

Surface Mount **top hat™**
Directional Coupler

DBTC-20-4X+

50Ω, 20dB coupling, 20 to 1000 MHz

Maximum 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.

Pin Connections

| | |
|----------------------|---|
| INPUT | 3 |
| OUTPUT | 4 |
| COUPLED | 1 |
| GROUND | 2 |
| ISOLATE (DO NOT USE) | 6 |

Features

- very flat coupling
- very broadband, multi octave
- temperature stable, LTCC base
- all welded construction
- leads attached for better solderability
- micro miniature coupler
- aqueous washable
- protected by US Patents 6,140,887 & 6,784,521

Applications

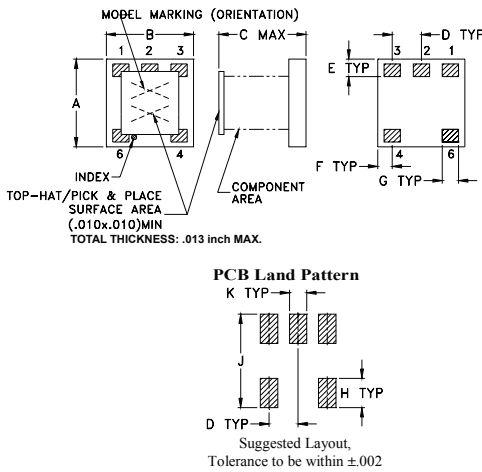
- VHF/UHF receivers/transmitters
- cellular



CASE STYLE: AT1667-1
 PRICE: \$1.99 ea. QTY (20)
 \$1.69 ea. QTY (1000)

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

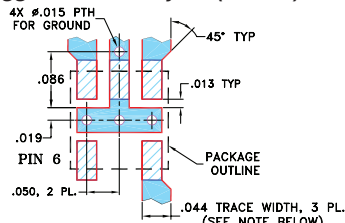
Outline Drawing



Outline Dimensions (inch/mm)

| | | | | | | |
|------|------|------|------|------|------|-------|
| A | B | C | D | E | F | |
| .150 | .150 | .150 | .050 | .030 | .025 | |
| 3.81 | 3.81 | 3.81 | 1.27 | 0.76 | 0.64 | |
| G | H | J | K | | | wt |
| .028 | .050 | .160 | .030 | | | grams |
| 0.71 | 1.27 | 4.06 | 0.76 | | | 0.10 |

**Demo Board MCL P/N: TB-278
 Suggested PCB Layout (PL-150)**



- 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

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- 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

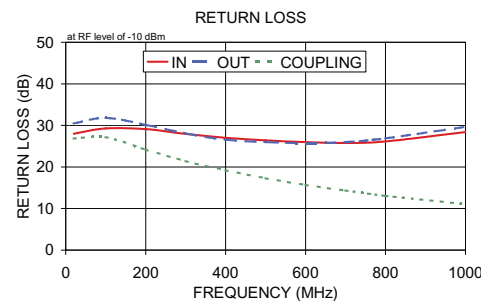
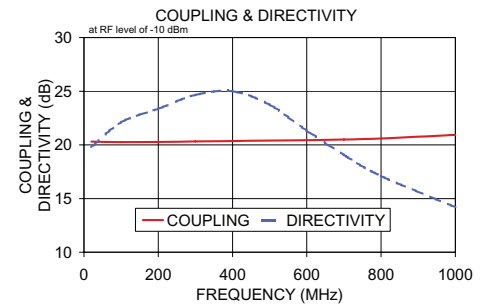
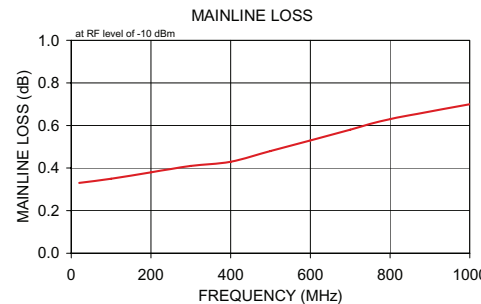
Electrical Specifications

| FREQ. RANGE (MHz) | COUPLING (dB) | | MAINLINE LOSS* (dB) | | | | DIRECTIVITY (dB) | | | VSWR** (:1) | POWER INPUT (W) | | | | | | |
|--------------------------------|---------------|---------------|---------------------|------|------|------|------------------|------|------|-------------|-----------------|------|------|---|-----|-----|-----|
| | Nom. | Max. Flatness | L | M | U | L | M | U | L | | MU | | | | | | |
| f _l -f _u | | | Typ. | Max. | Typ. | Max. | Typ. | Min. | Typ. | Min. | Typ. | Max. | Max. | | | | |
| 20-1000 | 20.4±0.5 | ±0.8 | 0.3 | 1.0 | 0.4 | 1.0 | 0.7 | 1.3 | 21 | 13 | 21 | 14 | 16 | — | 1.2 | 1.0 | 1.0 |

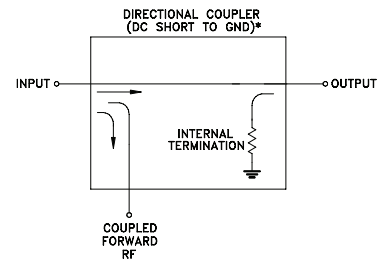
L = low range [f_l to 10 f_l] M = mid range [10 f_l to f_u/2] U = upper range [f_u/2 to f_u]
 * Includes theoretical coupled power loss of 0.04 dB at 20 dB coupling
 ** For coupled port VSWR above 500 MHz, 1.6:1 typ.

Typical Performance Data

| Frequency (MHz) | Mainline Loss (dB) In-Out | Coupling (dB) In-Cpl | Directivity (dB) | Return Loss (dB) | | |
|-----------------|------------------------------|-------------------------|------------------|------------------|-------|-------|
| | | | | In | Out | Cpl |
| 20.00 | 0.33 | 20.30 | 19.79 | 28.00 | 30.48 | 26.85 |
| 100.00 | 0.35 | 20.25 | 22.11 | 29.28 | 31.80 | 27.18 |
| 200.00 | 0.38 | 20.28 | 23.36 | 29.12 | 30.13 | 24.16 |
| 300.00 | 0.41 | 20.32 | 24.66 | 27.95 | 28.09 | 21.44 |
| 400.00 | 0.43 | 20.36 | 25.00 | 27.01 | 26.54 | 19.23 |
| 500.00 | 0.48 | 20.40 | 23.74 | 26.41 | 25.97 | 17.30 |
| 600.00 | 0.53 | 20.43 | 21.33 | 25.99 | 25.74 | 15.69 |
| 700.00 | 0.58 | 20.50 | 19.06 | 25.78 | 26.00 | 14.31 |
| 800.00 | 0.63 | 20.59 | 17.10 | 26.16 | 26.88 | 13.07 |
| 1000.00 | 0.70 | 20.94 | 14.20 | 28.41 | 29.64 | 11.03 |



Electrical Schematic



* ELECTRICAL SCHEMATIC IS FOR DIRECTIONAL COUPLER WITH INTERNAL TRANSFORMER(S) THAT ROUTES DC FROM RF PORTS TO GROUND.