top hat®

Surface Mount

Power Splitter/Combiner

CDP-2-13-75+

2 Way-0° 75Ω 5 to 1000 MHz



Generic photo used for illustration purposes only

CASE STYLE: TT1491-1

+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
7"	10, 20, 50, 100, 200
13"	500

Features

- wideband, 5 to 1000 MHz
- low insertion loss, 0.6 dB typ.
- excellent matching return loss, 20 dB typ.
- aqueous washable

Applications

- cellular
- VHF/UHF
- communication systems
- CATV

Electrical Specifications at 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		5		1000	MHz
Insertion Loss Above 3.0 dB	5-50 50-500 500-1000	— — —	0.2 0.6 0.8	0.5 0.7 1.1	dB
Isolation	5-50 50-500 500-1000	20 20 18	24 25 20	— — —	dB
Phase Unbalance	5-50 50-500 500-1000	— — —	— — —	2.0 3.0 5.0	Degree
Amplitude Unbalance	5-50 50-500 500-1000	— — —	— — —	0.3 0.3 0.3	dB
VSWR (Port S)	5-50 50-500 500-1000	— — —	1.05 1.10 1.25	1.2 1.3 1.4	:1
VSWR (Port 1-2)	5-50 50-500 500-1000	— — —	1.20 1.15 1.10	1.5 1.3 1.3	:1

Maximum Ratings

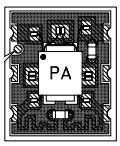
Parameter	Ratings
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Power Input (as a splitter)	1W max.
Internal Dissipation	0.125W max

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

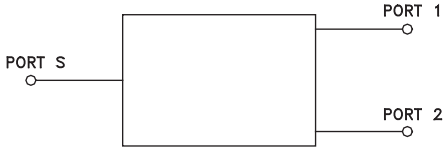
Pad Connections

Function	Pin Number
SUM PORT	1
PORT 1	3
PORT 2	4
GROUND	6
NOT USED	2,5

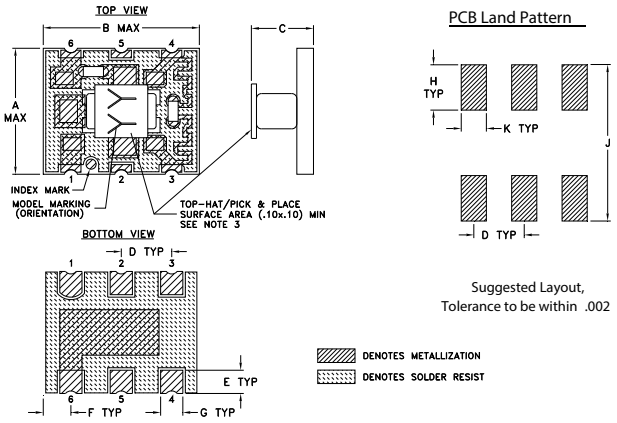
Product Marking



Electrical Schematic



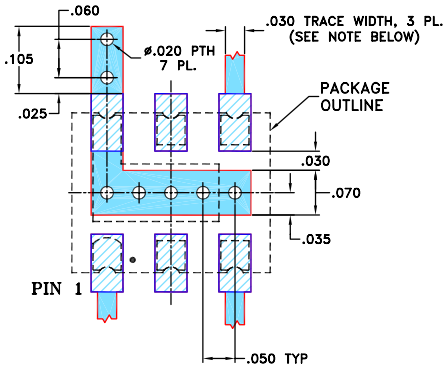
Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	J	K	wt.
.255	.310	.133	.100	.050	.055	.044	.090	.310	.050	grams
6.48	7.87	3.38	2.54	1.27	1.40	1.12	2.29	7.87	1.27	0.35

Demo Board MCL P/N: TB-565+
Suggested PCB Layout (PL-327)



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. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

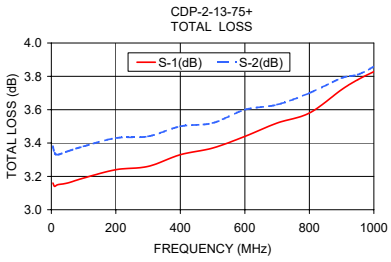
DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

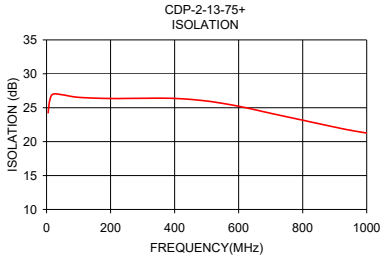
DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

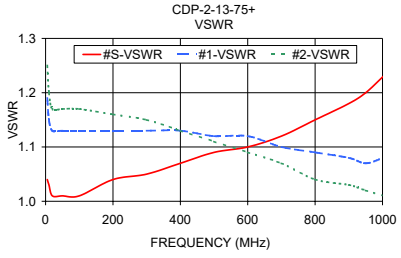
Typical Performance Data

Frequency (MHz)	Total Loss[1] (dB)		Amplitude Unbalance (dB)	Isolation (dB)	Phase Unbalance (deg.)	VSWR S	VSWR 1	VSWR 2
	S-1	S-2						
5.00	3.16	3.38	0.22	24.25	0.59	1.04	1.19	1.25
10.00	3.14	3.34	0.20	26.11	0.36	1.03	1.15	1.20
20.00	3.15	3.33	0.18	27.00	0.15	1.01	1.13	1.17
50.00	3.16	3.35	0.18	26.91	0.05	1.01	1.13	1.17
100.00	3.19	3.38	0.19	26.53	0.20	1.01	1.13	1.17
200.00	3.24	3.43	0.19	26.36	0.40	1.04	1.13	1.16
300.00	3.26	3.44	0.18	26.39	0.51	1.05	1.13	1.15
400.00	3.33	3.50	0.18	26.37	0.77	1.07	1.13	1.13
500.00	3.37	3.52	0.15	25.99	0.75	1.09	1.12	1.11
600.00	3.44	3.60	0.16	25.22	0.88	1.10	1.12	1.09
700.00	3.52	3.63	0.11	24.18	0.96	1.12	1.10	1.07
800.00	3.58	3.70	0.12	23.16	0.71	1.15	1.09	1.04
900.00	3.72	3.79	0.07	22.14	0.84	1.18	1.08	1.03
950.00	3.78	3.81	0.03	21.67	0.51	1.20	1.07	1.02
1002.00	3.83	3.86	0.03	21.25	0.17	1.23	1.08	1.01

1. Total Loss = Insertion Loss + 3dB splitter loss.







Additional 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

2 Way-0° Power Splitter/Combiner CDP-2-13-75+

Typical Performance Data

FREQUENCY (MHz)	Total Loss[1] (dB) S-1	Total Loss[1] (dB) S-2	AMPLITUDE UNBALANCE (dB)	ISOLATION (dB) 1-2	PHASE UNBALANCE (Deg)
5.0	3.16	3.38	0.22	24.25	0.59
10.0	3.14	3.34	0.20	26.11	0.36
20.0	3.15	3.33	0.18	27.00	0.15
30.0	3.15	3.33	0.18	27.11	0.05
40.0	3.16	3.34	0.18	27.02	0.02
50.0	3.16	3.35	0.18	26.91	0.05
54.0	3.16	3.35	0.18	26.87	0.07
60.0	3.17	3.35	0.18	26.81	0.09
70.0	3.18	3.36	0.18	26.73	0.13
80.0	3.19	3.37	0.19	26.65	0.15
90.0	3.19	3.38	0.19	26.58	0.18
100.0	3.19	3.38	0.19	26.53	0.20
200.0	3.24	3.43	0.19	26.36	0.40
300.0	3.26	3.44	0.18	26.39	0.51
400.0	3.33	3.50	0.18	26.37	0.77
500.0	3.37	3.52	0.15	25.99	0.75
600.0	3.44	3.60	0.16	25.22	0.88
700.0	3.52	3.63	0.11	24.18	0.96
800.0	3.58	3.70	0.12	23.16	0.71
870.0	3.65	3.74	0.09	22.42	0.53
900.0	3.72	3.79	0.07	22.14	0.84
950.0	3.78	3.81	0.03	21.67	0.51
1002.0	3.83	3.86	0.03	21.25	0.17

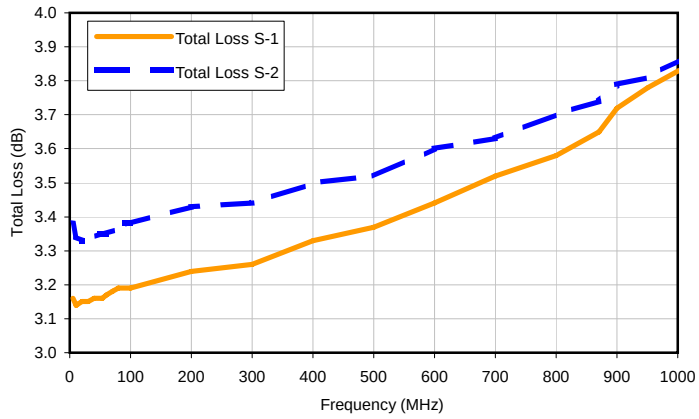
FREQUENCY (MHz)	VSWR (:1) S	VSWR (:1) 1	VSWR (:1) 2
5.0	1.04	1.19	1.25
10.0	1.03	1.15	1.20
20.0	1.01	1.13	1.17
30.0	1.01	1.13	1.17
40.0	1.01	1.13	1.17
50.0	1.01	1.13	1.17
54.0	1.01	1.13	1.17
60.0	1.01	1.13	1.17
70.0	1.01	1.13	1.17
80.0	1.01	1.13	1.17
90.0	1.01	1.13	1.17
100.0	1.01	1.13	1.17
200.0	1.04	1.13	1.16
300.0	1.05	1.13	1.15
400.0	1.07	1.13	1.13
500.0	1.09	1.12	1.11
600.0	1.10	1.12	1.09
700.0	1.12	1.10	1.07
800.0	1.15	1.09	1.04
870.0	1.17	1.08	1.03
900.0	1.18	1.08	1.03
950.0	1.20	1.07	1.02
1002.0	1.23	1.08	1.01

[1]Total Loss =Insertion Loss + 3dB Splitter Loss

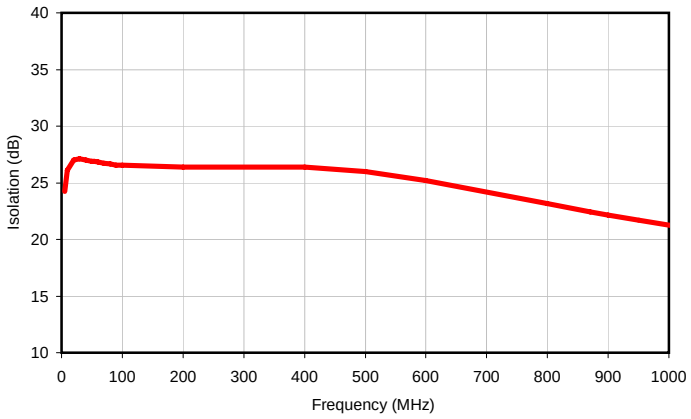
2 Way-0° Power Splitter/Combiner CDP-2-13-75+

Typical Performance Curves

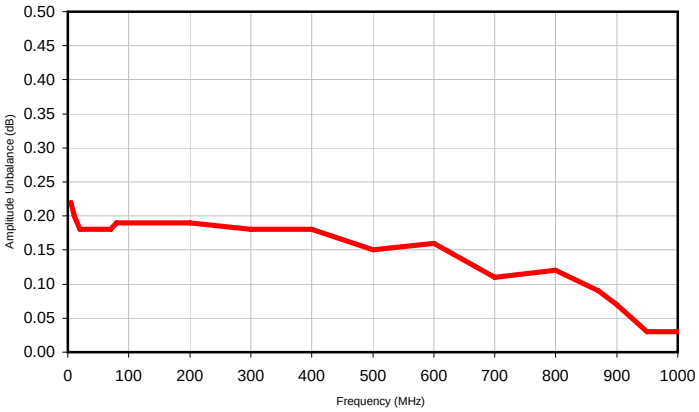
Total Loss



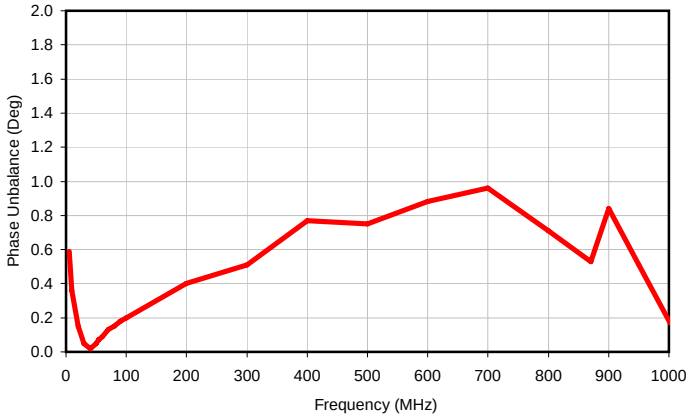
Isolation



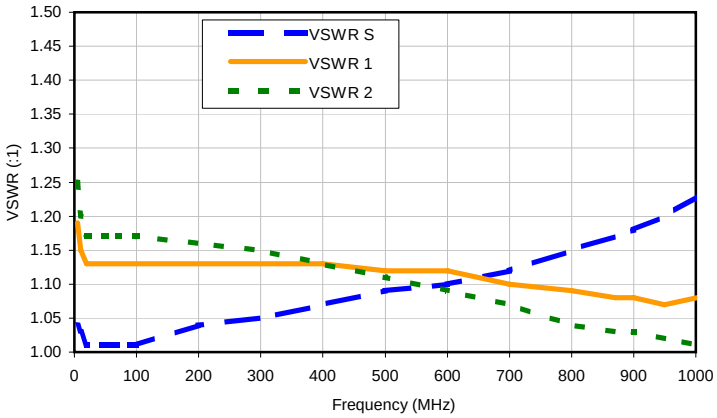
Amplitude Unbalance



Phase Unbalance



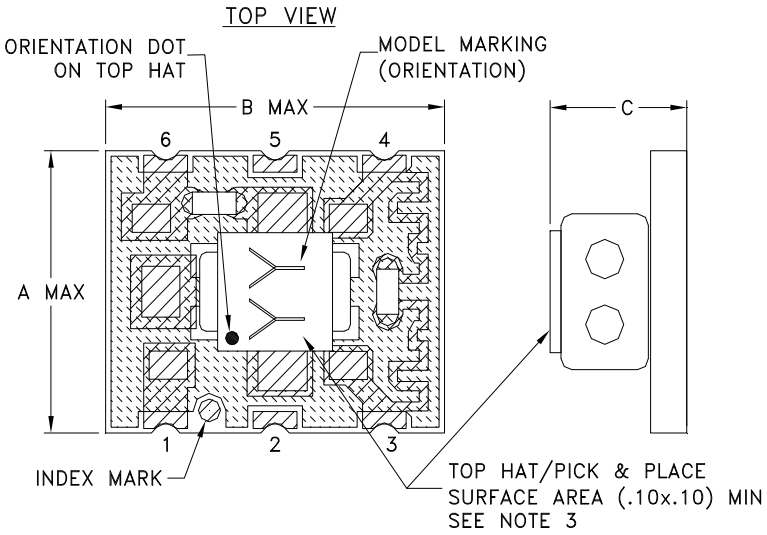
VSWR

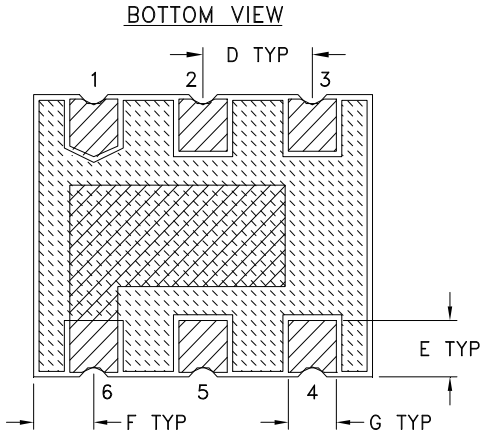


Case Style TT

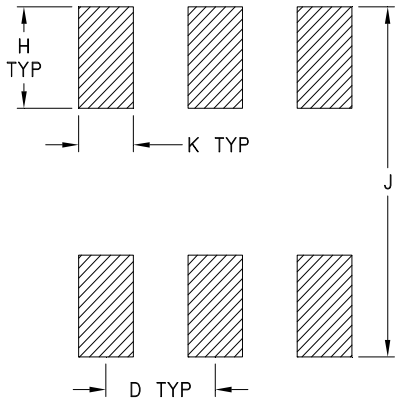
TT1491-1

Outline Dimensions





PCB Land Pattern



SUGGESTED LAYOUT
TOLERANCE TO BE WITHIN ±.002

DENOTES METALLIZATION
DENOTES SOLDER RESIST

CASE #	A	B	C	D	E	F	G	H	J	K	WT GRAMS
TT1491-1	.255 (6.48)	.310 (7.87)	.133 (3.38)	.100 (2.54)	.050 (1.27)	.055 (1.40)	.044 (1.12)	.090 (2.29)	.310 (7.87)	.050 (1.27)	.35

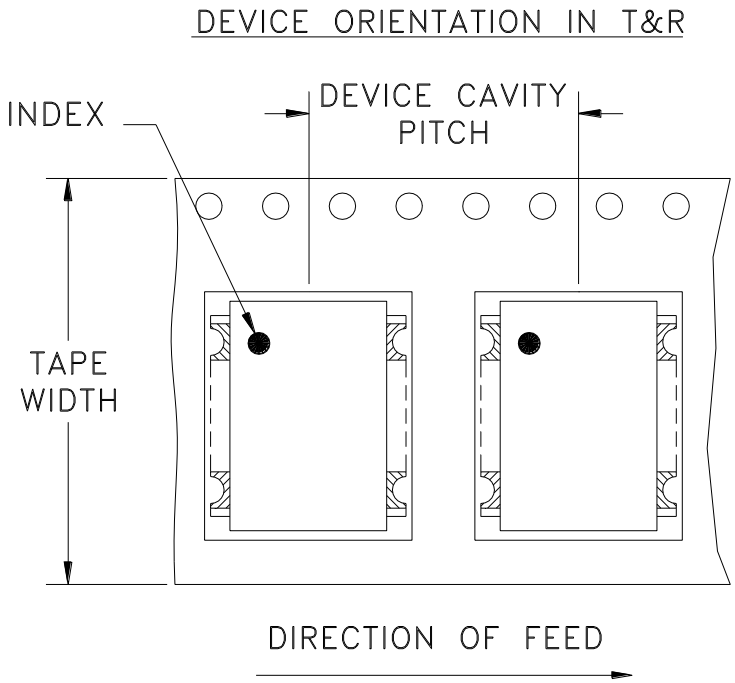
Dimensions are in inches (mm). Tolerances: 2Pl. ± .01; 3 Pl. ± .005

Notes:

1. Open style, Base material: Printed wiring laminate.
2. 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.
3 Top-Hat total thickness: .013 inches MAX.
4. Orientation Dot on Top Hat & PCB corresponds to Pin #1.

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Tape & Reel Packaging TR-F2



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel See note
16	12	7	10
			20
			50
			100
			200
		13	500

Note: Please consult individual model data sheet to determine device per reel availability

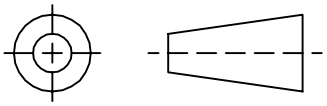
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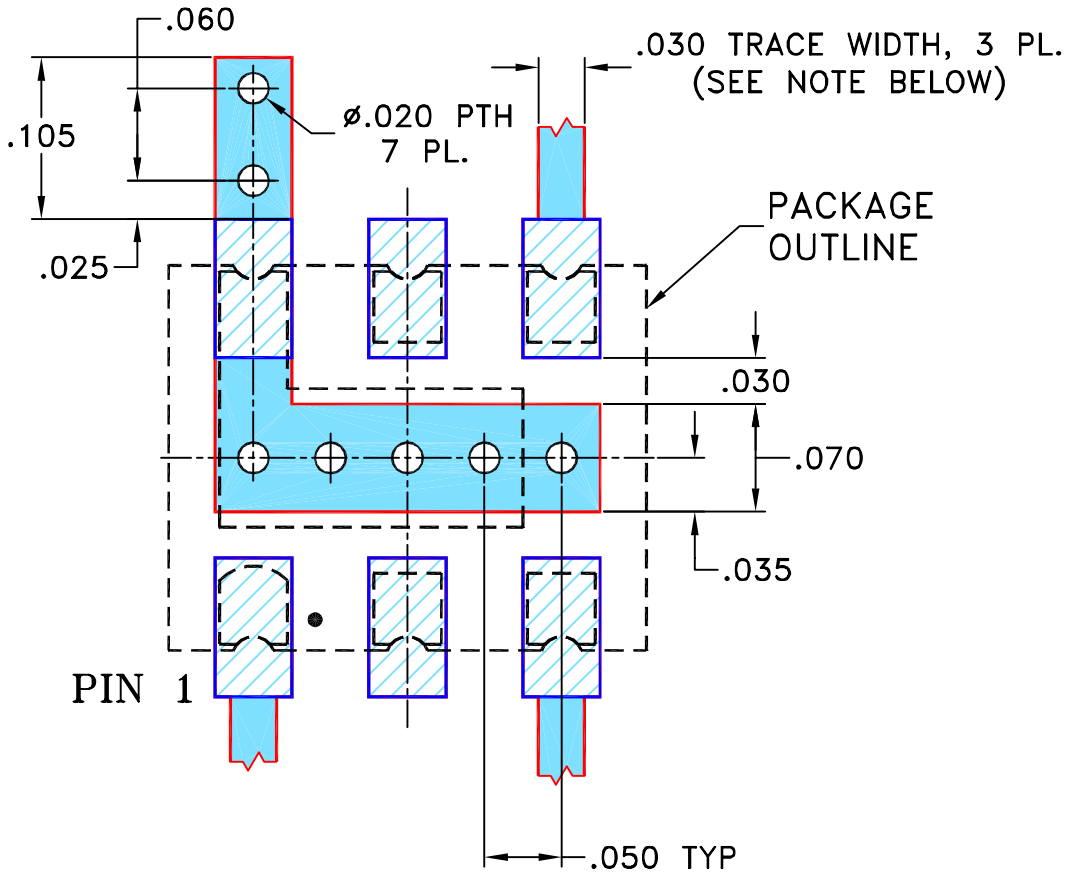
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THIRD ANGLE PROJECTION



REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M125940	NEW RELEASE	06/28/10	AV	JC

SUGGESTED MOUNTING CONFIGURATION FOR TT1491 CASE STYLE, "06SP01" 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. 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	DRAWN	AV	06/22/10
TOLERANCES ON:	CHECKED	MMG	06/28/10
2 PL DECIMALS ±	APPROVED	JC	06/28/10
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

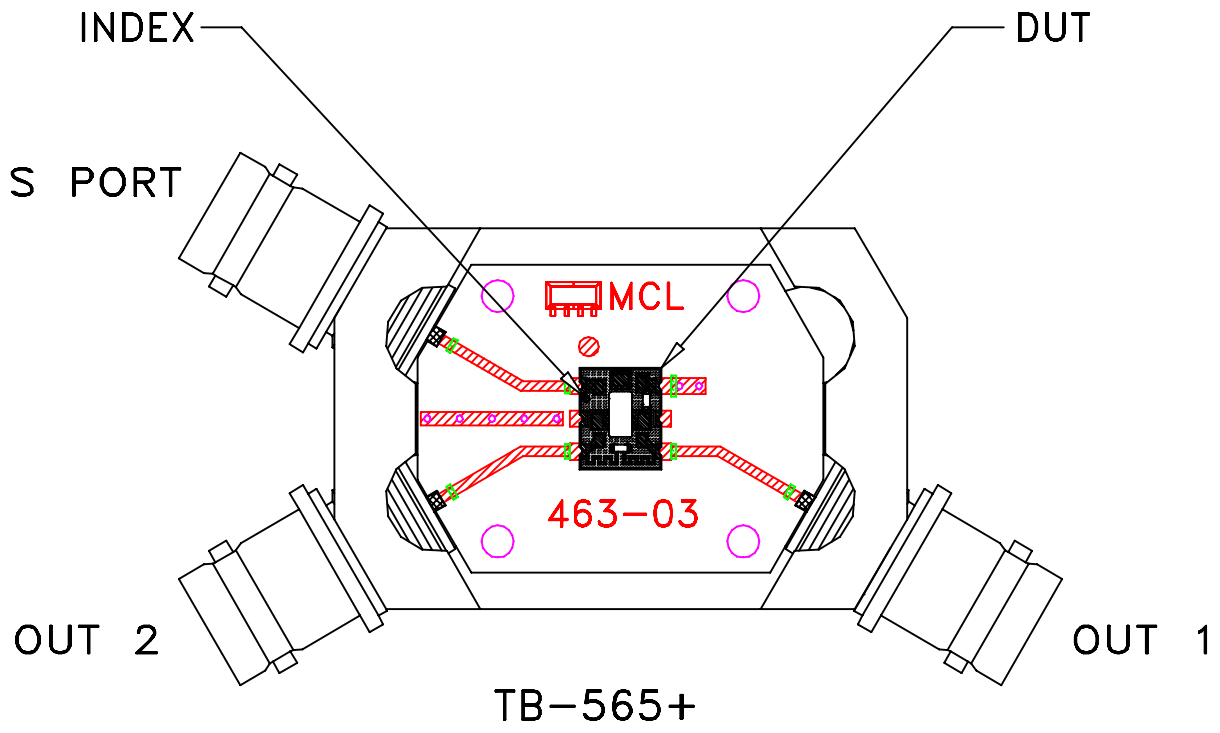
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, 06SP01, 75, TT1491, TB-565+

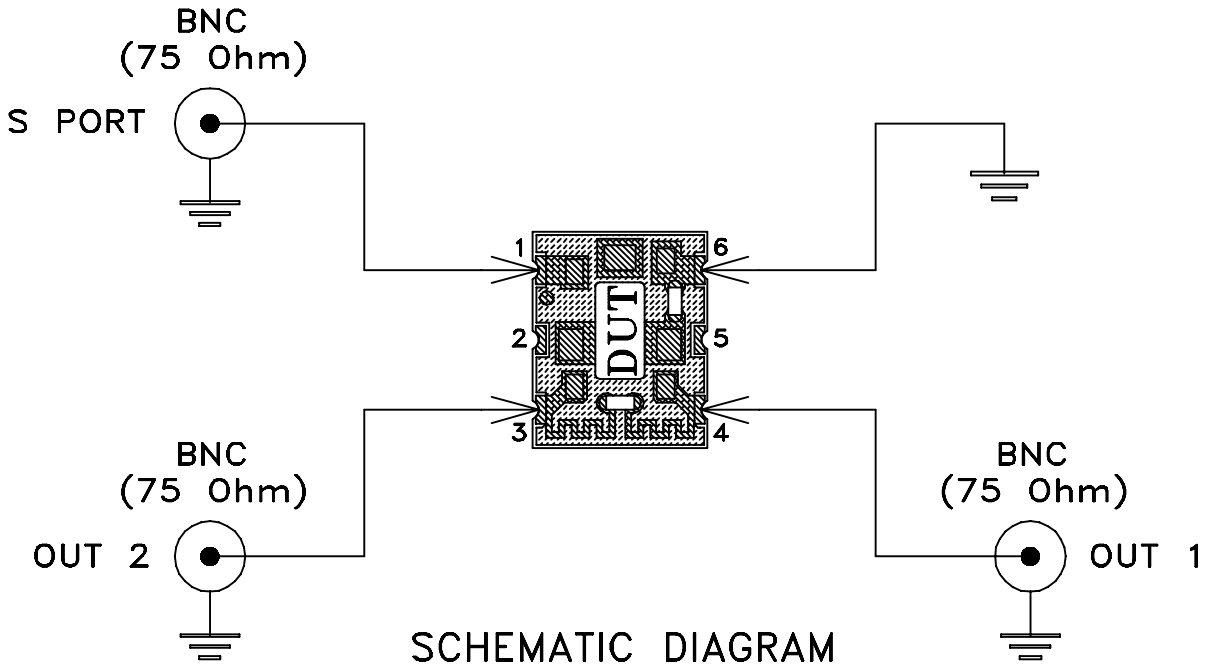
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-327	OR

FILE:	SCALE:	SHEET:
98PL327	8:1	1 OF 1

Evaluation Board and Circuit



TB-565+



SCHEMATIC DIAGRAM

Notes:

1. 75 Ohm BNC connectors.
2. PCB Material: RO4350 or equivalent, Dielectric Constant=3.5, Thickness=.030 inch.

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Environmental Specifications ENV02T1

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

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