



Mini-Circuits

SURFACE MOUNT

Bi-Directional Coupler

SYDC-10-62HP+

50 Ω 10 dB Coupling 10 to 600 MHz

THE BIG DEAL

- High Power Handling, 20 W
- Multi-Octave Bandwidth
- Very Low Mainline Loss, 0.5 dB
- Excellent VSWR, 1.10:1



CASE STYLE: AH202-1

Generic photo used for illustration purposes only

+RoHS Compliant

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

APPLICATIONS

- VHF/UHF
- Signal Monitoring
- Communications
- Military Mobile

PRODUCT OVERVIEW

Mini-Circuits' SYDC-10-62HP+ surface mount bi-directional coupler provides high power handling up to 20 W and low mainline loss of 0.5 dB or better for applications from 10 to 600 MHz. The coupler features core and wire construction mounted on an 8-lead printed laminate base with wraparound terminations for excellent solderability. The unit measures 0.38x0.50x0.25", accommodating dense circuit board layouts.

KEY FEATURES

Feature	Advantages
High Power Handling, 20 W	Usable in many systems with high-power requirements.
Low Mainline Loss, ≤ 0.5 dB	Provides excellent through-path signal power transmission.
Good Directivity, 21 to 25 dB	High directivity allows accurate signal sampling through the coupled port with minimal measurement error.
Excellent VSWR, 1.10:1 (Input/Output/Coupling)	Provides excellent matching in 50 Ω systems with minimal signal reflection.
Small Size, 0.38x0.50x0.25"	Provides high power capability while saving space in systems with tight layouts.





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ELECTRICAL SPECIFICATIONS AT +25°C¹

Parameter	Condition (MHz)	Min.	Typ.	Max.	Units
Frequency Range		10		600	MHz
Mainline Loss (Above Theoretical 0.5 dB)	10		0.2	0.8	dB
	50		0.2	0.6	
	340		0.3	0.7	
	600		0.5	0.9	
Coupling	10-600		9.6		dB
	10	9.2	9.7	10.2	
	50	9.3	9.8	10.5	
	340	9.2	9.7	10.2	
Coupling Flatness (±)	10-340		±0.2	±0.4	dB
	340-600		±0.3	±0.5	
Directivity	10	15	21		dB
	50	18	22.8		
	340	16	24.5		
	600	14	25.6		
Return Loss (Input)	10	12	15		dB
	50	20	23		
	340	19	25		
	600	13	17		
Return Loss (Output)	10	12	15		dB
	50	20	26		
	340	19	28		
	600	15	19		
Return Loss (Coupling)	10	12	15		dB
	50	20	23		
	340	19	27		
	600	15	30		
Input Power ²	10-600			20	W

1. Tested on Evaluation Board TB-SYDC-10-62HP+.

2. The user must provide adequate means of heat removal to limit the temperature of ground connections 2,3,6,7 to +85°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 20°C/W or less when the unit is driven at maximum specified RF input power, 20 W. At higher ambient temperature, with the same heat sink. Input power in watts must not exceed $20 \text{ W} \times (+85^\circ\text{C} - T_{\text{ambient}}) \div +60^\circ\text{C}$.

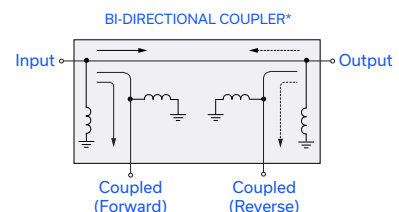
ABSOLUTE MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-40°C to +85°C Case ³
Storage Temperature	-55°C to +100°C

3. Case temperature is defined as temperature on ground leads.

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

ELECTRICAL SCHEMATIC



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SYDC-10-62HP+



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Bi-Directional Coupler

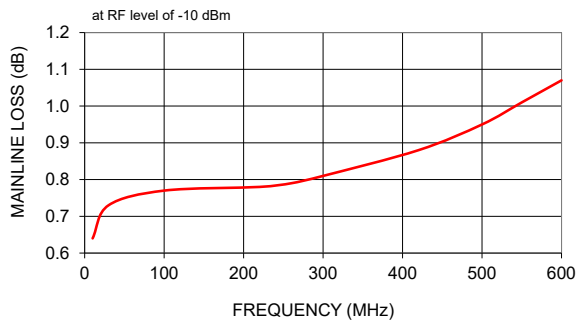
SYDC-10-62HP+

50Ω 10 dB Coupling 10 to 600 MHz

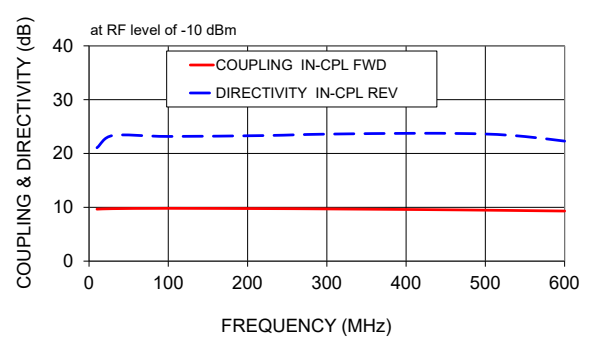
TYPICAL PERFORMANCE DATA

Frequency (MHz)	Mainline Loss (dB)	Coupling (dB)		Directivity (dB)		Return Loss (dB)			
	In-Out	In-Cpl Fwd	Out-Cpl Rev	Out-Cpl Fwd	In-Cpl Rev	In	Out	Cpl Fwd	Cpl Rev
10	0.64	9.66	9.81	21.07	21.37	17.37	16.72	17.18	16.46
30	0.73	9.75	9.89	23.34	23.55	22.96	26.98	22.68	25.93
100	0.77	9.81	9.91	23.17	23.76	24.86	30.56	23.95	28.23
220	0.78	9.76	9.81	23.33	24.25	27.52	30.01	25.41	28.47
260	0.79	9.74	9.77	23.47	24.44	27.47	28.89	25.83	28.73
300	0.81	9.70	9.72	23.60	24.43	27.05	28.11	26.16	29.10
420	0.88	9.58	9.55	23.76	25.83	22.81	23.61	27.89	31.16
500	0.95	9.47	9.43	23.62	26.73	20.12	21.09	29.87	33.58
550	1.01	9.39	9.34	23.15	27.81	18.62	19.71	31.45	36.30
600	1.07	9.31	9.23	22.30	28.25	16.96	18.25	32.64	38.36

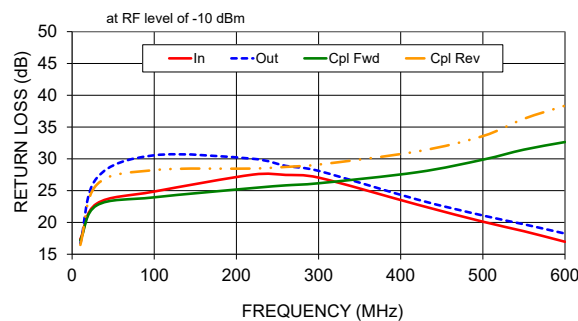
MAINLINE LOSS



COUPLING & DIRECTIVITY



RETURN LOSS



NOTES

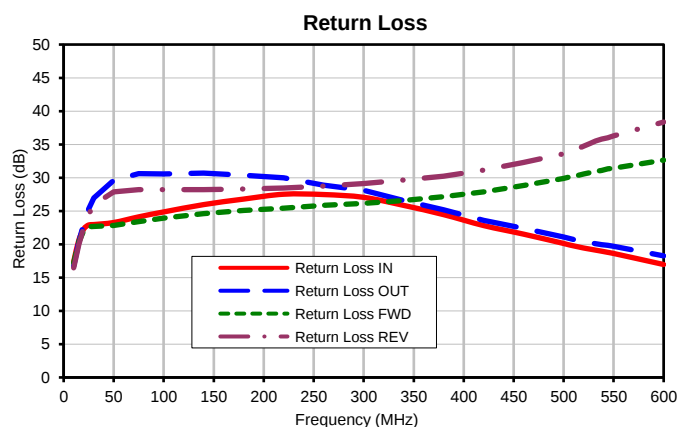
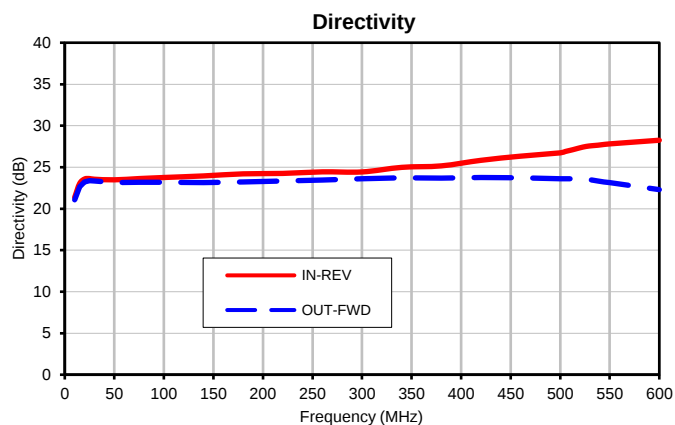
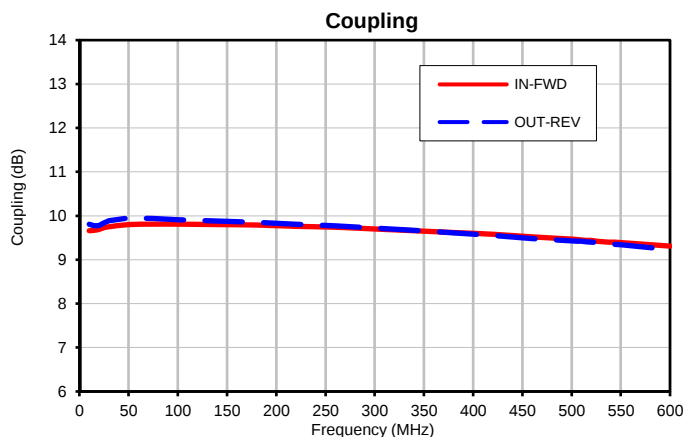
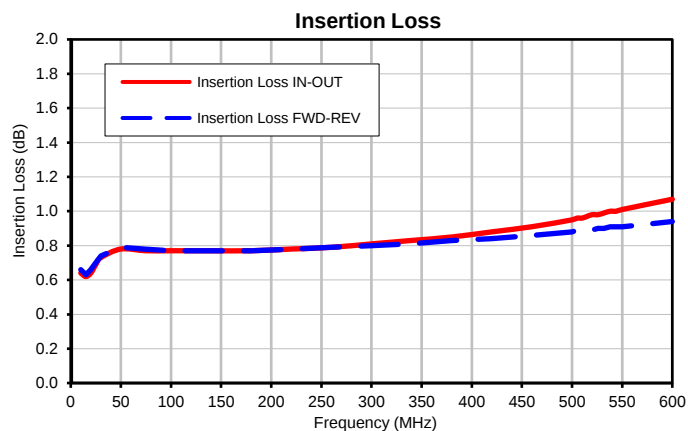
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Typical Performance Data

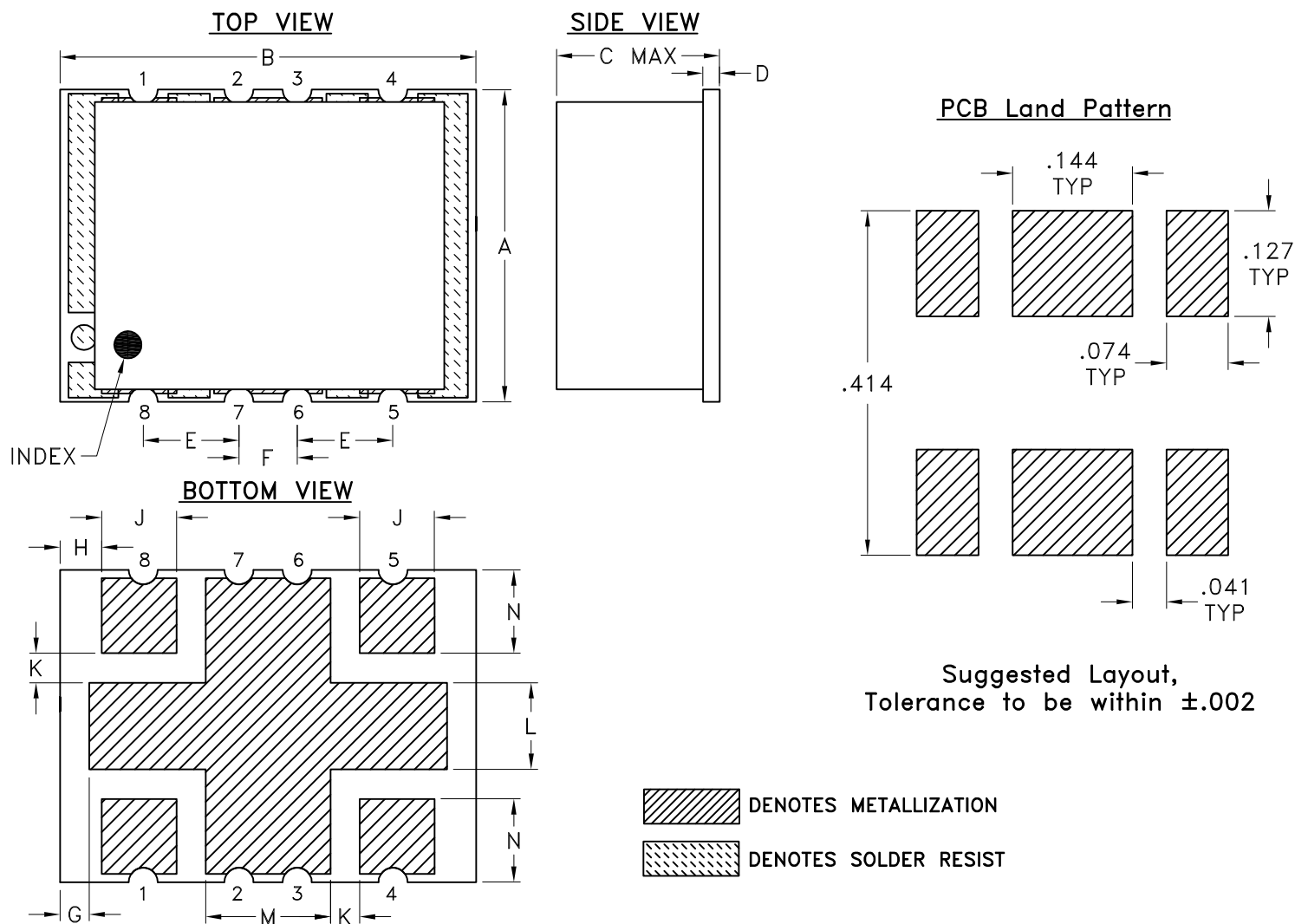
FREQ. (MHz)	INSERTION LOSS		COUPLING		DIRECTIVITY		RETURN LOSS			
	(dB)		(dB)		(dB)		(dB)			
	IN-OUT	FWD-REV	IN-FWD	OUT-REV	IN-REV	OUT-FWD	IN	OUT	FWD	REV
10.0	0.64	0.66	9.66	9.81	21.37	21.07	17.37	16.72	17.18	16.46
15.0	0.62	0.63	9.67	9.77	23.03	22.64	20.56	20.31	20.33	19.92
20.0	0.64	0.66	9.69	9.78	23.58	23.24	22.28	23.05	22.02	22.47
25	0.69	0.70	9.73	9.84	23.63	23.38	22.90	25.33	22.62	24.52
30	0.73	0.74	9.75	9.89	23.55	23.34	22.96	26.98	22.68	25.93
50	0.78	0.79	9.80	9.95	23.48	23.16	23.27	29.62	22.83	27.87
75	0.77	0.78	9.81	9.94	23.63	23.17	24.12	30.62	23.41	28.21
100	0.77	0.77	9.81	9.91	23.76	23.17	24.86	30.56	23.95	28.23
140	0.77	0.77	9.80	9.88	23.95	23.16	25.96	30.69	24.58	28.19
180	0.77	0.77	9.79	9.85	24.20	23.22	26.79	30.35	25.08	28.30
220	0.78	0.78	9.76	9.81	24.25	23.33	27.52	30.01	25.41	28.47
260	0.79	0.79	9.74	9.77	24.44	23.47	27.47	28.89	25.83	28.73
300	0.81	0.80	9.70	9.72	24.43	23.60	27.05	28.11	26.16	29.10
340	0.83	0.81	9.66	9.67	24.98	23.71	25.84	26.55	26.59	29.66
380	0.85	0.83	9.62	9.61	25.16	23.67	24.45	25.16	27.17	30.22
420	0.88	0.84	9.58	9.55	25.83	23.76	22.81	23.61	27.89	31.16
460	0.91	0.86	9.52	9.48	26.33	23.71	21.52	22.39	28.82	32.31
500	0.95	0.88	9.47	9.43	26.73	23.62	20.12	21.09	29.87	33.58
505	0.96	0.89	9.46	9.42	26.89	23.61	19.93	20.89	30.06	33.80
510	0.96	0.89	9.45	9.42	27.03	23.62	19.76	20.70	30.21	34.11
515	0.97	0.89	9.44	9.41	27.18	23.61	19.60	20.53	30.38	34.42
520	0.98	0.89	9.44	9.40	27.34	23.58	19.44	20.37	30.54	34.75
526	0.98	0.90	9.42	9.39	27.50	23.54	19.28	20.21	30.75	35.14
532	0.99	0.90	9.41	9.38	27.59	23.47	19.12	20.07	30.94	35.52
538	1.00	0.91	9.40	9.37	27.65	23.35	18.96	19.95	31.11	35.80
544	1.00	0.91	9.40	9.35	27.74	23.22	18.79	19.84	31.31	35.98
550	1.01	0.91	9.39	9.34	27.81	23.15	18.62	19.71	31.45	36.30
600	1.07	0.94	9.31	9.23	28.25	22.30	16.96	18.25	32.64	38.36

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.

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ISO 9001 ISO 14001 CERTIFIED

ALL NEW
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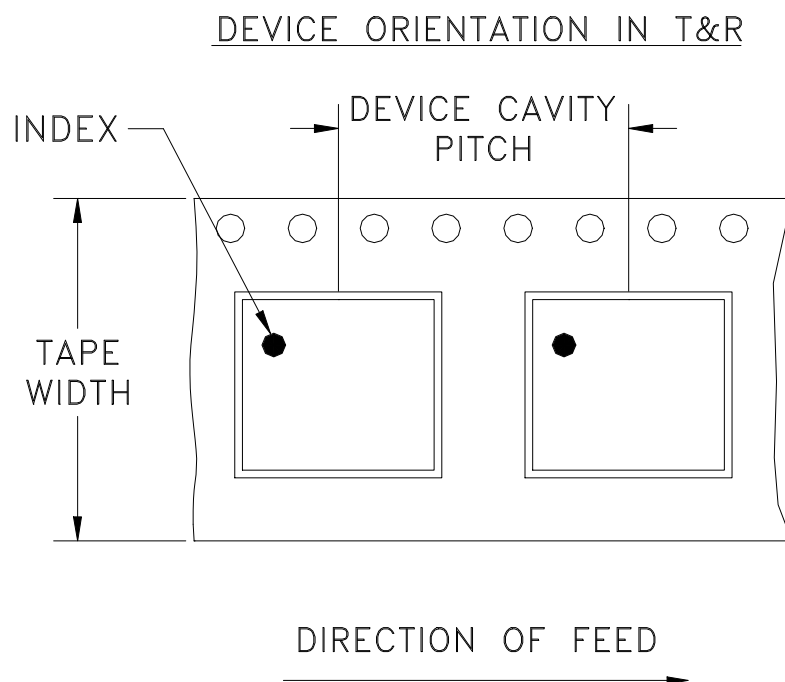
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RF/IF MICROWAVE COMPONENTS

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

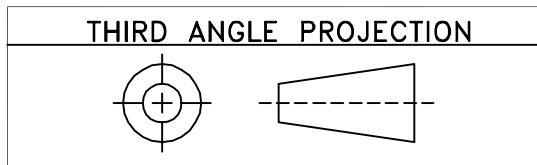


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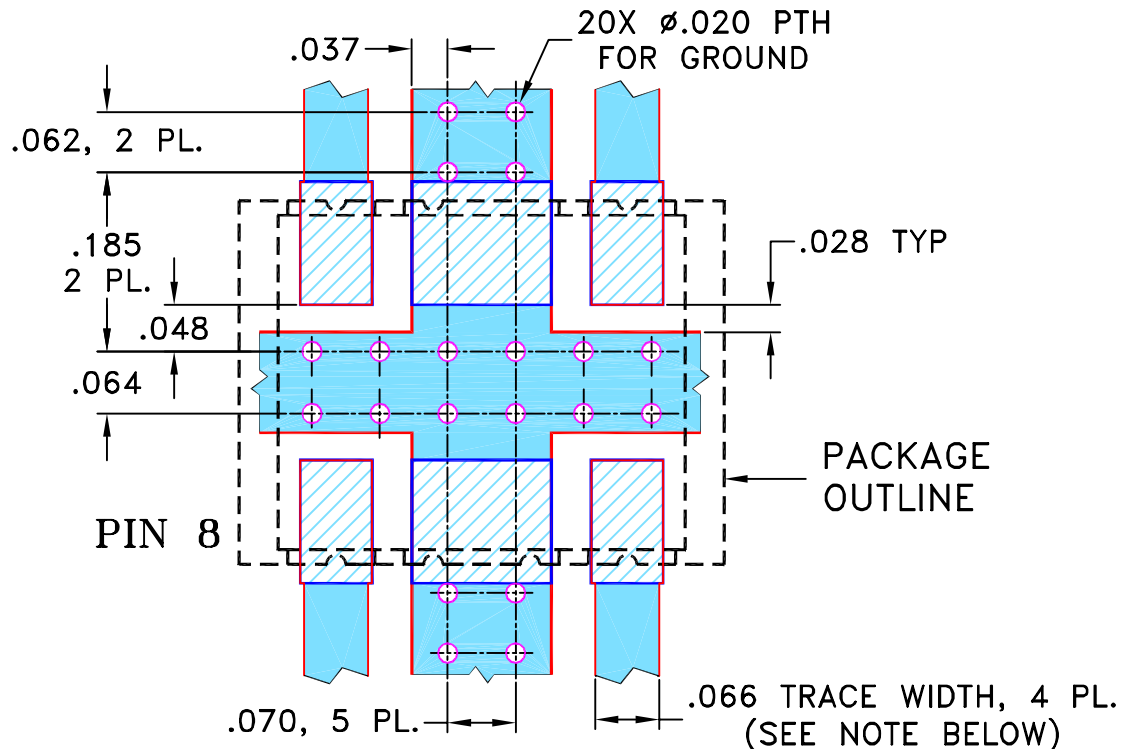
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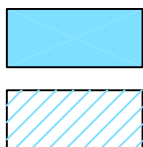
REVISIONS					
REV OR	ECN No.	DESCRIPTION	DATE	DR	AUTH
	M107473	NEW RELEASE	09/25/06	AV	DY

**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



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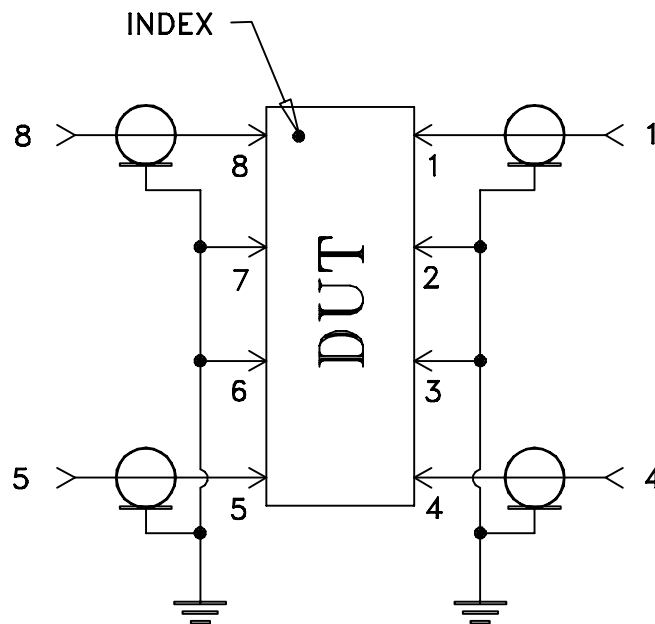
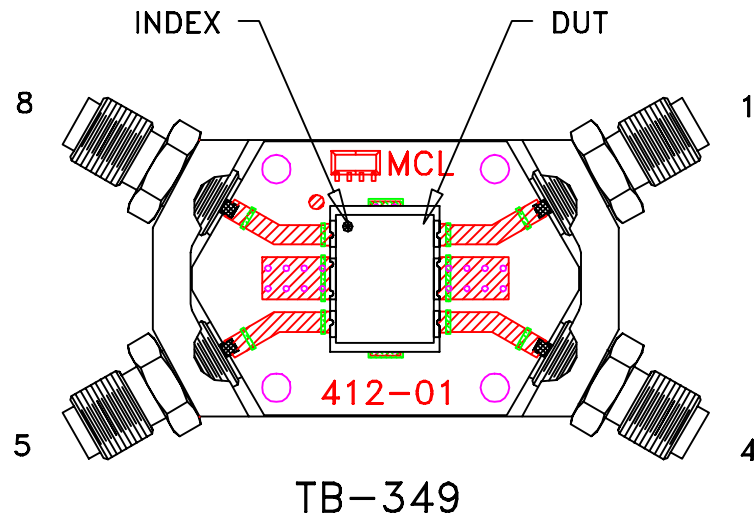
PL, rr, AH202-1, SYDC, TB-349

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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

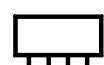
For Pin Connections refer to Data Sheet of the DUT



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 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