



Mini-Circuits

SURFACE MOUNT

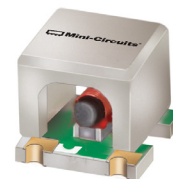
Bias Tee

TCBT-123+

50Ω Wideband 10 MHz to 12 GHz

THE BIG DEAL

- Wideband, 10 MHz to 12 GHz
- Low Insertion Loss, 0.5 dB Typ.
- Excellent VSWR, 1.25:1 Typ.
- Miniature Surface Mount 0.15x0.15"
- Aqueous Washable
- Protected by US Patent 8,644,029



Generic photo used for illustration purposes only

CASE STYLE: GU1414

APPLICATIONS

- Biasing Amplifiers
- Biasing of Laser Diodes
- Biasing of Active Antennas

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 (1 W) RF input power and DC input current up to 200 mA. The unit comes housed in a miniature, shielded package (0.15x0.15x0.14") 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 1 W	This model supports applications with a variety of power requirements.
Excellent DC-RF Isolation • 55 dB, 10 to 100 MHz • 33 dB, 100 to 6000 MHz • 22 dB, 6000 to 12000 MHz	Minimizes RF leakage and interference with other elements in the system.
Miniature Size, 0.15x0.15x0.14"	Small footprint makes the TCBT-123+ a space-saver in dense PCB-layouts.





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ELECTRICAL SPECIFICATIONS AT +25°C

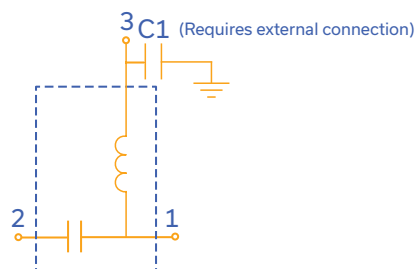
Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		10		12000	MHz
Insertion Loss	10-100		0.1	0.5	dB
	100-6000		0.3	0.8	
	6000-12000		0.8	1.6	
Isolation	10-100	30	55		dB
	100-6000	18	33		
	6000-12000	15	22		
VSWR	10-100		1.05	1.3	:1
	100-6000		1.2	1.5	
	6000-12000		1.3	1.7	

ABSOLUTE 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	+25 V max.
Input Current	200 mA

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

FUNCTIONAL SCHEMATIC





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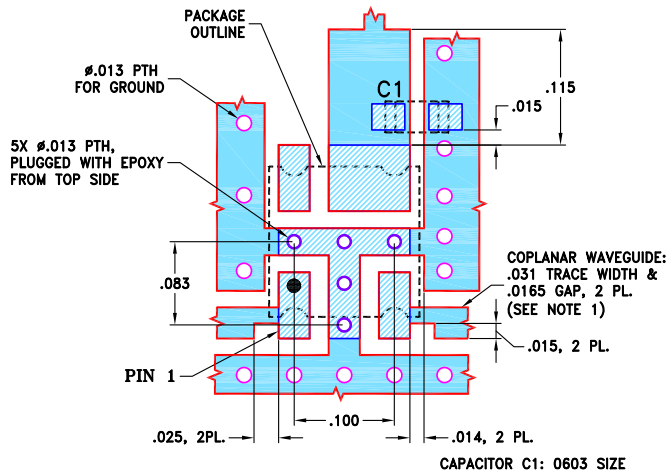
50Ω Wideband 10 MHz to 12 GHz

PAD CONNECTIONS

RF	2
RF & DC	1
DC	3
NOT USED	4

PRODUCT MARKING: N/A

DEMO BOARD MCL P/N: TB-TCBT-123+ SUGGESTED PCB LAYOUT (PL-481)

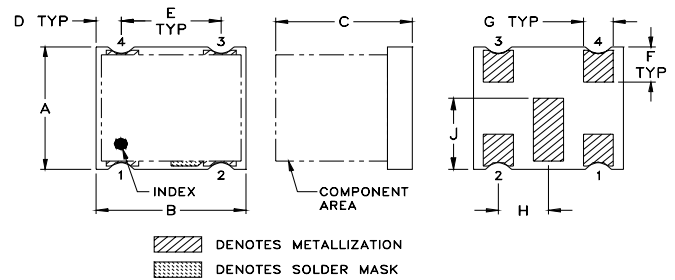


NOTES:

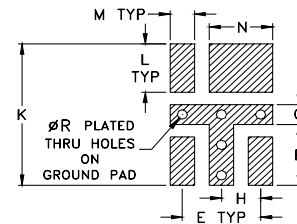
1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS $.020 \pm .0015$; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
2. FOOTPRINT OF C1 IS SHOWN FOR REFERENCE.
3. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

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

OUTLINE DRAWING



PCB Land Pattern



Suggested Layout,
Tolerance to be within $\pm .002$

OUTLINE DIMENSIONS (Inches/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	



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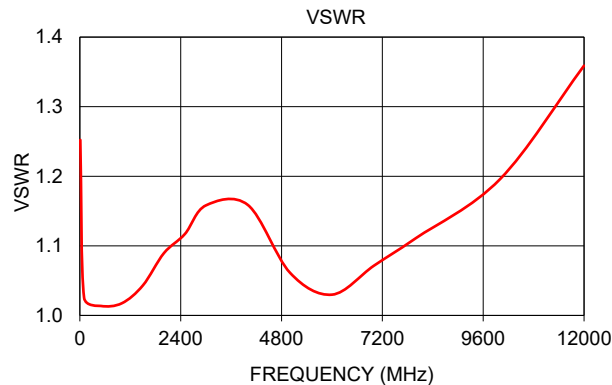
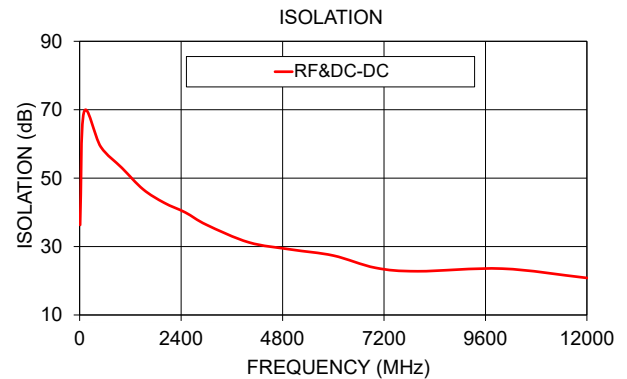
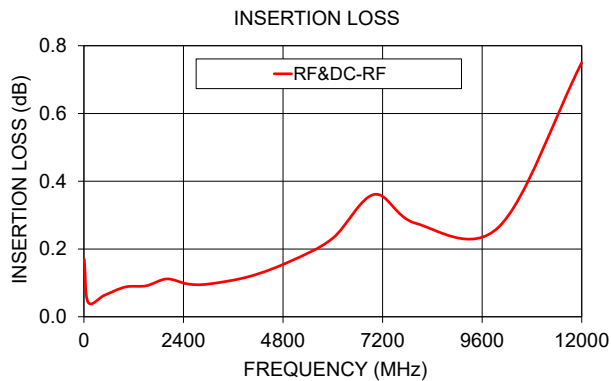
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TYPICAL PERFORMANCE DATA

Frequency (MHz)	Insertion Loss (dB) RF & DC-RF with Current	VSWR (:1) RF & DC with Current	Isolation (dB) 0 mA 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



NOTES

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- 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/terms/viewterm.html

