(LUMPED LC) SURFACE MOUNT

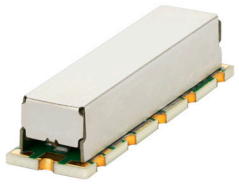
Bandpass Filter

BPF-BY250+

50Ω 150 to 350 MHz

KEY FEATURES

- Low Insertion Loss, 1.5 dB Typ.
- Return Loss, 18 dB Typ.
- Stop Band Rejection, 55 dB Typ.
- Miniature Shielded Package.



Generic photo used for illustration purposes only

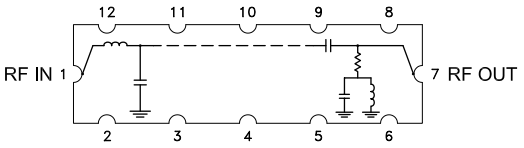
APPLICATIONS

- Test and Measurement.
- Transmitter/Receivers.
- Harmonic Rejection.

PRODUCT OVERVIEW

Mini-Circuits' Model-BPF-BY250+ is a Lumped LC filter that offer a good insertion loss and high rejection. This bandpass filter covers from 150 to 350MHz. This filter has high Q capacitors and inductors to achieve a low insertion loss. It has repeatable performance across production lots .

FUNCTIONAL DIAGRAM



ELECTRICAL SPECIFICATIONS[1,2] AT +25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Units
Passband	Center Frequency[3]	Fc	—	—	250	—	MHz
	Insertion Loss	F1-F2	150 - 350	—	1.5	2.5	dB
	Return Loss	F1-F2	150 - 350	10	18	—	dB
Stop Band, Lower	Rejection	DC-F3	DC - 50	45	58	—	dB
		F3-F4	50 - 75	20	30	—	
Stop Band, Upper	Rejection	F5-F6	444 - 500	20	30	—	dB
		F6-F7	500 - 1500	45	55	—	
		F7-F8	1500 - 4000	—	30	—	

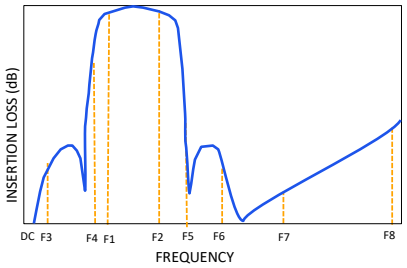
1. Tested in Evaluation Board P/N TB-BPF-BY250+.
2. This component should not be used as a DC-block. In applications where DC voltage and/or current is present at either the input or output ports, external DC blocking capacitors are required.
3. Typical variation ± 2%

ABSOLUTE MAXIMUM RATINGS[4]

Parameter	Ratings
Operating Temperature	-40 °C to +85 °C
Storage Temperature	-55 °C to +100 °C
Input Power[5]	0.5 W

4. Permanent damage may occur if any of these limits are exceeded.
5. Power rating applies only to signals within the passband.

TYPICAL FREQUENCY RESPONSE AT +25°C



REV. OR
ECO-020982
BPF-BY250+
EDU4702
URJ
240224

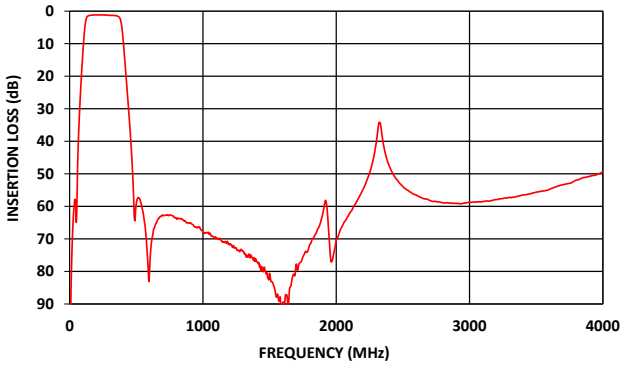
Bandpass Filter

BPF-BY250+

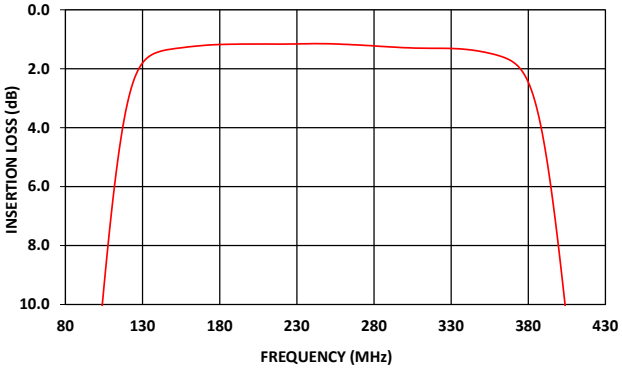
50Ω 150 to 350 MHz

TYPICAL PERFORMANCE GRAPHS AT +25°C

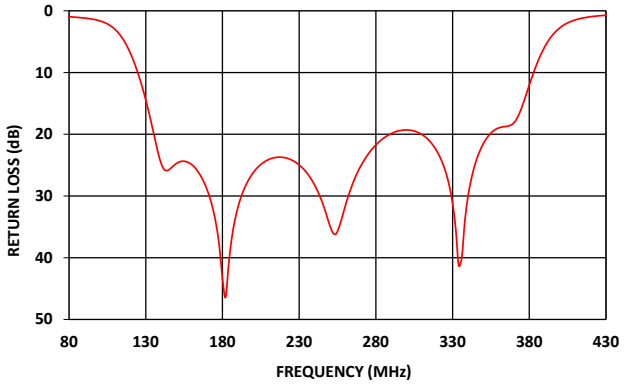
BPF-BY250+
INSERTION LOSS



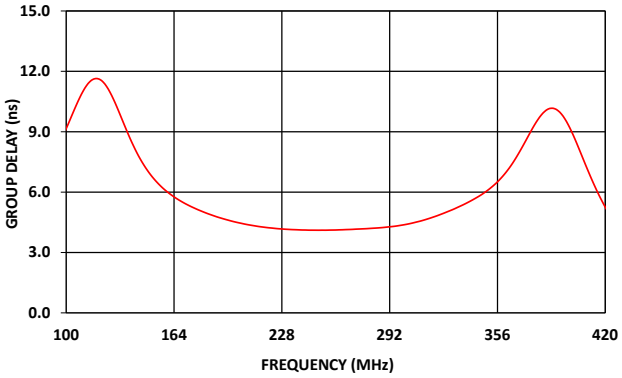
BPF-BY250+
INSERTION LOSS (Zoomed)



BPF-BY250+
RETURN LOSS



BPF-BY250+
GROUP DELAY

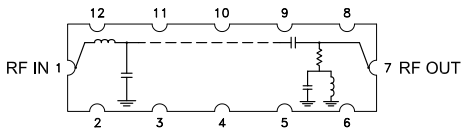


Bandpass Filter

BPF-BY250+

50Ω 150 to 350 MHz

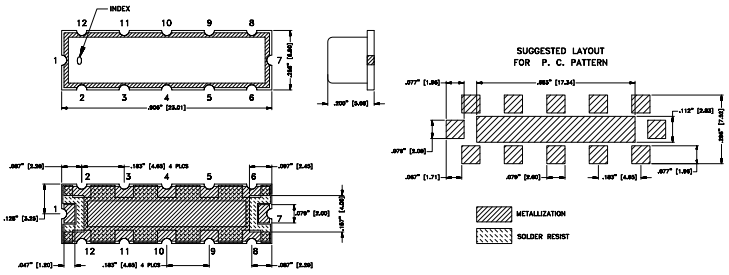
FUNCTIONAL DIAGRAM



PAD DESCRIPTION

Function	Pad Number	Description
RF1	1	Connects to RF Input Port
RF2	7	Connects to RF Output Port
GROUND	2-6,8-12	Connects to Ground on PCB, (See drawing PL-773)

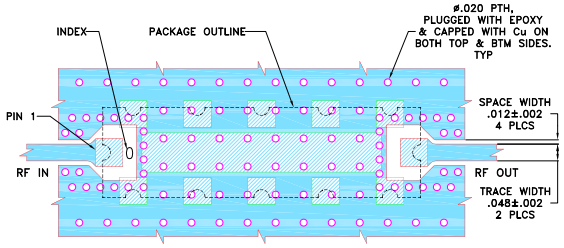
CASE STYLE DRAWING



Unit weight: 1.5 grams
Dimensions are in inches [mm]. Tolerances: 2 Pl.±.03; 3 Pl.±.015

SUGGESTED PCB LAYOUT (PL-773)

SUGGESTED MOUNTING CONFIGURATION
FOR ZV3471 CASE STYLE



NOTES:
1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS (RO4350B) WITH DIELECTRIC THICKNESS .030±.002. 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 PATTERN WITH SMOBC (SOLDER MASK OVER BARE COPPER)

DENOTES PCB COPPER PATTERN FREE OF SOLDERMASK

Figure 2. Suggested PCB Layout PL-773

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ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASH BOARD. CLICK HERE

Performance Data and Graphs	Data Graphs S-Parameter (S2P Files) Data Set (.zip file) De-embedded to device pads
Case Style	ZV3471 Lead Finish: Gold over Nickel Plate
RoHs Status	Compliant
Tape and Reel	TR-F010
Suggested Layout for PCB Design	PL-773
Evaluation Board	TB-BPF-BY250+
	Gerber File
Environmental Rating	ENV02T1

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-Circuits' 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/terms/viewterm.html

Surface mount Band Pass Filter BPF-BY250+

Typical Performance Data

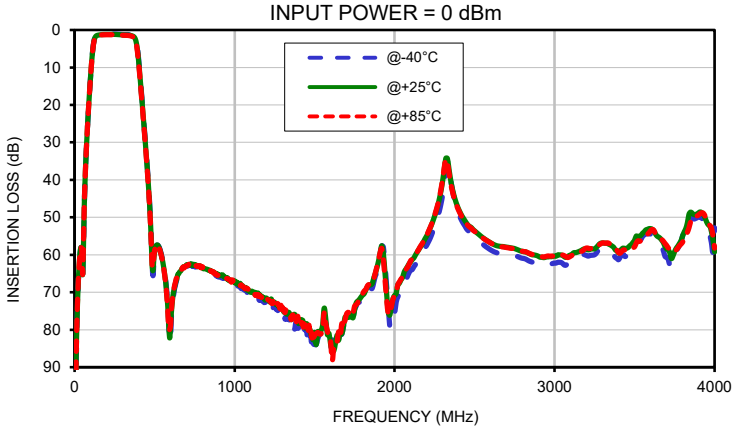
FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
1	108.16	100.24	107.36	0.05	0.05	0.05	2.27	2.27	2.27
5	93.26	102.83	102.91	0.05	0.05	0.05	2.26	2.26	2.26
10	89.12	86.08	87.09	0.05	0.05	0.05	2.25	2.25	2.26
15	77.64	77.69	76.76	0.06	0.06	0.07	2.23	2.24	2.24
20	70.84	70.56	70.16	0.08	0.08	0.09	2.21	2.22	2.22
25	65.66	65.42	65.33	0.10	0.11	0.12	2.18	2.19	2.19
35	59.32	59.08	59.26	0.18	0.20	0.22	2.10	2.12	2.12
40	58.05	58.00	58.01	0.23	0.26	0.29	2.05	2.07	2.08
45	58.67	58.75	58.81	0.30	0.34	0.37	2.00	2.02	2.03
50	65.51	65.35	65.28	0.37	0.42	0.47	1.94	1.96	1.97
55	59.17	58.60	57.86	0.45	0.51	0.57	1.87	1.90	1.91
60	47.88	47.59	47.30	0.53	0.61	0.68	1.80	1.82	1.84
75	30.57	30.46	30.32	0.79	0.90	0.99	1.54	1.58	1.60
100	12.38	12.34	12.28	1.49	1.65	1.79	1.37	1.45	1.52
120	3.15	3.24	3.30	6.57	6.90	7.21	5.59	5.83	6.05
140	1.35	1.46	1.55	23.81	24.75	25.70	20.38	19.49	18.88
150	1.25	1.35	1.44	23.56	24.83	26.10	19.16	18.67	18.24
180	1.12	1.21	1.28	43.80	43.96	49.08	20.04	20.03	20.04
200	1.11	1.19	1.26	25.24	26.26	26.78	26.38	25.15	24.36
250	1.09	1.18	1.26	33.65	35.08	34.13	19.90	19.48	18.89
270	1.13	1.23	1.31	24.94	25.15	24.55	18.74	19.00	18.85
290	1.19	1.29	1.37	19.12	19.87	20.21	19.46	20.40	20.85
300	1.22	1.32	1.40	18.37	19.28	19.90	20.80	22.10	22.98
320	1.23	1.34	1.43	21.31	22.82	24.50	27.45	29.01	29.62
340	1.24	1.38	1.50	31.98	30.01	27.65	23.38	23.13	22.29
350	1.30	1.45	1.59	21.65	21.47	20.83	20.26	20.68	20.48
380	2.13	2.48	2.80	12.99	12.07	11.32	16.39	15.28	14.35
384	2.65	3.07	3.45	9.84	9.23	8.69	11.75	11.19	10.63
424	19.95	20.42	20.86	0.78	0.88	0.94	1.45	1.62	1.75
442	29.60	30.07	30.48	0.52	0.60	0.66	1.50	1.64	1.76
444	30.70	31.18	31.59	0.51	0.58	0.64	1.52	1.65	1.77
500	59.61	59.32	58.80	0.29	0.34	0.39	2.01	2.08	2.15
1050	69.02	68.27	68.47	0.03	0.08	0.10	0.48	0.53	0.57
1100	70.10	70.02	69.51	0.03	0.07	0.10	0.39	0.44	0.48
1150	71.72	70.72	70.67	0.03	0.07	0.10	0.33	0.38	0.42
1200	73.04	71.58	71.65	0.02	0.06	0.09	0.28	0.34	0.39
1250	74.09	72.65	73.08	0.01	0.06	0.09	0.26	0.32	0.37
1300	75.95	74.14	74.11	0.01	0.05	0.09	0.26	0.32	0.38
1350	77.72	76.58	76.87	0.00	0.05	0.09	0.28	0.34	0.39
1400	79.43	78.37	78.04	0.00	0.05	0.08	0.31	0.37	0.43
1450	79.54	78.35	78.47	0.00	0.05	0.08	0.34	0.41	0.47
1500	83.92	80.75	81.49	0.00	0.05	0.08	0.39	0.46	0.52
1600	84.95	83.88	83.11	0.00	0.05	0.08	0.51	0.59	0.65
1700	76.26	76.79	75.78	0.01	0.04	0.08	0.64	0.73	0.79
1800	71.51	70.77	70.37	0.01	0.04	0.07	0.78	0.88	0.94
1900	62.42	61.59	61.38	0.01	0.04	0.07	0.96	1.07	1.15
2000	75.81	70.84	70.94	0.02	0.03	0.07	1.04	1.14	1.20
2200	57.49	55.00	54.86	0.02	0.03	0.07	1.26	1.36	1.42
2400	48.96	47.80	48.12	0.02	0.03	0.06	1.46	1.55	1.61
2600	58.68	56.80	56.84	0.04	0.01	0.04	1.62	1.70	1.75
2800	60.94	59.10	59.07	0.04	0.01	0.04	1.76	1.84	1.89
3000	62.23	60.33	60.33	0.04	0.02	0.05	1.87	1.96	2.00
3100	61.89	60.04	60.38	0.04	0.02	0.06	1.92	2.02	2.06
3200	60.20	58.54	58.19	0.03	0.03	0.06	1.98	2.07	2.11
3400	61.31	59.51	59.42	0.01	0.05	0.09	2.10	2.18	2.22
3600	54.47	53.02	53.60	0.00	0.07	0.11	2.18	2.28	2.33
3700	60.72	58.42	57.48	0.00	0.07	0.11	2.21	2.33	2.38
3800	54.88	55.02	56.63	0.01	0.08	0.13	2.25	2.38	2.45
3900	49.91	48.82	49.35	0.01	0.09	0.18	2.27	2.42	2.50
4000	52.81	59.24	58.23	0.03	0.10	0.13	2.30	2.46	2.55

Typical Performance Data

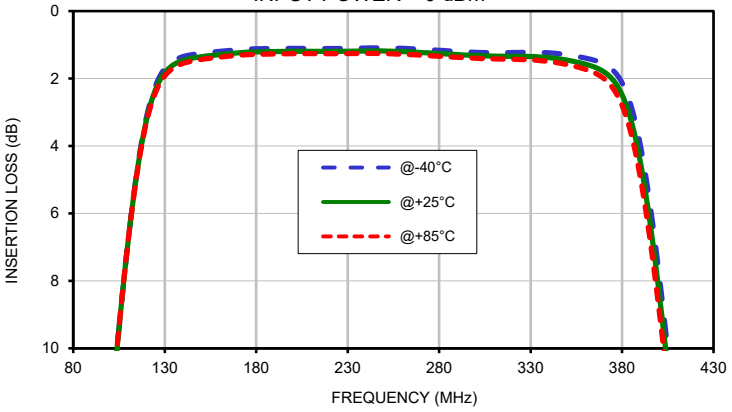
FREQ. (MHz)	GROUP DELAY (nsec)		
	@-40°C	@+25°C	@+85°C
150.00	6.91	6.87	6.84
152.00	6.70	6.67	6.64
156.00	6.33	6.31	6.28
158.00	6.18	6.15	6.13
160.00	6.03	6.01	5.99
164.00	5.79	5.76	5.75
168.00	5.57	5.55	5.54
170.00	5.48	5.46	5.44
174.00	5.30	5.28	5.27
178.00	5.15	5.13	5.12
180.00	5.08	5.06	5.05
184.00	4.95	4.93	4.92
190.00	4.77	4.76	4.75
194.00	4.67	4.66	4.65
198.00	4.58	4.57	4.56
200.00	4.53	4.52	4.52
202.00	4.49	4.49	4.48
208.00	4.39	4.38	4.37
210.00	4.36	4.35	4.34
212.00	4.33	4.32	4.32
214.00	4.30	4.30	4.29
216.00	4.28	4.27	4.27
218.00	4.25	4.25	4.25
250.00	4.11	4.11	4.10
252.00	4.11	4.11	4.10
254.00	4.11	4.11	4.10
260.00	4.12	4.12	4.11
262.00	4.13	4.12	4.12
270.00	4.15	4.15	4.14
272.00	4.16	4.16	4.15
280.00	4.19	4.19	4.19
282.00	4.20	4.20	4.21
290.00	4.25	4.26	4.27
292.00	4.27	4.28	4.28
300.00	4.36	4.38	4.39
310.00	4.54	4.56	4.57
312.00	4.58	4.61	4.62
320.00	4.80	4.82	4.84
330.00	5.13	5.15	5.17
340.00	5.53	5.55	5.57
350.00	6.04	6.08	6.11

Typical Performance Curves

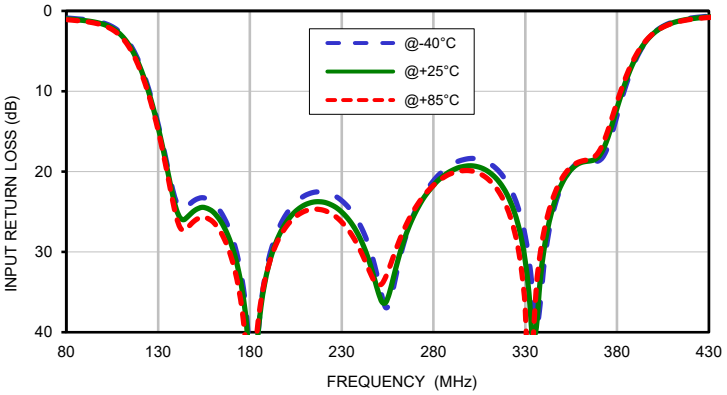
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



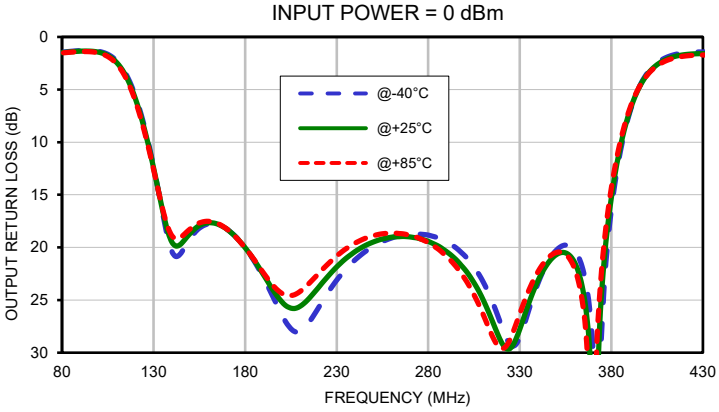
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



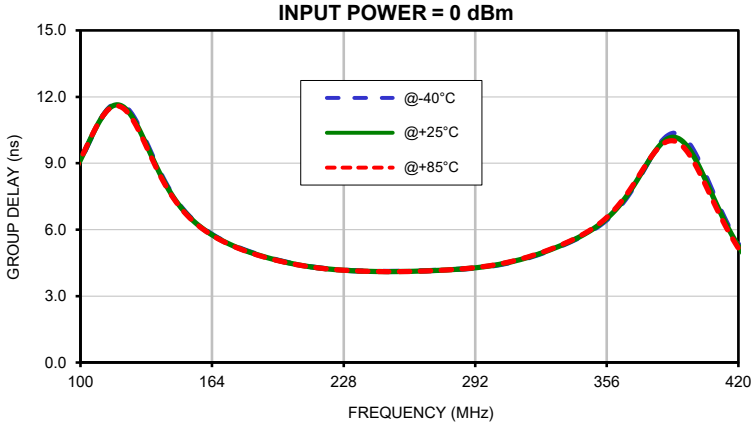
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



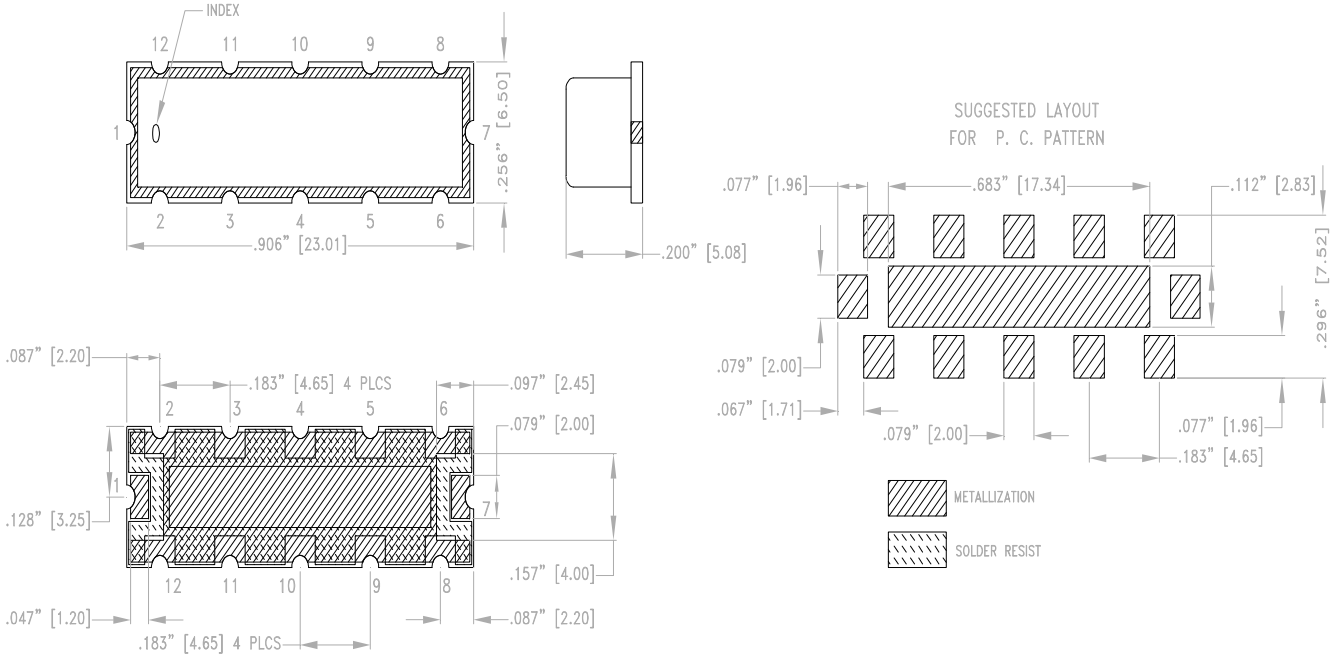
GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm



Case Style ZV

Outline Dimensions

ZV3471



Dimensions are in inches [mm]. Tolerances: 2 Pl. ± .03; 3 Pl. ± .015

Notes:

1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. Unit Weight: 1.5 grams
4. Termination finish:
   For RoHS Case Styles: 2-5 µ inch (.05-.13 microns) Gold over 120-240 µ inch (3.05-6.10 microns) Nickel plate.
   All models, (+) suffix.

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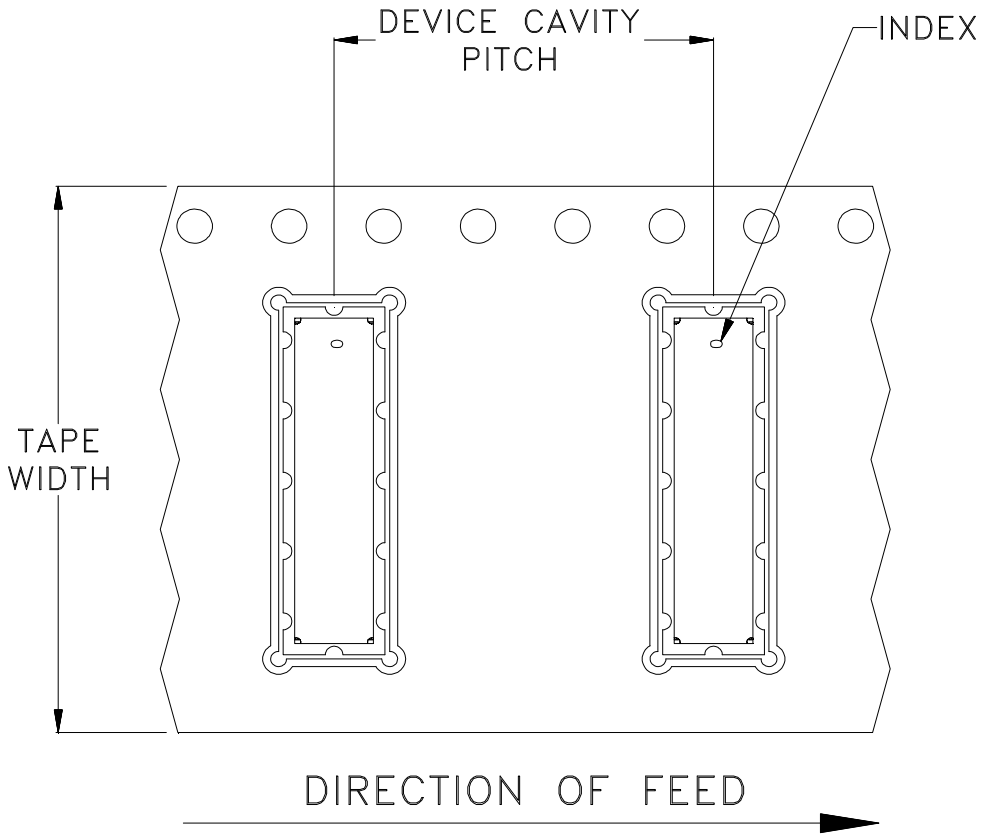
Tape & Reel Packaging TR-F010

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel See note	
44	12	13	Small quantity standards	10
				20
				50
				100
			Standard	250

Note: Please consult individual model data sheet/dashboard 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

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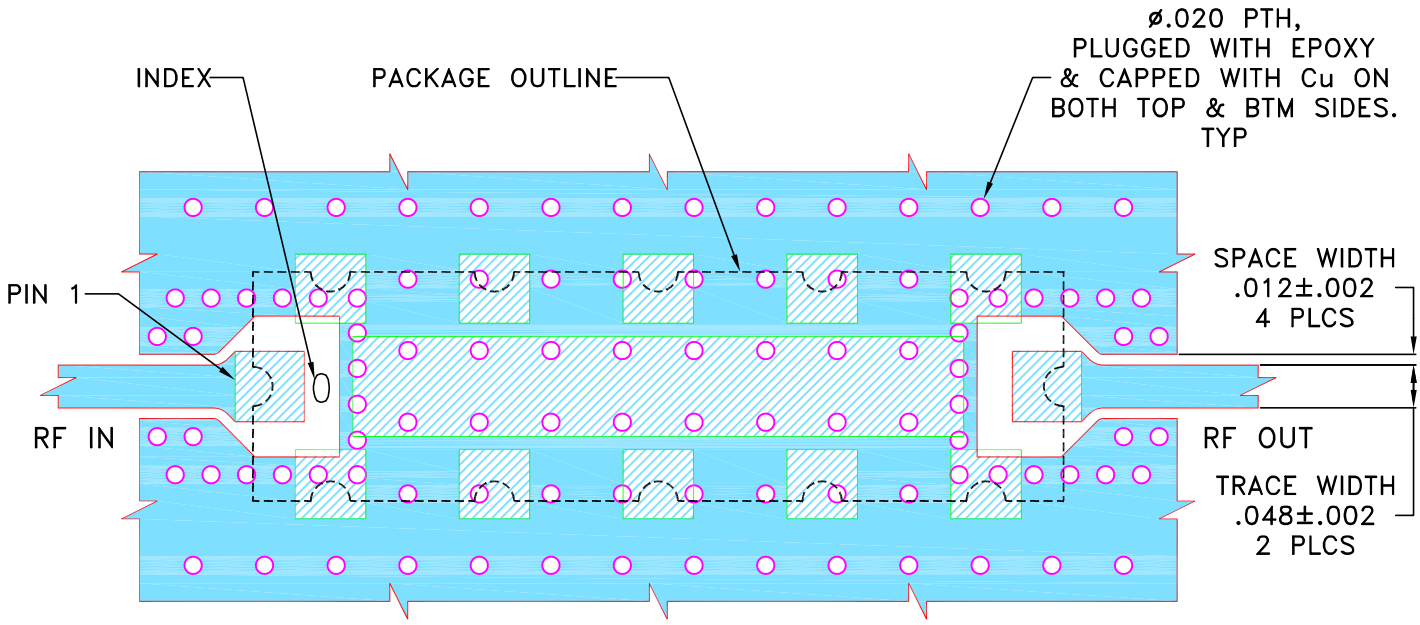
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	NPO-003975	NEW RELEASE	DEC 23	LK	VC

SUGGESTED MOUNTING CONFIGURATION FOR ZV3471 CASE STYLE



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DENOTES PCB COPPER PATTERN WITH SMOBC (SOLDER MASK OVER BARE COPPER)

DENOTES PCB COPPER PATTERN FREE OF SOLDERMASK

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	LK	06 DEC 23
TOLERANCES ON: 2 PL DECIMALS ± 3 PL DECIMALS ± ANGLES ± FRACTIONS ±	CHECKED	DDR	06 DEC 23
	APPROVED	MD	07 DEC 23

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

Mini-Circuits®
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Brooklyn NY 11235

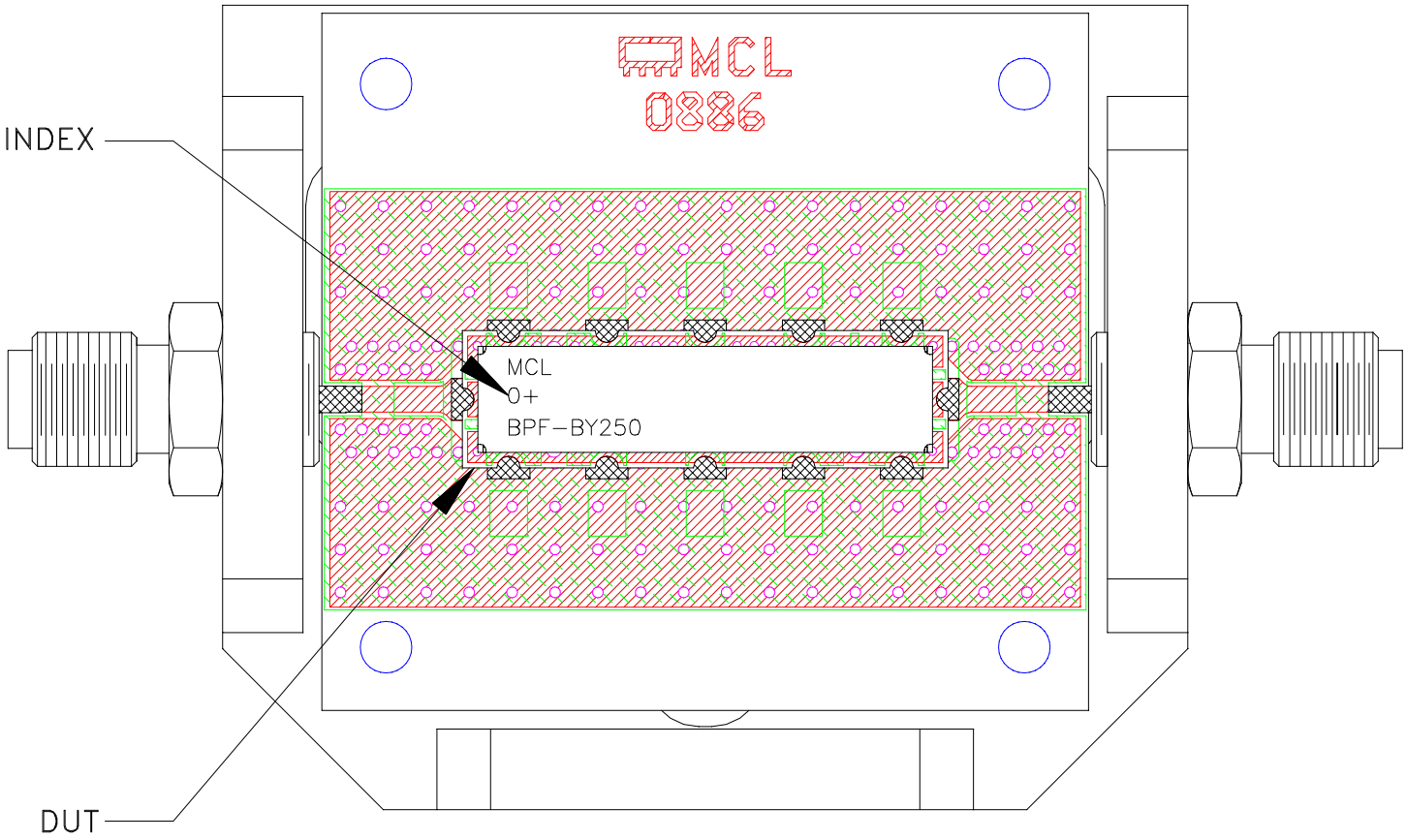
PL, ZV3471, TB-1259

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-773	OR

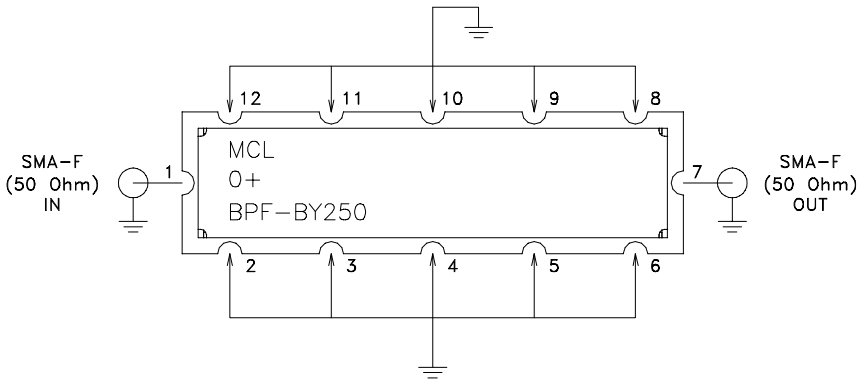
FILE:	SCALE:	SHEET:
98-PL-773	4.5:1	1 OF 1

Evaluation Board and Circuit

TB-BPF-BY250+



Schematic diagram



Notes:

1. PCB Material: ROGERS (RO4350B) OR Equivalent, Dielectric Constant=3.48±.05
Dielectric Thickness: .030±.002
2. 50 Ohm SMA Female Connectors.

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Environmental Specifications ENV02T1

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

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