

# High Power Bi-Directional Coupler

50Ω 6dB Coupling DC Pass 950 to 2200 MHz

BDCA1-6-22+

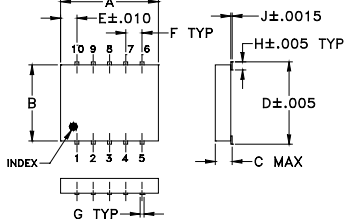
## Maximum Ratings

|                                                                 |                |
|-----------------------------------------------------------------|----------------|
| Operating Temperature                                           | -55°C to 100°C |
| Storage Temperature                                             | -55°C to 100°C |
| DC Current                                                      | 0.25A          |
| Permanent damage may occur if any of these limits are exceeded. |                |

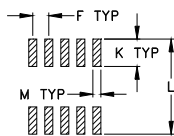
## Pin Connections

|                   |             |
|-------------------|-------------|
| INPUT             | 1           |
| OUTPUT            | 6           |
| COUPLED (forward) | 10          |
| COUPLED (reverse) | 5           |
| GROUND            | 2,3,4,7,8,9 |

## Outline Drawing



PCB Land Pattern

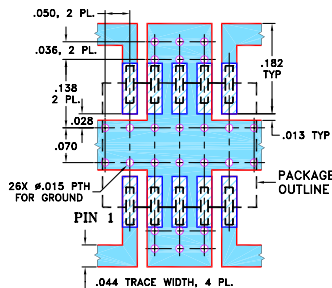


Suggested Layout,  
Tolerance to be within ±.002

## Outline Dimensions (inch/mm)

|      |      |      |      |      |      |       |
|------|------|------|------|------|------|-------|
| A    | B    | C    | D    | E    | F    | G     |
| .30  | .250 | .052 | .266 | .050 | .050 | .012  |
| 7.62 | 6.35 | 1.32 | 6.76 | 1.27 | 1.27 | 0.30  |
| H    | J    | K    | L    | M    |      | wt    |
| .029 | .004 | .085 | .296 | .030 |      | grams |
| 0.74 | 0.10 | 2.16 | 7.52 | 0.76 |      | 0.25  |

## Demo Board MCL P/N: TB-115+ Suggested PCB Layout (PL-004)



- NOTE: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020 ± .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

- 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.  
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## Features

- wideband, 950 to 2200 MHz
- excellent VSWR 1.15:1 typ.
- excellent power handling capability, 44W (1900 MHz)
- hermetically sealed
- low temperature variation
- protected by US Patent 7,049,905
- DC current through input to output 0.25A Max. at 1.0 watt RF input power.

## Applications

- DCS, PCS
- mobile satellite

## Bi-Directional Coupler Electrical Specifications

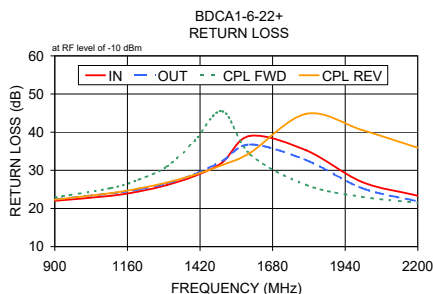
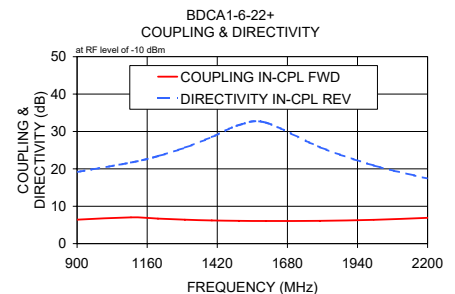
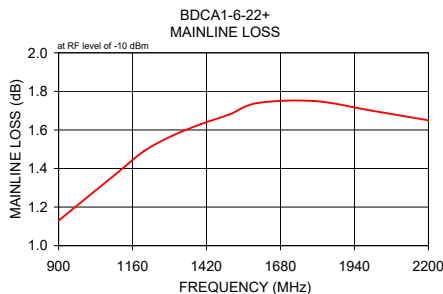
| FREQUENCY<br>(MHz) | COUPLING<br>(dB) |                  | MAINLINE LOSS <sup>1</sup><br>(dB) |      | DIRECTIVITY<br>(dB) |      | VSWR<br>(:1) | POWER<br>INPUT <sup>2</sup><br>(W) |
|--------------------|------------------|------------------|------------------------------------|------|---------------------|------|--------------|------------------------------------|
|                    | Nom.             | Max.<br>Flatness | Typ.                               | Max. | Typ.                | Min. |              |                                    |
| 950-2200           |                  |                  |                                    |      |                     |      |              |                                    |
| 950-1400           | 6.9±1.0          | ±1.0             | 1.4                                | 1.9  | 23                  | 17   | 1.20         | 57                                 |
| 1400-1900          | 6.0±0.5          | ±0.3             | 1.7                                | 2.1  | 28                  | 20   | 1.10         | 44                                 |
| 1900-2200          | 6.5±0.7          | ±0.7             | 1.7                                | 2.1  | 22                  | 15   | 1.15         | 37                                 |

1. Includes theoretical coupled power loss of 1.25 dB at 6 dB coupling.

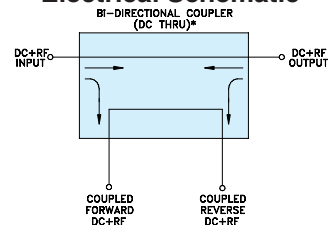
2. Derate linearly 1/3 at 100°C

## Typical Performance Data

| Frequency<br>(MHz) | Mainline Loss<br>(dB) | Coupling<br>(dB) |             | Directivity<br>(dB) |            | Return Loss<br>(dB) |       |         |         |
|--------------------|-----------------------|------------------|-------------|---------------------|------------|---------------------|-------|---------|---------|
|                    | In-Out                | In-Cpl Fwd       | Out-Cpl Rev | Out-Cpl Fwd         | In-Cpl Rev | In                  | Out   | Cpl Fwd | Cpl Rev |
| 900.00             | 1.13                  | 6.41             | 7.97        | 18.73               | 19.16      | 22.02               | 22.37 | 22.89   | 22.31   |
| 1100.00            | 1.37                  | 7.03             | 7.01        | 20.95               | 21.69      | 23.33               | 23.95 | 25.33   | 24.01   |
| 1200.00            | 1.49                  | 6.70             | 6.69        | 22.51               | 23.40      | 24.45               | 24.99 | 27.54   | 25.24   |
| 1300.00            | 1.57                  | 6.41             | 6.40        | 24.54               | 25.66      | 26.11               | 26.55 | 30.92   | 26.77   |
| 1400.00            | 1.63                  | 6.21             | 6.19        | 27.42               | 28.52      | 28.50               | 28.97 | 37.66   | 28.82   |
| 1500.00            | 1.68                  | 6.10             | 6.07        | 31.79               | 31.71      | 32.09               | 32.46 | 45.49   | 31.40   |
| 1600.00            | 1.74                  | 6.05             | 6.00        | 41.94               | 32.37      | 39.04               | 36.77 | 34.19   | 34.60   |
| 1800.00            | 1.75                  | 6.09             | 6.04        | 30.48               | 25.81      | 35.26               | 32.67 | 26.19   | 44.83   |
| 2000.00            | 1.70                  | 6.36             | 6.31        | 23.05               | 20.91      | 26.95               | 25.34 | 23.04   | 40.59   |
| 2200.00            | 1.65                  | 6.90             | 6.85        | 18.81               | 17.40      | 23.34               | 21.86 | 21.49   | 35.92   |



## Electrical Schematic



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

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