

Surface Mount Bandpass Filter

BPF-A535+

50Ω 460 to 610 MHz



Generic photo used for illustration purposes only

CASE STYLE: HQ1157

The Big Deal

- Sharp roll-off
- Low passband IL
- Miniature shielded package

Product Overview

The BPF-A535+ is a 50Ω bandpass filter in a shielded package (size of 0.365" x 1.360" x 0.35") fabricated using SMT technology. Covering 535 MHz ± 75 MHz band width, these units offer good matching within the passband and low IL in the passband. This unit uses a miniature high Q capacitors and wire welded inductors for high reliability. In addition It has consistent performance across temperature.

Key Features

| Feature | Advantages |
|---|---|
| Good VSWR, 1.25:1 typical over passband | Good return loss over the passband which provides better impedance matching when cascaded with other devices. |
| Sharp roll-off | Sharp roll-off helps in adjacent channel rejection and hence increased selectivity. |
| Shielded case | Reduced interference with the surrounding components. |

Notes

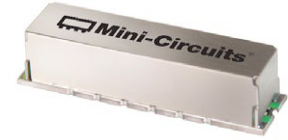
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CASE STYLE: HQ1157

Features

- Sharp roll-off
- Low passband IL
- Shielded case

Applications

- Biomedical telemetry devices
- Wireless microphones
- Television broadcasting

Electrical Specifications at 25°C

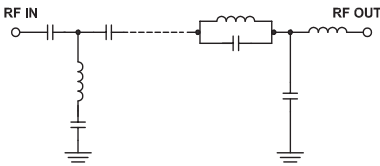
| Parameter | F# | Frequency (MHz) | Min. | Typ. | Max. | Unit | |
|------------------|------------------|-----------------|------------|------|------|------|----|
| Pass Band | Center Frequency | — | — | 535 | — | MHz | |
| | Insertion Loss | F1-F2 | 460 - 610 | — | 1.3 | 2.0 | dB |
| | VSWR | F1-F2 | 460 - 610 | — | 1.25 | 1.5 | :1 |
| Stop Band, Lower | Insertion Loss | DC-F3 | DC - 380 | 30 | 40 | — | dB |
| | VSWR | DC-F3 | DC - 380 | — | 20 | — | :1 |
| Stop Band, Upper | Insertion Loss | F4-F5 | 700 - 1600 | 20 | 30 | — | dB |
| | VSWR | F4-F5 | 700 - 1600 | — | 20 | — | :1 |

Maximum Ratings

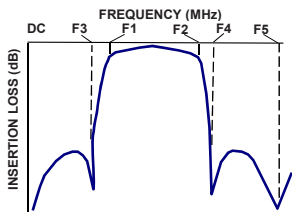
| | |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C |
| Storage Temperature | -55°C to 100°C |
| RF Power Input | 0.5 W Max. |

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

Functional Schematic



Typical Frequency Response

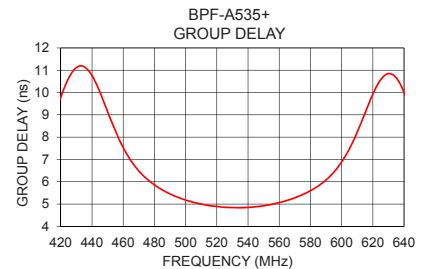
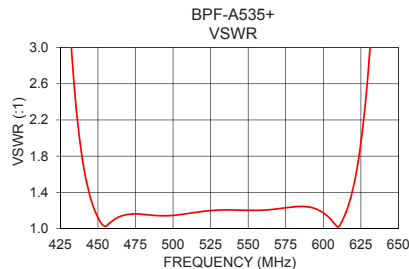
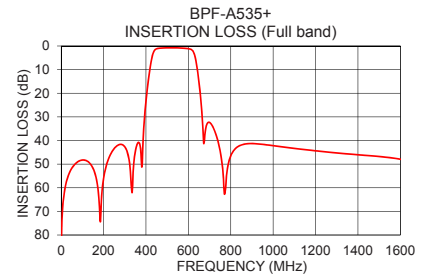
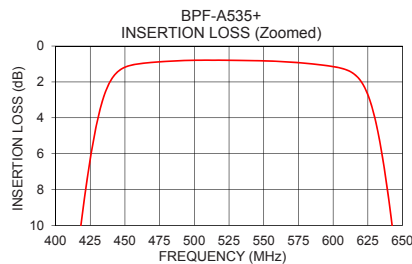


Typical Performance Data at 25°C

| Frequency (MHz) | Insertion Loss (dB) | VSWR (:1) | Frequency (MHz) | Group Delay (nsec) |
|-----------------|---------------------|-----------|-----------------|--------------------|
| 1.0 | 84.13 | 566.36 | 460 | 7.53 |
| 50.0 | 51.74 | 1151.52 | 470 | 6.49 |
| 100.0 | 48.26 | 933.46 | 480 | 5.86 |
| 380.0 | 51.11 | 41.88 | 490 | 5.45 |
| 392.5 | 30.98 | 32.72 | 500 | 5.18 |
| 395.0 | 28.19 | 30.71 | 510 | 5.00 |
| 402.5 | 21.26 | 24.46 | 520 | 4.89 |
| 432.5 | 3.41 | 2.95 | 525 | 4.86 |
| 437.5 | 2.27 | 2.03 | 530 | 4.84 |
| 460.0 | 0.99 | 1.09 | 535 | 4.84 |
| 535.0 | 0.80 | 1.21 | 540 | 4.85 |
| 610.0 | 1.34 | 1.02 | 550 | 4.92 |
| 625.0 | 2.71 | 1.94 | 560 | 5.07 |
| 630.0 | 3.99 | 2.76 | 570 | 5.28 |
| 655.0 | 19.19 | 10.96 | 580 | 5.60 |
| 665.0 | 29.64 | 12.86 | 590 | 6.08 |
| 700.0 | 32.35 | 15.96 | 595 | 6.43 |
| 1000.0 | 42.19 | 32.63 | 600 | 6.88 |
| 1300.0 | 45.28 | 27.29 | 605 | 7.48 |
| 1600.0 | 47.92 | 28.53 | 610 | 8.22 |

+RoHS Compliant

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



Notes

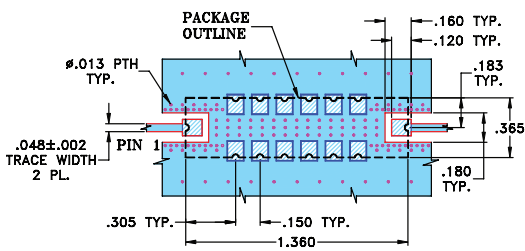
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Pad Connections



| | |
|--------|------------------------------|
| 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)

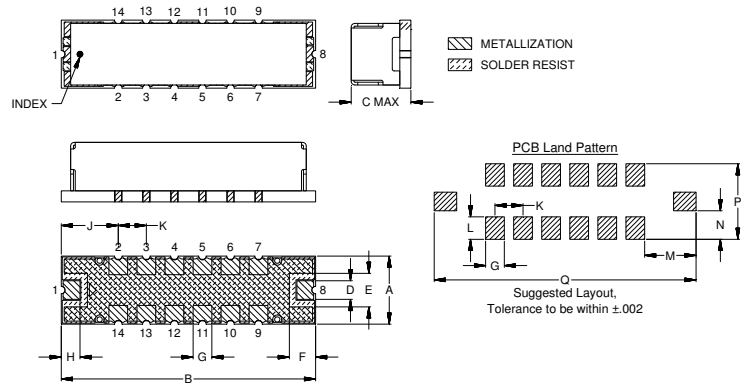


NOTE:

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

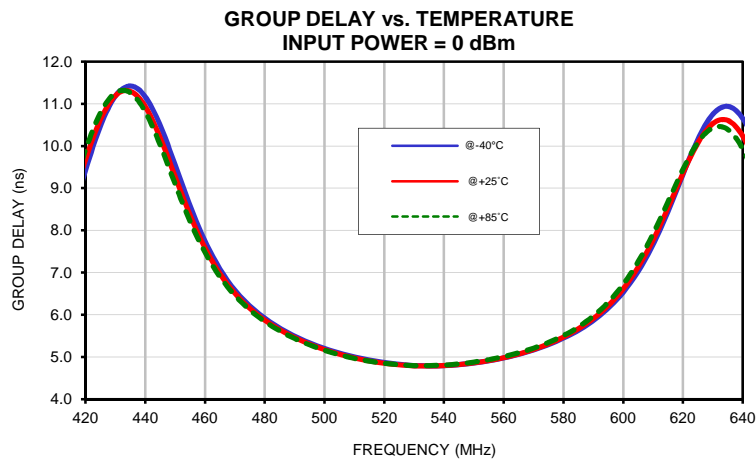
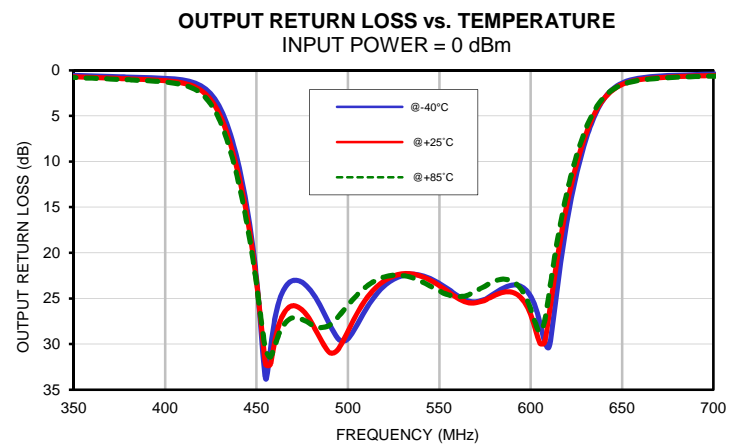
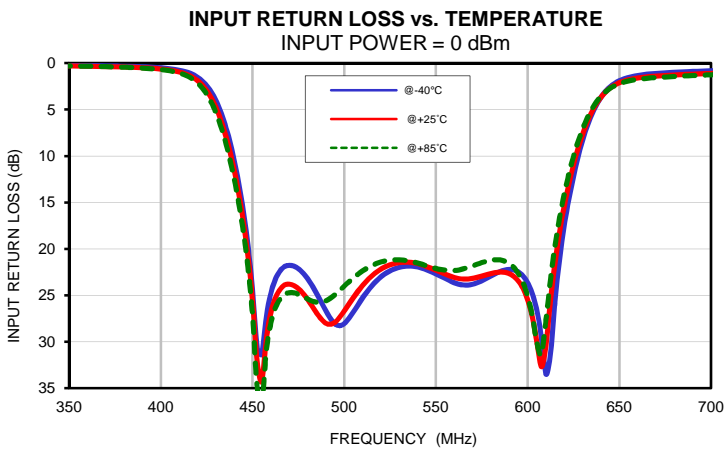
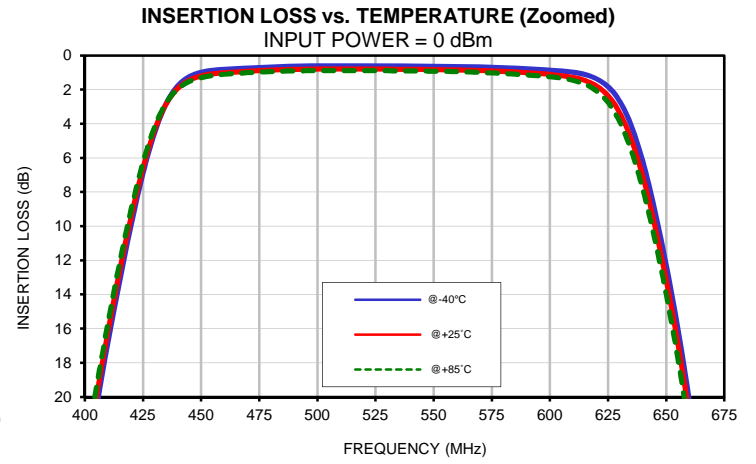
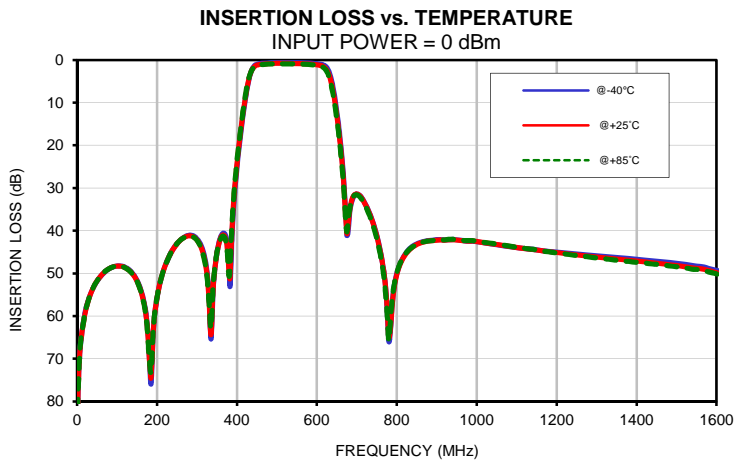
| FREQ. (MHz) | INSERTION LOSS | | | INPUT RETURN LOSS | | | OUTPUT RETURN LOSS | | |
|--------------------|----------------|--------|--------|-------------------|--------|--------|--------------------|--------|--------|
| | (dB) | | | (dB) | | | (dB) | | |
| | @-40°C | @+25°C | @+85°C | @-40°C | @+25°C | @+85°C | @-40°C | @+25°C | @+85°C |
| 1.0 | 84.44 | 85.44 | 84.36 | 0.10 | 0.10 | 0.10 | 0.05 | 0.05 | 0.05 |
| 5.0 | 71.17 | 71.24 | 71.18 | 0.17 | 0.17 | 0.17 | 0.03 | 0.04 | 0.04 |
| 10.0 | 65.01 | 65.20 | 65.08 | 0.17 | 0.17 | 0.17 | 0.05 | 0.05 | 0.05 |
| 50.0 | 51.84 | 51.74 | 51.75 | 0.09 | 0.11 | 0.10 | 0.05 | 0.07 | 0.07 |
| 100.0 | 48.28 | 48.33 | 48.27 | 0.06 | 0.08 | 0.08 | 0.12 | 0.18 | 0.20 |
| 150.0 | 51.64 | 51.82 | 51.90 | 0.04 | 0.08 | 0.08 | 0.24 | 0.32 | 0.36 |
| 200.0 | 55.80 | 55.68 | 55.60 | 0.05 | 0.09 | 0.10 | 0.32 | 0.41 | 0.45 |
| 250.0 | 43.01 | 43.04 | 43.02 | 0.08 | 0.12 | 0.13 | 0.31 | 0.43 | 0.48 |
| 300.0 | 41.87 | 42.14 | 42.26 | 0.13 | 0.18 | 0.19 | 0.34 | 0.47 | 0.54 |
| 380.0 | 47.90 | 49.66 | 50.62 | 0.33 | 0.41 | 0.44 | 0.74 | 0.94 | 1.04 |
| 390.0 | 36.87 | 35.40 | 34.48 | 0.39 | 0.49 | 0.53 | 0.80 | 1.03 | 1.14 |
| 392.5 | 33.25 | 32.06 | 31.30 | 0.41 | 0.52 | 0.56 | 0.82 | 1.05 | 1.17 |
| 395.0 | 30.19 | 29.18 | 28.52 | 0.44 | 0.55 | 0.59 | 0.84 | 1.08 | 1.21 |
| 402.5 | 22.80 | 22.04 | 21.51 | 0.54 | 0.68 | 0.75 | 0.92 | 1.19 | 1.34 |
| 405.0 | 20.69 | 19.97 | 19.46 | 0.59 | 0.75 | 0.83 | 0.96 | 1.24 | 1.41 |
| 430.0 | 4.52 | 4.37 | 4.18 | 3.99 | 4.72 | 5.30 | 4.09 | 4.91 | 5.56 |
| 432.5 | 3.57 | 3.52 | 3.39 | 5.14 | 5.98 | 6.66 | 5.18 | 6.10 | 6.83 |
| 437.5 | 2.21 | 2.31 | 2.30 | 8.33 | 9.33 | 10.20 | 8.21 | 9.25 | 10.11 |
| 450.0 | 0.98 | 1.20 | 1.29 | 24.41 | 25.50 | 27.05 | 22.74 | 23.06 | 23.42 |
| 460.0 | 0.81 | 1.01 | 1.10 | 24.79 | 26.88 | 28.01 | 27.30 | 29.71 | 30.22 |
| 535.0 | 0.61 | 0.81 | 0.90 | 21.84 | 21.43 | 21.29 | 22.35 | 22.31 | 22.71 |
| 610.0 | 0.99 | 1.28 | 1.46 | 33.48 | 30.35 | 27.61 | 30.32 | 26.97 | 24.52 |
| 625.0 | 1.82 | 2.36 | 2.75 | 12.16 | 10.94 | 10.05 | 11.46 | 10.35 | 9.42 |
| 630.0 | 2.68 | 3.35 | 3.87 | 8.29 | 7.64 | 7.06 | 7.71 | 7.10 | 6.48 |
| 632.5 | 3.31 | 4.05 | 4.65 | 6.77 | 6.33 | 5.90 | 6.23 | 5.81 | 5.33 |
| 655.0 | 15.98 | 16.85 | 17.72 | 1.53 | 1.78 | 1.92 | 1.05 | 1.22 | 1.27 |
| 660.0 | 20.26 | 21.15 | 22.07 | 1.32 | 1.59 | 1.74 | 0.85 | 1.02 | 1.08 |
| 665.0 | 25.37 | 26.34 | 27.37 | 1.19 | 1.47 | 1.63 | 0.72 | 0.90 | 0.96 |
| 667.5 | 28.45 | 29.49 | 30.62 | 1.14 | 1.42 | 1.59 | 0.68 | 0.85 | 0.92 |
| 670.0 | 32.11 | 33.24 | 34.45 | 1.10 | 1.38 | 1.55 | 0.64 | 0.81 | 0.88 |
| 700.0 | 31.40 | 31.40 | 31.58 | 0.83 | 1.11 | 1.25 | 0.43 | 0.58 | 0.64 |
| 725.0 | 34.42 | 34.52 | 34.90 | 0.69 | 0.95 | 1.06 | 0.34 | 0.48 | 0.54 |
| 750.0 | 41.20 | 41.33 | 41.91 | 0.60 | 0.83 | 0.92 | 0.27 | 0.42 | 0.48 |
| 775.0 | 56.85 | 56.77 | 58.49 | 0.55 | 0.75 | 0.82 | 0.23 | 0.37 | 0.44 |
| 800.0 | 50.01 | 50.28 | 49.84 | 0.51 | 0.69 | 0.75 | 0.20 | 0.34 | 0.41 |
| 825.0 | 44.90 | 45.11 | 45.02 | 0.49 | 0.65 | 0.71 | 0.17 | 0.32 | 0.38 |
| 850.0 | 43.06 | 43.24 | 43.23 | 0.48 | 0.62 | 0.68 | 0.15 | 0.30 | 0.37 |
| 870.0 | 42.43 | 42.58 | 42.56 | 0.47 | 0.61 | 0.66 | 0.13 | 0.29 | 0.36 |
| 900.0 | 42.12 | 42.25 | 42.17 | 0.46 | 0.60 | 0.66 | 0.12 | 0.28 | 0.35 |
| 920.0 | 42.16 | 42.22 | 42.17 | 0.45 | 0.59 | 0.66 | 0.11 | 0.28 | 0.35 |
| 950.0 | 42.13 | 42.17 | 42.07 | 0.43 | 0.59 | 0.66 | 0.09 | 0.27 | 0.34 |
| 980.0 | 42.44 | 42.46 | 42.35 | 0.42 | 0.59 | 0.68 | 0.08 | 0.27 | 0.34 |
| 1000.0 | 42.57 | 42.54 | 42.49 | 0.40 | 0.59 | 0.69 | 0.07 | 0.27 | 0.34 |
| 1050.0 | 43.28 | 43.21 | 43.14 | 0.37 | 0.59 | 0.72 | 0.06 | 0.27 | 0.34 |
| 1100.0 | 43.96 | 43.94 | 43.89 | 0.33 | 0.60 | 0.74 | 0.05 | 0.27 | 0.35 |
| 1150.0 | 44.48 | 44.50 | 44.50 | 0.30 | 0.60 | 0.75 | 0.05 | 0.28 | 0.36 |
| 1200.0 | 45.04 | 45.12 | 45.20 | 0.28 | 0.60 | 0.75 | 0.05 | 0.28 | 0.36 |
| 1250.0 | 45.46 | 45.67 | 45.81 | 0.26 | 0.59 | 0.74 | 0.05 | 0.29 | 0.37 |
| 1300.0 | 45.86 | 46.16 | 46.39 | 0.25 | 0.58 | 0.73 | 0.05 | 0.30 | 0.38 |
| 1320.0 | 46.07 | 46.38 | 46.59 | 0.25 | 0.58 | 0.72 | 0.05 | 0.30 | 0.38 |
| 1340.0 | 46.21 | 46.58 | 46.79 | 0.24 | 0.58 | 0.71 | 0.06 | 0.31 | 0.39 |
| 1360.0 | 46.36 | 46.75 | 46.99 | 0.24 | 0.57 | 0.70 | 0.05 | 0.31 | 0.39 |
| 1380.0 | 46.54 | 46.96 | 47.20 | 0.24 | 0.57 | 0.70 | 0.05 | 0.31 | 0.39 |
| 1400.0 | 46.71 | 47.10 | 47.39 | 0.24 | 0.57 | 0.69 | 0.05 | 0.31 | 0.39 |
| 1420.0 | 46.86 | 47.27 | 47.55 | 0.23 | 0.56 | 0.68 | 0.05 | 0.31 | 0.39 |
| 1440.0 | 47.03 | 47.53 | 47.82 | 0.23 | 0.56 | 0.68 | 0.05 | 0.31 | 0.40 |
| 1460.0 | 47.25 | 47.71 | 47.98 | 0.23 | 0.55 | 0.67 | 0.05 | 0.32 | 0.40 |
| 1500.0 | 47.65 | 48.15 | 48.43 | 0.23 | 0.55 | 0.66 | 0.06 | 0.32 | 0.40 |
| 1550.0 | 48.28 | 48.81 | 49.08 | 0.23 | 0.54 | 0.65 | 0.06 | 0.32 | 0.41 |
| 1600.0 | 49.28 | 49.81 | 50.13 | 0.23 | 0.53 | 0.64 | 0.07 | 0.33 | 0.41 |



Typical Performance Data

| FREQ. (MHz) | GROUP DELAY | | |
|--------------------|-------------|--------|--------|
| | (ns) | | |
| | @-40°C | @+25°C | @+85°C |
| 460.0 | 7.74 | 7.58 | 7.48 |
| 462.5 | 7.39 | 7.26 | 7.17 |
| 465.0 | 7.08 | 6.97 | 6.90 |
| 467.5 | 6.81 | 6.72 | 6.66 |
| 470.0 | 6.58 | 6.51 | 6.46 |
| 472.5 | 6.38 | 6.32 | 6.27 |
| 475.0 | 6.21 | 6.15 | 6.11 |
| 477.5 | 6.05 | 6.00 | 5.97 |
| 480.0 | 5.92 | 5.87 | 5.84 |
| 482.5 | 5.79 | 5.75 | 5.72 |
| 485.0 | 5.68 | 5.64 | 5.62 |
| 487.5 | 5.58 | 5.55 | 5.52 |
| 490.0 | 5.49 | 5.46 | 5.44 |
| 492.5 | 5.41 | 5.38 | 5.36 |
| 495.0 | 5.34 | 5.30 | 5.29 |
| 497.5 | 5.27 | 5.24 | 5.22 |
| 500.0 | 5.20 | 5.17 | 5.16 |
| 502.5 | 5.15 | 5.12 | 5.10 |
| 505.0 | 5.09 | 5.06 | 5.05 |
| 507.5 | 5.04 | 5.02 | 5.01 |
| 510.0 | 5.00 | 4.98 | 4.97 |
| 512.5 | 4.96 | 4.94 | 4.93 |
| 515.0 | 4.92 | 4.90 | 4.90 |
| 517.5 | 4.89 | 4.87 | 4.87 |
| 520.0 | 4.86 | 4.85 | 4.85 |
| 522.5 | 4.84 | 4.83 | 4.83 |
| 525.0 | 4.82 | 4.81 | 4.82 |
| 527.5 | 4.81 | 4.80 | 4.80 |
| 530.0 | 4.80 | 4.79 | 4.80 |
| 532.5 | 4.79 | 4.78 | 4.79 |
| 535.0 | 4.79 | 4.78 | 4.79 |
| 537.5 | 4.79 | 4.79 | 4.80 |
| 540.0 | 4.79 | 4.79 | 4.81 |
| 542.5 | 4.80 | 4.80 | 4.82 |
| 545.0 | 4.82 | 4.82 | 4.84 |
| 547.5 | 4.83 | 4.83 | 4.85 |
| 550.0 | 4.85 | 4.86 | 4.88 |
| 552.5 | 4.88 | 4.88 | 4.90 |
| 555.0 | 4.91 | 4.91 | 4.93 |
| 557.5 | 4.94 | 4.95 | 4.97 |
| 560.0 | 4.98 | 4.98 | 5.01 |
| 562.5 | 5.02 | 5.02 | 5.05 |
| 565.0 | 5.06 | 5.07 | 5.10 |
| 567.5 | 5.11 | 5.12 | 5.15 |
| 570.0 | 5.17 | 5.18 | 5.21 |
| 572.5 | 5.23 | 5.24 | 5.27 |
| 575.0 | 5.29 | 5.31 | 5.34 |
| 577.5 | 5.36 | 5.39 | 5.42 |
| 580.0 | 5.45 | 5.47 | 5.51 |
| 582.5 | 5.53 | 5.56 | 5.60 |
| 585.0 | 5.63 | 5.66 | 5.71 |
| 587.5 | 5.74 | 5.78 | 5.83 |
| 590.0 | 5.86 | 5.91 | 5.97 |
| 592.5 | 6.00 | 6.05 | 6.12 |
| 595.0 | 6.16 | 6.22 | 6.30 |
| 597.5 | 6.33 | 6.40 | 6.50 |
| 600.0 | 6.53 | 6.61 | 6.72 |
| 602.5 | 6.76 | 6.85 | 6.97 |
| 605.0 | 7.03 | 7.13 | 7.26 |
| 610.0 | 7.66 | 7.77 | 7.92 |

Typical Performance Curves

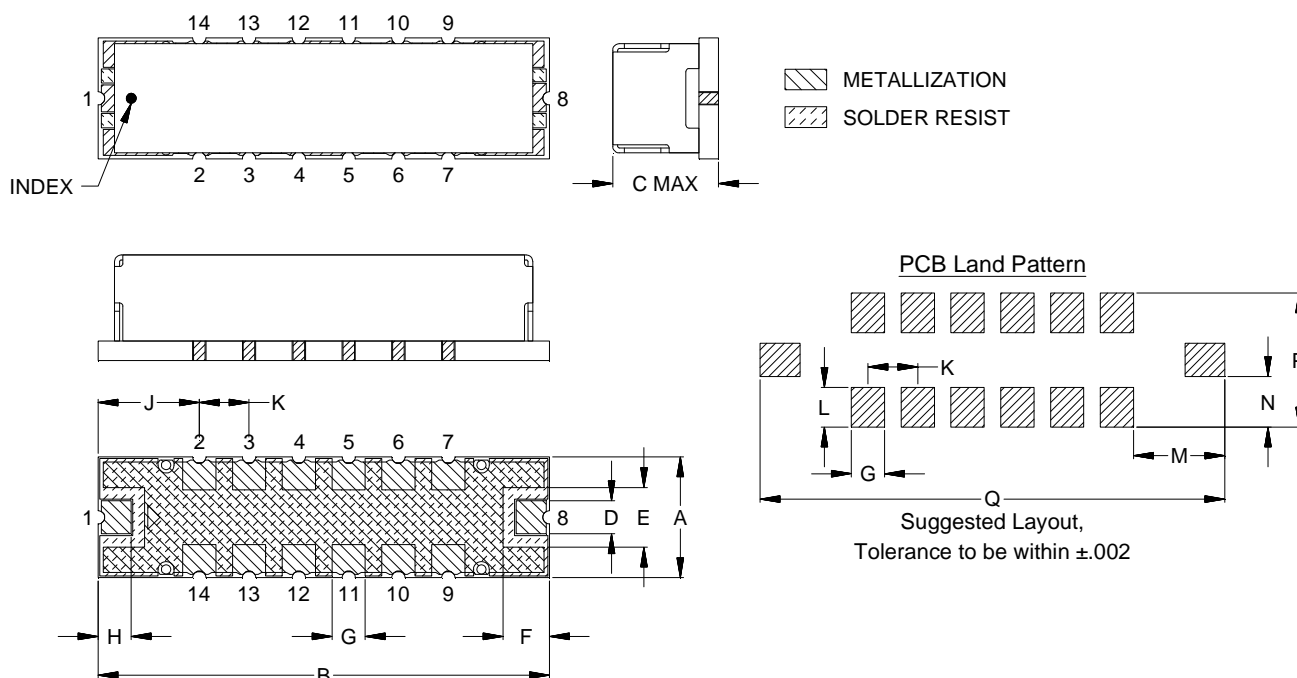


Case Style

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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ISO 9001 ISO 14001 CERTIFIED

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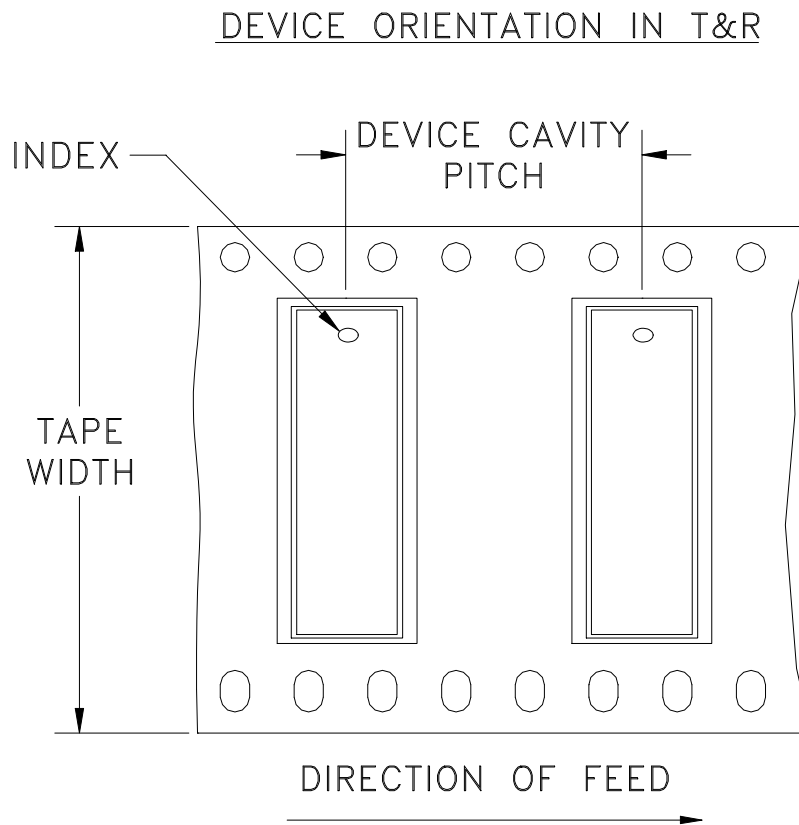
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



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

RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-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



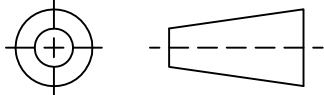
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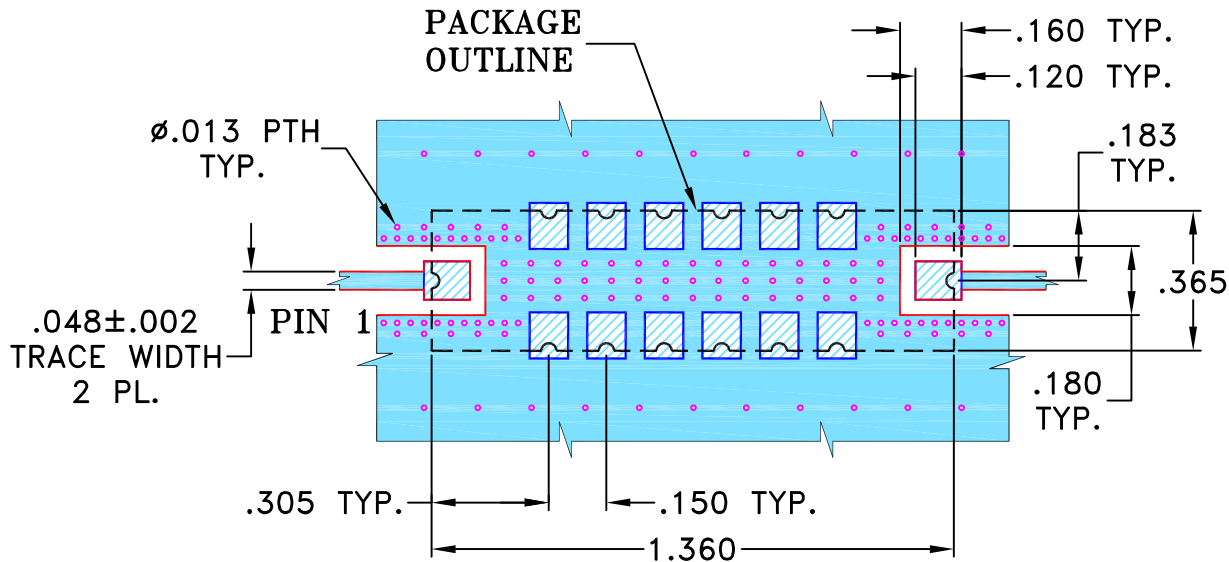
THIRD ANGLE PROJECTION



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 TOLERANCES ON: 2 PL DECIMALS ± 3 PL DECIMALS ± .005 ANGLES ± FRACTIONS ± | DRAWN | HB (RAVON) | 12 JUN 2008 |
| | CHECKED | RZ (RAVON) | 12 JUN 2008 |
| | APPROVED | HH (RAVON) | 12 JUN 2008 |

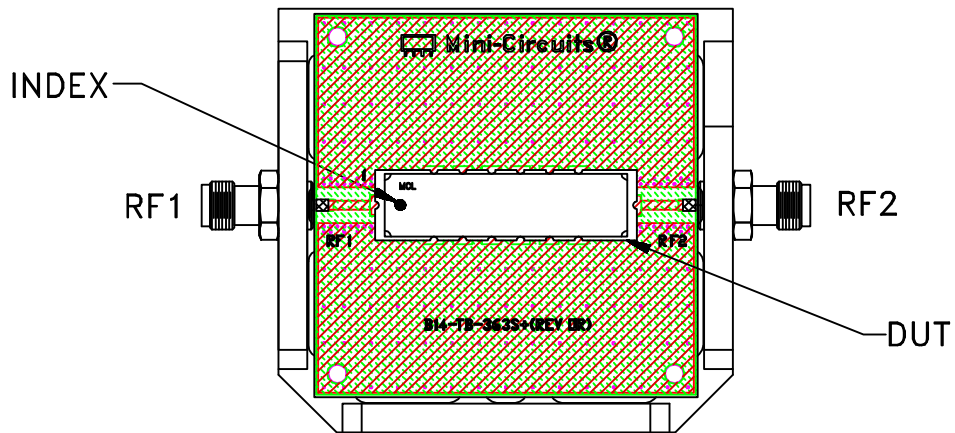
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 Brooklyn NY 11235

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

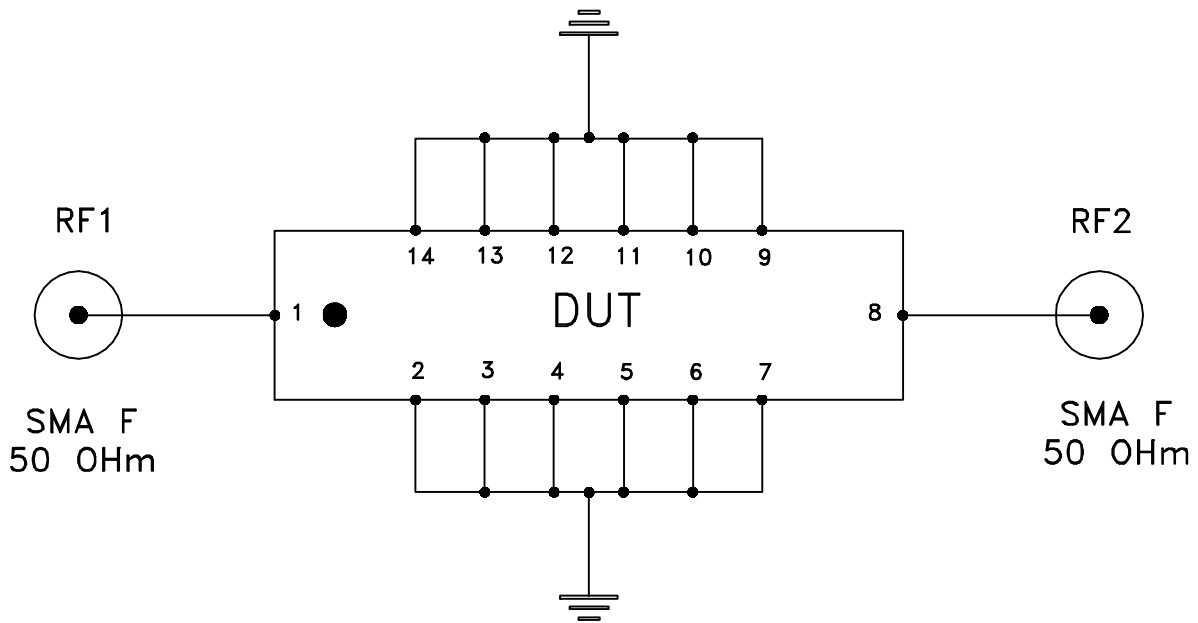
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| | | | |
|----------------------|----------------------------|---------------------------------|------------------|
| SIZE A | CODE IDENT 15542 | DRAWING NO: 98-PL-227 | REV: C |
| FILE: 98PL227 | SCALE: 2:1 | SHEET: 1 OF 1 | |

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®**

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 |