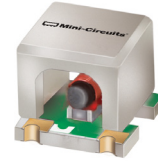


50Ω Wideband 10 MHz to 12 GHz



CASE STYLE: GU1414

## The Big Deal

- Extremely Wideband, 10 MHz to 12 GHz
- Very low insertion loss, 0.5 dB
- Excellent VSWR, 1.25:1
- Tiny size, 0.15 x 0.15 x 0.14”

## Product Overview

Mini-Circuits’ TCBT-123+ is an ultra-wideband surface-mount bias tee covering applications from 10 MHz to 12 GHz with low insertion loss, excellent VSWR, and high DC-RF isolation over its entire frequency range. This model is capable of handling up to +30 dBm (1W) RF input power and DC input current up to 200mA. The unit comes housed in a miniature, shielded package (0.15 x 0.15 x 0.14”) with wraparound terminations for excellent solderability.

## Key Features

| Feature  | Advantages  |
|--|---|
| Ultra-wideband, 10 MHz to 12 GHz   | Supports a wide range of applications with a single device, including biasing broadband amplifiers, laser diodes, active antennas and more. |
| Low insertion loss, 0.5 dB   | Preserves signal strength from input to output and minimizes overall system loss  |
| Excellent VSWR, 1.25:1   | Provides excellent matching for 50Ω systems with minimal signal reflection.   |
| RF power handling up to 1W   | This model supports applications with a variety of power requirements.  |
| Excellent DC-RF isolation <ul style="list-style-type: none"> <li>• 55 dB, 10 to 100 MHz</li> <li>• 33 dB, 100 to 6000 MHz</li> <li>• 22 dB, 6000 to 12000 MHz</li> </ul> | Minimizes RF leakage and interference with other elements in the system.  |
| Miniature size, 0.15 x 0.15 x 0.14”  | Small footprint makes the TCBT-123+ a space-saver in dense PCB-layouts.   |

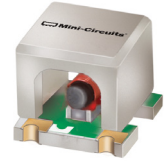
### Notes

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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)

# Surface Mount Bias-Tee

50Ω Wideband 10 MHz to 12 GHz

## TCBT-123+



CASE STYLE: GU1414

**+RoHS Compliant**

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

| Reel Size | Devices/Reel              |
|-----------|---------------------------|
| 7"        | 10, 20, 50, 100, 200, 500 |
| 13"       | 1000                      |

### Maximum Ratings

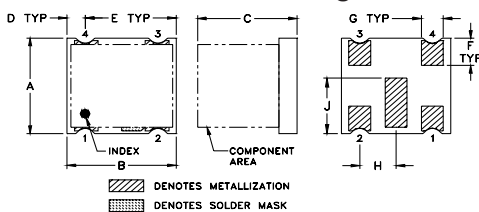
|                       |                |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C  |
| Storage Temperature   | -55°C to 100°C |
| RF Power              | 30dBm max.     |
| Voltage at DC port    | 25V max.       |
| Input Current         | 200mA          |

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

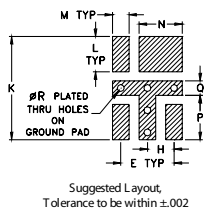
### Pad Terminations

|          |   |
|----------|---|
| RF       | 2 |
| RF&DC    | 1 |
| DC       | 3 |
| NOT USED | 4 |

### Outline Drawing



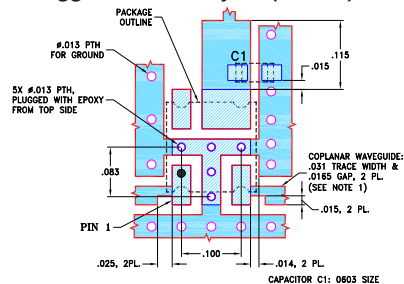
### PCB Land Pattern



### Outline Dimensions (inch)

| A    | B    | C     | D    | E    | F    | G     | H     | J    |
|------|------|-------|------|------|------|-------|-------|------|
| .150 | .150 | .14   | .025 | .100 | .043 | .030  | .050  | .087 |
| 3.81 | 3.81 | 3.56  | 0.64 | 2.54 | 1.09 | 0.76  | 1.27  | 2.21 |
| K    | L    | M     | N    | P    | Q    | R     | wt    |      |
| .193 | .066 | 0.031 | .081 | .083 | .027 | 0.013 | grams |      |
| 4.90 | 1.68 | 0.79  | 2.06 | 2.11 | 0.69 | 0.33  | 0.06  |      |

### Demo Board MCL P/N: TB-879+ Suggested PCB Layout (PL-481)



- NOTES:
- COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020"±.0015". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
  - FOOTPRINT OF C1 IS SHOWN FOR REFERENCE.
  - 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

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### Features

- wideband, 10 to 12000 MHz
- low insertion loss, 0.5 dB typ.
- excellent VSWR, 1.25:1 typ.
- miniature surface mount 0.15"x0.15"
- aqueous washable
- protected by US Patent 8,644,029

### Applications

- biasing amplifiers
- biasing of laser diodes
- biasing of active antennas

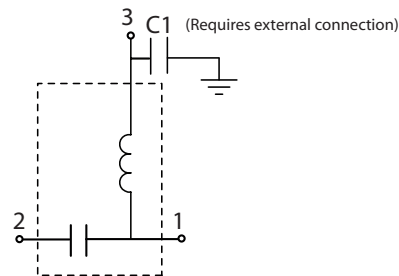
### Electrical Specifications at 25°C

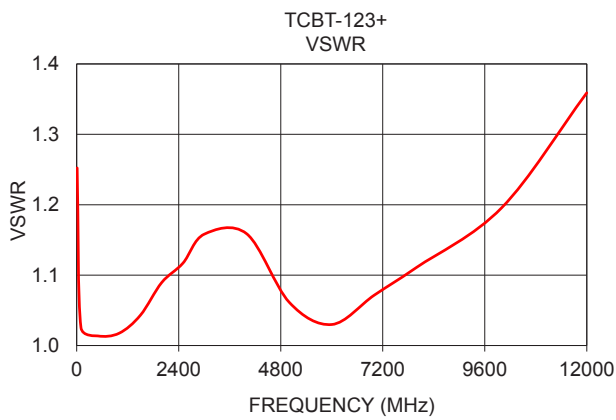
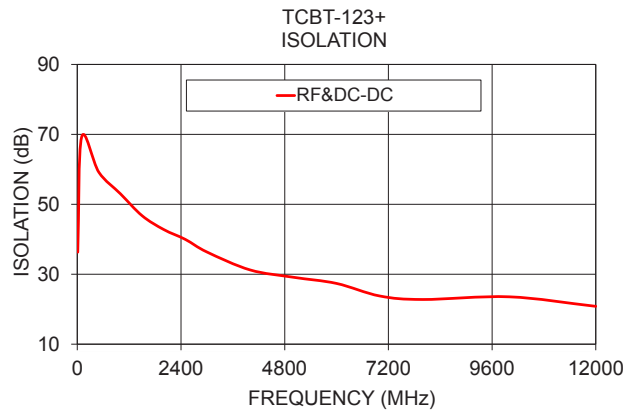
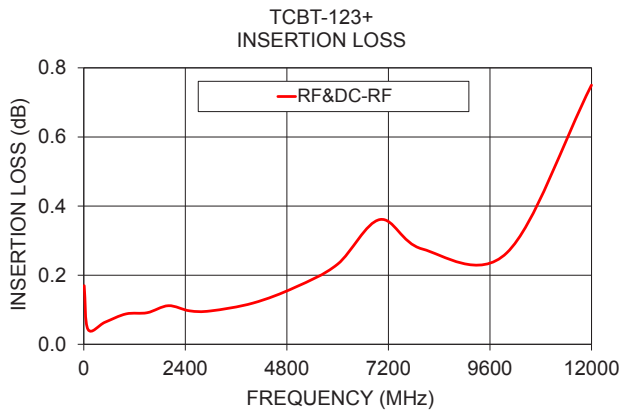
| Parameter       | Frequency (MHz) | Min. | Typ. | Max.  | Unit |
|-----------------|-----------------|------|------|-------|------|
| Frequency Range |                 | 10   |      | 12000 | MHz  |
| Insertion Loss  | 10-100          | —    | 0.1  | 0.5   | dB   |
|                 | 100-6000        | —    | 0.3  | 0.8   |      |
|                 | 6000-12000      | —    | 0.8  | 1.6   |      |
| Isolation       | 10-100          | 30   | 55   | —     | dB   |
|                 | 100-6000        | 18   | 33   | —     |      |
|                 | 6000-12000      | 15   | 22   | —     |      |
| VSWR            | 10-100          |      | 1.05 | 1.3   | :1   |
|                 | 100-6000        |      | 1.2  | 1.5   |      |
|                 | 6000-12000      |      | 1.3  | 1.7   |      |

### Typical Performance Data

| FREQUENCY (MHz) | INSERTION LOSS (dB) with current | VSWR (:1) with current | ISOLATION (dB) 0mA |
|-----------------|----------------------------------|------------------------|--------------------|
|                 | RF & DC-RF                       | RF-DC                  | RF & DC - DC       |
| 10              | 0.17                             | 1.25                   | 36.31              |
| 100             | 0.04                             | 1.03                   | 69.24              |
| 500             | 0.06                             | 1.01                   | 59.14              |
| 1000            | 0.09                             | 1.02                   | 52.98              |
| 1500            | 0.09                             | 1.04                   | 46.74              |
| 2000            | 0.11                             | 1.09                   | 42.79              |
| 2500            | 0.10                             | 1.12                   | 39.96              |
| 3000            | 0.10                             | 1.16                   | 36.36              |
| 4000            | 0.12                             | 1.16                   | 31.23              |
| 5000            | 0.17                             | 1.06                   | 29.13              |
| 6000            | 0.23                             | 1.03                   | 27.37              |
| 7000            | 0.36                             | 1.07                   | 23.78              |
| 8000            | 0.28                             | 1.11                   | 22.78              |
| 10000           | 0.26                             | 1.20                   | 23.54              |
| 12000           | 0.75                             | 1.36                   | 20.82              |

### Functional Schematic





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