*Non-Catalog Model*

# Power Splitter/Combiner SYPQ-113-1

2 Way-90°

### Important Note

This is a non-catalog model and can be manufactured on specific request.
Pricing and delivery information can be supplied upon request.

Please click "Back", and then click "Contact Us" for Applications support.

**CASE STYLE : AH202**

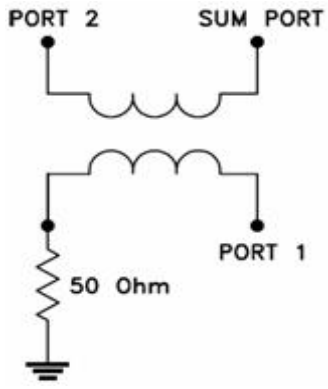
| ELECTRICAL SPECIFICATIONS 50Ω @ +25°C | | | | | |
|---|---|---|---|---|---|
| **Parameter** | | **Min.** | **Typ.** | **Max.** | **Units** |
| **Frequency** | | 108 | | 118 | MHz |
| **Isolation** | **108 - 118 MHz** | 20 | 25 | | dB |
| **Insertion Loss Average of Coupled Outputs above 3.0 dB** | **108 - 118 MHz** | | 0.15 | 0.40 | dB |
| **Phase Unbalance** | **108 - 118 MHz** | | 0.034 | 3.000 | deg. |
| **Amplitude Unbalance** | **108 - 118 MHz** | | 0.186 | 1.000 | dB |
| **VSWR** | **SUM Port** | | 1.07 | | (:1) |
| | **OUT Ports** | | 1.07 | | (:1) |

**Notes:** Matched power rating: 1 Watt.
Internal load dissipation: 0.125 Watt.
Non-hermetic.

| MAXIMUM RATINGS | |
|---|---|
| **Operating Temperature** | -40°C to 85°C |
| **Storage Temperature** | -55°C to 100°C |

| PIN CONNECTIONS | |
|---|---|
| **SUM PORT** | 1 |
| **PORT 1** | 5 |
| **PORT 2** | 8 |
| **GND EXT** | 2, 3, 6, 7 |
| **50Ω TERMINATION** | 4 |

## Functional Diagram



# 2 Way-90° Power Splitter/Combiner SYPQ-113-1

*Typical Performance Data*

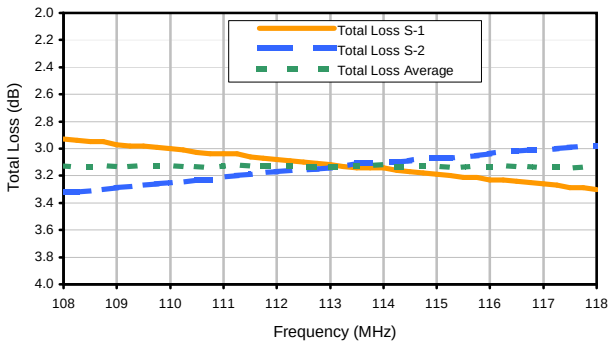
| FREQ. (MHz) | TOTAL LOSS[1] (dB) | | | AMP. UNBAL. (dB) | ISOLATION (dB) | PHASE UNBAL. (deg.) | FREQ. (MHz) | VSWR (:1) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | S-1 | S-2 | AVG. | | | | | S | 1 | 2 |
| 108.0 | 2.93 | 3.32 | 3.13 | 0.39 | 27.29 | 89.99 | 108.0 | 1.06 | 1.06 | 1.07 |
| 108.3 | 2.94 | 3.32 | 3.13 | 0.38 | 27.29 | 90.01 | 108.3 | 1.06 | 1.06 | 1.07 |
| 108.5 | 2.95 | 3.31 | 3.13 | 0.36 | 27.29 | 89.94 | 108.5 | 1.06 | 1.06 | 1.07 |
| 108.8 | 2.95 | 3.30 | 3.13 | 0.35 | 27.28 | 89.98 | 108.8 | 1.07 | 1.06 | 1.07 |
| 109.0 | 2.97 | 3.29 | 3.13 | 0.32 | 27.29 | 90.00 | 109.0 | 1.07 | 1.06 | 1.07 |
| 109.3 | 2.98 | 3.28 | 3.13 | 0.30 | 27.29 | 89.99 | 109.3 | 1.07 | 1.06 | 1.07 |
| 109.5 | 2.98 | 3.27 | 3.13 | 0.29 | 27.29 | 89.94 | 109.5 | 1.07 | 1.06 | 1.07 |
| 109.8 | 2.99 | 3.26 | 3.13 | 0.27 | 27.31 | 89.98 | 109.8 | 1.07 | 1.06 | 1.07 |
| 110.0 | 3.00 | 3.25 | 3.13 | 0.25 | 27.30 | 90.00 | 110.0 | 1.07 | 1.06 | 1.07 |
| 110.3 | 3.01 | 3.25 | 3.13 | 0.24 | 27.29 | 89.96 | 110.3 | 1.07 | 1.06 | 1.07 |
| 110.5 | 3.03 | 3.23 | 3.13 | 0.20 | 27.29 | 90.01 | 110.5 | 1.07 | 1.06 | 1.07 |
| 110.8 | 3.04 | 3.23 | 3.14 | 0.19 | 27.28 | 89.96 | 110.8 | 1.07 | 1.06 | 1.07 |
| 111.0 | 3.04 | 3.21 | 3.13 | 0.17 | 27.30 | 90.00 | 111.0 | 1.07 | 1.06 | 1.07 |
| 111.3 | 3.04 | 3.20 | 3.12 | 0.16 | 27.28 | 89.99 | 111.3 | 1.07 | 1.06 | 1.07 |
| 111.5 | 3.06 | 3.19 | 3.13 | 0.13 | 27.29 | 89.94 | 111.5 | 1.07 | 1.06 | 1.07 |
| 111.8 | 3.07 | 3.18 | 3.13 | 0.11 | 27.30 | 90.00 | 111.8 | 1.07 | 1.07 | 1.07 |
| 112.0 | 3.08 | 3.17 | 3.13 | 0.09 | 27.30 | 89.99 | 112.0 | 1.07 | 1.06 | 1.07 |
| 112.3 | 3.09 | 3.16 | 3.13 | 0.08 | 27.26 | 89.95 | 112.3 | 1.07 | 1.07 | 1.07 |
| 112.5 | 3.10 | 3.16 | 3.13 | 0.06 | 27.29 | 89.91 | 112.5 | 1.07 | 1.07 | 1.07 |
| 112.8 | 3.11 | 3.15 | 3.13 | 0.04 | 27.28 | 89.94 | 112.8 | 1.07 | 1.07 | 1.07 |
| 113.0 | 3.12 | 3.14 | 3.13 | 0.02 | 27.28 | 89.97 | 113.0 | 1.07 | 1.07 | 1.07 |
| 113.3 | 3.13 | 3.13 | 3.13 | 0.00 | 27.27 | 89.94 | 113.3 | 1.07 | 1.07 | 1.07 |
| 113.5 | 3.14 | 3.11 | 3.13 | 0.02 | 27.28 | 89.97 | 113.5 | 1.07 | 1.07 | 1.07 |
| 113.8 | 3.14 | 3.11 | 3.13 | 0.04 | 27.29 | 89.91 | 113.8 | 1.07 | 1.07 | 1.07 |
| 114.0 | 3.14 | 3.10 | 3.12 | 0.04 | 27.27 | 89.94 | 114.0 | 1.07 | 1.07 | 1.07 |
| 114.3 | 3.16 | 3.10 | 3.13 | 0.06 | 27.27 | 90.01 | 114.3 | 1.07 | 1.07 | 1.07 |
| 114.5 | 3.17 | 3.09 | 3.13 | 0.09 | 27.28 | 89.93 | 114.5 | 1.07 | 1.07 | 1.07 |
| 114.8 | 3.18 | 3.07 | 3.13 | 0.10 | 27.28 | 89.90 | 114.8 | 1.07 | 1.07 | 1.07 |
| 115.0 | 3.19 | 3.07 | 3.13 | 0.11 | 27.29 | 89.94 | 115.0 | 1.07 | 1.07 | 1.07 |
| 115.3 | 3.20 | 3.07 | 3.14 | 0.13 | 27.28 | 89.95 | 115.3 | 1.07 | 1.07 | 1.07 |
| 115.5 | 3.21 | 3.06 | 3.14 | 0.15 | 27.29 | 89.96 | 115.5 | 1.07 | 1.07 | 1.07 |
| 115.8 | 3.21 | 3.05 | 3.13 | 0.17 | 27.30 | 89.94 | 115.8 | 1.07 | 1.07 | 1.07 |
| 116.0 | 3.23 | 3.04 | 3.14 | 0.19 | 27.28 | 89.96 | 116.0 | 1.07 | 1.07 | 1.07 |
| 116.3 | 3.23 | 3.02 | 3.13 | 0.21 | 27.28 | 89.94 | 116.3 | 1.07 | 1.07 | 1.07 |
| 116.5 | 3.24 | 3.02 | 3.13 | 0.22 | 27.28 | 90.00 | 116.5 | 1.07 | 1.07 | 1.07 |
| 116.8 | 3.25 | 3.01 | 3.13 | 0.24 | 27.29 | 89.98 | 116.8 | 1.07 | 1.07 | 1.07 |
| 117.0 | 3.26 | 3.01 | 3.14 | 0.25 | 27.28 | 89.99 | 117.0 | 1.07 | 1.07 | 1.07 |
| 117.3 | 3.27 | 3.00 | 3.14 | 0.28 | 27.27 | 89.96 | 117.3 | 1.07 | 1.07 | 1.07 |
| 117.5 | 3.29 | 2.99 | 3.14 | 0.29 | 27.29 | 89.97 | 117.5 | 1.07 | 1.07 | 1.07 |
| 117.8 | 3.29 | 2.98 | 3.14 | 0.31 | 27.28 | 89.96 | 117.8 | 1.07 | 1.07 | 1.07 |
| 118.0 | 3.30 | 2.98 | 3.14 | 0.32 | 27.28 | 90.01 | 118.0 | 1.07 | 1.07 | 1.07 |

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

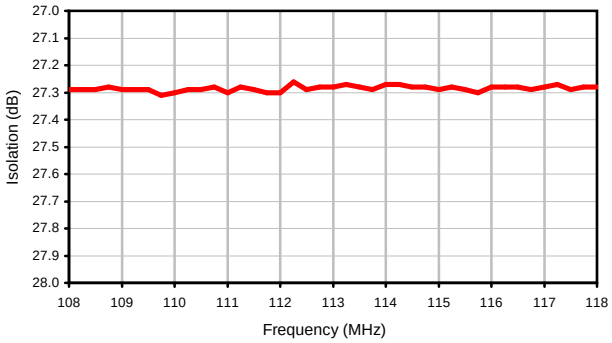
# 2 Way-90° Power Splitter/Combiner SYPQ-113-1

*Typical Performance Curves*

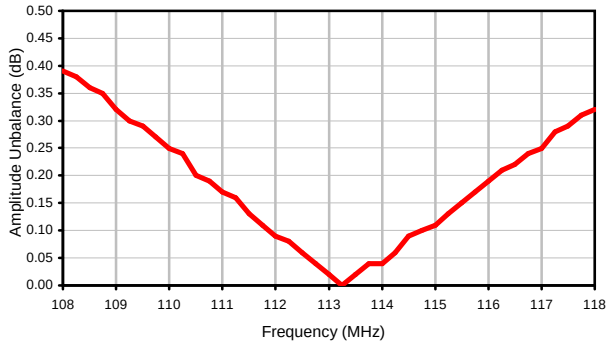
**Total Loss**



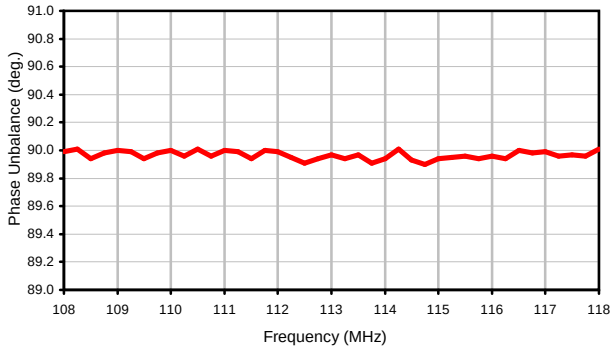

**Isolation**



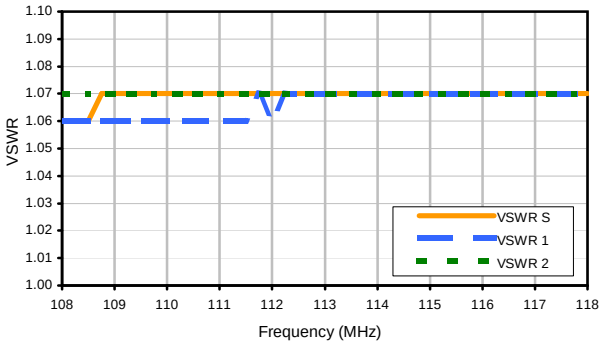

**Amplitude Unbalance**




**Phase Unbalance**



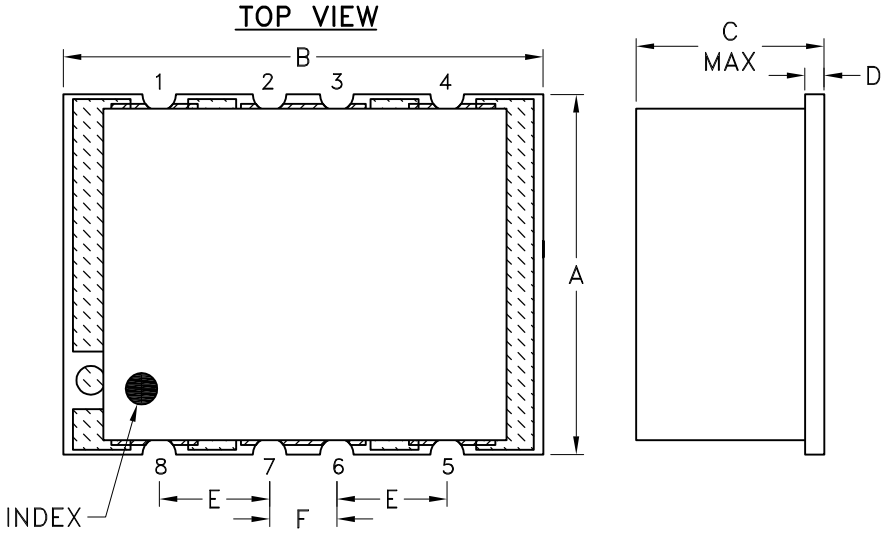

**VSWR**

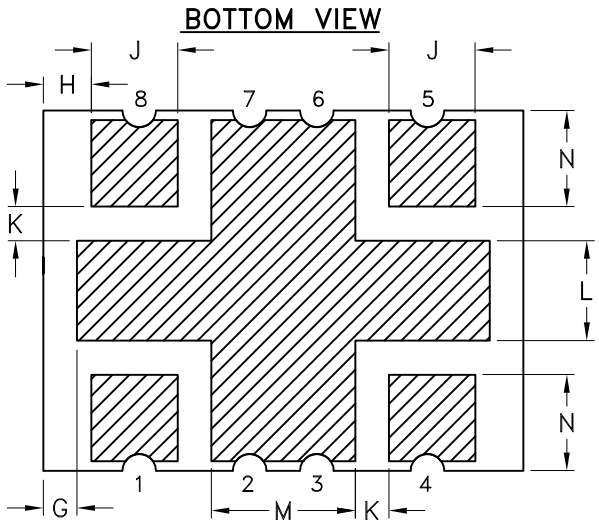


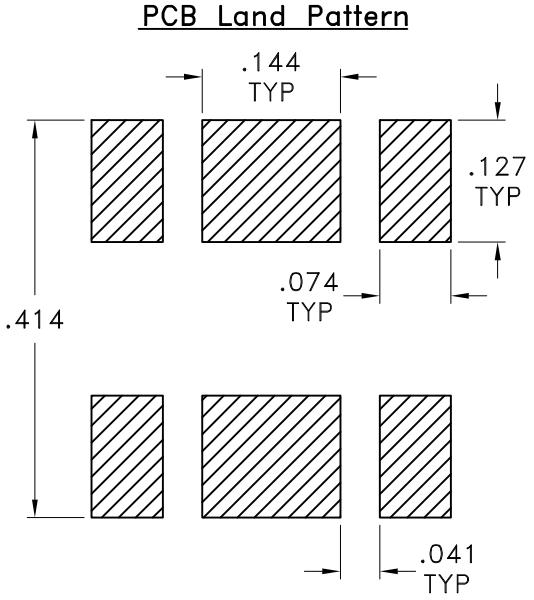
# Case Style AH

## 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

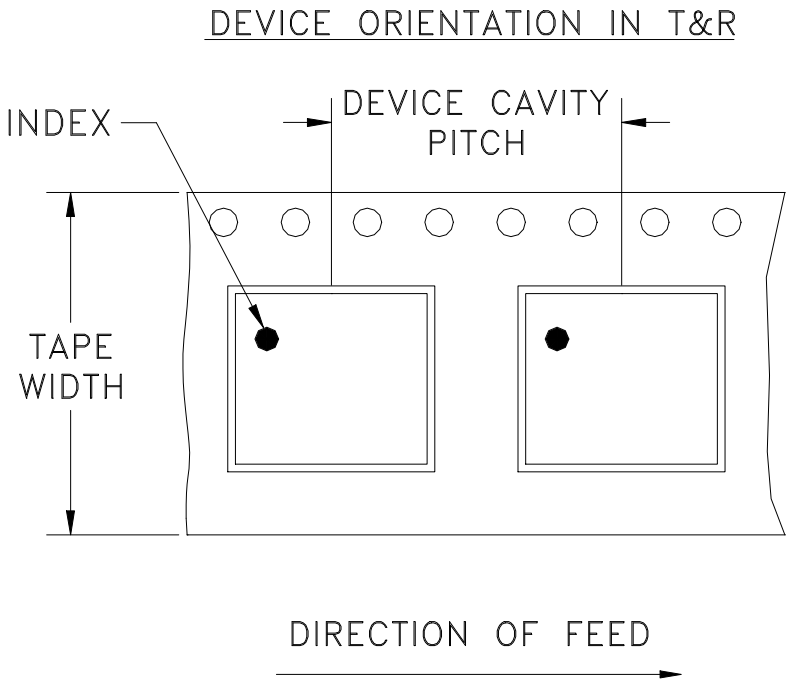
Notes:

1. Case material: Plastic.
2. Base material: Printed wiring laminate.
3. Termination finish:

For RoHS 3-5 $\mu$ 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.

# 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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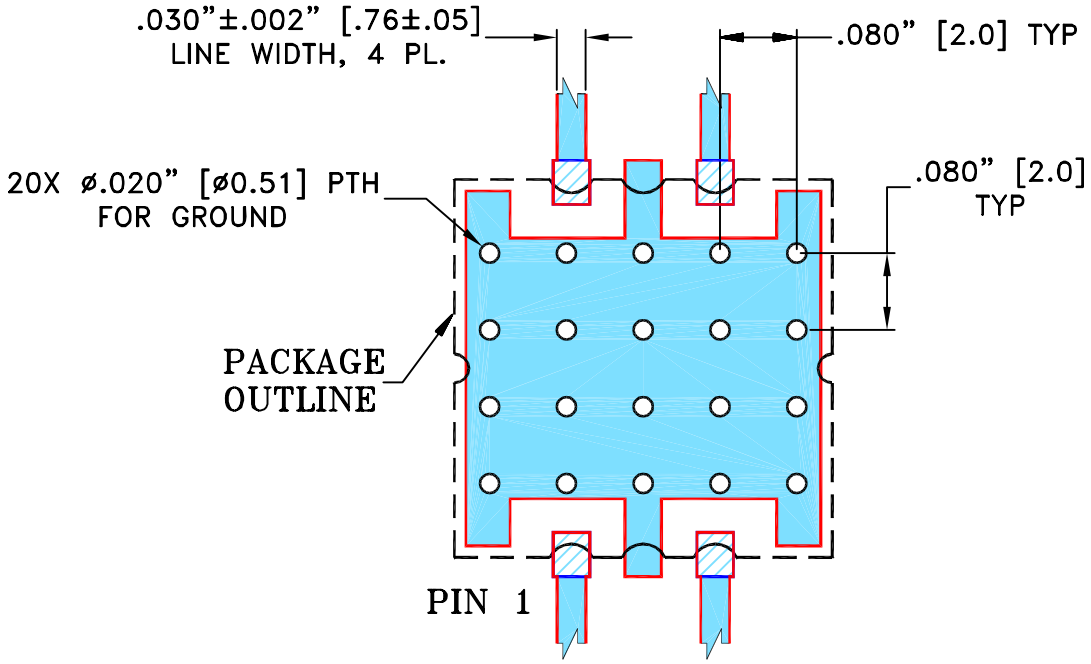
THIRD ANGLE PROJECTION

| REVISIONS | | | | | |
|---|---|---|---|---|---|
| REV | ECN No. | DESCRIPTION | DATE | DR | AUTH |
| OR | M103787 | NEW RELEASE (FROM RAVON) | 03/06 | RZ | HH |
| A | M121588 | UPDATE GROUND PLANE | 02/09 | EM | KN |
| A | R75766 | UPDATE GROUND PLANE | 02/09 | EM | KN |
| | | | | | |

## SUGGESTED MOUNTING CONFIGURATION
## FOR HE1135 CASE STYLE, qg PIN CONNECTION, 75 OHM




NOTE:

1. TRACE WIDTH IS SHOWN FOR RO4350 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 SOLDERMASK

| UNLESS OTHERWISE SPECIFIED | | INITIALS | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES | DRAWN | RZ (RAVON) | 2 MAR 06 |
| TOLERANCES ON: | CHECKED | RZ (RAVON) | 2 MAR 06 |
| 2 PL DECIMALS ± | APPROVED | HH (RAVON) | 2 MAR 06 |
| 3 PL DECIMALS ± .005 | | | |
| ANGLES ± | | | |
| FRACTIONS ± | | | |



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

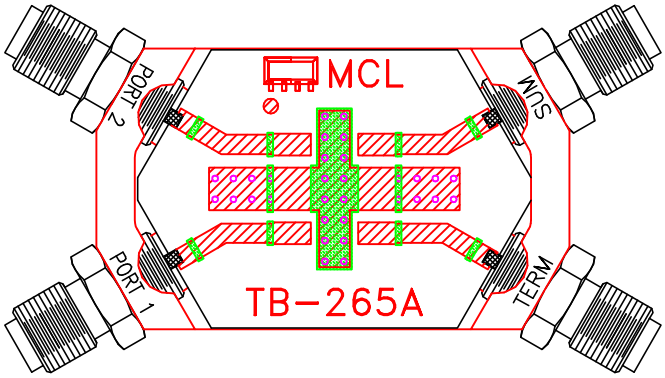
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, qg, HE1135, TB-381, 75 OHM

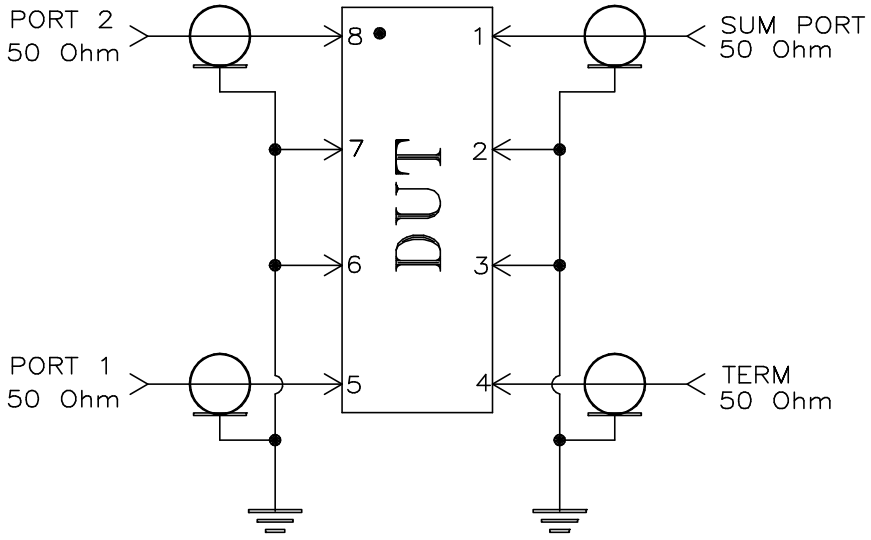
| SIZE | CODE IDENT | DRAWING NO: | REV: |
|---|---|---|---|
| A | 15542 | 98-PL-238 | A |

| FILE: | SCALE: | SHEET: |
|---|---|---|
| 98PL238 | 5:1 | 1 OF 1 |

# Evaluation Board and Circuit




TB-265




Schematic Diagram

## Notes:

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

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