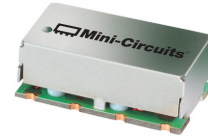


Surface Mount Bandpass Filter

SXBP-1940+

50Ω 1710 to 2170 MHz



Generic photo used for illustration purposes only
CASE STYLE: HF1139

The Big Deal

- Fast roll-off on the upper sideband
- Good Matching and low loss in the pass band
- Miniature shielded package

Product Overview

SXBP-1940+ is a wideband bandpass filter in a miniature shielded package covering 1710 to 2170 MHz. This is designed for asymmetric rejection applications such as super-heterodyne receivers. By having asymmetric band, faster roll-off at upper side band is achieved in a comparatively smaller package and lower pass band insertion loss. It has repeatable performance across lots and consistent performance across temperature.

Key Features

Feature	Advantages
Fast roll-off on the upper side band	Wide bandwidth filter with fast-roll off on the upper side band, which increases selectivity on the adjacent channel.
Good matching and low loss in pass band	This filter has good matching and low loss in the pass band
Small size, 0.44" X 0.74" X 0.27"	The surface mount package enables the SXBP-1940+ to be used in compact designs.
High power handling	This model uses high Q capacitors and high current handling inductors which is well suited for high power applications.

Notes

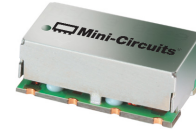
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B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
C. The parts covered by this specification document 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 Bandpass Filter

50Ω 1710 to 2170 MHz

SXBP-1940+



Generic photo used for illustration purposes only

CASE STYLE: HF1139

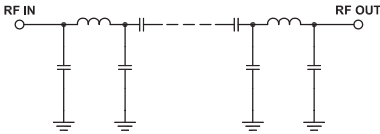
Features

- Fast roll-off on the upper side band
- Good matching in the pass band
- Miniature shielded package

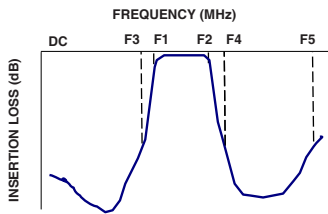
Applications

- Defense systems
- Cable TV relay
- DECT, GSM and IMT
- Mobile satellite
- Private and public land mobile
- PCS Broadband

Functional Schematic



Typical Frequency Response



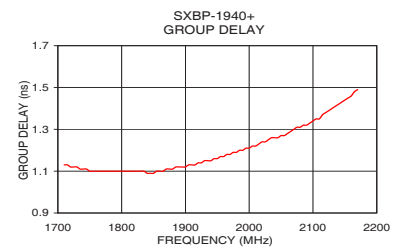
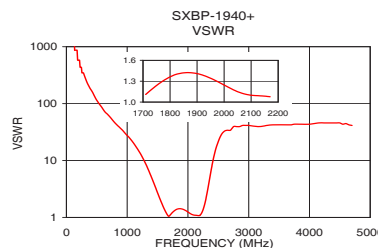
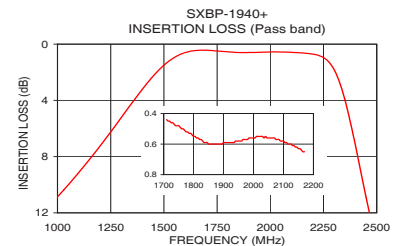
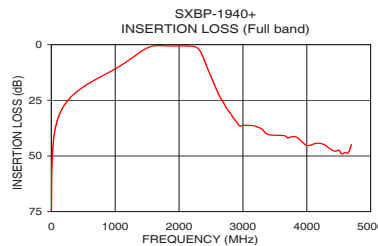
Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
1	73.65	1737.18	1710	1.13
5	59.44	1737.18	1750	1.10
55	38.58	1737.18	1780	1.10
145	30.12	868.59	1800	1.10
430	20.39	157.93	1820	1.10
1030	10.36	25.56	1840	1.09
1280	5.63	9.90	1860	1.10
1400	3.18	5.09	1880	1.11
1500	1.50	2.71	1900	1.12
1580	0.71	1.66	1920	1.14
1710	0.44	1.11	1940	1.15
1940	0.58	1.36	1960	1.17
2170	0.65	1.08	1980	1.19
2290	1.57	1.99	2000	1.21
2335	3.15	3.52	2020	1.24
2385	6.15	7.08	2040	1.26
2500	14.35	21.73	2060	1.28
2900	34.71	41.37	2100	1.34
3400	40.38	42.38	2150	1.44
4700	44.89	41.37	2170	1.49

Maximum Ratings	
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	8 W max.

Permanent damage may occur if any of these limits are exceeded.

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



Notes

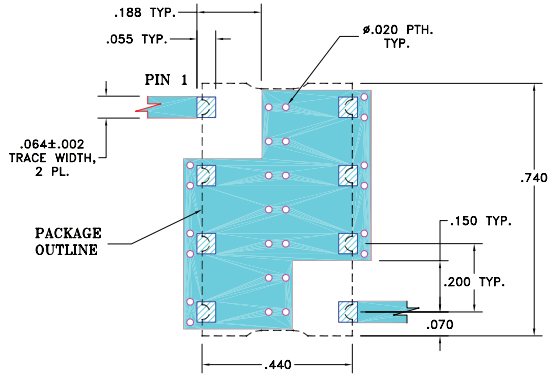
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Pad Connections

INPUT	1
OUTPUT	8
GROUND	2,3,4,5,6,7

Demo Board MCL P/N: TB-368+ Suggested PCB Layout (PL-230)

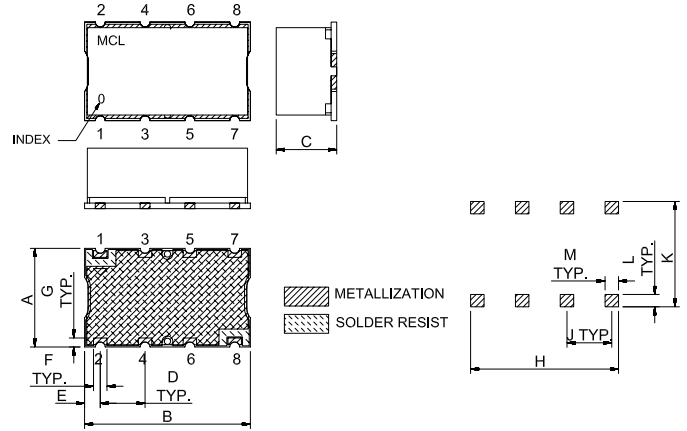


NOTE:

- 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

Outline Drawing



Outline Dimensions (inch)

A	B	C	D	E	F	G
.44	.74	.27	.200	.07	.060	.040
11.18	18.80	6.86	5.08	1.78	1.52	1.02
H	J	K	L	M	wt	
.660	.200	.470	.055	.060	grams	
16.76	5.08	11.94	1.40	1.52	3.0	

Note: Please refer to case style drawing for details

Notes

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Typical Performance Data

FREQ. (MHz)	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
1	73.33	73.65	73.32	0.00	0.00	0.00	0.00	0.00	0.00
4	61.39	61.34	61.29	0.00	0.00	0.00	0.00	0.00	0.00
5	59.48	59.44	59.37	0.00	0.00	0.00	0.00	0.00	0.00
15	49.86	49.83	49.84	0.00	0.00	0.00	0.00	0.00	0.00
45	40.35	40.34	40.31	0.00	0.00	0.01	0.00	0.00	0.01
145	30.24	30.12	30.03	0.00	0.02	0.02	0.01	0.02	0.03
430	20.30	20.39	20.48	0.08	0.11	0.12	0.10	0.13	0.14
630	16.60	16.66	16.73	0.20	0.24	0.24	0.22	0.26	0.27
780	14.26	14.30	14.34	0.31	0.36	0.36	0.33	0.38	0.39
880	12.69	12.76	12.77	0.41	0.46	0.47	0.42	0.48	0.50
1030	10.26	10.36	10.33	0.63	0.68	0.70	0.64	0.69	0.72
1130	8.51	8.58	8.52	0.88	0.94	0.96	0.89	0.94	0.98
1230	6.62	6.65	6.58	1.31	1.39	1.44	1.32	1.40	1.45
1380	3.57	3.58	3.55	2.89	3.06	3.14	2.89	3.05	3.13
1405	3.08	3.09	3.07	3.38	3.57	3.66	3.38	3.56	3.65
1410	2.98	2.99	2.97	3.49	3.68	3.77	3.49	3.67	3.76
1485	1.69	1.71	1.73	5.76	6.06	6.16	5.75	6.03	6.13
1500	1.47	1.50	1.52	6.41	6.73	6.84	6.38	6.69	6.78
1540	0.98	1.03	1.07	8.56	8.96	9.05	8.50	8.87	8.96
1580	0.63	0.71	0.75	11.63	12.09	12.19	11.46	11.89	11.96
1615	0.45	0.54	0.58	15.52	16.07	16.13	15.10	15.59	15.63
1655	0.35	0.45	0.49	23.09	23.82	23.91	21.20	21.70	21.71
1710	0.34	0.44	0.48	25.53	25.69	25.84	23.14	23.25	23.44
1745	0.38	0.48	0.52	19.71	19.98	20.07	19.13	19.36	19.48
1795	0.44	0.54	0.58	16.13	16.50	16.56	16.05	16.38	16.47
1820	0.47	0.57	0.61	15.24	15.64	15.73	15.23	15.61	15.70
1860	0.50	0.60	0.64	14.69	15.16	15.22	14.76	15.21	15.28
1900	0.49	0.59	0.64	14.84	15.40	15.48	14.94	15.50	15.57
1940	0.48	0.58	0.63	15.70	16.36	16.43	15.86	16.54	16.60
1990	0.44	0.56	0.61	17.87	18.62	18.65	18.23	19.06	19.12
2020	0.43	0.55	0.60	19.92	20.66	20.75	20.56	21.45	21.54
2080	0.43	0.57	0.63	24.96	25.49	25.58	27.69	28.45	28.56
2120	0.46	0.60	0.66	26.31	27.08	26.94	30.22	30.72	30.20
2170	0.50	0.65	0.72	27.46	28.64	28.81	29.84	29.53	28.72
2230	0.62	0.82	0.90	21.61	20.09	19.69	20.65	19.13	18.63
2255	0.77	1.01	1.10	16.09	15.02	14.68	15.56	14.48	14.17
2290	1.26	1.57	1.70	10.24	9.63	9.43	9.97	9.34	9.14
2310	1.78	2.13	2.29	7.69	7.29	7.12	7.52	7.09	6.95
2330	2.51	2.92	3.10	5.70	5.46	5.34	5.57	5.30	5.20
2335	2.73	3.15	3.33	5.29	5.08	4.97	5.16	4.92	4.83
2385	5.69	6.15	6.37	2.45	2.47	2.45	2.36	2.36	2.36
2450	10.49	10.89	11.08	1.06	1.17	1.19	1.02	1.12	1.16
2500	14.00	14.35	14.58	0.67	0.80	0.84	0.67	0.79	0.83
2550	17.49	17.80	18.01	0.49	0.61	0.66	0.47	0.59	0.63
2600	20.75	21.08	21.24	0.40	0.53	0.57	0.39	0.51	0.55
2700	25.97	26.24	26.44	0.36	0.51	0.54	0.30	0.42	0.48
2800	30.51	30.71	30.77	0.30	0.44	0.48	0.30	0.41	0.47
2900	34.60	34.71	34.40	0.29	0.42	0.46	0.25	0.37	0.43
3050	38.86	38.40	38.53	0.29	0.41	0.45	0.27	0.41	0.46
3300	38.02	38.00	37.65	0.28	0.42	0.44	0.26	0.37	0.43
3500	39.42	40.96	41.41	0.31	0.43	0.43	0.31	0.43	0.45
3600	39.30	39.32	39.82	0.29	0.41	0.42	0.30	0.41	0.45
3850	40.13	41.71	43.25	0.28	0.40	0.40	0.32	0.42	0.46
3950	39.93	40.23	40.58	0.27	0.40	0.40	0.32	0.42	0.45
4000	45.01	45.23	44.59	0.26	0.40	0.40	0.31	0.41	0.46
4200	43.52	43.33	43.68	0.24	0.38	0.39	0.26	0.38	0.42
4350	46.67	46.44	46.17	0.23	0.38	0.40	0.25	0.37	0.41
4550	47.86	49.10	49.00	0.23	0.40	0.42	0.26	0.41	0.42
4650	47.29	48.62	48.41	0.24	0.41	0.44	0.23	0.38	0.43
4700	46.23	44.89	45.46	0.25	0.42	0.46	0.23	0.38	0.44



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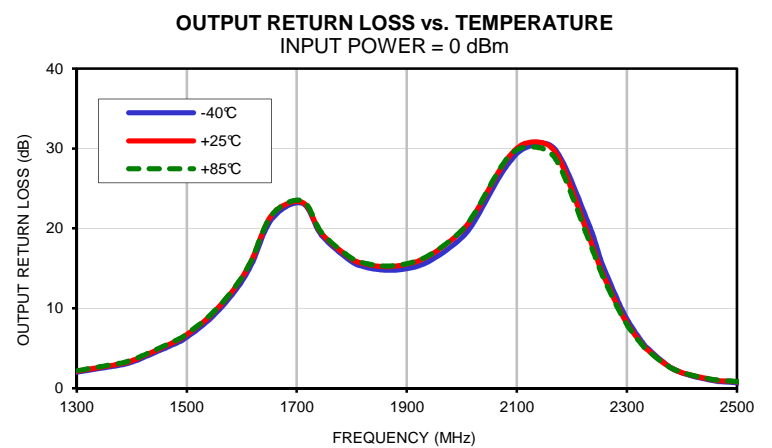
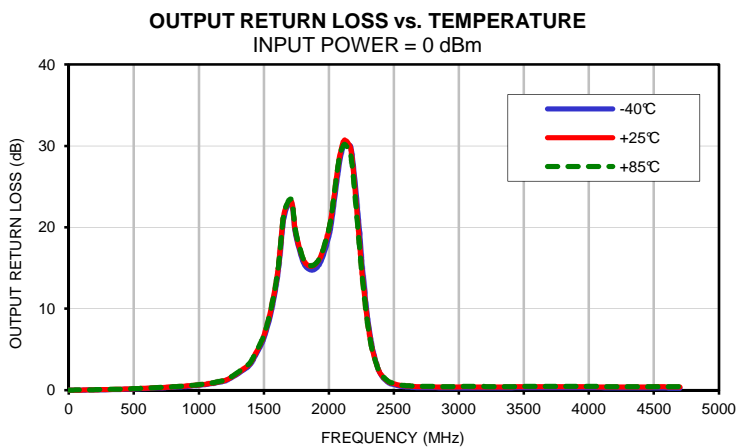
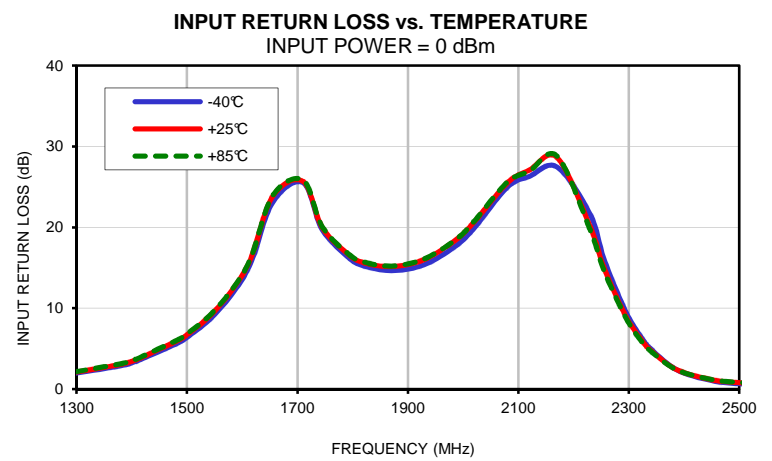
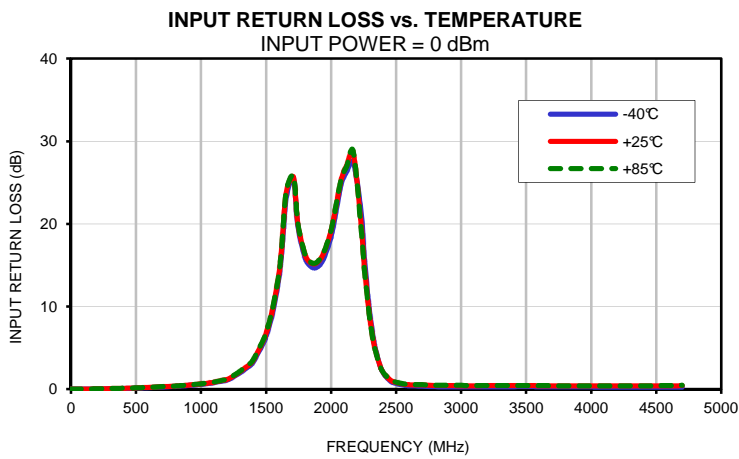
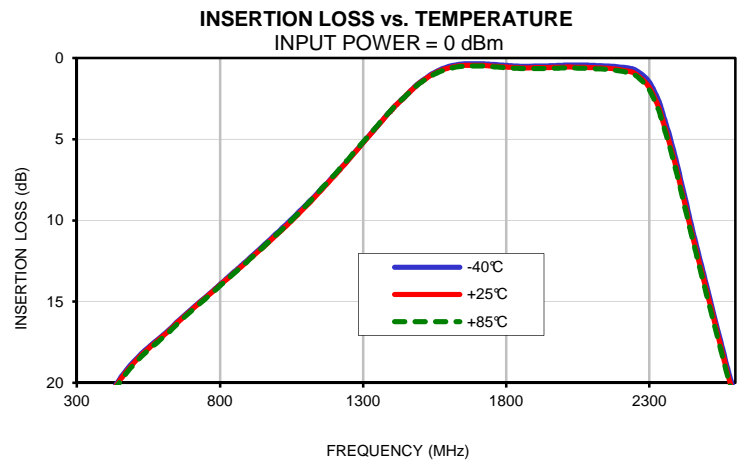
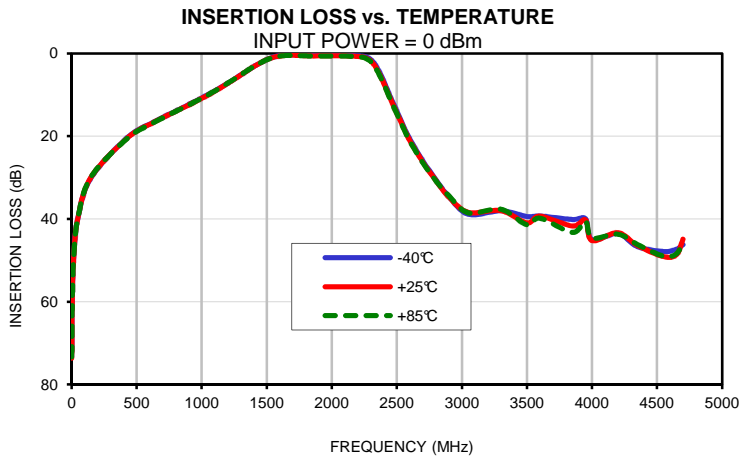
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IF/RF MICROWAVE COMPONENTS

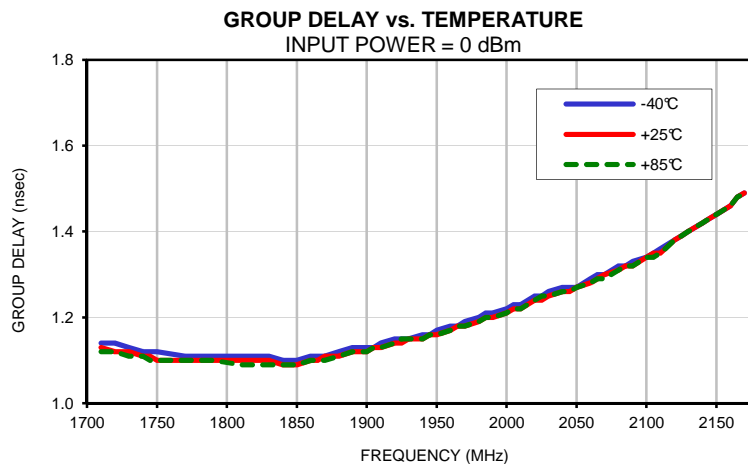
Typical Performance Data

FREQ. (MHz)	GROUP DELAY		
	(nsec)		
	@-40°C	@+25°C	@+85°C
1710	1.14	1.13	1.12
1720	1.14	1.12	1.12
1730	1.13	1.12	1.11
1740	1.12	1.11	1.11
1745	1.12	1.11	1.10
1750	1.12	1.10	1.10
1770	1.11	1.10	1.10
1790	1.11	1.10	1.10
1810	1.11	1.10	1.09
1830	1.11	1.10	1.09
1840	1.10	1.09	1.09
1845	1.10	1.09	1.09
1850	1.10	1.09	1.09
1860	1.11	1.10	1.10
1865	1.11	1.10	1.10
1870	1.11	1.11	1.10
1880	1.12	1.11	1.11
1890	1.13	1.12	1.12
1900	1.13	1.12	1.12
1905	1.13	1.13	1.13
1910	1.14	1.13	1.13
1920	1.15	1.14	1.14
1925	1.15	1.14	1.15
1930	1.15	1.15	1.15
1940	1.16	1.15	1.15
1945	1.16	1.16	1.16
1950	1.17	1.16	1.16
1960	1.18	1.17	1.17
1965	1.18	1.18	1.18
1970	1.19	1.18	1.18
1980	1.20	1.19	1.19
1985	1.21	1.20	1.20
1990	1.21	1.20	1.20
2000	1.22	1.21	1.21
2005	1.23	1.22	1.22
2010	1.23	1.22	1.22
2020	1.25	1.24	1.24
2025	1.25	1.24	1.25
2030	1.26	1.25	1.25
2040	1.27	1.26	1.26
2045	1.27	1.26	1.26
2050	1.27	1.27	1.27
2060	1.29	1.28	1.28
2065	1.30	1.29	1.29
2070	1.30	1.30	1.29
2080	1.32	1.31	1.31
2085	1.32	1.32	1.32
2090	1.33	1.32	1.32
2100	1.34	1.34	1.34
2105	1.35	1.35	1.34
2110	1.36	1.35	1.35
2120	1.38	1.38	1.38
2125	1.39	1.39	1.39
2130	1.40	1.40	1.40
2140	1.42	1.42	1.42
2145	1.43	1.43	1.43
2150	1.44	1.44	1.44
2160	1.46	1.46	1.46
2165	1.48	1.48	1.48
2170	1.49	1.49	1.49

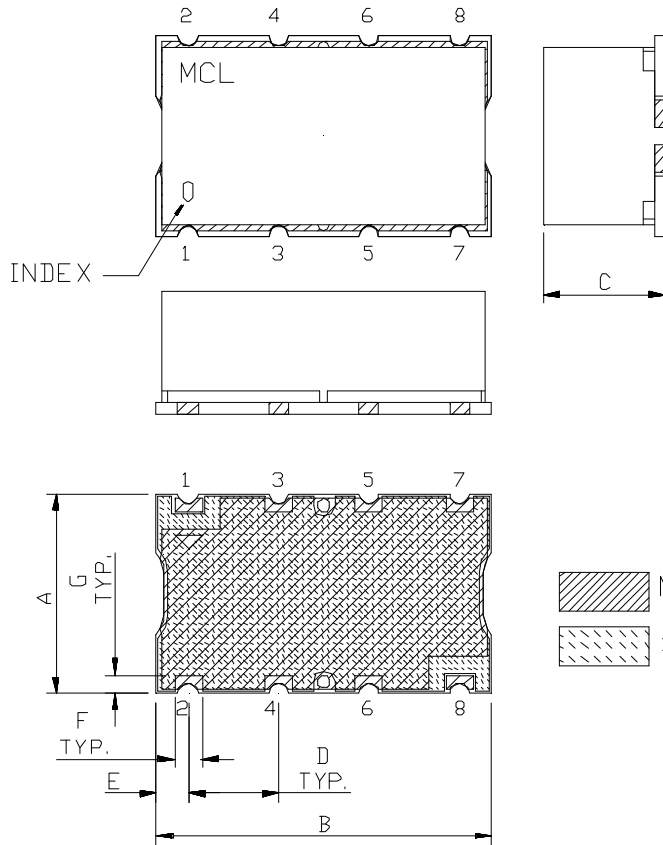
Typical Performance Curves



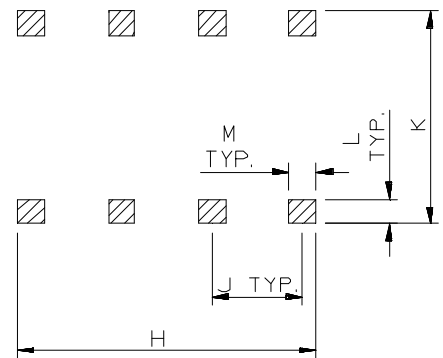
Typical Performance Curves





Outline Dimensions



PCB Land Pattern



 METALLIZATION
 SOLDER RESIST

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. $\pm 0.015''$; 3 Pl. $\pm 0.01''$

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.



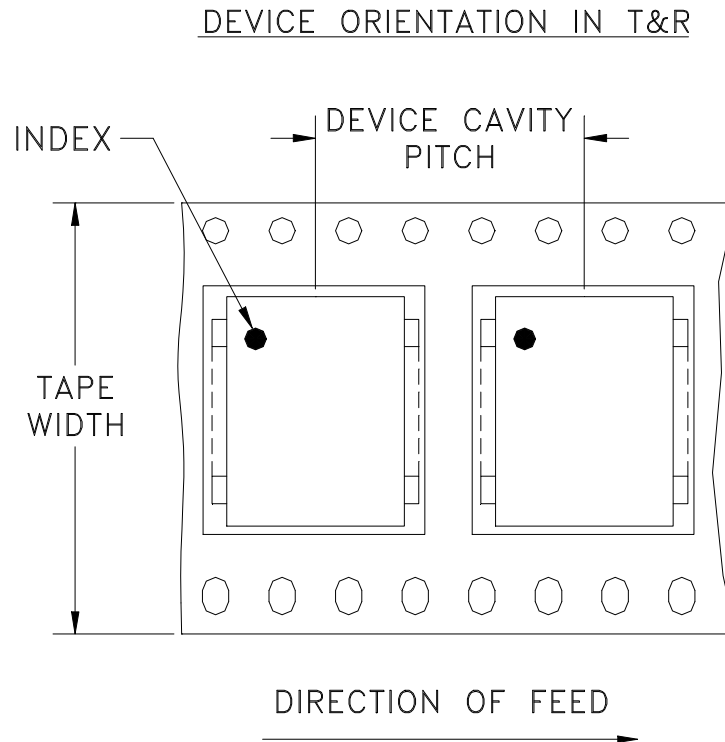
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RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F5



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

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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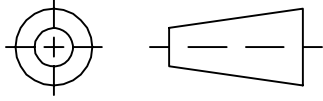
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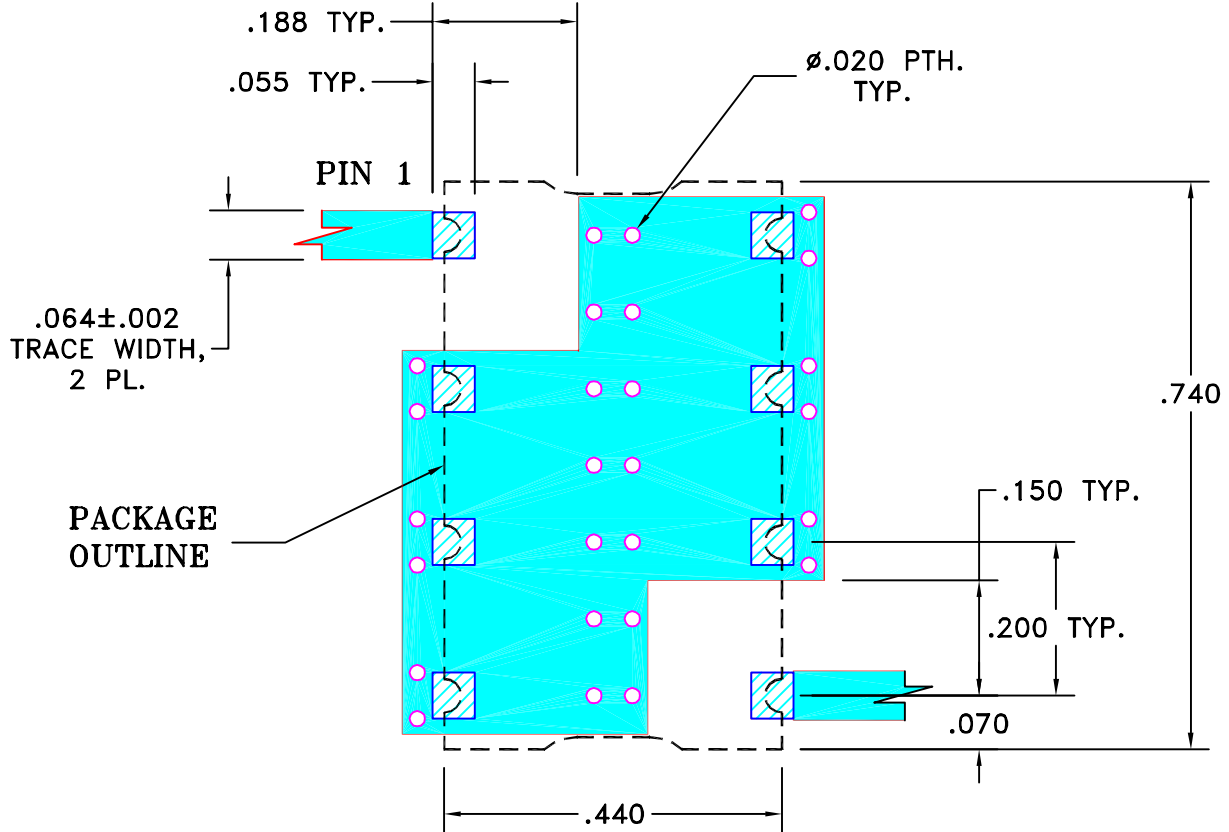
THIRD ANGLE PROJECTION



REVISIONS

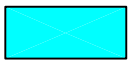
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OR	M101757	NEW RELEASE (FROM RAVON)	11/05	DK	HH
OR	R62293	NEW RELEASE (FROM RAVON)	11/05	DK	HH

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

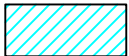


NOTE:

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



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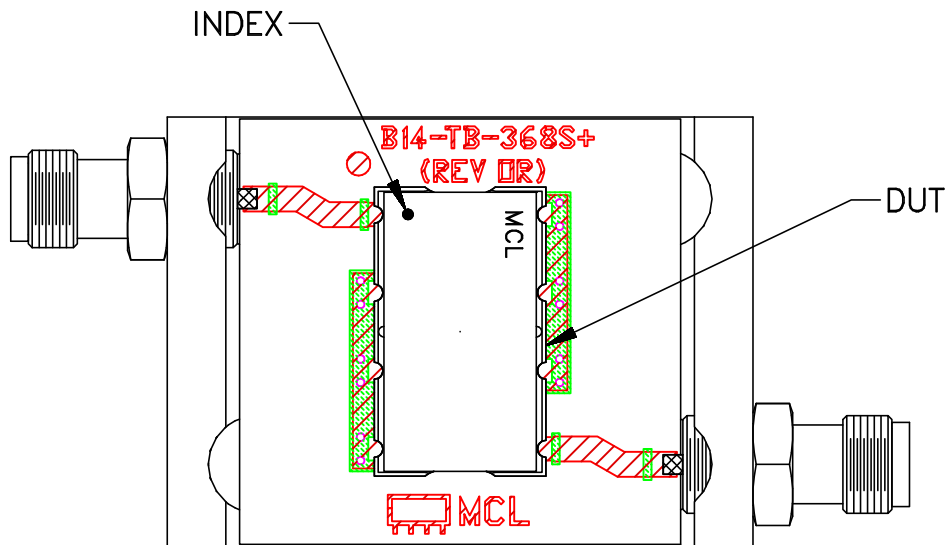
13 Neptune Avenue
Brooklyn NY 11235

PL, cr, HF1139, SCLF, TB-368

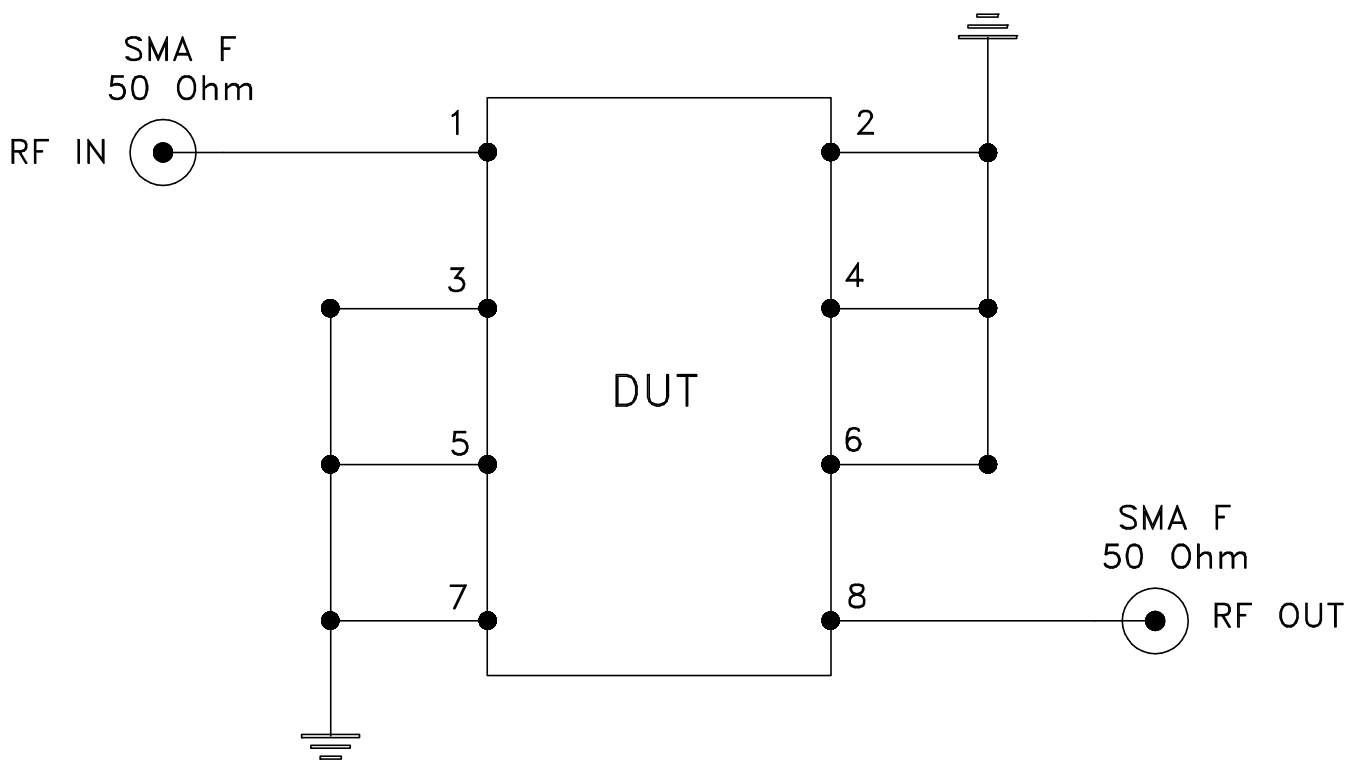
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SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-230	REV: OR
FILE: 98PL230	SCALE: 4:1	SHEET: 1 OF 1	

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.

 **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