



LTCC SMT

# Band Pass Filter

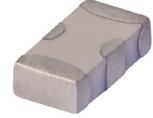
## BFCN-3115+

Mini-Circuits

50Ω 2720 to 3570 MHz

### THE BIG DEAL

- Low Insertion Loss, 1.7 dB Typ.
- Good Rejection, 24 dB Typ.
- 1206 Surface Mount Footprint
- Power Handling: 1.5 Watts



Generic photo used for illustration purposes only

CASE STYLE: FV1206

### +RoHS Compliant

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

### APPLICATIONS

- Harmonic Rejection
- Transmitters / Receivers
- Military and Avionics

### PRODUCT OVERVIEW

Mini-Circuits' BFCN-3115+ 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 850 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. B  
ECO-016659  
BFCN-3115+  
URJ  
230202





LTCC SMT

# Band Pass Filter

## BFCN-3115+

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

Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Units
Center Frequency	—	—	—	3115	—	MHz
Passband	Insertion Loss	F1-F2	2720 - 3570	1.7	3	dB
	Return Loss	F1-F2	2720 - 3570	6.0	8.5	dB
Stop Band, Lower	Rejection	DC-F3	DC - 1850	20	24	dB
Stop Band, Upper	Rejection	F4-F5	4300 - 8160	20	23	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-270.

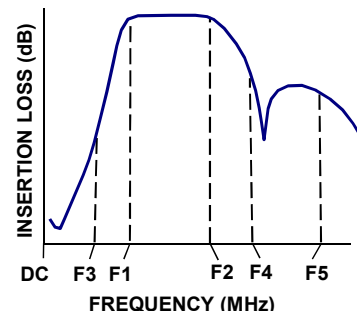
### ABSOLUTE MAXIMUM RATINGS<sup>1</sup>

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

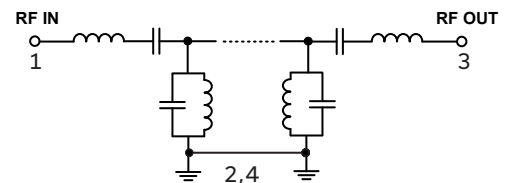
1. Permanent damage may occur if any of these limits are exceeded.

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



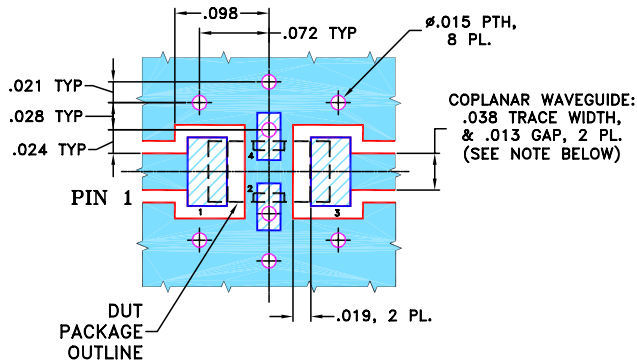


### PAD CONNECTIONS

RF IN	1
RF OUT	3
GROUND	2,4

PRODUCT MARKING: NH

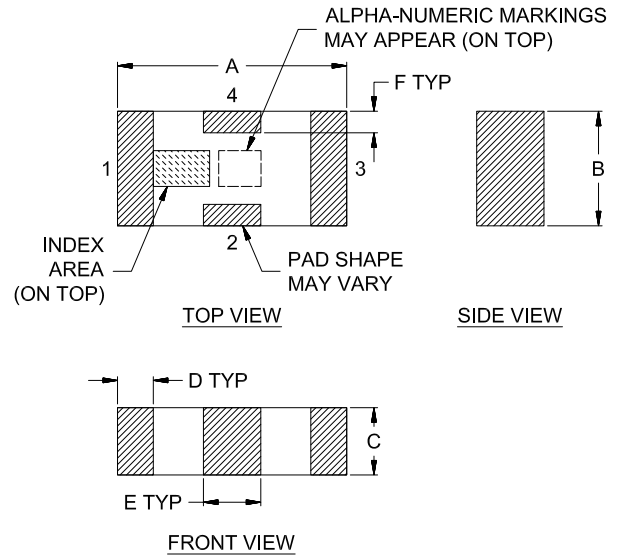
DEMO BOARD MCL P/N: TB-270  
SUGGESTED PCB LAYOUT (PL-137)



**NOTES:** 1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS R04350B WITH THICKNESS .020"  $\pm$  .0015".  
COPPER: 1/2 OZ. EACH SIDE.  
FOR OTHER MATERIALS TRACE WIDTH & 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

### OUTLINE DRAWING



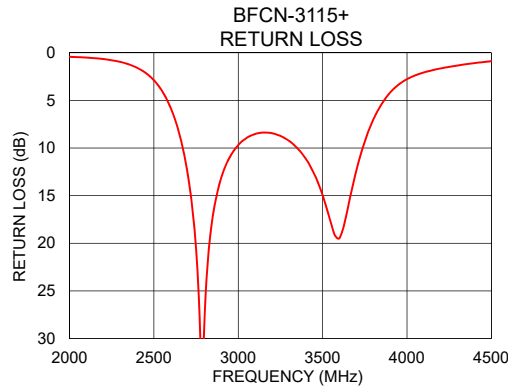
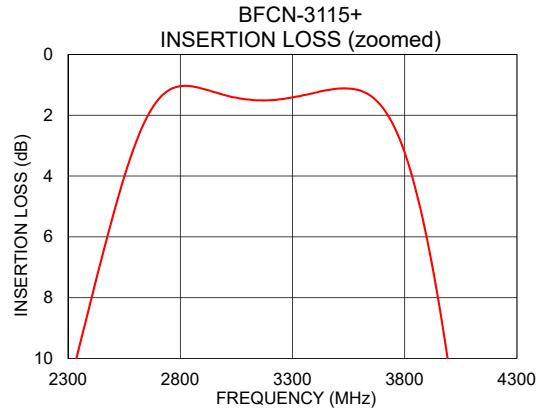
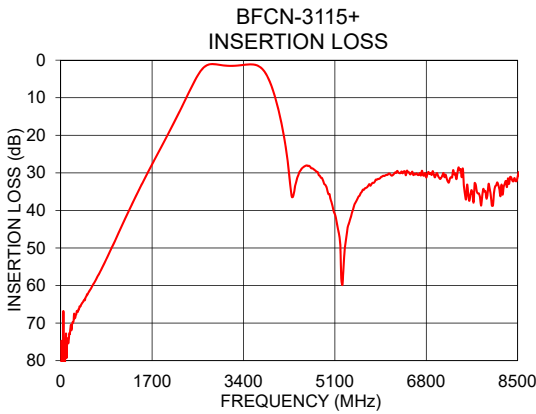
### OUTLINE DIMENSIONS (Inches/mm)

A	B	C	D	E	F	Wt.
.126	.063	.037	.020	.032	.009	grams
3.20	1.60	0.94	0.51	0.81	0.23	.020



### TYPICAL PERFORMANCE DATA AT 25°C

Frequency (MHz)	Insertion Loss (dB)	Return Loss (dB)
10	74.72	0.05
500	62.36	0.09
1600	30.48	0.31
1850	23.68	0.36
1980	20.14	0.41
2600	2.95	5.81
2720	1.34	15.13
3000	1.34	9.69
3115	1.49	8.45
3300	1.41	9.23
3570	1.14	19.06
3800	3.24	7.03
4160	20.88	1.79
4300	36.41	1.33
6000	30.77	0.12
8160	34.34	0.10



#### 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-3115+

## Typical Performance Data

FREQ. (MHz)	INSERTION LOSS @ +25° C (dB)	INPUT RETURN LOSS @ +25° C (dB)	OUTPUT RETURN LOSS @ +25° C (dB)
10	58.24	0.02	0.02
100	75.15	0.02	0.08
200	69.81	0.00	0.13
300	66.06	0.01	0.06
400	62.89	0.03	0.00
500	59.90	0.04	0.04
600	56.80	0.06	0.03
700	53.82	0.09	0.00
800	50.90	0.11	0.02
900	48.35	0.14	0.04
1000	45.50	0.18	0.05
1500	31.19	0.30	0.18
1850	22.47	0.41	0.30
1900	21.15	0.44	0.28
2000	18.50	0.45	0.42
2200	13.16	0.77	0.72
2300	10.28	1.08	1.07
2400	7.58	1.79	1.77
2500	4.87	3.05	3.27
2600	2.73	5.87	6.38
2700	1.44	11.46	13.71
2720	1.32	12.74	16.19
2800	1.09	15.77	22.88
2850	1.12	13.95	16.10
2900	1.22	11.89	12.65
3000	1.46	9.43	9.55
3100	1.65	8.69	8.74
3115	1.65	8.67	8.73
3200	1.59	8.95	8.86
3300	1.46	10.37	9.86
3400	1.33	13.76	13.17
3500	1.25	29.05	19.21
3570	1.45	18.40	16.44
3600	1.64	14.48	13.74
3700	2.90	7.03	7.43
3730	3.48	5.77	6.28
3800	5.26	3.73	4.32
3850	6.86	2.73	3.45
3900	8.70	2.05	2.85
4000	12.76	1.28	2.22
4100	17.93	0.98	1.94
4200	24.43	0.84	1.67
4300	33.88	0.79	1.55
4500	31.98	0.72	1.19
5000	36.43	0.62	0.72
5300	50.34	0.56	0.59
5500	42.04	0.55	0.61
6000	34.24	0.56	0.82
6500	31.97	0.64	0.62
7000	30.23	0.82	0.77
7500	25.68	1.17	0.88
8000	27.35	0.99	0.64
8160	26.12	1.07	0.75
8200	26.21	1.07	0.73

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BFCN-3115+  
110612  
Page 1 of 2



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



# Ceramic Band Pass Filter

# BFCN-3115+

## Typical Performance Data

FREQ.	GROUP DELAY @ +25° C
(MHz)	(nsec)
2700	0.92
2720	0.91
2760	0.89
2800	0.86
2820	0.84
2830	0.84
2840	0.83
2850	0.82
2860	0.82
2880	0.80
2900	0.78
2920	0.76
2930	0.75
2940	0.73
2950	0.72
2960	0.72
2980	0.70
3000	0.69
3020	0.68
3030	0.68
3040	0.68
3050	0.67
3060	0.67
3080	0.66
3100	0.66
3120	0.66
3140	0.66
3150	0.66
3160	0.66
3180	0.67
3200	0.68
3220	0.68
3240	0.69
3250	0.69
3260	0.70
3280	0.70
3300	0.71
3320	0.73
3340	0.74
3350	0.75
3360	0.75
3380	0.77
3400	0.78
3420	0.80
3430	0.81
3440	0.82
3450	0.82
3460	0.83
3480	0.85
3500	0.87
3520	0.88
3550	0.90
3560	0.91
3570	0.92
3600	0.94

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Page 2 of 2



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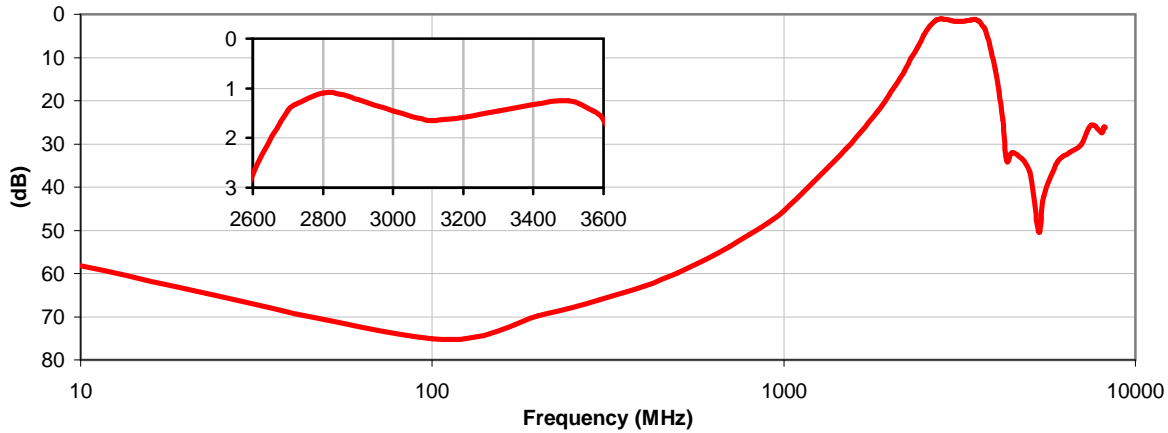


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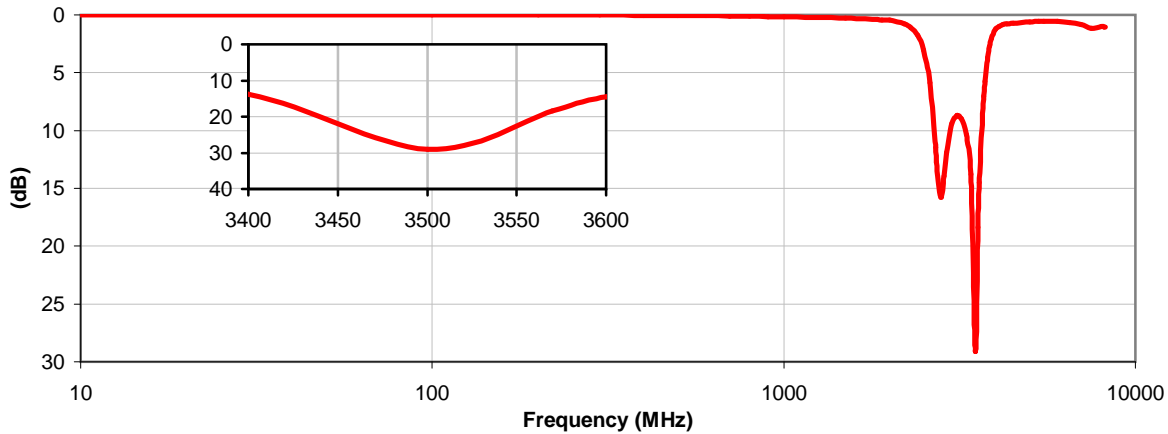


## Typical Performance Curves

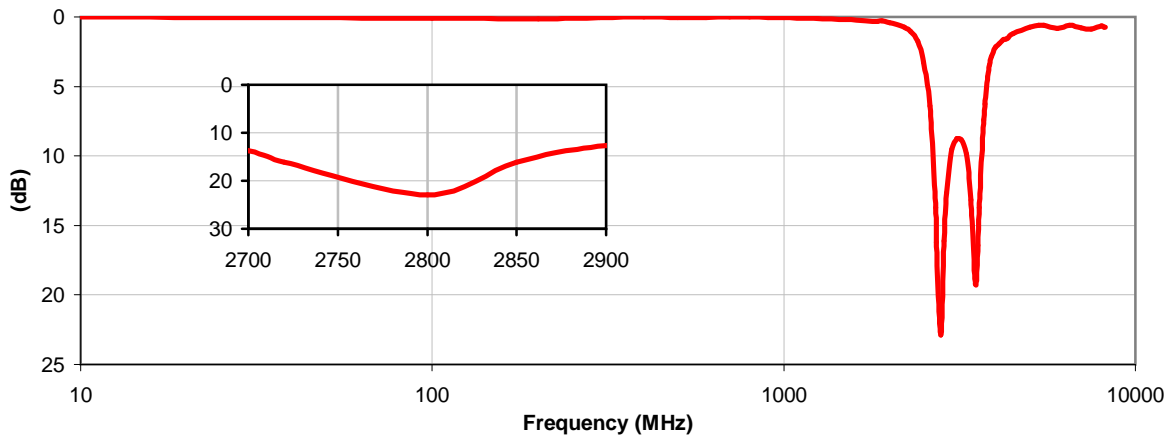
### INSERTION LOSS vs. TEMPERATURE



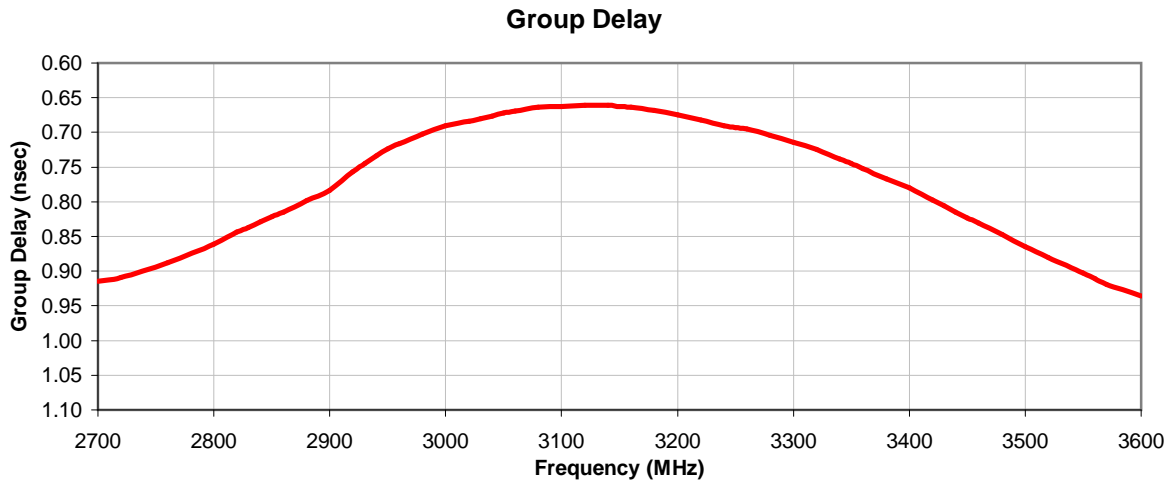
### INPUT RETURN LOSS vs. TEMPERATURE



### OUTPUT RETURN LOSS vs. TEMPERATURE



## Typical Performance Curves



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Page 2 of 2



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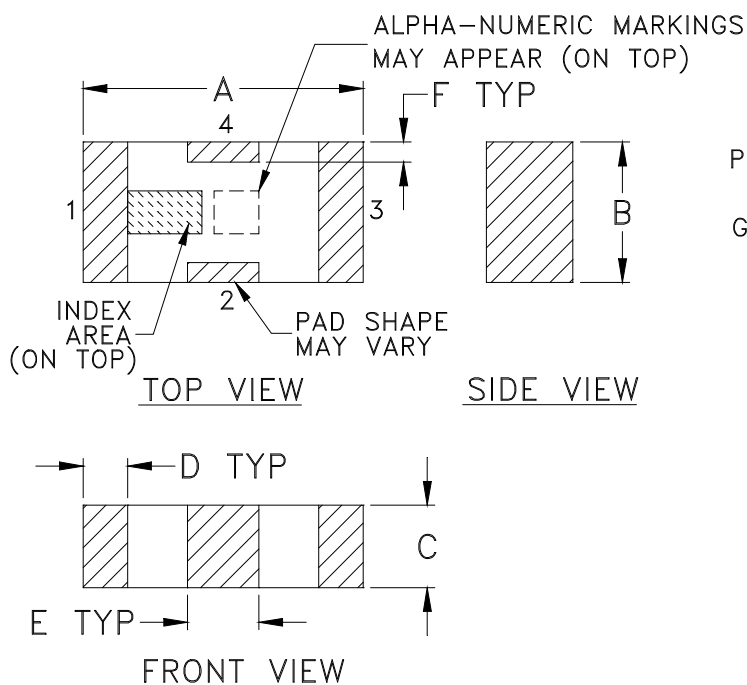


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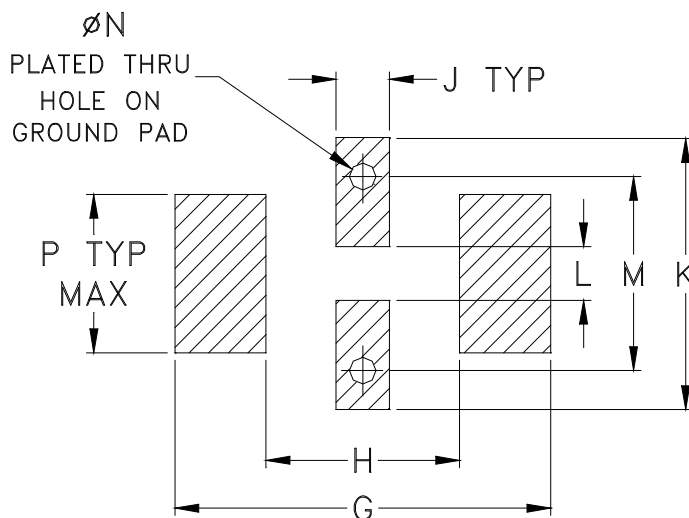




### Outline Dimensions



### 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	.126 (3.20)	.063 (1.60)	.037 (0.94)	.020 (0.51)	.032 (0.81)	.009 (0.23)	.169 (4.29)	.087 (2.21)	.024 (0.61)	.122 (3.10)	.024 (0.61)	.087 (2.21)	.012 (0.30)	.071 (1.80)	.020

Dimensions are in inches (mm). Tolerances: 2 Pl.  $\pm .01$ ; 3 Pl.  $\pm .005$

#### Notes:

1. Open style, ceramic base.
2. 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.



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RF/IF MICROWAVE COMPONENTS

# Tape & Reel Packaging TR-F71

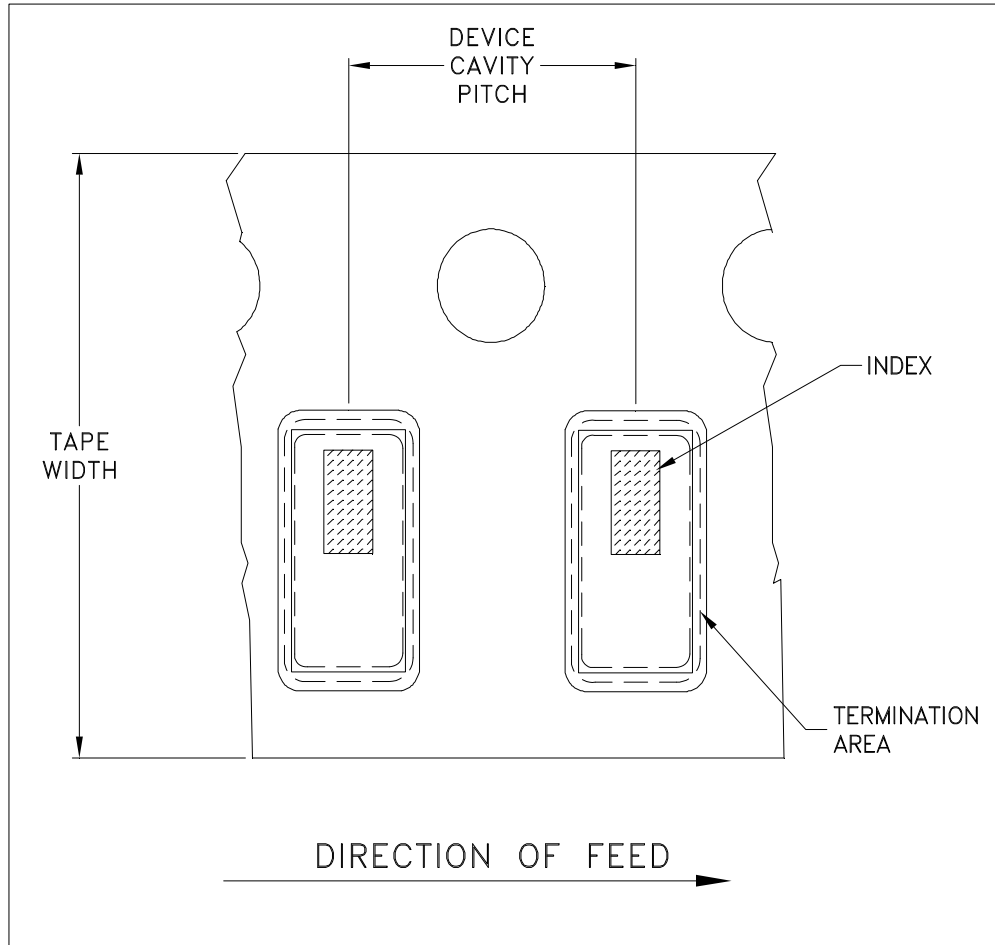


ILLUSTRATION 1

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)



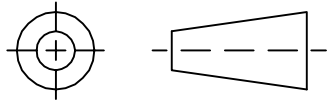
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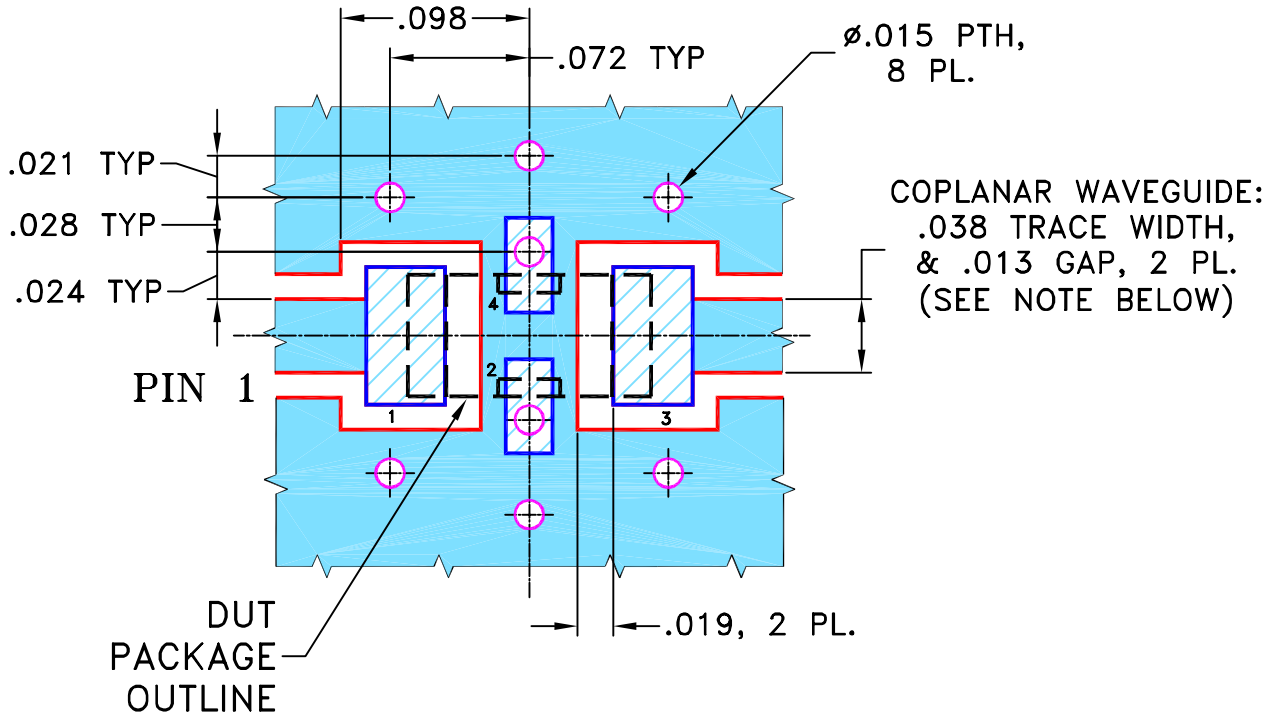
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M88634	NEW RELEASE	08/28/03	GF	ABD
A	M102713	ADDED "...WITH SMOBC"	01/17/06	MMG	IL

SUGGESTED MOUNTING CONFIGURATION  
FOR FV1206 CASE STYLE, "nx" PIN CONNECTION

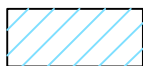


- NOTES:**
- COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS R04350B WITH THICKNESS .020" ± .0015".  
 COPPER: 1/2 OZ. EACH SIDE.  
 FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.

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 08/27/03
	CHECKED	AV 08/28/03
	APPROVED	ABD 08/28/03



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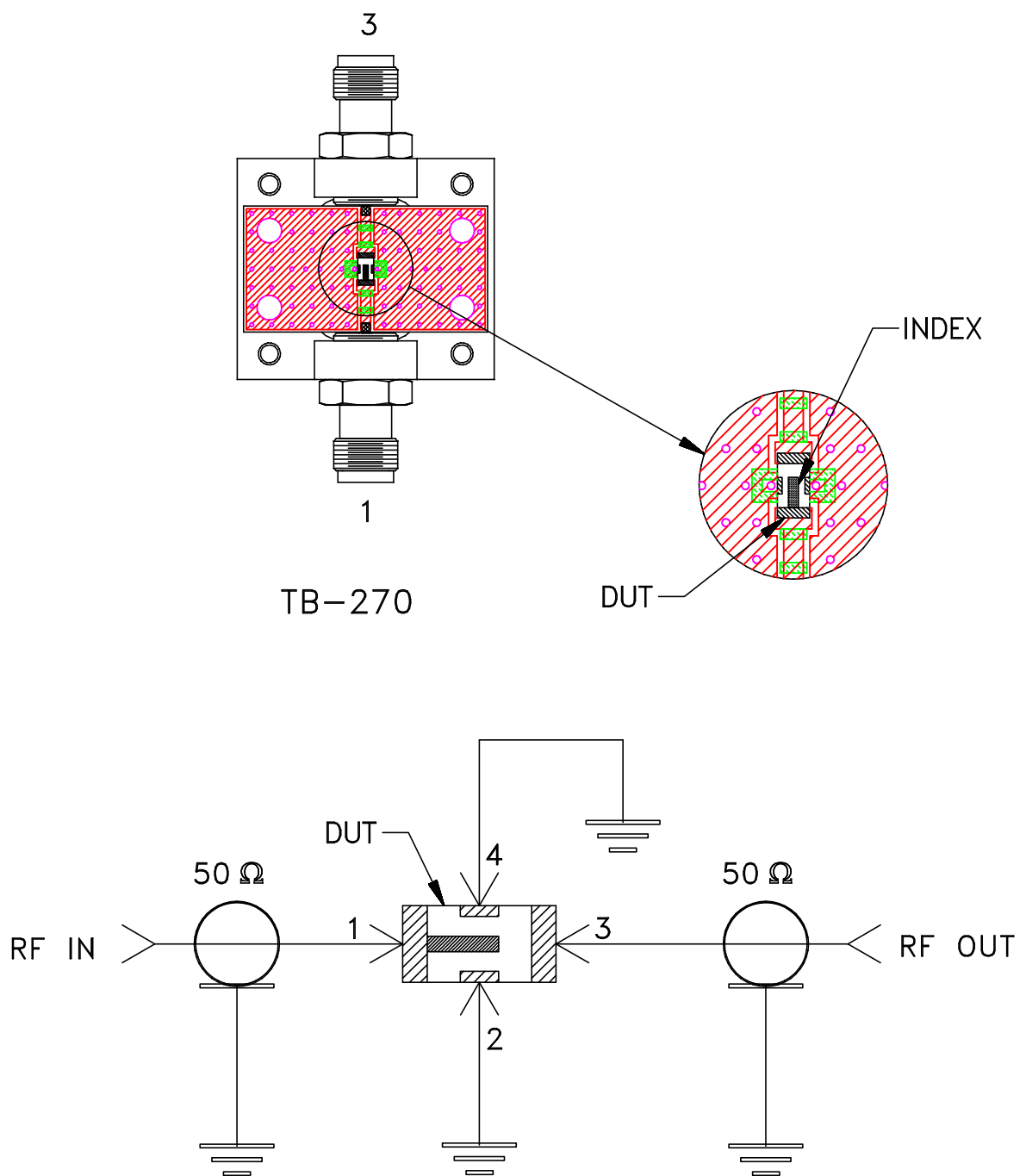
13 Neptune Avenue  
 Brooklyn NY 11235

PL, nx, FV1206, LFCN/HFCN, TB-270

SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-137	REV: A
FILE: 98PL137	SCALE: 10:1	SHEET: 1 OF 1	

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# 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 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