

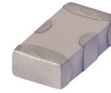
LTCC Bandpass Filter

BFCN-1855+

50Ω 1790 to 1920 MHz

The Big Deal

- Small size 3.2mm x 1.6mm
- Pass band (1790-1920 MHz)
- Low Insertion Loss (2.0 dB typical)
- Sharp rejection peaks close to stop band



CASE STYLE: FV1206

Product Overview

The BFCN-1855+ LTCC Band Pass Filter is constructed with 12 layers in order to achieve a miniature size and high repeatability of performance. Wrap-around terminations minimize variations in performance due to parasitics. Covering 1855 MHz \pm 65 MHz, these units offer low insertion loss and good rejection.

Key Features

| Feature | Advantages |
|---|---|
| Small Size (3.20mm x1.6 mm) | Allows for high layout density of circuit boards, while minimizing affects of parasitics. |
| Rejection peaks at harmonic frequencies | Provides good rejection of signals at harmonic frequencies, for improved system performance. |
| Wrap around termination | Provides excellent solderability and easy visual inspection capability. |
| LTCC construction | Provides a rugged package that is well suited for tough environments including high humidity and high temperature extremes. |

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-Circuit's 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



Bandpass Filter

50Ω 1790 to 1920 MHz

BFCN-1855+



Generic photo used for illustration purposes only

CASE STYLE: FV1206

+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 |
| RF Power Input* | 1.5W max. at 25°C |

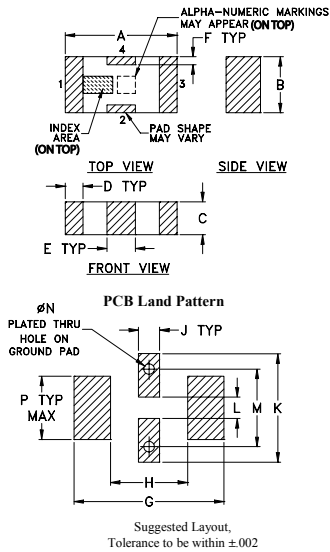
*Passband rating, derate linearly to 0.25W at 100°C ambient
Permanent damage may occur if any of these limits are exceeded.

Pin Connections

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

Product Marking: 31

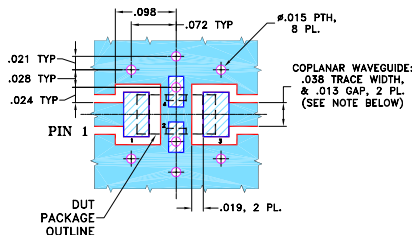
Outline Drawing



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

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Features

- Small size
- Temperature stable
- Hermetically sealed
- LTCC construction

Applications

- Harmonic Rejection
- Transmitters / Receivers

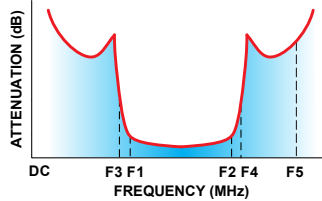
Electrical Specifications^{1,2} at 25°C

| Parameter | F# | Frequency (MHz) | Min. | Typ. | Max. | Unit |
|------------------|------------------|-----------------|-----------|------|------|------|
| Pass Band | Center Frequency | — | — | 1855 | — | MHz |
| | Insertion Loss | F1-F2 | 1790-1920 | — | 3.0 | dB |
| | VSWR | F1-F2 | 1790-1920 | — | 2.5 | :1 |
| Stop Band, Lower | Insertion Loss | DC-F3 | DC-1400 | — | 20 | dB |
| | VSWR | DC-F3 | DC-1400 | — | 25 | :1 |
| Stop Band, Upper | Insertion Loss | F4-F5 | 3700-5500 | — | 25 | dB |
| | VSWR | F4-F5 | 3700-5500 | — | 20 | :1 |

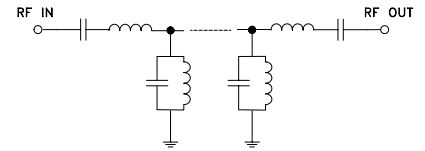
1. Measured on Mini-Circuits Characterization Test Board TB-270.

2. This filter is not intended for use as a DC Blocking circuit element. In Application where DC voltage is present at either input or output ports, blocking capacitors are required at the corresponding RF port.

Typical Frequency Response

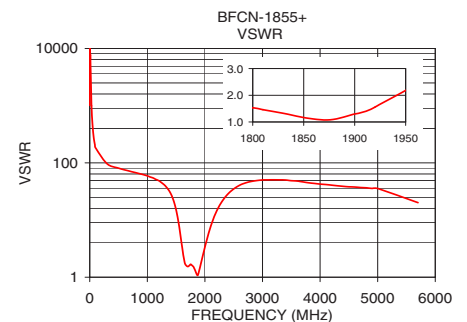
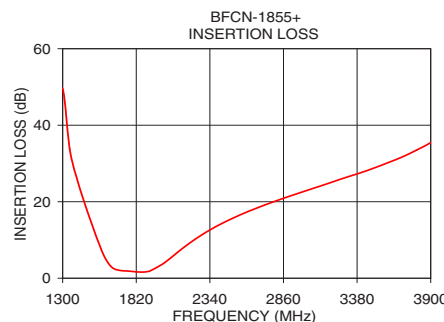
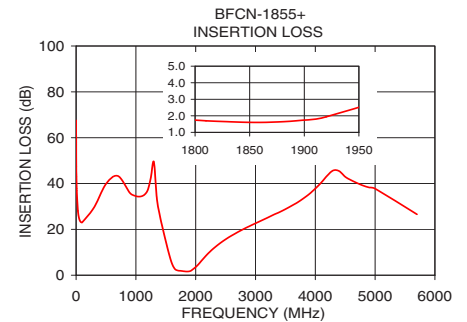


Functional Schematic



Typical Performance Data at 25°C

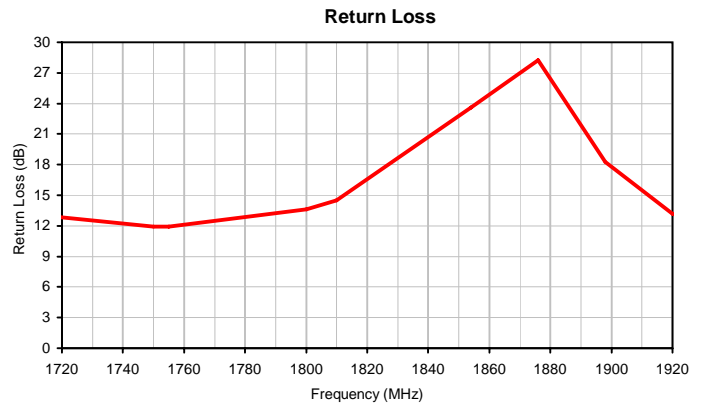
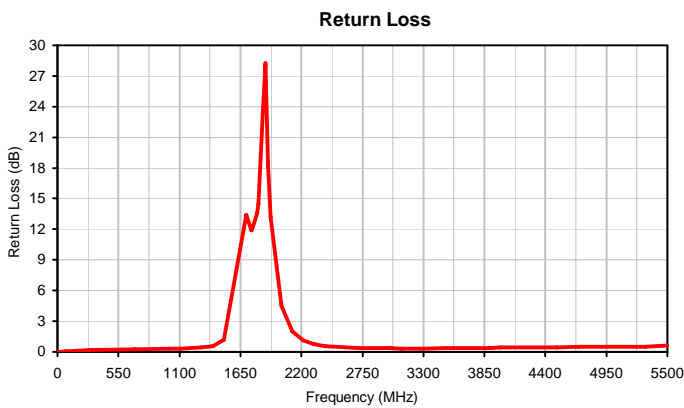
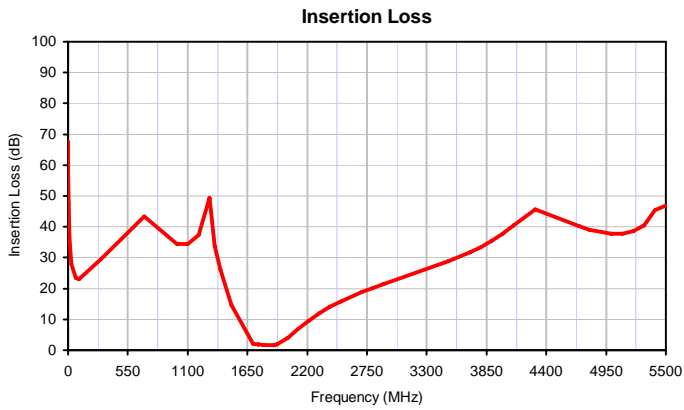
| Frequency (MHz) | Insertion Loss (dB) | VSWR (:1) |
|-----------------|---------------------|-----------|
| 0.30 | 67.54 | 1012.60 |
| 300.00 | 29.56 | 96.71 |
| 500.00 | 39.87 | 80.77 |
| 1000.00 | 34.53 | 59.27 |
| 1200.00 | 37.32 | 48.68 |
| 1400.00 | 26.13 | 29.80 |
| 1500.00 | 14.77 | 15.06 |
| 1800.00 | 1.74 | 1.53 |
| 1920.00 | 1.94 | 1.56 |
| 2410.00 | 14.03 | 29.22 |
| 2802.00 | 20.15 | 47.26 |
| 3900.00 | 35.44 | 43.70 |
| 4200.00 | 43.45 | 40.72 |
| 4800.00 | 39.10 | 36.62 |
| 5700.00 | 26.57 | 20.16 |



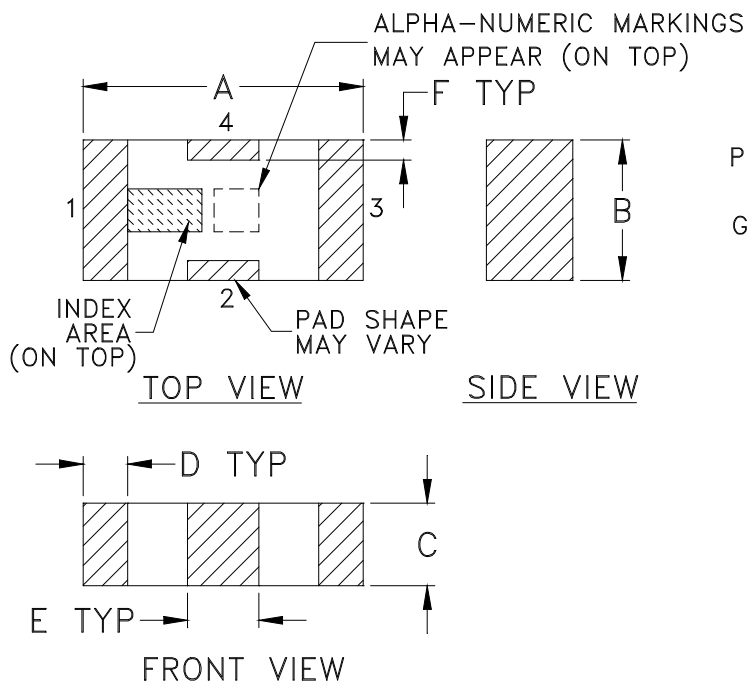
Typical Performance Data

| FREQUENCY | INSERTION LOSS | RETURN LOSS |
|-----------|----------------|-------------|
| (MHz) | (dB) | (dB) |
| 0.3 | 67.54 | 0.02 |
| 1.0 | 56.83 | 0.00 |
| 3.0 | 47.30 | 0.00 |
| 10.0 | 36.95 | 0.00 |
| 30.0 | 28.08 | 0.02 |
| 70.0 | 23.46 | 0.06 |
| 100.0 | 23.01 | 0.09 |
| 300.0 | 29.56 | 0.18 |
| 700.0 | 43.29 | 0.24 |
| 1000.0 | 34.53 | 0.29 |
| 1100.0 | 34.50 | 0.32 |
| 1200.0 | 37.32 | 0.36 |
| 1300.0 | 49.47 | 0.43 |
| 1350.0 | 33.72 | 0.49 |
| 1400.0 | 26.13 | 0.58 |
| 1500.0 | 14.77 | 1.16 |
| 1700.0 | 2.07 | 13.40 |
| 1750.0 | 1.90 | 11.93 |
| 1755.0 | 1.89 | 11.94 |
| 1800.0 | 1.74 | 13.62 |
| 1810.0 | 1.70 | 14.49 |
| 1854.0 | 1.60 | 23.61 |
| 1876.0 | 1.63 | 28.22 |
| 1898.0 | 1.73 | 18.28 |
| 1920.0 | 1.94 | 13.21 |
| 2018.0 | 4.00 | 4.48 |
| 2116.0 | 6.90 | 2.02 |
| 2214.0 | 9.64 | 1.15 |
| 2312.0 | 12.00 | 0.78 |
| 2410.0 | 14.03 | 0.59 |
| 2508.0 | 15.80 | 0.49 |
| 2704.0 | 18.82 | 0.39 |
| 2802.0 | 20.15 | 0.37 |
| 2900.0 | 21.40 | 0.35 |
| 3000.0 | 22.64 | 0.35 |
| 3100.0 | 23.87 | 0.34 |
| 3300.0 | 26.34 | 0.34 |
| 3500.0 | 28.81 | 0.36 |
| 3600.0 | 30.24 | 0.36 |
| 3700.0 | 31.72 | 0.37 |
| 3800.0 | 33.47 | 0.39 |
| 3900.0 | 35.44 | 0.40 |
| 4000.0 | 37.80 | 0.41 |
| 4100.0 | 40.43 | 0.42 |
| 4300.0 | 45.71 | 0.44 |
| 4500.0 | 42.97 | 0.46 |
| 4700.0 | 40.18 | 0.47 |
| 4800.0 | 39.10 | 0.47 |
| 4900.0 | 38.29 | 0.49 |
| 5000.0 | 37.78 | 0.49 |
| 5100.0 | 37.84 | 0.50 |
| 5200.0 | 38.53 | 0.51 |
| 5300.0 | 40.43 | 0.53 |
| 5400.0 | 45.36 | 0.55 |
| 5500.0 | 46.94 | 0.60 |

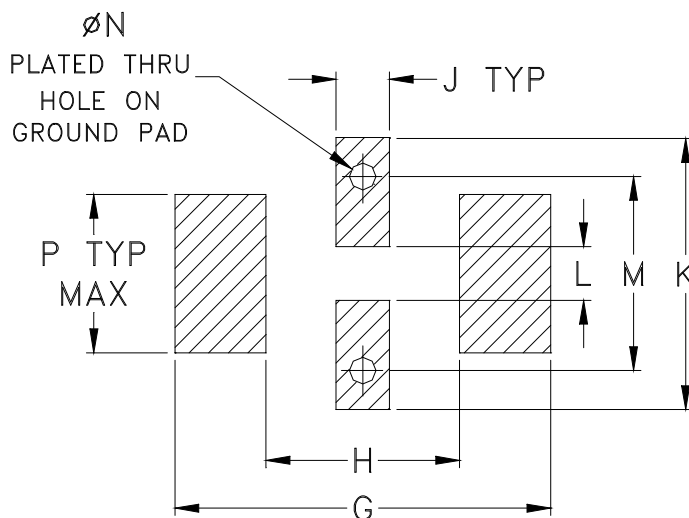
Typical Performance Curves



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:

- 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

Tape & Reel Packaging TR-F71

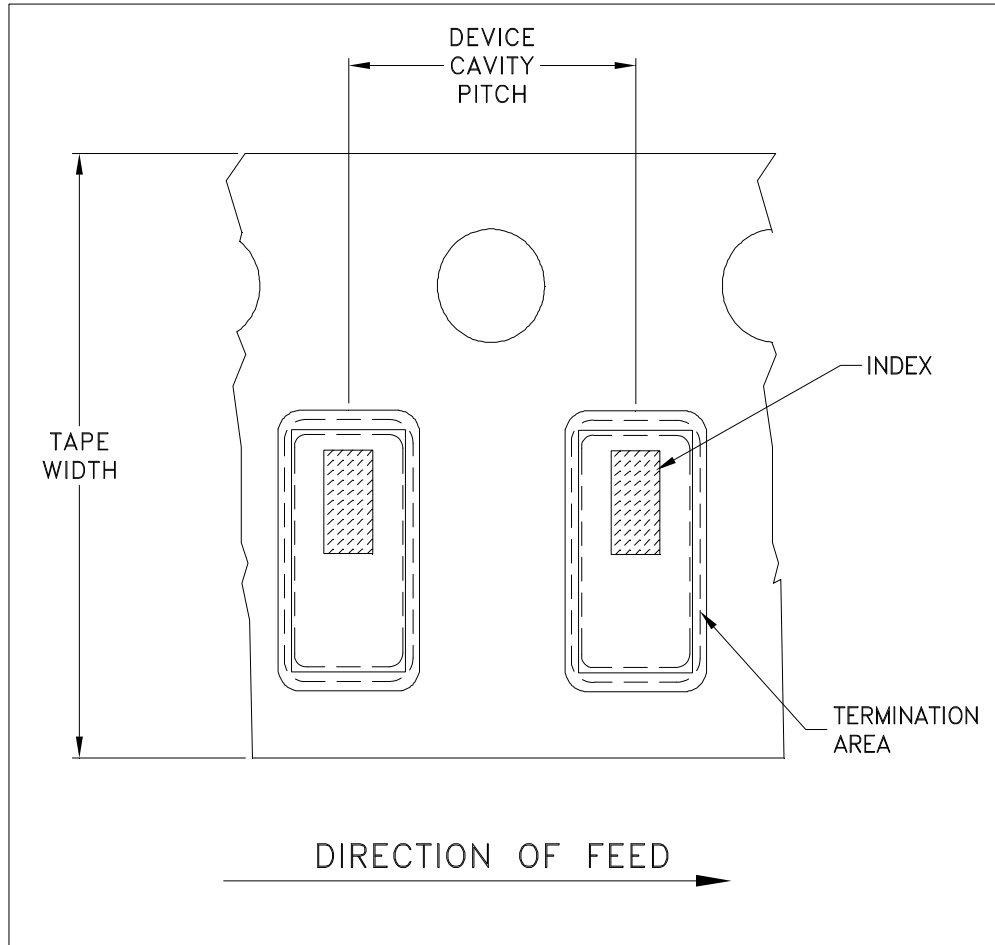


ILLUSTRATION 1

| 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



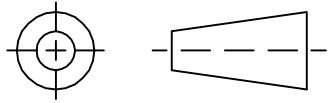
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



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RF/IF MICROWAVE COMPONENTS

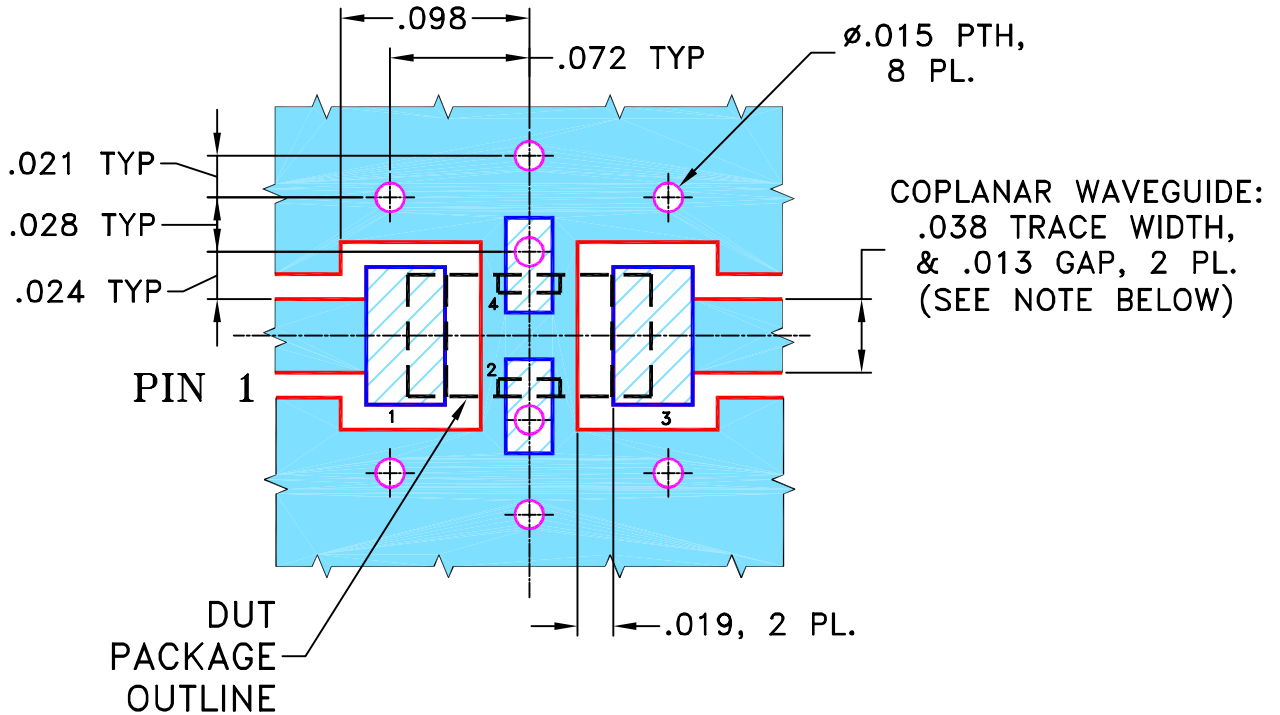
THIRD ANGLE PROJECTION



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:**
- 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

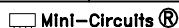
ABD

08/28/03

3 PL DECIMALS ± .005

ANGLES ±

FRACTIONS ±



Mini-Circuits®

13 Neptune Avenue
 Brooklyn NY 11235

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

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SIZE

CODE IDENT

DRAWING NO:

REV:

A

15542

98-PL-137

A

FILE: 98PL137

SCALE:

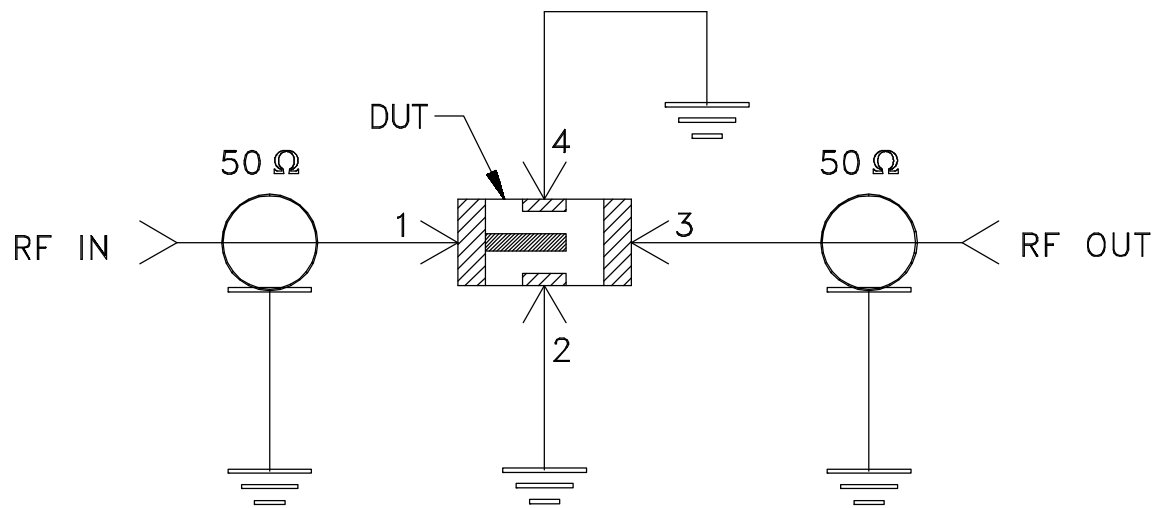
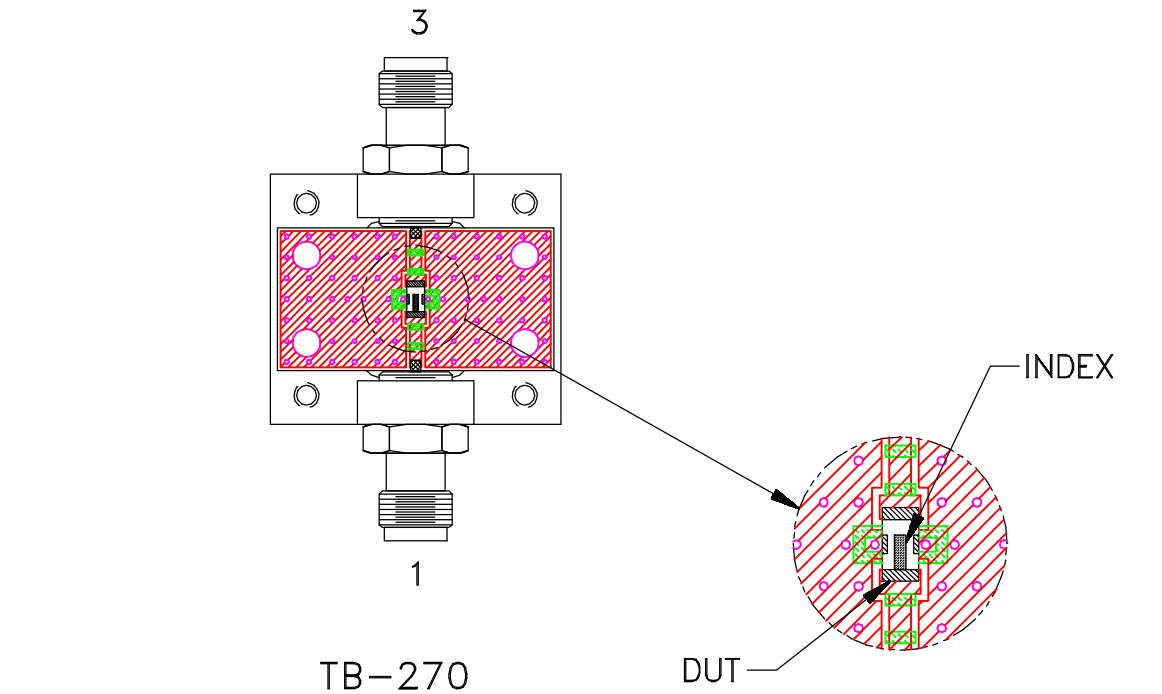
10:1

SHEET:

1 OF 1

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


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 |
| Barometric Pressure | 100,000 Feet | MIL-STD-202, Method 105, Condition D |
| Humidity | 90% RH, 65°C Units may require bake-out after humidity to restore full performance. | MIL-STD-202, Method 103 |
| Thermal Shock | -65° to 125°C, 5 cycles | MIL-STD-202, Method 107, Condition B |
| 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 | 100g, 6ms sawtooth, 3 shocks each direction 3 axes (total 18) | MIL-STD-202, Method 213, Condition I |