THE DATASHEET OF

TCM3-452X+

Surface Mount top hat®

RF Transformer

TCM3-452X+

50Ω 20 to 4500 MHz

The Big Deal

- Low insertion loss, 1.5 dB typ.
- Low unbalance, 0.2 dB, 2°
- Power handling up to 0.4W

CASE STYLE: DB1627

Product Overview

Mini-Circuits TCM3-452X+ is a 50Ω surface mount balanced transmission line transformer with a 3:1 secondary/primary impedance ratio covering the 20 to 4500 MHz band. This model handles RF input power up to 0.4W and provides low insertion loss, good return loss, and low amplitude unbalance. Measuring only 0.16 x 0.15 x 0.16", the unit features core and wire, all-welded construction mounted on a six-lead plastic base. The unit also includes Mini-Circuits' Top Hat® feature for faster, more accurate pick-and-place assembly.

Key Features

Feature	Advantages
Wideband, 20 to 4500 MHz	Supports a variety of applications including PCS, SatCom and more.
Power Handling up to 0.4W	Supports a variety of RF input power requirements.
Low insertion loss, 1.5 dB	Enables excellent signal power transmission from input to output.
Low unbalance • 0.5 dB amplitude unbalance • 4° phase unbalance	Produces nearly equal output signals, ideal for parallel path / multichannel systems.
Small footprint, 0.16 x 0.15"	Accommodates tight space requirements for dense PCB layouts.
Top Hat® feature	Improves speed and accuracy of pick and place assembly and provides clear device marking for visual inspection

top hat®

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Generic photo used for illustration purposes only

CASE STYLE: DB1627

+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”	20, 50, 100, 200, 500
13”	1000, 2000

Features

- wide bandwidth 20 to 4500 MHz
- balanced transmission line
- good return loss
- aqueous washable

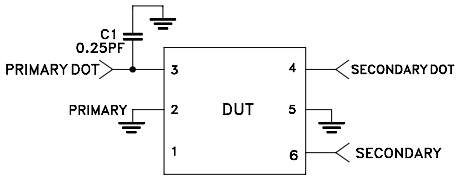
Applications

- PCS
- wideband push-pull amplifiers
- cellular

Electrical Specifications at 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Impedance Ratio (secondary/primary)			3		
Frequency Range		20	—	4500	MHz
Insertion Loss	20 - 4500	—	1.5	3.0	dB
Amplitude Unbalance	20 - 4500	—	0.5	—	dB
Phase Unbalance	20 - 4500	—	4	—	Degree

Electrical Schematic



Maximum Ratings

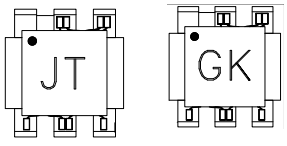
Parameter	Ratings
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power	0.4W
DC Current	30mA

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

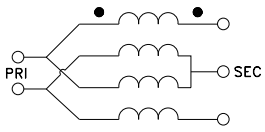
Pin Connections

Function	Pin Number
PRIMARY DOT	3
PRIMARY	2
SECONDARY DOT	4
SECONDARY	6
GND	2,5
NOT USED	1

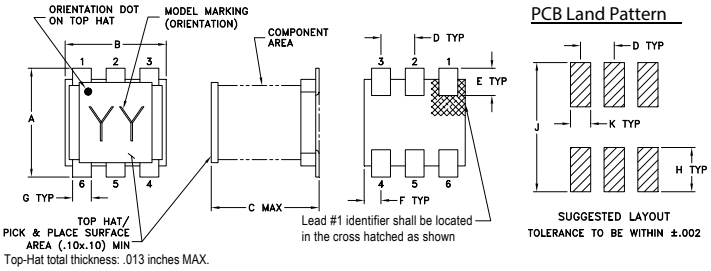
Internal Optional Product Marking



Config. H



Outline Drawing



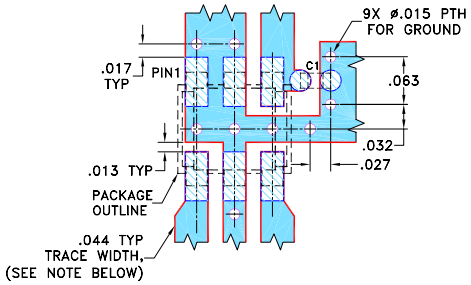
PCB Land Pattern

Outline Dimensions (inch / mm)

A	B	C	D	E	F
.160	.150	.160	.050	.040	.025
4.06	3.81	4.06	1.27	1.02	0.64

G	H	J	K		wt
.028	.065	.190	.030		grams
0.71	1.65	4.83	0.76		0.15

Demo Board MCL P/N: TB-697+
Suggested PCB Layout (PL-381)



NOTES:
1. TRACE WIDTH IS 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.
3. 0402 SIZE CHIP COMPONENT FOOTPRINT IS SHOWN FOR REFERENCE. FOR COMPONENT VALUE REFER TO TB-697+.

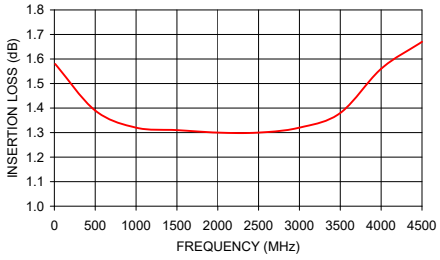
DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

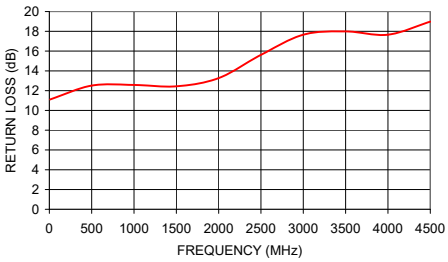
Typical Performance Data

Frequency (MHz)	Insertion Loss (dB)	Input R. Loss (dB)	Amplitude Unbalance (dB)	Phase Unbalance (Deg.)
10	1.58	11.11	0.01	0.07
500	1.39	12.51	0.03	3.37
1000	1.32	12.58	0.09	5.92
1500	1.31	12.44	0.14	7.91
2000	1.30	13.27	0.17	9.03
2500	1.30	15.62	0.18	8.53
3000	1.32	17.66	0.21	8.24
3500	1.38	17.99	0.46	6.49
4000	1.56	17.66	0.67	3.78
4500	1.67	18.98	0.76	4.17

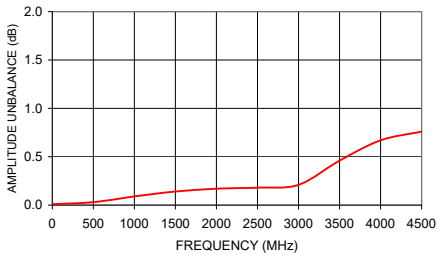
TCM3-452X+
INSERTION LOSS



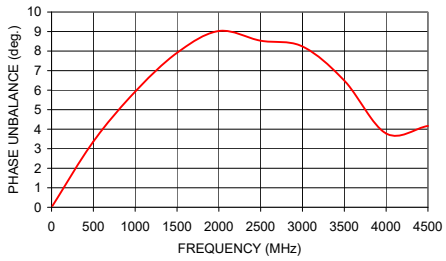
TCM3-452X+
INPUT RETURN LOSS



TCM3-452X+
AMPLITUDE UNBALANCE



TCM3-452X+
PHASE UNBALANCE



Additional 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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