



Mini-Circuits

# SURFACE MOUNT <sup>top hat</sup> Bias Tee

50Ω Wideband 20 to 2500 MHz

TCBT-2R5G+

## FEATURES

- Wideband, 20 to 2500 MHz
- Low Insertion Loss, 0.4 dB Typ.
- Miniature Surface Mount 0.15x0.15"
- Aqueous Washable
- Protected by US Patent 7,012,486



Generic photo used for illustration purposes only

CASE STYLE: GU1604

## APPLICATIONS

- Biasing Amplifiers
- Biasing of Laser Diodes
- Biasing of Active Antennas

### +RoHS Compliant

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

## ELECTRICAL SPECIFICATIONS AT +25°C

| Parameter                                                      | Frequency (MHz) | Min. | Typ. | Max. | Unit |
|----------------------------------------------------------------|-----------------|------|------|------|------|
| Frequency Range                                                |                 | 20   |      | 2500 | MHz  |
| Insertion Loss                                                 | 20-2500         |      | 0.2  | 0.8  | dB   |
|                                                                | 200-1250        |      | 0.35 | 0.8  |      |
|                                                                | 1250-2500       |      | 0.7  | 1.2  |      |
| Isolation<br>(RF Port to DC Port)<br>(RF & DC Port to DC Port) | 20-2500         | 40   | 65   |      | dB   |
|                                                                | 200-1250        | 25   | 44   |      |      |
|                                                                | 1250-2500       | 20   | 40   |      |      |
| VSWR                                                           | 20-2500         |      | 1.05 | 1.5  | :1   |
|                                                                | 200-1250        |      | 1.05 | 1.2  |      |
|                                                                | 1250-2500       |      | 1.1  | 1.25 |      |

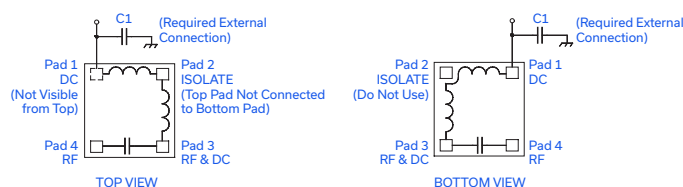
External C1(0.01 µF) is required. See functional schematic and PCB layout.

## ABSOLUTE MAXIMUM RATINGS

|                       |                 |
|-----------------------|-----------------|
| Operating Temperature | -40°C to +85°C  |
| Storage Temperature   | -55°C to +100°C |
| RF Power              | +30 dBm max.    |
| Voltage at DC Port    | +25 V max.      |
| DC Current            | 200 mA          |

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

## FUNCTIONAL SCHEMATIC



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REV. G  
ECO-026344  
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250728

PAGE 1 OF 3



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SURFACE MOUNT 

## Bias Tee

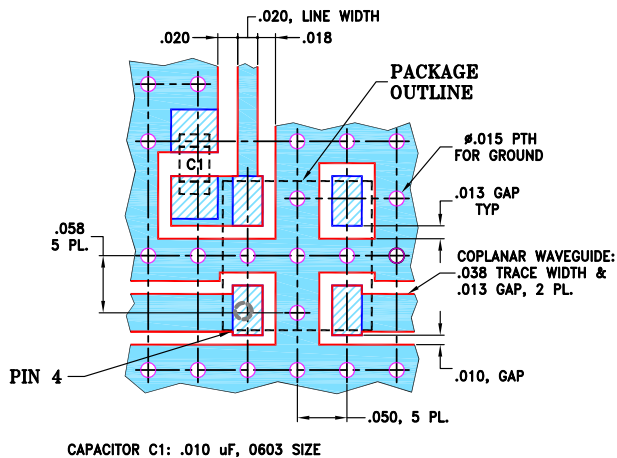
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50Ω Wideband 20 to 2500 MHz

## PAD CONNECTIONS

|                          |   |
|--------------------------|---|
| RF                       | 4 |
| RF & DC                  | 3 |
| DC                       | 1 |
| ISOLATE (See PCB Layout) | 2 |

PRODUCT MARKING: BA

DEMO BOARD MCL P/N: TB-TCBT-2R5G+  
SUGGESTED PCB LAYOUT (PL-146)

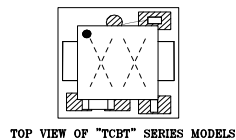
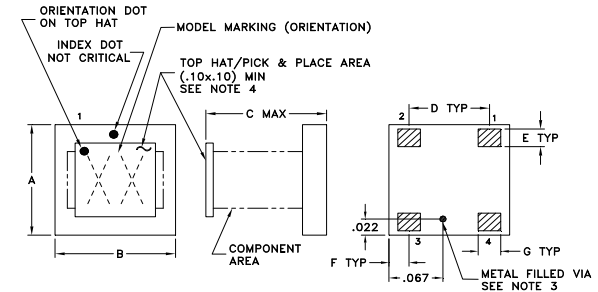
## NOTES:

- COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS  $0.020 \pm 0.0015$ ; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
- BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

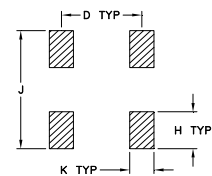
 DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER).

 DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

## OUTLINE DRAWING



## PCB Land Pattern



SUGGESTED LAYOUT  
TOLERANCE TO BE WITHIN  $\pm .002$

## Notes:

- Must be isolated from external conductors on mounting surface. Suggested solder mask area is .025 x .025. At Mini-Circuits option via may be removed.
- Top-Hat total thickness: .013 inches MAX.

OUTLINE DIMENSIONS (Inches)  
mm

| A    | B    | C    | D    | E    | F     |
|------|------|------|------|------|-------|
| .150 | .150 | .150 | .100 | .030 | .025  |
| 3.81 | 3.81 | 3.81 | 2.54 | 0.76 | 0.64  |
| G    | H    | J    | K    |      | wt    |
| .028 | .050 | .160 | .030 |      | grams |
| 0.71 | 1.27 | 4.06 | 0.76 |      | 0.10  |

## TAPE &amp; REEL INFORMATION: F77

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PAGE 2 OF 3



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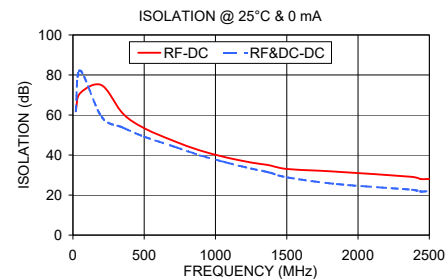
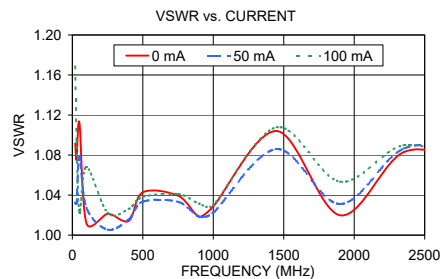
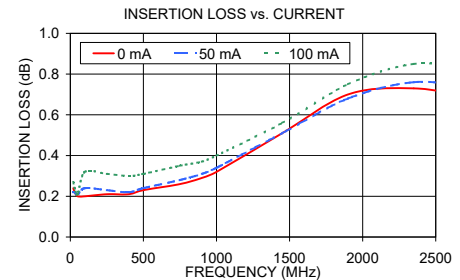
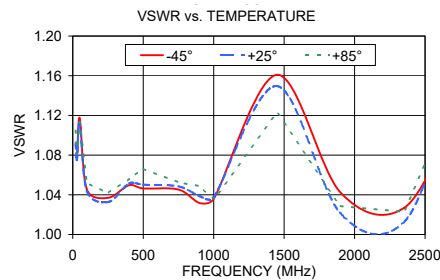
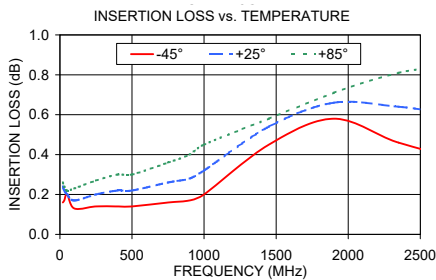
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50Ω Wideband 20 to 2500 MHz

## TYPICAL PERFORMANCE DATA

| Frequency (MHz) | Insertion Loss (dB) with Current |       |        | VSWR (:1) with Current |       |        | Frequency (MHz) | Isolation (dB) 0 mA |              |
|-----------------|----------------------------------|-------|--------|------------------------|-------|--------|-----------------|---------------------|--------------|
|                 | 0 mA                             | 50 mA | 100 mA | 0 mA                   | 50 mA | 100 mA |                 | RF-DC               | RF & DC - DC |
| 20              | 0.24                             | 0.22  | 0.27   | 1.09                   | 1.03  | 1.17   | 20              | 61.91               | 61.88        |
| 30              | 0.22                             | 0.22  | 0.24   | 1.08                   | 1.03  | 1.09   | 50              | 70.90               | 82.16        |
| 50              | 0.20                             | 0.21  | 0.21   | 1.11                   | 1.08  | 1.02   | 200             | 74.93               | 59.19        |
| 100             | 0.20                             | 0.24  | 0.32   | 1.01                   | 1.03  | 1.07   | 350             | 60.74               | 53.73        |
| 250             | 0.21                             | 0.23  | 0.31   | 1.02                   | 1.01  | 1.02   | 500             | 53.42               | 49.17        |
| 400             | 0.21                             | 0.22  | 0.30   | 1.01                   | 1.02  | 1.03   | 710             | 46.96               | 44.20        |
| 500             | 0.23                             | 0.24  | 0.31   | 1.04                   | 1.03  | 1.04   | 890             | 42.32               | 39.88        |
| 750             | 0.26                             | 0.28  | 0.35   | 1.04                   | 1.03  | 1.04   | 1070            | 38.90               | 36.40        |
| 900             | 0.29                             | 0.31  | 0.37   | 1.02                   | 1.02  | 1.03   | 1250            | 36.26               | 33.23        |
| 1000            | 0.32                             | 0.34  | 0.40   | 1.03                   | 1.02  | 1.03   | 1375            | 34.93               | 31.36        |
| 1450            | 0.51                             | 0.51  | 0.56   | 1.10                   | 1.09  | 1.11   | 1500            | 33.06               | 28.86        |
| 1900            | 0.70                             | 0.68  | 0.75   | 1.02                   | 1.03  | 1.05   | 1852            | 31.65               | 25.51        |
| 2350            | 0.73                             | 0.76  | 0.85   | 1.08                   | 1.09  | 1.09   | 2380            | 29.08               | 22.65        |
| 2800            | 0.69                             | 0.74  | 0.83   | 1.08                   | 1.09  | 1.08   | 2440            | 28.00               | 21.74        |
| 3250            | 0.71                             | 0.76  | 0.85   | 1.07                   | 1.09  | 1.07   | 2500            | 28.05               | 22.03        |



## 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.
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