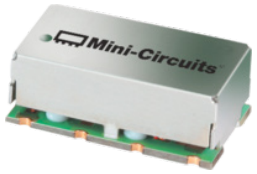
Surface Mount

Bandpass Filter

SXBP-375+

50Ω 330 to 420 MHz



Generic photo used for illustration purposes only

CASE STYLE: HF1139

The Big Deal

- Flat group delay, 2ns typ.
- High rejection, 50 dB typ.
- Fast roll-off
- Miniature shielded package

Product Overview

The SXBP-375+ is a bandpass filter fabricated using SMT technology. Covering 375 MHz ± 45 MHz, these units offer good matching within the passband and high rejection. This unit uses miniature high Q capacitors and wire welded inductors for high reliability. It has repeatable performance across production lots and consistent performance across temperature.

Key Features

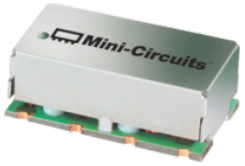
Feature	Advantages
Fast Rejection Roll-off	This enables the filter to reject adjacent channels with increased selectivity.
More than 40dB rejection upto 1300 MHz	This enables the filter to attenuate spurious signals and reject harmonics for a broad frequency band.
Flat group delay 2ns, typ.	This model has group delay variation of less than 2nsec which helps in reducing the signal distortion .
Small size, 0.44" x 0.74" x 0.27"	The surface mount package enables the SXBP-375+ to be used in compact designs.

Surface Mount

Bandpass Filter

50Ω 330 to 420 MHz

SXBP-375+



Generic photo used for illustration purposes only
CASE STYLE: HF1139

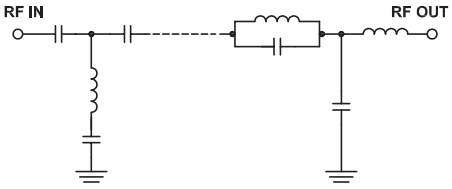
Features

- Flat group delay over passband
- High rejection, 50 dB typ.
- Shielded case
- Aqueous washable

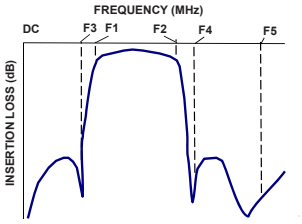
Applications

- Radio link
- Receivers / Transmitters
- Harmonic rejection
- Military

Functional Schematic



Typical Frequency Response



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

Electrical Specifications at 25°C

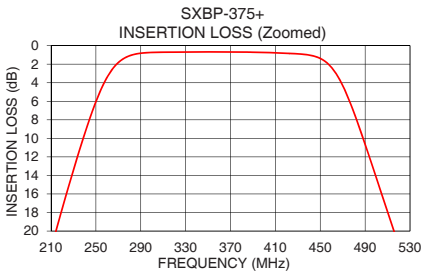
Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
	Center frequency	-	-	-	375	-	MHz
Pass Band	Insertion Loss	F1-F2	330 - 420	-	0.8	1.6	dB
	VSWR	F1-F2	330 - 420	-	1.2	1.8	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC - 170	40	50	-	dB
Stop Band, Upper	Insertion Loss	F4-F5	580 - 1300	40	50	-	dB

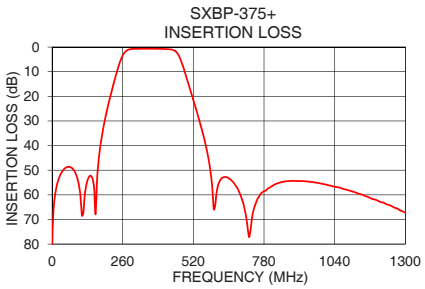
Maximum Ratings	
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	1 W max.

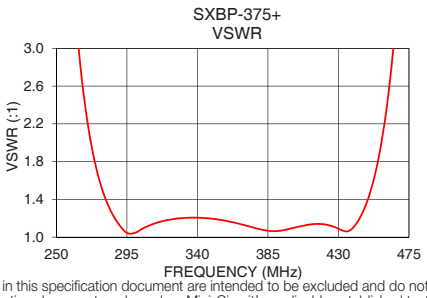
Permanent damage may occur if any of these limits are exceeded.

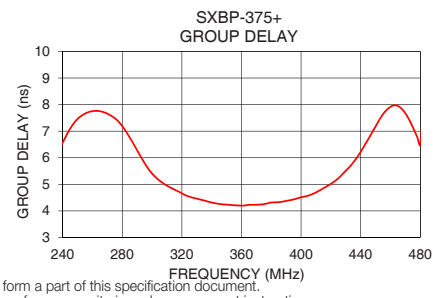
Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
1	80.44	267.26	330	4.46
50	49.02	386.04	335	4.39
100	56.75	334.07	340	4.31
170	47.56	129.64	345	4.26
195	29.28	77.56	350	4.24
215	19.74	46.09	355	4.22
260	3.42	3.85	360	4.20
330	0.69	1.20	365	4.23
350	0.68	1.19	370	4.23
375	0.69	1.10	375	4.25
400	0.74	1.09	380	4.32
420	0.82	1.14	383	4.31
466	3.39	3.17	385	4.33
516	20.12	23.65	390	4.37
544	30.58	30.65	395	4.43
580	48.21	34.14	400	4.51
800	57.09	38.44	405	4.58
1000	55.65	51.25	410	4.69
1200	62.47	58.69	415	4.85
1300	67.26	57.15	420	5.02









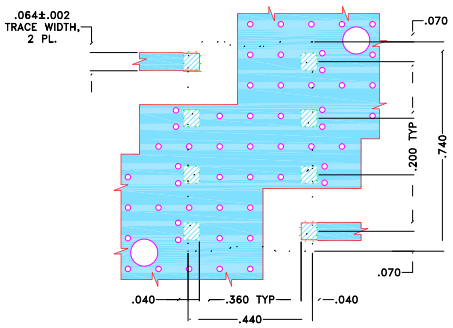
Notes
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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

Pad Connections

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

Demo Board MCL P/N: TB-SXBP-375+
Suggested PCB Layout (PL-449)

SUGGESTED MOUNTING CONFIGURATION FOR
HF1139 CASE STYLE "08FL01" PIN CODE



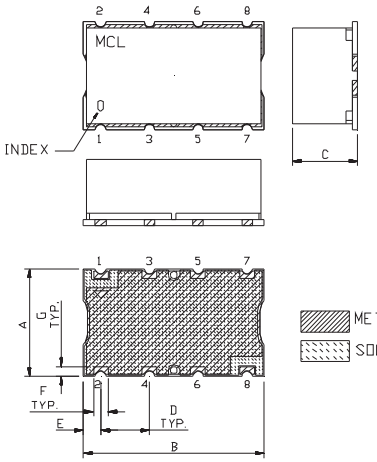
NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS WITH DIELECTRIC THICKNESS .030"±.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.

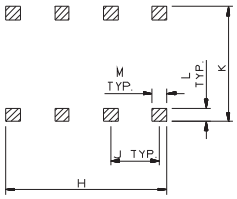
DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

Outline Drawing



PCB Land Pattern



Outline Dimensions (inch / mm)

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

Surface Mount Band Pass Filter SXBP-375+

Typical Performance Data

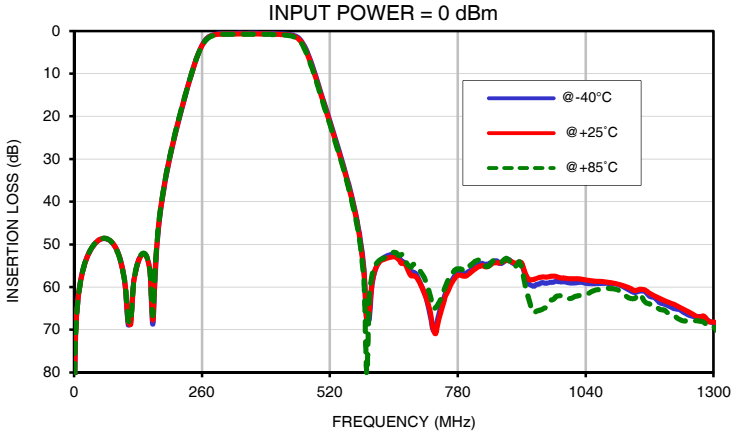
FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
1	80.78	81.07	80.31	0.07	0.06	0.07	0.05	0.05	0.05
10	60.88	60.88	61.02	0.05	0.05	0.05	0.06	0.06	0.06
20	55.15	55.20	55.10	0.05	0.05	0.05	0.05	0.06	0.06
30	52.03	52.06	51.99	0.04	0.04	0.05	0.06	0.06	0.07
40	50.17	50.12	50.09	0.04	0.04	0.04	0.07	0.08	0.09
50	49.02	49.00	48.99	0.04	0.05	0.05	0.09	0.11	0.12
60	48.62	48.58	48.56	0.04	0.04	0.05	0.12	0.14	0.16
70	48.90	48.89	48.85	0.04	0.05	0.05	0.15	0.18	0.20
80	49.97	49.98	50.03	0.04	0.05	0.05	0.19	0.22	0.25
90	52.25	52.22	52.33	0.04	0.05	0.05	0.24	0.28	0.31
100	56.74	56.84	56.86	0.04	0.05	0.06	0.29	0.33	0.36
110	68.81	68.12	67.84	0.05	0.06	0.07	0.34	0.38	0.42
120	59.86	60.13	60.05	0.06	0.07	0.07	0.38	0.43	0.47
130	54.14	54.18	54.05	0.06	0.08	0.09	0.42	0.47	0.50
140	52.18	52.26	52.08	0.07	0.09	0.10	0.44	0.49	0.53
150	53.69	53.73	53.73	0.08	0.10	0.11	0.46	0.51	0.55
160	68.69	67.74	66.66	0.09	0.11	0.13	0.46	0.52	0.56
170	47.99	47.66	47.38	0.11	0.13	0.15	0.45	0.52	0.56
180	38.72	38.49	38.30	0.14	0.16	0.18	0.45	0.52	0.57
195	29.47	29.30	29.11	0.19	0.22	0.24	0.44	0.52	0.58
215	19.88	19.76	19.60	0.33	0.37	0.41	0.51	0.61	0.69
240	9.52	9.51	9.46	1.14	1.22	1.30	1.26	1.40	1.53
260	3.32	3.41	3.48	4.43	4.59	4.72	4.63	4.84	5.02
290	0.71	0.81	0.89	22.46	24.21	25.16	23.65	25.64	26.70
330	0.58	0.68	0.76	22.06	20.94	19.83	23.57	22.45	21.18
340	0.58	0.68	0.76	21.43	20.73	19.78	22.97	22.36	21.25
350	0.58	0.68	0.76	21.43	21.12	20.32	22.80	22.67	21.77
360	0.58	0.67	0.75	22.27	22.34	21.66	23.22	23.52	22.77
370	0.57	0.67	0.75	23.96	24.59	24.13	24.25	25.03	24.51
375	0.58	0.67	0.75	25.13	26.22	25.96	24.92	25.97	25.59
380	0.58	0.68	0.75	26.42	28.14	28.24	25.55	26.82	26.61
390	0.59	0.70	0.77	28.04	30.46	31.65	26.02	27.18	27.26
400	0.62	0.72	0.80	26.39	27.16	27.58	25.08	25.55	25.61
410	0.65	0.77	0.85	24.31	24.31	24.29	23.95	23.95	23.86
420	0.69	0.81	0.90	24.02	23.78	23.55	24.04	23.80	23.49
466	3.02	3.35	3.63	5.74	5.69	5.64	5.43	5.34	5.22
490	10.13	10.59	10.97	1.40	1.48	1.55	1.33	1.40	1.44
518	20.36	20.80	21.19	0.61	0.70	0.77	0.56	0.64	0.70
544	30.10	30.54	30.96	0.48	0.56	0.61	0.41	0.48	0.53
580	47.47	48.08	48.93	0.43	0.50	0.56	0.31	0.38	0.42
600	67.64	65.91	62.15	0.42	0.49	0.55	0.27	0.34	0.38
650	52.35	52.89	51.87	0.42	0.49	0.54	0.21	0.27	0.32
700	58.03	58.39	55.69	0.42	0.49	0.54	0.16	0.23	0.27
750	63.21	64.06	61.31	0.40	0.47	0.53	0.12	0.18	0.23
800	56.50	57.19	55.92	0.37	0.45	0.51	0.10	0.16	0.20
850	54.18	54.51	54.03	0.34	0.42	0.49	0.08	0.14	0.19
900	54.49	54.44	54.85	0.31	0.39	0.47	0.07	0.13	0.17
950	59.00	57.68	65.32	0.26	0.36	0.43	0.05	0.12	0.16
1000	58.86	57.96	62.72	0.23	0.33	0.40	0.04	0.11	0.15
1020	59.02	58.08	62.17	0.23	0.32	0.40	0.04	0.11	0.14
1040	59.13	58.33	61.89	0.21	0.31	0.39	0.04	0.11	0.15
1060	59.15	58.66	60.71	0.21	0.31	0.38	0.04	0.11	0.15
1080	59.10	58.81	60.26	0.20	0.30	0.38	0.03	0.10	0.14
1100	59.27	59.16	60.50	0.19	0.29	0.36	0.03	0.10	0.14
1120	60.14	59.83	61.97	0.18	0.29	0.36	0.03	0.10	0.14
1140	61.27	60.83	62.66	0.18	0.29	0.36	0.03	0.10	0.14
1160	61.04	60.66	63.42	0.19	0.29	0.37	0.03	0.10	0.14
1200	64.03	63.20	65.41	0.18	0.29	0.36	0.03	0.11	0.15
1250	66.57	65.87	67.82	0.17	0.28	0.36	0.02	0.10	0.14
1300	68.48	68.17	69.40	0.17	0.29	0.37	0.03	0.11	0.15

Typical Performance Data

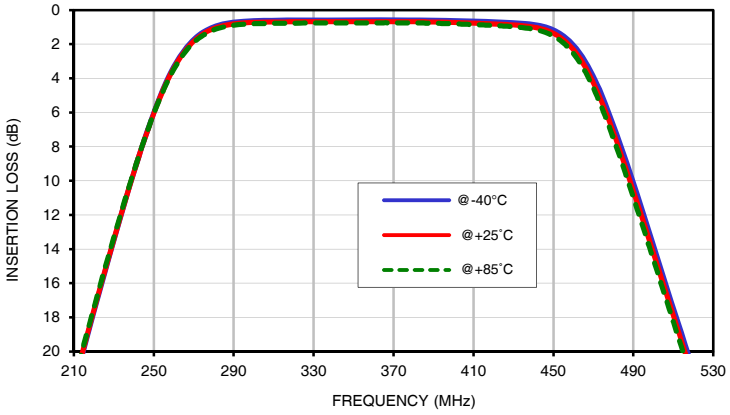
FREQ. (MHz)	GROUP DELAY (nsec)		
	@-40°C	@+25°C	@+85°C
330	4.48	4.47	4.45
332	4.45	4.44	4.43
334	4.42	4.41	4.40
336	4.39	4.38	4.37
338	4.36	4.35	4.34
340	4.33	4.32	4.32
342	4.30	4.30	4.29
344	4.28	4.27	4.27
346	4.26	4.26	4.24
348	4.24	4.24	4.22
350	4.23	4.23	4.21
352	4.22	4.22	4.20
354	4.22	4.21	4.20
356	4.22	4.22	4.21
358	4.22	4.22	4.21
360	4.22	4.21	4.21
362	4.21	4.21	4.21
364	4.22	4.22	4.22
368	4.23	4.23	4.23
370	4.23	4.23	4.24
372	4.23	4.24	4.24
374	4.24	4.25	4.25
375	4.25	4.25	4.26
378	4.27	4.27	4.28
380	4.28	4.28	4.29
382	4.29	4.30	4.31
384	4.31	4.31	4.32
386	4.32	4.33	4.34
388	4.34	4.35	4.36
390	4.36	4.37	4.38
392	4.38	4.39	4.40
394	4.40	4.41	4.42
396	4.43	4.44	4.45
398	4.45	4.46	4.47
400	4.48	4.50	4.51
404	4.55	4.56	4.58
408	4.63	4.65	4.67
410	4.68	4.69	4.71
414	4.78	4.80	4.81
418	4.90	4.93	4.95
420	4.97	4.99	5.02

Typical Performance Curves

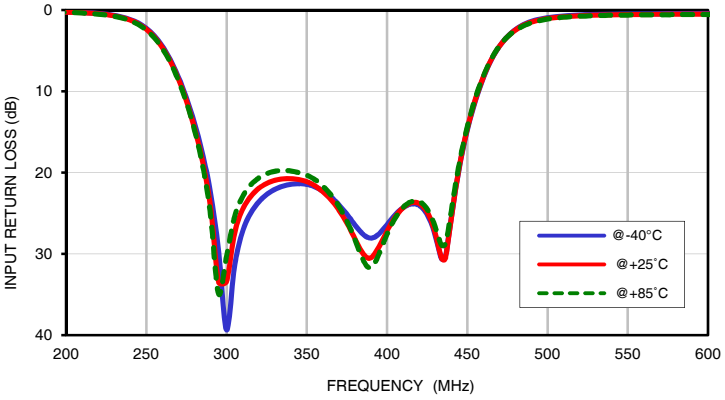
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



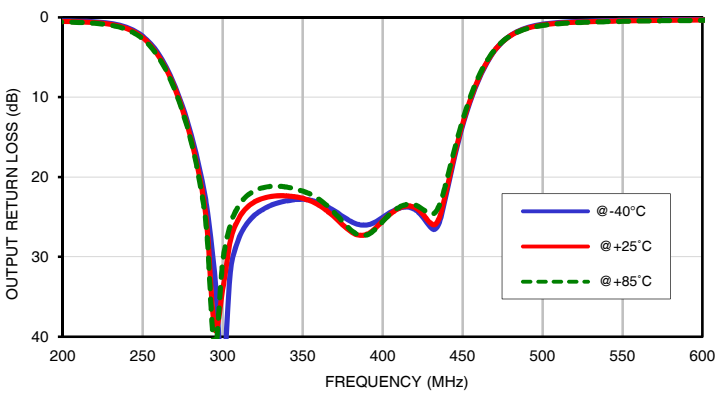
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



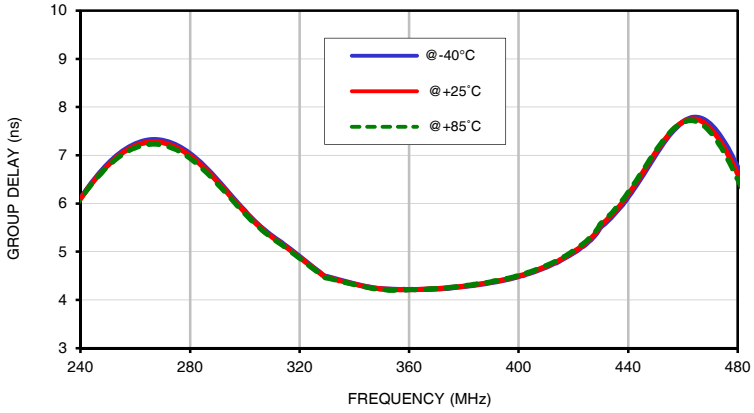
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



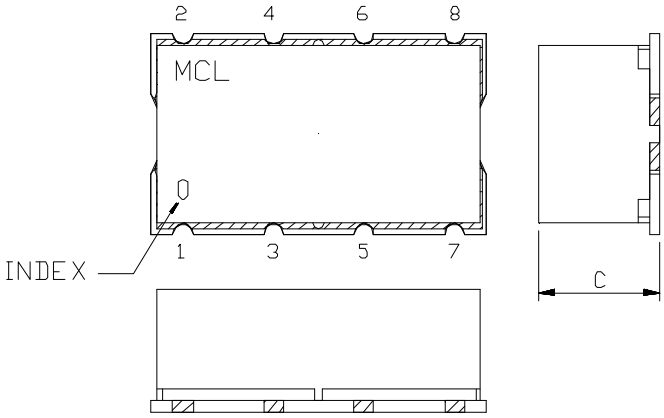
GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm

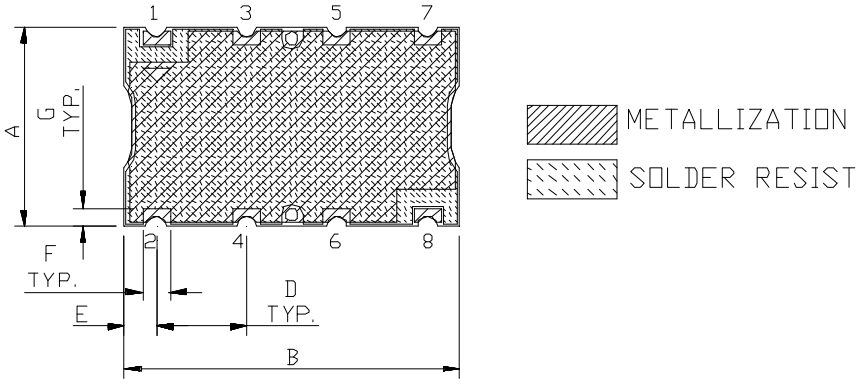


Case Style HF

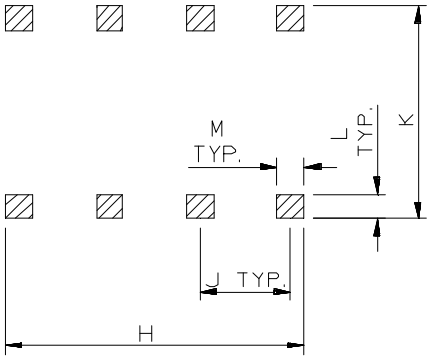
HF1139

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

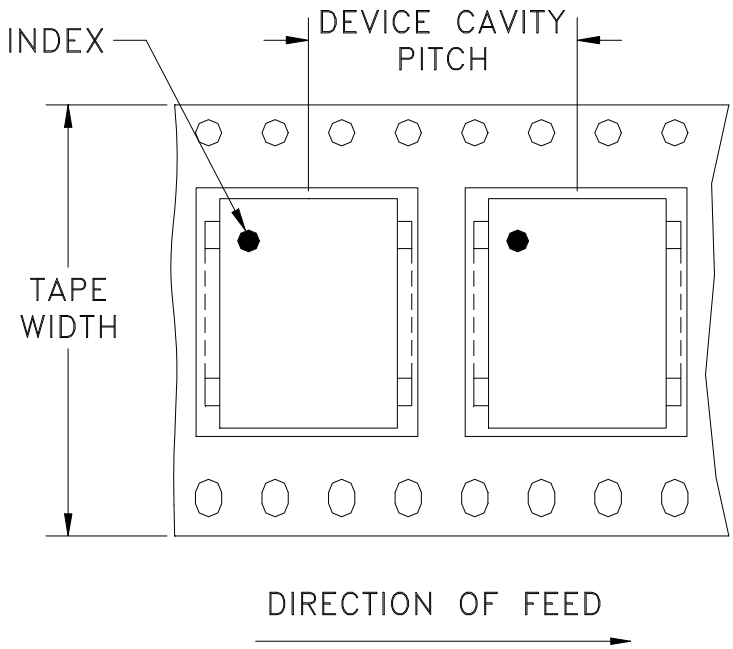
Dimensions are in inches (mm). Tolerances: 2 Pl. ±.015"; 3 Pl. ±.01"

Notes:

1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. 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.

Tape & Reel Packaging TR-F5

DEVICE ORIENTATION IN T&R



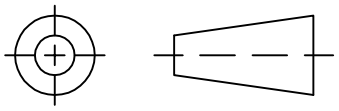
Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
32	16	13	500

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.

Go to: www.minicircuits.com/pages/pdfs/tape.pdf

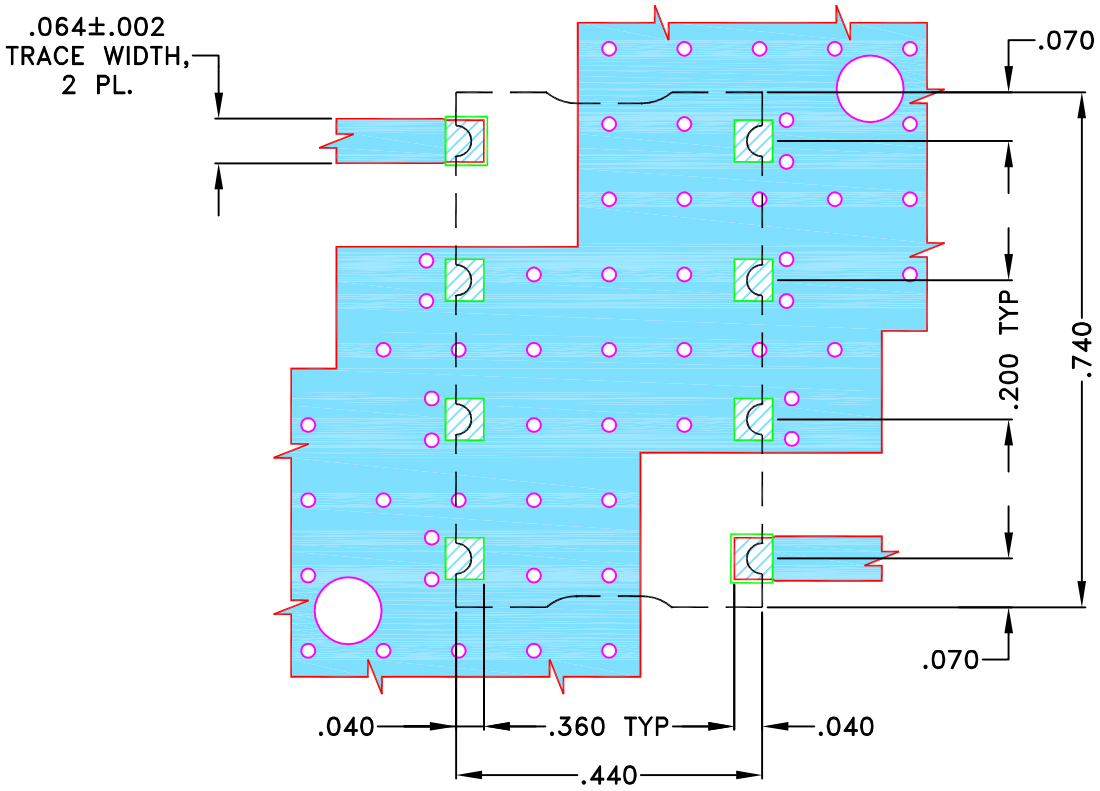
Mini-Circuits®
INTERNET http://www.minicircuits.com
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010
Mini-Circuits ISO 9001 & ISO 14001 Certified

THIRD ANGLE PROJECTION



REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M150680	NEW RELEASE	APR 15	TM	MD

SUGGESTED MOUNTING CONFIGURATION FOR HF1139 CASE STYLE "08FL01" PIN CODE



NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS WITH DIELECTRIC THICKNESS .030"±.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 SOLDERMASK

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	TM	10 APR 15
TOLERANCES ON:	CHECKED	MD	10 APR 15
2 PL DECIMALS ± .005"	APPROVED	RK	10 APR 15
3 PL DECIMALS ±			
ANGLES ±			
FRACTIONS ±			

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

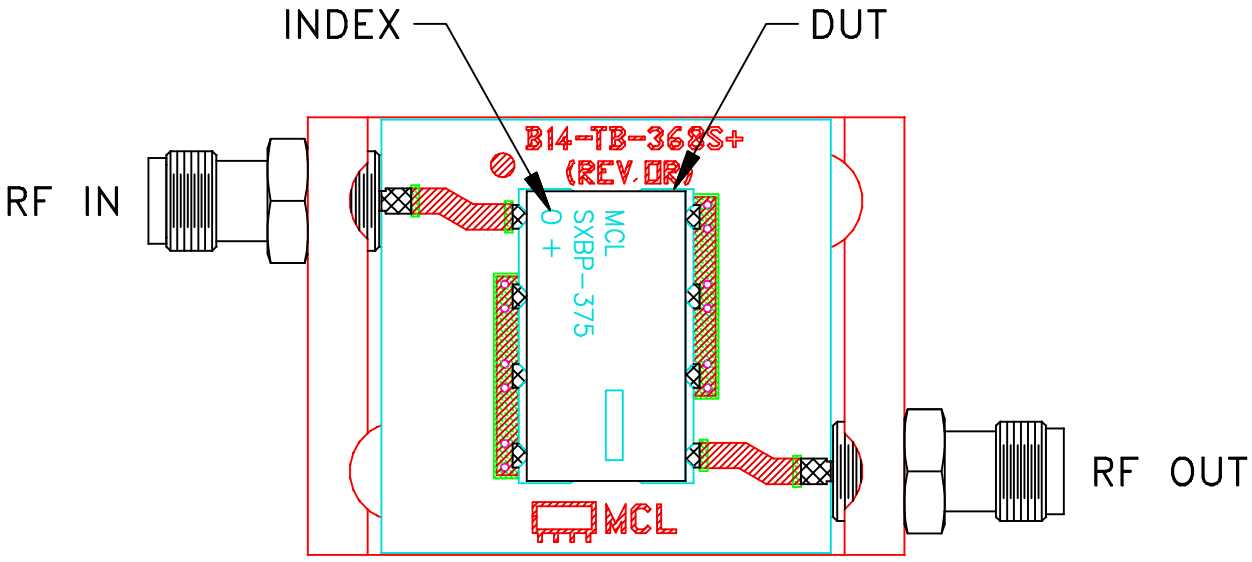
Mini-Circuits®
13 Neptune Avenue
Brooklyn NY 11235

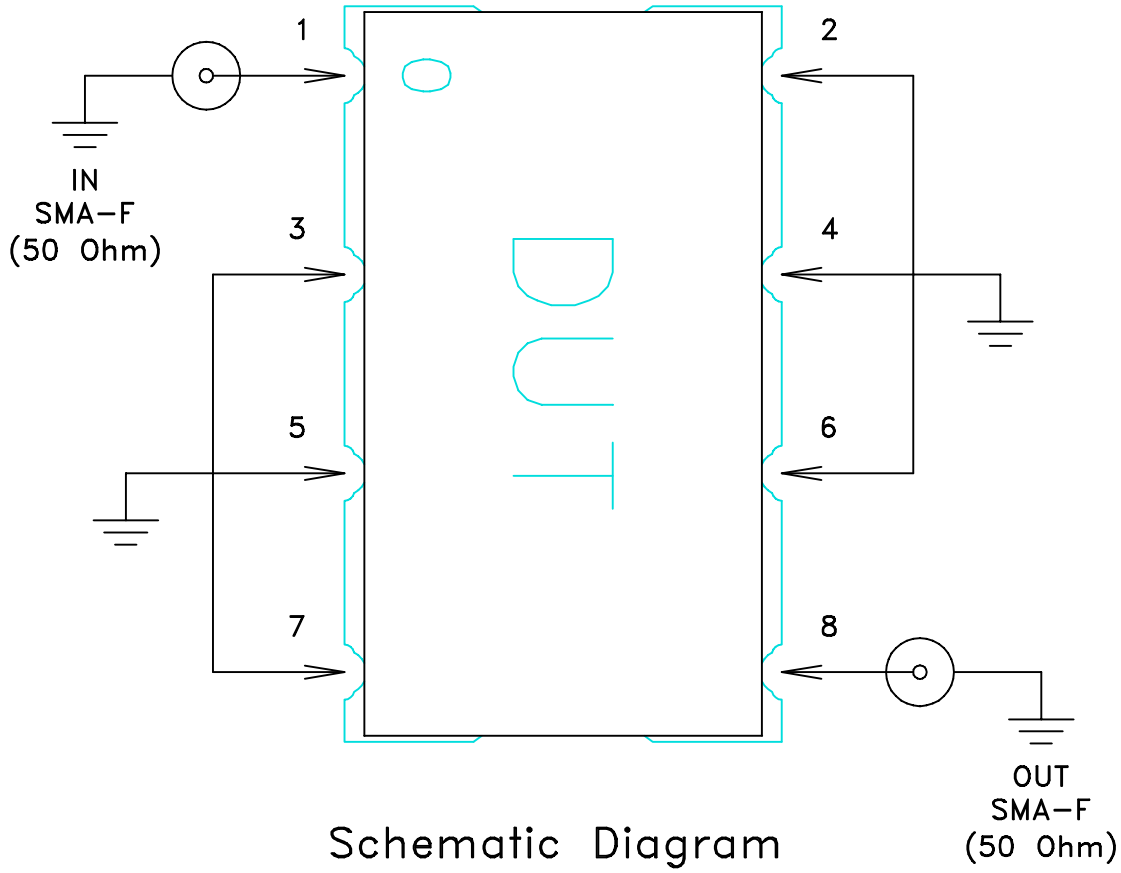
PL, 08FL01, HF1139
TB-368+, 50 OHM

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-449	OR
FILE: 98PL449		SCALE: 3:1	SHEET: 1 OF 1

Evaluation Board and Circuit

TB-SXBP-375+





Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: RO4350B OR Equivalent
   Dielectric Constant=3.48±.05, Thickness=.030 inch.

Mini-Circuits®

Mini-Circuits

Environmental Specifications ENV02T1

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