



(LUMPED LC) SURFACE MOUNT High Pass Filter

HPF-BZ50+

50Ω 50 to 1500 MHz

KEY FEATURES

- Low Insertion Loss, 0.5 dB Typ.
- High Power Handling of 8 W
- Stop Band Rejection, 70 dB Typ.
- Miniature Shielded Package

APPLICATIONS

- Transmitters/Receivers
- Military

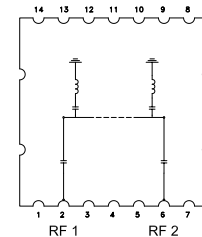
PRODUCT OVERVIEW

Mini-Circuits' Model-HPF-BZ50+ is a Lumped LC filter that offer a good insertion loss and high rejection. This highpass filter covers from 50 to 1500 MHz. This filter has high Q capacitors and inductors to achieve a low insertion loss. It has repeatable performance across production lots.



Generic photo used for illustration purposes only

FUNCTIONAL DIAGRAM



ELECTRICAL SPECIFICATIONS^{1,2} AT +25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Units
Pass Band	Insertion Loss	F3-F4	50 - 1000	—	0.5	1.5	dB
		F4-F5	1000 - 1500	—	1.5	—	
	Return Loss	F3-F4	50 - 1000	8	14	—	dB
		F4-F5	1000 - 1500	—	12	—	
Stop Band	Rejection	DC-F1	DC - 5	60	70	—	dB
		F1-F2	5 - 25	20	34	—	
	Freq. Cut-Off ³	Fc	39	—	3	—	dB

1. Tested in Evaluation Board P/N TB-HPF-BZ50+.

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%.

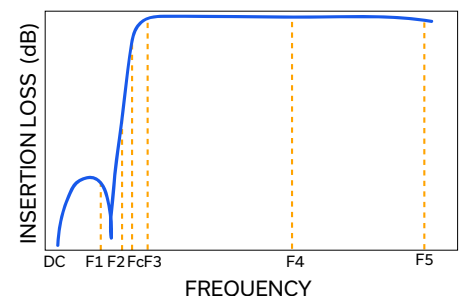
ABSOLUTE MAXIMUM RATINGS⁴

Parameter	Ratings
Operating Temperature	-40°C to +85°C
Storage Temperature	-55°C to +100°C
Input Power ⁵	8 W at 25°C

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

5. Power rating applies only to signals within the passband. Power rating above +25°C operating temperature decreases linearly to 3 W at +85°C.

TYPICAL FREQUENCY RESPONSE AT +25°C





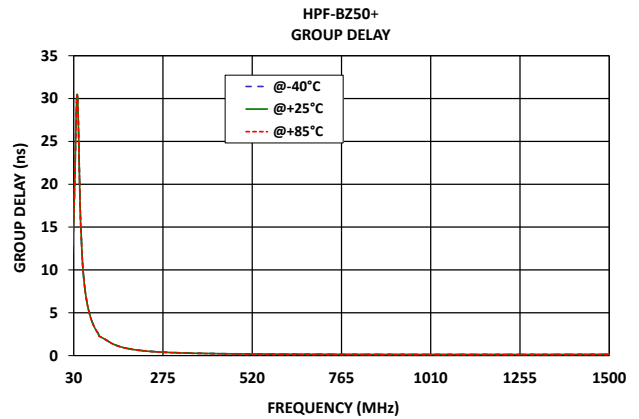
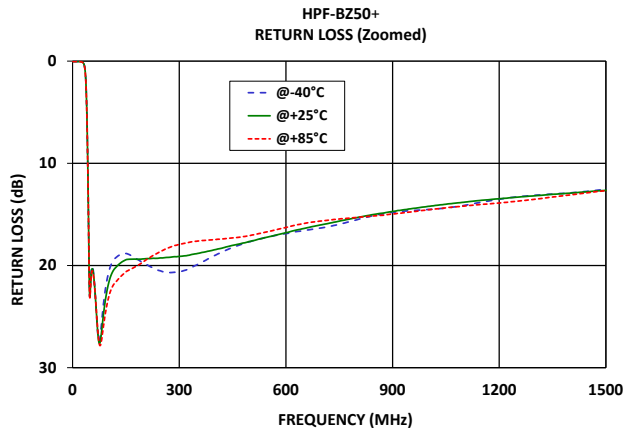
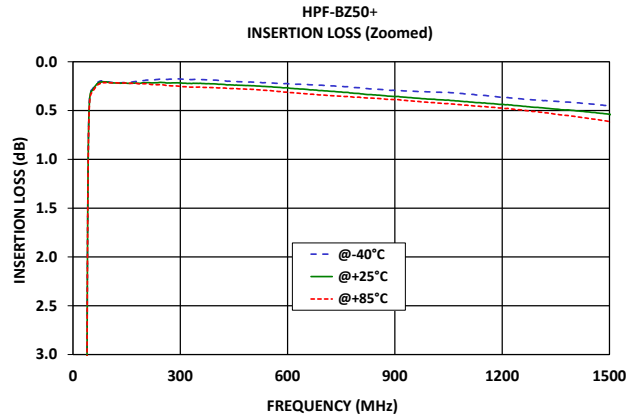
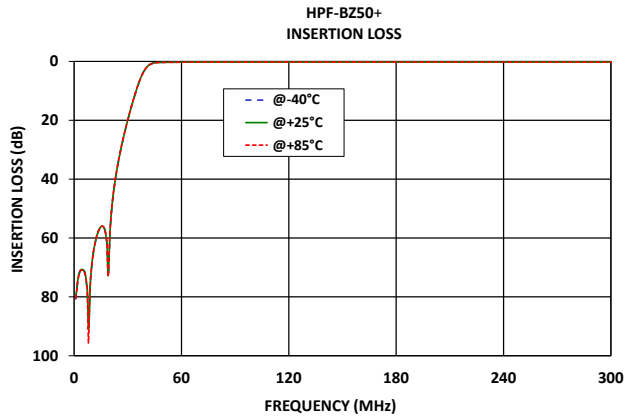
(LUMPED LC) SURFACE MOUNT High Pass Filter

HPF-BZ50+

Mini-Circuits

50Ω 50 to 1500 MHz

TYPICAL PERFORMANCE GRAPHS





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HPF-BZ50+

Mini-Circuits

50Ω 50 to 1500 MHz

FUNCTIONAL DIAGRAM

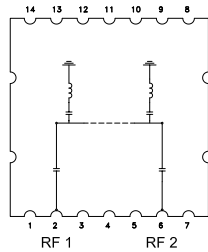


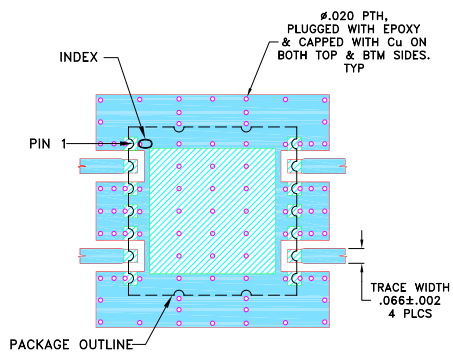
Figure 1. HPF-BZ50+ Functional Diagram

PAD DESCRIPTION

Function	Pad Number	Description
RF1 ²	2	Connects to RF Input Port
RF2 ²	6	Connects to RF Output Port
GROUND	1,3,4,5,7,8,10,11,12,14	Connects to Ground on PCB, (See drawing PL-790)
NC	9,13	No connection, not used internally. See drawing PL-790 for connection to PCB

SUGGESTED PCB LAYOUT (PL-790)

SUGGESTED MOUNTING CONFIGURATION
FOR CASE STYLE AAZ1482-2

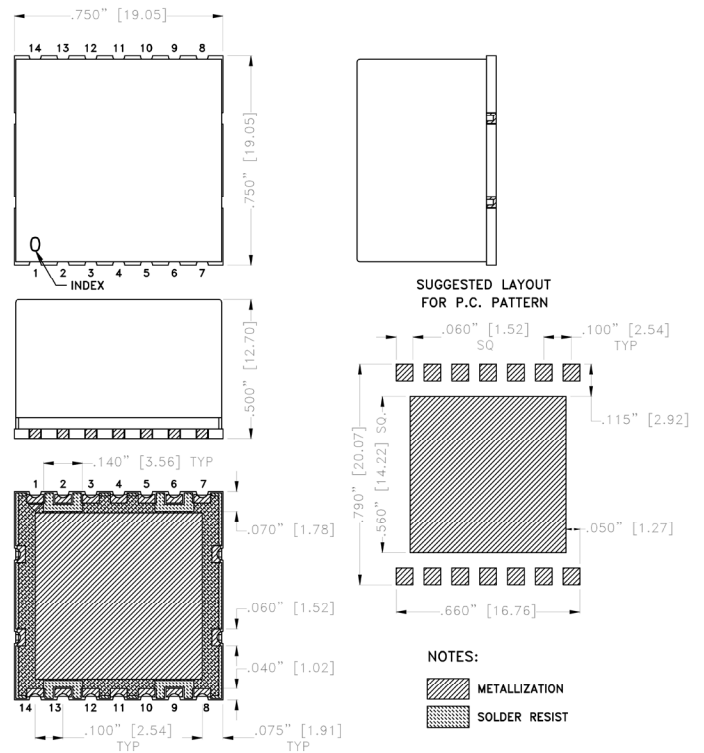


NOTES:

- TRACE WIDTH ARE SHOWN FOR ROGERS (R04350B) WITH DIELECTRIC THICKNESS .030±.002. COPPER: 1/2 Oz. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
 - 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-790

CASE STYLE DRAWING



Weight: 5 gram

Dimensions are in inches (mm). Tolerances: 2Pl. ± .03; 3Pl. ± .015

PRODUCT MARKING*: HPF-BZ50

*Marking may contain other features or characters for internal lot control.



(LUMPED LC) SURFACE MOUNT

High Pass Filter

HPF-BZ50+

50Ω 50 to 1500 MHz

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	AAZ1482-2 Lead Finish: Electroless Nickel Immersion Gold
RoHS Status	Compliant
Tape and Reel	TR-F011
Suggested Layout for PCB Design	PL-790
Evaluation Board	TB-HPF-BZ50+
	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 High Pass Filter

HPF-BZ50+

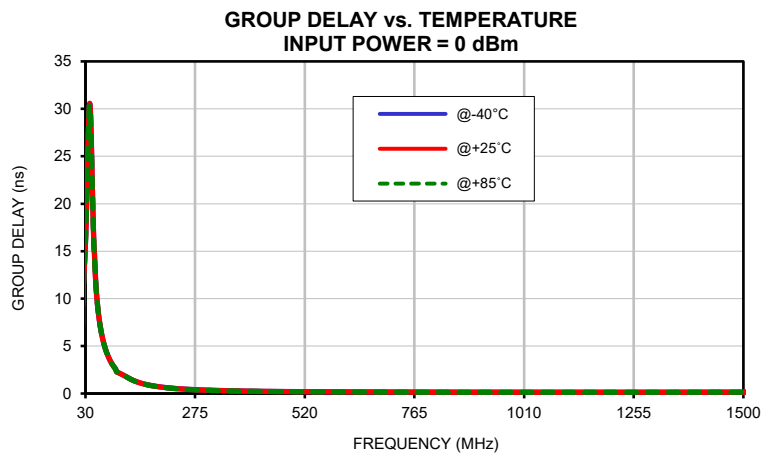
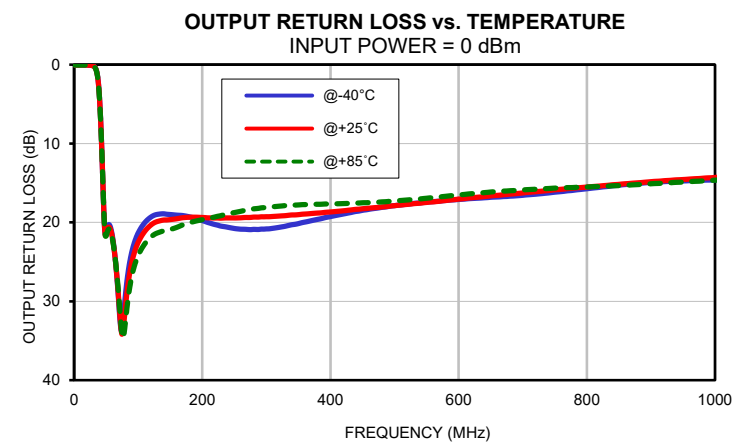
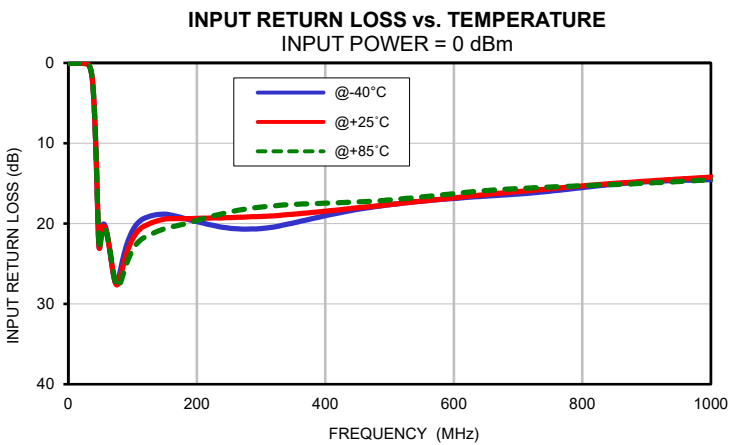
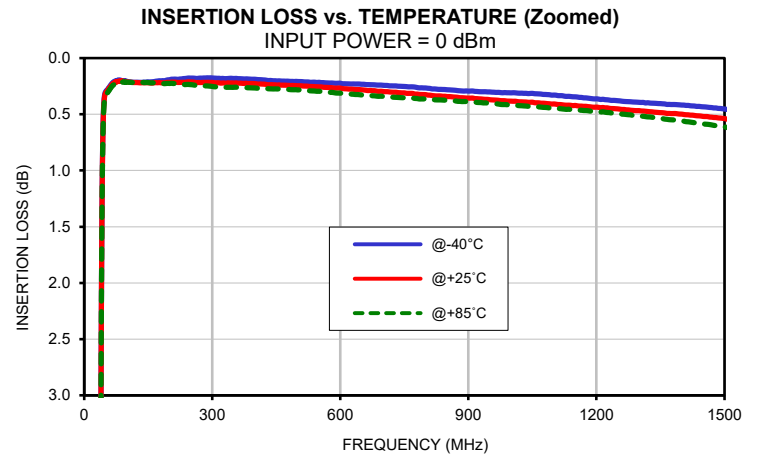
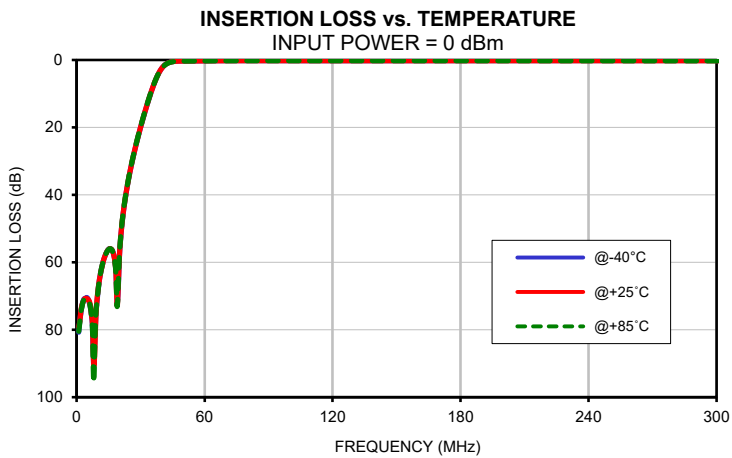
Typical Performance Data

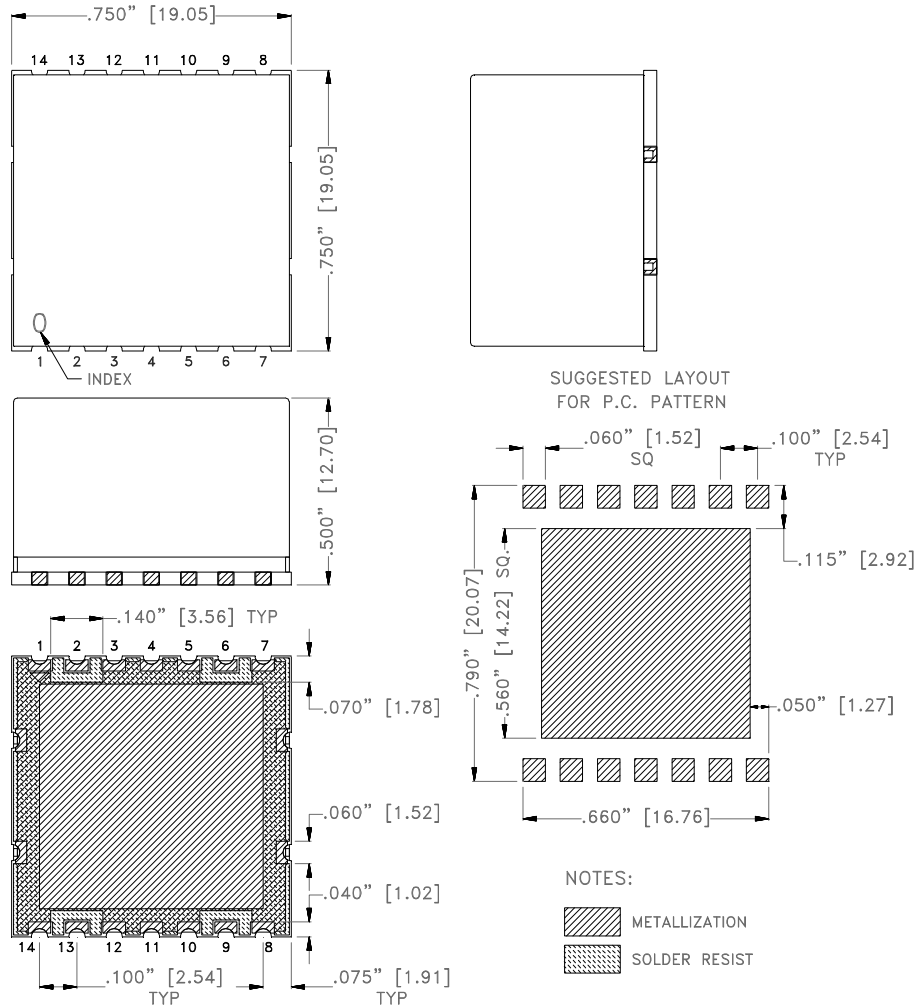
FREQ. (MHz)	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
1	80.72	79.15	80.47	0.05	0.04	0.05	0.05	0.05	0.05
5	70.54	70.77	70.84	0.04	0.04	0.04	0.05	0.05	0.05
10	68.88	68.43	68.71	0.04	0.04	0.04	0.05	0.05	0.05
25	33.28	33.18	33.06	0.07	0.07	0.08	0.08	0.08	0.09
26	30.26	30.16	30.06	0.07	0.08	0.09	0.08	0.09	0.10
27	27.48	27.38	27.27	0.09	0.09	0.11	0.09	0.10	0.11
28	24.85	24.75	24.65	0.10	0.11	0.13	0.11	0.12	0.13
29	22.37	22.26	22.16	0.13	0.14	0.15	0.13	0.14	0.15
30	19.99	19.89	19.79	0.16	0.17	0.19	0.16	0.17	0.19
31	17.71	17.61	17.52	0.21	0.22	0.25	0.21	0.23	0.24
33	13.40	13.31	13.23	0.40	0.42	0.45	0.39	0.41	0.44
35	9.45	9.37	9.31	0.81	0.84	0.89	0.79	0.83	0.87
36	7.65	7.59	7.54	1.18	1.22	1.28	1.15	1.19	1.24
37	6.01	5.96	5.93	1.72	1.77	1.84	1.68	1.72	1.78
38	4.57	4.54	4.52	2.47	2.53	2.62	2.41	2.47	2.54
39	3.36	3.34	3.35	3.50	3.57	3.66	3.41	3.48	3.55
40	2.40	2.40	2.42	4.83	4.90	5.00	4.71	4.78	4.85
41	1.68	1.69	1.72	6.49	6.55	6.65	6.31	6.37	6.44
50	0.30	0.31	0.33	22.11	22.36	22.57	21.29	21.56	21.72
100	0.21	0.21	0.21	20.88	21.94	23.31	21.34	22.53	24.17
200	0.19	0.22	0.23	19.75	19.35	19.61	19.77	19.38	19.65
300	0.18	0.22	0.25	20.62	19.12	17.94	20.82	19.28	18.09
400	0.19	0.23	0.27	19.02	18.46	17.46	19.26	18.68	17.66
440	0.20	0.24	0.27	18.38	18.12	17.34	18.60	18.34	17.54
460	0.20	0.24	0.28	18.11	17.96	17.27	18.34	18.20	17.48
480	0.21	0.24	0.28	17.86	17.80	17.17	18.09	18.04	17.40
500	0.21	0.25	0.28	17.66	17.64	17.06	17.88	17.88	17.28
520	0.21	0.25	0.29	17.46	17.46	16.91	17.68	17.71	17.15
540	0.21	0.25	0.29	17.28	17.29	16.76	17.52	17.56	17.02
560	0.22	0.26	0.30	17.14	17.13	16.61	17.37	17.40	16.86
580	0.22	0.26	0.31	17.00	16.96	16.44	17.22	17.22	16.69
600	0.22	0.27	0.31	16.87	16.79	16.28	17.09	17.04	16.51
620	0.23	0.28	0.32	16.74	16.61	16.10	16.97	16.87	16.36
640	0.23	0.28	0.32	16.64	16.46	15.97	16.88	16.72	16.22
660	0.24	0.29	0.33	16.53	16.30	15.83	16.78	16.57	16.09
680	0.24	0.29	0.34	16.43	16.16	15.73	16.67	16.41	15.98
700	0.24	0.30	0.34	16.33	16.02	15.64	16.56	16.26	15.89
720	0.25	0.30	0.35	16.20	15.88	15.56	16.42	16.11	15.79
740	0.25	0.31	0.35	16.05	15.74	15.49	16.26	15.96	15.70
760	0.26	0.31	0.36	15.88	15.59	15.42	16.09	15.80	15.63
780	0.26	0.32	0.36	15.70	15.45	15.36	15.91	15.66	15.57
800	0.27	0.33	0.36	15.52	15.32	15.30	15.73	15.52	15.51
820	0.27	0.34	0.37	15.34	15.18	15.23	15.55	15.39	15.44
840	0.28	0.34	0.37	15.17	15.05	15.17	15.36	15.23	15.36
860	0.28	0.34	0.38	15.02	14.93	15.11	15.20	15.10	15.29
880	0.29	0.35	0.38	14.91	14.83	15.04	15.06	14.98	15.20
900	0.29	0.36	0.39	14.80	14.71	14.96	14.93	14.84	15.10
950	0.30	0.37	0.40	14.63	14.46	14.77	14.74	14.56	14.88
980	0.31	0.38	0.41	14.56	14.31	14.63	14.66	14.41	14.74
1000	0.31	0.38	0.42	14.52	14.21	14.55	14.61	14.30	14.64
1050	0.31	0.39	0.43	14.38	14.01	14.36	14.43	14.05	14.41
1090	0.33	0.41	0.44	14.19	13.85	14.23	14.23	13.88	14.26
1100	0.33	0.41	0.44	14.13	13.81	14.19	14.17	13.84	14.23
1150	0.34	0.42	0.46	13.80	13.62	14.02	13.82	13.62	14.02
1200	0.36	0.44	0.47	13.52	13.47	13.89	13.51	13.45	13.86
1250	0.38	0.45	0.49	13.28	13.32	13.71	13.23	13.26	13.65
1300	0.39	0.47	0.51	13.13	13.18	13.52	13.05	13.09	13.43
1360	0.41	0.49	0.54	12.99	13.02	13.27	12.88	12.90	13.15
1400	0.42	0.50	0.56	12.90	12.92	13.10	12.77	12.79	12.95
1500	0.45	0.54	0.61	12.55	12.64	12.67	12.42	12.49	12.51

Typical Performance Data

FREQ. (MHz)	GROUP DELAY		
	(nsec)		
	@-40°C	@+25°C	@+85°C
50	14.80	14.74	14.69
100	2.28	2.27	2.26
180	0.82	0.81	0.81
200	0.68	0.67	0.66
280	0.40	0.39	0.38
300	0.36	0.35	0.34
380	0.27	0.26	0.25
400	0.26	0.24	0.23
480	0.21	0.20	0.19
500	0.20	0.20	0.19
580	0.18	0.17	0.16
600	0.18	0.17	0.16
650	0.17	0.16	0.15
680	0.17	0.15	0.14
700	0.16	0.15	0.14
780	0.15	0.14	0.13
790	0.15	0.14	0.13
800	0.15	0.14	0.13
820	0.15	0.14	0.13
830	0.15	0.14	0.13
840	0.15	0.14	0.13
850	0.15	0.14	0.13
880	0.14	0.13	0.13
900	0.15	0.14	0.13
920	0.15	0.14	0.13
940	0.15	0.14	0.13
980	0.14	0.13	0.13
1000	0.14	0.13	0.13
1020	0.14	0.13	0.12
1050	0.15	0.13	0.12
1100	0.14	0.13	0.12
1150	0.14	0.13	0.12
1200	0.14	0.13	0.13
1250	0.14	0.13	0.13
1300	0.14	0.13	0.13
1320	0.14	0.13	0.13
1350	0.14	0.13	0.13
1400	0.15	0.14	0.13
1450	0.15	0.14	0.13
1500	0.15	0.14	0.13

Typical Performance Curves





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

Notes:

1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. Unit Weight: 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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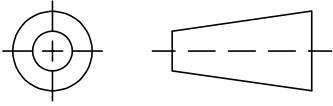
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RF/IF MICROWAVE COMPONENTS

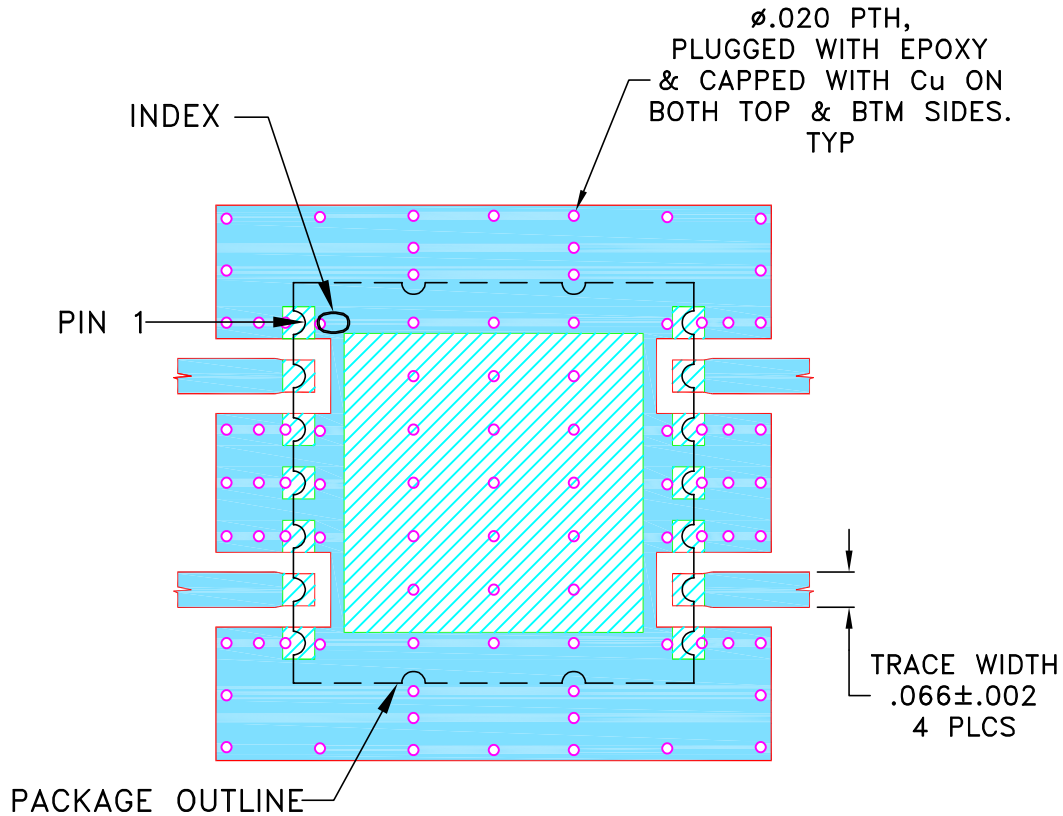
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	NPO-004562	NEW RELEASE	AUG 24	SS	VR

SUGGESTED MOUNTING CONFIGURATION
FOR CASE STYLE AAZ1482-2



NOTES:

- TRACE WIDTH ARE SHOWN FOR ROGERS (R04350B) WITH DIELECTRIC THICKNESS $.030 \pm .002$. COPPER: 1/2 Oz. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
- 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

UNLESS OTHERWISE SPECIFIED	INITIALS	DATE
DIMENSIONS ARE IN INCHES	SS	03 AUG 24
TOLERANCES ON:	LK	07 AUG 24
2 PL DECIMALS ±	CSS	08 AUG 24
3 PL DECIMALS ± .005		
ANGLES ±		
FRACTIONS ±		



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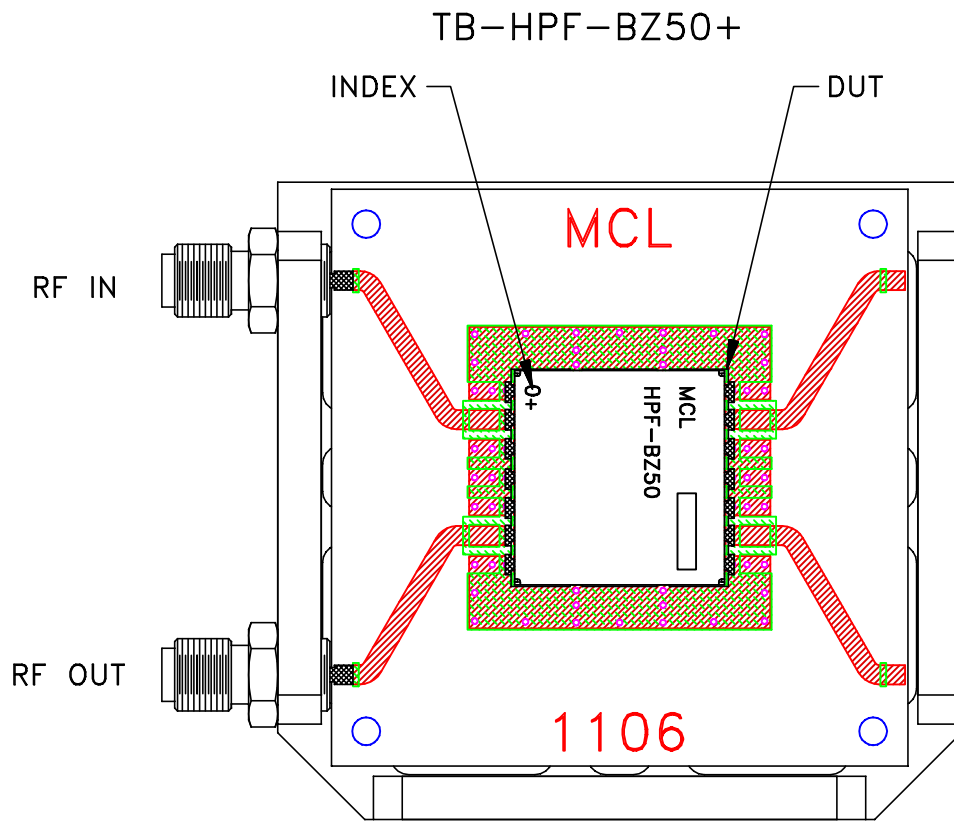
PL DWG, AAZ1482-2, TB-1276

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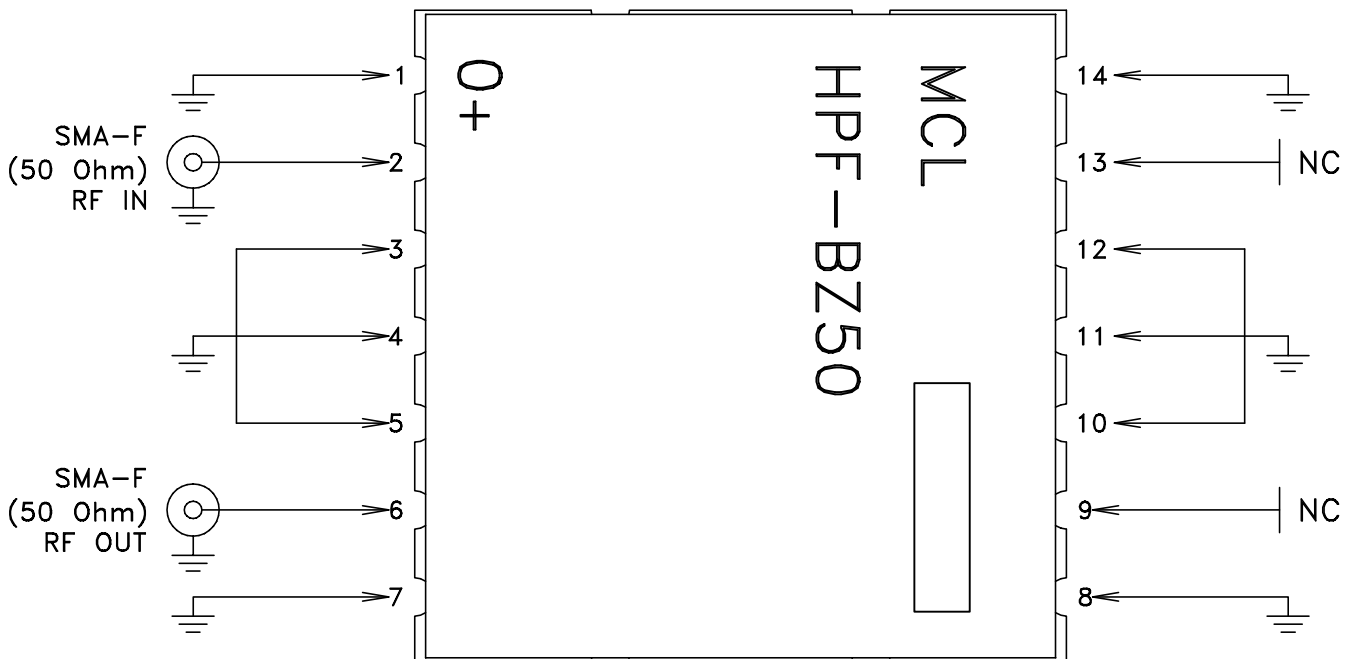
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SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-790	OR
FILE: 98-PL-790	SCALE: 2.7:1	SHEET: 1 OF 1	

Evaluation Board and Circuit




Schematic diagram



Notes:

1. PCB Material: ROGERS (R04350B) OR Equivalent, Dielectric Constant= $3.48 \pm .05$
Dielectric Thickness: $.030 \pm .002$
2. 50 Ohm SMA Female Connectors.

 **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