

Low Pass Filter

50Ω DC to 190 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.

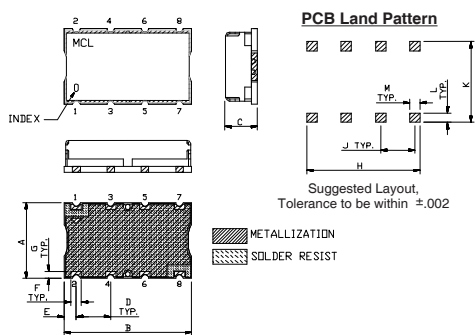
Pin Connections

INPUT 1

OUTPUT 8

GROUND 2, 3, 4, 5, 6, 7

Outline Drawing



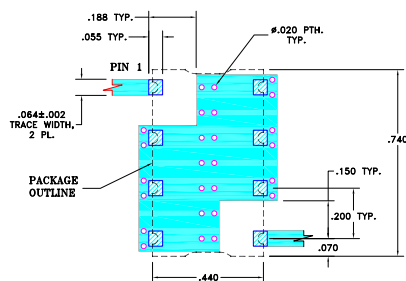
Outline Dimensions (inch/mm)

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	w
.040	.660	.200	.470	.055	.060	gram
1.02	16.76	5.08	11.94	1.40	1.52	3.

Note: Please refer to case style drawing for details

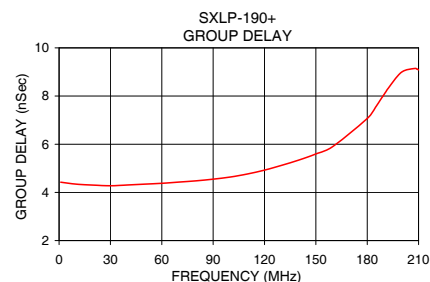
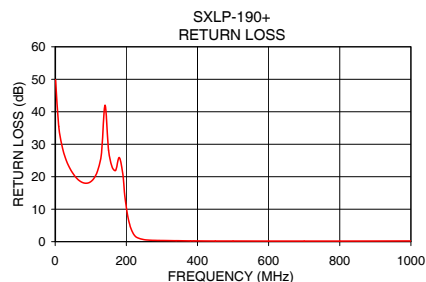
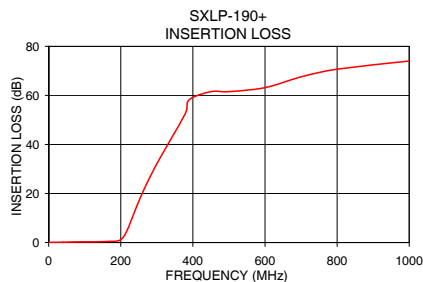
Demo Board MCL P/N: TB-368

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



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.
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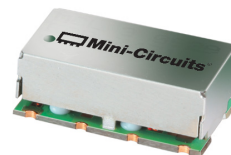
Features

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

Applications

- defense communications
- receivers / transmitters
- harmonic rejection

SXLP-190+



Generic photo used for illustration purposes only
CASE STYLE: HF1139

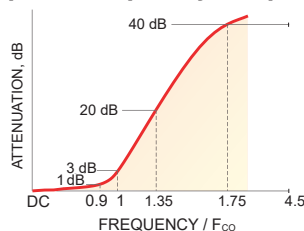
+RoHS Compliant

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

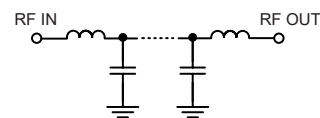
Low Pass Filter Electrical Specifications (T_{AMB} = 25°C)

PASSBAND (MHz)	f _{co} , MHz Nom.	STOPBAND (MHz)		VSWR (:1)	
		(Loss > 20dB)	(Loss > 40dB)	Passband Typ.	Stopband Typ.
DC - 190	210	290 - 390	390 - 1000	1.4	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	0.04	0.01	49.88	1.0	4.42
20.0	0.08	0.01	29.15	10.0	4.34
50.0	0.17	0.01	21.01	20.0	4.30
120.0	0.29	0.01	22.07	30.0	4.28
140.0	0.33	0.00	42.01	50.0	4.34
190.0	0.63	0.01	20.93	60.0	4.38
200.0	1.17	0.03	10.55	80.0	4.48
210.0	2.79	0.09	5.05	90.0	4.55
220.0	5.74	0.15	2.39	100.0	4.64
230.0	9.45	0.22	1.28	110.0	4.76
250.0	16.95	0.26	0.61	120.0	4.92
290.0	29.35	0.34	0.38	130.0	5.12
390.0	55.75	2.14	0.23	140.0	5.34
500.0	65.57	4.10	0.19	150.0	5.60
600.0	68.15	5.42	0.18	160.0	5.91
700.0	75.50	5.06	0.17	180.0	7.07
800.0	71.08	3.29	0.18	190.0	8.08
1000.0	74.05	3.49	0.22	210.0	9.09

Surface Mount Low Pass Filter

SXLP-190+

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	0.00	0.02	0.02	60.10	55.87	52.78	58.94	54.72	52.32
10	0.03	0.05	0.05	38.21	38.81	38.97	38.21	39.41	40.45
20	0.05	0.07	0.08	31.40	31.67	31.65	31.33	32.22	32.84
50	0.12	0.16	0.17	22.28	21.93	21.61	22.53	22.20	21.88
100	0.26	0.31	0.34	16.92	16.98	17.10	16.94	16.98	17.08
120	0.26	0.32	0.35	18.97	19.04	19.16	18.75	18.89	19.06
130	0.24	0.31	0.35	21.96	21.96	22.13	21.65	21.78	22.07
140	0.25	0.32	0.36	28.06	27.94	28.13	27.64	27.95	28.55
150	0.27	0.35	0.39	31.83	30.91	29.90	33.26	32.85	31.82
160	0.31	0.40	0.45	24.22	23.74	23.17	24.74	24.24	23.62
170	0.36	0.46	0.51	21.48	21.16	20.76	21.74	21.38	20.93
180	0.39	0.50	0.56	23.59	23.46	23.25	23.60	23.38	23.06
190	0.46	0.58	0.66	29.02	28.32	27.68	26.69	25.90	25.21
200	0.86	1.05	1.18	12.36	12.05	11.74	12.22	11.90	11.56
210	2.38	2.67	2.90	5.47	5.37	5.24	5.43	5.32	5.17
220	5.45	5.81	6.11	2.33	2.36	2.36	2.30	2.33	2.31
230	9.37	9.72	10.02	1.11	1.18	1.22	1.07	1.15	1.19
240	13.36	13.69	13.96	0.65	0.72	0.77	0.61	0.70	0.75
250	17.15	17.45	17.70	0.45	0.52	0.57	0.41	0.50	0.55
260	20.70	20.98	21.22	0.36	0.42	0.47	0.31	0.40	0.45
270	24.01	24.27	24.50	0.30	0.36	0.41	0.26	0.34	0.39
280	27.13	27.38	27.59	0.27	0.32	0.37	0.22	0.30	0.35
290	30.07	30.30	30.51	0.25	0.29	0.34	0.19	0.28	0.33
300	32.87	33.09	33.28	0.23	0.27	0.32	0.17	0.25	0.29
310	35.54	35.76	35.91	0.21	0.26	0.30	0.15	0.24	0.28
320	38.15	38.29	38.55	0.20	0.24	0.28	0.14	0.23	0.27
330	40.56	40.74	40.97	0.19	0.23	0.26	0.13	0.21	0.26
340	42.94	43.08	43.29	0.17	0.22	0.25	0.12	0.20	0.24
350	45.27	45.38	45.61	0.17	0.21	0.24	0.10	0.18	0.23
360	47.46	47.55	47.84	0.16	0.20	0.23	0.10	0.18	0.23
370	49.69	49.80	50.00	0.15	0.19	0.22	0.09	0.17	0.21
380	51.86	52.04	52.14	0.15	0.18	0.22	0.08	0.16	0.21
390	53.87	54.31	54.28	0.14	0.17	0.21	0.07	0.15	0.20
400	55.87	56.34	56.26	0.13	0.17	0.21	0.07	0.15	0.19
500	77.28	77.07	76.57	0.09	0.13	0.16	0.03	0.12	0.17
600	91.90	92.73	99.84	0.07	0.11	0.15	0.00	0.10	0.16
700	90.21	90.21	90.26	0.07	0.11	0.15	0.01	0.10	0.16
800	90.37	91.79	87.55	0.06	0.11	0.16	0.02	0.11	0.18
900	99.95	93.27	91.31	0.06	0.11	0.16	0.02	0.12	0.19
1000	90.16	87.95	90.52	0.06	0.12	0.17	0.02	0.13	0.21
1100	86.79	82.17	86.01	0.07	0.13	0.18	0.02	0.14	0.23
1200	78.38	85.17	83.86	0.08	0.14	0.20	0.01	0.15	0.25
1300	80.42	83.25	82.00	0.08	0.14	0.21	0.01	0.17	0.27
1400	77.06	81.22	82.63	0.09	0.16	0.22	0.00	0.18	0.28
1500	70.62	71.56	86.52	0.10	0.17	0.23	0.00	0.20	0.30
1600	67.83	74.11	80.35	0.11	0.18	0.24	0.02	0.21	0.32
1700	80.34	68.21	75.68	0.11	0.19	0.25	0.02	0.22	0.34
1800	71.63	64.13	79.48	0.13	0.21	0.27	0.03	0.23	0.36
1900	59.47	67.53	67.93	0.13	0.21	0.28	0.05	0.25	0.38
2000	64.71	66.63	65.81	0.14	0.23	0.29	0.04	0.26	0.40
3000	44.14	41.60	52.66	0.36	0.51	0.49	0.09	0.40	0.59
4000	30.27	33.49	29.65	0.70	0.85	1.11	0.37	0.91	1.25
5000	18.10	18.11	13.12	2.51	2.65	3.55	1.62	2.48	4.70
6000	16.38	15.86	17.22	2.90	3.51	3.27	1.90	3.26	3.16

REV. X2
SXLP-190+
101124
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Typical Performance Data

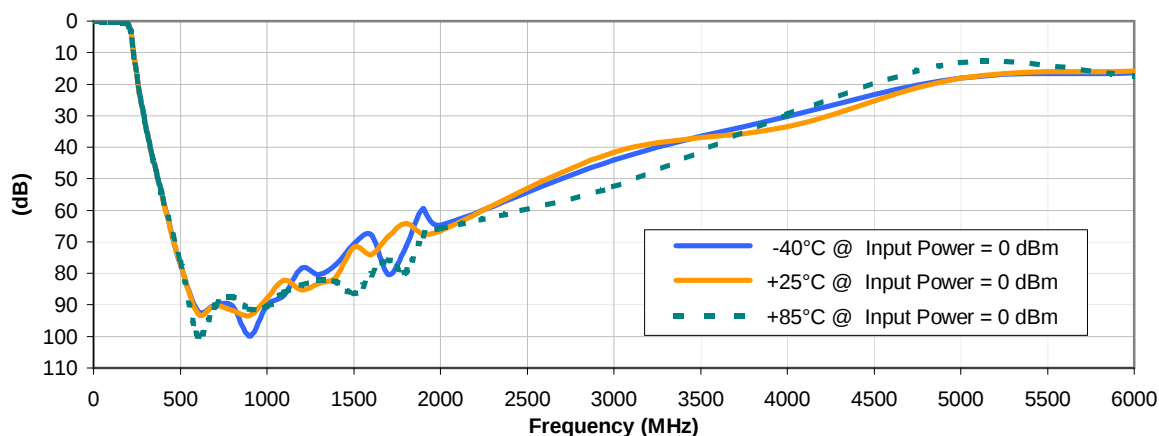
FREQ. (MHz)	GROUP DELAY (nsec)		
	@ -40° C	@ +25° C	@ +85° C
0.5	4.23	4.30	4.45
1	4.23	4.28	4.38
5	4.20	4.23	4.28
10	4.18	4.20	4.23
15	4.17	4.18	4.19
20	4.17	4.17	4.18
25	4.17	4.18	4.19
30	4.18	4.19	4.20
35	4.19	4.19	4.20
40	4.20	4.21	4.21
45	4.22	4.22	4.23
50	4.23	4.23	4.24
55	4.25	4.25	4.26
60	4.27	4.27	4.27
65	4.29	4.29	4.29
70	4.31	4.31	4.31
75	4.33	4.33	4.34
80	4.37	4.37	4.37
85	4.39	4.39	4.40
90	4.43	4.43	4.44
95	4.47	4.47	4.48
100	4.51	4.52	4.53
110	4.64	4.64	4.65
120	4.79	4.80	4.81
130	4.99	5.00	5.01
140	5.21	5.22	5.24
150	5.46	5.47	5.49
160	5.75	5.76	5.79
170	6.15	6.17	6.19
180	6.65	6.68	6.72
190	7.84	7.90	7.96
200	9.47	9.51	9.58
210	10.04	9.91	9.83
220	8.53	8.36	8.18
230	6.38	6.26	6.13
240	4.78	4.71	4.64
250	3.76	3.71	3.67
260	3.06	3.04	3.02
270	2.62	2.59	2.57
280	2.28	2.24	2.24
290	2.02	1.99	1.97
300	1.80	1.79	1.80
310	1.65	1.64	1.76
320	1.50	1.49	1.30
330	1.40	1.34	1.39
340	1.22	1.26	1.40
350	1.21	1.30	1.12
360	1.19	1.30	1.21
370	0.98	1.65	1.05
380	1.05	0.62	0.89
390	1.06	0.61	0.97
400	0.92	0.65	0.65
450	0.66	0.66	0.70

REV. X2
SXLP-190+
101124
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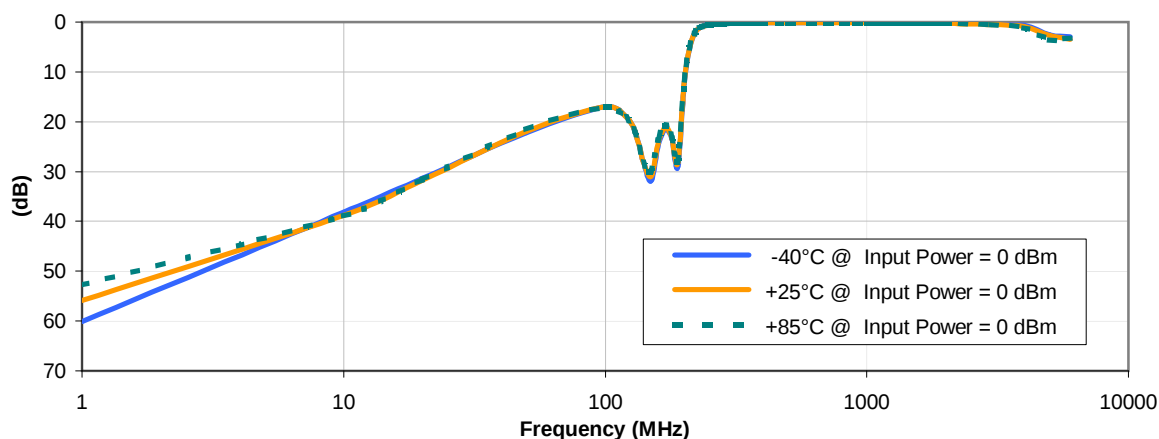


Typical Performance Curves

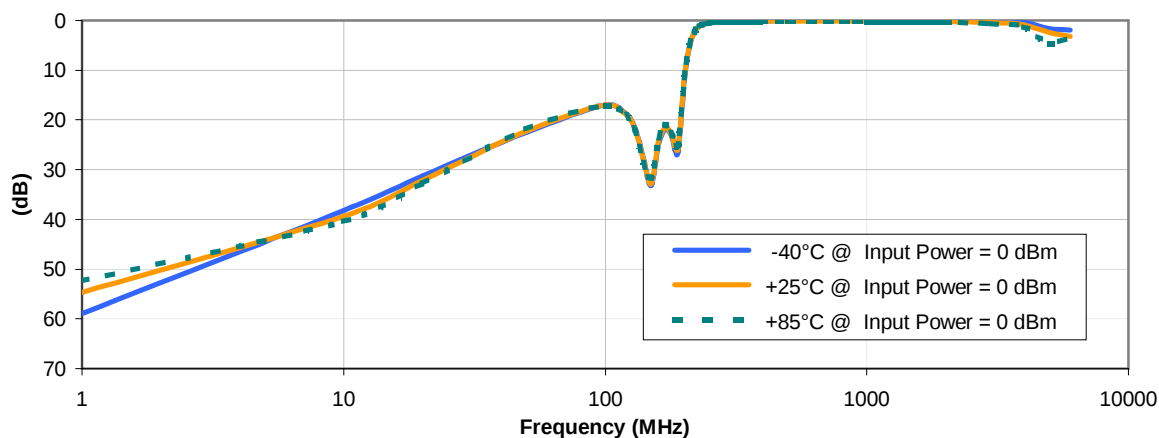
INSERTION LOSS vs. TEMPERATURE



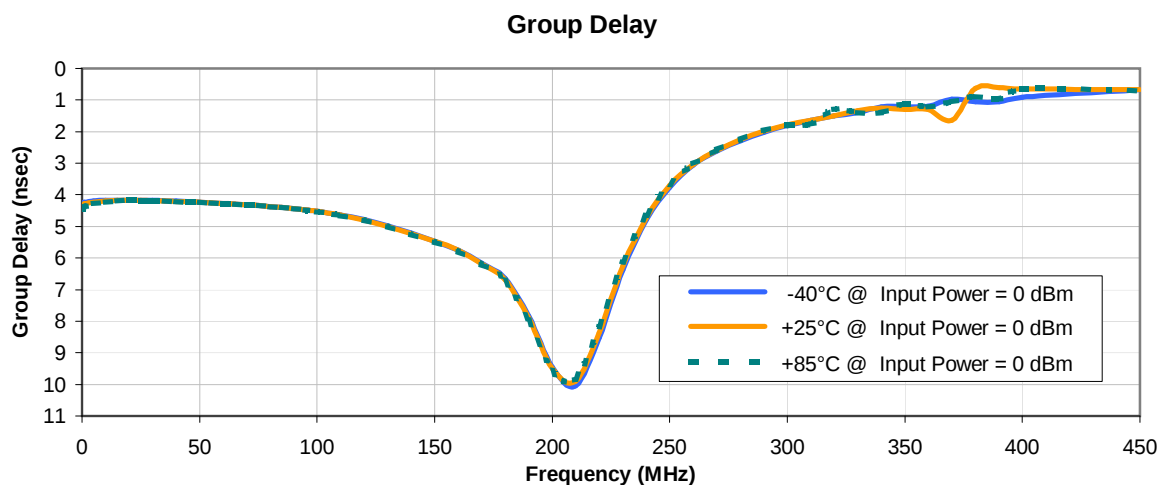
INPUT RETURN LOSS vs. TEMPERATURE



OUTPUT RETURN LOSS vs. TEMPERATURE



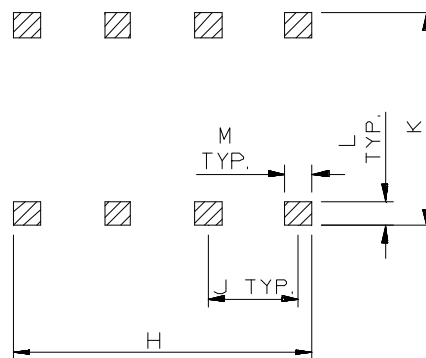
Typical Performance Curves



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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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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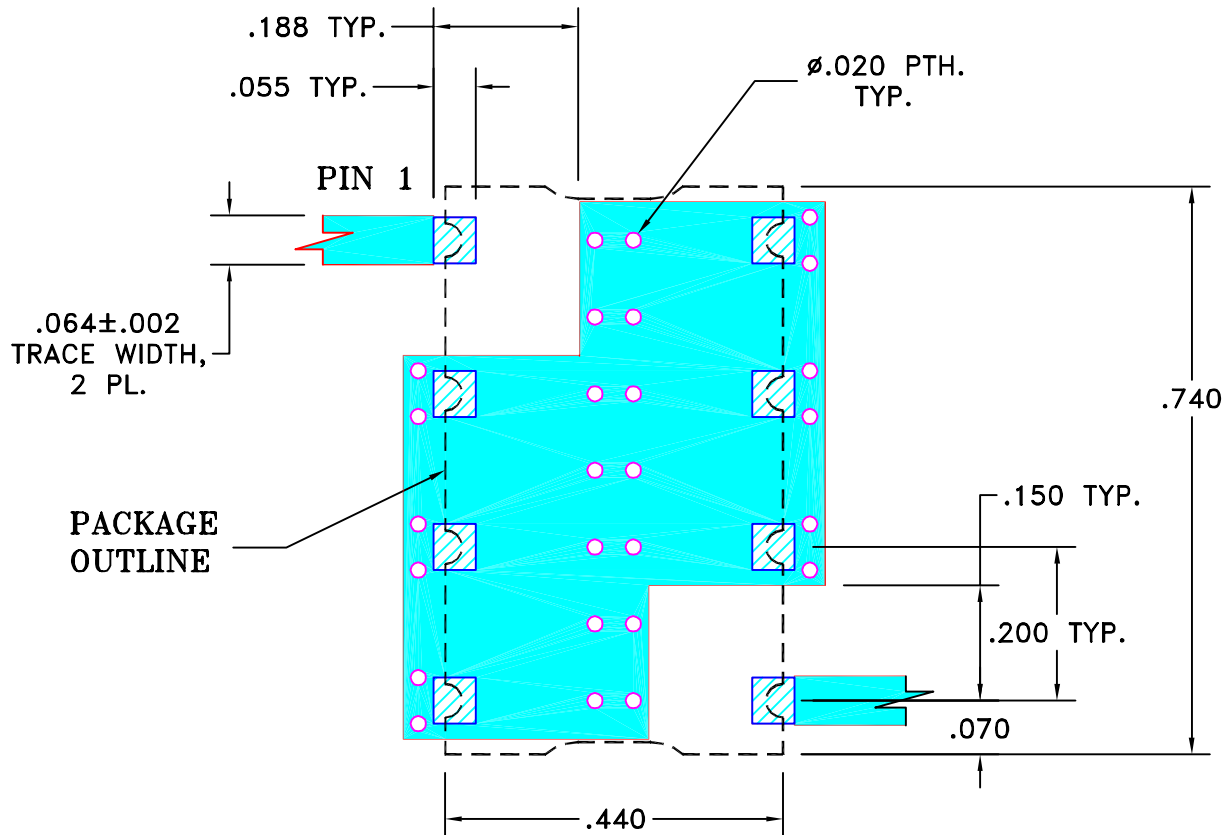
THIRD ANGLE PROJECTION



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	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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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

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