Surface Mount

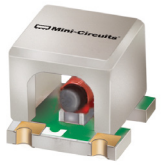
Bias Tee

TCBT-14R+

50Ω Wideband 10 MHz to 10 GHz

The Big Deal

- Extremely Wideband 10 GHz
- Miniature SMT (0.15”x0.15”)



CASE STYLE: GU1414

Product Overview

The TCBT-14R+ surface mount bias tee provides outstanding application versatility, covering an ultra-wide frequency range of 10 MHz to 10 GHz with excellent isolation performance over the band. Its miniature package and surface mount are space-efficient and practical for automated pick and place operation. Designed to handle 30 dBm of RF power and 200 mA input current, the TCBT-14R+ is ideal for many communications and testing applications including biasing of amplifiers and MMICs, laser diodes and active antennas.

Key Features

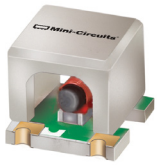
Feature	Advantages
Wideband	The TCBT-14R+ achieves wide 10 MHz – 10 GHz frequency range to serve a large host of applications.
Low Insertion Loss	0.6 dB typ. insertion loss enables highly efficient signal amplification with minimal impact on gain.
Excellent VSWR	Well-matched for 50Ω systems at 1.25:1 typ. VSWR.
Miniature Size	Its miniature footprint (0.15” x 0.15”) makes the TCBT-14R+ a high-performing space-saver in surface mount assemblies.
Aqueous Washable	The TCBT-14R+ features a unique open casing style which allows easy washing without trapping water.

Surface Mount

Bias-Tee

50Ω Wideband 10 MHz to 10 GHz

TCBT-14R+



CASE STYLE: GU1414-2
PRICE: $8.45 ea. QTY (10)

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

Available Tape and Reel at no extra cost

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	1
RF&DC	2
DC	4
NOT USED	3

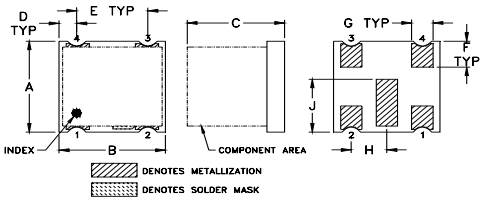
Features

- wideband, 10 to 10000 MHz
- low insertion loss, 0.6 dB typ.
- excellent VSWR, 1.25:1 typ.
- miniature surface mount 0.15"x0.15"
- aqueous washable
- protected by US Patent 8,644,029

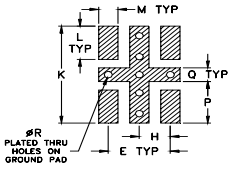
Applications

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

Outline Drawing



PCB Land Pattern



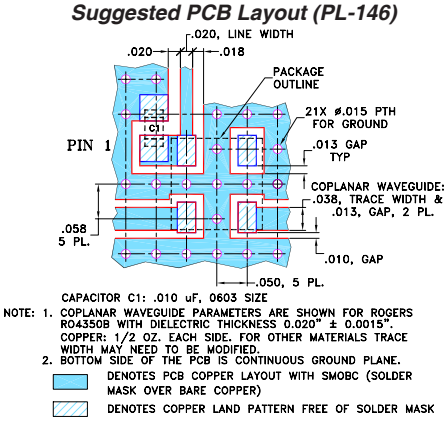
Suggested Layout,
Tolerance to be within ±.002

Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H
0.150	0.150	0.140	0.025	0.100	0.043	0.030	0.050
3.81	3.81	3.56	0.64	2.54	1.09	0.76	1.27

J	K	L	M	P	Q	R	wt
0.087	0.193	0.066	0.031	0.083	0.027	0.013	grams
2.21	4.90	1.68	0.79	2.11	0.69	0.33	0.06

Demo Board MCL P/N: TB-268
Suggested PCB Layout (PL-146)



CAPACITOR C1: .010 uF, 0603 SIZE
NOTE: 1. COPLANAR WAVEGUIDE PARAMETERS ARE 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

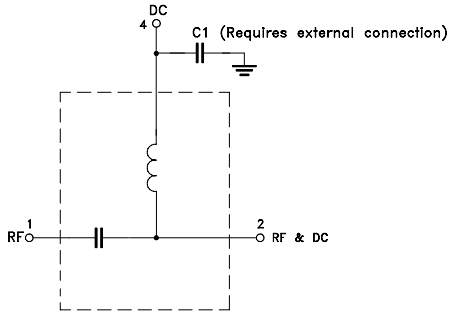
Electrical Specifications at 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		10		10000	MHz
Insertion Loss	10 - 10000	0.05	0.6	1.6	dB
Isolation	10 - 10000	15	33	—	dB
VSWR	10 - 10000	1.02	1.25	1.7	:1
DC Resistance, DC to RF and DC port	10 - 10000	—	1.0	—	ohms

Typical Performance Data

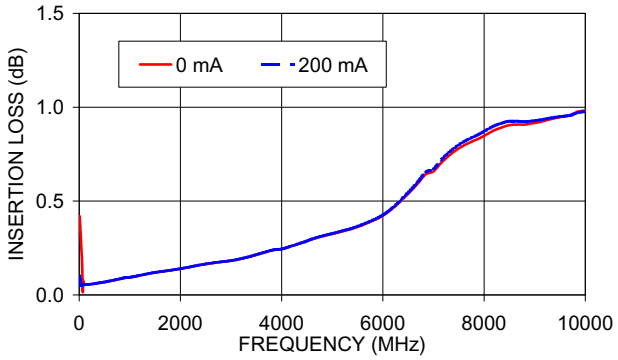
Frequency (MHz)	INSERTION LOSS (dB)	VSWR (:1)		Isolation 0 mA	
		RF	RF&DC	RF-DC	RF&DC-DC
10.00	0.42	1.19	1.42	36.38	35.97
50.00	0.21	1.03	1.03	67.83	76.42
100.00	0.05	1.03	1.02	65.56	66.99
500.00	0.07	1.03	1.02	60.34	56.95
1000.00	0.09	1.02	1.02	51.24	48.05
2050.00	0.14	1.02	1.03	37.50	36.11
3100.00	0.19	1.08	1.08	31.08	29.64
4000.00	0.24	1.07	1.07	29.31	27.43
5050.00	0.33	1.04	1.03	26.34	24.91
6100.00	0.44	1.04	1.01	20.43	19.27
7000.00	0.66	1.09	1.07	16.60	15.87
8050.00	0.86	1.09	1.15	17.92	17.69
9100.00	0.92	1.23	1.22	19.03	18.34
9400.00	0.94	1.29	1.27	18.86	18.17
10000.00	0.98	1.45	1.41	17.61	17.20

Functional Schematic

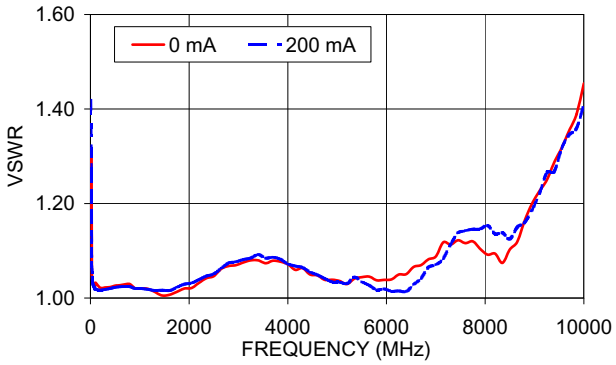


Notes
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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

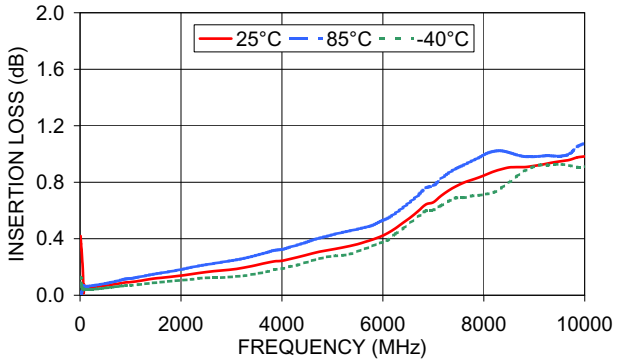
TCBT-14R+
INSERTION LOSS vs. CURRENT



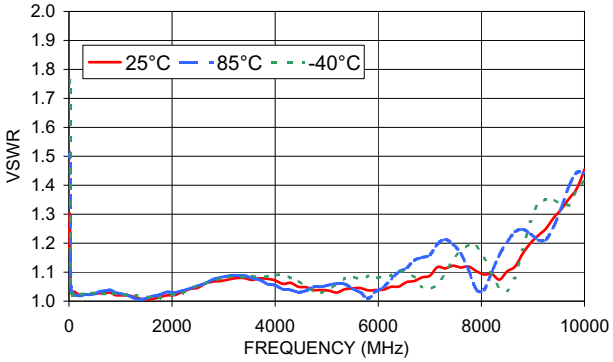
TCBT-14R+
VSWR vs. CURRENT



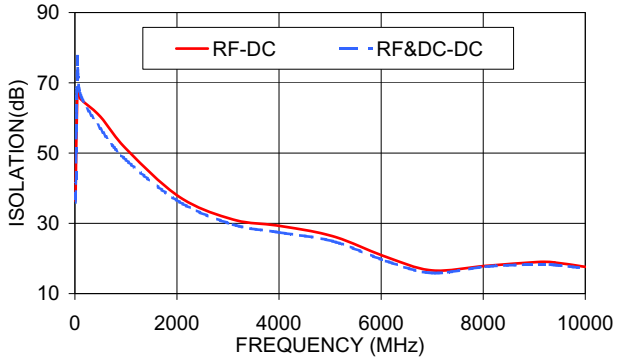
TCBT-14R+
INSERTION LOSS vs. TEMPERATURE



TCBT-14R+
VSWR vs. TEMPERATURE



TCBT-14R+
ISOLATION @ 25°C & 0mA



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