

Low Pass Filter

50Ω DC to 22 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.

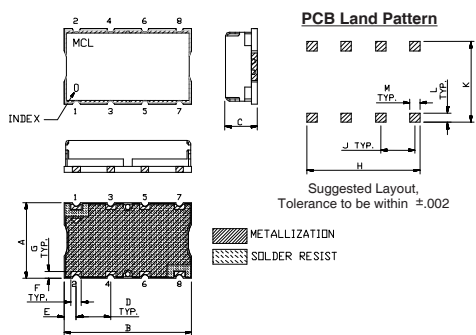
Pin Connections

INPUT 1

OUTPUT 8

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

Outline Drawing



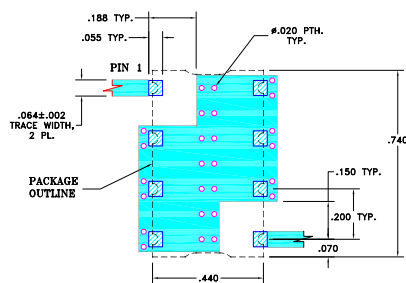
Outline Dimensions (inch/mm)

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	gr
.040	.660	.200	.470	.055	.060	
1.02	16.76	5.08	11.94	1.40	1.52	

Note: Please refer to case style drawing for details

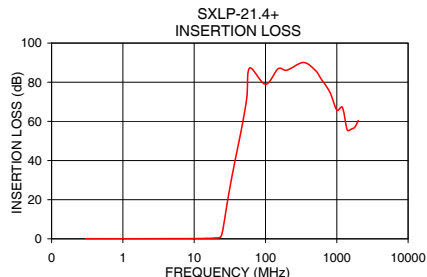
Demo Board MCL P/N: TB-368

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.

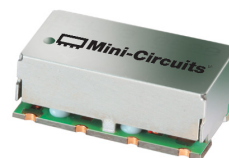
 DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
 DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK


Features

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

Applications

- defense communications
- receivers / transmitters
- harmonic rejection

SXLP-21.4+

 Generic photo used for illustration purposes only
 CASE STYLE: HF1139

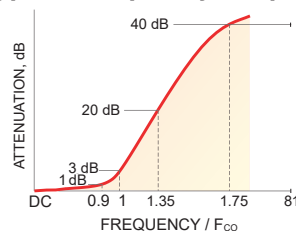
+RoHS Compliant

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

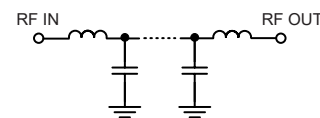
Low Pass Filter Electrical Specifications (T_{AMB} = 25°C)

PASSBAND (MHz)	f _{co} , MHz Nom.	STOPBAND (MHz)	VSWR (:1)
(Loss < 1dB)	(Loss 3dB)	(Loss > 20dB) (Loss > 40dB)	Passband Typ. Stopband Typ.
DC - 22	24.5	32 - 41 41 - 2000	1.3 18

Typical Frequency Response

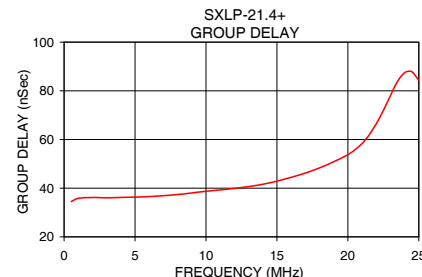
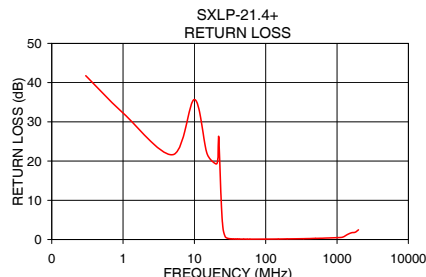


Functional Schematic



Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	Return Loss (dB)	Frequency (MHz)	Group Delay (nSec)
$\bar{x}$	σ			
0.5	0.04	0.01	0.5	34.48
2.5	0.08	0.01	2.0	36.18
11.0	0.16	0.01	4.0	36.18
19.0	0.33	0.01	6.0	36.53
22.0	0.47	0.01	8.0	37.40
23.5	0.95	0.04	10.0	38.72
24.0	1.53	0.09	12.0	39.90
24.5	2.46	0.14	14.0	41.60
25.5	5.35	0.26	16.0	44.45
27.5	12.69	0.38	18.0	48.34
32.0	26.80	0.44	20.0	53.79
41.0	46.58	0.58	21.0	58.29
70.0	85.52	4.91	21.4	61.06
100.0	83.48	4.91	21.8	64.61
300.0	93.44	3.07	22.0	66.39
500.0	88.28	4.20	23.0	78.07
1000.0	66.04	2.86	23.5	83.86
1500.0	55.48	1.81	24.0	87.44
2000.0	58.00	3.29	25.0	84.33



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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Surface Mount Low Pass Filter

SXLP-21.4+

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	0.04	0.05	0.06	34.70	34.57	34.27	34.56	34.39	34.10
2.5	0.08	0.10	0.10	21.74	21.66	21.55	21.74	21.64	21.53
11.0	0.15	0.17	0.18	30.31	30.58	30.70	30.29	30.55	30.66
19.0	0.40	0.44	0.47	16.93	16.84	16.72	16.97	16.89	16.78
22.0	0.54	0.59	0.64	23.92	24.09	24.24	24.69	24.72	24.77
23.5	1.20	1.29	1.39	10.62	10.40	10.19	10.67	10.46	10.24
24.0	1.94	2.06	2.19	6.98	6.83	6.69	7.00	6.86	6.72
24.5	3.06	3.21	3.38	4.53	4.44	4.36	4.54	4.46	4.38
25.5	6.26	6.44	6.66	1.93	1.91	1.90	1.94	1.92	1.91
27.5	13.69	13.89	14.11	0.52	0.53	0.55	0.52	0.54	0.56
32.0	27.56	27.74	27.94	0.17	0.18	0.21	0.17	0.18	0.20
41.0	46.85	46.99	47.08	0.11	0.12	0.13	0.11	0.11	0.12
50.0	61.39	61.80	61.64	0.09	0.10	0.11	0.09	0.10	0.11
60.0	76.92	78.89	78.34	0.08	0.09	0.10	0.08	0.09	0.11
70.0	87.06	88.93	81.73	0.08	0.09	0.10	0.07	0.09	0.11
80.0	81.54	80.29	79.67	0.08	0.09	0.10	0.07	0.09	0.12
90.0	80.11	79.71	83.15	0.08	0.09	0.10	0.07	0.10	0.12
100.0	78.76	80.66	79.03	0.08	0.09	0.11	0.06	0.10	0.12
200.0	84.67	85.31	85.95	0.08	0.10	0.13	0.06	0.11	0.15
300.0	85.26	87.79	86.48	0.08	0.12	0.15	0.06	0.13	0.18
400.0	88.21	86.13	88.90	0.09	0.14	0.18	0.07	0.15	0.21
500.0	85.52	84.79	85.57	0.10	0.16	0.21	0.08	0.18	0.25
600.0	91.87	85.79	85.48	0.12	0.18	0.24	0.09	0.21	0.30
700.0	82.91	82.22	83.34	0.14	0.21	0.28	0.11	0.25	0.35
800.0	76.42	77.54	79.94	0.15	0.25	0.33	0.14	0.29	0.41
900.0	75.59	72.95	75.61	0.19	0.29	0.39	0.17	0.35	0.49
1000.0	74.20	76.77	77.03	0.23	0.35	0.47	0.23	0.44	0.61
1200.0	69.46	72.87	71.62	0.45	0.65	0.86	0.52	0.86	1.19
1300.0	70.75	77.51	71.48	0.81	1.09	1.33	0.99	1.48	1.87
1400.0	63.56	61.69	60.75	1.46	1.55	1.59	1.94	2.29	2.48
1500.0	56.13	58.58	60.67	1.39	1.40	1.50	2.39	2.48	2.60
1600.0	58.39	61.27	62.11	1.13	1.31	1.54	2.14	2.43	2.73
1700.0	62.39	63.13	65.27	1.16	1.47	1.79	2.26	2.74	3.06
1800.0	61.25	64.23	61.98	1.43	1.84	2.18	2.77	3.14	3.19
2000.0	55.28	50.50	54.13	2.44	2.60	2.57	2.64	2.50	2.42
2200.0	46.98	53.95	45.99	2.14	2.02	1.98	1.61	1.70	1.81
2300.0	49.97	53.30	48.57	1.76	1.71	1.72	1.33	1.50	1.64
2400.0	52.19	52.14	48.77	1.46	1.50	1.55	1.18	1.37	1.55
2500.0	55.13	51.51	55.32	1.29	1.35	1.47	1.06	1.31	1.47
2600.0	49.27	47.26	50.49	1.17	1.29	1.40	0.99	1.29	1.44
2700.0	40.64	42.32	41.01	1.17	1.27	1.44	1.02	1.28	1.52
2800.0	39.83	42.19	42.04	1.13	1.26	1.44	0.97	1.38	1.52
3000.0	35.65	39.02	35.79	1.18	1.40	1.60	1.02	1.41	1.66
3200.0	36.22	36.06	38.11	1.40	1.75	1.98	1.29	1.59	2.09
3300.0	36.08	37.02	37.79	1.72	1.98	2.28	1.41	1.87	2.22
3400.0	33.20	34.22	36.23	1.94	2.31	2.58	1.46	2.10	2.33
3500.0	37.87	36.76	35.91	2.36	2.57	3.21	1.63	2.33	2.51
3600.0	32.10	31.66	32.50	2.48	2.94	3.11	1.82	2.53	2.76
3700.0	30.24	28.54	32.71	2.78	3.16	3.41	2.36	2.67	3.44
3800.0	27.34	27.64	28.38	3.12	3.65	4.06	2.60	3.29	3.82
4000.0	26.10	28.07	26.66	4.43	5.10	5.61	3.59	4.57	5.16
4200.0	24.73	25.98	24.49	6.69	7.45	8.23	6.01	7.13	7.57
4400.0	31.47	26.94	34.94	9.08	9.22	9.21	8.43	10.24	10.88
4500.0	28.08	28.51	29.17	9.55	8.72	8.51	10.60	12.43	11.60

REV. X2

SXLP-21.4+

101123

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Surface Mount Low Pass Filter

SXLP-21.4+

Typical Performance Data

FREQ. (MHz)	GROUP DELAY (nsec)		
	@ -40° C	@ +25° C	@ +85° C
0.5	37.94	38.28	38.12
1.0	37.46	37.61	37.59
1.5	37.12	37.24	37.28
2.0	36.82	36.85	36.95
2.5	36.65	36.69	36.78
3.0	36.57	36.62	36.69
3.5	36.55	36.57	36.69
4.0	36.56	36.60	36.65
4.5	36.59	36.60	36.67
5.0	36.65	36.68	36.76
5.5	36.77	36.79	36.83
6.0	36.90	36.94	37.01
6.5	37.07	37.12	37.21
7.0	37.36	37.42	37.46
7.5	37.58	37.64	37.71
8.0	37.87	37.93	37.96
8.5	38.19	38.25	38.31
9.0	38.50	38.54	38.63
9.5	38.86	38.91	39.00
10.0	39.20	39.29	39.34
10.5	39.55	39.64	39.69
11.0	39.95	39.99	40.11
11.5	40.33	40.39	40.49
12.0	40.72	40.78	40.86
12.5	41.13	41.18	41.26
13.0	41.61	41.69	41.78
13.5	42.12	42.21	42.29
14.0	42.67	42.75	42.86
14.5	43.30	43.38	43.50
15.0	43.99	44.08	44.19
15.5	44.80	44.90	45.02
16.0	45.60	45.72	45.85
16.5	46.47	46.57	46.72
17.0	47.41	47.55	47.68
17.5	48.39	48.49	48.66
18.0	49.37	49.51	49.67
18.5	50.44	50.59	50.78
19.0	51.65	51.81	51.97
19.5	53.09	53.24	53.44
20.0	54.81	55.02	55.24
20.5	57.15	57.38	57.63
21.0	60.28	60.55	60.90
21.5	64.41	64.80	65.21
22.0	69.75	70.19	70.70
25.0	81.68	81.14	80.51
26.0	64.17	63.47	62.70
27.0	47.46	46.91	46.30
28.0	35.82	35.43	34.99
29.0	28.15	27.87	27.56
30.0	22.94	22.76	22.55
35.0	11.51	11.32	11.13
40.0	6.93	7.86	6.97
45.0	5.45	4.18	4.31
50.0	4.02	2.19	3.62
55.0	1.75	1.46	1.18

REV. X2
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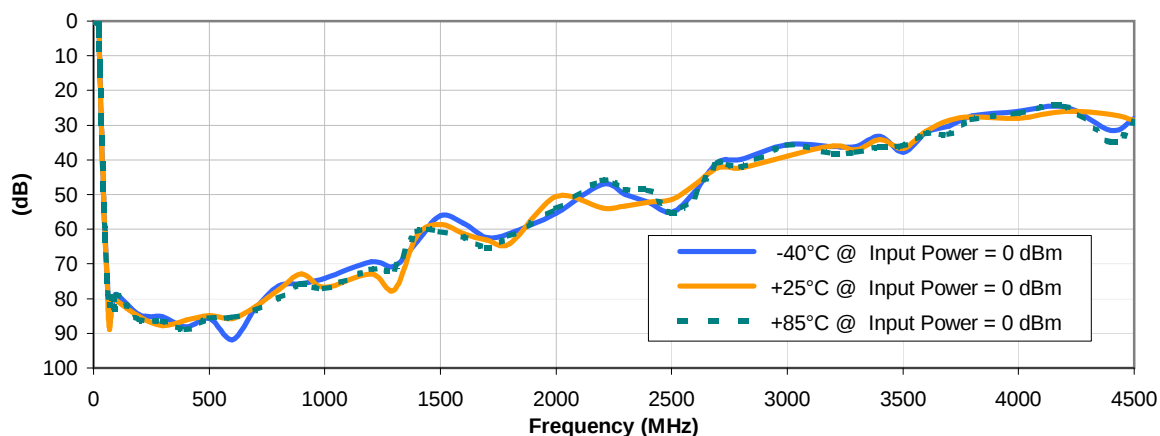


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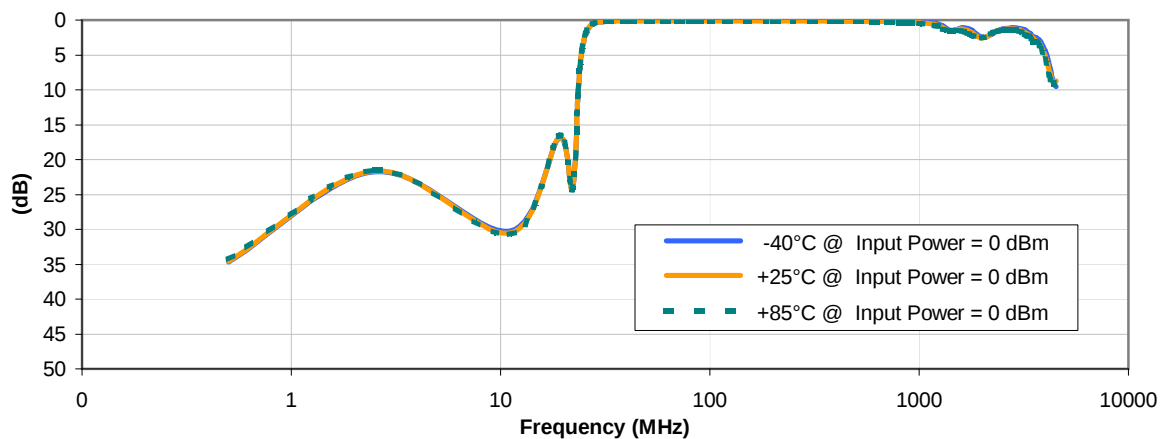


Typical Performance Curves

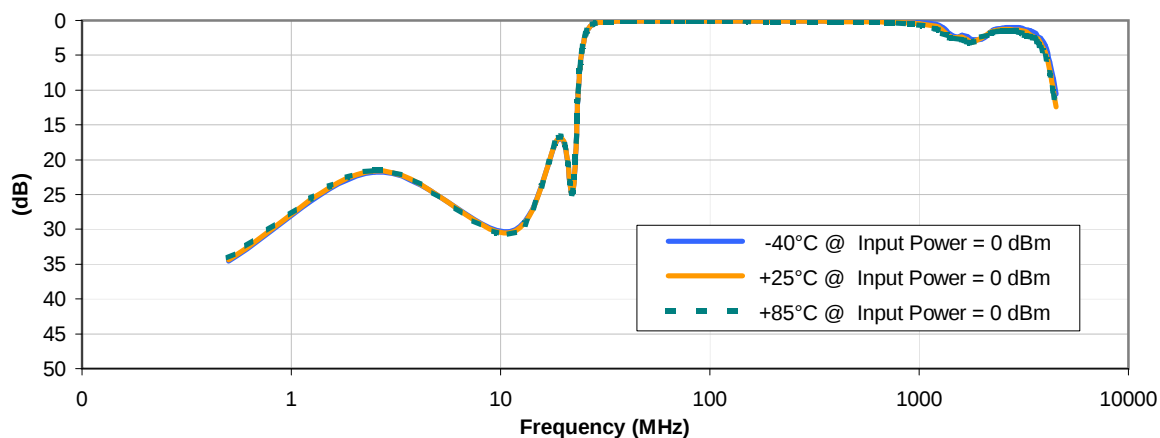
INSERTION LOSS vs. TEMPERATURE



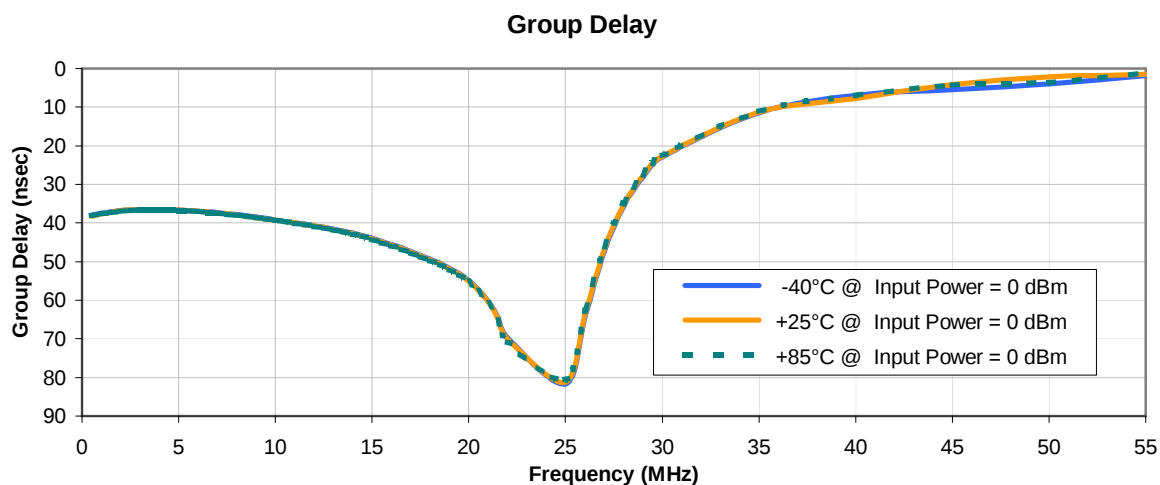
INPUT RETURN LOSS vs. TEMPERATURE



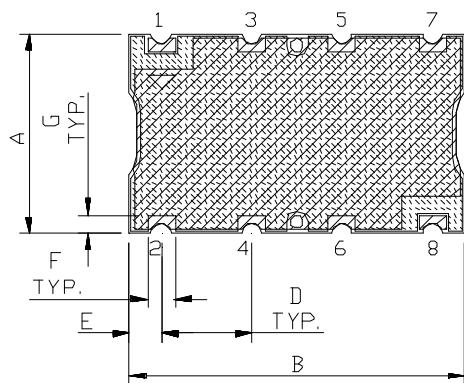
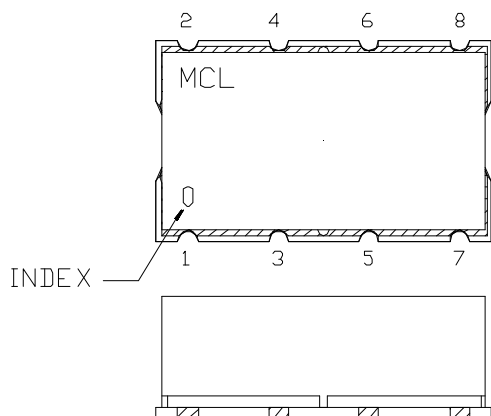
OUTPUT RETURN LOSS vs. TEMPERATURE



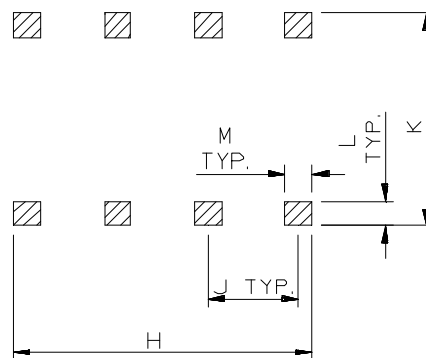
Typical Performance Curves



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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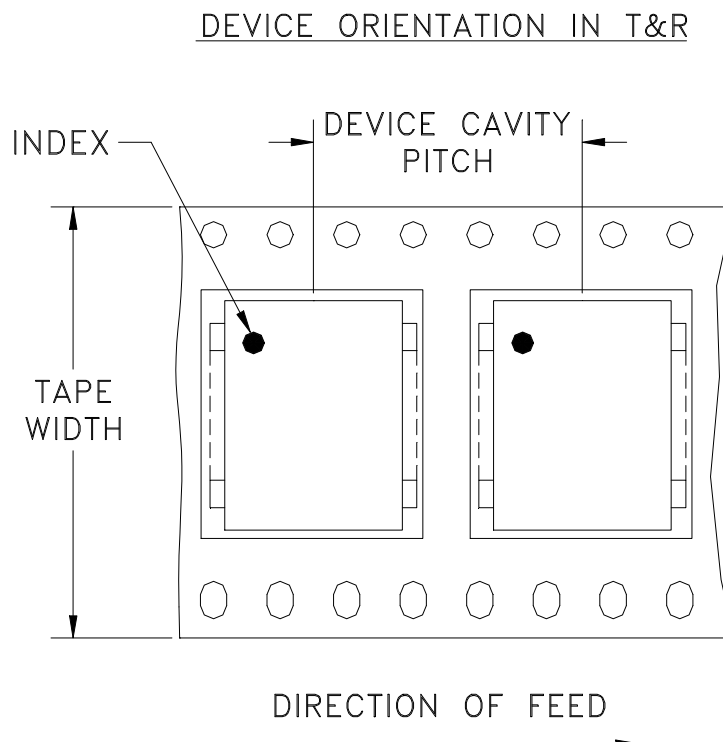


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RF/IF MICROWAVE COMPONENTS



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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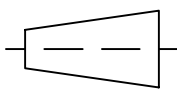


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REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M101757	NEW RELEASE (FROM RAVON)	11/05	DK	HH
OR	R62293	NEW RELEASE (FROM RAVON)	11/05	DK	HH

.188 TYP.
 .055 TYP.
 PIN 1
 .064±.002
 TRACE WIDTH,
 2 PL.
 PACKAGE
 OUTLINE
 .740
 .150 TYP.
 .200 TYP.
 .070
 .440
 Ø.020 PTH.
 TYP.

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 COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED		INITIALS		DATE	
DIMENSIONS ARE IN INCHES		DRAWN	DK (RAYON)	29 NOV 05	
TOLERANCES ON:		CHECKED	RZ (RAYON)	29 NOV 05	
2 PL DECIMALS ±	.005	APPROVED	HH (RAYON)	29 NOV 05	
3 PL DECIMALS ±					
ANGLES ±					
FRACTIONS ±					



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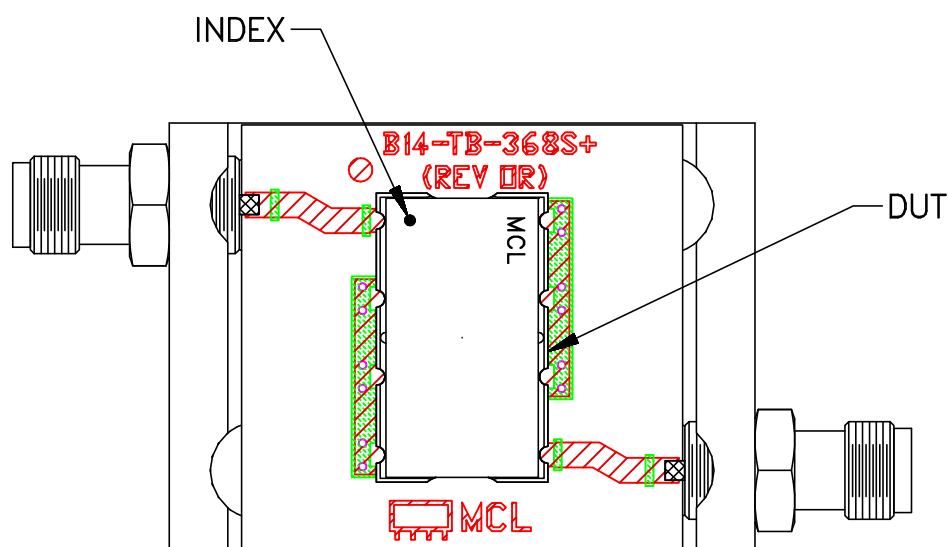
PL, cr, HF1139, SCLF, TB-368

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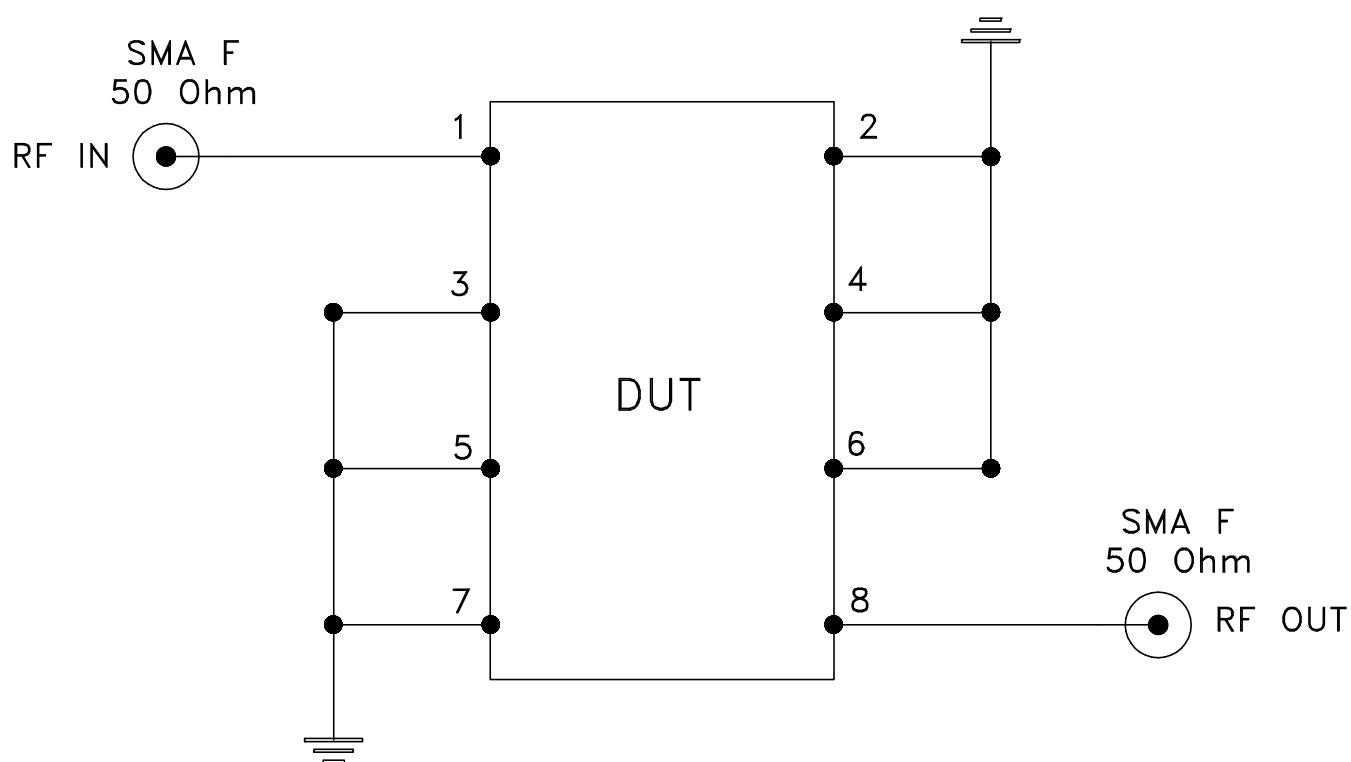
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SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-230		REV: OR
FILE: 98PL230		SCALE: 4:1	SHEET: 1 OF 1	

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