

Bi-Directional Coupler

50Ω Up to 100W 1 to 50 MHz

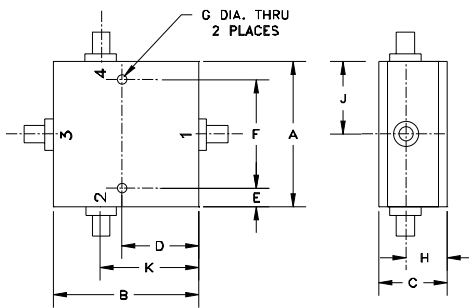
Maximum Ratings

Operating Temperature	-55°C to 75°C
Storage Temperature	-55°C to 100°C
Permanent damage may occur if any of these limits are exceeded.	

Coaxial Connections

INPUT	1 (N-Type)
OUTPUT	4 (N-Type)
COUPLED (forward)	2 (SMA)
COUPLED (reverse)	3 (SMA)

Outline Drawing



Outline Dimensions (inch/mm)

A	B	C	D	E	F
2.00	2.00	.95	1.062	.125	1.75
50.80	50.80	24.13	26.97	3.18	44.45
G	H	J	K	wt	
.125	.575	1.00	1.35	grams	
3.18	14.61	25.40	34.29	200	

Features

- high directivity, 25 dB typ.
- excellent VSWR, 1.07:1 typ.
- high power, up to 100W
- extremely low insertion loss, 0.05 dB typ.

Applications

- HF radios
- AM radio, amateur radio, medical ultrasound
- military mobile
- instrumentation
- communication receivers & transmitters

Electrical Specifications at 25°C

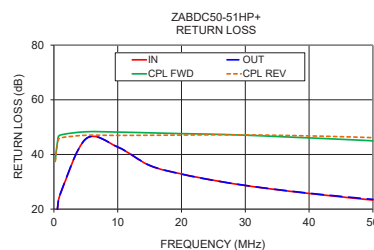
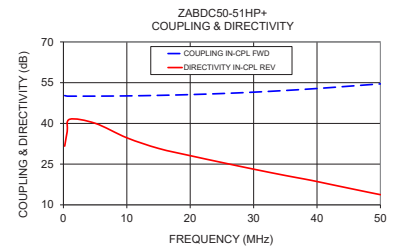
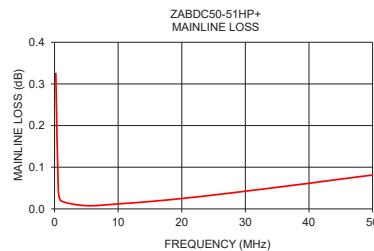
Parameter	Condition (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		1	—	50	MHz
Mainline Loss¹	1-30 30-50	—	0.02 0.06	0.15 0.2	dB
Nominal Coupling	1-30 30-50	—	49.5±1 51.5±1.5	—	dB
Coupling Flatness(±)	1-30 30-50	—	0.8 1.5	1.5 2.0	dB
Directivity	1-30 30-50	17 10	30 20	—	dB
Return Loss (Input)	1-50	17	30	—	dB
Return Loss (Output)	1-50	17	30	—	dB
Return Loss (Coupling)	1-50	30	45	—	dB
Input Power²	1-30 30-50	—	—	100 50	W

1. Include Coupling Loss.

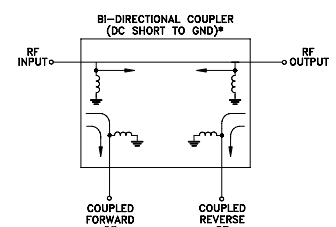
2. At 25°C. Derate linearly to 60W (1-30MHz), 25W (30-50MHz) at 75°C.

Typical Performance Data

Frequency (MHz)	Mainline Loss (dB)	Coupling (dB)		Directivity (dB)		Return Loss (dB)			
		In-Out	In-Cpl Fwd	Out-Cpl Rev	Out-Cpl Fwd	In-Cpl Rev	In	Out	Cpl Fwd
1.0	0.02	50.02	50.03	37.28	41.53	25.42	25.64	47.09	46.03
10.0	0.01	50.12	50.12	35.61	34.70	42.72	42.73	48.19	46.97
20.0	0.02	50.60	50.60	30.40	28.11	32.87	32.81	47.62	47.09
30.0	0.04	51.50	51.49	25.83	23.15	28.63	28.68	47.05	47.16
35.0	0.05	52.11	52.12	23.86	20.82	27.09	27.16	46.57	47.01
38.0	0.06	52.54	52.57	22.46	19.52	26.25	26.34	46.25	46.90
40.0	0.06	52.85	52.90	21.67	18.60	25.73	25.83	46.07	46.78
42.0	0.07	53.17	53.26	20.80	17.60	25.21	25.34	45.86	46.69
48.0	0.08	54.21	54.51	18.12	14.69	23.76	24.00	45.23	46.31
50.0	0.08	54.55	54.98	17.19	13.75	23.32	23.58	44.99	46.13



Electrical Schematic



* ELECTRICAL SCHEMATIC IS FOR BI-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-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/MCStore/terms.jsp



ZABDC50-51HP+



Generic photo used for illustration purposes only

CASE STYLE: HHH141

Connectors Model
N-Type/SMA ZABDC50-51HP+

+RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

Typical Performance Data

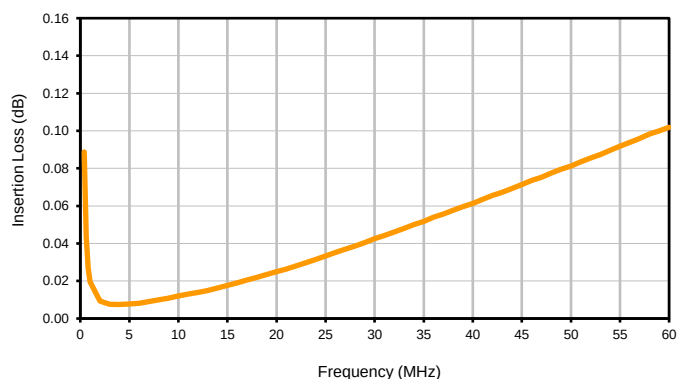
FREQ. (MHz)	INSERTION LOSS	COUPLING		DIRECTIVITY		RETURN LOSS			
	(dB)	(dB)		(dB)		(dB)			
	IN-OUT	IN-FWD	OUT-REV	IN-REV	OUT-FWD	IN	OUT	FWD	REV
0.4	0.09	50.06	50.11	35.49	35.16	17.51	17.56	43.32	42.73
0.6	0.04	50.03	50.09	37.05	37.23	20.97	21.13	45.26	44.47
0.8	0.03	50.02	50.02	42.20	39.19	23.47	23.70	46.41	45.42
1.0	0.02	50.02	50.03	41.53	37.28	25.42	25.64	47.09	46.03
2.0	0.01	49.97	50.00	43.72	44.86	32.06	32.36	48.18	46.75
3.0	0.01	50.01	50.02	41.62	43.61	36.70	36.76	48.32	46.95
4.0	0.01	50.03	50.03	42.71	40.73	40.65	40.69	48.52	47.06
5.0	0.01	50.03	50.04	40.04	40.93	45.67	45.70	48.30	47.02
6.0	0.01	50.01	50.03	37.26	38.77	53.89	54.30	48.24	46.95
8.0	0.01	50.06	50.10	37.03	38.32	49.92	50.80	48.16	46.91
9.0	0.01	50.10	50.10	34.83	36.67	45.49	45.73	48.18	46.94
10	0.01	50.12	50.12	34.70	35.61	42.72	42.73	48.19	46.97
11	0.01	50.16	50.15	33.86	35.38	40.75	40.62	48.10	46.99
12	0.01	50.19	50.19	32.99	34.74	39.18	39.15	48.05	47.03
13	0.01	50.23	50.23	32.22	33.99	37.92	37.92	48.04	47.04
14	0.02	50.27	50.27	31.44	33.30	36.87	36.87	47.89	46.99
15	0.02	50.31	50.31	30.78	33.00	35.95	36.02	47.92	47.02
16	0.02	50.37	50.37	30.19	32.42	35.18	35.26	47.82	47.02
17	0.02	50.42	50.42	29.68	31.77	34.53	34.55	47.78	47.01
18	0.02	50.48	50.48	29.12	31.39	33.91	33.93	47.74	47.08
19	0.02	50.54	50.53	28.55	30.88	33.37	33.36	47.67	47.10
20	0.02	50.60	50.60	28.11	30.40	32.87	32.81	47.62	47.09
21	0.03	50.68	50.67	27.52	29.95	32.37	32.31	47.59	47.09
22	0.03	50.75	50.74	27.18	29.52	31.91	31.84	47.55	47.12
23	0.03	50.83	50.82	26.58	29.13	31.43	31.38	47.44	47.13
24	0.03	50.91	50.90	26.06	28.55	30.98	30.95	47.43	47.13
25	0.03	50.99	50.99	25.60	28.07	30.56	30.53	47.41	47.18
26	0.04	51.09	51.08	25.10	27.76	30.13	30.13	47.33	47.14
27	0.04	51.19	51.17	24.61	27.36	29.75	29.75	47.24	47.18
28	0.04	51.28	51.27	24.09	26.89	29.35	29.38	47.20	47.19
29	0.04	51.39	51.37	23.68	26.36	28.99	29.03	47.11	47.18
30	0.04	51.50	51.49	23.15	25.83	28.63	28.68	47.05	47.16
31	0.04	51.61	51.60	22.78	25.47	28.30	28.37	46.92	47.11
32	0.05	51.73	51.72	22.28	25.14	27.99	28.06	46.86	47.13
33	0.05	51.85	51.85	21.79	24.63	27.68	27.75	46.71	47.07
34	0.05	51.99	51.98	21.40	24.14	27.38	27.45	46.65	47.02
35	0.05	52.11	52.12	20.82	23.86	27.09	27.16	46.57	47.01
36	0.05	52.26	52.26	20.41	23.34	26.81	26.87	46.47	46.98
37	0.06	52.39	52.41	19.94	22.98	26.53	26.60	46.34	46.90
38	0.06	52.54	52.57	19.52	22.46	26.25	26.34	46.25	46.90
39	0.06	52.69	52.73	19.06	22.12	25.99	26.09	46.14	46.85
40	0.06	52.85	52.90	18.60	21.67	25.73	25.83	46.07	46.78
41	0.06	53.01	53.07	18.09	21.28	25.47	25.58	45.96	46.77
42	0.07	53.17	53.26	17.60	20.80	25.21	25.34	45.86	46.69
43	0.07	53.34	53.44	17.15	20.32	24.96	25.11	45.74	46.64
44	0.07	53.51	53.65	16.68	19.87	24.71	24.88	45.63	46.61
45	0.07	53.68	53.85	16.19	19.47	24.46	24.65	45.51	46.51
46	0.07	53.86	54.06	15.72	18.99	24.23	24.43	45.41	46.45
47	0.08	54.03	54.28	15.25	18.51	24.00	24.21	45.33	46.40
48	0.08	54.21	54.51	14.69	18.12	23.76	24.00	45.23	46.31
49	0.08	54.39	54.74	14.18	17.60	23.54	23.78	45.13	46.22
50	0.08	54.55	54.98	13.75	17.19	23.32	23.58	44.99	46.13
51	0.08	54.72	55.22	13.21	16.72	23.10	23.37	44.88	46.01
52	0.09	54.89	55.48	12.70	16.34	22.89	23.17	44.78	45.91
53	0.09	55.04	55.73	12.17	15.91	22.69	22.97	44.63	45.80
54	0.09	55.18	55.98	11.66	15.46	22.48	22.77	44.49	45.68
55	0.09	55.31	56.24	11.20	15.05	22.28	22.58	44.39	45.59
56	0.09	55.43	56.49	10.66	14.69	22.08	22.38	44.30	45.53
57	0.10	55.52	56.75	10.14	14.32	21.88	22.19	44.18	45.40
58	0.10	55.60	56.99	9.65	13.96	21.69	22.00	44.05	45.25
59	0.10	55.65	57.21	9.21	13.63	21.50	21.81	43.95	45.15
60	0.10	55.66	57.41	8.75	13.34	21.31	21.63	43.81	44.99

Bi-Directional Coupler

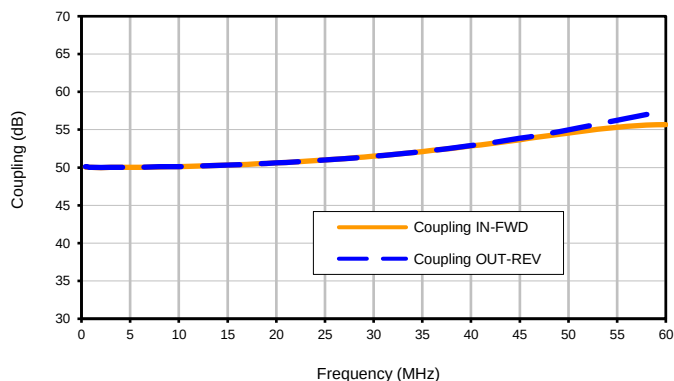
Typical Performance Curves

ZABDC50-51HP+

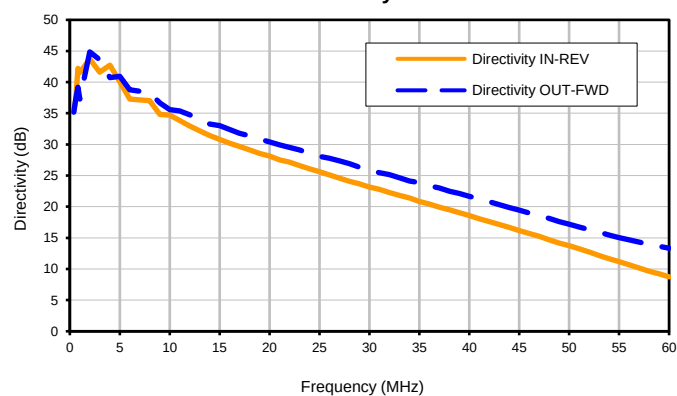
Insertion Loss



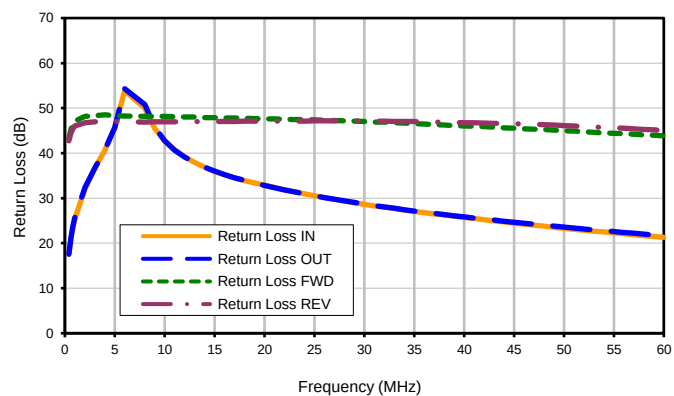
Coupling



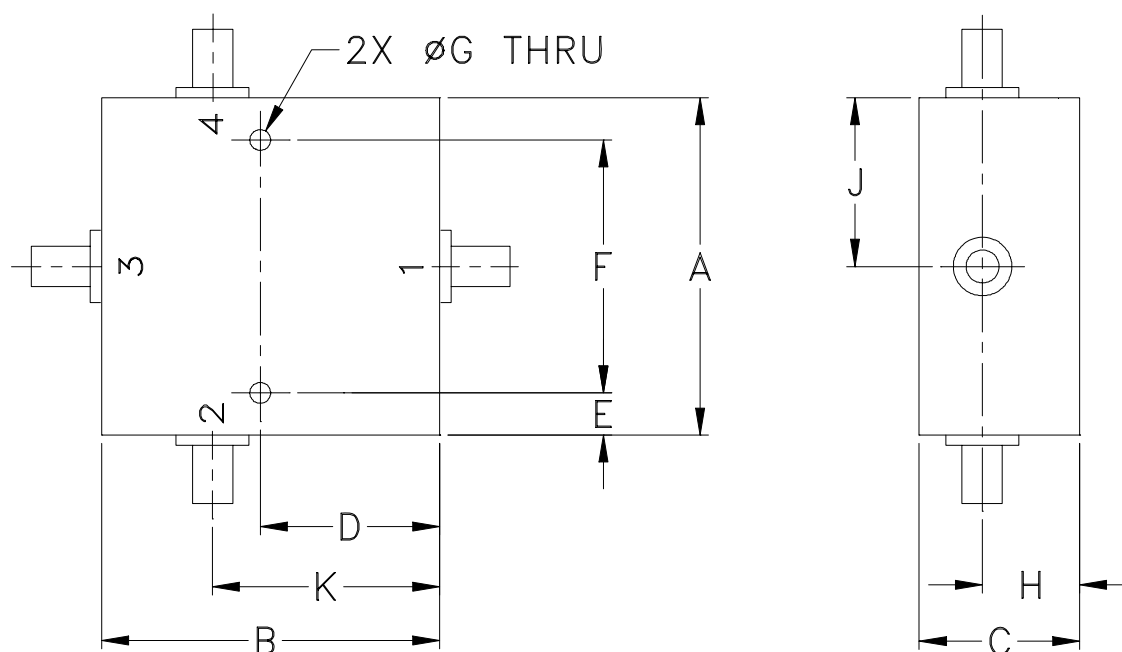
Directivity



Return Loss



Outline Dimensions



CASE#	A	B	C	D	E	F	G	H	J	K	WT. GRAM
HHH141	2.00 (50.80)	2.00 (50.80)	.95 (24.13)	1.062 (26.98)	.125 (3.18)	1.75 (44.45)	.125 (3.18)	.575 (14.60)	1.00 (25.4)	1.35 (34.29)	200

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

Notes:

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



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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 75°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