

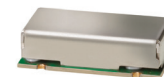
Surface Mount Bandpass Filter

BPF-B199+

50Ω 194 to 204 MHz

The Big Deal

- Narrow band filter (BW of 5%)
- Excellent VSWR (1.2:1 typical)
- Wide stopband rejection till 2GHz (70 dB typical)
- Fast roll-off



CASE STYLE: HZ1198

Product Overview

The BPF-B199+ is a narrow-band bandpass filter in a shielded package (size of 0.472" x 0.826" x .22") fabricated using SMT technology. Covering 199 MHz \pm 5 MHz band width, these units offer good matching within the passband and high rejection. This unit uses a miniature high Q capacitors and wire welded inductors for high reliability. In addition it has repeatable performance across production lots and consistent performance across temperature.

Key Features

| Feature | Advantages |
|--|---|
| Narrow bandwidth filter (fractional bandwidth of 5%) | Provides sharp rejection which rejects adjacent channel. |
| Excellent VSWR, 1.2:1 typical in passband | The model has very good return loss for a narrow bandwidth which provides good matching when used with other devices. |
| More than 50dB rejection up to 2000MHz | This enables the filter to attenuate spurious signals and reject harmonics for broad band of frequency. |
| Shielded case | Reduced interference with the surrounding components. |

Notes

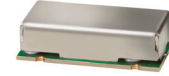
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Bandpass Filter

BPF-B199+

50Ω 194 to 204 MHz



CASE STYLE: HZ1198

Features

- Excellent VSWR, 1.2:1 typical in passband
- High rejection, 70 dB typical
- Sharp insertion loss roll-off
- Shielded case
- Aqueous washable

Applications

- Harmonic rejection
- Transmitters / receivers
- Radio communications

Electrical Specifications at 25°C

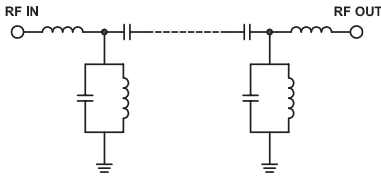
| Parameter | F# | Frequency (MHz) | Min. | Typ. | Max. | Unit | |
|------------------|------------------|-----------------|----------|------|------|------|----|
| Pass Band | Center Frequency | — | — | 199 | — | MHz | |
| | Insertion Loss | F1-F2 | 194-204 | — | 4.2 | 5 | dB |
| | VSWR | F1-F2 | 194-204 | — | 1.2 | 1.5 | :1 |
| Stop Band, Lower | Insertion Loss | DC-F3 | DC-179 | 20 | 31 | — | dB |
| | VSWR | DC-F3 | DC-179 | — | 24 | — | :1 |
| Stop Band, Upper | Insertion Loss | F4-F5 | 221-2000 | 20 | 30 | — | dB |
| | VSWR | F4-F5 | 221-2000 | — | 16 | — | :1 |

Maximum Ratings

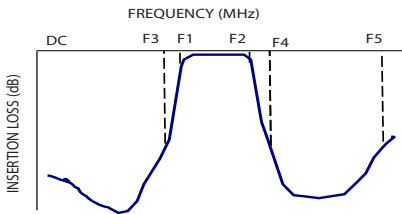
| | |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C |
| Storage Temperature | -55°C to 100°C |
| RF Power Input | 0.25W max. |

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

Functional Schematic



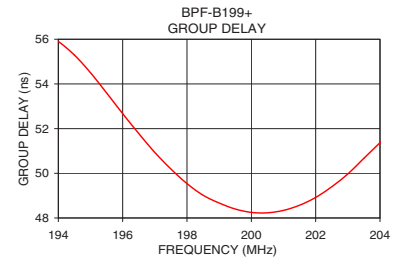
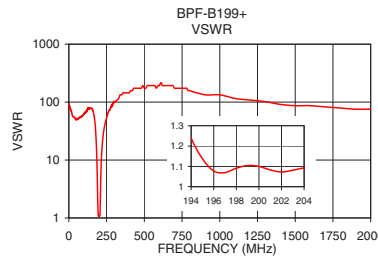
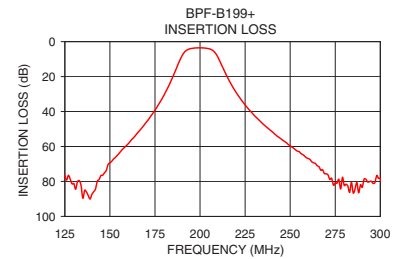
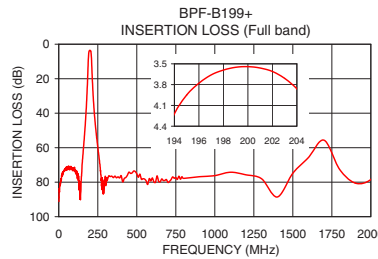
Typical Frequency Response



Typical Performance Data at 25°C

| Frequency (MHz) | Insertion Loss (dB) | VSWR (:1) | Frequency (MHz) | Group Delay (nsec) |
|-----------------|---------------------|-----------|-----------------|--------------------|
| 1.0 | 91.17 | 91.43 | 194.0 | 55.90 |
| 50.0 | 73.13 | 51.10 | 194.5 | 55.29 |
| 100.0 | 72.40 | 62.05 | 195.0 | 54.50 |
| 164.0 | 53.90 | 64.35 | 195.5 | 53.60 |
| 179.0 | 32.48 | 27.16 | 196.0 | 52.67 |
| 186.0 | 17.49 | 9.38 | 196.5 | 51.78 |
| 189.0 | 10.16 | 4.09 | 197.0 | 50.93 |
| 194.0 | 4.22 | 1.24 | 197.5 | 50.19 |
| 199.0 | 3.55 | 1.10 | 198.0 | 49.54 |
| 204.0 | 3.86 | 1.09 | 198.5 | 49.02 |
| 208.0 | 5.90 | 1.71 | 199.0 | 48.67 |
| 212.0 | 13.43 | 5.36 | 199.5 | 48.40 |
| 221.0 | 30.59 | 17.93 | 200.0 | 48.25 |
| 239.0 | 50.71 | 41.37 | 200.5 | 48.23 |
| 500.0 | 75.12 | 173.72 | 201.0 | 48.34 |
| 1000.0 | 76.18 | 133.63 | 201.5 | 48.57 |
| 1300.0 | 78.02 | 102.19 | 202.0 | 48.92 |
| 1500.0 | 74.83 | 86.86 | 202.5 | 49.40 |
| 1700.0 | 55.64 | 82.73 | 203.5 | 50.67 |
| 2000.0 | 78.44 | 75.53 | 204.0 | 51.37 |

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



Notes

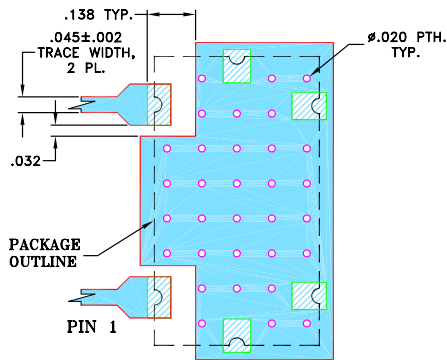
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Pad Connections

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

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

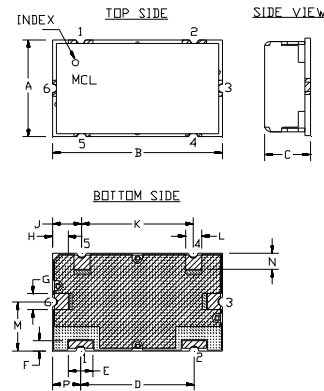


NOTES:

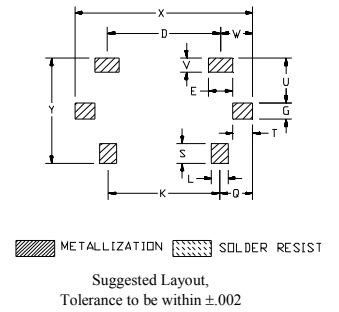
- TRACE WIDTH IS SHOWN FOR FR4 WITH DIELECTRIC THICKNESS .025"±.002". COPPER: 1/2 OZ. EACH SIDE.
 FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
- BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

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

Outline Drawing



PCB Land Pattern



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 | 1.93 | 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 | |

Notes

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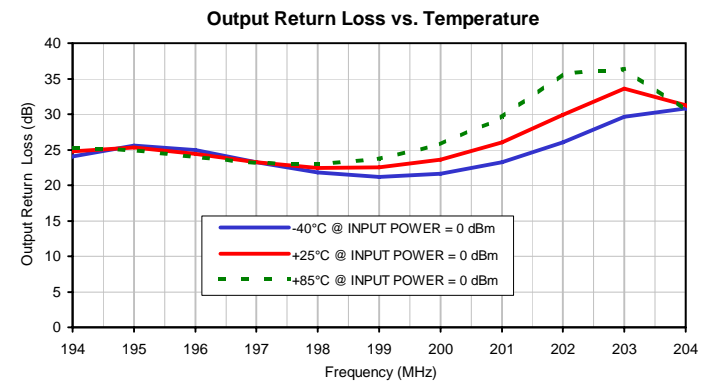
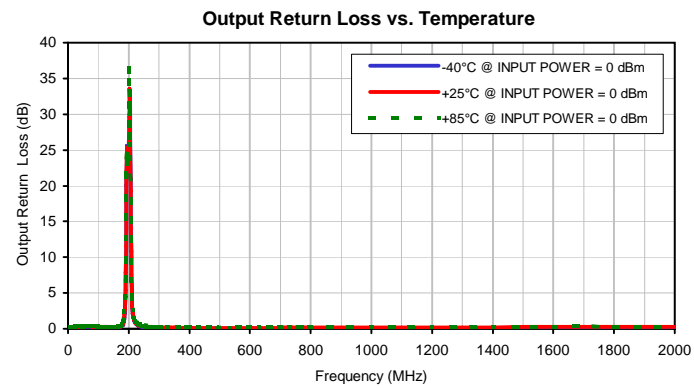
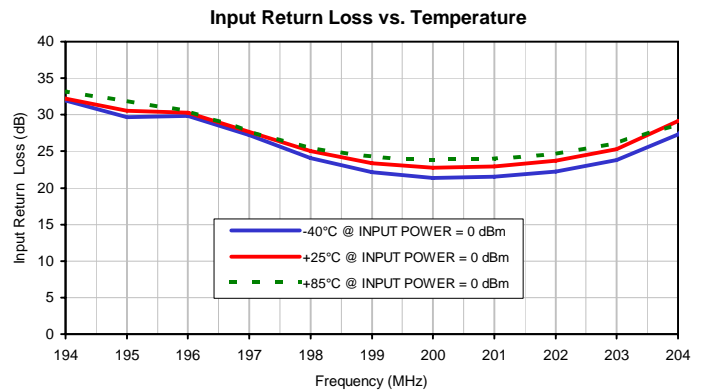
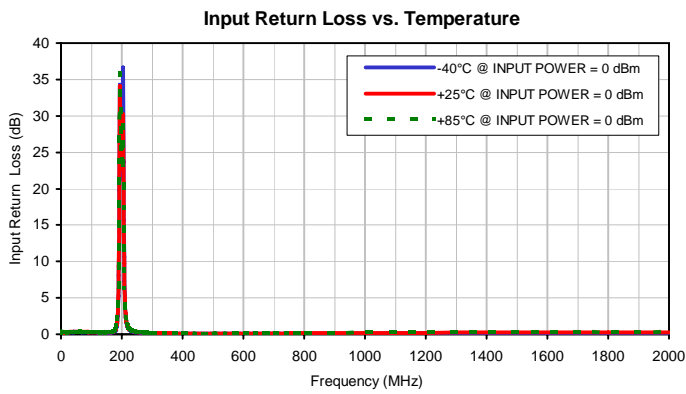
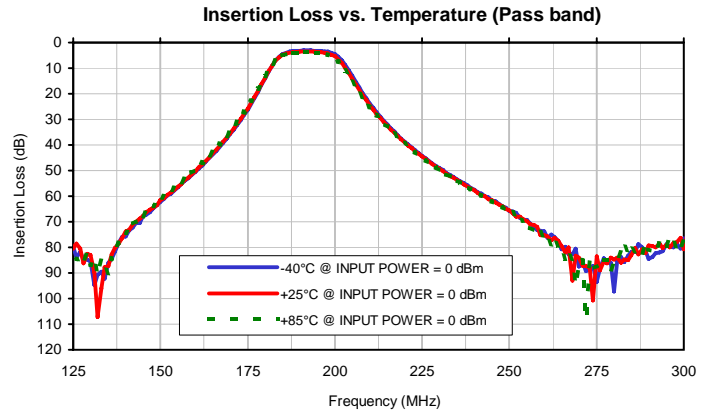
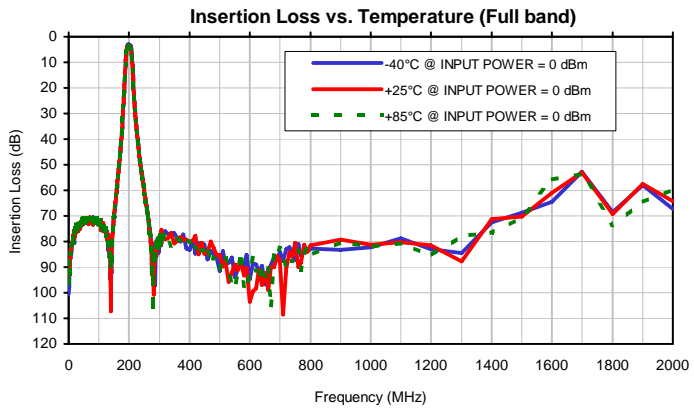
Typical Performance Data

| 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 |
| 1.0 | 100.60 | 91.60 | 96.39 | 0.14 | 0.18 | 0.21 | 0.14 | 0.18 | 0.22 |
| 5.0 | 87.01 | 86.89 | 85.24 | 0.16 | 0.20 | 0.24 | 0.16 | 0.20 | 0.23 |
| 10.0 | 81.54 | 80.87 | 81.37 | 0.19 | 0.23 | 0.26 | 0.18 | 0.22 | 0.25 |
| 50.0 | 72.01 | 72.03 | 71.71 | 0.31 | 0.35 | 0.38 | 0.31 | 0.34 | 0.36 |
| 100.0 | 72.01 | 73.42 | 72.63 | 0.26 | 0.29 | 0.31 | 0.24 | 0.28 | 0.31 |
| 150.0 | 70.62 | 69.98 | 69.68 | 0.19 | 0.23 | 0.25 | 0.17 | 0.22 | 0.25 |
| 155.0 | 64.80 | 64.59 | 63.68 | 0.19 | 0.24 | 0.26 | 0.18 | 0.23 | 0.26 |
| 160.0 | 58.93 | 58.62 | 58.14 | 0.21 | 0.25 | 0.28 | 0.19 | 0.25 | 0.28 |
| 161.0 | 57.66 | 57.45 | 56.88 | 0.21 | 0.26 | 0.28 | 0.20 | 0.25 | 0.29 |
| 162.0 | 56.42 | 56.22 | 55.94 | 0.22 | 0.26 | 0.29 | 0.20 | 0.25 | 0.29 |
| 163.0 | 55.34 | 55.20 | 54.76 | 0.22 | 0.27 | 0.30 | 0.20 | 0.26 | 0.29 |
| 164.0 | 54.11 | 53.78 | 53.39 | 0.23 | 0.28 | 0.30 | 0.21 | 0.27 | 0.30 |
| 165.0 | 53.07 | 52.67 | 52.25 | 0.23 | 0.28 | 0.32 | 0.21 | 0.28 | 0.31 |
| 166.0 | 51.67 | 51.48 | 50.97 | 0.23 | 0.29 | 0.32 | 0.22 | 0.29 | 0.32 |
| 167.0 | 50.50 | 50.15 | 49.82 | 0.24 | 0.29 | 0.34 | 0.23 | 0.29 | 0.32 |
| 168.0 | 49.24 | 48.81 | 48.39 | 0.26 | 0.31 | 0.35 | 0.25 | 0.30 | 0.35 |
| 169.0 | 47.89 | 47.53 | 47.09 | 0.27 | 0.32 | 0.37 | 0.25 | 0.32 | 0.36 |
| 170.0 | 46.54 | 46.13 | 45.78 | 0.29 | 0.34 | 0.39 | 0.26 | 0.33 | 0.37 |
| 175.0 | 39.15 | 38.75 | 38.25 | 0.38 | 0.46 | 0.53 | 0.36 | 0.44 | 0.51 |
| 179.0 | 32.23 | 31.77 | 31.22 | 0.57 | 0.68 | 0.79 | 0.51 | 0.63 | 0.72 |
| 180.0 | 30.31 | 29.86 | 29.29 | 0.64 | 0.77 | 0.90 | 0.58 | 0.71 | 0.82 |
| 185.0 | 19.18 | 18.72 | 18.14 | 1.50 | 1.80 | 2.13 | 1.30 | 1.59 | 1.86 |
| 190.0 | 6.91 | 7.02 | 7.00 | 8.09 | 9.29 | 10.71 | 6.79 | 7.87 | 9.01 |
| 194.0 | 3.56 | 3.97 | 4.27 | 31.99 | 32.17 | 33.16 | 24.07 | 24.73 | 25.25 |
| 195.0 | 3.36 | 3.78 | 4.09 | 29.64 | 30.58 | 31.84 | 25.57 | 25.32 | 24.97 |
| 196.0 | 3.24 | 3.65 | 3.97 | 29.88 | 30.32 | 30.58 | 24.93 | 24.43 | 23.94 |
| 197.0 | 3.17 | 3.58 | 3.90 | 27.24 | 27.70 | 27.75 | 23.20 | 23.20 | 23.11 |
| 198.0 | 3.12 | 3.53 | 3.86 | 24.10 | 25.00 | 25.48 | 21.76 | 22.42 | 22.95 |
| 199.0 | 3.10 | 3.52 | 3.85 | 22.17 | 23.40 | 24.24 | 21.18 | 22.49 | 23.73 |
| 200.0 | 3.11 | 3.53 | 3.87 | 21.37 | 22.80 | 23.83 | 21.66 | 23.61 | 25.76 |
| 201.0 | 3.13 | 3.57 | 3.92 | 21.49 | 22.95 | 23.98 | 23.22 | 26.03 | 29.57 |
| 202.0 | 3.18 | 3.64 | 4.02 | 22.26 | 23.68 | 24.59 | 26.03 | 29.95 | 35.64 |
| 203.0 | 3.27 | 3.75 | 4.16 | 23.83 | 25.31 | 26.13 | 29.60 | 33.56 | 36.42 |
| 204.0 | 3.40 | 3.92 | 4.38 | 27.28 | 29.19 | 28.70 | 30.78 | 31.28 | 30.61 |
| 210.0 | 8.75 | 9.89 | 11.02 | 5.13 | 4.95 | 4.67 | 5.44 | 5.27 | 5.03 |
| 215.0 | 19.72 | 20.58 | 21.52 | 1.56 | 1.69 | 1.74 | 1.72 | 1.85 | 1.91 |
| 220.0 | 28.88 | 29.49 | 30.17 | 0.88 | 0.98 | 1.04 | 0.96 | 1.08 | 1.14 |
| 221.0 | 30.48 | 31.04 | 31.69 | 0.81 | 0.91 | 0.97 | 0.87 | 0.99 | 1.05 |
| 222.0 | 31.99 | 32.52 | 33.12 | 0.75 | 0.84 | 0.90 | 0.81 | 0.92 | 0.98 |
| 224.0 | 34.80 | 35.30 | 35.85 | 0.65 | 0.74 | 0.79 | 0.70 | 0.81 | 0.87 |
| 225.0 | 36.16 | 36.59 | 37.11 | 0.62 | 0.70 | 0.76 | 0.65 | 0.75 | 0.82 |
| 226.0 | 37.43 | 37.85 | 38.37 | 0.58 | 0.67 | 0.71 | 0.62 | 0.72 | 0.78 |
| 228.0 | 39.86 | 40.23 | 40.73 | 0.53 | 0.61 | 0.66 | 0.55 | 0.64 | 0.71 |
| 230.0 | 42.12 | 42.48 | 42.86 | 0.47 | 0.55 | 0.59 | 0.50 | 0.59 | 0.64 |
| 232.0 | 44.24 | 44.61 | 44.95 | 0.44 | 0.51 | 0.55 | 0.46 | 0.55 | 0.60 |
| 234.0 | 46.25 | 46.57 | 46.94 | 0.40 | 0.47 | 0.52 | 0.42 | 0.51 | 0.55 |
| 235.0 | 47.21 | 47.59 | 47.89 | 0.39 | 0.46 | 0.50 | 0.40 | 0.49 | 0.53 |
| 240.0 | 51.72 | 52.15 | 52.33 | 0.33 | 0.39 | 0.43 | 0.34 | 0.42 | 0.46 |
| 300.0 | 82.08 | 78.56 | 78.43 | 0.15 | 0.17 | 0.20 | 0.13 | 0.18 | 0.21 |
| 400.0 | 83.32 | 80.13 | 79.96 | 0.09 | 0.12 | 0.14 | 0.06 | 0.12 | 0.15 |
| 500.0 | 91.41 | 85.16 | 90.48 | 0.07 | 0.11 | 0.13 | 0.04 | 0.11 | 0.14 |
| 600.0 | 94.67 | 103.50 | 93.30 | 0.07 | 0.12 | 0.14 | 0.04 | 0.12 | 0.15 |
| 700.0 | 83.98 | 87.52 | 82.80 | 0.08 | 0.14 | 0.16 | 0.05 | 0.13 | 0.15 |
| 800.0 | 82.80 | 81.57 | 85.30 | 0.10 | 0.15 | 0.18 | 0.06 | 0.15 | 0.18 |
| 900.0 | 83.20 | 79.37 | 80.33 | 0.12 | 0.18 | 0.21 | 0.07 | 0.16 | 0.19 |
| 1000.0 | 82.26 | 81.28 | 81.89 | 0.13 | 0.19 | 0.23 | 0.08 | 0.18 | 0.20 |
| 1100.0 | 78.75 | 80.29 | 80.63 | 0.15 | 0.20 | 0.23 | 0.10 | 0.19 | 0.22 |
| 1200.0 | 83.04 | 81.49 | 85.59 | 0.15 | 0.21 | 0.24 | 0.09 | 0.20 | 0.24 |
| 1300.0 | 84.52 | 87.83 | 77.63 | 0.16 | 0.23 | 0.27 | 0.09 | 0.21 | 0.25 |
| 1400.0 | 72.58 | 71.16 | 76.84 | 0.17 | 0.24 | 0.27 | 0.09 | 0.22 | 0.26 |
| 1500.0 | 68.79 | 70.19 | 70.45 | 0.18 | 0.25 | 0.28 | 0.09 | 0.23 | 0.29 |
| 1600.0 | 64.42 | 61.08 | 55.79 | 0.19 | 0.26 | 0.29 | 0.10 | 0.24 | 0.31 |
| 1700.0 | 52.87 | 52.96 | 53.42 | 0.20 | 0.28 | 0.32 | 0.09 | 0.24 | 0.32 |
| 1800.0 | 68.52 | 69.18 | 73.43 | 0.17 | 0.25 | 0.28 | 0.07 | 0.23 | 0.31 |
| 1900.0 | 58.06 | 57.52 | 64.65 | 0.17 | 0.25 | 0.28 | 0.07 | 0.23 | 0.31 |
| 2000.0 | 67.37 | 64.34 | 59.70 | 0.17 | 0.25 | 0.31 | 0.05 | 0.24 | 0.31 |

Typical Performance Data

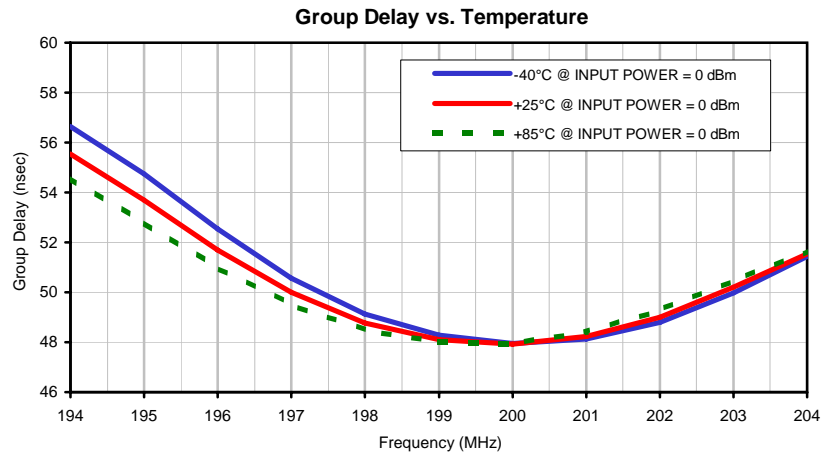
| FREQ. (MHz) | GROUP DELAY | | |
|--------------------|-------------|--------|--------|
| | (nsec) | | |
| | @-40°C | @+25°C | @+85°C |
| 194.0 | 56.65 | 55.54 | 54.58 |
| 195.0 | 54.74 | 53.69 | 52.79 |
| 196.0 | 52.54 | 51.69 | 51.00 |
| 197.0 | 50.57 | 49.99 | 49.51 |
| 198.0 | 49.13 | 48.78 | 48.49 |
| 199.0 | 48.29 | 48.11 | 48.00 |
| 200.0 | 47.95 | 47.93 | 47.96 |
| 201.0 | 48.13 | 48.24 | 48.40 |
| 202.0 | 48.80 | 49.01 | 49.29 |
| 203.0 | 49.97 | 50.20 | 50.46 |
| 204.0 | 51.44 | 51.54 | 51.65 |

Typical Performance Curves



Surface Mount Band Pass Filter BPF-B199+

Typical Performance Curves

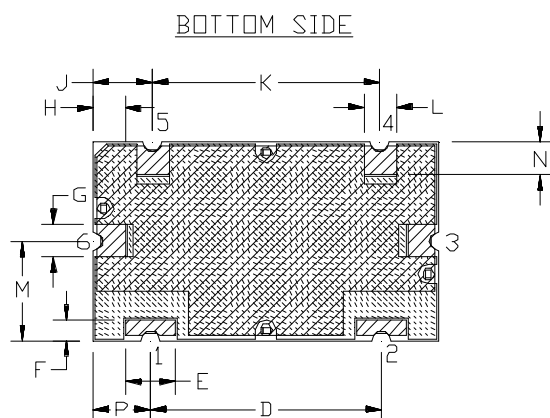
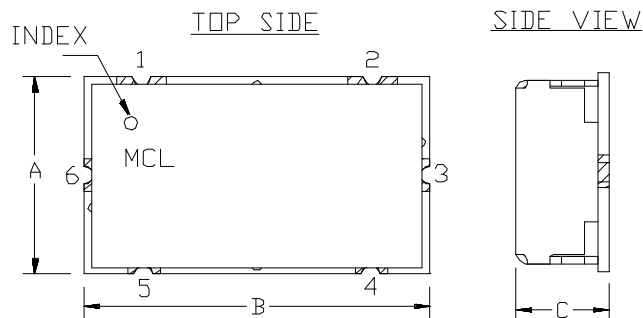


Case Style

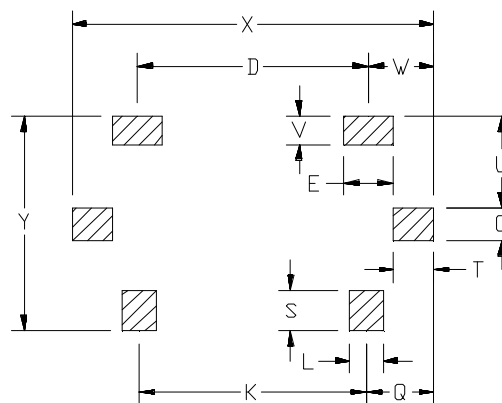
HZ

Outline Dimensions

HZ1198



PCB Land Pattern



 METALLIZATION  SOLDER RESIST

Suggested Layout,
Tolerance to be within ± 0.02

| 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.


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

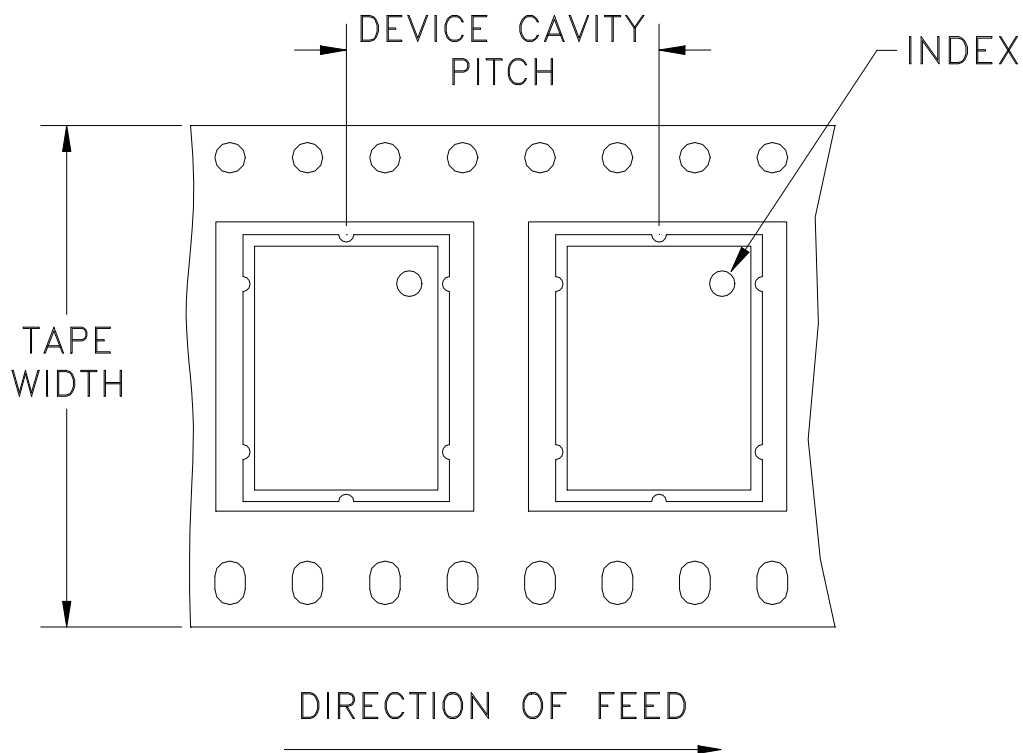


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RF/IF MICROWAVE COMPONENTS

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



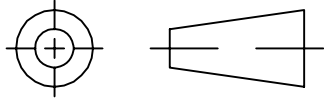
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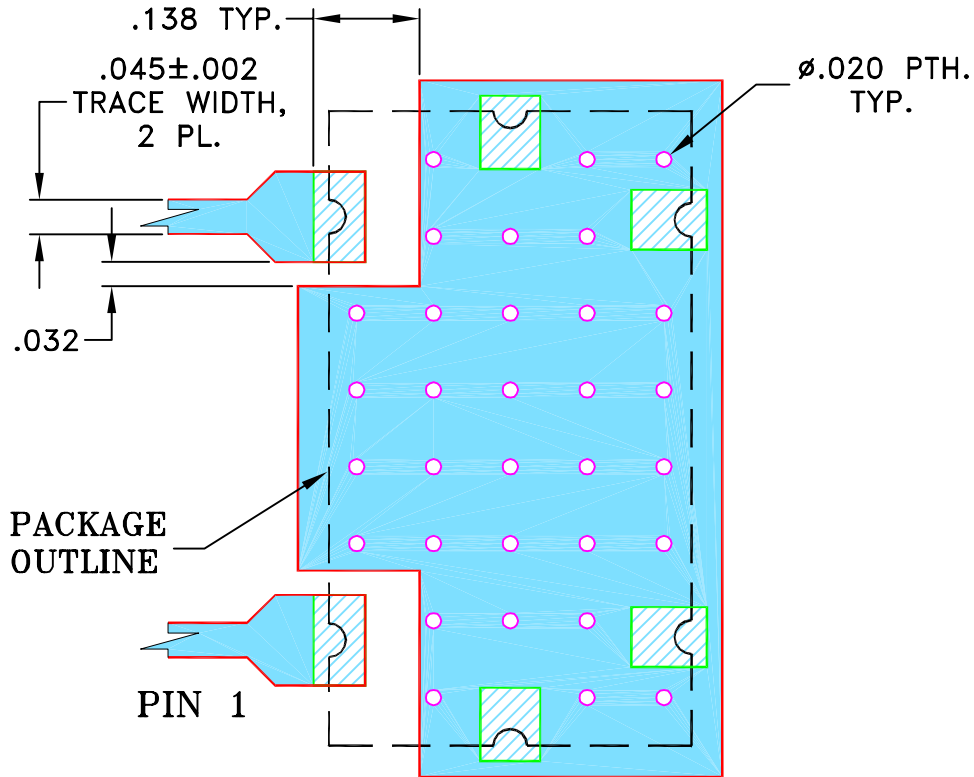
THIRD ANGLE PROJECTION



REVISIONS

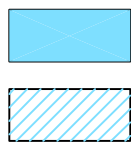
| REV | ECN No. | DESCRIPTION | DATE | DR | AUTH |
|-----|---------|--------------------------|-------|----|------|
| OR | M107879 | NEW RELEASE (FROM RAVON) | 11/06 | DK | HH |
| OR | R66100 | NEW RELEASE (FROM RAVON) | 11/06 | DK | HH |
| | | | | | |
| | | | | | |

**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 |



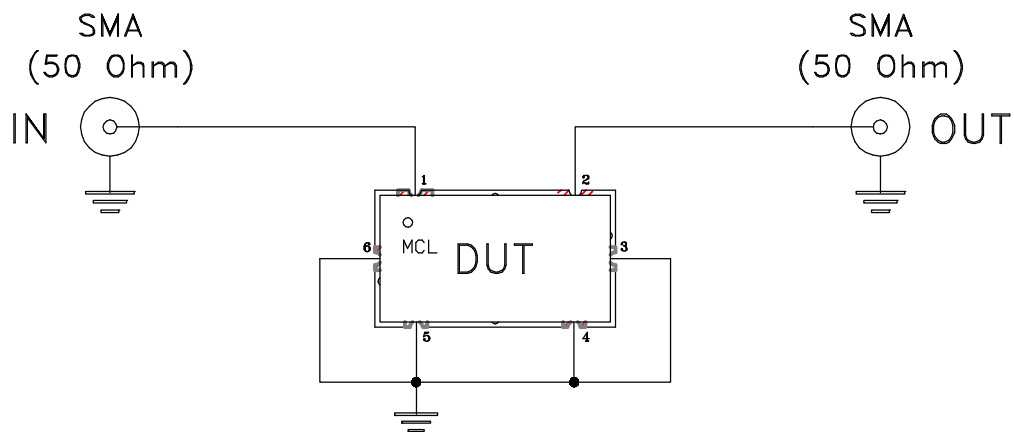
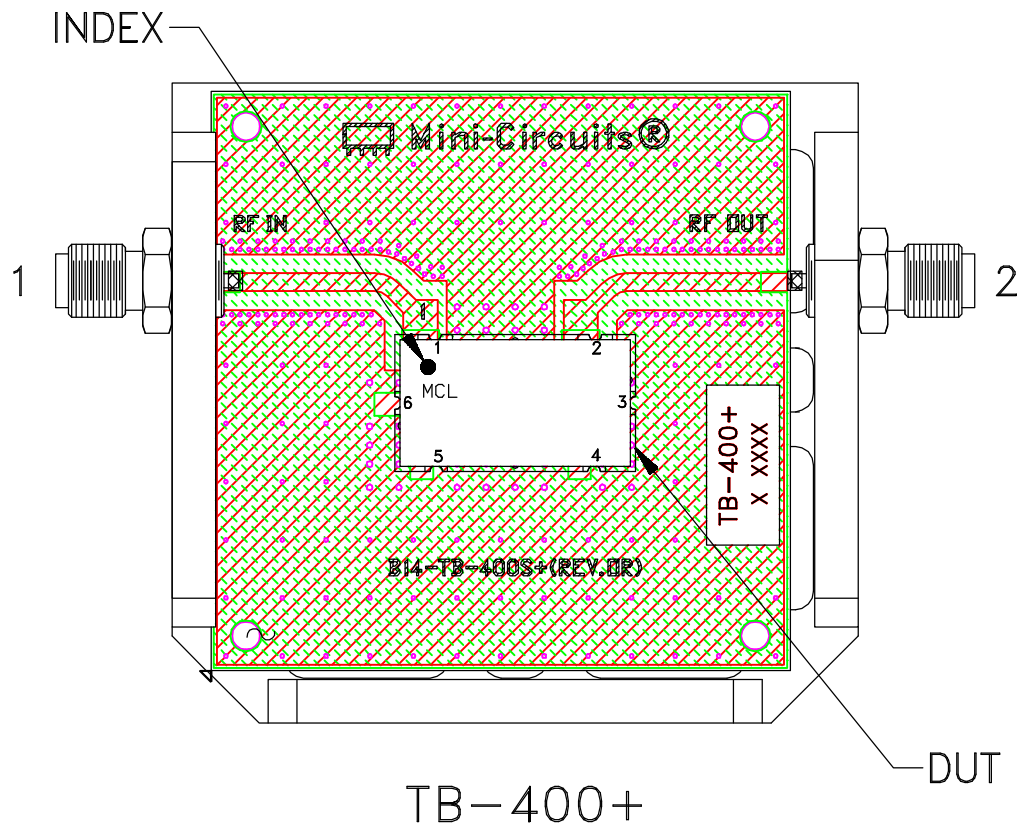
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Brooklyn NY 11235

PL, rg, HZ1198, DPLX, TB-400+
50 Ω

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| | | | |
|------------------|---------------------|--------------------------|------------|
| SIZE A | CODE IDENT 15542 | DRAWING NO: 98-PL-247 | REV: OR |
| FILE: 98PL247 | SCALE: 4:1 | SHEET: 1 OF 1 | |


Evaluation Board and Circuit



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: R04350 or equivalent.
Dielectric Constant=3.5, 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 | -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 |