

RF Transformer

50Ω 720 to 1600 MHz

Maximum Ratings

Operating Temperature -40°C to 85°C

Storage Temperature	-55°C to 100°C
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Input RF Power*** 3W

**Derate linearly to 2.5W at 100°C

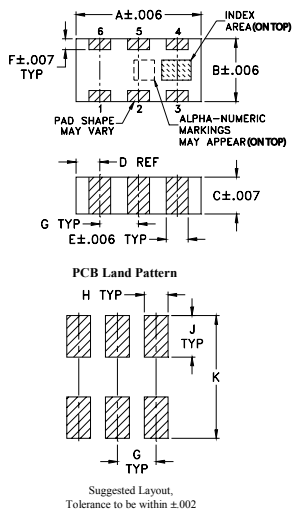
Permanent damage may occur if any of these limits are exceeded.

Pad Connections

PRIMARY DOT (Unbalanced Port)	5
PRIMARY (GND)	4,6
SECONDARY DOT (Balanced)	3
SECONDARY (Balanced)	1
NO CONNECTION	2

Pads 1.3.4.6 are DC-connected internally

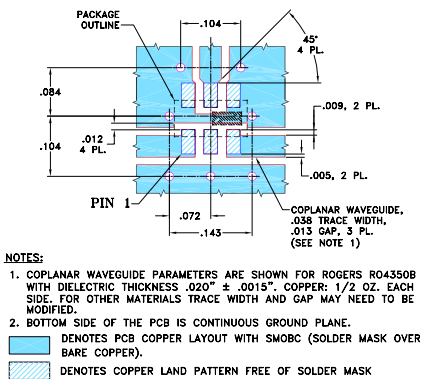
Outline Drawing



Outline Dimensions (inch)

A	B	C	D	E	F
.126	.063	.035	.024	.022	.011
3.20	1.60	0.89	0.61	0.56	0.28
G	H	J	K		wt
.039	.024	.042	.123		grams
0.99	0.61	1.07	3.12		.020

Demo Board MCL P/N: TB-417+
Suggested PCB Layout (PL-265)



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-Circuits' 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

Features

- wideband, 720 to 1600 MHz
- low phase unbalance, 2 deg. typ. and amplitude unbalance, 0.3 dB typ.
- miniature size, 0.12"x.06"x.037"
- LTCC construction
- low cost
- aqueous washable

Applications

- GSM
- WCDMA
- GPS
- ISM

Electrical Specifications (T_{AMB}=25°C)

Ω RATIO (Secondary/Primary)	FREQUENCY (MHz)	INSERTION* LOSS (dB)	PHASE UNBALANCE† (Deg.) Typ.	AMPLITUDE UNBALANCE (dB) Typ.
4	720-1600	1.0	2.0	0.4

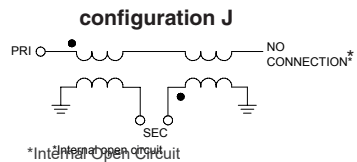
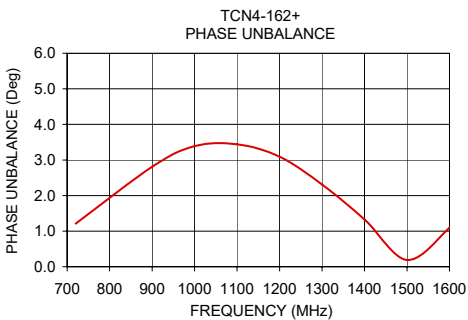
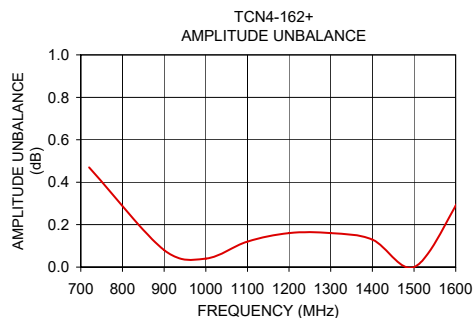
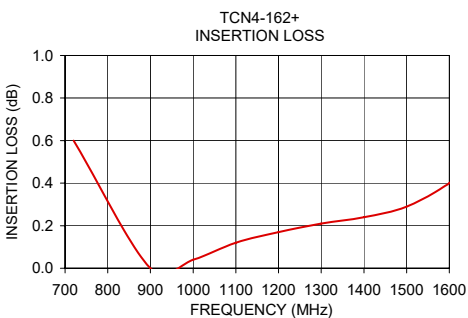
* Insertion Loss is referenced to mid-band loss, 0.7 dB. Reference Demo Board TB-417+

† Relative to 180°

Typical Performance Data at 25°C**

FREQUENCY (MHz)	INSERTION LOSS (dB)	INPUT R. LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (Deg.)
720.00	0.60	10.28	0.47	1.21
900.00	0.00	25.18	0.08	2.81
1000.00	0.04	19.64	0.04	3.39
1100.00	0.12	16.88	0.12	3.44
1200.00	0.17	16.38	0.16	3.09
1300.00	0.21	17.28	0.16	2.31
1400.00	0.24	19.25	0.13	1.33
1500.00	0.29	21.00	0.00	0.19
1600.00	0.40	19.65	0.29	1.10

** Measured with Agilent E5071B network analyzer using impedance conversion and port extension.



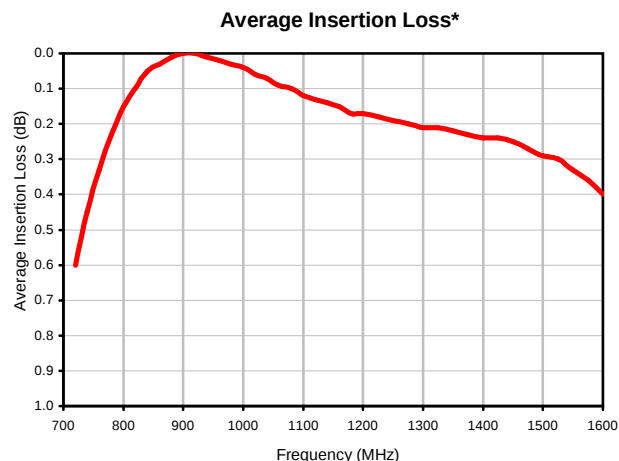
Typical Performance Data

FREQUENCY (MHz)	AVERAGE INSERTION LOSS*	INPUT RETURN LOSS	AMPLITUDE UNBALANCE	PHASE UNBALANCE**
(dB)	(dB)	(dB)	(dB)	(deg)
720	0.60	10.28	0.47	1.21
740	0.45	11.53	0.41	1.35
760	0.33	12.89	0.36	1.50
780	0.23	14.44	0.32	1.67
800	0.15	16.17	0.27	1.91
820	0.10	18.11	0.23	2.12
840	0.05	20.22	0.19	2.36
860	0.03	22.44	0.14	2.51
880	0.01	24.37	0.11	2.62
900	0.00	25.18	0.08	2.81
920	0.00	24.56	0.05	2.98
940	0.01	23.30	0.02	3.20
960	0.02	21.96	0.01	3.30
980	0.03	20.68	0.02	3.31
1000	0.04	19.64	0.04	3.39
1020	0.06	18.83	0.06	3.47
1040	0.07	18.18	0.07	3.61
1060	0.09	17.66	0.09	3.67
1080	0.10	17.23	0.10	3.51
1100	0.12	16.88	0.12	3.44
1120	0.13	16.63	0.13	3.39
1140	0.14	16.47	0.13	3.51
1160	0.15	16.40	0.14	3.43
1180	0.17	16.37	0.15	3.26
1200	0.17	16.38	0.16	3.09
1225	0.18	16.46	0.16	2.87
1250	0.19	16.65	0.15	2.79
1275	0.20	16.94	0.16	2.60
1300	0.21	17.28	0.16	2.31
1325	0.21	17.64	0.16	1.93
1350	0.22	18.08	0.15	1.70
1375	0.23	18.64	0.15	1.52
1400	0.24	19.25	0.13	1.33
1425	0.24	19.77	0.10	1.02
1450	0.25	20.27	0.08	0.62
1475	0.27	20.70	0.04	0.41
1500	0.29	21.00	0.00	0.19
1525	0.30	20.96	0.05	0.19
1550	0.33	20.74	0.11	0.59
1575	0.36	20.31	0.19	0.85
1600	0.40	19.65	0.29	1.10

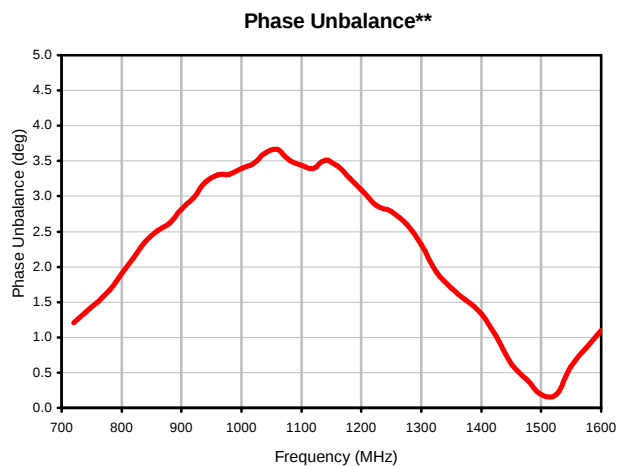
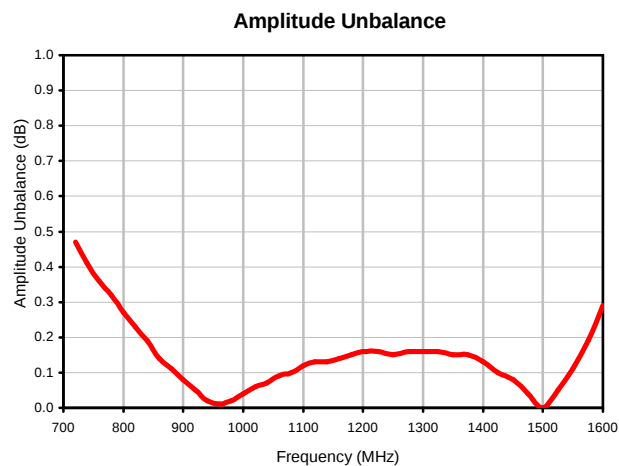
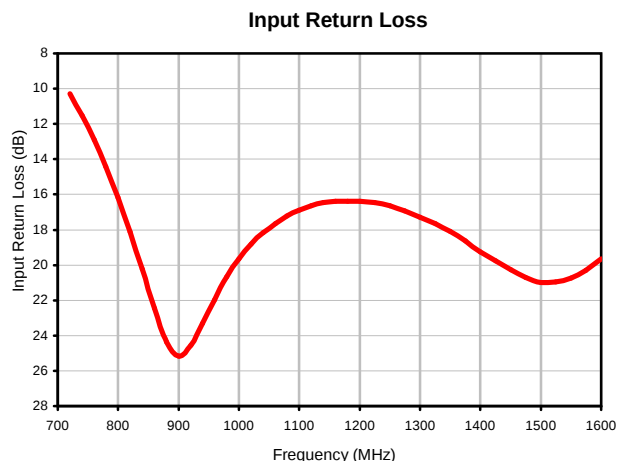
* Insertion Loss is referenced to mid-band loss , 0.7 dB.

**Phase Unbalance is relative to 180°

Typical Performance Curves



* Insertion Loss is referenced to mid-band loss , 0.7 dB.



**Phase Unbalance is relative to 180°

Outline Dimensions



PCB Land Pattern



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

CASE #	A	B	C	D	E	F	G	H	J	K	L	M	N	P	WT. GRAM
FV1206-1	.126 (3.20)	.063 (1.60)	.035 (0.89)	.024 (0.61)	.022 (0.56)	.011 (0.28)	.039 (0.99)	.024 (0.61)	.042 (1.07)	.123 (3.12)	--	--	--	--	.020

Dimensions are in inches (mm). Tolerances: 2 PL. $\pm .01$; 3 PL. $\pm .005$

Notes:

- Open style, ceramic base.
- Termination finish: **as shown below or indicated on Data Sheet.**
 For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.
 For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging

TR-F75

DEVICE ORIENTATION IN T&R

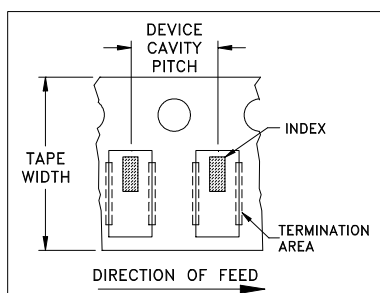


ILLUSTRATION 1

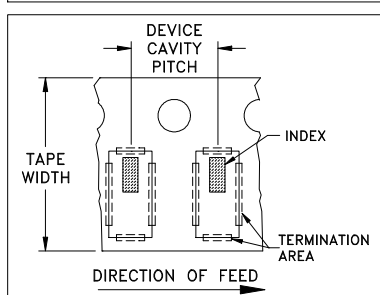


ILLUSTRATION 2

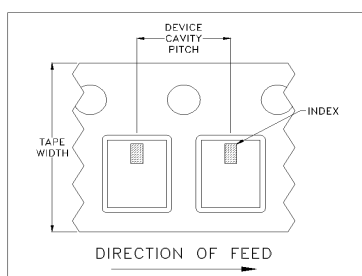


ILLUSTRATION 3

Applicable Case Styles
FV1206-1
FV1206-3

Applicable Case Styles
FV1206-4
FV1206-5
FV1206-6
FV1206-7
FV1206-9
JC0603C-1

Applicable Case Styles
FV1206-12
NL1008C-6
NL1008C-7
NL1008C-9
NL1008C-10

Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
8	4	7	Small quantity standards (see note)	20
				50
				100
				200
				500
				1000
			Standard	3000

Note: Please consult individual model data sheet to determine device per reel availability.

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

Go to: www.minicircuits.com/pages/pdfs/tape.pdf

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REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M109527	NEW RELEASE	01/31/07	PW	DJ

Top view drawing of a package outline. The drawing shows a central rectangular area with a complex internal structure, surrounded by a larger rectangular frame. Key dimensions and features include:

- PIN 1**: Indicated at the bottom left corner.
- PACKAGE OUTLINE**: Indicated by a dashed line around the perimeter.
- Coplanar Waveguide**: Located at the bottom right, with dimensions: .038 TRACE WIDTH, .013 GAP, 3 PL. (SEE NOTE 1).
- Dimensions**:
 - .084 (Vertical distance from top edge to centerline)
 - .104 (Horizontal distance from centerline to right edge)
 - .012 4 PL. (Small vertical dimension near centerline)
 - .072 (Horizontal distance between two vertical lines)
 - .143 (Total horizontal width)
 - .009, 2 PL. (Small vertical dimension near right edge)
 - .005, 2 PL. (Small vertical dimension near bottom edge)
 - .45° 4 PL. (Angle and layer count for a chamfered corner)

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. 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

UNLESS OTHERWISE SPECIFIED

INITIALS

DATE _____

DIMENSIONS ARE IN INCHES

DRAWN

PW

01/29/07

TOLERANCES ON:

CLASSIFIED

II

01 / 21 / 07

2 PL DECIMALS ±

CHECKED

01/01/01
01/01/01

3 PL DECIMALS ±
ANGLES ± 1°

APPROVED

DJ

01/31/07

FRACTIONS $\pm$

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13 Neptune Avenue
Brooklyn NY 11235

PL, sa, FV1206-1, TCN, TB-417+

SIZE
A

CODE IDENT
15542

DRAWING NO: 98-PL-265

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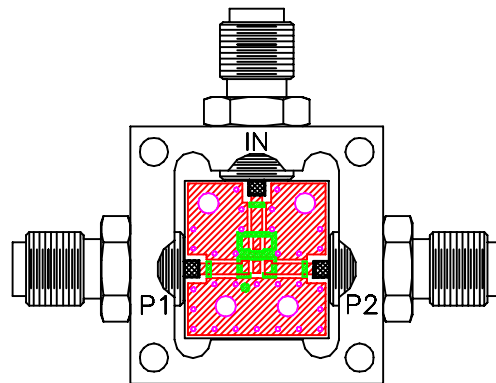
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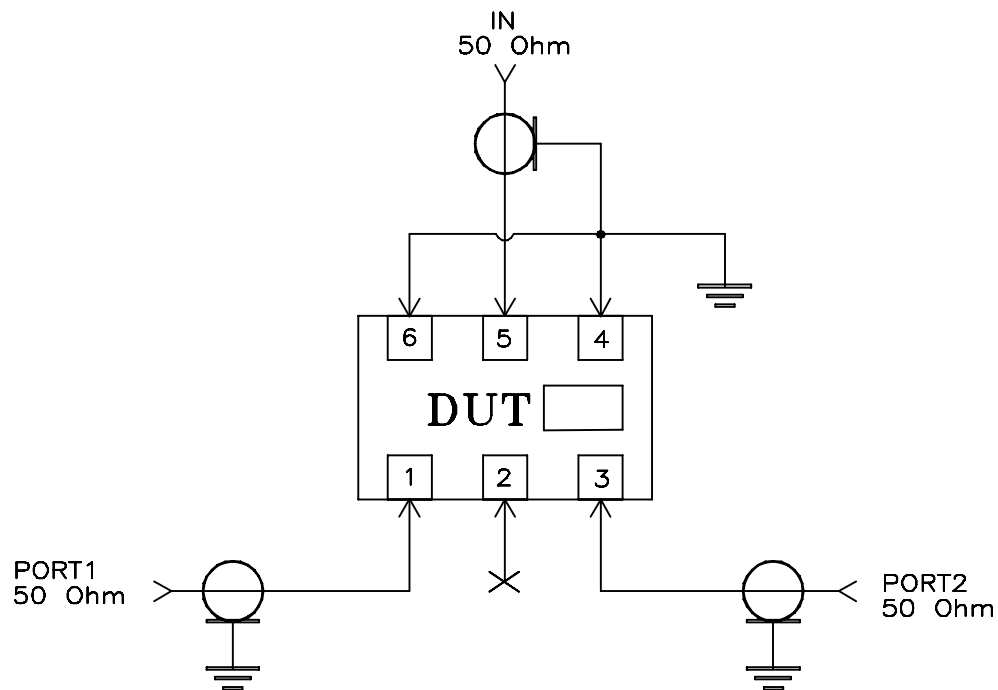
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ASHEETA1.DWG REV:A DATE:01/12/95

Evaluation Board and Circuit



TB-417+



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,
Dielectric Constant=3.5, Thickness=.010 inch.

 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, Para 4.2.5, Test S, 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