

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 handling | 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

- 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



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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

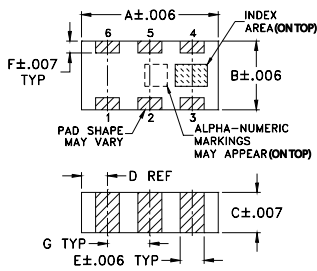
Applications

- UHF communication

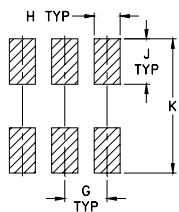
+RoHS Compliant
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

Available Tape and Reel at no extra cost
Reel Size 7" Devices/Reel 20, 50, 100, 200, 500, 1000, 3000

Outline Drawing



PCB Land Pattern

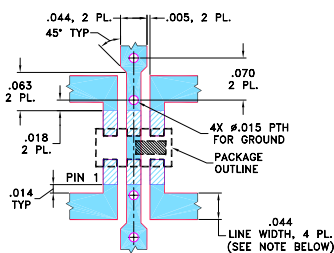


Suggested Layout, Tolerance to be within ±0.02

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

Notes

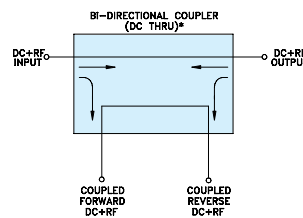
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Electrical Specifications at 25°C

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

1. Derate linearly 8W at 100°C

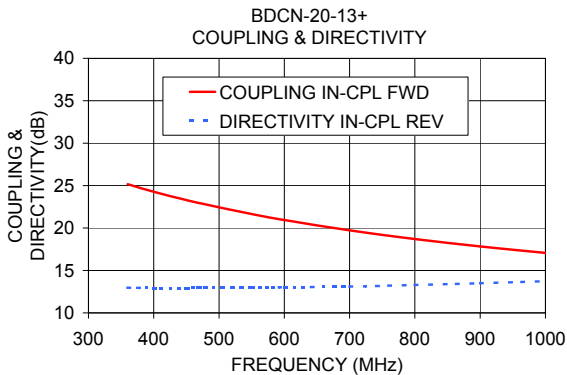
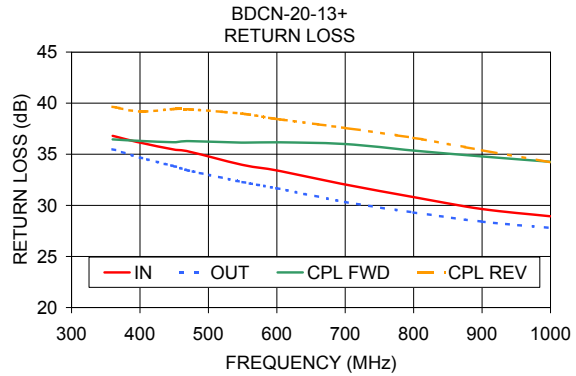
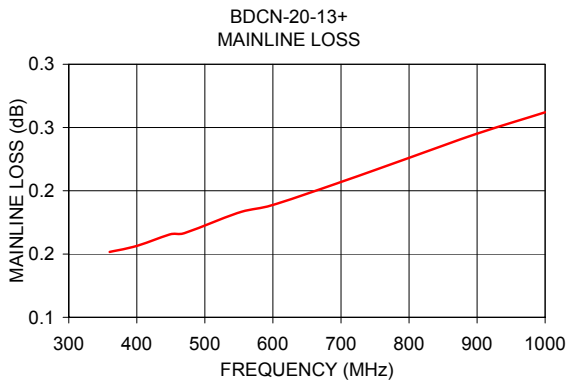
Electrical Schematic



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

Typical Performance Data

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