Surface Mount

Bias Tee

25-05851

TCBT-14+

50Ω Wideband 10 MHz to 10 GHz

The Big Deal

- Extremely Wideband
- Very high DC current up to 200mA
- Very low insertion loss,<1dB
- Well matched, VSWR1.1:1

CASE STYLE: GU1414

Product Overview

TCBT-14+ is the world's smallest footprint wideband Bias-Tee measuring 3.8 mm x 3.8 mm which utilizes a unique design to cover a frequency range of 10 MHz to 10 GHz without resonances that are typically observed over such broad bands. It is designed to handle 1W of RF power and 200 mA current and is suitable for automated pick and place operation.

Key Features

Feature	Advantages
Extremely wideband: 10 MHz to 10 GHz	Broad bandwidth enables biasing of wideband MMIC amplifiers or other active circuits starting at extremely low frequencies through microwave bands.
DC Current, 200 mA	Able to support most Class-A MMIC amplifiers with a P1dB of up to 22 dBm need less than 200 mA.
Low Insertion Loss: 0.2 dB typ. To 3 GHz 0.5 dB typ. to 5 GHz 1.0 dB typ. at 10 GHz	When used at the output of the amplifiers in a typical bias application; the low loss of the TCBT-14+ exhibits minimal impact on gain and over temperature improving reliability.
Excellent matching: 1:1.1 over 0.1- 4 GHz 1.2:1 over entire band	Excellent VSWR of TCBT minimizes interaction effects and resulting gain ripple. Use of TCBT-14+ with Mini-Circuits MMIC amplifiers has shown performance improvements over traditional L-C networks over the entire band.

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TCBT-14+

CASE STYLE: GU1414
PRICE: $8.45 ea. QTY (10-49)

+ RoHS compliant in accordance with EU Directive (2002/95/EC)

The +Suffix has been added in order to identify RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications.

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

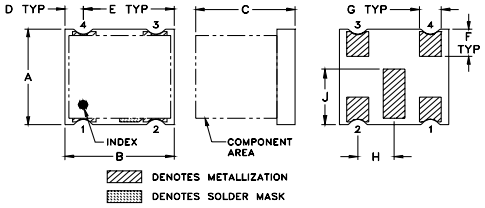
Features

- wideband, 10 to 10000 MHz
- low insertion loss, 0.5 dB typ.
- excellent VSWR, 1.25:1 typ.
- miniature surface mount 0.15"x0.15"
- aqueous washable

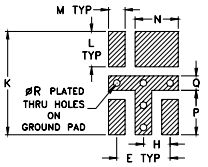
Applications

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

Outline Drawing



PCB Land Pattern



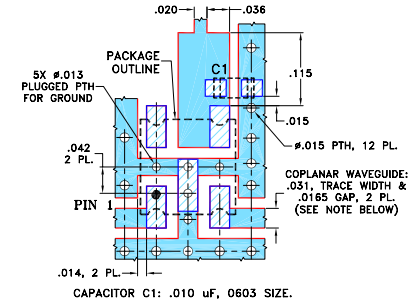
Suggested Layout,
Tolerance to be within ±.002

Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	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-510+
Suggested PCB Layout (PL-321)



CAPACITOR C1: .010 uF, 0603 SIZE.

NOTES:
1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020" ± .0015"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. FOOTPRINT OF C1 IS SHOWN FOR REFERENCE.
3. 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

Bias-Tee Electrical Specifications

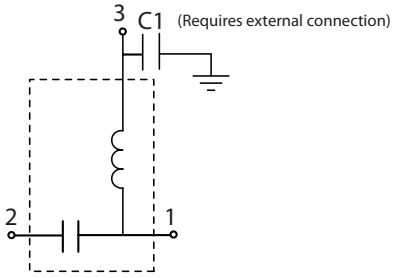
FREQUENCY (MHz)		INSERTION LOSS (dB)						ISOLATION (dB) (RF port to DC port) (RF&DC port to DC port)						VSWR (:1)					
		L		M		U		L		M		U		L		M		U	
f_L	f_U	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Max.	Typ.	Max.	Typ.	Max.
10	10000	0.1	0.5	0.35	0.8	0.8	1.6	55	30	33	18	22	15	1.05	1.3	1.2	1.5	1.3	1.5

L= 10-100 MHz M=100-5000 MHz U=5000-10000 MHz
External C1(0.01μF) is required. See functional schematic and PCB layout.

Typical Performance Data

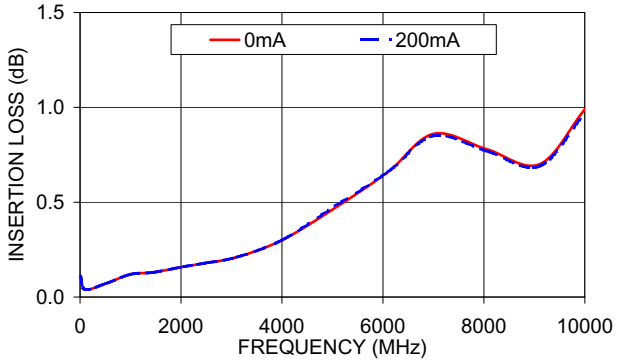
FREQUENCY (MHz)	INSERTION LOSS (dB) with current		VSWR (:1) with current		ISOLATION (dB) 0mA	
	0mA	200mA	0mA	200mA	RF-DC	RF & DC - DC
10.00	0.11	0.11	1.21	1.21	35.29	34.85
100.00	0.04	0.04	1.02	1.02	67.27	76.84
500.00	0.07	0.07	1.03	1.03	58.28	56.42
1000.00	0.12	0.12	1.05	1.05	51.44	48.45
1450.00	0.13	0.13	1.04	1.04	44.41	42.96
2050.00	0.16	0.16	1.02	1.02	39.31	37.44
2500.00	0.18	0.18	1.03	1.03	35.19	34.15
3100.00	0.21	0.21	1.03	1.03	30.85	29.35
4000.00	0.30	0.30	1.16	1.16	27.39	25.43
5050.00	0.47	0.48	1.08	1.08	25.68	23.02
6100.00	0.66	0.66	1.20	1.20	22.61	19.71
7000.00	0.86	0.85	1.25	1.25	22.68	18.80
8050.00	0.78	0.77	1.11	1.11	20.55	18.49
9100.00	0.70	0.69	1.22	1.21	21.37	18.82
10000.00	0.99	0.97	1.09	1.09	20.70	17.68

Functional Schematic

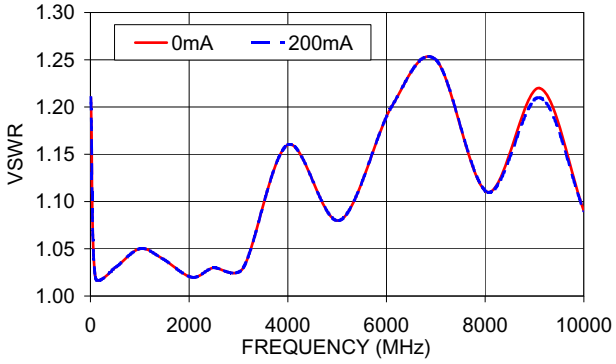


REV. A
M132840
TCBT-14+
ED-13597/14
DJ/CP/AM
110721

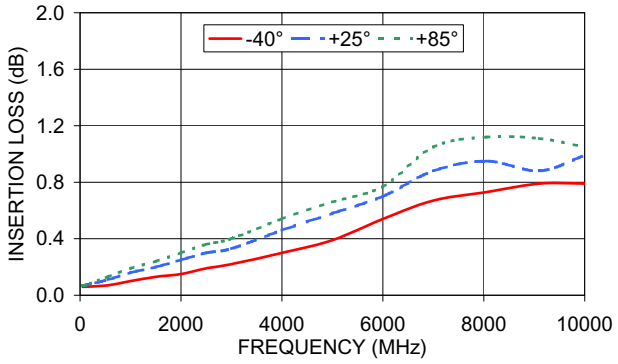
TCBT-14+
INSERTION LOSS vs. CURRENT



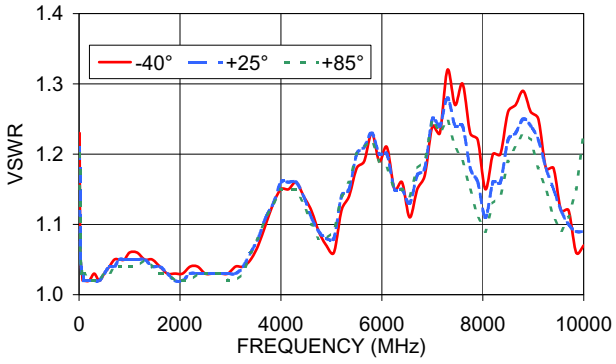
TCBT-14+
VSWR vs. CURRENT



TCBT-14+
INSERTION LOSS vs. TEMPERATURE



TCBT-14+
VSWR vs. TEMPERATURE



TCBT-14+
ISOLATION @ 25°C & 0mA