

# Surface Mount Bandpass Filter

## SXBP-150+

50Ω 140 to 160 MHz

### Maximum Ratings

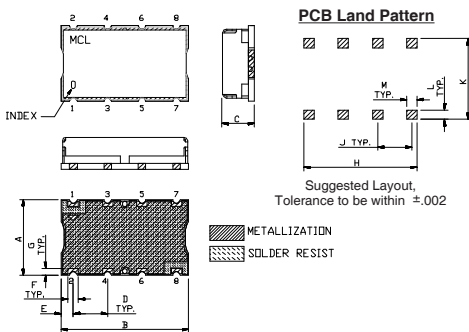
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	0.5W Max.

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

### Pin Connections

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

### Outline Drawing

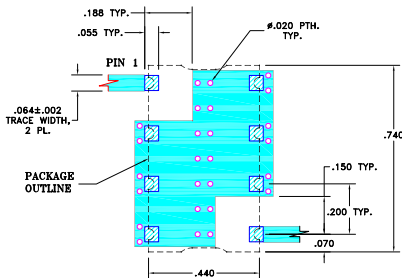


### Outline Dimensions (inch/mm)

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

Note: Please refer to case style drawing for details

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



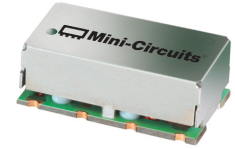
- NOTE:
- TRACE WIDTH IS SHOWN FOR FR4 WITH DIELECTRIC THICKNESS: .025"±.002". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
  - BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
  - DENOTES COPPER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

### Features

- high rejection
- good VSWR, 1.3:1 typ @ passband
- aqueous washable

### Applications

- radio link
- receivers / transmitters
- professional mobile radio / public access mobile radio (PMR/ PAMR)



Generic photo used for illustration purposes only

CASE STYLE: HF1139

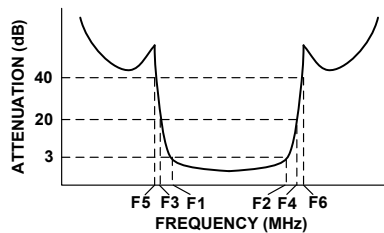
### +RoHS Compliant

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

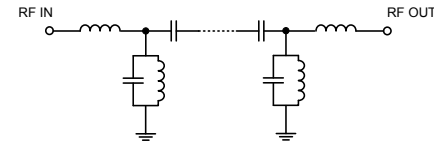
### Bandpass Filter Electrical Specifications (T<sub>AMB</sub> = 25°C)

CENTER FREQ. (MHz)	PASSBAND (MHz) (Loss < 3dB)	STOPBANDS (MHz)				VSWR (:1)		
		Loss > 20dB		Loss > 40dB		Passband		Stopband
F <sub>c</sub>	F <sub>1</sub> - F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>	F <sub>5</sub>	F <sub>6</sub>	Typ.	Max.	Typ.
150	140 - 160	120	190	100	250 - 2400	1.3	1.8	20

### Typical Frequency Response

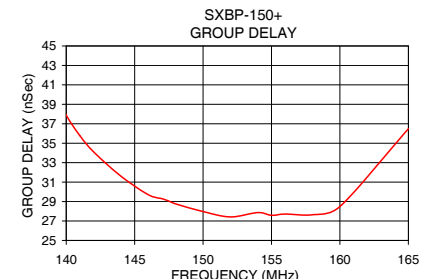
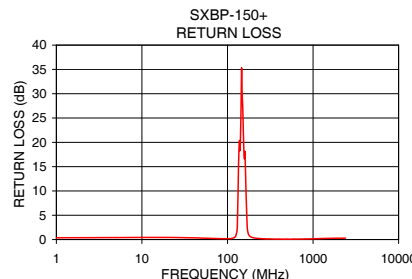
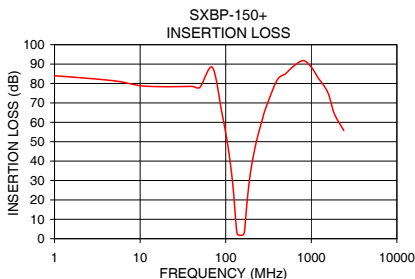


### Functional Schematic



### Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)		Return Loss (dB)	Frequency (MHz)	Group Delay (nSec)
	$\bar{x}$	$\sigma$			
1.0	83.96	1.58	0.37	135.0	47.94
50.0	78.09	1.11	0.31	138.0	43.87
100.0	54.50	0.68	0.17	139.0	40.79
120.0	29.52	0.89	0.40	140.0	37.89
130.0	11.22	1.23	2.35	141.0	35.78
135.0	3.38	0.59	16.16	142.0	34.12
140.0	1.99	0.06	18.26	144.0	31.61
150.0	1.69	0.01	28.35	146.0	29.70
160.0	2.05	0.04	17.98	147.5	29.05
165.0	3.19	0.36	9.45	148.0	28.76
170.0	8.77	0.99	2.53	150.0	27.97
175.0	15.71	0.87	1.21	152.0	27.42
184.0	25.51	0.60	0.64	154.0	27.86
190.0	30.53	0.49	0.49	155.0	27.58
250.0	56.82	0.34	0.18	156.0	27.72
1000.0	88.44	3.18	0.15	158.0	27.64
2000.0	61.58	0.28	0.28	160.0	28.49
2400.0	55.81	0.21	0.29	165.0	36.48



### Notes

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
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# Surface Mount Band Pass Filter

# SXBP-150+

## Typical Performance Data

FREQ. (MHz)	INSERTION LOSS (dB)			INPUT RETURN LOSS (dB)			OUTPUT RETURN LOSS (dB)		
	@ -40° C	@ +25° C	@ +85° C	@ -40° C	@ +25° C	@ +85° C	@ -40° C	@ +25° C	@ +85° C
10	84.18	83.43	83.48	0.35	0.42	0.52	0.35	0.44	0.52
20	83.30	87.61	80.16	0.34	0.42	0.49	0.36	0.43	0.50
30	80.48	78.08	80.42	0.33	0.39	0.45	0.33	0.40	0.45
40	79.75	79.38	78.55	0.30	0.34	0.39	0.31	0.36	0.39
50	78.07	78.81	78.82	0.27	0.30	0.34	0.27	0.31	0.33
60	79.63	83.54	77.29	0.22	0.26	0.29	0.23	0.27	0.30
70	89.89	87.38	85.23	0.18	0.22	0.26	0.18	0.23	0.26
80	80.32	76.48	80.04	0.16	0.19	0.23	0.15	0.20	0.24
90	66.90	66.87	66.45	0.13	0.17	0.22	0.13	0.18	0.22
100	55.98	55.83	55.66	0.13	0.18	0.21	0.13	0.18	0.21
120	31.53	31.21	30.88	0.27	0.36	0.42	0.26	0.34	0.40
130	13.90	13.47	13.05	1.28	1.59	1.86	1.17	1.48	1.73
135	4.40	4.41	4.38	6.88	8.15	9.35	6.58	7.79	8.94
140	1.86	2.15	2.35	24.98	24.50	24.31	23.69	22.70	22.02
150	1.51	1.79	1.99	23.51	23.96	24.16	21.82	22.73	23.56
160	1.74	2.07	2.33	16.91	16.94	17.16	17.53	17.72	18.06
165	2.31	2.90	3.42	16.13	14.07	12.52	19.43	16.51	14.46
170	6.89	7.93	8.78	3.57	3.42	3.28	3.88	3.74	3.60
175	14.04	14.95	15.69	1.32	1.43	1.48	1.44	1.55	1.60
184	24.44	25.06	25.60	0.60	0.69	0.76	0.63	0.75	0.81
190	29.70	30.23	30.66	0.44	0.52	0.59	0.46	0.57	0.62
250	56.46	56.83	57.35	0.13	0.18	0.23	0.12	0.20	0.23
300	67.73	67.48	68.13	0.06	0.13	0.17	0.06	0.13	0.17
400	79.14	87.21	84.70	0.02	0.08	0.12	0.02	0.09	0.13
500	87.49	86.08	97.36	0.01	0.07	0.12	0.00	0.08	0.13
600	89.91	90.03	97.76	0.00	0.09	0.14	0.01	0.08	0.14
700	85.89	93.28	89.56	0.01	0.09	0.16	0.00	0.10	0.17
800	86.21	97.45	96.86	0.01	0.10	0.17	0.02	0.13	0.20
900	96.07	91.22	88.25	0.01	0.13	0.20	0.02	0.14	0.20
1000	87.75	94.95	84.53	0.00	0.13	0.21	0.01	0.14	0.21
1200	87.93	86.14	94.72	0.01	0.17	0.24	0.03	0.19	0.26
1300	85.08	90.84	83.18	0.03	0.19	0.27	0.05	0.22	0.31
1400	76.59	75.32	78.31	0.03	0.20	0.29	0.05	0.22	0.32
1500	70.41	71.02	69.89	0.03	0.20	0.31	0.05	0.22	0.32
1600	65.48	68.34	69.32	0.04	0.22	0.32	0.07	0.26	0.35
1700	65.33	64.44	74.31	0.05	0.25	0.36	0.09	0.27	0.38
1800	71.27	82.74	62.99	0.05	0.26	0.39	0.09	0.26	0.38
2000	73.25	61.52	65.50	0.08	0.28	0.40	0.08	0.31	0.43
2200	59.89	55.42	59.16	0.09	0.30	0.45	0.09	0.33	0.45
2300	56.97	61.78	58.36	0.09	0.32	0.45	0.11	0.34	0.48
2400	50.91	53.73	50.10	0.10	0.31	0.48	0.13	0.33	0.50
2500	50.71	51.53	49.97	0.13	0.34	0.51	0.10	0.37	0.51
2600	50.52	50.70	49.23	0.14	0.36	0.54	0.13	0.37	0.53
2700	50.06	50.40	52.80	0.09	0.35	0.51	0.13	0.37	0.55
2800	47.88	48.19	48.33	0.15	0.40	0.57	0.13	0.39	0.57
3000	42.07	47.58	43.81	0.11	0.40	0.59	0.15	0.45	0.64
3200	38.78	40.15	40.32	0.18	0.47	0.64	0.16	0.44	0.68
3300	37.42	39.21	38.11	0.15	0.46	0.65	0.20	0.56	0.75
3400	38.42	38.43	38.33	0.17	0.52	0.75	0.37	0.71	1.07
3500	35.19	36.58	36.62	0.21	0.62	0.88	0.73	1.49	1.95
3600	35.48	38.56	35.18	0.39	0.91	1.37	1.45	1.23	1.20
3700	38.48	37.11	35.81	1.29	1.41	1.29	0.40	0.75	1.04
3800	38.02	33.00	35.78	0.39	0.75	0.94	0.45	0.67	1.15
4000	30.42	27.95	30.00	0.28	0.70	0.95	0.35	0.89	1.09

REV. X2  
SXBP-150+  
101118  
Page 1 of 2



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# Surface Mount Band Pass Filter

# SXBP-150+

## Typical Performance Data

FREQ. (MHz)	GROUP DELAY (nsec)		
	@ -40° C	@ +25° C	@ +85° C
80	15.92	2.43	28.52
85	1.08	2.02	9.30
90	3.96	2.79	1.63
95	1.45	5.61	2.04
100	3.12	2.81	4.79
105	4.27	4.93	4.69
108	4.95	4.37	4.26
110	5.30	4.65	4.80
115	5.71	6.30	6.31
118	7.07	7.56	7.66
120	8.23	8.51	8.72
125	12.48	13.06	13.67
128	17.78	18.80	19.75
130	23.75	25.14	26.41
135	45.61	45.75	45.87
138	45.68	44.43	43.38
140	40.13	39.06	38.25
141	37.47	36.65	36.04
142	35.30	34.71	34.23
143	33.63	33.20	32.85
144	32.34	32.04	31.77
145	31.26	31.03	30.81
146	30.44	30.22	30.07
147	29.73	29.59	29.45
148	29.14	29.05	28.99
149	28.66	28.60	28.57
150	28.32	28.30	28.26
151	28.06	28.05	28.09
152	27.86	27.90	27.97
153	27.79	27.82	27.85
154	27.72	27.77	27.83
155	27.69	27.75	27.86
156	27.75	27.86	27.94
157	27.86	27.99	28.14
158	28.03	28.23	28.47
159	28.41	28.71	29.09
160	29.02	29.48	29.96
165	36.30	36.58	36.66
168	36.72	35.31	33.96
170	31.87	29.87	28.23
175	16.95	16.04	15.17
178	11.97	11.51	11.06
180	9.82	9.42	9.11
185	6.48	6.28	6.30
188	5.30	5.18	5.11
190	4.64	4.69	4.61
195	3.51	3.52	3.54
198	3.03	3.06	3.11
200	2.88	2.86	2.78
205	2.39	2.44	2.45
300	1.32	1.07	1.47
305	0.57	0.97	0.43
400	3.16	1.18	9.44

REV. X2  
SXBP-150+  
101118  
Page 2 of 2



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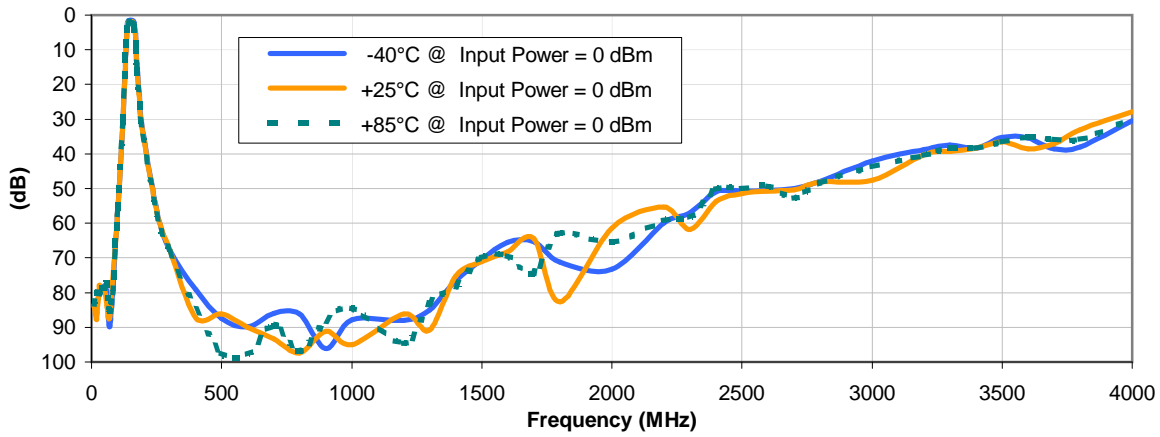


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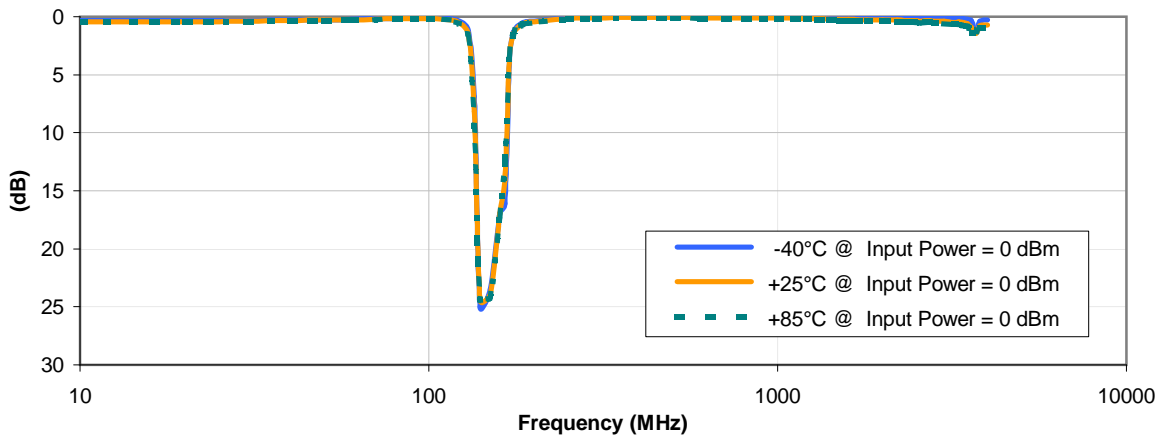


## Typical Performance Curves

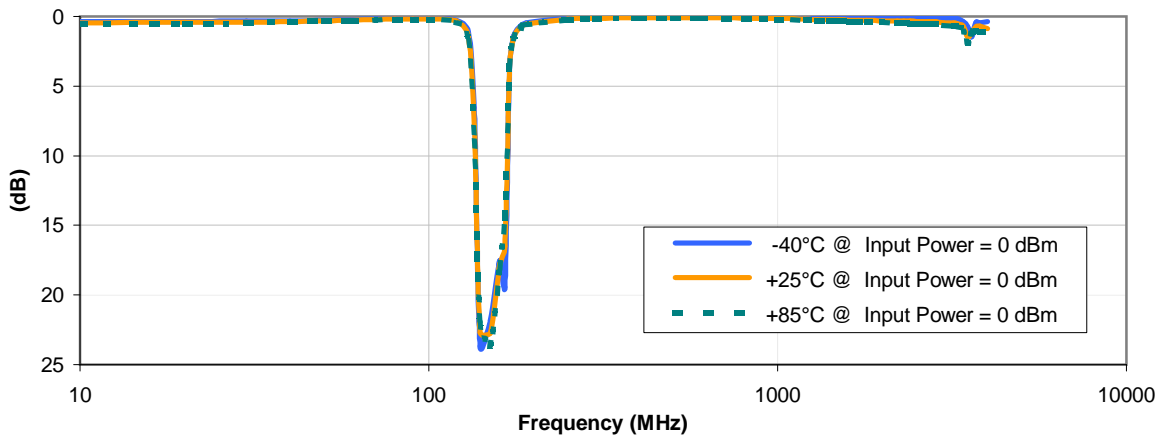
### INSERTION LOSS vs. TEMPERATURE



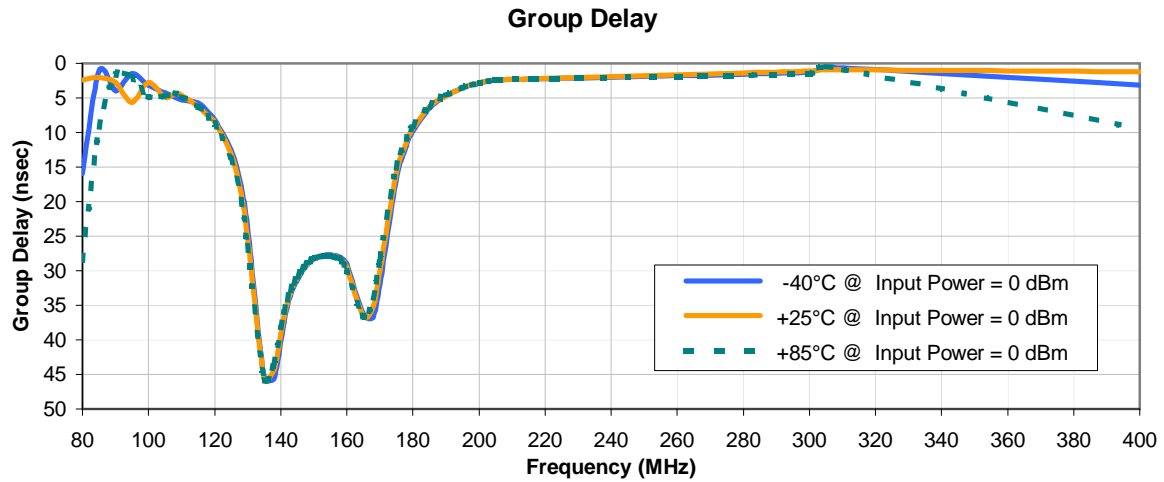
### INPUT RETURN LOSS vs. TEMPERATURE



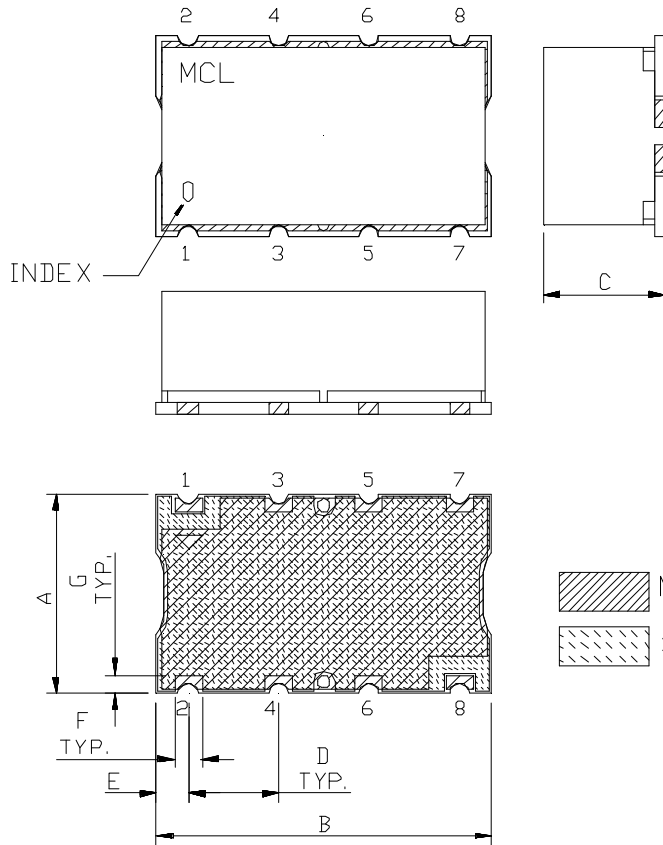
### OUTPUT RETURN LOSS vs. TEMPERATURE



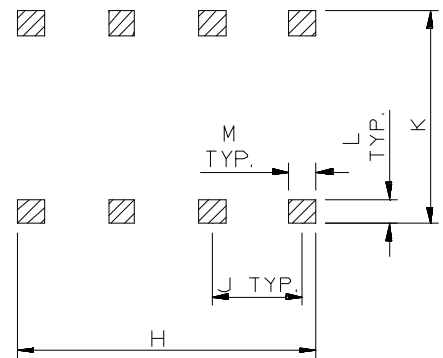
## Typical Performance Curves




### Outline Dimensions



### PCB Land Pattern



 METALLIZATION  
 SOLDER RESIST

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.



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RF/IF MICROWAVE COMPONENTS

# Tape & Reel Packaging TR-F5



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

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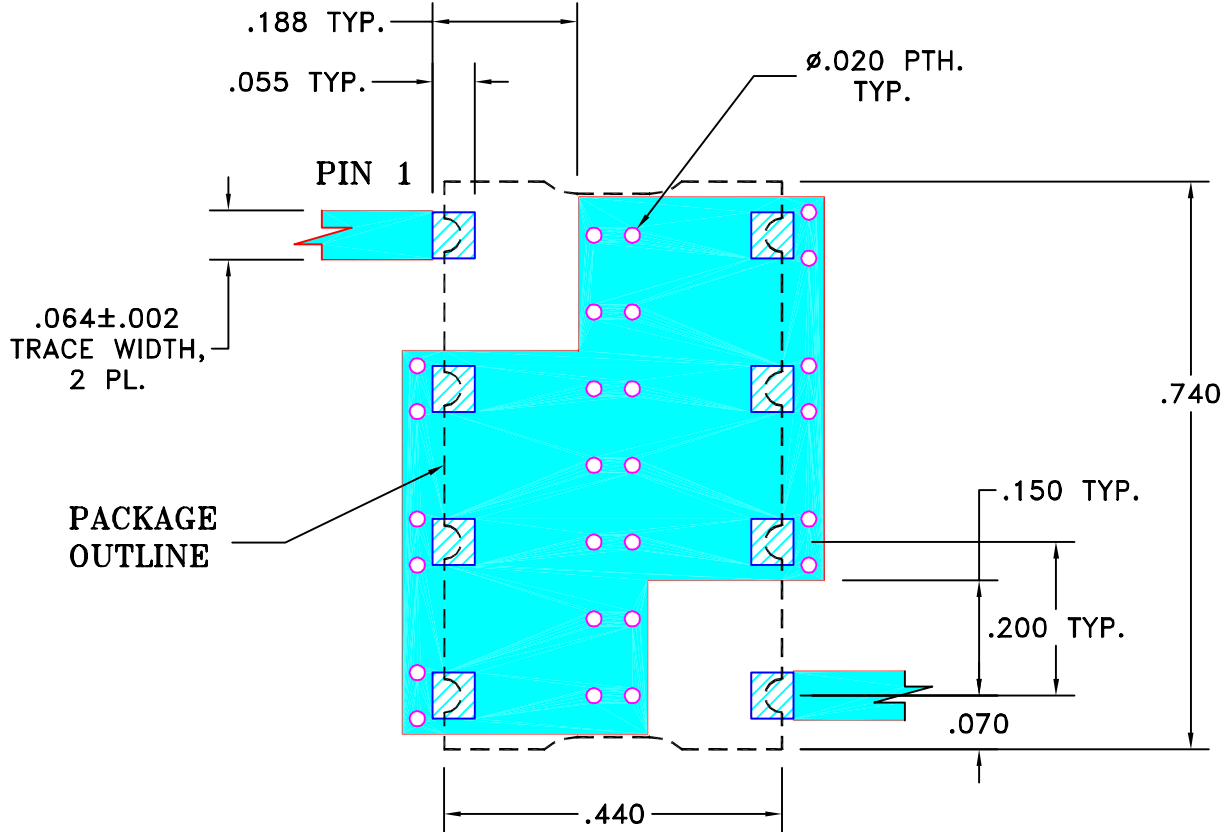
THIRD ANGLE PROJECTION



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.**

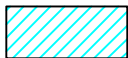


**NOTE:**

- 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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**PL, cr, HF1139, SCLF, TB-368**

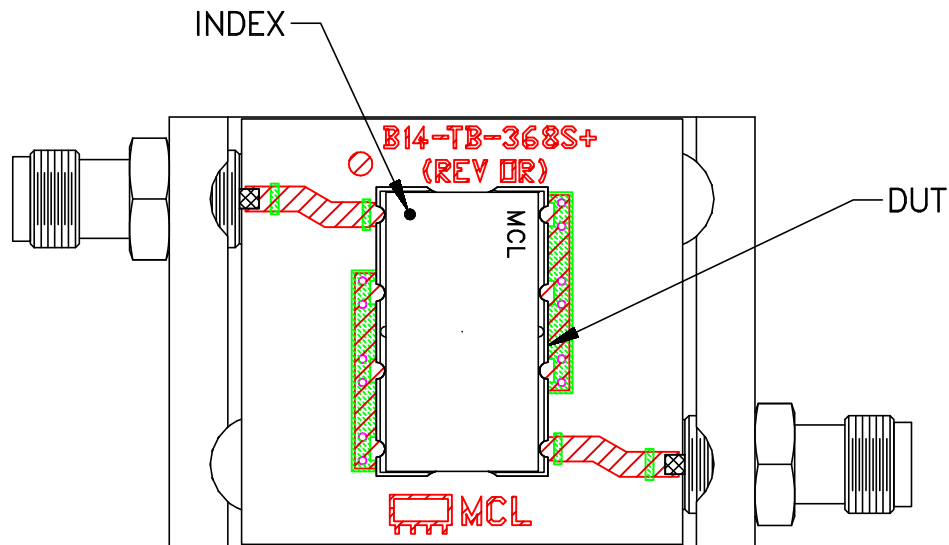
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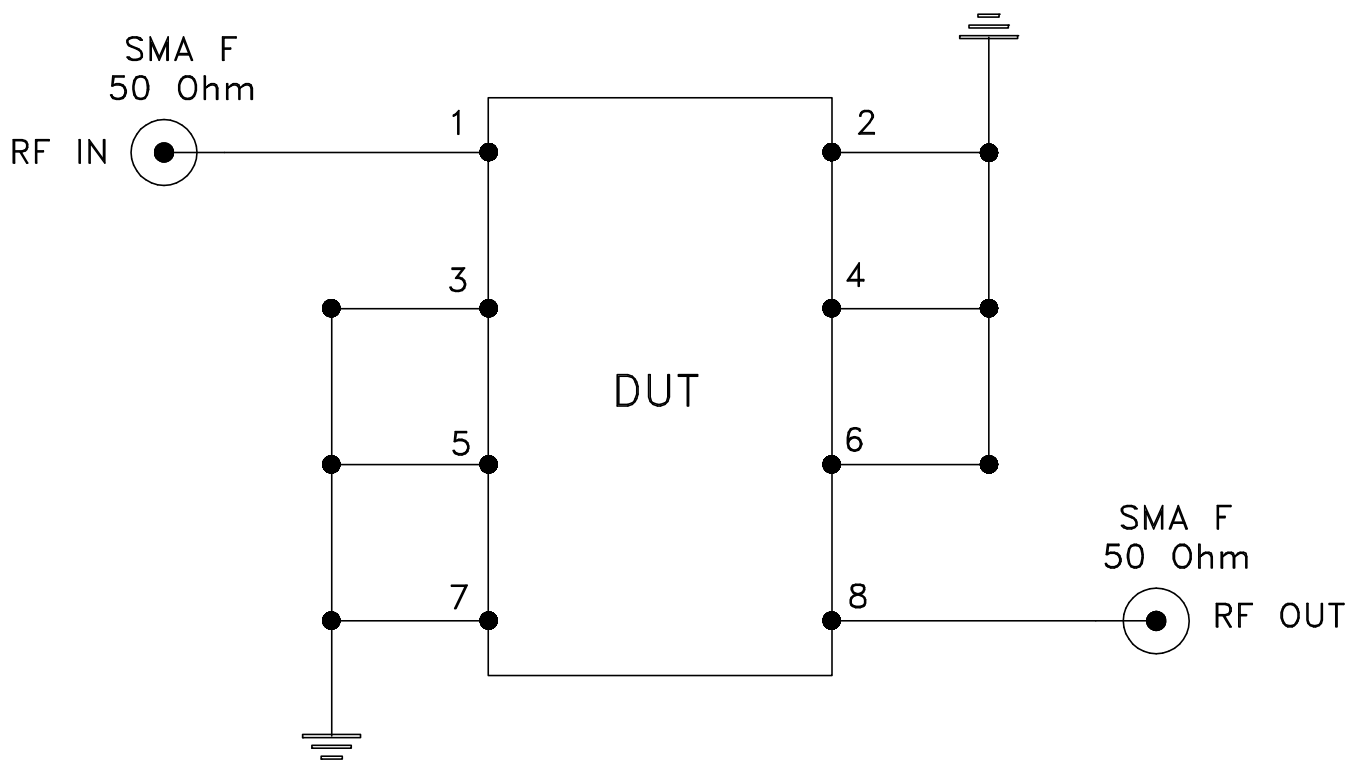
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-230	OR
FILE:	98PL230	SCALE:	SHEET:
		4:1	1 OF 1



# 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