

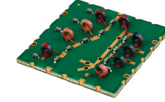
NON-CATALOG

Surface Mount

Diplexer

DPB4254-75+

**75Ω DC to 1220 MHz
(DC-42, 54-1220 MHz)**



CASE STYLE: PA2002

The Big Deal

- Low insertion loss, 0.8dB Typ.
- High rejection, > 45dB
- Very good return loss, 22dB Typ.
- 75Ω Impedance
- Used in DOCSIS 3.1 standard

Product Overview

DPB4254-75+ is a high performance diplexer with the lowpass port at DC-42 MHz and highpass port at 54-1220 MHz. Excellent return loss combined with high out of channel rejection makes it a ideal component in cable TV and multiband radio systems.

Key Features

| Feature | Advantages |
|--|---|
| Low passband insertion loss | Passband insertion loss 1dB ensures low signal loss through both the channels. |
| Excellent Stopband rejection | Co-channel rejection of 45dB ensures unwanted spurious are eliminated. |
| Excellent return loss at DC-42 and 54-1220 MHz | This makes signal transmission with very less reflection and well-matched with the adjacent component used in the system. |

Notes

- A. 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.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
C. 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

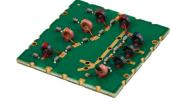


Surface Mount Diplexer

NON-CATALOG

DPB4254-75+

75Ω DC to 1220 MHz (DC-42, 54-1220 MHz)



CASE STYLE: PA2002

Maximum Ratings

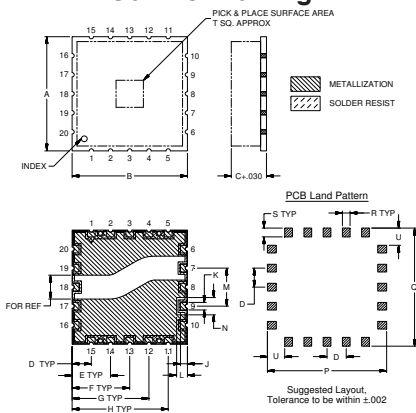
| | |
|-----------------------|----------------|
| Operating Temperature | -40° to 85°C |
| Storage Temperature | -55°C to 100°C |
| RF Power Input | 27dBm Max. |

Permanent damage may occur if any of these limits are exceeded. These ratings are not intended for continuous normal operation

Pin Connections

| | |
|----------------|-------------------|
| HIGH PASS PORT | 7 |
| LOW PASS PORT | 9 |
| COMMON PORT | 18 |
| GROUND | 1-6,8,10-17,19,20 |

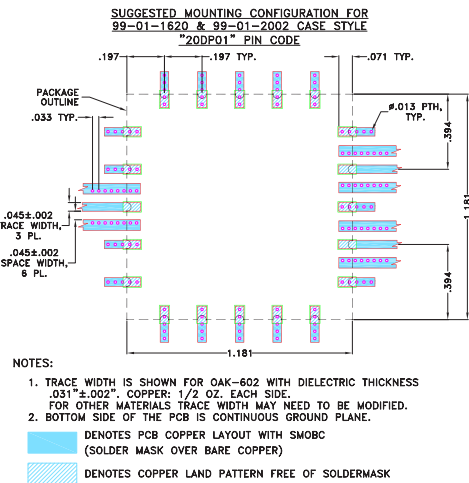
Outline Drawing



Outline Dimensions (inch/mm)

| | | | | | | | | | |
|-------|-------|------|-------|-------|-------|-------|-------|------|-------|
| A | B | C | D | E | F | G | H | J | K |
| 1.181 | 1.181 | .300 | .197 | .394 | .591 | .787 | .984 | .071 | .079 |
| 30.00 | 30.00 | 7.62 | 5.00 | 10.00 | 15.00 | 20.00 | 25.00 | 1.80 | 2.00 |
| L | M | N | P | Q | R | S | T | U | Wt. |
| .111 | .394 | .179 | 1.221 | 1.221 | .079 | .091 | .280 | .178 | grams |
| 2.82 | 10.00 | 4.54 | 31.01 | 31.01 | 2.01 | 2.31 | 7.11 | 4.52 | 3.8 |

Demo Board MCL P/N: TB-786+ Suggested PCB Layout (PL-435)



Features

- Low insertion loss
- 75Ω Impedance
- Excellent return loss
- High rejection

Applications

- Cable TV systems (DOCSIS 3.1 standard)
- Multiband radio systems

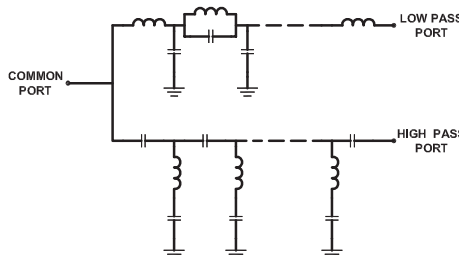
Electrical Specifications at 25°C

| Parameter | Port | Frequency (MHz) | Min. | Typ. | Max. | Unit | |
|---------------------|----------------|-----------------|---------|------|------|------|----|
| Pass Band | Insertion Loss | Low Pass | DC-42 | - | 0.8 | 1.5 | dB |
| | | High Pass | 54-1220 | - | 0.8 | 1.5 | |
| | Return Loss | Low Pass | DC-42 | 18 | 22 | - | dB |
| | | High Pass | 54-1220 | 17 | 22 | - | |
| Common | | DC-42 | 18 | 22 | - | | |
| Stop Band Isolation | Low Pass | 54-700 | 45 | 50 | - | dB | |
| | High Pass | 700-1220 | 43 | 45 | - | | |
| | | DC-42 | 45 | 50 | - | | |

Typical Performance Data at 25°C

| FREQUENCY (MHz) | INSERTION LOSS (dB) | | | RETURN LOSS (dB) | |
|-----------------|---------------------|----------------|-------------|------------------|----------------|
| | Low Pass Port | High Pass Port | Common Port | Low Pass Port | High Pass Port |
| 1.0 | 0.04 | 76.19 | 46.46 | 47.21 | 0.02 |
| 10.0 | 0.10 | 58.76 | 31.99 | 34.11 | 0.03 |
| 40.0 | 0.55 | 68.16 | 28.57 | 26.99 | 0.58 |
| 42.0 | 0.73 | 77.07 | 26.13 | 24.80 | 0.70 |
| 44.5 | 1.37 | 51.98 | 16.71 | 17.61 | 0.89 |
| 45.5 | 2.57 | 40.72 | 9.25 | 8.78 | 1.01 |
| 46.0 | 3.86 | 33.91 | 6.59 | 5.82 | 1.09 |
| 47.0 | 8.60 | 19.25 | 3.73 | 2.37 | 1.45 |
| 47.5 | 12.18 | 13.40 | 3.49 | 1.57 | 1.93 |
| 48.0 | 16.74 | 8.74 | 4.15 | 1.12 | 2.96 |
| 49.5 | 34.02 | 2.28 | 13.39 | 0.65 | 12.04 |
| 50.0 | 37.91 | 1.73 | 18.70 | 0.59 | 16.67 |
| 54.0 | 70.61 | 0.78 | 30.05 | 0.40 | 27.62 |
| 55.0 | 72.01 | 0.71 | 30.35 | 0.38 | 27.25 |
| 60.0 | 64.95 | 0.51 | 28.76 | 0.34 | 25.46 |
| 100.0 | 68.36 | 0.29 | 32.99 | 0.27 | 32.67 |
| 250.0 | 64.30 | 0.28 | 28.44 | 0.17 | 28.74 |
| 300.0 | 62.66 | 0.29 | 26.35 | 0.16 | 26.71 |
| 500.0 | 57.58 | 0.35 | 21.76 | 0.15 | 22.03 |
| 700.0 | 55.33 | 0.42 | 19.69 | 0.19 | 20.30 |
| 1000.0 | 50.67 | 0.49 | 20.87 | 0.32 | 22.66 |
| 1220.0 | 48.51 | 0.67 | 26.83 | 0.44 | 31.42 |

Functional Schematic

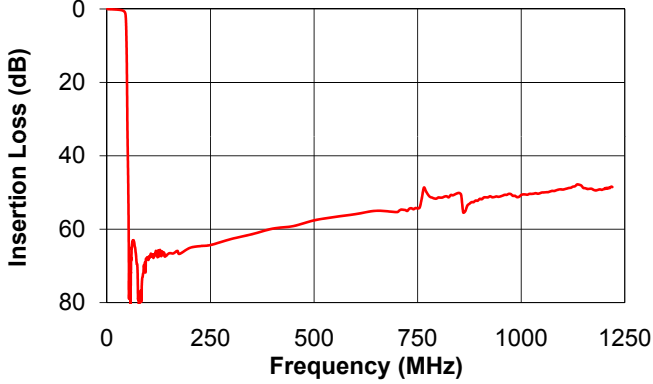


Notes

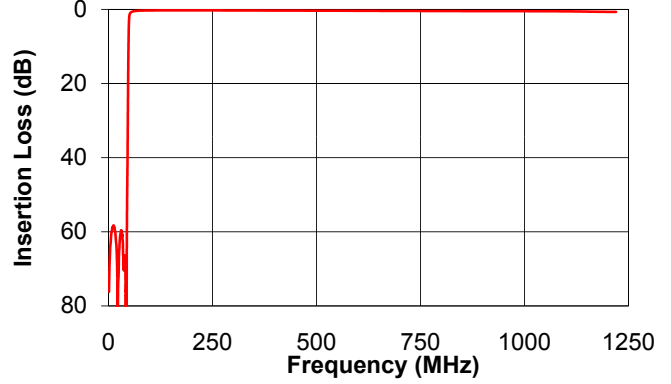
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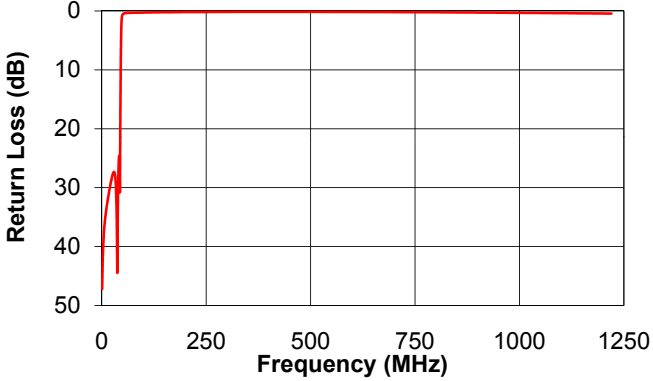
**DPB4254-75+ LOW PASS PORT
INSERTION LOSS (P_{in}=0dBm)**



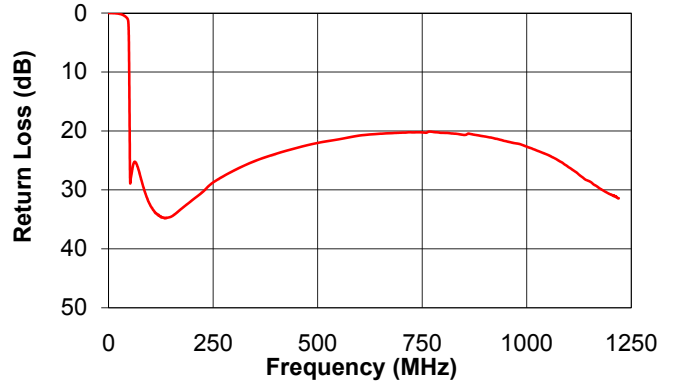
**DPB4254-75+ HIGH PASS PORT
INSERTION LOSS (P_{in}=0dBm)**



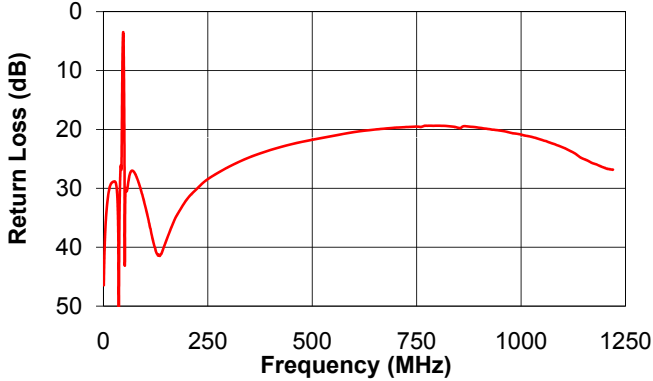
**DPB4254-75+ LOW PASS PORT
RETURN LOSS (P_{in}=0dBm)**



**DPB4254-75+ HIGH PASS PORT
RETURN LOSS (P_{in}=0dBm)**



**DPB4254-75+ COMMON PORT
RETURN LOSS (P_{in}=0dBm)**



Notes

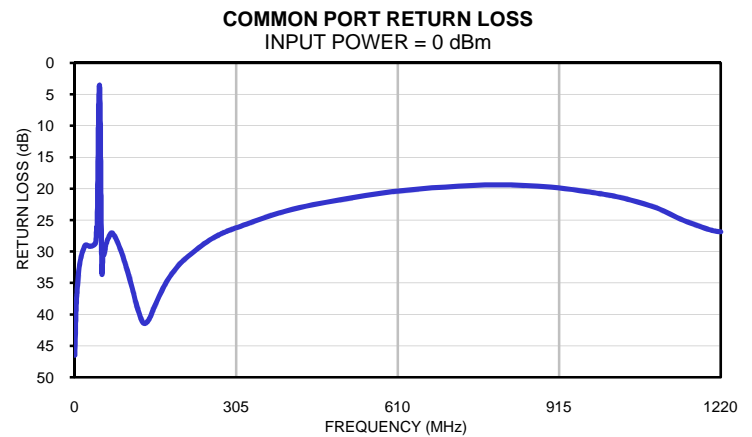
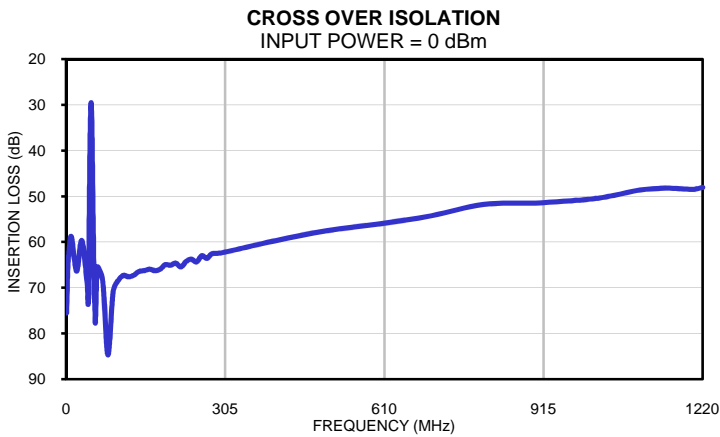
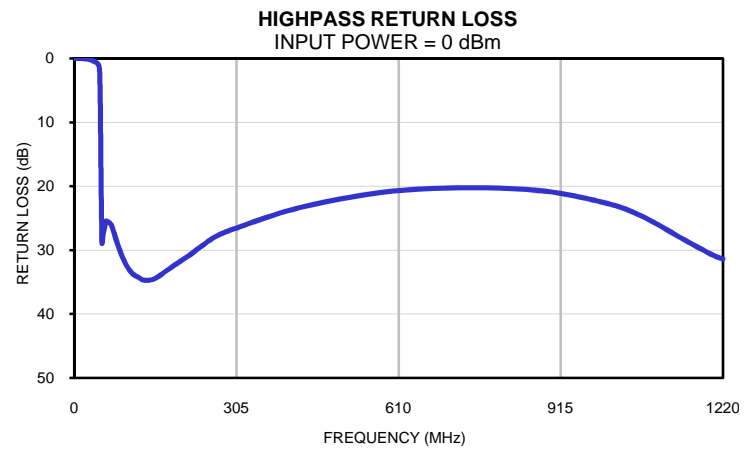
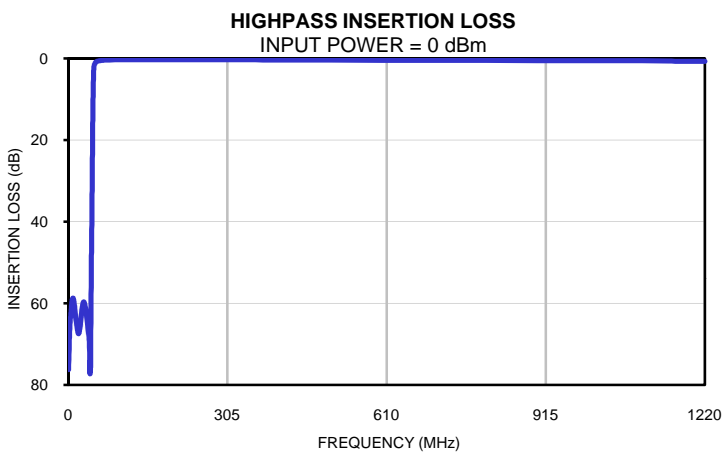
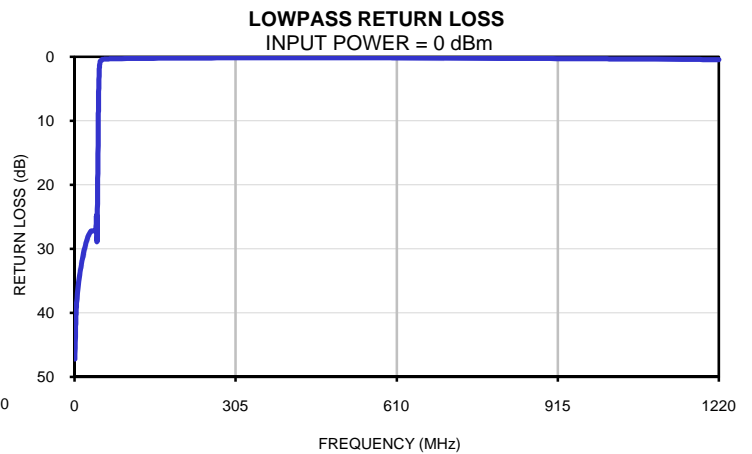
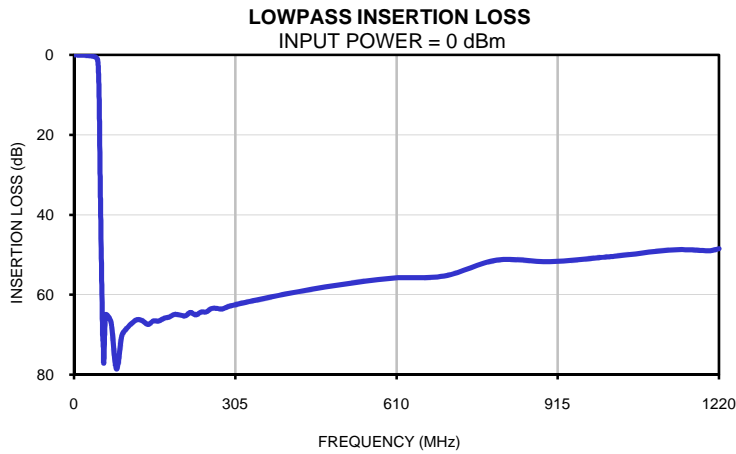
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Typical Performance Data

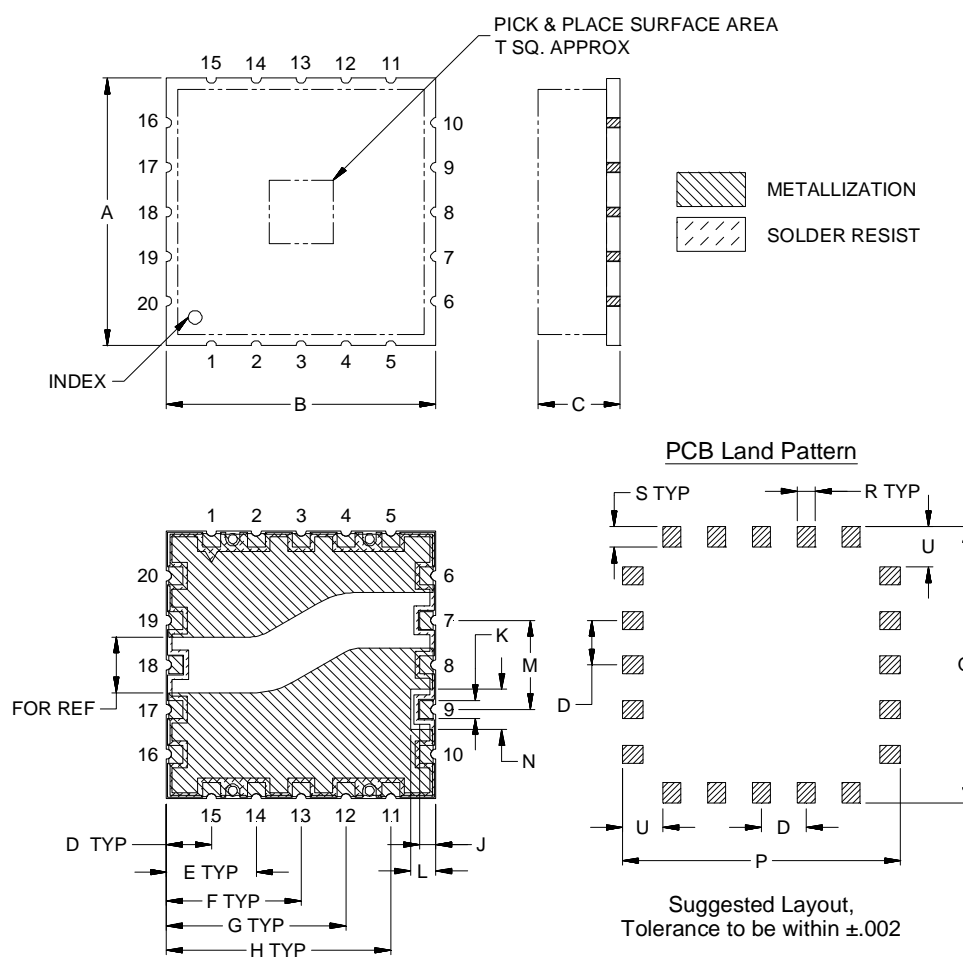
| FREQUENCY (MHz) | INSERTION LOSS (dB) | | Cross over isolation (dB) (between LPF and HPF) | RETURN LOSS (dB) | | |
|--------------------|---------------------------|---------------|---|------------------------|--------------|---------------|
| | Lowpass port | Highpass port | | Common port | Lowpass port | Highpass port |
| 1 | 0.04 | 76.19 | 75.52 | 46.46 | 47.21 | 0.02 |
| 3 | 0.06 | 66.88 | 66.28 | 39.95 | 40.75 | 0.02 |
| 5 | 0.08 | 62.96 | 62.68 | 36.55 | 37.80 | 0.02 |
| 10 | 0.10 | 58.76 | 58.83 | 31.99 | 34.11 | 0.03 |
| 20 | 0.15 | 67.38 | 66.40 | 29.04 | 29.74 | 0.07 |
| 30 | 0.24 | 59.61 | 59.68 | 29.15 | 27.39 | 0.21 |
| 40 | 0.55 | 68.16 | 68.89 | 28.57 | 26.99 | 0.58 |
| 42 | 0.73 | 77.07 | 73.61 | 26.13 | 24.80 | 0.70 |
| 42.5 | 0.79 | 74.08 | 73.01 | 26.55 | 25.94 | 0.73 |
| 43 | 0.87 | 75.98 | 71.84 | 26.86 | 28.59 | 0.77 |
| 44.5 | 1.37 | 51.98 | 51.61 | 16.71 | 17.61 | 0.89 |
| 45.5 | 2.57 | 40.72 | 40.35 | 9.25 | 8.78 | 1.01 |
| 46 | 3.86 | 33.91 | 36.39 | 6.59 | 5.82 | 1.09 |
| 47 | 8.60 | 19.25 | 31.19 | 3.73 | 2.37 | 1.45 |
| 47.5 | 12.18 | 13.40 | 29.89 | 3.49 | 1.57 | 1.93 |
| 48 | 16.74 | 8.74 | 29.52 | 4.15 | 1.12 | 2.96 |
| 49 | 28.73 | 3.36 | 32.23 | 9.11 | 0.73 | 8.03 |
| 49.5 | 34.02 | 2.28 | 35.15 | 13.39 | 0.65 | 12.04 |
| 50 | 37.91 | 1.73 | 38.60 | 18.70 | 0.59 | 16.67 |
| 52 | 55.45 | 1.02 | 56.91 | 33.27 | 0.46 | 28.85 |
| 54 | 70.61 | 0.78 | 72.26 | 30.05 | 0.40 | 27.62 |
| 55 | 72.01 | 0.71 | 73.61 | 30.35 | 0.38 | 27.25 |
| 56 | 77.12 | 0.65 | 77.72 | 30.44 | 0.37 | 26.82 |
| 58 | 69.03 | 0.57 | 70.09 | 29.75 | 0.35 | 25.98 |
| 60 | 64.95 | 0.51 | 65.44 | 28.76 | 0.34 | 25.46 |
| 70 | 67.02 | 0.38 | 68.46 | 27.01 | 0.31 | 26.19 |
| 80 | 78.56 | 0.33 | 84.73 | 28.19 | 0.29 | 28.76 |
| 90 | 70.38 | 0.30 | 70.89 | 30.33 | 0.28 | 31.00 |
| 100 | 68.36 | 0.29 | 68.39 | 32.99 | 0.27 | 32.67 |
| 110 | 67.07 | 0.28 | 67.31 | 36.03 | 0.25 | 33.74 |
| 120 | 66.21 | 0.28 | 67.64 | 39.22 | 0.24 | 34.25 |
| 130 | 66.61 | 0.28 | 67.24 | 41.32 | 0.23 | 34.72 |
| 140 | 67.45 | 0.27 | 66.44 | 40.90 | 0.22 | 34.74 |
| 150 | 66.56 | 0.27 | 66.27 | 38.98 | 0.22 | 34.53 |
| 160 | 66.59 | 0.27 | 65.95 | 37.11 | 0.22 | 34.04 |
| 170 | 65.90 | 0.27 | 66.31 | 35.39 | 0.21 | 33.45 |
| 180 | 65.62 | 0.27 | 65.98 | 33.99 | 0.20 | 32.85 |
| 190 | 64.93 | 0.27 | 64.96 | 32.85 | 0.19 | 32.28 |
| 200 | 65.08 | 0.27 | 65.11 | 31.86 | 0.18 | 31.75 |
| 210 | 65.31 | 0.28 | 64.63 | 31.07 | 0.18 | 31.17 |
| 220 | 64.44 | 0.28 | 65.46 | 30.37 | 0.17 | 30.64 |
| 230 | 65.05 | 0.28 | 64.24 | 29.70 | 0.18 | 29.97 |
| 240 | 64.37 | 0.28 | 63.76 | 29.03 | 0.18 | 29.37 |
| 250 | 64.30 | 0.28 | 64.37 | 28.44 | 0.17 | 28.74 |
| 260 | 63.46 | 0.28 | 62.99 | 27.89 | 0.17 | 28.17 |
| 270 | 63.42 | 0.29 | 63.58 | 27.43 | 0.17 | 27.72 |
| 280 | 63.59 | 0.29 | 62.56 | 27.02 | 0.16 | 27.33 |
| 300 | 62.66 | 0.29 | 62.33 | 26.35 | 0.16 | 26.71 |
| 400 | 59.84 | 0.32 | 59.74 | 23.50 | 0.15 | 23.89 |
| 500 | 57.58 | 0.35 | 57.50 | 21.76 | 0.15 | 22.03 |
| 600 | 55.89 | 0.39 | 56.05 | 20.45 | 0.17 | 20.78 |
| 700 | 55.33 | 0.42 | 54.26 | 19.69 | 0.19 | 20.30 |
| 800 | 51.35 | 0.44 | 51.78 | 19.36 | 0.23 | 20.32 |
| 900 | 51.72 | 0.47 | 51.46 | 19.72 | 0.27 | 20.94 |
| 1000 | 50.67 | 0.49 | 50.67 | 20.87 | 0.32 | 22.66 |
| 1050 | 50.00 | 0.50 | 49.80 | 21.79 | 0.34 | 24.05 |
| 1100 | 49.19 | 0.53 | 48.60 | 23.06 | 0.37 | 26.14 |
| 1150 | 48.74 | 0.61 | 48.22 | 25.02 | 0.40 | 28.55 |
| 1200 | 49.01 | 0.67 | 48.46 | 26.52 | 0.43 | 30.76 |
| 1220 | 48.51 | 0.67 | 48.07 | 26.83 | 0.44 | 31.42 |

Typical Performance Curves



Outline Dimensions

PA2002



| CASE# | A | B | C | | D | E | F | G | H | J | K | L | M |
|--------|------------------|------------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|----------------|-----------------|
| | | | Max | Min | | | | | | | | | |
| PA2002 | 1.181 (30.00) | 1.181 (30.00) | .280 (7.11) | .205 (5.21) | .197 (5.00) | .394 (10.00) | .591 (15.00) | .787 (20.00) | .984 (25.00) | .071 (1.80) | .079 (2.01) | .111 (2.82) | .394 (10.00) |

| CASE# | N | P | Q | R | S | T | U | WT.GRAMS |
|--------|----------------|------------------|------------------|----------------|----------------|----------------|----------------|----------|
| PA2002 | .179 (4.54) | 1.221 (31.01) | 1.221 (31.01) | .079 (2.01) | .091 (2.31) | .280 (7.11) | .178 (4.52) | 3.8 |

Dimensions are in inches (mm). Tolerances: 2Pl. $\pm .03$; 3Pl. $\pm .015$

Notes:

1. Base: Printed wiring laminate.
2. Termination finish:
 - For RoHS Case Styles: 3-5 μ inch Gold over 120-240 μ inch Nickel plate.
 - For RoHS-5 Case Styles: Tin-Lead plate.

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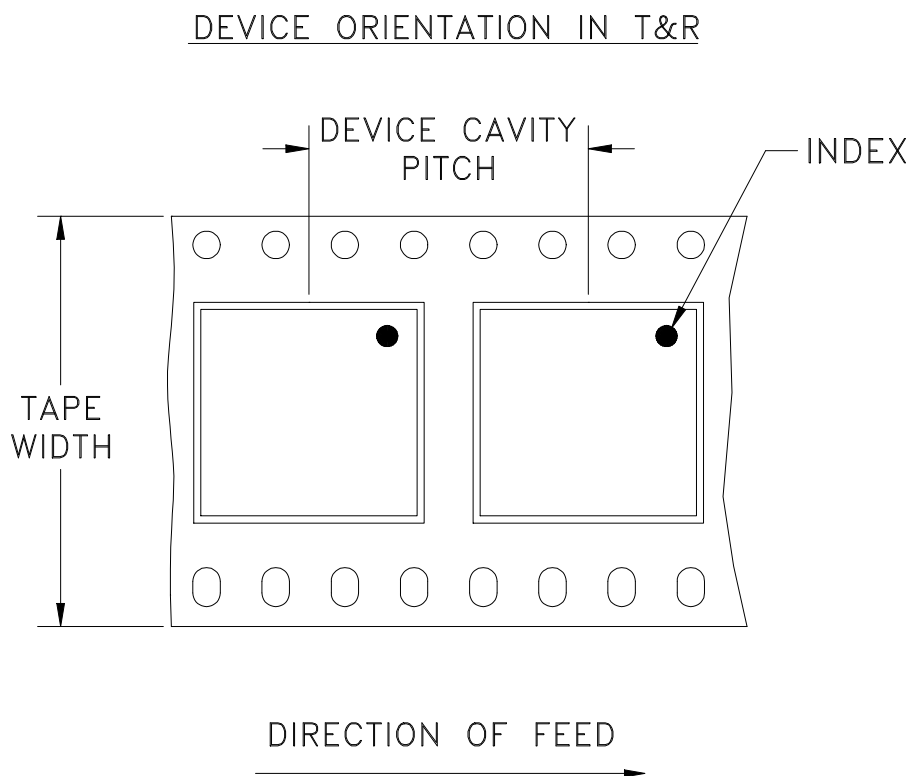
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| Tape Width, mm | Device Cavity Pitch, mm | Reel Size, inches | Devices per Reel |
|---------------------------|------------------------------------|------------------------------|-------------------------|
| 44 | 40 | 13 | 100 |

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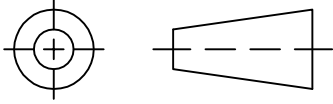
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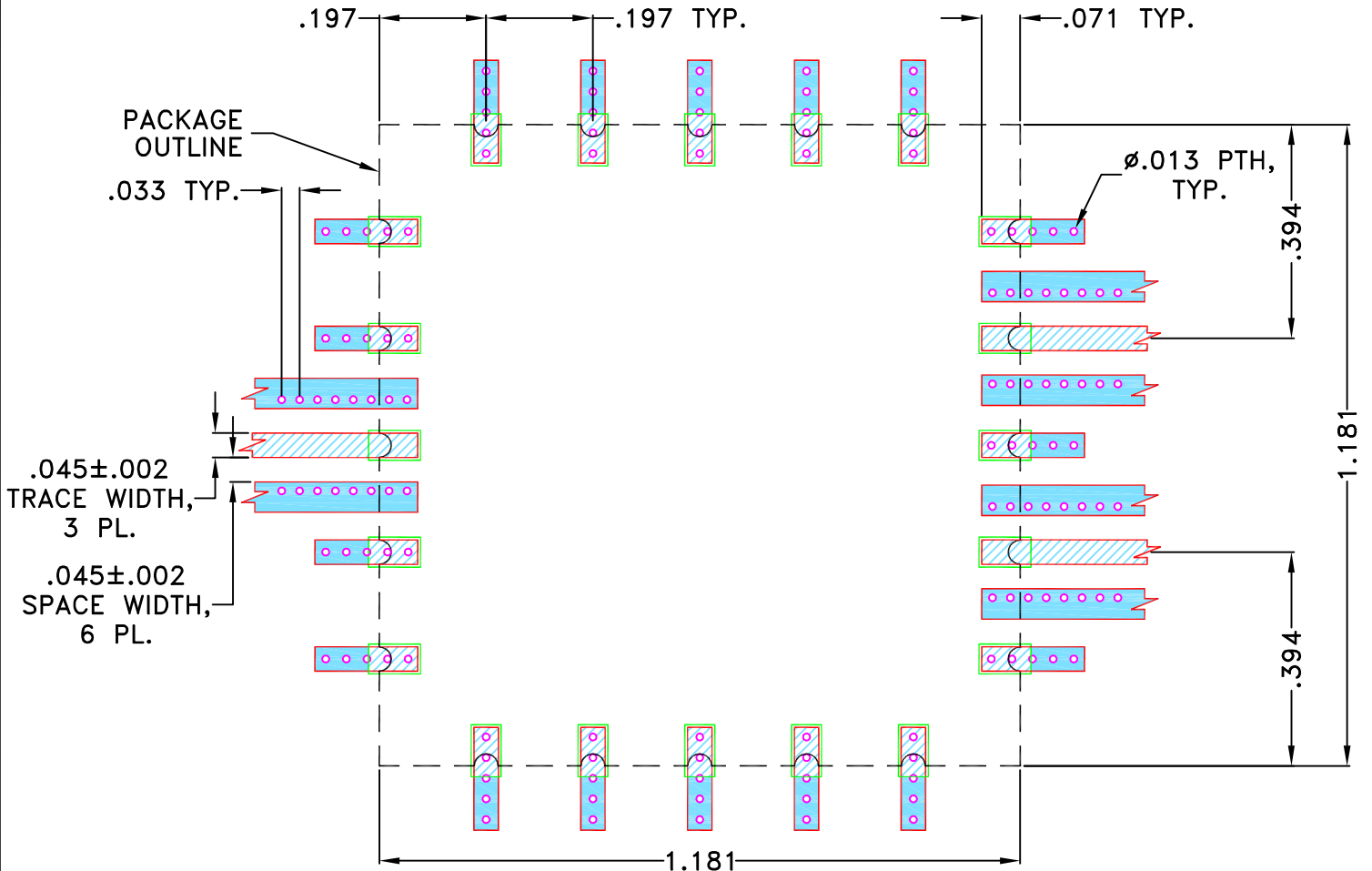
THIRD ANGLE PROJECTION



REVISIONS

| REV OR | ECN No. | DESCRIPTION | DATE | DR | AUTH |
|--------|---------|-------------|--------|-----|------|
| | M147697 | NEW RELEASE | SEP 14 | DDR | MD |
| | | | | | |
| | | | | | |

SUGGESTED MOUNTING CONFIGURATION FOR NU1620, NV1998, NZ2001, PA2002 CASE STYLE "20DP01" PIN CODE



NOTES:

- TRACE WIDTH IS SHOWN FOR OAK-602 WITH DIELECTRIC THICKNESS .031"±.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 | DRAWN DDR | 09 SEP 14 |
| TOLERANCES ON: | CHECKED MD | 09 SEP 14 |
| 2 PL DECIMALS ± | APPROVED KR | 09 SEP 14 |
| 3 PL DECIMALS ± .005" | | |
| ANGLES ± | | |
| FRACTIONS ± | | |



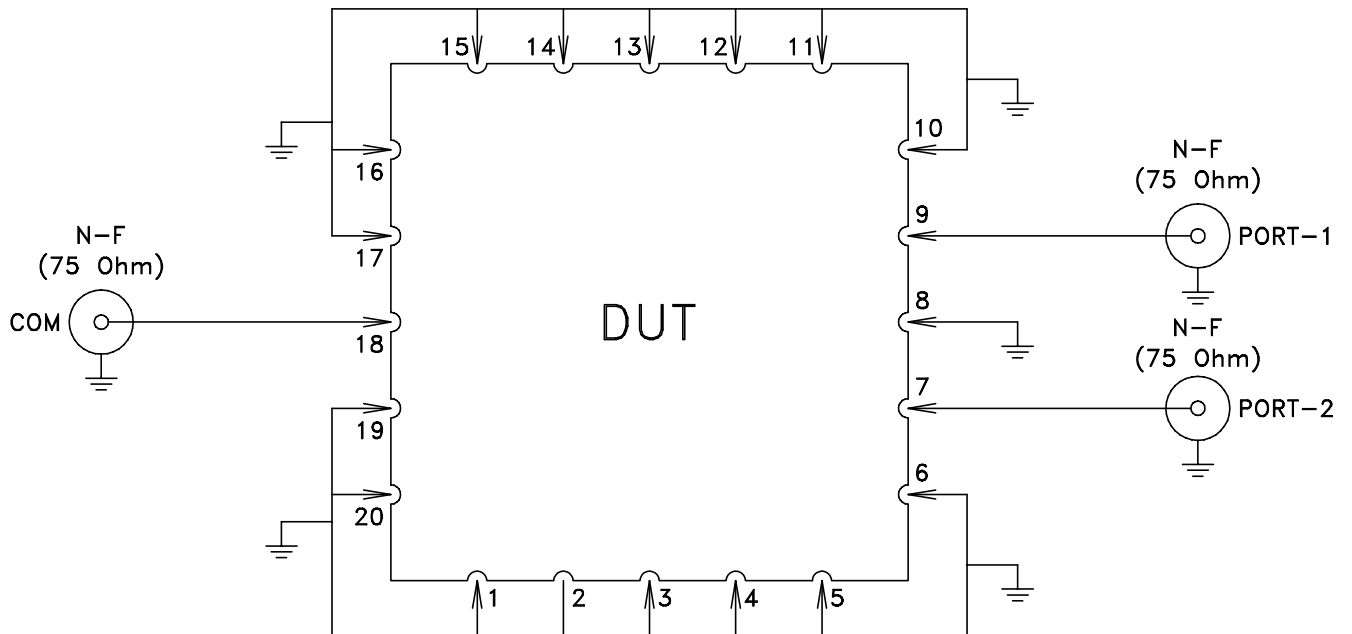
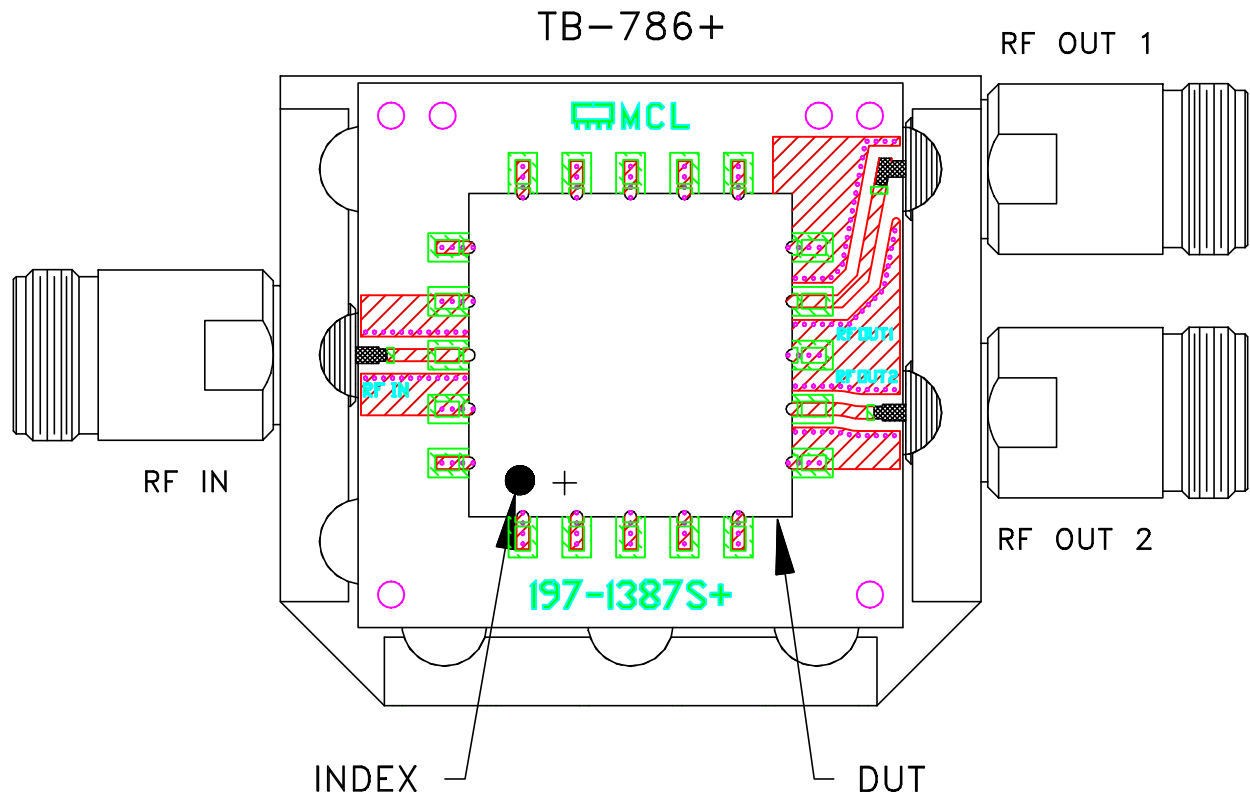
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, 20DP01, NU1620, NV1998, NZ2001, PA2002, TB-786+, 75 OHM

| | | | |
|---------------|------------------|-----------------------|---------|
| SIZE A | CODE IDENT 15542 | DRAWING NO: 98-PL-435 | REV: OR |
| FILE: 98PL435 | SCALE: 3:1 | SHEET: 1 OF 1 | |

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Evaluation Board and Circuit



Schematic Diagram

Notes:

1. 75 Ohm N Female connectors.
2. PCB Material: OAK-602 OR Equivalent
Dielectric Constant=2.50±.04, Thickness=.031 inch.

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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 | -55° to 85°C Ambient Environment | Individual Model Data Sheet |
| Storage Temperature | -55° to 100° C Ambient Environment | Individual Model Data Sheet |
| HAST | 130°C, 85% RH, 96 hours | JESD22-A110 |
| 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 Eutectic Process: 225°C peak Pb-Free Process, 245°C peak | J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1 |
| Solderability | 10X Magnification | J-STD-002, Para 4.2.5, Test S, 95% Coverage |
| Vibration (High Frequency) | 20g peak, 20-2000 Hz, 4 times in each of three axes (total 12) | MIL-STD-883, Method 2007.3, Condition A |
| 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 |