

Surface Mount Bandpass Filter

BPF-A587R5+

50Ω 475 to 700 MHz

The Big Deal

- Low insertion loss
- Good rejection
- Miniature shielded package



Generic photo used for illustration purposes only
CASE STYLE: HQ1157

Product Overview

The BPF-A587R5+ is a 50Ω bandpass filter fabricated using SMT technology. This bandpass filter covers from 475-700 MHz. This filter is built with high Q capacitors, air-coil inductors and transformers for superior performance. It has repeatable performance across lots and consistent performance across temperature. This filter will be suitable for applications such as military radio communication, radio microphones and TV broadcasting.

Key Features

Feature	Advantages
Low insertion loss	Can be used in high performance applications.
Good rejection	This enables the filter to attenuate spurious signals and reject harmonics for broad frequency band.
Shielded case	Reduced interference with and from the surrounding components.

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



Surface Mount Bandpass Filter

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Features

- Very low insertion loss
- Good rejection
- Miniature shielded package

Applications

- Military radio communication
- Radio microphones
- TV broadcasting

Electrical Specifications at 25°C

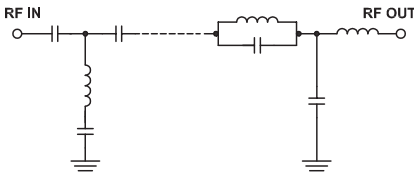
Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Unit	
Pass Band	Center Frequency	—	—	587.5	—	MHz	
	Insertion Loss	F1-F2	475 - 700	—	1.20	1.8	dB
	VSWR	F1-F2	475 - 700	—	1.35	1.67	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC - 100	45	55	—	dB
		F3-F4	100 - 390	30	35	—	dB
	VSWR	DC-F4	DC - 390	—	20	—	:1
Stop Band, Upper	Insertion Loss	F5-F6	820 - 1000	30	39	—	dB
		F6-F7	1000 - 1500	45	50	—	dB
	VSWR	F5-F8	820 - 3800	—	20	—	:1

Maximum Ratings

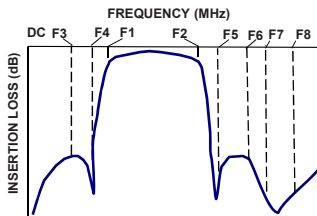
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input*	3 W Max. @ 25°C

*Passband rating, derate linearly to 1 W at 85°C ambient
Permanent damage may occur if any of these limits are exceeded.

Functional Schematic



Typical Frequency Response

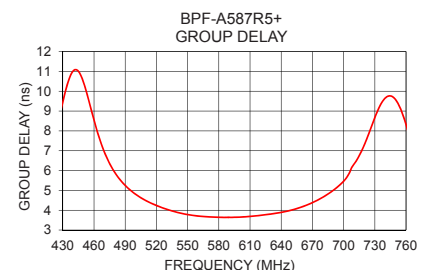
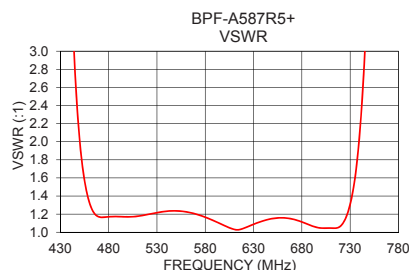
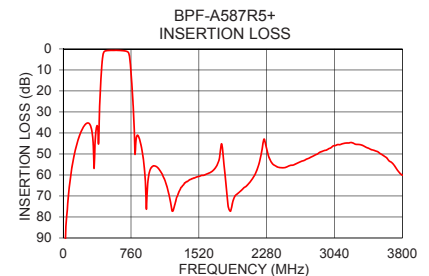
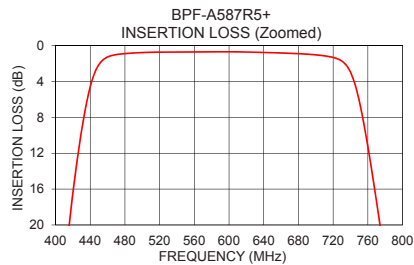


Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
10.0	101.53	532.93	475.0	6.35
100.0	55.89	1021.02	485.0	5.54
390.0	39.13	52.87	495.0	5.01
405.0	31.77	38.65	505.0	4.63
415.0	20.62	27.37	515.0	4.36
445.0	3.06	2.81	525.0	4.14
475.0	0.93	1.17	535.0	3.97
587.5	0.68	1.13	545.0	3.83
700.0	1.02	1.05	555.0	3.74
776.0	21.36	14.57	565.0	3.69
788.0	30.44	18.11	575.0	3.65
800.0	43.93	20.86	587.5	3.64
820.0	42.25	24.60	590.0	3.64
900.0	53.21	34.10	600.0	3.65
1000.0	55.96	39.43	610.0	3.69
1500.0	60.89	39.29	620.0	3.74
1700.0	56.90	39.59	630.0	3.81
2000.0	67.18	50.15	650.0	4.01
3000.0	47.05	12.06	670.0	4.38
3800.0	60.09	28.27	700.0	5.46

+RoHS Compliant

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



Notes

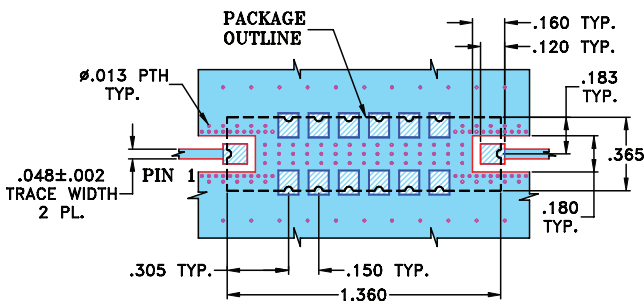
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Pad Connections

INPUT	1
OUTPUT	8
GROUND	2,3,4,5,6,7,9,10,11,12,13,14

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

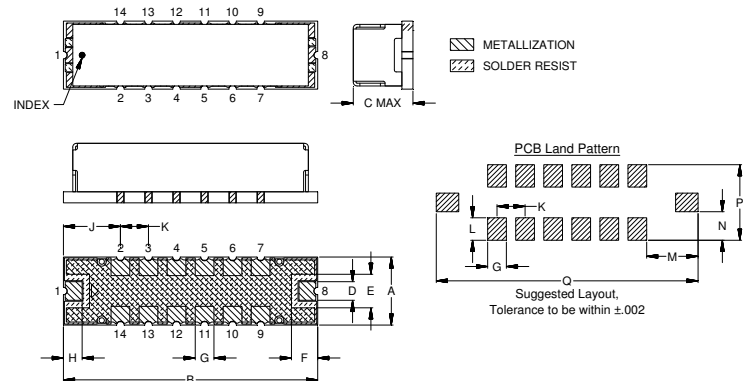


NOTE:

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 SOLDERMASK

Outline Drawing



Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H
.365	1.360	.35	.100	.180	.140	.100	.100
9.27	34.54	8.89	2.54	4.57	3.56	2.54	2.54
J	K	L	M	N	P	Q	Wt.
.305	.150	.120	.275	.152	.405	1.400	grams
7.75	3.81	3.05	6.99	3.86	10.29	35.56	4.0

Note: Please refer to case style drawing for details

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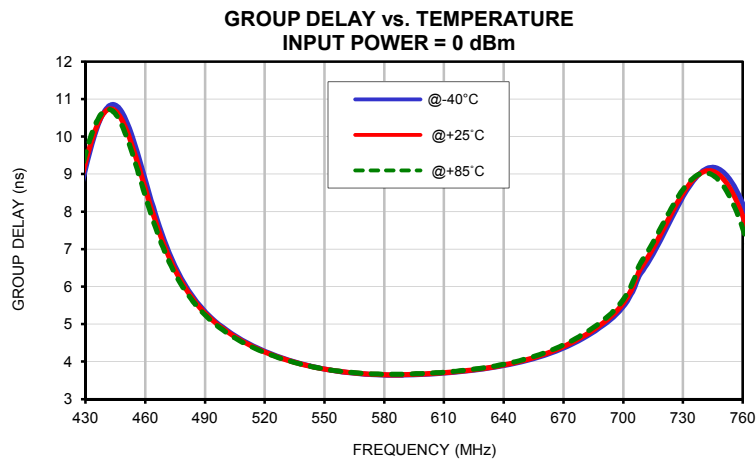
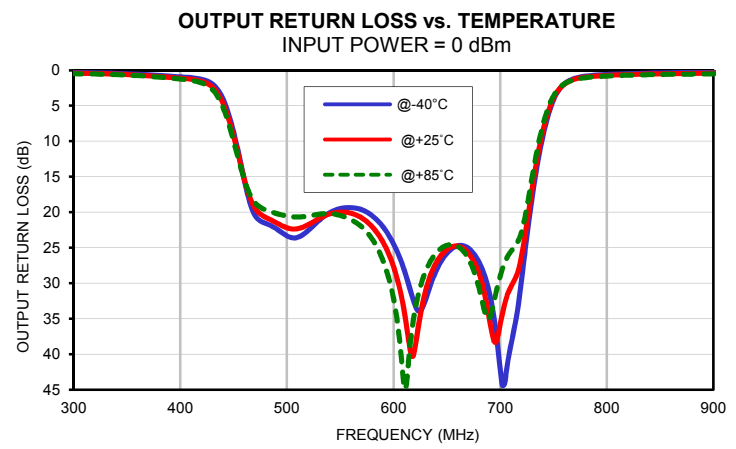
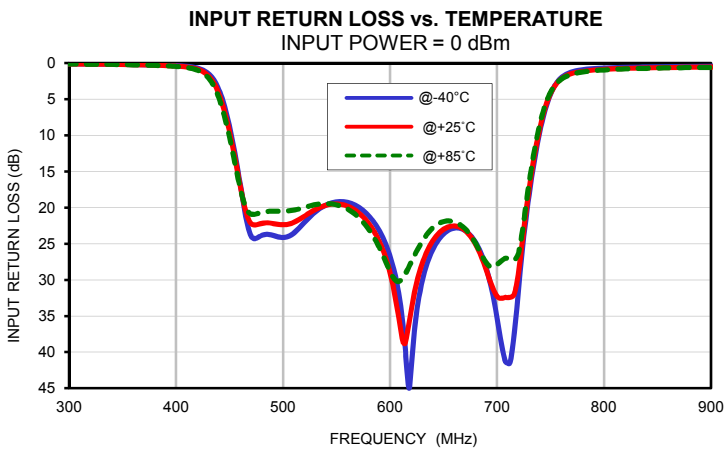
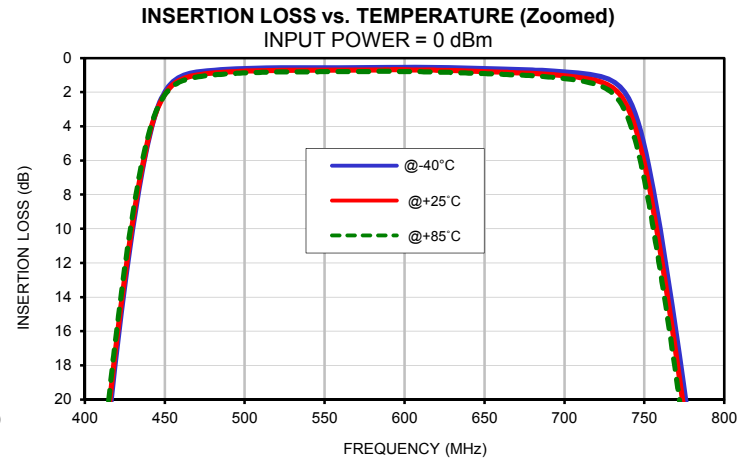
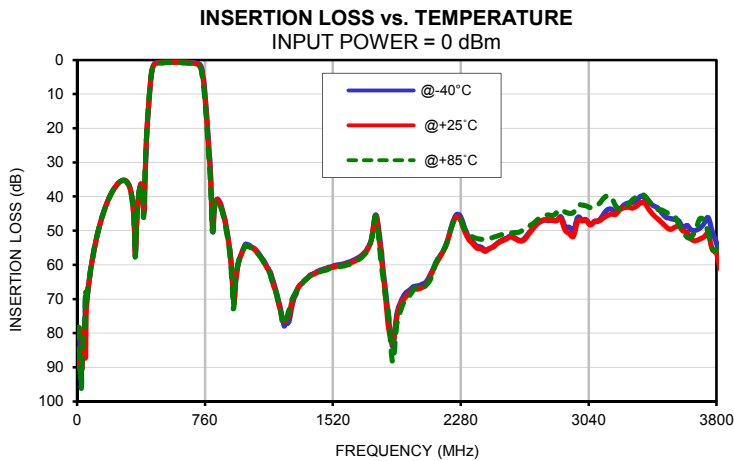
Typical Performance Data

FREQ. (MHz)	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
10.0	79.65	86.14	78.28	0.04	0.04	0.04	0.04	0.04	0.04
20.0	86.70	87.47	91.67	0.03	0.03	0.03	0.03	0.04	0.03
40.0	78.44	82.05	79.39	0.02	0.02	0.04	0.03	0.04	0.05
100.0	55.93	56.05	55.46	0.01	0.02	0.03	0.11	0.13	0.15
120.0	51.21	51.18	51.15	0.00	0.02	0.03	0.16	0.18	0.20
300.0	35.88	36.02	36.13	0.08	0.11	0.12	0.31	0.41	0.49
390.0	38.41	39.10	39.76	0.28	0.33	0.37	0.83	1.00	1.10
400.0	44.15	41.36	39.41	0.34	0.41	0.45	0.93	1.12	1.24
415.0	21.32	20.61	19.97	0.53	0.65	0.75	1.13	1.38	1.57
419.0	17.86	17.23	16.65	0.64	0.79	0.91	1.23	1.51	1.73
445.0	3.05	3.08	3.02	5.81	6.49	7.21	6.03	6.66	7.34
475.0	0.76	0.93	1.04	24.24	22.38	20.87	21.22	20.24	19.31
587.5	0.55	0.69	0.78	22.58	23.95	24.82	21.58	23.55	25.89
600.0	0.54	0.69	0.79	26.73	29.02	28.84	24.46	27.67	32.21
620.0	0.55	0.71	0.82	41.77	33.91	27.45	33.06	39.24	33.91
640.0	0.59	0.76	0.88	25.76	24.57	22.78	28.21	27.10	25.74
700.0	0.80	1.03	1.20	35.24	32.27	27.90	42.20	35.80	28.98
776.0	20.10	21.43	22.76	1.00	1.22	1.32	0.93	1.05	1.12
780.0	22.89	24.26	25.63	0.90	1.12	1.22	0.83	0.96	1.04
788.0	29.05	30.55	32.11	0.78	0.98	1.08	0.71	0.84	0.92
800.0	42.01	44.16	46.45	0.68	0.85	0.94	0.60	0.72	0.81
820.0	42.19	42.11	42.06	0.58	0.73	0.80	0.48	0.60	0.70
840.0	40.93	41.25	41.59	0.52	0.65	0.72	0.41	0.53	0.63
900.0	52.83	53.31	54.11	0.44	0.54	0.59	0.28	0.41	0.51
960.0	59.06	59.10	58.96	0.38	0.48	0.55	0.21	0.35	0.46
1000.0	53.99	54.35	54.32	0.35	0.47	0.55	0.18	0.33	0.44
1100.0	58.14	58.48	58.50	0.29	0.45	0.57	0.13	0.31	0.42
1150.0	62.37	62.83	63.41	0.26	0.46	0.59	0.12	0.30	0.42
1160.0	63.94	64.82	64.92	0.26	0.46	0.59	0.12	0.30	0.42
1180.0	67.07	67.79	67.84	0.25	0.46	0.60	0.12	0.30	0.42
1200.0	71.25	71.96	71.74	0.25	0.47	0.61	0.11	0.30	0.42
1300.0	68.70	67.99	68.05	0.23	0.48	0.63	0.11	0.30	0.42
1400.0	62.71	62.88	62.94	0.23	0.49	0.64	0.11	0.30	0.42
1500.0	60.75	60.88	61.16	0.23	0.49	0.63	0.11	0.31	0.43
1700.0	56.70	57.10	57.42	0.26	0.50	0.62	0.11	0.30	0.42
1800.0	52.54	54.48	56.27	0.96	1.08	1.09	0.11	0.30	0.41
1875.0	83.91	82.91	88.43	0.23	0.45	0.57	0.10	0.29	0.41
1900.0	74.38	75.34	77.29	0.21	0.43	0.54	0.10	0.29	0.40
1900.0	74.38	75.34	77.29	0.21	0.43	0.54	0.10	0.29	0.40
2000.0	66.36	67.15	67.33	0.17	0.39	0.49	0.09	0.27	0.38
2100.0	62.79	63.37	64.15	0.16	0.37	0.48	0.08	0.26	0.36
2125.0	60.11	60.48	60.26	0.17	0.38	0.49	0.08	0.25	0.36
2175.0	55.86	56.19	56.00	0.23	0.45	0.58	0.07	0.25	0.35
2200.0	53.09	53.25	53.16	0.31	0.56	0.73	0.07	0.24	0.35
2300.0	48.75	49.81	49.22	0.52	0.69	0.74	0.05	0.22	0.32
2400.0	54.79	55.32	52.49	0.14	0.36	0.48	0.03	0.20	0.29
2500.0	53.60	53.62	51.52	0.11	0.35	0.48	0.01	0.18	0.27
2600.0	52.02	52.29	50.58	0.14	0.42	0.55	0.00	0.16	0.26
2700.0	49.70	49.94	48.28	0.16	0.48	0.70	0.03	0.14	0.24
2800.0	47.13	46.81	45.36	0.29	0.70	0.98	0.05	0.12	0.22
2900.0	48.78	49.85	44.54	0.57	1.12	1.51	0.07	0.10	0.21
3000.0	46.79	47.14	42.49	0.82	1.56	2.28	0.09	0.08	0.19
3100.0	47.02	47.21	42.20	1.10	2.07	2.91	0.11	0.07	0.17
3200.0	44.50	45.26	42.66	1.43	2.38	3.19	0.13	0.05	0.17
3300.0	41.78	43.39	40.94	1.55	2.30	2.60	0.14	0.03	0.16
3400.0	41.62	43.96	41.40	1.59	2.13	2.34	0.14	0.05	0.20
3500.0	46.09	48.87	44.62	1.39	1.75	1.88	0.15	0.04	0.19
3600.0	49.06	50.05	50.07	0.77	1.13	1.27	0.15	0.05	0.19
3700.0	49.29	52.47	46.56	0.45	0.80	0.95	0.17	0.04	0.22
3800.0	53.63	56.71	55.67	0.28	0.62	0.79	0.17	0.05	0.19

Typical Performance Data

FREQ.	GROUP DELAY		
	(ns)		
	@-40°C	@+25°C	@+85°C
(MHz)			
475.0	6.54	6.44	6.34
481.0	5.96	5.88	5.82
487.0	5.52	5.46	5.41
493.0	5.18	5.14	5.10
499.0	4.91	4.88	4.84
505.0	4.69	4.66	4.63
511.0	4.50	4.48	4.46
517.0	4.35	4.32	4.31
523.0	4.21	4.19	4.18
529.0	4.09	4.08	4.07
535.0	3.99	3.98	3.98
541.0	3.90	3.90	3.90
547.0	3.83	3.83	3.83
553.0	3.77	3.77	3.78
559.0	3.73	3.73	3.73
565.0	3.69	3.70	3.70
571.0	3.66	3.67	3.68
577.0	3.65	3.66	3.67
583.0	3.64	3.65	3.66
585.0	3.64	3.65	3.66
587.5	3.64	3.65	3.66
590.0	3.64	3.65	3.67
592.0	3.64	3.66	3.67
594.0	3.65	3.66	3.67
596.0	3.65	3.66	3.68
598.0	3.66	3.67	3.68
600.0	3.66	3.67	3.68
602.0	3.67	3.68	3.69
604.0	3.67	3.68	3.70
606.0	3.68	3.69	3.70
608.0	3.69	3.70	3.71
610.0	3.69	3.70	3.72
612.0	3.70	3.71	3.73
614.0	3.71	3.72	3.73
616.0	3.72	3.73	3.74
618.0	3.73	3.74	3.75
620.0	3.74	3.75	3.77
622.0	3.75	3.76	3.78
624.0	3.77	3.78	3.79
626.0	3.78	3.79	3.80
628.0	3.79	3.80	3.82
630.0	3.81	3.82	3.83
632.0	3.82	3.83	3.85
634.0	3.84	3.85	3.87
644.0	3.94	3.95	3.98
654.0	4.06	4.09	4.12
664.0	4.23	4.27	4.31
674.0	4.46	4.50	4.55
684.0	4.75	4.81	4.87
694.0	5.14	5.21	5.29
700.0	5.46	5.55	5.65

Typical Performance Curves

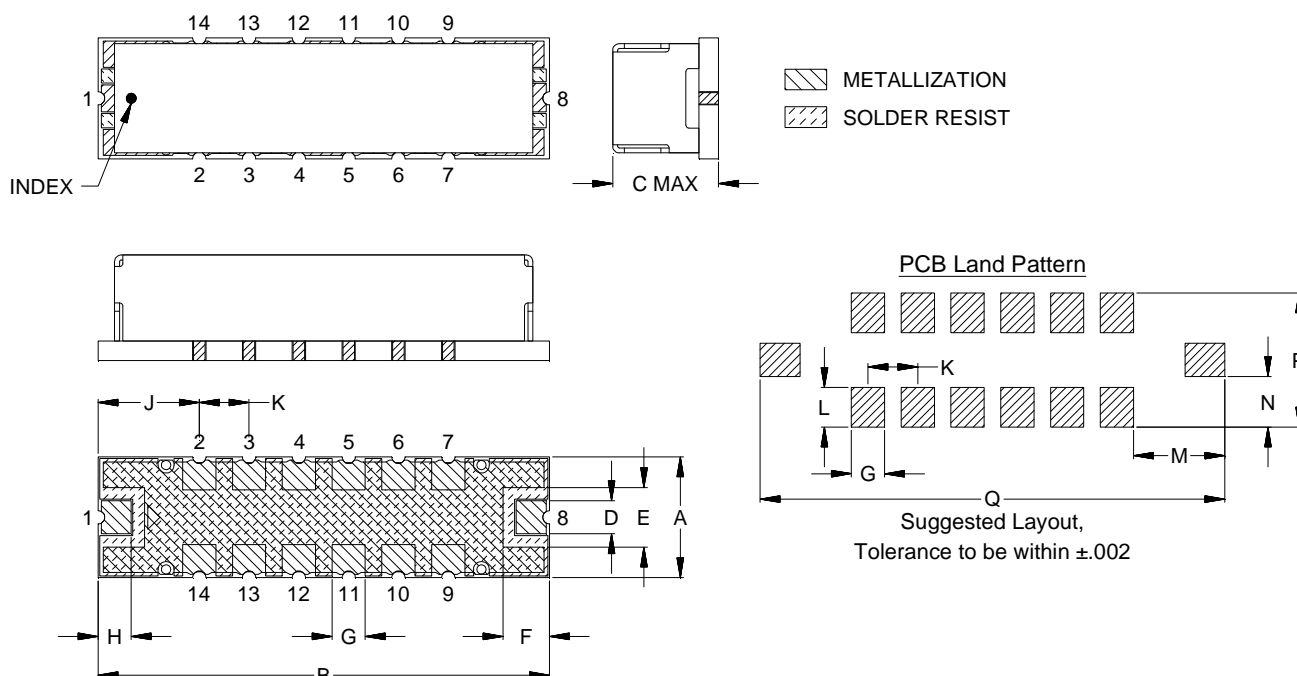


Case Style

HQ

Outline Dimensions

HQ1157



CASE#	A	B	C	D	E	F	G	H	J	K	L	M
HQ1157	.365 (9.27)	1.360 (34.54)	.350 (8.89)	.100 (2.54)	.180 (4.57)	.140 (3.56)	.100 (2.54)	.100 (2.54)	.305 (7.75)	.150 (3.81)	.120 (3.05)	.275 (6.99)

CASE#	N	P	Q	WT.GRAM
HQ1157	.152 (3.87)	.405 (10.29)	1.400 (35.56)	4.0

Dimensions are in inches (mm). Tolerances: 2Pl. ± .03; 3Pl. ± .015

Notes:

- Case material: Nickel-Silver alloy.
- Base: Printed wiring laminate.
- Termination finish:
 - For RoHS Case Styles: 3-5 μ inch (.08-.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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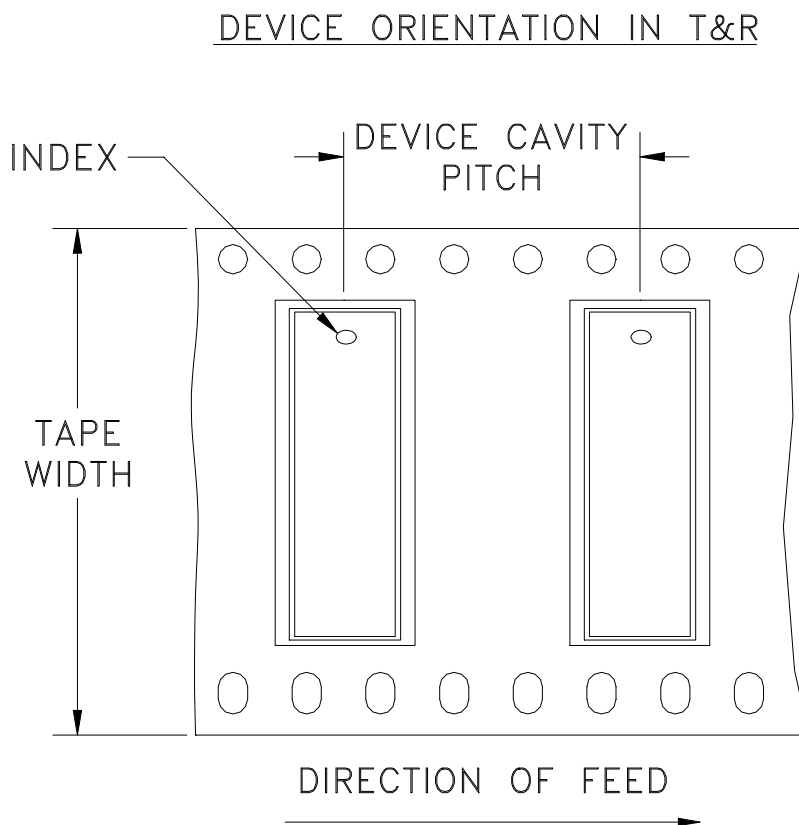
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The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F83



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
56	16	13	100

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



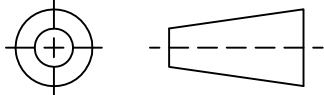
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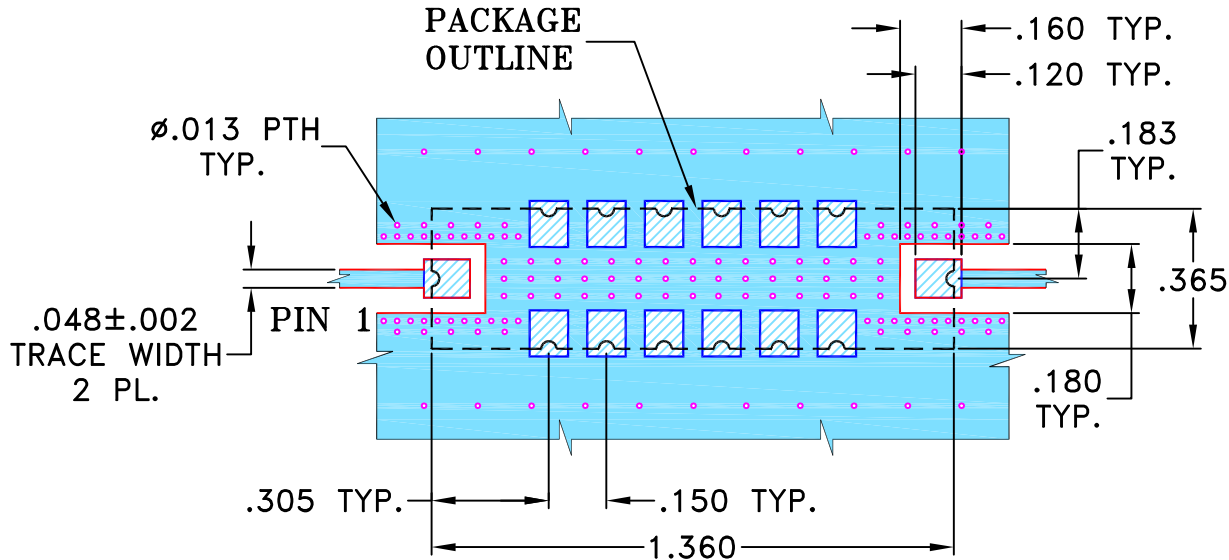
THIRD ANGLE PROJECTION



REVISIONS


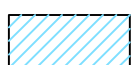
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M101212	NEW RELEASE (FROM RAVON)	11/05	DK	YB
A	M108938	SWITCH HATCHES	12/06	DK	HH
B	M118075	CHANGE LINE PLACES	06/08	HB	HH
C	M173459	CORRECTED CASE STYLE & TB PART#	03/27/19	ITG	IL

**SUGGESTED MOUNTING CONFIGURATION
FOR HQ1157 CASE STYLE, rf PIN CONNECTION**



NOTE:

1. TRACE WIDTH IS SHOWN FOR FR4 WITH DIELECTRIC THICKNESS .025" ± .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.

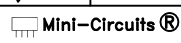
-  DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
-  DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

UNLESS OTHERWISE SPECIFIED	INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN HB (RAVON)	12 JUN 2008
TOLERANCES ON:	CHECKED RZ (RAVON)	12 JUN 2008
2 PL DECIMALS ±	APPROVED HH (RAVON)	12 JUN 2008
3 PL DECIMALS ± .005		
ANGLES ±		
FRACTIONS ±		

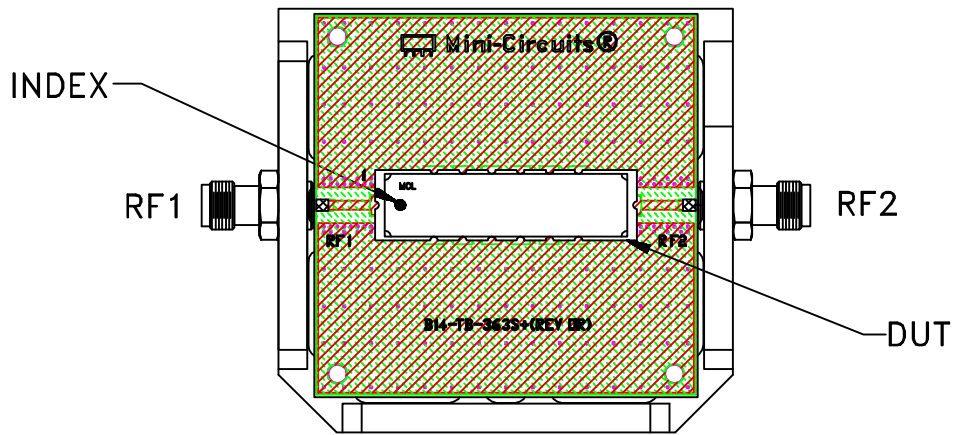
 **Mini-Circuits®** 13 Neptune Avenue
Brooklyn NY 11235

PL, rf, HQ1157, TB-363+, 50 OHM

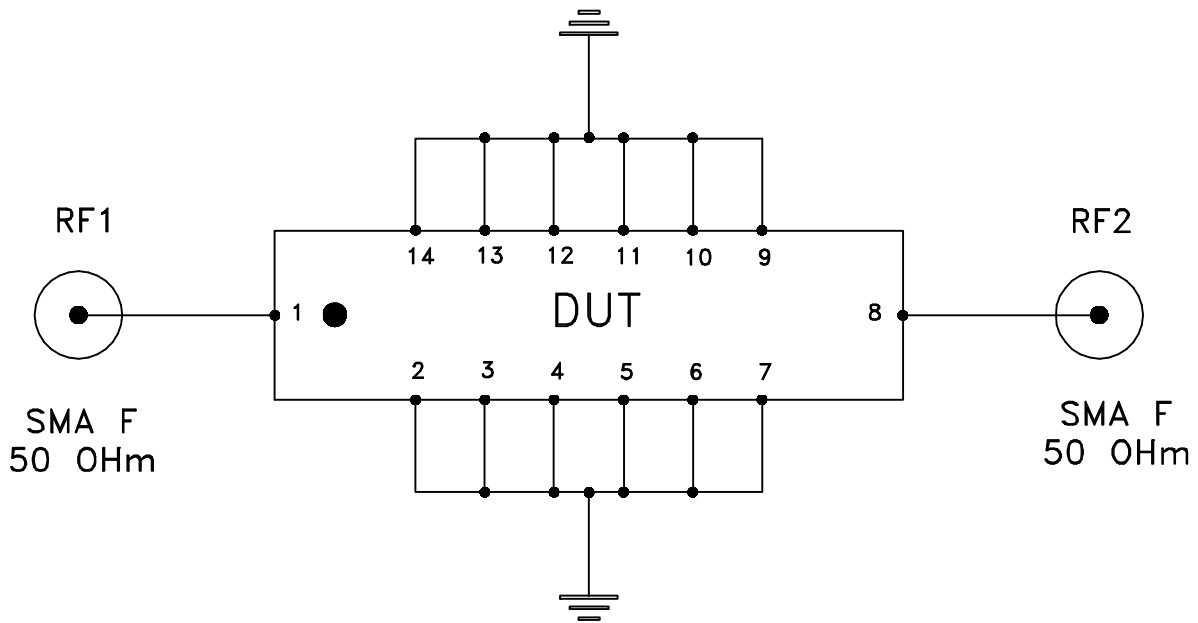
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-227	C
FILE:	98PL227	SCALE:	2:1
		SHEET:	1 OF 1

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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.

 **Mini-Circuits®**

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