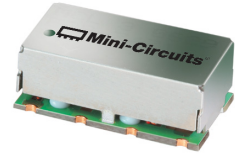


Bandpass Filter

50Ω 170 to 186 MHz

SXBP-178+



Generic photo used for illustration purposes only
CASE STYLE: HF1139

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

Features

- excellent rejection
- flat group delay @ passband
- good VSWR, 1.2:1 typ. @ passband

Applications

- receivers / transmitters
- CDMA base station

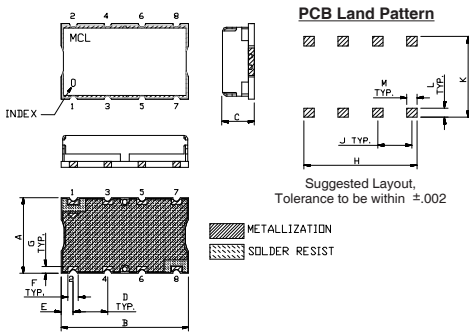
+RoHS Compliant

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

Bandpass Filter Electrical Specifications (T_{AMB} = 25°C)

CENTER FREQ. (MHz)	PASSBAND (MHz) (Loss < 3dB) F1 - F2	STOPBANDS (MHz)				VSWR (:1)	
		Loss > 20dB		Loss > 40dB		Passband Max.	Stopband Typ.
		F3	F4	F5	F6		
178	170 - 186	150	210	135	240 - 2000	1.5	20

Outline Drawing



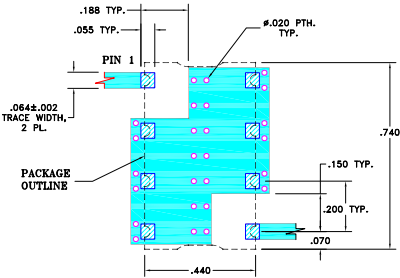
Outline Dimensions (inch/mm)

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

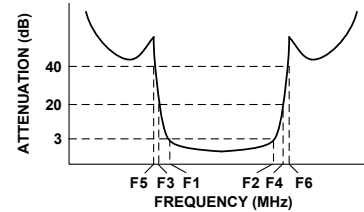
Note: Please refer to case style drawing for details

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

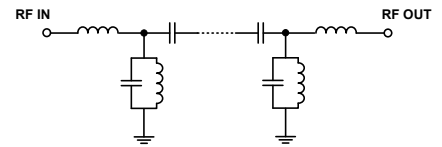


- NOTE:
1. TRACE WIDTH IS SHOWN FOR FR4 WITH DIELECTRIC THICKNESS: .025" ± .002". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
 2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
 - DENOTES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

Typical Frequency Response

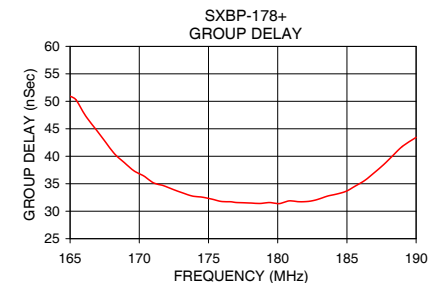
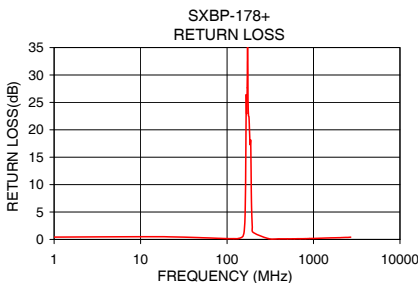
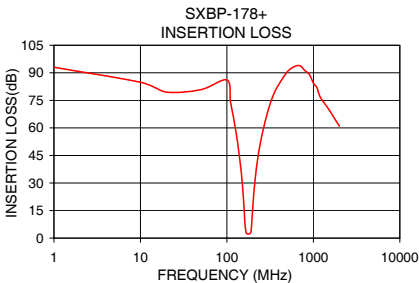


Functional Schematic



Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)		Return Loss (dB)	Frequency (MHz)	Group Delay (nSec)
	\bar{x}	σ			
1.0	93.03	6.18	0.42	165.0	50.93
135.0	49.78	0.49	0.17	167.0	44.46
150.0	30.67	0.60	0.45	168.0	42.70
159.0	14.09	0.83	1.92	169.0	38.84
163.0	6.12	0.61	7.06	170.0	37.33
170.0	2.48	0.05	24.26	171.0	35.17
178.0	2.23	0.01	22.44	173.0	33.34
186.0	2.61	0.04	17.52	174.0	32.76
191.0	4.41	0.45	8.71	176.0	31.77
194.0	8.32	0.79	3.64	178.0	31.49
199.0	16.45	0.74	1.46	179.0	31.41
210.0	29.98	0.48	0.64	181.0	31.89
240.0	50.04	0.21	0.28	182.0	31.73
400.0	83.79	1.77	0.11	183.0	32.14
900.0	89.10	5.45	0.16	185.0	33.62
1200.0	76.91	0.98	0.22	186.0	34.56
1600.0	66.71	0.70	0.28	188.0	38.47
2000.0	60.95	1.70	0.32	190.0	43.45



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.
- The parts covered by this specification document are subject to Mini-Circuit's 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-Circuit's website at www.minicircuits.com/MCLStore/terms.jsp



Surface Mount Band Pass Filter

SXBP-178+

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
0.5	95.34	102.91	96.93	0.30	0.40	0.47	0.30	0.40	0.48
1	98.75	96.71	107.80	0.30	0.40	0.47	0.30	0.40	0.48
10	84.22	82.33	83.23	0.36	0.45	0.53	0.36	0.46	0.53
20	78.77	79.42	79.00	0.37	0.45	0.51	0.37	0.45	0.51
30	77.71	77.51	77.27	0.35	0.41	0.46	0.35	0.41	0.46
40	77.37	76.11	77.65	0.32	0.36	0.40	0.31	0.36	0.39
50	77.21	77.85	76.64	0.27	0.31	0.34	0.27	0.31	0.33
60	78.23	76.80	77.06	0.24	0.27	0.29	0.22	0.26	0.29
70	79.56	78.53	79.67	0.20	0.23	0.25	0.19	0.23	0.25
80	80.96	80.47	80.59	0.17	0.20	0.22	0.15	0.19	0.22
90	83.41	83.21	85.36	0.15	0.18	0.19	0.13	0.17	0.20
100	108.50	105.47	93.74	0.13	0.15	0.17	0.10	0.15	0.18
110	76.73	76.27	76.58	0.11	0.14	0.15	0.09	0.14	0.17
120	65.89	65.54	65.37	0.11	0.13	0.15	0.09	0.13	0.17
130	55.80	55.51	55.28	0.11	0.14	0.16	0.10	0.15	0.19
135	50.54	50.22	49.92	0.13	0.17	0.19	0.12	0.18	0.22
150	31.59	31.09	30.65	0.31	0.40	0.46	0.34	0.46	0.54
163	6.89	6.64	6.41	4.38	5.48	6.45	4.94	6.25	7.37
170	2.24	2.60	2.83	19.50	19.69	19.89	20.26	20.44	20.59
178	1.96	2.34	2.59	36.74	35.78	31.85	39.07	47.00	36.57
186	2.32	2.77	3.07	15.38	15.89	16.57	15.70	15.90	16.23
191	3.41	4.40	5.18	15.10	12.31	10.64	12.24	10.31	9.06
194	6.84	8.25	9.30	5.05	4.62	4.32	4.57	4.19	3.92
199	15.17	16.39	17.29	1.63	1.71	1.74	1.51	1.61	1.65
210	29.09	29.86	30.43	0.60	0.68	0.73	0.57	0.67	0.74
220	37.67	38.26	38.69	0.38	0.45	0.48	0.36	0.45	0.51
230	44.19	44.69	45.06	0.28	0.33	0.36	0.26	0.34	0.39
240	49.45	49.87	50.20	0.22	0.27	0.29	0.20	0.27	0.32
250	53.85	54.20	54.56	0.18	0.22	0.25	0.16	0.23	0.28
260	57.69	57.93	58.29	0.15	0.19	0.22	0.13	0.20	0.25
270	61.02	61.33	61.51	0.13	0.17	0.19	0.11	0.18	0.23
280	64.07	64.30	64.45	0.12	0.15	0.17	0.09	0.16	0.21
290	66.87	67.00	67.20	0.10	0.14	0.16	0.08	0.15	0.19
300	68.90	69.37	69.56	0.09	0.13	0.15	0.07	0.14	0.18
350	79.74	79.83	80.25	0.06	0.09	0.11	0.03	0.11	0.15
400	88.23	90.21	90.04	0.04	0.07	0.09	0.01	0.09	0.14
500	98.85	94.87	96.85	0.03	0.07	0.09	0.00	0.08	0.14
600	105.67	105.61	100.74	0.03	0.07	0.10	0.01	0.09	0.15
700	94.78	102.63	99.50	0.04	0.09	0.12	0.02	0.09	0.16
800	96.88	95.48	92.74	0.06	0.11	0.14	0.02	0.11	0.18
900	96.58	91.24	94.51	0.07	0.12	0.15	0.02	0.12	0.19
1000	96.78	95.93	114.76	0.08	0.14	0.17	0.01	0.13	0.21
1100	83.02	89.94	83.27	0.09	0.16	0.19	0.00	0.15	0.23
1200	85.49	86.90	89.96	0.10	0.17	0.21	0.01	0.17	0.25
1300	84.22	84.77	85.23	0.11	0.18	0.22	0.01	0.18	0.27
1400	76.15	82.80	76.45	0.11	0.19	0.23	0.03	0.19	0.29
1500	68.60	74.10	68.85	0.13	0.22	0.26	0.04	0.21	0.32
2000	77.37	62.87	75.04	0.19	0.28	0.33	0.05	0.27	0.41
2500	46.56	50.47	49.32	0.25	0.35	0.40	0.08	0.31	0.52
3000	41.37	43.77	41.20	0.23	0.40	0.46	0.05	0.36	0.57
3500	35.42	37.32	35.43	1.44	1.26	1.27	0.17	0.55	0.79
4000	30.72	28.67	29.64	0.46	0.85	0.95	0.27	0.78	0.94
4500	23.03	20.80	24.38	1.71	2.10	2.23	1.92	1.97	2.57
5000	9.33	12.64	15.76	17.22	10.47	10.67	12.31	8.08	8.42

REV. X2
SXBP-178+
101118
Page 1 of 2



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Surface Mount Band Pass Filter

SXBP-178+

Typical Performance Data

FREQ. (MHz)	GROUP DELAY (nsec)		
	@ -40° C	@ +25° C	@ +85° C
110	3.36	3.14	0.68
115	2.24	0.81	2.47
120	2.21	2.68	1.90
125	2.85	2.96	3.17
130	3.12	3.03	3.08
135	3.95	4.00	3.93
140	4.61	4.85	5.11
145	6.08	6.41	6.68
150	8.70	9.22	9.66
155	14.37	15.43	16.36
160	29.32	30.99	32.35
165	45.09	44.97	44.89
166	45.97	45.49	45.11
167	45.97	45.16	44.52
168	45.07	44.02	43.21
169	43.43	42.29	41.42
170	41.34	40.28	39.48
171	39.22	38.35	37.71
172	37.35	36.70	36.22
173	35.87	35.41	35.06
174	34.73	34.41	34.18
175	33.89	33.67	33.50
176	33.25	33.10	32.99
177	32.77	32.68	32.61
178	32.42	32.37	32.35
179	32.17	32.17	32.19
180	32.02	32.07	32.15
181	31.98	32.10	32.24
182	32.08	32.29	32.52
183	32.35	32.69	33.03
184	32.87	33.35	33.82
185	33.68	34.32	34.89
186	34.82	35.55	36.15
187	36.22	36.92	37.43
188	37.70	38.20	38.49
189	38.98	39.12	39.10
190	39.81	39.50	39.13
195	33.80	31.59	29.82
200	17.93	16.63	15.68
205	9.79	9.41	9.10
210	6.39	6.25	6.14
215	4.65	4.59	4.54
220	3.61	3.59	3.54
225	2.92	2.90	2.90
230	2.47	2.47	2.45
235	2.09	2.08	2.09
240	1.79	1.86	1.71
245	1.68	1.63	1.65
250	1.35	1.46	1.25
260	1.38	1.29	1.10
270	1.24	0.87	1.13
280	0.86	1.38	1.10
290	0.98	0.05	1.29
300	1.02	0.23	0.09

REV. X2
 SXBP-178+
 101118
 Page 2 of 2



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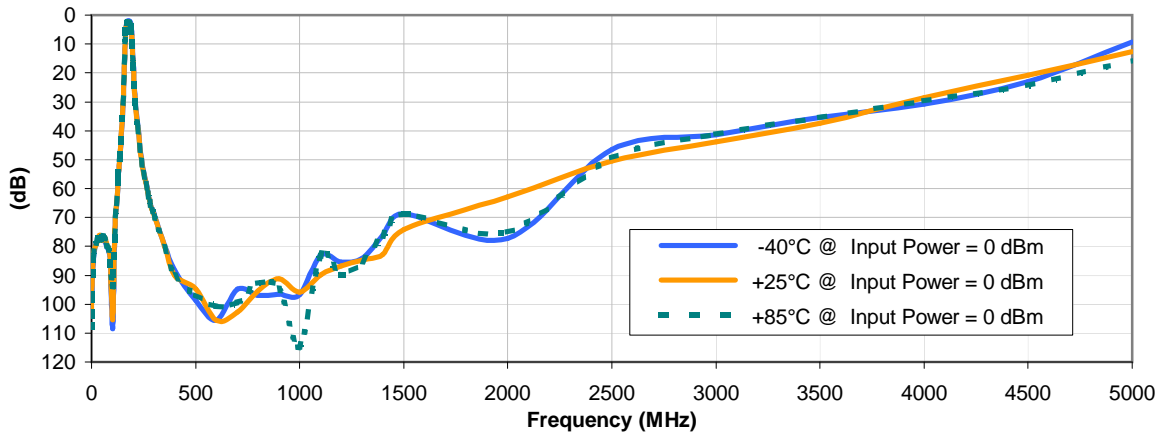


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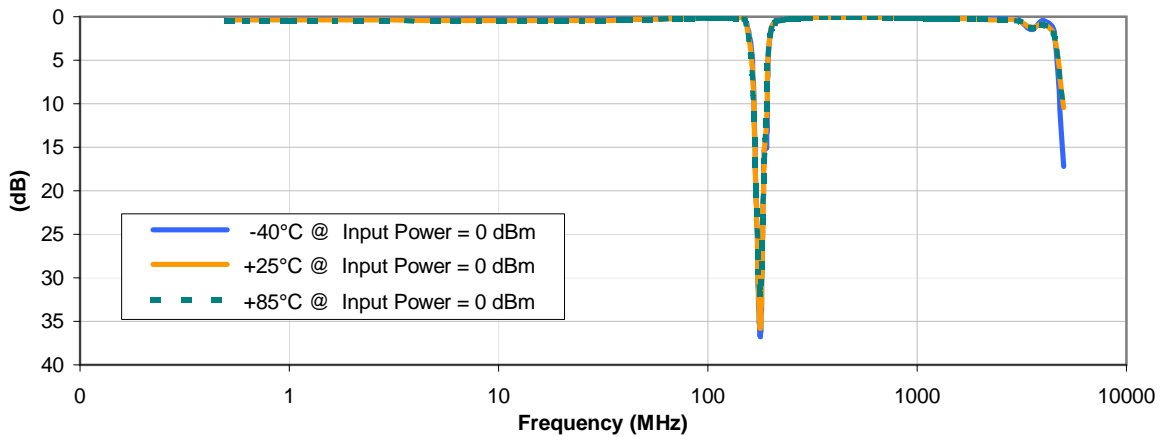


Typical Performance Curves

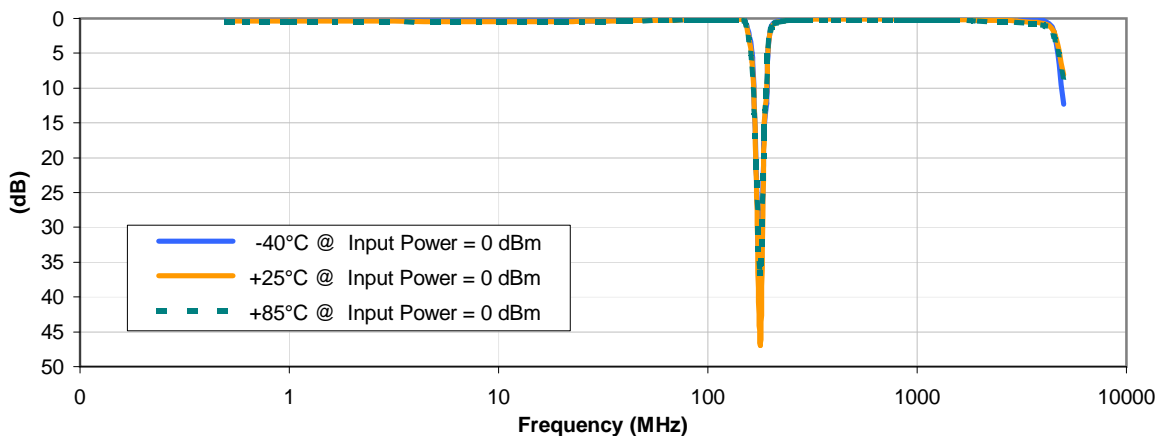
INSERTION LOSS vs. TEMPERATURE



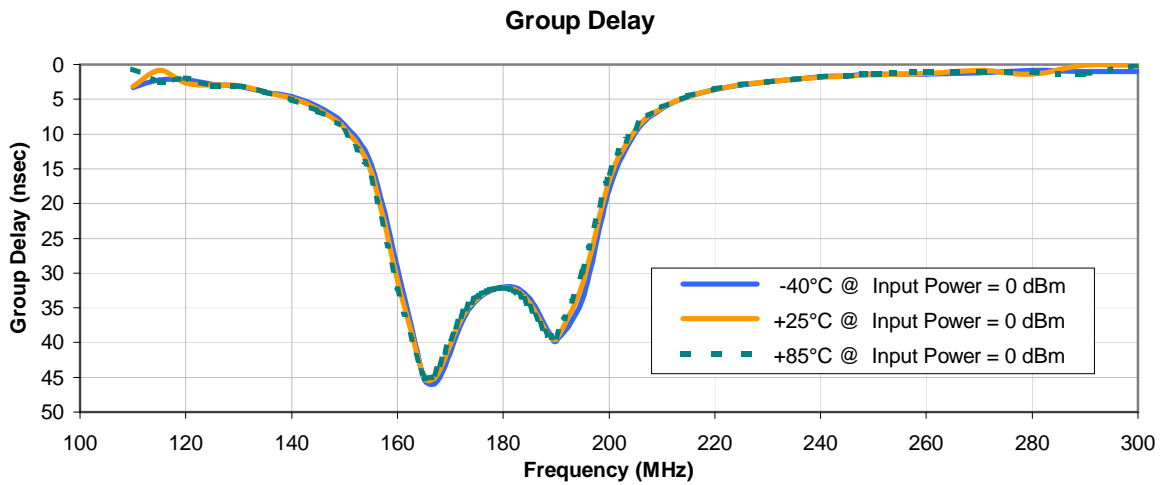
INPUT RETURN LOSS vs. TEMPERATURE



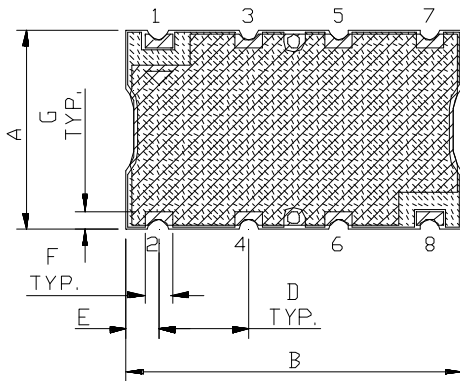
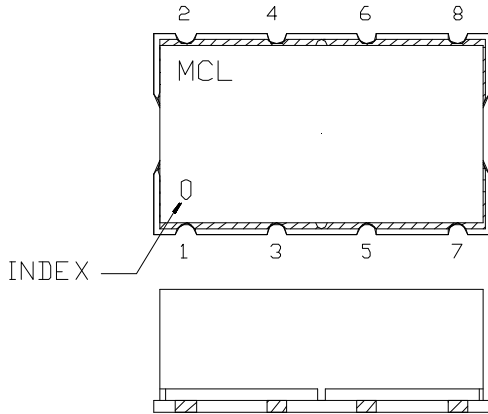
OUTPUT RETURN LOSS vs. TEMPERATURE



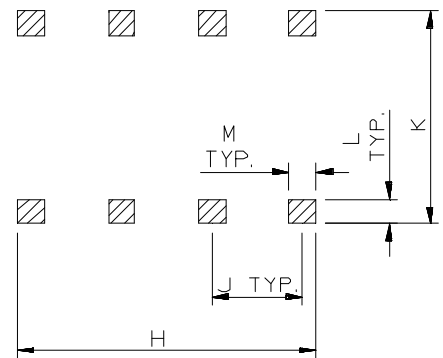
Typical Performance Curves



Outline Dimensions



PCB Land Pattern



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. ± 0.015 "; 3 Pl. ± 0.01 "

Notes:

- Case material: Nickel-Silver alloy.
- Base: Printed wiring laminate.
- 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.
 - For RoHS-5 Case Styles: Tin-Lead plate.



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32	16	13	500

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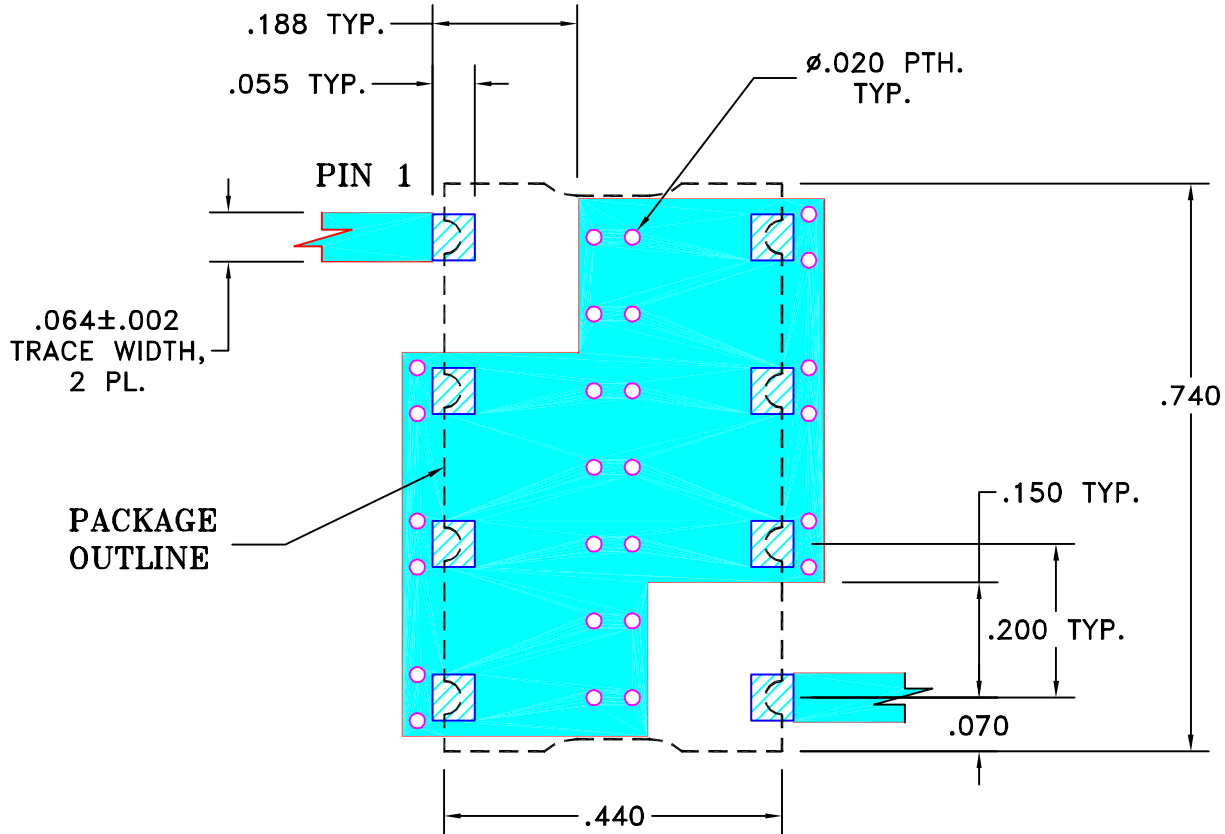
THIRD ANGLE PROJECTION



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.**

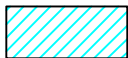


NOTE:

1. 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.
2. 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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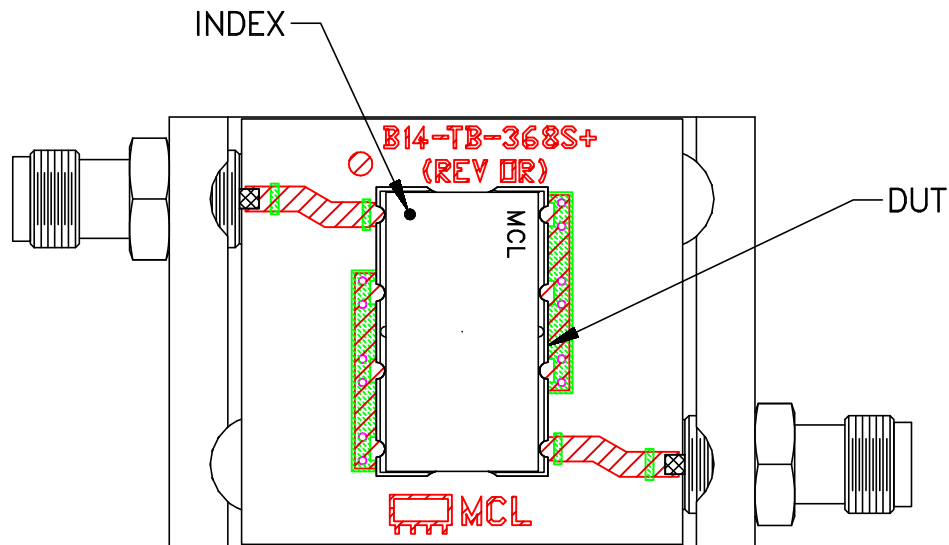
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PL, cr, HF1139, SCLF, TB-368

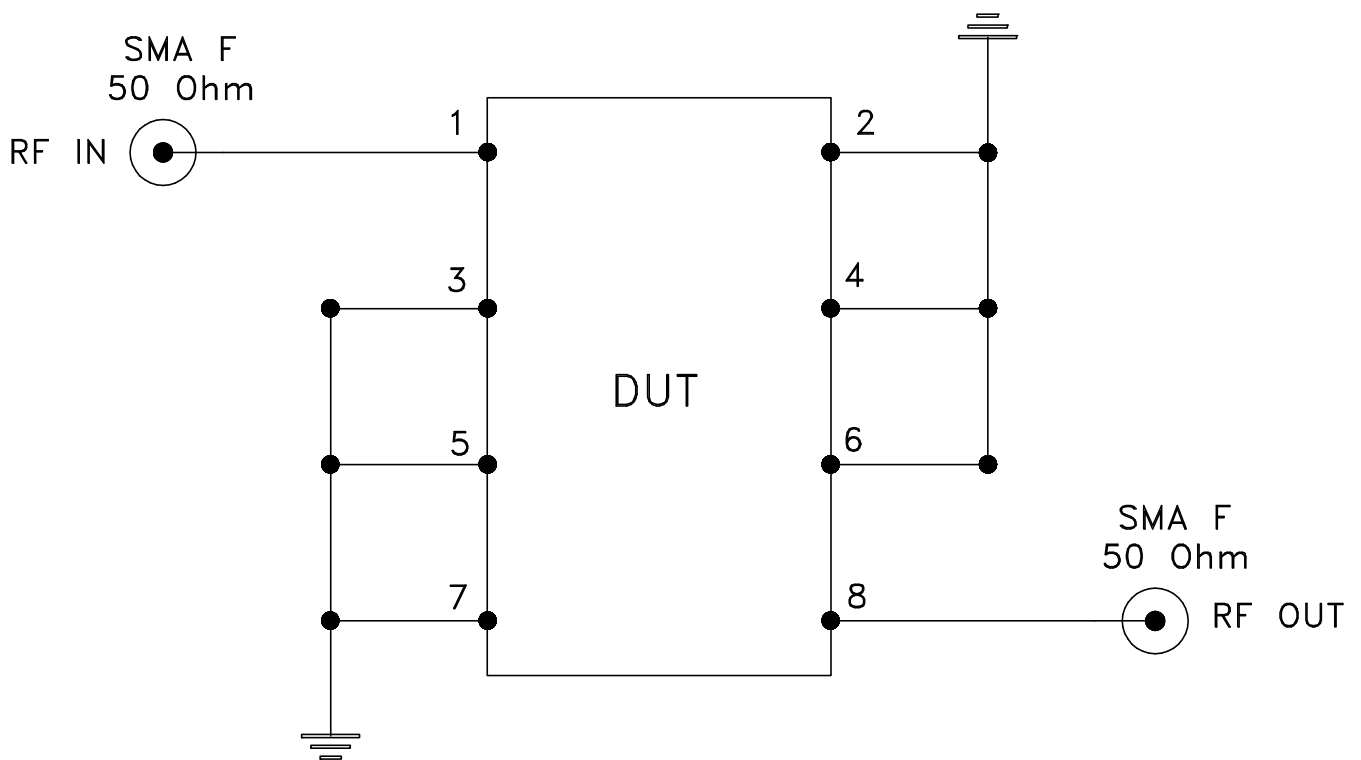
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SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-230	REV: OR
FILE: 98PL230	SCALE: 4:1	SHEET: 1 OF 1	

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