Surface Mount

High Power Splitter

SYPJ-2-5W-52+

2 Way-180° 50Ω 10 to 520 MHz

CASE STYLE: AH202-1

Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Power Input (as a splitter)	5.0W max.
Internal Dissipation	1.0W max.

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

Pin Connections

SUM PORT	8
PORT 1 (0°)	5
PORT 2 (180°)	4
GROUND	1,2,3,6,7

Features

- wideband, 10 to 500 MHz
- low phase unbalance, 2 deg. typ.
- low amplitude unbalance, 0.1 dB typ.
- high isolation, 23 dB typ.
- high input power as a splitter, 5.0 W

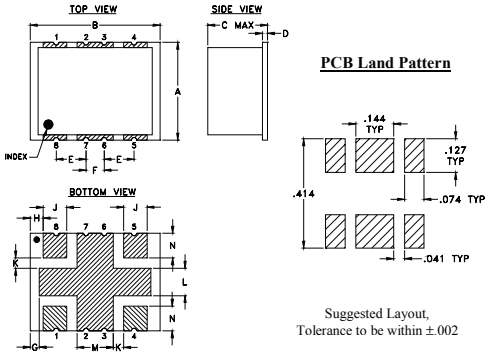
+RoHS Compliant

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

Applications

- VHF/UHF
- communication systems
- receivers & transmitters
- instrumentation
- CATV

Outline Drawing



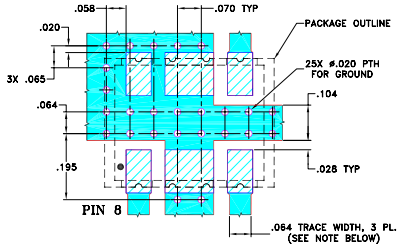
Suggested Layout,
Tolerance to be within ±.002

Outline Dimensions (inch / mm)

A	B	C	D	E	F	G
.38	.50	.25	.020	.115	.070	.035
9.65	12.70	6.35	0.51	2.92	1.78	0.89

H	J	K	L	M	N	wt
.050	.090	.040	.105	.140	.095	grams
1.27	2.29	1.02	2.67	3.56	2.41	0.80

Demo Board MCL P/N: TB-427+
Suggested PCB Layout (PL-274)



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

Electrical Specifications at 25°C

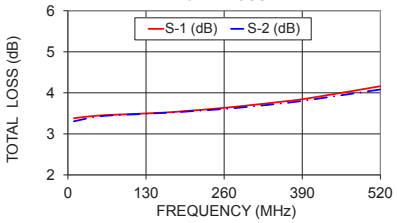
Parameter		Frequency (MHz)	Min.	Typ.	Max.	Unit
Frequency			10		520	MHz
Insertion Loss (above theoretical 3.0 dB)		10 - 250 250 - 520	— —	0.5 0.9	0.9 1.5	dB
Isolation		10 - 250 250 - 520	18 19	22 24	— —	dB
Phase Unbalance		10 - 250 250 - 520	— —	2.0 2.0	8.0 10	Degree
Amplitude Unbalance		10 - 250 250 - 520	— —	0.05 0.1	0.2 0.3	dB
VSWR (Port S)		10 - 250 250 - 520	— —	1.4 1.5	1.55 1.95	:1
VSWR (Port 1-2)		10 - 250 250 -520	— —	1.35 1.6	1.65 2.3	:1
Input Power	as splitter as combiner	10 - 520 10 - 520	— —	— —	5.0 1.0	W

Typical Performance Data

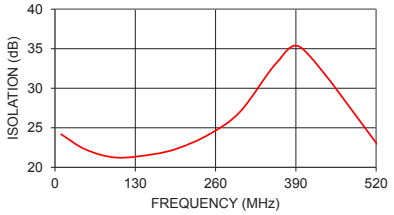
Frequency (MHz)	Total Loss[1] (dB) S-1	Total Loss[1] (dB) S-2	Amplitude Unbalance (dB)	Isolation (dB)	Phase Unbalance (deg.)	VSWR S	VSWR 1	VSWR 2
10	3.38	3.31	0.08	24.18	179.96	1.39	1.22	1.22
50	3.45	3.42	0.02	22.24	179.43	1.10	1.26	1.20
100	3.48	3.47	0.01	21.23	179.08	1.12	1.32	1.22
160	3.52	3.51	0.01	21.67	178.76	1.15	1.38	1.22
200	3.56	3.55	0.01	22.43	178.60	1.18	1.42	1.22
250	3.62	3.60	0.02	24.19	178.48	1.22	1.47	1.25
300	3.69	3.66	0.04	27.05	178.46	1.26	1.52	1.30
360	3.79	3.75	0.04	33.32	178.69	1.32	1.59	1.41
400	3.87	3.82	0.04	35.05	179.07	1.38	1.65	1.51
525	4.17	4.09	0.08	22.57	178.05	1.60	1.91	1.93

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

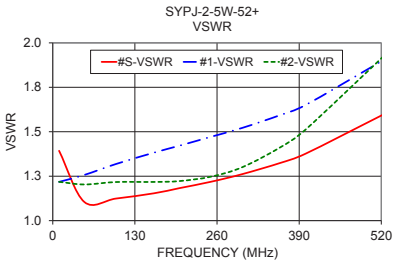
SYPJ-2-5W-52+
TOTAL LOSS



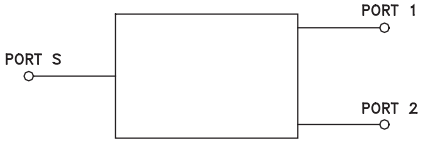
SYPJ-2-5W-52+
ISOLATION



SYPJ-2-5W-52+
VSWR



Electrical Schematic



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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2 Way-180° Power Splitter/Combiner SYPJ-2-5W-52+

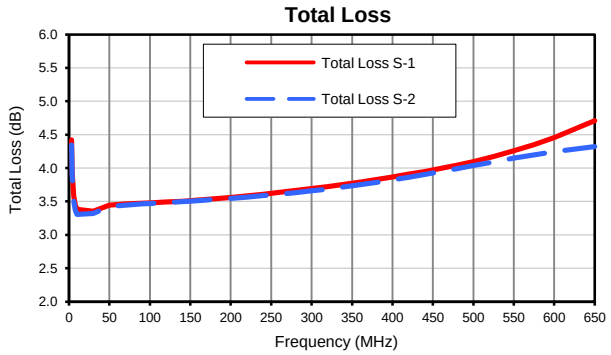
Typical Performance Data

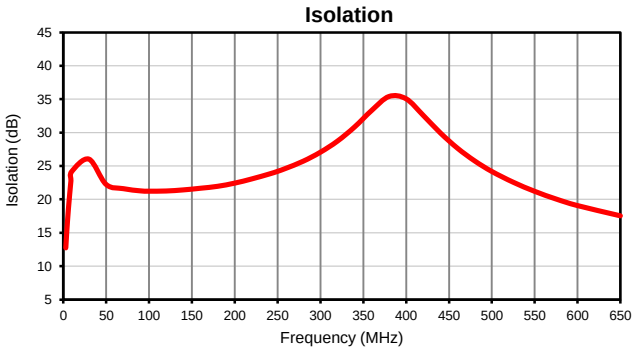
FREQUENCY (MHz)	TOTAL LOSS[1] (dB)		AMPLITUDE UNBALANCE (dB)	ISOLATION (dB)	PHASE UNBALANCE (deg.)
	S-1	S-2		1-2	
3.0	4.42	4.35	0.08	12.75	179.51
4.0	3.95	3.87	0.08	14.90	179.68
5.0	3.71	3.63	0.08	16.78	179.77
6.0	3.57	3.50	0.07	18.46	179.84
7.0	3.49	3.42	0.08	19.99	179.90
8.0	3.44	3.36	0.08	21.43	179.96
9.0	3.40	3.33	0.08	22.80	179.99
10.0	3.38	3.31	0.08	24.18	179.96
30.0	3.36	3.32	0.04	26.02	179.48
50.0	3.45	3.42	0.02	22.24	179.43
70.0	3.46	3.45	0.02	21.61	179.28
90.0	3.47	3.46	0.01	21.27	179.15
100.0	3.48	3.47	0.01	21.23	179.08
120.0	3.49	3.48	0.01	21.26	178.97
140.0	3.50	3.50	0.01	21.42	178.85
160.0	3.52	3.51	0.01	21.67	178.76
180.0	3.54	3.53	0.01	21.95	178.67
200.0	3.56	3.55	0.01	22.43	178.60
220.0	3.58	3.57	0.02	23.06	178.54
240.0	3.61	3.59	0.02	23.78	178.49
250.0	3.62	3.60	0.02	24.19	178.48
260.0	3.63	3.61	0.03	24.66	178.46
280.0	3.66	3.63	0.03	25.71	178.45
300.0	3.69	3.66	0.04	27.05	178.46
320.0	3.72	3.69	0.04	28.72	178.51
340.0	3.76	3.72	0.04	30.84	178.58
360.0	3.79	3.75	0.04	33.32	178.69
380.0	3.83	3.79	0.04	35.39	178.86
400.0	3.87	3.82	0.04	35.05	179.07
420.0	3.91	3.86	0.04	32.57	179.33
440.0	3.95	3.91	0.04	29.94	179.66
460.0	4.00	3.95	0.05	27.65	179.93
480.0	4.04	3.99	0.05	25.76	179.45
500.0	4.10	4.04	0.06	24.18	178.88
525.0	4.17	4.09	0.08	22.57	178.05
550.0	4.26	4.15	0.11	21.21	177.10
575.0	4.35	4.20	0.15	20.05	175.97
600.0	4.45	4.24	0.21	19.07	174.69
650.0	4.71	4.32	0.39	17.54	171.69

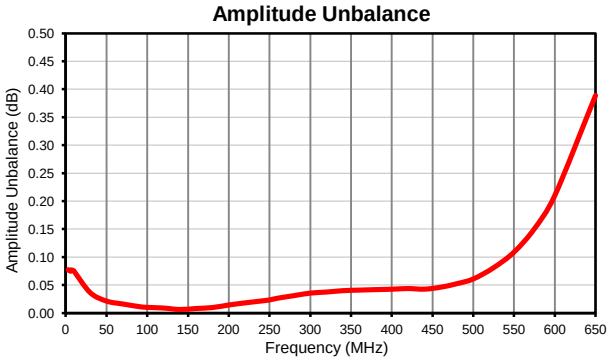
FREQUENCY (MHz)	VSWR (:1)		
	S	1	2
3.0	2.82	1.59	1.64
4.0	2.21	1.45	1.48
5.0	1.90	1.37	1.39
6.0	1.72	1.31	1.33
7.0	1.59	1.28	1.29
8.0	1.51	1.25	1.26
9.0	1.44	1.23	1.24
10.0	1.39	1.22	1.22
30.0	1.13	1.23	1.20
50.0	1.10	1.26	1.20
70.0	1.11	1.28	1.21
90.0	1.12	1.31	1.22
100.0	1.12	1.32	1.22
120.0	1.14	1.34	1.22
140.0	1.14	1.36	1.22
160.0	1.15	1.38	1.22
180.0	1.17	1.40	1.22
200.0	1.18	1.42	1.22
220.0	1.19	1.44	1.23
240.0	1.21	1.46	1.24
250.0	1.22	1.47	1.25
260.0	1.23	1.48	1.25
280.0	1.24	1.50	1.27
300.0	1.26	1.52	1.30
320.0	1.28	1.54	1.33
340.0	1.30	1.57	1.37
360.0	1.32	1.59	1.41
380.0	1.35	1.62	1.46
400.0	1.38	1.65	1.51
420.0	1.41	1.68	1.57
440.0	1.44	1.71	1.63
460.0	1.47	1.75	1.69
480.0	1.51	1.79	1.76
500.0	1.55	1.84	1.84
525.0	1.60	1.91	1.93
550.0	1.66	1.98	2.03
575.0	1.72	2.07	2.13
600.0	1.79	2.17	2.24
650.0	1.95	2.42	2.45

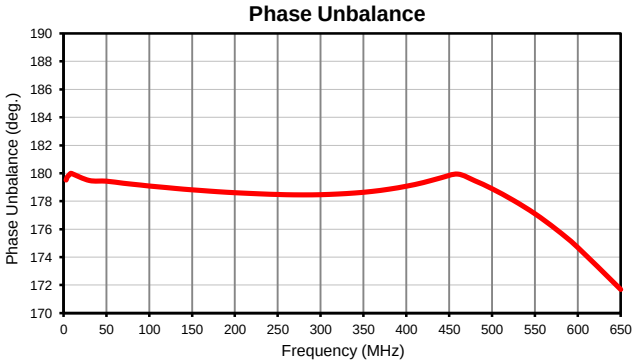
[1]Total Loss = Insertion Loss + 3dB Splitter Loss

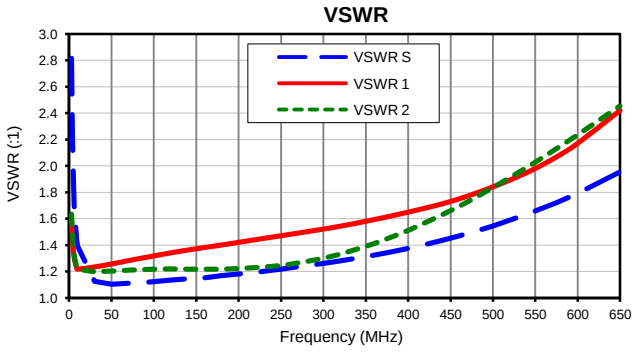
Typical Performance Curves







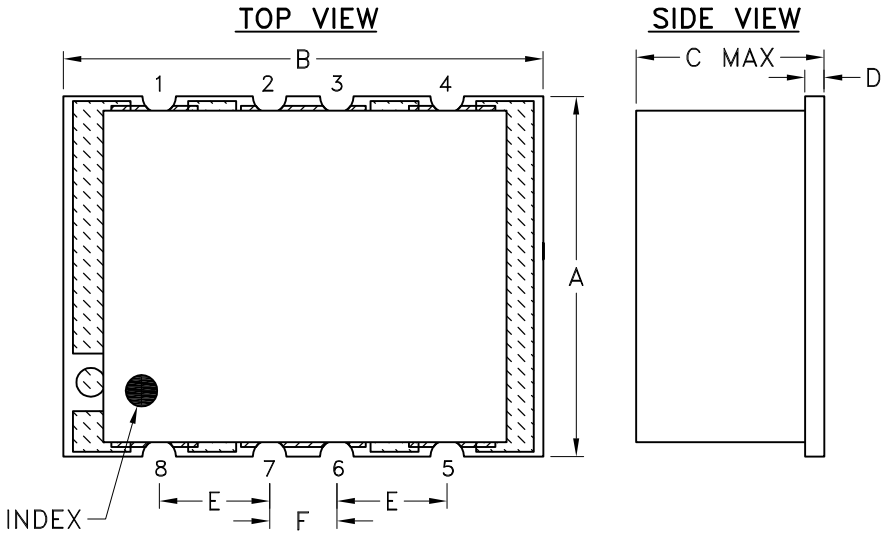


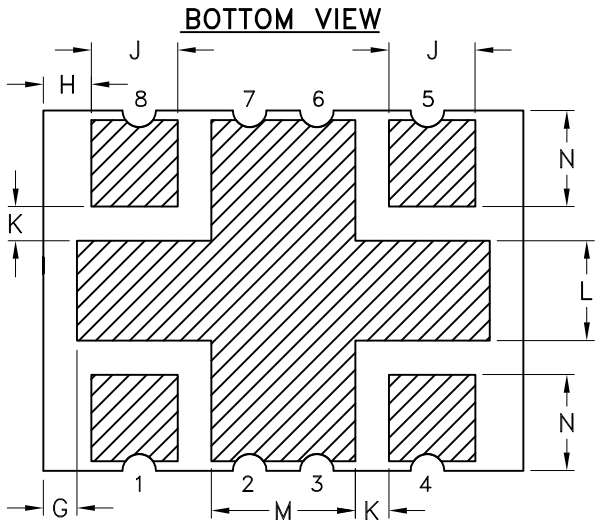


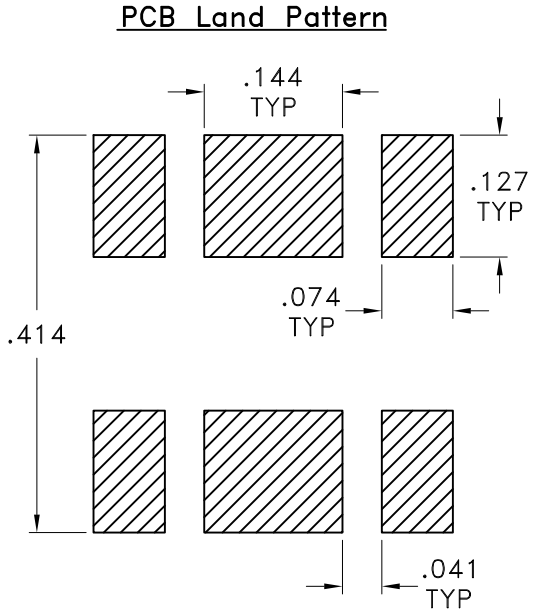
Case Style AH

Outline Dimensions

AH202-1







Suggested Layout,
Tolerance to be within ±.002

DENOTES METALLIZATION

DENOTES SOLDER RESIST

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.±.01; 3 Pl. ±.005

Notes:

1. Case material: Nickel Silver alloy.
2. Base material: Printed wiring laminate.
3. 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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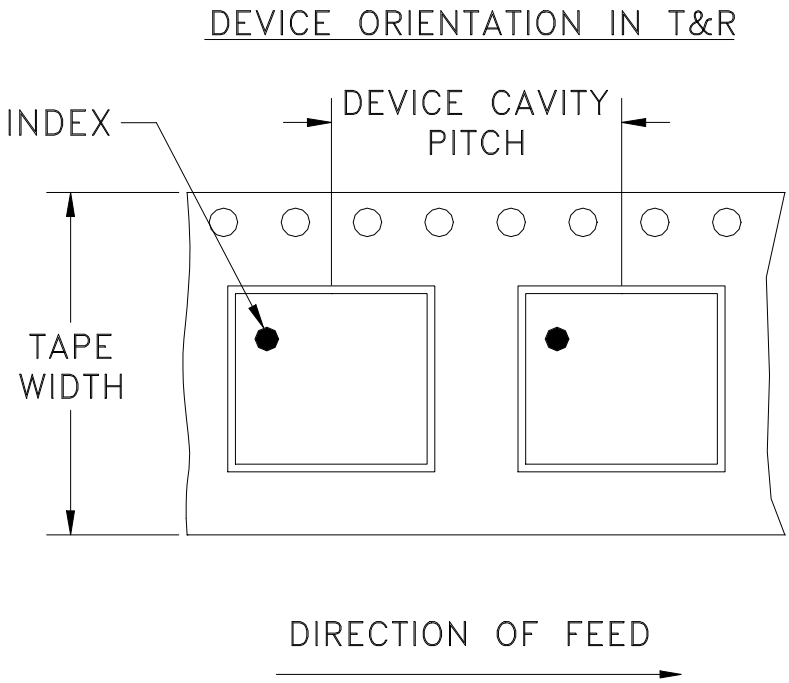
RF/IF MICROWAVE COMPONENTS

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.

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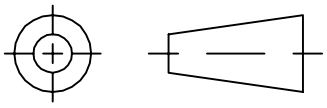
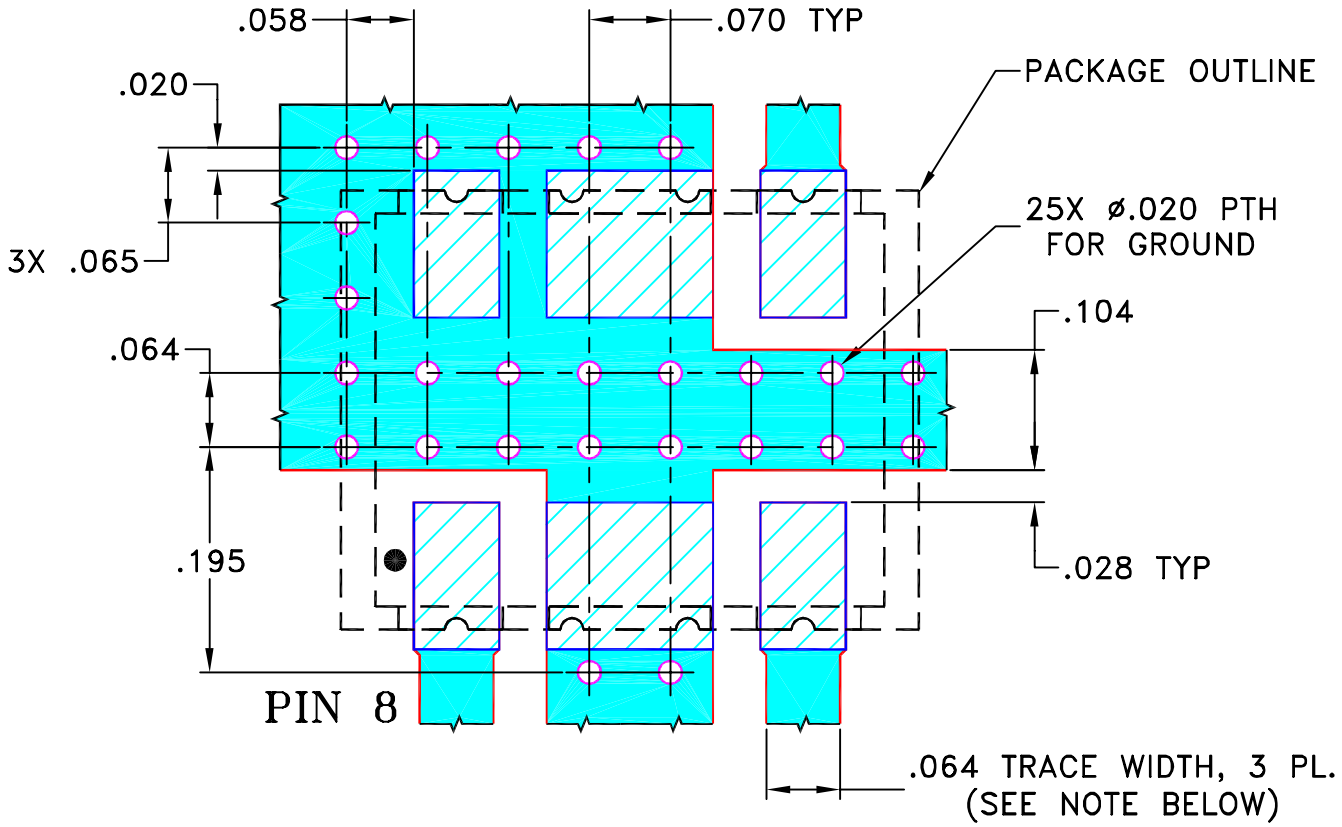
THIRD ANGLE PROJECTION



REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M110938	NEW RELEASE	04/12/07	AV	HY

SUGGESTED MOUNTING CONFIGURATION FOR AH202-2 CASE STYLE, "sb" PIN CONNECTION



NOTES:
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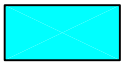
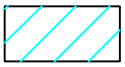
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



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	04/11/07
TOLERANCES ON:	CHECKED	IL	04/12/07
2 PL DECIMALS ±	APPROVED	HY	04/12/07
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

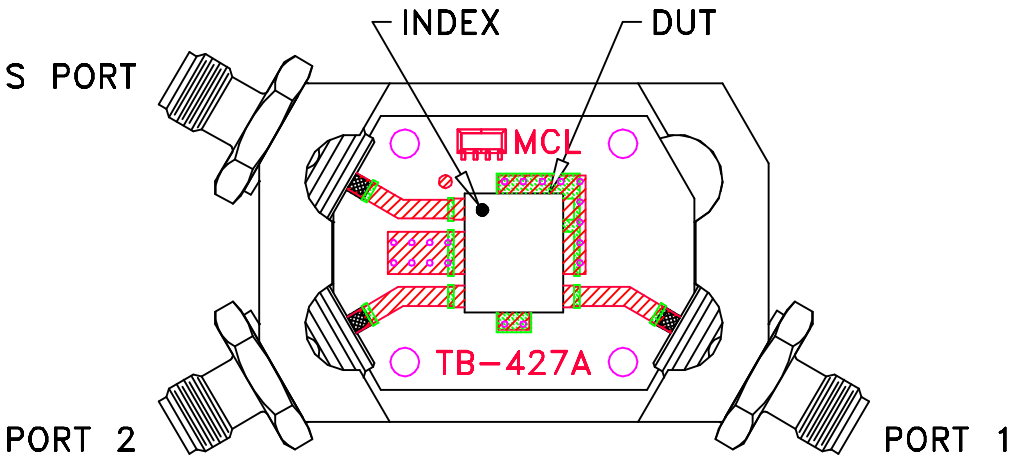
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, sb, AH202-2, SYPS-2, TB-427+

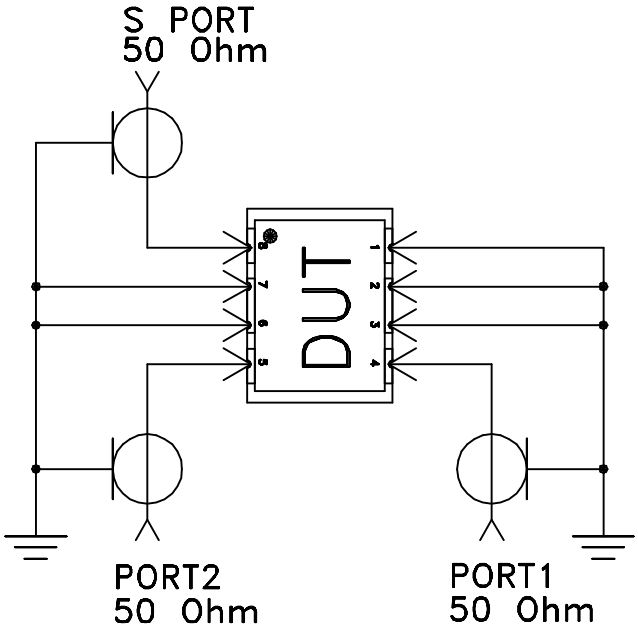
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-274	OR

FILE:	SCALE:	SHEET:
98PL274	6:1	1 OF 1

Evaluation Board and Circuit



TB-427+



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers RO4350 or its equivalent, Dielectric Constant=3.5, Thickness=.030"

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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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