Surface Mount

RF Transformer

SYTX4-13HP+

50Ω 30 to 1000 MHz 10 Watt

Generic photo used for illustration purposes only

CASE STYLE: AH1647

+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
13"	200

Maximum Ratings

Operating Temperature	-40°C to 65°C
Storage Temperature	-55°C to 100°C
RF Power	10W
DC Current	30mA

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

Pin Connections

PRIMARY DOT	1
PRIMARY	4
SECONDARY DOT	8
SECONDARY	5
SECONDARY CT (GND)	6,7
GROUND	2,3

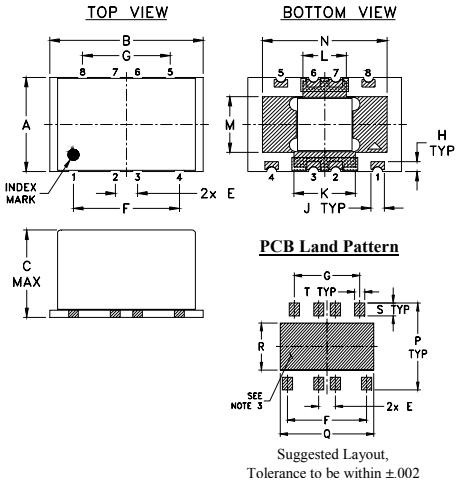
Features

- high power input, 10 Watt max.
- wide bandwidth, 30 to 1000 MHz
- good amplitude unbalance, 0.5 dB typ. at 1 dB bandwidth
- excellent phase unbalance 3 deg. typ. at 1 dB bandwidth
- balanced transmission line with secondary center tap

Applications

- PCS
- cellular

Outline Drawing



Suggested Layout,
Tolerance to be within ±.002

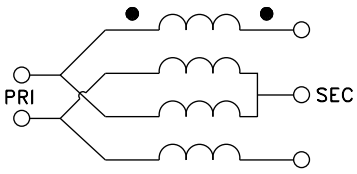
Refer to Application Note: AN-00-017

Outline Dimensions (inch / mm)

A	B	C	E	F	G	H	J	K
.433	.690	.415	.100	.476	.394	.045	.060	.276
11.00	17.53	10.54	2.54	12.09	10.01	1.14	1.52	7.01

L	M	N	P	Q	R	S	T	wt
.194	.257	.560	.475	.561	.258	.069	.061	grams
4.93	6.53	14.22	12.07	14.25	6.55	1.75	1.55	2.80

Config. H



Electrical Specifications at 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Impedance Ratio (secondary/primary)			4		Ohm
Frequency Range		30	—	1000	MHz
Insertion Loss*	100-500	—	0.3	1.0	dB
	50-700	—	0.7	1.5	
	30-1000	—	1.0	2.5	
Amplitude Unbalance	100-500	—	0.5	1.5	dB
	50-700	—	0.9	2.5	
Phase Unbalance	100-500	—	3	9	Degree
	50-700	—	5	12	

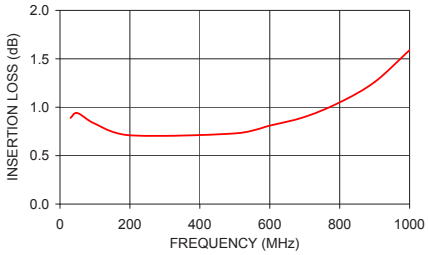
* Insertion Loss is referenced to mid-band loss 0.6 dB typ.

1. The user must provide adequate means of heat removal to limit the temperature of ground connections under the PCB to 65°C, in order to ensure proper performance. At 25°C ambient temperature this requres thermal resistance of the user's PC board heat sink to be 10°C/W.

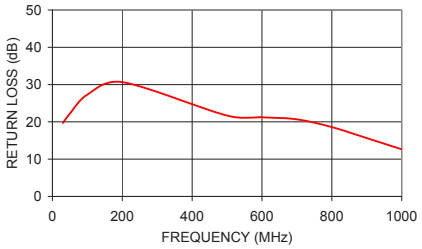
Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS (dB)	INPUT R. LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (Deg.)
30.00	0.89	19.69	0.64	0.51
50.00	0.94	22.20	0.61	0.92
100.00	0.83	27.30	0.58	1.65
200.00	0.71	30.65	0.49	2.78
500.00	0.73	21.68	0.10	2.93
600.00	0.81	21.24	0.01	0.65
700.00	0.90	20.68	0.03	2.25
800.00	1.05	18.61	0.28	6.29
900.00	1.26	15.64	0.78	10.33
1000.00	1.59	12.63	1.48	13.63

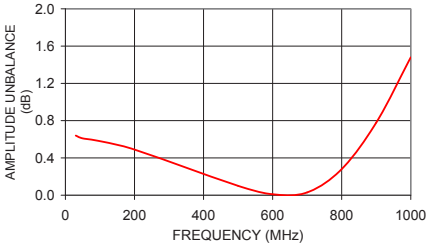
SYTX4-13HP+
INSERTION LOSS



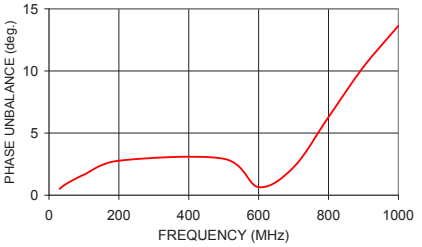
SYTX4-13HP+
INPUT RETURN LOSS



SYTX4-13HP+
AMPLITUDE UNBALANCE



SYTX4-13HP+
PHASE UNBALANCE



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

RF Transformer SYTX4-13HP+

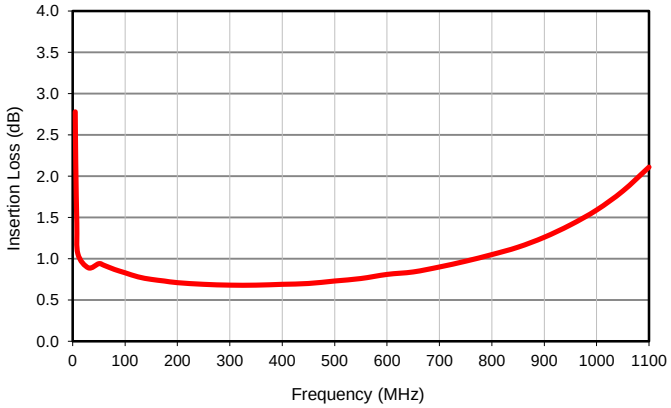
Typical Performance Data

FREQUENCY (MHz)	AVERAGE INSERTION LOSS (dB)	INPUT RETURN LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (deg.)
5	2.78	3.83	0.60	0.11
6	2.15	4.85	0.60	0.10
8	1.43	6.78	0.61	0.04
10	1.06	8.59	0.62	0.01
30	0.89	19.69	0.64	0.51
50	0.94	22.20	0.61	0.92
60	0.92	23.24	0.60	1.08
80	0.87	25.34	0.59	1.36
100	0.83	27.30	0.58	1.65
125	0.78	29.94	0.55	1.94
150	0.75	31.47	0.53	2.32
175	0.73	31.99	0.51	2.54
200	0.71	30.65	0.49	2.78
250	0.69	27.85	0.44	3.25
300	0.68	25.59	0.38	3.55
350	0.68	23.92	0.32	3.74
400	0.69	22.75	0.24	3.64
450	0.70	22.04	0.17	3.37
500	0.73	21.68	0.10	2.93
550	0.76	21.44	0.03	2.15
600	0.81	21.24	0.01	0.65
650	0.84	21.01	0.01	0.53
700	0.90	20.68	0.03	2.25
750	0.97	19.79	0.13	4.16
800	1.05	18.61	0.28	6.29
850	1.14	17.20	0.51	8.39
900	1.26	15.64	0.78	10.33
950	1.41	14.11	1.11	12.13
1000	1.59	12.63	1.48	13.63
1050	1.82	11.22	1.87	14.89
1100	2.11	9.86	2.28	15.86

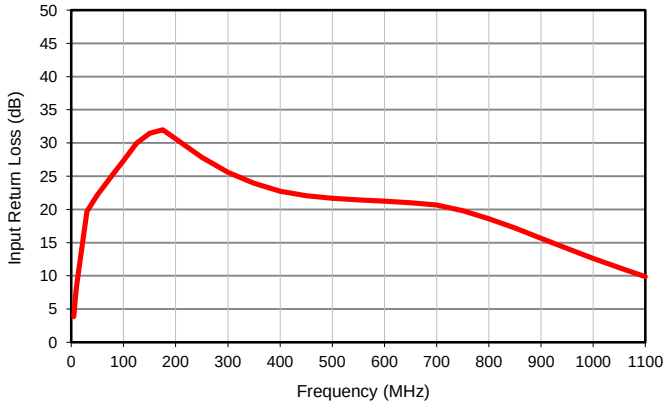
RF Transformer SYTX4-13HP+

Typical Performance Data

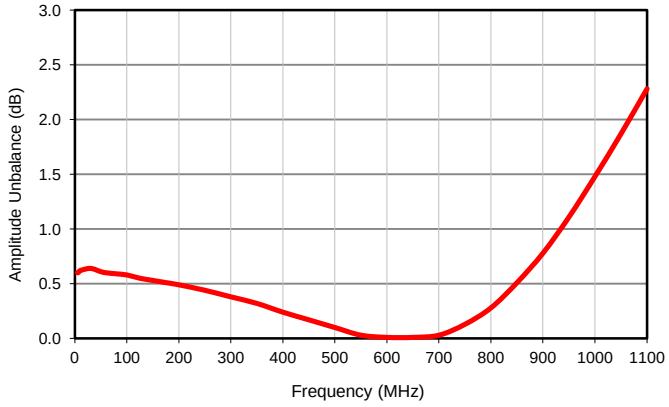
Average Insertion Loss



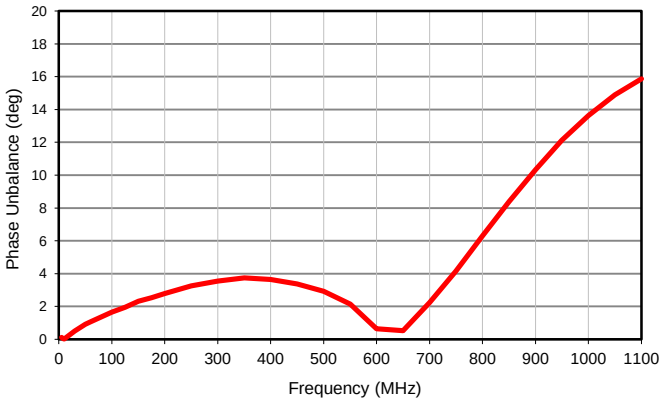
Input Return Loss



Amplitude Unbalance



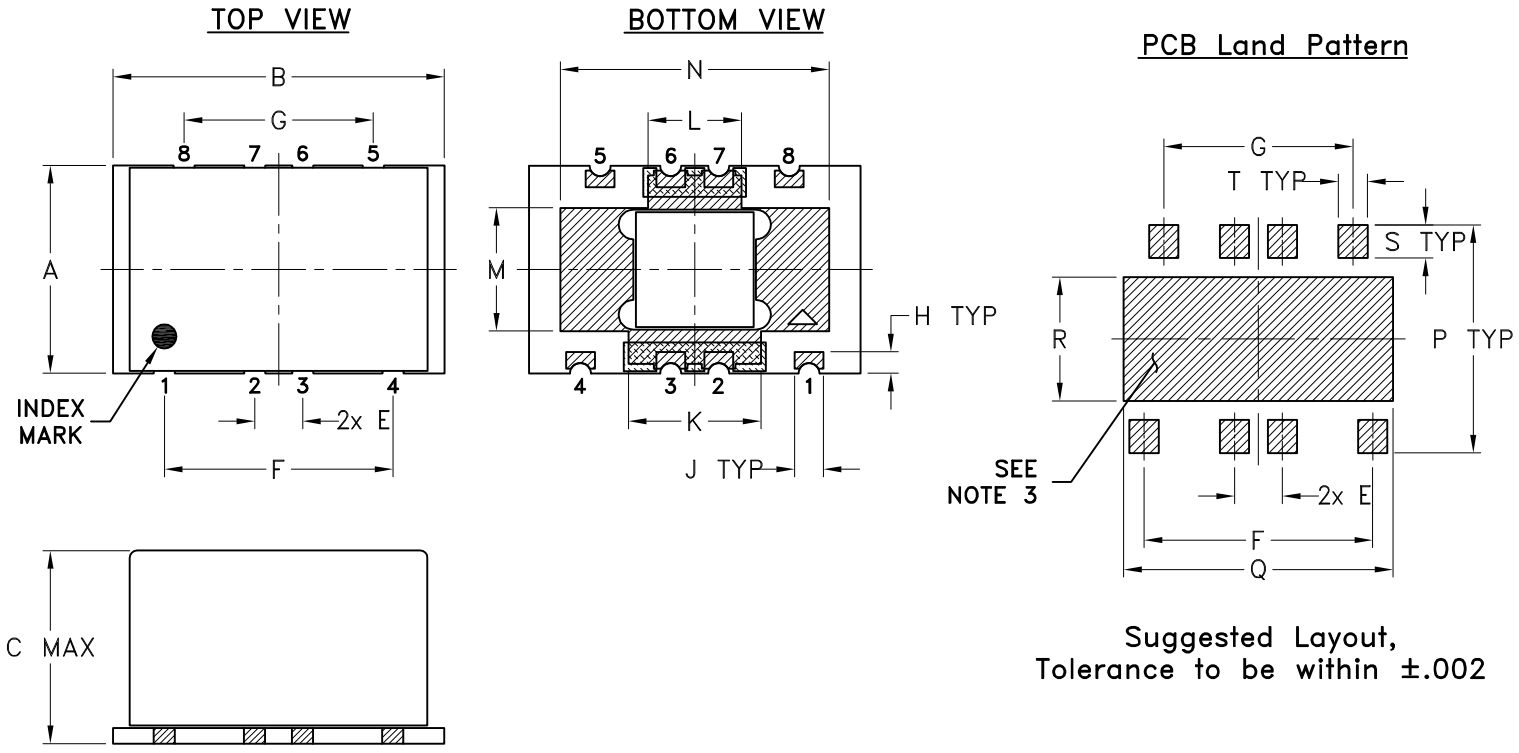
Phase Unbalance



Case Style AH

Outline Dimensions

AH1647



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
AH1647	.433 (11.00)	.690 (17.53)	.415 (10.54)	- -	.100 (2.54)	.476 (12.09)	.394 (10.01)	.045 (1.14)	.060 (1.52)	.276 (7.01)	.194 (4.93)	.257 (6.53)	.560 (14.22)

CASE #	P	Q	R	S	T	WT, GRAM
AH1647	.475 (12.07)	.561 (14.25)	.258 (6.55)	.069 (1.75)	.061 (1.55)	2.80

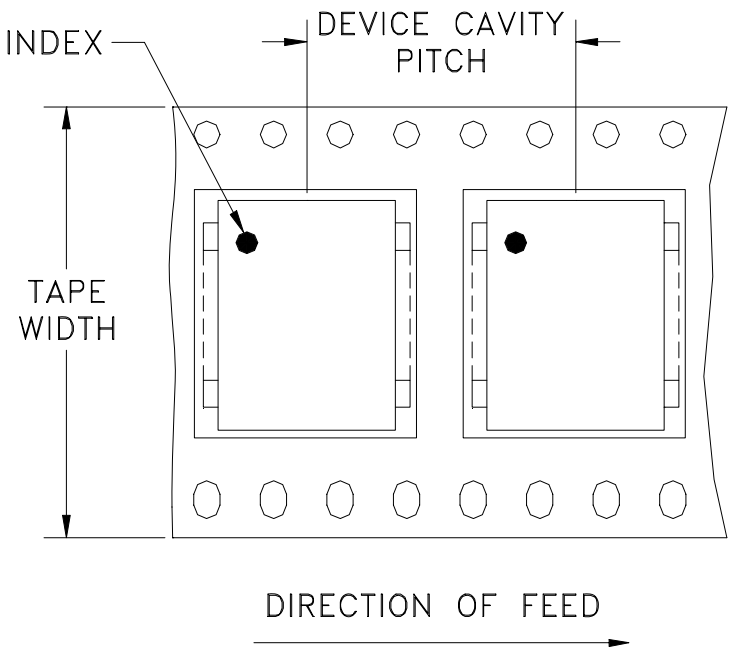
Dimensions are in inches (mm). Tolerances: 2 Pl.±.01; 3 Pl. ±.005

Notes:

1. Case material: Nickel Silver alloy.
2. Base material: Printed wiring laminate.
3. Termination finish: Tin copper solder alloy up to 0.07% Nickel. All models, (+) suffix.

Tape & Reel Packaging TR-F109

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
32	16	13	200

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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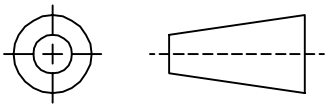
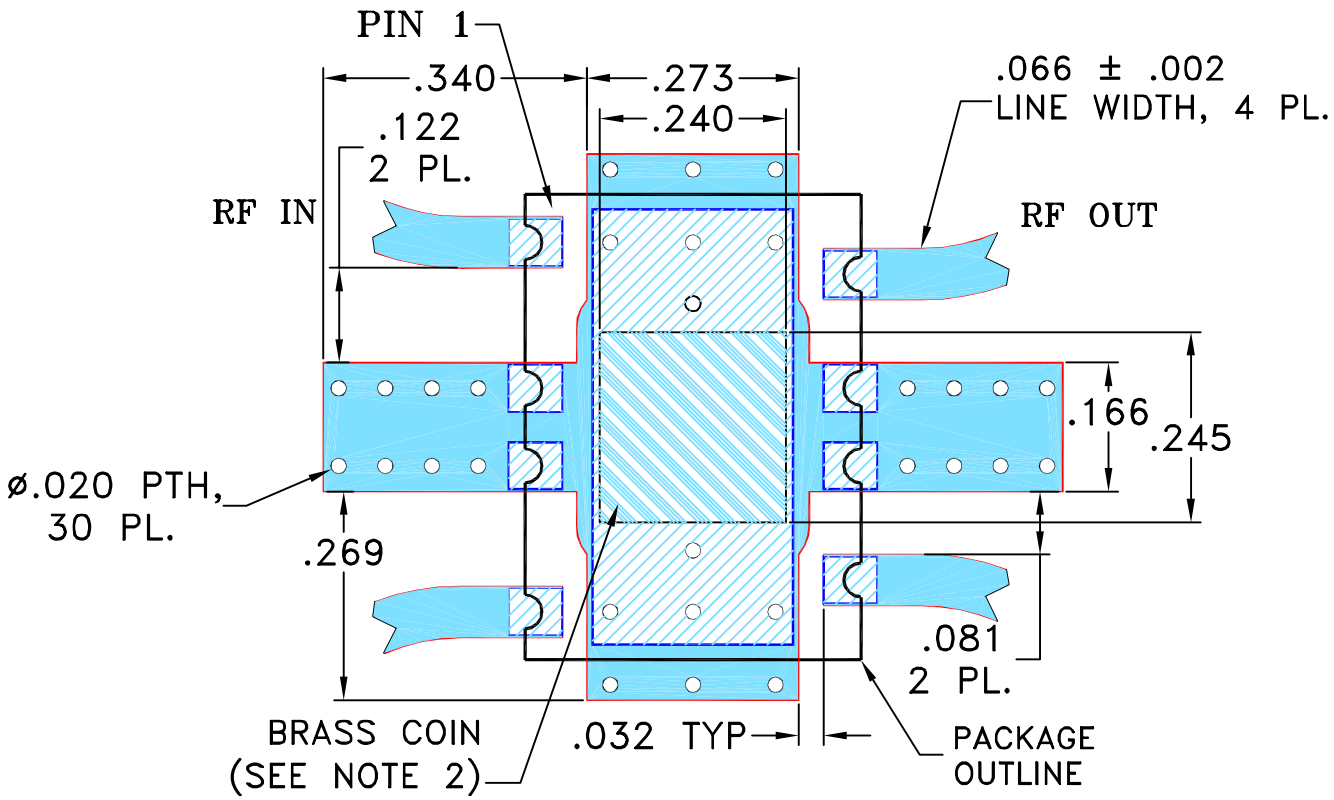
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M133287	NEW RELEASE	08/26/11	GF	WP

SUGGESTED MOUNTING CONFIGURATION FOR AH1647 CASE STYLE, "08DC05" PIN CODE



NOTES:
1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. SUGGEST TO PROVIDE BRASS COIN FOR BETTER HEAT TRANSFER FROM THE UNIT. OTHERWISE PROVIDE ARRAY OF THERMAL VIAS ADEQUATE TO LIMIT TEMPERATURE OF GROUND CONNECTIONS UNDER THE UNIT TO 65°C.
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

DENOTES BRASS COIN.

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	GF	08/22/11
TOLERANCES ON:	CHECKED	IL	08/25/11
2 PL DECIMALS ±	APPROVED	WP	08/26/11
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

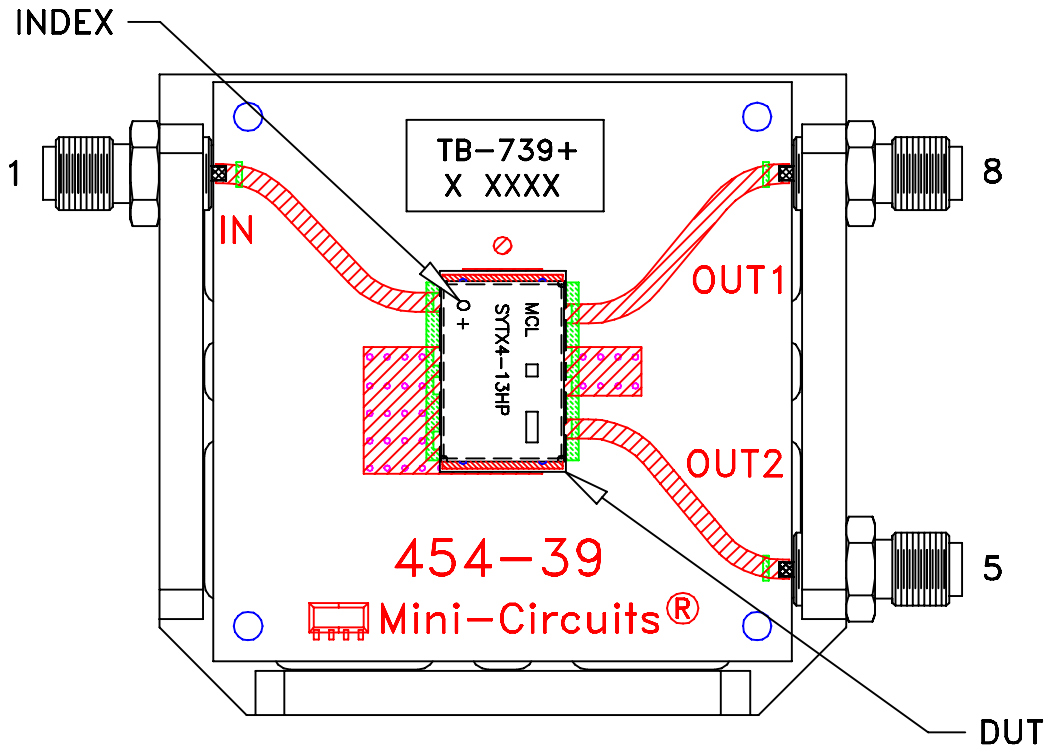
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, 08DC05, AH1647, TB-630+

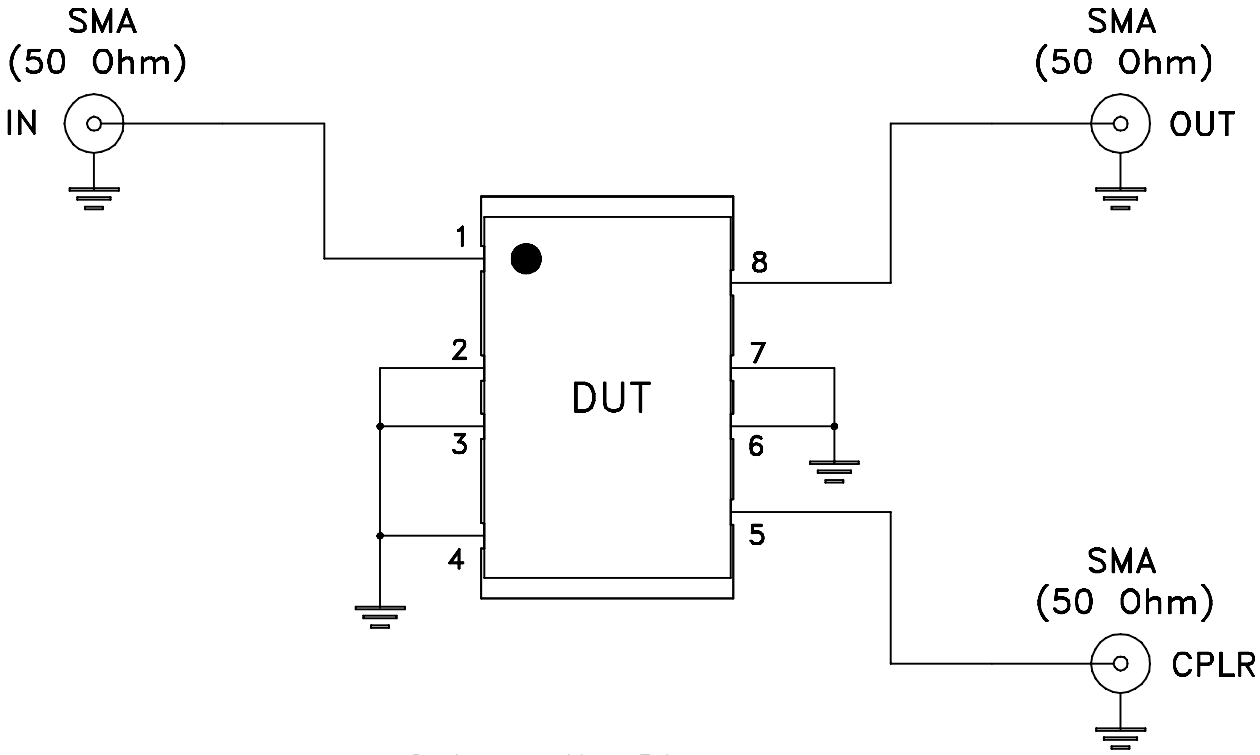
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-351	OR

FILE:	SCALE:	SHEET:
98PL351	4:1	1 OF 1

Evaluation Board and Circuit



TB-739+



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: RO4350 or equivalent.
   Dielectric Constant=3.5, Thickness=.030 inch.

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Environmental Specifications **ENV23T16**

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 65° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Stabilization Bake	(non-operating) 125°C, 24 hours	- - -
Burn-in at Elevated Temp.	(DC on) 160 hours at 85° C	MIL-STD-202, Method 108
Thermal Shock	-55° to 100°C, 5 cycles	MIL-STD-202, Method 107, Condition A, except 100°C