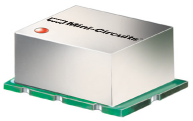
Surface Mount

Power Splitter/Combiner

SYPJ-2-222+

2 Way-180° 50Ω 500 to 2250 MHz



CASE STYLE: AH202-1

Maximum Ratings

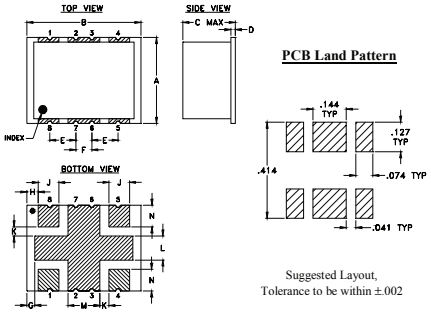
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Power Input (as a splitter)	0.5W max.
Internal Dissipation	0.05W max.

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

Pin Connections

SUM PORT	8
PORT 1	4
PORT 2	5
GROUND	1,2,3,6,7

Outline Drawing



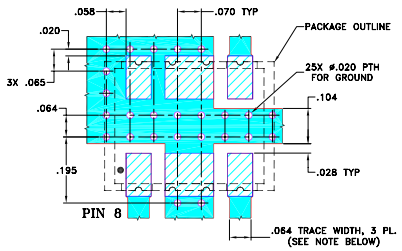
Suggested Layout,
Tolerance to be within ±.002

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

Features

- wideband, 500 to 2200 MHz
- low phase unbalance, 3.0 deg. typ.
- low amplitude unbalance, 0.6 dB typ.
- good isolation, 22 dB typ.

Applications

- VHF/UHF
- communication systems
- receivers & transmitters
- instrumentation
- CATV
- cellular, GPS, PCS

+RoHS Compliant

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

Electrical Specifications at 25°C

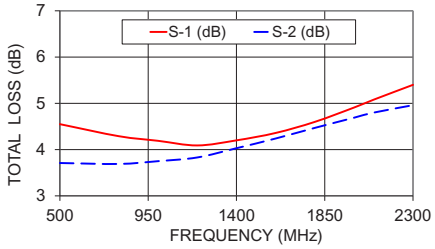
Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Frequency		500		2250	MHz
Insertion Loss (above theoretical 3.0 dB)	500-900	—	1.5	1.9	dB
	900-1600	—	1.7	2.3	
	1600-2250	—	2.0	2.6	
Isolation	500-900	18	22	—	dB
	900-1600	20	25	—	
	1600-2250	15	19	—	
Phase Unbalance	500-900	—	3.0	7.0	Degree
	900-1600	—	3.0	9.0	
	1600-2250	—	5.0	14.0	
Amplitude Unbalance	500-900	—	0.8	1.2	dB
	900-1600	—	0.5	0.9	
	1600-2250	—	0.4	0.9	
VSWR (Port S)	500-2250	—	1.5	—	:1
VSWR (Port 1-2)	500-2250	—	1.5	—	:1

Typical Performance Data

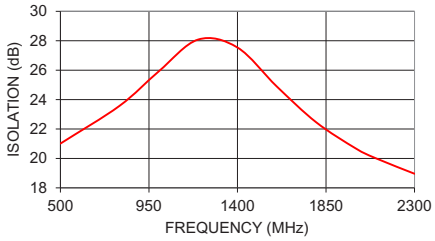
Frequency (MHz)	Total Loss[1] (dB)		Amplitude Unbalance (dB)	Isolation (dB)	Phase Unbalance (deg.)	VSWR S	VSWR 1	VSWR 2
	S-1	S-2						
500	4.55	3.71	0.84	21.01	0.53	1.80	1.21	1.49
800	4.29	3.69	0.60	23.57	0.52	1.47	1.12	1.31
1000	4.19	3.75	0.44	25.92	1.19	1.25	1.13	1.17
1200	4.09	3.83	0.26	28.08	1.81	1.05	1.24	1.07
1400	4.20	4.03	0.17	27.54	2.58	1.18	1.40	1.16
1600	4.36	4.24	0.12	24.89	3.28	1.42	1.60	1.33
1800	4.60	4.47	0.14	22.46	4.07	1.64	1.82	1.53
2000	4.91	4.69	0.23	20.69	4.99	1.85	2.07	1.74
2100	5.08	4.80	0.29	20.03	5.32	1.93	2.20	1.84
2300	5.40	4.96	0.44	18.96	5.72	2.02	2.40	2.00

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

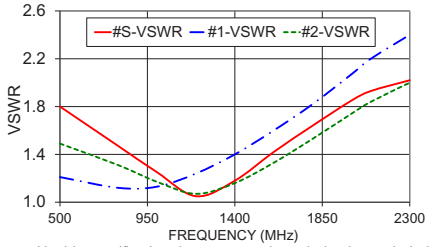
SYPJ-2-222+
TOTAL LOSS



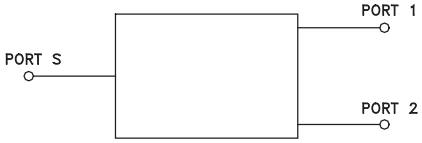
SYPJ-2-222+
ISOLATION



SYPJ-2-222+
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.
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-180° Power Splitter/Combiner SYPJ-2-222+

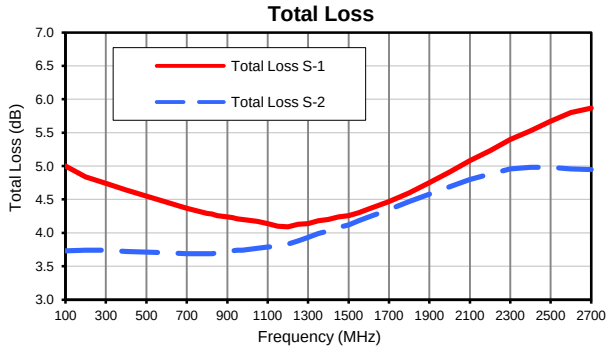
Typical Performance Data

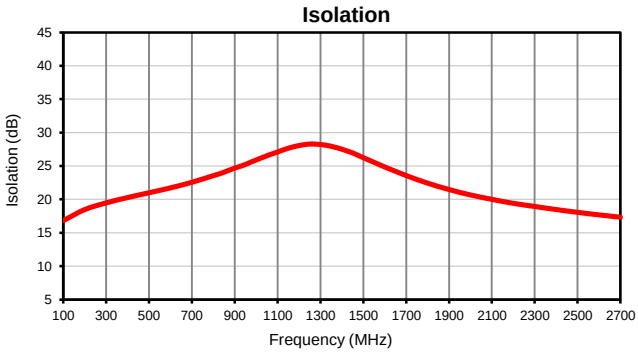
FREQUENCY (MHz)	TOTAL LOSS[1] (dB)		AMPLITUDE UNBALANCE (dB)	ISOLATION (dB)	PHASE UNBALANCE (deg.)
	S-1	S-2		1-2	
100	5.00	3.73	1.28	16.83	3.59
200	4.84	3.74	1.10	18.49	2.21
300	4.74	3.74	1.00	19.49	1.47
400	4.64	3.72	0.92	20.29	0.95
500	4.55	3.71	0.84	21.01	0.53
600	4.46	3.70	0.76	21.74	0.18
700	4.37	3.69	0.68	22.58	0.17
800	4.29	3.69	0.60	23.57	0.52
825	4.28	3.69	0.58	23.81	0.61
850	4.26	3.70	0.56	24.09	0.71
875	4.25	3.70	0.54	24.40	0.79
900	4.24	3.72	0.52	24.70	0.88
925	4.23	3.73	0.49	24.96	0.92
950	4.21	3.74	0.47	25.25	0.98
975	4.20	3.74	0.46	25.59	1.11
1000	4.19	3.75	0.44	25.92	1.19
1050	4.17	3.77	0.40	26.55	1.40
1100	4.14	3.79	0.35	27.12	1.61
1150	4.10	3.80	0.30	27.68	1.69
1200	4.09	3.83	0.26	28.08	1.81
1250	4.13	3.88	0.24	28.31	2.07
1300	4.14	3.93	0.21	28.24	2.25
1350	4.18	3.99	0.19	27.98	2.42
1400	4.20	4.03	0.17	27.54	2.58
1425	4.22	4.06	0.16	27.27	2.67
1450	4.24	4.09	0.15	26.99	2.75
1475	4.25	4.10	0.14	26.63	2.85
1500	4.26	4.12	0.14	26.28	2.93
1550	4.30	4.18	0.13	25.58	3.08
1600	4.36	4.24	0.12	24.89	3.28
1700	4.47	4.35	0.12	23.60	3.65
1800	4.60	4.47	0.14	22.46	4.07
1900	4.75	4.58	0.17	21.50	4.51
2000	4.91	4.69	0.23	20.69	4.99
2100	5.08	4.80	0.29	20.03	5.32
2200	5.23	4.88	0.35	19.43	5.44
2300	5.40	4.96	0.44	18.96	5.72
2400	5.53	4.98	0.55	18.50	5.89
2500	5.67	4.98	0.69	18.08	6.20
2600	5.80	4.96	0.84	17.70	6.67
2700	5.87	4.95	0.92	17.35	7.24

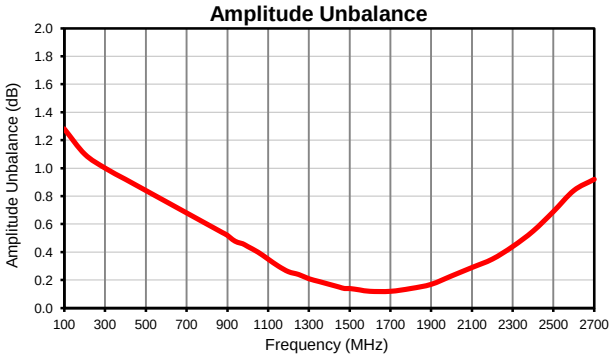
FREQUENCY (MHz)	VSWR (:1)		
	S	1	2
100	2.18	1.40	1.55
200	2.08	1.30	1.57
300	1.99	1.26	1.57
400	1.90	1.24	1.54
500	1.80	1.21	1.49
600	1.69	1.17	1.44
700	1.58	1.14	1.38
800	1.47	1.12	1.31
825	1.44	1.11	1.29
850	1.41	1.11	1.27
875	1.39	1.11	1.26
900	1.36	1.11	1.24
925	1.34	1.11	1.22
950	1.31	1.12	1.21
975	1.28	1.13	1.19
1000	1.25	1.13	1.17
1050	1.19	1.15	1.14
1100	1.13	1.18	1.11
1150	1.09	1.21	1.08
1200	1.05	1.24	1.07
1250	1.03	1.28	1.08
1300	1.08	1.31	1.10
1350	1.13	1.35	1.13
1400	1.18	1.40	1.16
1425	1.22	1.42	1.18
1450	1.24	1.44	1.20
1475	1.27	1.47	1.22
1500	1.30	1.49	1.24
1550	1.35	1.54	1.28
1600	1.42	1.60	1.33
1700	1.53	1.71	1.42
1800	1.64	1.82	1.53
1900	1.75	1.95	1.63
2000	1.85	2.07	1.74
2100	1.93	2.20	1.84
2200	1.98	2.30	1.92
2300	2.02	2.40	2.00
2400	2.04	2.48	2.08
2500	2.03	2.52	2.12
2600	1.99	2.53	2.15
2700	1.94	2.49	2.14

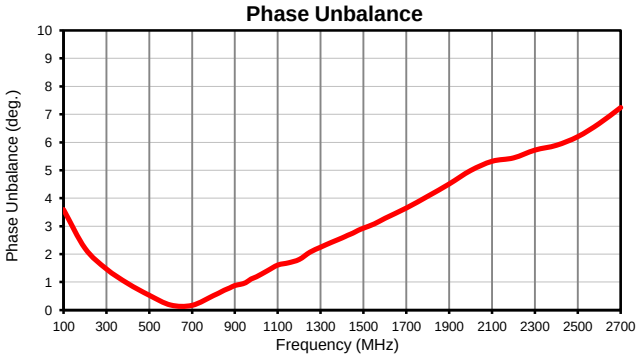
[1]Total Loss = Insertion Loss + 3dB Splitter Loss

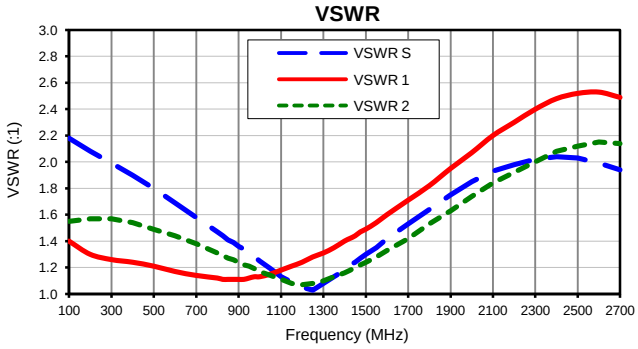
Typical Performance Curves







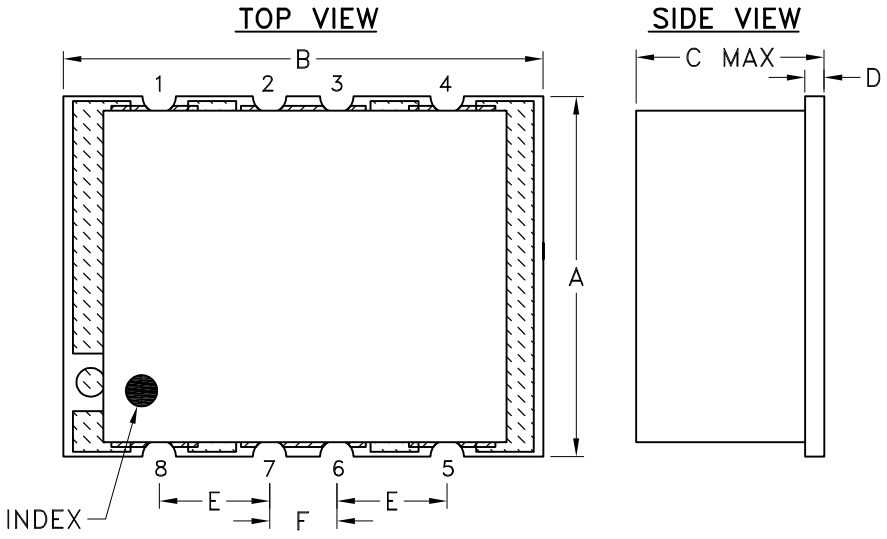


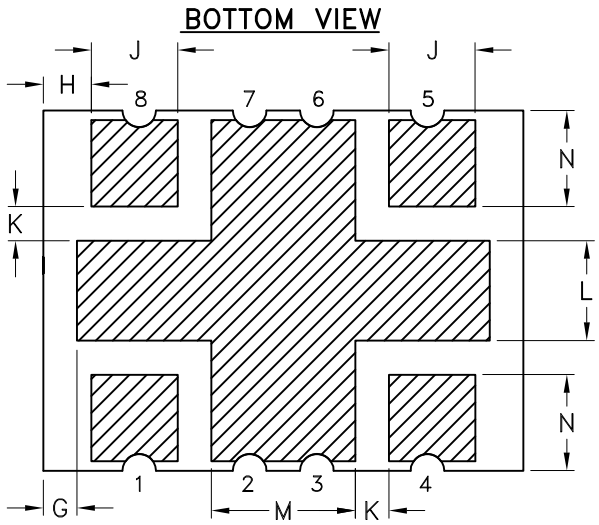


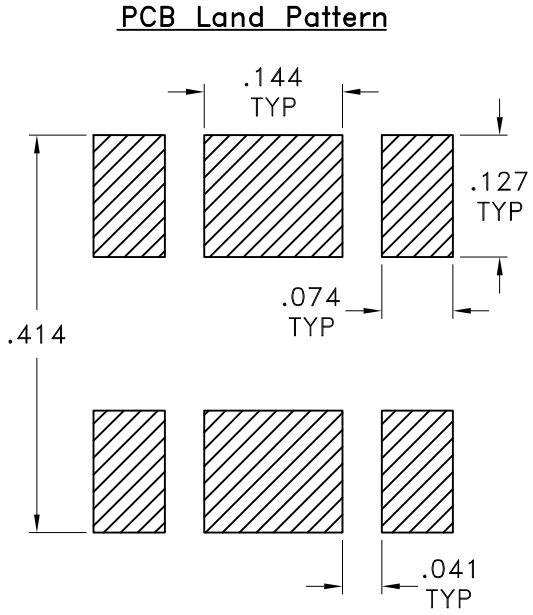
Case Style AH

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

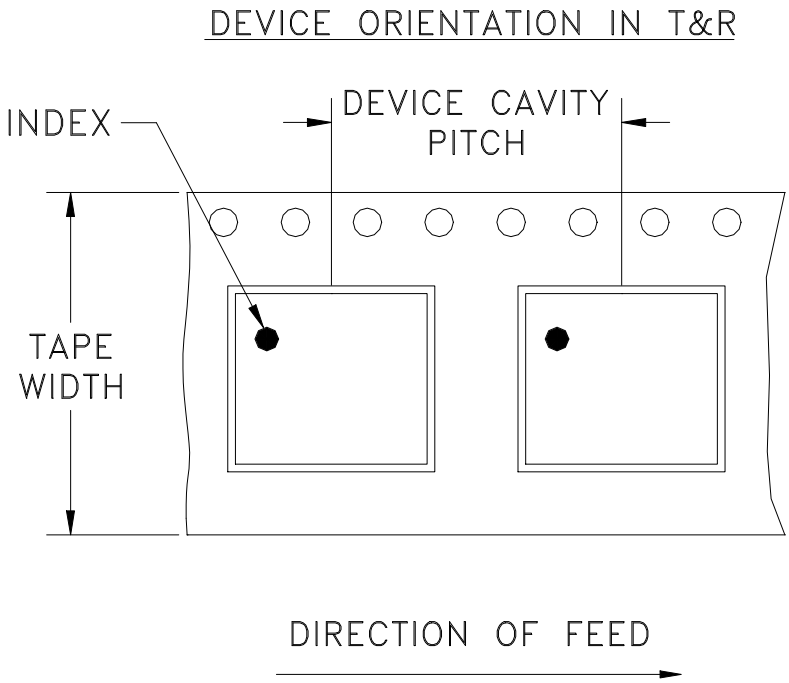
Notes:

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.

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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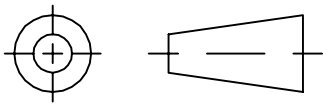
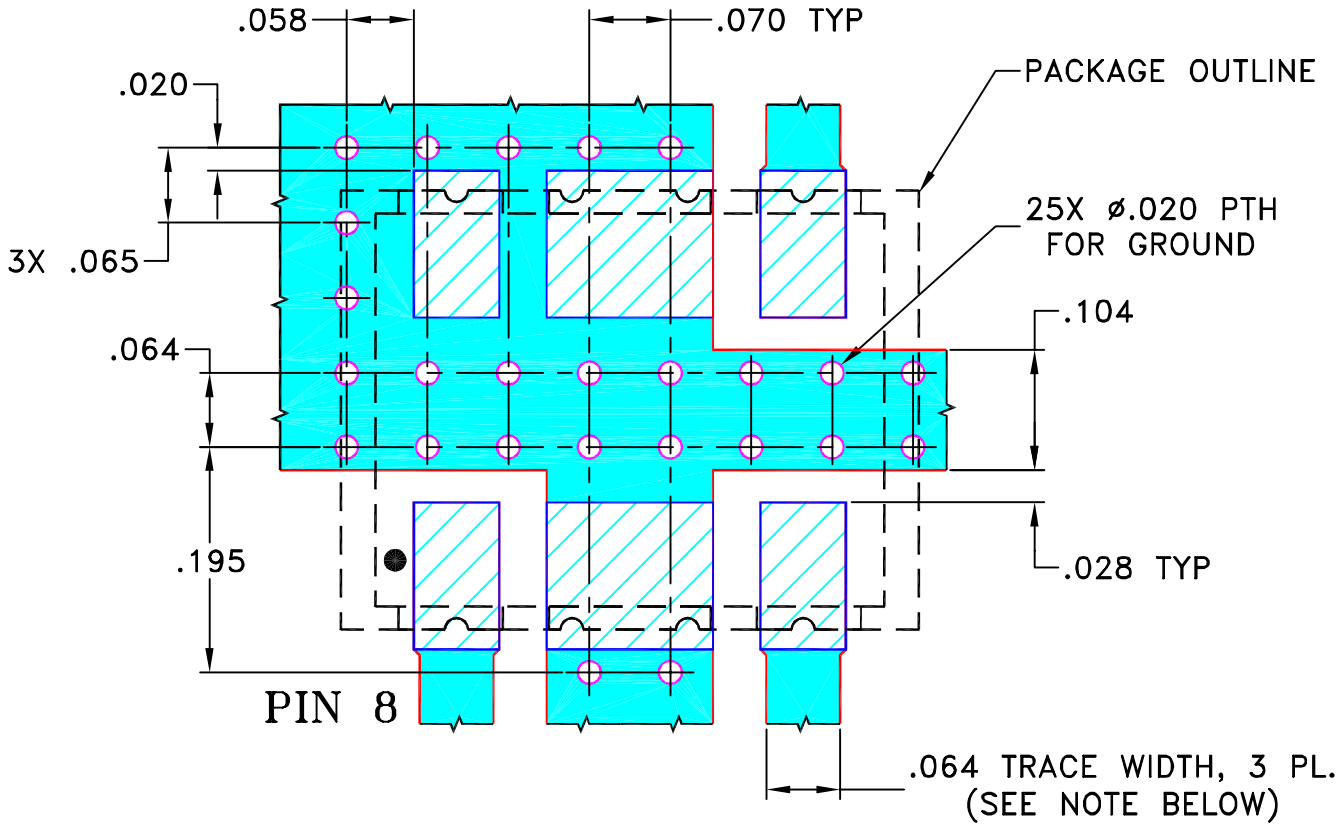
THIRD ANGLE PROJECTION



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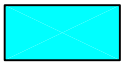
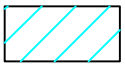
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



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 ±			

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

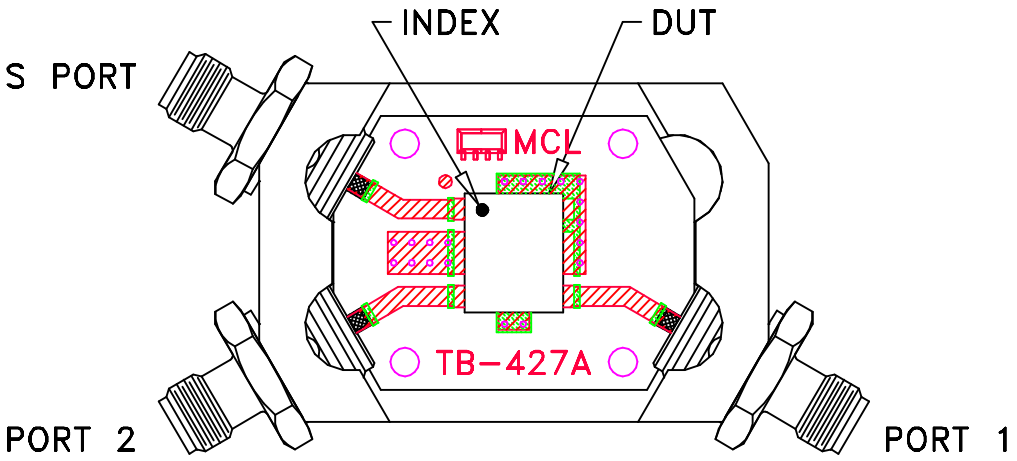
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

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

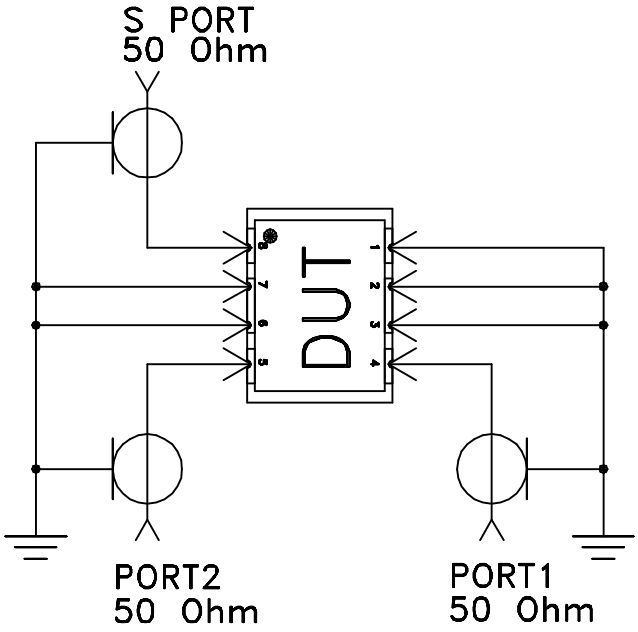
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-274	OR

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"

Mini-Circuits®

Mini-Circuits

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