

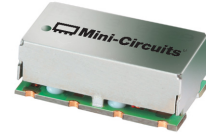
# Surface Mount High Pass Filter

## SXHP-5+

50Ω      5 to 400 MHz

### The Big Deal

- Low insertion loss
- High rejection
- Miniature shielded package



Generic photo used for illustration purposes only  
CASE STYLE: HF1139

### Product Overview

SXHP-5+ is a 50Ω high pass filter fabricated using SMT technology. This high pass filter covers from 5-400 MHz. This filter is built with high Q capacitors and wire wound inductors for superior performance. It has repeatable performance across lots and consistent performance across temperature.

### Key Features

Feature	Advantages
Low insertion loss	Can be used in high performance applications.
Good rejection	This enables the filter to attenuate spurious signals and reject harmonics for broad band frequency band.
Small size, 0.44" X 0.74" X 0.27"	The small surface mount package enables the SXHP-5+ to used in compact design.

#### Notes

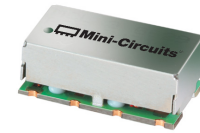
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50Ω 5 to 400 MHz

## SXHP-5+



Generic photo used for illustration purposes only  
CASE STYLE: HF1139

### Features

- Low insertion loss
- High rejection
- Miniature shielded package

### Applications

- Electromagnetic sensor applications
- Defence communications
- Test and measurement

### Electrical Specifications at 25°C

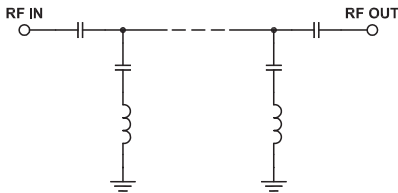
Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Unit	
Stop Band	Rejection Loss	DC-F1	DC-3.5	20	29.71	-	dB
	VSWR	DC-F1	DC-3.5	-	20	-	:1
Pass Band	Insertion Loss	F2-F3	5-400	-	0.5	1.2	dB
	VSWR	F2-F3	5-400	-	1.2	1.43	:1

### Maximum Ratings

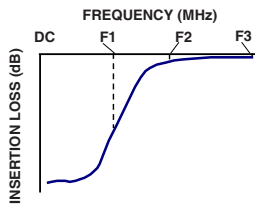
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	2.0 W max.

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

### Functional Schematic



### Typical Frequency Response

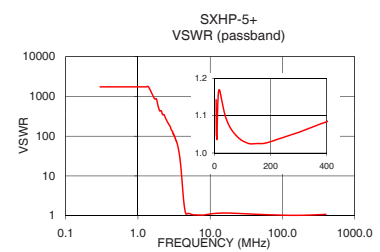
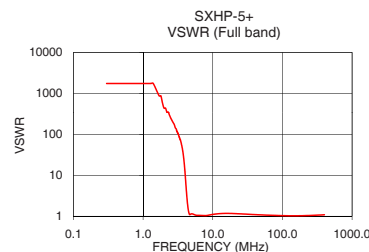
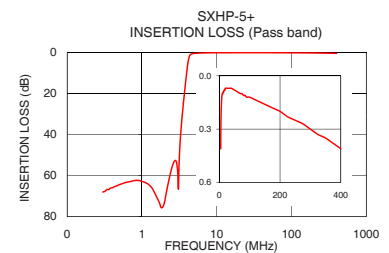
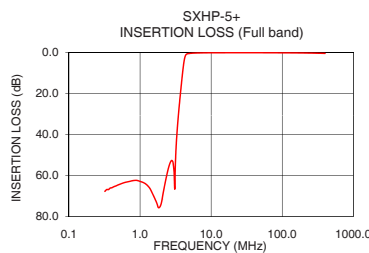


### Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)
1.00	62.78	1737.18
2.00	73.07	434.30
3.00	57.57	133.63
3.20	47.32	102.19
3.30	39.54	86.86
3.40	33.64	75.53
3.50	28.61	64.35
3.70	19.84	40.41
3.82	15.10	27.16
4.00	8.65	11.77
4.20	3.39	3.86
4.30	1.93	2.40
5.00	0.41	1.14
50.00	0.08	1.08
100.00	0.12	1.03
150.00	0.16	1.03
200.00	0.20	1.03
250.00	0.25	1.04
300.00	0.30	1.06
400.00	0.41	1.08

### +RoHS Compliant

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



### Notes

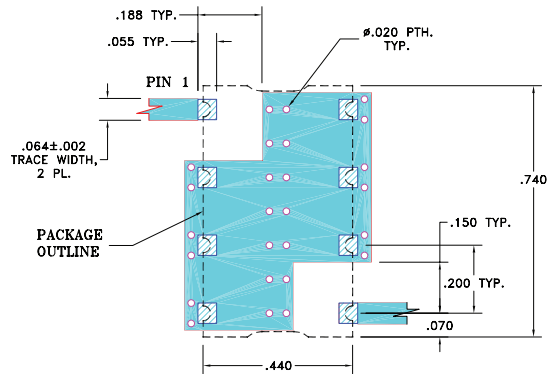
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## Pad Connections

INPUT	1
OUTPUT	8
GROUND	2, 3, 4, 5, 6, 7

## Demo Board MCL P/N: TB-368 Suggested PCB Layout (PL-230)

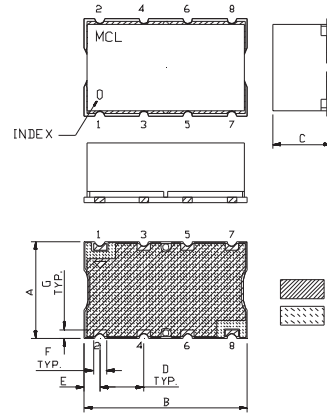


### NOTE:

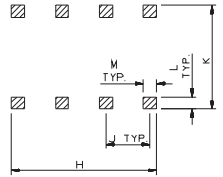
- TRACE WIDTH IS SHOWN FOR FR4 WITH DIELECTRIC THICKNESS: .025" ± .002". COPPER: 1/2 OZ. EACH SIDE.  
FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
- BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
- DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

## Outline Drawing



## PCB Land Pattern



## Outline Dimensions (inch / mm)

A	B	C	D	E	F	G
.44	.74	.27	.200	.07	.060	.040
11.18	18.80	6.86	5.08	1.78	1.52	1.02
H	J	K	L	M	wt	
.660	.200	.470	.055	.060	grams	
16.76	5.08	11.94	1.40	1.52	3.0	

Note: Please refer to case style drawing for details

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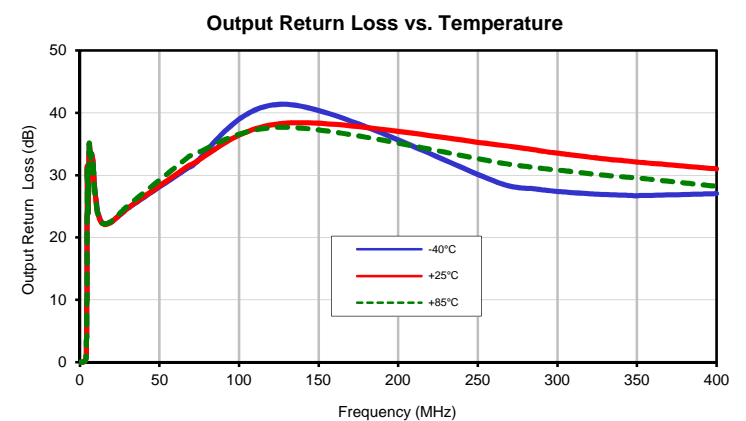
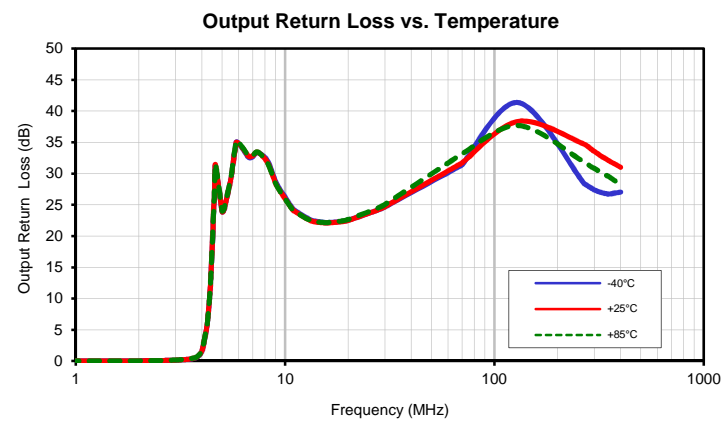
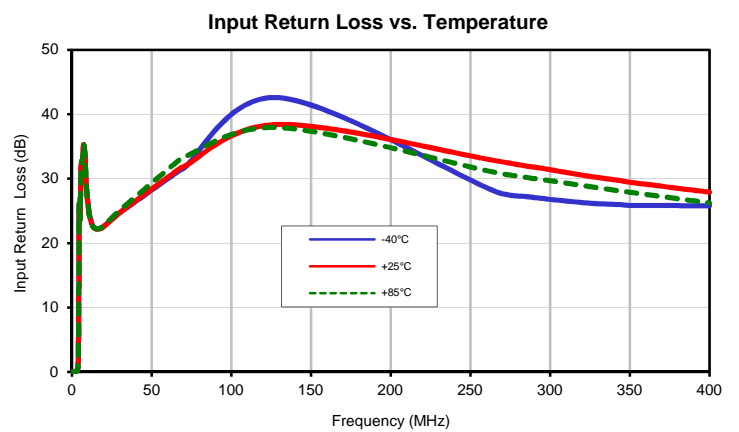
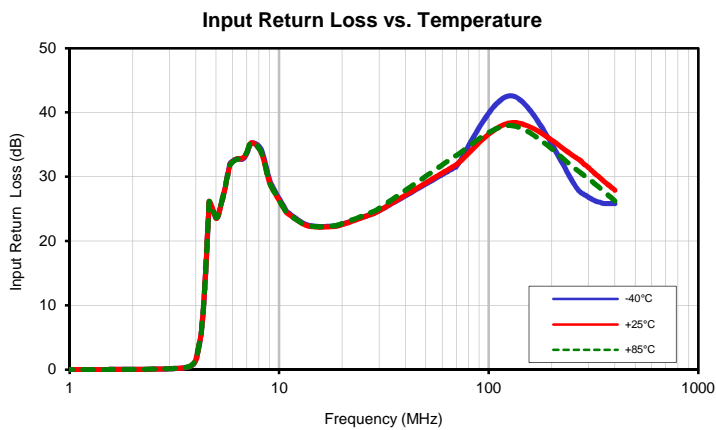
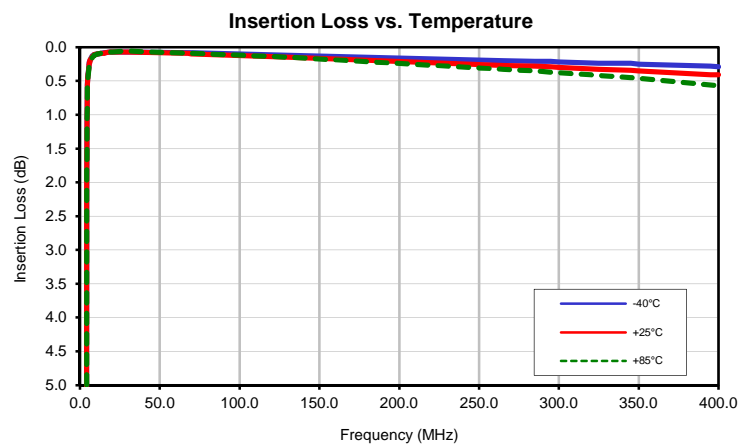
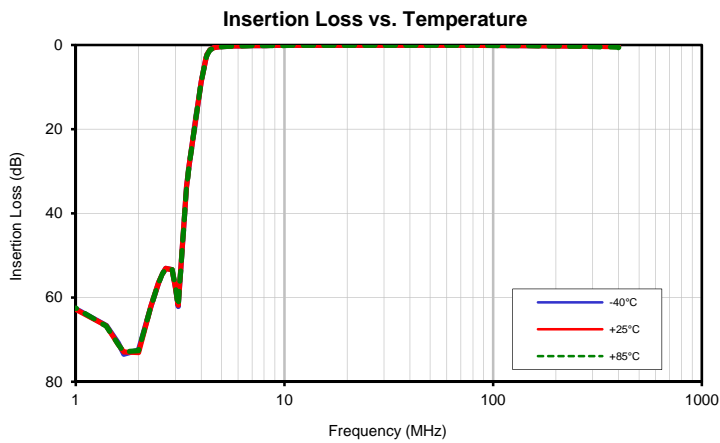
## Typical Performance Data

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
0.30	67.93	67.93	67.95	0.01	0.00	0.01	0.00	0.01	0.00
0.50	64.17	64.39	64.51	0.00	0.01	0.01	0.00	0.00	0.00
1.00	62.63	62.78	62.49	0.00	0.00	0.01	0.00	0.00	0.00
1.40	66.64	66.68	66.75	0.01	0.01	0.01	0.01	0.01	0.02
1.60	70.88	71.16	71.20	0.02	0.02	0.02	0.02	0.02	0.02
1.70	73.47	72.93	72.96	0.02	0.02	0.02	0.03	0.03	0.03
2.00	72.50	73.07	72.65	0.03	0.04	0.04	0.04	0.04	0.04
2.30	62.08	61.98	62.06	0.05	0.05	0.06	0.06	0.06	0.07
2.50	56.41	56.44	56.45	0.07	0.07	0.08	0.07	0.08	0.08
2.60	54.48	54.46	54.46	0.07	0.08	0.09	0.09	0.09	0.10
2.70	53.10	53.10	53.14	0.09	0.09	0.10	0.10	0.10	0.11
2.90	53.37	53.36	53.29	0.11	0.12	0.13	0.12	0.13	0.15
3.00	57.50	57.57	57.32	0.12	0.13	0.15	0.14	0.15	0.17
3.10	62.14	61.82	61.96	0.14	0.15	0.17	0.17	0.17	0.19
3.40	33.68	33.64	33.74	0.22	0.23	0.25	0.26	0.27	0.29
3.46	30.59	30.55	30.62	0.24	0.25	0.28	0.28	0.30	0.32
3.50	28.64	28.61	28.68	0.26	0.27	0.30	0.30	0.32	0.35
3.68	20.70	20.67	20.74	0.39	0.41	0.44	0.45	0.47	0.51
3.80	15.90	15.87	15.95	0.57	0.59	0.63	0.65	0.68	0.72
4.00	8.67	8.65	8.75	1.44	1.48	1.54	1.57	1.62	1.67
4.22	3.02	3.03	3.12	5.06	5.14	5.18	5.30	5.39	5.44
4.28	2.14	2.16	2.24	6.91	7.00	7.03	7.21	7.32	7.36
4.40	1.13	1.15	1.22	11.87	12.00	11.99	12.43	12.56	12.57
4.60	0.59	0.61	0.66	23.87	24.05	23.98	27.31	27.56	27.51
4.64	0.55	0.57	0.62	26.03	26.19	26.17	31.28	31.44	31.55
5.00	0.40	0.41	0.44	23.54	23.54	23.65	23.90	23.90	24.04
5.10	0.37	0.38	0.41	23.80	23.80	23.90	24.17	24.18	24.32
5.50	0.28	0.29	0.31	28.04	27.97	28.00	29.14	29.13	29.32
5.60	0.26	0.27	0.30	29.42	29.33	29.33	30.98	30.96	31.17
5.78	0.24	0.25	0.27	31.52	31.37	31.31	34.18	34.12	34.39
5.86	0.23	0.24	0.26	32.20	32.05	31.96	35.08	35.02	35.29
6.28	0.20	0.21	0.22	32.78	32.77	32.70	33.91	34.03	34.12
6.68	0.18	0.18	0.20	32.73	32.85	32.86	32.61	32.78	32.84
6.98	0.16	0.17	0.18	33.48	33.65	33.70	32.67	32.83	32.88
7.40	0.14	0.15	0.16	35.23	35.31	35.42	33.37	33.42	33.45
8.20	0.12	0.13	0.14	34.27	33.80	33.82	32.14	31.87	31.81
8.80	0.11	0.11	0.12	30.66	30.26	30.23	29.63	29.34	29.28
9.20	0.11	0.11	0.12	28.74	28.41	28.38	28.11	27.84	27.79
10.80	0.10	0.10	0.10	24.73	24.52	24.52	24.50	24.32	24.30
11.00	0.10	0.10	0.10	24.46	24.26	24.26	24.21	24.04	24.03
13.20	0.09	0.09	0.09	22.68	22.54	22.57	22.61	22.49	22.51
15.20	0.08	0.09	0.09	22.28	22.18	22.24	22.21	22.12	22.18
16.00	0.08	0.08	0.09	22.25	22.16	22.23	22.17	22.09	22.17
18.60	0.07	0.07	0.07	22.36	22.29	22.41	22.35	22.29	22.41
20.00	0.07	0.07	0.07	22.64	22.58	22.73	22.54	22.51	22.65
20.40	0.07	0.07	0.07	22.71	22.65	22.81	22.63	22.59	22.74
27.00	0.07	0.07	0.06	24.07	24.07	24.36	24.03	24.04	24.34
30.00	0.07	0.07	0.06	24.70	24.72	25.09	24.68	24.72	25.08
68.00	0.08	0.09	0.09	31.34	31.63	33.06	31.17	31.47	32.90
70.00	0.08	0.10	0.09	31.58	31.86	33.32	31.42	31.72	33.17
130.00	0.12	0.15	0.15	42.58	38.43	37.94	41.36	38.36	37.69
265.00	0.20	0.27	0.33	28.09	32.83	31.00	28.61	34.78	31.94
285.00	0.21	0.28	0.35	27.24	31.97	30.21	27.83	34.08	31.26
295.00	0.21	0.29	0.37	26.95	31.63	29.86	27.52	33.68	30.94
300.00	0.22	0.30	0.38	26.79	31.40	29.69	27.38	33.54	30.83
325.00	0.24	0.33	0.42	26.20	30.36	28.77	26.94	32.74	30.10
345.00	0.24	0.34	0.45	25.96	29.67	28.06	26.76	32.24	29.65
350.00	0.25	0.35	0.46	25.86	29.45	27.90	26.71	32.10	29.56
395.00	0.28	0.41	0.56	25.81	28.06	26.40	27.00	31.11	28.34
400.00	0.29	0.41	0.57	25.82	27.91	26.24	27.04	31.01	28.23

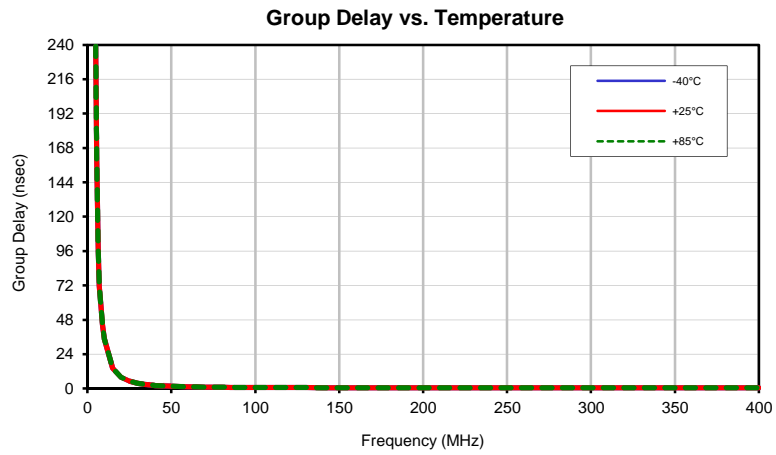
## Typical Performance Data

FREQ.  (MHz)	GROUP DELAY		
	(nsec)		
	@-40°C	@+25°C	@+85°C
5.00	239.00	238.70	238.97
5.50	163.25	163.08	163.14
6.00	122.16	122.18	122.12
6.50	96.20	96.09	96.08
7.00	71.66	71.68	71.71
8.00	58.96	58.92	58.95
9.00	44.77	44.76	44.76
10.00	34.64	34.62	34.63
15.00	14.10	14.11	14.11
20.00	7.89	7.89	7.90
25.00	5.16	5.17	5.18
30.00	3.70	3.71	3.71
35.00	2.82	2.83	2.83
36.00	2.69	2.70	2.70
37.00	2.55	2.57	2.58
38.00	2.45	2.45	2.47
39.00	2.34	2.35	2.35
40.00	2.16	2.16	2.16
45.00	1.91	1.93	1.93
50.00	1.64	1.65	1.66
55.00	1.43	1.44	1.44
60.00	1.28	1.28	1.29
65.00	1.15	1.15	1.16
70.00	1.05	1.05	1.06
75.00	0.97	0.97	0.98
80.00	0.90	0.91	0.91
85.00	0.85	0.85	0.86
90.00	0.81	0.81	0.81
95.00	0.77	0.77	0.78
100.00	0.74	0.74	0.74
110.00	0.68	0.68	0.68
120.00	0.65	0.65	0.66
130.00	0.63	0.63	0.64
140.00	0.61	0.61	0.61
150.00	0.59	0.59	0.59
160.00	0.57	0.57	0.57
170.00	0.55	0.55	0.56
180.00	0.54	0.54	0.54
190.00	0.53	0.53	0.53
200.00	0.52	0.52	0.52
210.00	0.52	0.51	0.52
220.00	0.51	0.51	0.51
230.00	0.50	0.50	0.50
240.00	0.50	0.50	0.50
250.00	0.49	0.49	0.49
260.00	0.49	0.49	0.49
270.00	0.49	0.49	0.49
280.00	0.48	0.48	0.48
290.00	0.48	0.48	0.48
300.00	0.48	0.48	0.48
310.00	0.48	0.48	0.48
320.00	0.47	0.48	0.48
330.00	0.47	0.47	0.47
340.00	0.47	0.47	0.47
350.00	0.47	0.47	0.47
360.00	0.47	0.47	0.47
370.00	0.47	0.47	0.47
380.00	0.47	0.47	0.47
390.00	0.47	0.47	0.47
400.00	0.47	0.47	0.47

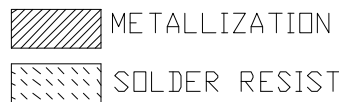
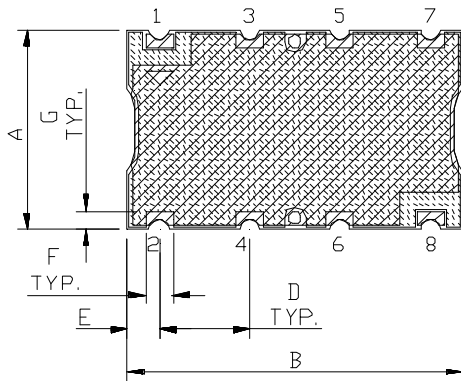
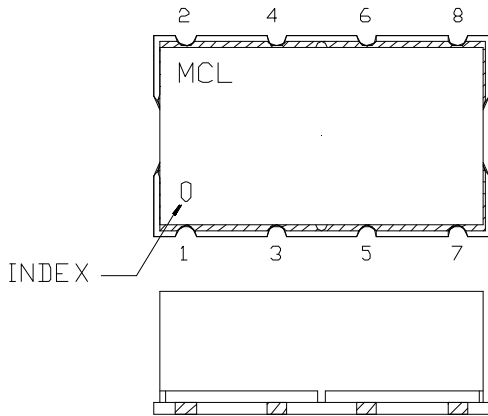
## Typical Performance Curves



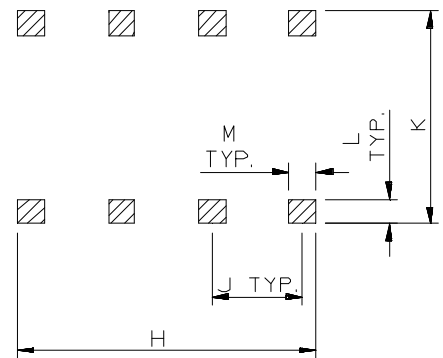
## Typical Performance Curves



### Outline Dimensions



### PCB Land Pattern



CASE #	A	B	C	D	E	F	G	H	J	K	L	M	WT. GRAMS
HF1139	.44 (11.18)	.74 (18.80)	.27 (6.86)	.200 (5.08)	.07 (1.78)	.060 (1.52)	.040 (1.02)	.660 (16.76)	.200 (5.08)	.470 (11.94)	.055 (1.40)	.060 (1.52)	3.0

Dimensions are in inches (mm). Tolerances: 2 Pl.  $\pm 0.015$ "; 3 Pl.  $\pm 0.01$ "

#### Notes:

- Case material: Nickel-Silver alloy.
- Base: Printed wiring laminate.
- Termination finish:
  - For RoHS Case Styles: 2-5  $\mu$  inch (.05-.13 microns) Gold over 120-240  $\mu$  inch (3.05-6.10 microns) Nickel plate.
  - For RoHS-5 Case Styles: Tin-Lead plate.



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

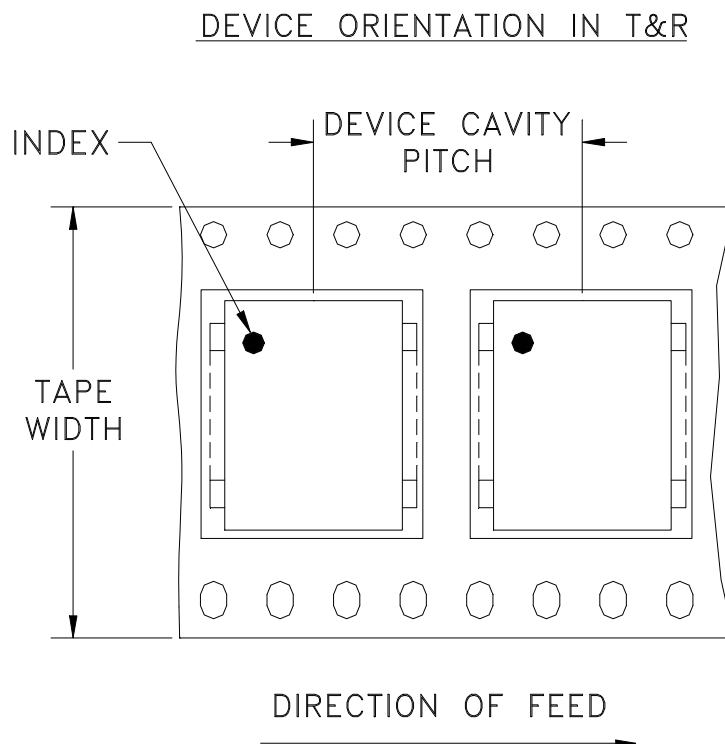


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RFIIF MICROWAVE COMPONENTS



# Tape & Reel Packaging TR-F5



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)



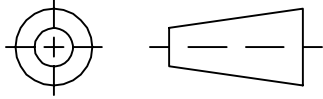
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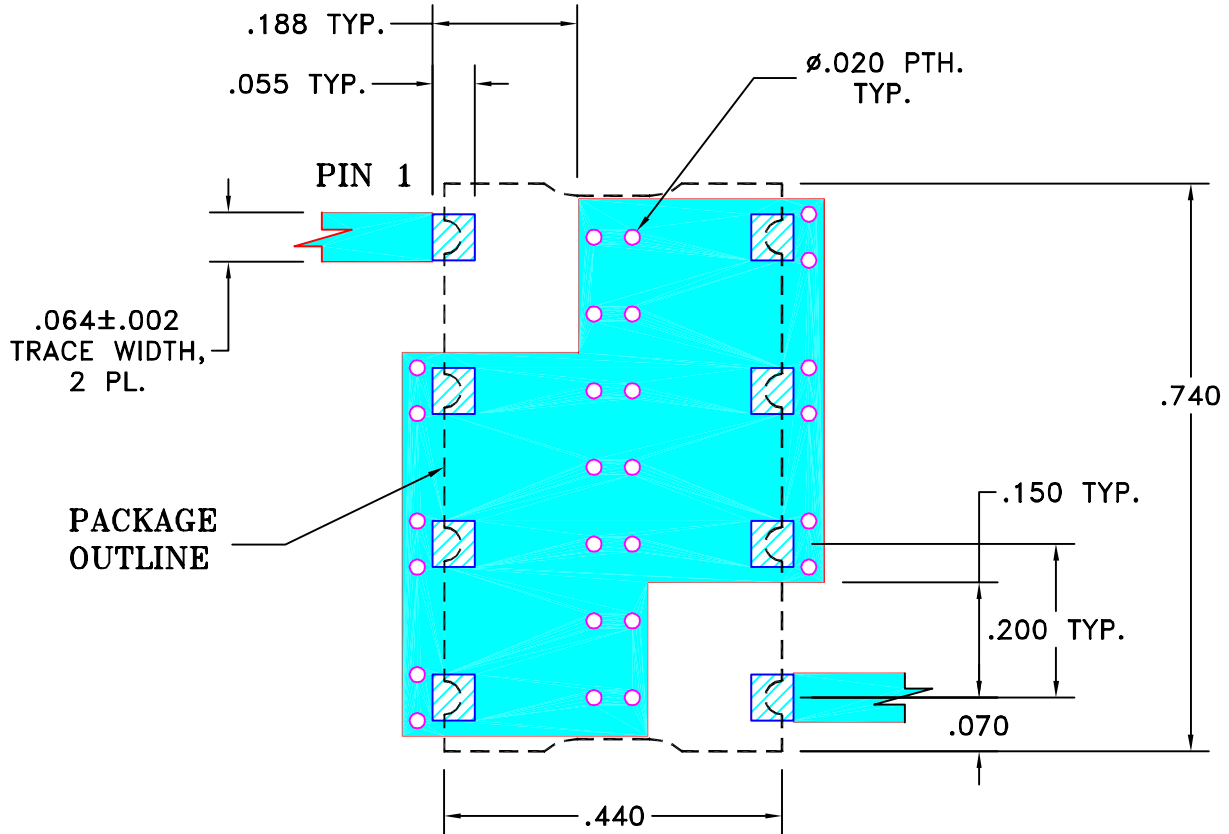
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M101757	NEW RELEASE (FROM RAVON)	11/05	DK	HH
OR	R62293	NEW RELEASE (FROM RAVON)	11/05	DK	HH

**SUGGESTED MOUNTING CONFIGURATION  
FOR HF1139 CASE STYLE, cr PIN CONNECTION, 50 OHM.**

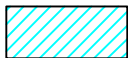


NOTE:

- 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 SOLDER MASK

UNLESS OTHERWISE SPECIFIED	INITIALS		DATE
DIMENSIONS ARE IN INCHES TOLERANCES ON: 2 PL DECIMALS ± 3 PL DECIMALS ± .005 ANGLES ± FRACTIONS ±	DRAWN	DK (RAVON)	29 NOV 05
	CHECKED	RZ (RAVON)	29 NOV 05
	APPROVED	HH (RAVON)	29 NOV 05



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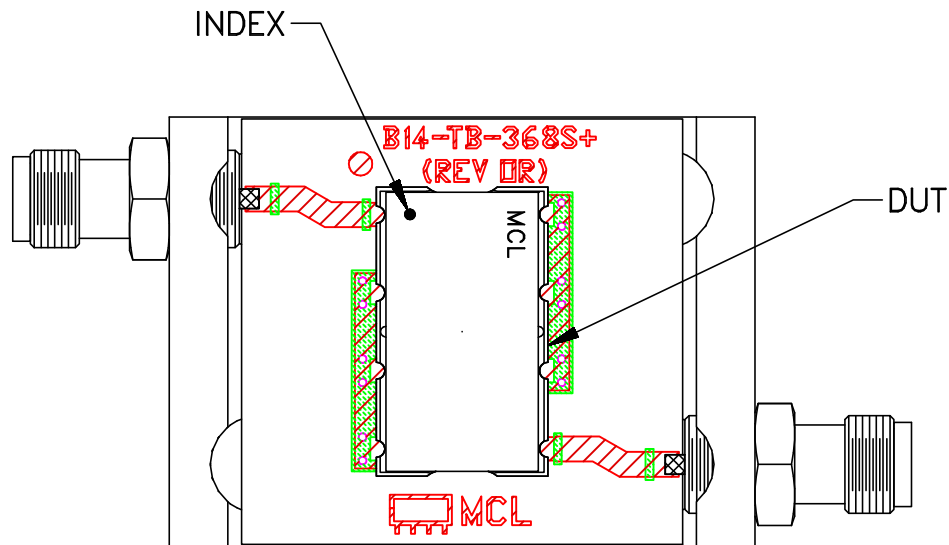
13 Neptune Avenue  
Brooklyn NY 11235

PL, cr, HF1139, SCLF, TB-368

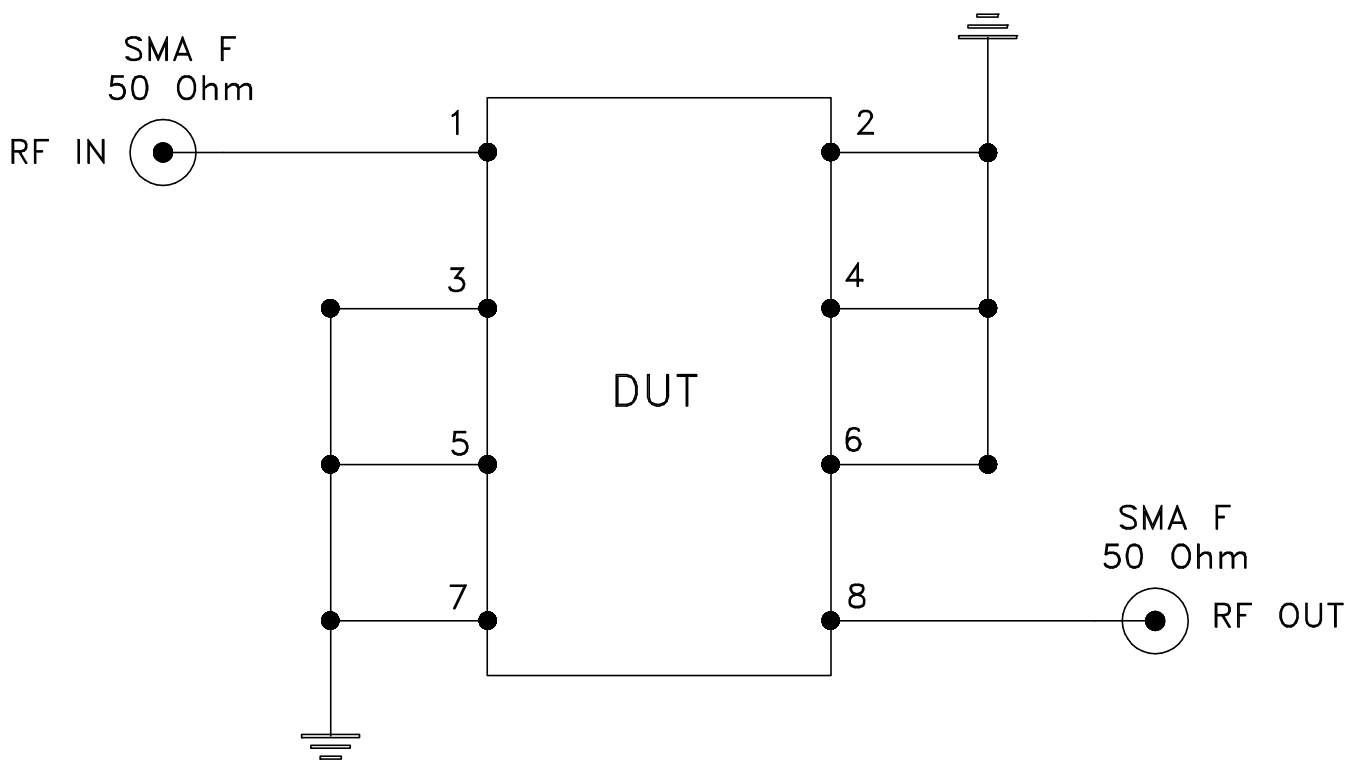
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SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-230	REV: OR
FILE: 98PL230	SCALE: 4:1	SHEET: 1 OF 1	

# Evaluation Board and Circuit




TB-368



Schematic Diagram

## Notes:

1. SMA Female connectors.
2. PCB Material: ROGERS R04350B or equivalent, Dielectric Constant=3.5, Thickness=.030 inch.

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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