

# High Power Bi-Directional Coupler

50Ω 7dB Coupling DC Pass 1200 to 2500 MHz

BDCA-7-25+



CASE STYLE: DZ944

## 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 |

## Features

- four-port coupler
- wideband, 1200 to 2500 MHz
- excellent VSWR, 1.05:1 typ. all ports
- good flatness,  $\pm 0.3$  dB typ.
- excellent power handling capability, 35W (2100 MHz)
- hermetically sealed
- minimal variation with temperature variation
- low profile, 0.052" height
- protected by US Patent 7,049,905
- DC current through input to output 0.25A Max. at 1.0 watt RF input power.

## Applications

- PCS, PCN, UMTS
- ISM
- GPS
- defense

## +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 |
| 13"       | 500, 1000        |

## Bi-Directional Coupler Electrical Specifications

| FREQUENCY (MHz) | COUPLING (dB) |               | MAINLINE LOSS <sup>1</sup> (dB) |      | DIRECTIVITY (dB) |      | VSWR (:1) | POWER INPUT <sup>2</sup> (W) |
|-----------------|---------------|---------------|---------------------------------|------|------------------|------|-----------|------------------------------|
|                 | Nom.          | Max. Flatness | Typ.                            | Max. | Typ.             | Min. |           |                              |
| $f_c - f_u$     |               |               |                                 |      |                  |      |           |                              |
| 1200-2500       |               |               |                                 |      |                  |      |           |                              |
| 1200-1700       | 7.1 $\pm$ 0.8 | $\pm$ 0.8     | 1.5                             | 1.9  | 22               | 19   | 1.08      | 35                           |
| 1700-2100       | 6.5 $\pm$ 0.5 | $\pm$ 0.3     | 1.6                             | 2.0  | 22               | 14   | 1.05      | 35                           |
| 2100-2500       | 7.0 $\pm$ 0.8 | $\pm$ 1.0     | 1.5                             | 2.0  | 22               | 12   | 1.10      | 27                           |

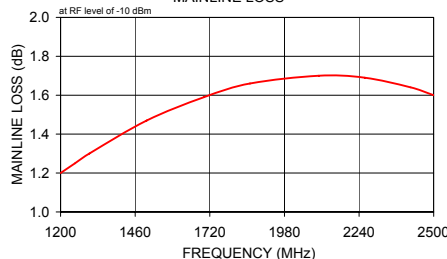
1. Includes theoretical power loss of 1.0 dB at 7 dB coupling.

2. Derate linearly 1/3 at 100°C

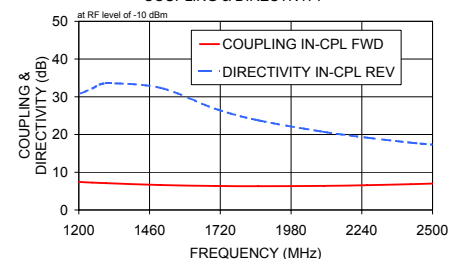
## Typical Performance Data

| 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 | Cpl Rev |
| 1200.00         | 1.20               | 7.44          | 7.44        | 28.71            | 30.67      | 33.76            | 38.52 | 34.05   | 31.62   |
| 1250.00         | 1.25               | 7.25          | 7.26        | 28.83            | 32.19      | 34.26            | 41.86 | 36.87   | 33.16   |
| 1300.00         | 1.30               | 7.10          | 7.09        | 28.92            | 33.55      | 34.75            | 58.50 | 42.17   | 34.02   |
| 1500.00         | 1.47               | 6.62          | 6.62        | 26.70            | 32.36      | 29.75            | 32.95 | 35.05   | 30.66   |
| 1700.00         | 1.59               | 6.36          | 6.37        | 23.78            | 26.87      | 25.23            | 26.63 | 27.37   | 25.76   |
| 1860.00         | 1.66               | 6.30          | 6.30        | 21.94            | 23.76      | 23.19            | 23.89 | 24.17   | 23.22   |
| 2100.00         | 1.70               | 6.39          | 6.38        | 19.67            | 20.71      | 21.34            | 21.69 | 21.28   | 20.95   |
| 2260.00         | 1.69               | 6.57          | 6.56        | 18.53            | 19.15      | 20.76            | 21.18 | 20.21   | 20.12   |
| 2420.00         | 1.64               | 6.84          | 6.84        | 17.58            | 17.85      | 20.67            | 21.04 | 19.83   | 19.80   |
| 2500.00         | 1.60               | 7.01          | 7.00        | 17.10            | 17.32      | 20.88            | 21.37 | 19.63   | 19.70   |

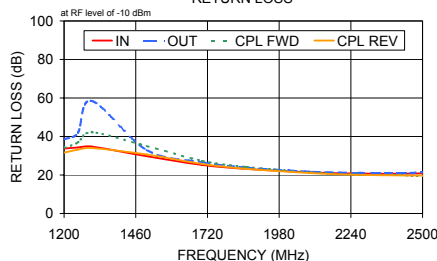
BDCA-7-25+  
MAINLINE LOSS



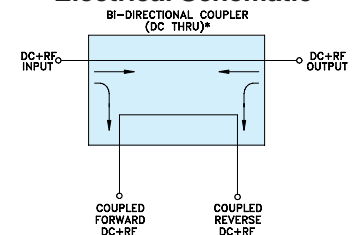
BDCA-7-25+  
COUPLING & DIRECTIVITY



BDCA-7-25+  
RETURN LOSS

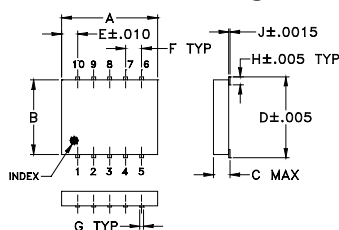


## Electrical Schematic

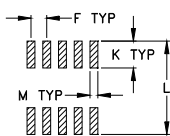


\* ELECTRICAL SCHEMATIC IS FOR BI-DIRECTIONAL COUPLER WITHOUT INTERNAL TRANSFORMERS AND RESISTORS.

## Outline Drawing



## PCB Land Pattern

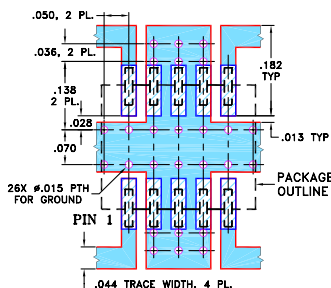


Suggested Layout,  
Tolerance to be within  $\pm 0.02$

## 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  $\pm$  .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.
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