*Engineering Development Model*

# Power Splitter/Combiner SXP-ED13920A/1

4 Way-0°

### Important Note

This model has been designed, built and tested in our engineering department. Performance data represents model capability.
At present it is a non-catalog model. On request, we can supply a final specification sheet, part number and price/delivery information.

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

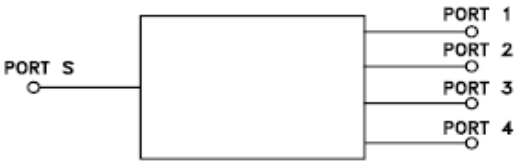
**CASE STYLE : HF1485**

| ELECTRICAL SPECIFICATIONS 75Ω @ +25°C | | | | | |
|---|---|---|---|---|---|
| **Parameter** | | **Min.** | **Typ.** | **Max.** | **Units** |
| **Frequency** | | 50 | | 1000 | MHz |
| **Isolation** | **50-500 MHz** | | 30 | | dB |
| | **500-1000 MHz** | | 23 | | |
| **Insertion Loss Above 6.0 dB** | **50-500 MHz** | | 0.80 | | dB |
| | **500-1000 MHz** | | 1.20 | | |
| **Phase Unbalance** | **50-500 MHz** | | 0.40 | | deg. |
| | **500-1000 MHz** | | 1.00 | | |
| **Amplitude Unbalance** | **50-500 MHz** | | 0.02 | | dB |
| | **500-1000 MHz** | | 0.05 | | |
| **VSWR** | **SUM Port** | | 1.20 | | (:1) |
| | **OUT Ports** | | 1.20 | | (:1) |

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

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

## Functional Diagram



# 4 Way-0° Power Splitter/Combiner SXP-ED13920A/1

## *Typical Performance Data*

| FREQ. (MHz) | TOTAL LOSS[1] (dB) | | | | AMP. UNBAL. (dB) | ISOLATION (dB) | | | PHASE UNBAL. (deg.) |
|---|---|---|---|---|---|---|---|---|---|
| | S-1 | S-2 | S-3 | S-4 | | 1-2 | 2-3 | 3-4 | |
| 10.0 | 6.67 | 6.66 | 6.65 | 6.67 | 0.02 | 24.69 | 21.38 | 25.43 | 0.05 |
| 30.0 | 6.64 | 6.64 | 6.62 | 6.64 | 0.02 | 30.59 | 26.91 | 30.95 | 0.04 |
| 50.0 | 6.65 | 6.64 | 6.63 | 6.65 | 0.02 | 33.17 | 29.02 | 33.10 | 0.08 |
| 70.0 | 6.66 | 6.65 | 6.64 | 6.66 | 0.02 | 34.59 | 30.25 | 34.13 | 0.10 |
| 90.0 | 6.67 | 6.67 | 6.65 | 6.67 | 0.02 | 35.47 | 31.07 | 34.77 | 0.12 |
| 100.0 | 6.67 | 6.67 | 6.65 | 6.67 | 0.02 | 35.82 | 31.37 | 35.00 | 0.15 |
| 150.0 | 6.70 | 6.69 | 6.68 | 6.70 | 0.02 | 36.88 | 32.59 | 35.81 | 0.18 |
| 200.0 | 6.72 | 6.71 | 6.69 | 6.72 | 0.03 | 37.31 | 33.68 | 36.30 | 0.29 |
| 250.0 | 6.73 | 6.71 | 6.71 | 6.73 | 0.02 | 37.10 | 34.96 | 36.45 | 0.40 |
| 300.0 | 6.74 | 6.73 | 6.71 | 6.73 | 0.03 | 36.12 | 36.53 | 35.86 | 0.49 |
| 350.0 | 6.76 | 6.76 | 6.73 | 6.75 | 0.03 | 34.56 | 38.51 | 34.57 | 0.49 |
| 375.0 | 6.77 | 6.75 | 6.75 | 6.76 | 0.02 | 33.64 | 39.62 | 33.76 | 0.58 |
| 400.0 | 6.79 | 6.78 | 6.76 | 6.78 | 0.04 | 32.79 | 40.89 | 32.95 | 0.50 |
| 450.0 | 6.80 | 6.78 | 6.77 | 6.79 | 0.03 | 31.07 | 43.03 | 31.24 | 0.61 |
| 500.0 | 6.79 | 6.78 | 6.78 | 6.78 | 0.02 | 29.55 | 42.88 | 29.71 | 0.78 |
| 550.0 | 6.80 | 6.81 | 6.78 | 6.78 | 0.03 | 28.24 | 40.53 | 28.34 | 0.80 |
| 600.0 | 6.83 | 6.85 | 6.80 | 6.81 | 0.05 | 27.18 | 38.02 | 27.21 | 0.69 |
| 650.0 | 6.87 | 6.86 | 6.84 | 6.84 | 0.03 | 26.26 | 35.92 | 26.27 | 0.71 |
| 700.0 | 6.88 | 6.86 | 6.88 | 6.85 | 0.03 | 25.53 | 34.26 | 25.51 | 0.92 |
| 725.0 | 6.90 | 6.91 | 6.87 | 6.87 | 0.04 | 25.28 | 33.61 | 25.21 | 0.77 |
| 750.0 | 6.89 | 6.90 | 6.90 | 6.86 | 0.04 | 25.00 | 33.01 | 24.93 | 1.09 |
| 775.0 | 6.93 | 6.92 | 6.92 | 6.90 | 0.03 | 24.81 | 32.51 | 24.72 | 0.88 |
| 800.0 | 6.92 | 6.96 | 6.91 | 6.89 | 0.07 | 24.68 | 32.10 | 24.54 | 1.06 |
| 850.0 | 6.98 | 7.00 | 6.96 | 6.95 | 0.05 | 24.50 | 31.45 | 24.33 | 0.95 |
| 900.0 | 7.03 | 7.02 | 7.03 | 7.00 | 0.04 | 24.48 | 31.07 | 24.28 | 1.12 |
| 940.0 | 7.03 | 7.07 | 7.07 | 6.99 | 0.08 | 24.62 | 30.96 | 24.40 | 1.40 |
| 960.0 | 7.09 | 7.08 | 7.11 | 7.05 | 0.06 | 24.72 | 30.91 | 24.48 | 1.22 |
| 980.0 | 7.10 | 7.13 | 7.10 | 7.06 | 0.07 | 24.89 | 30.91 | 24.58 | 0.99 |
| 1002.0 | 7.09 | 7.15 | 7.15 | 7.05 | 0.10 | 25.07 | 30.97 | 24.79 | 1.36 |
| 1050.0 | 7.15 | 7.23 | 7.18 | 7.12 | 0.11 | 25.66 | 31.16 | 25.29 | 1.09 |
| 1100.0 | 7.23 | 7.27 | 7.25 | 7.20 | 0.07 | 26.45 | 31.45 | 25.98 | 1.25 |
| 1150.0 | 7.29 | 7.32 | 7.34 | 7.26 | 0.08 | 27.52 | 31.87 | 26.97 | 1.57 |
| 1200.0 | 7.31 | 7.39 | 7.40 | 7.29 | 0.11 | 28.93 | 32.22 | 28.19 | 1.75 |

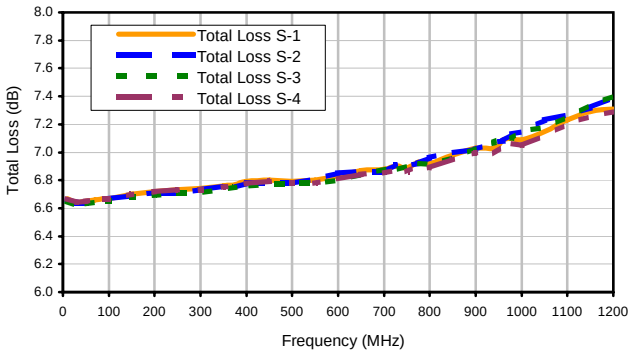
| FREQ. (MHz) | VSWR (:1) | | | | |
|---|---|---|---|---|---|
| | S | 1 | 2 | 3 | 4 |
| 10.0 | 1.14 | 1.44 | 1.44 | 1.46 | 1.46 |
| 30.0 | 1.12 | 1.28 | 1.28 | 1.29 | 1.29 |
| 50.0 | 1.12 | 1.25 | 1.25 | 1.26 | 1.26 |
| 70.0 | 1.12 | 1.24 | 1.24 | 1.25 | 1.25 |
| 90.0 | 1.12 | 1.24 | 1.23 | 1.24 | 1.24 |
| 100.0 | 1.13 | 1.23 | 1.23 | 1.24 | 1.24 |
| 150.0 | 1.16 | 1.23 | 1.22 | 1.23 | 1.23 |
| 200.0 | 1.19 | 1.21 | 1.21 | 1.22 | 1.22 |
| 250.0 | 1.22 | 1.20 | 1.21 | 1.22 | 1.21 |
| 300.0 | 1.24 | 1.19 | 1.20 | 1.20 | 1.19 |
| 350.0 | 1.26 | 1.18 | 1.19 | 1.19 | 1.18 |
| 375.0 | 1.27 | 1.17 | 1.18 | 1.19 | 1.17 |
| 400.0 | 1.28 | 1.16 | 1.17 | 1.18 | 1.16 |
| 450.0 | 1.28 | 1.14 | 1.15 | 1.16 | 1.15 |
| 500.0 | 1.27 | 1.12 | 1.13 | 1.13 | 1.12 |
| 550.0 | 1.26 | 1.09 | 1.11 | 1.11 | 1.10 |
| 600.0 | 1.23 | 1.07 | 1.08 | 1.08 | 1.07 |
| 650.0 | 1.20 | 1.04 | 1.06 | 1.06 | 1.05 |
| 700.0 | 1.16 | 1.02 | 1.05 | 1.05 | 1.04 |
| 725.0 | 1.14 | 1.02 | 1.05 | 1.05 | 1.04 |
| 750.0 | 1.12 | 1.02 | 1.05 | 1.05 | 1.04 |
| 775.0 | 1.10 | 1.03 | 1.06 | 1.06 | 1.05 |
| 800.0 | 1.09 | 1.05 | 1.07 | 1.08 | 1.06 |
| 850.0 | 1.06 | 1.08 | 1.10 | 1.10 | 1.09 |
| 900.0 | 1.03 | 1.10 | 1.13 | 1.13 | 1.12 |
| 940.0 | 1.03 | 1.12 | 1.16 | 1.15 | 1.15 |
| 960.0 | 1.04 | 1.13 | 1.17 | 1.17 | 1.16 |
| 980.0 | 1.04 | 1.14 | 1.18 | 1.18 | 1.17 |
| 1002.0 | 1.06 | 1.15 | 1.19 | 1.19 | 1.18 |
| 1050.0 | 1.07 | 1.17 | 1.22 | 1.21 | 1.21 |
| 1100.0 | 1.10 | 1.19 | 1.25 | 1.23 | 1.24 |
| 1150.0 | 1.11 | 1.21 | 1.27 | 1.26 | 1.26 |
| 1200.0 | 1.12 | 1.23 | 1.29 | 1.28 | 1.28 |

[1]Total Loss = Insertion Loss + 6dB Splitter Loss

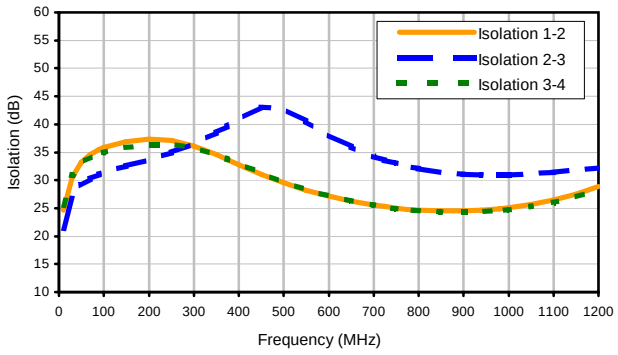
# 4 Way-0° Power Splitter/Combiner SXP-ED13920A/1

## *Typical Performance Curves*

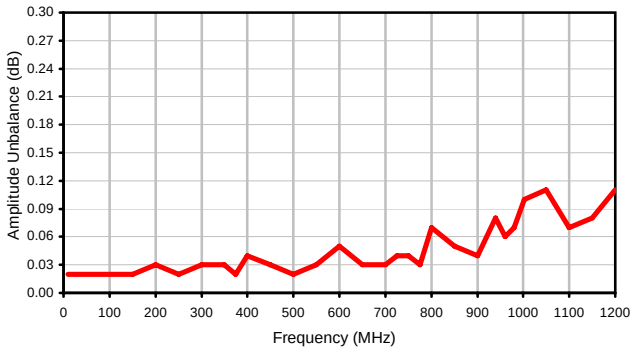
**Total Loss**



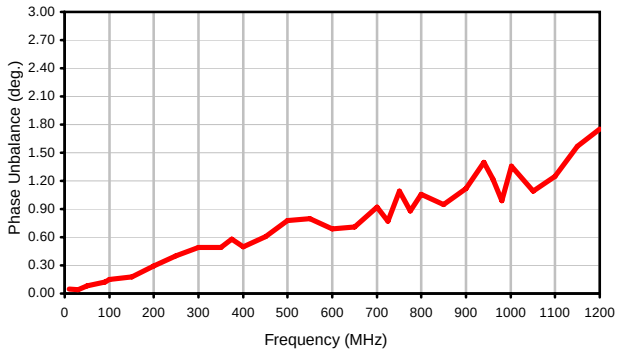

**Isolation**



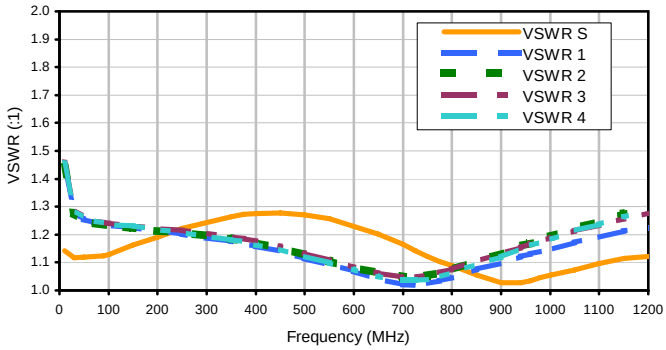

**Amplitude Unbalance**




**Phase Unbalance**



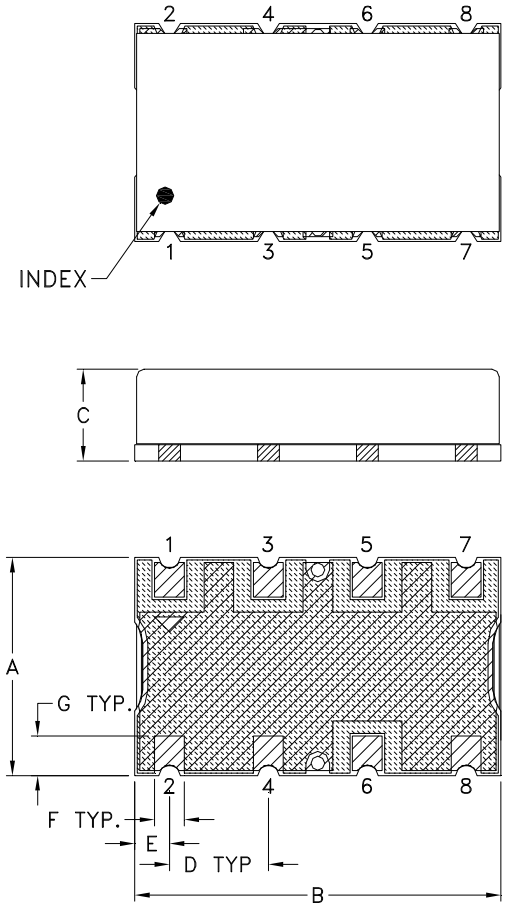

**VSWR**



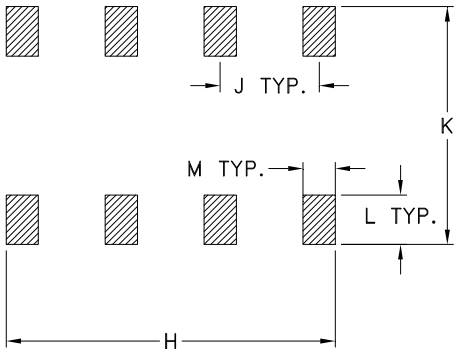
# Case Style HF

**HF1485**

## Outline Dimensions




### PCB Land Pattern




Suggested Layout,
Tolerance to be within ±.002

METALLIZATION

SOLDER RESIST

| CASE # | A | B | C | D | E | F | G | H | J | K | L | M | WT. GRAMS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HF1485 | .44 (11.18) | .74 (18.80) | .19 (4.83) | .200 (5.08) | .07 (1.78) | .060 (1.52) | .080 (2.03) | .665 (16.89) | .200 (5.08) | .480 (12.19) | .100 (2.54) | .065 (1.65) | 2.5 |

**Dimensions are in inches (mm). Tolerances: 2 Pl. ±.015"; 3 Pl. ±.01"**

### Notes:

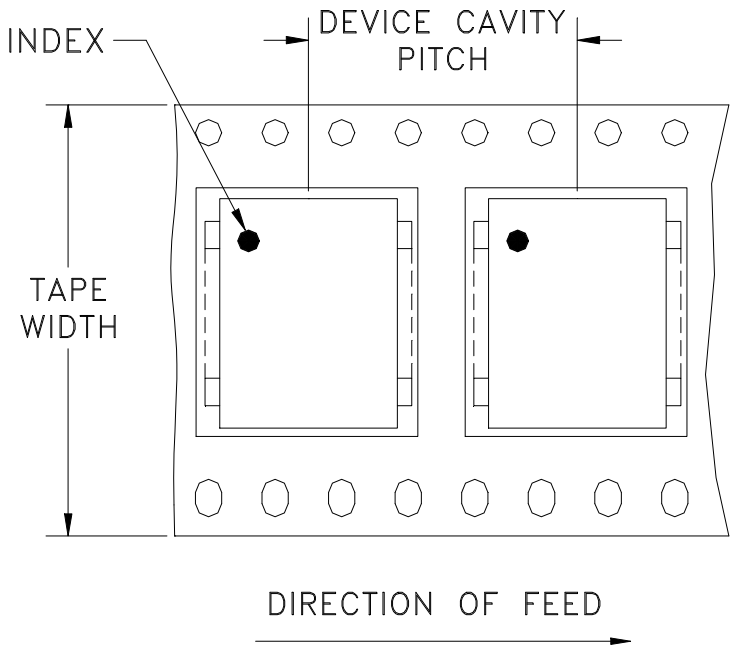
1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. Termination finish:
   For RoHS Case Styles: 2-5 µ inch (.05-.13 microns) Gold over 120-240 µ inch (3.05-6.10 microns) Nickel plate.
   For RoHS-5 Case Styles: Tin-Lead plate.



This document and its contents are the property of Mini-Circuits.

# Tape & Reel Packaging TR-F5

DEVICE ORIENTATION IN T&R




| Tape Width, mm | Device Cavity Pitch, mm | Reel Size, inches | Devices per Reel |
|---|---|---|---|
| 32 | 16 | 13 | 500 |

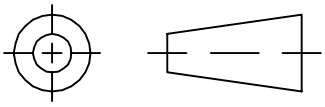
Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

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

Mini-Circuits®
INTERNET http://www.minicircuits.com
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010
Mini-Circuits ISO 9001 & ISO 14001 Certified


This document and its contents are the property of Mini-Circuits.

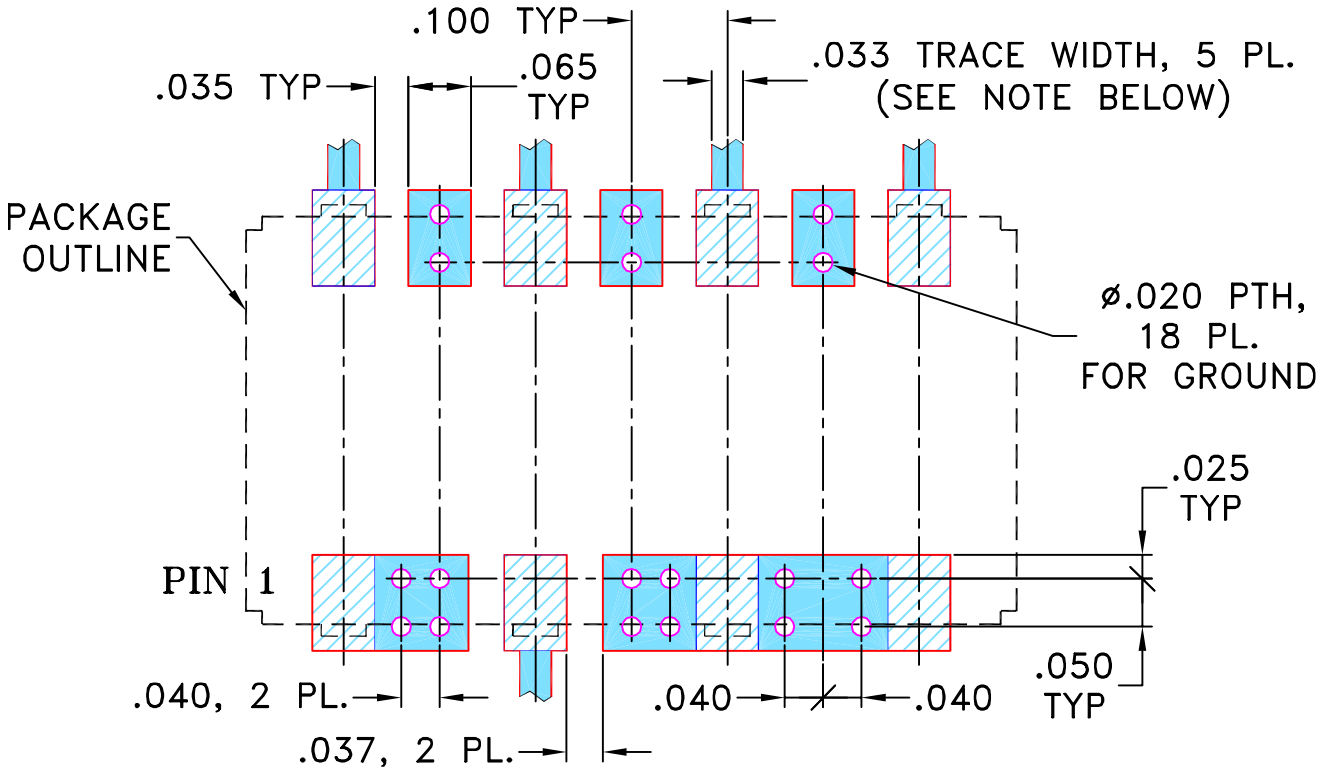
THIRD ANGLE PROJECTION



REVISIONS

| REV | ECN No. | DESCRIPTION | DATE | DR | AUTH |
|---|---|---|---|---|---|
| OR | M90087 | NEW RELEASE | 12/18/03 | AV | HY |
| A | M102713 | ADDED "...WITH SMOBC" | 01/12/06 | GF | IL |
| | | | | | |
| | | | | | |

# SUGGESTED MOUNTING CONFIGURATION FOR BJ360 CASE STYLE, "kb" PIN CONNECTION




NOTE: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS 0.030" ± 0.002"; 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 | | INITIALS | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES | DRAWN | AV | 12/11/03 |
| TOLERANCES ON: | CHECKED | IL | 12/18/03 |
| 2 PL DECIMALS ± | APPROVED | HY | 12/18/03 |
| 3 PL DECIMALS ± .005 | | | |
| ANGLES ± | | | |
| FRACTIONS ± | | | |

Mini-Circuits®

THIS DOCUMENT AND ITS CONTENTS ARE THE PROPERTY OF MINI-CIRCUITS. EXCEPT FOR USE EXPRESSLY GRANTED, IN WRITING, TO ITS VENDORS, VENDEE AND THE UNITED STATES GOVERNMENT, MINI-CIRCUITS RESERVES ALL PROPRIETARY DESIGN, USE , MANUFACTURING AND REPRODUCTION RIGHTS THERETO. THESE CONTENTS SHALL NOT BE USED, DUPLICATED OR DISCLOSED TO ANY OUTSIDE PARTY, IN WHOLE OR IN PART, WITHOUT WRITTEN PERMISSION OF MINI-CIRCUITS.

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

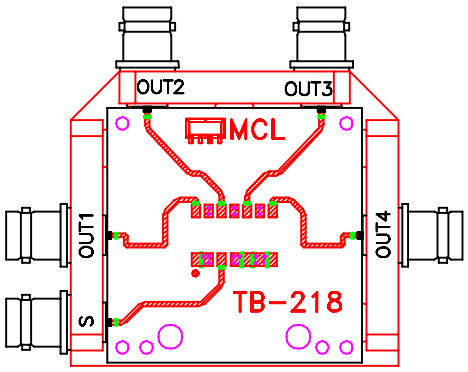
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, kb, 75, BJ360, JS4PS, TB-218

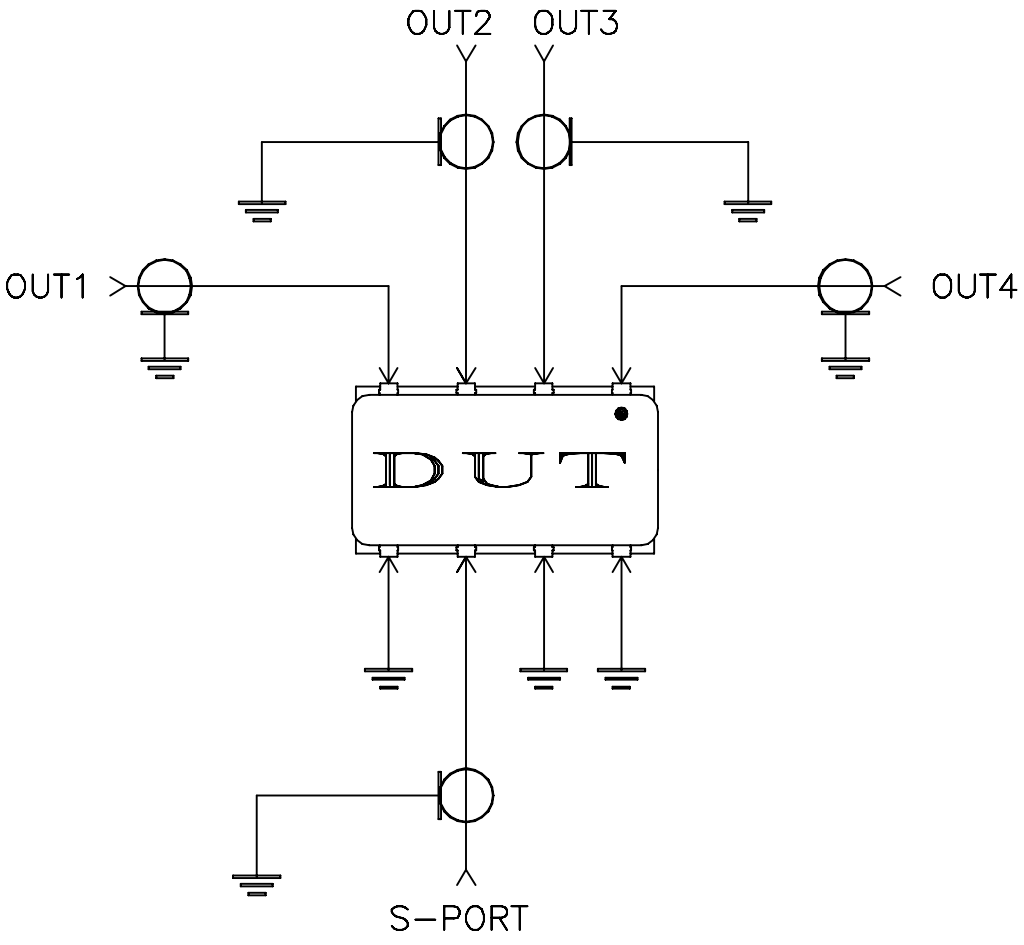
| SIZE | CODE IDENT | DRAWING NO: | REV: |
|---|---|---|---|
| A | 15542 | 98-PL-149 | A |

| FILE: | SCALE: | SHEET: |
|---|---|---|
| 98PL149 | 5:1 | 1 OF 1 |

# Evaluation Board and Circuit




TB-218




Schematic Diagram

## Notes:

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

Mini-Circuits®


THIS DOCUMENT AND ITS CONTENTS ARE THE PROPERTY OF 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<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 |


This document and its contents are the property of Mini-Circuits.