

# LTCC Bandpass Filter

**BFCN-1052+**

50Ω

9700 to 11950 MHz



CASE STYLE: FV1206-9

## The Big Deal

- Small size 3.2mm x 1.6mm
- Low loss in passband (1.5 dB typ over 9700 to 11950 MHz)
- Very high rejection over wide band

## Product Overview

The BFCN-1052+ LTCC bandpass Filter achieves a miniature size and high repeatability of performance. Wrap-around terminations minimize variations in performance due to parasitics. Passing 9700-11950 MHz, these units offer excellent rejection over a wide stopband.

Key Features	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.
Wide stopband	Reduced regrowth at 2nd harmonic permits filter to be used in presence of wideband undesired signals.
LTCC construction	Provides a rugged package that is well suited for tough environments including high humidity and high temperature extremes.

Ceramic

# Bandpass Filter

50Ω 9700 to 11950 MHz

## Features

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

## Applications

- Harmonic Rejection
- Transmitters / Receivers
- Test and Measurement

**BFCN-1052+**



Generic photo used for illustration purposes only

CASE STYLE: FV1206-9

**+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

## Electrical Specifications<sup>(1,2)</sup> at 25°C

Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	—	—	10770	—	MHz
	Insertion Loss	F1-F2	—	1.6	3.0	dB
	VSWR	F1-F2	—	1.9	—	:1
Stop Band, Lower	Insertion Loss	DC-F3	30	38	—	dB
	Insertion Loss	8100-8400	20	32	—	dB
Stop Band, Upper	Insertion Loss	F4-F5	20	28	—	dB
	Insertion Loss	28500-44000	—	25	—	dB

1. Measured on Mini-Circuits Characterization Test Board TB-1003+ with feedline losses removed by normalization of S12 and S21 traces to measurement of TB thru-line.

2. This filter can not be used as a DC Blocking circuit element. In applications where DC voltage is present at either input or output ports, blocking capacitors are required at the corresponding RF port.

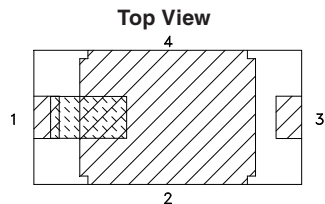
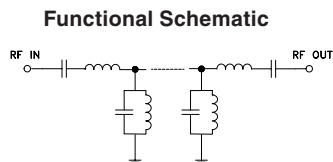
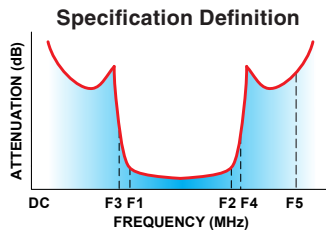
## Maximum Ratings

Operating Temperature	-55°C to +100°C
Storage Temperature	-55°C to +100°C
RF Power Input*	2W at 25°C

\*Passband rating, derate linearly to 0.5W at 100°C ambient  
Permanent damage may occur if any of these limits are exceeded.

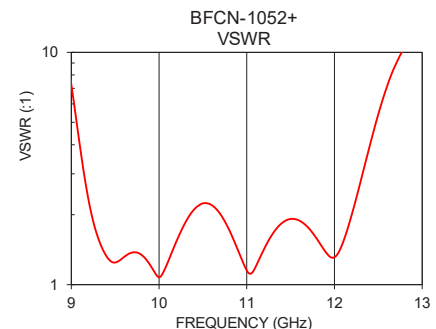
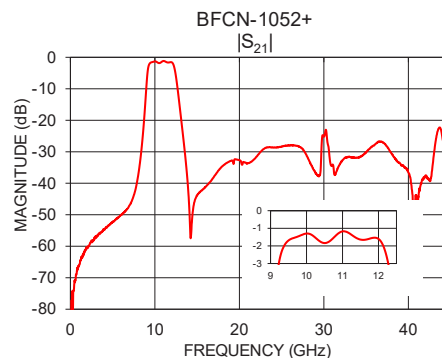
## Typical Performance Data at 25°C

Frequency (GHz)	Insertion Loss (dB)	VSWR (:1)
1	-67.66	50.51
5	-53.39	26.26
8	-37.87	16.83
9	-12.22	7.04
10	-1.28	1.06
11	-1.38	1.63
12	-1.43	1.57
13	-13.21	5.03
15	-43.13	9.36
17	-37.34	11.85
20	-31.96	9.70
25	-28.59	6.41
35	-32.06	6.05
40	-40.15	5.17
41	-35.93	4.53



## Pad Connections

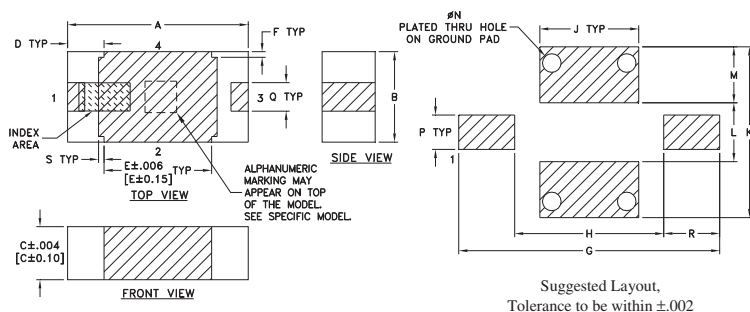
Input	1
Output	3
Ground	2



# Bandpass Filter

# BFCN-1052+

## Outline Drawing



### Pad Connections

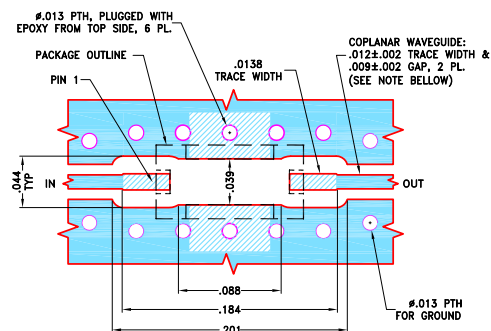
Input	1
Output	3
Ground	2

## Product Marking: KL

## Outline Dimensions ( $\frac{\text{inch}}{\text{mm}}$ )

A	B	C	D	E	F	G	H	J
.126	.063	.037	.026	.075	.004	.182	.104	.069
3.20	1.60	0.94	0.66	1.91	0.10	4.62	2.64	1.753
K	L	M	N	P	Q	R	S	wt
0.119	0.041	.039	.013	.024	.020	.039	.004	grams
3.023	1.041	0.99	0.33	0.61	0.51	0.99	0.10	.020

## Demo Board MCL P/N: TB-1003 + Suggested PCB Layout (PL- 610 )



### NOTES:

1. TRACE WIDTH AND GAP 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.
  3. UNIT LAND PATTERN WAS OPTIMIZED FOR BETTER PERFORMANCE.
- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER).  
 DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

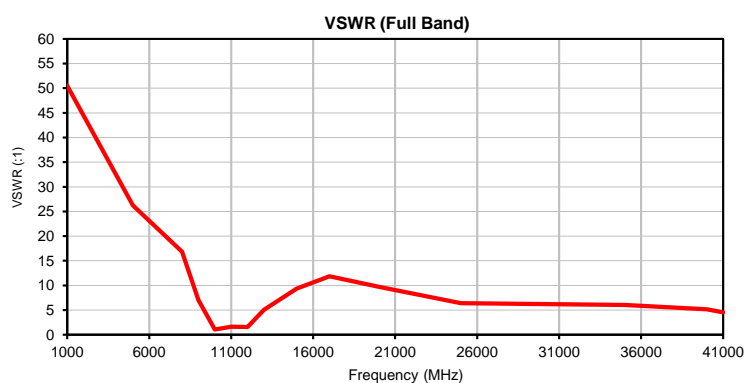
## Additional Notes

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

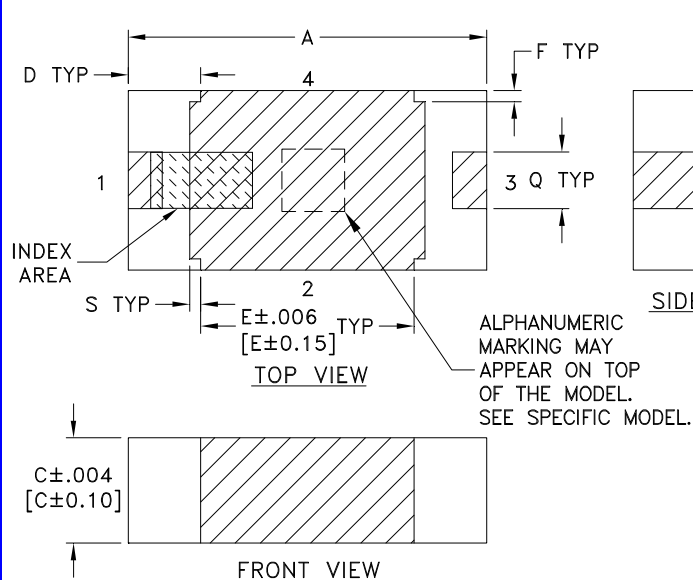


FREQUENCY (MHz)	INSERTION LOSS (dB)	VSWR (:1)
1000	-67.66	50.51
5000	-53.39	26.26
8000	-37.87	16.83
9000	-12.22	7.04
10000	-1.28	1.06
11000	-1.38	1.63
12000	-1.43	1.57
13000	-13.21	5.03
15000	-43.13	9.36
17000	-37.34	11.85
20000	-31.96	9.70
25000	-28.59	6.41
35000	-32.06	6.05
40000	-40.15	5.17
41000	-35.93	4.53

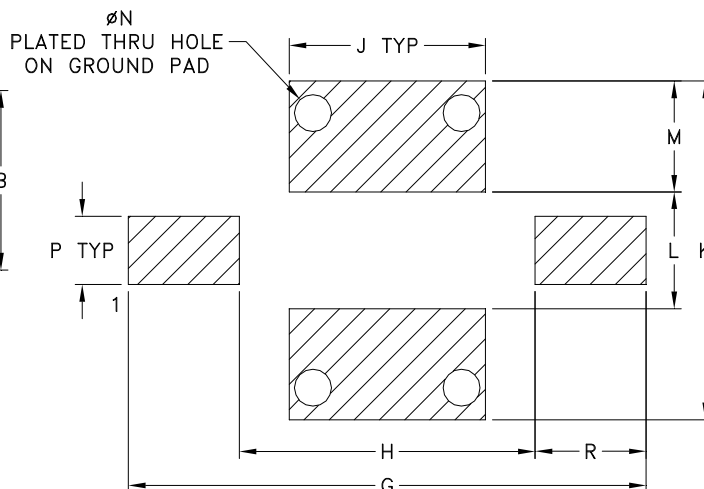
## Typical Performance Curves



### 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
FV1206-9	.126 (3.20)	.063 (1.60)	.037 (0.94)	.026 (0.66)	.075 (1.91)	.004 (0.10)	.182 (4.62)	.104 (2.64)	.069 (1.75)	.119 (3.02)	.041 (1.04)	.039 (0.99)

CASE #	N	P	Q	R	S	WT. GRAM
FV1206-9	.013 (0.33)	.024 (0.61)	.020 (0.51)	.039 (0.99)	.004 (0.10)	.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



Provides ACTUAL Data Instantly From MINI-CIRCUITS At: [www.minicircuits.com](http://www.minicircuits.com)

RF/IF MICROWAVE COMPONENTS

## DEVICE ORIENTATION IN T&R

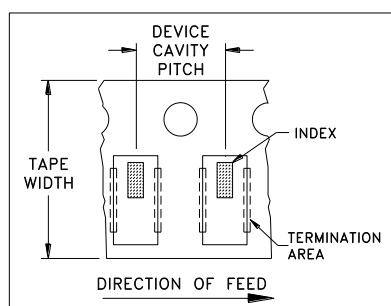


ILLUSTRATION 1

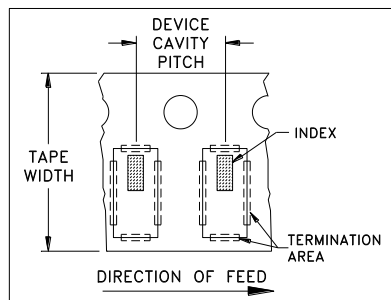


ILLUSTRATION 2

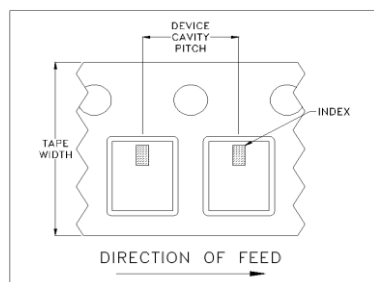


ILLUSTRATION 3

### 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](http://www.minicircuits.com/pages/pdfs/tape.pdf)

Mini-Circuits ISO 9001 & ISO 14001 Certified

**Mini-Circuits®**

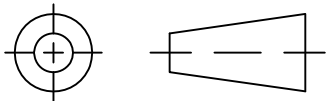
INTERNET <http://www.minicircuits.com>

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

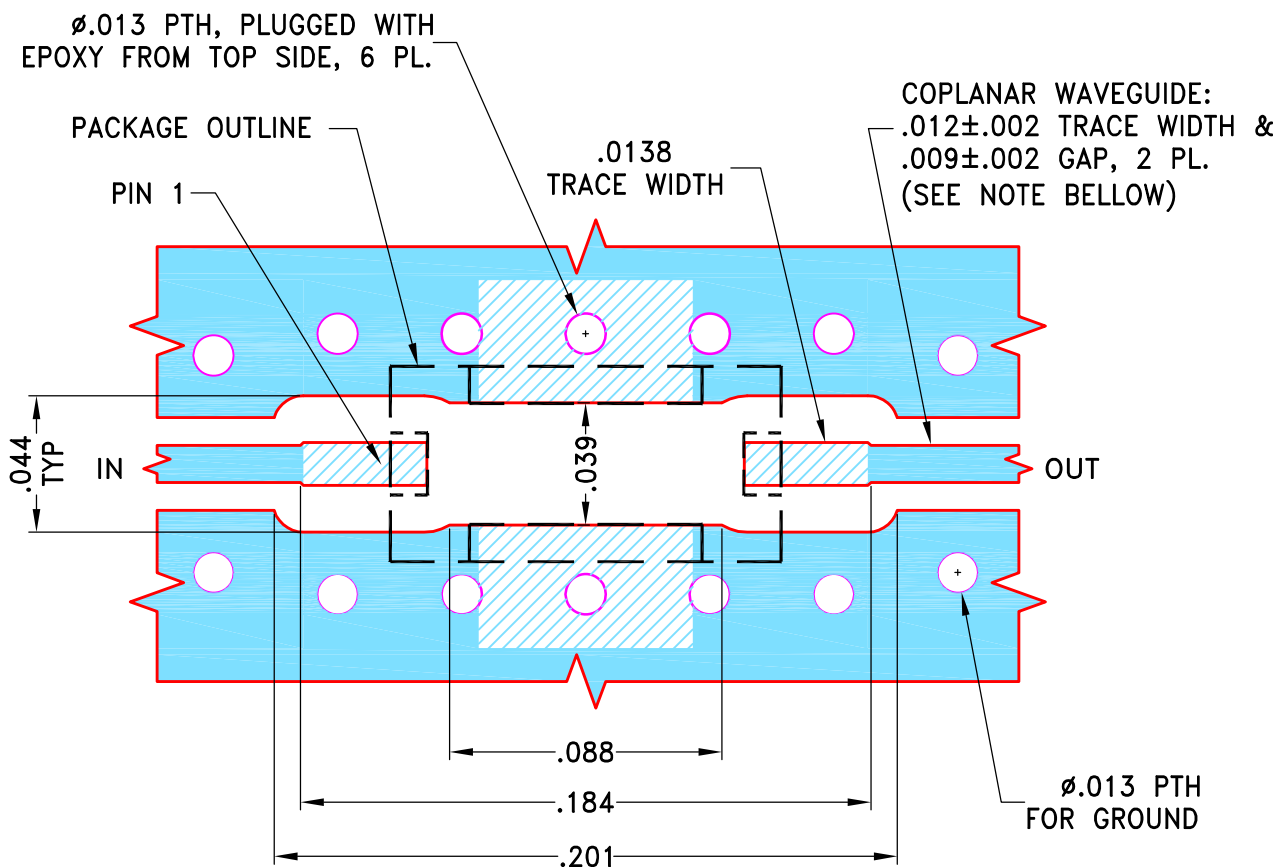
## THIRD ANGLE PROJECTION



## REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M170506	NEW RELEASE	12/06/18	ITG	BK

**SUGGESTED MOUNTING CONFIGURATION**  
**FOR FV1206-9 CASE STYLE, "04FL01" PIN CODE**

**NOTES:**

- TRACE WIDTH AND GAP 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.
- UNIT LAND PATTERN WAS OPTIMIZED FOR BETTER PERFORMANCE.



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

ITG

12/05/18

TOLERANCES ON:

CHECKED

GF

12/05/18

2 PL DECIMALS  $\pm$ 

APPROVED

BK

12/06/18

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

Mini-Circuits®



**Mini-Circuits®**

13 Neptune Avenue  
Brooklyn NY 11235

**PL, 04FL01, FV1206-9, TB-1003+**

SIZE

CODE IDENT

DRAWING NO:

REV:

A

15542

98-PL-610

OR

FILE:

98PL610

SCALE:

16:1

SHEET:

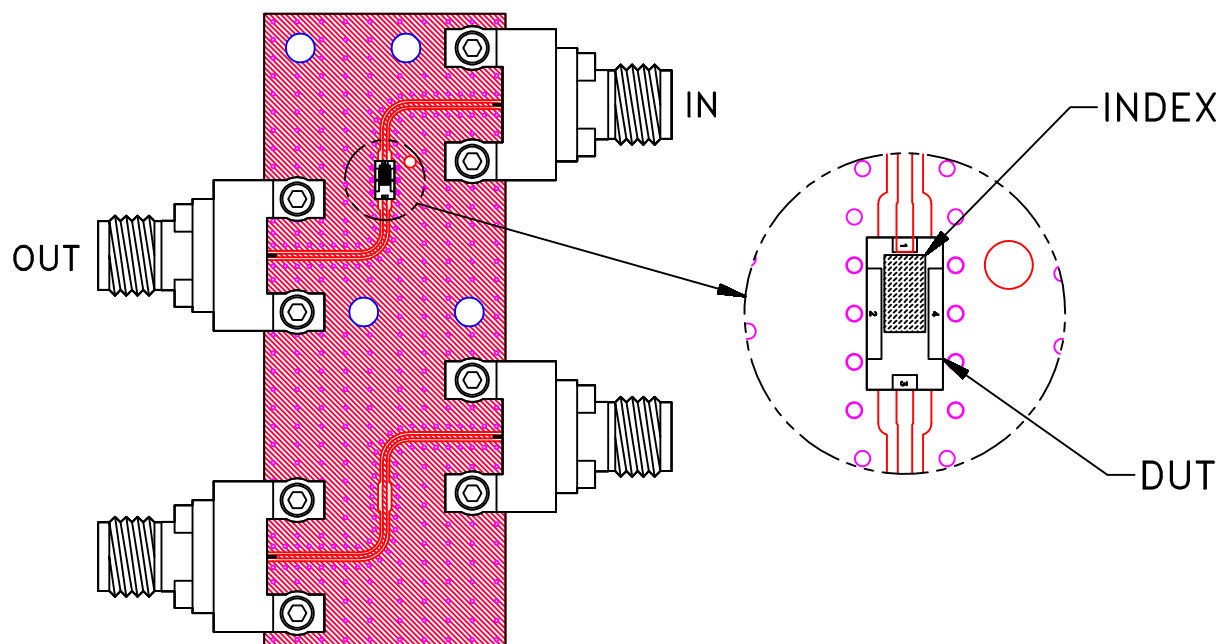
1 OF 1

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.

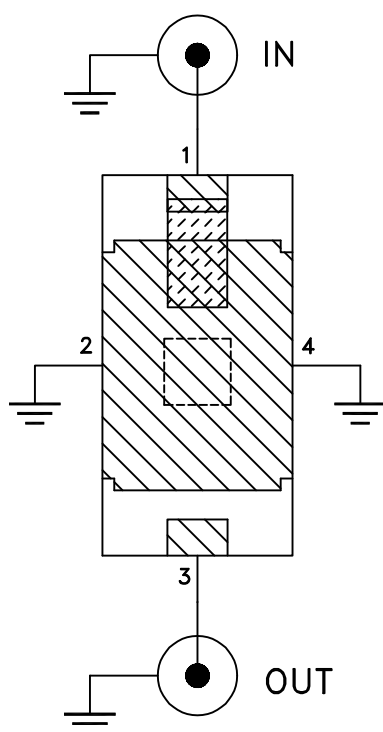
ASHEETA1.DWG REV:A DATE:01/12/95



# Evaluation Board and Circuit



TB-1003+



Schematic Diagram

## Notes:

1. 50 Ohm 2.92 mm Female connectors.
2. PCB Material: 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	-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