

Bi-Directional Coupler

SYDC-ED14517/3

Important Note

This model has been designed, built and tested in our engineering department. Performance data represents model capability. At present it is a non-catalog model. On request, we can supply a final specification sheet, part number and price/delivery information.

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CASE STYLE : AH1647

ELECTRICAL SPECIFICATIONS 50Ω @ +25°C					
Parameter		Min.	Typ.	Max.	Units
Frequency		30		512	MHz
Coupling	Nominal		20±1		dB
	Flatness		±1		dB
Mainline Loss **	30-512 MHz		0.50		dB
Directivity	30-512 MHz		25		dB
VSWR	30-512 MHz		1.20		(:1)
RF Power Input	30-512 MHz			50	W

**Mainline loss includes theoretical coupled power loss of 0.044 dB at 20 dB coupling.

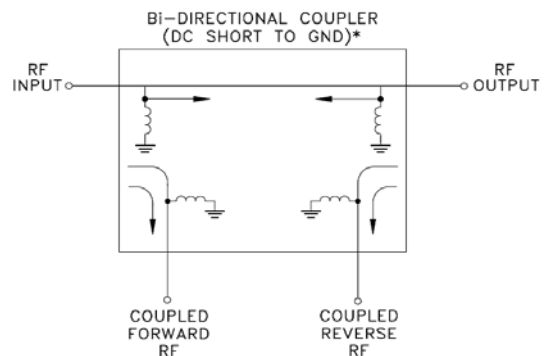
***The user must provide adequate means of heat removal to limit the temperature of ground connections 2,3,6,7 to 65°C, in order to ensure proper performance. At 25°C ambient temperature this requires thermal resistance of the user's PC board heat sink to be 10°C/W.

MAXIMUM RATINGS	
Operating Temperature	-40°C to 65°C Case ⁽¹⁾
Storage Temperature	-55°C to 100°C

⁽¹⁾Case temperature is defined as temperature on ground leads

PIN CONNECTIONS	
INPUT	1
OUTPUT	8
COUPLED FORWARD	4
COUPLED REVERSE	5
GROUND	2,3,6,7

Functional Diagram



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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
30.0	0.20	0.23	19.53	19.39	35.50	35.44	30.87	32.42	31.49	32.72
40.0	0.22	0.25	19.57	19.42	36.32	36.30	31.50	33.60	32.29	33.81
50.0	0.23	0.25	19.60	19.45	36.09	36.33	32.04	34.21	32.75	34.44
60.0	0.23	0.25	19.62	19.47	35.95	36.29	32.56	34.71	33.27	35.02
70.0	0.23	0.25	19.64	19.50	36.10	36.18	33.06	35.17	33.67	35.62
80.0	0.23	0.25	19.65	19.53	35.84	35.86	33.66	35.56	34.12	36.10
90.0	0.23	0.25	19.66	19.55	35.81	35.80	34.02	35.86	34.44	36.37
100.0	0.23	0.25	19.66	19.57	35.56	35.65	34.30	36.09	34.74	36.52
150.0	0.23	0.26	19.70	19.66	33.97	34.87	36.74	37.48	35.35	38.24
175.0	0.24	0.26	19.72	19.69	33.59	33.89	35.78	36.94	35.36	37.47
200.0	0.25	0.27	19.73	19.73	33.07	33.09	35.32	36.68	34.82	37.69
225.0	0.26	0.28	19.74	19.77	32.35	32.22	34.71	36.49	34.19	37.83
250.0	0.26	0.29	19.76	19.80	31.39	31.34	33.83	36.11	33.37	37.33
275.0	0.27	0.30	19.77	19.84	30.31	30.39	32.86	35.57	32.44	36.86
300.0	0.28	0.31	19.77	19.86	29.31	29.46	31.78	34.90	31.48	36.27
325.0	0.29	0.32	19.78	19.89	28.42	28.41	30.58	34.06	30.47	35.79
350.0	0.31	0.33	19.79	19.91	27.57	27.51	29.37	33.28	29.43	35.15
375.0	0.32	0.34	19.79	19.93	26.65	26.61	28.23	32.45	28.32	34.25
400.0	0.33	0.36	19.80	19.93	25.76	25.71	27.22	31.60	27.29	33.32
425.0	0.34	0.37	19.81	19.94	24.78	24.69	26.27	30.63	26.38	32.27
450.0	0.36	0.39	19.81	19.94	23.83	23.69	25.29	29.58	25.50	31.16
475.0	0.38	0.40	19.82	19.93	22.85	22.76	24.36	28.62	24.61	30.05
500.0	0.40	0.42	19.82	19.91	21.95	21.89	23.53	27.79	23.80	29.02
505.0	0.40	0.43	19.82	19.91	21.77	21.73	23.39	27.62	23.64	28.78
510.0	0.40	0.43	19.82	19.90	21.58	21.55	23.23	27.44	23.48	28.57
512.0	0.41	0.43	19.82	19.90	21.52	21.51	23.16	27.41	23.40	28.52
525.0	0.41	0.44	19.82	19.89	21.08	20.99	22.77	26.94	23.00	28.00



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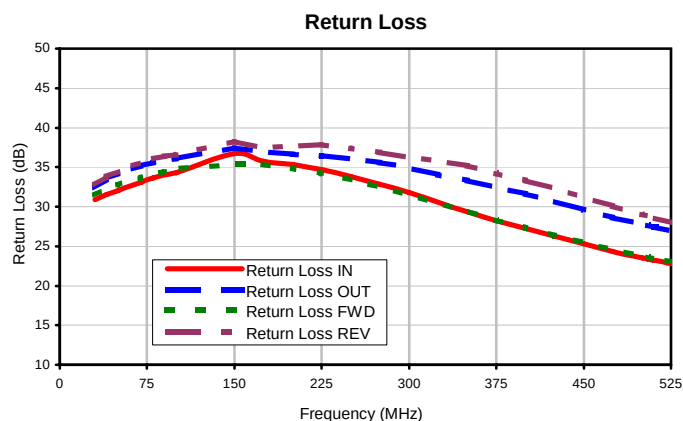
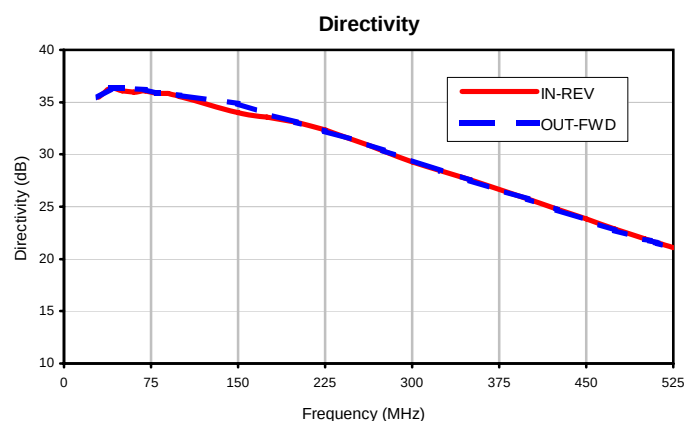
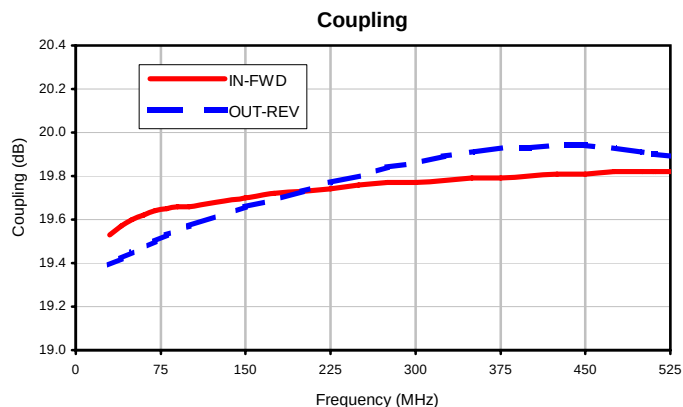
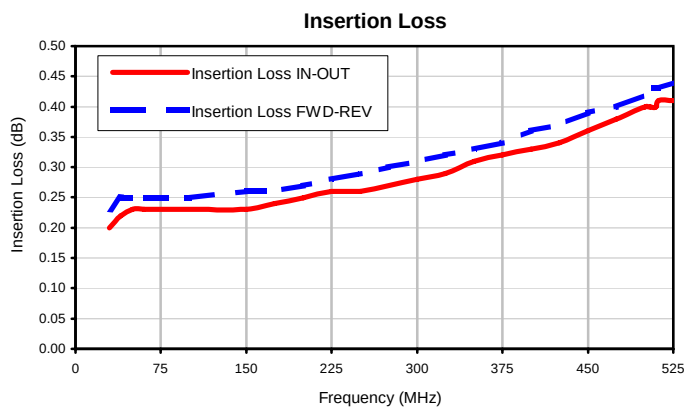
IF/RF MICROWAVE COMPONENTS

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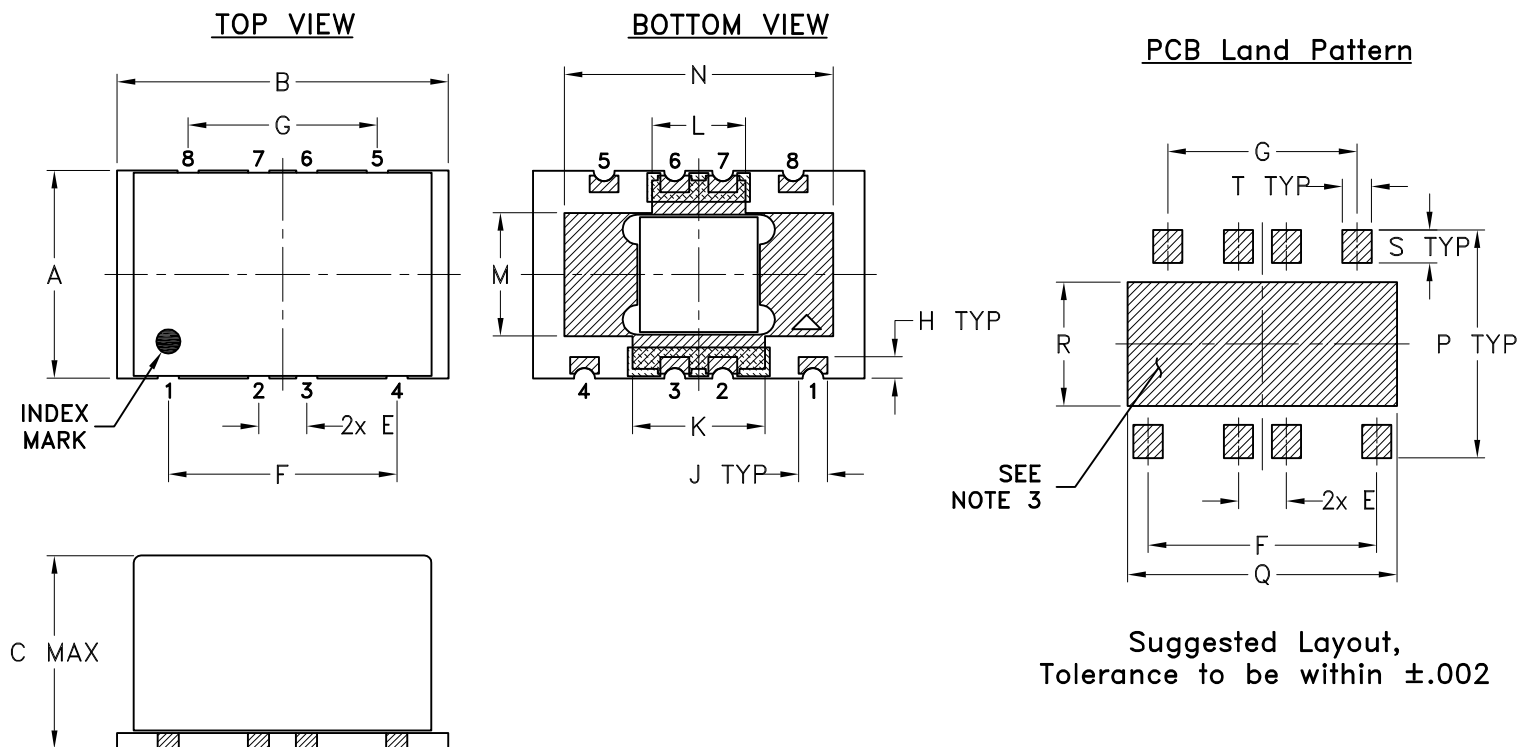
Typical Performance Curves

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Outline Dimensions

AH1647



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
AH164 7	.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. $\pm.01$; 3 Pl. $\pm.005$

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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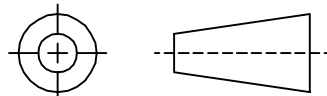
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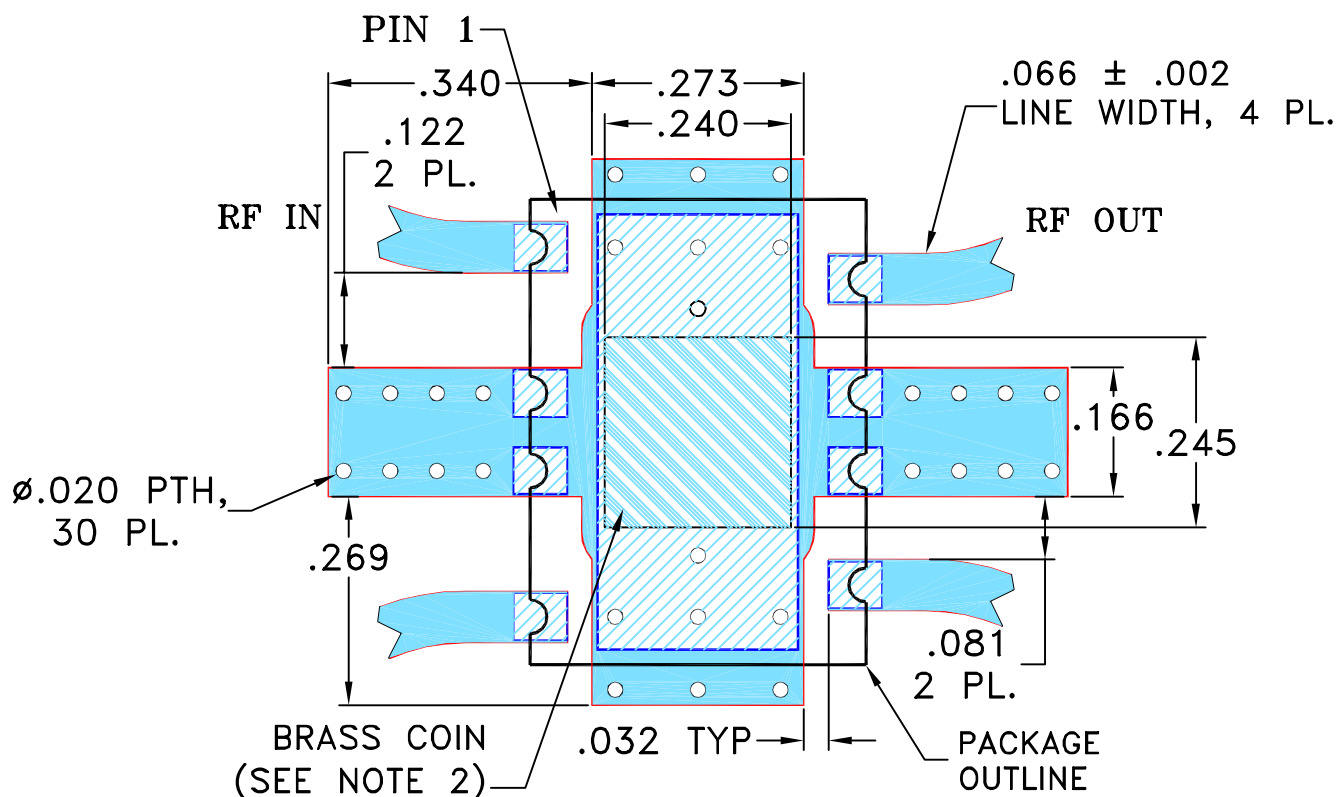


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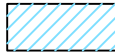
RF/IF MICROWAVE COMPONENTS

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**

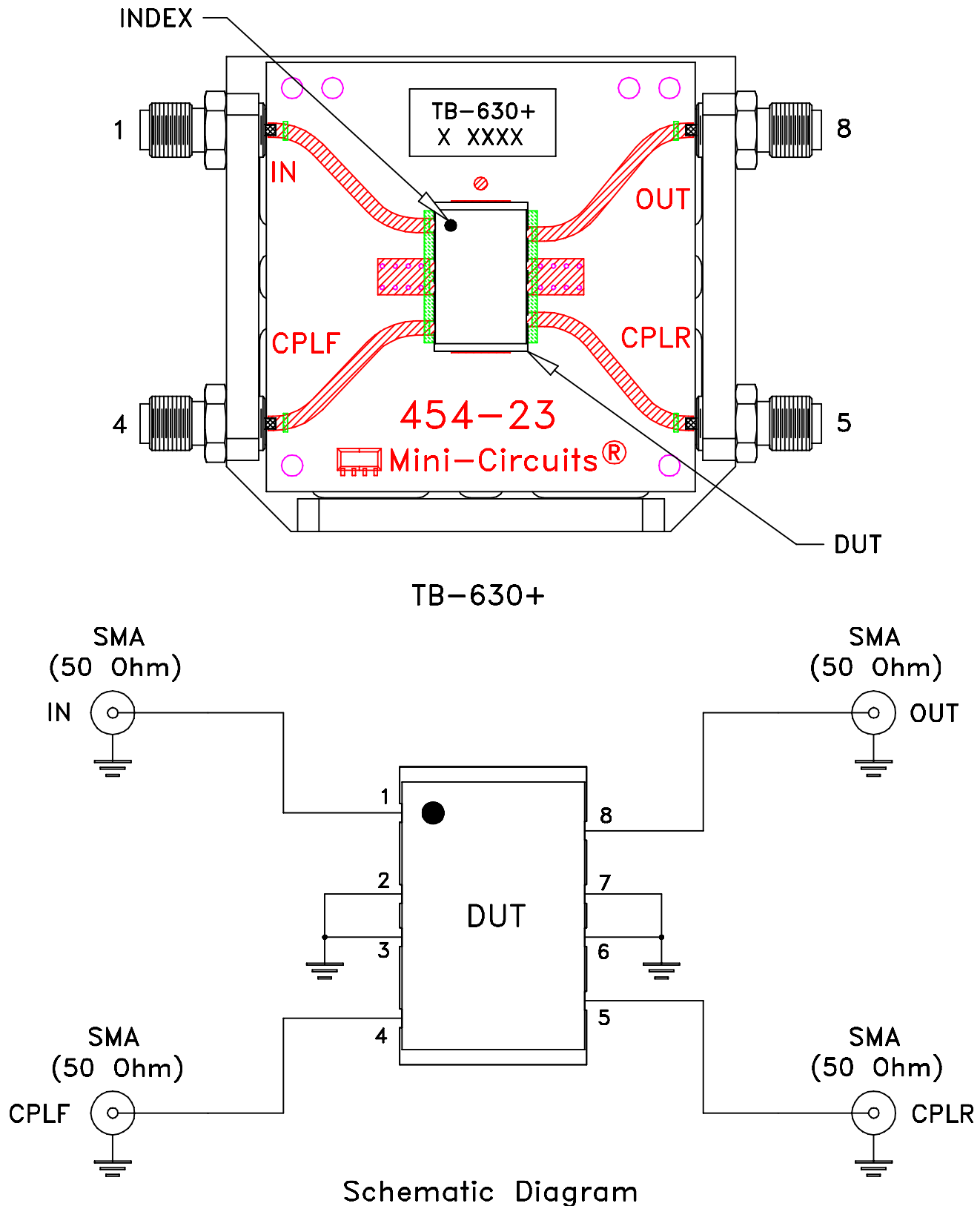


- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .030" ± .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. SUGGEST TO PROVIDE BRASS COIN FOR BETTER HEAT TRANSFER FROM THE UNIT. OTHERWISE PROVIDE ARRAY OF THERMAL VIAS ADEQUATE TO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

UNLESS OTHERWISE SPECIFIED		INITIALS		DATE		Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235							
DIMENSIONS ARE IN INCHES		DRAWN	GF	08/22/11		PL, 08DC05, AH1647, TB-630+							
TOLERANCES ON:		CHECKED	IL	08/25/11									
2 PL DECIMALS ±		APPROVED	WP	08/26/11									
3 PL DECIMALS ± .005													
ANGLES ±													
FRACTIONS ±													
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						FILE: 98PL351		SCALE: 4:1		SHEET: 1 OF 1			

Evaluation Board and Circuit



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: R04350 or equivalent.
Dielectric Constant=3.5, Thickness=.030 inch.

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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