Surface Mount

Bandpass Filter

BPF-A332+

50Ω 329 to 335 MHz

Generic photo used for illustration purposes only

CASE STYLE: HQ1157

Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	0.5W at 25°C

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

Pin Connections

RF IN	1
RF OUT	8
GROUND	2,3,4,5,6,7,9,10,11,12,13,14

Features

- Linear phase, up to ±5 deg typ @ Fc ± 7.5 MHz
- High rejection
- Shielded case
- Aqueous washable

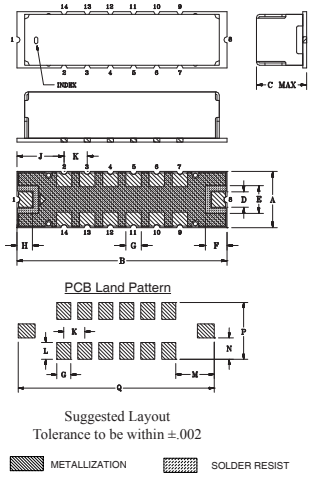
+RoHS Compliant

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

Applications

- Radio communications
- Harmonic rejection
- Transmitters/receivers

Outline Drawing



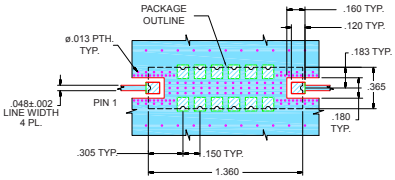
Outline Dimensions (inch / mm)

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 case style drawing for details

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



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.

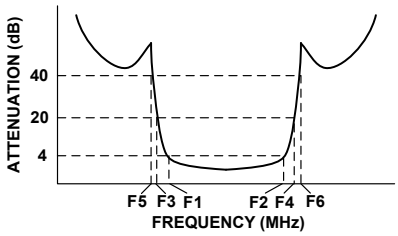
DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

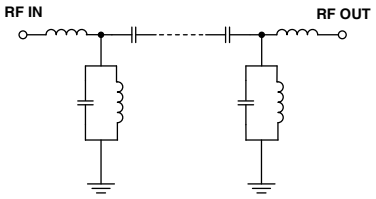
Bandpass Filter Electrical Specifications (T_{AMB}= 25°C)

CENTER FREQ. (MHz)	PASSBAND (MHz)	STOPBANDS (MHz)				MAXIMUM DEVIATION FROM LINEAR PHASE (deg.)	VSWR (:1)		
	(Loss < 4dB)	Loss > 20dB		Loss > 40dB			Passband		Stopband
Fc	F1 - F2	F3	F4	F5	F6	Fc ± 7.5MHz	Typ.	Max.	Typ.
332	329 - 335	305	365	290	385 - 2200	±10	1.4	1.8	20

Typical Frequency Response



Functional Schematic

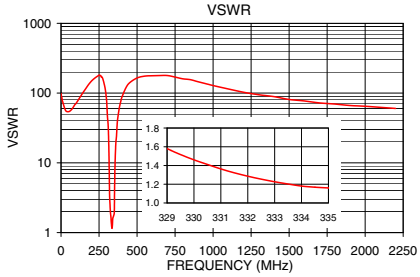


Typical Performance Data at 25°C

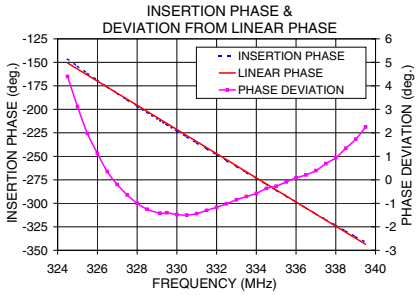
Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Deviation from Linear Phase (deg.)
0.5	89.57	98.58	324.5	4.40
250	74.03	180.61	325.5	1.97
290	49.02	116.69	326.5	0.35
305	31.30	46.61	327.5	-0.64
310	24.00	33.56	328.5	-1.25
315	13.85	14.80	329.0	-1.42
319	7.12	3.76	329.5	-1.40
329	3.16	1.58	330.5	-1.50
332	3.01	1.29	331.5	-1.30
335	3.09	1.16	332.0	-1.17
345	6.86	1.73	332.5	-1.02
352	13.84	3.88	333.5	-0.71
355	19.43	8.82	334.5	-0.37
365	32.76	24.52	335.0	-0.27
385	49.98	64.49	335.5	-0.09
500	93.50	164.78	336.5	0.21
2000	61.85	64.67	338.5	1.34
2200	57.21	60.17	339.5	2.25

INSERTION LOSS

VSWR



INSERTION PHASE & DEVIATION FROM LINEAR PHASE



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

Mini-Circuits®

www.minicircuits.com P.O. Box 350166, Brooklyn, NY 11235-0003 (718) 934-4500 sales@minicircuits.com

REV.B
M174392
EDR-9072AU
BPF-A332+
URJ/RAV
190620

Surface Mount Band Pass Filter BPF-A332+

Typical Performance Data

FREQ. (MHz)	INSERTION LOSS (dB)			INPUT RETURN LOSS (dB)			OUTPUT RETURNLOSS (dB)		
	@ -40° C	@ +25° C	@ +85° C	@ -40° C	@ +25° C	@ +85° C	@ -40° C	@ +25° C	@ +85° C
0.5	103.08	99.00	116.16	0.13	0.19	0.22	0.14	0.18	0.22
1	93.75	93.11	108.09	0.13	0.18	0.22	0.13	0.18	0.22
10	98.20	88.66	91.64	0.19	0.23	0.27	0.18	0.24	0.28
20	84.11	94.33	86.58	0.24	0.27	0.30	0.23	0.28	0.31
30	91.59	91.09	92.02	0.27	0.31	0.33	0.26	0.30	0.33
40	90.02	93.44	87.12	0.29	0.32	0.34	0.28	0.33	0.35
50	97.10	96.41	90.55	0.30	0.33	0.35	0.29	0.33	0.35
60	92.91	97.18	90.90	0.29	0.31	0.34	0.28	0.32	0.35
70	81.21	94.00	94.00	0.28	0.30	0.33	0.26	0.31	0.34
80	87.50	93.35	99.41	0.25	0.29	0.31	0.24	0.29	0.33
90	91.54	92.55	91.51	0.24	0.28	0.30	0.23	0.28	0.31
100	84.33	83.86	87.90	0.22	0.25	0.28	0.20	0.26	0.30
110	93.11	107.57	91.37	0.20	0.24	0.27	0.19	0.25	0.28
120	93.71	86.90	87.62	0.19	0.22	0.25	0.17	0.23	0.27
130	95.89	86.81	82.20	0.17	0.21	0.24	0.16	0.22	0.25
140	95.73	86.54	94.53	0.15	0.20	0.23	0.16	0.21	0.25
150	87.53	92.56	90.67	0.15	0.18	0.23	0.14	0.19	0.23
200	90.37	101.27	89.88	0.10	0.15	0.19	0.09	0.15	0.19
250	83.14	78.58	77.52	0.08	0.14	0.18	0.06	0.13	0.18
290	50.97	50.51	49.90	0.15	0.23	0.29	0.12	0.22	0.28
300	40.83	40.16	39.60	0.25	0.35	0.42	0.21	0.34	0.43
305	34.65	33.84	33.15	0.34	0.47	0.58	0.33	0.48	0.60
310	27.17	26.20	25.37	0.58	0.78	0.94	0.58	0.83	1.01
315	17.93	16.84	15.86	1.12	1.55	1.93	1.30	1.85	2.34
319	9.04	8.36	7.76	3.40	4.68	5.87	4.55	6.55	8.66
329	2.73	3.22	3.51	18.09	19.33	19.70	16.80	18.80	20.53
332	2.57	3.12	3.45	22.21	21.78	21.88	24.85	23.51	22.24
335	2.62	3.22	3.60	23.61	25.39	25.70	18.33	16.74	15.51
340	3.32	4.02	4.46	11.97	11.20	10.69	9.26	8.66	8.29
345	4.05	4.66	5.06	8.23	9.28	10.56	6.80	7.44	8.13
350	6.40	8.40	10.03	8.76	6.71	5.53	6.01	4.82	4.07
352	10.36	12.45	14.07	3.81	3.45	3.16	2.78	2.55	2.36
355	16.75	18.45	19.80	1.75	1.84	1.85	1.25	1.36	1.39
360	25.35	26.61	27.62	0.89	1.03	1.11	0.63	0.77	0.85
365	32.03	33.00	33.87	0.61	0.73	0.82	0.43	0.57	0.66
385	49.50	50.08	50.74	0.28	0.38	0.45	0.19	0.32	0.39
400	58.25	58.42	58.80	0.21	0.30	0.37	0.14	0.26	0.33
500	95.52	85.57	81.54	0.10	0.19	0.27	0.06	0.19	0.27
600	88.99	88.36	88.58	0.10	0.20	0.27	0.04	0.20	0.28
700	85.29	103.17	90.89	0.11	0.23	0.33	0.05	0.23	0.32
800	84.01	95.63	88.46	0.12	0.26	0.34	0.06	0.25	0.34
900	92.20	89.64	92.81	0.15	0.29	0.38	0.06	0.26	0.37
1000	85.88	86.59	92.41	0.14	0.29	0.40	0.08	0.30	0.41
1100	96.90	92.11	83.93	0.17	0.33	0.43	0.08	0.31	0.43
1200	84.19	89.67	92.18	0.17	0.34	0.44	0.08	0.32	0.45
1300	82.99	81.98	81.14	0.19	0.36	0.47	0.11	0.35	0.47
1400	79.27	80.59	76.75	0.20	0.37	0.49	0.13	0.37	0.50
1500	87.63	79.90	81.97	0.22	0.40	0.53	0.14	0.38	0.50
1600	76.57	76.29	72.26	0.25	0.42	0.55	0.15	0.39	0.52
1700	67.52	71.68	68.55	0.24	0.42	0.55	0.18	0.41	0.54
1800	77.14	71.69	72.78	0.24	0.43	0.56	0.15	0.40	0.52
1900	75.45	74.05	74.78	0.24	0.43	0.57	0.16	0.40	0.55
2000	64.59	67.43	63.05	0.25	0.46	0.60	0.15	0.42	0.56
2100	61.09	62.44	61.83	0.26	0.45	0.61	0.14	0.40	0.57
2200	60.76	57.01	63.00	0.23	0.45	0.60	0.14	0.43	0.59

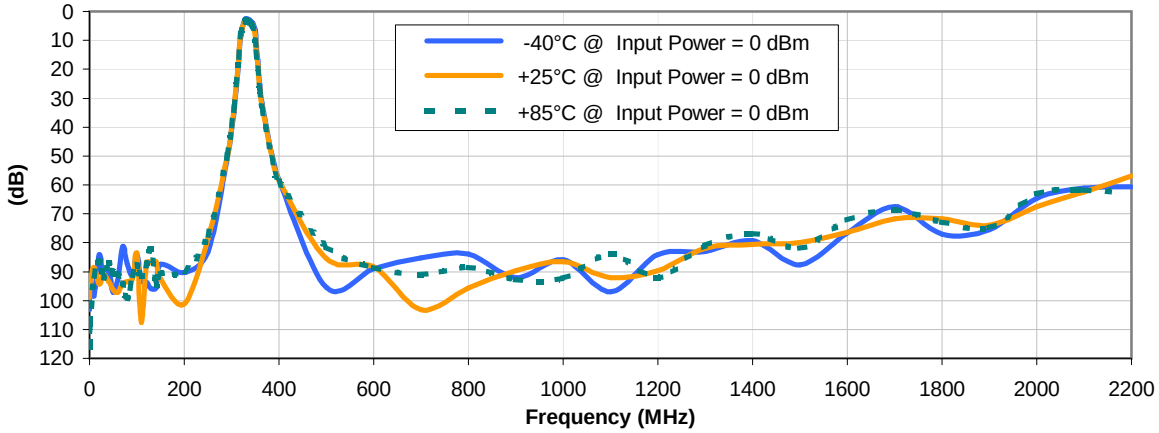
Typical Performance Data

FREQ. (MHz)	GROUP DELAY (nsec)		
	@ -40° C	@ +25° C	@ +85° C
325.0	43.56	41.55	40.12
325.5	42.10	40.41	39.25
326.0	40.88	39.46	38.53
326.5	39.80	38.71	37.95
327.0	38.94	38.12	37.35
327.5	38.40	37.66	37.03
328.0	37.81	37.12	36.63
328.5	37.34	36.73	36.27
329.0	37.02	36.39	36.02
329.5	36.68	36.10	35.74
330.0	36.29	35.74	35.40
330.5	36.11	35.65	35.22
331.0	35.78	35.33	34.99
331.5	35.50	35.09	34.75
332.0	35.29	34.87	34.57
332.5	35.08	34.69	34.50
333.0	34.80	34.55	34.33
333.5	34.64	34.44	34.23
334.0	34.55	34.33	34.16
334.5	34.44	34.33	34.17
335.0	34.44	34.27	34.01

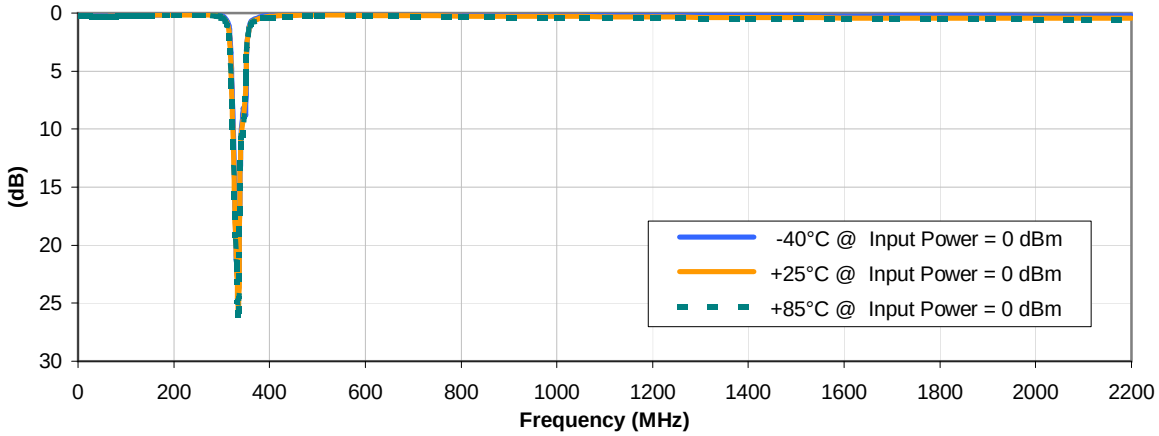
Surface Mount Band Pass Filter BPF-A332+

Typical Performance Curves

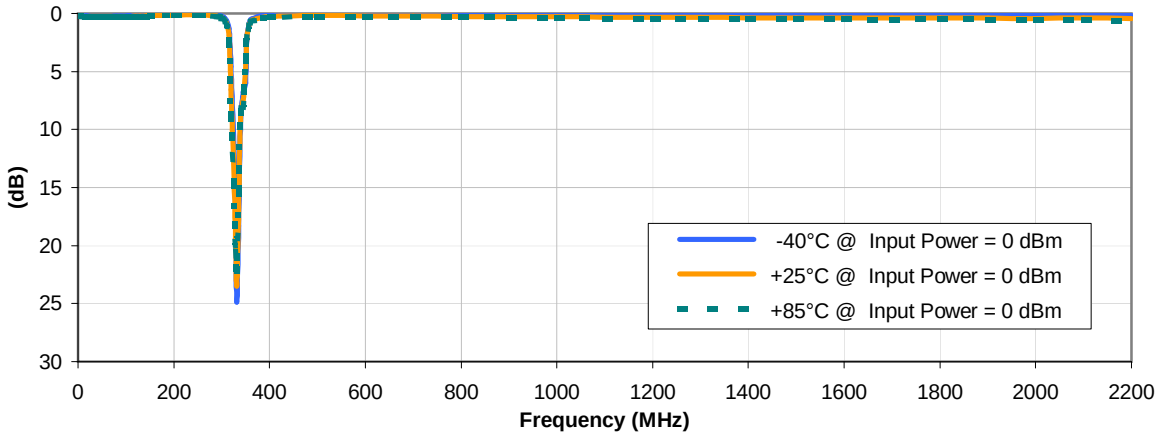
INSERTION LOSS vs. TEMPERATURE



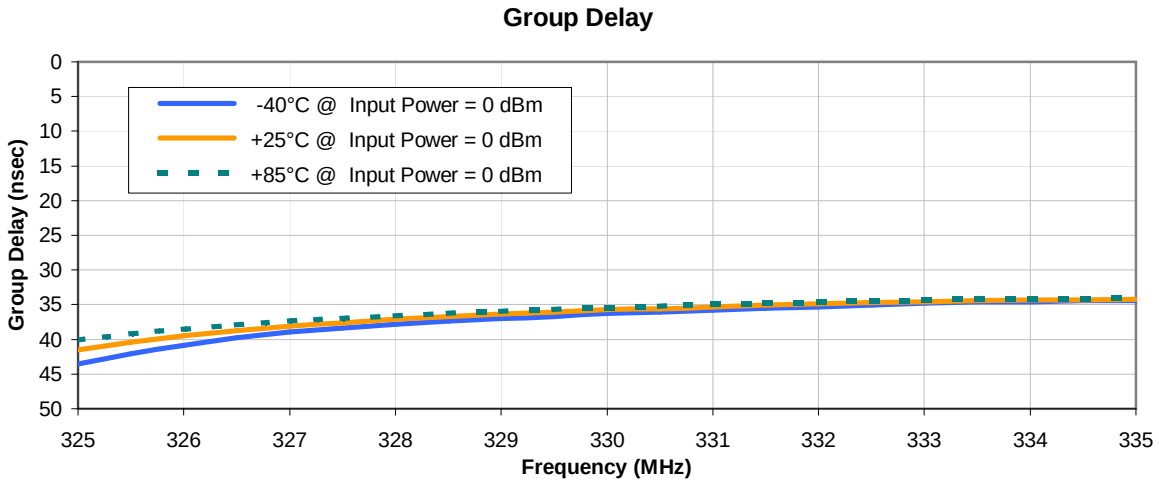
INPUT RETURN LOSS vs. TEMPERATURE



OUTPUT RETURN LOSS vs. TEMPERATURE



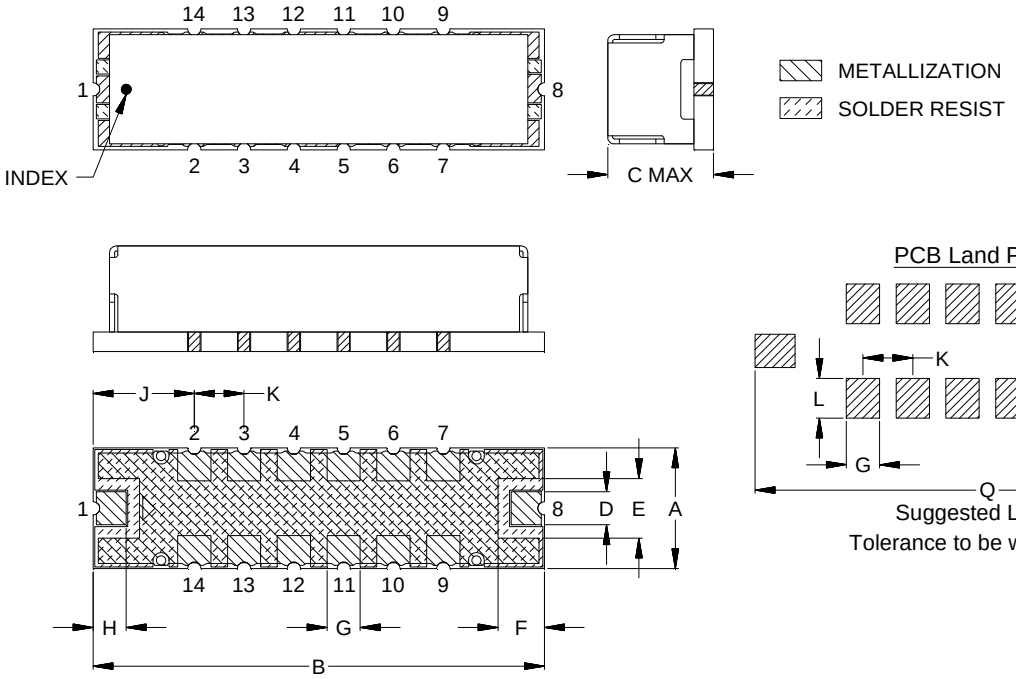
Typical Performance Curves



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

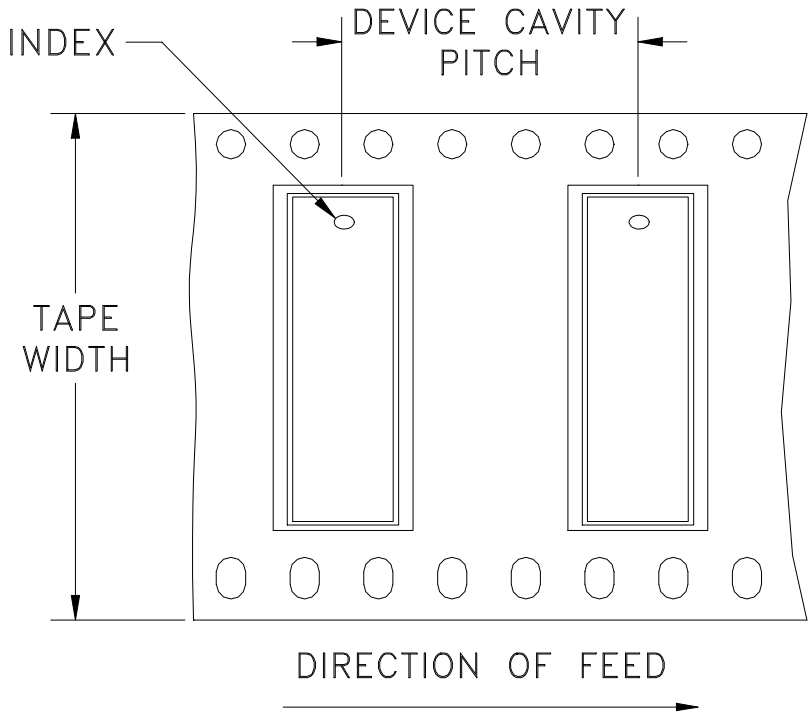
Dimensions are in inches (mm). Tolerances: 2Pl. ± .03; 3Pl. ± .015

Notes:

1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. 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.

Tape & Reel Packaging TR-F83

DEVICE ORIENTATION IN T&R



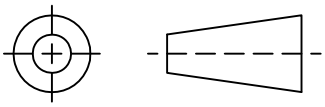
Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
56	16	13	100

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

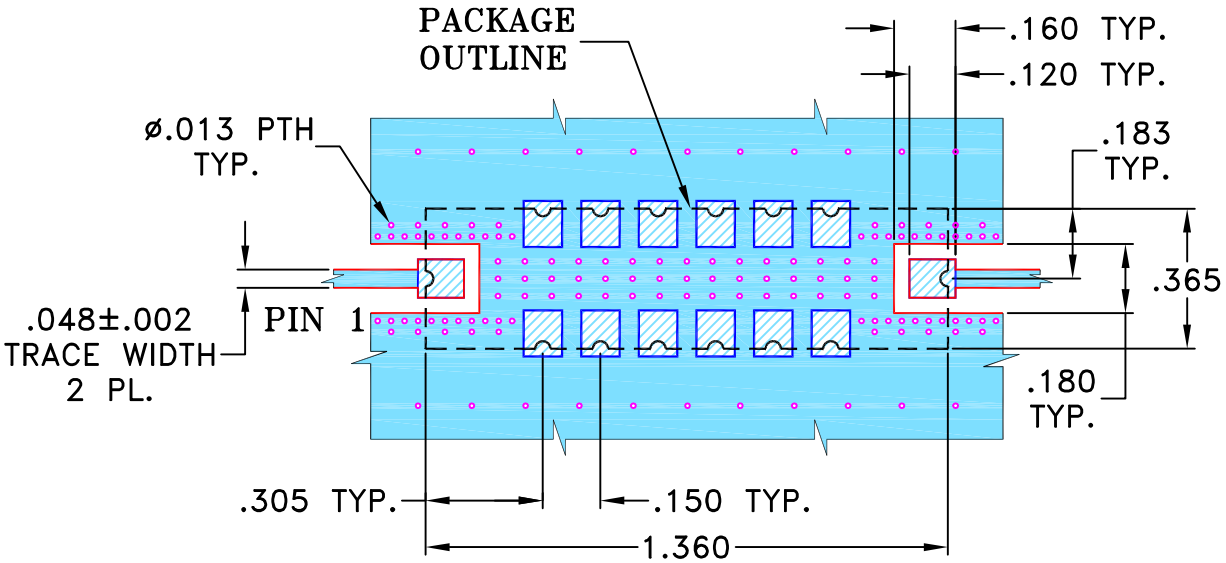
Mini-Circuits®
INTERNET http://www.minicircuits.com
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010
Mini-Circuits ISO 9001 & ISO 14001 Certified

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 ±			

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

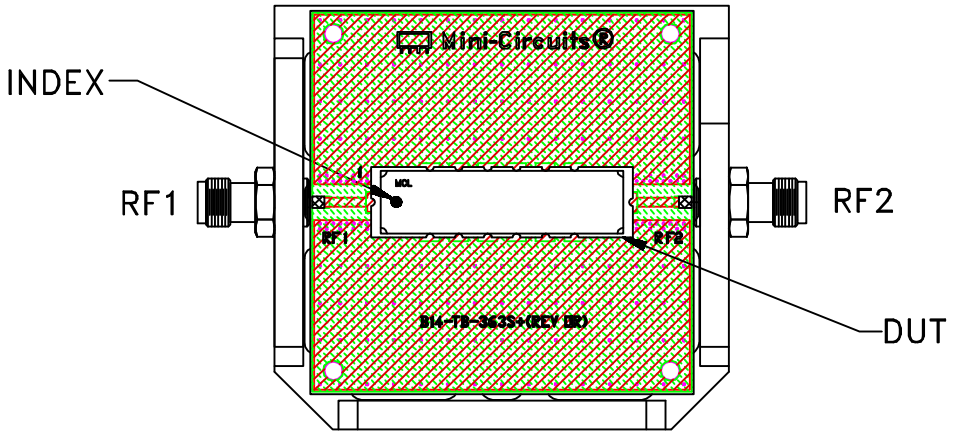
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

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

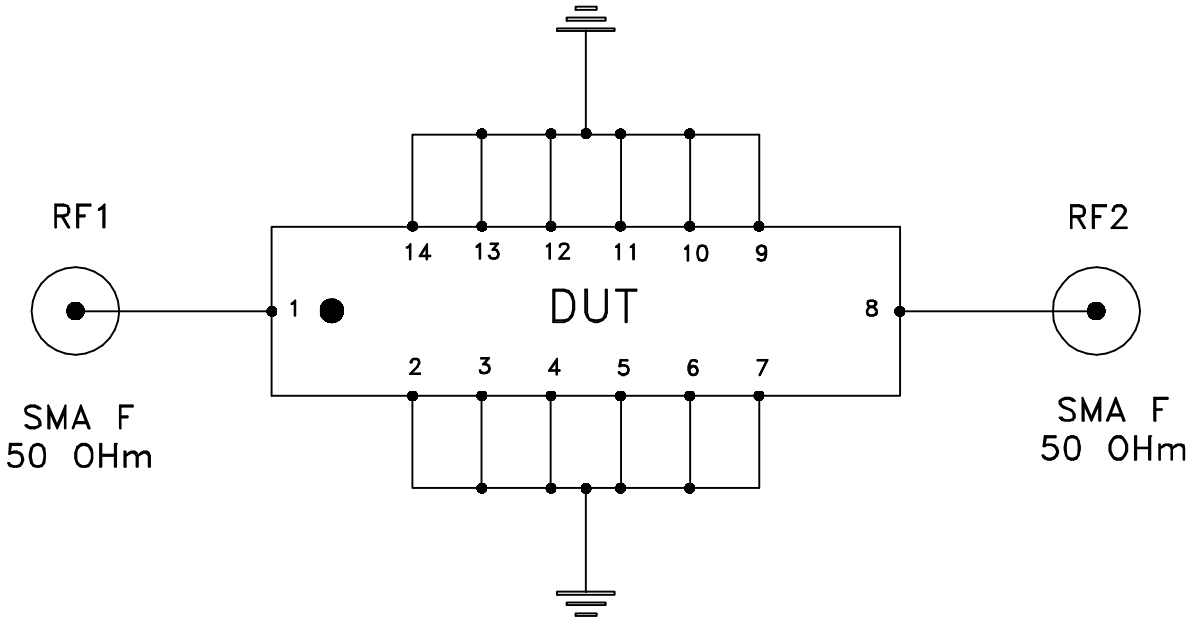
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-227	C

FILE:	SCALE:	SHEET:
98PL227	2:1	1 OF 1

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®

Mini-Circuits

Environmental Specifications ENV12

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	-65° to 150° C Ambient Environment	Individual Model Data Sheet
Autoclave	15 psig, 100% RH, 121°C, 96 hours	JESD22-A102-C, Condition C
Temperature Cycling	-65° to 150°C, 100 cycles	JESD22-A104
Temperature Humidity	85°C/ 85% RH, 168 hours	JESD22-113
Solder Reflow Heat	Sn-Pb Eutetic Process: 240°C peak Pb-Free Process: 260°C peak	J-STD-020, Table 4-1, 4-2 and 5-2; Figure 5-1
Moisture Sensitivity: Level 1	Bake at 125°C for 24 hours Soak at 85°C/85% RH for 168 hours, Reflow 3 cycles at 240°C peak (Non-RoHS) or 260°C (RoHS)	J-STD-020
Solderability	10X magnification, 95% coverage	JESD22-B102, Method 1: Dip and Look Test
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A
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