

Ceramic

Low Pass Filter

LFCN-490

50Ω DC⁽¹⁾ to 490 MHz



Generic photo used for illustration purposes only

CASE STYLE: FV1206

Maximum Ratings

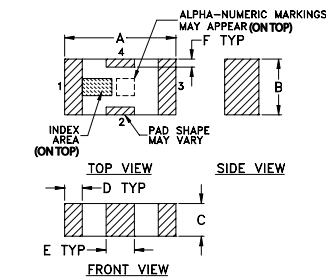
| | |
|-----------------------|-------------------|
| Operating Temperature | -55°C to 100°C |
| Storage Temperature | -55°C to 100°C |
| RF Power Input* | 8.5W max. at 25°C |

* Passband rating, derate linearly to 3.5W at 100°C ambient. Permanent damage may occur if any of these limits are exceeded.

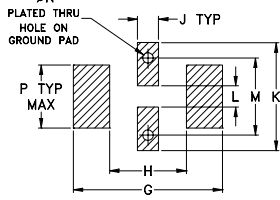
Pin Connections

| | |
|--------|-----|
| RF IN | 1 |
| RF OUT | 3 |
| GROUND | 2,4 |

Outline Drawing



PCB Land Pattern

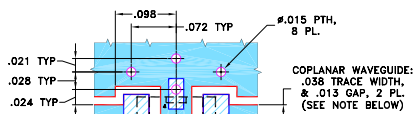


Suggested Layout, Tolerance to be within ±0.02

Outline Dimensions (inch/mm)

| A | B | C | D | E | F | G | |
|------|------|------|------|------|------|------|-------|
| .126 | .063 | .037 | .020 | .032 | .009 | .169 | |
| 3.20 | 1.60 | 0.94 | 0.51 | 0.81 | 0.23 | 4.29 | |
| H | J | K | L | M | N | P | wt |
| .087 | .024 | .122 | .024 | .087 | .012 | .071 | grams |
| 2.21 | 0.61 | 3.10 | 0.61 | 2.21 | 0.30 | 1.80 | .020 |

Demo Board MCL P/N: TB-270 Suggested PCB Layout (PL-137)



- NOTES:**
1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH THICKNESS .020" ± .0015". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH & GAP 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

Features

- excellent power handling, 8.5W
- small size
- 7 sections
- temperature stable
- LTCC construction
- protected by U.S. Patent 6,943,646

Applications

- harmonic rejection
- VHF/UHF transmitters/receivers

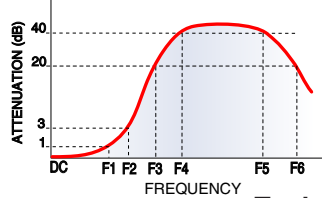
Electrical Specifications^(1,2) at 25°C

| Parameter | F# | Frequency (MHz) | Min. | Typ. | Max. | Unit | |
|-----------|----------------|-----------------|----------|------|------|------|----|
| Pass Band | Insertion Loss | DC-F1 | DC-490 | — | — | 1.2 | dB |
| | Freq. Cut-Off | F2 | 650 | — | 3.0 | — | dB |
| | VSWR | DC-F1 | DC-490 | — | 1.2 | — | :1 |
| Stop Band | Rejection Loss | F3 | 800 | 20 | — | — | dB |
| | | F4-F5 | 880-2500 | — | 40 | — | dB |
| | VSWR | F6 | 6000 | — | 20 | — | dB |
| | | F3-F6 | 800-6000 | — | 20 | — | :1 |

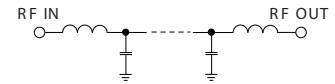
(1) In Applications where DC isolation to ground is required, coupling capacitors are recommended to avoid DC leakage. Alternatively, if DC pass IN-OUT is required, Mini-Circuits' "D" suffix version of this model will support DC IN-OUT, and provide >100 MOhm isolation to ground.

(2) Measured on Mini-Circuits Characterization Test Board TB-270.

Typical Frequency Response

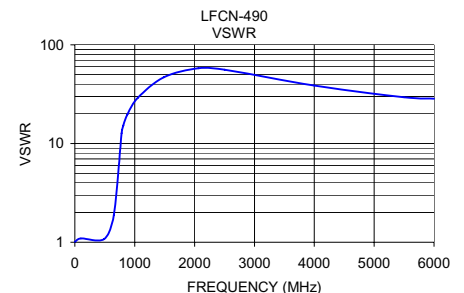
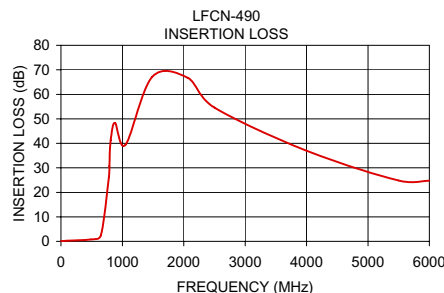


Electrical Schematic



Typical Performance Data at 25°C

| Frequency (MHz) | Insertion Loss (dB) | VSWR (:1) |
|-----------------|---------------------|-----------|
| 1.00 | 0.05 | 1.01 |
| 100.00 | 0.25 | 1.09 |
| 490.00 | 0.82 | 1.08 |
| 650.00 | 2.45 | 1.88 |
| 780.00 | 26.27 | 12.71 |
| 790.00 | 30.75 | 13.70 |
| 810.00 | 41.27 | 15.26 |
| 880.00 | 48.37 | 19.76 |
| 1050.00 | 39.38 | 28.96 |
| 1485.00 | 67.14 | 46.96 |
| 2065.00 | 66.75 | 57.91 |
| 2500.00 | 54.57 | 56.04 |
| 4000.00 | 36.98 | 38.61 |
| 5500.00 | 24.86 | 29.46 |
| 6000.00 | 24.74 | 28.49 |



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-Circuits' 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/MCLStore/terms.jsp



Ceramic Low Pass Filter

LFCN-490D

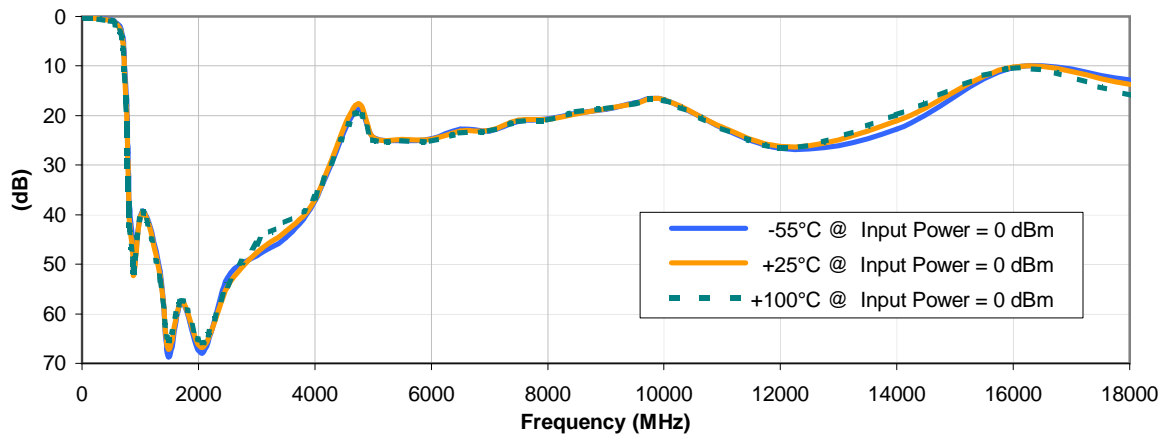
Typical Performance Data

| FREQ. (MHz) | INSERTION LOSS (dB) | | | INPUT RETURN LOSS (dB) | | | OUTPUT RETURNLOSS (dB) | | |
|----------------|------------------------|----------|-----------|---------------------------|----------|-----------|---------------------------|----------|-----------|
| | @ -55° C | @ +25° C | @ +100° C | @ -55° C | @ +25° C | @ +100° C | @ -55° C | @ +25° C | @ +100° C |
| 1 | 0.02 | 0.05 | 0.08 | 47.08 | 46.06 | 45.07 | 47.08 | 46.06 | 46.01 |
| 50 | 0.15 | 0.18 | 0.21 | 30.19 | 29.03 | 28.44 | 29.98 | 28.79 | 28.26 |
| 100 | 0.20 | 0.25 | 0.29 | 27.56 | 26.92 | 26.68 | 27.09 | 26.38 | 26.03 |
| 490 | 0.66 | 0.82 | 0.96 | 28.82 | 28.80 | 28.43 | 27.90 | 27.66 | 27.14 |
| 545 | 0.84 | 1.04 | 1.23 | 23.04 | 22.47 | 21.75 | 23.36 | 22.86 | 22.18 |
| 650 | 1.98 | 2.45 | 2.91 | 10.80 | 10.30 | 9.80 | 13.06 | 13.17 | 13.28 |
| 670 | 2.57 | 3.19 | 3.81 | 8.78 | 8.31 | 7.85 | 11.63 | 11.97 | 12.33 |
| 700 | 4.29 | 5.34 | 6.43 | 5.70 | 5.29 | 4.91 | 9.34 | 9.73 | 9.97 |
| 730 | 8.44 | 10.24 | 12.07 | 2.95 | 2.82 | 2.71 | 6.04 | 6.22 | 6.22 |
| 750 | 13.26 | 15.54 | 17.78 | 1.87 | 1.93 | 1.97 | 4.21 | 4.44 | 4.52 |
| 765 | 17.90 | 20.47 | 23.00 | 1.44 | 1.57 | 1.67 | 3.32 | 3.59 | 3.72 |
| 780 | 23.37 | 26.27 | 29.11 | 1.21 | 1.37 | 1.48 | 2.73 | 3.01 | 3.17 |
| 790 | 27.57 | 30.75 | 33.83 | 1.10 | 1.27 | 1.39 | 2.45 | 2.73 | 2.90 |
| 800 | 32.42 | 35.89 | 38.94 | 1.03 | 1.20 | 1.33 | 2.23 | 2.51 | 2.68 |
| 810 | 38.09 | 41.27 | 42.83 | 0.97 | 1.14 | 1.27 | 2.05 | 2.32 | 2.50 |
| 880 | 46.81 | 48.37 | 49.73 | 0.72 | 0.88 | 1.00 | 1.36 | 1.60 | 1.77 |
| 895 | 51.09 | 51.96 | 51.46 | 0.69 | 0.84 | 0.96 | 1.27 | 1.50 | 1.67 |
| 1050 | 39.27 | 39.38 | 39.49 | 0.47 | 0.60 | 0.71 | 0.77 | 0.95 | 1.09 |
| 1345 | 51.34 | 52.31 | 53.37 | 0.28 | 0.41 | 0.51 | 0.43 | 0.55 | 0.65 |
| 1485 | 68.77 | 67.14 | 65.29 | 0.24 | 0.37 | 0.47 | 0.34 | 0.46 | 0.55 |
| 1720 | 57.55 | 57.46 | 57.39 | 0.21 | 0.33 | 0.43 | 0.27 | 0.38 | 0.45 |
| 2065 | 67.96 | 66.75 | 65.92 | 0.18 | 0.30 | 0.39 | 0.22 | 0.32 | 0.37 |
| 2500 | 52.78 | 54.57 | 54.19 | 0.19 | 0.31 | 0.40 | 0.17 | 0.27 | 0.31 |
| 3000 | 48.24 | 47.60 | 45.88 | 0.22 | 0.33 | 0.43 | 0.18 | 0.28 | 0.35 |
| 3500 | 44.71 | 43.44 | 41.60 | 0.20 | 0.34 | 0.44 | 0.13 | 0.26 | 0.36 |
| 4000 | 37.19 | 36.98 | 36.50 | 0.28 | 0.45 | 0.56 | 0.18 | 0.33 | 0.44 |
| 4690 | 19.10 | 18.00 | 19.76 | 1.21 | 1.47 | 1.18 | 1.05 | 1.29 | 1.04 |
| 5000 | 24.39 | 24.39 | 24.91 | 0.47 | 0.62 | 0.72 | 0.34 | 0.52 | 0.64 |
| 5500 | 25.03 | 24.86 | 25.01 | 0.40 | 0.59 | 0.82 | 0.33 | 0.57 | 0.86 |
| 6000 | 24.65 | 24.74 | 25.16 | 0.41 | 0.61 | 0.84 | 0.29 | 0.51 | 0.72 |
| 6500 | 22.75 | 23.13 | 23.54 | 0.45 | 0.64 | 0.89 | 0.28 | 0.49 | 0.70 |
| 7000 | 23.18 | 23.00 | 23.10 | 0.49 | 0.73 | 0.92 | 0.28 | 0.49 | 0.67 |
| 7500 | 21.23 | 20.98 | 21.21 | 0.71 | 0.96 | 1.16 | 0.31 | 0.50 | 0.67 |
| 8000 | 20.61 | 20.76 | 20.93 | 1.07 | 1.09 | 1.21 | 0.31 | 0.49 | 0.64 |
| 8500 | 19.56 | 19.65 | 19.27 | 0.79 | 1.01 | 1.20 | 0.32 | 0.53 | 0.66 |
| 9000 | 18.75 | 18.61 | 18.58 | 0.89 | 1.14 | 1.23 | 0.35 | 0.58 | 0.69 |
| 9500 | 17.45 | 17.56 | 17.51 | 0.91 | 1.20 | 1.39 | 0.36 | 0.64 | 0.84 |
| 10000 | 16.76 | 16.84 | 16.98 | 0.77 | 1.10 | 1.40 | 0.49 | 0.87 | 1.20 |
| 12000 | 26.65 | 26.21 | 26.42 | 3.87 | 4.98 | 5.67 | 5.11 | 5.51 | 5.68 |
| 14000 | 22.70 | 21.05 | 19.95 | 2.19 | 3.13 | 3.96 | 1.39 | 1.83 | 2.23 |
| 16000 | 10.35 | 10.17 | 10.42 | 4.24 | 5.21 | 6.53 | 4.44 | 4.81 | 5.32 |
| 18000 | 12.76 | 13.67 | 15.83 | 6.18 | 6.17 | 6.37 | 14.90 | 10.75 | 10.01 |

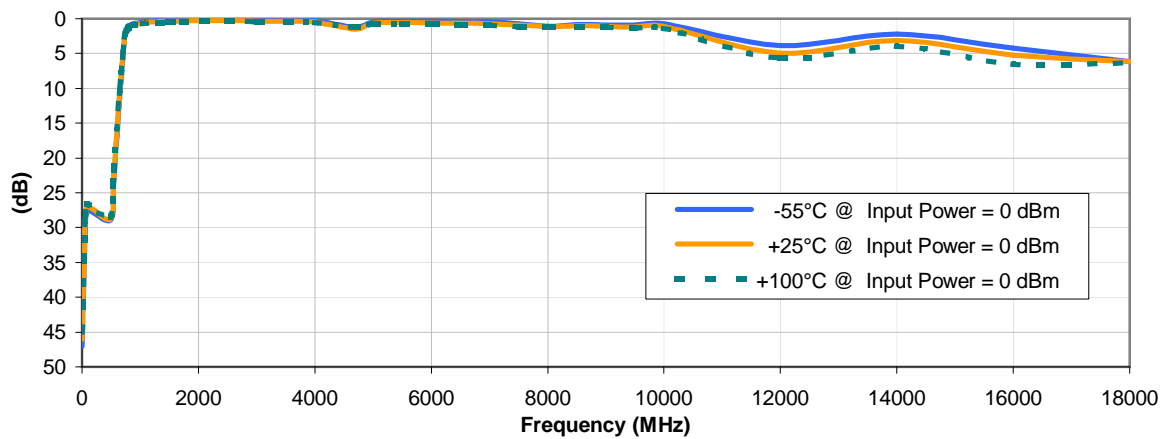


Typical Performance Curves

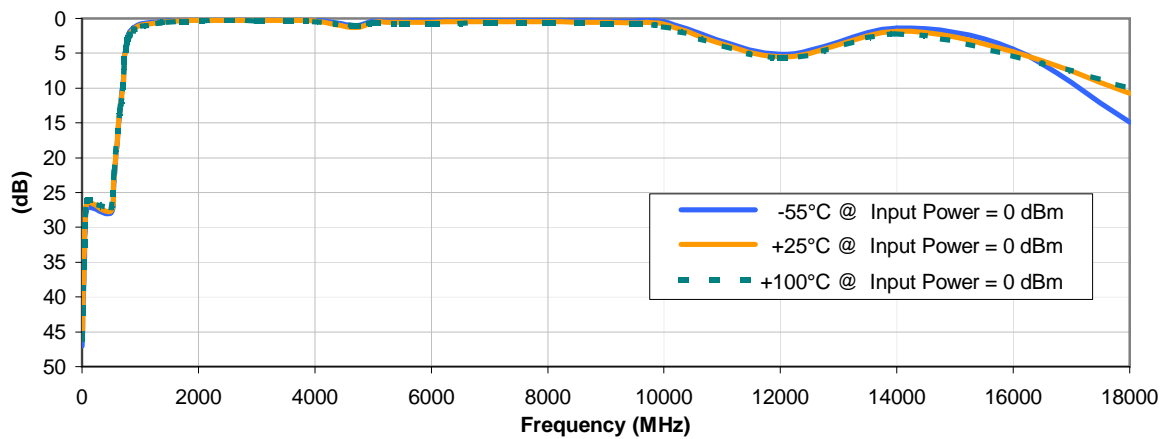
INSERTION LOSS vs. TEMPERATURE



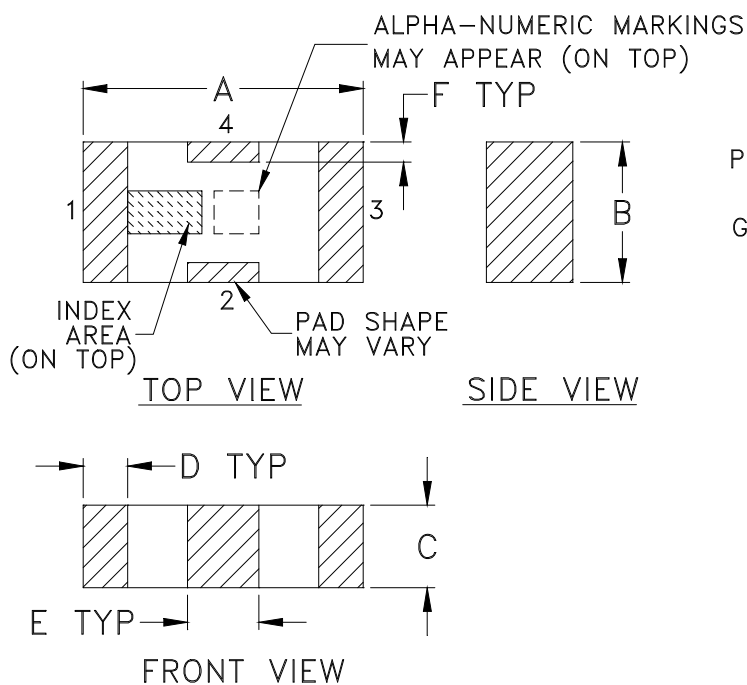
INPUT RETURN LOSS vs. TEMPERATURE



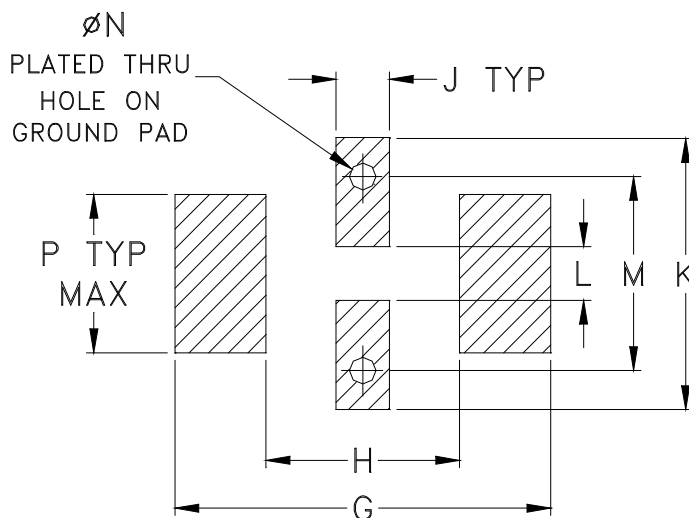
OUTPUT RETURN LOSS vs. TEMPERATURE



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 | .126 (3.20) | .063 (1.60) | .037 (0.94) | .020 (0.51) | .032 (0.81) | .009 (0.23) | .169 (4.29) | .087 (2.21) | .024 (0.61) | .122 (3.10) | .024 (0.61) | .087 (2.21) | .012 (0.30) | .071 (1.80) | .020 |

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

Notes:

1. Open style, ceramic base.
2. 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

Tape & Reel Packaging TR-F71

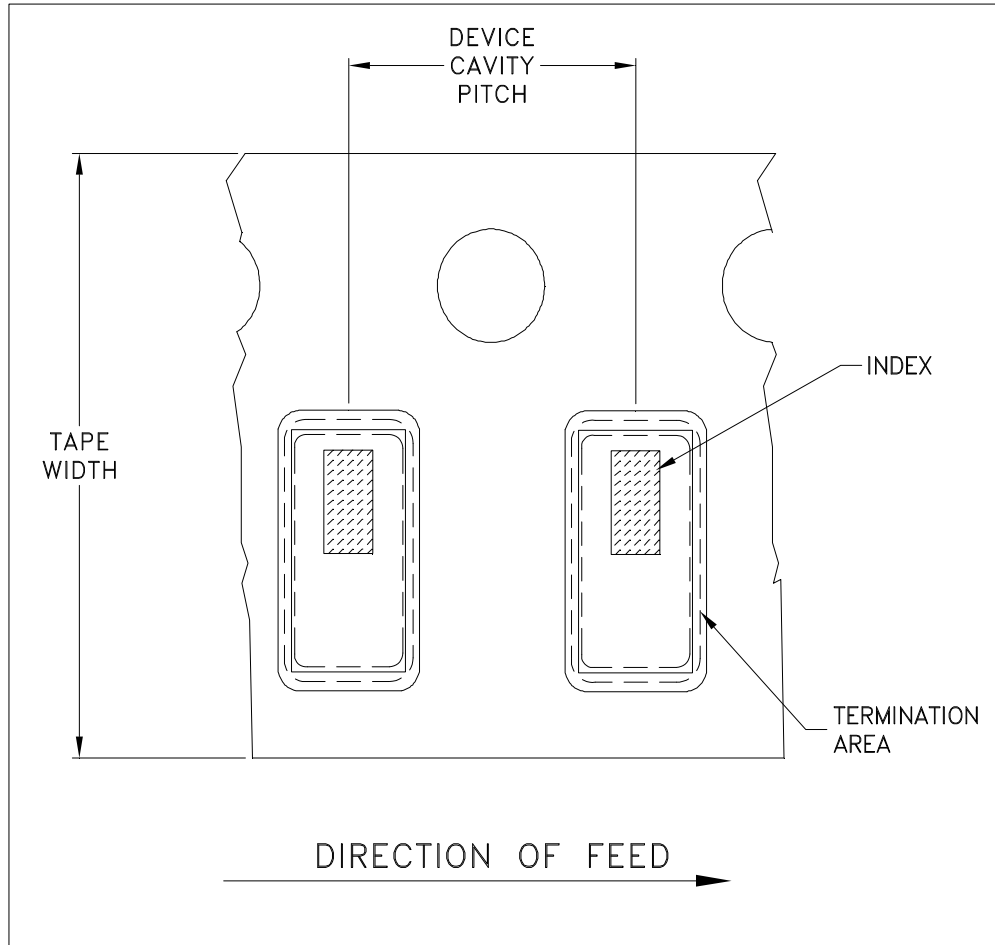


ILLUSTRATION 1

| 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



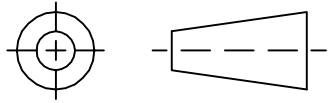
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RF/IF MICROWAVE COMPONENTS

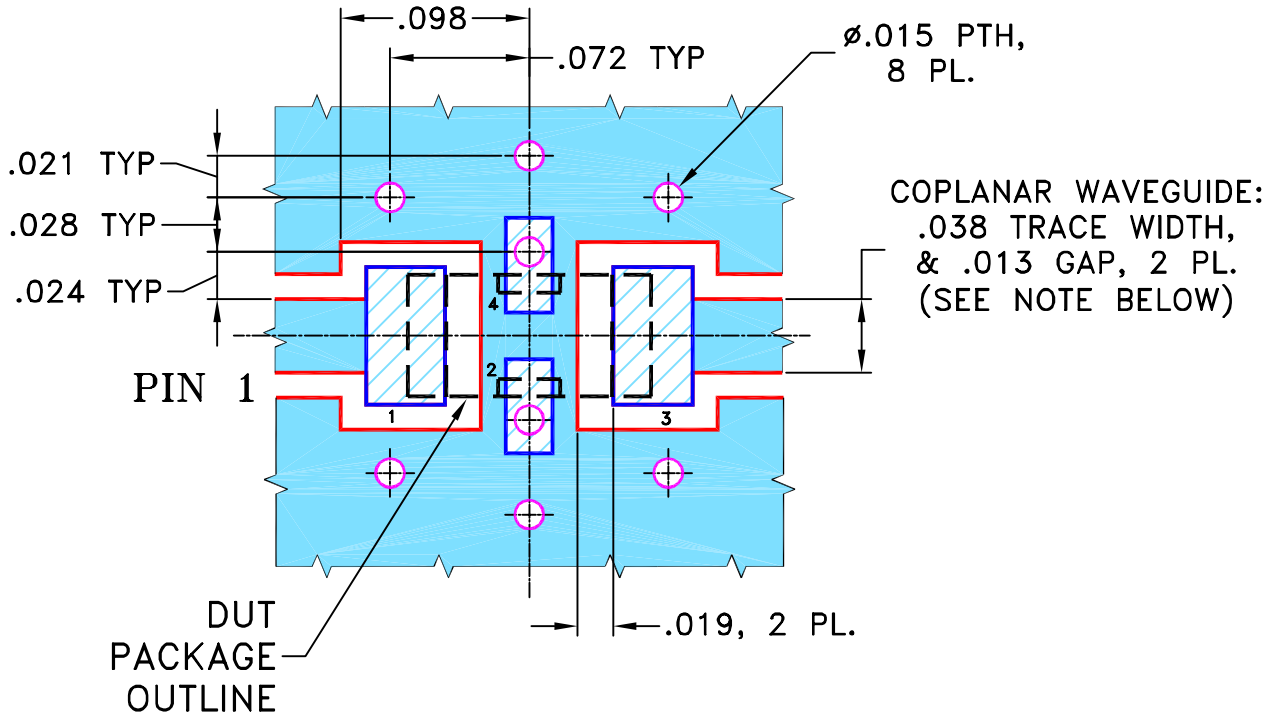
THIRD ANGLE PROJECTION



REVISIONS

| REV | ECN No. | DESCRIPTION | DATE | DR | AUTH |
|-----|---------|-----------------------|----------|-----|------|
| OR | M88634 | NEW RELEASE | 08/28/03 | GF | ABD |
| A | M102713 | ADDED "...WITH SMOBC" | 01/17/06 | MMG | IL |
| | | | | | |

SUGGESTED MOUNTING CONFIGURATION
FOR FV1206 CASE STYLE, "nx" PIN CONNECTION



- NOTES:**
1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS R04350B WITH THICKNESS .020" ± .0015".
 COPPER: 1/2 OZ. EACH SIDE.
 FOR OTHER MATERIALS TRACE WIDTH & GAP 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

GF

08/27/03

TOLERANCES ON:

CHECKED

AV

08/28/03

2 PL DECIMALS ±

APPROVED

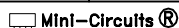
ABD

08/28/03

3 PL DECIMALS ± .005

ANGLES ±

FRACTIONS ±



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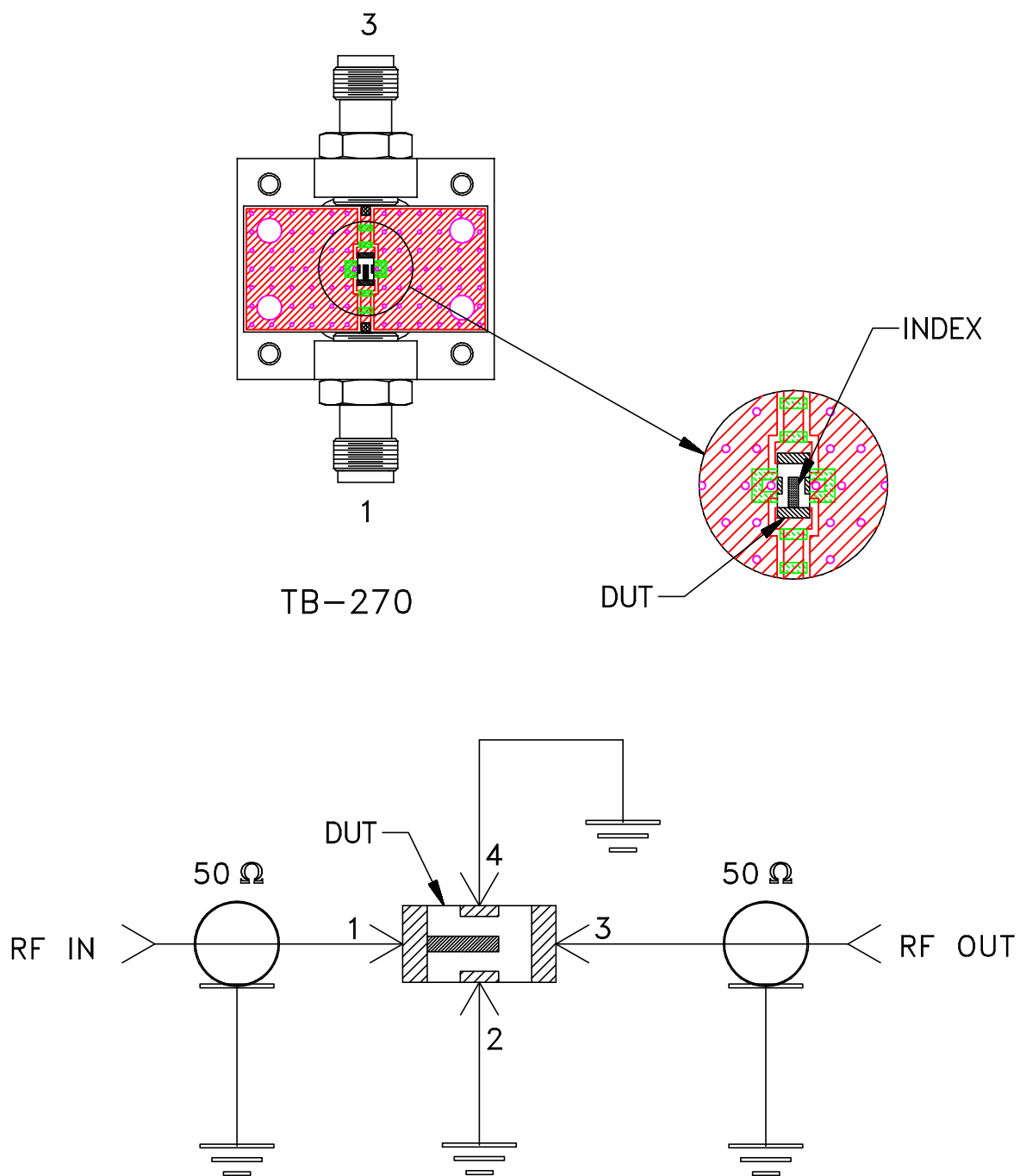
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13 Neptune Avenue
 Brooklyn NY 11235

PL, nx, FV1206, LFCN/HFCN, TB-270

| | | | |
|------------------|---------------------|--------------------------|-----------|
| SIZE A | CODE IDENT 15542 | DRAWING NO: 98-PL-137 | REV: A |
| FILE: 98PL137 | SCALE: 10:1 | SHEET: 1 OF 1 | |


Evaluation Board and Circuit



Schematic Diagram

Notes:

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

 **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 | -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 |