



**SURFACE MOUNT**

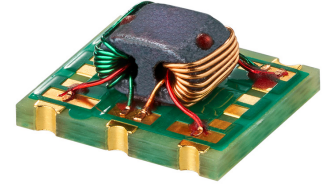
# Bi-Directional Coupler

**RDC-20-52-10W+**

50Ω    20dB    30 to 520 MHz    10 Watt

## THE BIG DEAL

- Wideband 30 to 520 MHz
- Low Mainline Loss, 0.3 dB typ. at 520 MHz
- Flat Coupling, ±0.5 dB
- Good Return Loss, 22 dB typ.



*Generic photo used for illustration purposes only*

CASE STYLE: TT1491-7

### +RoHS Compliant

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

## APPLICATIONS

- VHF/UHF
- Cable TV
- Defense / Military
- Military / Radio Application

## PRODUCT OVERVIEW

Mini-Circuits' RDC-20-52-10W+ surface-mount directional coupler provides 20 dB coupling with high directivity, low mainline loss, and good return loss for 50Ω applications from 30 to 520 MHz, supporting a variety of broadband applications including VHF/UHF, cellular and more. This model features core and wire construction with wrap-around terminations for good solderability and easy visual inspection.

## KEY FEATURES

| Feature                              | Advantages  |
|--------------------------------------|---|
| Broadband, 30 to 520 MHz             | Supports bandwidth requirements.  |
| Low Mainline Loss, 0.3 dB at 520 MHz | Provides excellent through-path signal transmission and maintains low heat dissipation, avoiding the need for special heat sinking methods. |
| Power Handling, up to 10 W           | Usable in systems with a variety of signal power requirements.  |
| Good Return Loss, 22 dB typ.         | Provides excellent matching for 50Ω systems.  |

REV. A  
ECO-021586  
RDC-20-52-10W+  
MCL NY  
240430





**SURFACE MOUNT**

# Bi-Directional Coupler

**RDC-20-52-10W+**

50Ω    20dB    30 to 520 MHz    10 Watt

## ELECTRICAL SPECIFICATIONS AT 25°C

| Parameter                  | Condition (MHz) | Min. | Typ.       | Max. | Unit |
|----------------------------|-----------------|------|------------|------|------|
| Frequency Range            |                 | 30   |            | 520  | MHz  |
| Mainline Loss <sup>1</sup> | 30-520          | –    | 0.3        | 0.4  | dB   |
| Nominal Coupling           | 30-520          | –    | 19.0 ± 0.5 | –    | dB   |
| Coupling Flatness(±)       | 30-520          | –    | 0.3        | 0.5  | dB   |
| Directivity                | 30-520          | 14   | 20         | –    | dB   |
| Return Loss (Input)        | 30-520          | 18   | 28         | –    | dB   |
| Return Loss (Output)       | 30-520          | 18   | 28         | –    | dB   |
| Return Loss (Coupled)      | 30-520          | 18   | 28         | –    | dB   |
| Input Power                | 30-520          | –    | –          | 10   | W    |

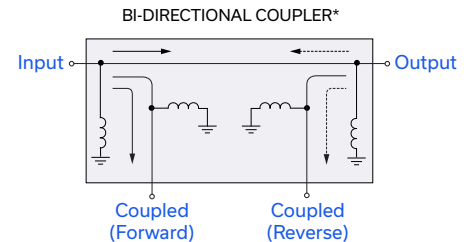
1. Mainline loss includes theoretical power loss at coupled port.

## ABSOLUTE MAXIMUM RATINGS

| Parameter             | Ratings        |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C  |
| Storage Temperature   | -55°C to 100°C |

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

## ELECTRICAL SCHEMATIC



\*Electrical schematic is for Bi-Directional coupler with internal transformer(s) that routes DC from all ports to ground



**SURFACE MOUNT**

# Bi-Directional Coupler

**RDC-20-52-10W+**

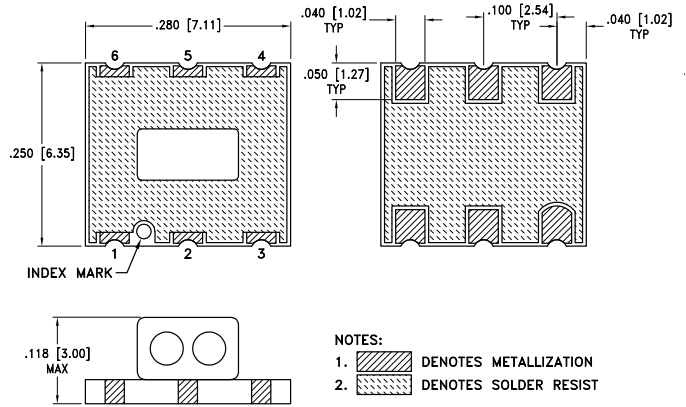


50Ω    20dB    30 to 520 MHz    10 Watt

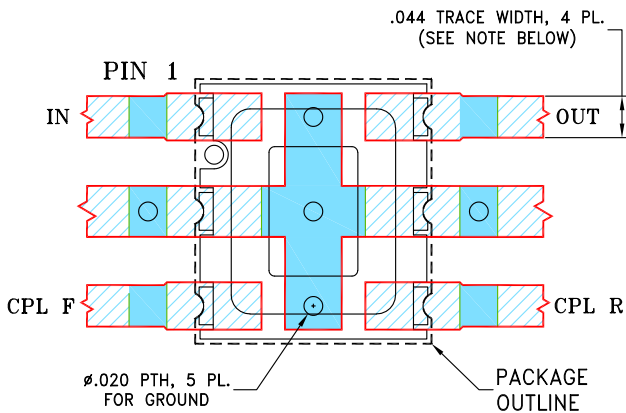
**PAD CONNECTIONS**

| Function             | Pad Number |
|----------------------|------------|
| INPUT                | 1          |
| OUTPUT               | 6          |
| COUPLED (Fwd)        | 3          |
| GROUND               | 2          |
| COUPLED (Rev)        | 4          |
| ISOLATE (DO NOT USE) | 5          |

**OUTLINE DRAWING**



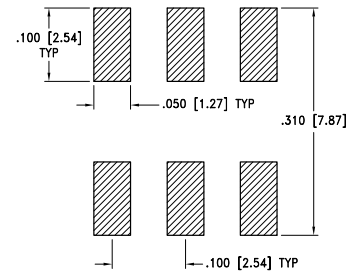
**DEMO BOARD MCL P/N: TB-RDC205210W+  
 SUGGESTED PCB LAYOUT (PL-759)**



**NOTES:**

- TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .020". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
- 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



**SUGGESTED LAYOUT FOR PC PATTERN**  
 TOLERANCE TO BE WITHIN ±.002

**OUTLINE DIMENSIONS (Inches mm)**

| A    | B    | C     | D    | E    | F    | G    | H    | J    | K    |
|------|------|-------|------|------|------|------|------|------|------|
| .250 | .280 | 0.118 | .100 | .050 | .040 | .040 | .100 | .310 | .050 |
| 6.35 | 7.11 | 3.00  | 2.54 | 1.27 | 1.02 | 1.02 | 2.54 | 7.87 | 1.27 |

Weight: 0.35 grams

**TAPE & REEL INFORMATION: F2**





SURFACE MOUNT

# Bi-Directional Coupler

## RDC-20-52-10W+

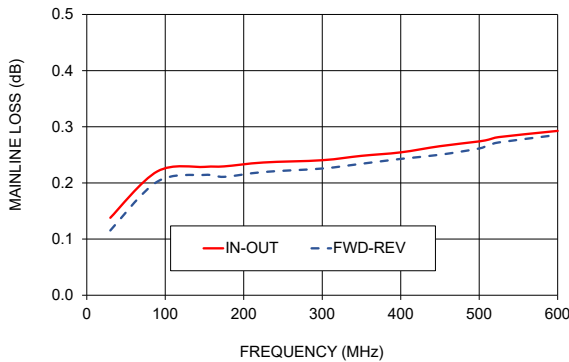
Mini-Circuits

50Ω 20dB 30 to 520 MHz 10 Watt

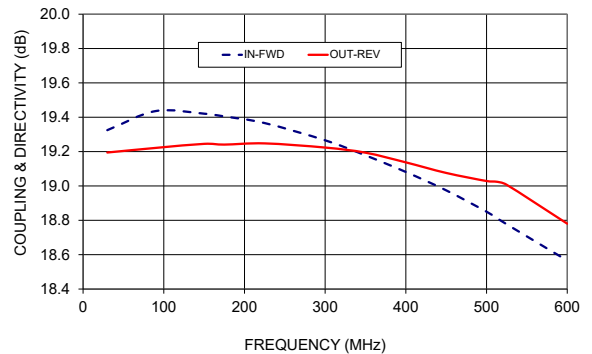
### TYPICAL PERFORMANCE DATA

| Frequency (Mhz) | Insertion Loss (Db) |         | Coupling (Db) |         | Directivity (Db) |         | Return Loss (Db) |       |       |       |
|-----------------|---------------------|---------|---------------|---------|------------------|---------|------------------|-------|-------|-------|
|                 | In-Out              | Fwd-Rev | In-Fwd        | Out-Rev | In-Fwd           | Out-Rev | In               | Out   | Fwd   | Rev   |
| 30              | 0.14                | 0.12    | 19.32         | 19.19   | 41.64            | 39.17   | 27.24            | 27.59 | 26.80 | 27.28 |
| 90              | 0.22                | 0.20    | 19.44         | 19.22   | 33.77            | 39.32   | 31.80            | 34.16 | 31.06 | 33.23 |
| 150             | 0.23                | 0.21    | 19.42         | 19.25   | 27.83            | 32.03   | 32.71            | 35.14 | 31.77 | 34.41 |
| 175             | 0.23                | 0.21    | 19.40         | 19.24   | 26.96            | 30.36   | 32.88            | 34.94 | 31.79 | 33.82 |
| 225             | 0.24                | 0.22    | 19.37         | 19.25   | 24.70            | 27.35   | 32.89            | 34.19 | 31.27 | 33.21 |
| 300             | 0.24                | 0.23    | 19.27         | 19.22   | 21.99            | 24.13   | 33.43            | 33.47 | 30.73 | 31.75 |
| 350             | 0.25                | 0.23    | 19.18         | 19.19   | 20.69            | 22.30   | 33.25            | 33.31 | 30.42 | 31.20 |
| 400             | 0.25                | 0.24    | 19.08         | 19.14   | 19.49            | 20.73   | 33.54            | 32.84 | 30.01 | 30.54 |
| 450             | 0.27                | 0.25    | 18.97         | 19.08   | 18.37            | 19.36   | 33.58            | 32.76 | 29.59 | 29.66 |
| 500             | 0.27                | 0.26    | 18.85         | 19.03   | 17.61            | 18.12   | 33.19            | 32.50 | 29.14 | 29.33 |
| 512             | 0.28                | 0.27    | 18.82         | 19.02   | 17.43            | 17.80   | 33.13            | 32.41 | 28.96 | 29.17 |
| 525             | 0.28                | 0.27    | 18.78         | 19.01   | 17.16            | 17.41   | 33.17            | 32.14 | 28.70 | 28.91 |
| 600             | 0.29                | 0.29    | 18.57         | 18.78   | 15.87            | 15.84   | 33.27            | 31.29 | 28.01 | 27.56 |

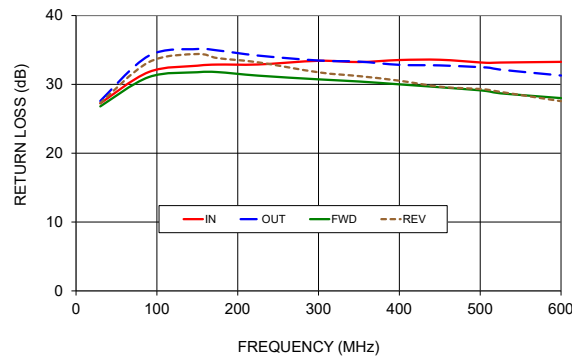
MAINLINE LOSS



COUPLING & DIRECTIVITY



RETURN LOSS



- 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](http://www.minicircuits.com/MCLStore/terms.jsp)

