High Power

Bi-Directional Coupler

BDCN-20-13+

50Ω 20 dB Coupling 360 to 1000 MHz



CASE STYLE: FV1206-1

The Big Deal

- High Power handling (15W)
- Industry leading combination of size/bandwidth

Product Overview

Mini-Circuits new Bi-directional coupler BDCN-20-13+ offers an industry leading combination of operating bandwidth and size; The low insertion loss makes this component a versatile building block for use in a variety of systems and sub-system designs.

Feature	Advantages
Small Size	Offered in the FV1206-1 package size, the BDCN-20-13+ offers an industry leading combination of size, bandwidth and frequency. The small footprint (3.2mm x1.6mm) allows for reduced parasitics in systems with improved performance and simplified layout.
Low Loss	The .15 dB typical insertion loss make this design ideal for power monitoring, signal conditioning, and open circuit, fault protection circuits.
High Power handlingl	Capable of operating up to 15W, the LTCC construction of the BDCN-20-13+ makes this bi-directional coupler a robust, rugged product that can be used effectively in either the transmit or receive paths.

Notes
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CASE STYLE: FV1206-1

Maximum Ratings

Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
DC Current	0.5A

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

Pin Connections

INPUT	1
OUTPUT	4
COUPLED (forward)	6
COUPLED (reverse)	3
GROUND	2,5

Features

- four-port coupler
- excellent VSWR, 1.2:1 typ., all ports
- ultra small size, hermetically sealed
- minimal variation with temperature variation
- protected by US Patent 7,049,905
- DC current through input to output 0.5A Max. at 1.0 watt RF input power

Applications

- UHF communication

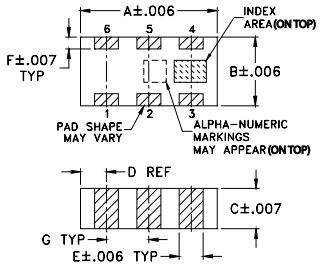
+RoHS Compliant

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

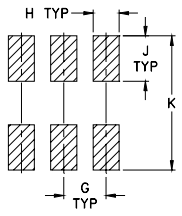
Available Tape and Reel at no extra cost

Reel Size	Devices/Reel
7"	20, 50, 100, 200, 500,1000, 3000

Outline Drawing



PCB Land Pattern



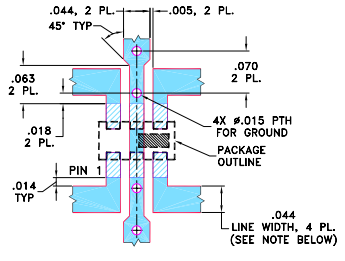
Suggested Layout,
Tolerance to be within ±.002

Outline Dimensions (inch / mm)

A	B	C	D	E	F
.126	.063	.035	.024	.022	.011
3.20	1.60	0.89	0.61	0.56	0.28

G	H	J	K	wt
.039	.024	.042	.123	grams
0.99	0.61	1.07	3.12	.020

Demo Board MCL P/N: TB-255+
Suggested PCB Layout (PL-131)



NOTES: 1.TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS 0.020" ± 0.0015"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2.BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

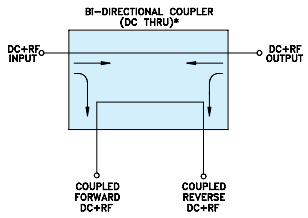
DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

Electrical Specifications at 25°C

Parameter	Condition (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		360	—	1000	MHz
Mainline Loss (above theoretical 0.03 dB)	360-470	—	0.15	0.25	dB
	470-550	—	0.17	0.30	
	550-700	—	0.20	0.35	
	700-900	—	0.25	0.40	
	900-1000	—	0.25	0.40	
Coupling	360-470	22.5	24.0	25.6	dB
	470-550	21.2	22.3	23.5	
	550-700	19.2	20.7	22.2	
	700-900	17.4	19.0	20.2	
	900-1000	16.5	17.5	18.5	
Coupling Flatness(±)	360-470	—	1.1	1.3	dB
	470-550	—	0.7	1.0	
	550-700	—	1.0	1.2	
	700-900	—	1.0	1.2	
	900-1000	—	0.4	0.6	
Directivity	360-470	10	12	—	dB
	470-550	10	12	—	
	550-700	10	12	—	
	700-900	10	12	—	
	900-1000	11	13	—	
Return Loss (Input)	360-470	25	33	—	dB
	470-550	25	31	—	
	550-700	22	30	—	
	700-900	20	27	—	
	900-1000	20	26	—	
Return Loss (Output)	360-470	25	31	—	dB
	470-550	25	30	—	
	550-700	22	28	—	
	700-900	20	26	—	
	900-1000	20	25	—	
Return Loss (Coupling)	360-470	25	35	—	dB
	470-550	25	34	—	
	550-700	25	33	—	
	700-900	20	31	—	
	900-1000	20	30	—	
Input Power[1]	300-1000	—	—	16	W

1. Derate linearly 8W at 100°C

Electrical Schematic



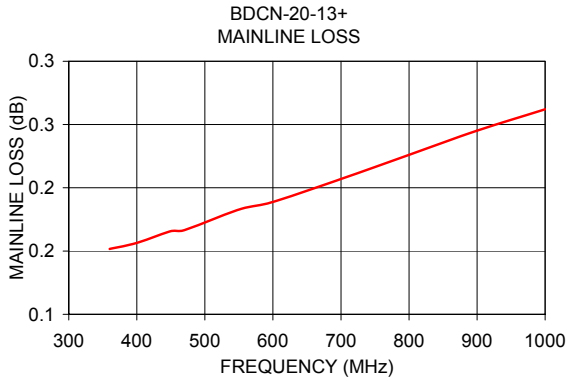
* ELECTRICAL SCHEMATIC IS FOR BI–DIRECTIONAL COUPLER WITHOUT INTERNAL TRANSFORMERS AND RESISTORS.

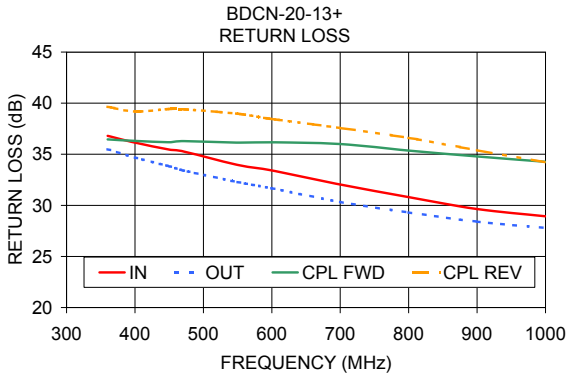
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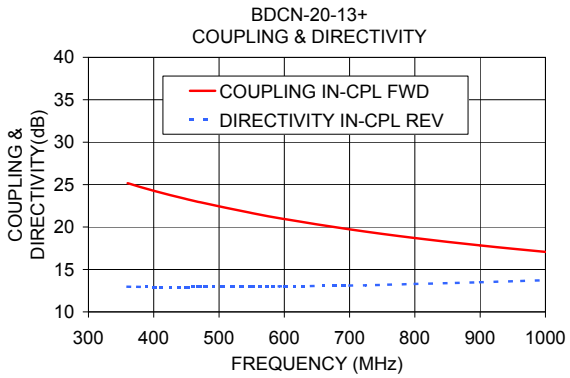
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Typical Performance Data

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	Cpl Rev
360.00	0.15	25.16	25.16	12.97	13.02	36.80	35.49	36.46	39.64
400.00	0.16	24.27	24.27	12.92	12.98	36.14	34.67	36.31	39.19
450.00	0.17	23.29	23.29	12.93	13.03	35.46	33.83	36.18	39.43
470.00	0.17	22.94	22.94	12.95	13.03	35.29	33.43	36.28	39.41
550.00	0.18	21.64	21.66	12.98	13.07	33.96	32.28	36.14	38.97
600.00	0.19	20.95	20.94	13.02	13.10	33.41	31.67	36.17	38.45
700.00	0.21	19.73	19.72	13.11	13.25	32.04	30.33	36.01	37.58
800.00	0.23	18.70	18.70	13.29	13.45	30.81	29.31	35.36	36.60
900.00	0.25	17.83	17.83	13.49	13.69	29.64	28.40	34.78	35.40
1000.00	0.26	17.07	17.07	13.73	13.96	28.93	27.80	34.26	34.20







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