Surface Mount

Power Splitter/Combiner SYPS-3-152-75+

3 Way-0° 75Ω 5 to 1500 MHz

The Big Deal

- Wideband, 5 to 1500 MHz
- Low insertion loss, 1.0 dB
- High isolation, 24 dB

CASE STYLE: AH202

Product Overview

Mini-Circuits' SYPS-3-152-75+ is a 75Ω 3-way 0˚ surface mount splitter/combiner covering the 5 to 1500 MHz frequency range, supporting bandwidth requirements for DOCSIS® 3.1 systems and equipment as well as other broadband applications. This model can handle up to 1W RF input power as a splitter and provides low insertion loss, high isolation, and low phase and amplitude unbalance. It comes housed in a miniature, 8-lead plastic package (0.38 x 0.50 x 0.25") with wrap-around terminations for excellent solder-ability and gold over nickel plate termination finish.

Key Features

Feature	Advantages
Wideband, 5 to 1500 MHz	Suitable for many broadband applications including DOCSIS® 3.1 systems and equipment.
Low insertion loss, 1.0 dB	The combination of 1W power handling and low insertion loss makes this model a suitable candidate for distributing signals while maintaining signal power.
Low unbalance: • 0.2 dB amplitude unbalance • 2.0˚ phase unbalance	SYPS-3-152-75+ produces nearly equal output signals, ideal for parallel path / multichannel systems.
Good isolation, 24 dB	Minimizes interference between input ports.
Good VSWR, 1.2:1 typ.	Provides excellent thru-path transmission with low signal reflection.

Surface Mount

Power Splitter/Combiner SYPS-3-152-75+

3 Way-0° 75Ω 5 to 1500 MHz

Generic photo used for illustration purposes only

CASE STYLE: AH202

+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
13"	200

Features

- low insertion loss 1.0 dB typ.
- good isolation, 24 dB typ.
- wide frequency band, 5 to 1500 MHz
- low amplitude unbalance, 0.4 dB typ.
- low phase unbalance, 2.0 deg. typ.

Applications

- CATV
- VHF/UHF
- cellular
- DOCSIS 3.1system

Electrical Specifications at 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		5		1500	MHz
Insertion Loss, above 4.8 dB	5-50 50-1220 1220-1500	— — —	0.6 0.8 1.9	1.3 1.8 2.9	dB
Isolation	5-50 50-1220 1220-1500	23 16 13	27 24 18	— — —	dB
Phase Unbalance	5-870 870-1500	— —	1.5 3.0	5.0 8.0	Deg.
Amplitude Unbalance	5-50 50-1220 1220-1500	— —	0.2 0.4 0.7	0.40 0.60 1.15	dB
VSWR (Port S)	5-50 50-1220 1220-1500	— —	1.3 1.1 1.25	1.65 1.30 1.80	:1
VSWR (Port 1 and Port 2)	5-50 50-1220 1220-1500	— — —	1.20 1.25 1.30	1.50 1.50 1.60	: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	0.15 W max.

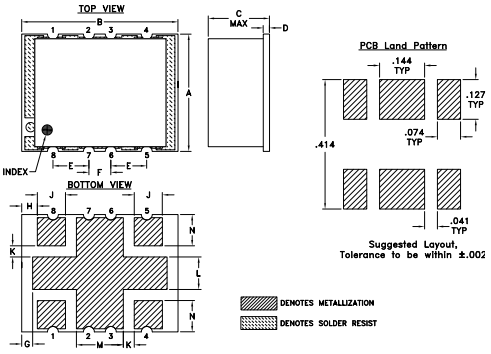
Permanent damage may occur if any of these limits are exceeded.

Pin Connections

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

Electrical Schematic

Outline Drawing

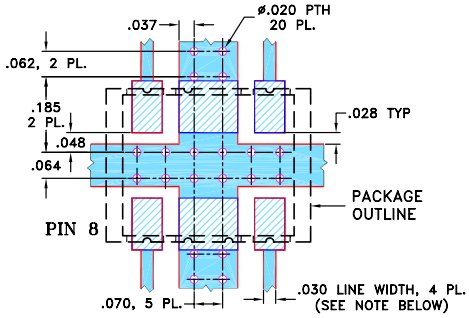


Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H
.38	.50	.25	.020	.115	.070	.035	.050
9.65	12.70	6.35	0.51	2.92	1.78	0.89	1.27

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

Demo Board MCL P/N: TB-361+
Suggested PCB Layout (PL-229)



NOTE:

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)

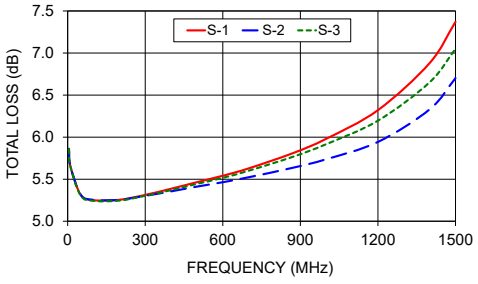
DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

Typical Performance Data

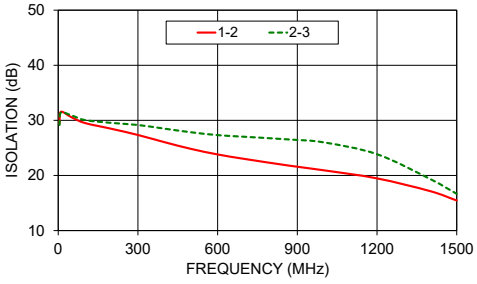
Freq. (MHz)	Total Loss[1] (dB)			Amp. Unbal. (dB)	Isolation (dB)		Phase Unbal. (deg.)	VSWR S	VSWR 1	VSWR 2	VSWR 3
	S-1	S-2	S-3		1-2	2-3					
5.00	5.86	5.86	5.86	0.00	29.44	29.16	0.02	1.51	1.40	1.40	1.39
10.00	5.66	5.66	5.66	0.01	31.55	31.39	0.07	1.32	1.30	1.31	1.30
50.00	5.32	5.32	5.31	0.01	30.57	30.91	0.14	1.12	1.22	1.22	1.22
100.00	5.25	5.26	5.24	0.01	29.53	30.06	0.23	1.07	1.20	1.20	1.20
200.00	5.26	5.26	5.25	0.01	28.48	29.54	0.40	1.04	1.19	1.19	1.17
300.00	5.31	5.30	5.30	0.01	27.35	29.16	0.58	1.05	1.19	1.18	1.18
400.00	5.39	5.36	5.37	0.03	26.04	28.50	0.74	1.06	1.19	1.18	1.20
500.00	5.46	5.41	5.44	0.05	24.82	27.84	0.90	1.08	1.19	1.19	1.21
600.00	5.54	5.46	5.52	0.08	23.82	27.32	1.00	1.10	1.19	1.20	1.20
700.00	5.63	5.52	5.60	0.11	23.01	27.03	1.01	1.12	1.20	1.23	1.20
870.00	5.81	5.64	5.77	0.17	21.78	26.53	0.99	1.15	1.27	1.28	1.25
1000.00	5.98	5.74	5.92	0.24	20.94	26.00	0.90	1.20	1.31	1.32	1.29
1200.00	6.32	5.94	6.20	0.38	19.47	23.86	0.59	1.28	1.40	1.39	1.33
1400.00	6.88	6.33	6.65	0.55	17.16	19.36	1.30	1.41	1.52	1.42	1.39
1500.00	7.37	6.70	7.05	0.67	15.46	16.67	2.48	1.52	1.55	1.41	1.38

1. Total Loss = Insertion Loss + 4dB splitter loss.

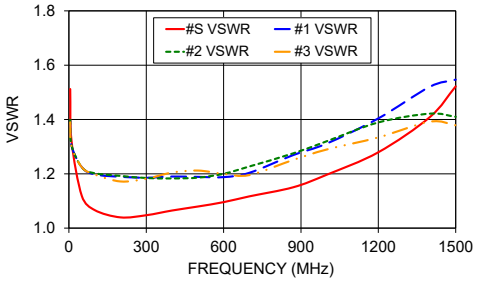
SYPS-3-152-75+
TOTAL LOSS



SYPS-3-152-75+
ISOLATION



SYPS-3-152-75+
VSWR



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

3 Way-0° Power Splitter/Combiner SYPS-3-152-75+

Typical Performance Data

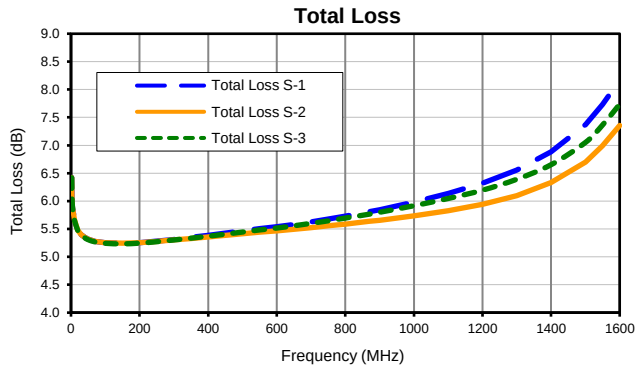
FREQ. (MHz)	TOTAL LOSS[1] (dB)			AMP. UNBAL. (dB)	ISOLATION (dB)			PHASE UNBAL. (deg.)
	S-1	S-2	S-3		1-2	1-3	2-3	
2	6.42	6.42	6.42	0.01	22.32	21.95	22.03	0.01
3	6.06	6.05	6.05	0.00	25.66	25.25	25.35	0.01
4	5.92	5.92	5.92	0.00	27.95	27.48	27.64	0.02
5	5.86	5.86	5.86	0.00	29.44	28.96	29.16	0.02
7	5.77	5.77	5.76	0.01	30.87	30.42	30.63	0.04
9	5.69	5.69	5.69	0.00	31.39	31.05	31.24	0.04
10	5.66	5.66	5.66	0.01	31.55	31.25	31.39	0.07
20	5.47	5.47	5.47	0.01	31.62	31.69	31.76	0.08
30	5.40	5.40	5.39	0.01	31.27	31.44	31.51	0.10
40	5.35	5.35	5.34	0.01	30.89	31.15	31.16	0.11
50	5.32	5.32	5.31	0.01	30.57	30.87	30.91	0.14
70	5.28	5.28	5.27	0.01	30.08	30.46	30.48	0.17
100	5.25	5.26	5.24	0.01	29.53	30.02	30.06	0.23
150	5.24	5.25	5.23	0.01	28.95	29.67	29.73	0.31
200	5.26	5.26	5.25	0.01	28.48	29.46	29.54	0.40
250	5.28	5.28	5.27	0.01	27.94	29.25	29.35	0.49
300	5.31	5.30	5.30	0.01	27.35	29.00	29.16	0.58
350	5.35	5.33	5.33	0.02	26.69	28.64	28.83	0.65
400	5.39	5.36	5.37	0.03	26.04	28.27	28.50	0.74
450	5.42	5.38	5.41	0.04	25.41	27.89	28.16	0.82
500	5.46	5.41	5.44	0.05	24.82	27.52	27.84	0.90
550	5.50	5.44	5.48	0.06	24.32	27.23	27.59	0.96
600	5.54	5.46	5.52	0.08	23.82	26.91	27.32	1.00
650	5.58	5.49	5.56	0.09	23.40	26.69	27.14	1.02
700	5.63	5.52	5.60	0.11	23.01	26.51	27.03	1.01
750	5.68	5.55	5.65	0.12	22.62	26.30	26.86	1.02
800	5.73	5.59	5.70	0.14	22.25	26.11	26.73	1.01
870	5.81	5.64	5.77	0.17	21.78	25.86	26.53	0.99
900	5.84	5.66	5.80	0.19	21.57	25.75	26.42	0.96
1000	5.98	5.74	5.92	0.24	20.94	25.36	26.00	0.90
1100	6.14	5.83	6.05	0.31	20.25	24.75	25.20	0.78
1200	6.32	5.94	6.20	0.38	19.47	23.84	23.86	0.59
1300	6.56	6.10	6.39	0.46	18.48	22.38	21.86	0.75
1400	6.88	6.33	6.65	0.55	17.16	20.33	19.36	1.30
1500	7.37	6.70	7.05	0.67	15.46	17.89	16.67	2.48
1550	7.73	6.99	7.36	0.74	14.48	16.64	15.34	3.35
1600	8.17	7.36	7.74	0.81	13.50	15.40	14.09	4.29

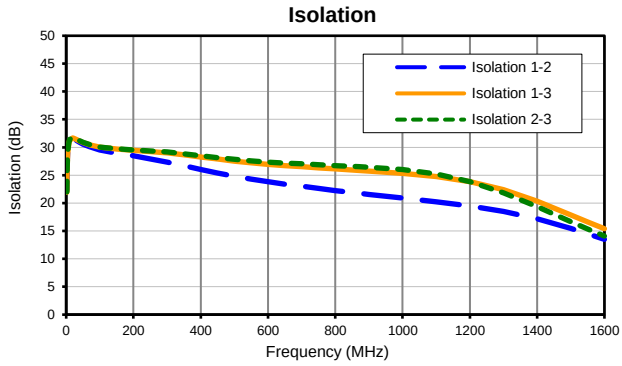
FREQ. (MHz)	VSWR (:1)			
	S	1	2	3
2	2.33	1.79	1.79	1.77
3	1.83	1.55	1.56	1.54
4	1.62	1.45	1.45	1.44
5	1.51	1.40	1.40	1.39
7	1.40	1.34	1.34	1.34
9	1.34	1.31	1.32	1.31
10	1.32	1.30	1.31	1.30
20	1.21	1.26	1.26	1.26
30	1.16	1.24	1.24	1.24
40	1.14	1.23	1.23	1.23
50	1.12	1.22	1.22	1.22
70	1.09	1.21	1.21	1.21
100	1.07	1.20	1.20	1.20
150	1.05	1.19	1.19	1.18
200	1.04	1.19	1.19	1.17
250	1.04	1.18	1.19	1.17
300	1.05	1.19	1.18	1.18
350	1.05	1.18	1.18	1.19
400	1.06	1.19	1.18	1.20
450	1.08	1.18	1.19	1.21
500	1.08	1.19	1.19	1.21
550	1.09	1.20	1.19	1.21
600	1.10	1.19	1.20	1.20
650	1.11	1.21	1.21	1.20
700	1.12	1.20	1.23	1.20
750	1.12	1.23	1.24	1.20
800	1.14	1.23	1.26	1.22
870	1.15	1.27	1.28	1.25
900	1.16	1.26	1.29	1.26
1000	1.20	1.31	1.32	1.29
1100	1.24	1.37	1.35	1.31
1200	1.28	1.40	1.39	1.33
1300	1.34	1.47	1.42	1.37
1400	1.41	1.52	1.42	1.39
1500	1.52	1.55	1.41	1.38
1550	1.64	1.49	1.38	1.34
1600	1.73	1.47	1.36	1.30

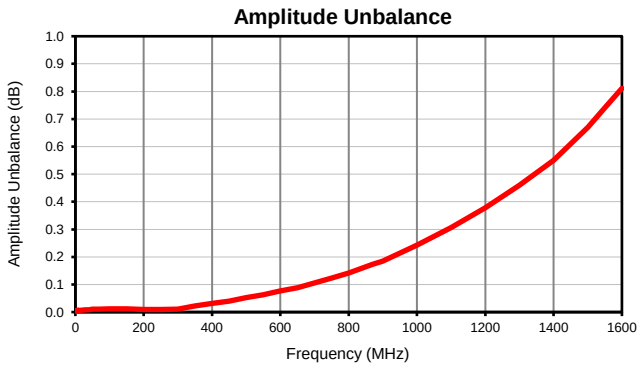
[1]Total Loss = Insertion Loss + 4.8dB Splitter Loss

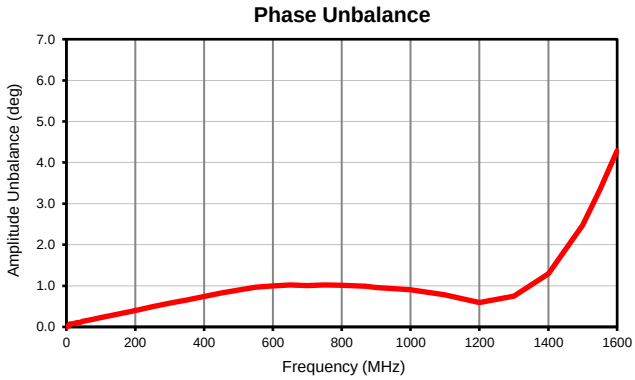
3 Way-0° Power Splitter/Combiner SYPS-3-152-75+

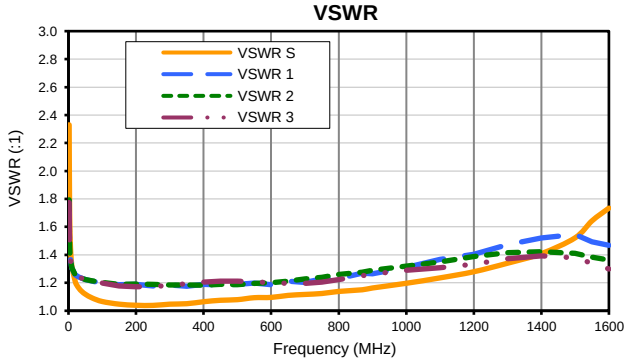
Typical Performance Curves







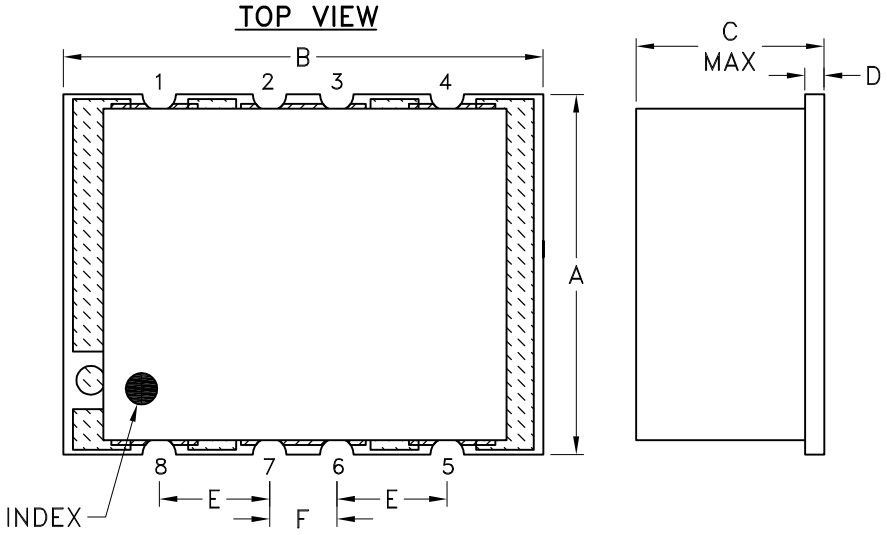


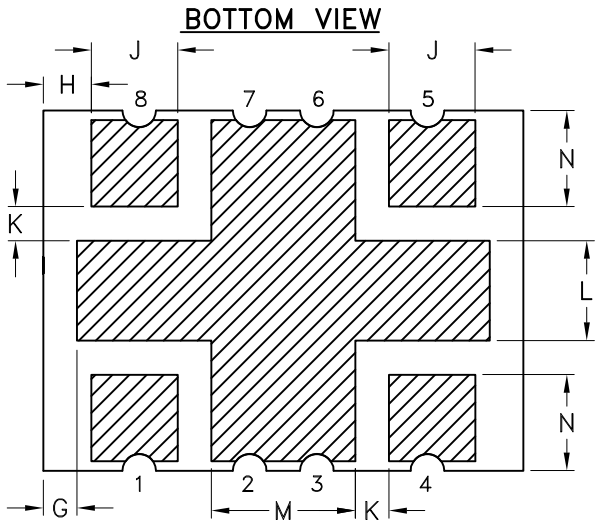


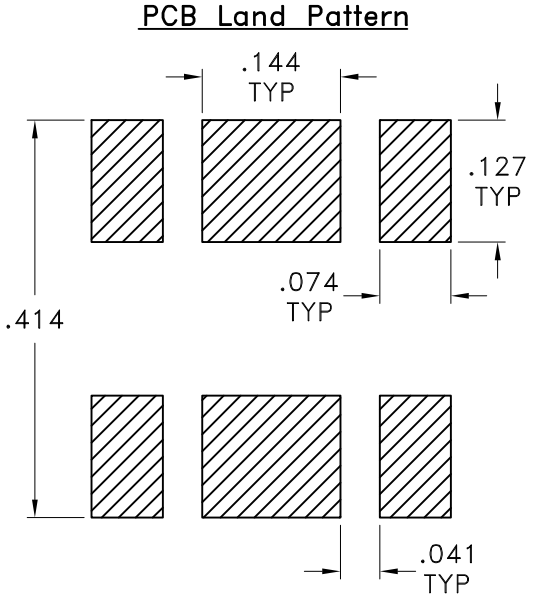
Case Style AH

Outline Dimensions

AH202







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	.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: Plastic.
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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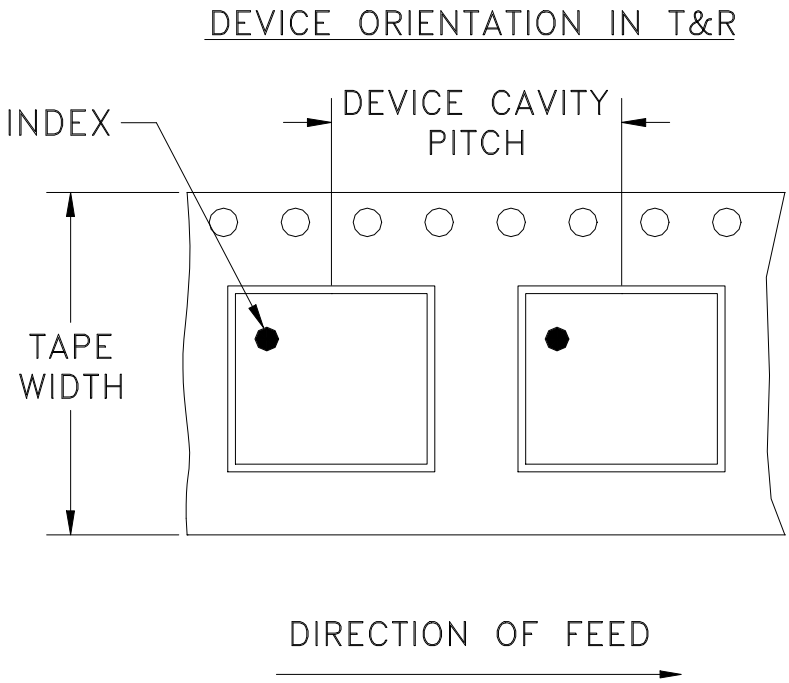
RF/IF MICROWAVE COMPONENTS

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.

Go to: www.minicircuits.com/pages/pdfs/tape.pdf

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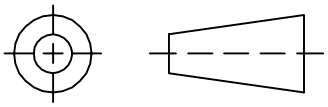
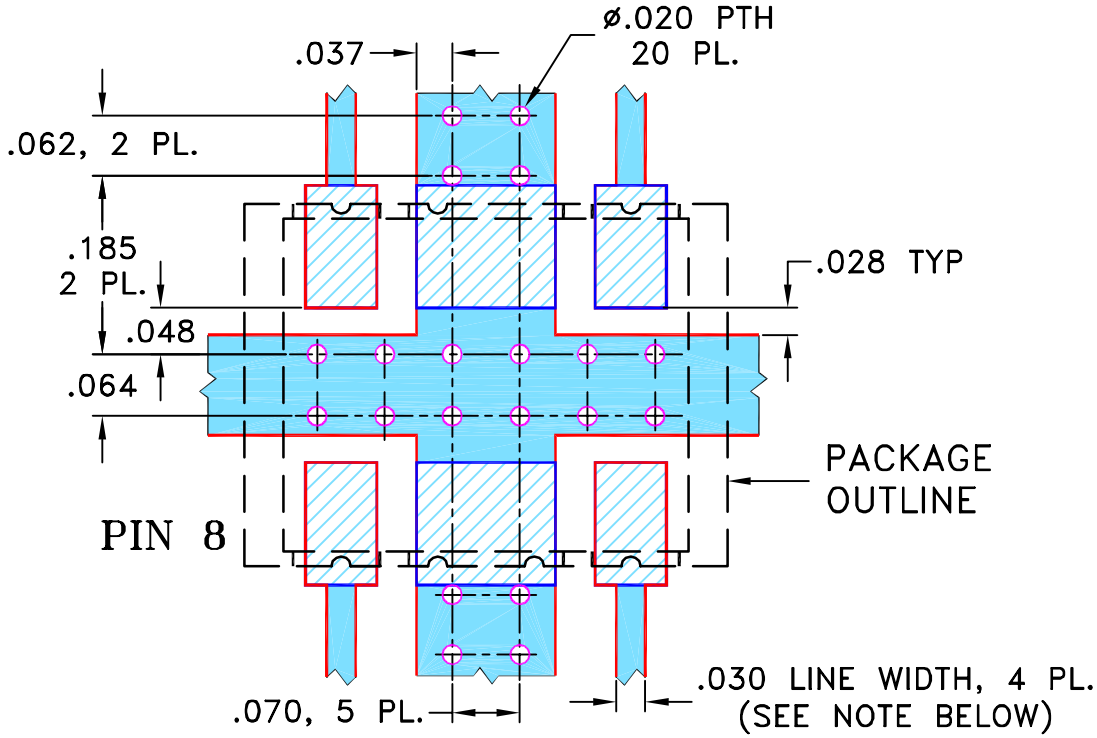
THIRD ANGLE PROJECTION



REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M101377	NEW RELEASE	10/18/05	MMG	HY
A	M102713	ADDED "...WITH SMOBC"	01/12/06	GT	IL

SUGGESTED MOUNTING CONFIGURATION FOR AH202 CASE STYLE, "rd" PIN CONNECTION.



NOTE:

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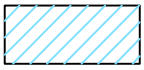
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

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	MMG	10/17/05
TOLERANCES ON:	CHECKED	IL	10/18/05
2 PL DECIMALS ±	APPROVED	HY	10/18/05
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

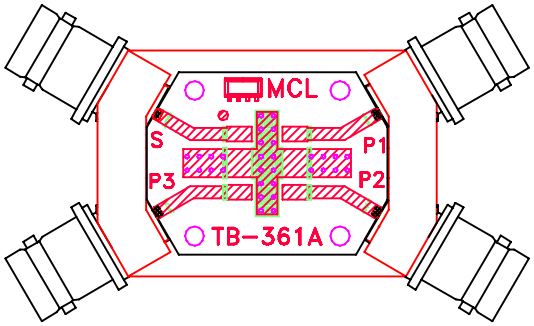
Mini-Circuits®
13 Neptune Avenue
Brooklyn NY 11235

PL, rd, 75, AH202, SYPS-3, TB-361

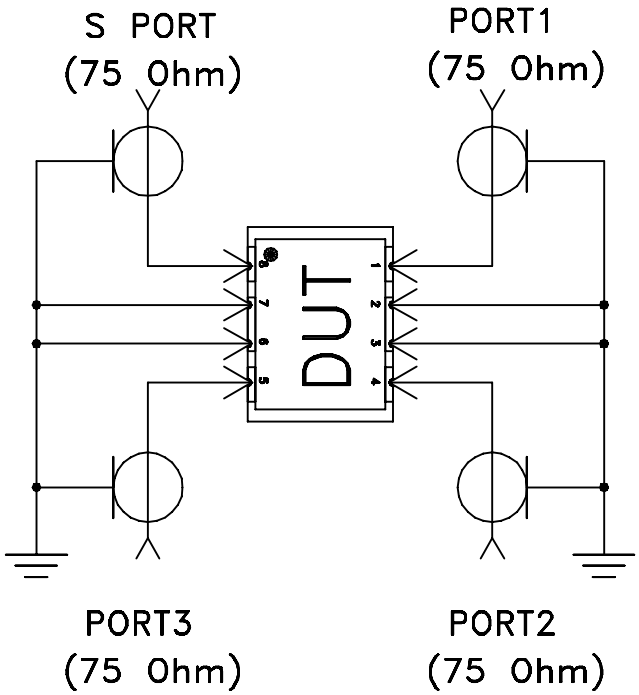
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-229	A

FILE:	SCALE:	SHEET:
98PL229	5:1	1 OF 1

Evaluation Board and Circuit



TB-361+



Schematic Diagram

Notes:

1. 75 Ohm BNC-type Female connectors.
2. PCB Material: Rogers RO4350 or its equivalent, Dielectric Constant=3.5, Thickness=.060"

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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