

Ceramic

# Bandpass Filter

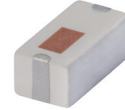
**BFCN-2491+**

50Ω

1950 to 3190 MHz

## The Big Deal

- Small size 3.2mm x 1.6mm
- Pass band (1950 to 3190 MHz)
- High rejection in upper stopband



CASE STYLE: FV1206-7

## Product Overview

The BFCN-2491+ LTCC Band Pass Filter achieves a miniature size and high repeatability of performance. Wrap-around terminations minimize variations in performance due to parasitics. Covering 1950 to 3190 MHz, these units offer excellent rejection over a deep stopband.

## Key Features

Feature	Advantages
Small Size (3.20mm x 1.6 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	No regrowth out to 3 <sup>rd</sup> harmonic permits filter to be used in presence of wideband interfering 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 1950 to 3190 MHz

## BFCN-2491+

### 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

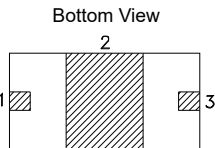
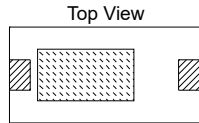
**+RoHS Compliant**

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.

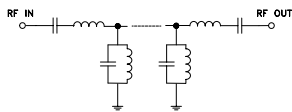
Permanent damage may occur if any of these limits are exceeded.



### Pad Connections

Input	1
Output	3
Ground	2

### Functional Schematic



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

Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Unit	
Pass Band	Center Frequency	—	—	2491	—	MHz	
	Insertion Loss	F1-F2	—	1.2	3.0	dB	
	Return Loss	F1-F2	1950-3190	—	15	—	dB
Stop Band, Lower	Insertion Loss	DC-F3	DC-1440	20	22	—	dB
Stop Band, Upper	Insertion Loss	F4-F5	4500-10000	20	29	—	dB

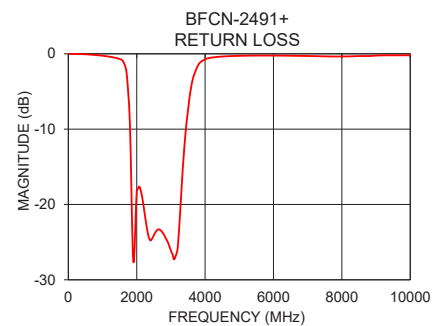
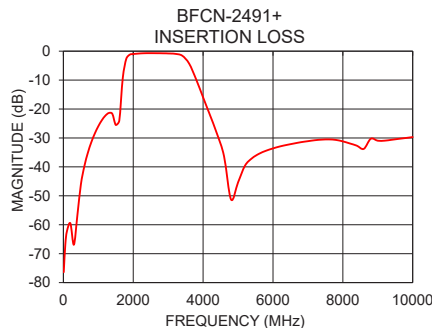
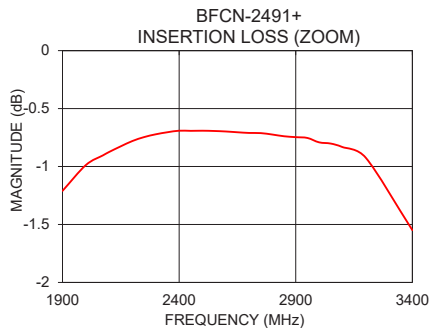
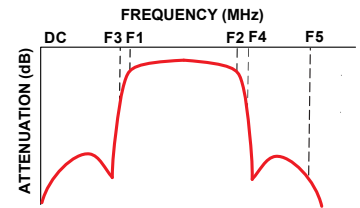
1. Measured on Mini-Circuits Characterization Test Board TB-812+.

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)
500	-46.14	-0.06
1000	-25.95	-0.26
1400	-21.64	-0.56
1700	-9.28	-2.41
1800	-2.67	-9.20
2200	-0.78	-20.19
2600	-0.70	-23.38
3200	-0.92	-25.70
3400	-1.55	-11.95
3600	-4.30	-4.19
4200	-22.20	-0.49
4600	-36.37	-0.34
7000	-31.12	-0.29
8600	-33.77	-0.29
10000	-29.70	-0.21

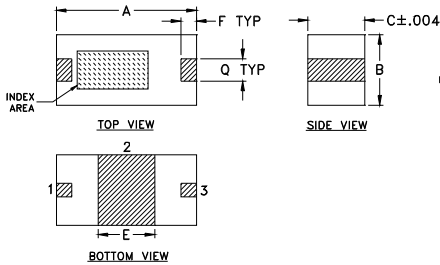
### Specification Definition



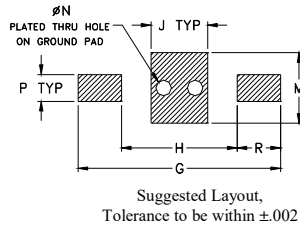
# Bandpass Filter

# BFCN-2491+

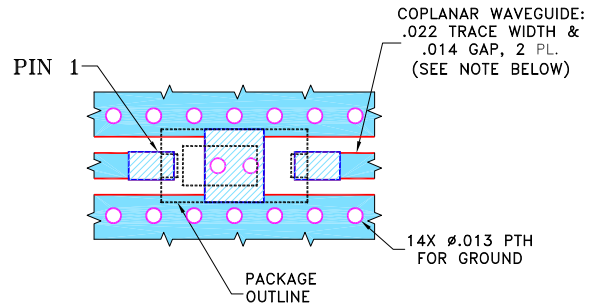
## Outline Drawing



## 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

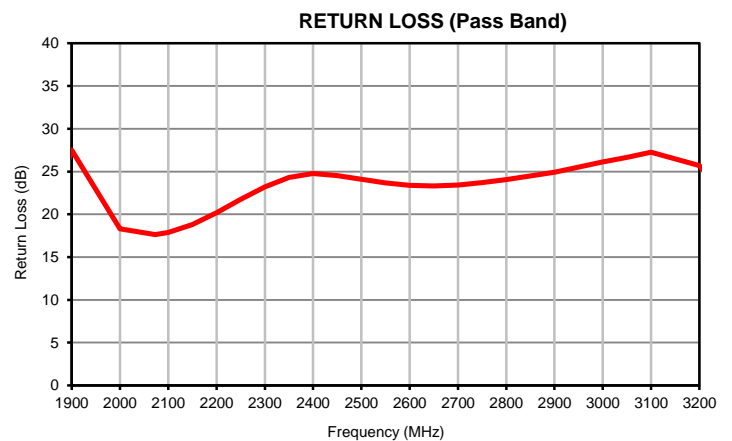
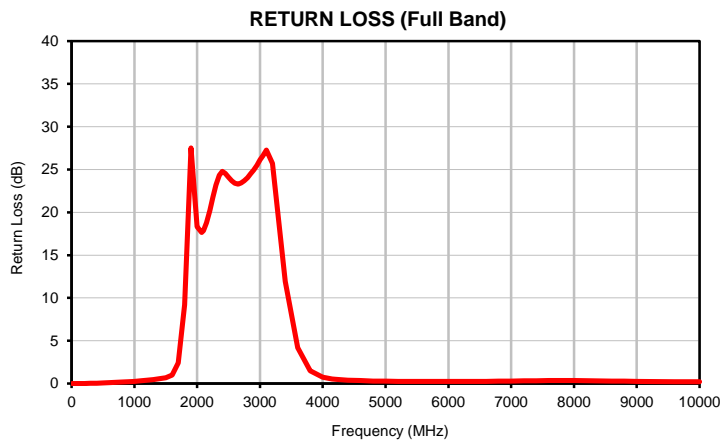
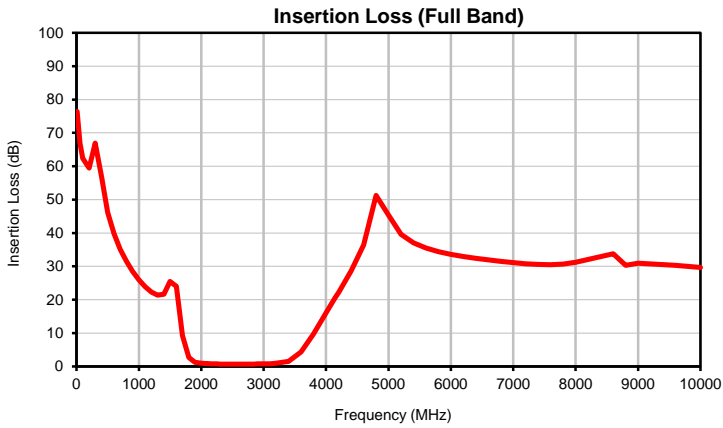
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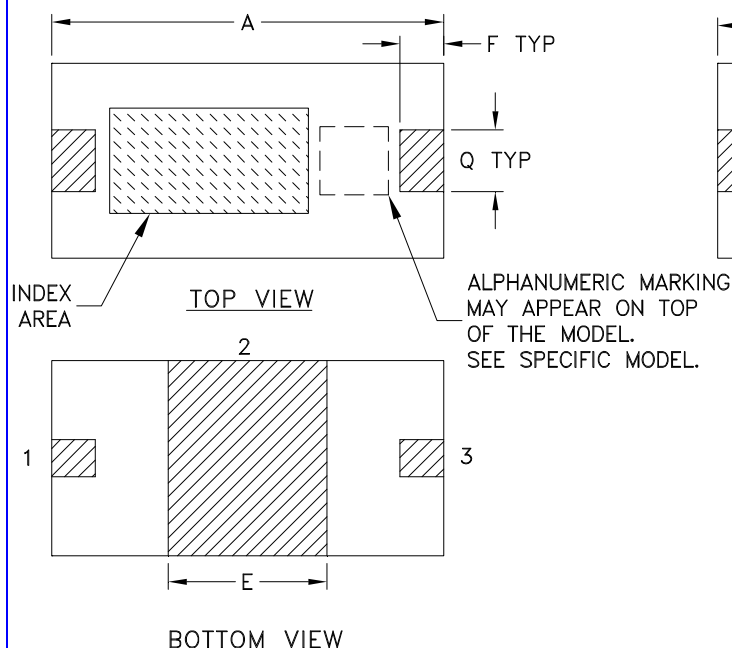
*Typical Performance Data*

FREQUENCY (MHz)	INSERTION LOSS (dB)	RETURN LOSS (dB)
10	76.41	0.00
55	66.83	0.00
100	62.35	0.00
200	59.49	0.01
300	66.91	0.03
400	56.80	0.04
500	46.14	0.06
600	39.80	0.09
700	35.15	0.13
800	31.46	0.17
900	28.46	0.21
1000	25.95	0.26
1100	23.89	0.32
1200	22.32	0.38
1300	21.38	0.46
1400	21.64	0.56
1500	25.51	0.69
1600	24.02	0.99
1700	9.28	2.41
1800	2.67	9.20
1900	1.21	27.52
2000	0.99	18.31
2073	0.90	17.64
2100	0.87	17.87
2150	0.83	18.80
2200	0.78	20.19
2250	0.75	21.75
2300	0.72	23.19
2350	0.70	24.32
2400	0.69	24.78
2450	0.69	24.53
2500	0.69	24.09
2550	0.69	23.68
2600	0.70	23.38
2650	0.70	23.30
2700	0.71	23.44
2750	0.71	23.69
2800	0.72	24.05
2850	0.74	24.50
2900	0.75	24.91
2950	0.75	25.50
3000	0.79	26.13
3050	0.80	26.65
3100	0.83	27.26
3200	0.92	25.70
3400	1.55	11.95
3600	4.30	4.19
3800	9.74	1.48
4000	15.98	0.74
4146	20.52	0.54
4200	22.20	0.49
4400	28.64	0.39
4600	36.37	0.34
4800	51.28	0.29
5000	45.37	0.27
5200	39.56	0.25
5400	37.02	0.24
5600	35.48	0.23
5800	34.42	0.23
6000	33.62	0.23
6200	32.93	0.24
6400	32.40	0.25
6600	31.92	0.26
6800	31.46	0.28
7000	31.12	0.29
7200	30.78	0.31
7400	30.58	0.33
7600	30.50	0.35
7800	30.68	0.36
8000	31.18	0.35
8600	33.77	0.29
8800	30.27	0.30
9000	30.95	0.23
9600	30.31	0.20
10000	29.70	0.21

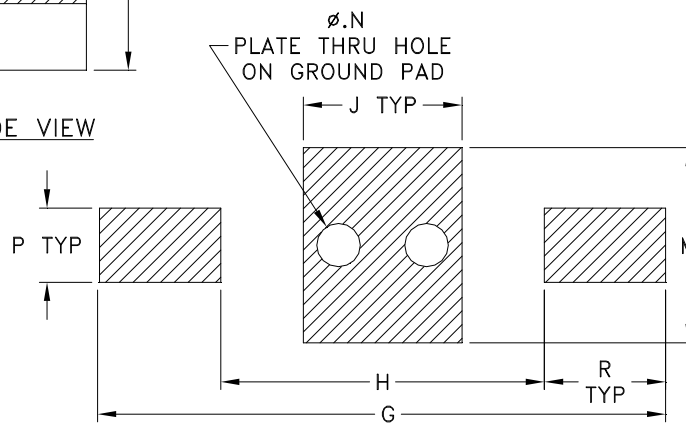
## Typical Performance Curves



### 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 $\Omega$  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



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RF/IF MICROWAVE COMPONENTS

## DEVICE ORIENTATION IN T&R

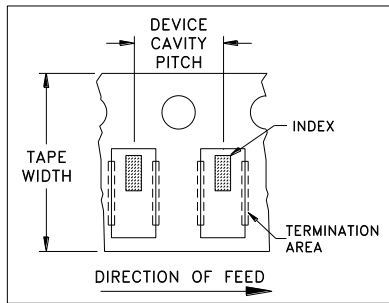


ILLUSTRATION 1

### Applicable Case Styles

FV1206-1  
FV1206-3

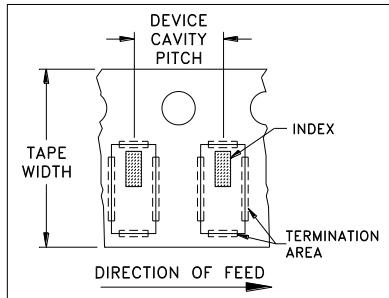


ILLUSTRATION 2

### Applicable Case Styles

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

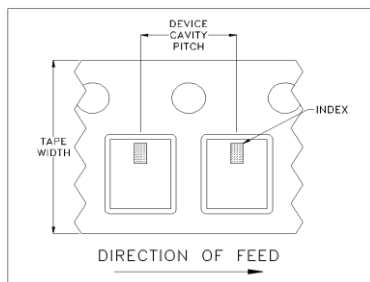


ILLUSTRATION 3

### 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.

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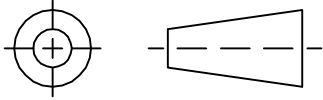
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THIRD ANGLE PROJECTION

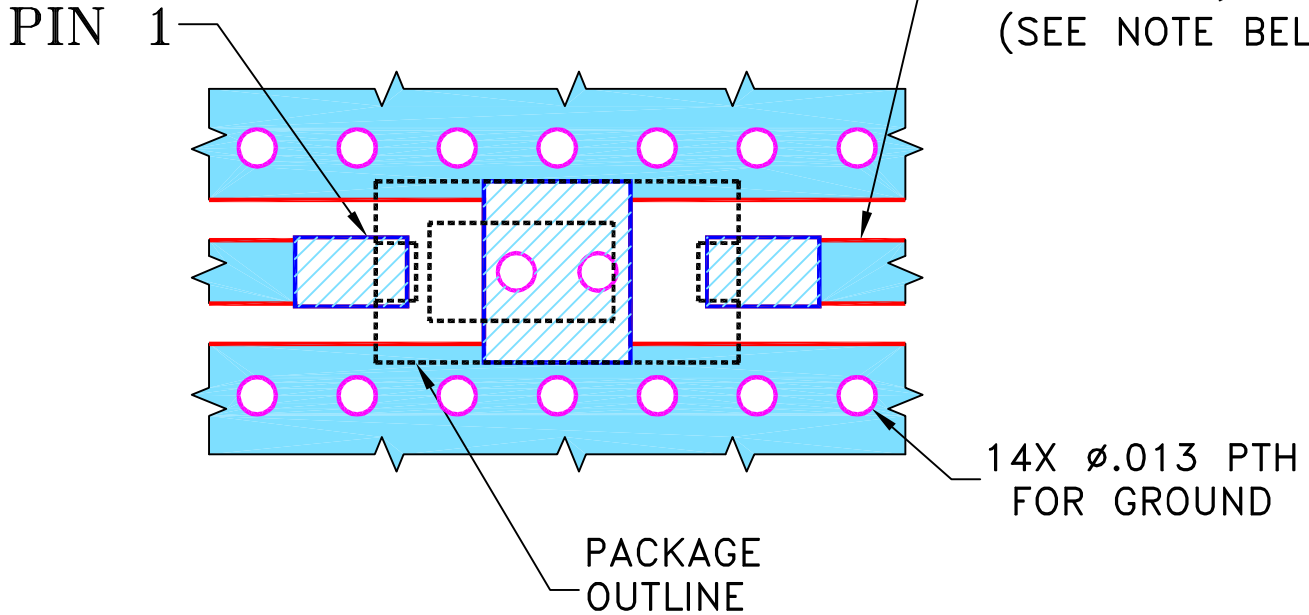


REVISIONS

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).

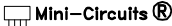
 DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

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

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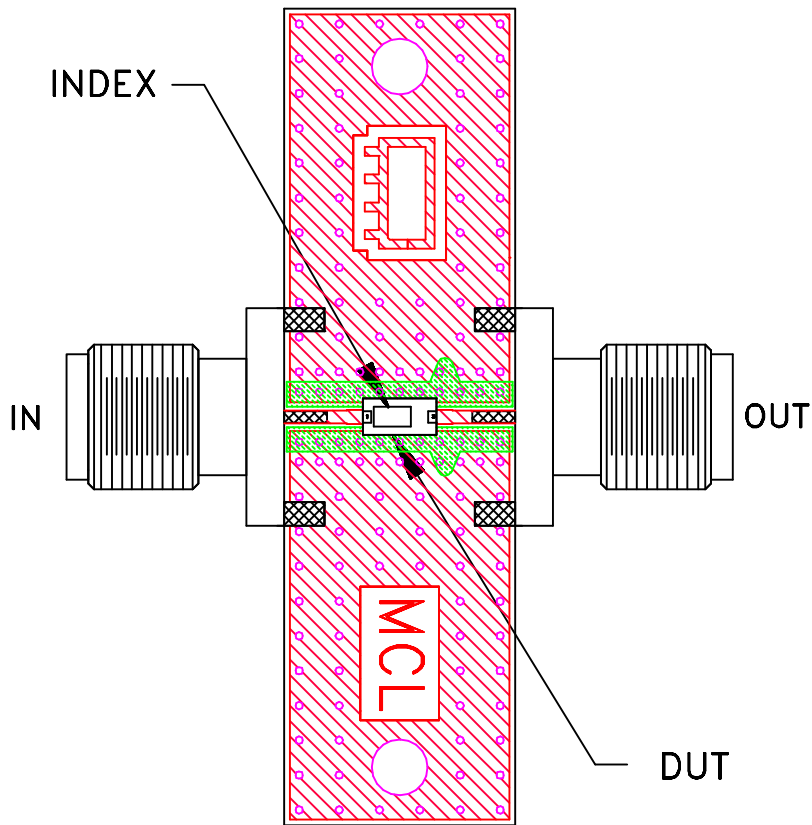
PL, 03FL02, FV1206-7, TB-812+

SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-439	REV: OR
FILE:	98PL439	SCALE: 15:1	SHEET: 1 OF 1

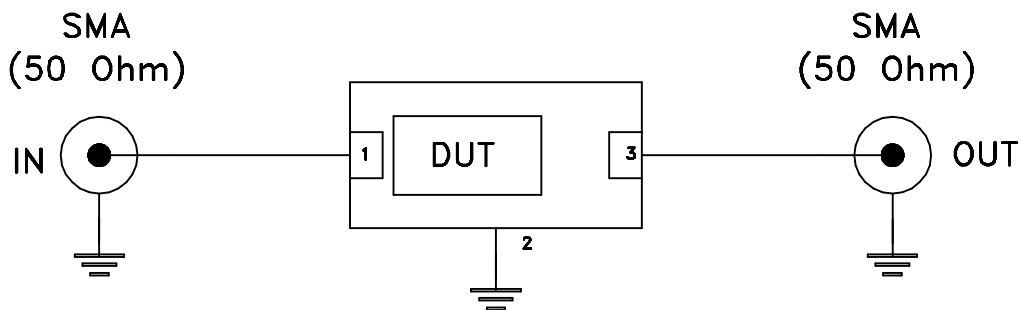
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# Evaluation Board and Circuit




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