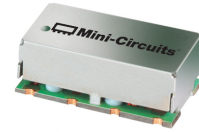


Surface Mount Bandpass Filter

SXBP-2150+

50Ω 2050 to 2250 MHz



Generic photo used for illustration purposes only
CASE STYLE: HF1139

The Big Deal

- Fast roll-off on the upper sideband
- Good Matching and low loss in the pass band
- Miniature shielded package

Product Overview

SXBP-2150+ is a wideband bandpass filter in a miniature shielded package covering 2050 to 2250 MHz. This is designed for asymmetric rejection applications such as super-heterodyne receivers. By having asymmetric band, faster roll-off at upper side band is achieved in a comparatively smaller package and lower pass band insertion loss. It has repeatable performance across lots and consistent performance across temperature.

Key Features

| Feature | Advantages |
|---|---|
| Fast roll-off on the upper side band | Wide bandwidth filter with fast-roll off on the upper side band, which increases selectivity on the adjacent channel. |
| Good matching and low loss in pass band | This filter has good matching and low loss in the pass band |
| Small size, 0.44" X 0.74" X 0.27" | The surface mount package enables the SXBP-2150+ to be used in compact designs. |
| High power handling | This model uses high Q capacitors and high current handling inductors which is well suited for high power applications. |

Notes

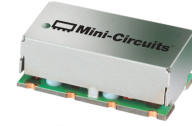
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Surface Mount Bandpass Filter

50Ω 2050 to 2250 MHz

SXBP-2150+



Generic photo used for illustration purposes only
CASE STYLE: HF1139

Features

- Wide bandwidth
- Better rejection
- Miniature shielded package

Applications

- Defense systems
- Fixed microwave
- IMT
- Auxiliary broadcasting
- Private and public land mobile

Electrical Specifications at 25°C

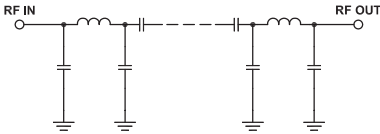
| Parameter | F# | Frequency (MHz) | Min. | Typ. | Max. | Unit |
|------------------|------------------|-----------------|-----------|------|------|------|
| Pass Band | Center Frequency | - | - | 2150 | - | MHz |
| | Insertion Loss | F1-F2 | 2050-2250 | 1.0 | 2.0 | dB |
| | VSWR | F1-F2 | 2050-2250 | 1.3 | 2.3 | :1 |
| Stop Band, Lower | Insertion Loss | DC-F3 | DC-950 | 20.0 | 30.0 | dB |
| | VSWR | DC-F3 | DC-950 | 20.0 | 20.0 | :1 |
| Stop Band, Upper | Insertion Loss | F4-F5 | 2675-5000 | 20.0 | 31.0 | dB |
| | VSWR | F4-F5 | 2675-5000 | - | 20.0 | :1 |

Maximum Ratings

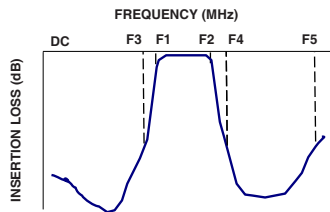
| | |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C |
| Storage Temperature | -55°C to 100°C |
| RF Power Input | 6.3 W max. |

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

Functional Schematic



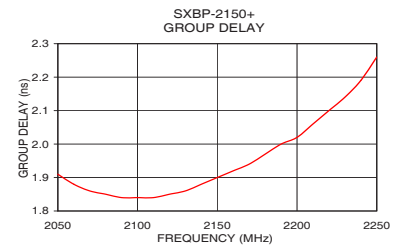
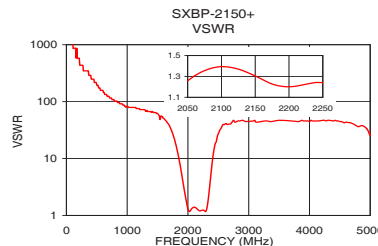
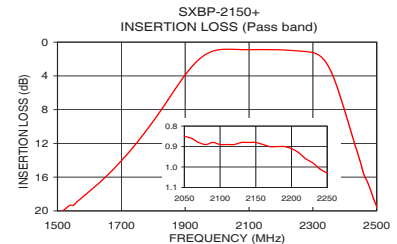
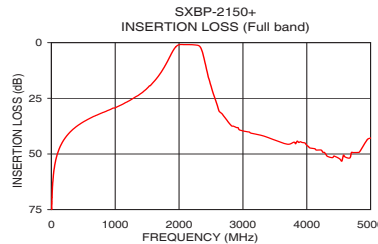
Typical Frequency Response



Typical Performance Data at 25°C

| Frequency (MHz) | Insertion Loss (dB) | VSWR (:1) | Frequency (MHz) | Group Delay (nsec) |
|-----------------|---------------------|-----------|-----------------|--------------------|
| 1 | 89.17 | 1737.18 | 2050 | 1.91 |
| 100 | 49.46 | 1737.18 | 2070 | 1.86 |
| 250 | 41.53 | 434.30 | 2080 | 1.85 |
| 850 | 30.91 | 96.51 | 2090 | 1.84 |
| 950 | 29.63 | 86.86 | 2100 | 1.84 |
| 1490 | 20.77 | 62.05 | 2110 | 1.84 |
| 1800 | 9.37 | 17.75 | 2120 | 1.85 |
| 1900 | 3.90 | 5.09 | 2130 | 1.86 |
| 1960 | 1.56 | 2.10 | 2140 | 1.88 |
| 2050 | 0.85 | 1.26 | 2150 | 1.90 |
| 2150 | 0.88 | 1.30 | 2160 | 1.92 |
| 2250 | 1.03 | 1.24 | 2170 | 1.94 |
| 2320 | 1.57 | 1.49 | 2180 | 1.97 |
| 2360 | 3.75 | 3.43 | 2190 | 2.00 |
| 2400 | 8.15 | 8.55 | 2200 | 2.02 |
| 2525 | 21.93 | 31.60 | 2210 | 2.06 |
| 2675 | 32.02 | 40.41 | 2220 | 2.10 |
| 3100 | 40.13 | 46.96 | 2230 | 2.14 |
| 4300 | 50.15 | 46.96 | 2240 | 2.19 |
| 5000 | 42.88 | 25.56 | 2250 | 2.26 |

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



Notes

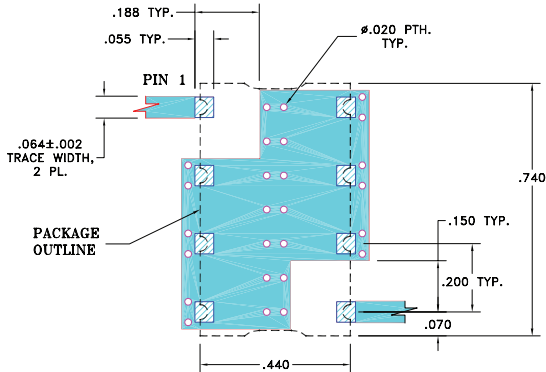
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Pad Connections

| | |
|--------|-------------|
| INPUT | 1 |
| OUTPUT | 8 |
| GROUND | 2,3,4,5,6,7 |

Demo Board MCL P/N: TB-368+ Suggested PCB Layout (PL-230)

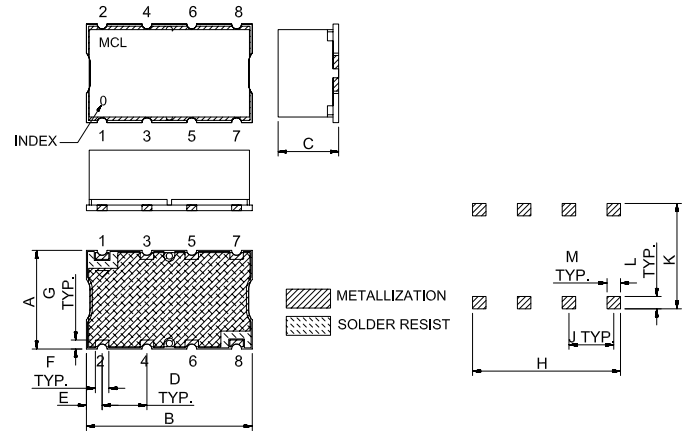


NOTE:

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- 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

Outline Drawing



Outline Dimensions (inch)

| A | B | C | D | E | F | G |
|-------|-------|-------|------|------|-------|------|
| .44 | .74 | .27 | .200 | .07 | .060 | .040 |
| 11.18 | 18.80 | 6.86 | 5.08 | 1.78 | 1.52 | 1.02 |
| H | J | K | L | M | wt | |
| .660 | .200 | .470 | .055 | .060 | grams | |
| 16.76 | 5.08 | 11.94 | 1.40 | 1.52 | 3.0 | |

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 |
| 1 | 88.76 | 89.17 | 88.45 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 |
| 25 | 61.58 | 61.61 | 61.47 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.00 |
| 90 | 50.47 | 50.38 | 50.28 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| 120 | 47.98 | 47.86 | 47.73 | 0.01 | 0.02 | 0.02 | 0.01 | 0.02 | 0.02 |
| 170 | 45.01 | 44.86 | 44.72 | 0.01 | 0.02 | 0.03 | 0.01 | 0.02 | 0.02 |
| 210 | 43.13 | 43.03 | 42.88 | 0.02 | 0.03 | 0.04 | 0.02 | 0.03 | 0.04 |
| 300 | 39.92 | 39.96 | 39.91 | 0.03 | 0.05 | 0.05 | 0.03 | 0.04 | 0.05 |
| 400 | 37.39 | 37.49 | 37.55 | 0.04 | 0.06 | 0.07 | 0.04 | 0.07 | 0.07 |
| 500 | 35.54 | 35.61 | 35.67 | 0.07 | 0.09 | 0.10 | 0.07 | 0.09 | 0.10 |
| 520 | 35.21 | 35.27 | 35.34 | 0.07 | 0.09 | 0.10 | 0.07 | 0.10 | 0.11 |
| 600 | 33.99 | 34.03 | 34.09 | 0.09 | 0.11 | 0.13 | 0.09 | 0.12 | 0.13 |
| 700 | 32.66 | 32.68 | 32.74 | 0.12 | 0.14 | 0.16 | 0.12 | 0.15 | 0.17 |
| 800 | 31.45 | 31.46 | 31.54 | 0.14 | 0.17 | 0.18 | 0.14 | 0.18 | 0.19 |
| 900 | 30.27 | 30.29 | 30.34 | 0.16 | 0.19 | 0.21 | 0.17 | 0.21 | 0.22 |
| 950 | 29.61 | 29.63 | 29.66 | 0.17 | 0.20 | 0.22 | 0.17 | 0.21 | 0.23 |
| 1000 | 29.22 | 29.25 | 29.27 | 0.18 | 0.21 | 0.23 | 0.18 | 0.23 | 0.24 |
| 1280 | 25.02 | 25.04 | 24.96 | 0.20 | 0.24 | 0.27 | 0.21 | 0.26 | 0.28 |
| 1400 | 22.94 | 22.86 | 22.76 | 0.21 | 0.27 | 0.29 | 0.22 | 0.28 | 0.30 |
| 1520 | 20.01 | 19.90 | 19.78 | 0.23 | 0.30 | 0.33 | 0.24 | 0.30 | 0.34 |
| 1600 | 17.82 | 17.68 | 17.54 | 0.26 | 0.34 | 0.38 | 0.27 | 0.34 | 0.38 |
| 1700 | 14.24 | 14.07 | 13.93 | 0.38 | 0.47 | 0.53 | 0.38 | 0.48 | 0.54 |
| 1770 | 11.05 | 10.90 | 10.79 | 0.63 | 0.75 | 0.82 | 0.63 | 0.75 | 0.83 |
| 1810 | 8.96 | 8.84 | 8.74 | 0.93 | 1.08 | 1.18 | 0.92 | 1.07 | 1.16 |
| 1880 | 4.99 | 4.95 | 4.90 | 2.34 | 2.58 | 2.75 | 2.25 | 2.48 | 2.64 |
| 1900 | 3.92 | 3.90 | 3.88 | 3.17 | 3.46 | 3.67 | 3.05 | 3.32 | 3.52 |
| 1920 | 2.94 | 2.95 | 2.95 | 4.38 | 4.74 | 4.99 | 4.19 | 4.51 | 4.74 |
| 1960 | 1.47 | 1.56 | 1.61 | 8.50 | 9.02 | 9.42 | 7.99 | 8.40 | 8.73 |
| 2000 | 0.80 | 0.94 | 1.02 | 16.73 | 17.43 | 18.16 | 14.27 | 14.56 | 14.90 |
| 2020 | 0.71 | 0.85 | 0.94 | 21.65 | 21.94 | 22.44 | 16.92 | 16.95 | 17.10 |
| 2050 | 0.70 | 0.85 | 0.94 | 18.74 | 18.83 | 18.69 | 16.48 | 16.57 | 16.48 |
| 2150 | 0.73 | 0.88 | 0.98 | 17.08 | 17.57 | 17.60 | 17.90 | 18.62 | 18.71 |
| 2180 | 0.74 | 0.90 | 1.00 | 19.73 | 20.17 | 20.31 | 22.21 | 23.11 | 23.32 |
| 2200 | 0.75 | 0.91 | 1.02 | 20.39 | 20.78 | 21.07 | 24.02 | 24.82 | 25.37 |
| 2250 | 0.85 | 1.03 | 1.15 | 18.47 | 19.37 | 20.05 | 19.85 | 21.04 | 22.05 |
| 2290 | 0.95 | 1.17 | 1.32 | 21.42 | 22.32 | 22.04 | 25.52 | 31.37 | 35.52 |
| 2320 | 1.24 | 1.57 | 1.82 | 15.69 | 14.07 | 13.03 | 17.70 | 15.72 | 14.54 |
| 2350 | 2.42 | 2.96 | 3.35 | 7.41 | 6.76 | 6.33 | 7.88 | 7.24 | 6.82 |
| 2390 | 6.24 | 6.94 | 7.46 | 2.59 | 2.51 | 2.44 | 2.76 | 2.71 | 2.67 |
| 2430 | 11.29 | 11.94 | 12.46 | 1.13 | 1.20 | 1.23 | 1.22 | 1.31 | 1.34 |
| 2500 | 18.85 | 19.48 | 20.08 | 0.58 | 0.64 | 0.67 | 0.60 | 0.72 | 0.79 |
| 2550 | 23.65 | 24.06 | 24.57 | 0.40 | 0.50 | 0.55 | 0.48 | 0.58 | 0.64 |
| 2625 | 29.98 | 30.64 | 30.89 | 0.35 | 0.42 | 0.49 | 0.35 | 0.45 | 0.51 |
| 2675 | 31.70 | 32.02 | 32.26 | 0.33 | 0.43 | 0.48 | 0.36 | 0.46 | 0.52 |
| 2975 | 41.44 | 42.05 | 43.17 | 0.29 | 0.40 | 0.46 | 0.26 | 0.36 | 0.43 |
| 3000 | 38.58 | 38.55 | 40.39 | 0.30 | 0.40 | 0.48 | 0.24 | 0.35 | 0.43 |
| 3100 | 40.20 | 40.13 | 39.99 | 0.27 | 0.37 | 0.43 | 0.25 | 0.36 | 0.43 |
| 3175 | 38.74 | 38.60 | 40.70 | 0.27 | 0.38 | 0.48 | 0.28 | 0.39 | 0.47 |
| 3375 | 42.68 | 42.42 | 41.63 | 0.29 | 0.39 | 0.44 | 0.29 | 0.41 | 0.49 |
| 3525 | 43.14 | 42.59 | 41.88 | 0.28 | 0.38 | 0.43 | 0.31 | 0.41 | 0.47 |
| 3700 | 45.82 | 45.62 | 44.38 | 0.28 | 0.38 | 0.44 | 0.29 | 0.40 | 0.46 |
| 3750 | 43.11 | 43.21 | 42.98 | 0.29 | 0.39 | 0.44 | 0.30 | 0.41 | 0.46 |
| 4000 | 47.03 | 46.13 | 44.47 | 0.28 | 0.39 | 0.43 | 0.31 | 0.42 | 0.47 |
| 4050 | 46.98 | 47.29 | 46.57 | 0.27 | 0.38 | 0.43 | 0.31 | 0.42 | 0.47 |
| 4150 | 49.16 | 48.24 | 47.91 | 0.27 | 0.38 | 0.43 | 0.30 | 0.40 | 0.46 |
| 4300 | 50.52 | 50.15 | 52.77 | 0.26 | 0.37 | 0.42 | 0.30 | 0.40 | 0.46 |
| 4525 | 51.74 | 52.42 | 51.43 | 0.28 | 0.39 | 0.44 | 0.29 | 0.40 | 0.46 |
| 4625 | 48.98 | 48.70 | 49.30 | 0.31 | 0.43 | 0.48 | 0.28 | 0.39 | 0.45 |
| 4825 | 48.29 | 49.12 | 55.39 | 0.35 | 0.47 | 0.56 | 0.30 | 0.41 | 0.48 |
| 4975 | 40.83 | 40.69 | 39.30 | 0.44 | 0.55 | 0.63 | 0.31 | 0.43 | 0.52 |
| 5000 | 44.19 | 42.88 | 42.61 | 0.53 | 0.68 | 0.66 | 0.36 | 0.48 | 0.53 |



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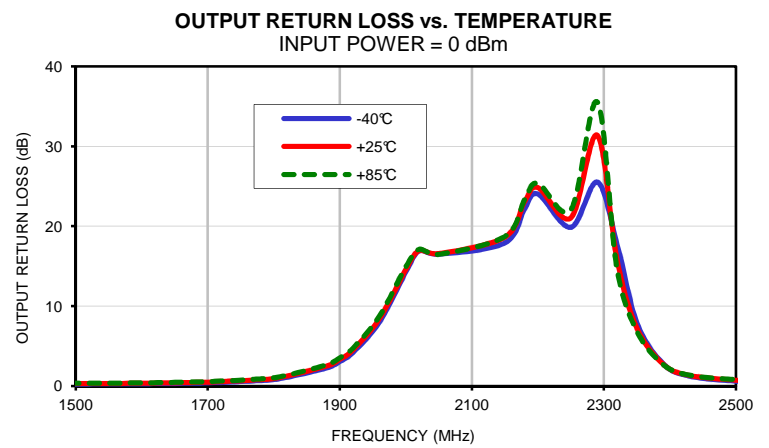
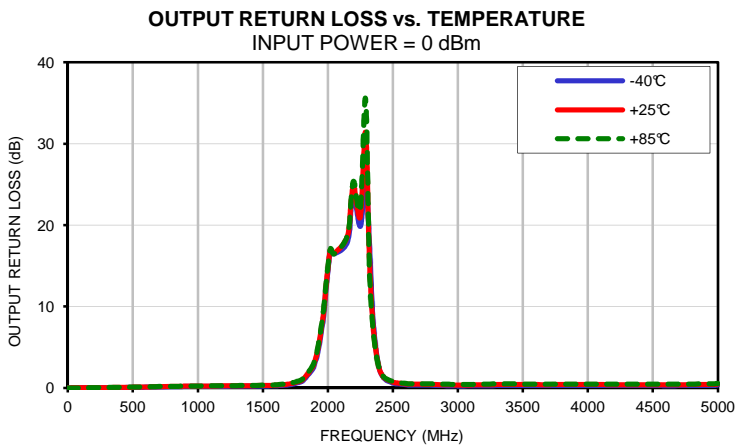
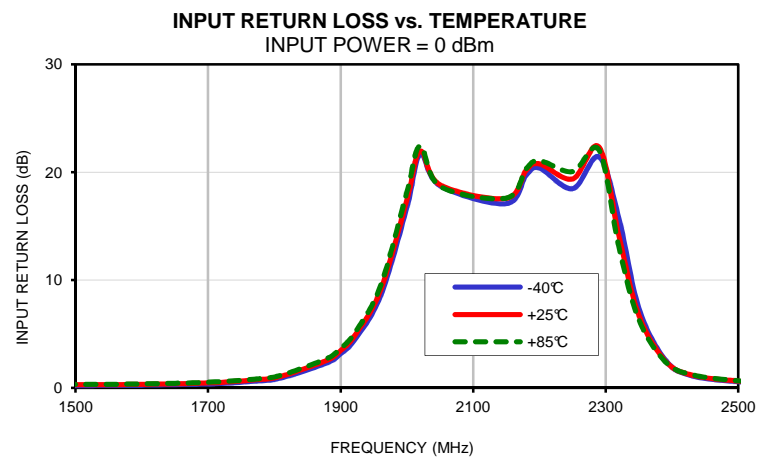
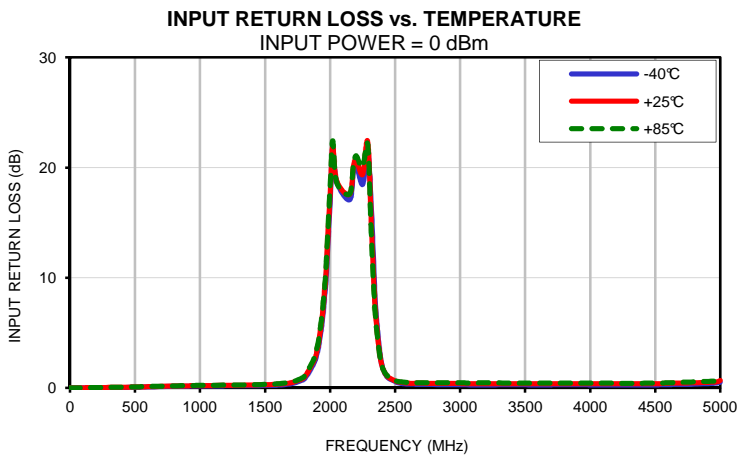
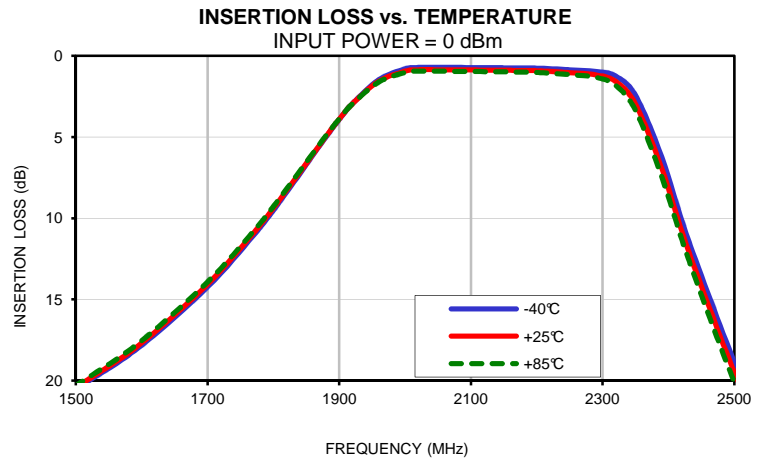
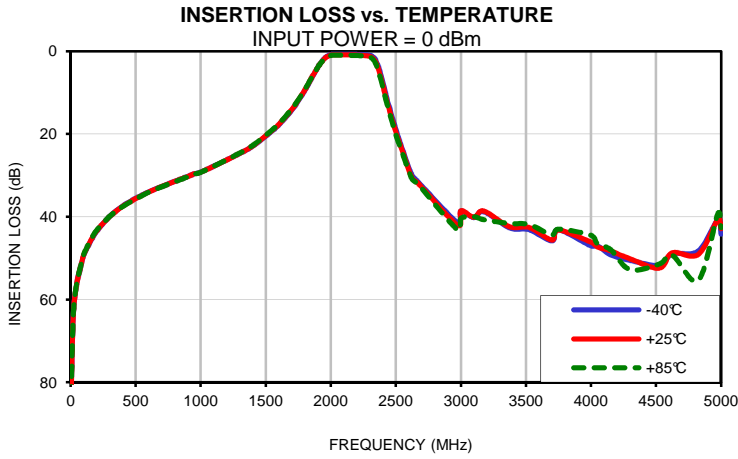
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IF/RF MICROWAVE COMPONENTS

Typical Performance Data

| FREQ. (MHz) | GROUP DELAY | | |
|--------------------|-------------|--------|--------|
| | (nsec) | | |
| | @-40°C | @+25°C | @+85°C |
| 2050 | 5.20 | 5.16 | 5.12 |
| 2060 | 5.16 | 5.14 | 5.09 |
| 2070 | 5.14 | 5.11 | 5.07 |
| 2080 | 5.11 | 5.08 | 5.03 |
| 2090 | 5.08 | 5.06 | 5.01 |
| 2100 | 5.06 | 5.03 | 4.99 |
| 2110 | 5.03 | 5.01 | 4.96 |
| 2120 | 5.00 | 4.98 | 4.94 |
| 2130 | 4.98 | 4.96 | 4.92 |
| 2140 | 4.96 | 4.94 | 4.90 |
| 2150 | 4.94 | 4.92 | 4.88 |
| 2160 | 4.91 | 4.89 | 4.86 |
| 2170 | 4.89 | 4.87 | 4.84 |
| 2180 | 4.87 | 4.85 | 4.82 |
| 2190 | 4.85 | 4.83 | 4.80 |
| 2200 | 4.83 | 4.81 | 4.78 |
| 2210 | 4.81 | 4.80 | 4.76 |
| 2220 | 4.79 | 4.78 | 4.74 |
| 2230 | 4.78 | 4.76 | 4.73 |
| 2240 | 4.76 | 4.74 | 4.71 |
| 2250 | 4.74 | 4.73 | 4.70 |

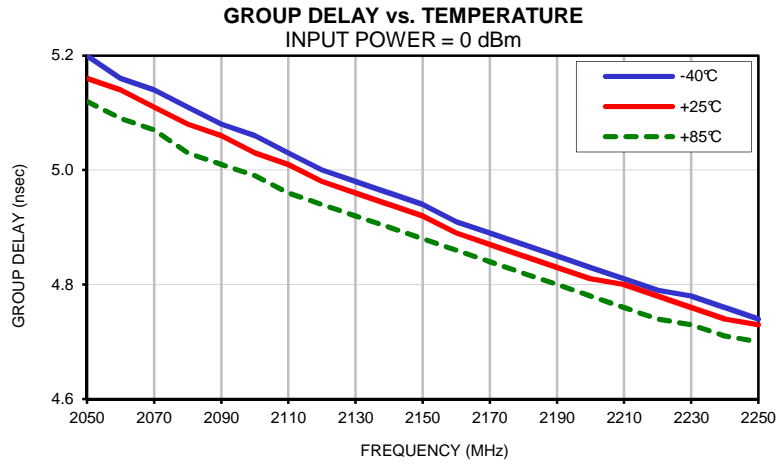
Typical Performance Curves



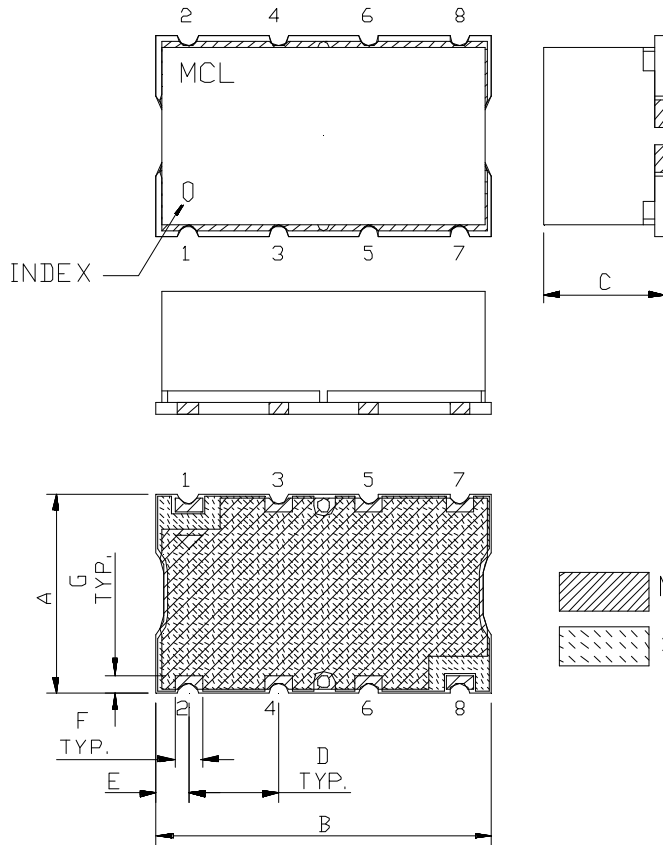
Band Pass Filter

SXBP-2150+

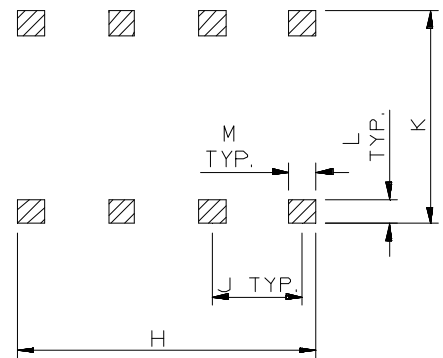
Typical Performance Curves




Outline Dimensions



PCB Land Pattern



 METALLIZATION
 SOLDER RESIST

| CASE # | A | B | C | D | E | F | G | H | J | K | L | M | WT. GRAMS |
|--------|----------------|----------------|---------------|----------------|---------------|----------------|----------------|-----------------|----------------|-----------------|----------------|----------------|-----------|
| HF1139 | .44 (11.18) | .74 (18.80) | .27 (6.86) | .200 (5.08) | .07 (1.78) | .060 (1.52) | .040 (1.02) | .660 (16.76) | .200 (5.08) | .470 (11.94) | .055 (1.40) | .060 (1.52) | 3.0 |

Dimensions are in inches (mm). Tolerances: 2 Pl. ± 0.015 "; 3 Pl. ± 0.01 "

Notes:

- Case material: Nickel-Silver alloy.
- Base: Printed wiring laminate.
- Termination finish:
 - For RoHS Case Styles: 2-5 μ inch (.05-.13 microns) Gold over 120-240 μ inch (3.05-6.10 microns) Nickel plate.
 - For RoHS-5 Case Styles: Tin-Lead plate.



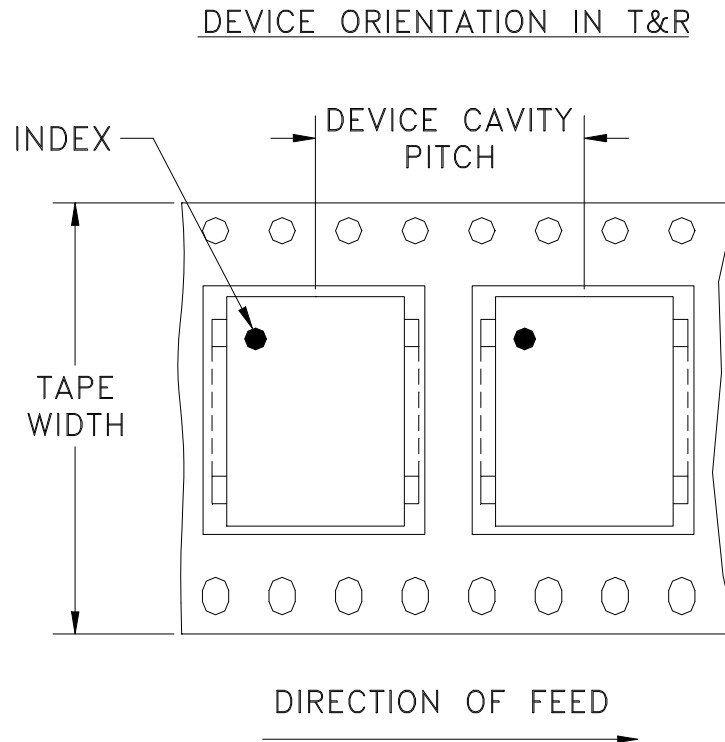
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The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F5



| 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



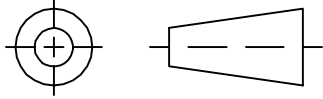
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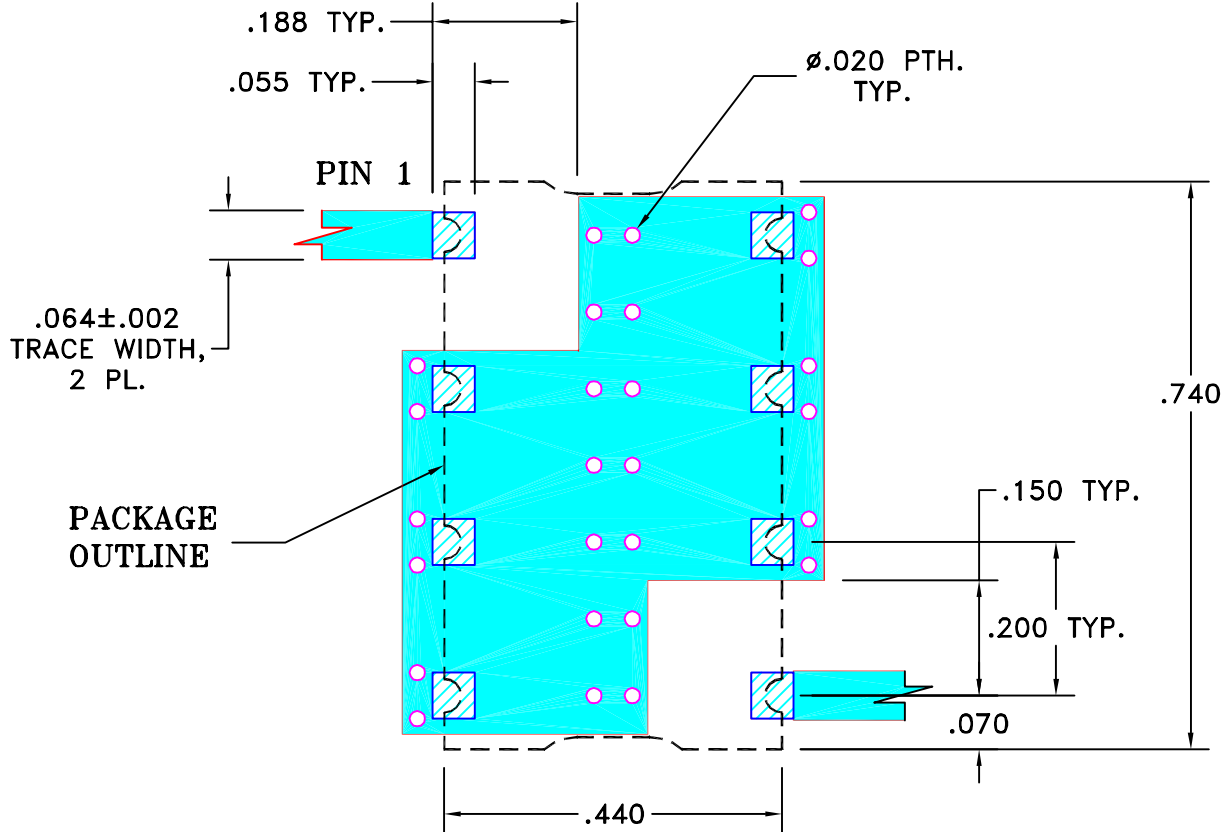
THIRD ANGLE PROJECTION



REVISIONS

| REV | ECN No. | DESCRIPTION | DATE | DR | AUTH |
|-----|---------|--------------------------|-------|----|------|
| OR | M101757 | NEW RELEASE (FROM RAVON) | 11/05 | DK | HH |
| OR | R62293 | NEW RELEASE (FROM RAVON) | 11/05 | DK | HH |
| | | | | | |
| | | | | | |

**SUGGESTED MOUNTING CONFIGURATION
FOR HF1139 CASE STYLE, cr PIN CONNECTION, 50 OHM.**

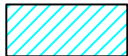


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- BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



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



DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

| UNLESS OTHERWISE SPECIFIED | INITIALS | | DATE |
|--|----------|------------|-----------|
| DIMENSIONS ARE IN INCHES TOLERANCES ON: 2 PL DECIMALS ± 3 PL DECIMALS ± .005 ANGLES ± FRACTIONS ± | DRAWN | DK (RAVON) | 29 NOV 05 |
| | CHECKED | RZ (RAVON) | 29 NOV 05 |
| | APPROVED | HH (RAVON) | 29 NOV 05 |



Mini-Circuits®

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Brooklyn NY 11235

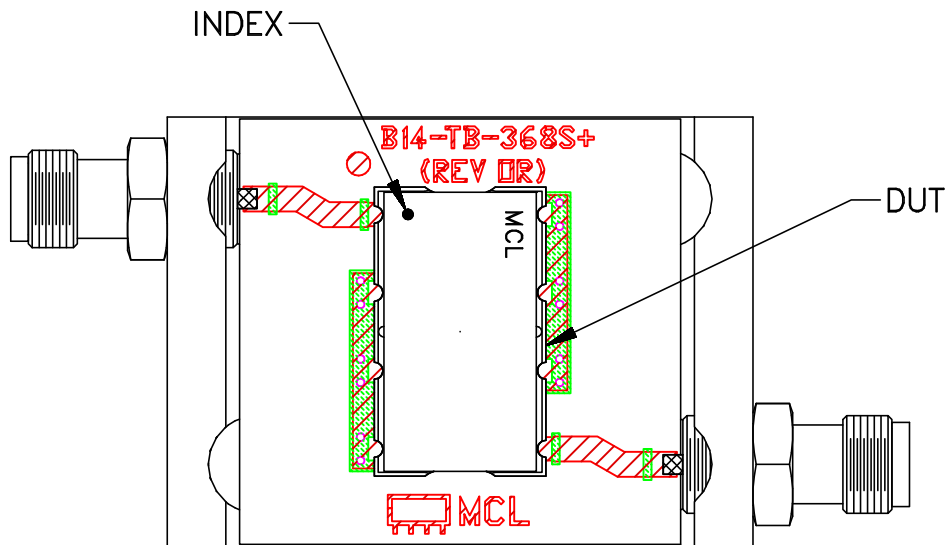
PL, cr, HF1139, SCLF, TB-368

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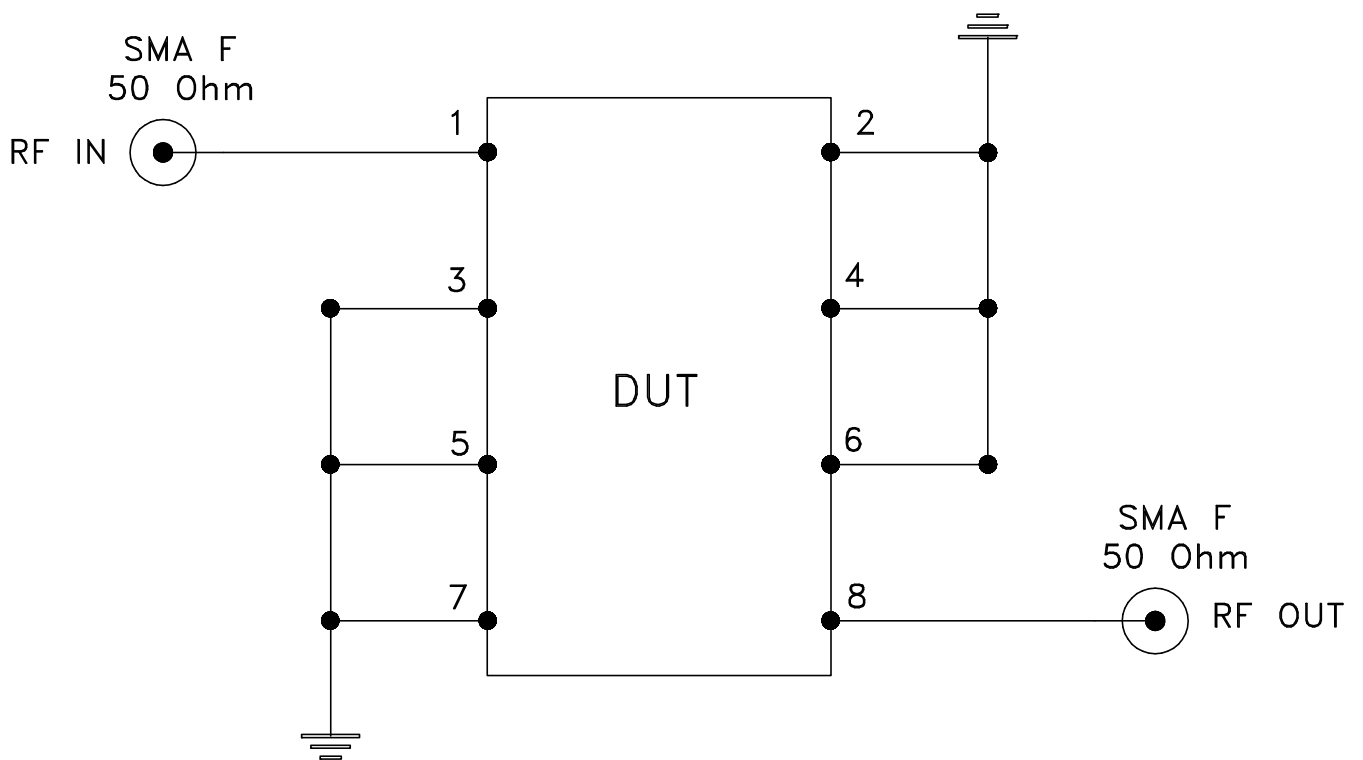
ASHEETA1.DWG REV:A DATE:01/12/95

| SIZE | CODE IDENT | DRAWING NO: | REV: |
|-------|------------|-------------|--------|
| A | 15542 | 98-PL-230 | OR |
| FILE: | 98PL230 | SCALE: | SHEET: |
| | | 4:1 | 1 OF 1 |

Evaluation Board and Circuit




TB-368



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: ROGERS R04350B 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 | -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 |