



## SURFACE MOUNT

# Power Splitter/Combiner **SYPS-3-182-75+**

3 Way-0° 75Ω 5 to 1800 MHz

### THE BIG DEAL

- Wideband, 5 to 1800 MHz
- Low insertion loss, 2.5 dB
- Good return loss, 20 dB typ.
- Low amplitude unbalance, 0.4 dB typ.
- Low phase unbalance, 2.0 deg. typ.



Generic photo used for illustration purposes only

CASE STYLE: AH202

#### +RoHS Compliant

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

### APPLICATIONS

- CATV
- DOCSIS® 4.0 system

### PRODUCT OVERVIEW

Mini-Circuits' SYPS-3-182-75+ is a 75Ω 3-way 0° surface mount splitter/combiner covering the 5 to 1800 MHz frequency range, supporting bandwidth requirements for DOCSIS® 4.0 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 solderability and gold over nickel plate termination finish.

### KEY FEATURES

Feature	Advantages
Wideband, 5 to 1800 MHz	Suitable for many broadband applications including DOCSIS® 4.0 systems and equipment.
Low insertion loss, 2.5 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: <ul style="list-style-type: none"> <li>• 0.4 dB amplitude unbalance</li> <li>• 2.0° phase unbalance</li> </ul>	SYPS-3-182-75+ produces nearly equal output signals, ideal for parallel path / multichannel systems.
Good isolation, 20 dB typ.	Minimizes interference between input ports.
Good Return Loss, 20 dB typ.	Provides excellent thru-path transmission with low signal reflection.





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### ELECTRICAL SPECIFICATIONS AT +25°C

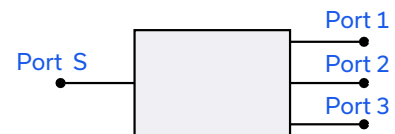
Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		5		1800	MHz
Insertion Loss, above 4.8 dB	5-50	—	0.6	1.1	dB
	50-1220	—	1.2	1.9	
	1220-1800	—	2.5	4.5	
Isolation	5-50	23	27	—	dB
	50-1220	15	20	—	
	1220-1800	12	16	—	
Phase Unbalance	5-870	—	1.5	5.0	Degree
	870-1800	—	5.0	12	
Amplitude Unbalance	5-50	—	0.2	0.40	dB
	50-1220	—	0.4	0.60	
	1220-1800	—	0.7	1.50	
Return Loss (Port S)	5-50	—	18	—	dB
	50-1220	—	20	—	
	1220-1800	—	16	—	
RET LOSS (Port 1 to Port 3)	5-50	—	18	—	dB
	50-1220	—	20	—	
	1220-1800	—	16	—	

### ABSOLUTE MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-40°C to +85°C
Storage Temperature	-55°C to +100°C
Power Input (as a splitter)	1 W max.
Internal Dissipation	0.15 W max.

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

### ELECTRICAL SCHEMATIC





**SURFACE MOUNT**

# Power Splitter/Combiner **SYPS-3-182-75+**

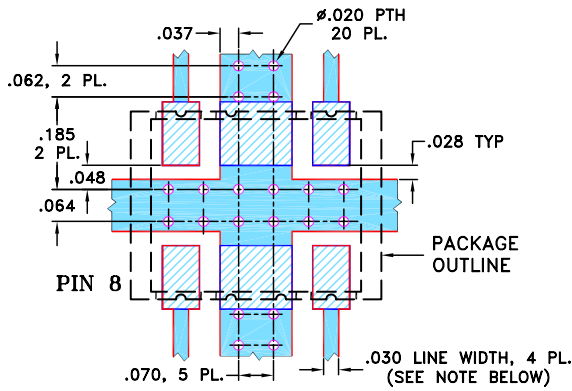
3 Way-0° 75Ω 5 to 1800 MHz

**PIN CONNECTIONS**

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

**PRODUCT MARKING:** N/A

**DEMO BOARD MCL P/N:** TB-SYPS3182-75+  
**SUGGESTED PCB LAYOUT (PL-229)**

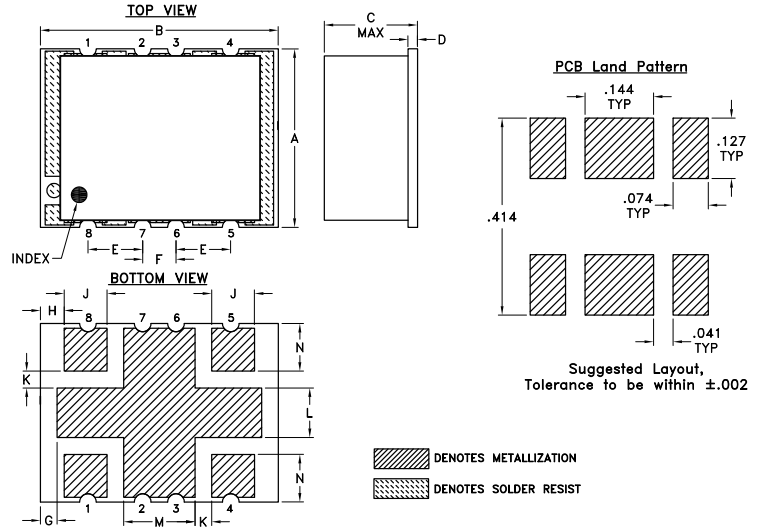


**NOTE:**

- TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .030" ± .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
- 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

**OUTLINE DRAWING**



**OUTLINE DIMENSIONS (Inches 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

**TAPE & REEL INFORMATION: F61**



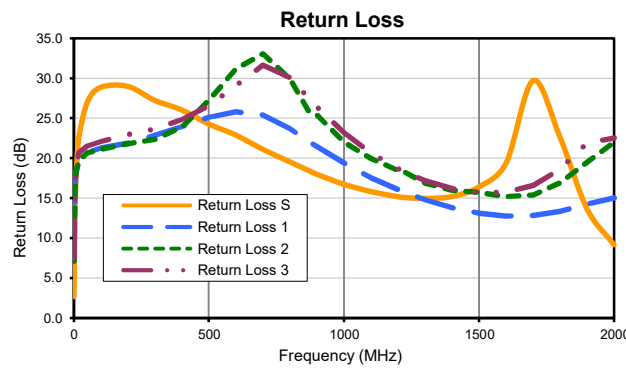
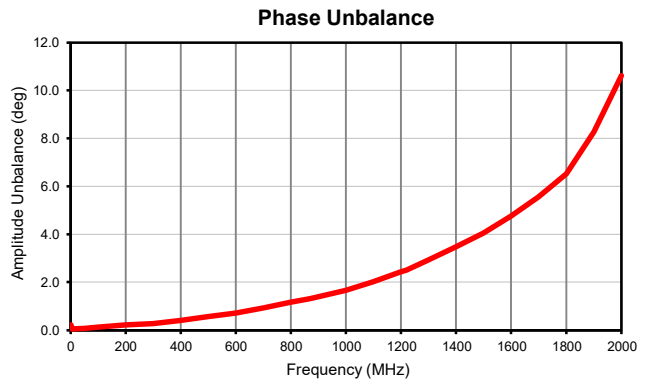
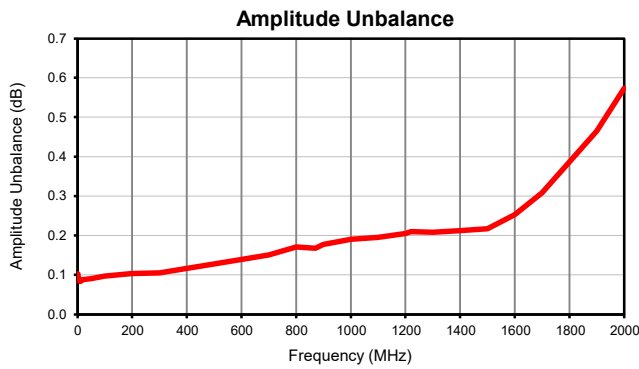
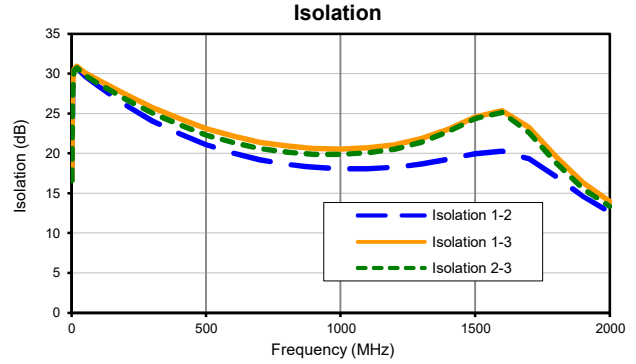
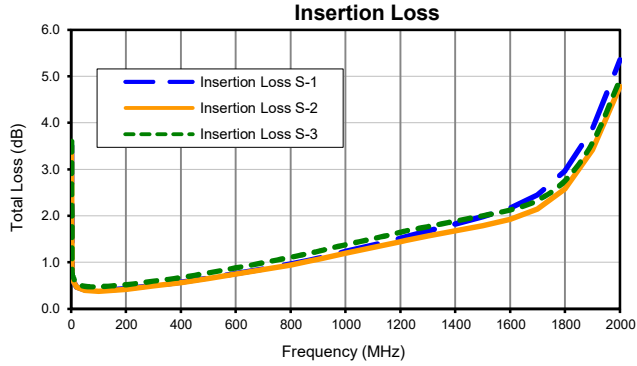


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# Power Splitter/Combiner **SYPS-3-182-75+**

3 Way-0° 75Ω 5 to 1800 MHz

## TYPICAL PERFORMANCE DATA



- 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/terms/viewterm.html](http://www.minicircuits.com/terms/viewterm.html)



# 3 Way-0° Power Splitter/Combiner

# SYPS-3-182-75+

## Typical Performance Data

FREQ. (MHz)	INSERTION LOSS <sup>1</sup> (dB)			AMP. UNBAL. (dB)	ISOLATION (dB)			PHASE UNBAL. (deg.)	FREQ. (MHz)	VSWR (:1)			
	S-1	S-2	S-3		1-2	1-3	2-3			S	1	2	3
1	3.51	3.50	3.60	0.10	16.71	16.61	16.63	0.22	1	6.55	2.56	2.57	2.45
3	0.71	0.71	0.79	0.09	23.67	23.61	23.56	0.06	3	1.93	1.54	1.54	1.50
5	0.61	0.62	0.70	0.09	27.93	27.84	27.77	0.06	5	1.48	1.36	1.36	1.33
7	0.59	0.60	0.68	0.09	29.68	29.57	29.56	0.10	7	1.34	1.30	1.30	1.27
10	0.56	0.56	0.64	0.08	30.49	30.56	30.46	0.05	10	1.26	1.26	1.27	1.24
20	0.47	0.46	0.55	0.09	30.71	30.97	30.77	0.06	20	1.16	1.23	1.23	1.20
50	0.40	0.40	0.49	0.09	29.69	30.15	29.82	0.07	50	1.09	1.20	1.20	1.18
100	0.39	0.38	0.48	0.10	28.44	29.20	28.78	0.13	100	1.07	1.19	1.19	1.17
200	0.43	0.42	0.52	0.10	26.13	27.46	26.86	0.21	200	1.07	1.18	1.18	1.15
300	0.50	0.49	0.60	0.10	24.09	25.77	25.07	0.27	300	1.09	1.16	1.16	1.14
400	0.57	0.56	0.67	0.12	22.49	24.40	23.62	0.41	400	1.10	1.14	1.14	1.12
500	0.66	0.65	0.78	0.13	21.10	23.13	22.33	0.56	500	1.13	1.12	1.09	1.10
600	0.76	0.74	0.88	0.14	20.06	22.17	21.40	0.71	600	1.15	1.11	1.06	1.07
700	0.86	0.84	0.99	0.15	19.22	21.40	20.64	0.92	700	1.19	1.11	1.05	1.05
800	0.97	0.94	1.11	0.17	18.66	20.94	20.19	1.17	800	1.24	1.14	1.07	1.06
870	1.05	1.03	1.20	0.17	18.38	20.69	19.97	1.31	870	1.27	1.17	1.11	1.09
900	1.09	1.06	1.24	0.18	18.29	20.62	19.92	1.40	900	1.29	1.18	1.11	1.10
1000	1.23	1.19	1.38	0.19	18.09	20.55	19.89	1.65	1000	1.34	1.24	1.17	1.15
1100	1.37	1.31	1.51	0.19	18.11	20.70	20.11	2.01	1100	1.39	1.31	1.22	1.20
1200	1.52	1.44	1.65	0.20	18.28	21.08	20.56	2.44	1200	1.42	1.37	1.27	1.26
1220	1.56	1.47	1.68	0.21	18.34	21.21	20.70	2.50	1220	1.43	1.39	1.27	1.27
1300	1.67	1.56	1.77	0.21	18.69	21.85	21.43	2.92	1300	1.43	1.45	1.33	1.32
1400	1.83	1.68	1.89	0.21	19.31	23.04	22.75	3.47	1400	1.42	1.51	1.38	1.37
1500	1.99	1.79	2.00	0.22	19.99	24.56	24.42	4.04	1500	1.36	1.57	1.39	1.39
1600	2.18	1.92	2.13	0.25	20.30	25.35	25.17	4.76	1600	1.24	1.60	1.42	1.39
1700	2.46	2.15	2.34	0.31	19.34	23.28	22.63	5.56	1700	1.07	1.59	1.41	1.35
1800	2.97	2.58	2.76	0.39	17.12	19.61	18.84	6.52	1800	1.16	1.55	1.33	1.26
1900	3.89	3.42	3.58	0.46	14.66	16.35	15.62	8.27	1900	1.53	1.48	1.24	1.17
2000	5.36	4.78	4.93	0.57	12.65	13.97	13.38	10.62	2000	2.06	1.43	1.17	1.16

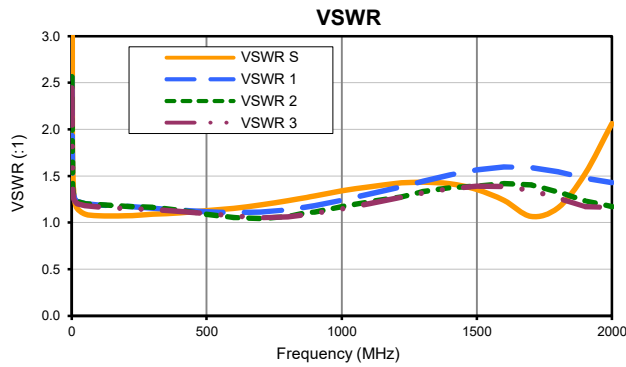
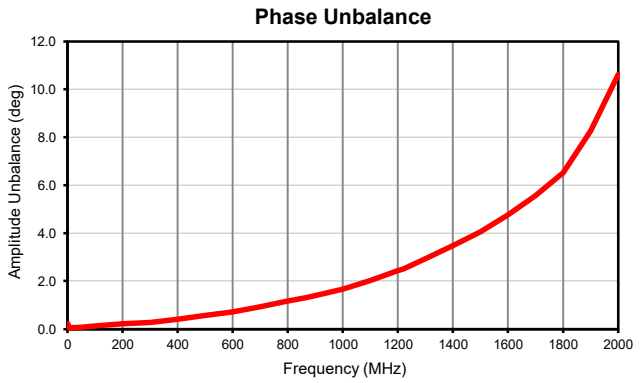
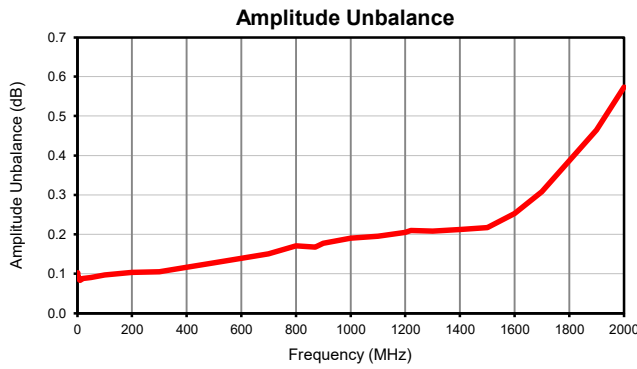
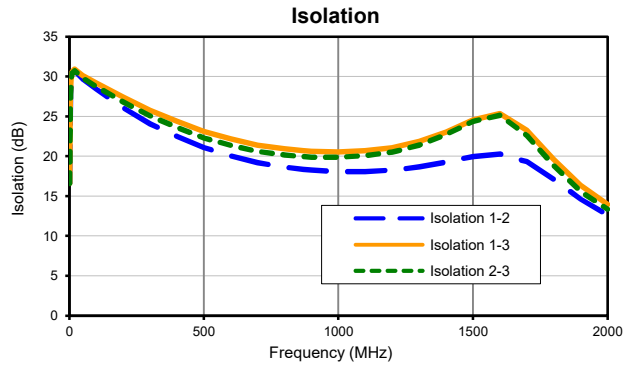
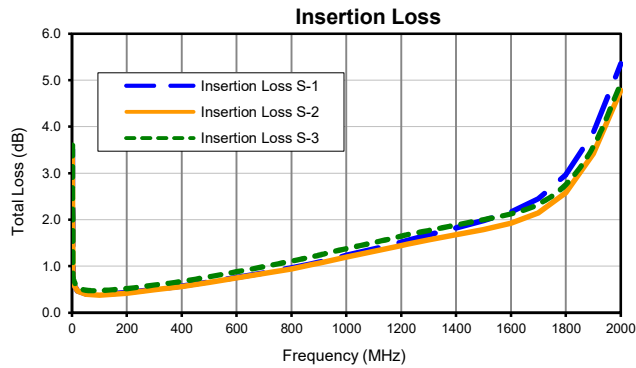
<sup>1</sup>Insertion loss is loss above theoretical loss (4.8dB)



# 3 Way-0° Power Splitter/Combiner

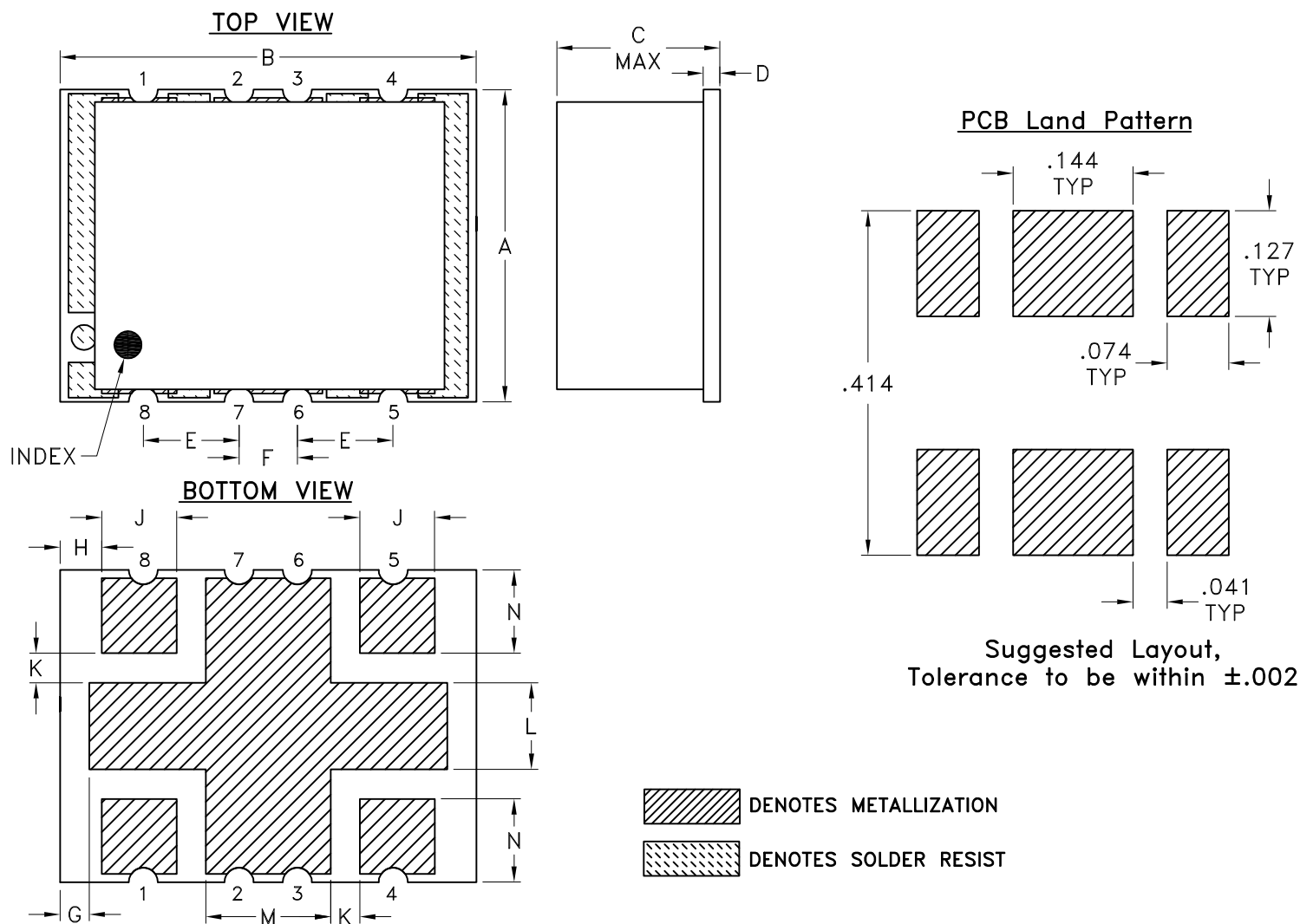
# SYPS-3-182-75+

## Typical Performance Curves



## Outline Dimensions

AH202



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.  $\pm .01$ ; 3 Pl.  $\pm .005$

### Notes:

- Case material: Plastic.
- Base material: Printed wiring laminate.
- Termination finish:
  - For RoHS 3-5  $\mu$  inch (.08-.13 microns) Gold over 120-240  $\mu$  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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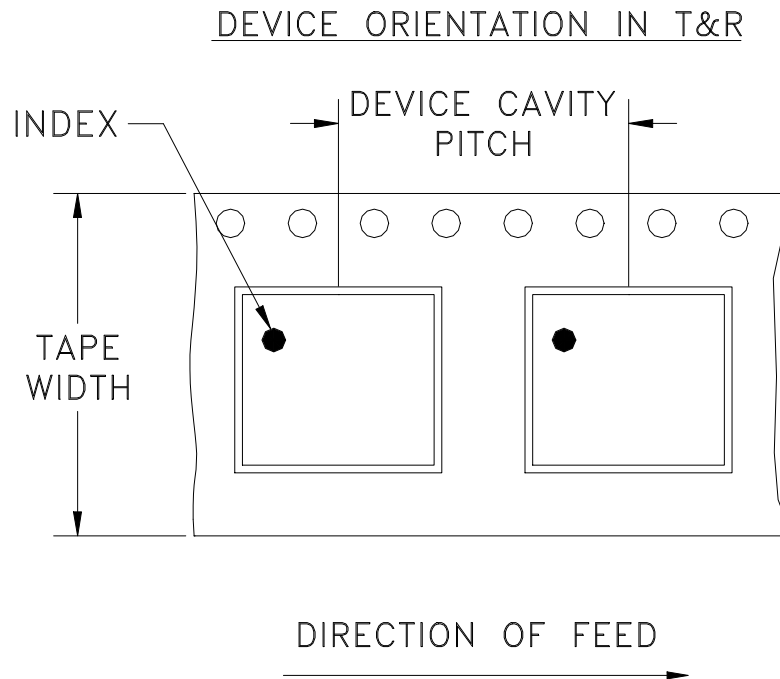
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RF/IF MICROWAVE COMPONENTS

# 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](http://www.minicircuits.com/pages/pdfs/tape.pdf)

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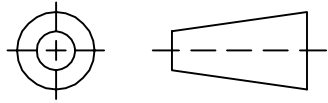
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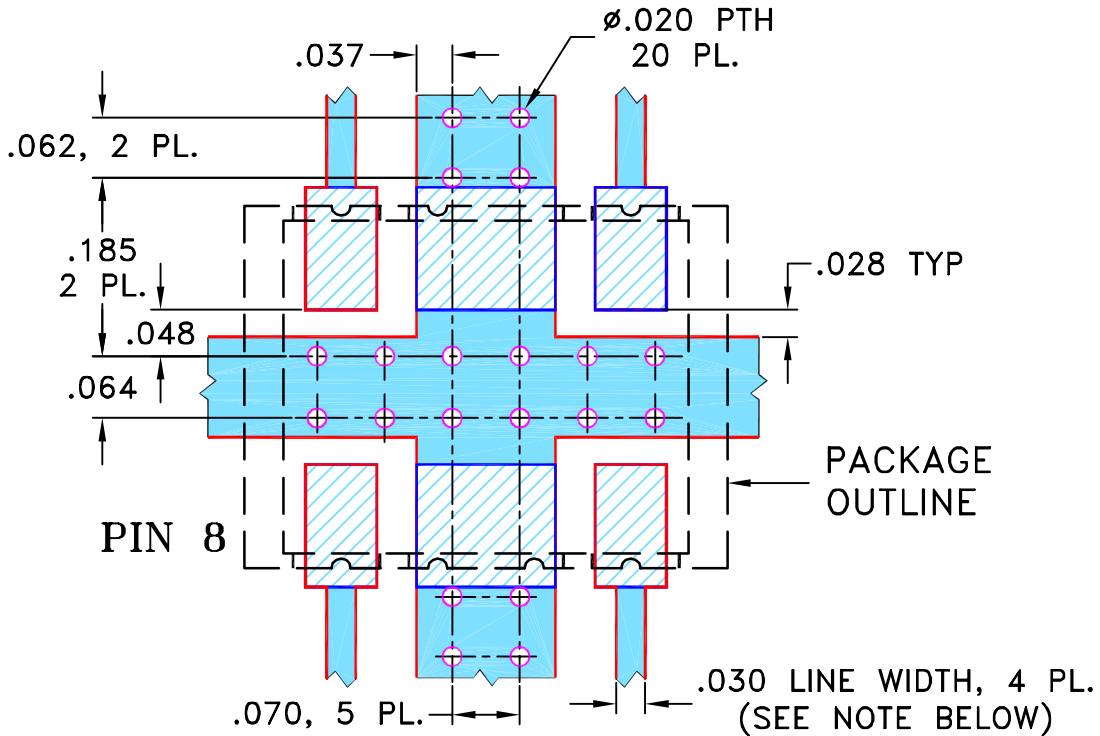
THIRD ANGLE PROJECTION



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.

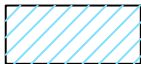


NOTE:

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

DIMENSIONS ARE IN INCHES  
TOLERANCES ON:  
2 PL DECIMALS ±  
3 PL DECIMALS ± .005  
ANGLES ±  
FRACTIONS ±

	INITIALS	DATE
DRAWN	MMG	10/17/05
CHECKED	IL	10/18/05
APPROVED	HY	10/18/05



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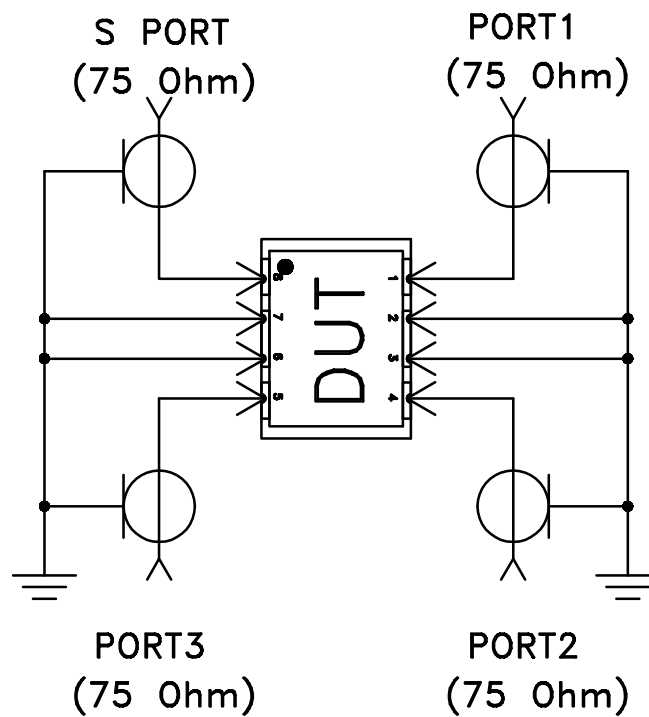
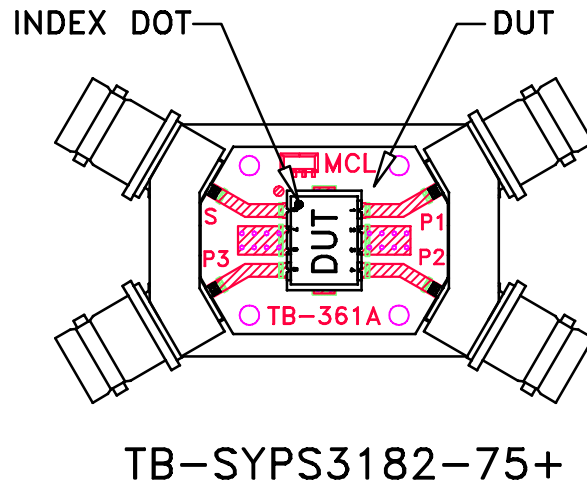
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PL, rd, 75, AH202, SYPS-3, TB-361

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SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-229	REV: A
FILE: 98PL229	SCALE: 5:1	SHEET: 1 OF 1	

# Evaluation Board and Circuit



Schematic Diagram

## Notes:

1. 75 Ohm BNC-type Female connectors.
2. PCB Material: Rogers R04350 or its equivalent, Dielectric Constant=3.5, Thickness=.060"

 Mini-Circuits®

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