



LTCC SMT

# Band Pass Filter

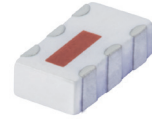
## BFCN-2900+

Mini-Circuits

50Ω 2700 to 3100 MHz

### THE BIG DEAL

- Good Rejection, 25 dB Typ.
- 1206 Surface Mount Footprint
- Power Handling: 1.5 Watts



Generic photo used for illustration purposes only

CASE STYLE: FV1206-1

### +RoHS Compliant

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

### APPLICATIONS

- Harmonic Rejection
- Transmitters / Receivers

### PRODUCT OVERVIEW

Mini-Circuits' BFCN-2900+ 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 400 MHz passband, these units offer low insertion loss and good rejection.

### KEY FEATURES

| Feature                 | Advantages  |
|-------------------------|---|
| Small Size, 1206        | Allows for high layout density of circuit boards, while minimizing the effects 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. |
| Rugged Power handling   | Handles up to 1.5 Watts in a small package.   |

REV. E  
ECO-016659  
BFCN-2900+  
URJ  
230202





### ELECTRICAL SPECIFICATIONS<sup>1,2</sup> AT 25°C

| Parameter        | F#               | Frequency (MHz) | Min.        | Typ. | Max. | Units |
|------------------|------------------|-----------------|-------------|------|------|-------|
| Passband         | Center Frequency | —               | —           | 2900 | —    | MHz   |
|                  | Insertion Loss   | F1-F2           | 2700 - 3100 | —    | 3    | dB    |
|                  | Return Loss      | F1-F2           | 2700 - 3100 | 4.96 | 8.09 | dB    |
| Stop Band, Lower | Rejection        | DC-F3           | DC - 1800   | —    | 25   | dB    |
|                  |                  | F4              | 1850        | 20   | —    | dB    |
| Stop Band, Upper | Rejection        | F5              | 4200        | 20   | —    | dB    |
|                  |                  | F6-F7           | 4900 - 7000 | —    | 25   | dB    |

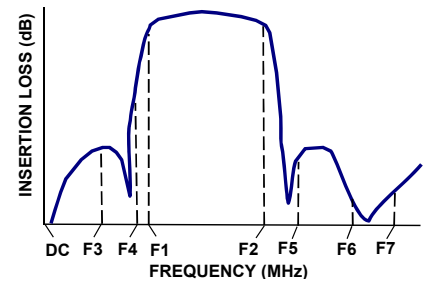
1. This component should not be used as a DC-block. In applications where DC voltage and/or current is present at either the input or output ports, external DC blocking capacitors are required.
2. Measured on Mini-Circuits Characterization Test Board TB-285.

### ABSOLUTE MAXIMUM RATINGS<sup>1</sup>

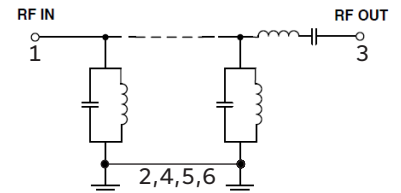
| Parameter                   | Ratings        |
|-----------------------------|----------------|
| Operating temperature       | -55°C to 100°C |
| Storage temperature         | -55°C to 100°C |
| RF Power Input <sup>2</sup> | 1.5W @25°C     |

1. Permanent damage may occur if any of these limits are exceeded.
2. Power rating applies only to signals within the passband. Power rating above +25°C operating temperature decreases linearly to 0.25W at +100°C.

### TYPICAL FREQUENCY RESPONSE



### FUNCTIONAL DIAGRAM



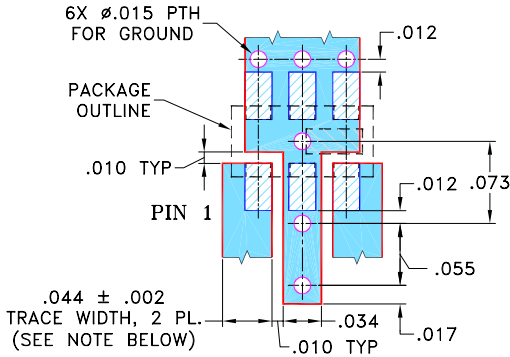


### PAD CONNECTIONS

|        |         |
|--------|---------|
| RF IN  | 1       |
| RF OUT | 3       |
| GROUND | 2,4,5,6 |

PRODUCT MARKING: RP

DEMO BOARD MCL P/N: TB-285  
SUGGESTED PCB LAYOUT (PL-158)

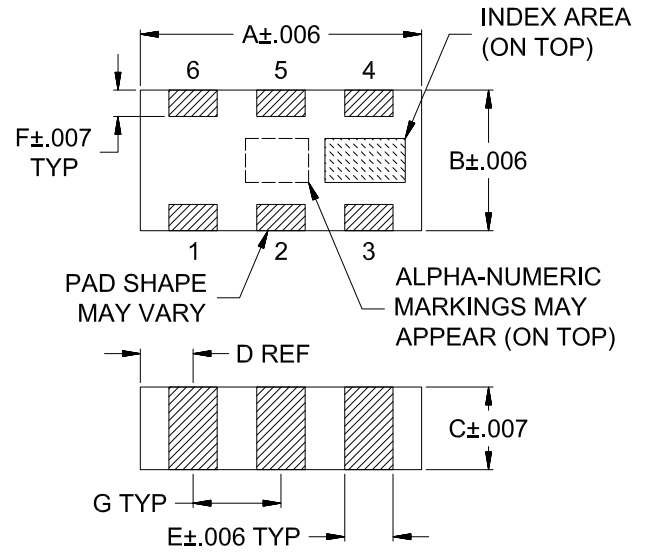


NOTE: 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .020"  $\pm$  .0015". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.

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

### OUTLINE DRAWING



### OUTLINE DIMENSIONS (Inches/mm)

| A    | B    | C    | D    | E    | F    | G    | Wt.   |
|------|------|------|------|------|------|------|-------|
| .126 | .063 | .035 | .024 | .022 | .011 | .039 | grams |
| 3.20 | 1.60 | 0.89 | 0.61 | 0.56 | 0.28 | 0.99 | .020  |



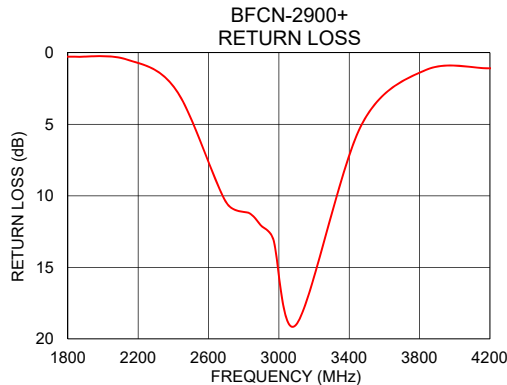
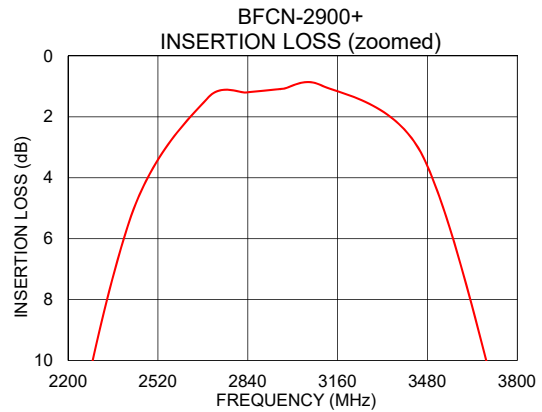
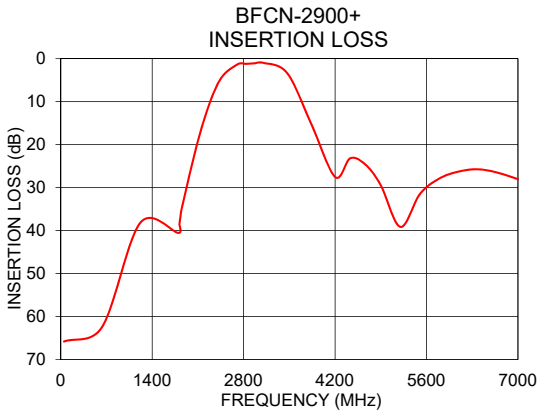
LTCC SMT

# Band Pass Filter

## BFCN-2900+

### TYPICAL PERFORMANCE DATA AT 25°C

| Frequency (MHz) | Insertion Loss (dB) | Return Loss (dB) |
|-----------------|---------------------|------------------|
| 50.00           | 65.81               | 0.03             |
| 1800.00         | 40.54               | 0.27             |
| 1850.00         | 34.99               | 0.28             |
| 2133.33         | 17.29               | 0.46             |
| 2416.67         | 5.46                | 2.62             |
| 2700.00         | 1.36                | 10.45            |
| 2833.33         | 1.20                | 11.22            |
| 2900.00         | 1.14                | 12.10            |
| 2966.67         | 1.08                | 12.98            |
| 3100.00         | 0.96                | 18.98            |
| 3466.67         | 3.35                | 5.12             |
| 3833.33         | 15.10               | 1.22             |
| 4200.00         | 27.52               | 1.09             |
| 4900.00         | 29.47               | 0.73             |
| 5800.00         | 27.85               | 0.41             |
| 7000.00         | 28.03               | 0.44             |



- 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](http://www.minicircuits.com/MCLStore/terms.jsp)



# Ceramic Band Pass Filter

# BFCN-2900+

## Typical Performance Data

| FREQ.<br>(MHz) | INSERTION LOSS<br>(dB) | INPUT RETURN LOSS<br>(dB) | OUTPUT RETURN LOSS<br>(dB) |
|----------------|------------------------|---------------------------|----------------------------|
|                | @ +25° C               | @ +25° C                  | @ +25° C                   |
| 50             | 68.92                  | 0.01                      | 0.00                       |
| 100            | 66.82                  | 0.01                      | 0.01                       |
| 200            | 60.69                  | 0.02                      | 0.01                       |
| 300            | 58.50                  | 0.04                      | 0.02                       |
| 400            | 58.18                  | 0.04                      | 0.03                       |
| 500            | 59.22                  | 0.06                      | 0.04                       |
| 600            | 63.99                  | 0.09                      | 0.05                       |
| 700            | 91.84                  | 0.11                      | 0.08                       |
| 800            | 61.25                  | 0.14                      | 0.10                       |
| 900            | 54.63                  | 0.17                      | 0.13                       |
| 1000           | 51.09                  | 0.21                      | 0.16                       |
| 1100           | 49.13                  | 0.22                      | 0.18                       |
| 1200           | 48.32                  | 0.25                      | 0.22                       |
| 1300           | 49.16                  | 0.27                      | 0.25                       |
| 1400           | 53.51                  | 0.30                      | 0.29                       |
| 1500           | 52.02                  | 0.33                      | 0.33                       |
| 1600           | 41.89                  | 0.36                      | 0.37                       |
| 1700           | 35.13                  | 0.39                      | 0.42                       |
| 1800           | 29.79                  | 0.41                      | 0.48                       |
| 1850           | 27.43                  | 0.44                      | 0.51                       |
| 1900           | 25.18                  | 0.47                      | 0.54                       |
| 2000           | 20.94                  | 0.53                      | 0.66                       |
| 2100           | 16.89                  | 0.66                      | 0.82                       |
| 2200           | 12.97                  | 0.93                      | 1.16                       |
| 2300           | 9.10                   | 1.51                      | 1.89                       |
| 2380           | 6.22                   | 2.53                      | 3.17                       |
| 2400           | 5.57                   | 2.93                      | 3.68                       |
| 2480           | 3.38                   | 5.23                      | 6.84                       |
| 2500           | 2.96                   | 6.00                      | 8.04                       |
| 2600           | 1.82                   | 9.79                      | 15.74                      |
| 2700           | 1.71                   | 9.52                      | 12.17                      |
| 2800           | 1.89                   | 8.15                      | 9.06                       |
| 2900           | 1.98                   | 7.79                      | 8.16                       |
| 3000           | 1.88                   | 8.57                      | 8.68                       |
| 3100           | 1.65                   | 11.12                     | 11.00                      |
| 3200           | 1.52                   | 19.37                     | 17.51                      |
| 3300           | 1.93                   | 14.29                     | 13.32                      |
| 3400           | 3.55                   | 6.32                      | 6.02                       |
| 3500           | 6.47                   | 3.19                      | 2.92                       |
| 3600           | 10.26                  | 1.93                      | 1.61                       |
| 3650           | 12.39                  | 1.63                      | 1.27                       |
| 3700           | 14.70                  | 1.43                      | 1.04                       |
| 3800           | 20.14                  | 1.25                      | 0.79                       |
| 3900           | 28.00                  | 1.20                      | 0.66                       |
| 4000           | 39.40                  | 1.23                      | 0.62                       |
| 4100           | 29.88                  | 1.26                      | 0.58                       |
| 4200           | 26.22                  | 1.29                      | 0.57                       |
| 4500           | 24.91                  | 1.24                      | 0.52                       |
| 4900           | 33.76                  | 0.99                      | 0.45                       |
| 5000           | 39.34                  | 0.93                      | 0.46                       |
| 5200           | 41.01                  | 0.85                      | 0.45                       |
| 5500           | 31.08                  | 0.75                      | 0.45                       |
| 6000           | 27.02                  | 0.67                      | 0.47                       |
| 6500           | 26.24                  | 0.62                      | 0.55                       |
| 7000           | 26.56                  | 0.57                      | 0.64                       |



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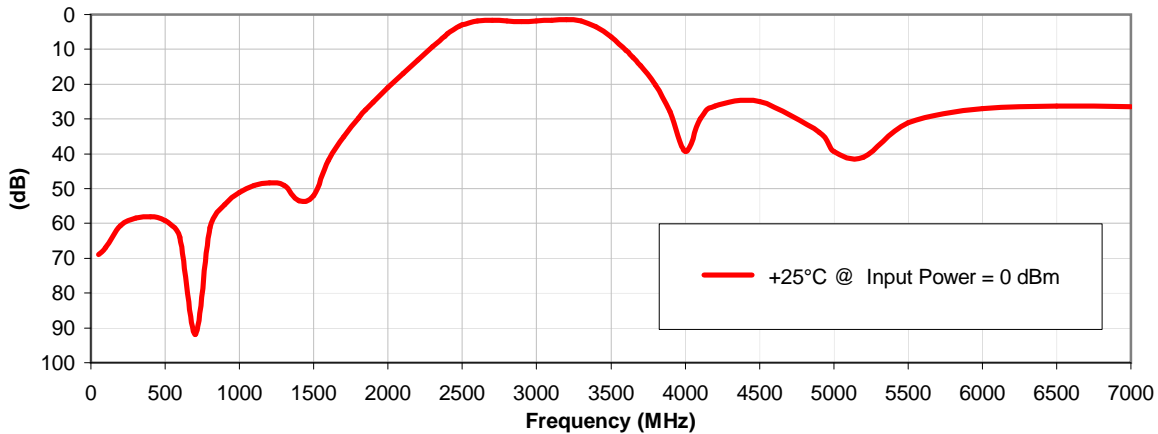
The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see



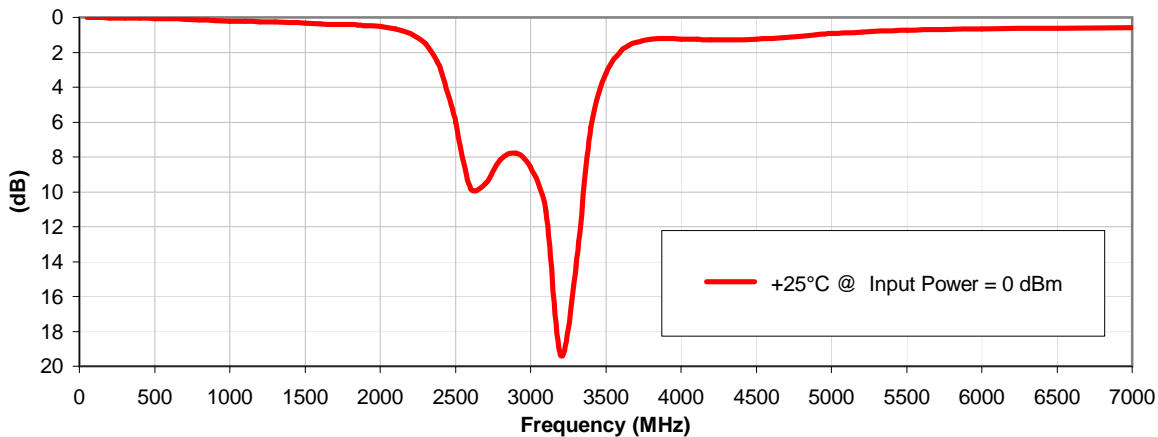
REV. X1  
 BFCN-2900+  
 090820  
 Page 1 of 1

## Typical Performance Curves

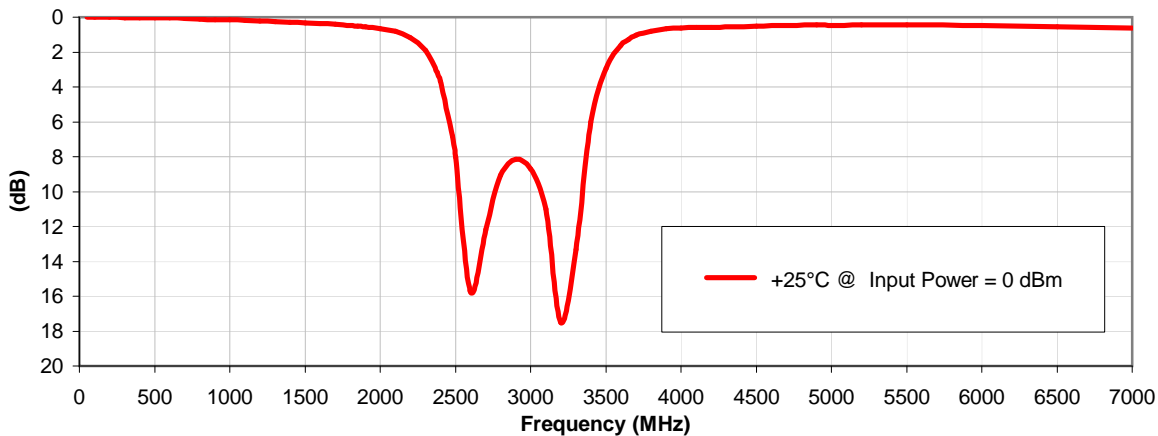
### INSERTION LOSS vs. TEMPERATURE



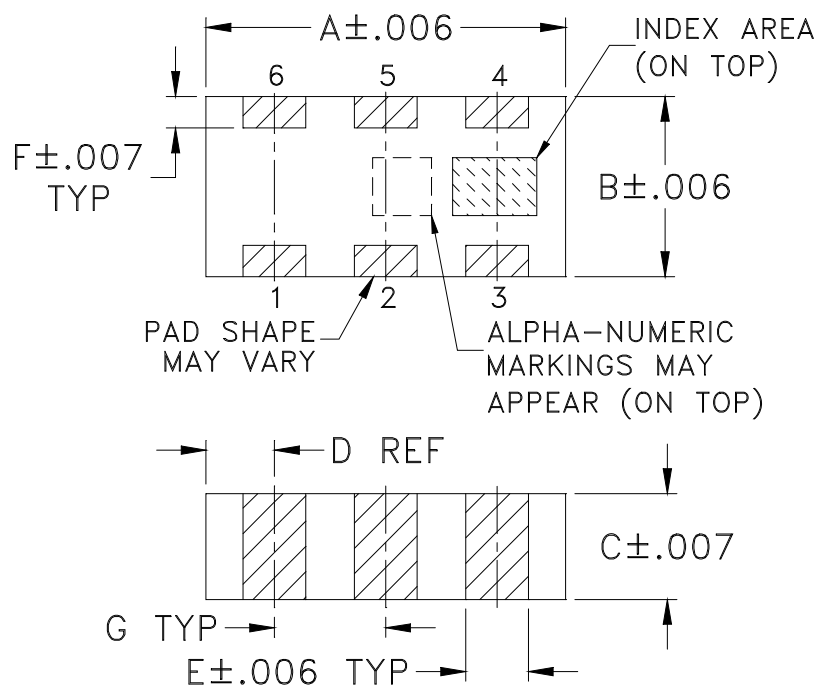
### INPUT RETURN LOSS vs. TEMPERATURE



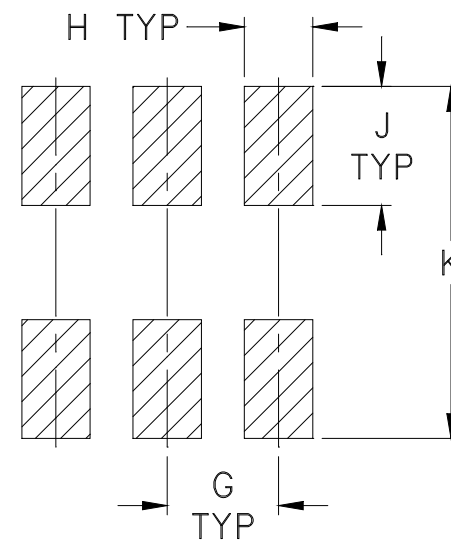
### OUTPUT RETURN LOSS vs. TEMPERATURE



### 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 |
|----------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|----|----|----|----------|
| FV1206-1 | .126<br>(3.20) | .063<br>(1.60) | .035<br>(0.89) | .024<br>(0.61) | .022<br>(0.56) | .011<br>(0.28) | .039<br>(0.99) | .024<br>(0.61) | .042<br>(1.07) | .123<br>(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



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RF/IF MICROWAVE COMPONENTS

## DEVICE ORIENTATION IN T&R

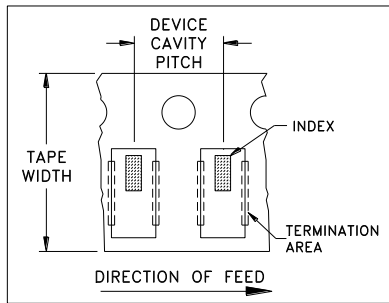


ILLUSTRATION 1

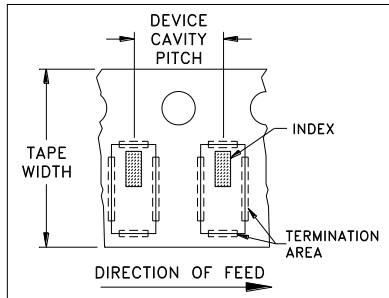


ILLUSTRATION 2

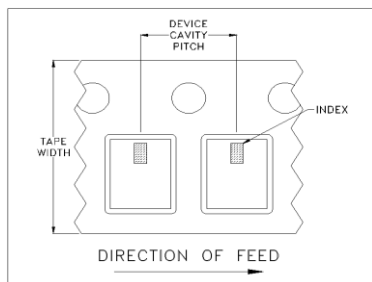


ILLUSTRATION 3

| Applicable Case Styles |
|------------------------|
| FV1206-1<br>FV1206-3   |

| Applicable Case Styles                                   |
|--|
| FV1206-4<br>FV1206-5<br>FV1206-6<br>FV1206-7<br>FV1206-9 |

| Applicable Case Styles   |
|--|
| FV1206-12<br>GE0805C-18<br>NL1008C-6<br>NL1008C-7<br>NL1008C-9<br>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](http://www.minicircuits.com/pages/pdfs/tape.pdf)

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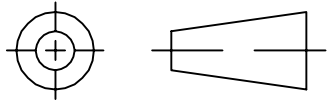
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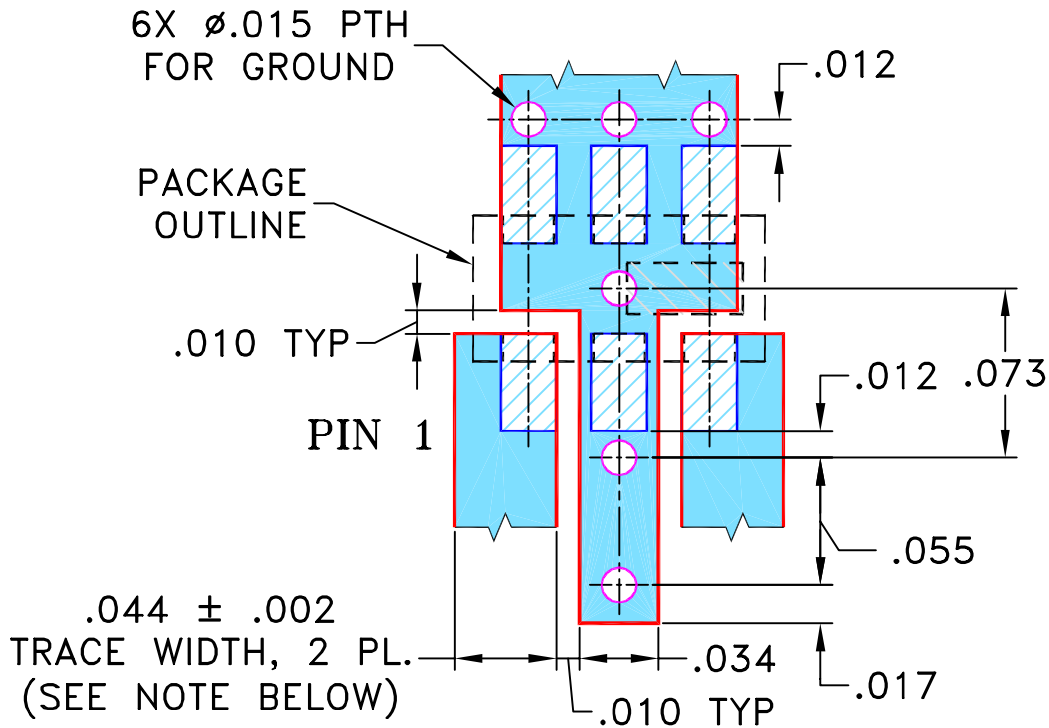
THIRD ANGLE PROJECTION



REVISIONS

| REV | ECN No. | DESCRIPTION           | DATE     | DR | AUTH |
|-----|---------|-----------------------|----------|----|------|
| OR  | M92199  | NEW RELEASE           | 05/24/04 | AV | ABD  |
| A   | M99247  | ADD GROUND PTH        | 06/05    | RZ | RZ   |
| A   | R60782  | ADD GROUND PTH        | 06/05    | RZ | RZ   |
| B   | M102713 | ADDED "...WITH SMOBC" | 01/12/06 | GF | IL   |

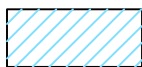
SUGGESTED MOUNTING CONFIGURATION  
FOR FV1206-1 CASE STYLE, "pr" PIN CONNECTION.



- NOTE:** 1. 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.
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

AV

05/03/04

TOLERANCES ON:

CHECKED

IL

05/24/04

2 PL DECIMALS ±

APPROVED

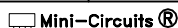
ABD

05/24/04

3 PL DECIMALS ± .005

ANGLES ±

FRACTIONS ±



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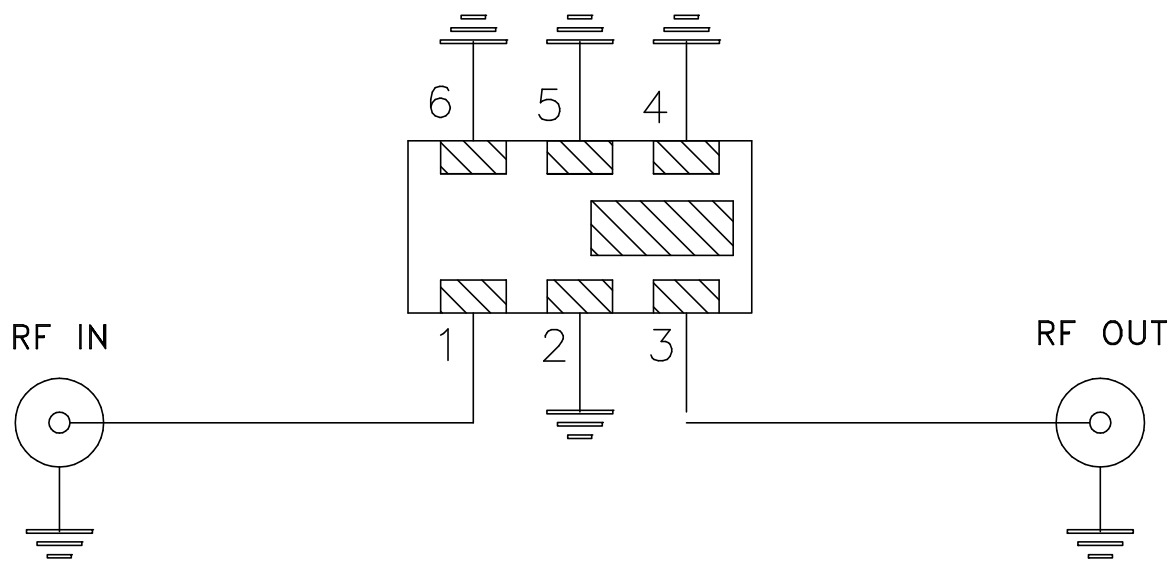
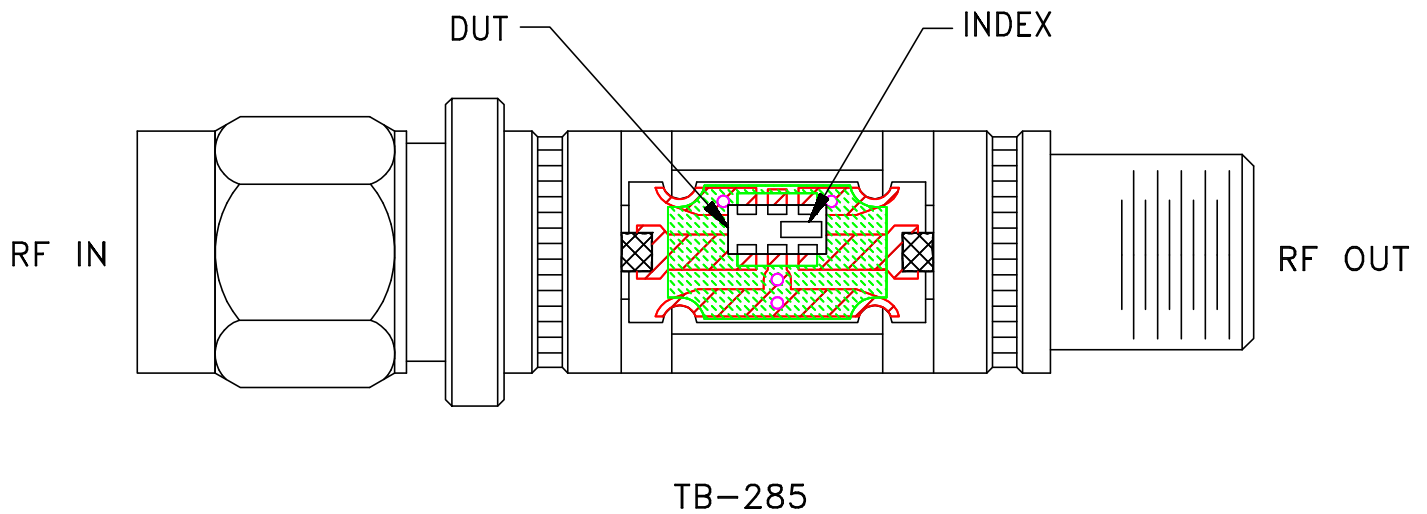
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PL, pr, FV1206-1, HFCN, TB-285

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|           |                     |                          |                  |
|-----------|---------------------|--------------------------|------------------|
| SIZE<br>A | CODE IDENT<br>15542 | DRAWING NO:<br>98-PL-158 | REV:<br>B        |
| FILE:     | 98PL158             | SCALE:<br>12:1           | SHEET:<br>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<br>Ambient Environment  | Individual Model Data Sheet  |
| Storage Temperature        | -55° to 100° C<br>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<br>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   |