

Surface Mount RF Transformer



THIS IS A TOP HAT VERSION OF REFERENCE DESIGN TC1-1-13M-17+

TC1-1-13M-17X+

75Ω 70 to 2700 MHz

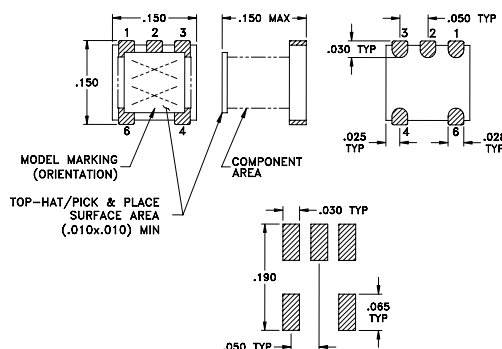
Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power	0.25W
DC Current	30mA
Permanent damage may occur if any of these limits are exceeded.	

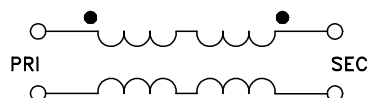
Pin Connections

PRIMARY DOT	6
PRIMARY	4
SECONDARY DOT	1
SECONDARY	3
NOT USED	2

Outline Drawing



Config. G



Features

- suitable for tin/lead and RoHS solder systems
- wideband, 70 to 2700 MHz
- balanced transmission line
- good return loss
- excellent amplitude unbalance and phase unbalance
- aqueous washable

Applications

- balanced to unbalanced transformation
- push-pull amplifiers
- PCS/DCS
- MMDS



CASE STYLE: 99-01-1740
PRICE: Contact Sales Dept.

+RoHS Compliant

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

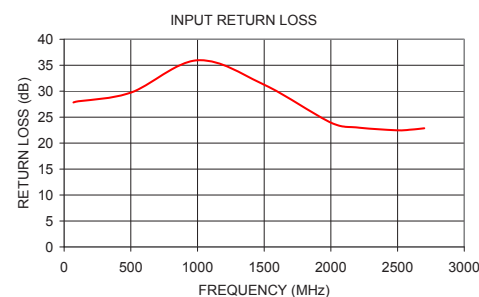
Electrical Specifications at 25°C

Ω RATIO	FREQUENCY (MHz)	AVG. INSERTION LOSS (dB) Max.	PHASE UNBALANCE (Deg.) Max.	AMPLITUDE* UNBALANCE (dB) Max.	RETURN LOSS (dB) Min.
1	70 - 2700	2	11	2	14

*Frequency where amplitude unbalance=0dB~2100 MHz

Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS (dB)	INPUT R. LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (Deg.)
70.0	0.53	27.83	1.66	0.07
100.0	0.54	28.03	1.68	0.30
500.0	0.58	29.73	1.57	1.86
1000.0	0.61	35.95	1.14	3.98
1500.0	0.67	31.24	0.58	5.81
2000.0	0.79	23.95	0.09	6.79
2200.0	0.85	23.00	0.24	6.72
2500.0	0.93	22.46	0.59	6.30
2600.0	0.96	22.59	0.69	6.07
2700.0	0.99	22.85	0.80	5.72



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 The Design Engineers Search Engine www.minicircuits.com Provides ACTUAL Data Instantly at minicircuits.com

Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet 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.

For detailed performance specs & shopping online see web site

REV. OR
M141483
TC1-1-13M-17X+
IG/CP/AM
130430

RF Transformer

TC1-1-13M-17X+

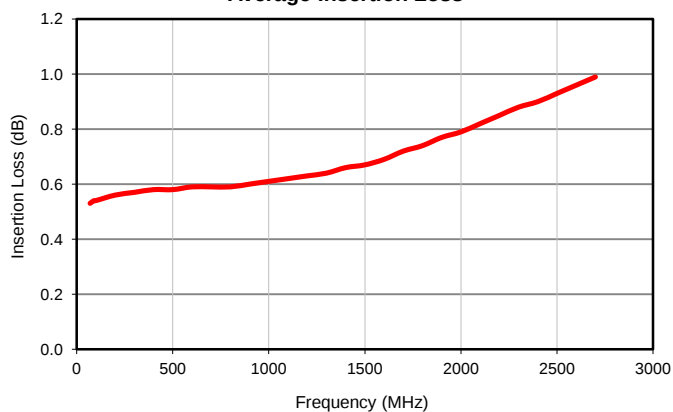
Typical Performance Data

FREQUENCY (MHz)	AVERAGE INSERTION LOSS (dB)	INPUT RETURN LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (deg.)
70.0	0.53	27.83	1.66	0.07
90.0	0.54	27.95	1.67	0.22
100.0	0.54	28.03	1.68	0.30
200.0	0.56	28.54	1.69	0.81
300.0	0.57	28.91	1.67	1.20
400.0	0.58	29.26	1.63	1.52
500.0	0.58	29.73	1.57	1.86
600.0	0.59	30.28	1.50	2.28
700.0	0.59	31.09	1.43	2.68
800.0	0.59	32.22	1.34	3.10
900.0	0.60	33.61	1.24	3.54
1000.0	0.61	35.95	1.14	3.98
1100.0	0.62	38.39	1.03	4.40
1200.0	0.63	36.59	0.92	4.82
1300.0	0.64	35.45	0.81	5.19
1400.0	0.66	33.51	0.69	5.52
1500.0	0.67	31.24	0.58	5.81
1600.0	0.69	29.19	0.46	6.09
1700.0	0.72	27.60	0.34	6.33
1800.0	0.74	26.12	0.23	6.52
1900.0	0.77	24.87	0.12	6.70
2000.0	0.79	23.95	0.09	6.79
2100.0	0.82	23.40	0.13	6.83
2200.0	0.85	23.00	0.24	6.72
2300.0	0.88	22.72	0.35	6.68
2400.0	0.90	22.52	0.47	6.52
2500.0	0.93	22.46	0.59	6.30
2600.0	0.96	22.59	0.69	6.07
2700.0	0.99	22.85	0.80	5.72

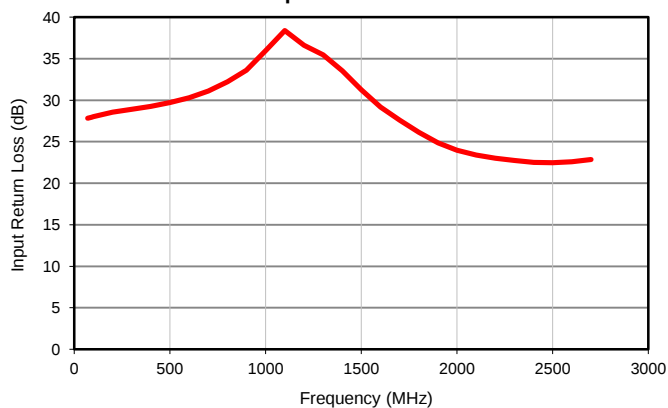


Typical Performance Data

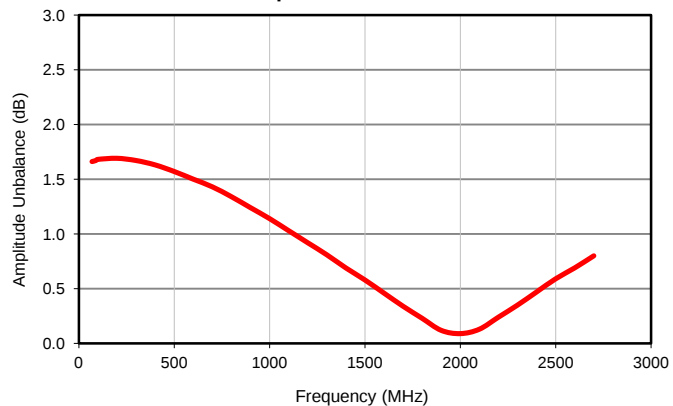
Average Insertion Loss



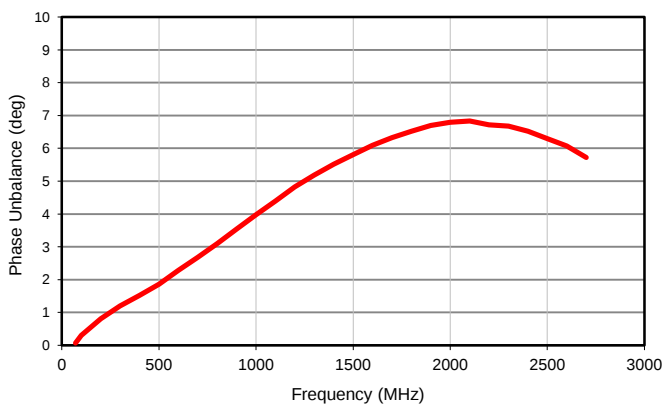
Input Return Loss



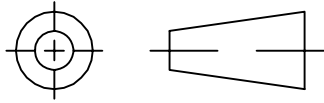
Amplitude Unbalance



Phase Unbalance



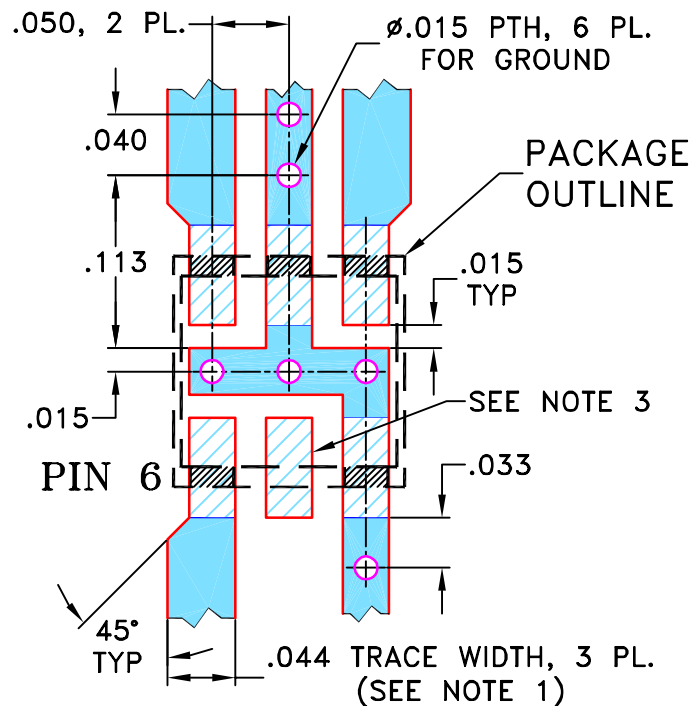
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M106563	NEW RELEASE	08/23/06	AV	IG

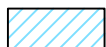
SUGGESTED MOUNTING CONFIGURATION
FOR AT224/DB714 CASE STYLE, "gs/ha/hd" PIN CONNECTIONS
(FOR SINGLE ENDED TO BALANCED APPLICATION)



- NOTES:** 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020" $\pm$.0015"; COPPER: 1/2 OZ. ON EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
 2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
 3. THIS PAD IS NOT REQUIRED FOR AT224 CASE STYLE.



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



DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED

INITIALS

DATE

DIMENSIONS ARE IN INCHES

TOLERANCES ON:

2 PL DECIMALS $\pm$ 3 PL DECIMALS $\pm$.005ANGLES $\pm$ FRACTIONS $\pm$

DRAWN

AV

07/28/06

CHECKED

IL

08/23/06

APPROVED

IG

08/23/06

Mini-Circuits®

THIS DOCUMENT AND ITS CONTENTS ARE THE PROPERTY OF MINI-CIRCUITS. EXCEPT FOR USE EXPRESSLY GRANTED, IN WRITING, TO ITS VENDORS, VENDEE AND THE UNITED STATES GOVERNMENT, MINI-CIRCUITS RESERVES ALL PROPRIETARY DESIGN, USE, MANUFACTURING AND REPRODUCTION RIGHTS THERETO. THESE CONTENTS SHALL NOT BE USED, DUPLICATED OR DISCLOSED TO ANY OUTSIDE PARTY, IN WHOLE OR IN PART, WITHOUT WRITTEN PERMISSION OF MINI-CIRCUITS.

ASHEETA1.DWG REV:A DATE:01/12/95



Mini-Circuits®

13 Neptune Avenue
Brooklyn NY 11235

PL, gs/ha/hd, AT224/DB714, TC/TCM, TB-145

SIZE
A

CODE IDENT
15542

DRAWING NO:
98-PL-244

REV:
OR

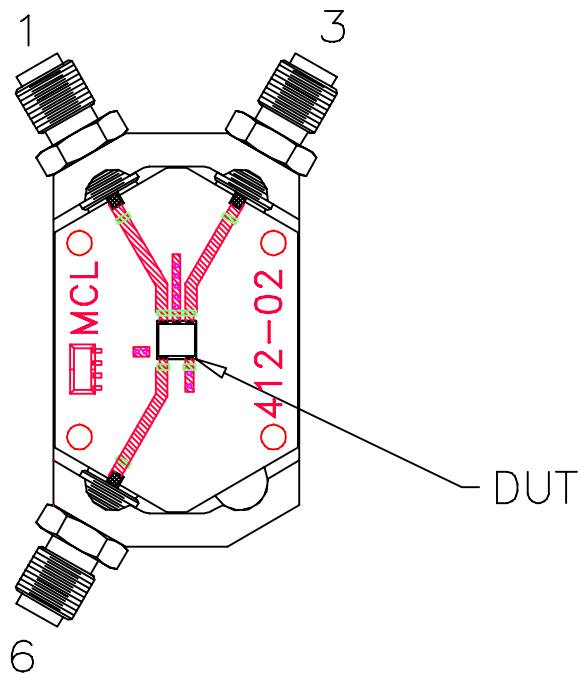
FILE: 98PL244

SCALE: 8:1

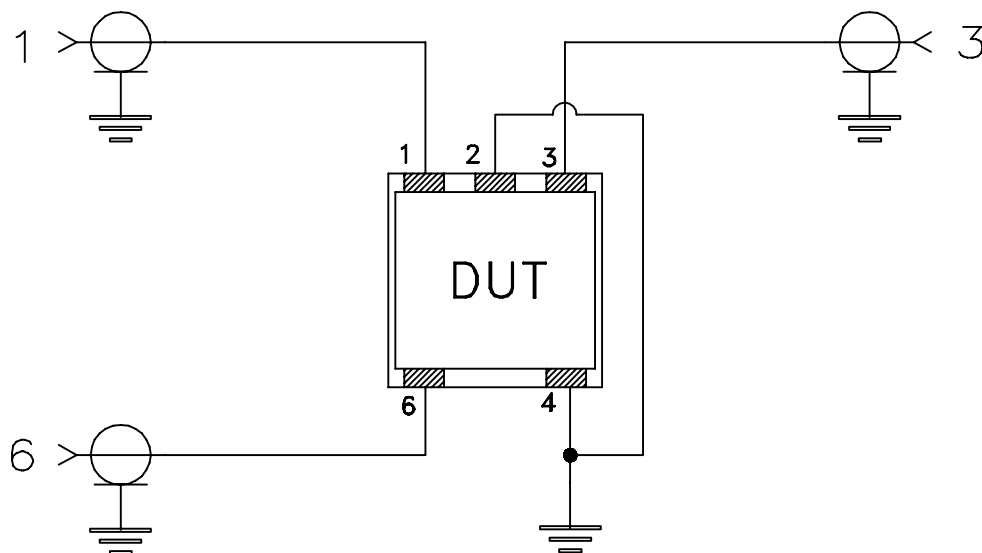
SHEET: 1 OF 1

Evaluation Board and Circuit

For Pin Connections refer to Data Sheet of the DUT



TB-145



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: Rogers R04350B or its equivalent, Dielectric Constant=3.5, Thickness=.020"

 **Mini-Circuits®**



All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-40° to 85°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Humidity	90 to 95% RH, 240 hours, 50°C	MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Solder Reflow Heat	Sn-Pb Eutetic Process: 225°C peak Pb-Free Process 245° - 250°C peak	J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, 95% Coverage
Vibration (High Frequency)	20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)	MIL-STD-202, Method 204, Condition D
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215