

# Bandpass Filter

## SXBP-425+

50Ω 410 to 440 MHz

### Maximum Ratings

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

### Pin Connections

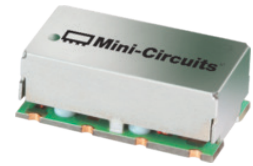
INPUT	1
OUTPUT	8
GROUND	2, 3, 4, 5, 6, 7

### 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



Generic photo used for illustration purposes only  
CASE STYLE: HF1139

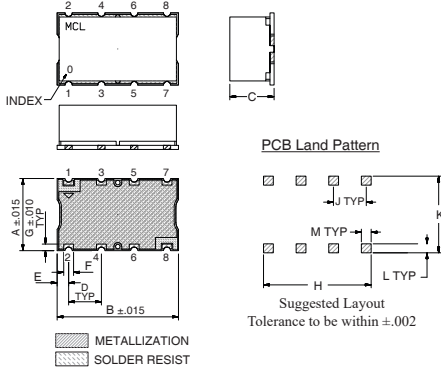
### +RoHS Compliant

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

### Bandpass Filter Electrical Specifications (T<sub>AMB</sub> = 25°C)

CENTER FREQ. (MHz)	PASSBAND (MHz) (Loss < 5dB)	STOPBANDS (MHz)				MAXIMUM DEVIATION FROM LINEAR PHASE (deg.)	VSWR (:1)		
		Loss > 20dB	Loss > 40dB	F3	F4		F5	F6	Passband
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

### Outline Drawing

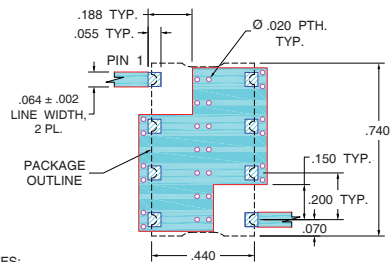


### Outline Dimensions (inch/mm)

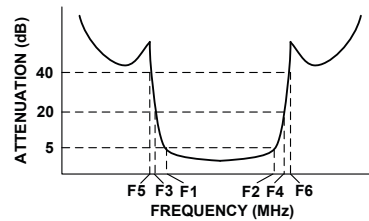
A	B	C	D	E	F	
.440	.740	.270	.200	0.70	0.60	
11.18	18.80	6.86	5.08	1.78	1.52	
G	H	J	K	L	M	wt.
.040	.660	.200	.470	.055	.060	grams
1.02	16.76	5.08	11.94	1.40	1.52	3

Note: Please refer to case style drawing for details

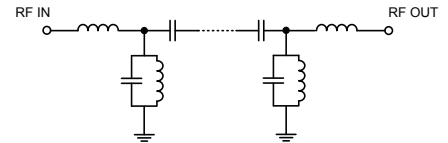
### Demo Board MCL P/N: TB-368 Suggested PCB Layout (PL-230)



### Typical Frequency Response

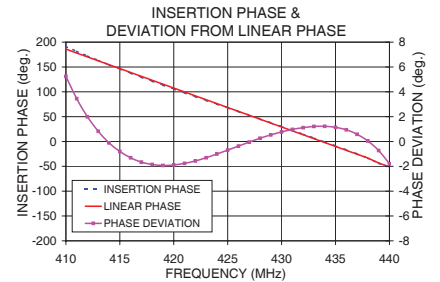
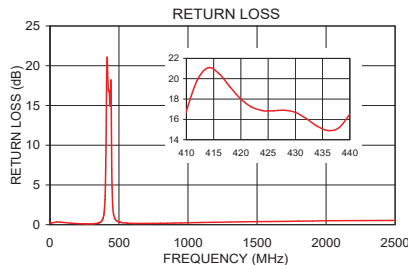
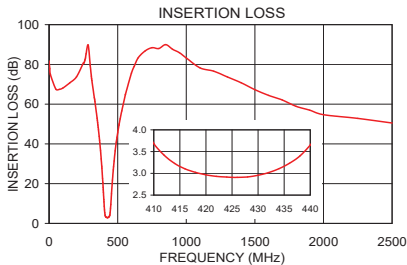


### Functional Schematic



### Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)		Return Loss (dB)	Frequency (MHz)	Deviation from Linear Phase (deg.)
	$\bar{x}$	$\sigma$			
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

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
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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

REV. X2  
SXBP-425+  
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# Surface Mount Band Pass Filter

# SXBP-425+

## 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

REV. X2  
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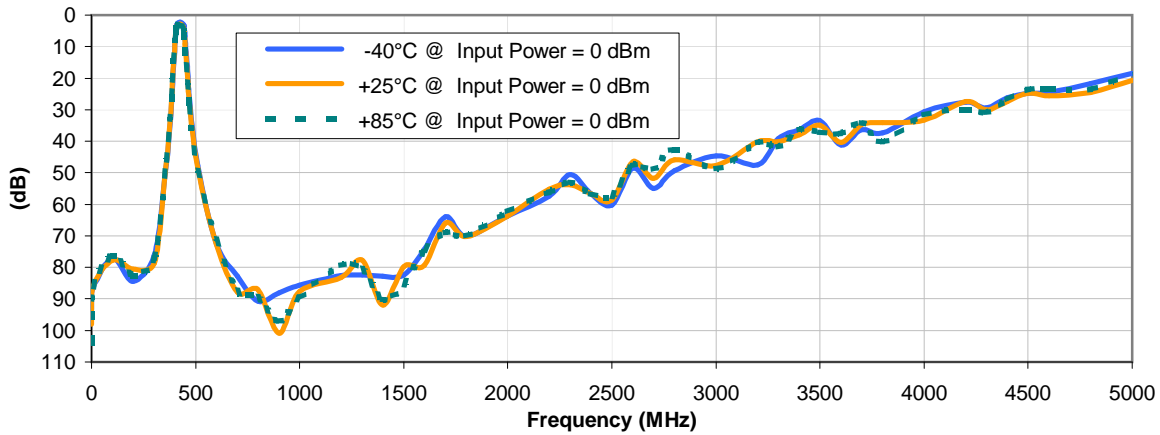


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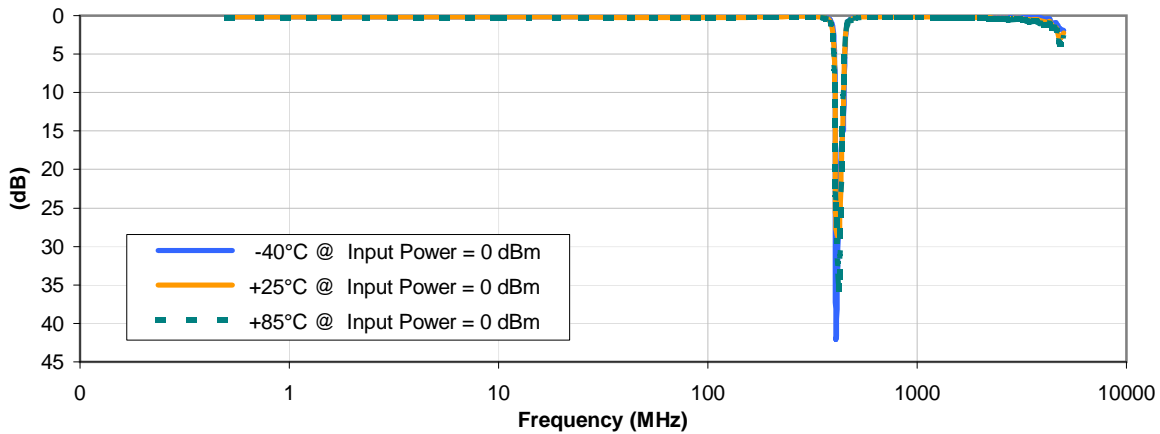


## Typical Performance Curves

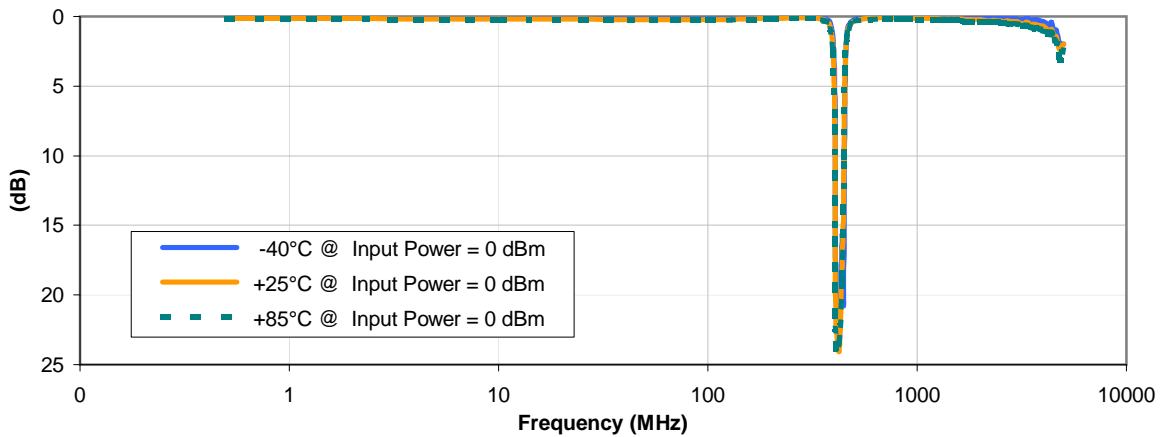
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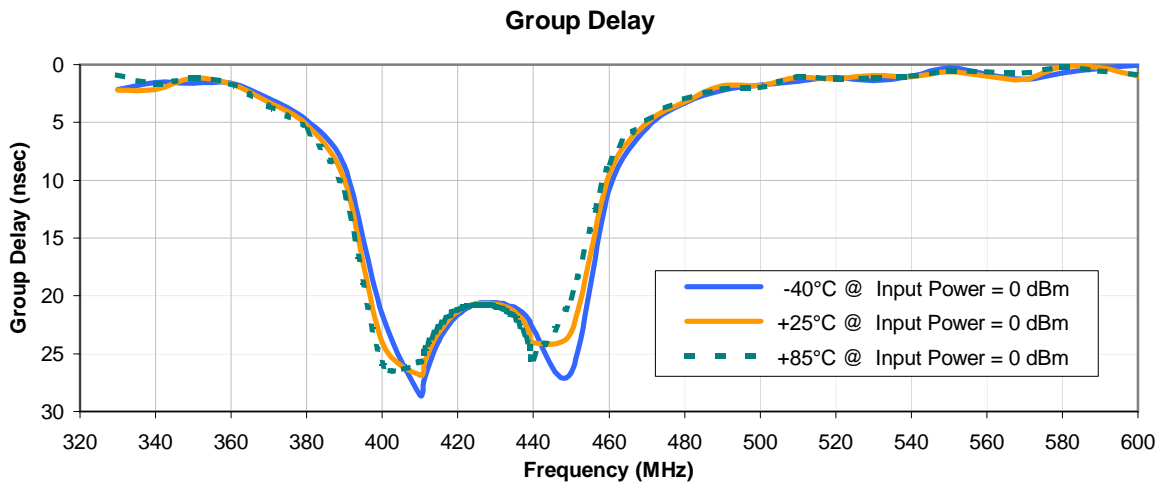
### INPUT RETURN LOSS vs. TEMPERATURE



### OUTPUT RETURN LOSS vs. TEMPERATURE



## Typical Performance Curves



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SXBP-425+  
101118  
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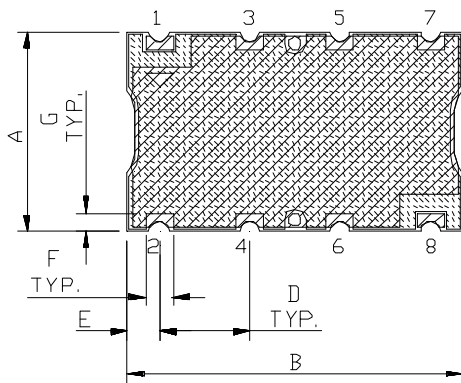
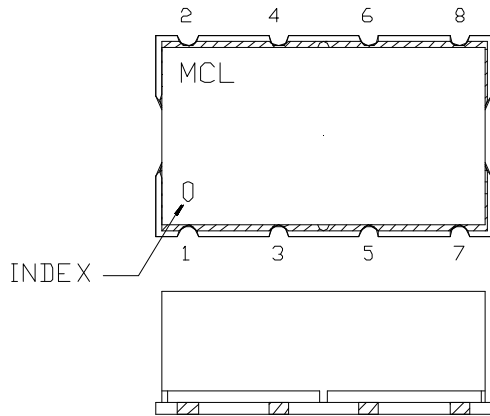
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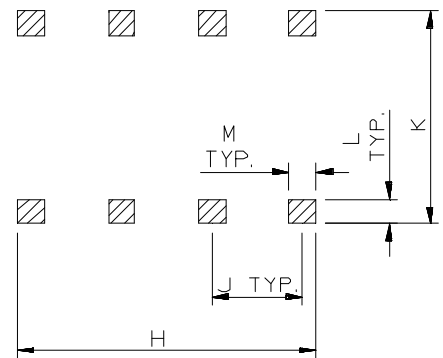
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### Outline Dimensions



### 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.  $\pm 0.015$ "; 3 Pl.  $\pm 0.01$ "

#### Notes:

- Case material: Nickel-Silver alloy.
- Base: Printed wiring laminate.
- Termination finish:
  - For RoHS Case Styles: 2-5  $\mu$  inch (.05-.13 microns) Gold over 120-240  $\mu$  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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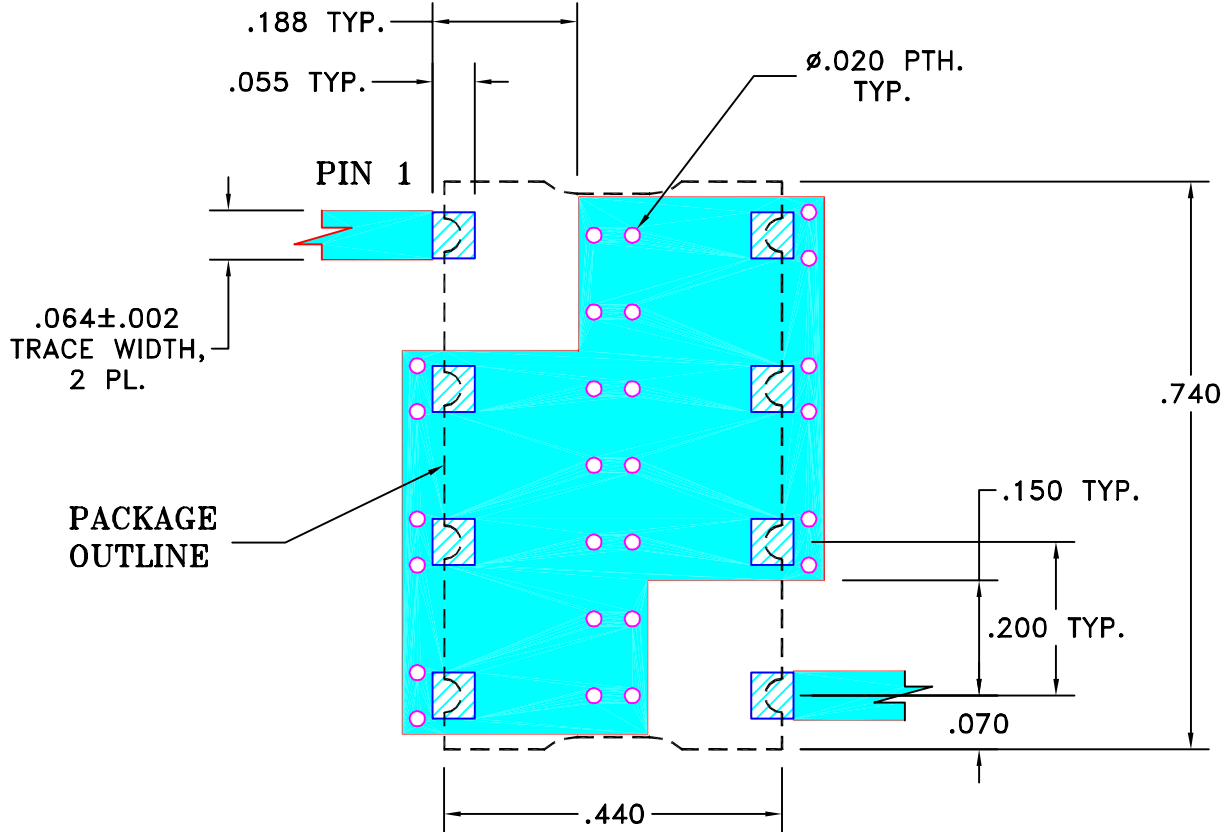
THIRD ANGLE PROJECTION



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.**

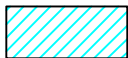


**NOTE:**

- 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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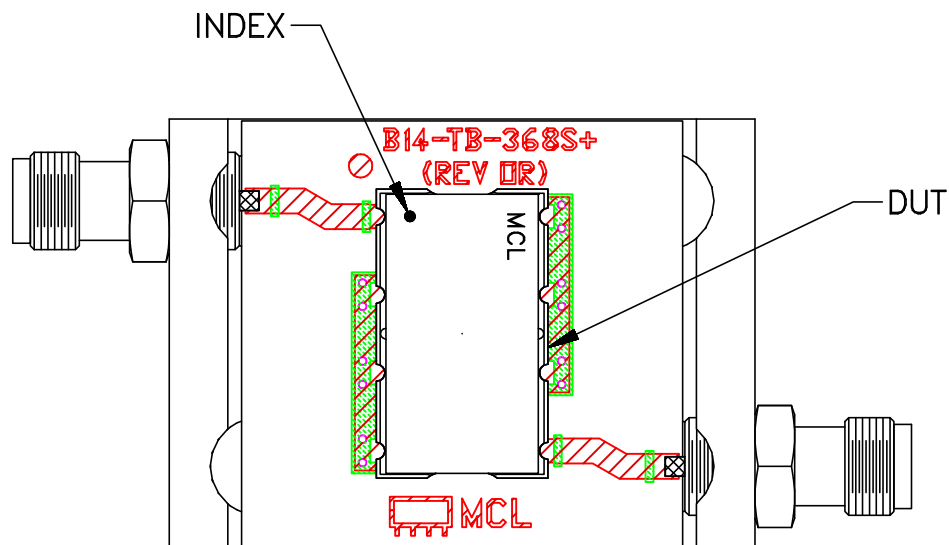
PL, cr, HF1139, SCLF, TB-368

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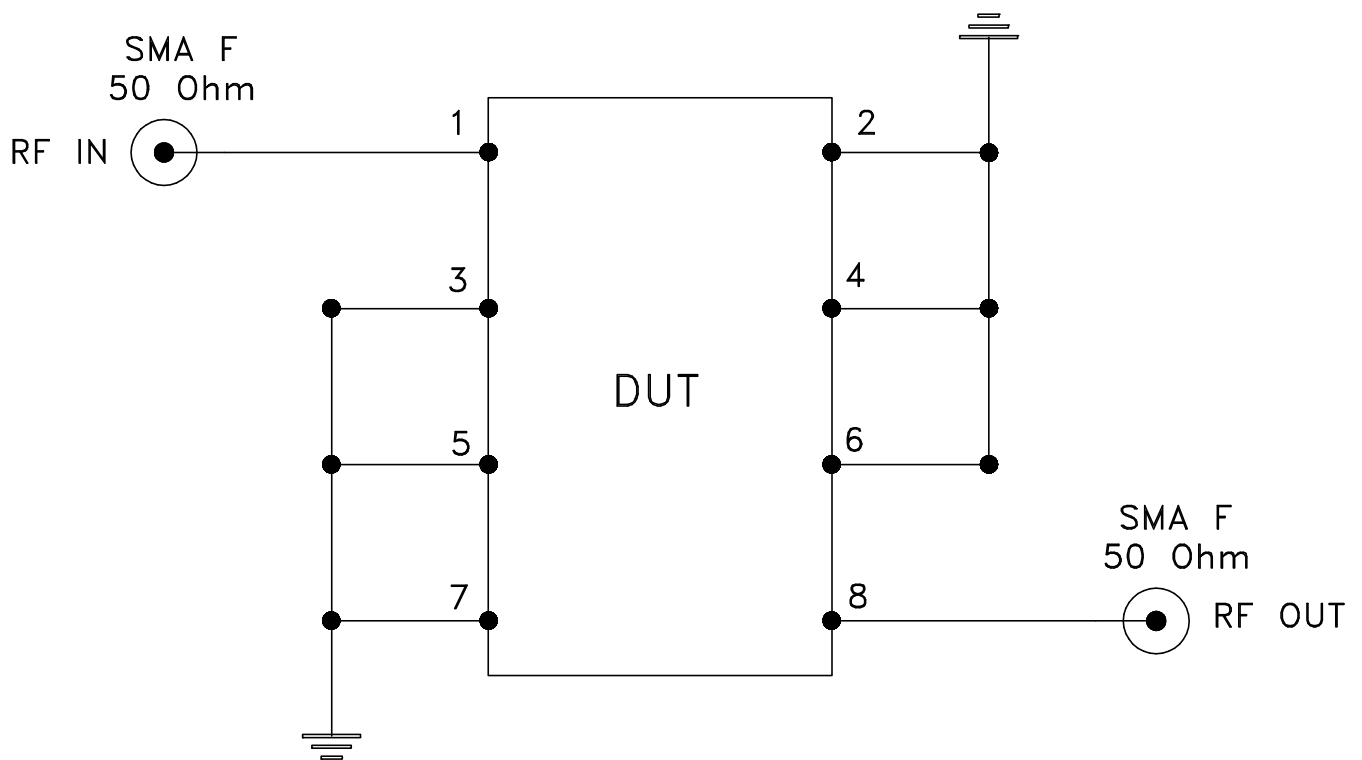
SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-230	REV: OR
FILE: 98PL230	SCALE: 4:1	SHEET: 1 OF 1	



# 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.

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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