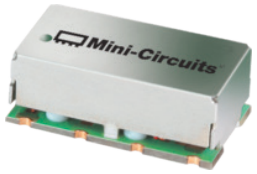
Surface Mount

Bandpass Filter

SXBP-300+

50Ω 290 to 310 MHz



Generic photo used for illustration purposes only

CASE STYLE: HF1139

The Big Deal

- Narrow band filter (BW of 6.5%)
- High rejection, 65 dB typical
- Good VSWR, 1.3:1 typical
- Miniature shielded package

Product Overview

The SXBP-300+ is a narrow-band bandpass filter fabricated using SMT technology. The bandpass filter covers from 290-310 MHz and offer good matching within the passband and high rejection. This filter uses miniature high Q capacitors and wire welded inductors for high reliability. In addition it has repeatable performance across production lots and consistent performance across temperature.

Key Features

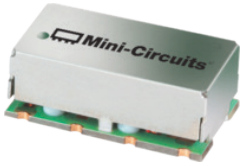
Feature	Advantages
Narrow bandwidth filter (Fractional bandwidth of 6.5%)	Provides sharp rejection which enables the filter to be used in adjacent channel rejection.
High rejection, 65 dB typical	This enables the filter to attenuate spurious signals and reject harmonics for a broad frequency band.
Shielded case	The surface mount package enables the SXBP-300+ to be used in compact designs.

Surface Mount

Bandpass Filter

50Ω 290 to 310 MHz

SXBP-300+



Generic photo used for illustration purposes only
CASE STYLE: HF1139

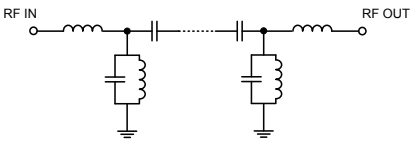
Features

- Good VSWR, 1.3:1 typical
- High rejection, 65 dB typical
- Shielded case

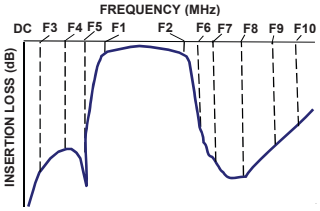
Applications

- Test and measurement
- Fixed and mobile communication
- Transmitters / Receivers

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

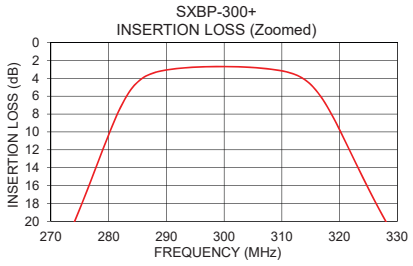
Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center frequency	-	-	-	300	-	MHz
	Insertion Loss	F1-F2	290 - 310	-	3.5	4.5	dB
	VSWR	F1-F2	290 - 310	-	1.3	1.57	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC - 200	60	69	-	dB
		F3-F4	200 - 249	40	46	-	dB
		F4-F5	249 - 265	20	30	-	dB
Stop Band, Upper	Insertion Loss	F6-F7	335 - 365	20	27	-	dB
		F7-F8	365 - 750	40	47	-	dB
		F8-F9	750 - 2000	55	68	-	dB
		F9-F10	2000 - 3300	30	39	-	dB

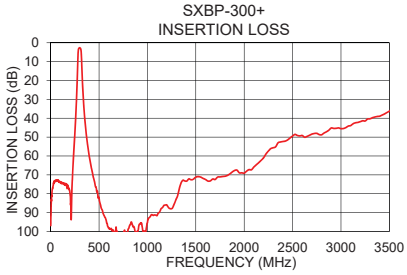
Maximum Ratings	
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	0.4 W max.

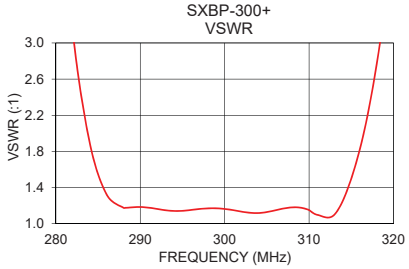
Permanent damage may occur if any of these limits are exceeded.

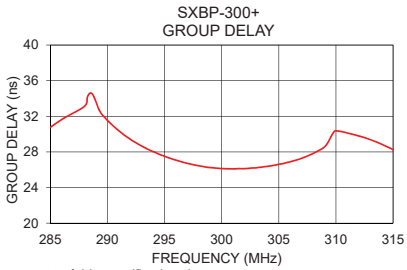
Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
1	96.89	59.62	290	31.54
10	81.09	53.70	291	30.38
100	73.74	83.69	292	29.42
200	79.87	207.23	293	28.66
249	48.93	97.63	294	28.04
265	32.44	39.01	295	27.52
274	20.18	15.79	296	27.08
290	3.07	1.18	297	26.71
295	2.75	1.14	298	26.44
300	2.69	1.16	299	26.24
305	2.79	1.13	300	26.13
310	3.17	1.15	301	26.10
329	21.15	13.55	302	26.12
335	27.29	21.07	303	26.21
341	32.43	29.07	304	26.38
365	47.03	66.11	305	26.61
750	100.92	746.97	306	26.89
2000	69.11	137.73	307	27.28
3000	45.52	138.17	308	27.83
3300	40.30	59.70	310	30.36







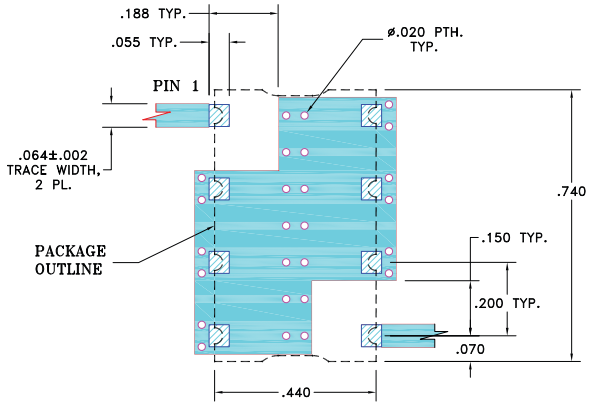


Notes
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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-368
Suggested PCB Layout (PL-230)



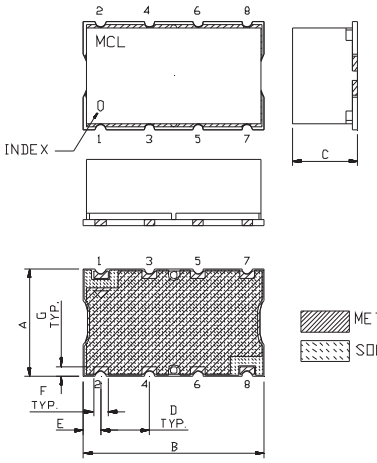
NOTE:

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.

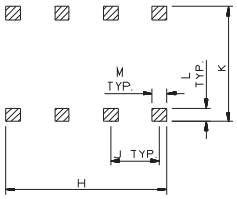
DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

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-300+

Typical Performance Data

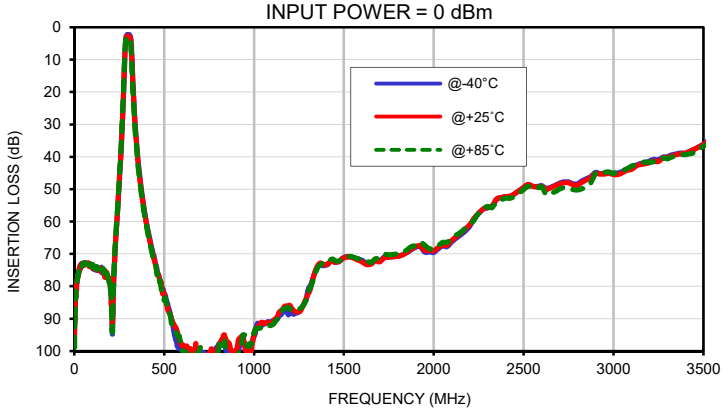
FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
1	95.18	96.89	105.20	0.24	0.29	0.34	0.21	0.26	0.31
10	81.50	81.09	80.79	0.27	0.32	0.37	0.27	0.32	0.36
50	73.63	73.16	73.08	0.31	0.34	0.37	0.31	0.34	0.37
60	72.99	72.91	72.75	0.28	0.31	0.34	0.28	0.31	0.33
70	73.27	73.03	73.12	0.26	0.29	0.31	0.25	0.28	0.30
80	73.21	72.88	72.86	0.23	0.26	0.28	0.23	0.26	0.28
100	74.02	73.74	73.69	0.18	0.21	0.22	0.19	0.21	0.23
110	74.85	74.51	74.58	0.16	0.19	0.20	0.16	0.19	0.20
120	73.88	74.24	73.99	0.14	0.16	0.18	0.14	0.17	0.18
150	74.12	74.88	74.93	0.10	0.12	0.14	0.10	0.12	0.14
160	76.09	75.20	74.52	0.09	0.11	0.13	0.09	0.12	0.13
200	80.00	79.87	80.14	0.06	0.08	0.10	0.06	0.09	0.11
230	66.37	66.04	65.40	0.07	0.10	0.12	0.07	0.11	0.14
246	52.09	51.64	51.06	0.11	0.16	0.19	0.12	0.18	0.21
249	49.46	48.93	48.32	0.13	0.18	0.22	0.14	0.20	0.24
250	48.53	48.02	47.38	0.14	0.19	0.22	0.15	0.21	0.25
256	42.82	42.27	41.59	0.19	0.25	0.30	0.20	0.27	0.33
260	38.74	38.12	37.39	0.24	0.31	0.38	0.26	0.35	0.41
265	33.13	32.44	31.61	0.34	0.45	0.54	0.37	0.49	0.58
270	26.82	26.04	25.08	0.53	0.69	0.84	0.57	0.75	0.91
274	21.04	20.18	19.13	0.84	1.10	1.38	0.92	1.21	1.49
280	11.08	10.31	9.41	2.52	3.39	4.44	2.74	3.69	4.81
290	2.63	3.07	3.35	23.15	21.47	21.17	24.98	22.48	21.78
291	2.53	2.97	3.26	22.78	21.79	21.87	24.17	22.69	22.49
293	2.39	2.84	3.14	23.48	23.22	23.53	26.12	24.97	24.79
295	2.31	2.75	3.06	23.59	23.56	23.74	27.37	25.88	25.26
300	2.23	2.69	3.03	21.25	22.45	23.82	22.26	23.36	24.98
301	2.23	2.69	3.04	21.76	23.15	24.55	22.74	24.17	26.15
305	2.28	2.79	3.20	25.04	24.40	23.48	29.78	27.66	25.84
308	2.41	2.97	3.44	21.18	21.64	22.74	23.03	22.45	22.02
310	2.54	3.17	3.74	20.33	23.10	29.18	20.53	20.89	20.29
321	9.09	11.07	12.90	3.89	3.55	3.20	3.34	3.06	2.77
329	19.61	21.15	22.59	1.19	1.28	1.31	1.05	1.14	1.17
335	26.03	27.29	28.49	0.73	0.83	0.87	0.66	0.76	0.80
341	31.34	32.43	33.45	0.51	0.60	0.65	0.47	0.56	0.61
345	34.42	35.41	36.36	0.42	0.50	0.55	0.40	0.48	0.52
365	46.29	47.03	47.76	0.21	0.26	0.30	0.20	0.26	0.30
400	59.86	60.40	60.81	0.09	0.13	0.16	0.10	0.15	0.18
500	82.49	82.14	84.38	0.02	0.05	0.08	0.02	0.08	0.10
600	97.95	98.08	99.56	0.01	0.02	0.05	0.01	0.05	0.08
700	101.41	100.72	99.09	0.03	0.01	0.04	0.02	0.05	0.08
750	103.16	100.92	105.92	0.02	0.02	0.05	0.01	0.06	0.09
800	98.40	98.94	100.11	0.03	0.02	0.05	0.03	0.05	0.09
840	98.59	95.82	98.34	0.03	0.02	0.05	0.01	0.07	0.11
900	102.72	99.91	104.19	0.02	0.02	0.05	0.01	0.07	0.11
940	96.46	95.67	94.98	0.03	0.02	0.05	0.02	0.06	0.10
980	98.43	100.37	98.32	0.02	0.03	0.06	0.00	0.08	0.12
1000	95.43	95.35	94.26	0.01	0.03	0.07	0.00	0.08	0.13
1100	90.76	91.57	92.01	0.01	0.04	0.07	0.01	0.08	0.13
1200	88.20	85.93	87.04	0.01	0.04	0.08	0.00	0.08	0.14
1250	87.95	87.92	87.09	0.02	0.06	0.10	0.03	0.11	0.17
1300	81.28	82.49	82.52	0.01	0.05	0.09	0.02	0.11	0.16
1350	74.50	74.03	74.73	0.01	0.06	0.10	0.02	0.11	0.17
1400	73.50	73.36	72.86	0.03	0.08	0.12	0.05	0.14	0.19
2000	69.58	69.11	68.56	0.06	0.13	0.18	0.07	0.18	0.25
2100	66.27	65.85	65.30	0.04	0.11	0.17	0.05	0.16	0.22
2200	61.45	60.99	61.10	0.04	0.11	0.17	0.04	0.15	0.22
3000	45.08	45.52	45.20	0.03	0.13	0.22	0.01	0.17	0.30
3200	41.31	41.81	41.74	0.07	0.15	0.24	0.10	0.27	0.38
3300	39.99	40.30	40.61	0.22	0.29	0.42	0.09	0.27	0.42

Typical Performance Data

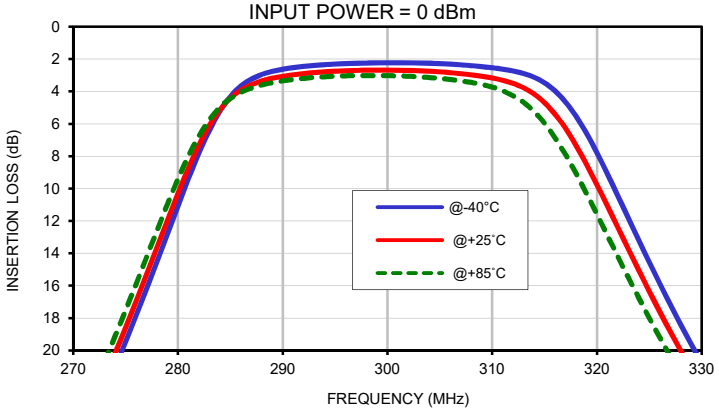
FREQ. (MHz)	GROUP DELAY (nsec)		
	@-40°C	@+25˚C	@+85˚C
290.0	32.72	31.54	30.57
290.5	31.95	30.92	30.06
291.0	31.28	30.38	29.62
291.5	30.66	29.86	29.20
292.0	30.11	29.42	28.84
292.5	29.63	29.03	28.50
293.0	29.18	28.66	28.20
293.5	28.78	28.32	27.91
294.0	28.44	28.04	27.67
294.5	28.11	27.75	27.43
295.0	27.81	27.52	27.25
295.5	27.53	27.28	27.06
296.0	27.29	27.08	26.89
296.5	27.06	26.88	26.74
297.0	26.84	26.71	26.61
297.5	26.68	26.57	26.52
298.0	26.50	26.44	26.41
298.5	26.35	26.33	26.34
299.0	26.25	26.24	26.30
299.5	26.14	26.18	26.27
300.0	26.05	26.13	26.24
300.5	25.99	26.10	26.24
301.0	25.97	26.10	26.28
301.5	25.95	26.13	26.32
302.0	25.93	26.12	26.37
302.5	25.96	26.17	26.43
303.0	25.99	26.21	26.52
303.5	26.03	26.29	26.62
304.0	26.09	26.38	26.73
304.5	26.17	26.48	26.89
305.0	26.27	26.61	27.06
305.5	26.34	26.73	27.23
306.0	26.48	26.89	27.46
306.5	26.59	27.07	27.71
307.0	26.73	27.28	27.98
307.5	26.92	27.53	28.34
308.0	27.12	27.83	28.72
308.5	27.36	28.16	29.14
309.0	27.68	28.56	29.63
309.5	28.60	29.55	30.54
310.0	29.98	30.36	30.68

Typical Performance Curves

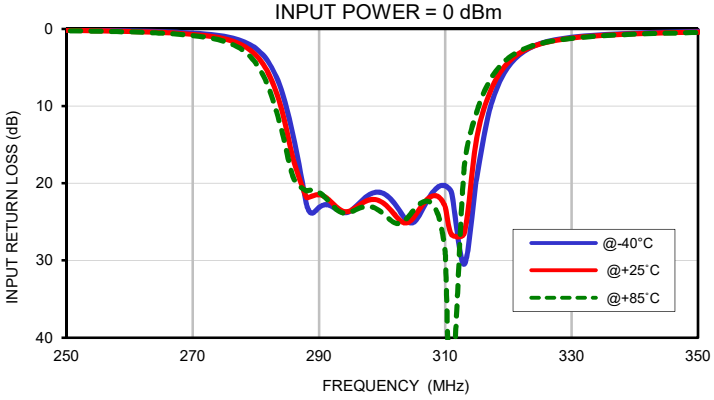
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



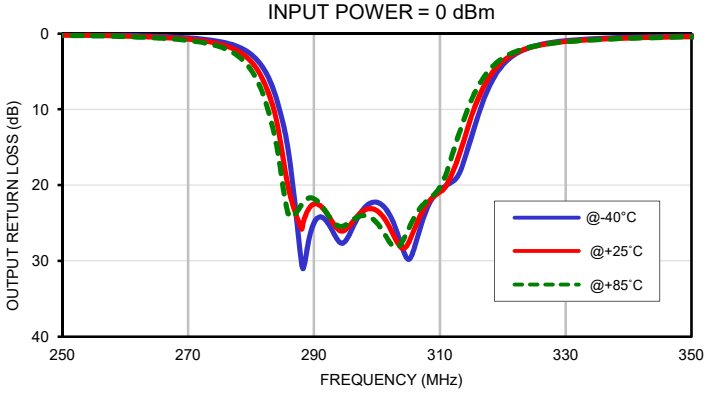
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



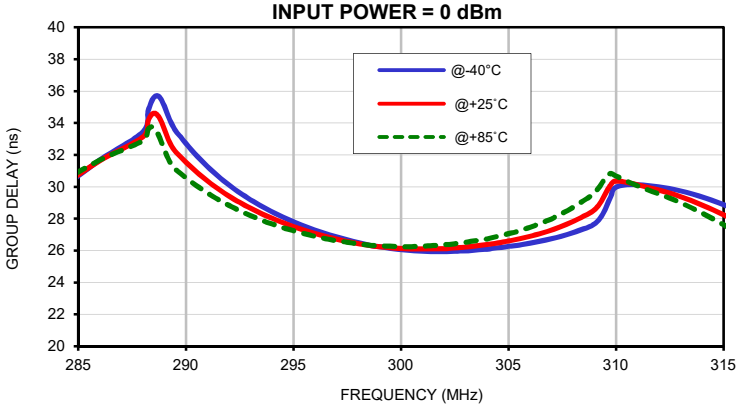
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



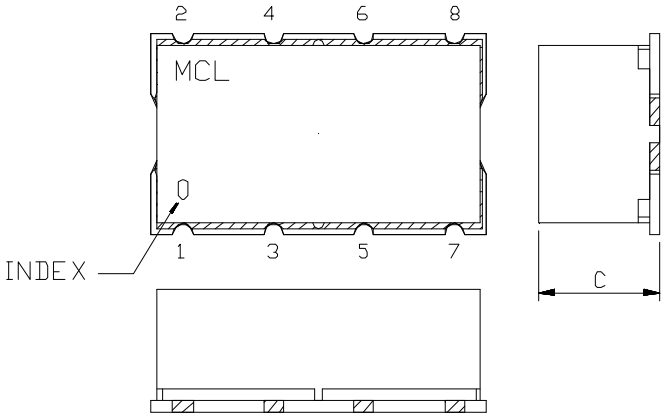
GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm

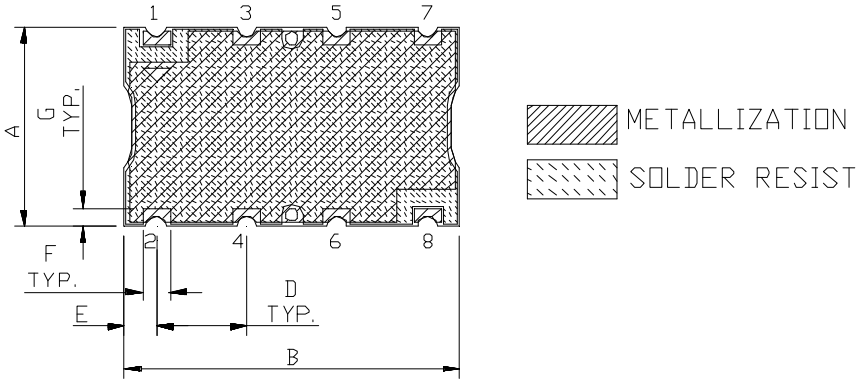


Case Style HF

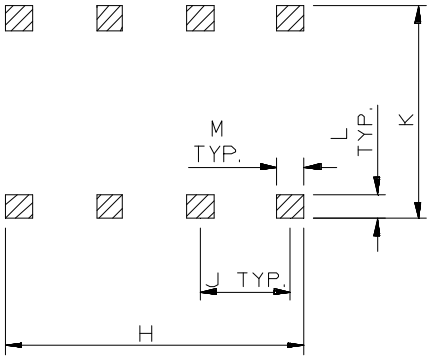
HF1139

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

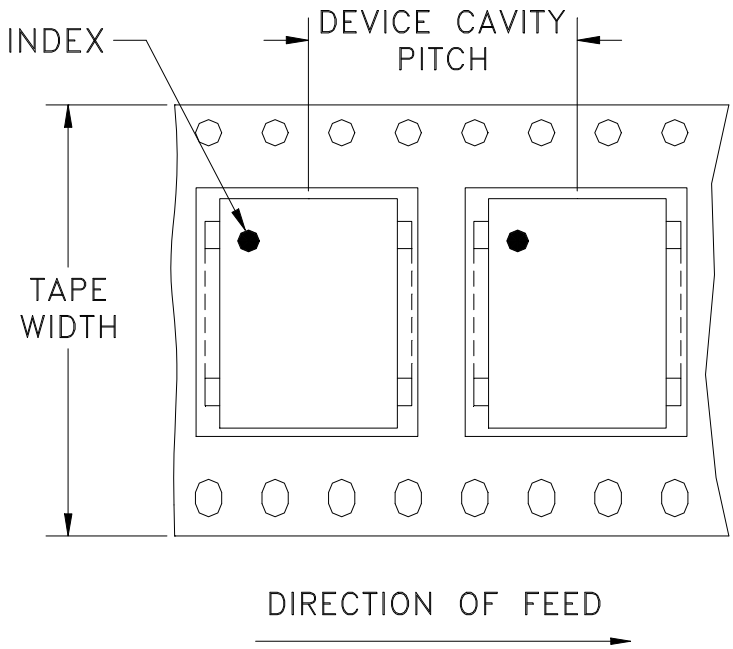
Dimensions are in inches (mm). Tolerances: 2 Pl. ±.015"; 3 Pl. ±.01"

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.

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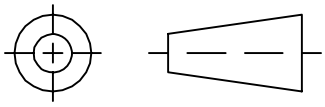
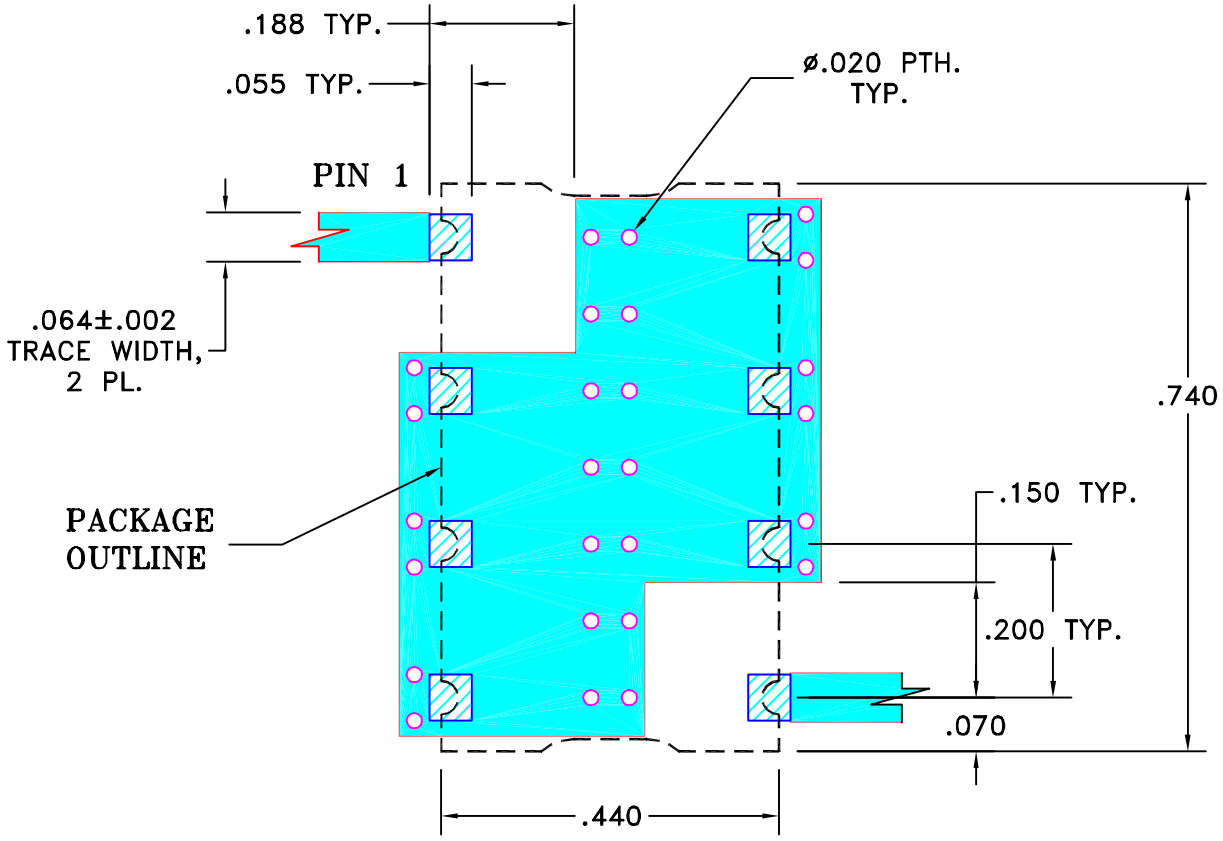
THIRD ANGLE PROJECTION



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"±.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	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 ±			

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

Mini-Circuits® 13 Neptune Avenue 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	

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