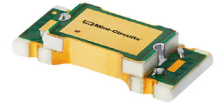


High Power Bi-Directional Coupler

50Ω 13dB Coupling DC Pass 2700 to 6000 MHz

SYBD-13-63HP+



Generic photo used for illustration purposes only

CASE STYLE: JB1233

+RoHS Compliant

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

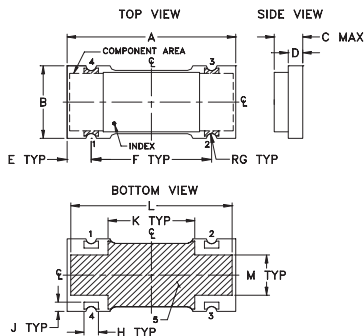
Maximum Ratings

Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
DC Current	2A
Permanent damage may occur if any of these limits are exceeded.	

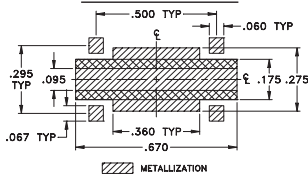
Pin Connections

INPUT	1
OUTPUT	2
COUPLED (forward)	4
COUPLED (reverse)	3
GROUND	5

Outline Drawing



PCB Land Pattern

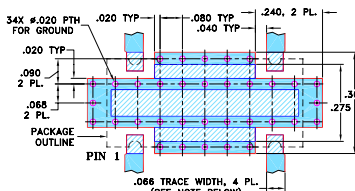


Suggested Layout,
Tolerance to be within ± 0.02

Outline Dimensions (inch/mm)

A	B	C	D	E	F	G
.70	.32	.13	.060	.100	.500	.022
17.78	8.13	3.30	1.52	2.54	12.70	0.56
H	J	K	L	M		wt
.060	.040	.360	.670	.175		grams
1.52	1.02	9.14	17.02	4.45		0.68

Demo Board MCL P/N: TB-398 Suggested PCB Layout (PL-260)



- 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.
3. DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
4. DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

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-Circuit's 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-Circuit's website at www.minicircuits.com/MCLStore/terms.jsp

Features

- high power handling, 25 watts typ.
- low mainline loss, 0.45 dB typ.
- excellent VSWR, 1.2:1 typ.
- excellent directivity, 20 dB typ.
- wideband frequency, 2700 to 6000 MHz

Applications

- instrumentation
- ISM
- defense communications
- federal communications
- fixed satellite

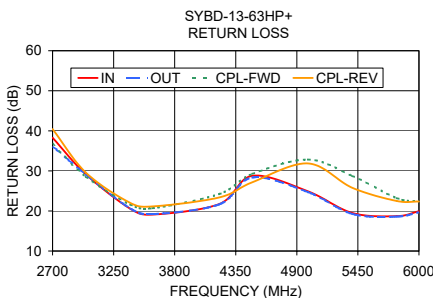
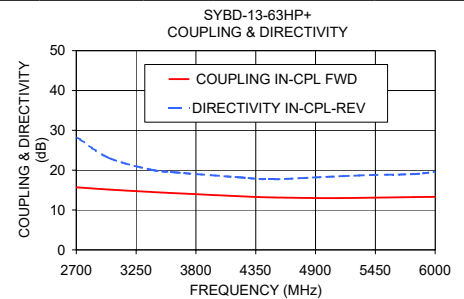
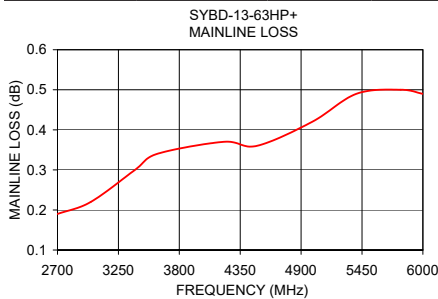
Bi-Directional Coupler Electrical Specifications

FREQ. (MHz)	COUPLING (dB)		MAINLINE LOSS ¹ (dB)		DIRECTIVITY (dB)		VSWR (:1)	POWER INPUT (W)
	Nom.	Flatness	Typ.	Max.	Typ.	Min.		
f_L - f_U								
2700-6000			0.45	0.80	20	10	1.20	
2700-3000	15.3 $\pm$ 0.8	$\pm$ 0.5	0.25	0.45	23	16	1.15	25
3000-3600	14.3 $\pm$ 0.8	$\pm$ 0.7	0.30	0.50	21	15	1.20	25
3600-4500	13.3 $\pm$ 0.7	$\pm$ 0.7	0.40	0.75	18	13	1.25	20
4500-6000	12.6 $\pm$ 0.7	$\pm$ 0.5	0.45	0.80	17	10	1.25	20

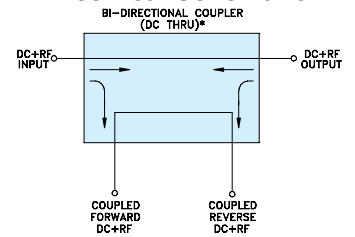
1. Mainline loss includes theoretical power loss at coupled port.

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
2700.00	0.19	15.71	15.72	31.11	28.33	38.29	36.15	36.76	40.44
3000.00	0.22	15.13	15.14	24.62	23.07	29.14	29.11	28.54	29.55
3400.00	0.30	14.51	14.50	20.72	20.06	20.56	20.64	21.58	22.01
3600.00	0.34	14.24	14.23	20.12	19.47	19.10	19.21	20.70	21.14
4200.00	0.37	13.46	13.46	18.11	18.21	21.72	21.63	24.22	23.37
4500.00	0.36	13.17	13.21	17.65	17.71	28.79	28.35	29.24	27.18
5000.00	0.42	12.99	13.03	17.90	18.31	24.90	24.71	32.83	31.87
5400.00	0.49	13.09	13.06	17.67	18.76	19.49	19.26	28.75	25.78
5800.00	0.50	13.25	13.18	17.83	19.03	18.71	18.59	23.22	22.49
6000.00	0.49	13.31	13.26	18.69	19.59	19.93	19.69	22.38	22.35



Electrical Schematic



* ELECTRICAL SCHEMATIC IS FOR BI-DIRECTIONAL COUPLER WITHOUT INTERNAL TRANSFORMERS AND RESISTORS.



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REV. B
M151107
ED-12713/1A
SYBD-13-63HP+
WZ/QL/AM
200811

Bi-Directional Coupler

SYBD-13-63HP+

Typical Performance Data

FREQ. (MHz)	INSERTION LOSS (dB) IN-OUT	COUPLING (dB)		DIRECTIVITY (dB)		RETURN LOSS (dB)			
		IN-FWD	OUT-REV	IN-REV	OUT-FWD	IN	OUT	FWD	REV
2700	0.19	15.71	15.72	28.33	31.11	38.29	36.15	36.76	40.44
2750	0.19	15.61	15.62	27.33	29.90	40.62	38.24	36.10	39.77
2800	0.19	15.50	15.52	26.09	28.49	40.64	37.67	35.80	38.20
2850	0.19	15.40	15.41	25.55	27.72	37.23	35.86	33.49	35.30
2900	0.20	15.31	15.32	24.51	26.34	33.89	33.46	31.93	33.54
2950	0.20	15.21	15.23	23.98	25.56	31.18	31.04	30.20	31.25
3000	0.22	15.13	15.14	23.07	24.62	29.14	29.11	28.54	29.55
3100	0.22	14.96	14.96	21.95	23.25	25.78	26.02	26.04	26.60
3200	0.25	14.80	14.80	21.13	22.08	23.52	23.65	24.08	24.47
3300	0.27	14.65	14.65	20.48	21.30	21.78	21.90	22.57	22.95
3400	0.30	14.51	14.50	20.06	20.72	20.56	20.64	21.58	22.01
3500	0.32	14.39	14.34	19.94	20.60	19.62	19.78	21.00	21.49
3600	0.34	14.24	14.23	19.47	20.12	19.10	19.21	20.70	21.14
3650	0.35	14.18	14.17	19.29	19.91	18.92	19.04	20.58	20.97
3725	0.36	14.08	14.06	19.18	19.89	18.79	19.01	20.67	20.97
3800	0.37	13.99	13.96	19.20	19.59	18.84	19.01	20.81	21.15
3900	0.37	13.84	13.82	18.97	19.16	19.14	19.23	21.25	21.40
3975	0.37	13.74	13.72	18.73	18.99	19.51	19.56	21.86	21.77
4000	0.37	13.71	13.69	18.77	18.83	19.74	19.74	22.01	21.99
4100	0.37	13.58	13.57	18.46	18.38	20.62	20.51	23.08	22.63
4200	0.37	13.46	13.46	18.21	18.11	21.72	21.63	24.22	23.37
4300	0.37	13.35	13.37	17.92	17.82	23.19	23.12	25.65	24.31
4400	0.36	13.26	13.28	17.81	17.71	25.50	25.36	27.33	25.71
4500	0.36	13.17	13.21	17.71	17.65	28.79	28.35	29.24	27.18
4600	0.36	13.10	13.14	17.66	17.69	34.43	33.07	31.31	28.80
4700	0.38	13.05	13.10	17.86	17.79	38.42	37.60	32.61	29.99
4800	0.39	13.01	13.07	18.02	17.77	32.29	32.29	32.66	30.82
4900	0.41	13.00	13.05	18.05	17.76	27.71	27.62	33.38	32.06
5000	0.42	12.99	13.03	18.31	17.90	24.90	24.71	32.83	31.87
5100	0.44	13.00	13.02	18.51	17.92	22.90	22.89	32.65	30.89
5200	0.46	13.01	13.03	18.67	18.02	21.30	21.25	31.55	28.57
5300	0.47	13.06	13.05	18.63	17.78	20.10	20.05	30.54	26.88
5400	0.49	13.09	13.06	18.76	17.67	19.49	19.26	28.75	25.78
5500	0.50	13.13	13.09	18.52	17.53	18.99	18.82	26.66	24.79
5600	0.50	13.17	13.12	18.47	17.54	18.55	18.41	25.31	23.86
5700	0.49	13.21	13.14	18.67	17.58	18.42	18.42	24.14	23.16
5800	0.50	13.25	13.18	19.03	17.83	18.71	18.59	23.22	22.49
5900	0.50	13.29	13.23	19.43	18.20	19.24	19.05	22.72	22.25
6000	0.49	13.31	13.26	19.59	18.69	19.93	19.69	22.38	22.35

REV. X1

SYBD-13-63HP+

070411

Page 1 of 1



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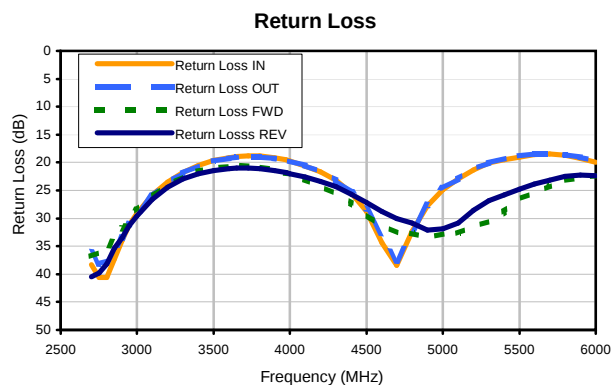
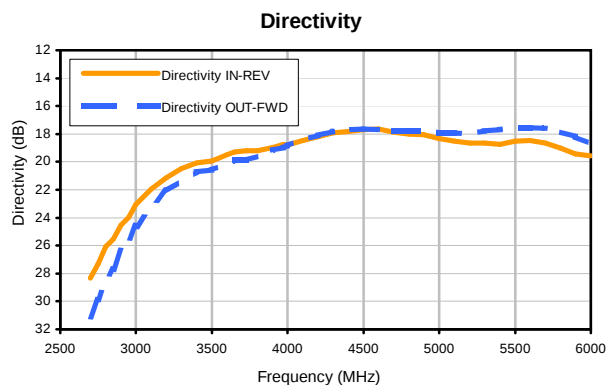
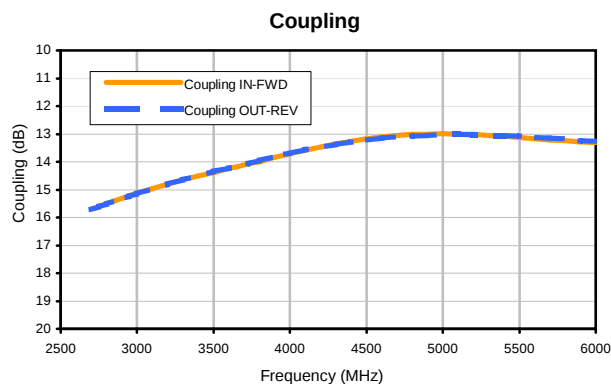
The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see



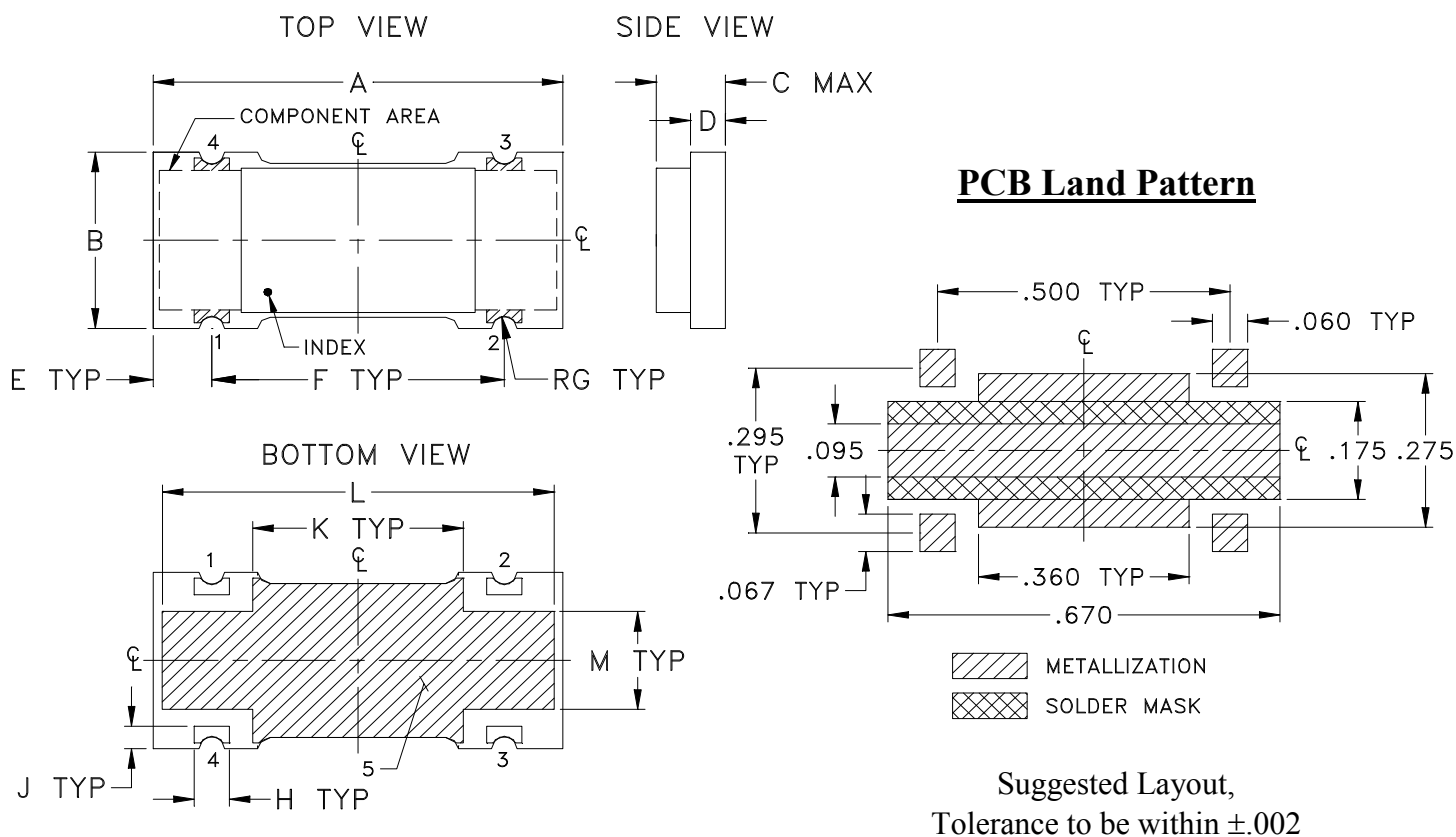
Bi-Directional Coupler

Typical Performance Curves

SYBD-13-63HP+



Outline Dimensions



CASE #.	A	B	C	D	E	F	G	H	J	K	L	M	WT, GRAM
JB1233	.70 (17.78)	.32 (8.13)	.13 (3.30)	.060 (1.52)	.100 (2.54)	.500 (12.70)	.022 (0.56)	.060 (1.52)	.040 (1.02)	.360 (9.14)	.670 (17.02)	.175 (4.45)	0.68

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

Notes:

- Open style, Base material: Printed wiring laminate.
- Termination finish: 3-5 μ inch (.08-.13 microns) Gold over 120-240 μ inch (3.05-6.10 microns) Nickel plate.
All models, (+) suffix.



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

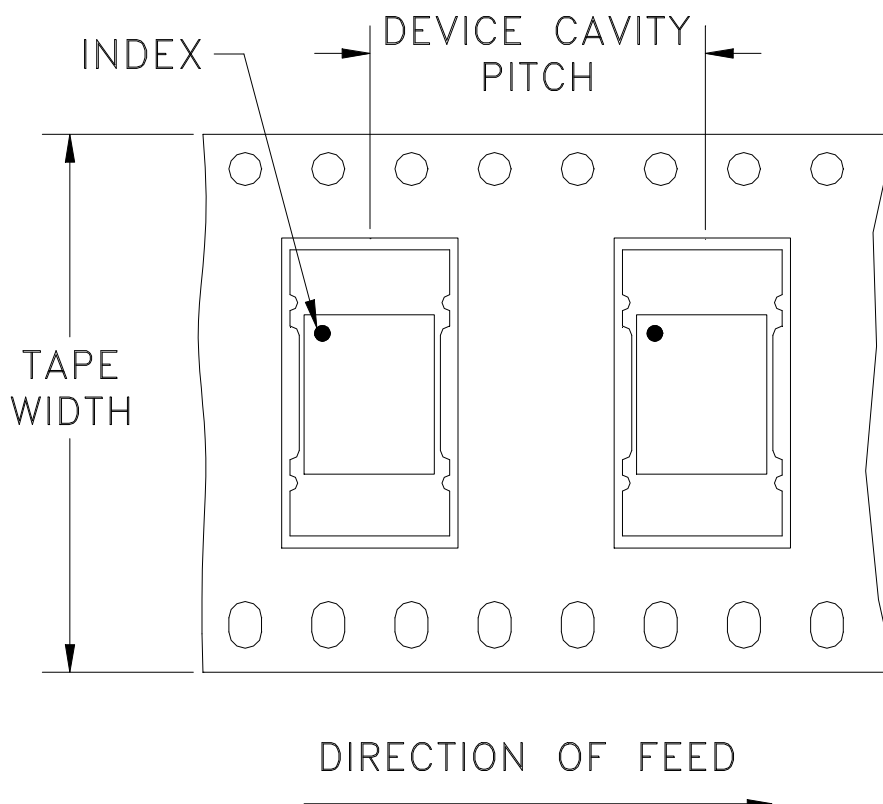
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DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
32	12	13	500

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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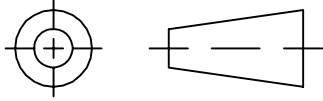
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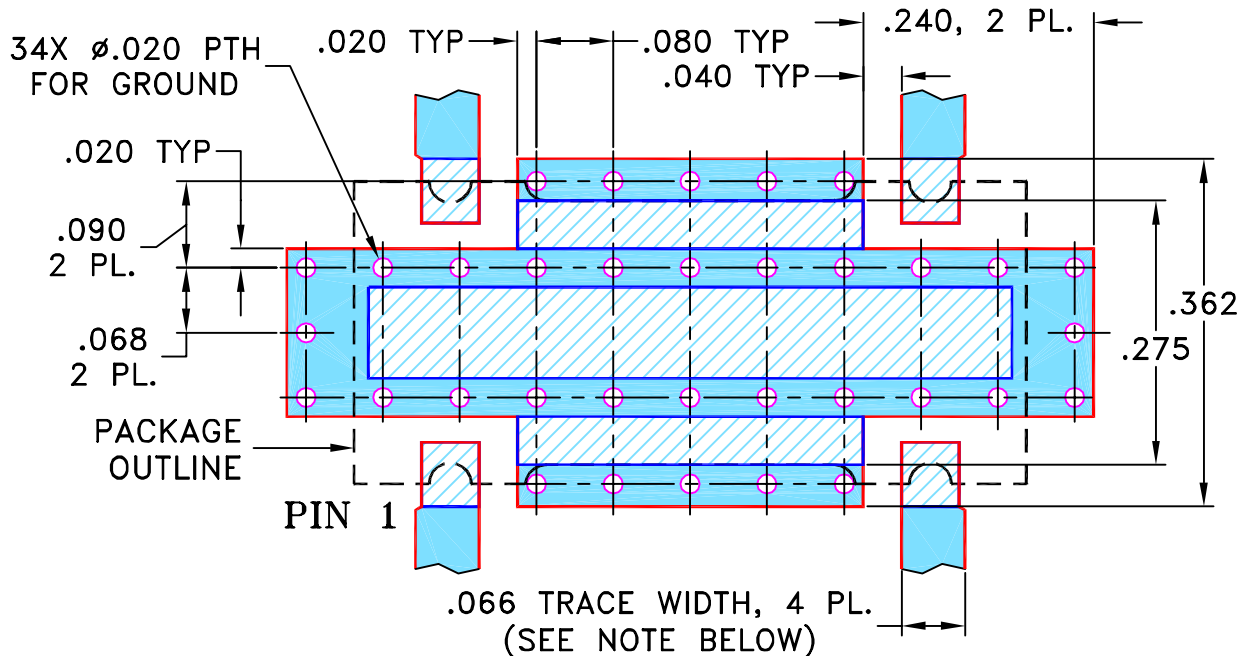
THIRD ANGLE PROJECTION



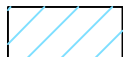
REVISIONS

REV OR	ECN No.	DESCRIPTION	DATE	DR	AUTH
	M109017	NEW RELEASE	12/29/06	MMG	WP

SUGGESTED MOUNTING CONFIGURATION FOR
JB1233 CASE STYLE, "rw" PIN CONNECTION



- 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

UNLESS OTHERWISE SPECIFIED

INITIALS

DATE

DIMENSIONS ARE IN INCHES

TOLERANCES ON:

2 PL DECIMALS $\pm$ 3 PL DECIMALS $\pm$.005ANGLES $\pm$ FRACTIONS $\pm$

DRAWN

MMG

12/21/06

CHECKED

AV

12/29/06

APPROVED

WP

12/29/06



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Brooklyn NY 11235

PL, rw, JB1233, SYBD, TB-398

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

SIZE
A

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15542

DRAWING NO:
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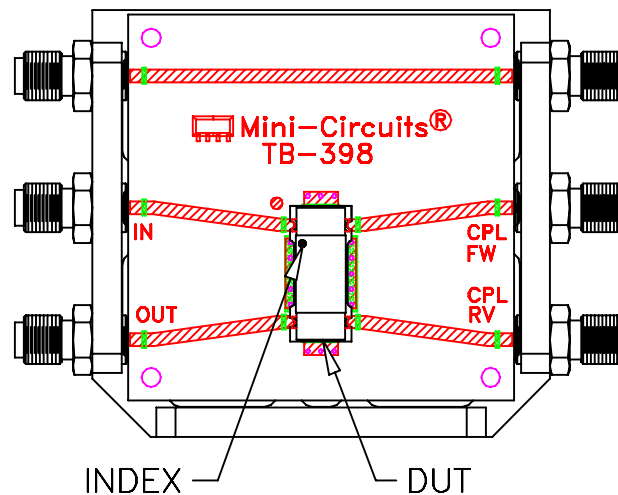
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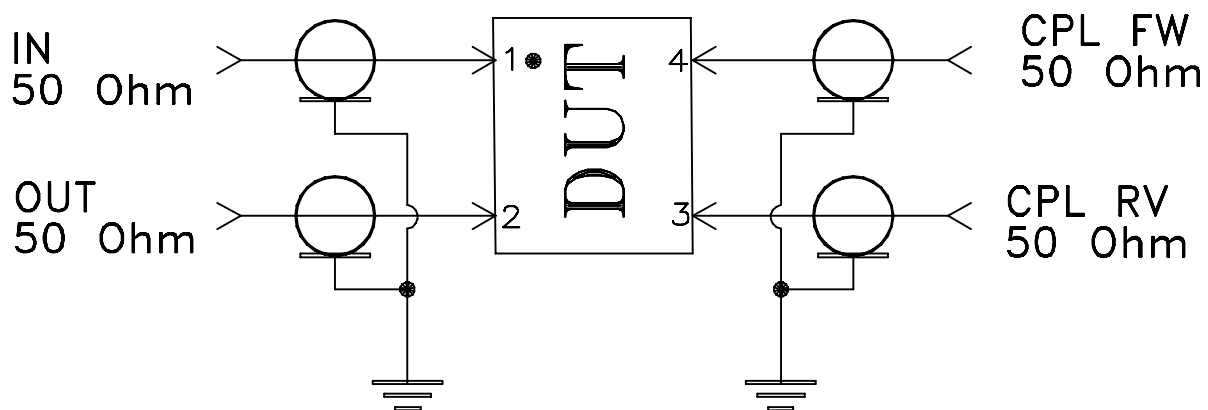
SCALE: 5:1

SHEET: 1 OF 1

Evaluation Board and Circuit



TB-398



Schematic Diagram

Notes:

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

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Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-55° to 100°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