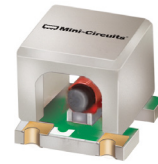




**THE DATASHEET OF  
TCBT-123+**



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.

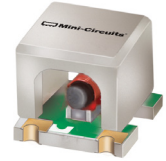
### Notes

- 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)

# 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	Available Tape and Reel at no extra cost
7"	Devices/Reel
13"	10, 20, 50, 100, 200, 500
	1000

### Maximum Ratings

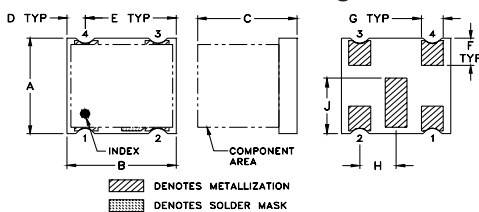
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power	30dBm max.
Voltage at DC port	25V max.
Input Current	200mA

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

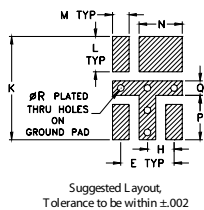
### Pad Terminations

RF	2
RF&DC	1
DC	3
NOT USED	4

### Outline Drawing



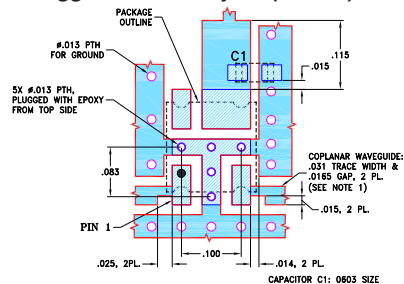
### PCB Land Pattern



### 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

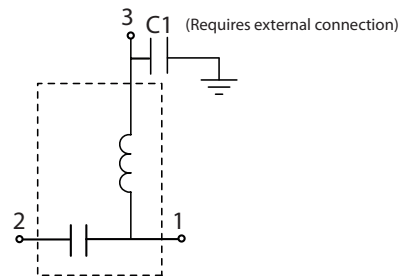
### Electrical Specifications at 25°C

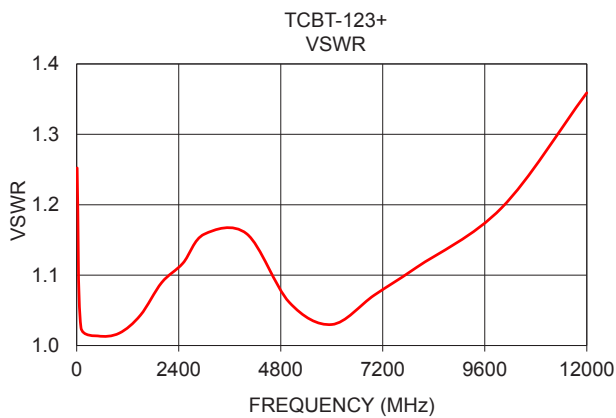
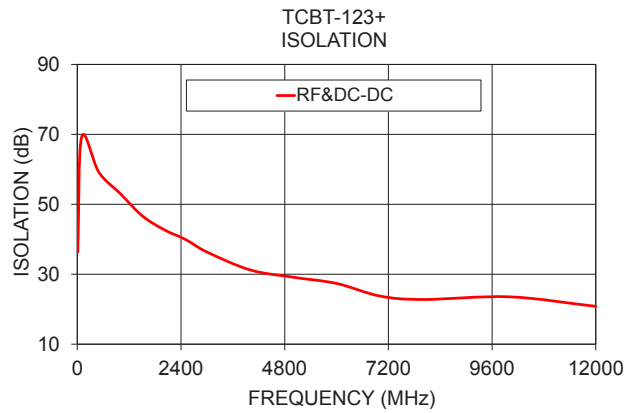
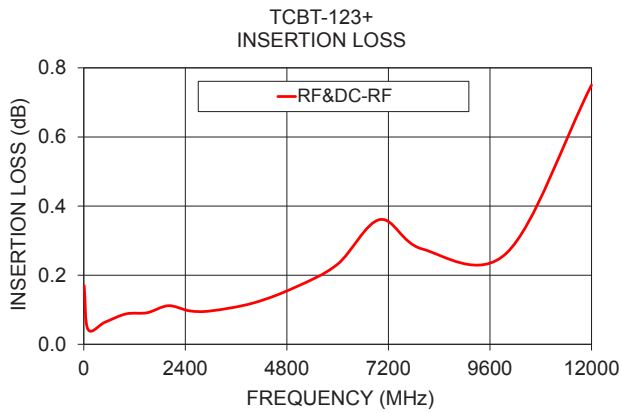
Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		10		12000	MHz
Insertion Loss	10-100	—	0.1	0.5	dB
	100-6000	—	0.3	0.8	
	6000-12000	—	0.8	1.6	
Isolation	10-100	30	55	—	dB
	100-6000	18	33	—	
	6000-12000	15	22	—	
VSWR	10-100		1.05	1.3	:1
	100-6000		1.2	1.5	
	6000-12000		1.3	1.7	

### 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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