

3 Way-0° 75Ω 5 to 1200 MHz

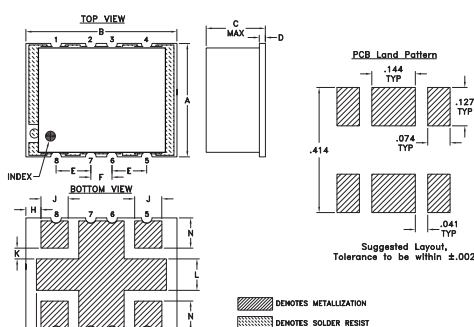
### Maximum Ratings

|                                                                 |                |
|-----------------------------------------------------------------|----------------|
| Operating Temperature                                           | -40°C to 85°C  |
| Storage Temperature                                             | -55°C to 100°C |
| Power Input (as a splitter)                                     | 1W max.        |
| Internal Dissipation                                            | 0.15W max.     |
| Permanent damage may occur if any of these limits are exceeded. |                |

### Pin Connections

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

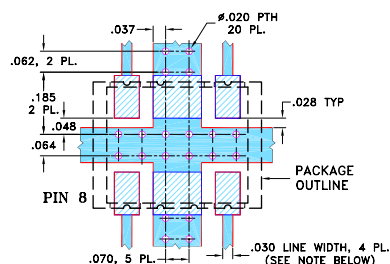
### Outline Drawing



### 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:

- 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.
  - 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

#### Notes

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- 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](http://www.minicircuits.com/MCLStore/terms.jsp)

### Features

- low insertion loss 0.7 dB typ.
- good isolation, 25 dB typ.
- wide frequency band, 5 to 1200 MHz, usable 5-1300 MHz
- low amplitude unbalance, 0.2 dB typ.
- low phase unbalance, 2.0 deg. typ.

### Applications

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

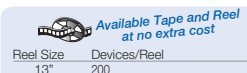


Generic photo used for illustration purposes only

CASE STYLE: AH202

#### +RoHS Compliant

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



### Electrical Specifications at 25°C

| Parameter                    | Frequency (MHz) | Min. | Typ. | Max. | Unit   |
|------------------------------|-----------------|------|------|------|--------|
| Frequency Range              |                 | 5    |      | 1200 | MHz    |
| Insertion Loss, above 4.8 dB | 5-20            | —    | 0.6  | 1.0  | dB     |
|                              | 20-860          | —    | 0.7  | 1.5  |        |
|                              | 860-1200        | —    | 1.2  | 2.2  |        |
| Isolation                    | 5-20            | 20   | 26   | —    | dB     |
|                              | 20-860          | 18   | 25   | —    |        |
|                              | 860-1200        | 17   | 20   | —    |        |
| Phase Unbalance              | 5-20            | —    | —    | —    | Degree |
|                              | 20-860          | —    | 1.5  | 3.0  |        |
|                              | 860-1200        | —    | 3.0  | 5.0  |        |
| Amplitude Unbalance          | 5-860           | —    | 0.1  | 0.1  | dB     |
|                              | 860-1200        | —    | 0.3  | 0.8  |        |
| VSWR (Port S)                | 5-20            | —    | 1.0  | 1.7  | :1     |
|                              | 20-860          | —    | 1.2  | 1.3  |        |
|                              | 860-1200        | —    | 1.25 | 1.5  |        |
| VSWR (Port 1 and Port 2)     | 5-20            | —    | 1.3  | 1.3  | :1     |
|                              | 20-860          | —    | 1.2  | 1.3  |        |
|                              | 860-1200        | —    | 1.25 | 1.4  |        |

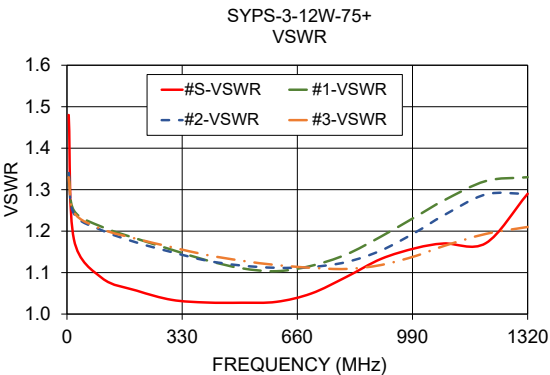
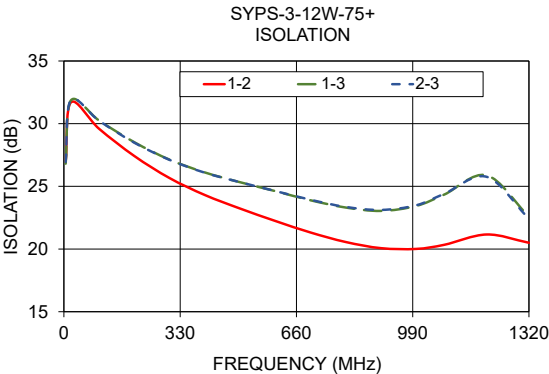
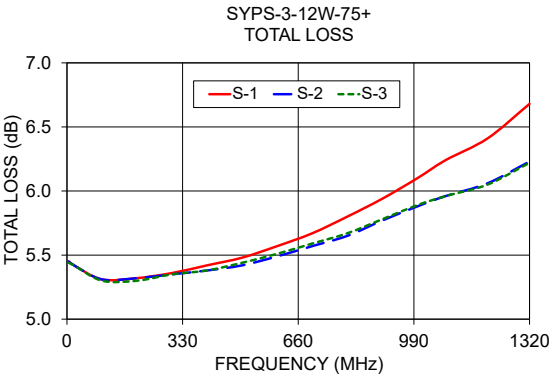
### electrical schematic



Typical Performance Data

| Freq.<br>(MHz) | Total Loss <sup>1</sup><br>(dB) |      |      | Amp.<br>Unbal.<br>(dB) | Isolation<br>(dB) |       |       | Phase<br>Unbal.<br>(deg.) | VSWR | VSWR | VSWR | VSWR |
|----------------|---------------------------------|------|------|------------------------|-------------------|-------|-------|---------------------------|------|------|------|------|
|                | S-1                             | S-2  | S-3  |                        | 1-2               | 1-3   | 2-3   |                           | S    | 1    | 2    | 3    |
| 5.00           | 5.45                            | 5.45 | 5.44 | 0.01                   | 26.93             | 26.81 | 26.95 | 0.02                      | 1.48 | 1.34 | 1.34 | 1.33 |
| 20.00          | 5.42                            | 5.42 | 5.42 | 0.01                   | 31.70             | 31.86 | 31.88 | 0.11                      | 1.18 | 1.25 | 1.24 | 1.25 |
| 100.00         | 5.31                            | 5.31 | 5.30 | 0.01                   | 29.59             | 30.25 | 30.23 | 0.12                      | 1.09 | 1.21 | 1.20 | 1.20 |
| 200.00         | 5.32                            | 5.32 | 5.30 | 0.02                   | 27.42             | 28.52 | 28.48 | 0.23                      | 1.06 | 1.18 | 1.17 | 1.18 |
| 300.00         | 5.36                            | 5.35 | 5.35 | 0.02                   | 25.66             | 27.13 | 27.11 | 0.22                      | 1.03 | 1.16 | 1.15 | 1.16 |
| 400.00         | 5.42                            | 5.38 | 5.38 | 0.04                   | 24.31             | 26.11 | 26.09 | 0.36                      | 1.03 | 1.13 | 1.13 | 1.14 |
| 500.00         | 5.48                            | 5.42 | 5.44 | 0.06                   | 23.23             | 25.33 | 25.33 | 0.27                      | 1.03 | 1.11 | 1.12 | 1.13 |
| 600.00         | 5.57                            | 5.49 | 5.51 | 0.07                   | 22.24             | 24.62 | 24.63 | 0.34                      | 1.03 | 1.10 | 1.11 | 1.12 |
| 700.00         | 5.67                            | 5.57 | 5.59 | 0.10                   | 21.32             | 23.89 | 23.93 | 0.23                      | 1.05 | 1.12 | 1.11 | 1.11 |
| 800.00         | 5.80                            | 5.65 | 5.67 | 0.14                   | 20.56             | 23.31 | 23.36 | 0.17                      | 1.09 | 1.14 | 1.13 | 1.11 |
| 900.00         | 5.94                            | 5.77 | 5.78 | 0.17                   | 20.07             | 23.04 | 23.12 | 0.12                      | 1.13 | 1.19 | 1.15 | 1.12 |
| 1000.00        | 6.10                            | 5.88 | 5.89 | 0.22                   | 20.01             | 23.44 | 23.49 | 0.38                      | 1.16 | 1.24 | 1.20 | 1.14 |
| 1080.00        | 6.24                            | 5.96 | 5.96 | 0.28                   | 20.34             | 24.35 | 24.41 | 0.72                      | 1.17 | 1.27 | 1.24 | 1.16 |
| 1200.00        | 6.41                            | 6.06 | 6.05 | 0.36                   | 21.16             | 25.88 | 25.76 | 1.60                      | 1.17 | 1.32 | 1.29 | 1.19 |
| 1320.00        | 6.68                            | 6.23 | 6.22 | 0.46                   | 20.50             | 22.58 | 22.41 | 2.83                      | 1.29 | 1.33 | 1.29 | 1.21 |

1. Total Loss = Insertion Loss + 4.8dB splitter loss.



Notes  
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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](http://www.minicircuits.com/MCLStore/terms.jsp)



# 3 Way-0° Power Splitter/Combiner

**SYPS-3-12W-75+**

## Typical Performance Data

| FREQ.<br>(MHz) | TOTAL LOSS <sup>1</sup> |      |      | AMP.<br>UNBAL.<br>(dB) | ISOLATION |       |       | PHASE<br>UNBAL.<br>(deg.) | FREQ.<br>(MHz) | VSWR |      |      |      |
|----------------|-------------------------|------|------|------------------------|-----------|-------|-------|---------------------------|----------------|------|------|------|------|
|                | S-1                     | S-2  | S-3  |                        | 1-2       | 1-3   | 2-3   |                           |                | S    | 1    | 2    | 3    |
| 4              | 5.50                    | 5.50 | 5.50 | 0.00                   | 23.93     | 23.86 | 23.86 | 0.09                      | 4              | 1.74 | 1.43 | 1.42 | 1.42 |
| 5              | 5.44                    | 5.45 | 5.44 | 0.00                   | 25.80     | 25.73 | 25.73 | 0.07                      | 5              | 1.55 | 1.36 | 1.36 | 1.36 |
| 6              | 5.44                    | 5.44 | 5.44 | 0.00                   | 27.20     | 27.14 | 27.14 | 0.03                      | 6              | 1.45 | 1.33 | 1.32 | 1.32 |
| 7              | 5.45                    | 5.44 | 5.43 | 0.01                   | 28.25     | 28.20 | 28.22 | 0.06                      | 7              | 1.38 | 1.31 | 1.30 | 1.30 |
| 8              | 5.45                    | 5.44 | 5.44 | 0.01                   | 29.06     | 29.03 | 29.03 | 0.07                      | 8              | 1.33 | 1.29 | 1.28 | 1.29 |
| 10             | 5.44                    | 5.44 | 5.44 | 0.01                   | 30.17     | 30.20 | 30.17 | 0.03                      | 10             | 1.28 | 1.28 | 1.27 | 1.27 |
| 20             | 5.42                    | 5.42 | 5.42 | 0.01                   | 31.70     | 31.86 | 31.88 | 0.11                      | 20             | 1.18 | 1.25 | 1.24 | 1.25 |
| 30             | 5.39                    | 5.40 | 5.39 | 0.01                   | 31.60     | 31.89 | 31.84 | 0.08                      | 30             | 1.15 | 1.24 | 1.23 | 1.24 |
| 40             | 5.37                    | 5.36 | 5.37 | 0.00                   | 31.34     | 31.67 | 31.66 | 0.09                      | 40             | 1.13 | 1.23 | 1.23 | 1.23 |
| 50             | 5.34                    | 5.34 | 5.34 | 0.00                   | 31.00     | 31.40 | 31.37 | 0.04                      | 50             | 1.12 | 1.23 | 1.22 | 1.22 |
| 100            | 5.31                    | 5.31 | 5.30 | 0.01                   | 29.59     | 30.25 | 30.23 | 0.12                      | 100            | 1.09 | 1.21 | 1.20 | 1.20 |
| 150            | 5.31                    | 5.30 | 5.30 | 0.01                   | 28.39     | 29.27 | 29.24 | 0.08                      | 150            | 1.07 | 1.19 | 1.19 | 1.19 |
| 200            | 5.32                    | 5.32 | 5.30 | 0.02                   | 27.42     | 28.52 | 28.48 | 0.23                      | 200            | 1.06 | 1.18 | 1.17 | 1.18 |
| 250            | 5.34                    | 5.33 | 5.32 | 0.02                   | 26.46     | 27.75 | 27.70 | 0.19                      | 250            | 1.05 | 1.17 | 1.16 | 1.17 |
| 300            | 5.36                    | 5.35 | 5.35 | 0.02                   | 25.66     | 27.13 | 27.11 | 0.22                      | 300            | 1.03 | 1.16 | 1.15 | 1.16 |
| 400            | 5.42                    | 5.38 | 5.38 | 0.04                   | 24.31     | 26.11 | 26.09 | 0.36                      | 400            | 1.03 | 1.13 | 1.13 | 1.14 |
| 500            | 5.48                    | 5.42 | 5.44 | 0.06                   | 23.23     | 25.33 | 25.33 | 0.27                      | 500            | 1.03 | 1.11 | 1.12 | 1.13 |
| 550            | 5.52                    | 5.46 | 5.47 | 0.06                   | 22.71     | 24.97 | 24.94 | 0.27                      | 550            | 1.03 | 1.11 | 1.11 | 1.12 |
| 600            | 5.57                    | 5.49 | 5.51 | 0.07                   | 22.24     | 24.62 | 24.63 | 0.34                      | 600            | 1.03 | 1.10 | 1.11 | 1.12 |
| 650            | 5.63                    | 5.53 | 5.56 | 0.10                   | 21.78     | 24.26 | 24.29 | 0.31                      | 650            | 1.04 | 1.11 | 1.11 | 1.11 |
| 700            | 5.67                    | 5.57 | 5.59 | 0.10                   | 21.32     | 23.89 | 23.93 | 0.23                      | 700            | 1.05 | 1.12 | 1.11 | 1.11 |
| 750            | 5.73                    | 5.62 | 5.64 | 0.11                   | 20.91     | 23.58 | 23.63 | 0.12                      | 750            | 1.07 | 1.13 | 1.12 | 1.11 |
| 800            | 5.80                    | 5.65 | 5.67 | 0.14                   | 20.56     | 23.31 | 23.36 | 0.17                      | 800            | 1.09 | 1.14 | 1.13 | 1.11 |
| 820            | 5.82                    | 5.67 | 5.69 | 0.15                   | 20.43     | 23.23 | 23.27 | 0.15                      | 820            | 1.10 | 1.15 | 1.13 | 1.11 |
| 840            | 5.85                    | 5.70 | 5.72 | 0.14                   | 20.32     | 23.16 | 23.20 | 0.18                      | 840            | 1.11 | 1.16 | 1.13 | 1.11 |
| 860            | 5.88                    | 5.72 | 5.75 | 0.16                   | 20.21     | 23.10 | 23.14 | 0.16                      | 860            | 1.12 | 1.17 | 1.14 | 1.11 |
| 900            | 5.94                    | 5.77 | 5.78 | 0.17                   | 20.07     | 23.04 | 23.12 | 0.12                      | 900            | 1.13 | 1.19 | 1.15 | 1.12 |
| 925            | 5.98                    | 5.80 | 5.82 | 0.19                   | 20.00     | 23.08 | 23.13 | 0.13                      | 925            | 1.14 | 1.20 | 1.16 | 1.12 |
| 950            | 6.02                    | 5.82 | 5.83 | 0.20                   | 19.98     | 23.14 | 23.20 | 0.14                      | 950            | 1.15 | 1.21 | 1.17 | 1.13 |
| 1000           | 6.10                    | 5.88 | 5.89 | 0.22                   | 20.01     | 23.44 | 23.49 | 0.38                      | 1000           | 1.16 | 1.24 | 1.20 | 1.14 |
| 1080           | 6.24                    | 5.96 | 5.96 | 0.28                   | 20.34     | 24.35 | 24.41 | 0.72                      | 1080           | 1.17 | 1.27 | 1.24 | 1.16 |
| 1140           | 6.33                    | 6.02 | 6.02 | 0.31                   | 20.77     | 25.33 | 25.33 | 1.01                      | 1140           | 1.17 | 1.30 | 1.27 | 1.18 |
| 1200           | 6.41                    | 6.06 | 6.05 | 0.36                   | 21.16     | 25.88 | 25.76 | 1.60                      | 1200           | 1.17 | 1.32 | 1.29 | 1.19 |
| 1260           | 6.52                    | 6.13 | 6.11 | 0.42                   | 21.22     | 24.95 | 24.79 | 2.09                      | 1260           | 1.21 | 1.33 | 1.29 | 1.21 |
| 1320           | 6.68                    | 6.23 | 6.22 | 0.46                   | 20.50     | 22.58 | 22.41 | 2.83                      | 1320           | 1.29 | 1.33 | 1.29 | 1.21 |
| 1380           | 6.93                    | 6.42 | 6.40 | 0.53                   | 19.09     | 19.90 | 19.79 | 3.48                      | 1380           | 1.39 | 1.31 | 1.26 | 1.22 |
| 1440           | 7.31                    | 6.77 | 6.74 | 0.57                   | 17.40     | 17.51 | 17.47 | 4.23                      | 1440           | 1.56 | 1.28 | 1.23 | 1.22 |
| 1500           | 7.84                    | 7.24 | 7.21 | 0.63                   | 15.76     | 15.53 | 15.56 | 5.17                      | 1500           | 1.72 | 1.24 | 1.18 | 1.21 |

<sup>1</sup>Total Loss = Insertion Loss + 4.8dB Splitter Loss



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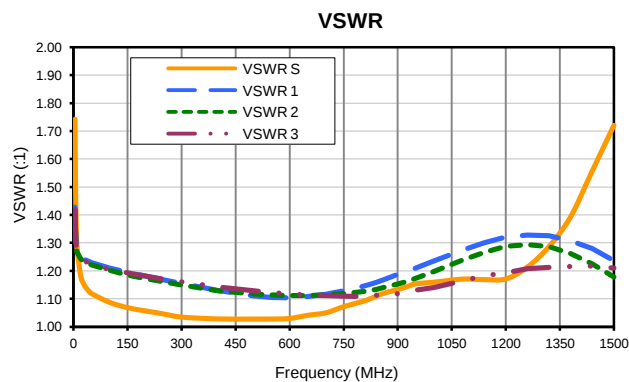
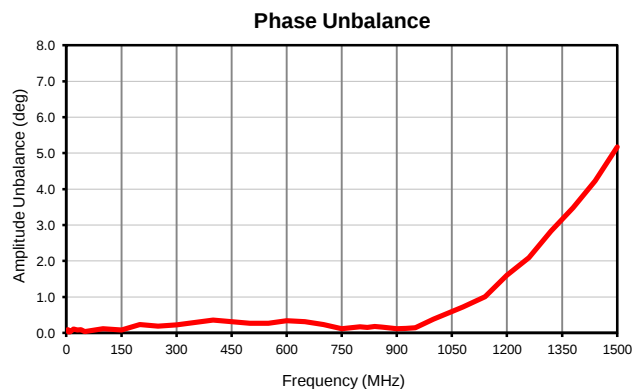
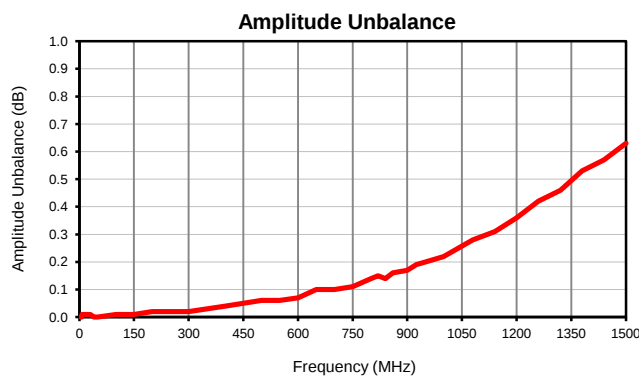
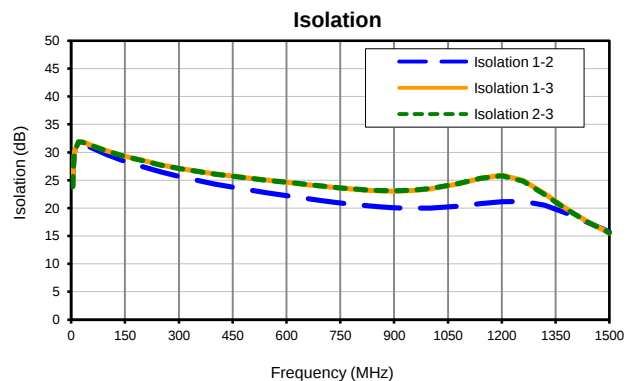
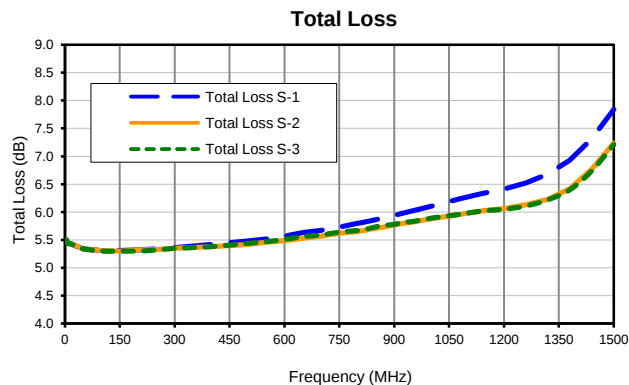
IF/RF MICROWAVE COMPONENTS

REV. OR  
SYPS-3-12W-75+  
4/24/2015  
Page 1 of 1

# 3 Way-0° Power Splitter/Combiner

SYPS-3-12W-75+

## Typical Performance Curves



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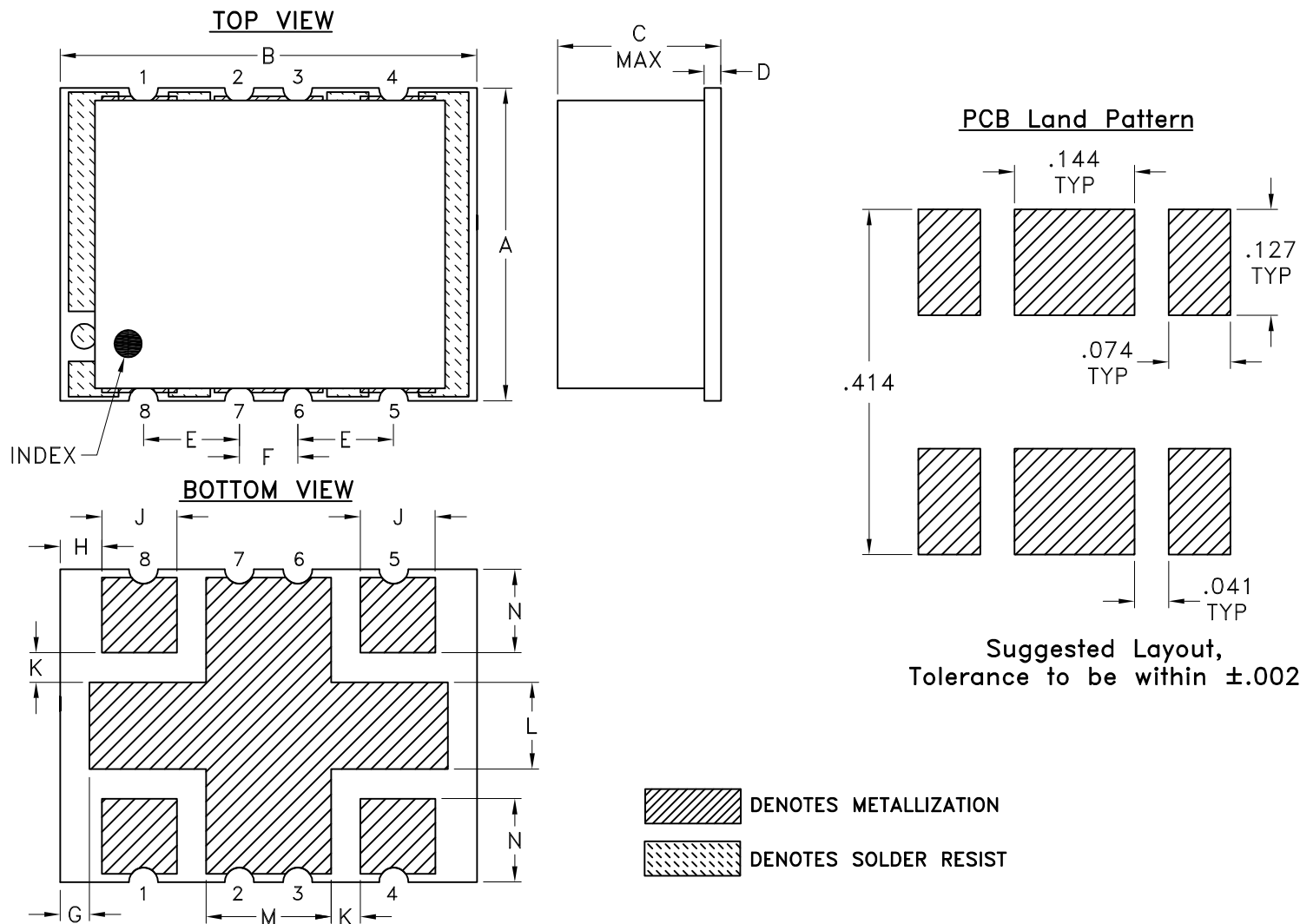
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IF/RF MICROWAVE COMPONENTS

REV. OR  
SYPS-3-12W-75+  
4/24/2015  
Page 1 of 1

## Outline Dimensions

AH202



| CASE# | A             | B              | C             | D              | E              | F              | G              | H              | J              | K              | L              | M              | N              | WT, GRAM |
|-------|---------------|----------------|---------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------|
| AH202 | .38<br>(9.65) | .50<br>(12.70) | .25<br>(6.35) | .020<br>(0.51) | .115<br>(2.92) | .070<br>(1.78) | .035<br>(0.89) | .050<br>(1.27) | .090<br>(2.29) | .040<br>(1.02) | .105<br>(2.67) | .140<br>(3.56) | .095<br>(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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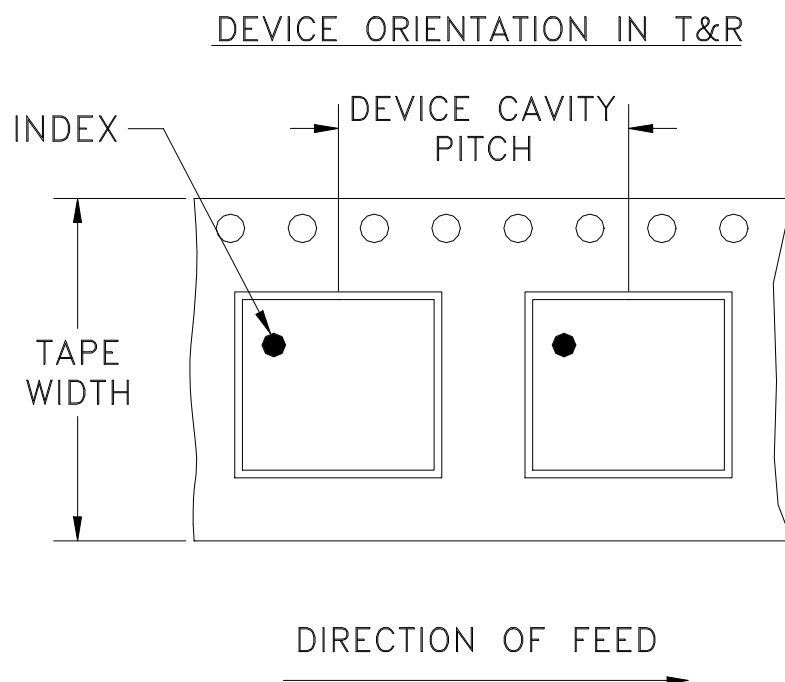
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RF/IF MICROWAVE COMPONENTS

# Tape & Reel Packaging TR-F61



| Tape Width,<br>mm | Device Cavity<br>Pitch, mm | Reel Size,<br>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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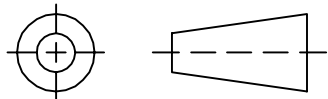
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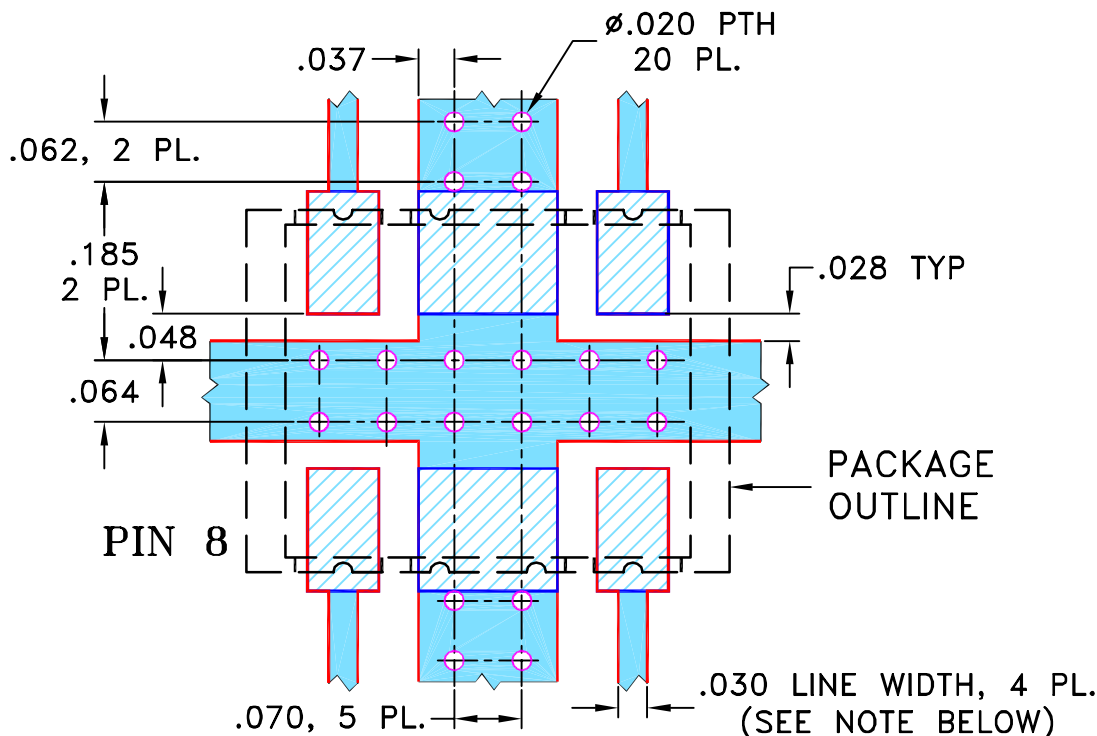
## THIRD ANGLE PROJECTION



## 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   |
|     |         |                       |          |     |      |
|     |         |                       |          |     |      |

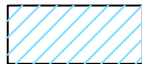
**SUGGESTED MOUNTING CONFIGURATION  
FOR AH202 CASE STYLE, "rd" PIN CONNECTION.**

**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

TOLERANCES ON:

2 PL DECIMALS  $\pm$ 3 PL DECIMALS  $\pm$  .005ANGLES  $\pm$ FRACTIONS  $\pm$ 

DRAWN

MMG

10/17/05

CHECKED

IL

10/18/05

APPROVED

HY

10/18/05



**Mini-Circuits®**

13 Neptune Avenue  
Brooklyn NY 11235

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

Mini-Circuits®

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CODE IDENT  
15542

DRAWING NO:  
98-PL-229

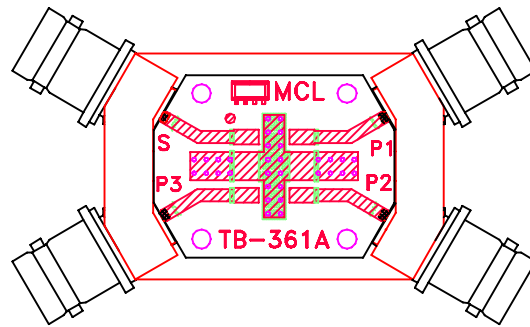
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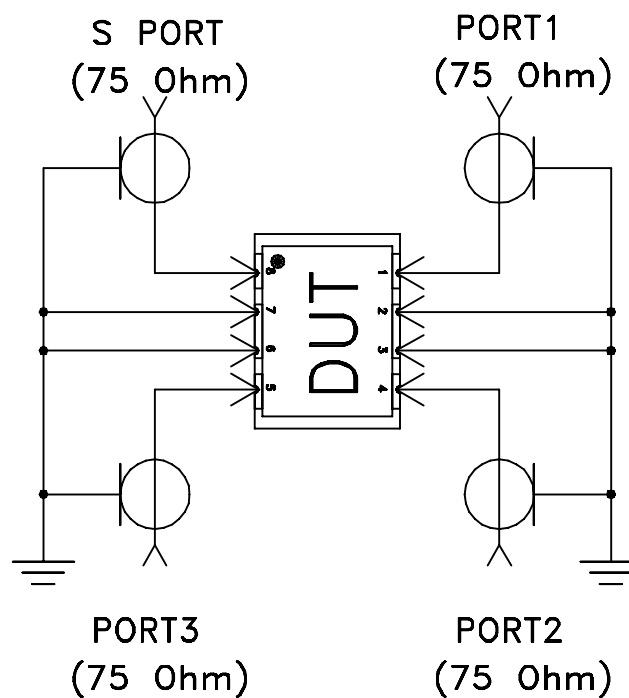
SCALE: 5:1

SHEET: 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"

 **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<br>Ambient Environment                                                                                                                             | Individual Model Data Sheet                                                                          |
| Storage Temperature            | -55° to 100° C<br>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<br>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;<br>distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C | MIL-STD-202, Method 215                                                                              |