

**THE BIG DEAL**

- Ultra-wideband, 10 MHz to 20 GHz
- Very low insertion loss, 0.8 dB
- Excellent VSWR, 1.3:1
- Small footprint, 0.175 x 0.150 x 0.110"

APPLICATIONS

- Biasing amplifiers
- Biasing of laser diodes
- Biasing of active antennas



Generic photo used for illustration purposes only

CASE STYLE: GU1414-4

+RoHS Compliant

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

PRODUCT OVERVIEW

Mini-Circuits' TCBT-203+ is an ultra-wideband surface mount bias tee, covering applications from 10 MHz to 20 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 (1 W) RF input power, and DC input current up to 250 mA. The unit comes housed in a miniature, surface mount package (0.175 x 0.150 x 0.110").

KEY FEATURES

Feature	Advantages
Ultra-wideband, 10 MHz to 20 GHz	Supports a wide range of applications with a single device, including biasing broadband amplifiers, laser diodes, active antennas and more.
Low insertion loss, 0.8 dB	Preserves signal strength from input to output, and minimizes overall system loss
Excellent VSWR, 1.3:1	Provides excellent matching for 50Ω systems, with minimal signal reflection.
RF power handling up to 1 W	This model supports applications with a variety of power requirements.
Excellent DC-RF isolation <ul style="list-style-type: none"> • 50 dB, 10 to 100 MHz • 33 dB, 100 to 12000 MHz • 23 dB, 12000 to 20000 MHz 	Minimizes RF leakage and interference with other elements in the system.
Miniature size, 0.175 x 0.150 x 0.110"	Small footprint makes the TCBT-203+ a space-saver in dense PCB-layouts.



SURFACE MOUNT Bias Tee

TCBT-203+

Mini-Circuits

ELECTRICAL SPECIFICATIONS AT 25°C

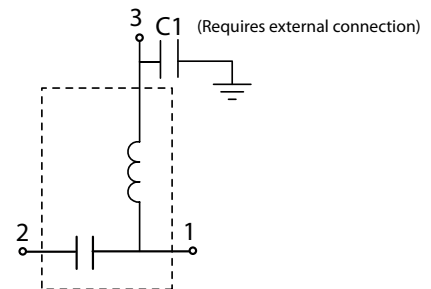
Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		10		20000	MHz
Insertion Loss	10-100	-	0.2	-	dB
	100-14000	-	0.4	1.1	
	14000-18000	-	0.8	1.3	
	18000-20000	-	0.9	1.6	
Isolation	10-100	24	50	-	dB
	100-14000	22	33	-	
	14000-18000	19	23	-	
VSWR	10-100	-	1.2	2.1	:1
	100-14000	-	1.22	1.7	
	14000-18000	-	1.35	1.8	
	18000-20000	-	1.4	2.0	

MAXIMUM RATINGS

Operating Temperature	-40 °C to 85 °C
Storage Temperature	-55 °C to 100 °C
RF Power	30 dBm max.
Voltage at DC port	30 V max.
Input Current	250 mA

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

FUNCTIONAL SCHEMATIC





SURFACE MOUNT Bias Tee

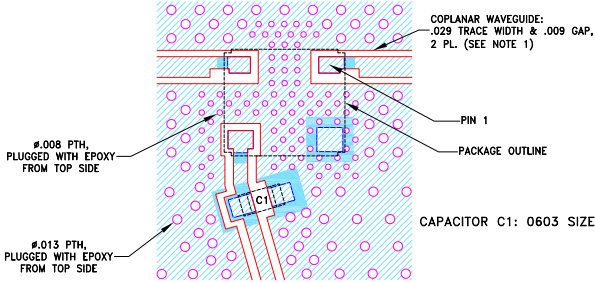
TCBT-203+

PAD CONNECTIONS

RF	2
RF & DC	1
DC	3
NOT USED	4

PRODUCT MARKING: N/A

DEMO BOARD MCL P/N: TB-TCBT-203+ SUGGESTED PCB LAYOUT (PL-715)

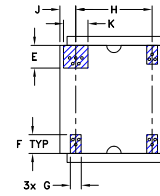
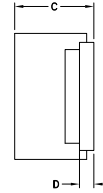
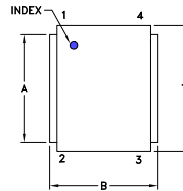


NOTES:

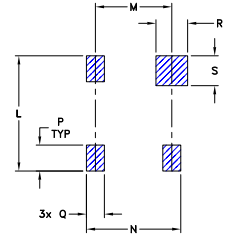
- COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020±.0015; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS, TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
- FOOTPRINT OF C1 IS SHOWN FOR REFERENCE.
- BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER).
- DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

OUTLINE DRAWING



PCB Land Pattern



- NOTES:**
- DENOTES METALLIZATION

SUGGESTED LAYOUT FOR PCB LAND PATTERN
TOLERANCE TO BE WITHIN ±.002

OUTLINE DIMENSIONS (Inches / mm)

A	B	C	D	E	F	G	H	J	K
0.150	0.150	0.110	0.020	0.031	0.026	0.015	0.106	0.022	0.034
3.81	3.81	2.79	0.51	0.79	0.66	0.38	2.69	0.56	0.86
L	M	N	P	Q	R	S	T	wt	
0.160	0.106	0.131	0.036	0.025	0.044	0.042	0.175	grams	
4.06	2.69	3.33	0.91	0.64	1.12	1.05	4.45	0.054	

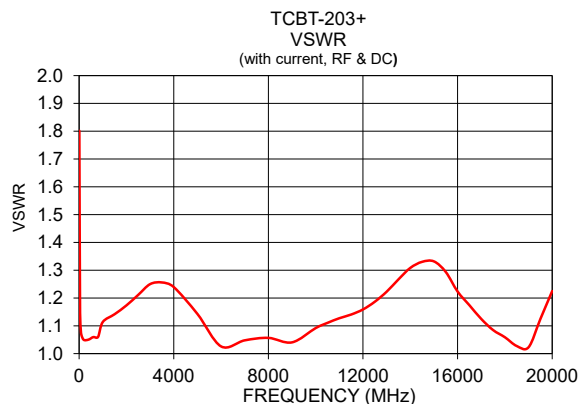
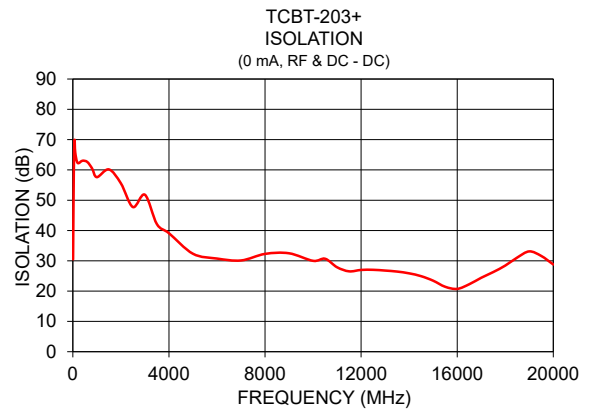
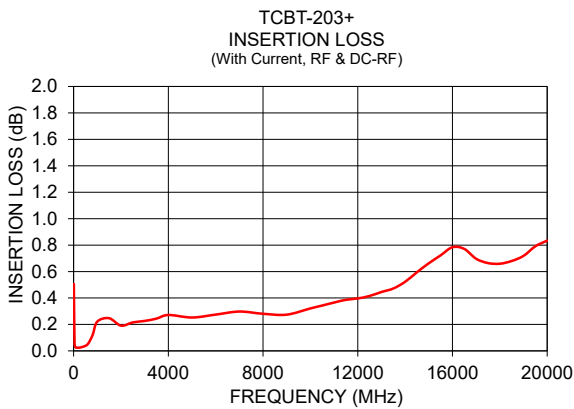


SURFACE MOUNT Bias Tee

TCBT-203+

TYPICAL PERFORMANCE DATA

Frequency (MHz)	Insertion Loss (dB) RF & DC - RF with Current	Isolation (dB) RF & DC - DC	VSWR (:1) RF & DC with Current
10	0.51	30.49	1.80
2000	0.19	55.58	1.17
3000	0.23	51.81	1.25
4000	0.27	39.12	1.24
5000	0.25	32.33	1.14
6000	0.27	30.75	1.03
7000	0.30	30.11	1.05
8000	0.28	32.28	1.06
9000	0.27	32.49	1.04
10000	0.32	29.99	1.09
11000	0.37	27.87	1.13
12000	0.40	26.99	1.16
13000	0.45	26.78	1.22
14000	0.52	25.86	1.31
15000	0.66	23.43	1.33
16000	0.78	20.74	1.22
17000	0.70	24.40	1.12
18000	0.66	28.43	1.06
19000	0.72	33.11	1.02
20000	0.83	28.79	1.23



- 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

