

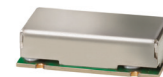
# Surface Mount Bandpass Filter

## BPF-B63+

50Ω 61 to 65 MHz

### The Big Deal

- Narrow bandwidth (3.2%)
- High rejection (55 dB typical)
- Good VSWR (1.3:1 typical)
- Miniature shielded package



CASE STYLE: HZ1198

### Product Overview

The BPF-B63+ is a narrow-band bandpass filter fabricated using SMT technology. It is enclosed in HZ1198 package. Covering a passband of 63 MHz  $\pm$  2 MHz, these units offer good matching within the passband and high rejection. This unit uses a miniature high Q capacitors and wire welded inductors for high reliability. In addition it has repeatable performance across production lots and consistent performance across temperature.

### Key Features

Feature	Advantages
Flat group delay over pass band (18ns typical)	Flat group delay ensures that the signal distortion is very less.
Good VSWR, 1.3:1 typical over passband	This provides well matched input and output ports.
Sharp shape factor	Sharp shape factor helps in adjacent channel rejection and hence increased selectivity.
More than 50 dB rejection up to 2300MHz	This enables the filter to attenuate spurious signals and reject harmonics for broad band of frequency.

#### Notes

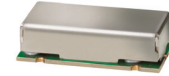
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# Bandpass Filter

## BPF-B63+

50Ω 61 to 65 MHz



CASE STYLE: HZ1198

### Features

- Excellent VSWR, 1.3:1 typical in passband
- Flat group delay over passband
- High rejection, 55 dB typical
- Sharp insertion loss roll-off
- Shielded case
- Aqueous washable

### Applications

- Harmonic rejection
- Radio communications
- ILS / Localiser
- Transmitters / receivers

### Electrical Specifications at 25°C

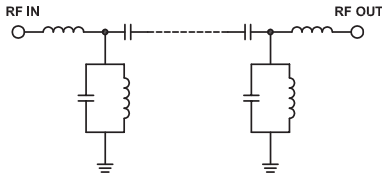
Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	—	—	63	—	MHz
	Insertion Loss	F1-F2	61-65	3.6	5	dB
	VSWR	F1-F2	61-65	1.3	1.7	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC-55	20	31	dB
	VSWR	DC-F3	DC-55	—	36	:1
Stop Band, Upper	Insertion Loss	F4-F5	72-2800	20	31	dB
	VSWR	F4-F5	72-2800	—	17	:1

### Maximum Ratings

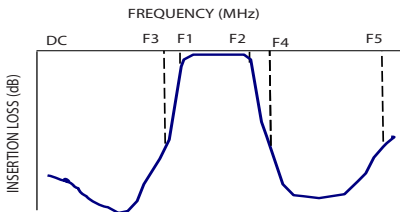
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	0.11W max.

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

### Functional Schematic

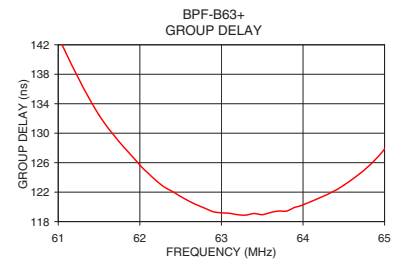
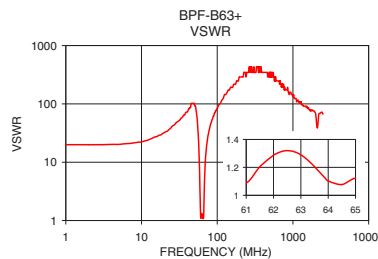
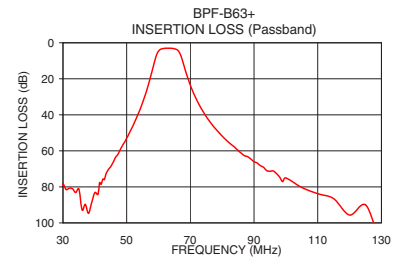
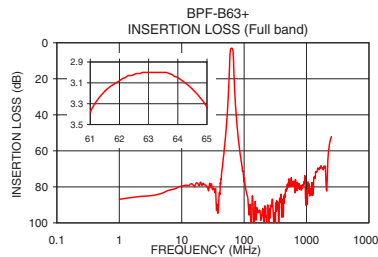


### Typical Frequency Response



Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
1.0	86.87	19.98	61.0	143.12
51.0	49.57	91.43	61.5	132.47
55.0	33.26	44.55	62.8	119.80
58.0	15.57	10.02	62.0	125.69
59.0	8.90	4.00	62.2	123.57
61.0	3.38	1.09	62.4	122.09
62.0	3.08	1.29	62.5	121.41
63.0	3.00	1.29	62.6	120.80
64.0	3.05	1.10	62.8	119.80
65.0	3.33	1.12	63.0	119.19
67.0	7.08	2.28	63.2	118.94
68.0	12.70	4.95	63.4	119.10
70.0	23.55	11.46	63.5	118.94
72.0	31.75	17.75	63.6	119.23
78.0	47.94	34.75	63.7	119.43
100.0	75.04	82.73	63.8	119.43
500.0	80.34	347.44	63.9	119.94
1000.0	88.82	133.63	64.0	120.27
2000.0	68.52	66.82	64.5	122.94
2800.0	45.50	57.91	65.0	127.87

**+RoHS Compliant**  
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications



### Notes

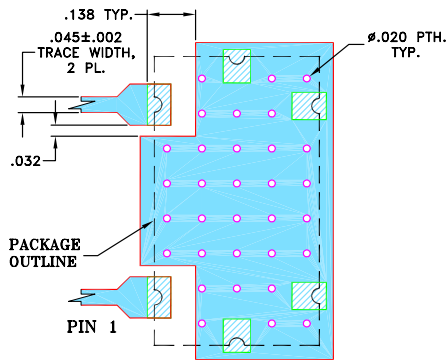
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## Pad Connections

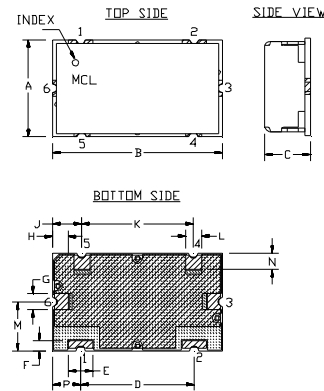
INPUT	1
OUTPUT	2
GROUND	3,4,5,6

**Demo Board MCL P/N: TB-400**  
**Suggested PCB Layout (PL-247)**

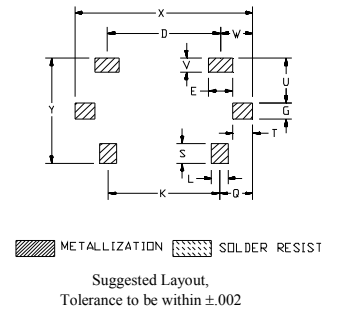


- NOTES:**
- TRACE WIDTH IS SHOWN FOR FR4 WITH DIELECTRIC THICKNESS .025"±.002". COPPER: 1/2 OZ. EACH SIDE.  
 FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
  - BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
  - DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

## Outline Drawing



## PCB Land Pattern



## Outline Dimensions ( inch / mm)

A	B	C	D	E	F	G	H	J	K	L	M
.472	.826	.220	.551	.118	.047	.078	.076	.142	.543	.078	.236
11.99	20.98	5.59	14.00	3.00	1.19	1.98	1.93	3.61	13.79	1.98	5.99
N	P	Q	S	T	U	V	W	X	Y	wt	
.079	.138	.162	.098	.096	.217	.067	.157	.866	.512	grams	
2.01	3.51	4.11	2.49	2.44	5.51	1.70	3.99	22.00	13.00	6.0	

### Notes

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*Typical Performance Data*

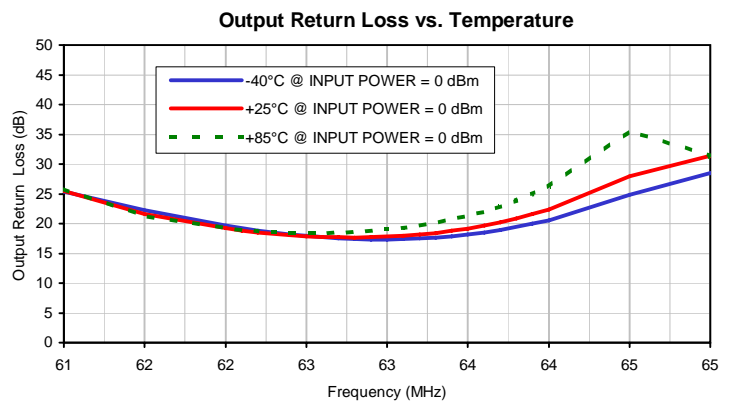
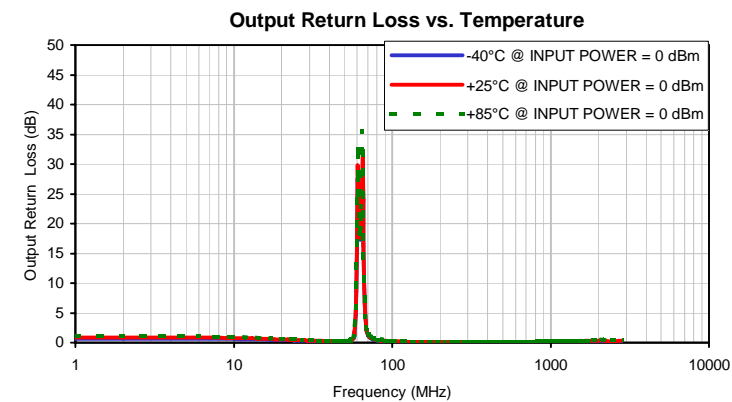
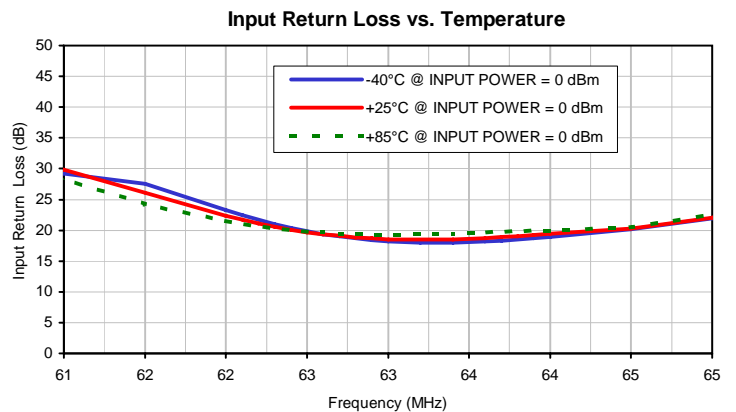
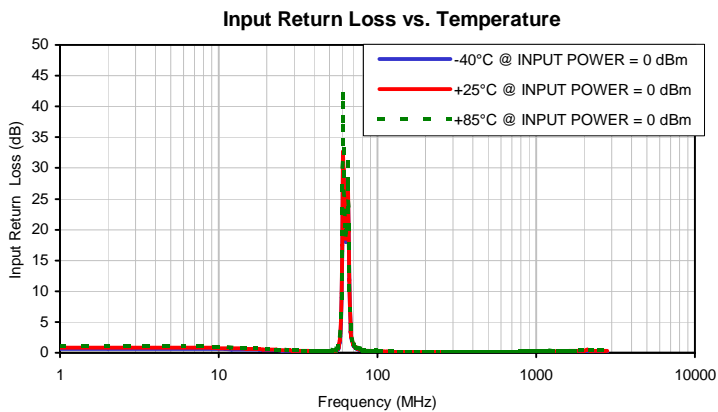
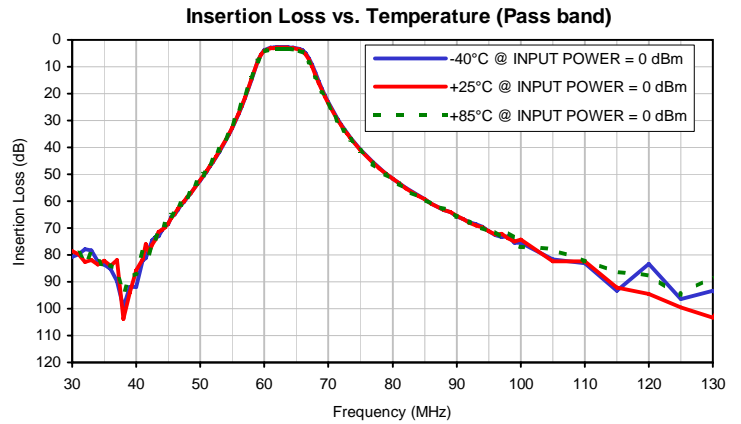
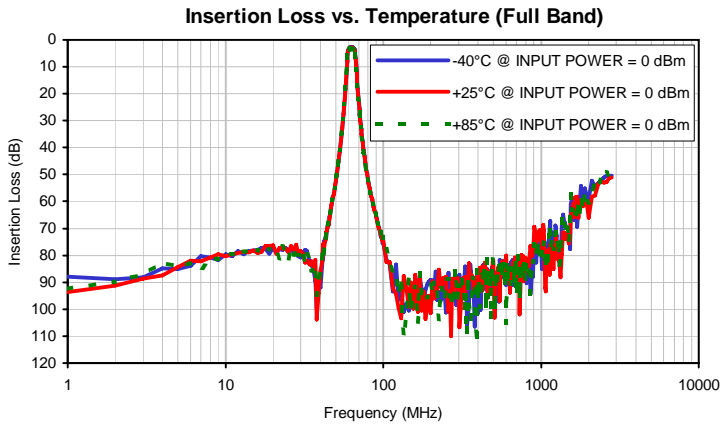
FREQ.  (MHz)	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
1.0	88.02	93.57	92.36	0.65	0.86	1.07	0.66	0.87	1.08
5.0	85.11	84.39	83.84	0.65	0.85	1.05	0.65	0.85	1.05
10.0	79.67	80.28	79.53	0.59	0.76	0.93	0.61	0.78	0.94
40.0	91.94	85.73	87.01	0.19	0.23	0.25	0.19	0.22	0.25
45.0	68.56	68.36	67.08	0.16	0.19	0.21	0.16	0.19	0.22
51.0	48.97	48.87	48.46	0.18	0.20	0.23	0.17	0.20	0.23
52.0	45.39	45.18	44.80	0.20	0.23	0.26	0.18	0.22	0.26
53.0	41.56	41.28	40.84	0.23	0.26	0.29	0.22	0.25	0.30
54.0	37.45	37.20	36.72	0.27	0.31	0.36	0.26	0.30	0.35
55.0	32.81	32.54	32.01	0.36	0.41	0.47	0.34	0.40	0.47
56.0	27.61	27.31	26.74	0.52	0.59	0.69	0.49	0.56	0.68
57.0	21.67	21.37	20.79	0.84	0.98	1.16	0.80	0.93	1.11
58.0	14.90	14.64	14.15	1.70	1.95	2.34	1.61	1.86	2.22
59.0	7.96	7.94	7.81	4.79	5.36	6.27	4.58	5.12	5.96
60.0	3.89	4.13	4.39	16.49	17.48	19.25	15.80	16.71	18.03
61.0	2.93	3.18	3.48	29.24	29.84	28.39	25.37	25.44	25.77
62.0	2.72	2.96	3.26	23.33	22.35	21.47	19.72	19.22	19.21
62.2	2.70	2.95	3.25	21.68	21.11	20.67	18.87	18.54	18.72
62.4	2.69	2.94	3.23	20.36	20.10	20.03	18.19	18.05	18.46
62.6	2.70	2.94	3.23	19.36	19.36	19.60	17.70	17.75	18.42
62.8	2.69	2.94	3.23	18.68	18.85	19.34	17.40	17.67	18.58
63.0	2.70	2.94	3.24	18.24	18.55	19.27	17.34	17.81	19.02
63.2	2.71	2.95	3.25	18.02	18.46	19.30	17.50	18.15	19.69
63.4	2.71	2.95	3.26	18.01	18.51	19.43	17.89	18.78	20.71
63.6	2.72	2.97	3.28	18.17	18.73	19.63	18.51	19.65	22.07
63.8	2.74	2.99	3.31	18.48	19.01	19.82	19.42	20.86	23.90
64.0	2.76	3.02	3.35	18.88	19.39	20.00	20.58	22.37	26.28
65.0	3.01	3.31	3.70	21.98	22.07	22.51	28.54	31.43	31.42
66.0	3.83	4.25	4.84	19.71	19.72	18.75	16.63	16.28	15.25
67.0	6.81	7.48	8.42	7.36	7.24	6.92	6.84	6.72	6.43
68.0	12.26	12.98	13.95	3.30	3.39	3.40	3.17	3.27	3.31
69.0	17.98	18.62	19.42	1.97	2.08	2.17	1.91	2.05	2.15
70.0	23.04	23.62	24.28	1.39	1.50	1.59	1.37	1.50	1.61
72.0	31.32	31.73	32.22	0.88	0.98	1.06	0.89	0.99	1.09
75.0	40.65	40.91	41.24	0.59	0.66	0.72	0.59	0.67	0.74
80.0	51.62	51.72	51.85	0.38	0.43	0.49	0.38	0.44	0.51
85.0	59.35	59.28	59.48	0.30	0.35	0.38	0.28	0.34	0.40
90.0	65.70	65.36	65.73	0.23	0.28	0.32	0.23	0.28	0.33
95.0	71.25	71.08	71.23	0.19	0.24	0.27	0.19	0.24	0.28
100.0	75.43	74.29	76.96	0.17	0.21	0.24	0.16	0.21	0.25
200.0	89.13	101.50	91.06	0.03	0.07	0.08	0.02	0.07	0.10
300.0	91.02	94.61	90.11	0.01	0.06	0.08	0.00	0.06	0.09
400.0	101.45	88.31	96.38	0.00	0.05	0.07	0.00	0.07	0.10
500.0	88.83	81.93	85.64	0.01	0.07	0.10	0.01	0.07	0.10
600.0	91.03	80.12	105.33	0.01	0.09	0.11	0.00	0.09	0.13
700.0	87.56	83.49	84.00	0.03	0.11	0.14	0.02	0.12	0.15
800.0	89.45	81.09	83.77	0.04	0.13	0.16	0.04	0.13	0.17
900.0	79.35	75.31	81.36	0.06	0.15	0.18	0.05	0.15	0.19
1000.0	79.01	74.57	79.47	0.07	0.17	0.20	0.06	0.17	0.21
1100.0	77.13	78.06	79.40	0.09	0.18	0.22	0.07	0.18	0.23
1200.0	75.64	85.04	77.71	0.10	0.20	0.23	0.08	0.20	0.24
1300.0	81.99	82.10	83.58	0.12	0.21	0.25	0.10	0.22	0.27
1400.0	67.71	71.41	67.66	0.13	0.23	0.27	0.11	0.23	0.29
1500.0	70.93	75.54	75.50	0.13	0.24	0.29	0.13	0.25	0.32
2000.0	59.18	66.03	60.26	0.14	0.28	0.38	0.11	0.27	0.39
2800.0	50.28	51.15	51.54	0.05	0.29	0.46	0.03	0.29	0.47



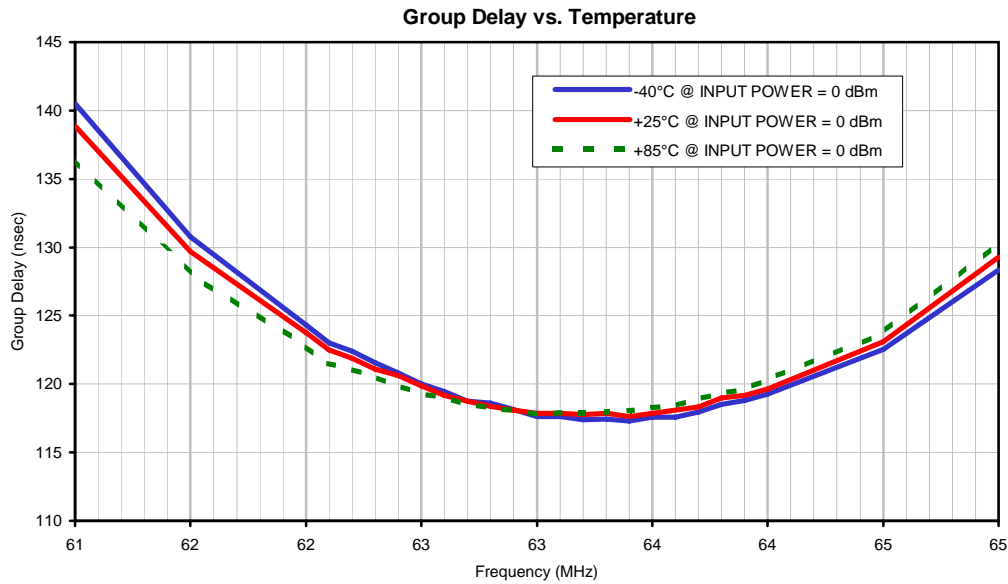
## Typical Performance Data

FREQ.  (MHz)	GROUP DELAY		
	(nsec)		
	@-40°C	@+25°C	@+85°C
61.0	140.49	138.88	136.44
61.5	130.76	129.71	128.09
62.0	124.32	123.78	122.76
62.1	123.01	122.47	121.50
62.2	122.39	121.90	121.08
62.3	121.57	121.09	120.53
62.4	120.80	120.61	119.88
62.5	119.99	119.86	119.29
62.6	119.46	119.15	119.02
62.7	118.77	118.74	118.50
62.8	118.63	118.39	118.27
62.9	118.12	118.10	118.07
63.0	117.65	117.85	117.83
63.1	117.63	117.87	117.90
63.2	117.37	117.77	117.93
63.3	117.42	117.85	117.94
63.4	117.32	117.65	118.07
63.5	117.57	117.88	118.30
63.6	117.58	118.09	118.42
63.7	117.94	118.35	118.90
63.8	118.50	118.97	119.30
63.9	118.78	119.16	119.62
64.0	119.28	119.66	120.29
64.5	122.53	123.10	123.78
65.0	128.33	129.26	130.37

## Typical Performance Curves



## Typical Performance Curves



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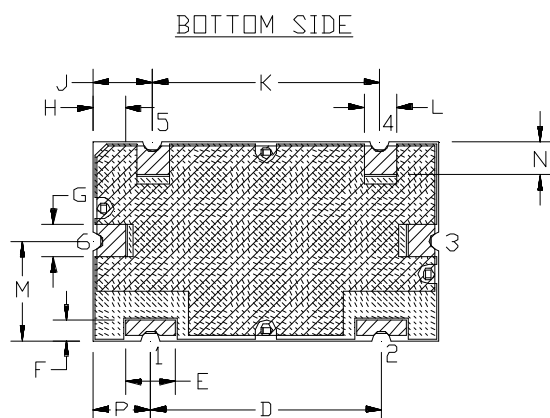
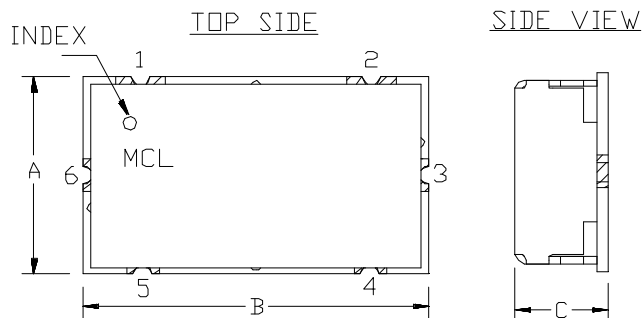
IF/RF MICROWAVE COMPONENTS

# Case Style

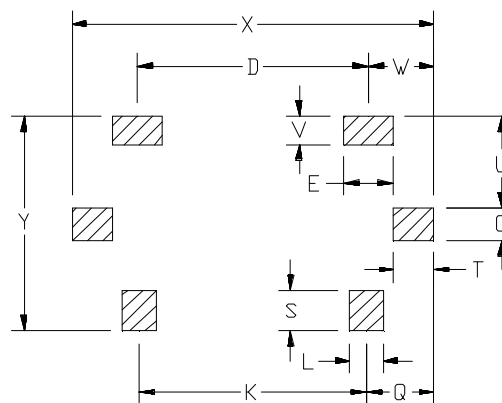
# HZ

## Outline Dimensions

## HZ1198



## PCB Land Pattern



 METALLIZATION  SOLDER RESIST

Suggested Layout,  
Tolerance to be within  $\pm 0.02$

CASE #	A	B	C	D	E	F	G	H	J	K	L	M
HZ1198	.472" (11.99)	.826" (20.98)	.220" (5.59)	.551" (14.00)	.118" (3.00)	.047" (1.19)	.078" (1.98)	.076" (1.92)	.142" (3.61)	.543" (13.79)	.078" (1.98)	.236" (5.99)

CASE #	N	P	Q	S	T	U	V	W	X	Y	WT GRAMS	NOTES
HZ1198	.079" (2.01)	.138" (3.51)	.162" (4.11)	.098" (2.49)	.096" (2.44)	.217" (5.51)	.067" (1.70)	.157" (3.99)	.866" (22.00)	.512" (13.00)	6.0	A35

Dimensions are in inches (mm). Tolerances: 2PL. +/- .03; 3PL. +/- .015

### Notes:

1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. Termination finish:

For RoHS Case Styles: 3-5  $\mu$ inch (.08-1.3 microns) Gold over 120-240  $\mu$ inch (3.05-6.10 microns) Nickel plate.  
For RoHS-5 Case Styles: Tin-Lead plate.

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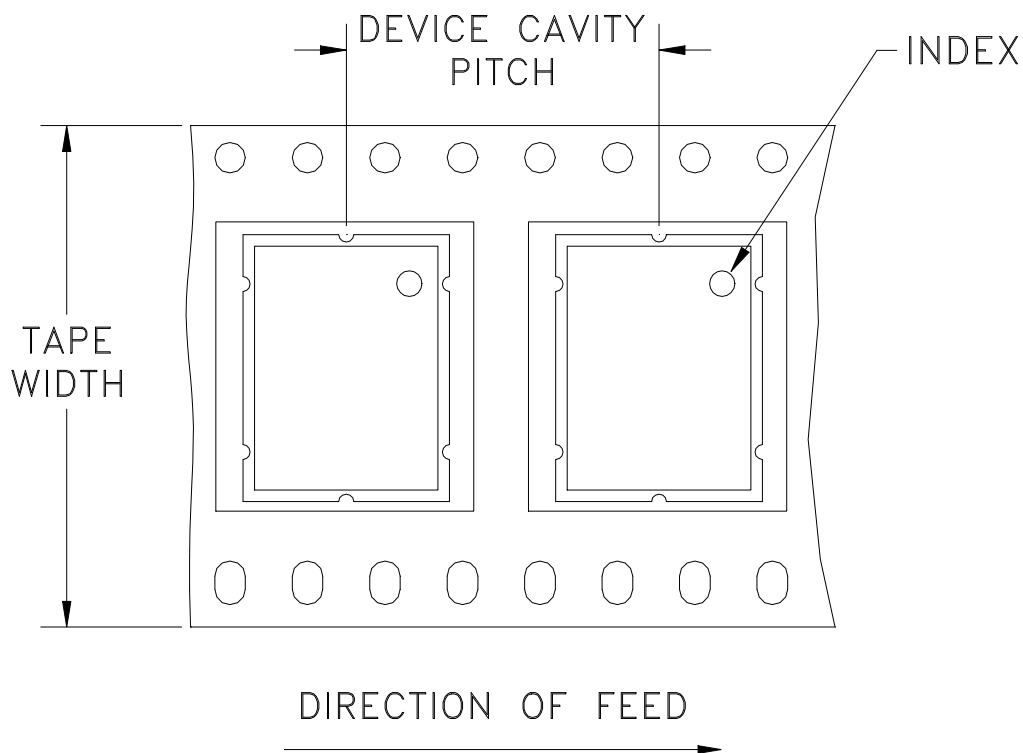
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RF/IF MICROWAVE COMPONENTS



# Tape & Reel Packaging TR-F6

## DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
32	16	13	500

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)



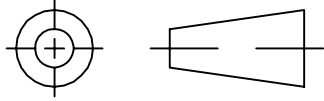
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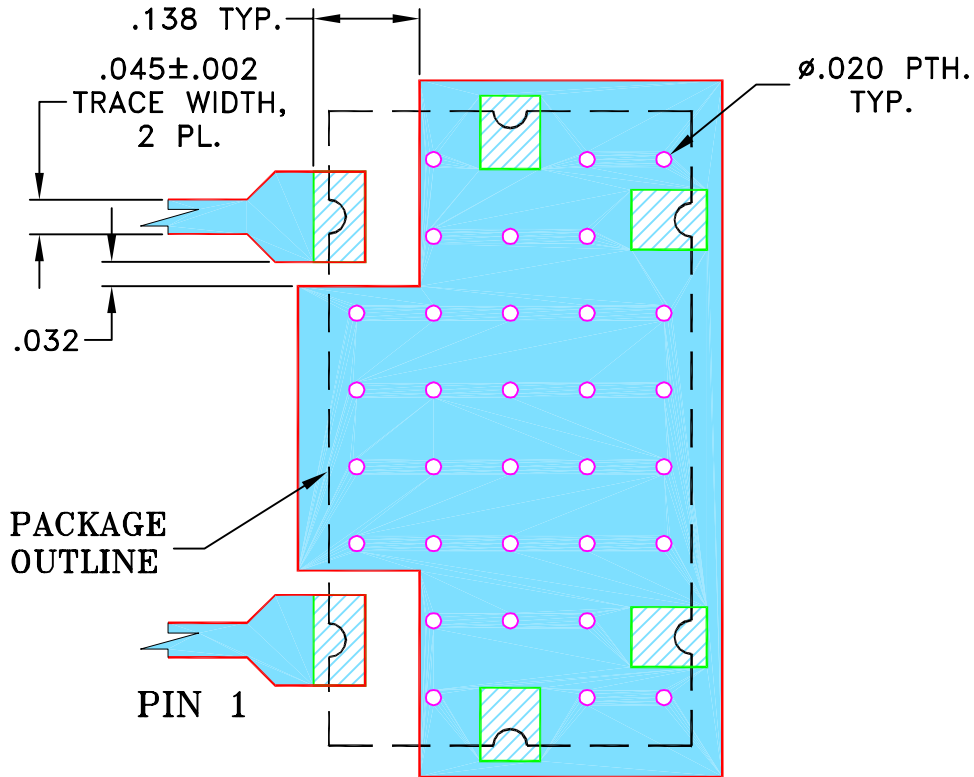
THIRD ANGLE PROJECTION



REVISIONS

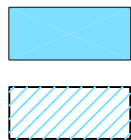
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M107879	NEW RELEASE (FROM RAVON)	11/06	DK	HH
OR	R66100	NEW RELEASE (FROM RAVON)	11/06	DK	HH

**SUGGESTED MOUNTING CONFIGURATION FOR  
HZ1198 CASE STYLE, "rg" PIN CONNECTION, 50 Ω**



NOTES:

- TRACE WIDTH IS SHOWN FOR FR4 WITH DIELECTRIC THICKNESS .025"±.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 LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)  
DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

UNLESS OTHERWISE SPECIFIED	INITIALS	DATE
DIMENSIONS ARE IN INCHES TOLERANCES ON: 2 PL DECIMALS ± 3 PL DECIMALS ± .005 ANGLES ± FRACTIONS ±	DRAWN	DK (RAVON) 14 NOV 06
	CHECKED	RZ (RAVON) 14 NOV 06
	APPROVED	HH (RAVON) 14 NOV 06



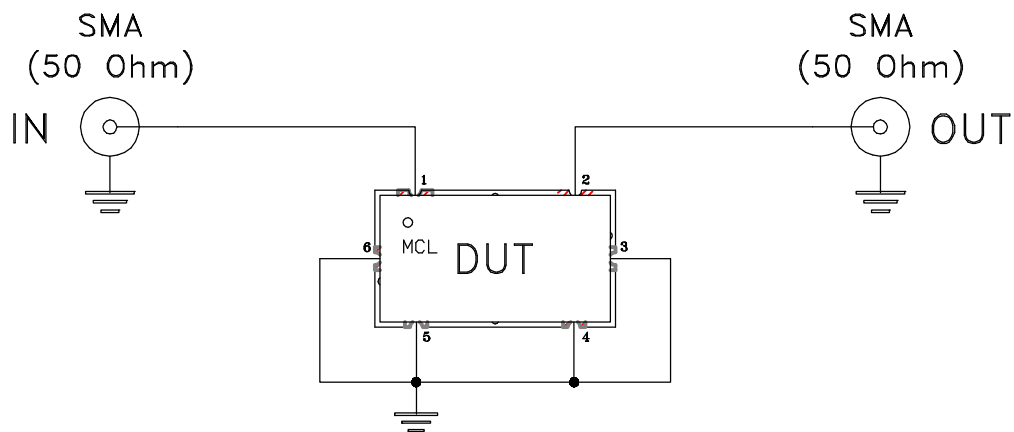
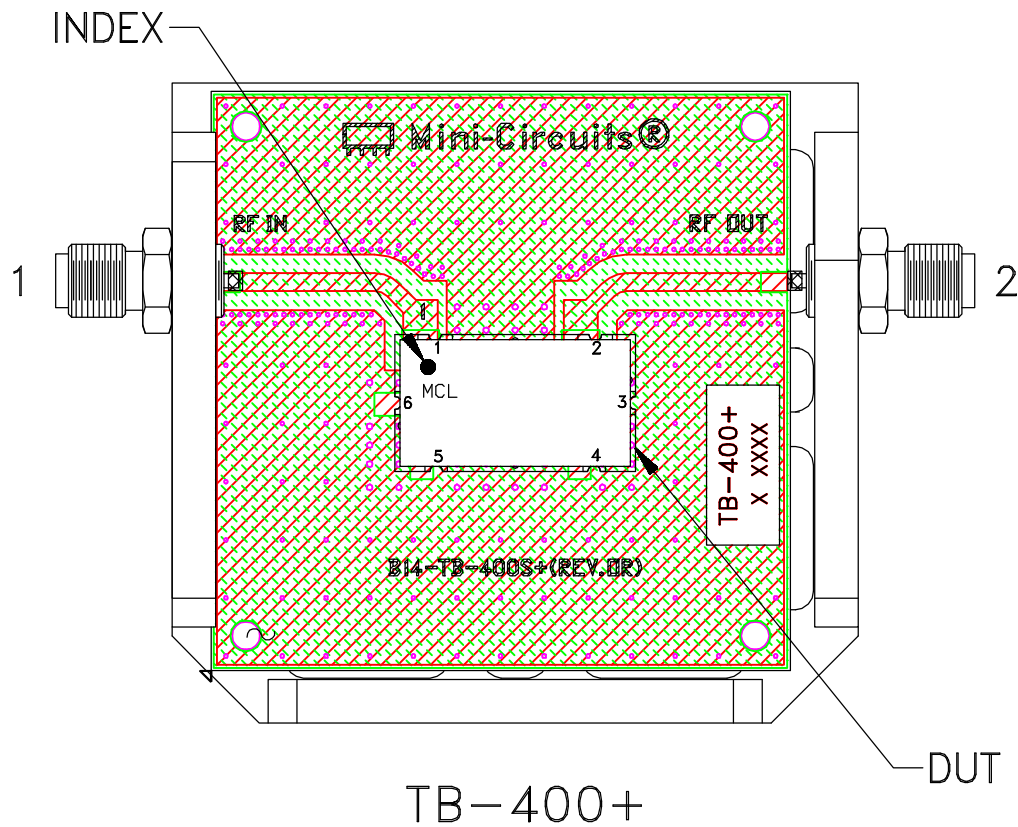
**Mini-Circuits®** 13 Neptune Avenue  
Brooklyn NY 11235

PL, rg, HZ1198, DPLX, TB-400+  
50 Ω

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SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-247	REV: OR
FILE: 98PL247	SCALE: 4:1	SHEET: 1 OF 1	


# Evaluation Board and Circuit



Schematic Diagram

## Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: R04350 or equivalent.  
Dielectric Constant=3.5, Thickness=.030 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	-40° to 85° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-65° to 150° C Ambient Environment	Individual Model Data Sheet
Autoclave	15 psig, 100% RH, 121°C, 96 hours	JESD22-A102-C, Condition C
Temperature Cycling	-65° to 150°C, 100 cycles	JESD22-A104
Temperature Humidity	85°C/ 85% RH, 168 hours	JESD22-113
Solder Reflow Heat	Sn-Pb Eutetic Process: 240°C peak Pb-Free Process: 260°C peak	J-STD-020, Table 4-1, 4-2 and 5-2; Figure 5-1
Moisture Sensitivity: Level 1	Bake at 125°C for 24 hours Soak at 85°C/85% RH for 168 hours, Reflow 3 cycles at 240°C peak (Non-RoHS) or 260°C (RoHS)	J-STD-020
Solderability	10X magnification, 95% coverage	JESD22-B102, Method 1: Dip and Look Test
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A
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