

Low Pass Filter

50Ω DC to 90 MHz

Maximum Ratings

Operating Temperature -40°C to 85°C

Storage Temperature -55°C to 100°C

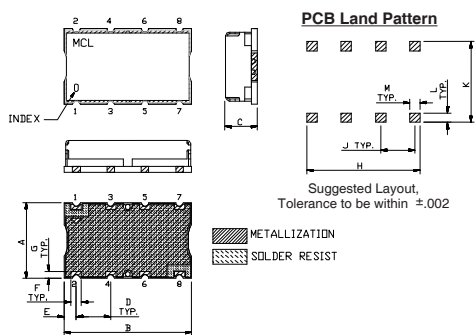
RF Power Input 0.5W Max.

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

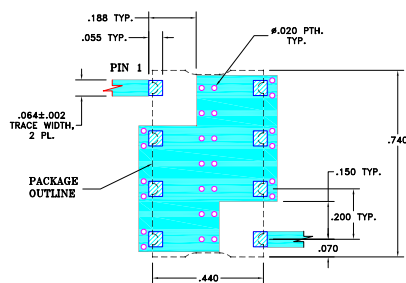


Outline Dimensions (inch mm)

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

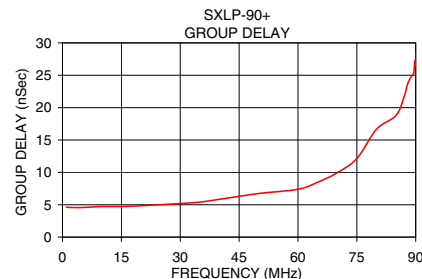
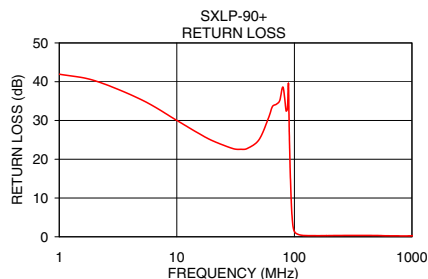
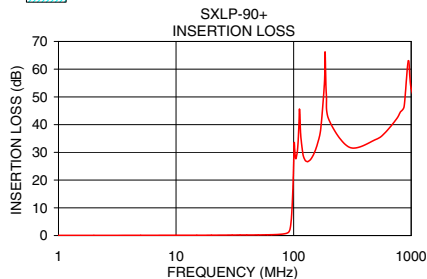
Demo Board MCL P/N: TB-368

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

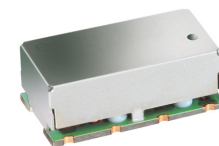


Features

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

Applications

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



CASE STYLE: HF1139

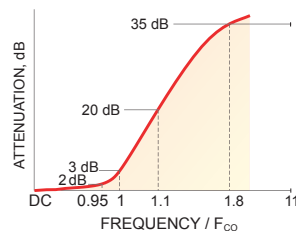
+RoHS Compliant

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

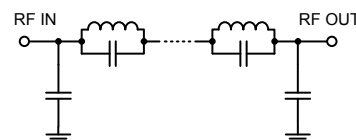
Low Pass Filter Electrical Specifications (T_{AMB} = 25°C)

PASSBAND (MHz)	f _{co} , MHz Nom.	STOPBAND (MHz)		VSWR (:1)	
		(Loss > 20dB)	(Loss > 35dB Typ.)	Passband Typ.	Stopband Typ.
DC - 90	94	105 - 170	170 - 1000	1.2	18

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	0.03	0.02	41.95	1.0	4.63
5.0	0.06	0.02	35.35	2.0	4.63
20.0	0.11	0.02	24.82	5.0	4.58
50.0	0.21	0.02	25.05	10.0	4.57
75.0	0.40	0.02	35.12	15.0	4.73
85.0	0.66	0.02	32.46	20.0	4.74
90.0	1.08	0.02	31.00	30.0	4.84
93.0	2.09	0.12	13.12	40.0	5.41
94.0	2.96	0.19	9.38	50.0	5.84
95.0	4.40	0.29	6.45	60.0	6.74
97.0	9.70	0.44	2.99	65.0	7.39
99.0	18.72	0.68	1.69	70.0	8.47
100.0	25.21	0.94	1.38	75.0	9.94
105.0	27.65	0.93	0.76	80.0	12.14
170.0	36.96	1.75	0.30	85.0	16.65
300.0	31.73	0.23	0.35	87.0	18.81
500.0	34.60	0.18	0.33	89.0	23.75
945.0	58.72	2.92	0.24	89.5	24.88
1000.0	51.39	1.46	0.28	90.0	27.29

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 Low Pass Filter

SXLP-90+

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
1	0.02	0.02	0.02	48.97	49.01	48.45	49.14	49.12	48.50
5	0.04	0.05	0.06	34.40	35.04	35.56	34.49	35.14	35.69
7	0.04	0.05	0.07	31.40	31.97	32.49	31.50	32.09	32.62
8	0.04	0.05	0.06	30.24	30.80	31.29	30.33	30.89	31.40
10	0.06	0.07	0.07	28.34	28.86	29.30	28.43	28.96	29.42
20	0.08	0.09	0.10	22.97	23.27	23.55	23.08	23.40	23.64
30	0.12	0.14	0.16	20.81	20.87	20.91	20.96	21.05	21.07
40	0.14	0.17	0.19	20.48	20.21	19.99	20.73	20.49	20.29
50	0.14	0.19	0.22	21.62	21.08	20.61	22.22	21.57	21.11
60	0.19	0.23	0.26	24.37	23.58	22.96	25.68	24.71	23.96
70	0.23	0.28	0.33	27.29	26.82	26.46	29.29	28.69	28.26
75	0.28	0.35	0.40	28.03	27.88	27.80	29.06	28.94	28.99
80	0.35	0.42	0.50	27.87	28.15	28.48	27.33	27.59	27.93
85	0.47	0.57	0.65	25.31	26.04	26.68	24.18	24.64	25.09
90	0.71	0.85	0.96	22.53	23.35	24.04	20.85	21.18	21.37
93	1.04	1.24	1.43	21.47	21.64	21.59	17.97	17.66	17.26
94	1.26	1.51	1.74	19.22	18.91	18.50	15.82	15.30	14.79
95	1.60	1.93	2.24	15.68	15.21	14.75	13.01	12.46	11.94
97	3.27	3.84	4.39	8.46	8.24	8.02	7.10	6.78	6.50
99	7.62	8.49	9.34	3.89	3.94	3.99	3.09	3.08	3.07
100	11.13	12.14	13.12	2.69	2.84	2.94	2.05	2.13	2.19
105	30.04	29.40	28.88	0.97	1.12	1.23	0.71	0.82	0.92
110	30.02	30.45	30.92	0.58	0.69	0.77	0.46	0.54	0.63
120	30.44	30.28	30.12	0.30	0.37	0.43	0.26	0.31	0.38
130	25.85	25.91	25.97	0.20	0.25	0.29	0.19	0.26	0.29
140	26.16	26.29	26.39	0.14	0.20	0.23	0.15	0.20	0.24
150	28.11	28.26	28.39	0.11	0.17	0.20	0.13	0.18	0.21
160	31.17	31.37	31.51	0.10	0.15	0.18	0.11	0.16	0.20
170	35.58	35.80	36.03	0.08	0.13	0.17	0.09	0.15	0.18
180	42.80	43.11	43.56	0.09	0.14	0.18	0.09	0.14	0.18
190	61.89	60.38	58.47	0.09	0.14	0.17	0.09	0.15	0.18
200	43.26	43.13	42.98	0.09	0.14	0.17	0.09	0.15	0.19
300	31.13	31.27	31.35	0.10	0.16	0.20	0.12	0.17	0.21
400	31.84	31.97	32.03	0.11	0.17	0.20	0.13	0.19	0.23
500	33.48	33.59	33.66	0.11	0.18	0.21	0.13	0.20	0.24
600	35.71	35.79	35.97	0.11	0.19	0.24	0.14	0.21	0.25
700	38.11	38.27	38.36	0.11	0.19	0.23	0.13	0.22	0.27
800	39.85	39.94	40.04	0.09	0.18	0.23	0.22	0.33	0.41
900	51.63	52.52	53.30	0.09	0.20	0.25	0.87	0.98	1.04
1000	62.08	63.75	62.54	0.07	0.19	0.24	0.16	0.27	0.34
1100	50.46	50.47	50.31	0.08	0.19	0.27	0.11	0.24	0.32
1200	45.95	45.92	45.64	0.05	0.19	0.28	0.11	0.25	0.34
1300	51.52	51.20	50.41	0.07	0.22	0.32	0.13	0.28	0.39
1400	23.08	23.74	24.33	0.53	0.64	0.69	0.27	0.44	0.56
1500	28.14	28.14	28.08	0.03	0.20	0.30	0.23	0.45	0.60
1600	27.68	27.67	27.60	0.03	0.20	0.31	0.38	0.65	0.84
1700	25.42	25.43	25.40	0.02	0.21	0.33	0.66	1.00	1.25
1800	23.88	23.99	24.11	0.01	0.21	0.35	1.06	1.45	1.74
1900	25.16	25.38	25.54	0.02	0.22	0.35	1.56	1.96	2.27
2000	25.25	25.47	25.68	0.03	0.23	0.38	1.02	1.28	1.44
2100	27.76	28.36	28.70	0.03	0.25	0.39	0.55	0.81	0.97
2200	30.42	31.12	31.84	0.21	0.43	0.57	0.36	0.59	0.74
2300	37.37	37.08	37.12	0.03	0.27	0.44	0.22	0.46	0.64
2400	43.52	42.28	41.27	0.07	0.31	0.48	0.46	0.72	0.92

REV. X2

SXLP-90+

101124

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Surface Mount Low Pass Filter

SXLP-90+

Typical Performance Data

FREQ. (MHz)	GROUP DELAY (nsec)		
	@ -40° C	@ +25° C	@ +85° C
1	4.31	4.48	4.41
10	4.24	4.20	4.23
12	4.28	4.47	4.17
14	4.39	4.36	4.33
15	4.41	4.35	4.38
16	4.31	4.61	4.44
18	4.50	4.52	4.47
20	4.34	4.36	4.44
22	4.52	4.63	4.34
24	4.58	4.59	4.54
25	4.59	4.49	4.60
26	4.33	4.33	4.54
28	4.44	4.49	4.51
30	4.51	4.49	4.63
32	4.60	4.34	4.62
34	4.96	4.96	4.85
35	4.60	4.75	4.62
36	4.82	4.70	4.84
38	4.88	4.86	4.78
40	4.93	5.01	4.84
42	4.91	4.88	4.81
44	5.08	5.00	5.08
45	5.31	5.18	5.11
46	5.10	5.16	5.28
48	5.36	5.29	5.28
50	5.45	5.36	5.46
52	5.56	5.59	5.66
54	5.48	5.63	5.71
55	5.92	6.00	5.84
56	5.81	5.92	5.94
58	6.23	6.07	5.95
60	6.21	6.25	6.32
62	6.38	6.52	6.55
64	6.69	6.76	6.77
65	6.98	7.04	7.10
66	7.21	7.03	7.12
68	7.33	7.45	7.25
70	7.71	7.89	7.93
72	8.10	8.13	8.20
74	8.50	8.51	8.56
75	8.87	8.90	9.12
76	9.15	9.29	9.26
78	9.76	9.73	9.81
80	10.49	10.41	10.77
82	11.55	11.64	11.82
84	12.77	12.63	12.86
85	13.31	13.48	13.66
86	14.14	14.29	14.45
88	16.04	16.35	16.28
90	18.66	19.13	19.49
92	22.85	23.35	23.96
94	29.52	30.28	30.88
95	34.42	35.10	35.85
98	50.15	49.05	47.87
100	43.21	39.97	36.81

REV. X2

SXLP-90+

101124

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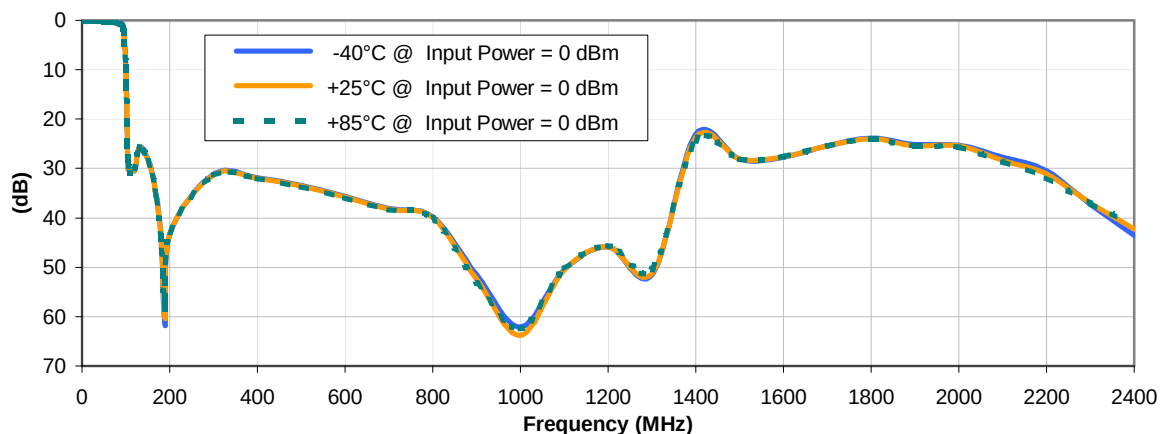


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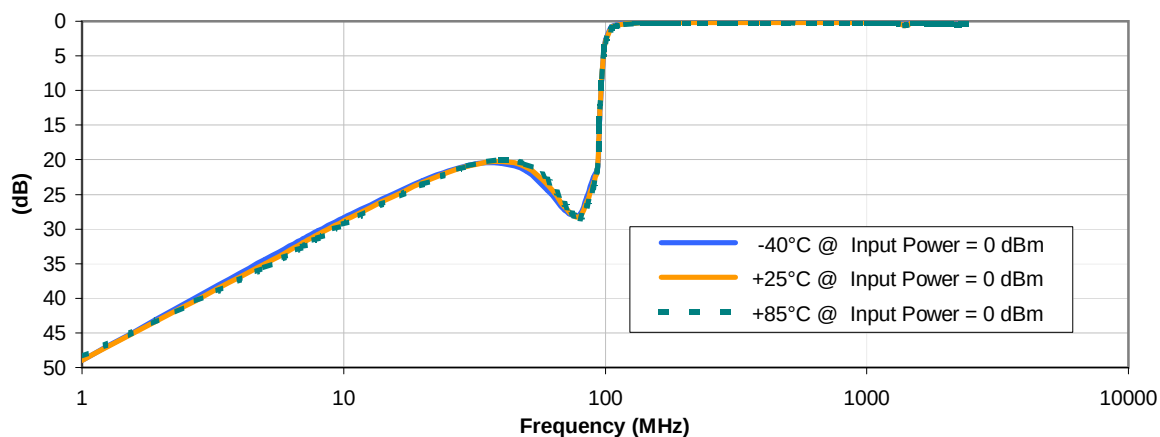


Typical Performance Curves

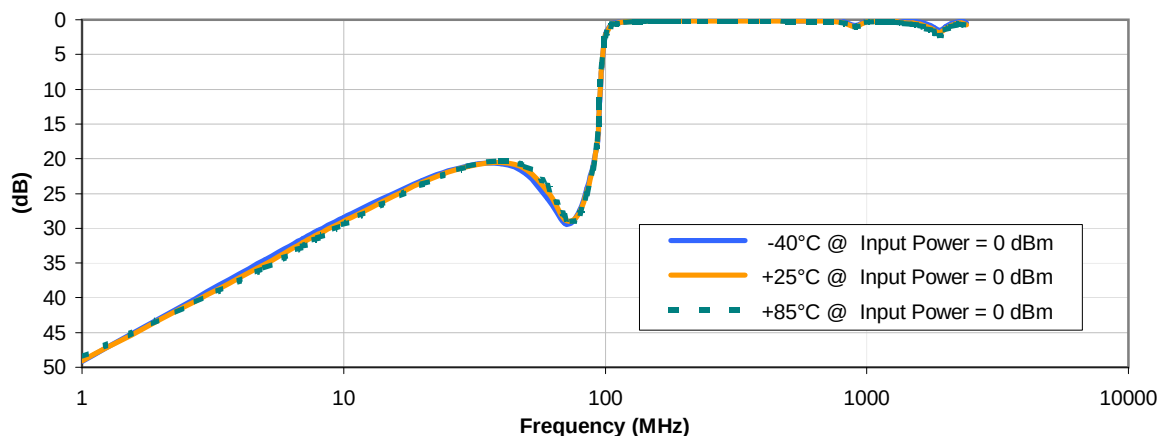
INSERTION LOSS vs. TEMPERATURE



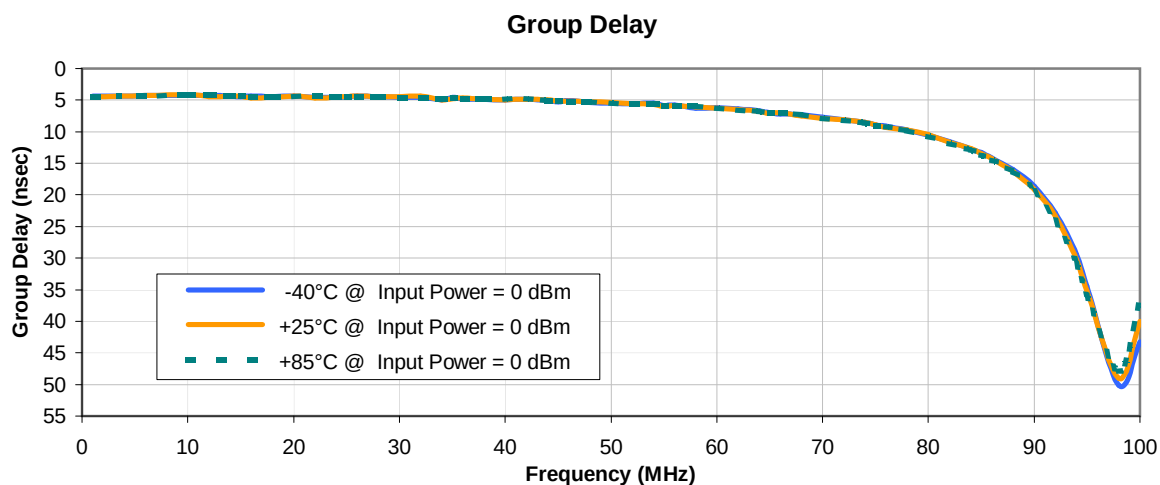
INPUT RETURN LOSS vs. TEMPERATURE



OUTPUT RETURN LOSS vs. TEMPERATURE



Typical Performance Curves



REV. X2
SXLP-90+
101124
Page 2 of 2



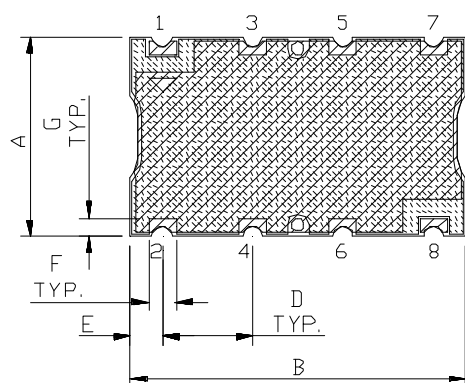
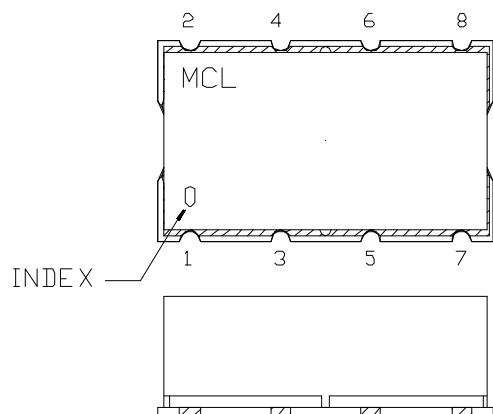
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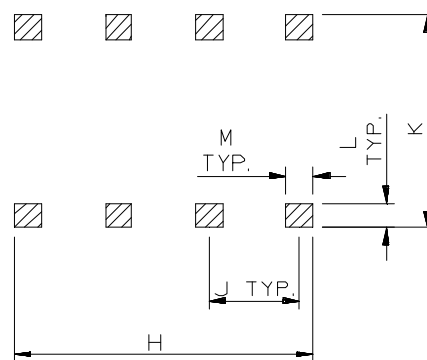
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Outline Dimensions



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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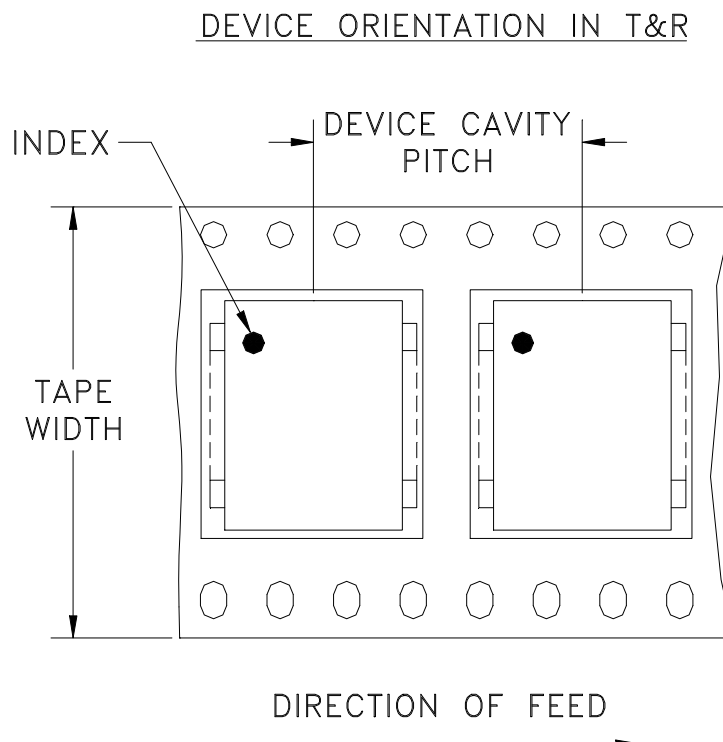


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RF/IF MICROWAVE COMPONENTS



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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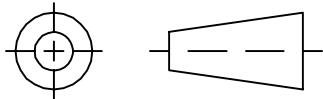
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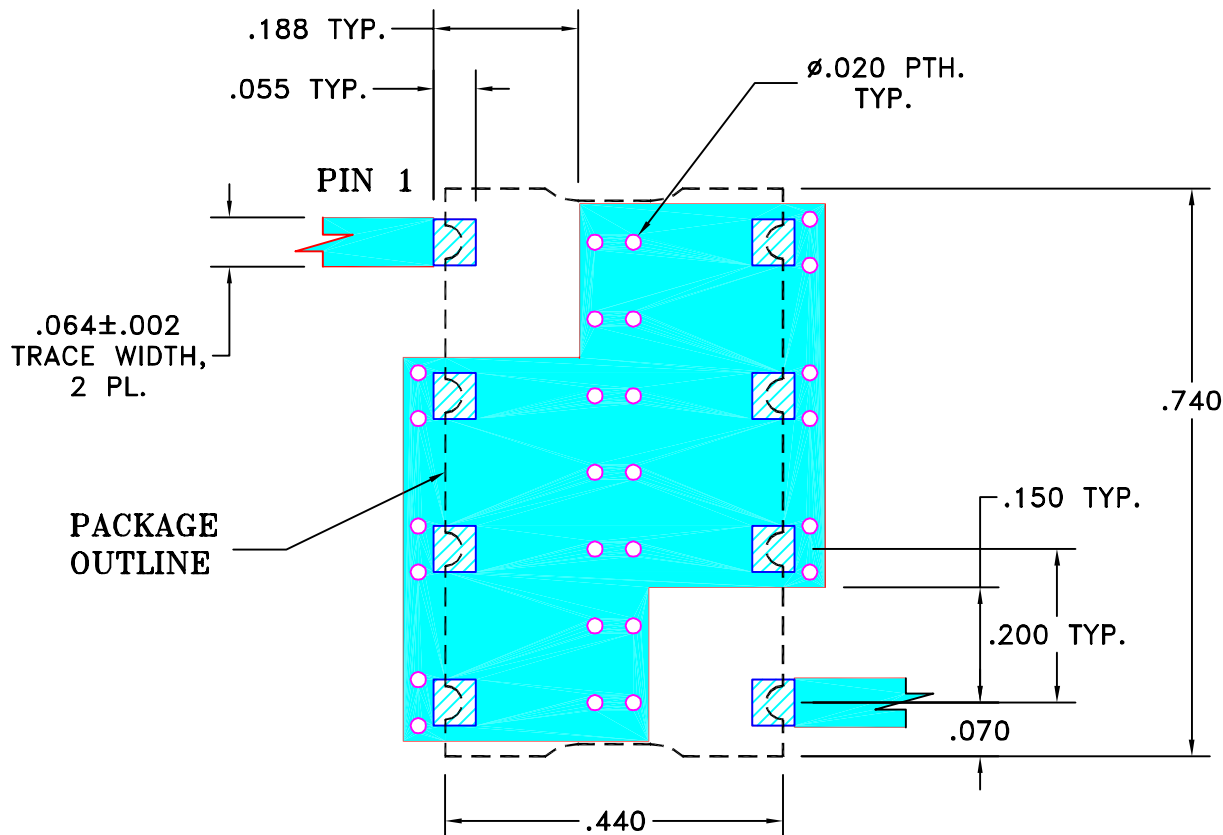
THIRD ANGLE PROJECTION



REVISIONS

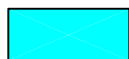
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OR	M101757	NEW RELEASE (FROM RAVON)	11/05	DK	HH
OR	R62293	NEW RELEASE (FROM RAVON)	11/05	DK	HH

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



NOTE:

1. TRACE WIDTH IS SHOWN FOR FR4 WITH DIELECTRIC THICKNESS: $.025 \pm .002$ ". 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 $\pm$ 3 PL DECIMALS $\pm$.005ANGLES $\pm$ FRACTIONS $\pm$

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

A

CODE IDENT

15542

DRAWING NO:

98-PL-230

REV:

OR

FILE:

98PL230

SCALE:

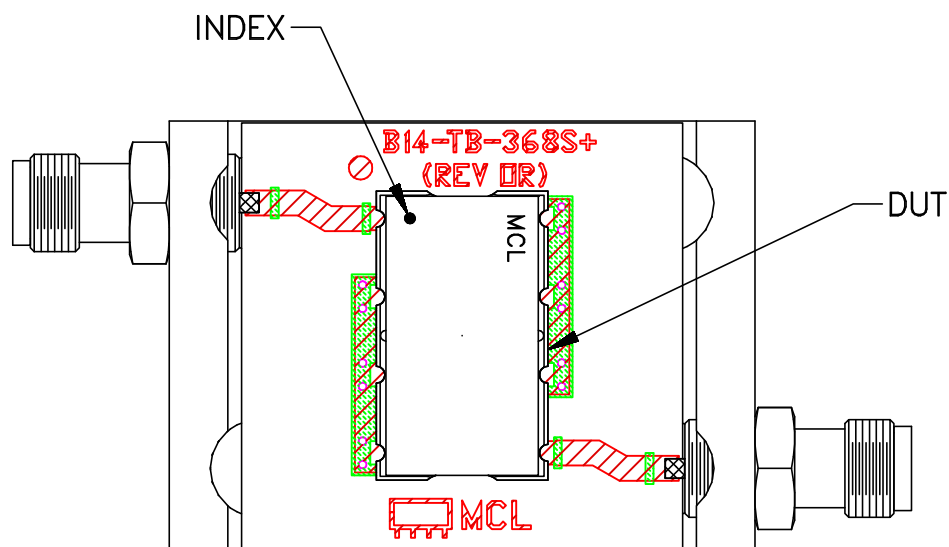
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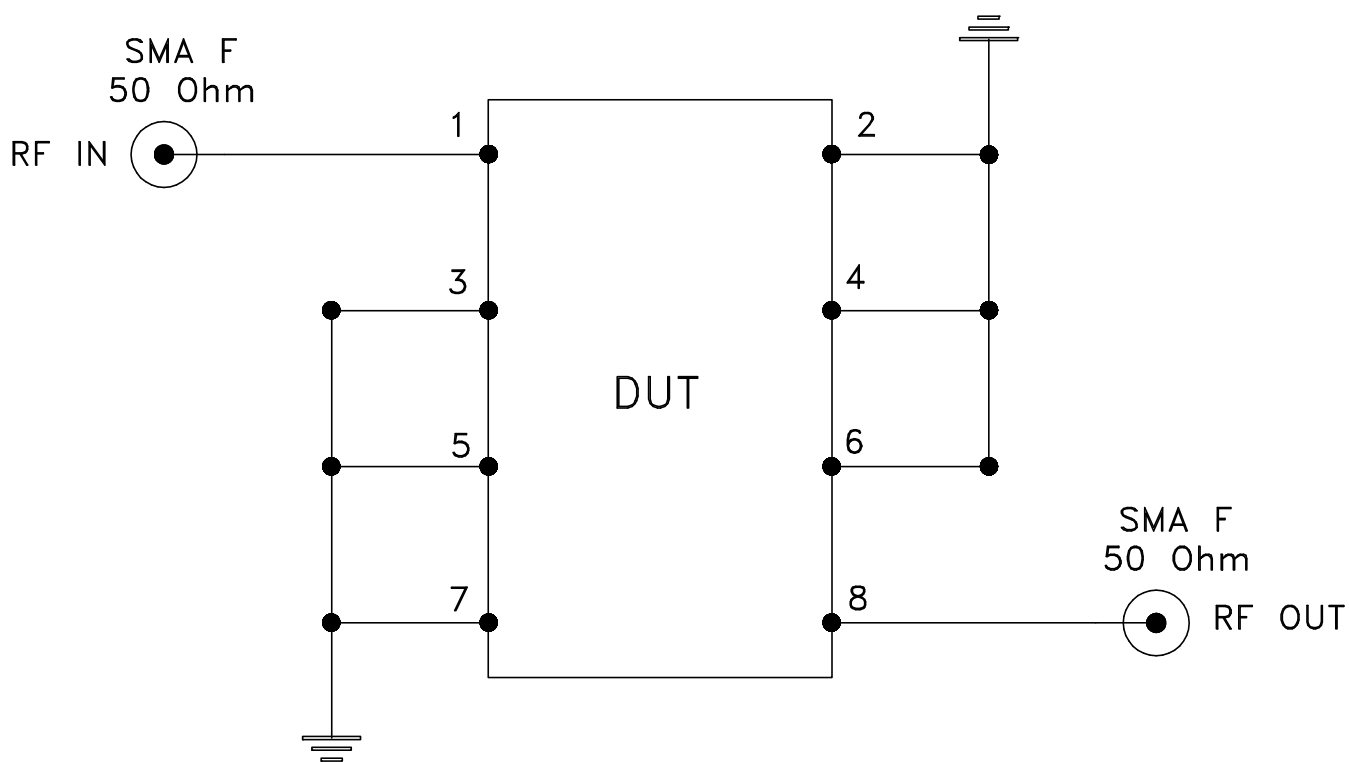
1 OF 1

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

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