



SURFACE MOUNT

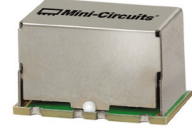
Directional Coupler **SYDC-25-92VHP+**

Mini-Circuits

50Ω 25 dB Coupling 120 to 870 MHz 75Watt

THE BIG DEAL

- High power, 75W max. with output load VSWR 1.4 max
- High power, 20W max. with output open or short
- Low mainline loss, 0.2 dB typ.
- Good VSWR, 1.2 typ.



Generic photo used for illustration purposes only

CASE STYLE: AH1647

+RoHS Compliant

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

APPLICATIONS

- Military mobile

PRODUCT OVERVIEW

Mini-Circuits' SYDC-25-92VHP+ surface mount directional coupler provides exceptionally high power handling up to 75W and low mainline loss of 0.2 dB for applications from 120 to 870 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 0.43 x 0.69 x 0.41", accommodating dense circuit board layouts.

KEY FEATURES

Feature	Advantages
High power handling, 75W	Usable in many systems with high-power requirements
Low mainline loss, 0.2 dB typ.	Provides excellent through-path signal power transmission
Small size, 0.43 x 0.69 x 0.41"	Provides high power capability while saving space in systems with tight layouts

REV. B
ECO-015601
SYDC-25-92VHP+
WP/CP/AM
221031





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Directional Coupler **SYDC-25-92VHP+**

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50Ω 25 dB Coupling 120 to 870 MHz 75Watt

ELECTRICAL SPECIFICATIONS AT 25°C

Parameter	Condition (MHz)	Min.	Typ.	Max.	Unit
Frequency Range	—	120	—	870	MHz
Mainline Loss (above theoretical 0.04 dB)	120	—	0.2	0.5	dB
	500	—	0.2	0.4	
	870	—	0.3	0.5	
Coupling	120-870	—	25	—	dB
	120	—	26.1	—	
	500	—	25.1	—	
	870	—	23.9	—	
Coupling Flatness	120-870	—	1.2	1.9	dB
Directivity	120	13	18	—	dB
	500	11	16	—	
	870	10	14	—	
Return Loss (Input)	120-250	14	18	—	dB
	250-500	18	22	—	
	500-870	16	20	—	
Return Loss (Output)	120-250	14	18	—	dB
	250-500	18	22	—	
	500-870	16	20	—	
Return Loss (Coupling)	120	15	18	—	dB
	500	17	22	—	
	870	14	17	—	
Input Power ¹	120-870	—	—	75	W

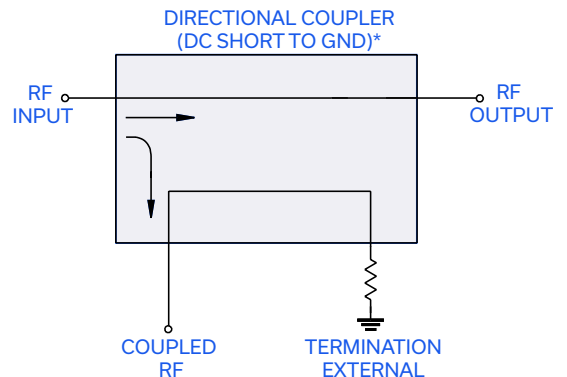
1. Power handling 75W/max at room temperature with output load 1.4:1/max. Power handling is decreased with poor VSWR or higher temperature. The user must provide adequate means of heat removal to limit the temperature of ground connection under the PCB to 65°C, in order to ensure the proper performance. At 25°C ambient temperature this requires thermal resistance of PCB heatsink 3.5°C/W.

MAXIMUM RATINGS

Parameter	Ratings
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.

ELECTRICAL SCHEMATIC



*Electrical schematic is for Directional coupler with internal transformer(s) and external termination



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50Ω 25 dB Coupling 120 to 870 MHz 75Watt

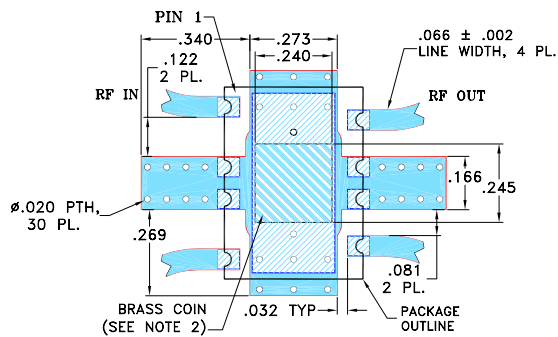
PAD CONNECTIONS

INPUT	1
OUTPUT	8
COUPLED	4
50Ω TERM EXTERNAL**	5
GROUND	2, 3, 6, 7

** External termination must be able to handle 250mW min.

PRODUCT MARKING: N/A

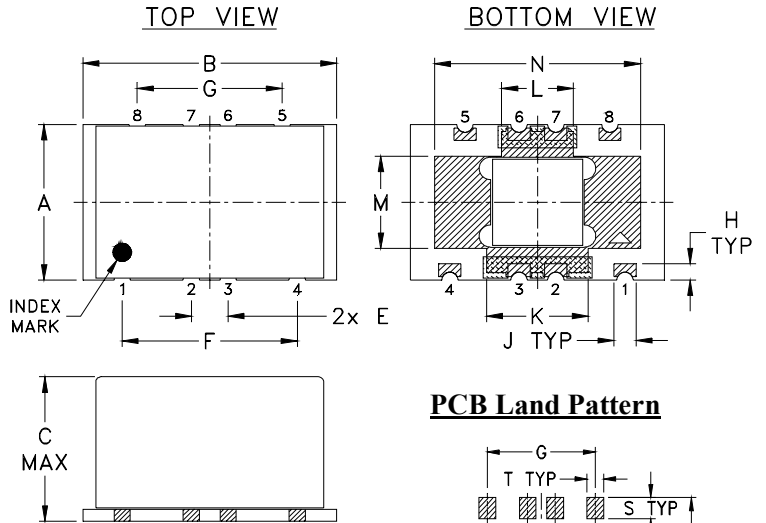
DEMO BOARD MCL P/N: TBSYDC25-92VHP+
SUGGESTED PCB LAYOUT (PL-351)



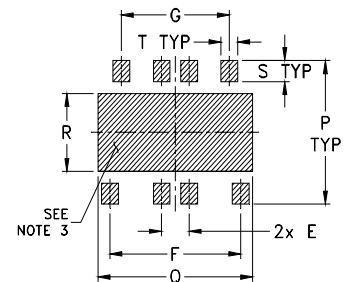
- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .030" ± .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. SUGGEST TO PROVIDE BRASS COIN FOR BETTER HEAT TRANSFER FROM THE UNIT. OTHERWISE PROVIDE ARRAY OF THERMAL VIAS ADEQUATE TO 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.

OUTLINE DRAWING



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

OUTLINE DIMENSIONS (Inches/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



SURFACE MOUNT

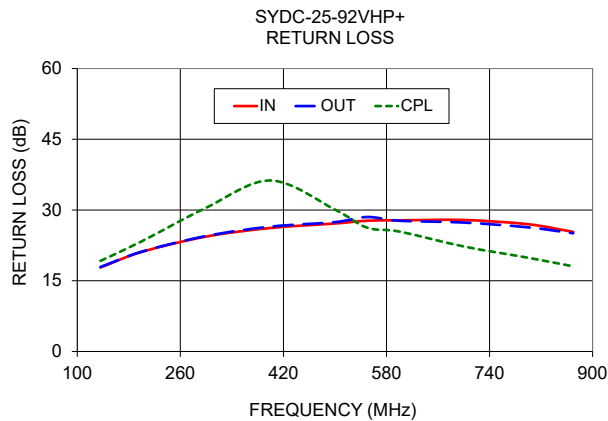
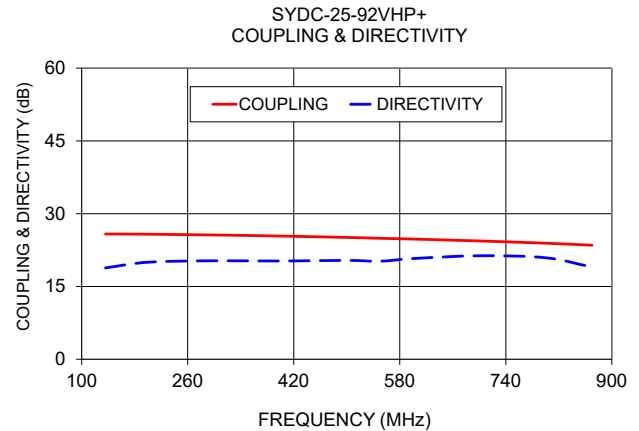
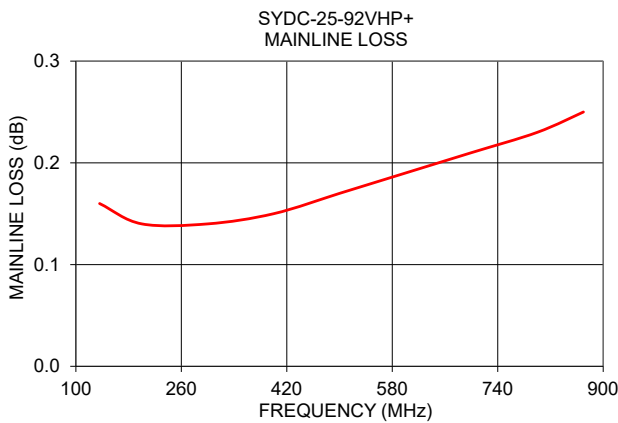
Directional Coupler **SYDC-25-92VHP+**

Mini-Circuits

50Ω 25 dB Coupling 120 to 870 MHz 75Watt

TYPICAL PERFORMANCE DATA

Frequency (MHz)	Mainline Loss (dB)	Coupling (dB)	Directivity (dB)	Return Loss (dB)		
	In-Out			In	Out	Cpl
136	0.16	25.82	18.83	17.82	17.91	19.22
200	0.14	25.77	20.00	21.11	21.16	23.36
300	0.14	25.61	20.30	24.37	24.48	30.48
400	0.15	25.39	20.24	26.19	26.47	36.26
500	0.17	25.11	20.38	27.14	27.43	30.09
550	0.18	24.93	20.21	27.73	28.51	26.25
600	0.19	24.77	20.75	27.81	27.72	25.43
700	0.21	24.38	21.33	27.88	27.34	22.27
800	0.23	23.92	20.92	26.98	26.32	19.87
870	0.25	23.50	19.00	25.36	25.07	18.05



- 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.
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Directional Coupler

SYDC-25-92VHP+

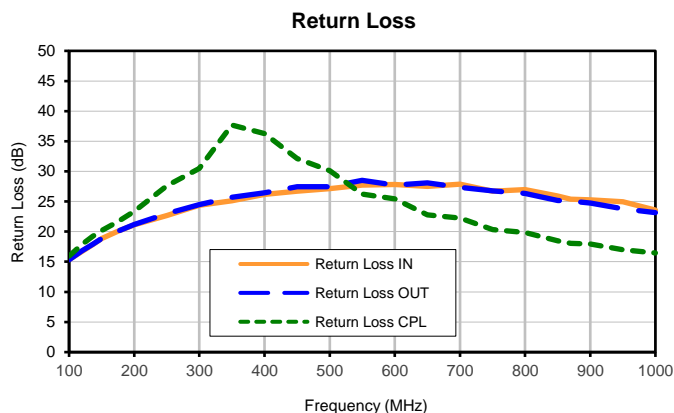
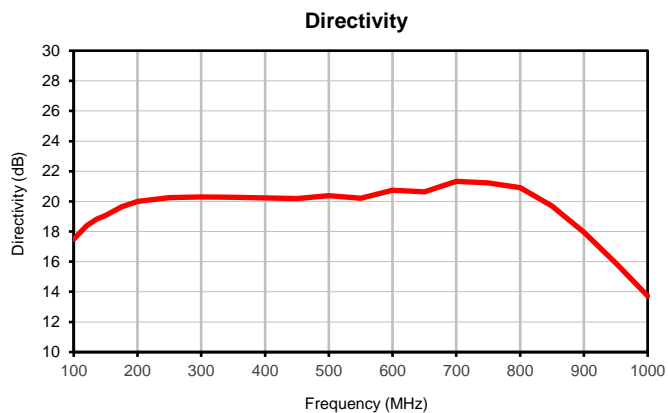
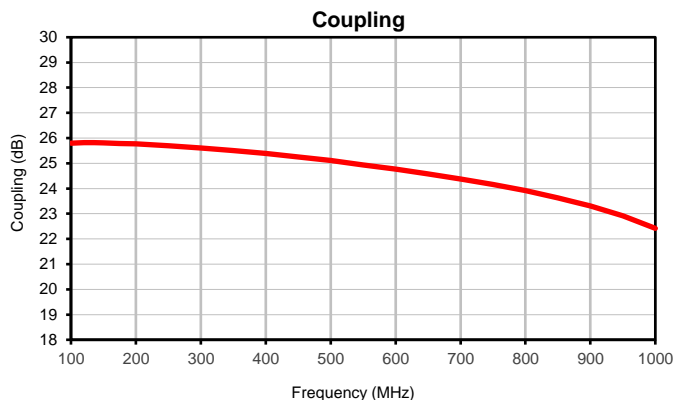
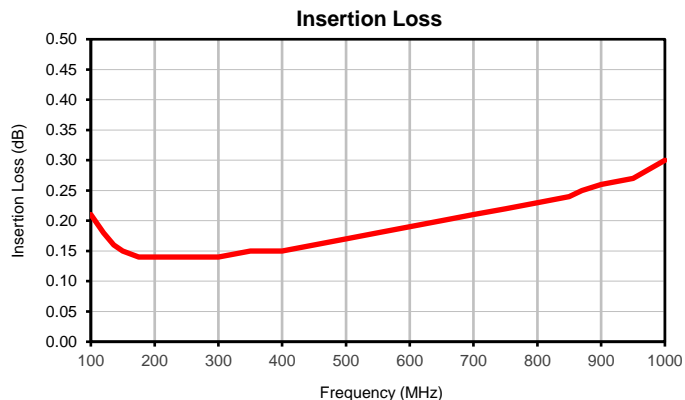
Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS (dB)	COUPLING (dB)	DIRECTIVITY (dB)	RETURN LOSS (dB)		
				IN	OUT	CPL
100	0.21	25.80	17.50	15.35	15.32	15.94
120	0.18	25.82	18.39	16.74	16.82	17.87
136	0.16	25.82	18.83	17.82	17.91	19.22
150	0.15	25.81	19.06	18.84	18.84	20.20
175	0.14	25.79	19.64	20.07	20.09	21.64
200	0.14	25.77	20.00	21.11	21.16	23.36
250	0.14	25.70	20.25	22.65	22.97	27.59
300	0.14	25.61	20.30	24.37	24.48	30.48
350	0.15	25.51	20.27	25.10	25.71	37.69
400	0.15	25.39	20.24	26.19	26.47	36.26
450	0.16	25.25	20.19	26.73	27.47	32.13
500	0.17	25.11	20.38	27.14	27.43	30.09
550	0.18	24.93	20.21	27.73	28.51	26.25
600	0.19	24.77	20.75	27.81	27.72	25.43
650	0.20	24.58	20.64	27.49	28.10	22.78
700	0.21	24.38	21.33	27.88	27.34	22.27
750	0.22	24.16	21.22	26.72	26.76	20.34
800	0.23	23.92	20.92	26.98	26.32	19.87
850	0.24	23.63	19.69	25.91	25.19	18.48
870	0.25	23.50	19.00	25.36	25.07	18.05
900	0.26	23.31	17.96	25.29	24.76	17.97
950	0.27	22.92	15.90	24.97	23.81	16.99
1000	0.30	22.42	13.73	23.60	23.15	16.44

Directional Coupler

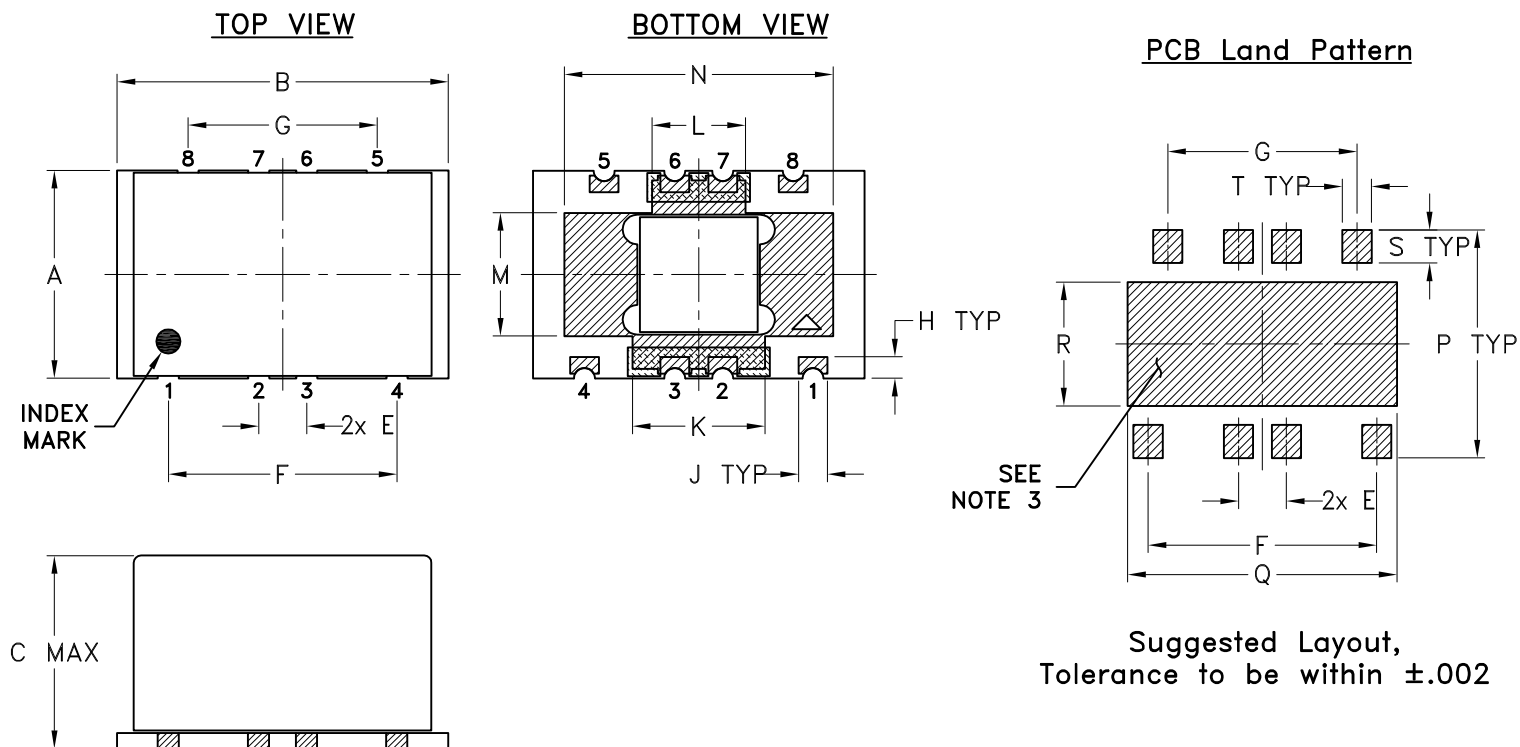
Typical Performance Curves

SYDC-25-92VHP+



Outline Dimensions

AH1647



Suggested Layout,
Tolerance to be within ± 0.002

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. ± 0.01 ; 3 Pl. ± 0.005

Notes:

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

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ISO 9001 ISO 14001 CERTIFIED

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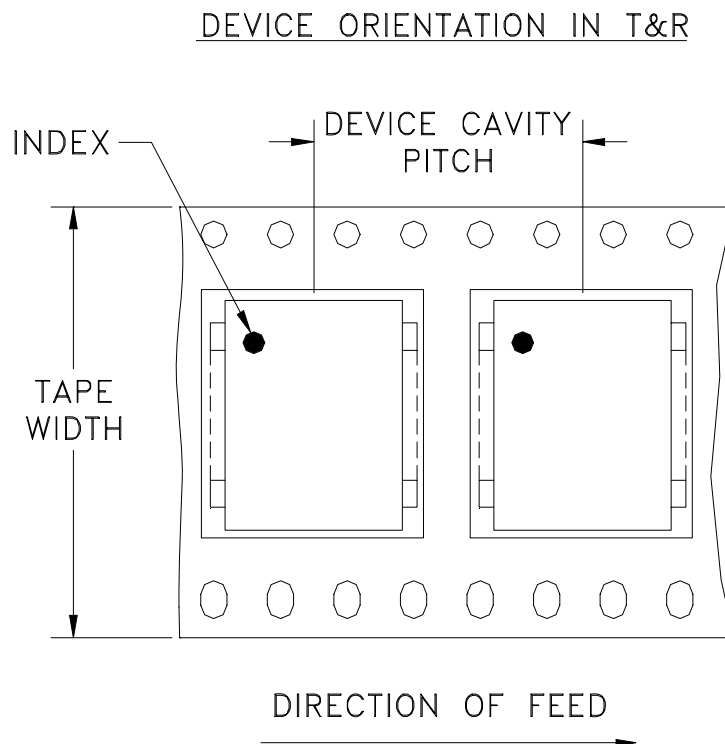
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RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F109



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.

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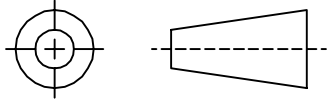
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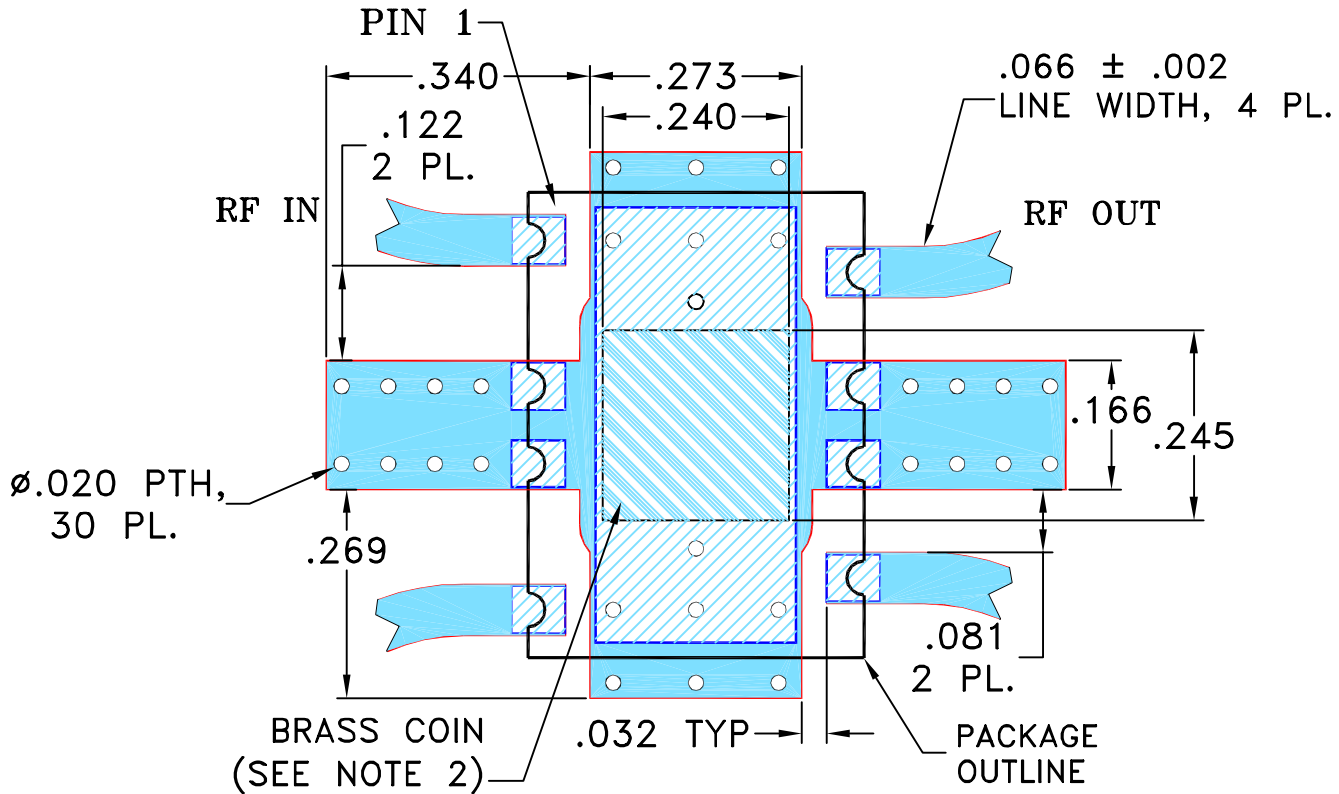
THIRD ANGLE PROJECTION



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 TOLERANCES ON: 2 PL DECIMALS ± 3 PL DECIMALS ± .005 ANGLES ± FRACTIONS ±	DRAWN	GF	08/22/11
	CHECKED	IL	08/25/11
	APPROVED	WP	08/26/11

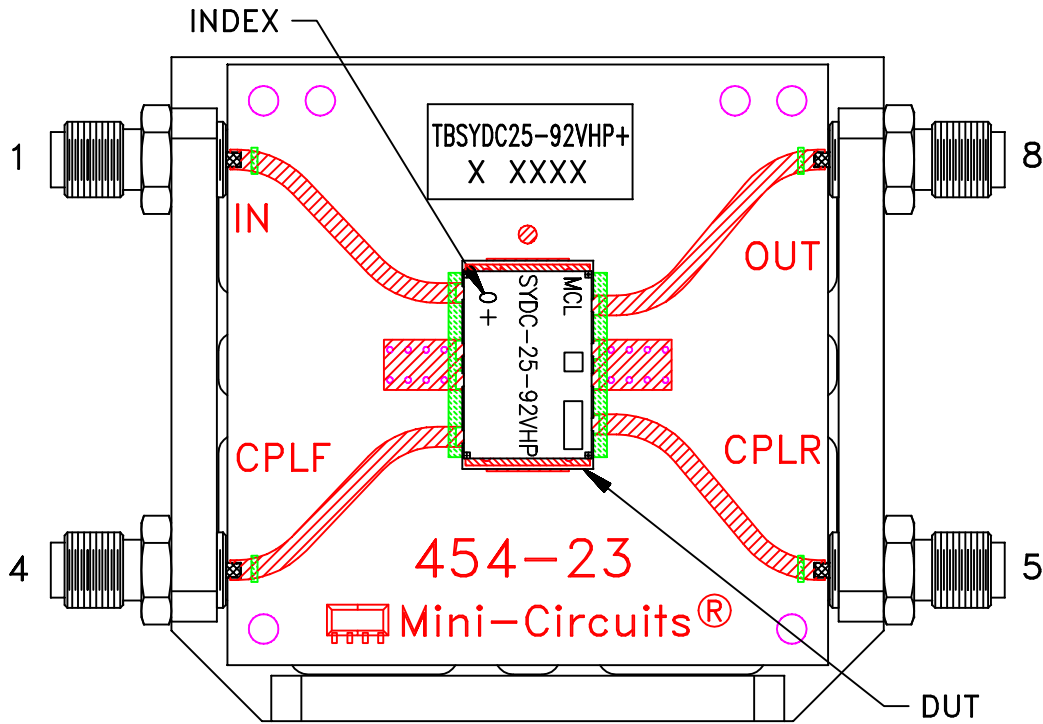
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PL, 08DC05, AH1647, TB-630+

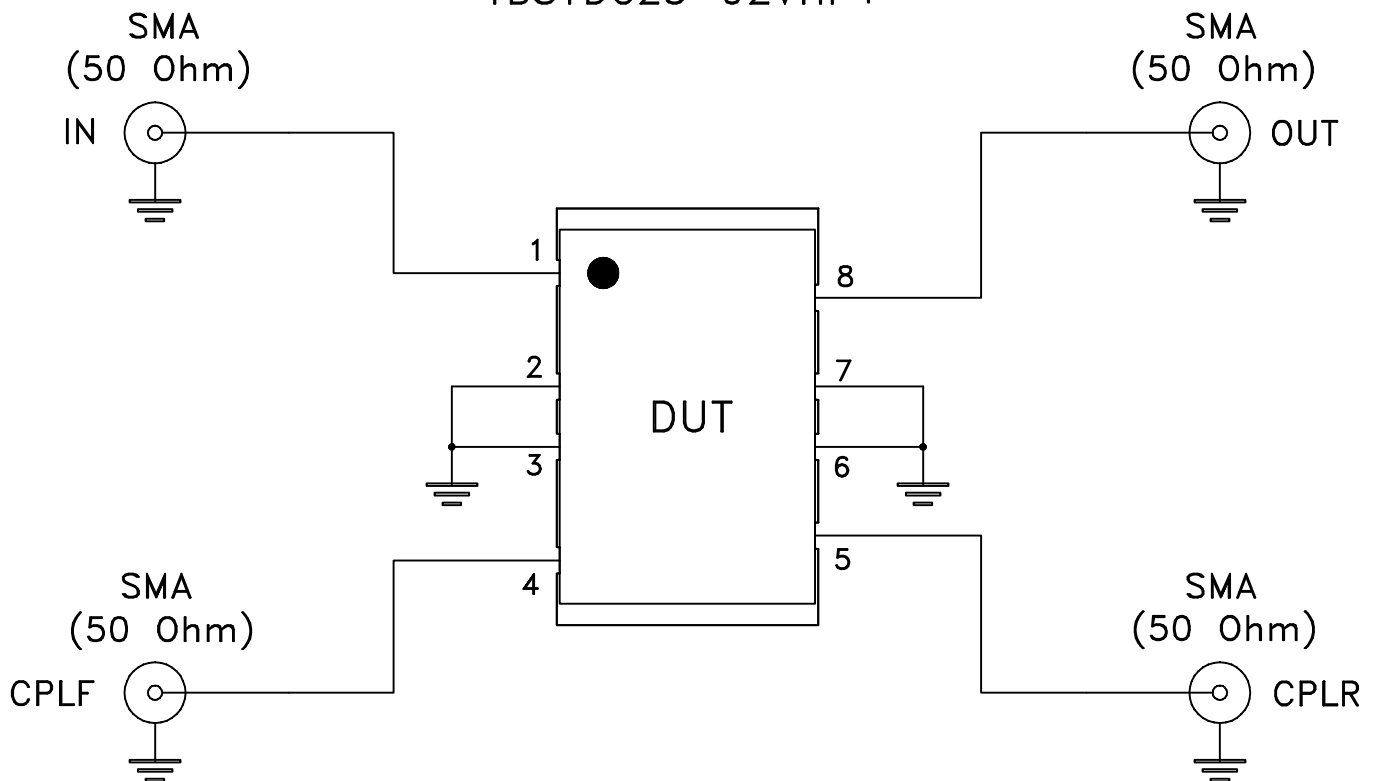
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SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-351	REV: OR
FILE: 98PL351	SCALE: 4:1	SHEET: 1 OF 1	

Evaluation Board and Circuit



TBSYDC25-92VHP+



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: 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