



### THE BIG DEAL

- High Power Handling, 20 W
- Multi-Octave Bandwidth
- Very Low Mainline Loss, 0.5 dB
- Excellent VSWR, 1.10:1



CASE STYLE: AH202-1

Generic photo used for illustration purposes only

### +RoHS Compliant

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

### APPLICATIONS

- VHF/UHF
- Signal Monitoring
- Communications
- Military Mobile

### PRODUCT OVERVIEW

Mini-Circuits' SYDC-10-62HP+ surface mount bi-directional coupler provides high power handling up to 20 W and low mainline loss of 0.5 dB or better for applications from 10 to 600 MHz. The coupler features core and wire construction mounted on an 8-lead printed laminate base with wraparound terminations for excellent solderability. The unit measures 0.38x0.50x0.25", accommodating dense circuit board layouts.

### KEY FEATURES

| Feature  | Advantages  |
|--|---|
| High Power Handling, 20 W                      | Usable in many systems with high-power requirements.  |
| Low Mainline Loss, ≤0.5 dB                     | Provides excellent through-path signal power transmission.  |
| Good Directivity, 21 to 25 dB                  | High directivity allows accurate signal sampling through the coupled port with minimal measurement error. |
| Excellent VSWR, 1.10:1 (Input/Output/Coupling) | Provides excellent matching in 50Ω systems with minimal signal reflection.                                |
| Small Size, 0.38x0.50x0.25"                    | Provides high power capability while saving space in systems with tight layouts.                          |



# SURFACE MOUNT

# Bi-Directional Coupler

# SYDC-10-62HP+

Mini-Circuits

50Ω 10 dB Coupling 10 to 600 MHz

### ELECTRICAL SPECIFICATIONS AT +25°C<sup>1</sup>

| Parameter                                | Condition (MHz) | Min. | Typ. | Max. | Units |
|--|-----------------|------|------|------|-------|
| Frequency Range                          |                 | 10   |      | 600  | MHz   |
| Mainline Loss (Above Theoretical 0.5 dB) | 10              |      | 0.2  | 0.8  | dB    |
|  | 50              |      | 0.2  | 0.6  |       |
|  | 340             |      | 0.3  | 0.7  |       |
|  | 600             |      | 0.5  | 0.9  |       |
| Coupling                                 | 10-600          |      | 9.6  |      | dB    |
|  | 10              | 9.2  | 9.7  | 10.2 |       |
|  | 50              | 9.3  | 9.8  | 10.5 |       |
|  | 340             | 9.2  | 9.7  | 10.2 |       |
| Coupling Flatness (±)                    | 10-340          |      | ±0.2 | ±0.4 | dB    |
|  | 340-600         |      | ±0.3 | ±0.5 |       |
| Directivity                              | 10              | 15   | 21   |      | dB    |
|  | 50              | 18   | 22.8 |      |       |
|  | 340             | 16   | 24.5 |      |       |
|  | 600             | 14   | 25.6 |      |       |
| Return Loss (Input)                      | 10              | 12   | 15   |      | dB    |
|  | 50              | 20   | 23   |      |       |
|  | 340             | 19   | 25   |      |       |
|  | 600             | 13   | 17   |      |       |
| Return Loss (Output)                     | 10              | 12   | 15   |      | dB    |
|  | 50              | 20   | 26   |      |       |
|  | 340             | 19   | 28   |      |       |
|  | 600             | 15   | 19   |      |       |
| Return Loss (Coupling)                   | 10              | 12   | 15   |      | dB    |
|  | 50              | 20   | 23   |      |       |
|  | 340             | 19   | 27   |      |       |
|  | 600             | 15   | 30   |      |       |
| Input Power <sup>2</sup>                 | 10-600          |      |      | 20   | W     |

1. Tested on Evaluation Board TB-SYDC-10-62HP+.

2. The user must provide adequate means of heat removal to limit the temperature of ground connections 2,3,6,7 to +85°C, in order to ensure proper performance.

At +25°C ambient temperature this requires thermal resistance of the user's PC board heat sink to be 20°C/W or less when the unit is driven at maximum specified RF input power, 20 W.

At higher ambient temperature, with the same heat sink. Input power in watts must not exceed 20 W x (+85°C - Tambient) ÷ +60°C.

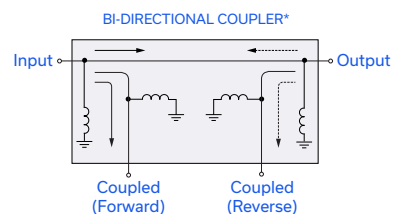
### ABSOLUTE MAXIMUM RATINGS

| Parameter             | Ratings                          |
|-----------------------|----------------------------------|
| Operating Temperature | -40°C to +85°C Case <sup>3</sup> |
| Storage Temperature   | -55°C to +100°C                  |

3. Case temperature is defined as temperature on ground leads.

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.





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# Bi-Directional Coupler

# SYDC-10-62HP+



50Ω 10 dB Coupling 10 to 600 MHz

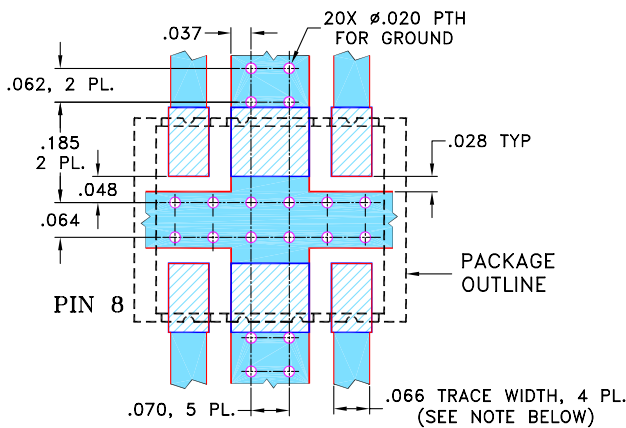
### PAD CONNECTIONS

|                   |            |
|-------------------|------------|
| INPUT             | 8          |
| OUTPUT            | 1          |
| COUPLED (FORWARD) | 5          |
| COUPLED (REVERSE) | 4          |
| GROUND            | 2, 3, 6, 7 |

**\*PRODUCT MARKING:** SYDC-10-62HP

\*Marking may contain other features or characters for internal lot control.

**EVAL BOARD MCL P/N:** TB-SYDC10-62HP+  
**SUGGESTED PCB LAYOUT (PL-246)**

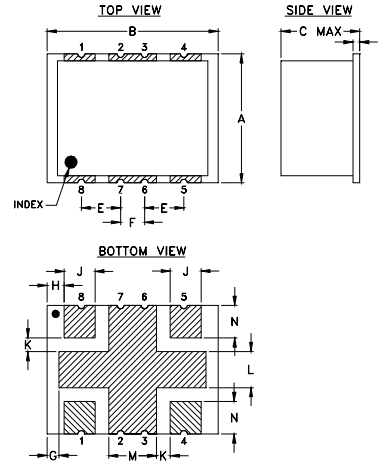


#### NOTES:

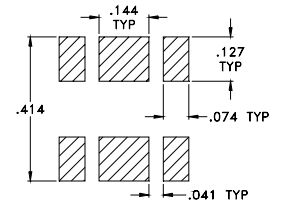
- TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
- BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
- DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

### OUTLINE DRAWING



### PCB Land Pattern



Suggested Layout,  
Tolerance to be within ±.002

### OUTLINE DIMENSIONS (Inches/mm)

| A    | B     | C    | D    | E    | F    | G     |
|------|-------|------|------|------|------|-------|
| .38  | .50   | .25  | .020 | .115 | .070 | .035  |
| 9.65 | 12.70 | 6.35 | 0.51 | 2.92 | 1.78 | 0.89  |
| H    | J     | K    | L    | M    | N    | wt    |
| .050 | .090  | .040 | .105 | .140 | .095 | grams |
| 1.27 | 2.29  | 1.02 | 2.67 | 3.56 | 2.41 | 0.80  |

### TAPE & REEL INFORMATION: F61





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# Bi-Directional Coupler

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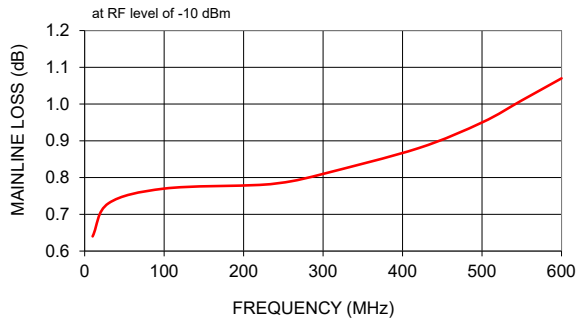
Mini-Circuits

50Ω 10 dB Coupling 10 to 600 MHz

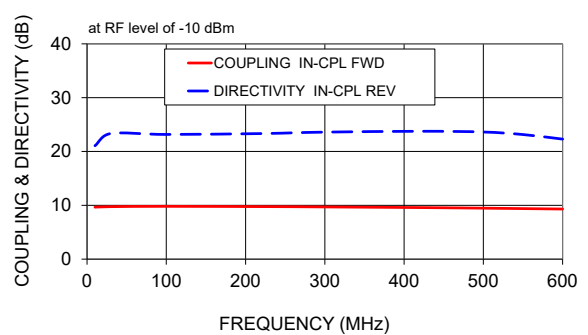
### TYPICAL PERFORMANCE DATA

| 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 |
| 10              | 0.64               | 9.66          | 9.81       | 21.07            | 21.37       | 17.37            | 16.72 | 17.18 | 16.46   |
| 30              | 0.73               | 9.75          | 9.89       | 23.34            | 23.55       | 22.96            | 26.98 | 22.68 | 25.93   |
| 100             | 0.77               | 9.81          | 9.91       | 23.17            | 23.76       | 24.86            | 30.56 | 23.95 | 28.23   |
| 220             | 0.78               | 9.76          | 9.81       | 23.33            | 24.25       | 27.52            | 30.01 | 25.41 | 28.47   |
| 260             | 0.79               | 9.74          | 9.77       | 23.47            | 24.44       | 27.47            | 28.89 | 25.83 | 28.73   |
| 300             | 0.81               | 9.70          | 9.72       | 23.60            | 24.43       | 27.05            | 28.11 | 26.16 | 29.10   |
| 420             | 0.88               | 9.58          | 9.55       | 23.76            | 25.83       | 22.81            | 23.61 | 27.89 | 31.16   |
| 500             | 0.95               | 9.47          | 9.43       | 23.62            | 26.73       | 20.12            | 21.09 | 29.87 | 33.58   |
| 550             | 1.01               | 9.39          | 9.34       | 23.15            | 27.81       | 18.62            | 19.71 | 31.45 | 36.30   |
| 600             | 1.07               | 9.31          | 9.23       | 22.30            | 28.25       | 16.96            | 18.25 | 32.64 | 38.36   |

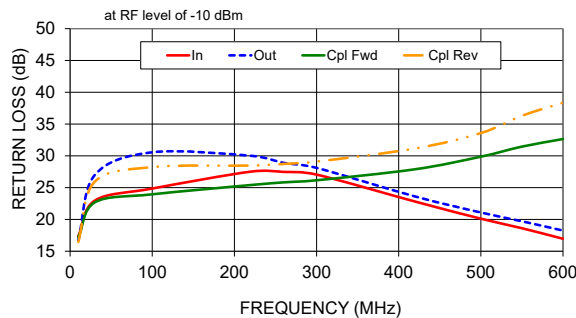
#### MAINLINE LOSS



#### 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.
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