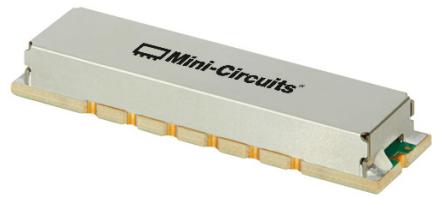


Surface Mount Bandpass Filter

BPF-A475+

50Ω 400 to 550 MHz



Generic photo used for illustration purposes only
CASE STYLE: HQ2706

The Big Deal

- Sharp roll-off
- High rejection
- Wide stopband
- Miniature shielded package

Product Overview

The BPF-A475+ is a 50Ω bandpass filter in a shielded package (size of 0.365" x 1.360" x 0.22") fabricated using SMT technology. Covering 475 MHz ± 75 MHz band width, these units offer good matching within the passband and high rejection in the stopband. Its wide stopband rejection will be suitable for application which needs far-frequency attenuation. In addition it has consistent performance across temperature.

Key Features

Feature	Advantages
High rejection	Rejects unwanted spurious in the adjacent band.
Sharp roll-off	Sharp roll-off helps in adjacent channel rejection and hence increased selectivity.
Shielded case	Reduced interference with the surrounding components.
Wide stopband	Rejects harmonics for a wide range of frequency.

Notes

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Surface Mount

Bandpass Filter

50Ω 400 to 550 MHz

BPF-A475+

Features

- Sharp roll-off
- High rejection
- Wide stopband
- Shielded case

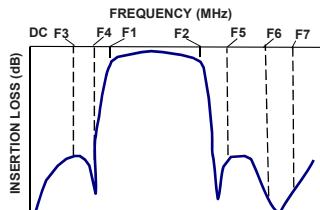
Applications

- Biomedical telemetry devices
- Wireless microphones
- Military radio

Functional Schematic



Typical Frequency Response



+RoHS Compliant

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



Generic photo used for illustration purposes only

CASE STYLE: HQ2706

Electrical Specifications at 25°C

	Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	—	—	—	475	—	MHz
	Insertion Loss	F1-F2	400 - 550	—	1.4	2.0	dB
	VSWR	F1-F2	400 - 550	—	1.41	1.67	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC - 200	40	45	—	dB
	VSWR	F3-F4	200 - 300	20	30	—	dB
		DC-F4	DC - 300	—	20	—	:1
Stop Band, Upper	Insertion Loss	F5-F6	650 - 3800	40	48	—	dB
	VSWR	F6-F7	3800 - 5000	—	30	—	dB
		F5-F7	650 - 5000	—	20	—	:1

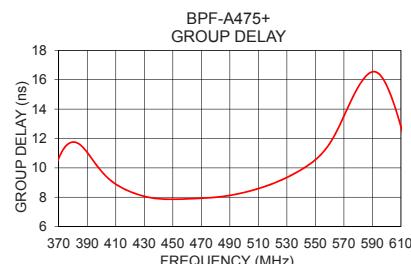
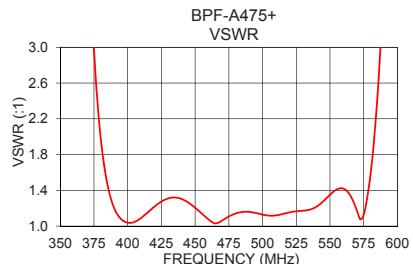
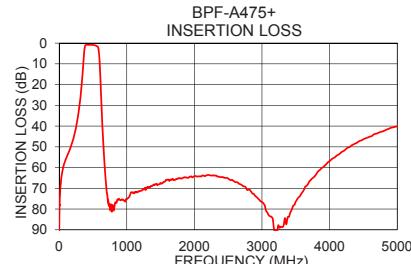
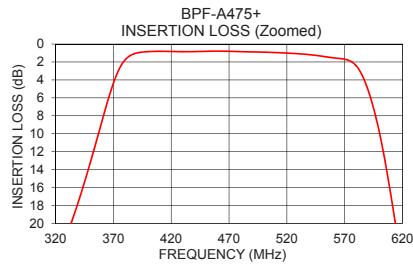
Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	5 W Max. @ 25°C

Permanent damage may occur if any of these limits are exceeded.
Max RF Power Input derate to 1.5 W @ 85°C

Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
1.0	99.92	180.04	400	9.76
100.0	55.84	411.40	405	9.26
200.0	47.30	188.77	410	8.89
300.0	30.34	91.22	415	8.61
330.0	21.28	52.26	420	8.38
372.5	3.52	3.72	425	8.20
400.0	0.84	1.04	430	8.07
475.0	0.83	1.11	435	7.96
500.0	0.90	1.13	440	7.90
550.0	1.35	1.35	475	7.96
585.0	3.46	2.40	480	8.00
615.0	20.98	25.11	490	8.12
627.5	31.00	37.40	495	8.22
650.0	46.45	56.08	500	8.33
1500.0	67.43	146.79	505	8.45
2700.0	68.39	36.30	510	8.59
3500.0	76.43	43.78	515	8.75
3800.0	63.36	55.80	520	8.92
4000.0	56.93	63.43	530	9.34
5000.0	40.13	59.42	550	10.55



Notes

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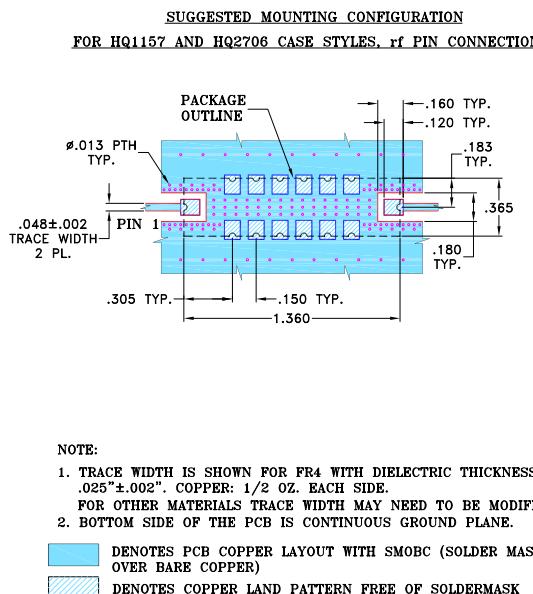
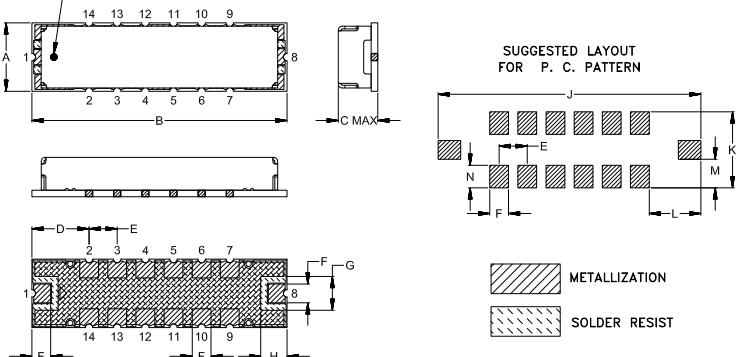
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Pad Connections

INPUT	1
OUTPUT	8
GROUND	2-7,9-14

**Demo Board MCL P/N: TB-363+
Suggested PCB Layout (PL-227)**

**Outline Drawing****Outline Dimensions (inch mm)**

A	B	C	D	E	F	G	H	J	K
.365	1.360	.220	.305	.150	.100	.180	.140	1.400	.405
9.27	34.54	5.59	7.75	3.81	2.54	4.57	3.56	35.56	10.29
L	M	N	Wt.						
.275	.153	.120	grams						
6.99	3.87	3.05							

Note: Please refer to case style drawing for details

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Band Pass Filter

BPF-A475+

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
	1.0	99.81	97.62	93.29	0.05	0.05	0.05	0.05	0.05
10.0	72.33	72.68	72.36	0.04	0.04	0.04	0.04	0.04	0.04
50.0	61.85	61.90	61.81	0.02	0.03	0.03	0.02	0.02	0.03
60.0	60.26	60.24	60.17	0.02	0.02	0.03	0.02	0.03	0.03
80.0	57.84	57.79	57.73	0.01	0.03	0.03	0.01	0.02	0.03
100.0	55.94	55.91	55.87	0.01	0.03	0.03	0.01	0.02	0.03
120.0	54.27	54.29	54.28	0.01	0.04	0.05	0.01	0.03	0.04
140.0	52.63	52.72	52.73	0.02	0.04	0.05	0.02	0.04	0.04
160.0	50.92	51.05	51.09	0.03	0.05	0.06	0.02	0.04	0.05
180.0	49.08	49.24	49.28	0.04	0.06	0.07	0.03	0.05	0.06
200.0	47.01	47.16	47.24	0.05	0.07	0.08	0.04	0.06	0.07
220.0	44.63	44.77	44.86	0.06	0.08	0.09	0.05	0.07	0.08
230.0	43.30	43.43	43.52	0.07	0.09	0.10	0.06	0.08	0.08
240.0	41.87	41.98	42.06	0.07	0.09	0.10	0.06	0.08	0.09
260.0	38.63	38.68	38.74	0.09	0.11	0.12	0.08	0.10	0.11
280.0	34.78	34.75	34.77	0.10	0.14	0.15	0.09	0.12	0.13
300.0	30.12	30.00	29.96	0.13	0.17	0.19	0.12	0.15	0.17
310.0	27.42	27.25	27.16	0.16	0.20	0.22	0.14	0.18	0.20
330.0	21.01	20.76	20.58	0.25	0.32	0.36	0.23	0.28	0.32
350.0	13.79	13.54	13.30	0.61	0.73	0.83	0.55	0.67	0.76
375.0	3.44	3.43	3.35	5.64	6.11	6.69	5.38	5.83	6.38
400.0	0.74	0.87	0.97	37.76	34.57	29.41	33.67	36.94	33.29
475.0	0.68	0.82	0.92	27.49	26.11	23.46	27.60	26.28	23.76
500.0	0.75	0.90	1.00	23.24	24.35	25.06	24.15	26.10	28.46
520.0	0.84	1.00	1.12	23.40	22.83	21.75	23.81	23.33	22.00
550.0	1.14	1.35	1.51	16.69	16.58	16.38	15.92	15.56	15.05
580.0	2.60	3.02	3.38	13.60	12.92	12.30	12.10	11.41	10.67
615.0	20.18	21.07	21.87	0.59	0.70	0.75	1.74	1.96	2.12
627.5	29.89	30.80	31.62	0.36	0.46	0.51	0.91	1.06	1.14
650.0	45.46	46.26	47.02	0.22	0.30	0.34	0.39	0.50	0.55
900.0	71.78	71.49	71.54	0.01	0.05	0.07	0.00	0.05	0.07
1000.0	69.53	69.38	69.38	0.01	0.03	0.05	0.02	0.02	0.04
1200.0	69.33	69.52	69.55	0.03	0.02	0.04	0.04	0.00	0.03
1300.0	70.70	70.56	70.76	0.04	0.01	0.04	0.06	0.00	0.02
1700.0	61.57	61.57	61.39	0.04	0.08	0.15	0.05	0.06	0.12
1750.0	60.86	60.94	60.86	0.04	0.09	0.17	0.05	0.07	0.14
1800.0	64.14	64.28	64.18	0.03	0.11	0.20	0.04	0.09	0.17
1850.0	66.31	66.58	66.88	0.02	0.13	0.22	0.04	0.10	0.19
1900.0	65.72	65.95	66.39	0.01	0.15	0.26	0.03	0.12	0.22
1950.0	65.37	65.54	65.41	0.01	0.17	0.28	0.02	0.14	0.25
2000.0	64.71	64.75	64.83	0.01	0.20	0.32	0.02	0.16	0.28
2060.0	65.02	65.06	65.25	0.02	0.23	0.36	0.00	0.19	0.32
2120.0	64.10	64.24	64.37	0.04	0.26	0.40	0.01	0.22	0.36
2180.0	64.34	64.65	65.24	0.05	0.29	0.45	0.03	0.25	0.41
2240.0	64.05	64.58	65.11	0.07	0.32	0.49	0.04	0.28	0.45
2300.0	63.86	64.42	65.07	0.08	0.35	0.53	0.05	0.31	0.48
2360.0	64.12	64.74	65.31	0.10	0.38	0.56	0.07	0.34	0.52
2420.0	64.33	65.10	65.69	0.11	0.40	0.59	0.08	0.36	0.55
2480.0	64.38	65.15	65.75	0.13	0.43	0.63	0.10	0.38	0.58
2540.0	65.35	66.12	67.12	0.14	0.45	0.65	0.11	0.40	0.60
2600.0	65.55	66.63	67.97	0.15	0.46	0.66	0.12	0.42	0.62
2700.0	67.23	68.55	69.94	0.16	0.48	0.68	0.13	0.44	0.64
2720.0	67.51	68.87	70.17	0.16	0.47	0.68	0.14	0.44	0.64
3000.0	73.87	75.77	79.32	0.14	0.46	0.64	0.12	0.43	0.61
3300.0	87.81	86.72	87.06	0.10	0.39	0.54	0.08	0.37	0.53
3600.0	71.38	69.88	67.82	0.03	0.30	0.45	0.01	0.28	0.44
3700.0	68.58	67.82	66.28	0.01	0.27	0.42	0.01	0.26	0.42
3800.0	65.21	63.90	63.08	0.00	0.27	0.41	0.03	0.24	0.39
4000.0	57.89	57.26	56.26	0.02	0.24	0.42	0.05	0.21	0.38
5000.0	41.08	40.87	43.40	0.05	0.32	0.44	0.13	0.36	0.41



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IF/RF MICROWAVE COMPONENTS



REV. OR

BPF-A475+

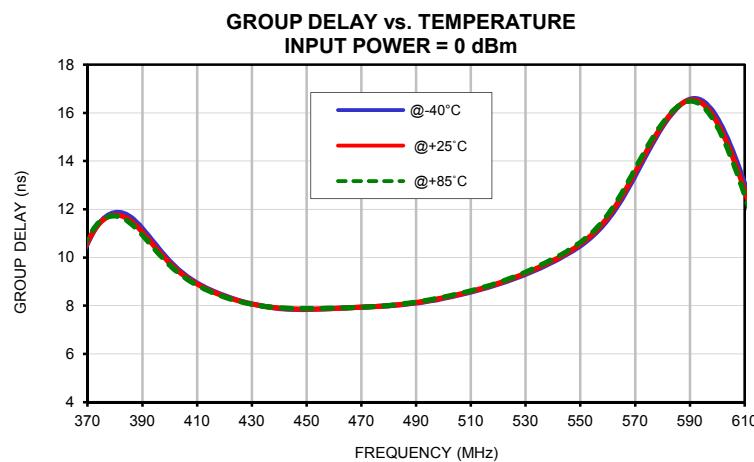
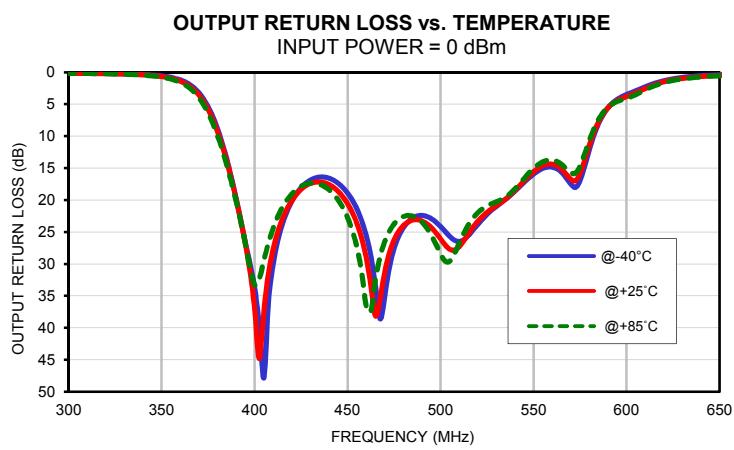
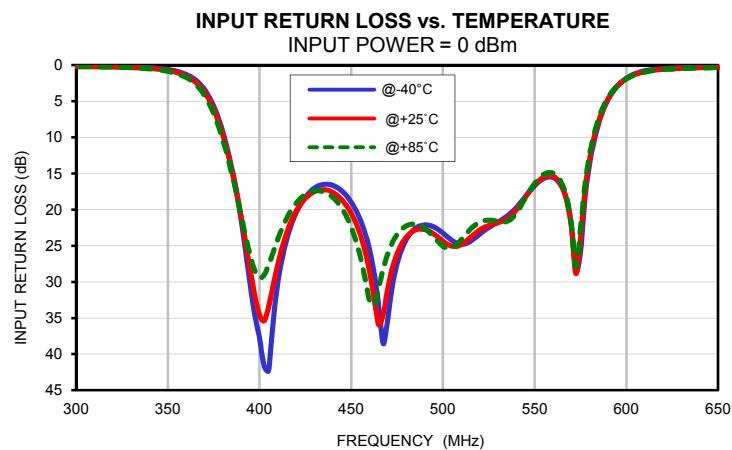
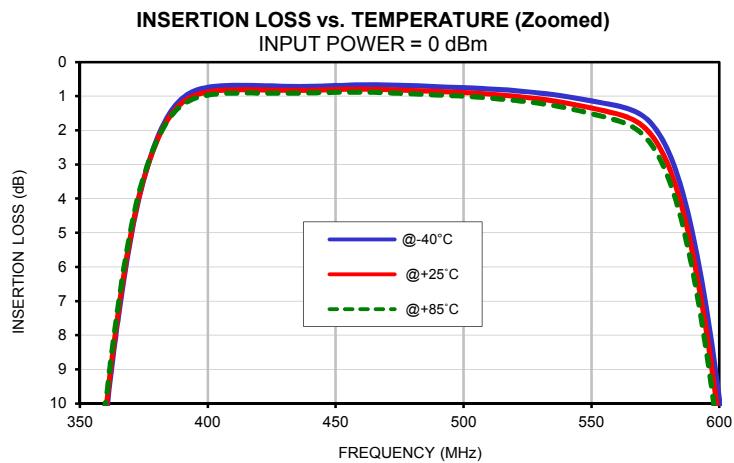
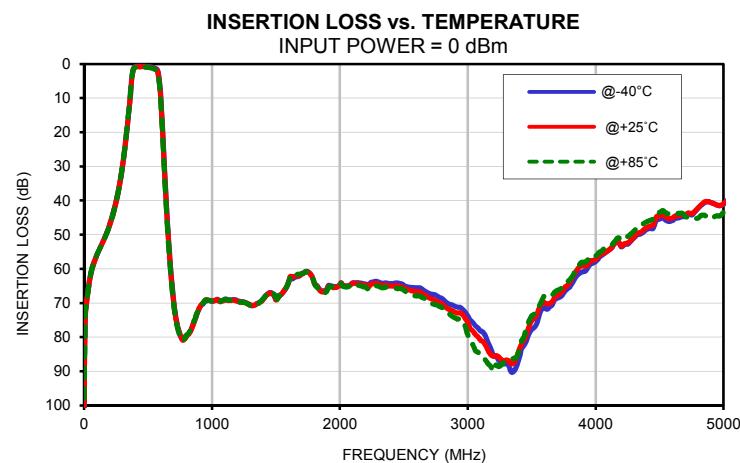
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Page 1 of 2

Typical Performance Data

FREQ. (MHz)	GROUP DELAY		
	(nsec)		
	@-40°C	@+25°C	@+85°C
400.0	9.85	9.76	9.68
402.5	9.57	9.50	9.43
405.0	9.33	9.26	9.21
407.5	9.12	9.06	9.01
410.0	8.94	8.89	8.85
412.5	8.78	8.74	8.70
415.0	8.65	8.61	8.57
417.5	8.53	8.49	8.46
420.0	8.41	8.39	8.35
422.5	8.32	8.29	8.27
425.0	8.23	8.21	8.19
427.5	8.14	8.13	8.11
430.0	8.07	8.07	8.06
432.5	8.01	8.01	8.01
435.0	7.96	7.96	7.96
437.5	7.92	7.93	7.93
440.0	7.89	7.90	7.91
442.5	7.86	7.88	7.89
445.0	7.85	7.87	7.88
447.5	7.85	7.86	7.88
450.0	7.84	7.86	7.88
452.5	7.85	7.86	7.88
455.0	7.86	7.87	7.89
457.5	7.87	7.88	7.89
460.0	7.88	7.89	7.90
462.5	7.90	7.90	7.91
465.0	7.91	7.91	7.92
467.5	7.92	7.92	7.93
470.0	7.94	7.94	7.94
472.5	7.95	7.95	7.95
475.0	7.96	7.96	7.97
477.5	7.98	7.98	7.99
480.0	8.00	8.00	8.01
482.5	8.02	8.03	8.04
485.0	8.05	8.06	8.07
487.5	8.08	8.09	8.11
490.0	8.11	8.13	8.15
492.5	8.15	8.17	8.20
495.0	8.20	8.22	8.25
497.5	8.24	8.27	8.30
500.0	8.30	8.33	8.36
502.5	8.36	8.39	8.42
505.0	8.43	8.45	8.48
507.5	8.49	8.52	8.55
510.0	8.57	8.59	8.62
512.5	8.64	8.67	8.70
515.0	8.72	8.75	8.78
517.5	8.80	8.83	8.86
520.0	8.89	8.92	8.96
522.5	8.99	9.02	9.06
550.0	10.48	10.55	10.63

Typical Performance Curves

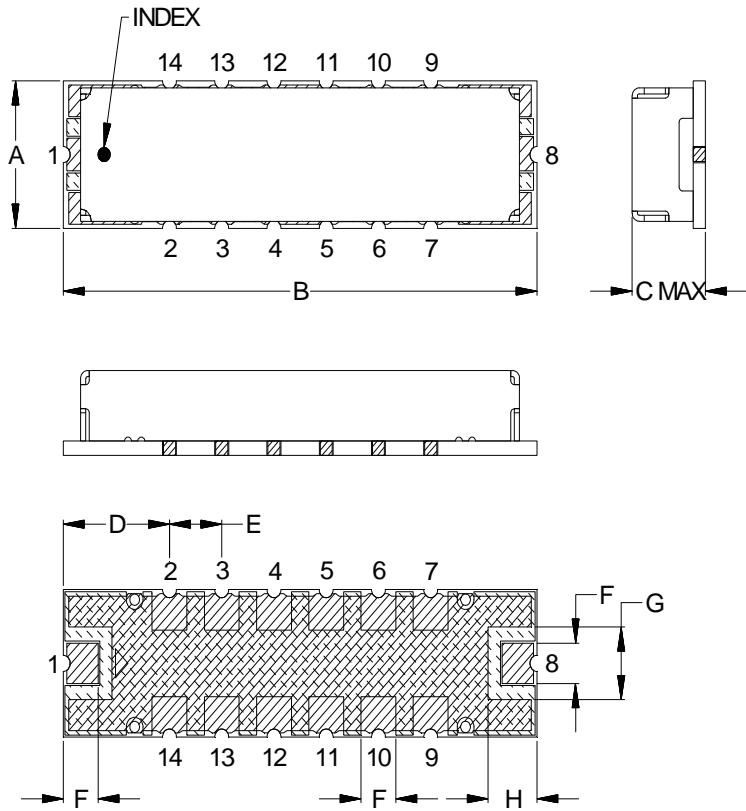


Case Style

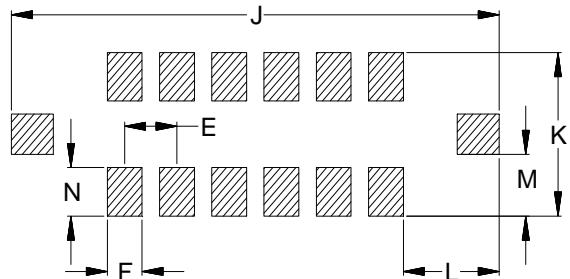
HQ

Outline Dimensions

HQ2706



SUGGESTED LAYOUT
FOR P. C. PATTERN



METALLIZATION
 SOLDER RESIST

CASE#	A	B	C	D	E	F	G	H	J	K	L
HQ2706	.365 (9.27)	1.360 (34.54)	.220 (5.59)	.305 (7.75)	.150 (3.81)	.100 (2.54)	.180 (4.57)	.140 (3.56)	1.400 (35.56)	.405 (10.29)	.275 (6.99)

CASE#	M	N	WT.GRAMS
HQ2706	.153 (3.87)	.120 (3.05)	3.0

Dimensions are in inches (mm). Tolerances: 2Pl. $\pm .015$; 3Pl. $\pm .030$

Notes:

1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. Termination finish:
For RoHS Case Styles: 3-5 μ inch Gold over 120-240 μ inch Nickel plate.
For RoHS-5 Case Styles: Tin-Lead plate.

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ALL NEW

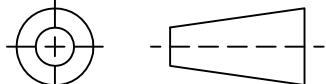
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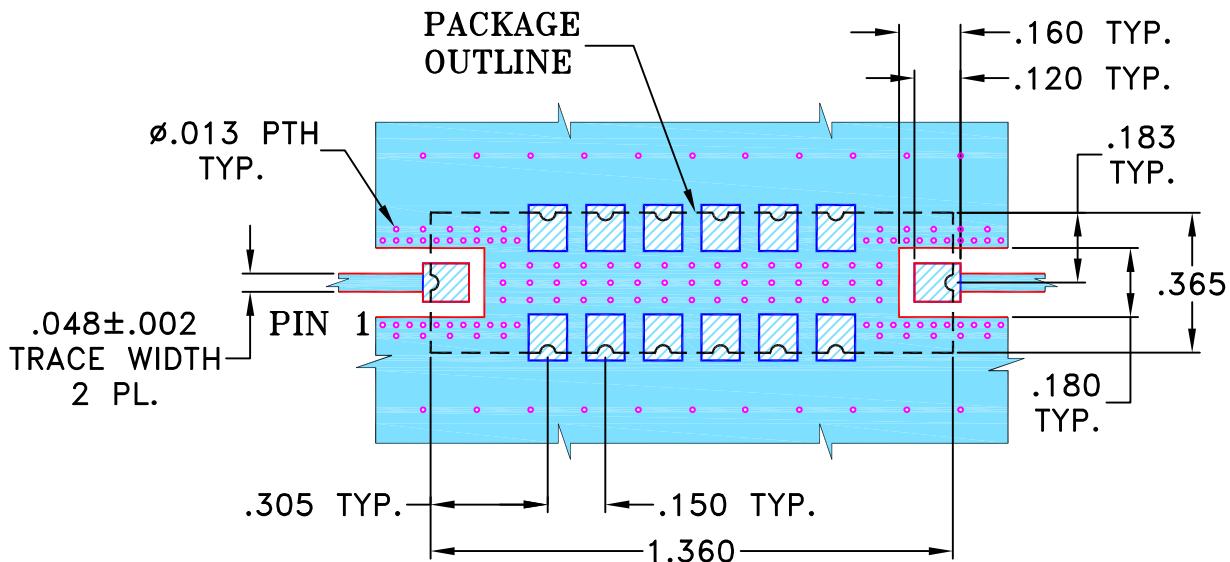
RF/IIF MICROWAVE COMPONENTS

THIRD ANGLE PROJECTION



REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M101212	NEW RELEASE (FROM RAVON)	11/05	DK	YB
A	M108938	SWITCH HATCHES	12/06	DK	HH
B	M118075	CHANGE LINE PLACES	06/08	HB	HH
C	M173459	CORRECTED CASE STYLE & TB PART#	03/27/19	ITG	IL

SUGGESTED MOUNTING CONFIGURATION
FOR HQ1157 CASE STYLE, rf PIN CONNECTION



NOTE:

1. TRACE WIDTH IS SHOWN FOR FR4 WITH DIELECTRIC THICKNESS $.025'' \pm .002''$. 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

TOLERANCES ON:

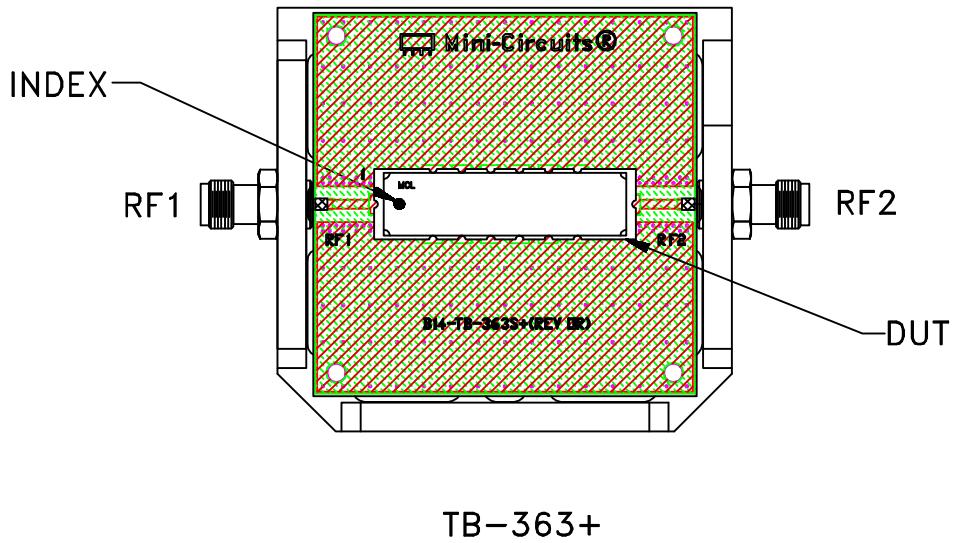
2 PL DECIMALS \pm 3 PL DECIMALS $\pm .005$ ANGLES \pm FRACTIONS \pm

DRAWN HB (RAVON) 12 JUN 2008

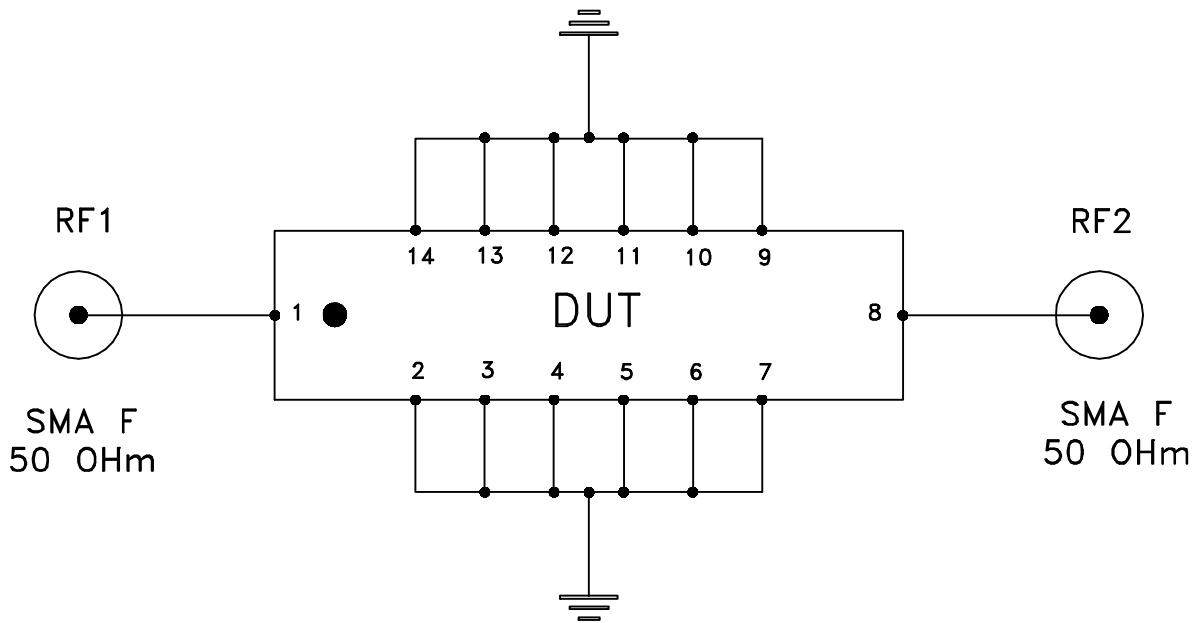
CHECKED RZ (RAVON) 12 JUN 2008

APPROVED HH (RAVON) 12 JUN 2008

Evaluation Board and Circuit



TB-363+



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: ROGERS R04350 or equivalent,
Dielectric Constant=3.48, 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 + propylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215