

Ceramic

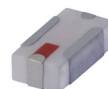
Bandpass Filter

BFCN-1860+

50Ω 1580 to 2200 MHz

The Big Deal

- LTCC construction
- Temperature stable from -55 to +100°C
- Small size (0.126 x .063 X .037")



CASE STYLE: FV1206-4

Product Overview

The BFCN-1860+ LTCC bandpass filter covers the 1580 to 2200 MHz passband with 2 dB passband insertion loss and 20 dB upper/lower stopband rejection. This model handles up to 2.5W RF input power and provides a wide operating temperature range from -55 to +100°C. Utilizing LTCC multi-layer construction, the filter achieves excellent repeatability of performance and comes in a tiny 1206 ceramic package with wraparound terminations, minimizing performance variations due to parasitics and saving space in dense PCB layouts.

Key Features

| Feature | Advantages |
|---|--|
| LTCC Construction | Provides a rugged package well suited for tough environments such as high humidity and temperature extremes. |
| Tiny size (0.126 x .063 x .037") | Saves space in dense circuit boards and minimizes the effects of parasitics. |
| Wrap-around terminations | Provides excellent solderability and easy visual inspection |
| Wide operating temperature range, -55 to +100°C | Enables reliable performance in extreme environments |

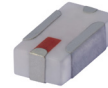


Ceramic

Bandpass Filter

50Ω 1580 to 2200 MHz

BFCN-1860+



Generic photo used for illustration purposes only

CASE STYLE: FV1206-4

+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 7" Devices/Reel 20, 50, 100, 200, 500, 1000, 3000

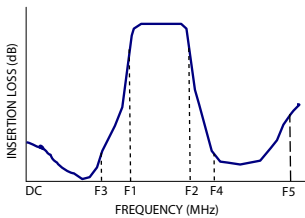
Features

- Good VSWR, 1.5:1 typ. @ passband
- Small size(0.126 x .063 x .037)
- Temperature stable
- LTCC construction

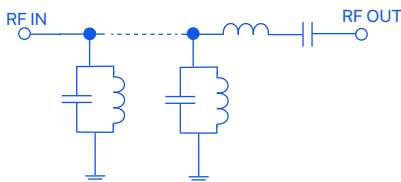
Applications

- Harmonic rejection
- Transmitters / Receivers

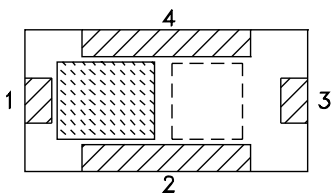
Specification Definition



Functional Schematic



Top View



Pad Connections

| | |
|--------|-----|
| Input | 1 |
| Output | 3 |
| Ground | 2,4 |

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

| Parameter | F# | Frequency (MHz) | Min. | Typ. | Max. | Unit |
|-------------------------|---------|-----------------|------|------|------|------|
| Pass Band | | | | | | |
| Center Frequency | — | — | — | 1860 | — | MHz |
| Insertion Loss | F1 - F2 | 1580 - 2200 | — | 2.0 | 3.5 | dB |
| VSWR | F1 - F2 | 1580 - 2200 | — | 1.5 | 2.5 | :1 |
| Stop Band, Lower | | | | | | |
| Insertion Loss | DC - F3 | 1300 | — | 20 | — | dB |
| VSWR | DC - F3 | 1300 | — | 20 | — | :1 |
| Stop Band, Upper | | | | | | |
| Insertion Loss | F4 - F5 | 2600 - 4800 | — | 20 | — | dB |
| VSWR | F4 - F5 | 2600 - 4800 | — | 15 | — | :1 |

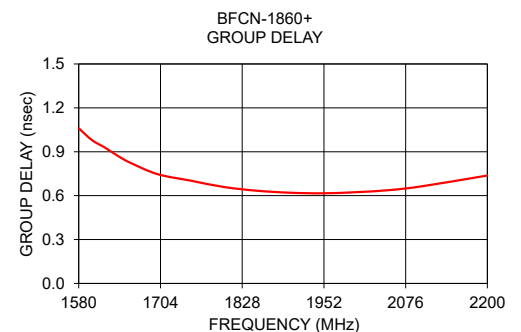
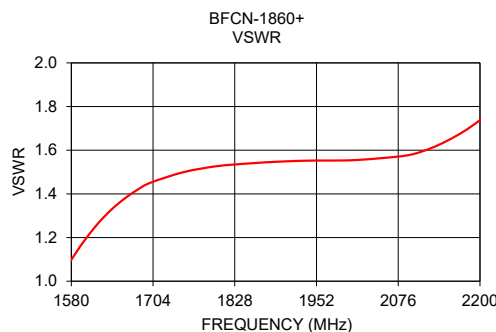
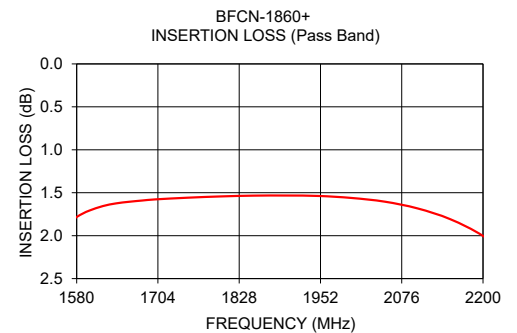
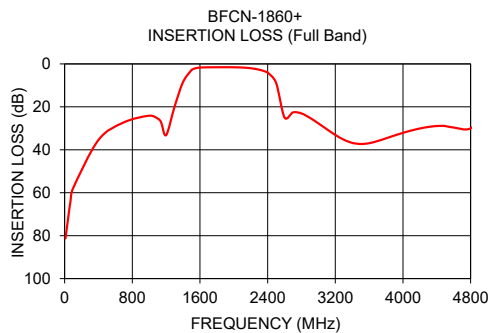
1. Measured on Mini-Circuits Characterization Test Board TB-824+.

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.

Maximum Ratings

| | |
|-----------------------|-----------------|
| Operating Temperature | -55°C to +100°C |
| Storage Temperature | -55°C to +100°C |
| RF Power Input* | 2.5W at 25°C |

*Passband rating, derate linearly to 0.7W at 100°C ambient
Permanent damage may occur if any of these limits are exceeded.



www.minicircuits.com P.O. Box 35166, Brooklyn, NY 11235-0003 (718) 934-4500 sales@minicircuits.com

REV. B
ECO-023980
ED-16195
BFCN-1860+
MCL NY
250417
Page 2 of 3

Full Band Performance

| Frequency (MHz) | Insertion Loss (dB) | VSWR (:1) | Frequency (MHz) | Insertion Loss (dB) | Group Delay (nsec) |
|-----------------|---------------------|-----------|-----------------|---------------------|--------------------|
| 10 | 81.30 | 72.38 | 1580 | 1.78 | 1.06 |
| 40 | 72.24 | 67.32 | 1600 | 1.71 | 0.98 |
| 100 | 57.92 | 60.68 | 1620 | 1.66 | 0.93 |
| 400 | 35.41 | 43.01 | 1640 | 1.62 | 0.87 |
| 1000 | 24.12 | 22.58 | 1660 | 1.61 | 0.82 |
| 1300 | 19.87 | 10.75 | 1700 | 1.58 | 0.75 |
| 1580 | 1.78 | 1.10 | 1750 | 1.56 | 0.70 |
| 1660 | 1.61 | 1.38 | 1800 | 1.54 | 0.66 |
| 2000 | 1.56 | 1.55 | 1850 | 1.53 | 0.63 |
| 2200 | 2.00 | 1.74 | 1900 | 1.53 | 0.62 |
| 2600 | 24.98 | 5.02 | 1950 | 1.54 | 0.62 |
| 3000 | 27.70 | 17.47 | 2000 | 1.56 | 0.62 |
| 3500 | 37.29 | 23.88 | 2050 | 1.60 | 0.64 |
| 4100 | 31.00 | 24.03 | 2100 | 1.68 | 0.66 |
| 4800 | 30.01 | 2.93 | 2200 | 2.00 | 0.74 |

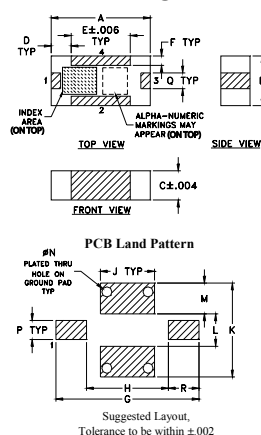
Pass Band Performance

Pad Connections

| | |
|--------|-----|
| Input | 1 |
| Output | 3 |
| Ground | 2,4 |

Product Marking: F8

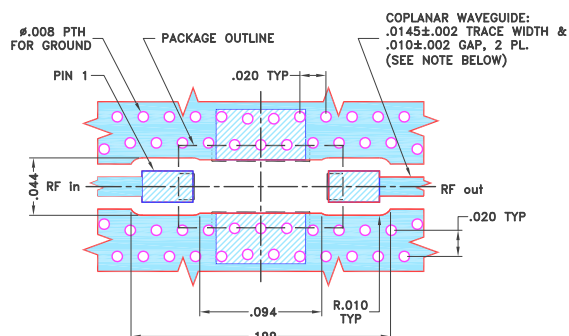
Outline Drawing



Outline Dimensions (inch mm)

| | | | | | | | | |
|------|------|------|------|------|------|------|------|-------|
| A | B | C | D | E | F | G | H | J |
| .126 | .063 | .037 | .026 | .075 | .012 | .182 | .104 | .069 |
| 3.20 | 1.60 | 0.94 | 0.66 | 1.91 | 0.30 | 4.62 | 2.64 | 1.75 |
| K | L | M | N | P | Q | R | | wt |
| .119 | .041 | .039 | .013 | .024 | .020 | .039 | | grams |
| 3.02 | 1.04 | 0.99 | 0.33 | 0.61 | 0.51 | 0.99 | | .020 |

Demo Board MCL P/N: TB-824+ Suggested PCB Layout (PL-454)



NOTES:

1. TRACE WIDTH PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .0066"±.0007". 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.

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

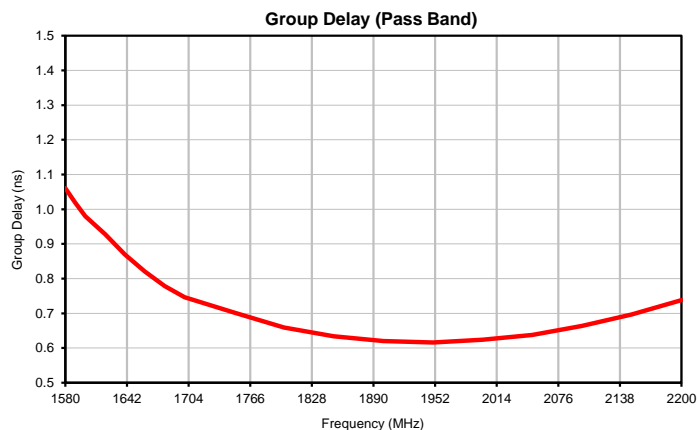
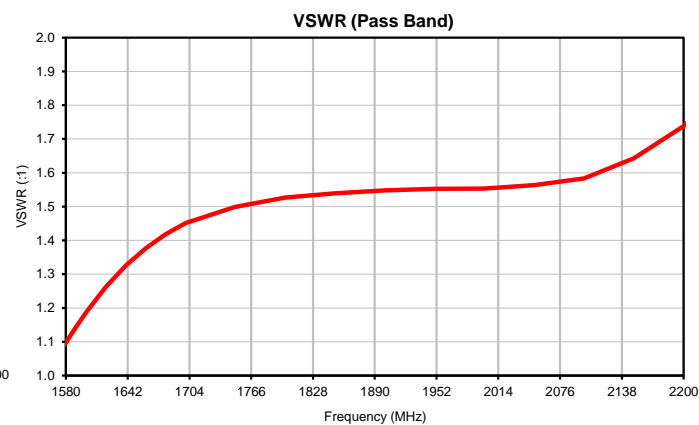
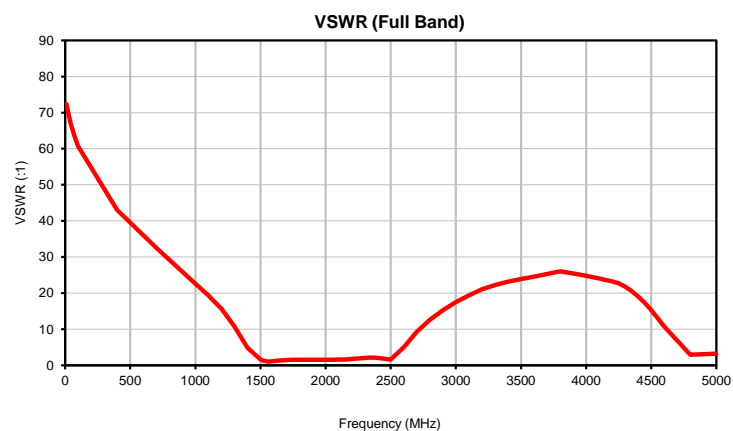
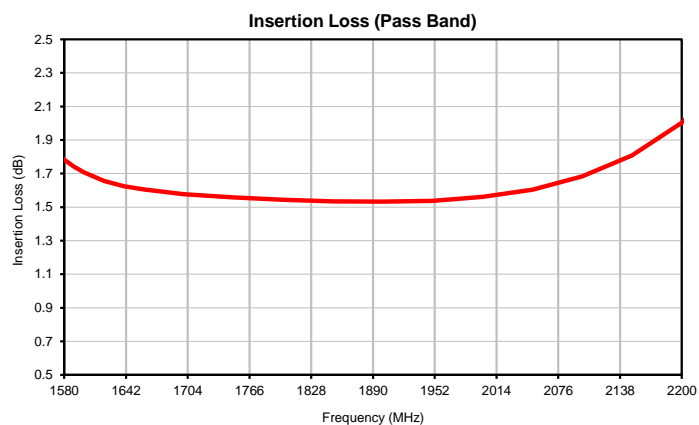
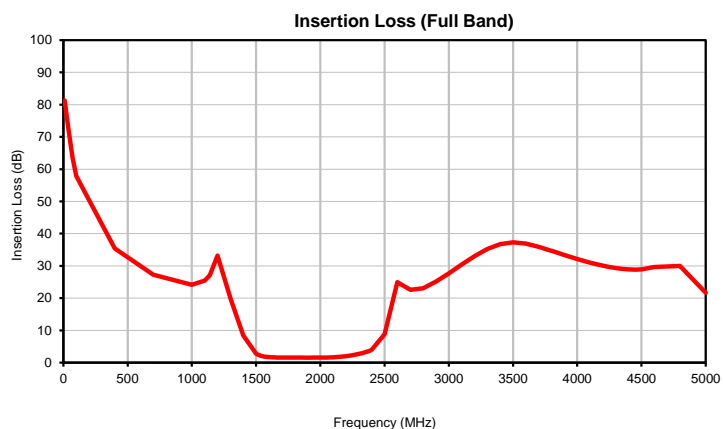
Ceramic Bandpass Filter

BFCN-1860+

Typical Performance Data

| FREQUENCY (MHz) | INSERTION LOSS (dB) | VSWR (:1) | FREQUENCY (MHz) | GROUP DELAY (ns) |
|--------------------|---------------------------|--------------|--------------------|---------------------|
| 10 | 81.30 | 72.38 | 1580 | 1.06 |
| 40 | 72.24 | 67.32 | 1590 | 1.02 |
| 70 | 63.71 | 63.58 | 1600 | 0.98 |
| 100 | 57.92 | 60.68 | 1620 | 0.93 |
| 400 | 35.41 | 43.01 | 1640 | 0.87 |
| 700 | 27.23 | 32.56 | 1660 | 0.82 |
| 1000 | 24.12 | 22.58 | 1680 | 0.78 |
| 1100 | 25.45 | 19.33 | 1700 | 0.75 |
| 1140 | 27.14 | 17.86 | 1750 | 0.70 |
| 1200 | 33.18 | 15.63 | 1800 | 0.66 |
| 1300 | 19.87 | 10.75 | 1850 | 0.63 |
| 1400 | 8.44 | 4.82 | 1900 | 0.62 |
| 1500 | 2.84 | 1.59 | 1950 | 0.62 |
| 1510 | 2.60 | 1.46 | 2000 | 0.62 |
| 1520 | 2.40 | 1.34 | 2050 | 0.64 |
| 1530 | 2.23 | 1.24 | 2100 | 0.66 |
| 1540 | 2.10 | 1.16 | 2150 | 0.70 |
| 1550 | 1.99 | 1.09 | 2200 | 0.74 |
| 1560 | 1.91 | 1.04 | | |
| 1570 | 1.84 | 1.05 | | |
| 1580 | 1.78 | 1.10 | | |
| 1590 | 1.74 | 1.14 | | |
| 1600 | 1.71 | 1.19 | | |
| 1620 | 1.66 | 1.26 | | |
| 1640 | 1.62 | 1.33 | | |
| 1660 | 1.61 | 1.38 | | |
| 1680 | 1.59 | 1.42 | | |
| 1700 | 1.58 | 1.45 | | |
| 1750 | 1.56 | 1.50 | | |
| 1800 | 1.54 | 1.53 | | |
| 1850 | 1.53 | 1.54 | | |
| 1900 | 1.53 | 1.55 | | |
| 1950 | 1.54 | 1.55 | | |
| 2000 | 1.56 | 1.55 | | |
| 2050 | 1.60 | 1.56 | | |
| 2100 | 1.68 | 1.58 | | |
| 2150 | 1.81 | 1.64 | | |
| 2200 | 2.00 | 1.74 | | |
| 2250 | 2.29 | 1.88 | | |
| 2300 | 2.70 | 2.04 | | |
| 2310 | 2.79 | 2.07 | | |
| 2320 | 2.89 | 2.09 | | |
| 2330 | 3.00 | 2.11 | | |
| 2340 | 3.12 | 2.13 | | |
| 2350 | 3.24 | 2.14 | | |
| 2360 | 3.37 | 2.14 | | |
| 2370 | 3.51 | 2.13 | | |
| 2380 | 3.66 | 2.11 | | |
| 2390 | 3.82 | 2.07 | | |
| 2400 | 4.00 | 2.02 | | |
| 2500 | 8.80 | 1.58 | | |
| 2600 | 24.98 | 5.02 | | |
| 2700 | 22.58 | 9.23 | | |
| 2800 | 23.07 | 12.57 | | |
| 2900 | 25.13 | 15.22 | | |
| 3000 | 27.70 | 17.47 | | |
| 3100 | 30.43 | 19.36 | | |
| 3200 | 33.06 | 21.02 | | |
| 3300 | 35.30 | 22.22 | | |
| 3400 | 36.77 | 23.14 | | |
| 3500 | 37.29 | 23.88 | | |
| 3600 | 36.94 | 24.56 | | |
| 3700 | 35.92 | 25.33 | | |
| 3790 | 34.79 | 25.98 | | |
| 3800 | 34.66 | 26.05 | | |
| 3900 | 33.35 | 25.48 | | |
| 4000 | 32.12 | 24.79 | | |
| 4100 | 31.00 | 24.03 | | |
| 4200 | 30.07 | 23.22 | | |
| 4250 | 29.69 | 22.69 | | |
| 4300 | 29.36 | 21.74 | | |
| 4350 | 29.10 | 20.57 | | |
| 4400 | 28.93 | 19.07 | | |
| 4450 | 28.85 | 17.33 | | |
| 4500 | 28.92 | 15.30 | | |
| 4600 | 29.63 | 10.72 | | |
| 4800 | 30.01 | 2.93 | | |
| 5000 | 21.68 | 3.24 | | |

Typical Performance Curves



DEVICE ORIENTATION IN T&R

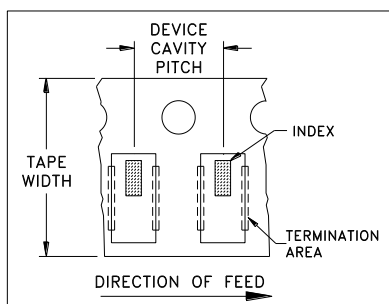


ILLUSTRATION 1

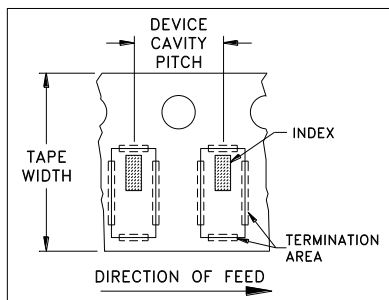


ILLUSTRATION 2

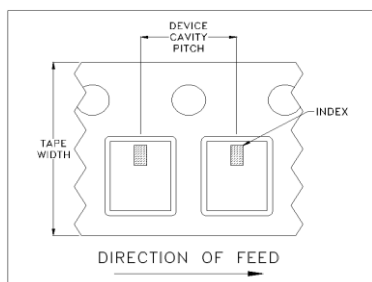


ILLUSTRATION 3

Applicable Case Styles

FV1206-1
FV1206-3

Applicable Case Styles

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

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

Mini-Circuits®

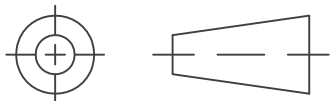
INTERNET <http://www.minicircuits.com>

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010

Mini-Circuits ISO 9001 & ISO 14001 Certified

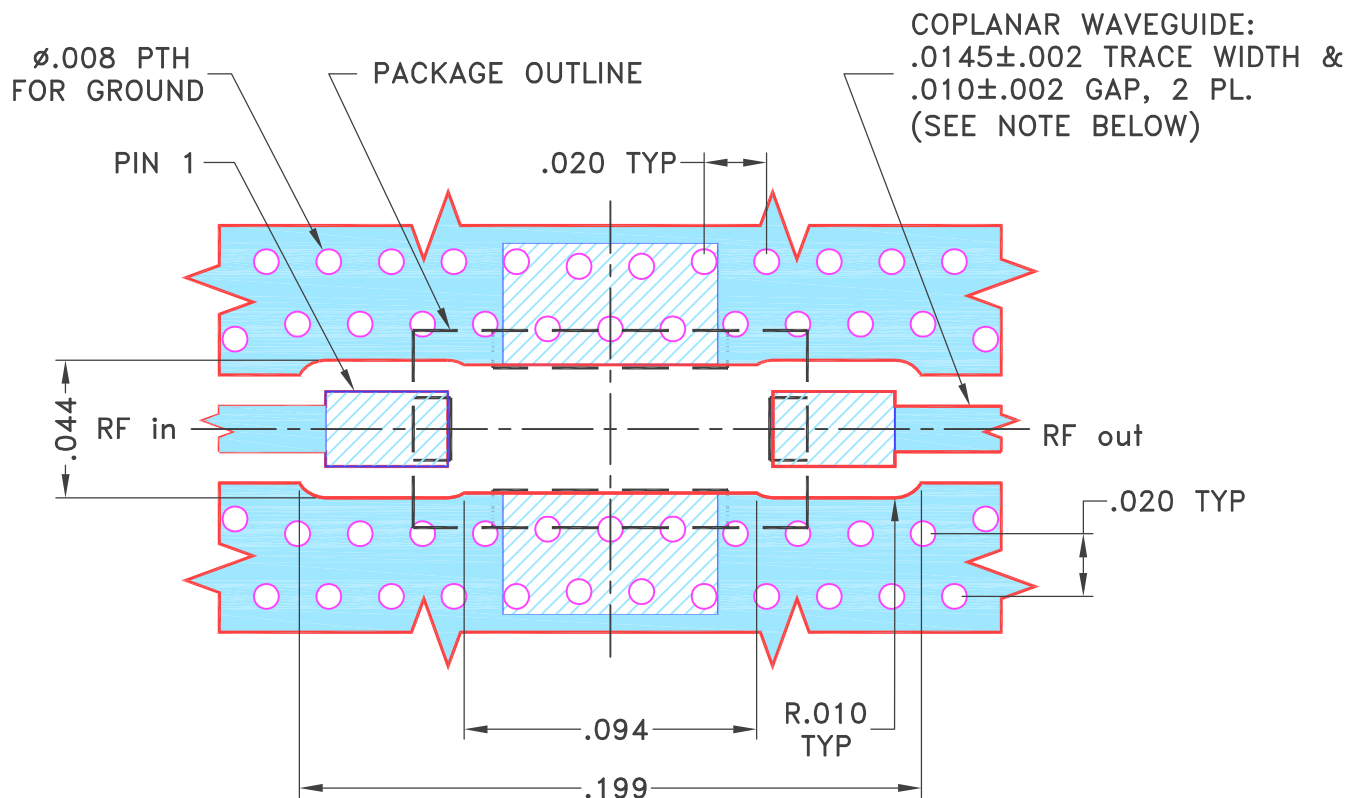
THIRD ANGLE PROJECTION



REVISIONS

| REV | ECN No. | DESCRIPTION | DATE | DR | AUTH |
|-----|---------|-------------|----------|-----|------|
| OR | M152168 | NEW RELEASE | 07/31/15 | ITG | AVB |
| | | | | | |
| | | | | | |

SUGGESTED MOUNTING CONFIGURATION
FOR FV1206-4 CASE STYLE, "04FL01" PIN CODE

**NOTES:**

- TRACE WIDTH PARAMETERS ARE SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS $.0066 \pm .0007$ ". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND 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.

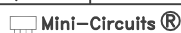
UNLESS OTHERWISE SPECIFIED

INITIALS

DATE

DIMENSIONS ARE IN INCHES

TOLERANCES ON:

2 PL DECIMALS \pm 3 PL DECIMALS \pm .005ANGLES \pm FRACTIONS \pm 

THIS DOCUMENT AND ITS CONTENTS ARE THE PROPERTY OF MINI-CIRCUITS. EXCEPT FOR USE EXPRESSLY GRANTED, IN WRITING, TO ITS VENDORS, VENDEE AND THE UNITED STATES GOVERNMENT, MINI-CIRCUITS RESERVES ALL PROPRIETARY DESIGN, USE, MANUFACTURING AND REPRODUCTION RIGHTS THERETO. THESE CONTENTS SHALL NOT BE USED, DUPLICATED OR DISCLOSED TO ANY OUTSIDE PARTY, IN WHOLE OR IN PART, WITHOUT WRITTEN PERMISSION OF MINI-CIRCUITS.

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



Mini-Circuits®

13 Neptune Avenue
Brooklyn NY 11235

PL, 04FL01, FV1206-4, TB-824+

SIZE
A

CODE IDENT
15542

DRAWING NO:

98-PL-454

REV:

OR

FILE: 98PL454

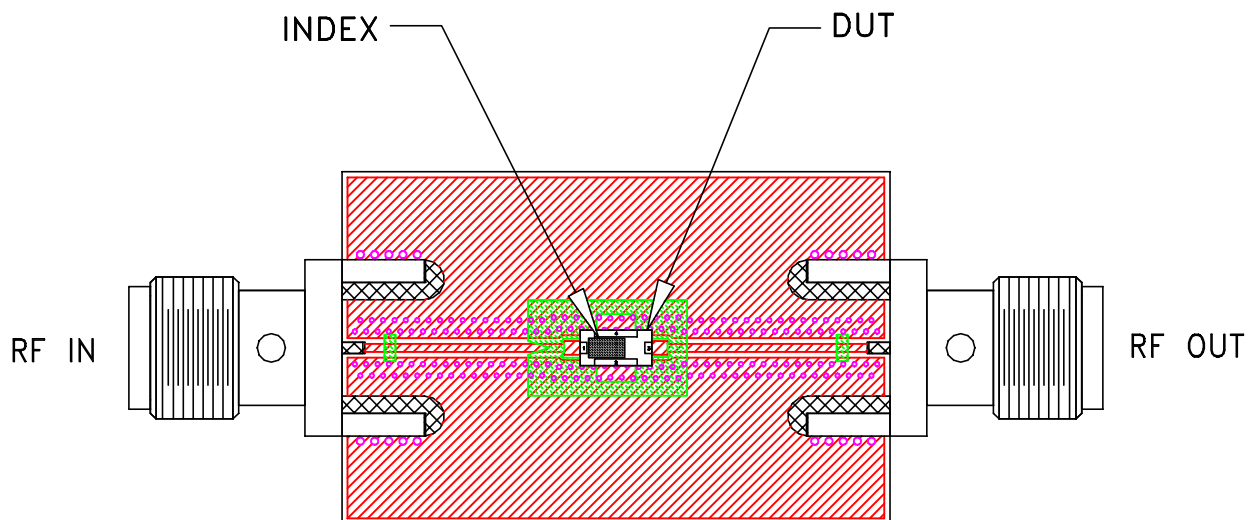
SCALE:

16:1

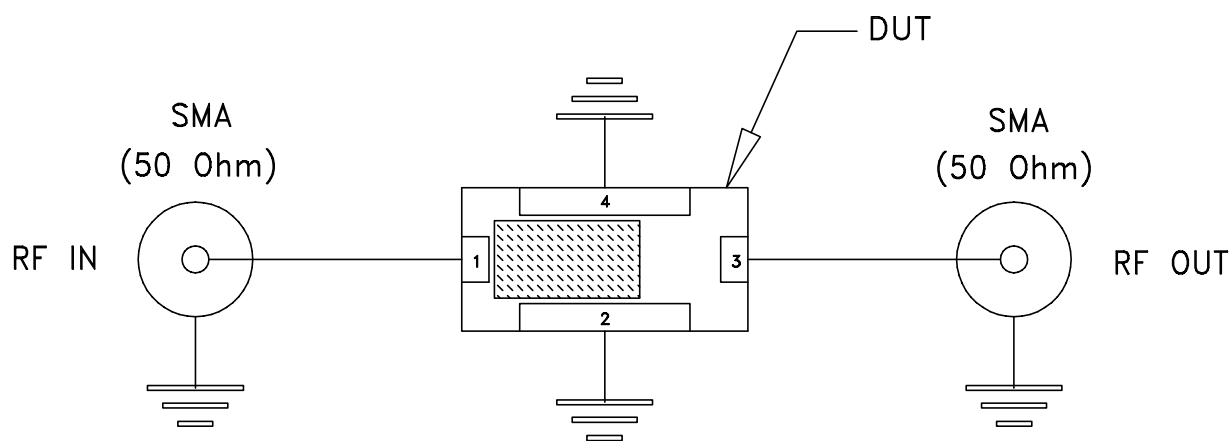
SHEET:

1 OF 1

Evaluation Board and Circuit




TB-824+



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,
Dielectric Constant=3.5, Thickness=.0066 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 | -40° to 85°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 |
| Thermal Shock | -55° to 100°C, 100 cycles | MIL-STD-202, Method 107, Condition A-3, except +100°C |
| 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, 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 |
| Marking Resistance to Solvents | Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C | MIL-STD-202, Method 215 |