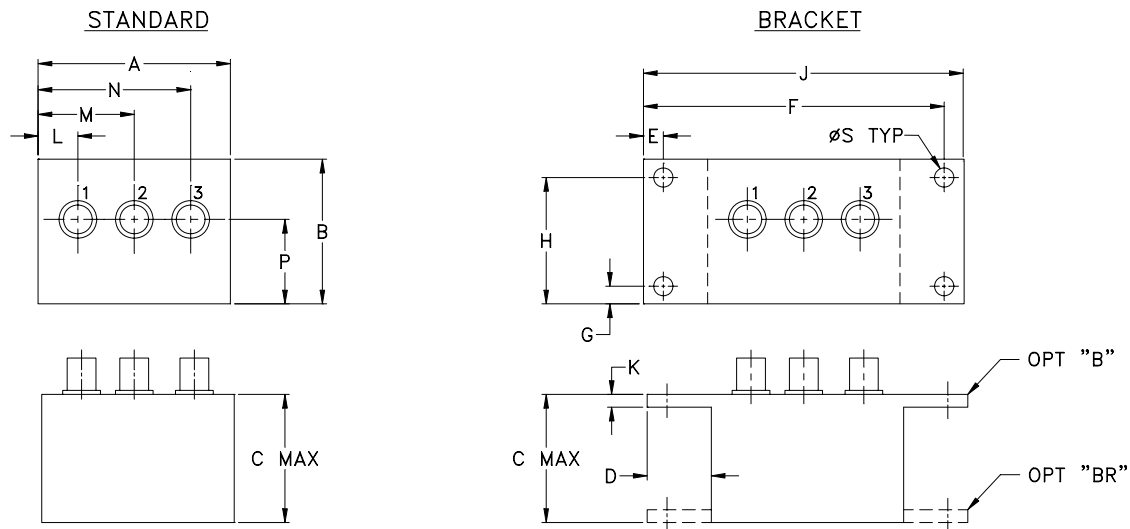


## Typical Performance Curves



M21  
M22  
M23

## Outline Dimensions



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.  $\pm .03$ ; 3 Pl.  $\pm .015$

### Notes:

- Case material: Aluminum alloy.
- 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.
- 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.

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.

<b>Specification</b>	<b>Test/Inspection Condition</b>	<b>Reference/Spec</b>
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