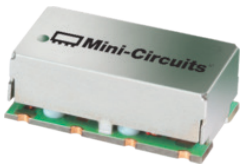
Surface Mount

Bandpass Filter

50Ω 410 to 440 MHz

SXBP-425+



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

Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	0.5W Max

Pin Connections

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

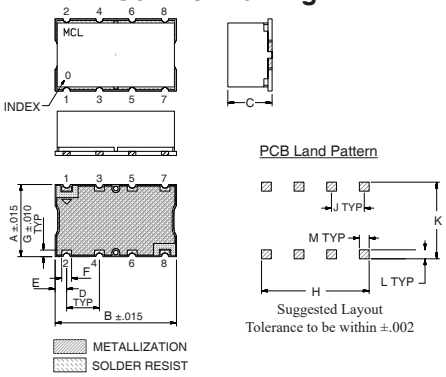
Features

- Linear Phase, up to ±6 deg typical @ Fc ± 15 MHz
- Good VSWR, 1.3:1 typical in Passband
- High rejection
- Shielded case
- Aqueous washable

Applications

- Industrial Microwave and RF
- Receivers / Transmitters
- Harmonic rejection

Outline Drawing



Outline Dimensions (inch / mm)

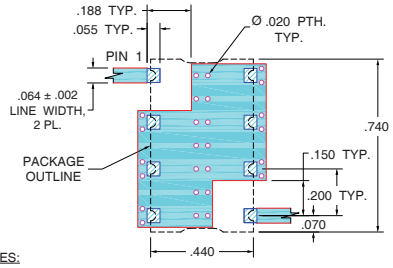
A	B	C	D	E	F
.440	.740	.270	.200	0.70	0.60
11.18	18.80	6.86	5.08	1.78	1.52

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

Note: Please refer to case style drawing for details

Demo Board MCL P/N: TB-368

Suggested PCB Layout (PL-230)



NOTES:

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.

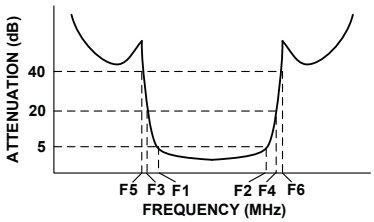
DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

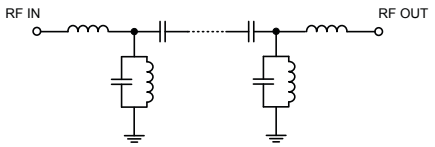
Bandpass Filter Electrical Specifications (T_{AMB}= 25°C)

CENTER FREQ. (MHz)	PASSBAND (MHz) (Loss < 5dB)	STOPBANDS (MHz) Loss > 20dB		Loss > 40dB		MAXIMUM DEVIATION FROM LINEAR PHASE (deg.)	VSWR (:1) Passband		Stopband
Fc	F1 - F2	F3	F4	F5	F6	Fc ± 15MHz	Typ.	Max.	Typ.
425	410-440	385	470	360	510-2500	±11	1.3	1.85	20

Typical Frequency Response

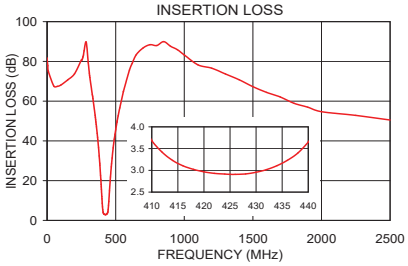


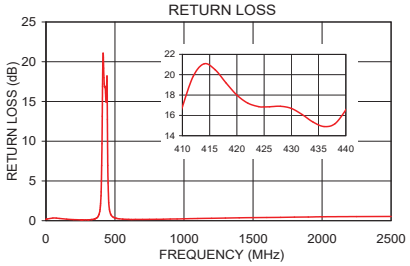
Functional Schematic

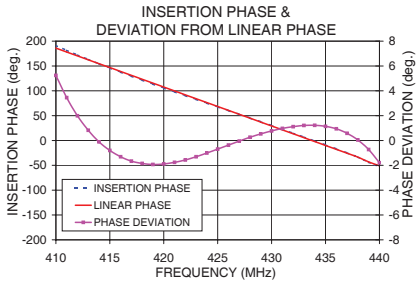


Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB) x̄	Insertion Loss (dB) σ	Return Loss (dB)	Frequency (MHz)	Deviation from Linear Phase (deg.)
0.5	81.76	3.40	0.17	410	5.24
100.0	68.09	3.05	0.28	412	1.99
360.0	47.06	0.36	0.27	414	-0.11
385.0	27.82	0.65	0.82	416	-1.31
395.0	16.90	1.00	1.90	418	-1.85
402.0	8.63	1.16	4.96	420	-1.89
406.0	5.40	0.97	9.68	422	-1.57
410.0	3.68	0.11	16.84	424	-1.01
425.0	2.91	0.07	16.83	425	-0.69
440.0	3.65	0.13	16.55	427	-0.05
445.0	5.32	0.42	12.75	429	0.53
450.0	9.56	0.74	4.75	430	0.77
460.0	19.96	0.67	1.39	432	1.11
470.0	28.48	0.54	0.78	434	1.22
510.0	49.71	0.45	0.29	436	0.94
1000.0	83.27	5.77	0.24	438	0.04
2000.0	54.71	2.24	0.49	439	-0.73
2500.0	50.52	1.55	0.54	440	-1.79







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

REV. C
M174392
EDR-9256UF1
SXBP-425+
URJ/RAV
200610
Page 1 of 1

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Surface Mount Band Pass Filter SXBP-425+

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	93.45	97.93	104.03	0.13	0.17	0.21	0.12	0.16	0.20
10	86.33	85.92	86.19	0.15	0.20	0.25	0.15	0.20	0.25
100	77.03	77.73	76.32	0.20	0.24	0.28	0.20	0.25	0.29
200	84.36	80.65	82.54	0.09	0.13	0.16	0.09	0.14	0.17
300	76.16	78.77	77.15	0.04	0.11	0.14	0.05	0.11	0.14
360	47.13	46.46	45.97	0.15	0.26	0.32	0.14	0.25	0.32
385	27.85	26.81	25.79	0.50	0.76	0.95	0.48	0.73	0.90
395	16.73	15.54	14.39	1.35	2.00	2.61	1.28	1.88	2.44
402	7.97	7.31	6.77	4.59	6.73	8.98	4.18	6.04	7.91
406	4.43	4.54	4.57	11.66	16.36	21.72	9.93	13.09	15.97
410	3.02	3.48	3.74	41.94	27.71	24.63	19.33	21.69	23.82
425	2.27	2.84	3.22	23.60	28.61	35.27	23.62	23.98	23.45
440	2.79	3.62	4.29	15.37	15.59	15.42	15.65	17.18	18.79
445	3.50	4.97	6.39	14.76	11.21	8.69	20.52	13.62	10.09
450	6.63	9.04	11.03	5.51	4.43	3.71	6.15	4.89	4.08
460	17.46	19.53	21.22	1.26	1.35	1.35	1.34	1.44	1.44
470	26.34	27.93	29.22	0.63	0.76	0.80	0.66	0.79	0.85
510	47.72	48.53	49.34	0.17	0.28	0.33	0.18	0.29	0.34
600	72.36	72.57	71.00	0.06	0.15	0.20	0.05	0.15	0.21
700	82.90	87.97	87.49	0.02	0.13	0.17	0.00	0.10	0.17
800	90.82	86.97	89.56	0.01	0.13	0.18	0.01	0.12	0.18
900	88.03	100.79	96.97	0.01	0.13	0.17	0.00	0.12	0.20
1000	85.70	87.77	89.61	0.01	0.15	0.19	0.00	0.13	0.21
1200	82.64	83.21	79.38	0.02	0.16	0.23	0.00	0.14	0.23
1300	82.31	77.72	80.48	0.02	0.17	0.26	0.01	0.18	0.26
1400	82.88	91.91	90.20	0.04	0.21	0.28	0.01	0.18	0.28
1500	82.34	79.85	85.38	0.03	0.20	0.28	0.02	0.18	0.27
1600	74.24	79.28	74.46	0.04	0.23	0.31	0.02	0.19	0.29
1700	64.01	66.06	69.10	0.06	0.24	0.33	0.05	0.23	0.35
1800	69.93	70.15	69.98	0.06	0.25	0.33	0.05	0.24	0.36
2000	63.72	63.68	62.34	0.05	0.25	0.35	0.06	0.25	0.37
2200	57.38	55.28	56.17	0.09	0.29	0.41	0.08	0.30	0.41
2300	50.57	53.84	52.98	0.12	0.32	0.43	0.09	0.27	0.40
2400	56.61	56.63	56.61	0.11	0.31	0.45	0.10	0.30	0.43
2500	60.33	58.64	57.44	0.08	0.30	0.44	0.10	0.32	0.48
2600	48.49	46.47	47.63	0.12	0.35	0.49	0.11	0.35	0.47
2700	54.95	51.82	48.82	0.10	0.35	0.50	0.09	0.34	0.51
2800	49.39	45.86	42.65	0.17	0.43	0.58	0.12	0.37	0.53
3000	44.67	47.78	48.61	0.10	0.36	0.53	0.17	0.36	0.52
3200	47.56	40.17	40.29	0.10	0.43	0.58	0.24	0.55	0.69
3300	39.21	40.20	41.87	0.13	0.46	0.61	0.14	0.43	0.62
3400	36.36	37.92	36.23	0.18	0.54	0.73	0.14	0.45	0.67
3500	33.52	34.88	37.09	0.19	0.57	0.81	0.27	0.58	0.78
3600	41.17	40.29	37.48	0.15	0.50	0.70	0.24	0.56	0.82
3700	36.38	34.63	34.11	0.13	0.53	0.70	0.25	0.62	0.86
3800	37.25	34.10	40.13	0.19	0.55	0.83	0.27	0.71	0.85
4000	30.73	33.22	31.70	0.40	0.79	1.20	0.37	0.71	1.00
4200	27.69	27.45	30.08	0.44	0.91	1.14	0.54	0.97	1.28
4300	29.35	30.08	30.78	0.40	0.79	1.08	0.72	1.25	1.26
4400	26.08	27.39	26.70	0.90	1.13	1.65	0.41	0.90	1.16
4500	24.74	24.79	23.50	0.98	1.57	1.59	1.20	1.44	1.69
4600	24.48	25.62	23.52	0.94	1.60	1.79	0.96	1.41	1.86
4800	21.81	24.54	23.58	1.68	3.00	3.66	1.91	2.40	3.14
5000	18.50	20.60	18.76	1.93	2.26	2.99	1.99	1.97	2.28

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Typical Performance Data

FREQ. (MHz)	GROUP DELAY (nsec)		
	@ -40° C	@ +25° C	@ +85° C
330	2.16	2.21	0.86
340	1.57	2.14	1.66
350	1.62	1.16	1.14
360	1.58	1.66	1.66
370	2.91	3.29	3.61
380	4.80	5.23	5.71
390	8.76	9.99	11.12
400	21.61	24.00	25.84
410	28.56	26.86	25.71
411	27.41	25.87	24.84
412	26.37	25.05	24.20
413	25.39	24.32	23.56
414	24.53	23.65	23.08
415	23.86	23.11	22.65
416	23.25	22.68	22.23
417	22.77	22.26	21.91
418	22.31	21.87	21.62
419	21.97	21.58	21.36
420	21.66	21.39	21.20
421	21.42	21.14	21.07
422	21.14	20.95	20.93
423	20.98	20.86	20.85
424	20.78	20.74	20.81
425	20.69	20.67	20.74
426	20.59	20.65	20.74
427	20.58	20.67	20.75
428	20.57	20.66	20.78
429	20.59	20.69	20.78
430	20.61	20.71	20.90
431	20.64	20.77	20.98
432	20.67	20.84	21.07
433	20.81	20.99	21.30
434	20.90	21.14	21.59
435	20.98	21.36	21.86
436	21.21	21.67	22.36
437	21.42	22.09	22.98
438	21.77	22.59	23.66
439	22.20	23.28	24.43
440	22.86	24.09	25.40
450	26.66	23.21	20.23
460	10.73	9.47	8.51
470	5.48	5.06	4.87
480	3.33	3.23	3.00
490	2.22	1.84	2.10
500	1.76	1.81	2.02
510	1.42	1.11	1.06
520	1.12	1.24	1.26
530	1.36	0.92	1.19
540	1.00	1.06	1.02
550	0.27	0.63	0.58
560	0.83	0.97	0.62
570	1.30	1.29	0.73
580	0.71	0.18	0.23
590	0.31	0.26	0.58
600	0.08	1.02	0.91

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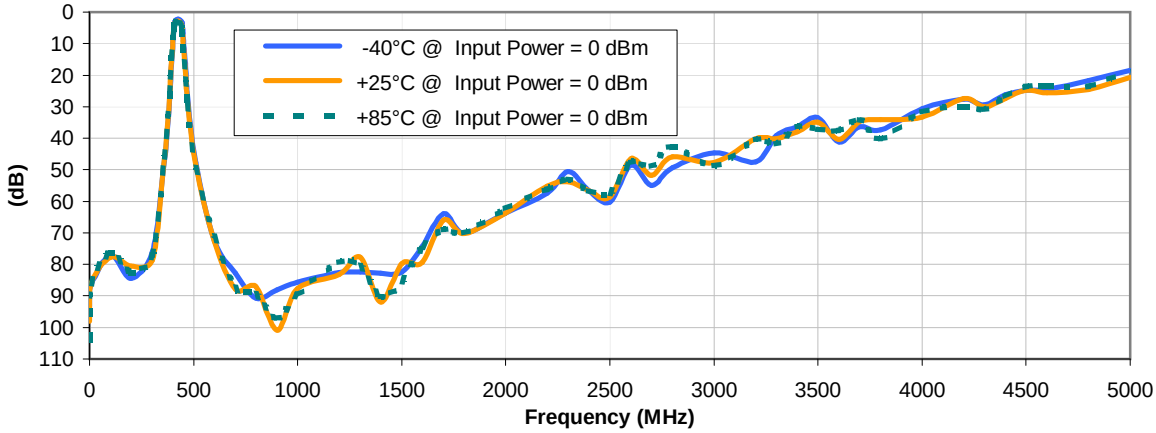
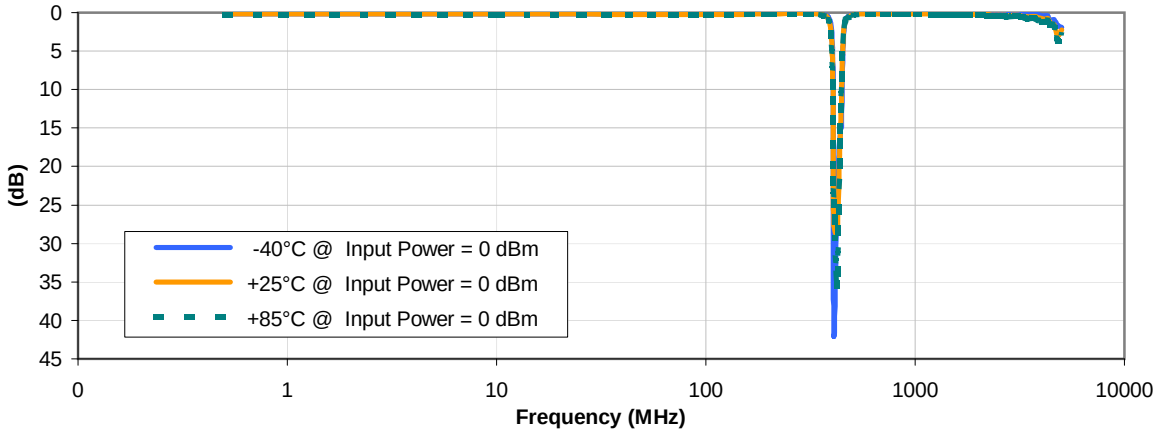
Surface Mount Band Pass Filter SXBP-425+

Typical Performance Curves

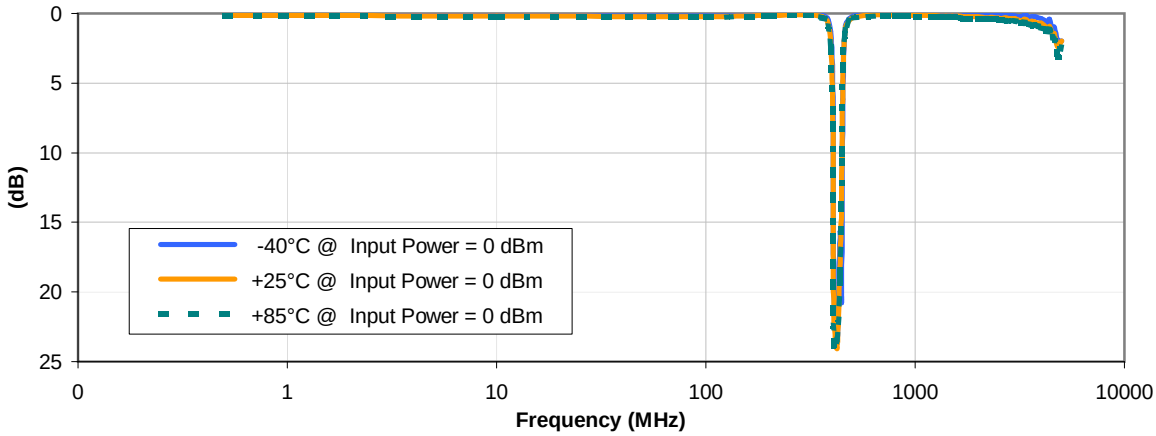
INSERTION LOSS vs. TEMPERATURE



INPUT RETURN LOSS vs. TEMPERATURE



OUTPUT RETURN LOSS vs. TEMPERATURE



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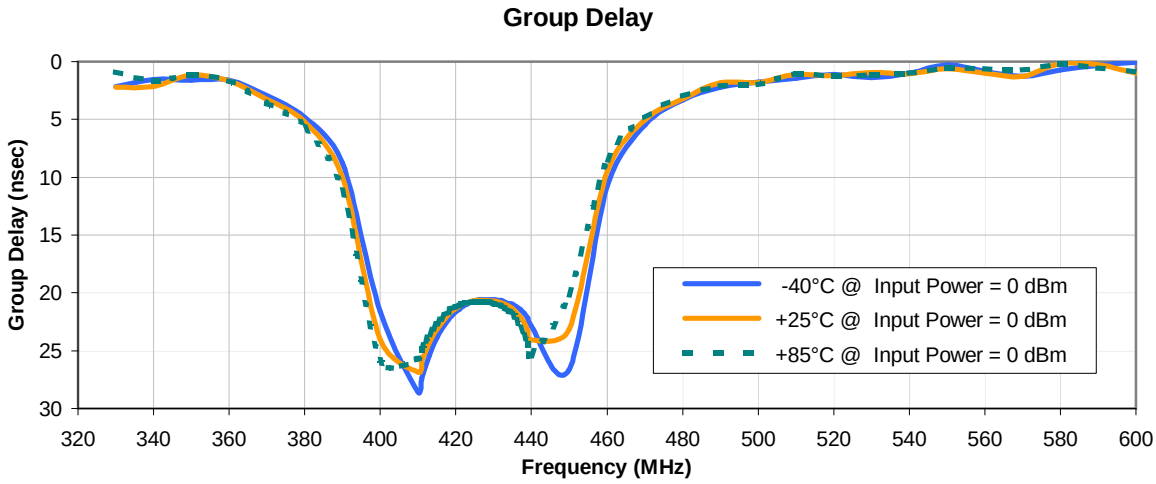

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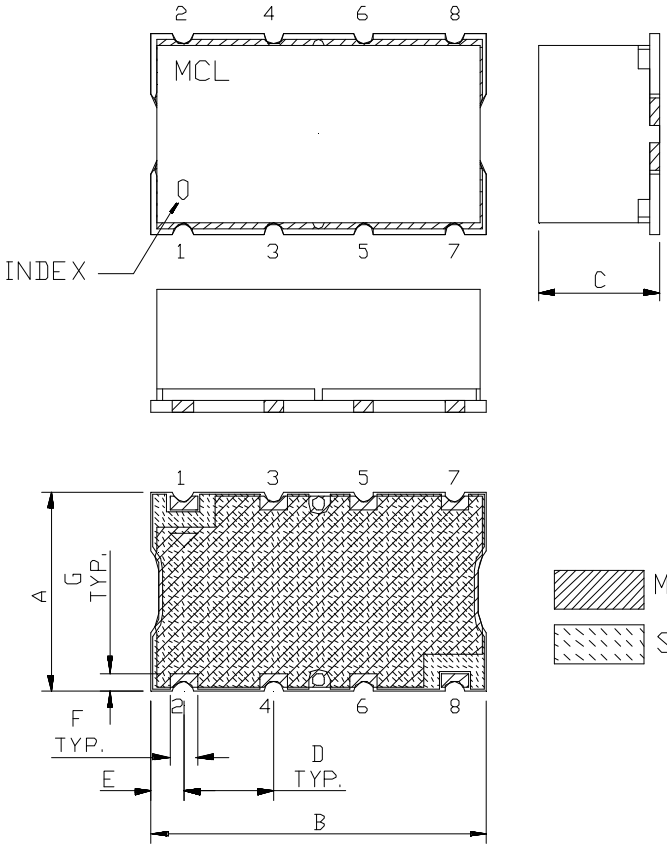
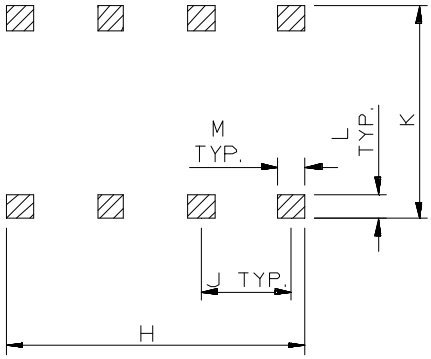
Case Style HF

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.

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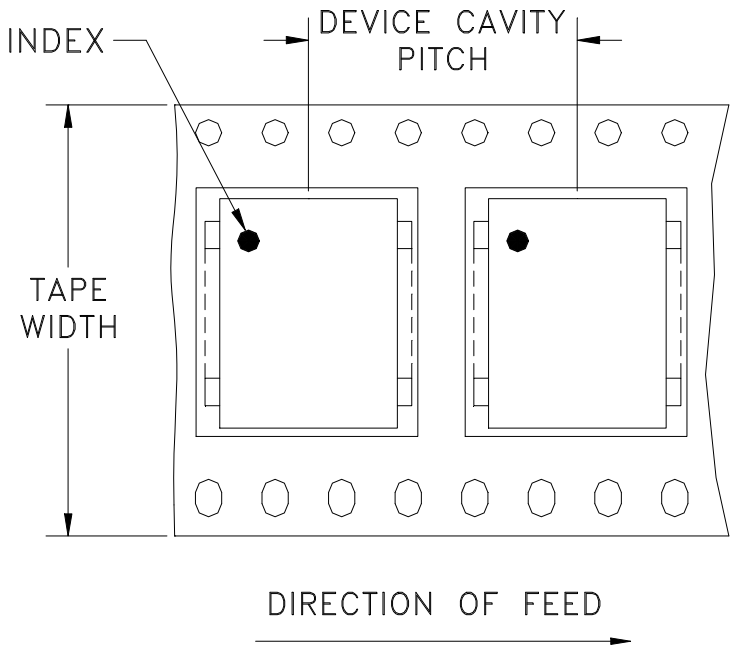
Tape & Reel Packaging TR-F5

DEVICE ORIENTATION IN T&R



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

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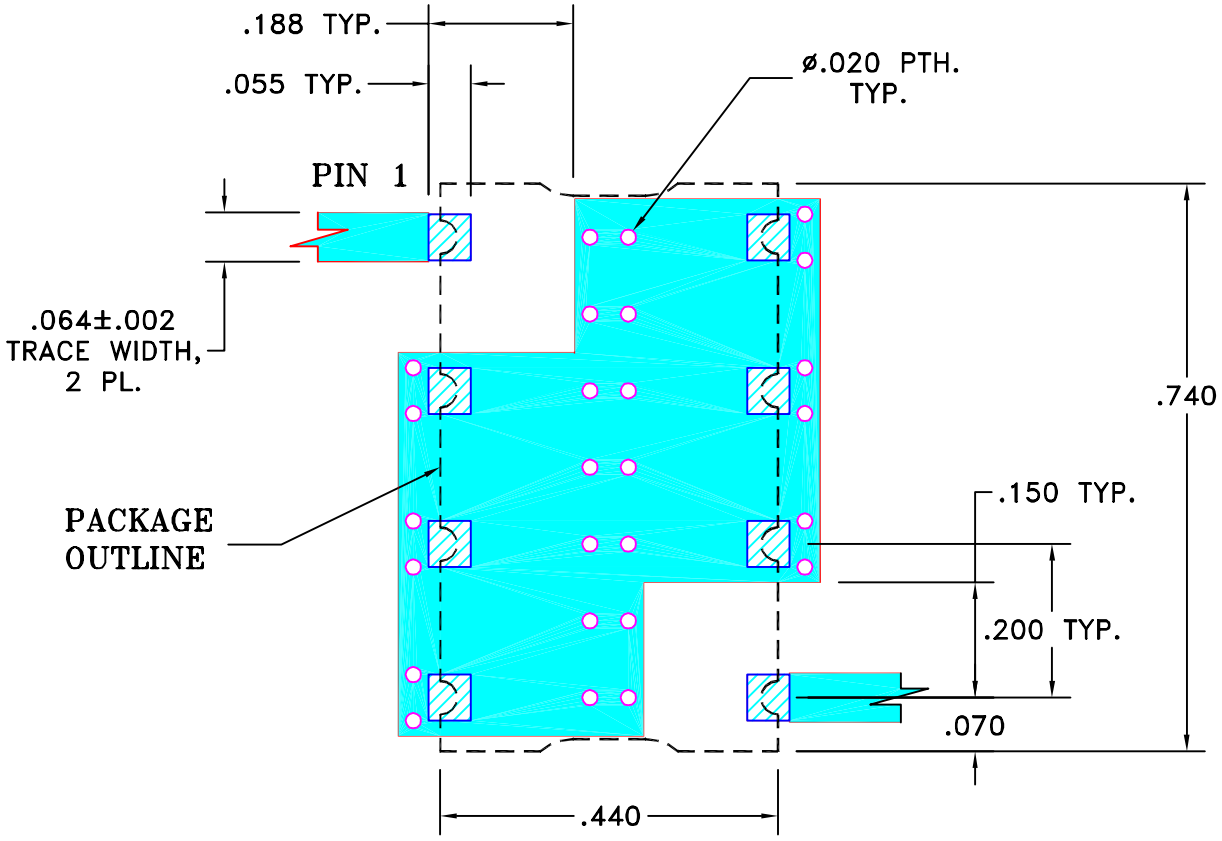
THIRD ANGLE PROJECTION

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 ±			

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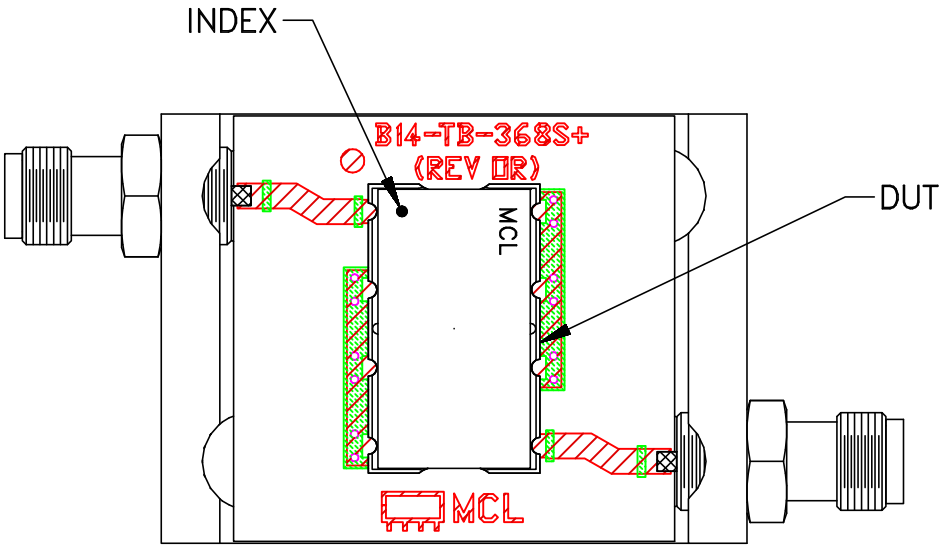
ASHEETA1.DWG REV:A DATE:01/12/95

Mini-Circuits®
13 Neptune Avenue
Brooklyn NY 11235

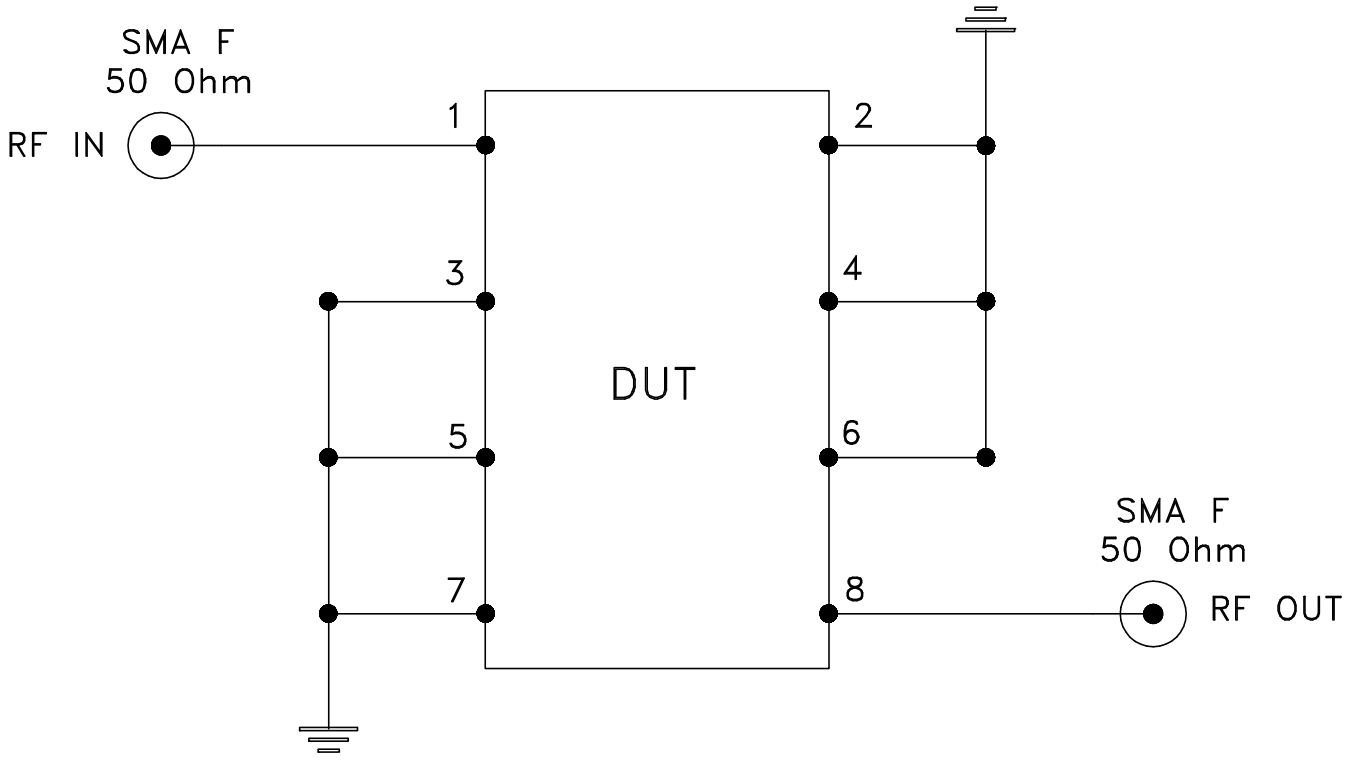
PL, cr, HF1139, SCLF, TB-368

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

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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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

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