

Surface Mount Low Pass Filter

SALF-865+

50Ω DC to 865 MHz

Maximum Ratings

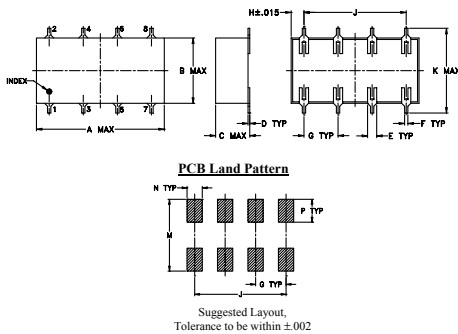
| | |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C |
| Storage Temperature | -55°C to 100°C |
| Power Input | 0.5W max. |

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

Pin Connections

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

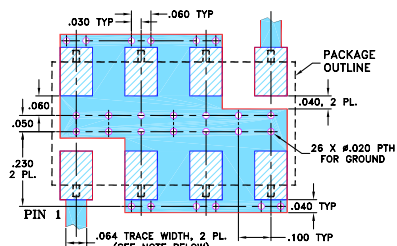
Outline Drawing



Outline Dimensions (inch/mm)

| A | B | C | D | E | F | G |
|-------|-------|-------|-------|------|------|-------|
| .75 | .38 | .20 | .010 | .050 | .020 | .200 |
| 19.05 | 9.65 | 5.08 | 0.25 | 1.27 | 0.51 | 5.08 |
| H | J | K | M | N | P | wt |
| .075 | .600 | .450 | .470 | .100 | .150 | grams |
| 1.91 | 15.24 | 11.43 | 11.94 | 2.54 | 3.81 | 1.6 |

Demo Board MCL P/N: TB-187+ Suggested PCB Layout (PL-049)



- NOTES:
- TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .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.
-

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

Features

- 7-section elliptic function
- excellent rejection

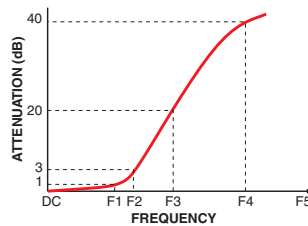
Applications

- defense communications
- receivers/transmitters
- harmonic rejection of VCOs

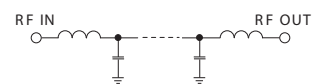
Electrical Specifications

| Parameter | F# | Frequency (MHz) | Min. | Typ. | Max. | Unit | |
|-----------|----------------|-----------------|-----------|------|------|------|----|
| Pass Band | Insertion Loss | DC-F1 | DC-865 | — | — | 1.0 | dB |
| | Freq. Cut-Off | F2 | 980 | — | 3.0 | — | dB |
| | VSWR | DC-F1 | DC-865 | — | 1.4 | — | :1 |
| Stop Band | Rejection Loss | F3-F4 | 1300-1400 | 20 | — | — | dB |
| | | F4-F5 | 1400-2550 | 35 | — | — | dB |
| | VSWR | F3-F5 | 1300-2550 | — | 18 | — | :1 |

Typical Frequency Response



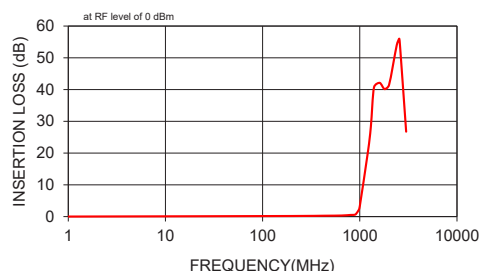
Electrical Schematic



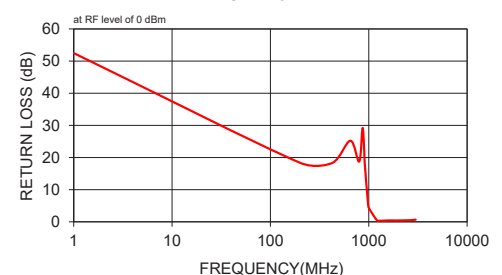
Typical Performance Data

| Frequency (MHz) | Insertion Loss (dB) | | Return Loss (dB) |
|-----------------|---------------------|----------|------------------|
| | \bar{x} | σ | |
| 1.00 | 0.02 | 0.00 | 52.50 |
| 200.00 | 0.19 | 0.01 | 18.38 |
| 425.00 | 0.28 | 0.01 | 18.30 |
| 650.00 | 0.35 | 0.00 | 25.24 |
| 800.00 | 0.52 | 0.01 | 18.75 |
| 865.00 | 0.54 | 0.01 | 29.17 |
| 900.00 | 0.66 | 0.04 | 21.87 |
| 910.00 | 0.75 | 0.06 | 18.31 |
| 980.00 | 2.19 | 0.25 | 6.10 |
| 1000.00 | 3.27 | 0.34 | 4.39 |
| 1210.00 | 20.21 | 0.60 | 0.48 |
| 1300.00 | 28.34 | 0.76 | 0.36 |
| 1400.00 | 40.68 | 1.67 | 0.37 |
| 1600.00 | 42.12 | 0.78 | 0.44 |
| 1800.00 | 40.14 | 0.36 | 0.43 |
| 2000.00 | 41.45 | 0.32 | 0.43 |
| 2400.00 | 53.98 | 1.66 | 0.49 |
| 2550.00 | 56.02 | 1.99 | 0.49 |
| 2600.00 | 53.42 | 1.94 | 0.47 |
| 3000.00 | 26.74 | 0.21 | 0.68 |

SALF-865+ INSERTION LOSS



SALF-865+ RETURN LOSS



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REV. E
M151107
SALF-865+
200818



Generic photo used for illustration purposes only

CASE STYLE: YY101

+RoHS Compliant

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

Surface Mount Low Pass Filter

SALF-865+

Typical Performance Data

| FREQ. (MHz) | INSERTION LOSS (dB) | | | INPUT RETURN LOSS (dB) | | | OUTPUT RETURN LOSS (dB) | | |
|----------------|------------------------|----------|----------|---------------------------|----------|----------|----------------------------|----------|----------|
| | @ -40° C | @ +25° C | @ +85° C | @ -40° C | @ +25° C | @ +85° C | @ -40° C | @ +25° C | @ +85° C |
| 1 | 0.02 | 0.03 | 0.11 | 52.92 | 49.76 | 37.88 | 53.85 | 50.31 | 37.73 |
| 10 | 0.02 | 0.03 | 0.12 | 41.55 | 40.53 | 35.91 | 41.91 | 40.68 | 35.71 |
| 20 | 0.03 | 0.04 | 0.13 | 36.05 | 35.12 | 32.92 | 36.26 | 35.21 | 32.58 |
| 30 | 0.04 | 0.05 | 0.14 | 32.75 | 31.91 | 30.48 | 32.94 | 32.02 | 30.07 |
| 40 | 0.04 | 0.06 | 0.15 | 30.39 | 29.68 | 28.63 | 30.45 | 29.69 | 28.11 |
| 50 | 0.05 | 0.07 | 0.16 | 28.45 | 27.90 | 27.13 | 28.45 | 27.86 | 26.53 |
| 100 | 0.09 | 0.11 | 0.21 | 22.28 | 22.46 | 22.68 | 22.25 | 22.38 | 21.96 |
| 110 | 0.10 | 0.12 | 0.21 | 21.42 | 21.74 | 22.15 | 21.39 | 21.64 | 21.40 |
| 115 | 0.10 | 0.13 | 0.22 | 21.03 | 21.42 | 21.92 | 21.00 | 21.31 | 21.15 |
| 120 | 0.11 | 0.13 | 0.22 | 20.66 | 21.09 | 21.69 | 20.62 | 21.00 | 20.91 |
| 125 | 0.11 | 0.14 | 0.23 | 20.32 | 20.80 | 21.49 | 20.26 | 20.69 | 20.68 |
| 130 | 0.11 | 0.14 | 0.23 | 19.97 | 20.52 | 21.30 | 19.92 | 20.40 | 20.47 |
| 135 | 0.12 | 0.15 | 0.23 | 19.67 | 20.27 | 21.13 | 19.58 | 20.14 | 20.27 |
| 140 | 0.12 | 0.15 | 0.24 | 19.36 | 20.01 | 20.96 | 19.27 | 19.87 | 20.08 |
| 145 | 0.13 | 0.15 | 0.24 | 19.06 | 19.77 | 20.80 | 18.96 | 19.62 | 19.91 |
| 150 | 0.13 | 0.16 | 0.24 | 18.78 | 19.54 | 20.65 | 18.67 | 19.39 | 19.73 |
| 155 | 0.13 | 0.16 | 0.25 | 18.53 | 19.34 | 20.53 | 18.41 | 19.18 | 19.59 |
| 160 | 0.14 | 0.17 | 0.25 | 18.27 | 19.14 | 20.39 | 18.15 | 18.97 | 19.44 |
| 165 | 0.14 | 0.17 | 0.25 | 18.04 | 18.95 | 20.27 | 17.91 | 18.77 | 19.30 |
| 170 | 0.15 | 0.17 | 0.26 | 17.80 | 18.76 | 20.15 | 17.68 | 18.59 | 19.16 |
| 175 | 0.15 | 0.18 | 0.26 | 17.59 | 18.59 | 20.04 | 17.48 | 18.43 | 19.05 |
| 180 | 0.16 | 0.18 | 0.27 | 17.40 | 18.42 | 19.94 | 17.29 | 18.27 | 18.94 |
| 185 | 0.17 | 0.19 | 0.27 | 17.21 | 18.27 | 19.83 | 17.12 | 18.13 | 18.84 |
| 190 | 0.17 | 0.20 | 0.28 | 17.03 | 18.12 | 19.71 | 16.96 | 17.99 | 18.74 |
| 195 | 0.18 | 0.20 | 0.28 | 16.87 | 17.98 | 19.62 | 16.81 | 17.86 | 18.64 |
| 200 | 0.18 | 0.21 | 0.28 | 16.73 | 17.86 | 19.54 | 16.68 | 17.74 | 18.56 |
| 300 | 0.22 | 0.27 | 0.35 | 16.03 | 16.86 | 18.67 | 16.01 | 16.76 | 17.52 |
| 400 | 0.20 | 0.27 | 0.39 | 18.41 | 18.73 | 20.13 | 18.33 | 18.56 | 18.61 |
| 500 | 0.17 | 0.26 | 0.40 | 25.84 | 26.69 | 28.65 | 25.56 | 26.18 | 24.92 |
| 600 | 0.20 | 0.31 | 0.47 | 27.17 | 25.99 | 25.23 | 27.30 | 26.23 | 27.28 |
| 700 | 0.32 | 0.45 | 0.62 | 17.71 | 17.46 | 17.64 | 17.67 | 17.43 | 17.97 |
| 800 | 0.39 | 0.53 | 0.72 | 17.53 | 18.10 | 18.97 | 17.42 | 17.86 | 18.39 |
| 900 | 0.52 | 0.74 | 1.02 | 19.13 | 17.34 | 16.08 | 18.47 | 16.86 | 16.64 |
| 1000 | 3.42 | 3.89 | 4.38 | 3.70 | 3.60 | 3.54 | 3.68 | 3.61 | 3.84 |
| 1100 | 10.80 | 11.26 | 11.79 | 0.78 | 0.93 | 1.04 | 0.79 | 0.96 | 1.22 |
| 1200 | 18.99 | 19.40 | 19.92 | 0.34 | 0.51 | 0.65 | 0.36 | 0.55 | 0.76 |
| 1300 | 27.66 | 28.11 | 28.67 | 0.25 | 0.43 | 0.58 | 0.28 | 0.47 | 0.66 |
| 1400 | 39.32 | 40.10 | 40.92 | 0.23 | 0.41 | 0.56 | 0.26 | 0.45 | 0.63 |
| 1500 | 52.13 | 50.85 | 50.01 | 0.23 | 0.40 | 0.56 | 0.25 | 0.45 | 0.62 |
| 1600 | 41.72 | 41.57 | 41.48 | 0.22 | 0.39 | 0.55 | 0.24 | 0.43 | 0.60 |
| 1700 | 39.97 | 40.09 | 40.02 | 0.22 | 0.39 | 0.55 | 0.22 | 0.42 | 0.60 |
| 1800 | 39.72 | 39.87 | 40.04 | 0.20 | 0.36 | 0.53 | 0.20 | 0.40 | 0.58 |
| 1900 | 40.81 | 41.22 | 41.58 | 0.19 | 0.35 | 0.51 | 0.19 | 0.38 | 0.57 |
| 2000 | 41.66 | 42.11 | 42.49 | 0.17 | 0.33 | 0.49 | 0.17 | 0.36 | 0.56 |
| 2100 | 43.58 | 44.25 | 44.83 | 0.15 | 0.32 | 0.48 | 0.15 | 0.35 | 0.55 |
| 2200 | 44.80 | 45.96 | 46.99 | 0.15 | 0.32 | 0.48 | 0.15 | 0.35 | 0.57 |
| 2300 | 50.84 | 52.95 | 55.28 | 0.15 | 0.32 | 0.48 | 0.16 | 0.36 | 0.60 |
| 2400 | 53.21 | 55.44 | 59.81 | 0.16 | 0.34 | 0.51 | 0.17 | 0.38 | 0.64 |
| 2500 | 54.04 | 50.44 | 48.27 | 0.17 | 0.35 | 0.53 | 0.20 | 0.41 | 0.70 |
| 2600 | 52.32 | 50.02 | 49.55 | 0.21 | 0.40 | 0.59 | 0.23 | 0.46 | 0.78 |
| 2700 | 52.14 | 50.69 | 49.05 | 0.23 | 0.44 | 0.66 | 0.28 | 0.52 | 0.89 |
| 2800 | 23.33 | 24.58 | 25.65 | 0.66 | 0.73 | 0.86 | 0.85 | 0.91 | 1.17 |
| 2900 | 28.97 | 28.41 | 27.94 | 0.33 | 0.56 | 0.82 | 0.39 | 0.67 | 1.11 |
| 3000 | 27.89 | 27.44 | 26.92 | 0.38 | 0.62 | 0.90 | 0.45 | 0.73 | 1.21 |

REV. X2
SALF-865+
101025
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Surface Mount Low Pass Filter

SALF-865+

Typical Performance Data

| FREQ. (MHz) | GROUP DELAY (nsec) | | |
|----------------|-----------------------|----------|----------|
| | @ -40° C | @ +25° C | @ +85° C |
| 0 | 0.37 | 0.55 | 0.46 |
| 10 | 0.55 | 0.55 | 0.55 |
| 11 | 0.55 | 0.55 | 0.55 |
| 12 | 0.54 | 0.55 | 0.55 |
| 13 | 0.54 | 0.55 | 0.55 |
| 14 | 0.54 | 0.55 | 0.55 |
| 15 | 0.54 | 0.54 | 0.55 |
| 16 | 0.54 | 0.54 | 0.54 |
| 17 | 0.54 | 0.54 | 0.54 |
| 18 | 0.54 | 0.54 | 0.54 |
| 19 | 0.54 | 0.54 | 0.54 |
| 20 | 0.54 | 0.54 | 0.54 |
| 21 | 0.54 | 0.54 | 0.54 |
| 22 | 0.54 | 0.54 | 0.54 |
| 23 | 0.54 | 0.54 | 0.54 |
| 24 | 0.54 | 0.54 | 0.54 |
| 25 | 0.54 | 0.54 | 0.54 |
| 26 | 0.54 | 0.54 | 0.54 |
| 27 | 0.54 | 0.54 | 0.54 |
| 28 | 0.54 | 0.54 | 0.54 |
| 29 | 0.54 | 0.54 | 0.54 |
| 30 | 0.54 | 0.54 | 0.54 |
| 32 | 0.54 | 0.53 | 0.53 |
| 35 | 0.54 | 0.54 | 0.53 |
| 40 | 0.54 | 0.53 | 0.53 |
| 45 | 0.54 | 0.53 | 0.53 |
| 50 | 0.53 | 0.53 | 0.53 |
| 55 | 0.53 | 0.53 | 0.53 |
| 60 | 0.53 | 0.53 | 0.53 |
| 65 | 0.53 | 0.53 | 0.53 |
| 70 | 0.53 | 0.53 | 0.53 |
| 75 | 0.53 | 0.53 | 0.53 |
| 80 | 0.53 | 0.53 | 0.53 |
| 85 | 0.53 | 0.53 | 0.52 |
| 90 | 0.53 | 0.53 | 0.53 |
| 95 | 0.53 | 0.53 | 0.53 |
| 100 | 0.53 | 0.53 | 0.52 |
| 110 | 0.53 | 0.53 | 0.52 |
| 120 | 0.53 | 0.52 | 0.52 |
| 130 | 0.53 | 0.53 | 0.52 |
| 140 | 0.53 | 0.53 | 0.53 |
| 150 | 0.53 | 0.53 | 0.53 |
| 160 | 0.53 | 0.53 | 0.53 |
| 170 | 0.53 | 0.53 | 0.53 |
| 180 | 0.53 | 0.53 | 0.53 |
| 190 | 0.52 | 0.52 | 0.53 |
| 200 | 0.52 | 0.52 | 0.52 |
| 300 | 0.53 | 0.53 | 0.54 |
| 400 | 0.57 | 0.57 | 0.57 |
| 500 | 0.63 | 0.63 | 0.63 |
| 600 | 0.70 | 0.70 | 0.70 |
| 700 | 0.78 | 0.77 | 0.78 |
| 800 | 0.94 | 0.94 | 0.95 |
| 900 | 1.40 | 1.42 | 1.43 |

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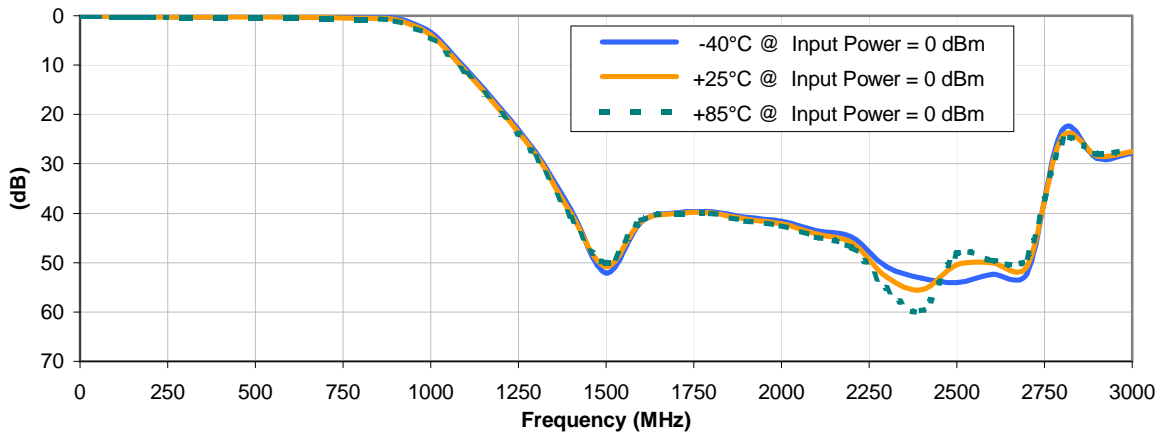


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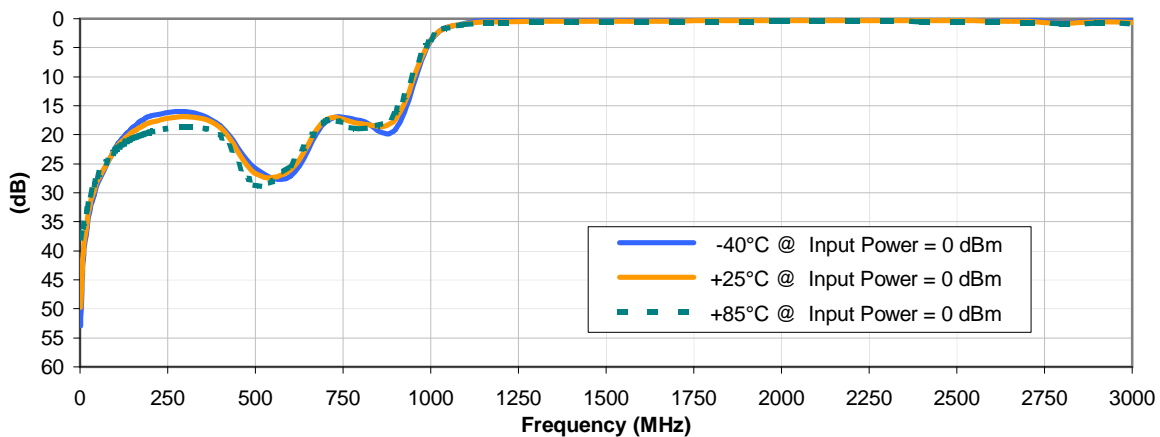


Typical Performance Curves

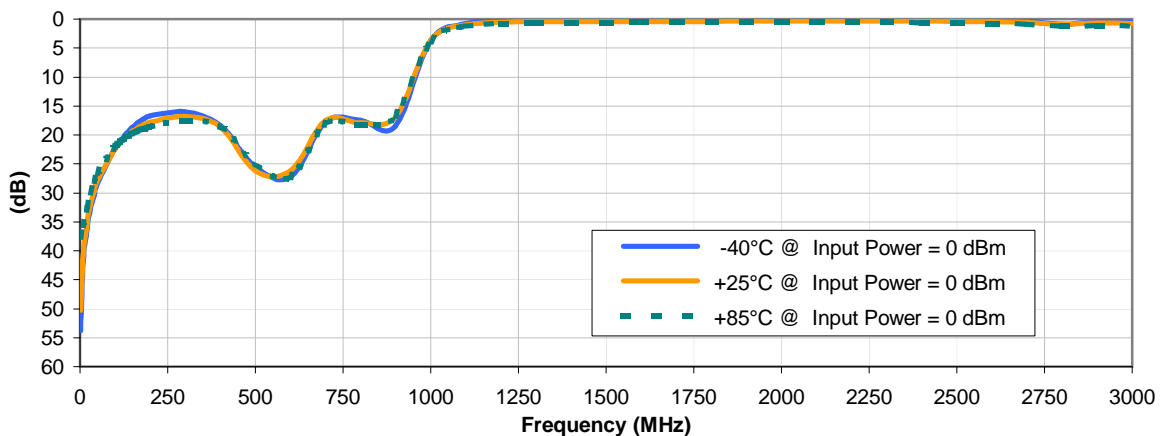
INSERTION LOSS vs. TEMPERATURE



INPUT RETURN LOSS vs. TEMPERATURE



OUTPUT RETURN LOSS vs. TEMPERATURE



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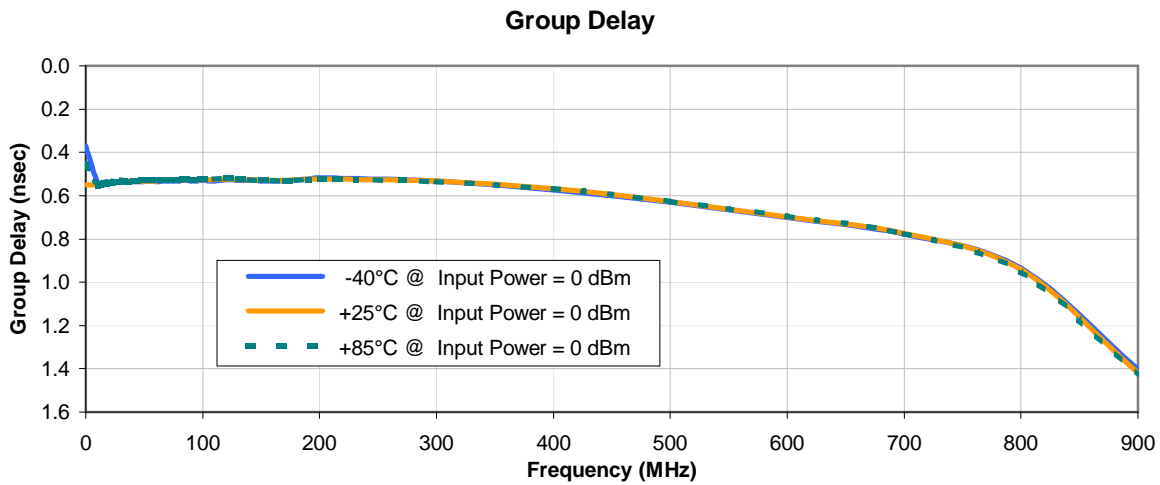
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Typical Performance Curves



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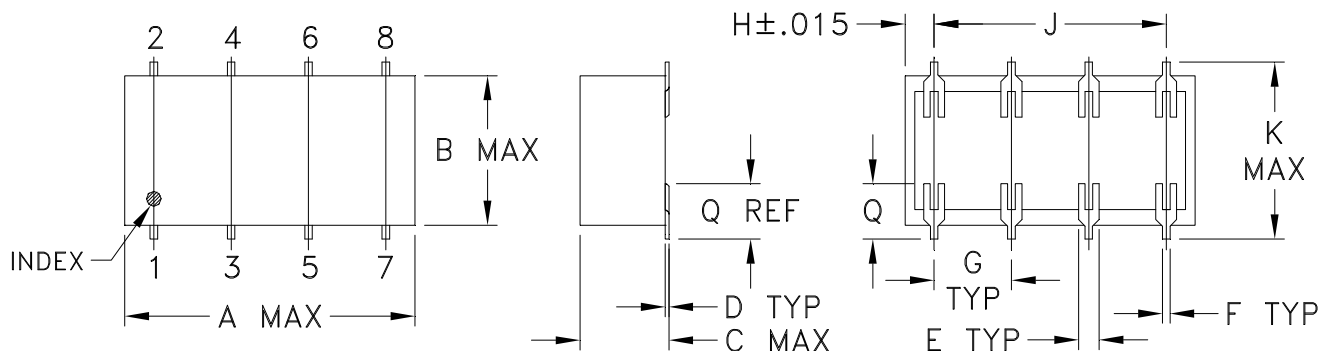


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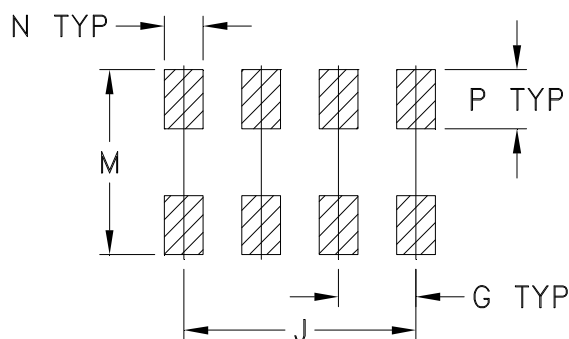


Outline Dimensions

YY101
YY109
YY161



PCB Land Pattern



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

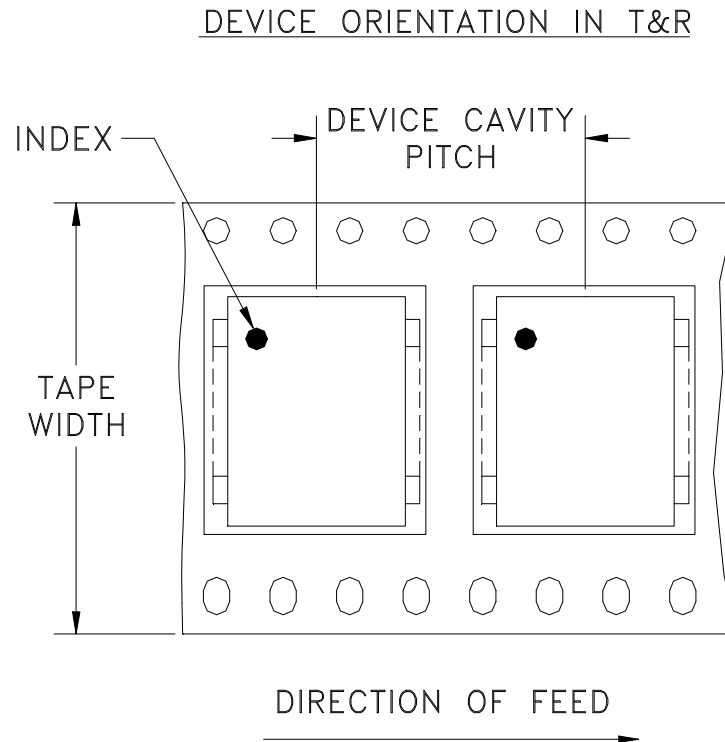
| CASE# | A | B | C | D | E | F | G | H | J | K | L | M | N | P | Q | WT. GRAMS |
|--------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|----------------|-----------------|-----------------|---------------|-----------------|----------------|----------------|----------------|-----------|
| YY101* | | | .20 (5.08) | | | | | | | .450 (11.43) | -- (11.94) | .470 (11.94) | | | | 1.6 |
| YY109* | .75 (19.05) | .38 (9.65) | .20 (5.08) | .010 (0.25) | .050 (1.27) | .020 (0.51) | .200 (5.08) | .075 (1.91) | .600 (15.24) | .720 (18.29) | -- (18.80) | .740 (18.80) | .100 (2.54) | .150 (3.81) | .148 (3.76) | 1.6 |
| YY161 | | | .28 (7.11) | | | | | | | .450 (11.43) | -- (11.94) | .470 (11.94) | | | | 1.6 |

Dimensions are in inches (mm). Tolerances: 2 Pl. $\pm .01$; 3 Pl. $\pm .005$

Notes:

- Case material: Plastic.
- Termination finish:
For RoHS Case Styles: Tin plate over Nickel plate.
For RoHS-5 Case Styles: Tin-Lead plate.
- Special Tolerances: Termination thickness $\pm .003$ inch.
- * Denotes: For SCM mixers, long termination version (case YY109) is available upon request, consult factory. To order short termination version (case YY101) add -NL suffix.

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



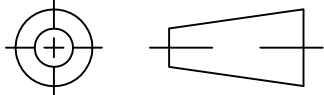
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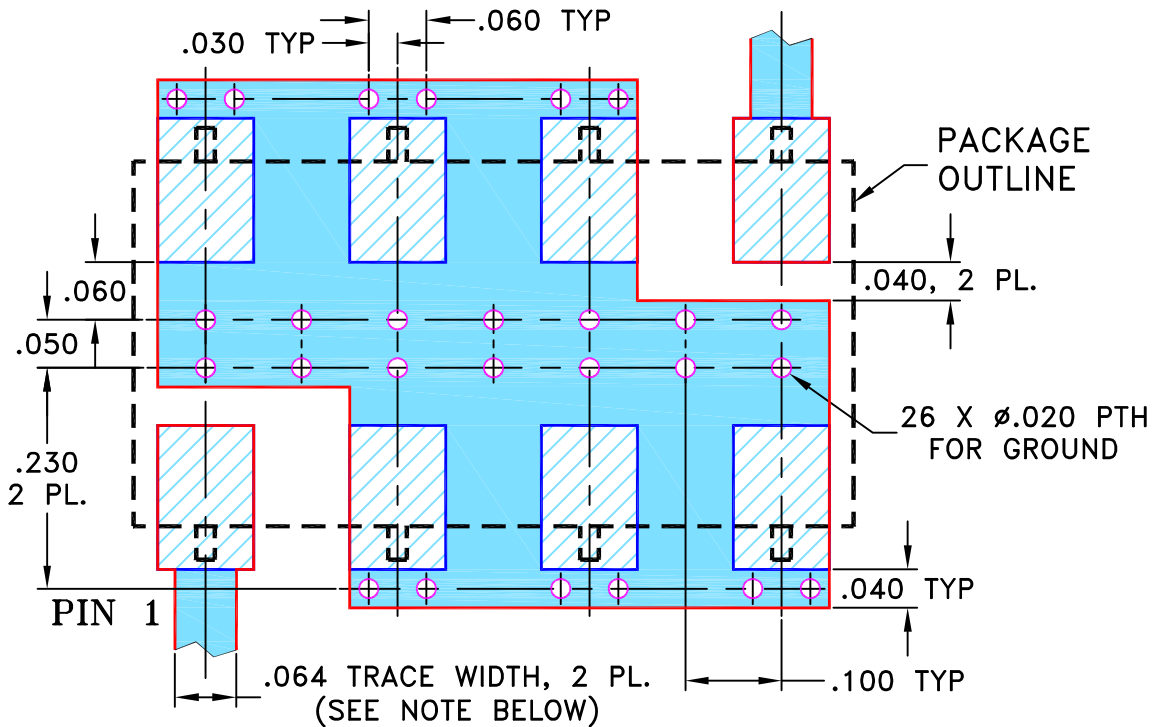
THIRD ANGLE PROJECTION



REVISIONS

| REV | ECN No. | DESCRIPTION | DATE | DR | AUTH |
|-----|---------|---------------------------------|----------|-----|------|
| OR | M81561 | NEW RELEASE | 09/11/02 | GF | ABD |
| A | M101145 | ADDED YY101 CASE STYLE & NOTE 2 | 10/07/05 | MMG | ABD |
| B | M102713 | ADDED "...WITH SMOBC" | 01/16/06 | GT | IL |
| C | M165986 | TB-187+ (WAS TB-187) | 02/01/18 | ITG | IL |

SUGGESTED MOUNTING CONFIGURATION FOR
YY101/YY161 CASE STYLE, "cr" PIN CONNECTION



- NOTES:** 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .030" ± .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

| UNLESS OTHERWISE SPECIFIED | INITIALS | | DATE |
|--|----------|-----|----------|
| DIMENSIONS ARE IN INCHES TOLERANCES ON: 2 PL DECIMALS ± 3 PL DECIMALS ± .005 ANGLES ± FRACTIONS ± | DRAWN | GF | 08/12/02 |
| | CHECKED | AV | 09/11/02 |
| | APPROVED | ABD | 09/11/02 |



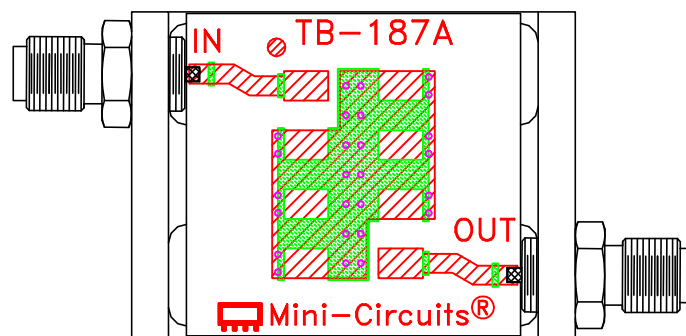
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PL, cr, YY101/YY161, SCLF, TB-187+

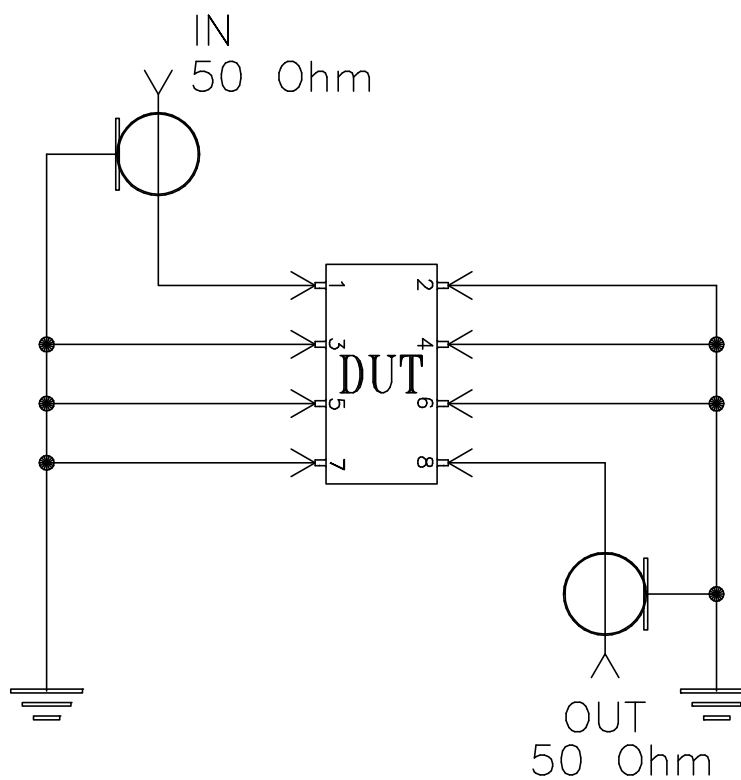
| | | | |
|------------------|---------------------|--------------------------|-----------|
| SIZE A | CODE IDENT 15542 | DRAWING NO: 98-PL-049 | REV: C |
| FILE: 98PL049 | SCALE: 5:1 | SHEET: 1 OF 1 | |

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Evaluation Board and Circuit




TB-187+



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers 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 | -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 |