

Surface Mount

50Ω

6 dB Coupling

50 to 1000 MHz

10Watt

Operating Temperature -40°C to 65°C Case*

Storage Temperature	-55°C to 100°C
---------------------	----------------

*Case temperature is defined as temperature on ground leads.

Permanent damage may occur if any of these limits are exceeded

INPUT	8
-------	---

OUTPUT	1
--------	---

COUPLED	5
---------	---

COUPLED	5
EXTERNAL LOG	1

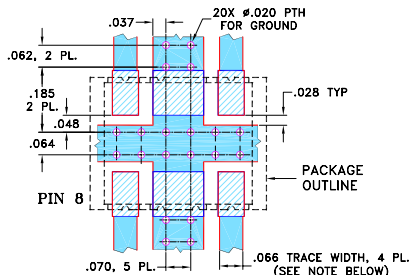
EXTERNAL 50Ω	4
--------------	---

GROUND	2,3,6,7
--------	---------

Time (min)						
A	B	C	D	E	F	G

A	B	C	D	E	F	G
.38	.50	.25	.020	.115	.070	.035
9.65	12.70	6.35	0.51	2.92	1.78	0.89
H	J	K	L	M	N	wt
.050	.090	.040	.105	.140	.095	grams
1.27	2.29	1.02	2.67	3.56	2.41	0.80

Demo Board MCL P/N: TB-349



NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" $\pm$.002"; 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.

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

 DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

- high power, 10W max.
- wideband multi-octave
- excellent coupling flatness, 0.1 dB typ.

- VHF/UHF
- signal monitoring
- communications
- military mobile



CASE STYLE: AH202-1

+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

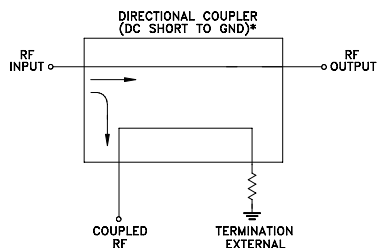
Reel Size	Devices/Reel
13"	200

Electrical Specifications at 25°C

Parameter	Condition (MHz)	Min.	Typ.	Max.	Units
Frequency Range		50		1000	MHz
Mainline Loss (above theoretical loss, 1.40 dB)	50	—	0.5	0.8	dB
	100	—	0.4	0.8	
	512	—	0.8	1.2	
	1000	—	1.5	2.0	
Coupling	50 - 1000	—	5.6	—	dB
Coupling Flatness (±)	100 - 512	—	0.1	0.4	dB
	50 - 1000	—	0.2	0.5	
Directivity	50	10	14	—	dB
	100	16	20	—	
	750	10	14	—	
	1000	8	11	—	
Return Loss (Input)	100 - 750		19	—	dB
	50 - 1000		15	—	
Return Loss (Output)	100 - 750		17	—	dB
	50 - 1000		13	—	
Return Loss (Coupling)	100 - 750		17	—	dB
	50 - 1000		13	—	
Input Power ¹	50 - 512	—	—	10	W
	512 - 1000	—	—	5	

1. The user must provide adequate means of heat removal to limit the temperature of ground connections 2,3,6,7 to 65°C, in order to ensure proper performance. At 25°C ambient temperature this requires thermal resistance of the user's PC board heat sink to be 6°C/W.

Electrical Schematic



* ELECTRICAL SCHEMATIC IS FOR DIRECTIONAL COUPLER WITH INTERNAL TRANSFORMER(S) AND EXTERNAL TERMINATION.

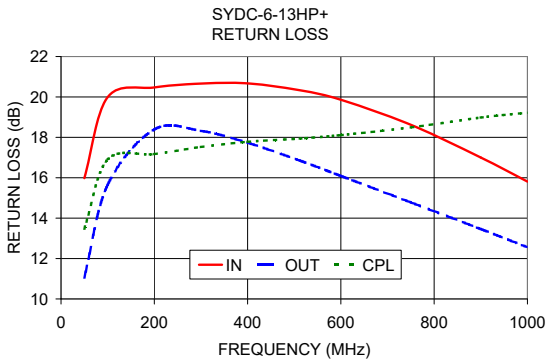
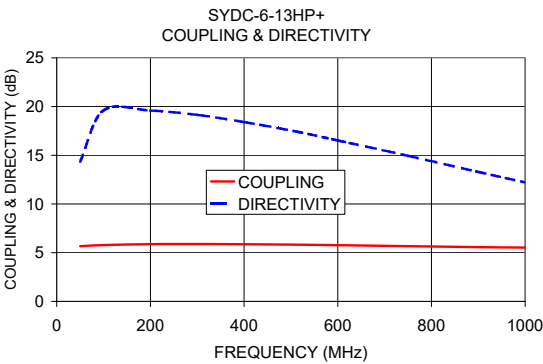
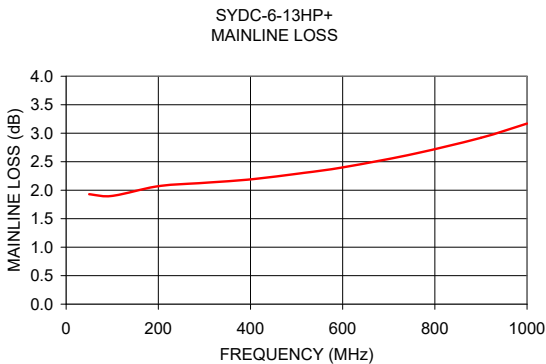
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.

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

Typical Performance Data

Frequency (MHz)	Mainline Loss (dB) In-Out	Coupling (dB) In-Cpl	Directivity (dB)	Return Loss (dB)		
				In	Out	Cpl
50	1.93	5.67	14.35	15.98	11.06	13.48
100	1.90	5.78	19.60	19.99	15.65	16.90
200	2.07	5.88	19.59	20.47	18.39	17.17
300	2.13	5.89	19.15	20.66	18.32	17.52
400	2.19	5.87	18.41	20.67	17.73	17.78
512	2.30	5.82	17.43	20.33	16.85	17.94
600	2.40	5.77	16.52	19.86	16.09	18.11
750	2.63	5.67	14.94	18.62	14.78	18.49
900	2.92	5.57	13.29	17.00	13.46	18.98
1000	3.17	5.52	12.21	15.81	12.56	19.22



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



Directional Coupler

SYDC-6-13HP+

Typical Performance Data

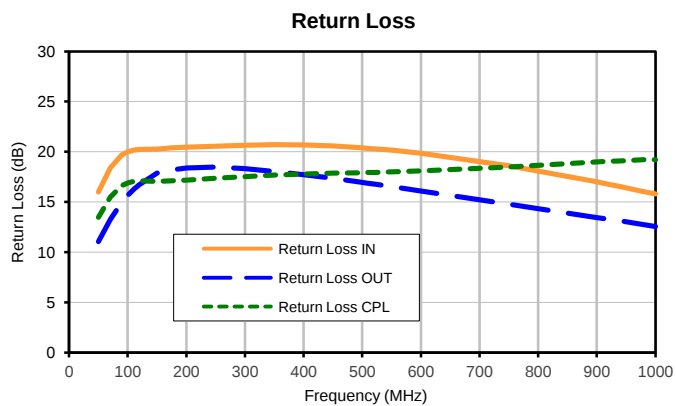
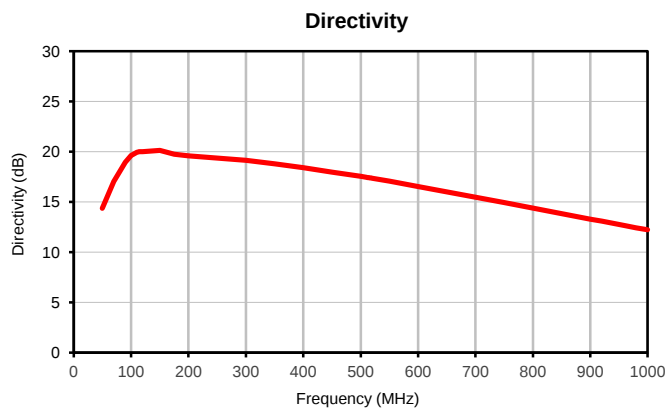
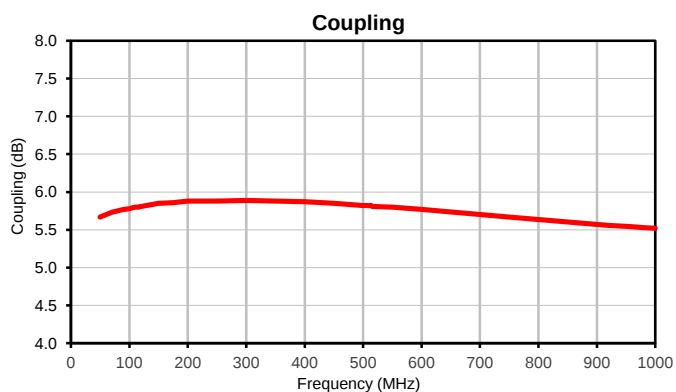
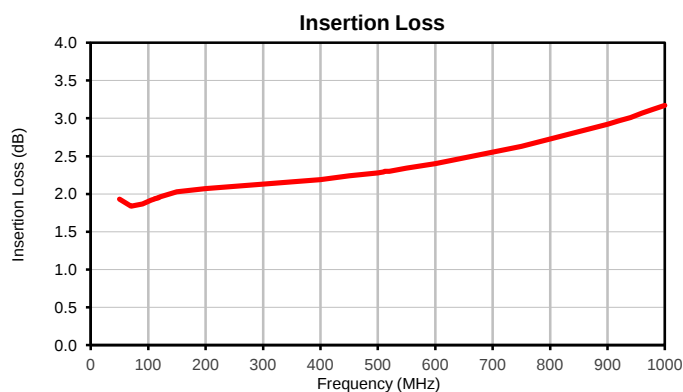
FREQUENCY (MHz)	INSERTION LOSS (dB)	COUPLING (dB)	DIRECTIVITY (dB)	RETURN LOSS		
				IN	OUT	CPL
50.0	1.93	5.67	14.35	15.98	11.06	13.48
70.0	1.84	5.73	17.04	18.37	13.24	15.49
90.0	1.87	5.77	18.96	19.69	14.96	16.62
100.0	1.90	5.78	19.60	19.99	15.65	16.90
105.0	1.92	5.79	19.79	20.08	15.96	16.98
110.0	1.93	5.80	19.92	20.16	16.24	17.04
112.0	1.94	5.80	19.96	20.17	16.34	17.06
114.0	1.94	5.80	19.99	20.19	16.44	17.07
116.0	1.95	5.80	19.99	20.20	16.54	17.08
118.0	1.95	5.81	20.00	20.22	16.63	17.09
120.0	1.96	5.81	20.01	20.24	16.72	17.10
150.0	2.03	5.85	20.13	20.27	17.89	17.04
175.0	2.05	5.86	19.73	20.39	18.18	17.10
200.0	2.07	5.88	19.59	20.47	18.39	17.17
250.0	2.10	5.88	19.37	20.56	18.47	17.36
300.0	2.13	5.89	19.15	20.66	18.32	17.52
350.0	2.16	5.88	18.79	20.71	18.04	17.67
400.0	2.19	5.87	18.41	20.67	17.73	17.78
450.0	2.24	5.85	17.97	20.58	17.35	17.86
500.0	2.28	5.82	17.53	20.38	16.95	17.92
510.0	2.29	5.82	17.44	20.34	16.86	17.94
512.0	2.30	5.82	17.43	20.33	16.85	17.94
514.0	2.30	5.82	17.41	20.32	16.83	17.94
516.0	2.30	5.81	17.39	20.31	16.82	17.94
518.0	2.30	5.81	17.37	20.30	16.80	17.95
520.0	2.30	5.81	17.35	20.30	16.78	17.95
550.0	2.34	5.80	17.07	20.16	16.53	18.01
600.0	2.40	5.77	16.52	19.86	16.09	18.11
750.0	2.63	5.67	14.94	18.62	14.78	18.49
900.0	2.92	5.57	13.29	17.00	13.46	18.98
920.0	2.97	5.56	13.07	16.77	13.29	19.04
940.0	3.01	5.55	12.86	16.53	13.12	19.09
960.0	3.07	5.54	12.64	16.29	12.94	19.15
980.0	3.12	5.53	12.42	16.04	12.75	19.20
1000.0	3.17	5.52	12.21	15.81	12.56	19.22



Directional Coupler

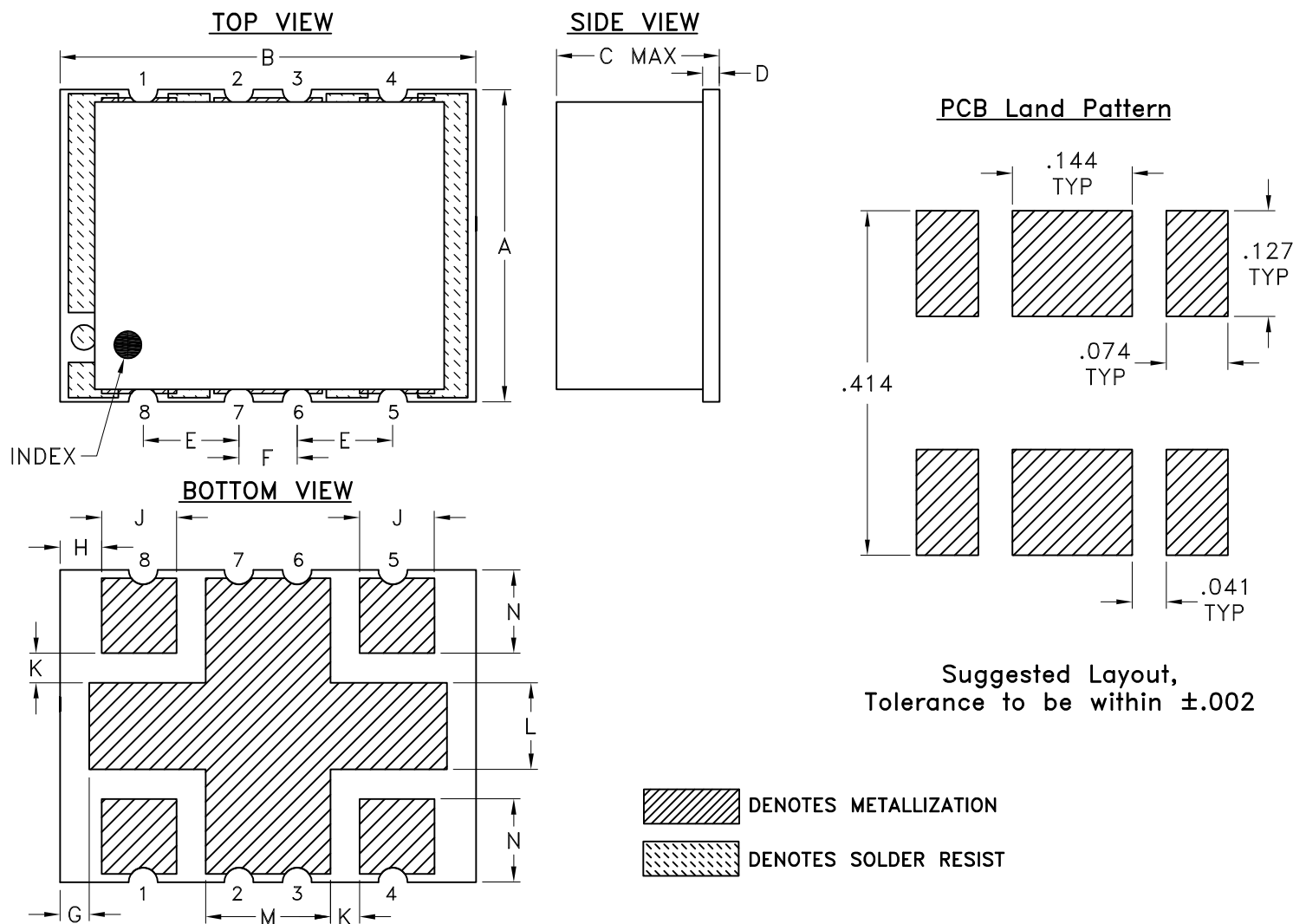
SYDC-6-13HP+

Typical Performance Curves



Outline Dimensions

AH202-1



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N	WT, GRAM
AH202-1	.38 (9.65)	.50 (12.70)	.25 (6.35)	.020 (0.51)	.115 (2.92)	.070 (1.78)	.035 (0.89)	.050 (1.27)	.090 (2.29)	.040 (1.02)	.105 (2.67)	.140 (3.56)	.095 (2.41)	.80

Dimensions are in inches (mm). Tolerances: 2 Pl. ± 0.01 ; 3 Pl. ± 0.005

Notes:

- Case material: Nickel Silver alloy.
- Base material: Printed wiring laminate.
- Termination finish:

For RoHS 3-5 μ inch (.08-.13 microns) Gold over 120-240 μ inch (3.05-6.10 microns) Nickel plate.

All models, (+) suffix.

For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.

Mini-Circuits
ISO 9001 ISO 14001 CERTIFIED

ALL NEW
minicircuits.com

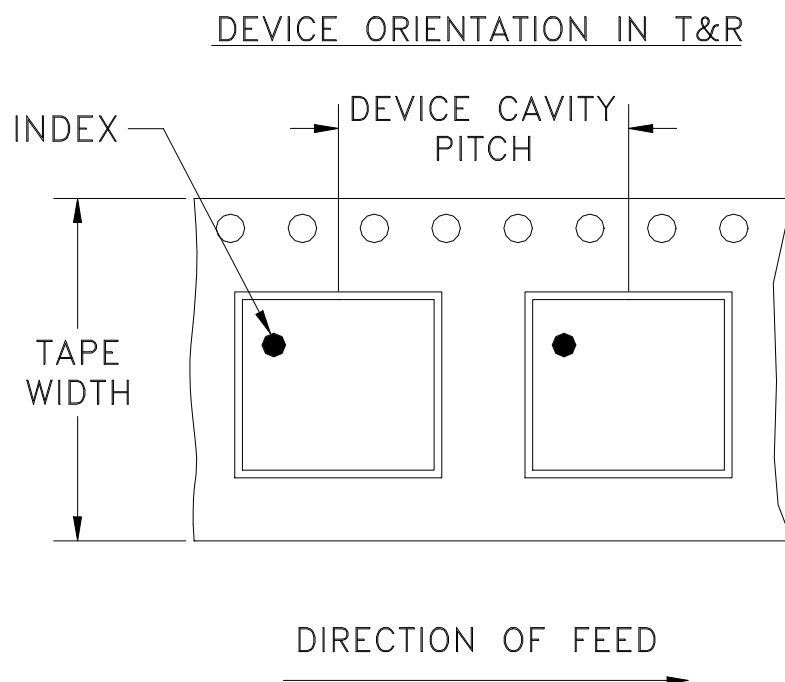
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



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

RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F61



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
24	12	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

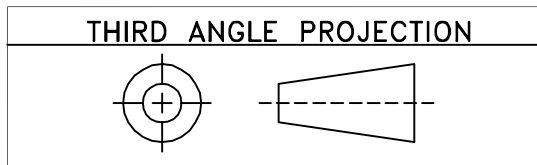


INTERNET <http://www.minicircuits.com>

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

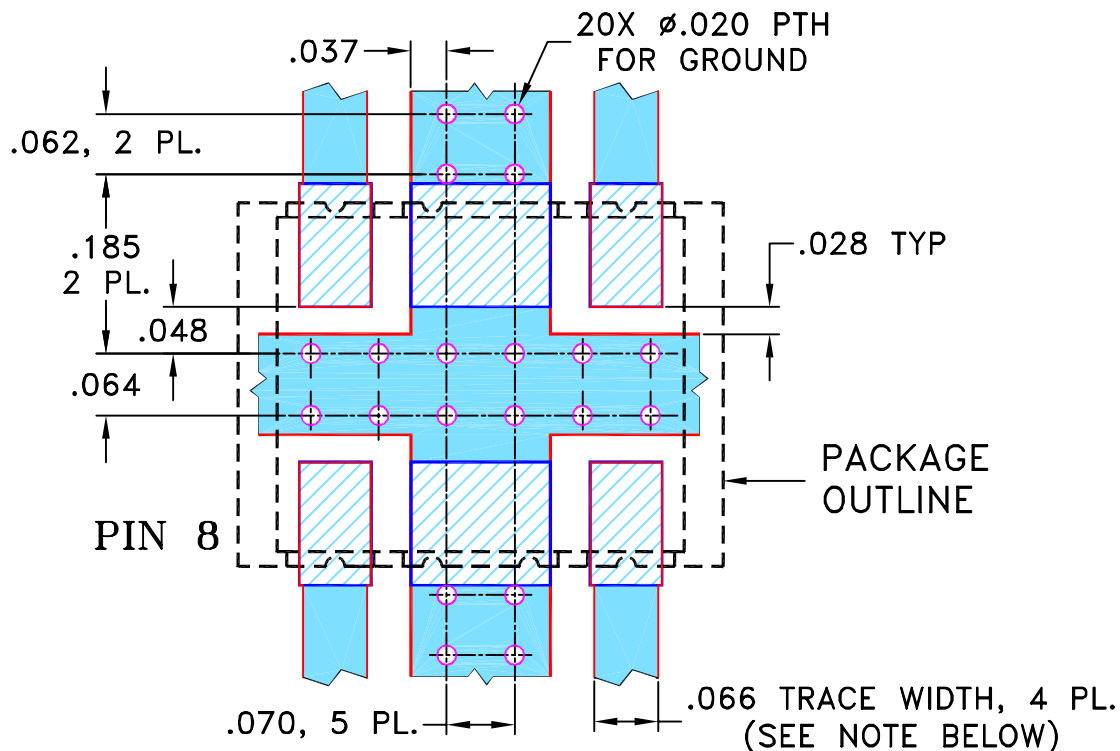
Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010

Mini-Circuits ISO 9001 & ISO 14001 Certified



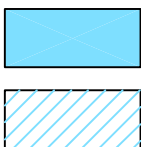
REVISIONS					
REV OR	ECN No.	DESCRIPTION	DATE	DR	AUTH
	M107473	NEW RELEASE	09/25/06	AV	DY

**SUGGESTED MOUNTING CONFIGURATION
FOR AH202-1 CASE STYLE, "rr" PIN CONNECTION**



NOTES:

- TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" $\pm$.002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
- 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 TOLERANCES ON: 2 PL DECIMALS $\pm$ 3 PL DECIMALS $\pm$.005 ANGLES $\pm$ FRACTIONS $\pm$	DRAWN	AV	09/19/06
	CHECKED	IL	09/25/06
	APPROVED	DY	09/25/06



Mini-Circuits® 13 Neptune Avenue
Brooklyn NY 11235

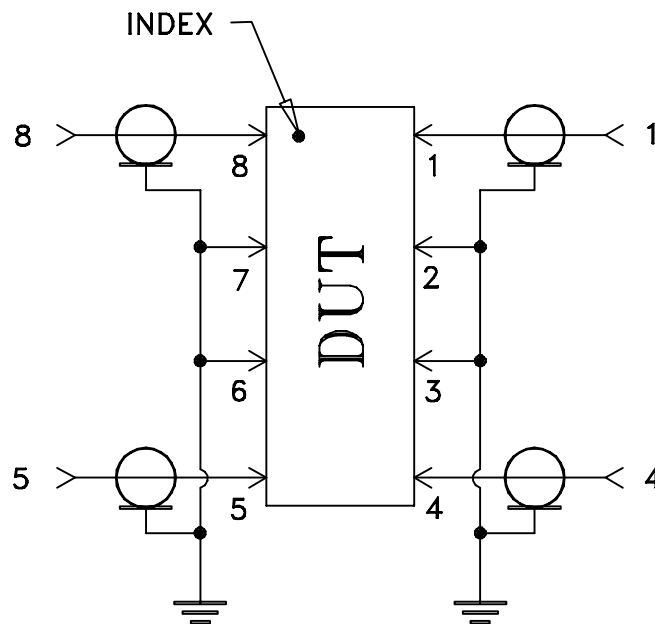
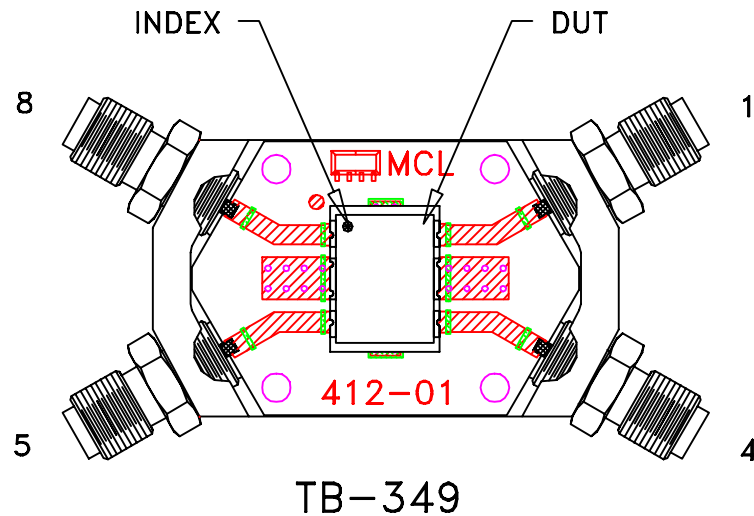
PL, rr, AH202-1, SYDC, TB-349

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

SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-246	REV: OR
FILE: 98PL246	SCALE: 5:1	SHEET: 1 OF 1	

Evaluation Board and Circuit

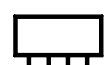
For Pin Connections refer to Data Sheet of the DUT



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,
Dielectric Constant=3.5, Thickness=.030 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 65° C Case 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
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