

Ceramic Balun RF Transformer

50Ω 650 to 1250 MHz

TCN4-13+



Generic photo used for illustration purposes only

CASE STYLE: FV1206-1

+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 |
|-----------|-----------------------------------|
| 7" | 20, 50, 100, 200, 500, 1000, 3000 |

Maximum Ratings

Operating Temperature -55°C to 100°C

Storage Temperature -55°C to 100°C

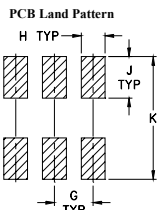
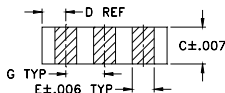
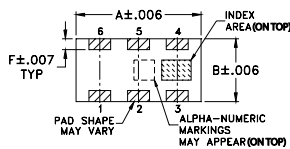
Input RF Power** 5W

** From 85°C derate linearly to 2.5W at 100°C
Permanent damage may occur if any of these limits are exceeded.

Pin Connections

| | |
|---------------|-----|
| PRIMARY DOT | 4 |
| PRIMARY(GND) | 2,5 |
| SECONDARY DOT | 1 |
| SECONDARY | 6 |
| NOT USED | 3 |

Outline Drawing

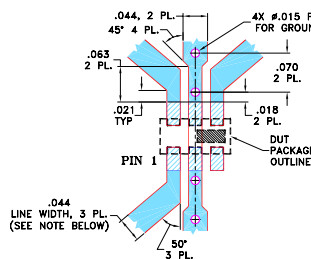


Suggested Layout,
Tolerance to be within ±0.02

Outline Dimensions (inch)

| A | B | C | D | E | F |
|------|------|------|------|-------|------|
| .126 | .063 | .035 | .024 | .022 | .011 |
| 3.20 | 1.60 | 0.89 | 0.61 | 0.56 | 0.28 |
| G | H | J | K | wt | |
| .039 | .024 | .042 | .123 | grams | |
| 0.99 | 0.61 | 1.07 | 3.12 | .020 | |

Demo Board MCL P/N: TB-287
Suggested PCB Layout (PL-163)



- NOTE:
- TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020" ± .0015". 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

Features

- wideband, 650 to 1250 MHz
- miniature size, 0.12"x.06"x.037"
- LTCC construction
- low cost
- aqueous washable

Applications

- WAN
- TACS
- AMPS
- NAMPS

Electrical Specifications (T_{AMB}=25°C)

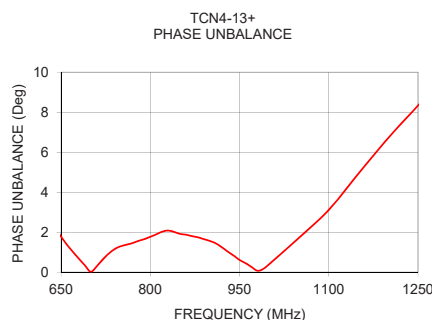
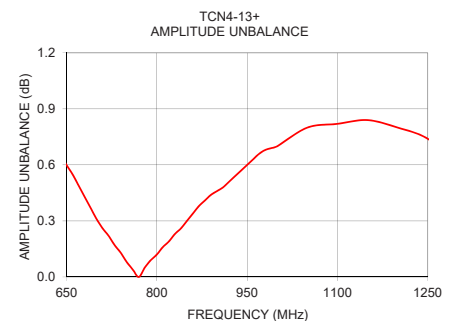
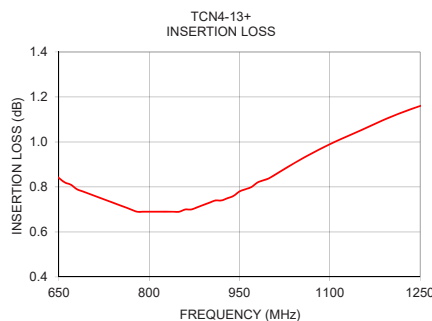
| Ω RATIO (Secondary/Primary) | FREQUENCY (MHz) | INSERTION* LOSS (dB) | PHASE UNBALANCE † (Deg.) Typ. | AMPLITUDE UNBALANCE (dB) Typ. |
|--------------------------------|--------------------|----------------------------|--|--|
| 4 | 650-1250 | 1.0 | 8.0 | 0.7 |
| | 800-900 | 0.5 | 3.0 | 0.4 |

* Insertion Loss is referenced to mid-band loss, 0.7 dB

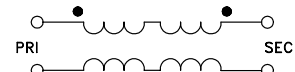
† Relative to 180°

Typical Performance Data

| FREQUENCY (MHz) | INSERTION LOSS (dB) | INPUT R. LOSS (dB) | AMPLITUDE UNBALANCE (dB) | PHASE UNBALANCE (Deg.) |
|--------------------|---------------------------|--------------------------|--------------------------------|------------------------------|
| 650.00 | 0.84 | 12.07 | 0.60 | 1.78 |
| 700.00 | 0.77 | 13.98 | 0.31 | 0.02 |
| 750.00 | 0.72 | 16.08 | 0.08 | 1.29 |
| 800.00 | 0.69 | 18.57 | 0.12 | 1.76 |
| 850.00 | 0.69 | 20.39 | 0.30 | 1.91 |
| 900.00 | 0.73 | 20.02 | 0.46 | 1.56 |
| 950.00 | 0.78 | 18.26 | 0.60 | 0.61 |
| 1000.00 | 0.84 | 16.14 | 0.70 | 0.40 |
| 1200.00 | 1.11 | 11.43 | 0.80 | 6.71 |
| 1250.00 | 1.16 | 10.83 | 0.74 | 8.33 |



configuration G



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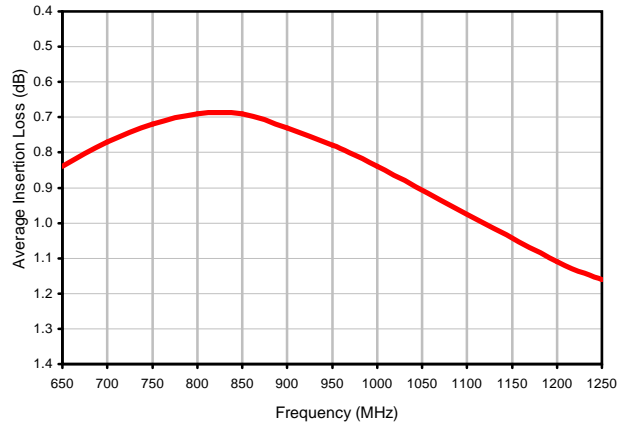
REV. E
M151107
TCN4-13+
ED-11687/5
DJ/RS/CP/AM
151008

Typical Performance Data

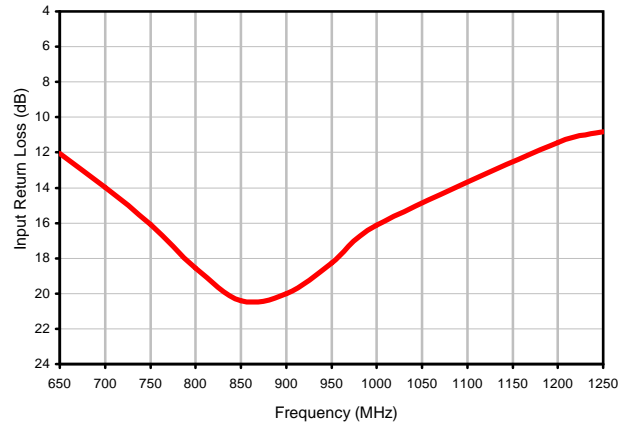
| FREQUENCY (MHz) | AVERAGE INSERTION LOSS (dB) | INPUT RETURN LOSS (dB) | AMPLITUDE UNBALANCE (dB) | PHASE UNBALANCE (deg) |
|--------------------|--------------------------------------|---------------------------------|--------------------------------|-----------------------------|
| 650 | 0.84 | 12.07 | 0.60 | 1.78 |
| 700 | 0.77 | 13.98 | 0.31 | 0.02 |
| 750 | 0.72 | 16.08 | 0.08 | 1.29 |
| 800 | 0.69 | 18.57 | 0.12 | 1.76 |
| 850 | 0.69 | 20.39 | 0.30 | 1.91 |
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| 1000 | 0.84 | 16.14 | 0.70 | 0.40 |
| 1200 | 1.11 | 11.43 | 0.80 | 6.71 |
| 1250 | 1.16 | 10.83 | 0.74 | 8.33 |

Typical Performance Curves

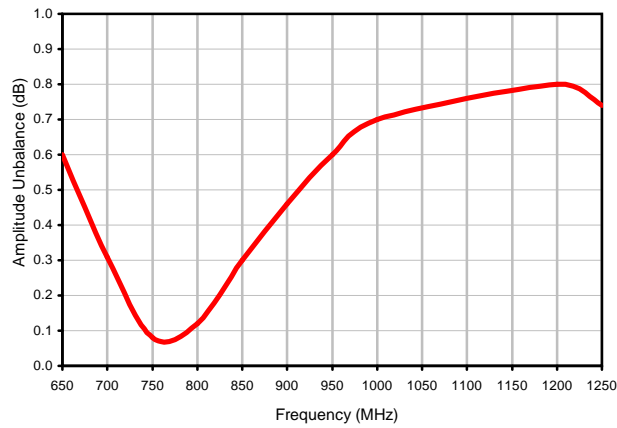
Average Insertion Loss



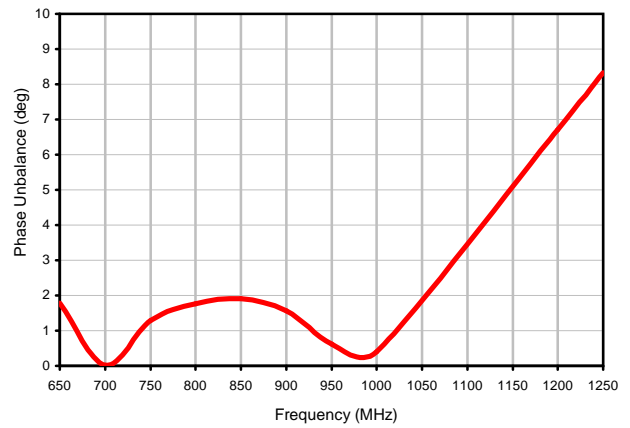
Input Return Loss



Amplitude Unbalance



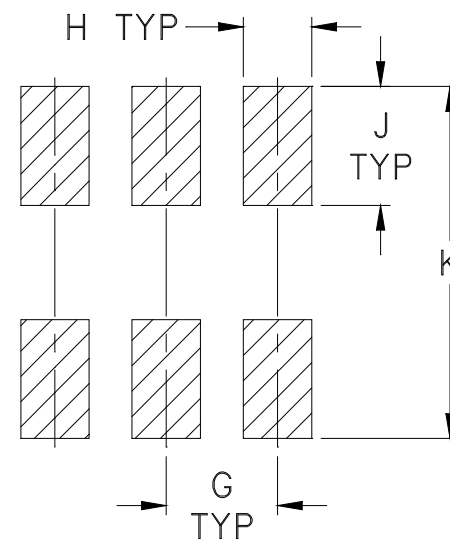
Phase Unbalance



Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within $\pm.002$

| CASE # | A | B | C | D | E | F | G | H | J | K | L | M | N | P | WT. GRAM |
|----------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|----|----|----|----------|
| FV1206-1 | .126 (3.20) | .063 (1.60) | .035 (0.89) | .024 (0.61) | .022 (0.56) | .011 (0.28) | .039 (0.99) | .024 (0.61) | .042 (1.07) | .123 (3.12) | -- | -- | -- | -- | .020 |

Dimensions are in inches (mm). Tolerances: 2 Pl. $\pm.01$; 3 Pl. $\pm.005$

Notes:

- Open style, ceramic base.
- Termination finish: **as shown below or indicated on Data Sheet.**
For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.
For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS

DEVICE ORIENTATION IN T&R

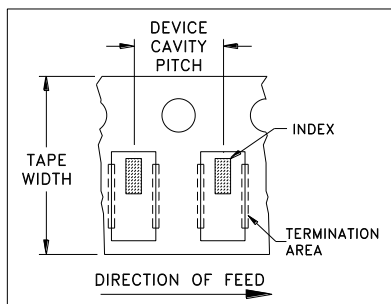


ILLUSTRATION 1

Applicable Case Styles

FV1206-1
FV1206-3

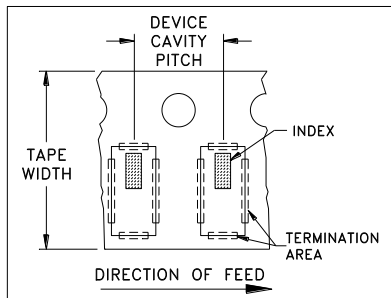


ILLUSTRATION 2

Applicable Case Styles

FV1206-4
FV1206-5
FV1206-6
FV1206-7
FV1206-9

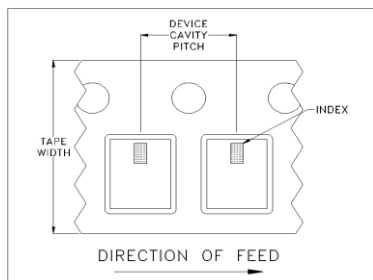


ILLUSTRATION 3

Applicable Case Styles

FV1206-12
GE0805C-18
NL1008C-6
NL1008C-7
NL1008C-9
NL1008C-10

| Tape Width, mm | Device Cavity Pitch, mm | Reel Size, inches | Devices per Reel | |
|----------------|-------------------------|-------------------|-------------------------------------|------|
| 8 | 4 | 7 | Small quantity standards (see note) | 20 |
| | | | | 50 |
| | | | | 100 |
| | | | | 200 |
| | | | | 500 |
| | | | 1000 | |
| | | | Standard | 3000 |

Note: Please consult individual model data sheet to determine device per reel availability.

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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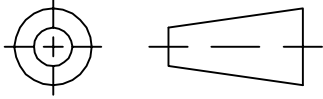
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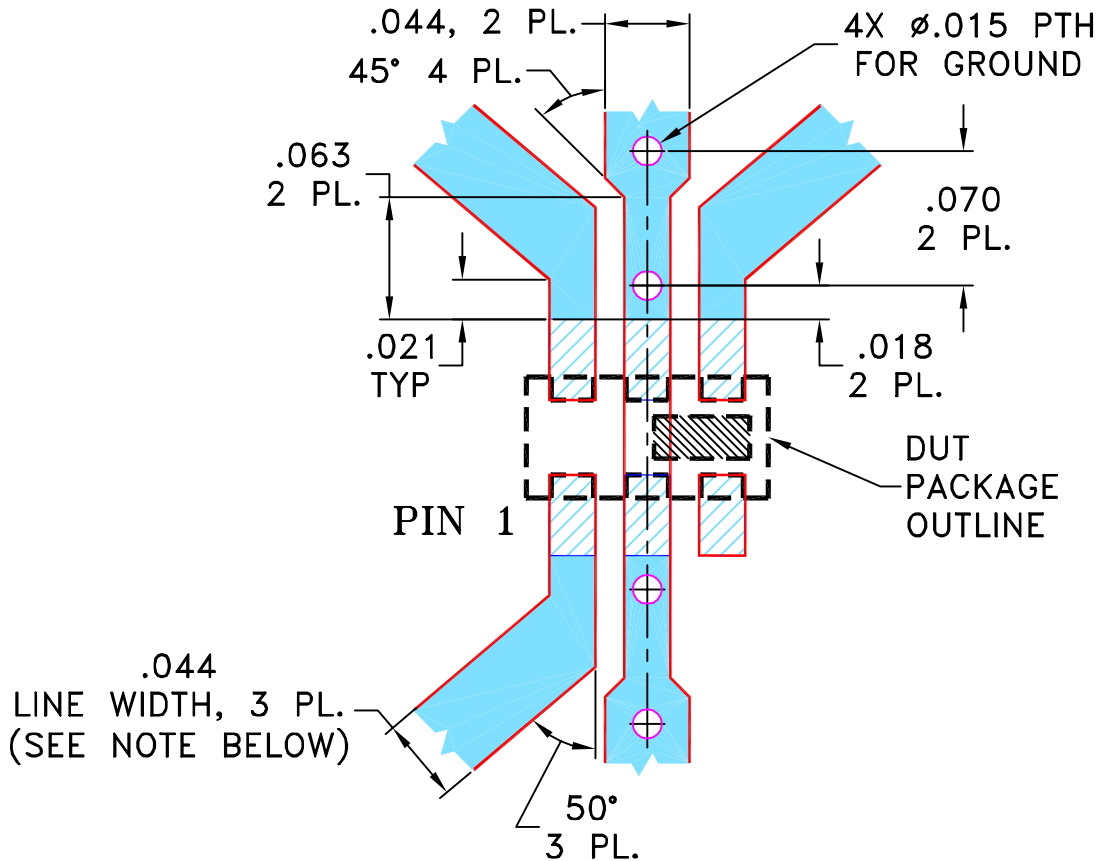
THIRD ANGLE PROJECTION



REVISIONS

| REV | ECN No. | DESCRIPTION | DATE | DR | AUTH |
|-----|---------|------------------------------|----------|----|------|
| OR | M93213 | NEW RELEASE | 07/20/04 | GF | LR |
| A | M102713 | TCN WAS BCN-2, UPDATED NOTES | 01/12/06 | GF | IL |
| | | | | | |

**SUGGESTED MOUNTING CONFIGURATION
FOR FV1206-1 CASE STYLE, "px" PIN CONNECTION**



- NOTE:**
1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .020" ± .0015". 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 TOLERANCES ON: 2 PL DECIMALS ± 3 PL DECIMALS ± .005 ANGLES ± FRACTIONS ± | DRAWN | GF 07/02/04 |
| | CHECKED | AY 07/20/04 |
| | APPROVED | LR 07/20/04 |



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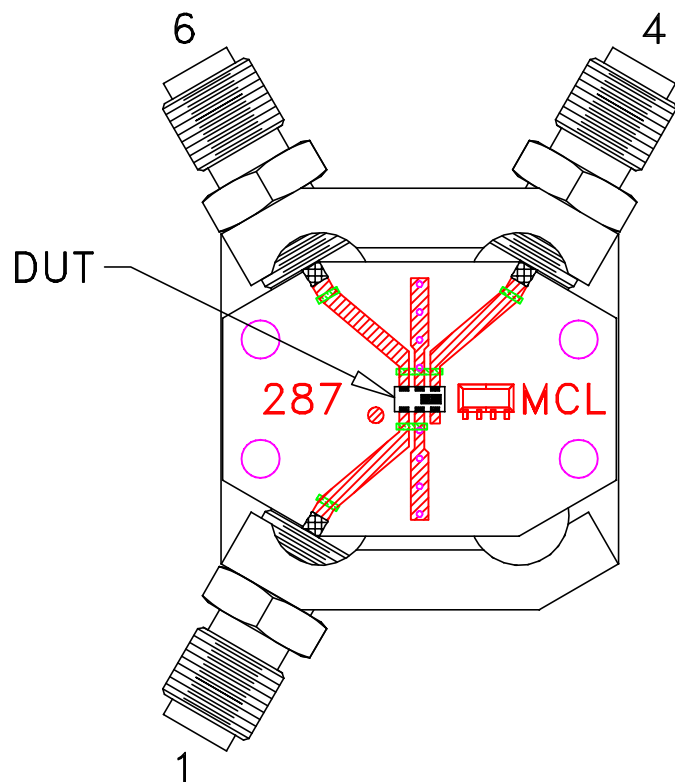
13 Neptune Avenue
Brooklyn NY 11235

PL, px, FV1206-1, TCN, TB-287

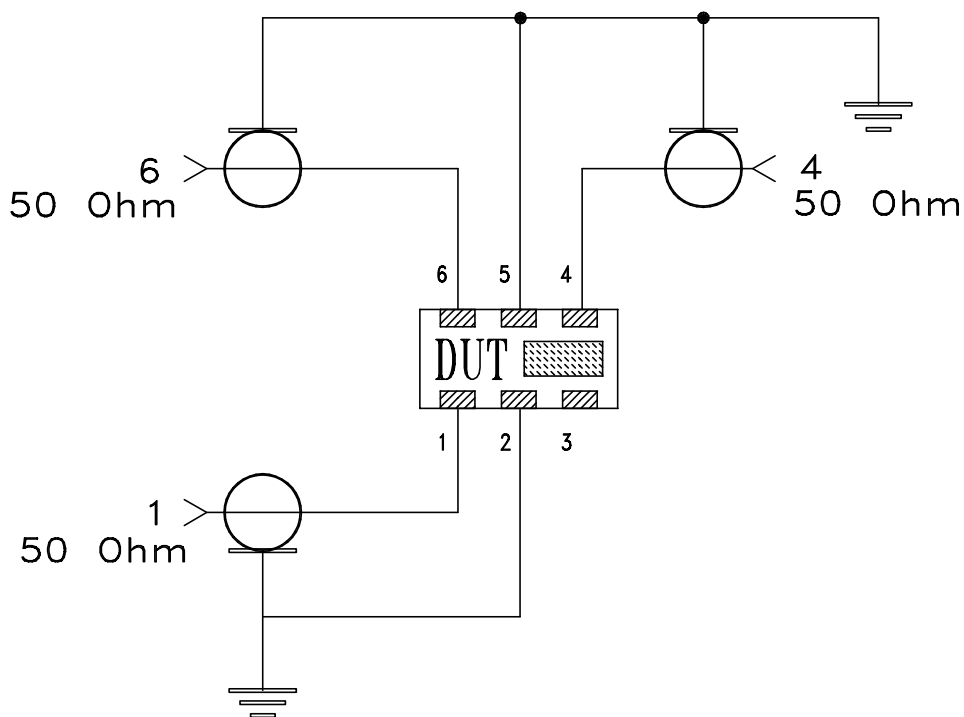
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| | | | |
|------------------|---------------------|--------------------------|-----------|
| SIZE A | CODE IDENT 15542 | DRAWING NO: 98-PL-163 | REV: A |
| FILE: 98PL163 | SCALE: 10:1 | SHEET: 1 OF 1 | |

Evaluation Board and Circuit




TB-287



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,
Dielectric Constant=3.5, Thickness=.020 inch.

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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 | -55° to 100°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 |
| 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, Para 4.2.5, Test S, 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 |