

LTCC Bandpass Filter

BFCN-3085A+

50Ω 2800 to 3400 MHz

The Big Deal

- Small size 3.2mm x 1.6mm
- Pass band (2800-3400 MHz)
- Low Insertion Loss (1.5 dB typical)
- Over 50 dB rejection up to 500 MHz



CASE STYLE: FV1206

Product Overview

The BFCN-3085A+ LTCC Band Pass Filter is constructed with multiple layers in order to achieve a miniature size and high repeatability of performance. Wrap-around terminations minimize variations in performance due to parasitics. Covering 600 MHz passband, 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. |
| 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



Ceramic Bandpass Filter

BFCN-3085A+

50Ω 2800 to 3400 MHz



CASE STYLE: FV1206

Maximum Ratings

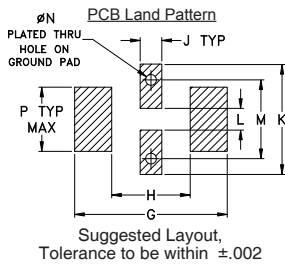
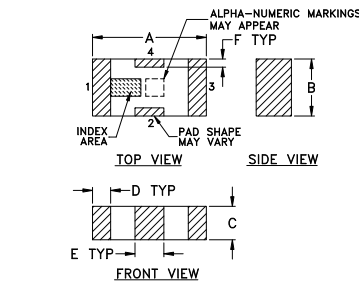
| | |
|-----------------------|-------------------|
| Operating Temperature | -55°C to 100°C |
| Storage Temperature | -55°C to 100°C |
| RF Power Input* | 1.5W max. at 25°C |

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

Pad Connections

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

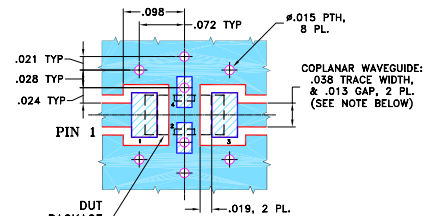
Outline Drawing



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:**
- 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.
 - 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

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Features

- Small size (0.126"x0.063"x0.037")
- Temperature stable
- Hermetically sealed
- LTCC construction

Applications

- Harmonic Rejection
- Transmitters / Receivers
- Military and Avionics

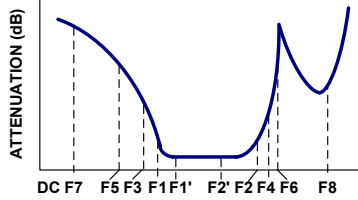
Electrical Specifications^{1,2} at 25°C

| Parameter | F# | Frequency (MHz) | Min. | Typ. | Max. | Unit | |
|------------------|------------------|-----------------|-----------|------|------|------|----|
| Pass Band | Center Frequency | — | — | 3085 | — | MHz | |
| | Insertion Loss | F1-F2 | 2800-3400 | — | 1.5 | 2.5 | dB |
| | VSWR | F1'-F2' | 3050-3350 | — | 1.85 | 3.0 | :1 |
| Stop Band, Lower | Insertion Loss | DC-F7 | DC-500 | 50 | 68 | — | dB |
| | | DC-F5 | DC-2000 | 12 | — | — | — |
| | VSWR | DC-F5 | DC-1750 | — | 40 | — | :1 |
| | | DC-F5 | DC-1750 | — | — | — | — |
| Stop Band, Upper | Insertion Loss | F6-F8 | 4210-7800 | 20 | 34 | — | dB |
| | | F4-F8 | 4000-7800 | 12 | — | — | — |
| | VSWR | F6-F8 | 4210-7800 | — | 24 | — | :1 |

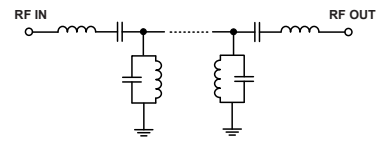
1. Measured on Mini-Circuits Characterization Test Board TB-270.

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

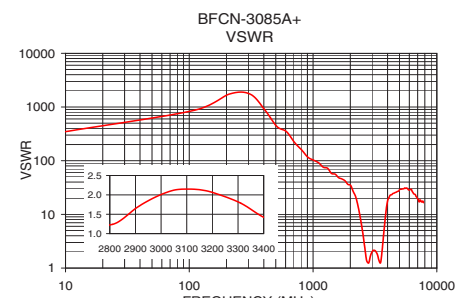
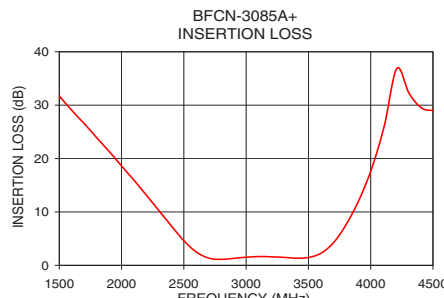
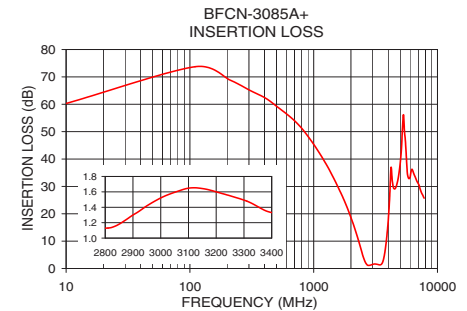


Functional Schematic



Typical Performance Data at 25°C

| Frequency (MHz) | Insertion Loss (dB) | VSWR (:1) |
|-----------------|---------------------|-----------|
| 10.00 | 60.29 | 347.44 |
| 100.00 | 74.29 | 434.30 |
| 500.00 | 59.20 | 579.06 |
| 1750.00 | 25.22 | 43.44 |
| 2000.00 | 18.63 | 35.46 |
| 2350.00 | 8.81 | 11.85 |
| 2550.00 | 3.46 | 3.73 |
| 2800.00 | 1.11 | 1.19 |
| 2900.00 | 1.31 | 1.65 |
| 3050.00 | 1.60 | 2.13 |
| 3085.00 | 1.63 | 2.15 |
| 3350.00 | 1.40 | 1.63 |
| 3400.00 | 1.35 | 1.44 |
| 3650.00 | 3.06 | 2.69 |
| 4000.00 | 17.57 | 17.93 |
| 4210.00 | 36.88 | 22.87 |
| 5300.00 | 56.71 | 30.49 |
| 7800.00 | 25.70 | 16.56 |



Ceramic Band Pass Filter

BFCN-3085A+

Typical Performance Data

| FREQUENCY (MHz) | INSERTION LOSS (dB) | RETURN LOSS (dB) | FREQUENCY (MHz) | GROUP DELAY (nsec) |
|--------------------|---------------------------|------------------------|--------------------|--------------------------|
| 10 | 60.29 | 0.05 | 2800 | 0.86 |
| 50 | 75.03 | 0.05 | 2820 | 0.85 |
| 100 | 74.29 | 0.04 | 2830 | 0.84 |
| 200 | 68.17 | 0.02 | 2840 | 0.83 |
| 300 | 65.42 | 0.00 | 2850 | 0.82 |
| 400 | 62.43 | 0.02 | 2860 | 0.82 |
| 500 | 59.20 | 0.03 | 2870 | 0.81 |
| 600 | 56.55 | 0.05 | 2880 | 0.80 |
| 700 | 53.99 | 0.08 | 2890 | 0.79 |
| 800 | 51.12 | 0.11 | 2900 | 0.79 |
| 900 | 48.25 | 0.14 | 2920 | 0.76 |
| 1000 | 45.39 | 0.17 | 2930 | 0.75 |
| 1500 | 31.70 | 0.32 | 2940 | 0.74 |
| 1750 | 25.22 | 0.40 | 2950 | 0.73 |
| 1900 | 21.31 | 0.46 | 2960 | 0.73 |
| 2000 | 18.63 | 0.49 | 2970 | 0.72 |
| 2100 | 15.92 | 0.62 | 2980 | 0.71 |
| 2200 | 13.16 | 0.82 | 2990 | 0.71 |
| 2300 | 10.22 | 1.16 | 3000 | 0.70 |
| 2400 | 7.40 | 1.95 | 3010 | 0.70 |
| 2450 | 5.95 | 2.50 | 3020 | 0.70 |
| 2500 | 4.62 | 3.37 | 3030 | 0.69 |
| 2570 | 3.02 | 5.42 | 3040 | 0.69 |
| 2600 | 2.50 | 6.74 | 3050 | 0.69 |
| 2700 | 1.33 | 14.67 | 3060 | 0.69 |
| 2800 | 1.11 | 21.03 | 3070 | 0.68 |
| 2900 | 1.31 | 12.20 | 3080 | 0.68 |
| 3000 | 1.51 | 9.47 | 3090 | 0.68 |
| 3050 | 1.60 | 8.86 | 3100 | 0.68 |
| 3085 | 1.63 | 8.76 | 3120 | 0.68 |
| 3200 | 1.61 | 9.13 | 3130 | 0.68 |
| 3300 | 1.48 | 10.78 | 3140 | 0.68 |
| 3350 | 1.40 | 12.43 | 3150 | 0.68 |
| 3400 | 1.35 | 14.88 | 3160 | 0.69 |
| 3500 | 1.47 | 19.79 | 3180 | 0.69 |
| 3600 | 2.25 | 9.92 | 3190 | 0.70 |
| 3700 | 4.22 | 4.74 | 3200 | 0.70 |
| 3800 | 7.48 | 2.44 | 3220 | 0.71 |
| 3900 | 11.94 | 1.43 | 3230 | 0.71 |
| 4000 | 17.57 | 0.97 | 3240 | 0.72 |
| 4100 | 25.29 | 0.83 | 3250 | 0.72 |
| 4200 | 36.25 | 0.76 | 3260 | 0.73 |
| 4250 | 35.69 | 0.76 | 3280 | 0.74 |
| 4300 | 32.67 | 0.74 | 3290 | 0.74 |
| 4400 | 29.58 | 0.72 | 3300 | 0.75 |
| 4500 | 29.01 | 0.70 | 3320 | 0.76 |
| 5000 | 38.48 | 0.62 | 3330 | 0.77 |
| 5300 | 56.71 | 0.57 | 3340 | 0.78 |
| 5500 | 46.94 | 0.57 | 3350 | 0.79 |
| 6000 | 33.27 | 0.61 | 3360 | 0.80 |
| 6500 | 34.15 | 0.70 | 3370 | 0.81 |
| 7000 | 30.98 | 0.89 | 3380 | 0.82 |
| 7500 | 27.29 | 1.00 | 3390 | 0.83 |
| 7800 | 25.70 | 1.05 | 3400 | 0.83 |

REV. X2

BFCN-3085A+

110801

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IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED RoHS compliant

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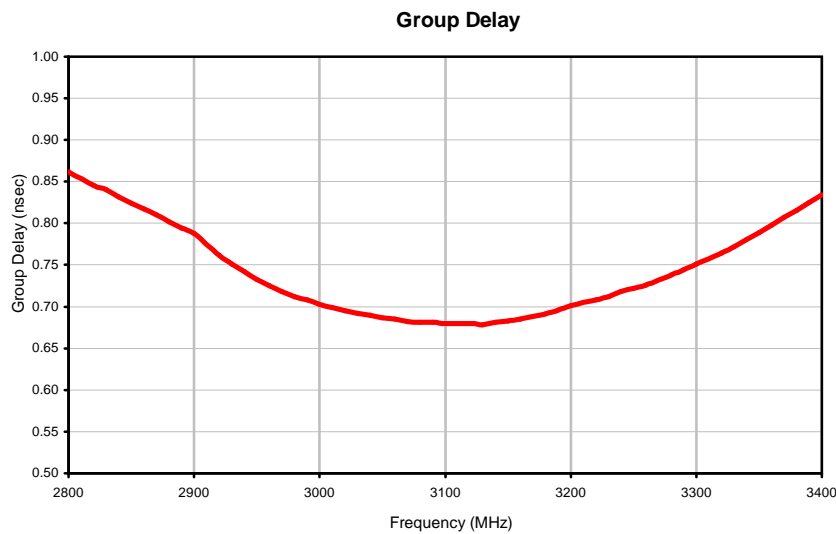
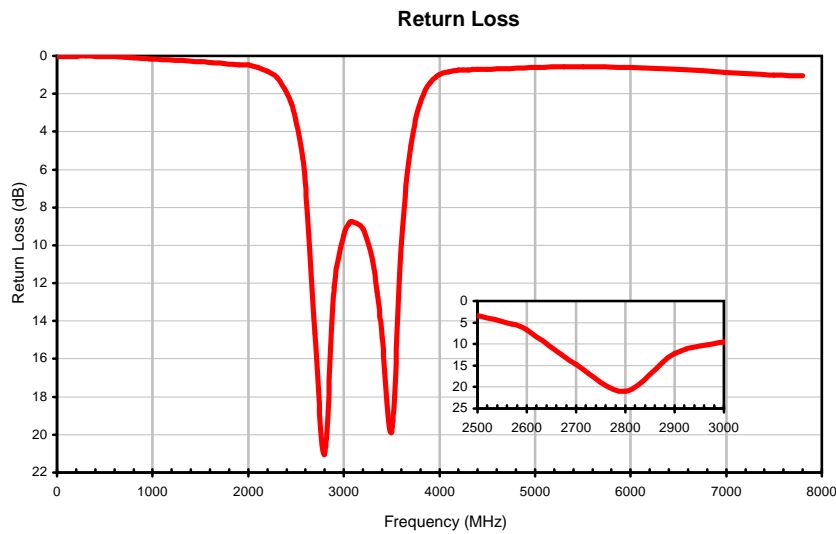
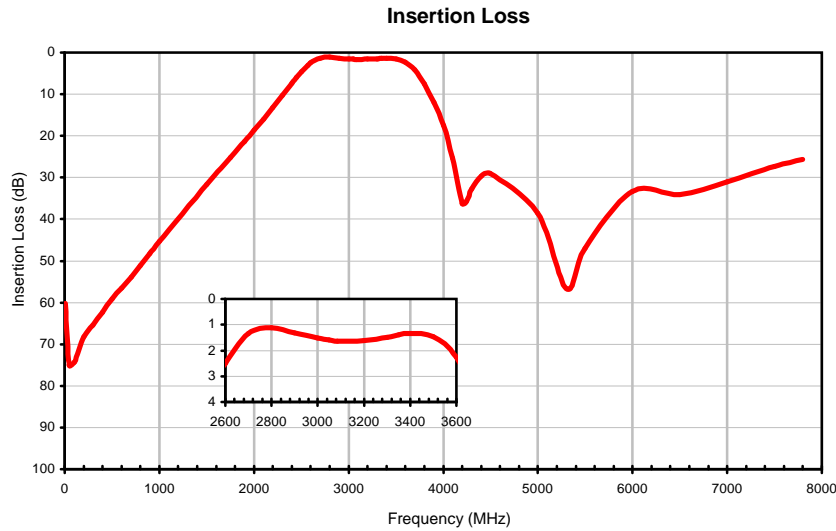
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Ceramic Band Pass Filter

BFCN-3085A+

Typical Performance Curves



REV. X2
BFCN-3085A+
110801
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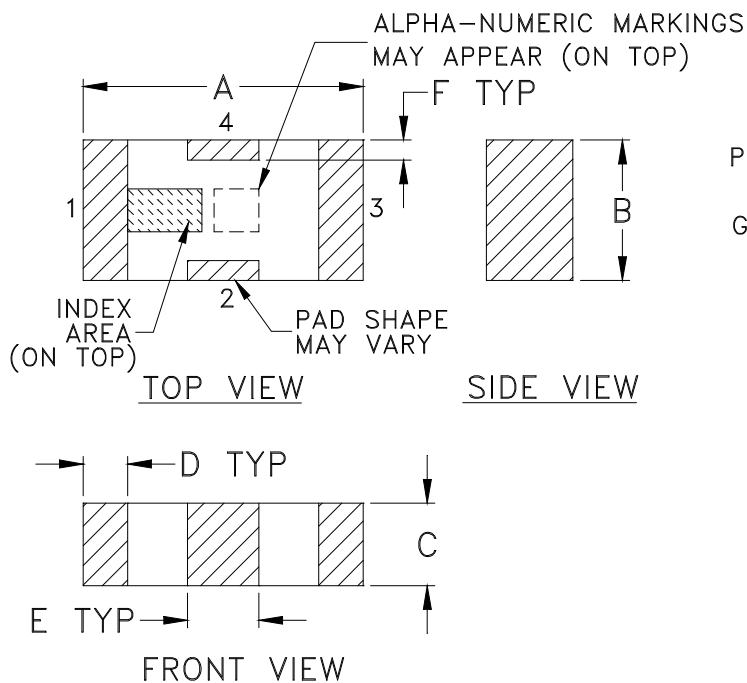
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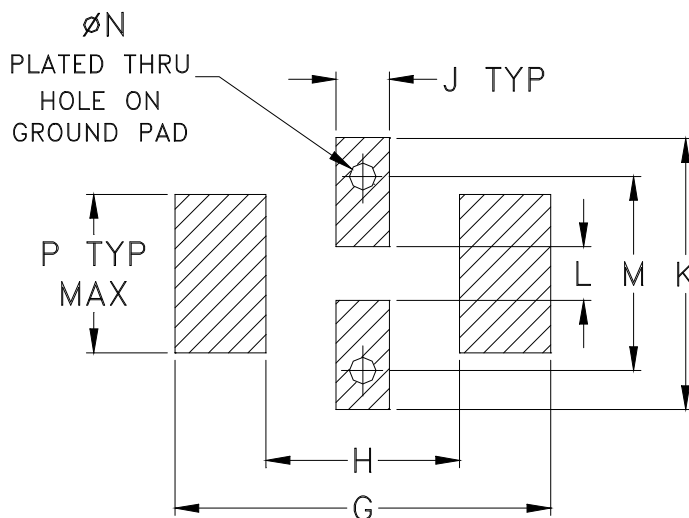
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Outline Dimensions



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.



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RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F71

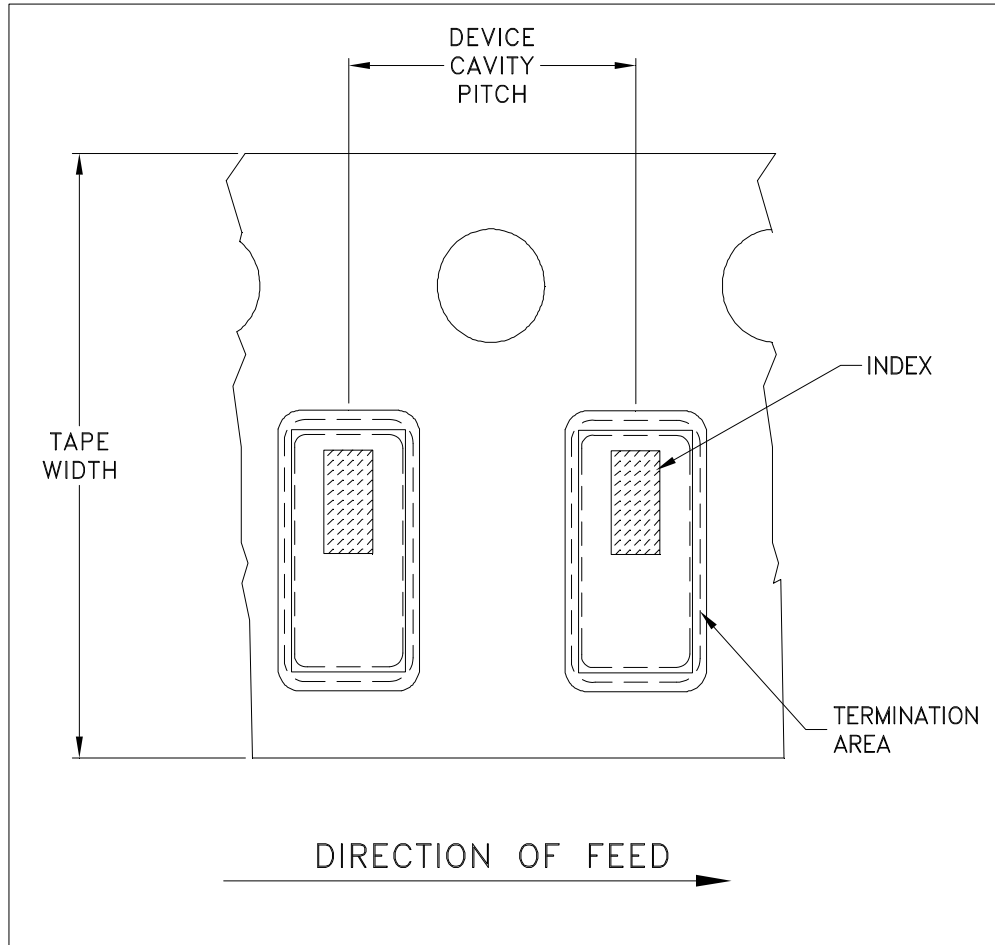


ILLUSTRATION 1

| 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



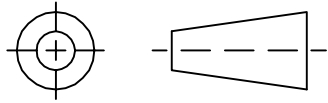
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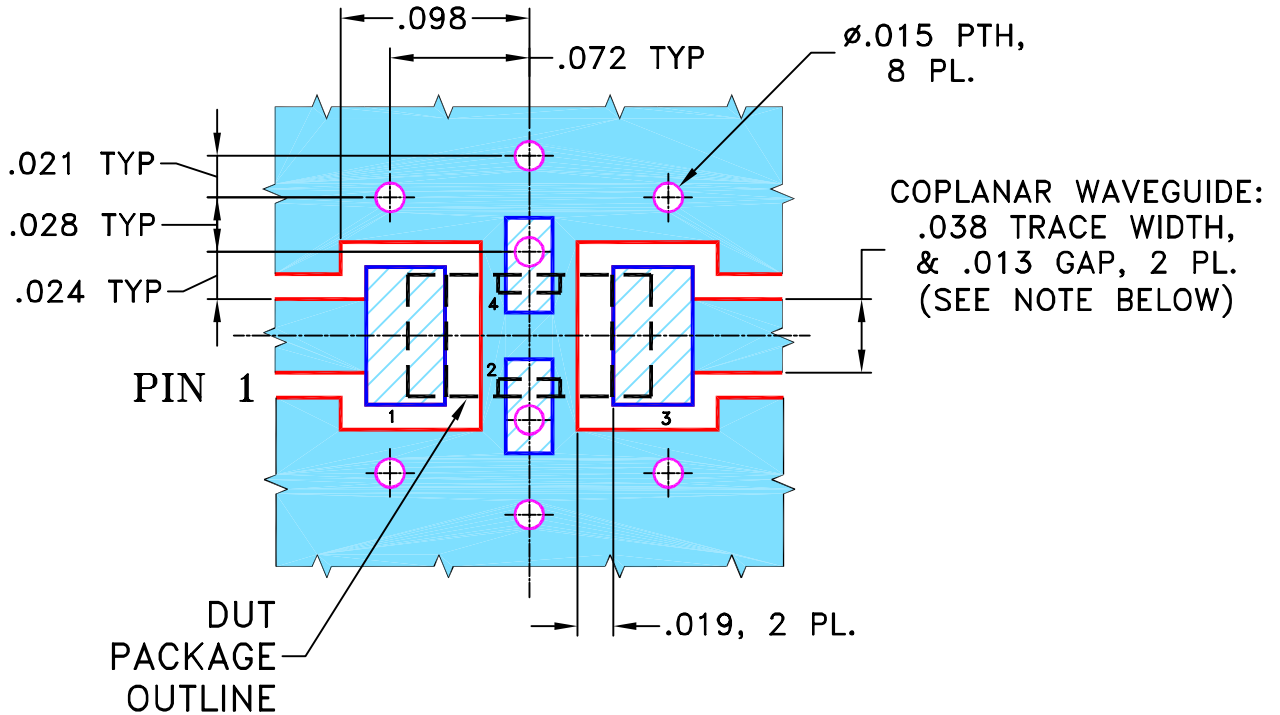
THIRD ANGLE PROJECTION



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

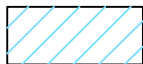


- NOTES:**
1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS R04350B WITH THICKNESS .020" ± .0015".
 COPPER: 1/2 OZ. EACH SIDE.
 FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.

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

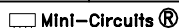
ABD

08/28/03

3 PL DECIMALS ± .005

ANGLES ±

FRACTIONS ±



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 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:

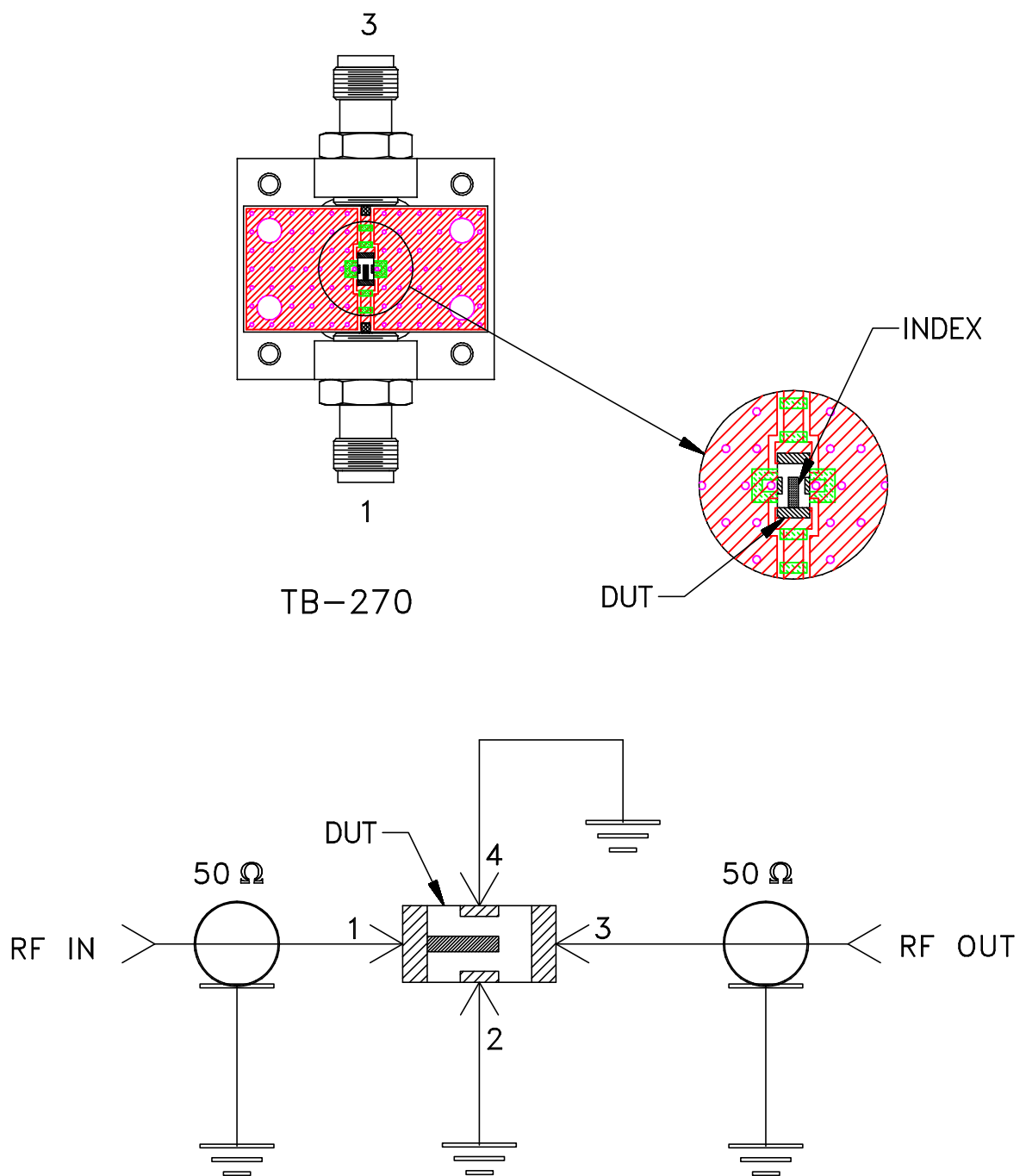
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SHEET:

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 |
| 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 |