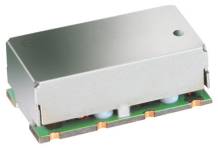
Surface Mount

Low Pass Filter

SXLP-95+

50Ω DC to 95 MHz



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

- high rejection
- sharp cut-off
- shielded package
- aqueous washable
- low cost

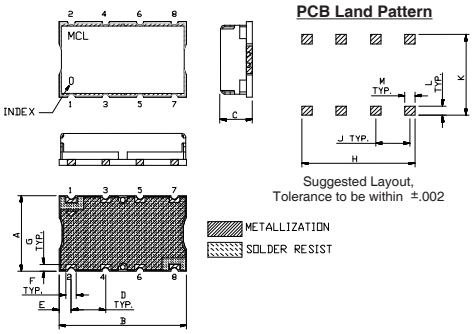
Applications

- test equipments
- defense communications
- receivers / transmitters
- harmonic rejection

+RoHS Compliant

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

Outline Drawing

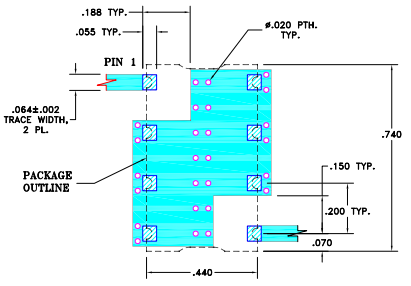


Outline Dimensions (inch / mm)

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

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.

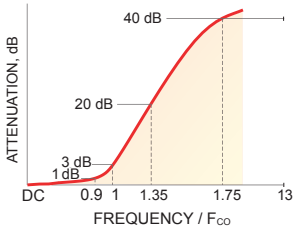
DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

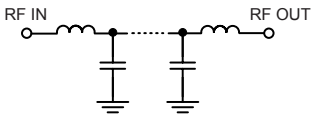
Low Pass Filter Electrical Specifications (T_{AMB}= 25°C)

PASSBAND (MHz)	fco, MHz Nom.	STOPBAND (MHz)		VSWR (:1)	
				Passband Typ.	Stopband Typ.
(Loss < 1dB)	(Loss 3dB)	(Loss > 20dB)	(Loss > 40dB)		
DC - 95	108	146 - 189	189 - 1400	1.7	18

Typical Frequency Response



Functional Schematic

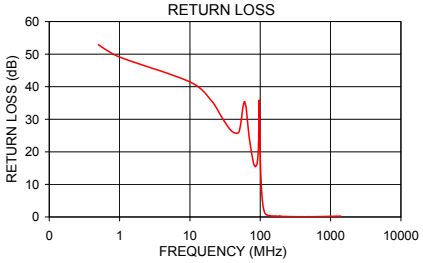


Typical Performance Data at 25°C

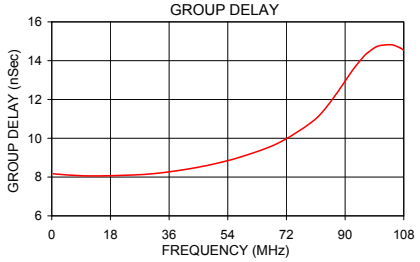
Frequency (MHz)	Insertion Loss (dB) $\bar{x}$	Insertion Loss (dB) σ	Return Loss (dB)	Frequency (MHz)	Group Delay (nSec)
0.5	0.02	0.01	52.90	0.5	8.17
1.0	0.04	0.00	49.11	10.0	8.06
10.0	0.08	0.00	41.48	20.0	8.08
30.0	0.15	0.01	29.77	30.0	8.16
70.0	0.31	0.01	24.07	40.0	8.37
95.0	0.53	0.01	23.82	50.0	8.68
100.0	0.79	0.03	18.19	60.0	9.14
104.0	1.57	0.10	8.88	70.0	9.80
108.0	3.30	0.21	4.43	80.0	10.87
115.0	8.14	0.47	1.48	85.0	11.76
120.0	12.00	0.61	0.84	90.0	12.95
146.0	28.80	0.94	0.31	91.0	13.19
189.0	48.66	1.53	0.20	92.0	13.44
200.0	53.38	2.00	0.18	93.0	13.66
400.0	72.49	2.86	0.07	94.0	13.88
800.0	80.12	3.70	0.15	95.0	14.08
1200.0	78.78	5.48	0.23	100.0	14.75
1400.0	71.99	2.28	0.26	108.0	14.53

SXLP-95+
INSERTION LOSS

SXLP-95+
RETURN LOSS



SXLP-95+
GROUP DELAY



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-Circuit's 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/MCLStore/terms.jsp

Surface Mount Low Pass Filter SXLP-95+

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	0.02	0.01	0.04	47.94	46.62	44.00	47.52	45.74	43.93
1	0.03	0.03	0.05	46.58	44.94	43.66	46.38	44.57	43.49
10	0.10	0.11	0.13	34.24	33.09	32.44	34.28	33.20	32.58
20	0.10	0.13	0.14	33.96	32.88	32.29	33.98	33.35	32.91
30	0.13	0.15	0.18	40.97	38.61	37.08	41.85	42.92	43.21
40	0.18	0.21	0.24	27.66	27.05	26.55	27.80	27.26	26.76
50	0.23	0.26	0.30	22.00	21.69	21.47	22.07	21.71	21.45
60	0.27	0.31	0.35	20.55	20.52	20.55	20.55	20.48	20.44
70	0.29	0.34	0.37	23.79	24.33	24.82	23.60	24.08	24.51
80	0.31	0.37	0.42	31.76	30.77	29.84	30.66	30.18	29.45
90	0.40	0.47	0.53	25.93	25.33	24.99	25.01	24.34	23.90
95	0.45	0.53	0.60	29.22	28.90	28.54	25.34	24.56	24.01
100	0.67	0.79	0.88	15.73	15.42	15.10	15.13	14.75	14.40
104	1.29	1.47	1.61	8.92	8.73	8.52	8.72	8.51	8.30
105	1.58	1.77	1.92	7.66	7.50	7.33	7.48	7.31	7.14
108	2.79	3.02	3.23	4.74	4.65	4.55	4.63	4.55	4.46
110	3.90	4.16	4.39	3.40	3.36	3.30	3.31	3.29	3.23
115	7.44	7.75	8.00	1.54	1.58	1.58	1.49	1.52	1.55
120	11.36	11.64	11.90	0.83	0.87	0.90	0.77	0.84	0.88
130	18.62	18.85	19.08	0.41	0.45	0.48	0.37	0.44	0.49
140	24.90	25.12	25.32	0.30	0.32	0.35	0.25	0.32	0.36
146	28.29	28.50	28.69	0.26	0.29	0.31	0.22	0.29	0.33
150	30.41	30.61	30.80	0.24	0.27	0.29	0.20	0.26	0.30
160	35.25	35.45	35.61	0.22	0.24	0.26	0.19	0.24	0.28
170	39.48	39.66	39.85	0.19	0.22	0.23	0.16	0.21	0.25
180	43.21	43.34	43.52	0.19	0.20	0.21	0.15	0.19	0.23
189	46.42	46.52	46.66	0.16	0.18	0.19	0.12	0.17	0.20
190	46.72	46.76	47.03	0.16	0.17	0.19	0.13	0.17	0.19
200	49.93	49.94	50.08	0.14	0.16	0.18	0.12	0.16	0.19
210	52.48	52.81	52.72	0.13	0.15	0.17	0.11	0.15	0.18
220	54.96	55.04	55.23	0.12	0.14	0.16	0.09	0.14	0.17
230	57.31	57.44	57.57	0.12	0.13	0.15	0.08	0.13	0.16
240	59.67	60.01	59.73	0.10	0.13	0.14	0.08	0.13	0.15
250	61.60	61.56	61.94	0.10	0.12	0.14	0.07	0.12	0.16
300	69.50	69.60	69.52	0.08	0.10	0.11	0.04	0.09	0.13
400	80.88	77.38	81.82	0.06	0.08	0.09	0.02	0.09	0.12
500	91.94	82.50	84.03	0.04	0.06	0.10	0.00	0.07	0.13
600	93.43	97.69	91.29	0.05	0.07	0.11	0.00	0.08	0.13
700	89.50	90.54	82.65	0.05	0.08	0.13	0.02	0.11	0.17
800	87.04	83.34	87.26	0.05	0.09	0.14	0.00	0.11	0.16
900	83.28	89.21	95.85	0.06	0.11	0.15	0.02	0.11	0.18
1000	81.73	82.38	80.95	0.09	0.14	0.18	0.03	0.15	0.21
1100	89.64	88.99	82.97	0.06	0.12	0.18	0.00	0.13	0.20
1200	83.35	77.75	79.82	0.08	0.15	0.20	0.02	0.16	0.24
1300	75.87	74.54	76.28	0.13	0.19	0.24	0.06	0.20	0.27
1400	76.70	78.97	79.46	0.13	0.19	0.25	0.05	0.20	0.28
1500	66.05	67.95	65.90	0.13	0.20	0.25	0.06	0.22	0.30
2000	62.63	63.26	62.98	0.22	0.29	0.37	0.13	0.30	0.41
2500	48.30	49.47	48.96	0.26	0.35	0.45	0.17	0.36	0.48
3000	39.62	47.70	43.58	0.40	0.48	0.57	0.32	0.56	0.68
3500	31.44	31.52	29.18	0.58	0.73	0.88	1.17	1.61	1.66
4000	31.20	31.83	30.95	2.26	2.74	3.17	0.47	0.89	1.08
4500	22.57	24.60	24.58	1.23	1.37	1.59	1.73	1.94	2.45
5000	14.11	17.32	17.34	3.20	3.49	3.69	4.37	3.44	3.62

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Typical Performance Data

FREQ. (MHz)	GROUP DELAY (nsec)		
	@ -40° C	@ +25° C	@ +85° C
0.5	8.12	8.29	7.84
10	7.93	7.99	7.99
12	7.97	8.00	8.01
14	7.96	7.99	8.01
15	8.00	8.02	8.03
18	8.01	8.03	8.05
20	8.04	8.05	8.07
22	8.06	8.07	8.13
24	8.10	8.12	8.17
25	8.12	8.14	8.15
28	8.16	8.18	8.20
30	8.21	8.20	8.23
32	8.28	8.28	8.30
34	8.30	8.34	8.35
35	8.32	8.32	8.35
38	8.40	8.42	8.43
40	8.43	8.45	8.46
42	8.50	8.51	8.53
44	8.58	8.57	8.61
45	8.60	8.62	8.62
48	8.70	8.71	8.73
50	8.77	8.77	8.78
52	8.80	8.82	8.83
54	8.89	8.91	8.93
55	8.95	8.95	9.00
58	9.10	9.10	9.09
60	9.23	9.23	9.22
62	9.30	9.33	9.34
64	9.43	9.47	9.48
65	9.49	9.51	9.59
68	9.75	9.79	9.82
70	9.91	9.95	9.99
72	10.15	10.18	10.18
74	10.33	10.36	10.40
75	10.43	10.47	10.52
78	10.75	10.78	10.81
80	10.99	11.02	11.05
82	11.26	11.28	11.29
84	11.52	11.55	11.59
85	11.68	11.72	11.76
88	12.18	12.24	12.30
90	12.67	12.74	12.80
92	13.19	13.27	13.36
94	13.90	14.00	14.10
95	14.32	14.41	14.53
98	15.75	15.87	15.98
100	16.88	16.98	17.11
110	18.28	18.08	17.91
120	10.66	10.50	10.35
130	6.49	6.42	6.33
150	3.41	3.32	3.32
200	1.18	1.03	1.08
210	0.70	0.91	1.66
220	1.70	2.59	0.81
230	1.43	2.93	2.21

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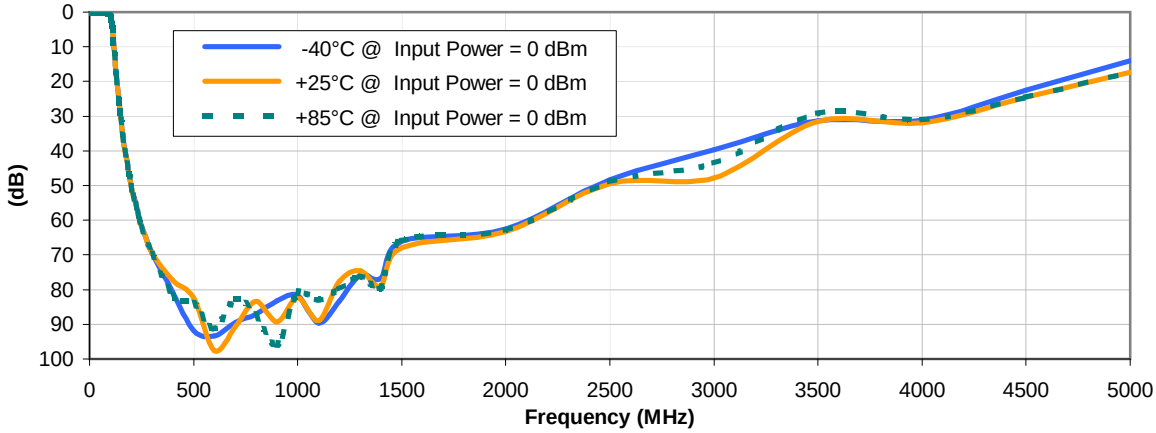
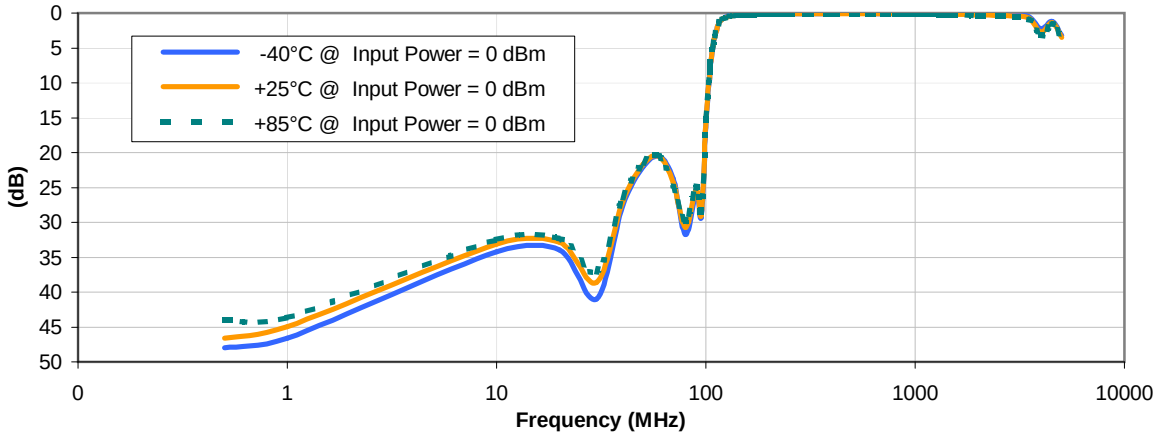
Surface Mount Low Pass Filter SXLP-95+

Typical Performance Curves

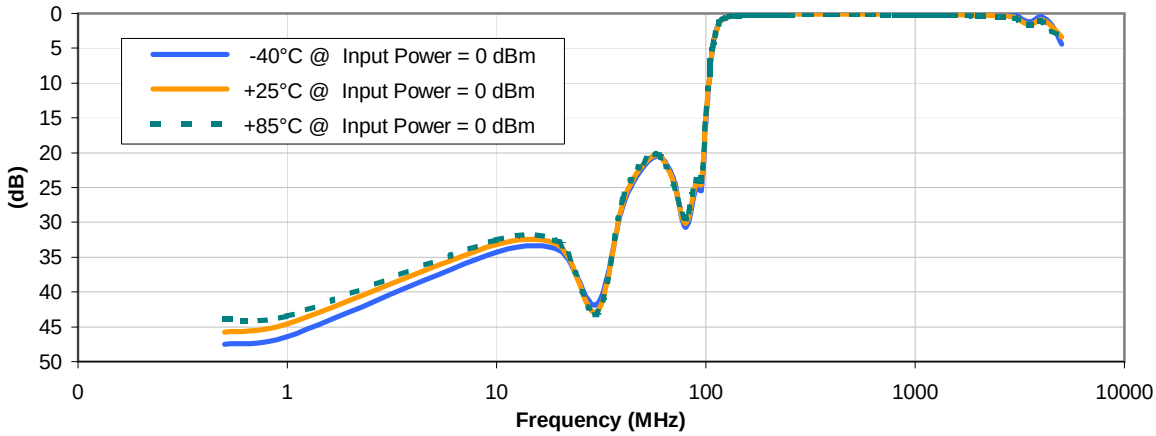
INSERTION LOSS vs. TEMPERATURE



INPUT RETURN LOSS vs. TEMPERATURE



OUTPUT RETURN LOSS vs. TEMPERATURE



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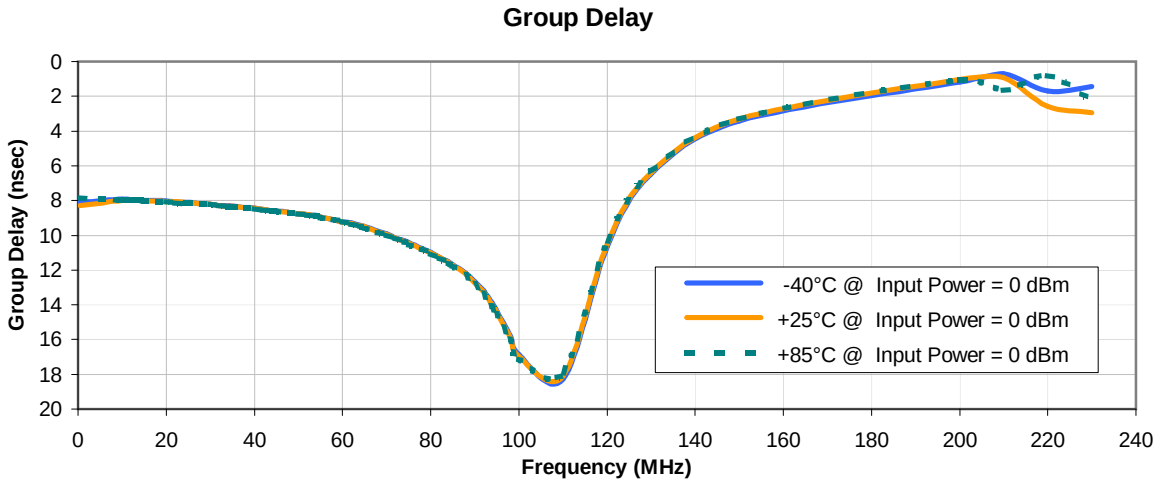
Typical Performance Curves



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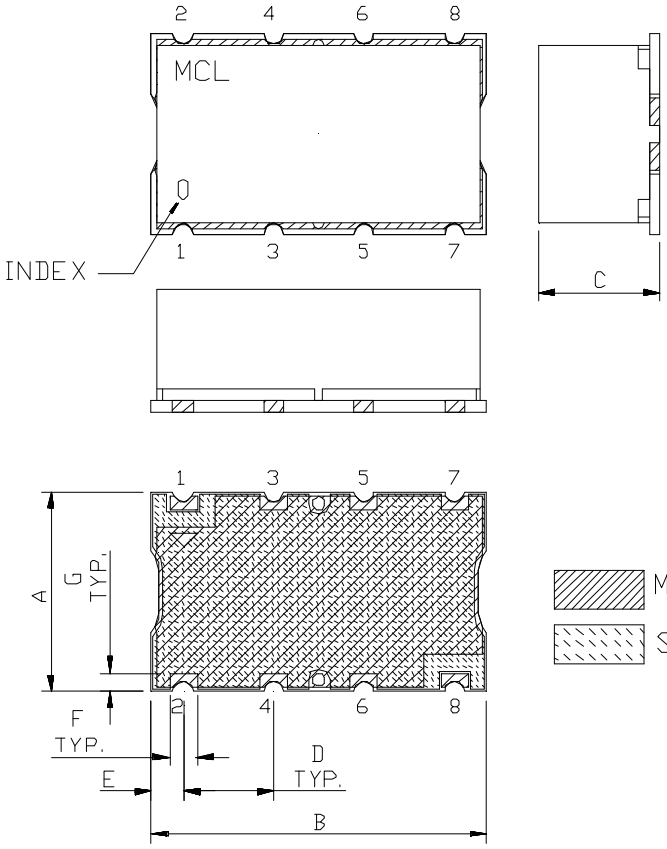
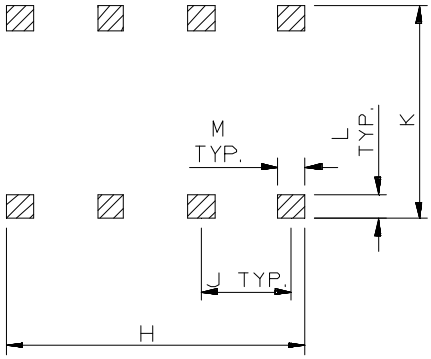
Case Style HF

HF1139

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. ±.015"; 3 Pl. ±.01"

Notes:

1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. 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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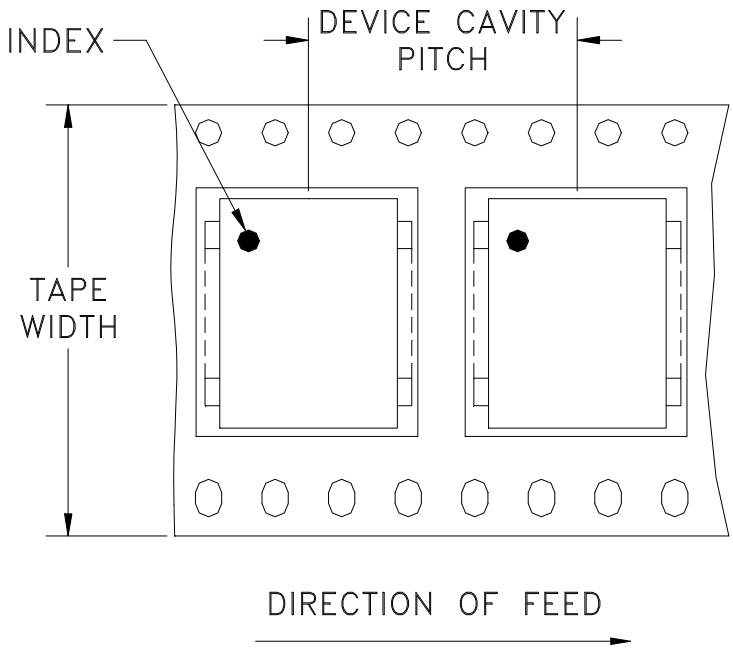
Tape & Reel Packaging TR-F5

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.

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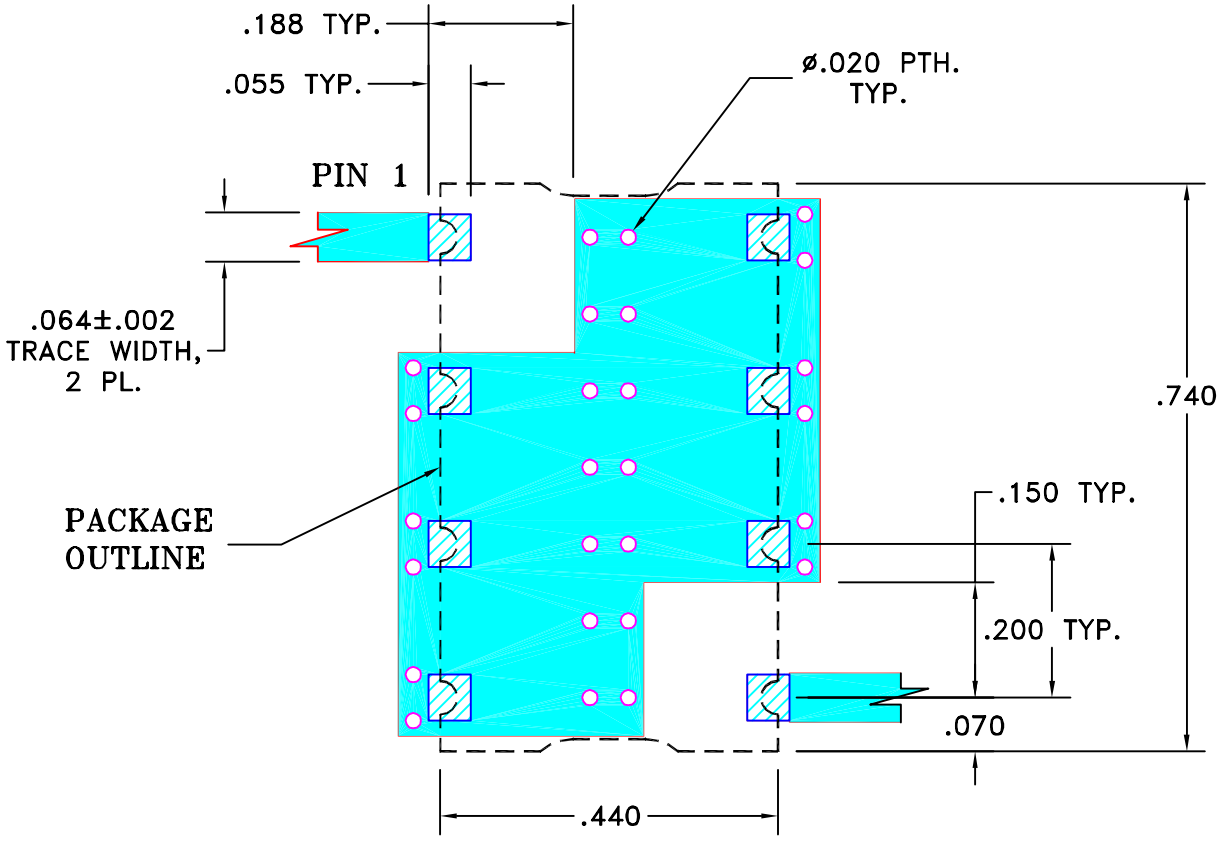
THIRD ANGLE PROJECTION

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	DRAWN	DK (RAVON)	29 NOV 05
TOLERANCES ON:	CHECKED	RZ (RAVON)	29 NOV 05
2 PL DECIMALS ±	APPROVED	HH (RAVON)	29 NOV 05
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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ASHEETA1.DWG REV:A DATE:01/12/95

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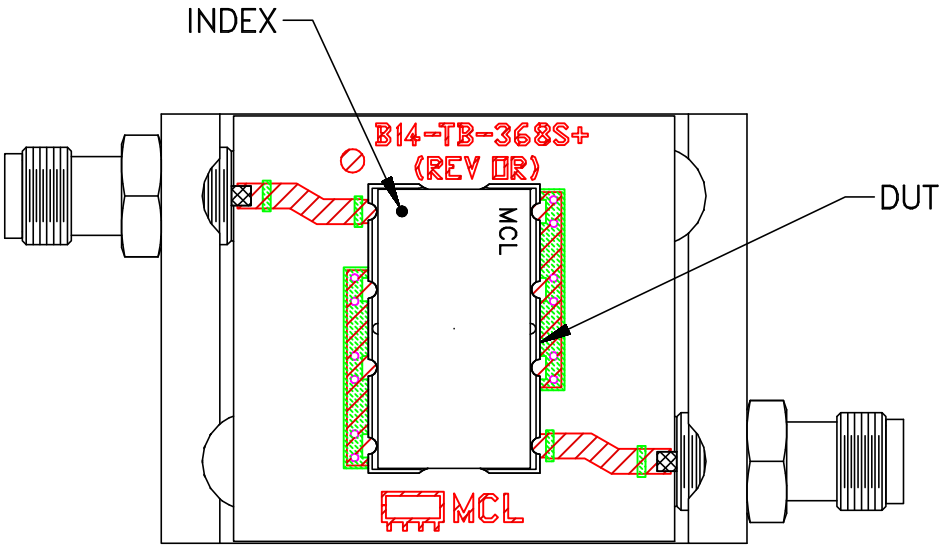
Brooklyn NY 11235

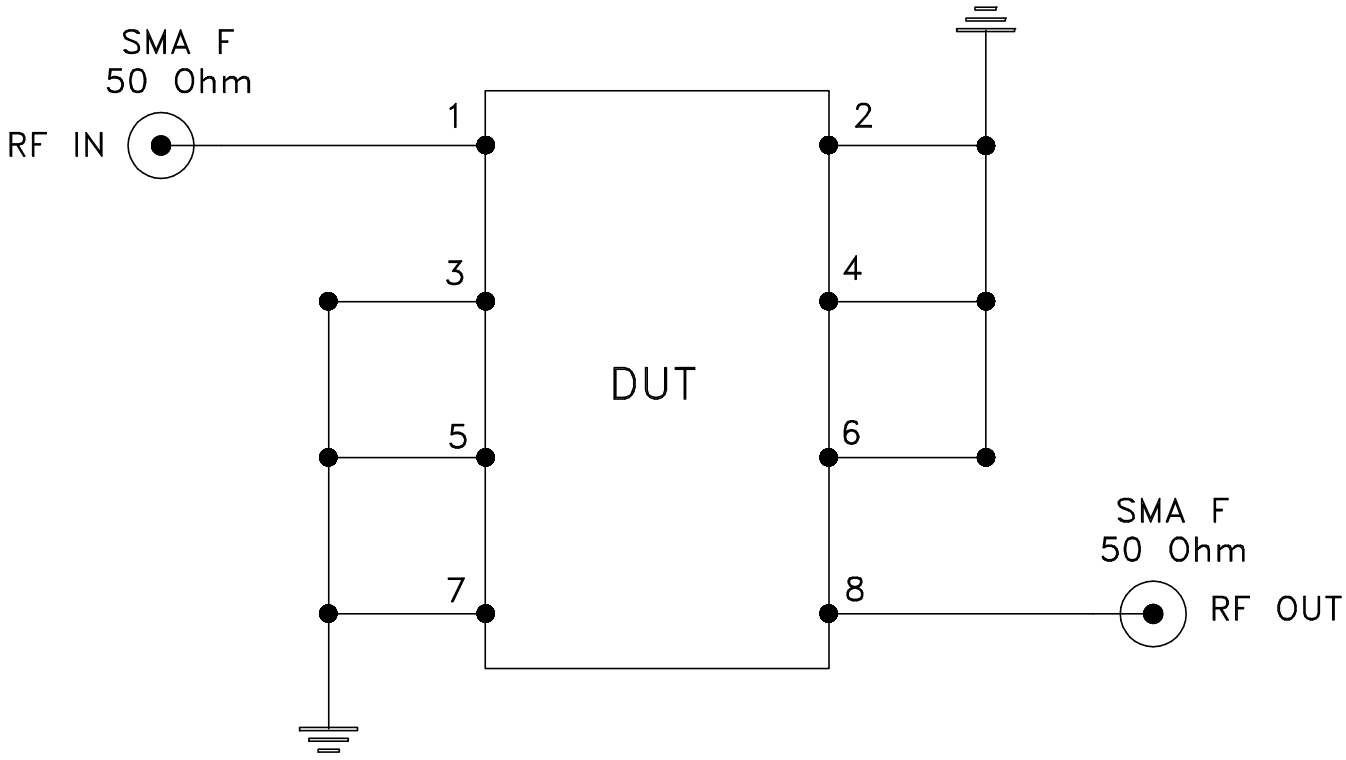
PL, cr, HF1139, SCLF, TB-368

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-230	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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Environmental Specifications ENV02T1

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

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