

Bandpass Filter

50Ω 137 to 143 MHz

Maximum Ratings

Operating Temperature -40°C to 85°C

Storage Temperature -55°C to 100°C

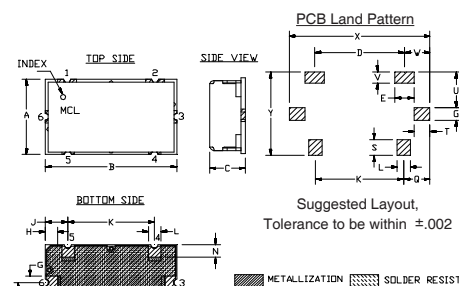
RF Power Input 0.5W Max.

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

Pin Connections

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

Outline Drawing



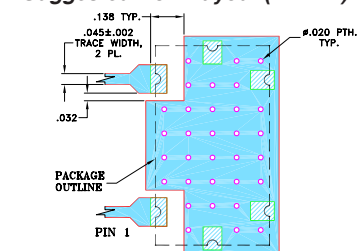
Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H	J	K	L	M
.472"	.826"	.220"	.551"	.118"	.047"	.078"	.076"	.142"	.543"	.078"	.236"
11.99	20.98	5.59	14.00	3.00	1.19	1.98	1.92	3.61	13.79	1.98	5.99

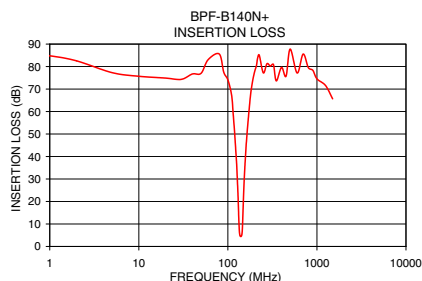
N	P	Q	S	T	U	V	W	X	Y	wt
.079"	.138"	.162"	.098"	.096"	.217"	.067"	.157"	.866"	.512"	grams
2.01	3.51	4.11	2.49	2.44	5.51	1.70	3.99	22.00	13.00	6.0

Note: Please refer to case style drawing for details

Demo Board MCL P/N: TB-400+ Suggested PCB Layout (PL-247)



- NOTES:
- 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 SOLDERMASK



Features

- Excellent rejection
- Flat group delay @ passband
- Good VSWR, 1.3:1 typ. @ passband

Applications

- Receivers/transmitters
- PMR / PAMR
- Base station

BPF-B140N+



Generic photo used for illustration purposes only
CASE STYLE: HZ1198

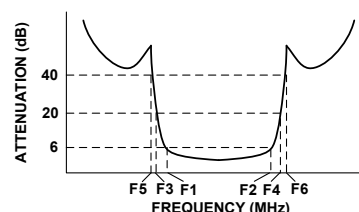
+RoHS Compliant

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

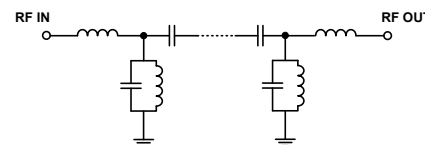
Bandpass Filter Electrical Specifications (T_{AMB} = 25°C)

CENTER FREQ. (MHz)	PASSBAND (MHz) (Loss < 6dB) F1 - F2	STOPBANDS (MHz)				VSWR (:1)	
		Loss > 20dB		Loss > 40dB		Passband Max.	Stopband Typ.
140	137 - 143	F3	F4	F5	F6	1.6	30

Typical Frequency Response

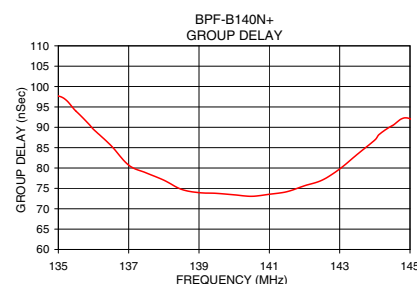
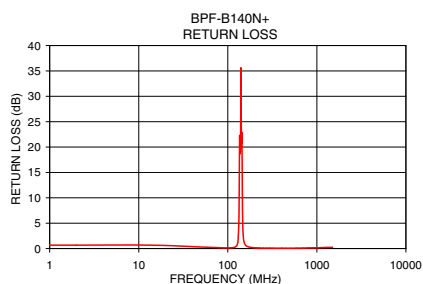


Functional Schematic



Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)		Return Loss (dB)	Frequency (MHz)	Group Delay (nsec)
	$\bar{x}$	σ			
1.0	84.10	3.17	0.67	135.0	96.41
119.0	51.15	0.38	0.25	136.0	90.34
126.0	35.29	0.32	0.57	137.0	83.07
130.0	22.83	0.33	1.41	137.5	79.66
133.0	11.59	0.34	4.96	138.0	78.33
134.0	8.44	0.29	8.99	138.5	76.61
137.0	4.71	0.08	19.03	139.0	75.42
140.0	4.32	0.07	27.57	139.5	74.79
143.0	4.83	0.08	20.72	140.0	74.28
146.0	9.03	0.34	8.53	140.5	74.18
148.0	15.72	0.39	3.44	141.0	74.84
154.0	32.74	0.33	1.01	141.5	75.90
165.0	51.19	0.44	0.43	142.0	76.78
200.0	76.29	2.43	0.15	142.5	78.59
400.0	80.32	3.07	0.07	143.0	81.75
800.0	81.57	3.51	0.13	143.5	85.13
1000.0	77.76	4.06	0.16	144.0	88.85
1500.0	66.03	1.78	0.24	145.0	92.31



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.
- 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



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

Surface Mount Band Pass Filter

BPF-B140N+

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	84.09	84.73	85.83	0.44	0.62	0.76	0.48	0.66	0.78
1	93.02	84.84	97.09	0.47	0.62	0.76	0.49	0.66	0.82
2	87.66	84.29	89.13	0.47	0.64	0.78	0.51	0.67	0.82
3	85.02	84.97	87.34	0.48	0.64	0.78	0.51	0.67	0.82
5	81.80	90.21	82.61	0.49	0.65	0.80	0.51	0.67	0.83
10	82.89	86.21	79.76	0.49	0.63	0.76	0.51	0.67	0.80
20	84.08	78.42	77.90	0.43	0.54	0.66	0.46	0.59	0.69
30	78.45	76.47	78.20	0.36	0.44	0.52	0.39	0.47	0.55
40	82.27	79.59	81.31	0.29	0.35	0.41	0.32	0.38	0.43
50	82.54	81.54	77.91	0.22	0.26	0.30	0.26	0.32	0.35
60	79.86	77.69	85.16	0.18	0.20	0.22	0.20	0.25	0.29
70	85.54	83.75	84.73	0.13	0.16	0.19	0.16	0.21	0.23
80	86.66	84.48	88.35	0.11	0.13	0.15	0.13	0.18	0.21
90	92.47	96.27	97.96	0.09	0.10	0.13	0.11	0.15	0.18
100	77.12	78.80	84.82	0.08	0.09	0.12	0.10	0.14	0.17
110	65.47	66.46	64.72	0.09	0.11	0.14	0.11	0.16	0.20
119	51.12	50.67	50.29	0.18	0.22	0.26	0.19	0.26	0.32
120	49.48	48.80	48.32	0.19	0.25	0.29	0.22	0.29	0.34
126	35.79	35.05	34.38	0.47	0.59	0.71	0.47	0.61	0.74
130	23.52	22.67	21.81	1.20	1.54	1.89	1.15	1.50	1.83
135	6.00	6.22	6.39	12.51	15.55	18.73	12.27	15.52	18.57
137	4.10	4.66	5.06	31.91	32.78	34.67	24.94	22.73	22.09
138	3.83	4.40	4.85	38.04	44.33	37.68	21.68	21.27	21.76
139	3.71	4.30	4.78	35.25	30.96	28.08	21.88	22.54	24.29
140	3.67	4.28	4.81	25.87	24.10	22.72	24.48	26.92	31.56
142	3.82	4.52	5.14	18.96	18.55	18.35	25.10	23.99	22.52
143	4.03	4.81	5.53	18.64	19.19	19.73	21.92	21.71	21.08
145	5.31	6.68	8.03	16.76	13.51	11.14	15.60	13.00	11.05
150	20.73	22.26	23.65	1.70	1.78	1.82	1.83	1.95	1.98
154	31.63	32.69	33.73	0.84	0.94	0.98	0.91	1.03	1.10
160	43.23	44.00	44.60	0.46	0.52	0.57	0.50	0.60	0.66
165	50.32	50.73	51.55	0.32	0.37	0.41	0.36	0.44	0.48
170	56.16	56.77	57.38	0.25	0.29	0.33	0.28	0.36	0.39
200	80.96	81.29	83.25	0.09	0.12	0.13	0.11	0.18	0.20
250	89.92	95.08	102.58	0.02	0.06	0.07	0.05	0.10	0.13
300	83.66	84.60	92.78	0.01	0.05	0.06	0.03	0.09	0.13
350	80.19	87.44	86.94	0.01	0.05	0.06	0.03	0.09	0.12
400	84.00	95.95	99.92	0.01	0.06	0.06	0.02	0.08	0.13
450	79.96	86.12	86.55	0.02	0.05	0.07	0.02	0.10	0.14
500	85.03	88.39	82.26	0.01	0.06	0.09	0.02	0.10	0.14
550	87.06	86.46	88.26	0.01	0.06	0.09	0.02	0.12	0.16
600	79.37	88.29	84.57	0.01	0.08	0.10	0.03	0.13	0.15
650	84.61	86.62	89.10	0.03	0.08	0.10	0.03	0.14	0.18
700	77.33	83.06	79.88	0.03	0.08	0.12	0.03	0.13	0.19
750	85.01	76.98	85.33	0.04	0.09	0.13	0.05	0.15	0.21
800	93.17	78.51	85.03	0.04	0.10	0.14	0.06	0.17	0.23
850	77.98	82.73	80.55	0.04	0.10	0.14	0.05	0.18	0.23
900	96.11	76.59	78.96	0.06	0.13	0.16	0.06	0.18	0.23
950	82.60	83.71	78.64	0.06	0.13	0.15	0.06	0.18	0.23
1000	82.93	84.02	79.74	0.06	0.14	0.16	0.07	0.20	0.25
1100	72.66	73.49	75.84	0.07	0.14	0.17	0.10	0.22	0.28
1200	73.48	75.29	73.10	0.10	0.16	0.22	0.09	0.22	0.29
1300	75.00	78.72	77.12	0.10	0.17	0.19	0.09	0.24	0.31
1400	76.39	70.51	74.14	0.08	0.17	0.20	0.09	0.24	0.32
1500	73.93	67.01	73.74	0.09	0.18	0.22	0.09	0.25	0.32

REV. X1

BPF-B140N+

081217

Page 1 of 2



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED • RoHS compliant

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see



Surface Mount Band Pass Filter

BPF-B140N+

Typical Performance Data

FREQ. (MHz)	GROUP DELAY (nsec)		
	@ -40° C	@ +25° C	@ +85° C
135.0	96.94	94.62	92.24
135.5	96.51	93.08	90.21
136.0	93.92	90.27	87.25
136.5	90.23	86.71	84.31
137.0	86.27	83.41	81.54
137.3	84.51	82.03	80.23
137.5	82.97	80.70	79.16
137.8	81.38	79.59	78.10
138.0	80.08	78.47	77.25
138.3	78.98	77.46	76.58
138.5	77.96	76.69	76.12
138.8	77.04	76.13	75.45
139.0	76.32	75.66	75.05
139.3	75.74	75.19	74.81
139.5	75.33	74.85	74.55
139.8	74.90	74.58	74.62
140.0	74.64	74.35	74.37
140.3	74.50	74.37	74.45
140.5	74.32	74.42	74.71
140.8	74.37	74.50	74.89
141.0	74.38	74.77	75.38
141.3	74.63	75.06	75.79
141.5	75.04	75.50	76.43
141.8	75.36	76.17	77.20
142.0	75.83	76.95	77.97
142.3	76.64	77.85	79.23
142.5	77.50	78.89	80.48
142.8	78.62	80.23	81.79
143.0	79.76	81.43	83.19
143.5	83.04	84.66	85.93
144.0	86.62	87.59	87.85
144.5	89.92	89.64	88.16
145.0	91.92	89.51	86.36

REV. X1
BPF-B140N+
081217
Page 2 of 2

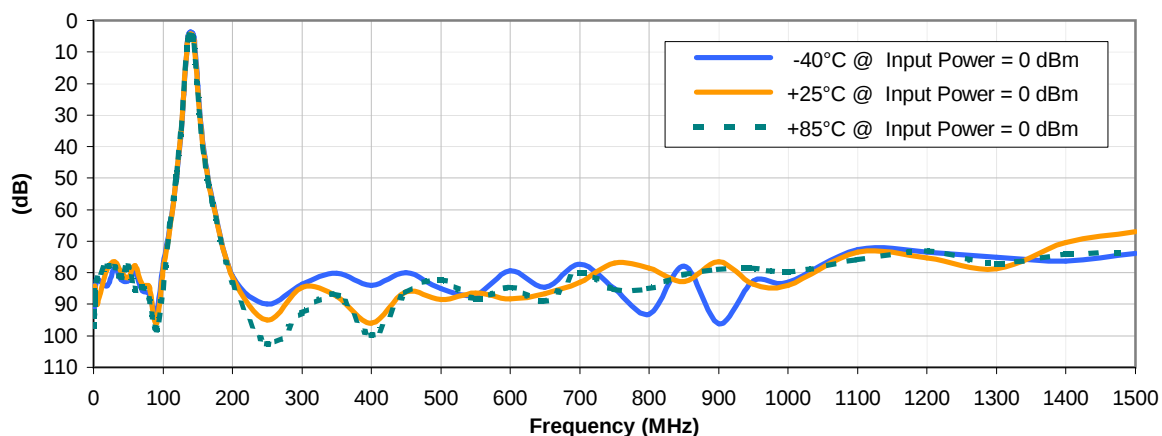


Mini-Circuits®
IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS9100 CERTIFIED • RoHS compliant
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see

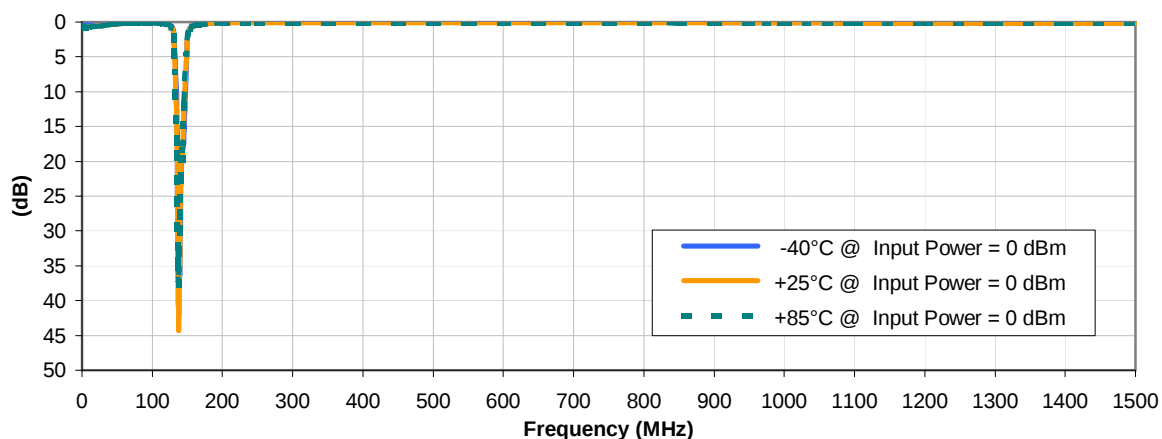


Typical Performance Curves

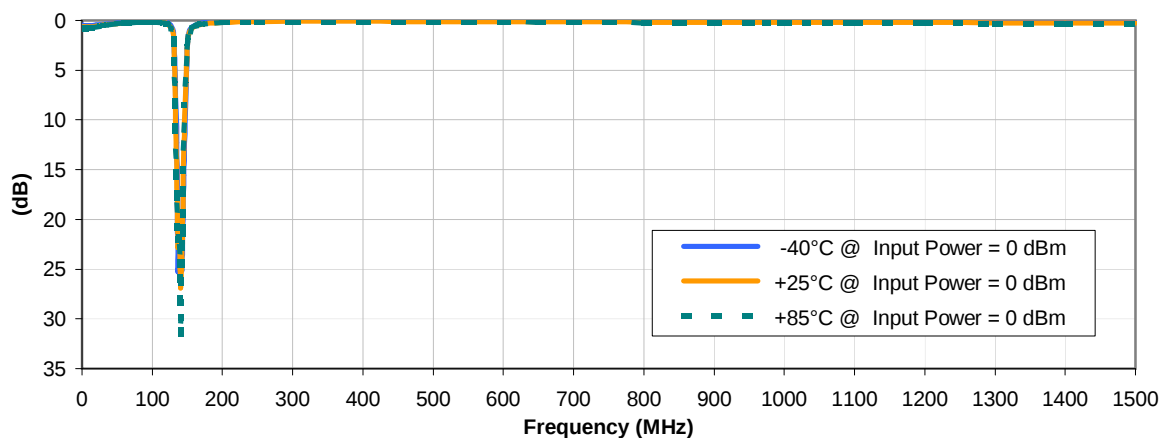
INSERTION LOSS vs. TEMPERATURE



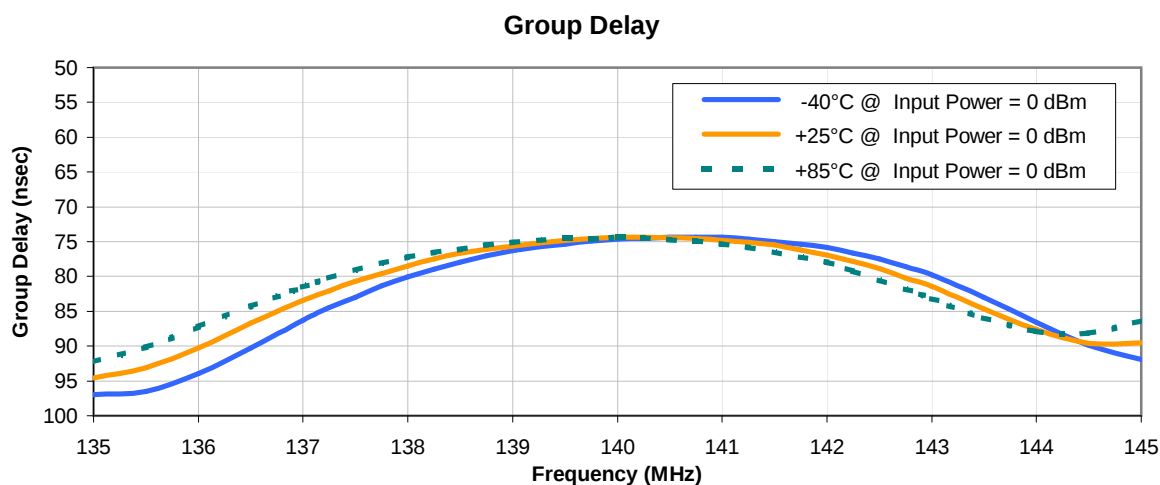
INPUT RETURN LOSS vs. TEMPERATURE



OUTPUT RETURN LOSS vs. TEMPERATURE



Typical Performance Curves

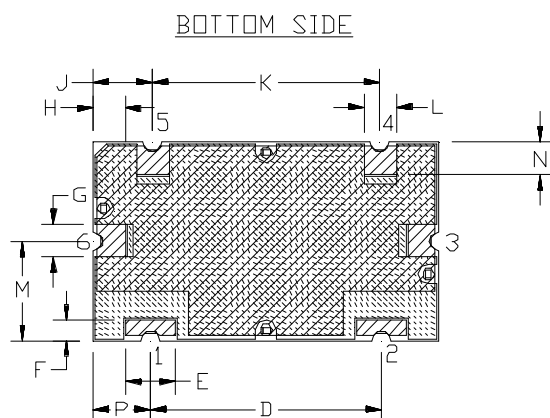
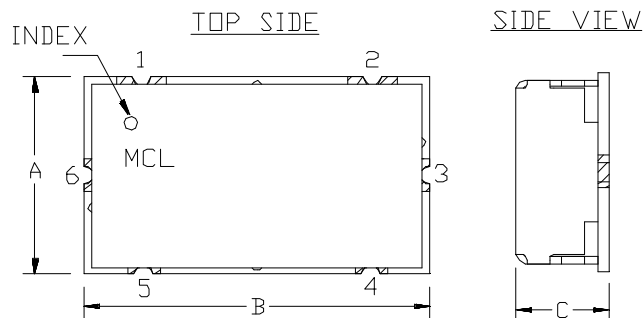


Case Style

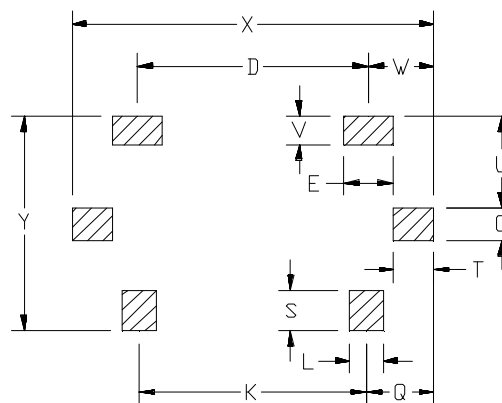
HZ

Outline Dimensions

HZ1198



PCB Land Pattern



 METALLIZATION  SOLDER RESIST

Suggested Layout,
Tolerance to be within $\pm .002$

CASE #	A	B	C	D	E	F	G	H	J	K	L	M
HZ1198	.472" (11.99)	.826" (20.98)	.220" (5.59)	.551" (14.00)	.118" (3.00)	.047" (1.19)	.078" (1.98)	.076" (1.92)	.142" (3.61)	.543" (13.79)	.078" (1.98)	.236" (5.99)

CASE #	N	P	Q	S	T	U	V	W	X	Y	WT GRAMS	NOTES
HZ1198	.079" (2.01)	.138" (3.51)	.162" (4.11)	.098" (2.49)	.096" (2.44)	.217" (5.51)	.067" (1.70)	.157" (3.99)	.866" (22.00)	.512" (13.00)	6.0	A35

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.

Mini-Circuits®
ISO 9001 ISO 14001 CERTIFIED

ALL NEW
minicircuits.com

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site

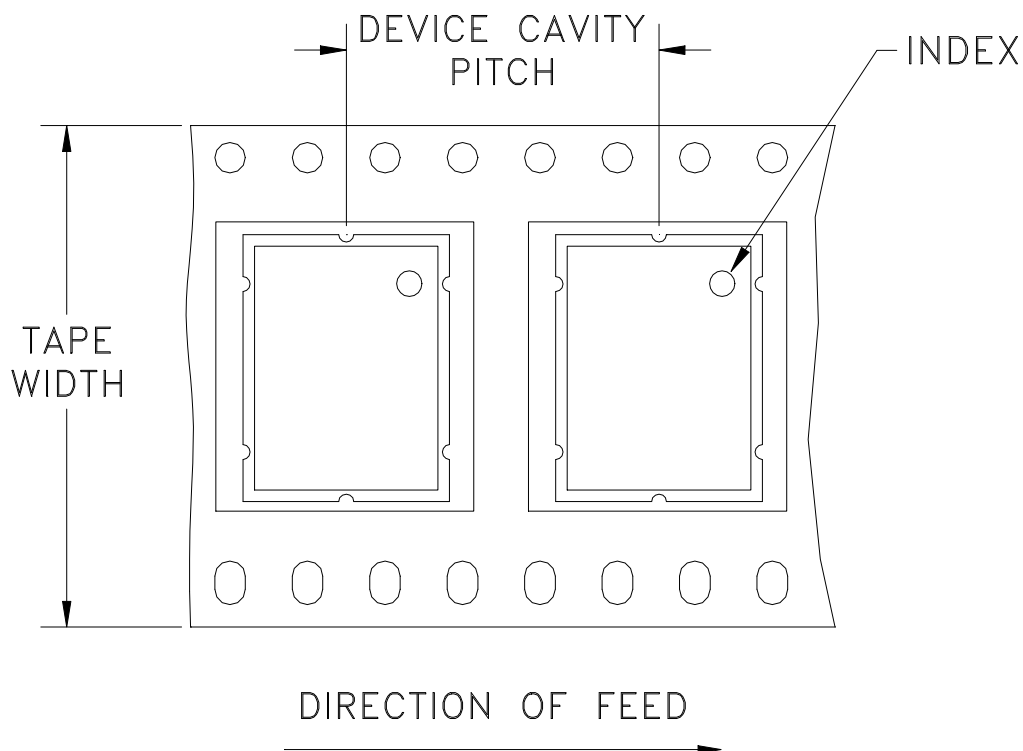


The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F6

DEVICE ORIENTATION IN T&R



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.

Go to: www.minicircuits.com/pages/pdfs/tape.pdf



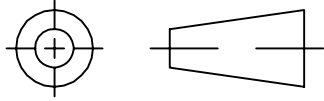
Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010

Mini-Circuits ISO 9001 & ISO 14001 Certified

INTERNET <http://www.minicircuits.com>

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

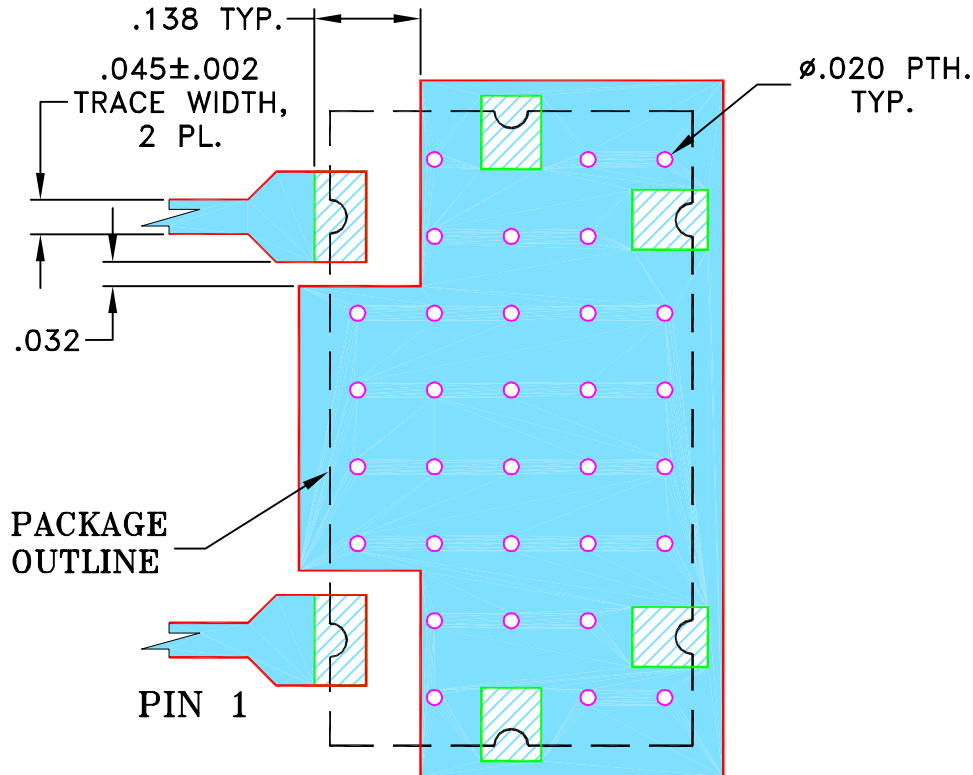
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M107879	NEW RELEASE (FROM RAVON)	11/06	DK	HH
OR	R66100	NEW RELEASE (FROM RAVON)	11/06	DK	HH

**SUGGESTED MOUNTING CONFIGURATION FOR
HZ1198 CASE STYLE, "rg" PIN CONNECTION, 50 Ω**



NOTES:

- 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.
- 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 ±

3 PL DECIMALS ± .005

ANGLES ±

FRACTIONS ±

DRAWN

DK (RAVON)

14 NOV 06

CHECKED

RZ (RAVON)

14 NOV 06

APPROVED

HH (RAVON)

14 NOV 06



Mini-Circuits®

13 Neptune Avenue
Brooklyn NY 11235

PL, rg, HZ1198, DPLX, TB-400+
50 Ω

SIZE

A

CODE IDENT

15542

DRAWING NO:

98-PL-247

REV:

OR

FILE:

98PL247

SCALE:

4:1

SHEET:

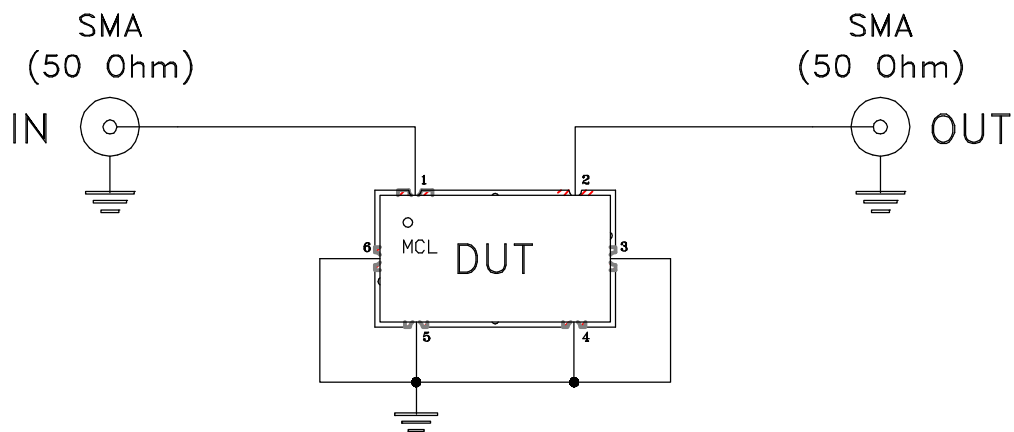
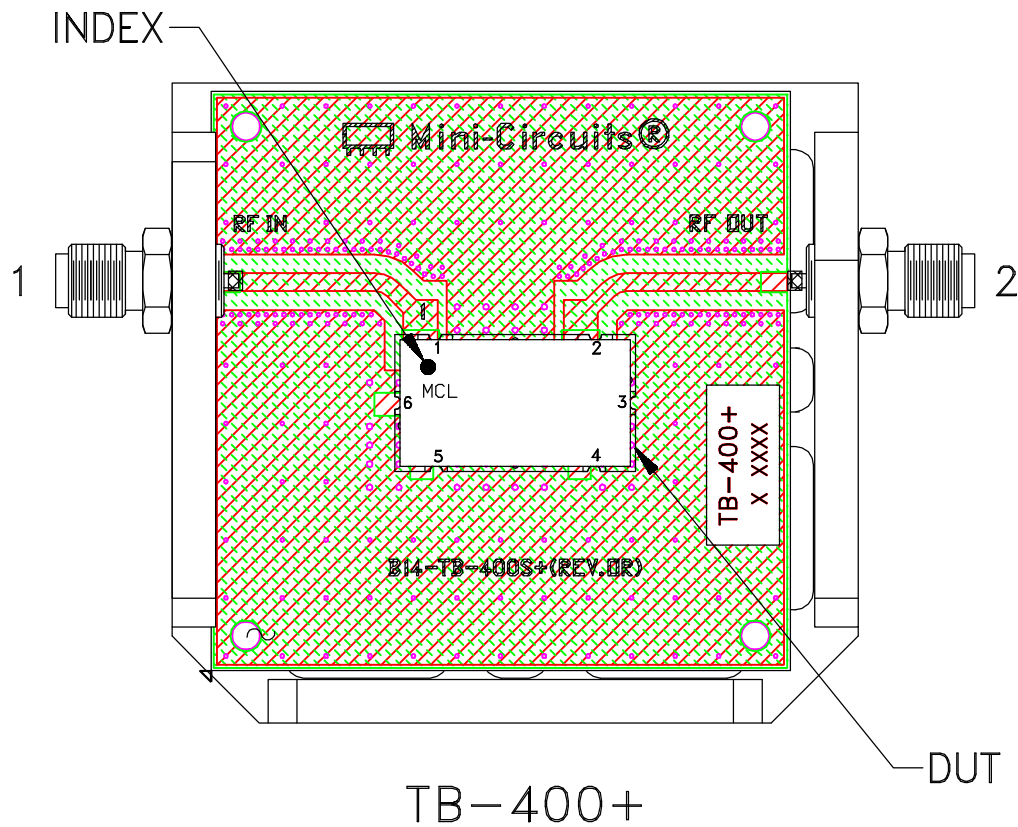
1 OF 1

Mini-Circuits®

THIS DOCUMENT AND ITS CONTENTS ARE THE PROPERTY OF MINI-CIRCUITS. EXCEPT FOR USE EXPRESSLY GRANTED, IN WRITING, TO ITS VENDORS, VENDEE AND THE UNITED STATES GOVERNMENT, MINI-CIRCUITS RESERVES ALL PROPRIETARY DESIGN, USE, MANUFACTURING AND REPRODUCTION RIGHTS THERETO. THESE CONTENTS SHALL NOT BE USED, DUPLICATED OR DISCLOSED TO ANY OUTSIDE PARTY, IN WHOLE OR IN PART, WITHOUT WRITTEN PERMISSION OF MINI-CIRCUITS.

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

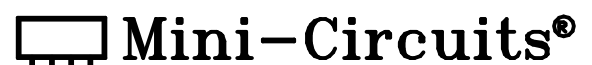
Evaluation Board and Circuit



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: RO4350 or equivalent.
Dielectric Constant=3.5, Thickness=.030 inch.





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