

Ceramic

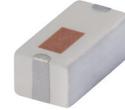
Bandpass Filter

BFCN-3491+

50Ω 2790 to 4370 MHz

The Big Deal

- Small size 3.2mm x 1.6mm
- Pass band (2790-3470 MHz)
- High rejection in upper stopband



CASE STYLE: FV1206-7

Product Overview

The BFCN-3491+ LTCC Band Pass Filter achieves a miniature size and high repeatability of performance. Wrap-around terminations minimize variations in performance due to parasitics. Covering 2790 to 4370 MHz, these units offer excellent rejection over a deep stopband.

Key Features

| Feature | Advantages |
|------------------------------------|---|
| Small Size (3.20mm x1.6 mm) | Allows for high layout density of circuit boards, while minimizing effects of parasitics. |
| Rejection peaks close to pass band | Provides good rejection of signals close to the pass band, for improved system performance. |
| Deep stopband | Upper stopband features transmission zeroes for high rejection. |
| LTCC construction | Provides a rugged package that is well suited for tough environments including high humidity and high temperature extremes. |

Ceramic Bandpass Filter

50Ω 2790 to 4370 MHz

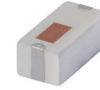
BFCN-3491+

Features

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

Applications

- Harmonic Rejection
- Transmitters / Receivers



Generic photo used for illustration purposes only

CASE STYLE: FV1206-7

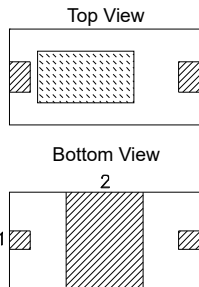
+RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

Maximum Ratings

| | |
|-----------------------|-----------------|
| Operating Temperature | -55°C to +100°C |
| Storage Temperature | -55°C to +100°C |
| RF Power Input | 1W max. |

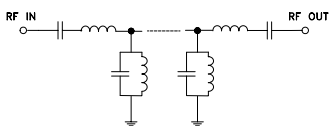
Permanent damage may occur if any of these limits are exceeded.



Pad Connections

| | |
|--------|---|
| Input | 1 |
| Output | 3 |
| Ground | 2 |

Functional Schematic



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

| Parameter | F# | Frequency (MHz) | Min. | Typ. | Max. | Unit |
|------------------|------------------|-----------------|------------|------|------|------|
| Pass Band | Center Frequency | — | — | 3489 | — | MHz |
| | Insertion Loss | F1-F2 | 2790-4370 | 1.5 | 3.0 | dB |
| | Return Loss | F1-F2 | 2790-4370 | 12 | — | dB |
| Stop Band, Lower | Insertion Loss | DC-F3 | DC-2150 | 18 | 21 | dB |
| Stop Band, Upper | Insertion Loss | F4-F5 | 5950-7200 | 20 | 30 | dB |
| | | F5-F6 | 7200-10000 | 15 | 20 | dB |

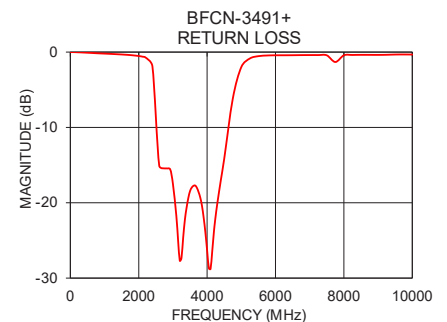
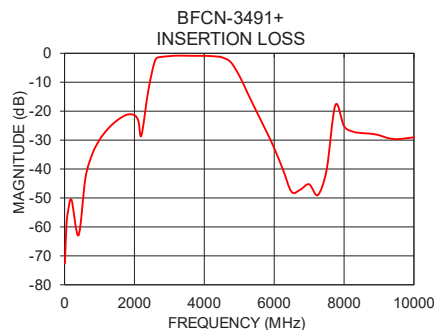
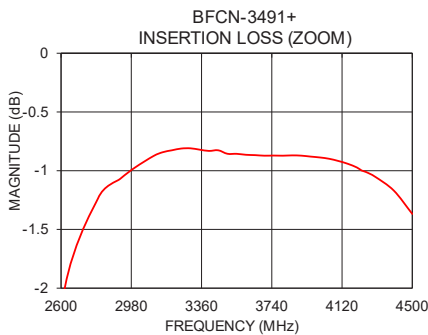
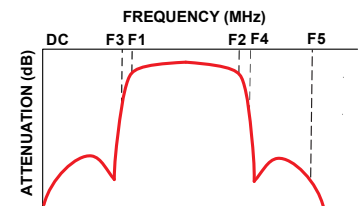
1. Measured on Mini-Circuits Characterization Test Board TB-812+.

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 Performance Data at 25°C

| Frequency (MHz) | Insertion Loss (dB) | Return Loss (dB) |
|-----------------|---------------------|------------------|
| 600 | -42.91 | -0.11 |
| 1200 | -26.66 | -0.24 |
| 2200 | -28.41 | -0.73 |
| 2600 | -2.25 | -15.09 |
| 3000 | -0.97 | -17.51 |
| 3600 | -0.86 | -17.76 |
| 4400 | -1.17 | -17.03 |
| 4500 | -1.37 | -14.16 |
| 4750 | -2.98 | -6.20 |
| 5250 | -14.02 | -0.85 |
| 6000 | -32.75 | -0.42 |
| 7000 | -45.26 | -0.40 |
| 8000 | -25.20 | -0.42 |
| 9000 | -28.29 | -0.37 |
| 10000 | -29.03 | -0.33 |

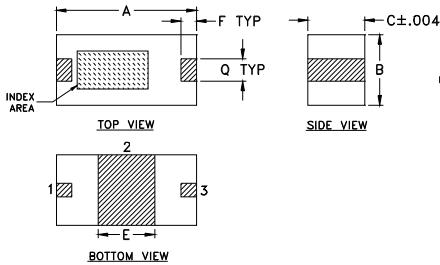
Specification Definition



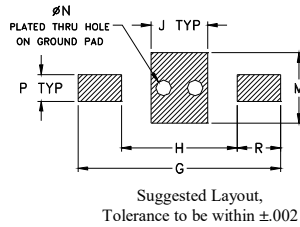
Bandpass Filter

BFCN-3491+

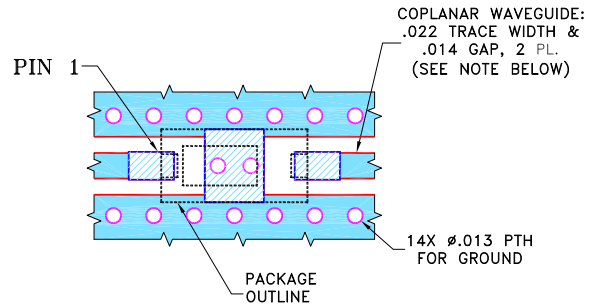
Outline Drawing



PCB Land Pattern



Demo Board MCL P/N: TB- 812+ Suggested PCB Layout (PL-439)



NOTES:

1. COPLANAR WAVEGUIDE IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS $.010" \pm .001"$, COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND 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.

Product Marking: N/A

Pad Connections

| | |
|--------|---|
| Input | 1 |
| Output | 3 |
| Ground | 2 |

Outline Dimensions (inch/mm)

| | | | | | | |
|------|------|------|------|------|------|-------|
| A | B | C | E | F | G | H |
| .126 | .063 | .051 | .051 | .014 | .183 | .104 |
| 3.20 | 1.60 | 1.30 | 1.30 | 0.36 | 4.65 | 2.64 |
| J | M | N | P | Q | R | wt |
| .051 | .063 | .014 | .024 | .020 | .039 | grams |
| 1.30 | 1.60 | 0.36 | 0.61 | 0.51 | 0.99 | .020 |

Additional 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-3491+

Typical Performance Data

| FREQUENCY (MHz) | INSERTION LOSS (dB) | RETURN LOSS (dB) |
|--------------------|------------------------|---------------------|
| 10 | 72.66 | 0.01 |
| 55 | 59.23 | 0.00 |
| 100 | 54.52 | 0.01 |
| 200 | 50.70 | 0.02 |
| 400 | 62.91 | 0.06 |
| 600 | 42.91 | 0.11 |
| 800 | 34.63 | 0.16 |
| 1000 | 29.91 | 0.20 |
| 1200 | 26.66 | 0.24 |
| 1400 | 24.23 | 0.29 |
| 1600 | 22.38 | 0.34 |
| 1800 | 21.18 | 0.42 |
| 2000 | 21.37 | 0.52 |
| 2113 | 23.37 | 0.61 |
| 2200 | 28.41 | 0.73 |
| 2400 | 12.70 | 1.89 |
| 2600 | 2.25 | 15.09 |
| 2800 | 1.24 | 15.43 |
| 2920 | 1.07 | 15.57 |
| 3000 | 0.97 | 17.51 |
| 3100 | 0.88 | 21.75 |
| 3150 | 0.84 | 24.93 |
| 3200 | 0.83 | 27.69 |
| 3250 | 0.81 | 27.33 |
| 3300 | 0.81 | 24.61 |
| 3350 | 0.82 | 22.24 |
| 3400 | 0.83 | 20.64 |
| 3450 | 0.83 | 19.37 |
| 3500 | 0.86 | 18.45 |
| 3550 | 0.86 | 17.99 |
| 3600 | 0.86 | 17.76 |
| 3650 | 0.87 | 17.71 |
| 3700 | 0.87 | 18.01 |
| 3750 | 0.87 | 18.58 |
| 3800 | 0.87 | 19.32 |
| 3850 | 0.87 | 20.42 |
| 3900 | 0.87 | 22.03 |
| 3950 | 0.88 | 23.97 |
| 4000 | 0.89 | 26.33 |
| 4050 | 0.90 | 28.68 |
| 4100 | 0.92 | 28.78 |
| 4150 | 0.94 | 26.40 |
| 4200 | 0.97 | 23.77 |
| 4226 | 1.00 | 22.66 |
| 4250 | 1.01 | 21.74 |
| 4300 | 1.05 | 20.02 |
| 4400 | 1.17 | 17.03 |
| 4500 | 1.37 | 14.16 |
| 4750 | 2.98 | 6.20 |
| 5000 | 7.70 | 1.99 |
| 5250 | 14.02 | 0.85 |
| 5500 | 20.25 | 0.54 |
| 5750 | 26.34 | 0.45 |
| 5840 | 28.59 | 0.44 |
| 6000 | 32.75 | 0.42 |
| 6250 | 40.14 | 0.42 |
| 6500 | 47.91 | 0.41 |
| 6750 | 47.12 | 0.40 |
| 7000 | 45.26 | 0.40 |
| 7250 | 49.02 | 0.40 |
| 7500 | 40.35 | 0.43 |
| 7750 | 17.93 | 1.32 |
| 8000 | 25.20 | 0.42 |
| 8250 | 27.05 | 0.38 |
| 8500 | 27.56 | 0.37 |
| 8750 | 27.78 | 0.37 |
| 9000 | 28.29 | 0.37 |
| 9250 | 29.29 | 0.36 |
| 9500 | 29.68 | 0.32 |
| 9750 | 29.40 | 0.32 |
| 10000 | 29.03 | 0.33 |



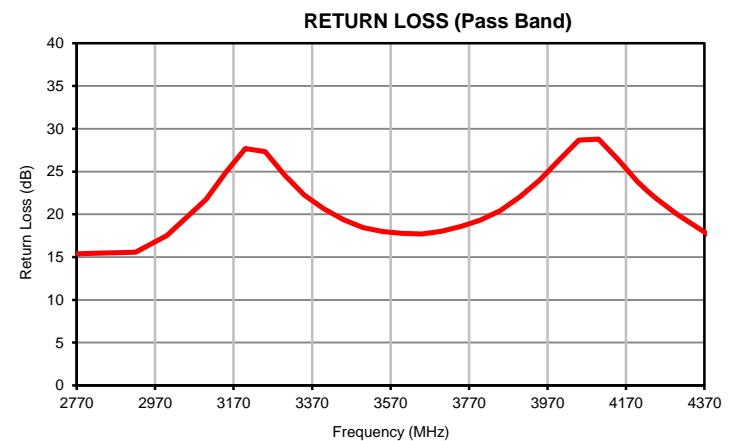
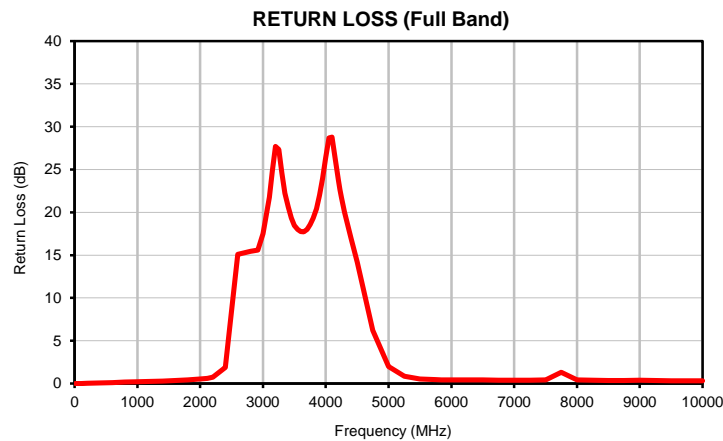
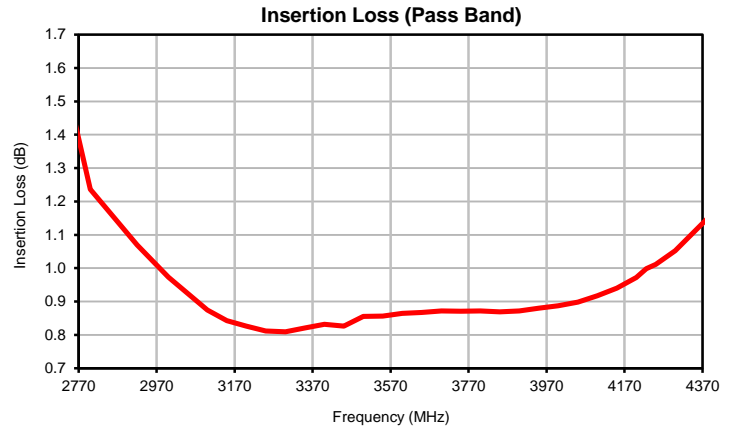
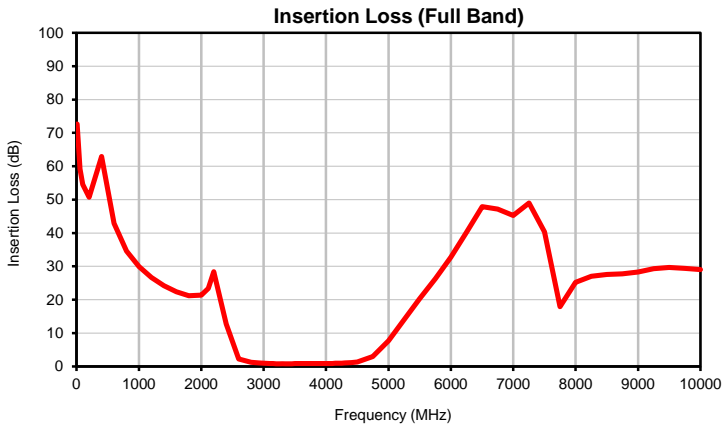
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 The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com



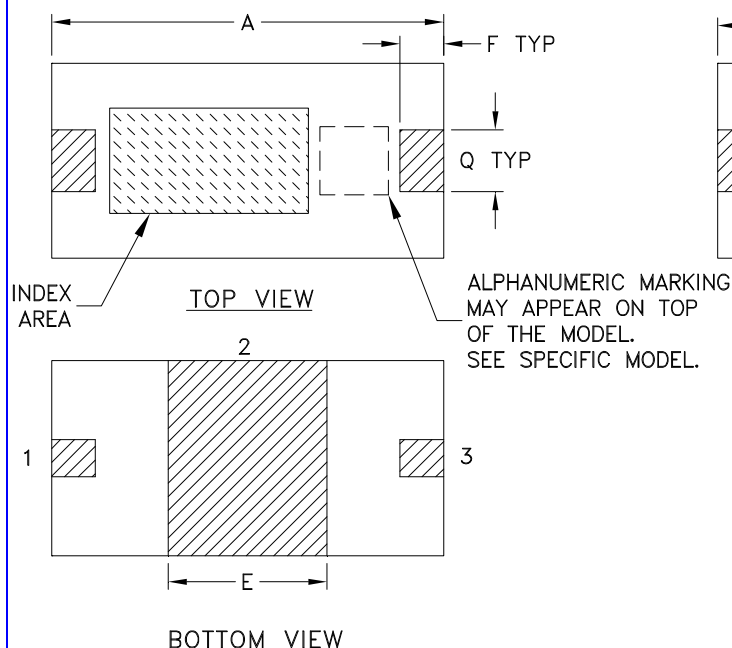
IF/RF MICROWAVE COMPONENTS

REV. OR
 BFCN-3491+
 5/5/2020
 Page 1 of 1

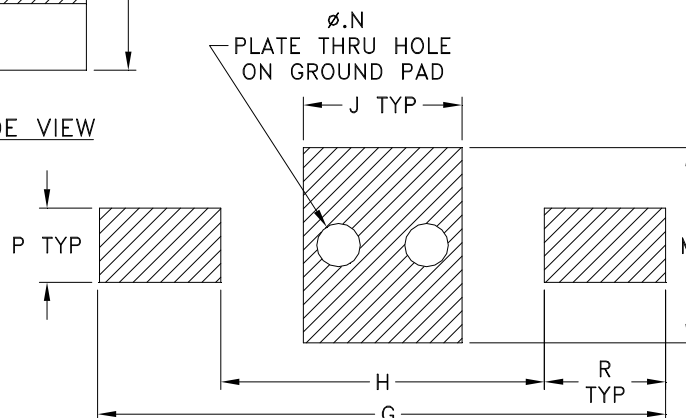
Typical Performance Curves



Outline Dimensions



PCB Land Pattern



| CASE # | A | B | C | D | E | F | G | H | J | K | L | M |
|----------|----------------|----------------|----------------|----------|----------------|----------------|----------------|----------------|----------------|----------|----------|----------------|
| FV1206-7 | .126 (3.20) | .063 (1.60) | .051 (1.30) | -- -- | .051 (1.30) | .014 (0.35) | .183 (4.65) | .104 (2.65) | .051 (1.30) | -- -- | -- -- | .063 (1.60) |

| CASE # | N | P | Q | R | S | WT. GRAM |
|----------|----------------|----------------|----------------|----------------|----------|----------|
| FV1206-7 | .014 (0.35) | .024 (0.60) | .020 (0.50) | .039 (1.00) | -- -- | .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.
- Line width should be designed to match 50 Ω characteristic impedance, depending on PCB material and thickness.



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

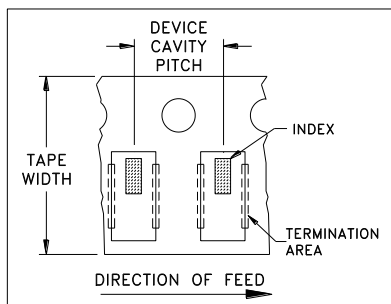


ILLUSTRATION 1

Applicable Case Styles

FV1206-1
FV1206-3

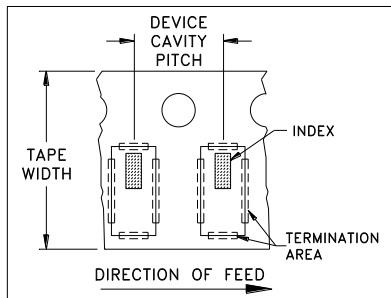


ILLUSTRATION 2

Applicable Case Styles

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

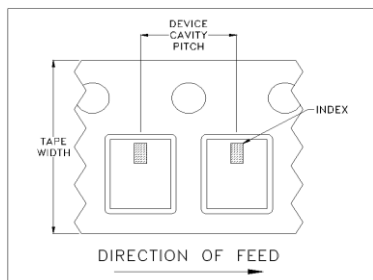


ILLUSTRATION 3

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

Mini-Circuits ISO 9001 & ISO 14001 Certified

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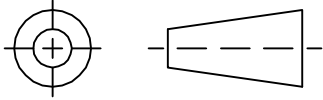
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THIRD ANGLE PROJECTION

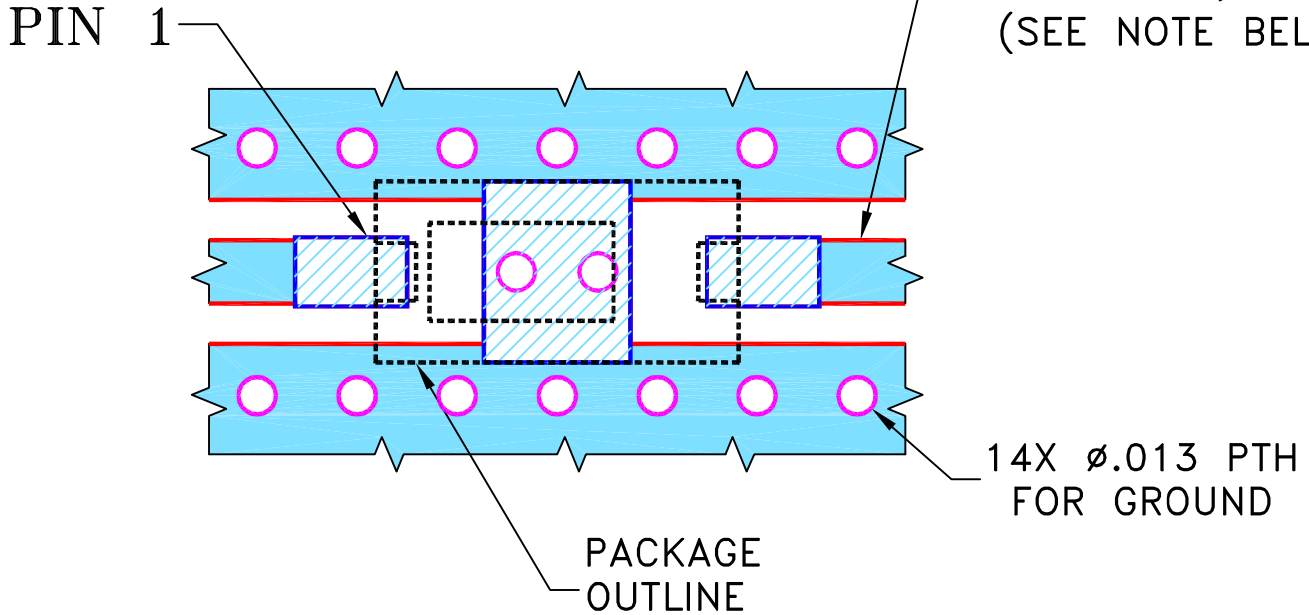


REVISIONS

| REV | ECN No. | DESCRIPTION | DATE | DR | AUTH |
|-----|---------|-------------|----------|----|------|
| OR | M148536 | NEW RELEASE | 10/14/14 | GF | MY |
| | | | | | |
| | | | | | |

SUGGESTED MOUNTING CONFIGURATION
FOR FV1206-7 CASE STYLE, "03FL02" PIN CODE

COPLANAR WAVEGUIDE:
 .022 TRACE WIDTH &
 .014 GAP, 2 PL.
 (SEE NOTE BELOW)



NOTES:

1. COPLANAR WAVEGUIDE IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .010" ± .001". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND 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.

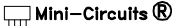
| UNLESS OTHERWISE SPECIFIED | INITIALS | | DATE |
|----------------------------|----------|----|----------|
| DIMENSIONS ARE IN INCHES | DRAWN | GF | 10/07/14 |
| TOLERANCES ON: | CHECKED | AV | 10/14/14 |
| 2 PL DECIMALS ± | APPROVED | MY | 10/14/14 |
| 3 PL DECIMALS ± .005 | | | |
| ANGLES ± | | | |
| FRACTIONS ± | | | |

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 Brooklyn NY 11235

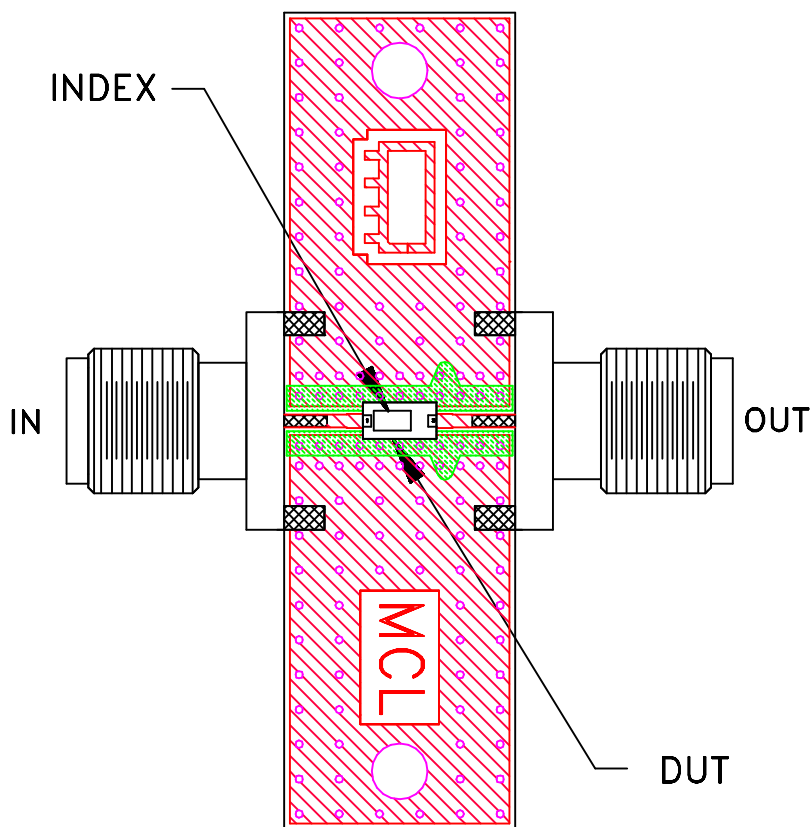
PL, 03FL02, FV1206-7, TB-812+

| SIZE | CODE IDENT | DRAWING NO: | REV: |
|------|------------|-------------|------|
| A | 15542 | 98-PL-439 | OR |

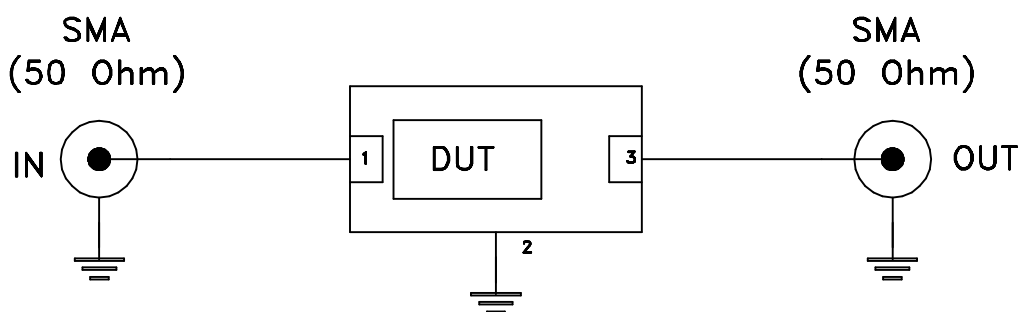
| FILE: | SCALE: | SHEET: |
|---------|--------|--------|
| 98PL439 | 15:1 | 1 OF 1 |

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Evaluation Board and Circuit




TB-812+



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: R04350 or equivalent,
Dielectric Constant=3.5, Thickness=.010 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 |