top hat®

Surface Mount

Bias-Tee

TCBT-2R5GL+

50Ω Wideband 20 to 2500 MHz

The Big Deal

- Wideband, 20 to 2500 MHz
- Very low insertion loss, 0.4 dB
- Excellent VSWR, 1.05:1
- Tiny size, 0.15 x 0.15 x 0.14”

CASE STYLE: GU1840

Product Overview

Mini-Circuits’ TCBT-2R5GL+ is an ultra-wideband surface-mount bias tee covering applications from 20 to 2500 MHz 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 features core and wire construction mounted on a ceramic base (0.15 x 0.15 x 0.14”) with Mini-Circuits Top-Hat feature for faster, more accurate pick and place assembly.

Key Features

Feature	Advantages
Wideband, 20 to 2500 MHz	Supports a wide range of applications with a single device, including biasing broadband amplifiers, laser diodes, active antennas and more.
Low insertion loss, 0.4 dB	Preserves signal strength from input to output and minimizes overall system loss
Excellent VSWR, 1.05:1	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	High DC-RF isolation (44 dB typ. at midband) 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-2R5GL+ a space-saver in dense PCB-layouts.
Top-Hat feature	Improves speed and accuracy of pick and place assembly.
Leads for excellent solderability.	This model features leads to facilitate soldering on PCB assemblies.

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

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+RoHS Compliant

The +Suffix identifies 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	4
RF&DC	3
DC	1
NOT USED	2

Features

- wideband, 20 to 2500 MHz
- low insertion loss, 0.4 dB typ.
- miniature surface mount 0.15"x0.15"
- aqueous washable
- protected by US Patent 7,012,486

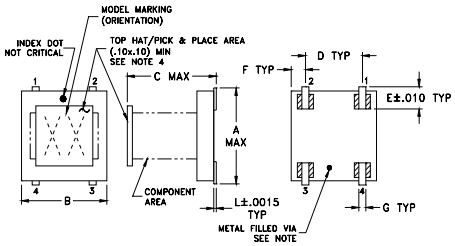
Applications

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

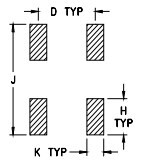
Available Tape and Reel at no extra cost

Reel Size	Devices/Reel
7"	20, 50, 100, 200, 500, 1000
13"	2000

Outline Drawing



PCB Land Pattern



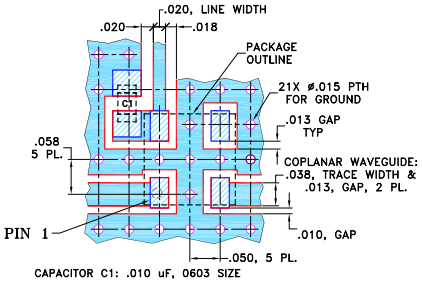
Suggested Layout, Tolerance to be within ±.002

Outline Dimensions (inch / mm)

A	B	C	D	E	F
.166	.150	.155	.100	.037	.025
4.22	3.81	3.94	2.54	0.94	0.64

G	H	J	K	L	wt
.012	.060	.184	.030	0.004	grams
0.30	1.52	4.67	0.76	0.10	0.10

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

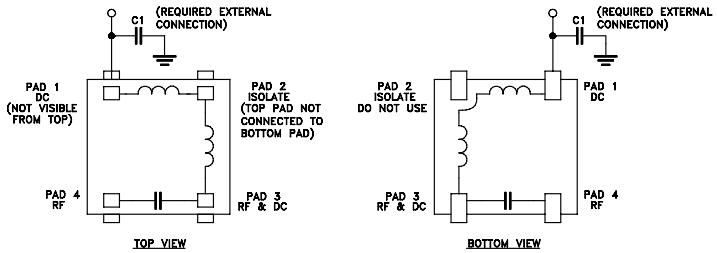
Electrical Specifications at 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		20		2500	MHz
Insertion Loss	20-200	—	0.2	0.8	dB
	200-1250	—	0.35	0.8	
	1250-2500	—	0.7	1.2	
Isolation	20-200	40	65	—	dB
	200-1250	25	44	—	
	1250-2500	20	40	—	
VSWR	20-200	—	1.05	1.5	:1
	200-1250	—	1.05	1.2	
	1250-2500	—	1.1	1.25	
DC Resistance, DC to RF and DC port		—	0.2	—	ohms

Typical Performance Data

Frequency (MHz)	INSERTION LOSS (dB)	VSWR (:1)		Isolation 0 mA	
		RF	RF&DC	RF-DC	RF&DC-DC
20.00	0.26	1.13	1.11	59.24	58.93
50.00	0.24	1.05	1.04	59.60	75.37
100.00	0.22	1.02	1.02	69.83	72.61
500.00	0.28	1.02	1.01	51.83	51.15
1000.00	0.43	1.04	1.04	40.89	38.59
1500.00	0.64	1.06	1.08	35.46	31.24
2000.00	0.72	1.04	1.11	33.88	26.97
2200.00	0.74	1.04	1.13	33.78	25.75
2400.00	0.75	1.03	1.14	33.55	24.74
2500.00	0.75	1.03	1.14	33.30	24.28

Functional Schematic



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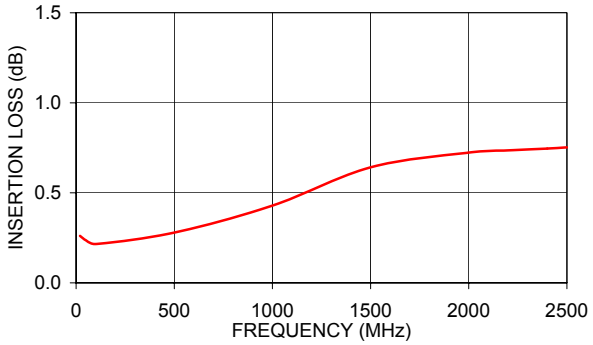
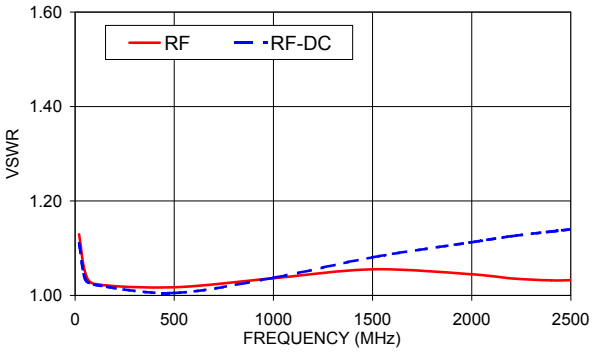
TCBT-2R5GL+
INSERTION LOSS



TCBT-2R5GL+
VSWR



TCBT-2R5GL+
ISOLATION @ 25°C & 0mA