

Low Pass Filter

50Ω DC to 4.7 MHz

SXLP-4.7+

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.

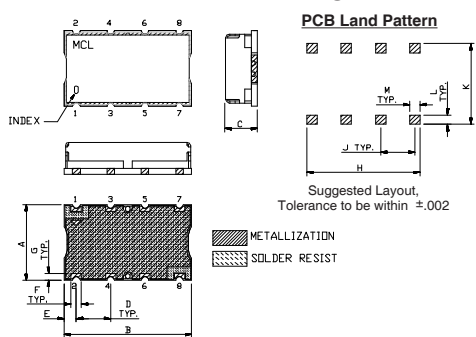
Pin Connections

INPUT 1

OUTPUT 8

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

Outline Drawing



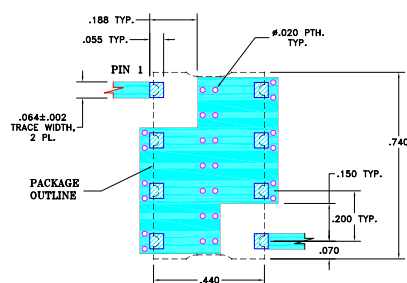
Outline Dimensions (inch/mm)

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:

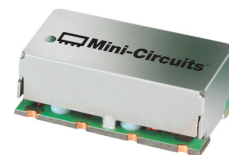
- TRACE WIDTH IS SHOWN FOR FR4 WITH DIELECTRIC THICKNESS: .025"±.002". COPPER: 1/2 OZ. EACH SIDE.
FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
 - BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
- DENOTES COPPER LAND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

Features

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

Applications

- defense communications
- receivers / transmitters
- harmonic rejection



Generic photo used for illustration purposes only
CASE STYLE: HF1139

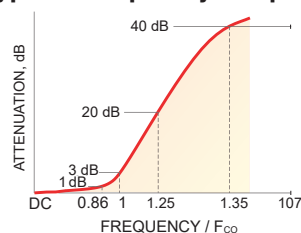
+RoHS Compliant

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

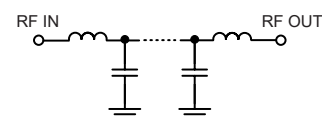
Low Pass Filter Electrical Specifications (T_{AMB} = 25°C)

PASSBAND (MHz)	f _{co} , MHz Nom.	STOPBAND (MHz)	VSWR (:1)
(Loss < 1dB)	(Loss 3dB)	(Loss > 20dB) (Loss > 40dB)	Passband Typ. Stopband Typ.
DC - 4.7	5.6	6.6 - 7.4 7.4 - 600	1.25 18

Typical Frequency Response

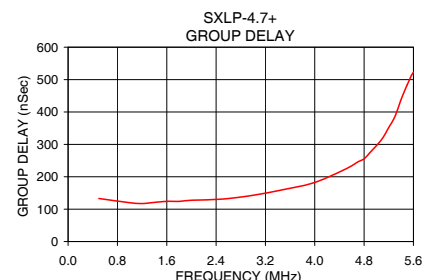
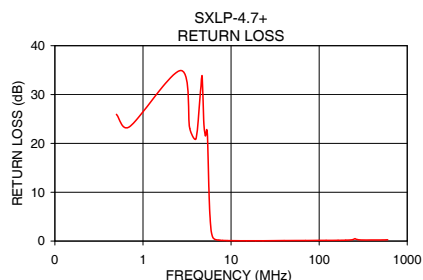
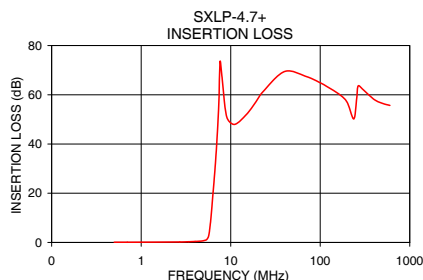


Functional Schematic



Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	Return Loss (dB)	Frequency (MHz)	Group Delay (nSec)
$\bar{x}$	σ			
0.5	0.08	0.01	0.5	132.84
2.7	0.20	0.01	1.2	117.19
2.7	0.20	0.01	1.4	120.85
4.5	0.49	0.02	1.6	124.16
4.7	0.56	0.02	1.8	124.15
5.3	1.02	0.04	2.0	127.50
5.6	2.09	0.32	2.5	131.07
5.8	4.70	0.75	3.0	142.83
6.0	9.43	1.03	3.5	160.70
6.2	15.17	1.09	4.0	182.44
6.6	27.16	1.10	4.5	223.68
7.4	57.30	1.96	4.7	245.95
15.0	52.02	0.24	4.8	255.31
23.0	61.33	0.16	5.0	295.98
40.0	69.54	0.59	5.2	352.27
100.0	65.17	0.41	5.3	385.52
200.0	57.06	0.25	5.4	438.20
400.0	58.40	0.26	5.5	484.24
600.0	55.96	0.30	5.6	521.62



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-4.7+

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	0.10	0.10	0.13	25.48	25.59	25.81	25.54	25.66	25.91
1.0	0.12	0.13	0.15	20.59	20.78	21.03	20.62	20.83	21.08
2.0	0.19	0.19	0.20	20.21	20.73	21.31	20.27	20.82	21.43
2.7	0.22	0.22	0.23	27.96	29.85	32.22	29.25	31.97	35.76
4.0	0.41	0.42	0.44	23.78	22.31	21.11	24.26	22.50	21.15
4.5	0.52	0.52	0.54	35.03	32.69	28.84	40.52	33.36	28.82
4.7	0.61	0.59	0.61	27.83	33.94	42.83	27.90	33.40	40.86
5.3	1.07	1.05	1.10	22.37	30.36	27.04	19.98	23.48	24.42
5.6	1.86	2.08	2.43	14.28	11.21	9.13	13.36	10.87	9.11
5.8	3.92	4.57	5.28	5.81	4.65	3.87	5.68	4.58	3.87
6.0	8.17	9.09	9.98	2.26	1.89	1.66	2.22	1.86	1.66
6.2	13.66	14.60	15.46	1.03	0.92	0.86	1.00	0.89	0.85
6.6	25.30	26.13	26.86	0.41	0.40	0.40	0.39	0.39	0.40
7.4	52.11	52.75	53.54	0.20	0.20	0.21	0.18	0.17	0.20
8.0	67.70	67.28	66.63	0.13	0.13	0.15	0.12	0.12	0.15
9.0	52.17	52.19	52.51	0.11	0.10	0.11	0.09	0.09	0.11
10.0	48.68	48.88	49.21	0.09	0.08	0.09	0.07	0.08	0.10
11.0	48.15	48.39	48.76	0.07	0.06	0.08	0.05	0.06	0.08
12.0	48.66	48.82	49.22	0.06	0.07	0.08	0.04	0.06	0.08
13.0	49.58	49.65	50.10	0.06	0.06	0.07	0.05	0.06	0.08
14.0	50.70	50.71	51.21	0.06	0.06	0.05	0.04	0.05	0.07
15.0	51.90	51.88	52.41	0.05	0.05	0.06	0.03	0.04	0.06
19.0	56.55	56.03	57.05	0.05	0.05	0.05	0.03	0.04	0.06
20.0	57.89	57.34	58.39	0.05	0.04	0.05	0.03	0.04	0.06
23.0	60.23	59.98	61.11	0.05	0.06	0.06	0.04	0.05	0.08
24.0	61.18	60.18	61.94	0.05	0.06	0.06	0.04	0.05	0.08
25.0	62.64	60.36	62.05	0.05	0.05	0.06	0.05	0.06	0.08
30.0	65.10	62.93	66.21	0.06	0.06	0.06	0.05	0.07	0.10
40.0	67.34	63.86	66.96	0.07	0.07	0.08	0.05	0.07	0.10
50.0	67.86	62.35	66.55	0.07	0.07	0.08	0.05	0.07	0.10
60.0	66.60	60.73	65.78	0.08	0.08	0.08	0.06	0.07	0.10
70.0	65.06	60.06	63.88	0.08	0.08	0.08	0.06	0.07	0.10
80.0	64.48	59.75	65.06	0.10	0.09	0.10	0.07	0.08	0.11
90.0	63.62	58.85	64.91	0.10	0.10	0.11	0.08	0.10	0.13
100.0	62.86	57.98	64.01	0.09	0.09	0.09	0.08	0.09	0.11
200.0	54.02	50.13	54.66	0.12	0.13	0.15	0.09	0.13	0.17
300.0	58.40	51.35	59.84	0.13	0.16	0.18	0.06	0.11	0.16
400.0	54.42	48.46	56.08	0.07	0.11	0.14	0.02	0.10	0.15
500.0	52.88	46.89	55.32	0.05	0.09	0.15	0.02	0.08	0.14
600.0	50.71	46.28	53.19	0.01	0.06	0.11	0.04	0.07	0.14
700.0	51.39	47.02	54.37	0.02	0.09	0.16	0.04	0.13	0.18
800.0	50.80	45.66	54.88	0.03	0.03	0.11	0.09	0.05	0.13
900.0	52.42	46.55	59.67	0.06	0.02	0.11	0.13	0.03	0.12
1000.0	58.63	50.69	57.98	0.00	0.08	0.17	0.13	0.04	0.14
1100.0	48.05	52.01	46.31	0.01	0.09	0.18	0.11	0.08	0.18
1200.0	43.59	48.03	45.19	0.04	0.12	0.21	0.06	0.12	0.22
1300.0	44.19	46.80	43.78	0.10	0.20	0.28	0.02	0.18	0.28
1400.0	39.96	42.18	38.16	0.19	0.29	0.39	0.10	0.29	0.41
1500.0	32.32	32.88	31.11	0.34	0.46	0.55	0.28	0.49	0.62
1600.0	23.39	23.32	22.67	0.71	0.86	1.00	0.82	1.10	1.28
1700.0	16.06	16.48	16.75	1.46	1.48	1.51	2.43	2.53	2.50
1800.0	20.00	20.40	20.64	0.70	0.79	0.88	0.66	0.84	0.93
1900.0	23.89	23.73	24.10	0.72	0.86	0.96	0.52	0.73	0.84
2000.0	25.06	24.61	24.80	0.91	1.06	1.17	0.64	0.86	1.01

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SXLP-4.7+

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Typical Performance Data

FREQ. (MHz)	GROUP DELAY (nsec)		
	@ -40° C	@ +25° C	@ +85° C
0.5	116.27	114.47	115.20
0.8	117.10	115.43	116.64
0.9	116.85	115.72	117.57
1.0	116.90	116.07	117.89
1.1	117.27	116.20	118.50
1.2	117.63	116.67	118.70
1.3	117.92	117.15	119.14
1.4	119.00	118.01	119.34
1.5	119.03	118.42	120.53
1.6	120.32	119.48	121.20
1.7	121.31	120.60	122.43
1.8	122.20	121.64	123.35
1.9	123.65	122.31	124.32
2.0	124.71	123.39	125.54
2.1	125.79	124.21	127.05
2.2	127.32	126.15	128.54
2.3	128.99	127.86	130.26
2.4	130.95	129.16	131.92
2.5	132.33	130.83	133.38
2.6	134.01	132.93	135.55
2.7	136.16	135.01	137.79
2.8	138.72	137.60	139.95
2.9	140.11	138.74	141.72
3.0	142.52	140.96	143.84
3.1	144.78	143.53	146.34
3.2	147.72	145.93	149.03
3.3	150.40	148.52	151.90
3.4	153.14	151.51	154.74
3.5	155.82	154.47	157.71
3.6	159.74	158.11	161.15
3.7	163.05	161.08	164.71
3.8	167.44	165.30	169.22
3.9	171.45	170.01	173.63
4.0	176.91	174.82	178.74
4.1	182.60	180.12	184.68
4.2	188.67	186.24	191.07
4.3	195.43	192.90	198.30
4.4	203.59	200.69	206.36
4.5	211.52	208.76	215.25
4.6	221.56	217.58	225.16
4.7	232.15	227.78	236.72
5.0	276.33	267.96	283.97
6.0	422.57	439.77	404.38
7.0	104.10	104.82	98.51
8.0	143.71	146.58	143.29
9.0	26.16	27.30	22.83
10.0	22.11	19.83	22.26
11.0	18.03	18.54	20.24
12.0	15.23	16.12	17.13
13.0	14.22	14.16	12.69
14.0	7.66	10.57	10.80
15.0	10.43	8.43	9.81
16.0	10.96	11.96	8.07

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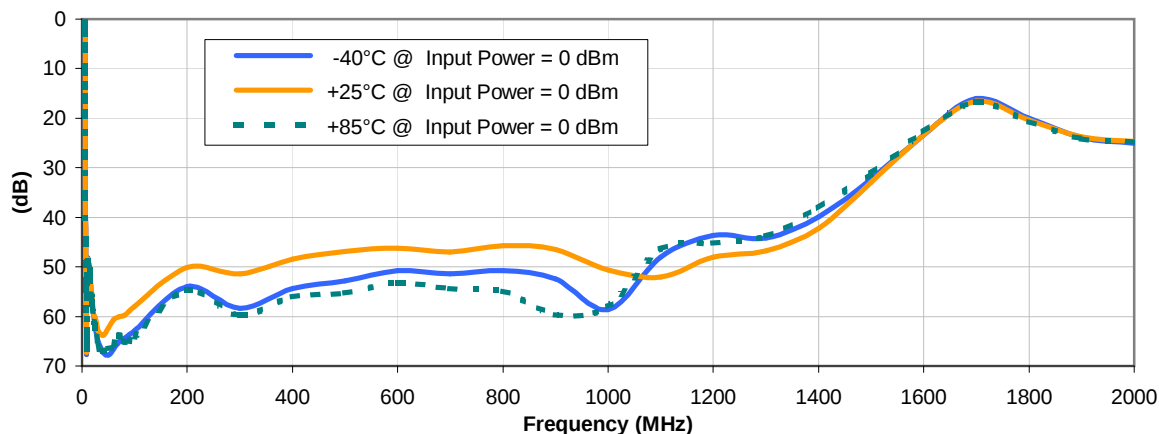


Surface Mount Low Pass Filter

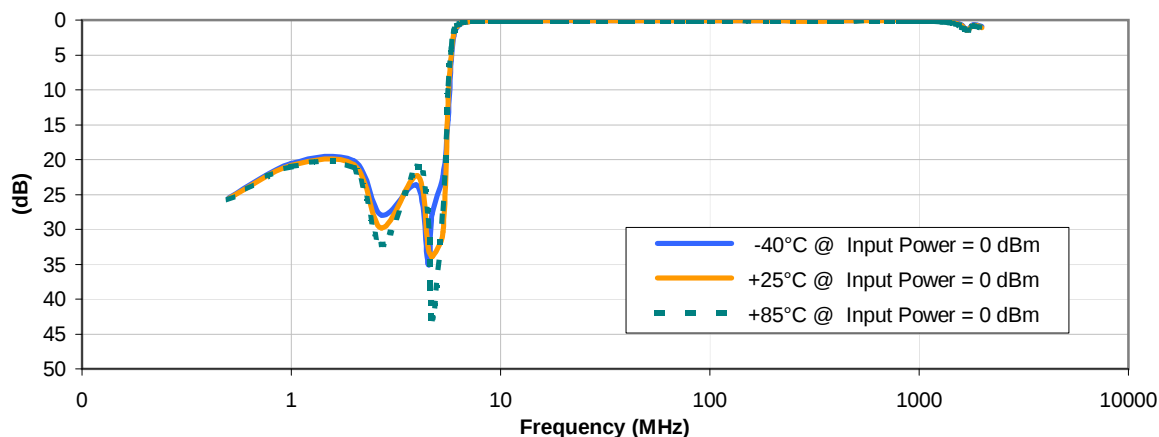
Typical Performance Curves

SXLP-4.7+

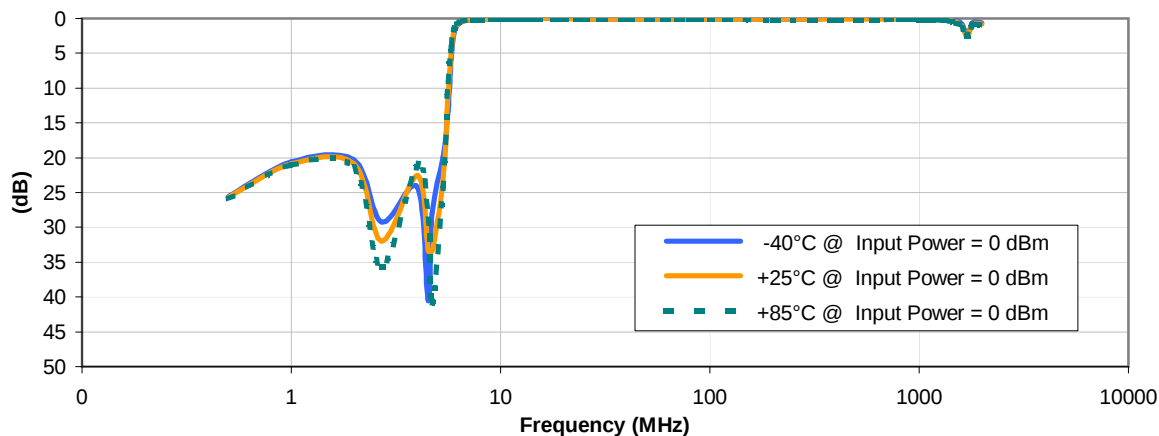
INSERTION LOSS vs. TEMPERATURE



INPUT RETURN LOSS vs. TEMPERATURE



OUTPUT RETURN LOSS vs. TEMPERATURE



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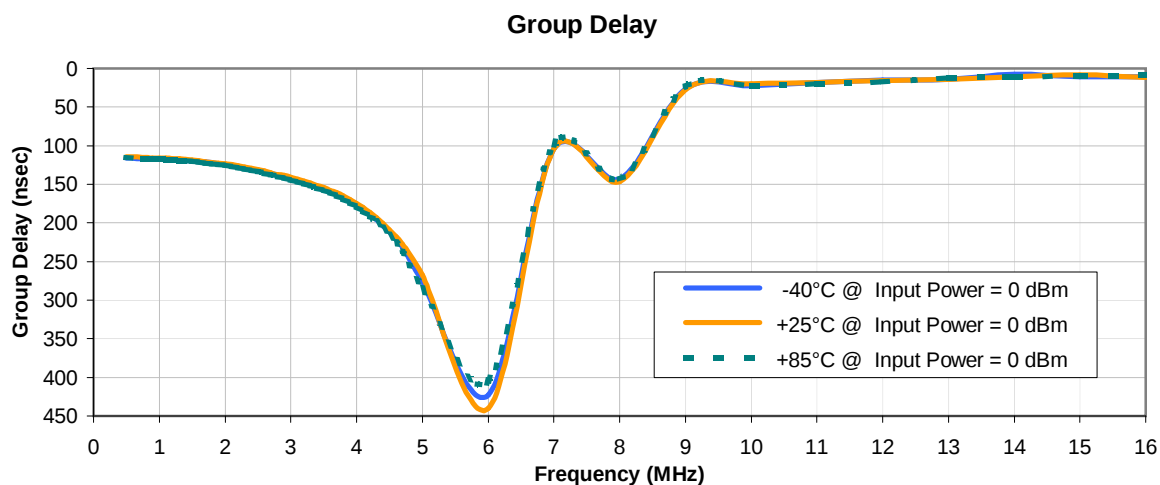


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Typical Performance Curves



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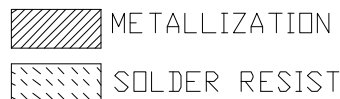
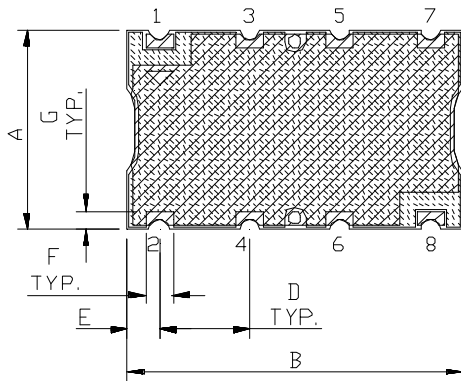
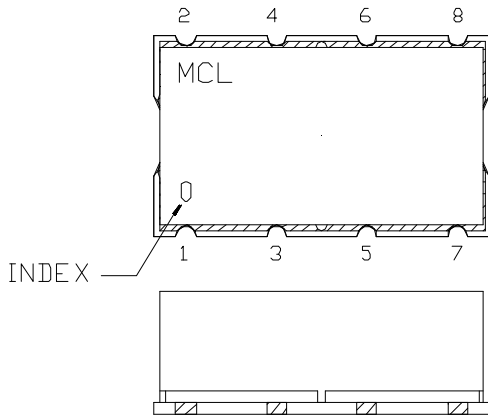
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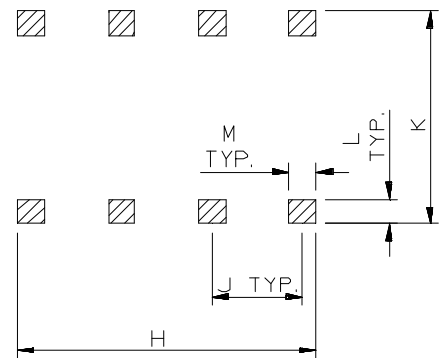
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Outline Dimensions



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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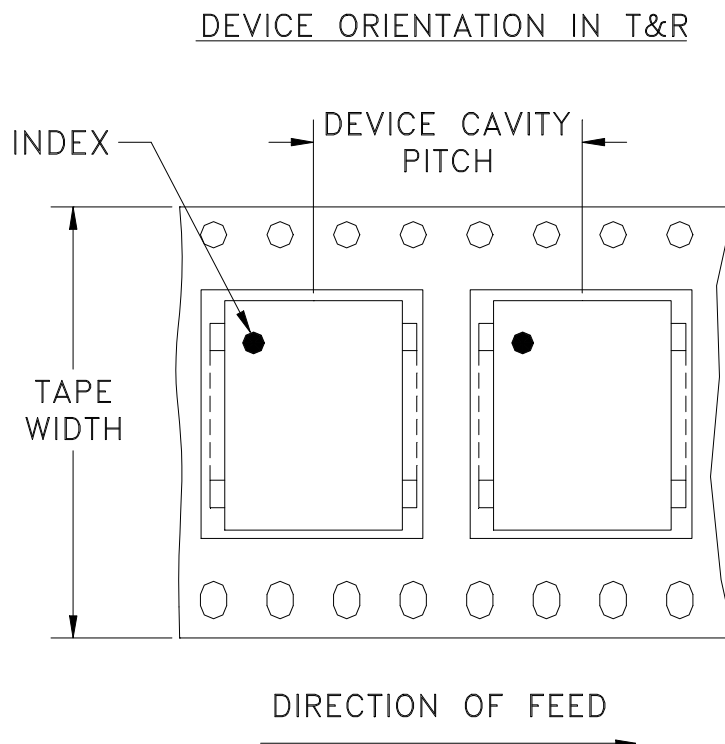


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RF/IF MICROWAVE COMPONENTS



Tape & Reel Packaging TR-F5



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

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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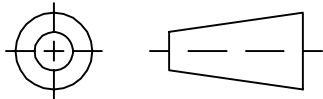
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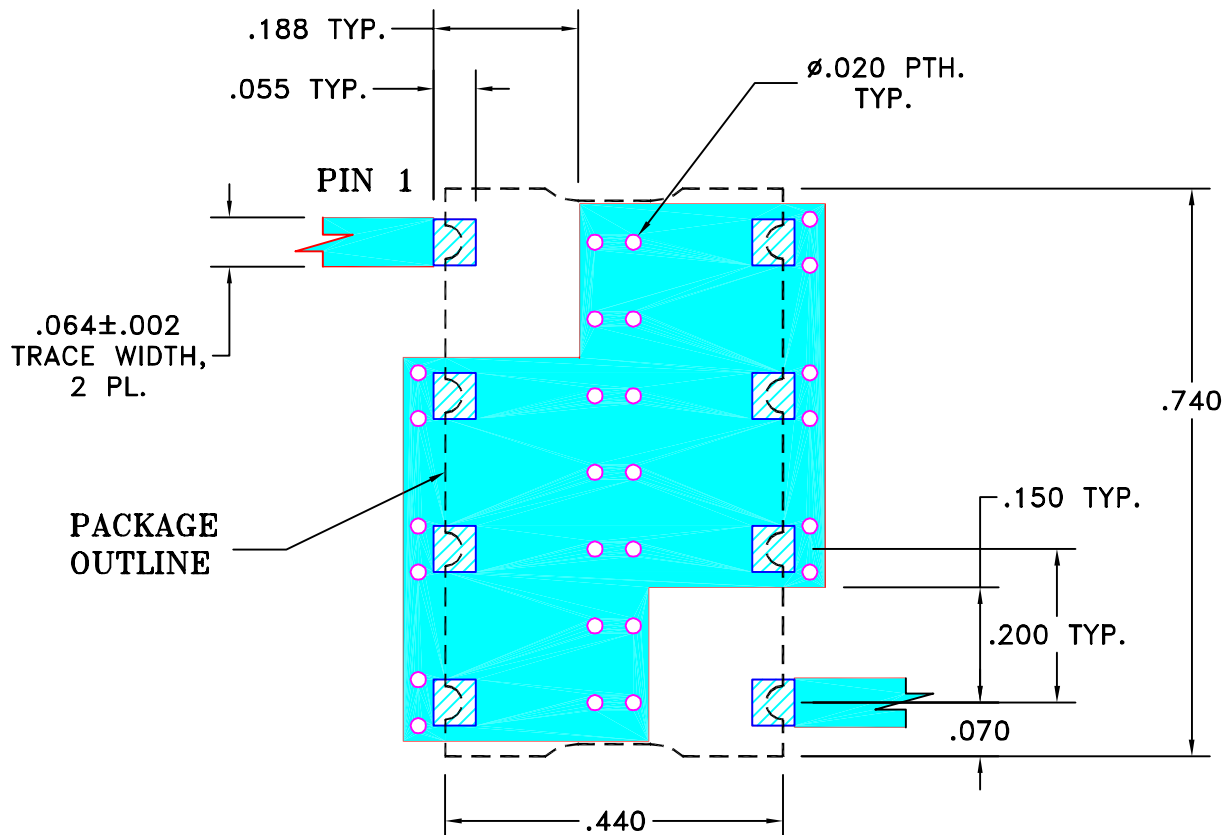
THIRD ANGLE PROJECTION



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: $.025 \pm .002$ ". 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

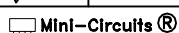
UNLESS OTHERWISE SPECIFIED

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



Mini-Circuits®

13 Neptune Avenue
Brooklyn NY 11235

PL, cr, HF1139, SCLF, TB-368

SIZE

A

CODE IDENT

15542

DRAWING NO:

98-PL-230

REV:

OR

FILE:

98PL230

SCALE:

4:1

SHEET:

1 OF 1

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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.

 **Mini-Circuits®**



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