*High Directivity*

# Monolithic Amplifier 0.5-2.5 GHz

## Product Features

- 2.8V & 5V operation
- Micro-miniature size .120”X.120”
- Internal DC blocking at RF input and output
- High directivity, 17 dB typ.
- Low noise figure, 2.9 dB typ.
- Output power, up to +18 dBm typ.
- Excellent repeatability
- Low cost
- Aqueous washable

## MNA-6+

CASE STYLE: DQ849
PRICE:Contact Sales Dept.

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

## Typical Applications

- Buffer amplifier
- Cellular
- PCN
- Communications satellite
- Defense

**Not Recommended for New Designs**

please refer to PCN# 15-054 and recommended replacement at :
http://www.minicircuits.com/support/product_change.html
or PCN History on Dash Board

## General Description

MNA-6+ is a wideband amplifier offering high dynamic range. It has repeatable performance from lot to lot. It is enclosed in a 3x3 mm MCLP plastic package. MNA-6+ is fabricated using GaAs MESFET technology. Expected MTBF at 85°C case temperature is 45,000 years at 2.8V; 7,000 years at 5V.

| Function | Pin Number | Description | |
|---|---|---|---|
| RF IN | 2 | RF input pin | |
| RF-OUT | 5 | RF output pin | |
| DC | 7, with 1000 pF bypass to ground; connect pin 8 via 33 ohms to pin 7 externally | | Bias pins |
| GND | 3,4 and paddle in center of bottom | | Connections to ground |
| OPTIONAL | 1,6 | No internal connection; recommended use: per PCB Layout PL-078 | |

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

## Electrical Specifications at 25°C

| Parameter | | Min. | Typ. | | Max. | Units |
|---|---|---|---|---|---|---|
| Frequency Range | | 0.5 | | | 2.5 | GHz |
| at DC Volts | | 5.0 | 5.0 | 2.8 | 5.0 | V |
| Gain | f=0.5 GHz | — | 19.4 | 18.6 | — | dB |
| | f=1.0 GHz | — | 23.5 | 21.5 | — | |
| | f=1.5 GHz | — | 23.6 | 21.2 | — | |
| | f=2.0 GHz | 21.5 | 23.0 | 21.0 | — | |
| | f=2.5 GHz | — | 20.2 | 19.0 | — | |
| Input Return Loss | f=0.75-2.5 GHz | | 14 | 14 | | dB |
| Output Return Loss | f=0.75-2.5 GHz | | 12.5 | 10 | | dB |
| Output Power @ 1 dB compression | f=0.5 GHz | | 18.0 | 14.1 | | dBm |
| | f=2.5GHz | | 15.8 | 13.2 | | |
| Output IP3 | f=1 GHz | | 27.1 | 23.4 | | dBm |
| | f=2 GHz | | 28.0 | 25.0 | | |
| Noise Figure | f=1 GHz | | 2.9 | | | dB |
| Directivity (Isolation - Gain) | | | 17 | | | |
| DC Current | | | 81 | 65 | 95 | mA |
| Thermal Resistance, junction-to-case | | | 78 | | | °C/W |

## Absolute Maximum Ratings

| Parameter | Ratings |
|---|---|
| Operating Temperature | -40°C to 85°C |
| Storage Temperature | -55°C to 100°C |
| DC Voltage | 7V at pin 7<br>10V at pins 2 & 5 |
| Power Dissipation | 500mW |
| Input Power | 10dBm (continuous operation) |
| | 26dBm (5 minutes max) |

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

## Product Marking


## Additional Detailed Technical Information

Additional information is available on our web site. To access this information enter the model number on our web site home page.

**Performance data, graphs, s-parameter data set (.zip file)**

**Case Style: DQ849**

MNA-6+: Plastic package, exposed paddle, lead finish: tin-silver over nickel

**Tape & Reel: F104**

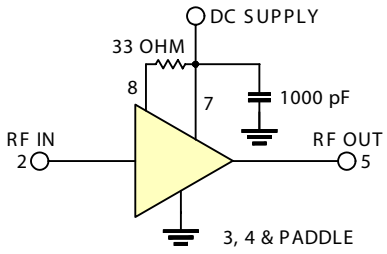
Standard quantities available on reel: 7" reels with 20, 50, 100, 200, 500, 1K, or 2K devices.

**Suggested Layout for PCB Design: PL-078**

**Evaluation Board: TB-186+**

**Environmental Ratings: ENV08T1**

## Recommended Application Circuit

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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

## ESD Rating

Human Body Model (HBM): Class 1A (250v to < 500v) in accordance with ANSI/ESD STM 5.1 - 2001

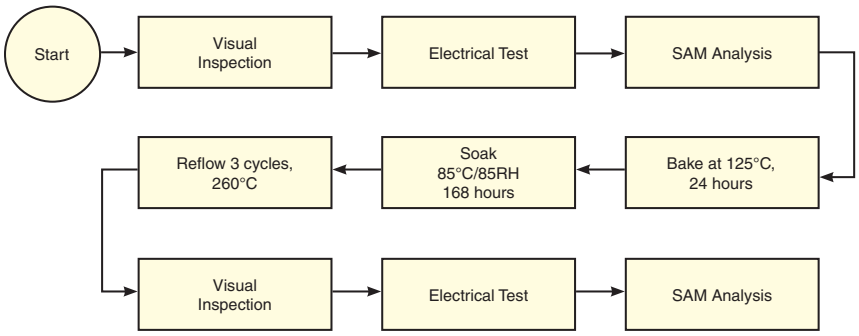
Charged Device Model (CDM): Class III (500 to 1000v) in accordance with JESD22-C101A

## MSL Rating

Moisture Sensitivity: MSL1 in accordance with IPC/JEDEC J-STD-020C

| No. | Test Required | Condition | Standard | Quantity |
|---|---|---|---|---|
| 1 | Visual Inspection | Low Power Microscope Magnification 40x | MIP-IN-0003 (MCT spec) | 45 units |
| 2 | Electrical Test | Room Temperature | SCD (MCL spec) | 45 units |
| 3 | SAM Analysis | Less than 10% growth in term of delamination | J-Std-020C (Jedec Standard) | 45 units |
| 4 | Moisture Sensitivity Level 1 | Bake at 125°C for 24 hours<br>Soak at 85°C/85%RH for 168 hours<br>Reflow 3 cycles at 260°C peak | J-Std-020C (Jedec Standard) | 45 units |

### MSL Test Flow Chart




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.
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# MMIC Amplifier MNA-6+

## *Typical Performance Data*

**NOTE: Use PDF Bookmarks to view DATA at required conditions or to view GRAPHS.**

**Definitions:**
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: I = 72mA, Vd = 3.9V @Temperature = +25degC

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP3 Output | 1dB Comp. Output | Noise Figure |
|---|---|---|---|---|---|---|---|---|---|
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Delta | (dBm) | (dBm) | (dB) |
| 500 | 18.50 | 43.77 | 7.64 | 8.93 | 6.50 | 0.09 | 29.86 | 16.81 | 3.01 |
| 550 | 19.31 | 43.25 | 8.69 | 10.63 | 6.14 | 0.05 | 30.14 | 17.79 | 3.16 |
| 600 | 19.94 | 43.23 | 9.86 | 12.26 | 6.12 | 0.02 | 30.22 | 16.56 | 3.38 |
| 650 | 20.40 | 43.09 | 11.13 | 13.99 | 6.02 | 0.02 | 30.00 | 16.84 | 3.14 |
| 700 | 20.73 | 42.99 | 12.61 | 15.91 | 5.97 | 0.04 | 29.95 | 17.82 | 2.93 |
| 750 | 21.00 | 41.78 | 14.13 | 17.78 | 5.19 | 0.07 | 29.90 | 17.20 | 3.10 |
| 800 | 21.22 | 42.64 | 15.79 | 19.74 | 5.70 | 0.07 | 29.71 | 16.44 | 3.23 |
| 850 | 21.41 | 41.21 | 17.39 | 21.33 | 4.81 | 0.09 | 29.62 | 17.33 | 3.07 |
| 900 | 21.55 | 41.95 | 19.35 | 22.47 | 5.19 | 0.09 | 29.54 | 17.10 | 2.82 |
| 940 | 21.68 | 40.95 | 20.78 | 22.81 | 4.59 | 0.11 | 29.48 | 16.56 | 2.88 |
| 1000 | 21.81 | 40.65 | 23.24 | 22.48 | 4.39 | 0.12 | 29.41 | 16.97 | 2.95 |
| 1050 | 21.88 | 41.22 | 24.69 | 21.71 | 4.64 | 0.11 | 29.33 | 16.92 | 2.97 |
| 1100 | 21.99 | 40.96 | 25.87 | 20.81 | 4.45 | 0.12 | 29.26 | 16.38 | 2.88 |
| 1150 | 22.06 | 40.14 | 26.48 | 19.66 | 4.02 | 0.13 | 29.22 | 16.51 | 2.81 |
| 1200 | 22.14 | 40.13 | 25.94 | 18.55 | 3.97 | 0.13 | 29.12 | 16.57 | 2.89 |
| 1250 | 22.18 | 39.89 | 25.71 | 17.88 | 3.84 | 0.14 | 29.05 | 16.15 | 2.89 |
| 1300 | 22.27 | 40.75 | 25.02 | 17.11 | 4.17 | 0.12 | 28.93 | 16.42 | 2.75 |
| 1350 | 22.29 | 39.60 | 24.59 | 16.23 | 3.64 | 0.14 | 28.91 | 16.66 | 2.83 |
| 1400 | 22.36 | 39.56 | 24.13 | 15.54 | 3.59 | 0.14 | 28.88 | 16.33 | 2.77 |
| 1450 | 22.40 | 39.60 | 24.25 | 15.01 | 3.57 | 0.14 | 28.86 | 16.21 | 3.04 |
| 1500 | 22.40 | 39.58 | 24.50 | 14.40 | 3.54 | 0.14 | 28.81 | 16.26 | 2.89 |
| 1550 | 22.45 | 39.48 | 24.81 | 13.88 | 3.47 | 0.15 | 28.82 | 16.08 | 2.92 |
| 1600 | 22.48 | 39.66 | 25.01 | 13.35 | 3.51 | 0.14 | 28.71 | 15.79 | 2.86 |
| 1650 | 22.44 | 39.90 | 25.60 | 13.03 | 3.61 | 0.14 | 28.55 | 15.85 | 2.75 |
| 1700 | 22.46 | 39.48 | 26.54 | 12.55 | 3.42 | 0.15 | 28.39 | 15.98 | 2.89 |
| 1750 | 22.43 | 39.03 | 27.39 | 12.27 | 3.25 | 0.15 | 28.37 | 15.79 | 2.87 |
| 1800 | 22.40 | 38.78 | 28.61 | 11.87 | 3.16 | 0.16 | 28.28 | 15.87 | 2.87 |
| 1850 | 22.36 | 39.51 | 29.89 | 11.60 | 3.43 | 0.15 | 28.19 | 15.91 | 2.90 |
| 1900 | 22.32 | 39.53 | 30.44 | 11.42 | 3.44 | 0.15 | 28.20 | 15.92 | 2.89 |
| 1950 | 22.21 | 38.87 | 29.46 | 11.15 | 3.22 | 0.16 | 28.10 | 15.74 | 2.90 |
| 2000 | 22.12 | 38.95 | 27.90 | 10.86 | 3.26 | 0.15 | 28.09 | 15.73 | 2.92 |
| 2050 | 22.06 | 38.74 | 25.62 | 10.74 | 3.20 | 0.16 | 28.08 | 16.00 | 2.79 |
| 2100 | 21.91 | 38.85 | 23.99 | 10.59 | 3.28 | 0.16 | 28.02 | 16.02 | 2.96 |
| 2150 | 21.76 | 39.20 | 22.37 | 10.35 | 3.44 | 0.15 | 27.97 | 15.58 | 3.01 |
| 2200 | 21.56 | 38.85 | 20.59 | 10.24 | 3.37 | 0.15 | 27.91 | 15.62 | 2.91 |
| 2250 | 21.42 | 38.79 | 19.41 | 10.13 | 3.38 | 0.16 | 27.94 | 16.02 | 2.83 |
| 2300 | 21.24 | 38.56 | 18.19 | 10.01 | 3.34 | 0.16 | 27.94 | 15.50 | 3.06 |
| 2350 | 21.06 | 39.03 | 17.14 | 9.93 | 3.57 | 0.15 | 27.95 | 15.09 | 3.19 |
| 2400 | 20.87 | 38.32 | 16.15 | 9.81 | 3.35 | 0.16 | 27.94 | 15.88 | 3.08 |
| 2500 | 20.37 | 37.90 | 14.49 | 9.77 | 3.34 | 0.17 | 27.89 | 15.43 | 2.99 |

## *Typical Performance Data*

**Definitions:**
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: I = 69mA, Vd = 2.8V @Temperature = +25degC

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP3 Output | 1dB Comp. Output | Noise Figure |
|---|---|---|---|---|---|---|---|---|---|
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Delta | (dBm) | (dBm) | (dB) |
| 500 | 17.65 | 44.61 | 7.42 | 9.13 | 7.88 | 0.10 | 26.44 | 14.35 | 3.07 |
| 550 | 18.40 | 43.81 | 8.45 | 10.76 | 7.24 | 0.06 | 26.55 | 15.26 | 3.19 |
| 600 | 18.95 | 44.16 | 9.51 | 12.39 | 7.58 | 0.03 | 26.63 | 14.10 | 3.43 |
| 650 | 19.36 | 42.98 | 10.71 | 13.98 | 6.64 | 0.01 | 26.56 | 14.41 | 3.19 |
| 700 | 19.64 | 42.71 | 11.95 | 15.42 | 6.47 | 0.04 | 26.49 | 15.41 | 2.95 |
| 750 | 19.87 | 41.38 | 13.23 | 16.70 | 5.56 | 0.06 | 26.46 | 14.82 | 3.10 |
| 800 | 20.03 | 41.19 | 14.65 | 17.54 | 5.45 | 0.08 | 26.36 | 14.24 | 3.25 |
| 850 | 20.20 | 42.18 | 15.90 | 17.90 | 6.05 | 0.07 | 26.37 | 15.11 | 3.10 |
| 900 | 20.30 | 41.09 | 17.26 | 17.94 | 5.33 | 0.09 | 26.34 | 14.98 | 2.84 |
| 940 | 20.40 | 40.13 | 18.40 | 17.73 | 4.75 | 0.10 | 26.22 | 14.37 | 2.90 |
| 1000 | 20.48 | 40.29 | 20.06 | 17.18 | 4.80 | 0.11 | 26.21 | 14.85 | 2.97 |
| 1050 | 20.53 | 40.31 | 21.23 | 16.72 | 4.79 | 0.11 | 26.14 | 15.01 | 3.04 |
| 1100 | 20.61 | 39.58 | 22.63 | 16.21 | 4.38 | 0.12 | 26.15 | 14.47 | 2.93 |
| 1150 | 20.65 | 38.94 | 23.62 | 15.49 | 4.05 | 0.13 | 26.15 | 14.52 | 2.82 |
| 1200 | 20.70 | 40.09 | 24.55 | 14.91 | 4.56 | 0.12 | 26.20 | 14.85 | 2.93 |
| 1250 | 20.72 | 39.16 | 25.39 | 14.56 | 4.09 | 0.13 | 26.12 | 14.51 | 2.91 |
| 1300 | 20.77 | 39.55 | 25.76 | 14.07 | 4.23 | 0.13 | 26.06 | 14.62 | 2.79 |
| 1350 | 20.77 | 39.14 | 26.50 | 13.47 | 4.02 | 0.13 | 26.07 | 14.97 | 2.83 |
| 1400 | 20.82 | 38.83 | 26.75 | 13.05 | 3.84 | 0.14 | 26.17 | 14.80 | 2.79 |
| 1450 | 20.83 | 39.25 | 27.30 | 12.75 | 4.01 | 0.13 | 26.28 | 14.56 | 3.08 |
| 1500 | 20.84 | 38.99 | 28.39 | 12.34 | 3.87 | 0.13 | 26.26 | 14.61 | 2.94 |
| 1550 | 20.86 | 38.64 | 28.99 | 11.94 | 3.69 | 0.14 | 26.42 | 14.61 | 2.93 |
| 1600 | 20.87 | 38.15 | 29.63 | 11.63 | 3.48 | 0.14 | 26.38 | 14.37 | 2.88 |
| 1650 | 20.85 | 38.07 | 31.37 | 11.34 | 3.44 | 0.14 | 26.32 | 14.27 | 2.79 |
| 1700 | 20.88 | 38.46 | 31.74 | 11.02 | 3.55 | 0.14 | 26.11 | 14.45 | 2.93 |
| 1750 | 20.83 | 38.40 | 32.54 | 10.80 | 3.53 | 0.14 | 26.11 | 14.44 | 2.86 |
| 1800 | 20.81 | 38.00 | 31.99 | 10.53 | 3.37 | 0.15 | 26.02 | 14.40 | 2.89 |
| 1850 | 20.78 | 38.38 | 31.54 | 10.30 | 3.51 | 0.14 | 25.97 | 14.34 | 2.96 |
| 1900 | 20.75 | 37.66 | 29.47 | 10.09 | 3.23 | 0.15 | 25.97 | 14.49 | 2.97 |
| 1950 | 20.66 | 37.44 | 27.18 | 9.87 | 3.17 | 0.15 | 25.94 | 14.41 | 2.91 |
| 2000 | 20.59 | 37.96 | 25.70 | 9.68 | 3.36 | 0.14 | 25.92 | 14.24 | 2.93 |
| 2050 | 20.55 | 37.67 | 23.88 | 9.56 | 3.26 | 0.15 | 25.93 | 14.49 | 2.81 |
| 2100 | 20.43 | 37.56 | 22.52 | 9.45 | 3.25 | 0.15 | 25.91 | 14.64 | 3.02 |
| 2150 | 20.31 | 37.57 | 21.13 | 9.20 | 3.26 | 0.15 | 25.83 | 14.14 | 3.05 |
| 2200 | 20.15 | 37.07 | 19.68 | 9.07 | 3.12 | 0.16 | 25.84 | 14.13 | 2.94 |
| 2250 | 20.04 | 36.84 | 18.73 | 8.91 | 3.06 | 0.16 | 25.83 | 14.62 | 2.88 |
| 2300 | 19.89 | 36.88 | 17.66 | 8.83 | 3.11 | 0.16 | 25.85 | 14.19 | 3.11 |
| 2350 | 19.77 | 36.81 | 16.75 | 8.68 | 3.10 | 0.17 | 25.80 | 13.59 | 3.23 |
| 2400 | 19.61 | 36.96 | 15.80 | 8.60 | 3.18 | 0.17 | 25.82 | 14.45 | 3.11 |
| 2500 | 19.19 | 36.37 | 14.34 | 8.43 | 3.08 | 0.18 | 25.77 | 14.00 | 3.02 |

## *Typical Performance Data*

**Definitions:**
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: I = 75mA, Vd = 5V @Temperature = +25degC

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP3 Output | 1dB Comp. Output | Noise Figure |
|---|---|---|---|---|---|---|---|---|---|
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Delta | (dBm) | (dBm) | (dB) |
| 500 | 18.95 | 46.37 | 7.73 | 8.71 | 8.32 | 0.11 | 31.55 | 18.12 | 3.03 |
| 550 | 19.79 | 44.26 | 8.81 | 10.27 | 6.51 | 0.06 | 31.92 | 19.45 | 3.18 |
| 600 | 20.45 | 44.64 | 10.02 | 11.94 | 6.78 | 0.02 | 32.07 | 17.81 | 3.39 |
| 650 | 20.94 | 43.79 | 11.40 | 13.70 | 6.15 | 0.02 | 31.82 | 17.96 | 3.13 |
| 700 | 21.30 | 42.69 | 12.96 | 15.47 | 5.41 | 0.05 | 31.77 | 19.29 | 2.93 |
| 750 | 21.62 | 43.40 | 14.60 | 17.50 | 5.83 | 0.06 | 31.84 | 18.49 | 3.12 |
| 800 | 21.86 | 42.98 | 16.55 | 19.75 | 5.53 | 0.07 | 31.63 | 17.63 | 3.25 |
| 850 | 22.10 | 42.96 | 18.40 | 21.96 | 5.44 | 0.08 | 31.49 | 18.50 | 3.06 |
| 900 | 22.26 | 41.88 | 20.67 | 25.22 | 4.78 | 0.10 | 31.47 | 18.21 | 2.81 |
| 940 | 22.43 | 41.67 | 22.64 | 27.46 | 4.60 | 0.11 | 31.40 | 17.67 | 2.89 |
| 1000 | 22.56 | 42.05 | 25.43 | 29.99 | 4.75 | 0.11 | 31.30 | 18.00 | 2.97 |
| 1050 | 22.66 | 41.44 | 26.89 | 29.78 | 4.39 | 0.12 | 31.20 | 17.86 | 2.98 |
| 1100 | 22.79 | 41.98 | 26.93 | 27.63 | 4.60 | 0.11 | 31.06 | 17.29 | 2.90 |
| 1150 | 22.89 | 41.47 | 26.25 | 25.06 | 4.28 | 0.12 | 31.03 | 17.46 | 2.83 |
| 1200 | 22.99 | 40.63 | 24.66 | 22.99 | 3.85 | 0.13 | 30.79 | 17.39 | 2.92 |
| 1250 | 23.03 | 40.97 | 23.91 | 21.58 | 3.97 | 0.13 | 30.76 | 16.98 | 2.86 |
| 1300 | 23.15 | 40.68 | 22.89 | 20.33 | 3.78 | 0.13 | 30.59 | 17.32 | 2.77 |
| 1350 | 23.19 | 40.46 | 22.23 | 18.96 | 3.65 | 0.14 | 30.56 | 17.51 | 2.86 |
| 1400 | 23.27 | 40.49 | 21.90 | 17.93 | 3.62 | 0.14 | 30.42 | 17.06 | 2.78 |
| 1450 | 23.32 | 41.23 | 21.54 | 17.18 | 3.89 | 0.13 | 30.33 | 16.98 | 3.03 |
| 1500 | 23.35 | 40.82 | 21.75 | 16.34 | 3.69 | 0.13 | 30.22 | 17.09 | 2.90 |
| 1550 | 23.39 | 40.36 | 21.77 | 15.68 | 3.48 | 0.14 | 30.20 | 16.83 | 2.95 |
| 1600 | 23.45 | 39.79 | 21.89 | 15.02 | 3.24 | 0.16 | 30.04 | 16.54 | 2.89 |
| 1650 | 23.41 | 40.54 | 22.54 | 14.56 | 3.52 | 0.14 | 29.85 | 16.62 | 2.74 |
| 1700 | 23.43 | 39.30 | 23.06 | 14.07 | 3.06 | 0.16 | 29.74 | 16.83 | 2.88 |
| 1750 | 23.38 | 40.40 | 23.85 | 13.60 | 3.45 | 0.15 | 29.71 | 16.57 | 2.87 |
| 1800 | 23.34 | 39.82 | 24.69 | 13.14 | 3.24 | 0.16 | 29.63 | 16.63 | 2.89 |
| 1850 | 23.30 | 41.43 | 25.70 | 12.83 | 3.88 | 0.13 | 29.54 | 16.78 | 2.90 |
| 1900 | 23.23 | 40.49 | 26.02 | 12.63 | 3.52 | 0.15 | 29.58 | 16.72 | 2.91 |
| 1950 | 23.11 | 40.15 | 26.16 | 12.33 | 3.42 | 0.15 | 29.44 | 16.49 | 2.91 |
| 2000 | 22.99 | 40.05 | 25.61 | 12.08 | 3.42 | 0.15 | 29.40 | 16.56 | 2.92 |
| 2050 | 22.92 | 40.74 | 24.04 | 11.95 | 3.71 | 0.14 | 29.39 | 16.88 | 2.78 |
| 2100 | 22.71 | 39.07 | 22.90 | 11.77 | 3.15 | 0.17 | 29.35 | 16.83 | 2.95 |
| 2150 | 22.56 | 40.09 | 21.41 | 11.58 | 3.56 | 0.15 | 29.34 | 16.46 | 3.03 |
| 2200 | 22.31 | 40.50 | 19.93 | 11.48 | 3.81 | 0.14 | 29.25 | 16.54 | 2.92 |
| 2250 | 22.14 | 40.63 | 18.82 | 11.37 | 3.92 | 0.14 | 29.29 | 16.92 | 2.85 |
| 2300 | 21.91 | 40.57 | 17.60 | 11.30 | 3.98 | 0.14 | 29.28 | 16.40 | 3.05 |
| 2350 | 21.71 | 39.88 | 16.59 | 11.26 | 3.75 | 0.15 | 29.33 | 15.95 | 3.21 |
| 2400 | 21.49 | 40.25 | 15.59 | 11.17 | 3.98 | 0.14 | 29.33 | 16.78 | 3.10 |
| 2500 | 20.92 | 38.91 | 14.04 | 11.17 | 3.61 | 0.16 | 29.29 | 16.31 | 2.99 |

## *Typical Performance Data*

**Definitions:**
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: I = 68mA, Vd = 3.9V @Temperature = -40degC

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP3 Output | 1dB Comp. Output | Noise Figure |
|---|---|---|---|---|---|---|---|---|---|
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Delta | (dBm) | (dBm) | (dB) |
| 500 | 18.94 | 46.09 | 7.57 | 8.75 | 8.02 | 0.11 | 29.86 | 16.75 | 2.44 |
| 550 | 19.74 | 44.79 | 8.59 | 10.35 | 6.91 | 0.06 | 30.10 | 17.85 | 2.56 |
| 600 | 20.36 | 44.33 | 9.75 | 12.03 | 6.57 | 0.03 | 30.21 | 16.39 | 2.81 |
| 650 | 20.83 | 42.99 | 11.05 | 13.80 | 5.64 | 0.02 | 30.04 | 16.53 | 2.56 |
| 700 | 21.17 | 42.80 | 12.48 | 15.56 | 5.53 | 0.04 | 29.93 | 17.77 | 2.37 |
| 750 | 21.44 | 42.42 | 13.98 | 17.44 | 5.30 | 0.06 | 29.87 | 17.07 | 2.51 |
| 800 | 21.67 | 42.30 | 15.67 | 19.31 | 5.20 | 0.08 | 29.70 | 16.24 | 2.66 |
| 850 | 21.90 | 42.74 | 17.33 | 20.87 | 5.39 | 0.08 | 29.62 | 17.18 | 2.52 |
| 900 | 22.04 | 41.67 | 19.23 | 22.15 | 4.75 | 0.10 | 29.56 | 16.97 | 2.24 |
| 940 | 22.16 | 42.37 | 20.83 | 22.53 | 5.10 | 0.09 | 29.46 | 16.32 | 2.32 |
| 1000 | 22.30 | 42.89 | 23.52 | 22.26 | 5.34 | 0.09 | 29.40 | 16.74 | 2.40 |
| 1050 | 22.42 | 41.06 | 25.37 | 21.78 | 4.30 | 0.12 | 29.30 | 16.78 | 2.42 |
| 1100 | 22.50 | 41.20 | 27.29 | 20.77 | 4.32 | 0.12 | 29.23 | 16.14 | 2.34 |
| 1150 | 22.61 | 40.88 | 28.65 | 19.65 | 4.11 | 0.13 | 29.19 | 16.22 | 2.26 |
| 1200 | 22.69 | 40.42 | 28.22 | 18.65 | 3.86 | 0.13 | 29.06 | 16.33 | 2.35 |
| 1250 | 22.77 | 40.66 | 27.83 | 18.04 | 3.92 | 0.13 | 28.99 | 15.94 | 2.33 |
| 1300 | 22.85 | 40.79 | 26.65 | 17.11 | 3.92 | 0.13 | 28.86 | 16.24 | 2.20 |
| 1350 | 22.91 | 40.08 | 26.28 | 16.28 | 3.59 | 0.14 | 28.86 | 16.44 | 2.27 |
| 1400 | 23.00 | 40.03 | 26.01 | 15.57 | 3.52 | 0.15 | 28.78 | 16.13 | 2.22 |
| 1450 | 23.05 | 39.85 | 25.45 | 14.98 | 3.42 | 0.15 | 28.78 | 16.01 | 2.47 |
| 1500 | 23.06 | 40.67 | 25.80 | 14.33 | 3.71 | 0.14 | 28.71 | 16.09 | 2.33 |
| 1550 | 23.14 | 39.84 | 25.95 | 13.80 | 3.34 | 0.15 | 28.69 | 15.88 | 2.36 |
| 1600 | 23.19 | 39.33 | 26.13 | 13.36 | 3.13 | 0.16 | 28.60 | 15.62 | 2.31 |
| 1650 | 23.16 | 40.06 | 27.02 | 12.88 | 3.39 | 0.15 | 28.42 | 15.65 | 2.19 |
| 1700 | 23.22 | 39.58 | 27.82 | 12.44 | 3.18 | 0.16 | 28.28 | 15.75 | 2.34 |
| 1750 | 23.21 | 39.05 | 29.19 | 12.14 | 2.99 | 0.17 | 28.26 | 15.61 | 2.28 |
| 1800 | 23.20 | 39.28 | 30.49 | 11.72 | 3.05 | 0.16 | 28.17 | 15.69 | 2.31 |
| 1850 | 23.19 | 39.17 | 32.28 | 11.38 | 3.00 | 0.16 | 28.07 | 15.69 | 2.34 |
| 1900 | 23.16 | 39.00 | 33.65 | 11.21 | 2.95 | 0.17 | 28.10 | 15.66 | 2.31 |
| 1950 | 23.07 | 39.19 | 32.73 | 10.86 | 3.02 | 0.16 | 27.99 | 15.59 | 2.31 |
| 2000 | 22.99 | 39.42 | 30.42 | 10.66 | 3.11 | 0.16 | 27.93 | 15.60 | 2.34 |
| 2050 | 22.97 | 39.84 | 28.14 | 10.51 | 3.25 | 0.15 | 27.94 | 15.79 | 2.21 |
| 2100 | 22.84 | 39.64 | 25.71 | 10.36 | 3.21 | 0.15 | 27.90 | 15.88 | 2.38 |
| 2150 | 22.69 | 39.34 | 23.49 | 10.15 | 3.14 | 0.16 | 27.85 | 15.45 | 2.41 |
| 2200 | 22.52 | 39.38 | 21.51 | 10.04 | 3.20 | 0.16 | 27.78 | 15.38 | 2.33 |
| 2250 | 22.40 | 38.32 | 20.15 | 9.89 | 2.87 | 0.17 | 27.79 | 15.81 | 2.26 |
| 2300 | 22.24 | 39.40 | 18.74 | 9.78 | 3.27 | 0.16 | 27.79 | 15.35 | 2.45 |
| 2350 | 22.08 | 38.40 | 17.75 | 9.70 | 2.96 | 0.17 | 27.79 | 14.77 | 2.57 |
| 2400 | 21.89 | 38.60 | 16.66 | 9.60 | 3.07 | 0.17 | 27.79 | 15.66 | 2.45 |
| 2500 | 21.40 | 38.49 | 14.90 | 9.55 | 3.16 | 0.17 | 27.73 | 15.27 | 2.39 |

## *Typical Performance Data*

**Definitions:**
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: I = 64mA, Vd = 2.8V @Temperature = -40degC

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP3 Output | 1dB Comp. Output | Noise Figure |
|---|---|---|---|---|---|---|---|---|---|
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Delta | (dBm) | (dBm) | (dB) |
| 500 | 18.11 | 44.31 | 7.38 | 9.03 | 7.17 | 0.10 | 26.58 | 14.38 | 2.47 |
| 550 | 18.85 | 45.70 | 8.38 | 10.58 | 8.49 | 0.07 | 26.70 | 15.38 | 2.59 |
| 600 | 19.41 | 44.13 | 9.44 | 12.22 | 7.12 | 0.03 | 26.80 | 13.71 | 2.85 |
| 650 | 19.83 | 43.98 | 10.67 | 13.83 | 7.04 | 0.01 | 26.67 | 14.20 | 2.63 |
| 700 | 20.11 | 42.17 | 12.01 | 15.25 | 5.76 | 0.04 | 26.60 | 15.45 | 2.41 |
| 750 | 20.35 | 42.71 | 13.26 | 16.54 | 6.13 | 0.05 | 26.57 | 14.73 | 2.55 |
| 800 | 20.53 | 42.42 | 14.67 | 17.41 | 5.91 | 0.07 | 26.45 | 13.72 | 2.69 |
| 850 | 20.71 | 41.50 | 16.03 | 17.85 | 5.28 | 0.08 | 26.44 | 15.04 | 2.58 |
| 900 | 20.82 | 41.71 | 17.53 | 17.95 | 5.39 | 0.09 | 26.40 | 14.90 | 2.26 |
| 940 | 20.93 | 41.51 | 18.63 | 17.67 | 5.22 | 0.09 | 26.29 | 14.03 | 2.34 |
| 1000 | 21.02 | 41.63 | 20.39 | 17.13 | 5.26 | 0.10 | 26.23 | 14.69 | 2.40 |
| 1050 | 21.07 | 40.94 | 21.94 | 16.67 | 4.84 | 0.11 | 26.16 | 14.93 | 2.47 |
| 1100 | 21.17 | 40.98 | 23.37 | 16.16 | 4.81 | 0.11 | 26.18 | 14.30 | 2.37 |
| 1150 | 21.22 | 39.49 | 24.95 | 15.54 | 4.04 | 0.13 | 26.15 | 14.29 | 2.27 |
| 1200 | 21.28 | 40.54 | 25.94 | 14.88 | 4.49 | 0.12 | 26.18 | 14.67 | 2.36 |
| 1250 | 21.32 | 39.92 | 27.10 | 14.55 | 4.16 | 0.13 | 26.10 | 14.33 | 2.38 |
| 1300 | 21.38 | 39.64 | 27.80 | 14.06 | 4.00 | 0.13 | 26.03 | 14.44 | 2.25 |
| 1350 | 21.41 | 39.64 | 28.65 | 13.45 | 3.96 | 0.13 | 26.05 | 14.82 | 2.28 |
| 1400 | 21.47 | 38.61 | 28.84 | 13.04 | 3.49 | 0.15 | 26.11 | 14.65 | 2.24 |
| 1450 | 21.50 | 38.84 | 29.35 | 12.67 | 3.55 | 0.14 | 26.23 | 14.37 | 2.51 |
| 1500 | 21.51 | 38.99 | 30.71 | 12.18 | 3.59 | 0.14 | 26.19 | 14.43 | 2.37 |
| 1550 | 21.54 | 38.72 | 31.38 | 11.86 | 3.45 | 0.14 | 26.30 | 14.38 | 2.36 |
| 1600 | 21.58 | 38.81 | 32.26 | 11.53 | 3.45 | 0.14 | 26.28 | 14.11 | 2.32 |
| 1650 | 21.54 | 38.14 | 34.19 | 11.26 | 3.20 | 0.15 | 26.20 | 14.04 | 2.24 |
| 1700 | 21.60 | 38.28 | 35.41 | 10.90 | 3.21 | 0.15 | 26.01 | 14.20 | 2.37 |
| 1750 | 21.56 | 38.34 | 36.29 | 10.68 | 3.23 | 0.15 | 25.98 | 14.21 | 2.30 |
| 1800 | 21.57 | 38.71 | 36.06 | 10.34 | 3.34 | 0.14 | 25.88 | 14.19 | 2.33 |
| 1850 | 21.55 | 38.21 | 34.97 | 10.11 | 3.15 | 0.15 | 25.81 | 14.12 | 2.39 |
| 1900 | 21.52 | 38.57 | 32.80 | 9.96 | 3.27 | 0.14 | 25.80 | 14.20 | 2.35 |
| 1950 | 21.46 | 38.28 | 29.39 | 9.76 | 3.17 | 0.15 | 25.76 | 14.15 | 2.33 |
| 2000 | 21.41 | 38.07 | 27.61 | 9.52 | 3.10 | 0.15 | 25.72 | 13.95 | 2.35 |
| 2050 | 21.41 | 37.40 | 25.58 | 9.38 | 2.86 | 0.16 | 25.72 | 14.25 | 2.25 |
| 2100 | 21.27 | 37.58 | 23.74 | 9.26 | 2.95 | 0.16 | 25.70 | 14.42 | 2.42 |
| 2150 | 21.19 | 37.75 | 22.25 | 9.09 | 3.01 | 0.16 | 25.61 | 13.84 | 2.45 |
| 2200 | 21.04 | 37.38 | 20.53 | 8.92 | 2.92 | 0.16 | 25.59 | 13.75 | 2.35 |
| 2250 | 20.94 | 38.13 | 19.37 | 8.80 | 3.18 | 0.15 | 25.57 | 14.29 | 2.29 |
| 2300 | 20.81 | 36.89 | 18.27 | 8.70 | 2.80 | 0.17 | 25.61 | 13.78 | 2.48 |
| 2350 | 20.70 | 36.53 | 17.33 | 8.61 | 2.71 | 0.18 | 25.56 | 13.09 | 2.59 |
| 2400 | 20.56 | 36.71 | 16.32 | 8.43 | 2.78 | 0.18 | 25.54 | 14.10 | 2.47 |
| 2500 | 20.17 | 36.49 | 14.84 | 8.33 | 2.80 | 0.18 | 25.51 | 13.52 | 2.42 |

## *Typical Performance Data*

**Definitions:**
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: I = 72mA, Vd = 5V @Temperature = -40degC

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP3 Output | 1dB Comp. Output | Noise Figure |
|---|---|---|---|---|---|---|---|---|---|
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Delta | (dBm) | (dBm) | (dB) |
| 500 | 19.38 | 44.23 | 7.63 | 8.52 | 6.10 | 0.10 | 31.57 | 18.01 | 2.44 |
| 550 | 20.20 | 43.41 | 8.73 | 10.04 | 5.57 | 0.06 | 31.97 | 19.44 | 2.59 |
| 600 | 20.88 | 44.17 | 9.89 | 11.71 | 6.07 | 0.02 | 32.07 | 17.76 | 2.82 |
| 650 | 21.38 | 43.99 | 11.29 | 13.38 | 5.95 | 0.02 | 31.97 | 17.84 | 2.56 |
| 700 | 21.73 | 43.60 | 12.80 | 15.12 | 5.70 | 0.05 | 31.95 | 19.16 | 2.36 |
| 750 | 22.06 | 43.27 | 14.48 | 17.04 | 5.45 | 0.06 | 31.88 | 18.45 | 2.53 |
| 800 | 22.30 | 43.83 | 16.28 | 19.28 | 5.78 | 0.07 | 31.70 | 17.52 | 2.67 |
| 850 | 22.57 | 41.86 | 18.28 | 21.37 | 4.55 | 0.10 | 31.60 | 18.33 | 2.50 |
| 900 | 22.72 | 41.95 | 20.66 | 24.01 | 4.57 | 0.10 | 31.54 | 18.17 | 2.24 |
| 940 | 22.88 | 42.80 | 22.53 | 26.14 | 4.96 | 0.10 | 31.44 | 17.54 | 2.36 |
| 1000 | 23.07 | 42.73 | 26.07 | 28.52 | 4.84 | 0.10 | 31.41 | 17.88 | 2.38 |
| 1050 | 23.17 | 42.46 | 28.48 | 28.66 | 4.65 | 0.11 | 31.29 | 17.81 | 2.39 |
| 1100 | 23.31 | 41.49 | 29.52 | 27.17 | 4.10 | 0.12 | 31.14 | 17.29 | 2.35 |
| 1150 | 23.41 | 41.87 | 28.53 | 24.67 | 4.23 | 0.12 | 31.06 | 17.41 | 2.28 |
| 1200 | 23.54 | 41.08 | 26.65 | 22.73 | 3.81 | 0.13 | 30.80 | 17.28 | 2.37 |
| 1250 | 23.62 | 41.39 | 25.37 | 21.53 | 3.89 | 0.13 | 30.79 | 16.96 | 2.30 |
| 1300 | 23.74 | 40.64 | 24.19 | 20.21 | 3.53 | 0.14 | 30.64 | 17.26 | 2.21 |
| 1350 | 23.81 | 40.47 | 23.45 | 18.81 | 3.42 | 0.15 | 30.59 | 17.41 | 2.29 |
| 1400 | 23.91 | 41.26 | 23.06 | 17.88 | 3.67 | 0.14 | 30.42 | 16.98 | 2.23 |
| 1450 | 24.00 | 40.92 | 22.53 | 17.02 | 3.49 | 0.14 | 30.34 | 17.00 | 2.47 |
| 1500 | 24.01 | 40.69 | 22.73 | 16.05 | 3.38 | 0.15 | 30.24 | 17.06 | 2.33 |
| 1550 | 24.10 | 40.82 | 22.73 | 15.46 | 3.39 | 0.15 | 30.17 | 16.78 | 2.37 |
| 1600 | 24.16 | 40.52 | 22.86 | 14.85 | 3.24 | 0.15 | 30.02 | 16.55 | 2.34 |
| 1650 | 24.14 | 40.40 | 23.58 | 14.29 | 3.19 | 0.16 | 29.82 | 16.65 | 2.18 |
| 1700 | 24.21 | 40.65 | 24.10 | 13.73 | 3.25 | 0.15 | 29.75 | 16.73 | 2.31 |
| 1750 | 24.20 | 40.69 | 24.80 | 13.34 | 3.25 | 0.15 | 29.72 | 16.50 | 2.30 |
| 1800 | 24.17 | 40.63 | 25.93 | 12.88 | 3.23 | 0.16 | 29.65 | 16.62 | 2.34 |
| 1850 | 24.15 | 40.08 | 27.06 | 12.41 | 3.03 | 0.17 | 29.53 | 16.69 | 2.33 |
| 1900 | 24.10 | 40.65 | 28.16 | 12.29 | 3.24 | 0.16 | 29.56 | 16.63 | 2.31 |
| 1950 | 24.01 | 41.25 | 28.44 | 11.95 | 3.48 | 0.15 | 29.42 | 16.55 | 2.32 |
| 2000 | 23.91 | 40.38 | 27.85 | 11.65 | 3.18 | 0.16 | 29.40 | 16.62 | 2.36 |
| 2050 | 23.85 | 40.37 | 26.28 | 11.53 | 3.19 | 0.16 | 29.38 | 16.82 | 2.22 |
| 2100 | 23.69 | 39.97 | 24.93 | 11.34 | 3.10 | 0.16 | 29.35 | 16.81 | 2.38 |
| 2150 | 23.53 | 41.41 | 22.88 | 11.16 | 3.68 | 0.14 | 29.33 | 16.47 | 2.40 |
| 2200 | 23.34 | 40.02 | 20.88 | 11.06 | 3.21 | 0.16 | 29.24 | 16.45 | 2.32 |
| 2250 | 23.18 | 40.54 | 19.55 | 10.96 | 3.44 | 0.15 | 29.27 | 16.83 | 2.24 |
| 2300 | 22.97 | 40.30 | 18.21 | 10.89 | 3.41 | 0.16 | 29.24 | 16.36 | 2.45 |
| 2350 | 22.77 | 39.43 | 17.11 | 10.80 | 3.15 | 0.16 | 29.32 | 15.94 | 2.59 |
| 2400 | 22.54 | 39.61 | 16.14 | 10.71 | 3.27 | 0.16 | 29.26 | 16.72 | 2.46 |
| 2500 | 22.00 | 39.69 | 14.49 | 10.77 | 3.47 | 0.16 | 29.27 | 16.36 | 2.40 |

## *Typical Performance Data*

**Definitions:**
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: I = 78mA, Vd = 3.9V @Temperature = +85degC

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP3 Output | 1dB Comp. Output | Noise Figure |
|---|---|---|---|---|---|---|---|---|---|
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Delta | (dBm) | (dBm) | (dB) |
| 500 | 18.00 | 44.96 | 7.70 | 9.09 | 7.99 | 0.10 | 29.99 | 17.19 | 3.53 |
| 550 | 18.80 | 43.63 | 8.72 | 10.75 | 6.84 | 0.05 | 30.23 | 18.00 | 3.66 |
| 600 | 19.42 | 42.82 | 9.88 | 12.51 | 6.22 | 0.01 | 30.22 | 16.97 | 3.89 |
| 650 | 19.87 | 43.43 | 11.10 | 14.26 | 6.67 | 0.01 | 30.06 | 17.20 | 3.63 |
| 700 | 20.18 | 42.68 | 12.51 | 16.17 | 6.15 | 0.04 | 29.95 | 18.09 | 3.42 |
| 750 | 20.46 | 42.51 | 13.98 | 18.04 | 6.00 | 0.05 | 29.97 | 17.51 | 3.59 |
| 800 | 20.67 | 42.19 | 15.56 | 20.05 | 5.76 | 0.07 | 29.76 | 16.89 | 3.70 |
| 850 | 20.86 | 41.59 | 17.12 | 21.45 | 5.33 | 0.08 | 29.76 | 17.72 | 3.53 |
| 900 | 20.98 | 41.51 | 18.80 | 22.72 | 5.26 | 0.09 | 29.69 | 17.50 | 3.29 |
| 940 | 21.11 | 40.46 | 20.08 | 22.81 | 4.62 | 0.11 | 29.60 | 16.97 | 3.36 |
| 1000 | 21.23 | 40.96 | 21.96 | 22.40 | 4.84 | 0.11 | 29.54 | 17.36 | 3.43 |
| 1050 | 21.27 | 41.06 | 22.89 | 21.51 | 4.88 | 0.11 | 29.47 | 17.32 | 3.47 |
| 1100 | 21.37 | 40.60 | 23.77 | 20.60 | 4.58 | 0.12 | 29.38 | 16.68 | 3.39 |
| 1150 | 21.43 | 40.33 | 24.12 | 19.47 | 4.40 | 0.12 | 29.35 | 16.87 | 3.30 |
| 1200 | 21.49 | 40.23 | 23.87 | 18.51 | 4.31 | 0.12 | 29.26 | 17.03 | 3.38 |
| 1250 | 21.53 | 40.17 | 23.77 | 17.72 | 4.25 | 0.12 | 29.26 | 16.51 | 3.36 |
| 1300 | 21.60 | 39.69 | 23.29 | 16.98 | 3.98 | 0.13 | 29.15 | 16.81 | 3.26 |
| 1350 | 21.60 | 39.55 | 23.18 | 16.22 | 3.91 | 0.13 | 29.12 | 17.11 | 3.30 |
| 1400 | 21.63 | 40.12 | 23.10 | 15.49 | 4.13 | 0.13 | 29.12 | 16.76 | 3.24 |
| 1450 | 21.67 | 39.56 | 22.94 | 14.99 | 3.85 | 0.13 | 29.12 | 16.52 | 3.52 |
| 1500 | 21.68 | 39.24 | 23.24 | 14.49 | 3.70 | 0.14 | 29.07 | 16.69 | 3.39 |
| 1550 | 21.70 | 38.78 | 23.33 | 13.97 | 3.49 | 0.15 | 29.09 | 16.53 | 3.40 |
| 1600 | 21.71 | 39.45 | 23.71 | 13.44 | 3.74 | 0.14 | 29.01 | 16.16 | 3.36 |
| 1650 | 21.65 | 38.49 | 24.47 | 13.13 | 3.37 | 0.15 | 28.87 | 16.18 | 3.23 |
| 1700 | 21.67 | 38.73 | 24.95 | 12.75 | 3.44 | 0.15 | 28.72 | 16.44 | 3.39 |
| 1750 | 21.61 | 39.27 | 25.57 | 12.46 | 3.66 | 0.14 | 28.68 | 16.27 | 3.35 |
| 1800 | 21.56 | 39.15 | 26.27 | 12.11 | 3.62 | 0.14 | 28.62 | 16.28 | 3.36 |
| 1850 | 21.51 | 38.78 | 27.12 | 11.82 | 3.48 | 0.15 | 28.49 | 16.34 | 3.39 |
| 1900 | 21.44 | 38.96 | 27.16 | 11.62 | 3.57 | 0.14 | 28.51 | 16.40 | 3.38 |
| 1950 | 21.33 | 38.49 | 26.47 | 11.35 | 3.41 | 0.15 | 28.44 | 16.17 | 3.40 |
| 2000 | 21.24 | 38.94 | 25.53 | 11.20 | 3.62 | 0.14 | 28.44 | 16.18 | 3.42 |
| 2050 | 21.15 | 38.57 | 24.01 | 11.01 | 3.49 | 0.15 | 28.42 | 16.50 | 3.29 |
| 2100 | 20.98 | 38.32 | 22.58 | 10.85 | 3.45 | 0.15 | 28.40 | 16.50 | 3.48 |
| 2150 | 20.83 | 38.69 | 21.30 | 10.73 | 3.63 | 0.15 | 28.35 | 15.99 | 3.54 |
| 2200 | 20.63 | 38.48 | 19.81 | 10.53 | 3.61 | 0.15 | 28.27 | 16.10 | 3.45 |
| 2250 | 20.48 | 38.44 | 18.76 | 10.41 | 3.63 | 0.15 | 28.28 | 16.55 | 3.34 |
| 2300 | 20.28 | 38.17 | 17.69 | 10.34 | 3.58 | 0.15 | 28.30 | 16.01 | 3.58 |
| 2350 | 20.12 | 38.79 | 16.75 | 10.23 | 3.89 | 0.15 | 28.30 | 15.53 | 3.76 |
| 2400 | 19.89 | 37.69 | 15.77 | 10.11 | 3.50 | 0.16 | 28.31 | 16.38 | 3.63 |
| 2500 | 19.40 | 38.53 | 14.19 | 10.00 | 4.00 | 0.15 | 28.32 | 15.88 | 3.51 |

## *Typical Performance Data*

**Definitions:**
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: I = 75mA, Vd = 2.8V @Temperature = +85degC

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP3 Output | 1dB Comp. Output | Noise Figure |
|---|---|---|---|---|---|---|---|---|---|
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Delta | (dBm) | (dBm) | (dB) |
| 500 | 17.03 | 45.65 | 7.41 | 9.27 | 9.60 | 0.11 | 25.92 | 14.23 | 3.61 |
| 550 | 17.76 | 46.12 | 8.37 | 10.83 | 10.17 | 0.07 | 26.09 | 15.10 | 3.70 |
| 600 | 18.29 | 42.53 | 9.34 | 12.49 | 6.74 | 0.02 | 26.17 | 13.73 | 3.92 |
| 650 | 18.70 | 43.30 | 10.54 | 14.12 | 7.42 | 0.02 | 26.12 | 14.26 | 3.70 |
| 700 | 18.99 | 42.92 | 11.71 | 15.52 | 7.12 | 0.04 | 26.10 | 15.29 | 3.47 |
| 750 | 19.23 | 41.56 | 12.87 | 16.69 | 6.09 | 0.06 | 26.10 | 14.60 | 3.61 |
| 800 | 19.37 | 40.65 | 14.16 | 17.61 | 5.50 | 0.08 | 26.00 | 13.89 | 3.74 |
| 850 | 19.54 | 40.51 | 15.33 | 18.00 | 5.38 | 0.09 | 26.02 | 15.04 | 3.61 |
| 900 | 19.62 | 40.91 | 16.49 | 17.92 | 5.62 | 0.09 | 26.03 | 14.90 | 3.34 |
| 940 | 19.72 | 39.84 | 17.49 | 17.74 | 4.95 | 0.10 | 25.94 | 14.16 | 3.38 |
| 1000 | 19.79 | 40.53 | 18.83 | 17.19 | 5.32 | 0.10 | 25.97 | 14.76 | 3.46 |
| 1050 | 19.81 | 39.51 | 19.77 | 16.70 | 4.74 | 0.11 | 25.88 | 15.00 | 3.53 |
| 1100 | 19.88 | 39.68 | 20.73 | 16.14 | 4.79 | 0.11 | 25.92 | 14.24 | 3.43 |
| 1150 | 19.91 | 39.76 | 21.57 | 15.55 | 4.81 | 0.11 | 25.90 | 14.39 | 3.31 |
| 1200 | 19.96 | 39.49 | 22.20 | 15.02 | 4.62 | 0.12 | 25.99 | 14.84 | 3.41 |
| 1250 | 19.97 | 38.95 | 22.94 | 14.60 | 4.34 | 0.13 | 25.95 | 14.45 | 3.43 |
| 1300 | 20.03 | 38.68 | 23.32 | 14.14 | 4.17 | 0.13 | 25.92 | 14.53 | 3.29 |
| 1350 | 20.02 | 38.65 | 23.94 | 13.64 | 4.14 | 0.13 | 25.96 | 14.99 | 3.32 |
| 1400 | 20.03 | 38.72 | 24.46 | 13.12 | 4.15 | 0.13 | 26.06 | 14.90 | 3.27 |
| 1450 | 20.06 | 38.89 | 24.73 | 12.83 | 4.20 | 0.13 | 26.20 | 14.53 | 3.57 |
| 1500 | 20.04 | 38.62 | 25.44 | 12.51 | 4.07 | 0.13 | 26.21 | 14.69 | 3.43 |
| 1550 | 20.05 | 38.27 | 26.11 | 12.14 | 3.89 | 0.13 | 26.40 | 14.69 | 3.43 |
| 1600 | 20.04 | 38.48 | 26.54 | 11.78 | 3.96 | 0.13 | 26.44 | 14.40 | 3.37 |
| 1650 | 20.01 | 37.86 | 27.59 | 11.56 | 3.70 | 0.14 | 26.41 | 14.33 | 3.30 |
| 1700 | 20.02 | 37.88 | 27.75 | 11.24 | 3.68 | 0.14 | 26.19 | 14.56 | 3.46 |
| 1750 | 19.95 | 37.46 | 28.26 | 11.00 | 3.53 | 0.14 | 26.21 | 14.66 | 3.37 |
| 1800 | 19.91 | 37.50 | 27.96 | 10.74 | 3.54 | 0.14 | 26.11 | 14.52 | 3.38 |
| 1850 | 19.88 | 38.20 | 27.68 | 10.52 | 3.82 | 0.13 | 26.06 | 14.48 | 3.46 |
| 1900 | 19.83 | 37.10 | 26.67 | 10.34 | 3.38 | 0.15 | 26.10 | 14.73 | 3.48 |
| 1950 | 19.73 | 37.19 | 25.23 | 10.10 | 3.44 | 0.15 | 26.11 | 14.56 | 3.43 |
| 2000 | 19.66 | 37.31 | 24.08 | 9.94 | 3.49 | 0.14 | 26.11 | 14.40 | 3.44 |
| 2050 | 19.61 | 36.34 | 22.59 | 9.84 | 3.15 | 0.16 | 26.10 | 14.79 | 3.33 |
| 2100 | 19.49 | 36.54 | 21.47 | 9.67 | 3.24 | 0.16 | 26.13 | 14.95 | 3.55 |
| 2150 | 19.35 | 36.80 | 20.31 | 9.47 | 3.36 | 0.15 | 26.07 | 14.29 | 3.59 |
| 2200 | 19.18 | 36.84 | 18.96 | 9.35 | 3.42 | 0.15 | 26.04 | 14.39 | 3.47 |
| 2250 | 19.07 | 37.45 | 18.09 | 9.19 | 3.67 | 0.15 | 26.05 | 14.93 | 3.39 |
| 2300 | 18.92 | 36.73 | 17.14 | 9.11 | 3.43 | 0.16 | 26.13 | 14.44 | 3.63 |
| 2350 | 18.77 | 36.11 | 16.27 | 8.98 | 3.23 | 0.17 | 26.06 | 13.74 | 3.80 |
| 2400 | 18.61 | 36.62 | 15.35 | 8.84 | 3.45 | 0.16 | 26.11 | 14.78 | 3.67 |
| 2500 | 18.17 | 36.40 | 13.89 | 8.71 | 3.48 | 0.17 | 26.09 | 14.17 | 3.59 |

## *Typical Performance Data*

**Definitions:**
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

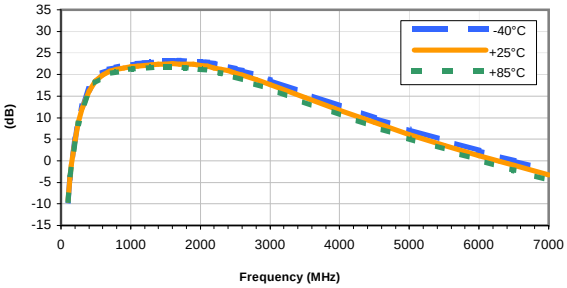
TEST CONDITIONS: I = 80mA, Vd = 5V @Temperature = +85degC

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP3 Output | 1dB Comp. Output | Noise Figure |
|---|---|---|---|---|---|---|---|---|---|
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Delta | (dBm) | (dBm) | (dB) |
| 500 | 18.50 | 45.77 | 7.80 | 8.86 | 8.26 | 0.11 | 31.47 | 18.63 | 3.54 |
| 550 | 19.32 | 44.19 | 8.87 | 10.49 | 6.86 | 0.05 | 32.01 | 19.64 | 3.67 |
| 600 | 19.96 | 42.83 | 10.05 | 12.18 | 5.85 | 0.01 | 32.05 | 18.34 | 3.88 |
| 650 | 20.45 | 43.10 | 11.41 | 13.91 | 6.02 | 0.02 | 31.92 | 18.55 | 3.63 |
| 700 | 20.83 | 41.66 | 12.96 | 15.83 | 5.10 | 0.05 | 31.89 | 19.67 | 3.41 |
| 750 | 21.11 | 43.50 | 14.54 | 17.91 | 6.27 | 0.05 | 31.95 | 18.95 | 3.59 |
| 800 | 21.35 | 42.78 | 16.38 | 20.27 | 5.73 | 0.07 | 31.74 | 18.19 | 3.72 |
| 850 | 21.60 | 42.50 | 18.27 | 22.83 | 5.47 | 0.08 | 31.61 | 19.03 | 3.54 |
| 900 | 21.74 | 41.31 | 20.36 | 25.91 | 4.76 | 0.10 | 31.58 | 18.69 | 3.29 |
| 940 | 21.88 | 42.11 | 21.93 | 28.56 | 5.14 | 0.10 | 31.56 | 18.13 | 3.39 |
| 1000 | 22.04 | 41.90 | 23.91 | 31.23 | 4.95 | 0.10 | 31.44 | 18.53 | 3.45 |
| 1050 | 22.12 | 41.38 | 24.67 | 29.40 | 4.63 | 0.11 | 31.40 | 18.37 | 3.46 |
| 1100 | 22.23 | 40.71 | 24.63 | 27.01 | 4.24 | 0.12 | 31.25 | 17.71 | 3.37 |
| 1150 | 22.30 | 41.14 | 24.01 | 24.67 | 4.40 | 0.12 | 31.23 | 17.97 | 3.32 |
| 1200 | 22.39 | 40.27 | 23.10 | 22.63 | 3.94 | 0.13 | 31.03 | 17.96 | 3.39 |
| 1250 | 22.42 | 40.14 | 22.49 | 21.23 | 3.86 | 0.13 | 30.97 | 17.45 | 3.36 |
| 1300 | 22.52 | 40.33 | 21.54 | 20.03 | 3.89 | 0.13 | 30.83 | 17.82 | 3.25 |
| 1350 | 22.56 | 39.90 | 21.28 | 18.90 | 3.68 | 0.14 | 30.78 | 18.05 | 3.35 |
| 1400 | 22.60 | 39.68 | 20.99 | 17.78 | 3.55 | 0.14 | 30.71 | 17.61 | 3.27 |
| 1450 | 22.65 | 40.25 | 20.78 | 17.06 | 3.75 | 0.13 | 30.63 | 17.48 | 3.49 |
| 1500 | 22.66 | 40.55 | 20.94 | 16.39 | 3.86 | 0.13 | 30.55 | 17.66 | 3.38 |
| 1550 | 22.68 | 40.22 | 21.00 | 15.69 | 3.71 | 0.14 | 30.50 | 17.45 | 3.43 |
| 1600 | 22.70 | 39.55 | 21.21 | 15.07 | 3.42 | 0.15 | 30.37 | 17.07 | 3.37 |
| 1650 | 22.64 | 40.28 | 21.63 | 14.70 | 3.73 | 0.13 | 30.17 | 17.20 | 3.23 |
| 1700 | 22.64 | 40.76 | 22.11 | 14.20 | 3.92 | 0.13 | 30.05 | 17.43 | 3.38 |
| 1750 | 22.57 | 39.43 | 22.54 | 13.82 | 3.40 | 0.15 | 30.03 | 17.15 | 3.38 |
| 1800 | 22.51 | 40.46 | 23.27 | 13.45 | 3.83 | 0.14 | 29.94 | 17.17 | 3.38 |
| 1850 | 22.45 | 40.06 | 24.00 | 13.13 | 3.67 | 0.14 | 29.85 | 17.35 | 3.38 |
| 1900 | 22.36 | 40.06 | 24.34 | 12.87 | 3.70 | 0.14 | 29.89 | 17.31 | 3.38 |
| 1950 | 22.23 | 39.83 | 24.15 | 12.67 | 3.65 | 0.15 | 29.77 | 17.08 | 3.42 |
| 2000 | 22.11 | 39.76 | 23.76 | 12.42 | 3.66 | 0.15 | 29.75 | 17.15 | 3.43 |
| 2050 | 21.99 | 40.78 | 22.74 | 12.27 | 4.15 | 0.13 | 29.72 | 17.48 | 3.27 |
| 2100 | 21.80 | 39.36 | 21.86 | 12.17 | 3.61 | 0.15 | 29.70 | 17.45 | 3.47 |
| 2150 | 21.61 | 39.96 | 20.48 | 12.01 | 3.92 | 0.14 | 29.69 | 17.01 | 3.56 |
| 2200 | 21.36 | 40.56 | 19.31 | 11.88 | 4.29 | 0.13 | 29.56 | 17.10 | 3.45 |
| 2250 | 21.19 | 39.90 | 18.35 | 11.79 | 4.05 | 0.14 | 29.65 | 17.57 | 3.33 |
| 2300 | 20.96 | 40.44 | 17.21 | 11.77 | 4.39 | 0.13 | 29.63 | 17.01 | 3.58 |
| 2350 | 20.74 | 39.30 | 16.32 | 11.66 | 3.94 | 0.15 | 29.70 | 16.64 | 3.76 |
| 2400 | 20.51 | 39.25 | 15.43 | 11.52 | 3.99 | 0.15 | 29.64 | 17.42 | 3.63 |
| 2500 | 19.93 | 40.02 | 13.85 | 11.53 | 4.58 | 0.14 | 29.65 | 16.92 | 3.51 |

## *Typical Performance Curves*

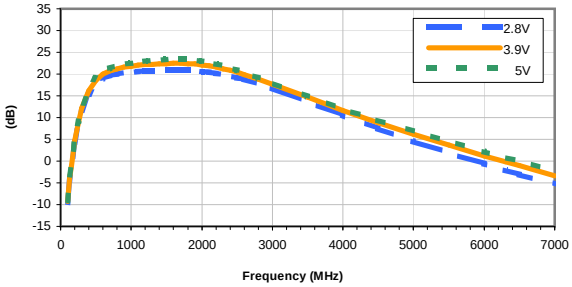
**GAIN vs. TEMPERATURE**

INPUT POWER = -25, VOLTAGE = 3.9V



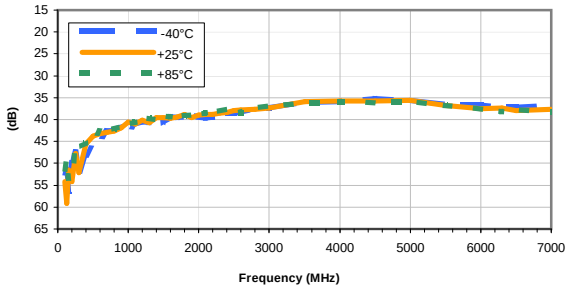

**GAIN vs. VOLTAGE**

INPUT POWER = -25, Temperature = +25°C



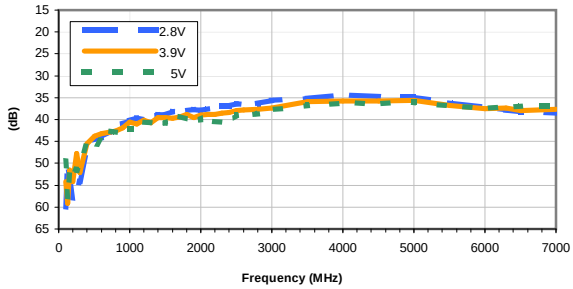

**ISOLATION vs. TEMPERATURE**

INPUT POWER = -25, VOLTAGE = 3.9V



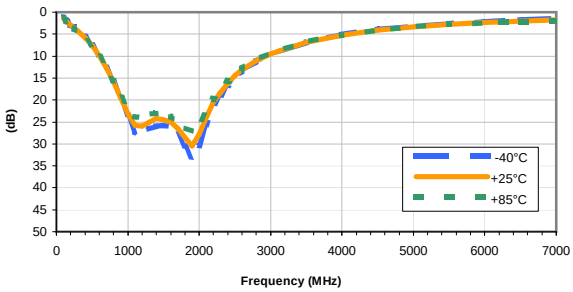

**ISOLATION vs. VOLTAGE**

INPUT POWER = -25, Temperature = +25°C



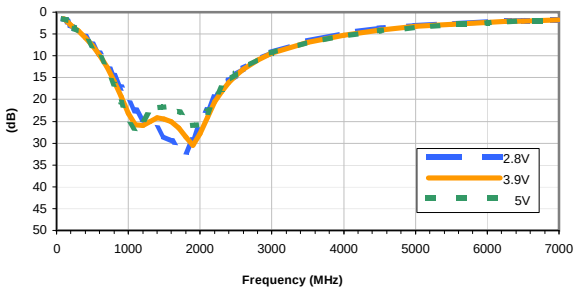

**INPUT RETURN LOSS vs. TEMPERATURE**

INPUT POWER = -25, VOLTAGE = 3.9V



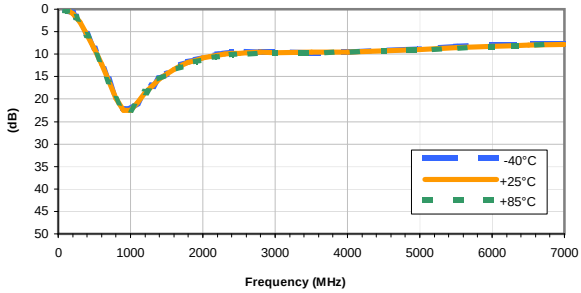

**INPUT RETURN LOSS vs. VOLTAGE**

INPUT POWER = -25, Temperature = +25°C



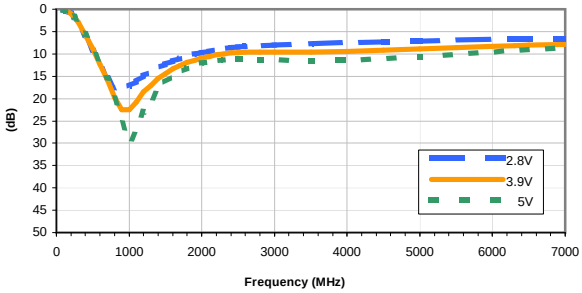

**OUTPUT RETURN LOSS vs. TEMPERATURE**

INPUT POWER = -25, VOLTAGE = 3.9V




**OUTPUT RETURN LOSS vs. VOLTAGE**

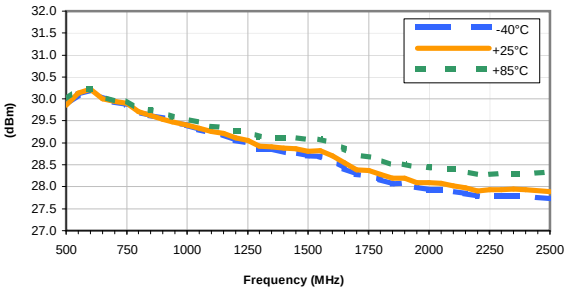
INPUT POWER = -25, Temperature = +25°C



## *Typical Performance Curves*

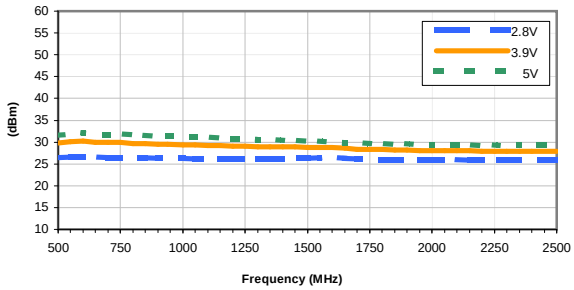
**OUTPUT IP3 vs. TEMPERATURE**

INPUT POWER = -25, VOLTAGE = 3.9V



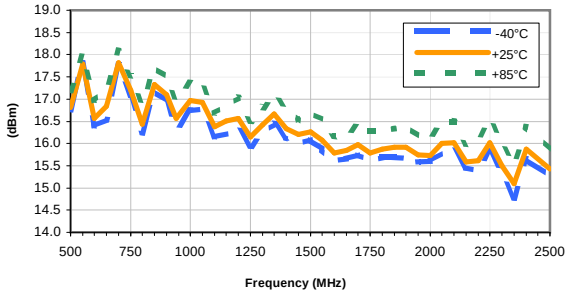

**OUTPUT IP-3 vs. VOLTAGE**

INPUT POWER = -25, Temperature = +25°C



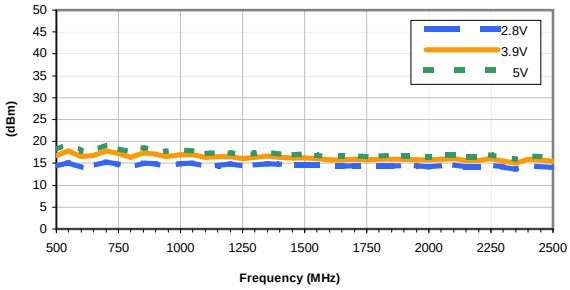

**OUTPUT POWER at 1dB Compression vs. TEMPERATURE**

VOLTAGE = 3.9V



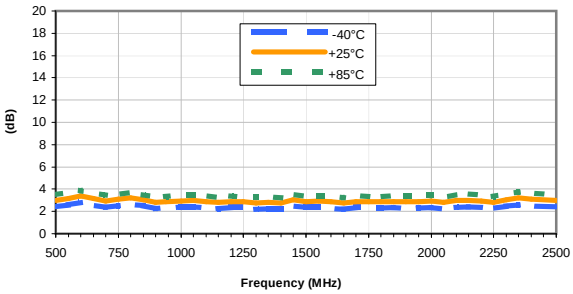

**OUTPUT POWER at 1dB Compression vs. VOLTAGE**

Temperature = +25°C



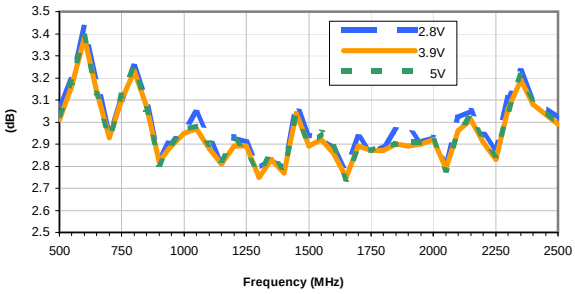

**Noise Figure vs. TEMPERATURE**

VOLTAGE = 3.9V




**Noise Figure vs. VOLTAGE**

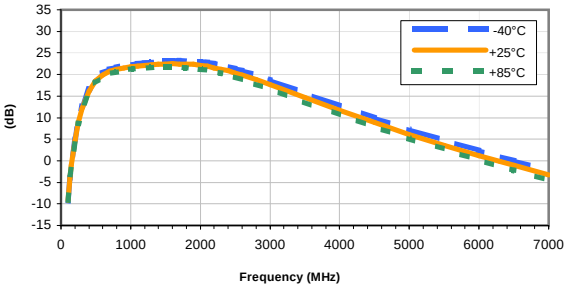
Temperature = +25°C



## *Typical Performance Curves*

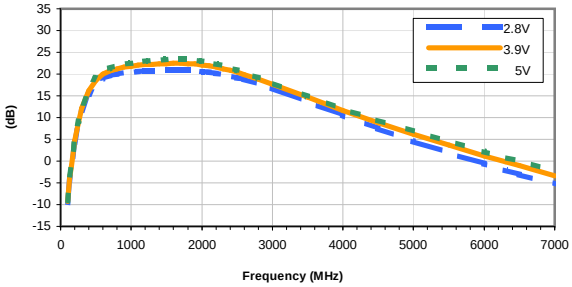
**GAIN vs. TEMPERATURE**

INPUT POWER = -25, VOLTAGE = 3.9V



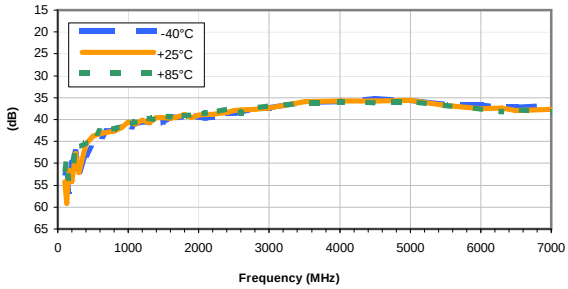

**GAIN vs. VOLTAGE**

INPUT POWER = -25, Temperature = +25°C



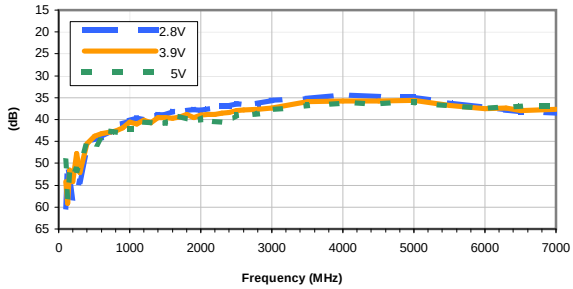

**ISOLATION vs. TEMPERATURE**

INPUT POWER = -25, VOLTAGE = 3.9V



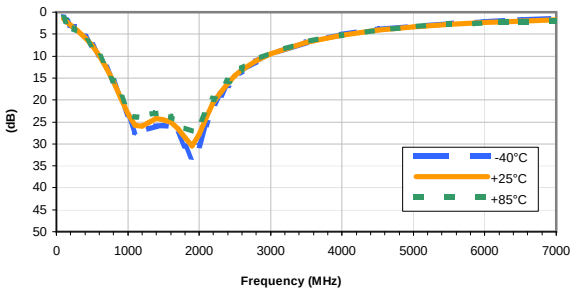

**ISOLATION vs. VOLTAGE**

INPUT POWER = -25, Temperature = +25°C



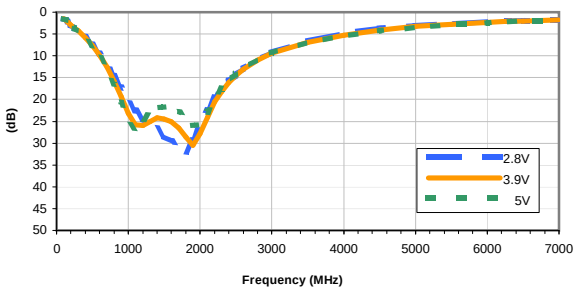

**INPUT RETURN LOSS vs. TEMPERATURE**

INPUT POWER = -25, VOLTAGE = 3.9V



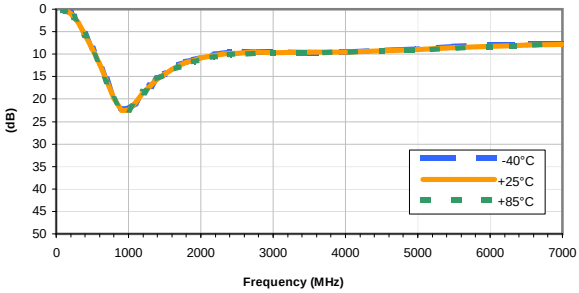

**INPUT RETURN LOSS vs. VOLTAGE**

INPUT POWER = -25, Temperature = +25°C



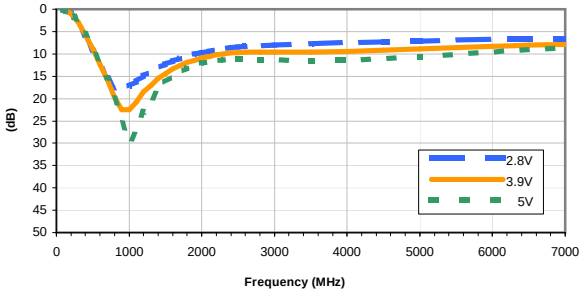

**OUTPUT RETURN LOSS vs. TEMPERATURE**

INPUT POWER = -25, VOLTAGE = 3.9V




**OUTPUT RETURN LOSS vs. VOLTAGE**

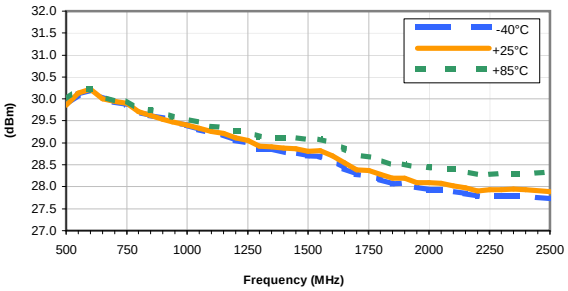
INPUT POWER = -25, Temperature = +25°C



## *Typical Performance Curves*

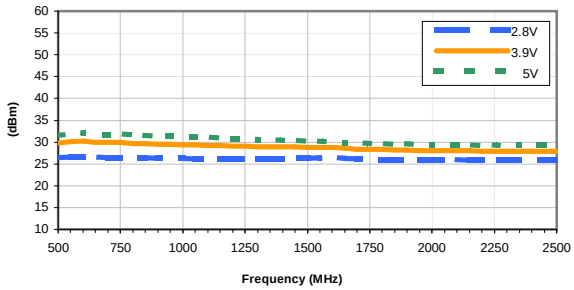
**OUTPUT IP3 vs. TEMPERATURE**

INPUT POWER = -25, VOLTAGE = 3.9V



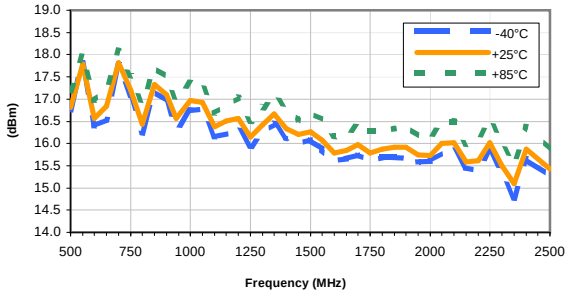

**OUTPUT IP-3 vs. VOLTAGE**

INPUT POWER = -25, Temperature = +25°C



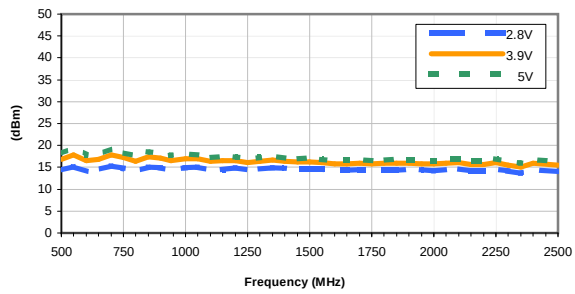

**OUTPUT POWER at 1dB Compression vs. TEMPERATURE**

VOLTAGE = 3.9V



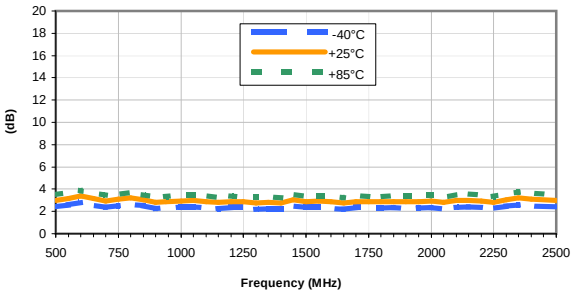

**OUTPUT POWER at 1dB Compression vs. VOLTAGE**

Temperature = +25°C



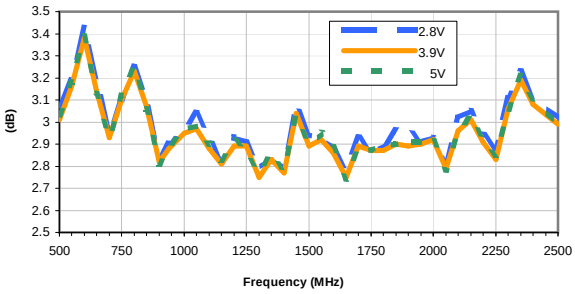

**Noise Figure vs. TEMPERATURE**

VOLTAGE = 3.9V




**Noise Figure vs. VOLTAGE**

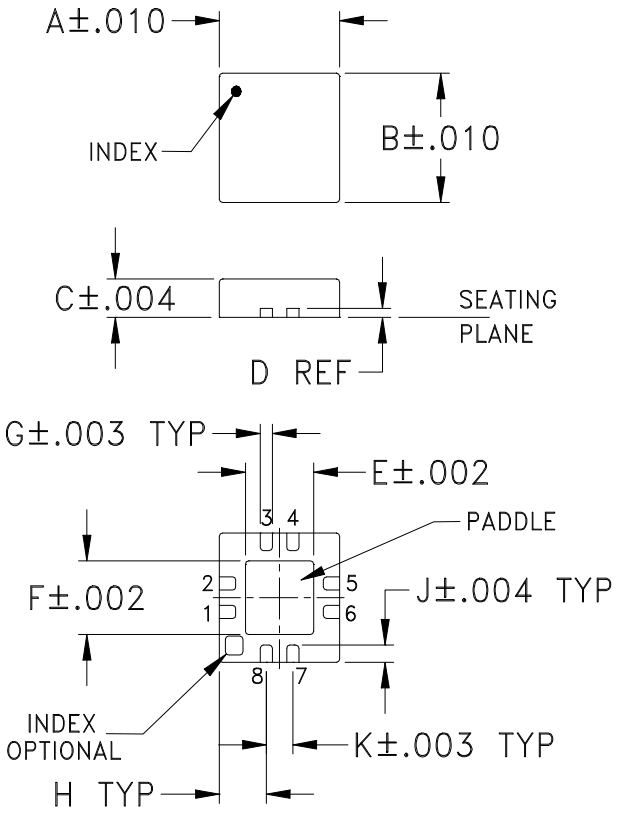
Temperature = +25°C



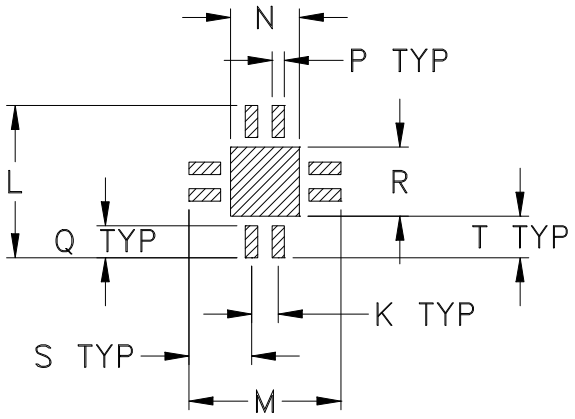
# Case Style DQ

**DQ849**

## Outline Dimensions




## PCB Land Pattern




Suggested Layout,
Tolerance to be within ±.002

| CASE # | A | B | C | D | E | F | G | H | J | K | L | M | N |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DQ849 | .118 (3.00) | .118 (3.00) | .035 (0.89) | .008 (0.20) | .067 (1.70) | .067 (1.70) | .012 (0.30) | .046 (1.17) | .016 (0.41) | .026 (0.66) | .148 (3.76) | .148 (3.76) | .067 (1.70) |

| CASE # | P | Q | R | S | T | WT. GRAM |
|---|---|---|---|---|---|---|
| DQ849 | .012 (0.30) | .031 (0.79) | .067 (1.70) | .061 (1.55) | .041 (1.04) | .02 |

**Dimensions are in inches (mm). Tolerances: 2Pl. ± .01; 3 Pl. ± .004**

### Notes:

1. Case material: Plastic.
2. Termination finish:
   For RoHS Case Styles: Tin-Silver alloy plate over Nickel barrier or Matte-Tin plated. All models, (+) suffix. See Data sheet.
   For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.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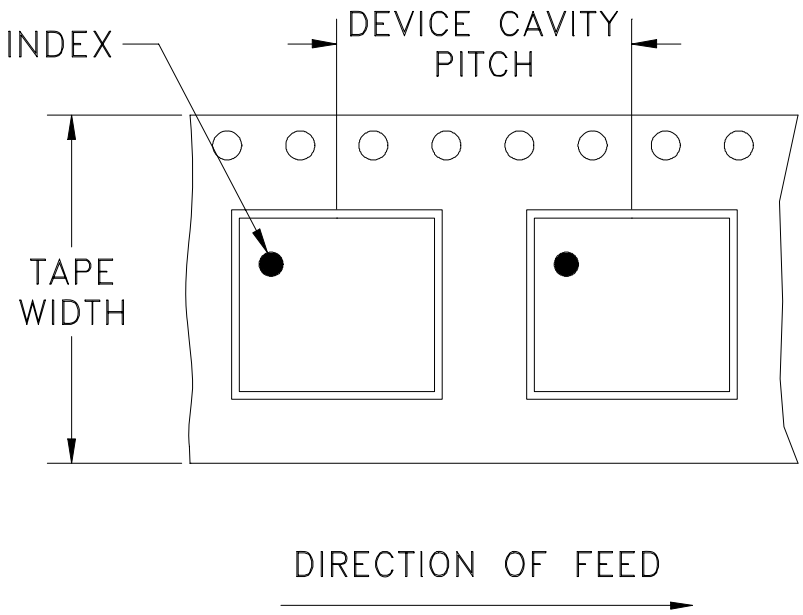
# Tape & Reel Packaging TR-F104

DEVICE ORIENTATION IN T&R




| Tape Width, mm | Device Cavity Pitch, mm | Reel Size, inches | Devices per Reel | |
|---|---|---|---|---|
| 8 | 4 | 7 | Small quantity standards (see note) | 20 |
| | | | | 50 |
| | | | | 100 |
| | | | | 200 |
| | | | | 500 |
| | | | | 1000 |
| | | 7 | Standard | 2000 |

Note: Please Consult individual model data sheet to determine device per reel availability.

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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P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
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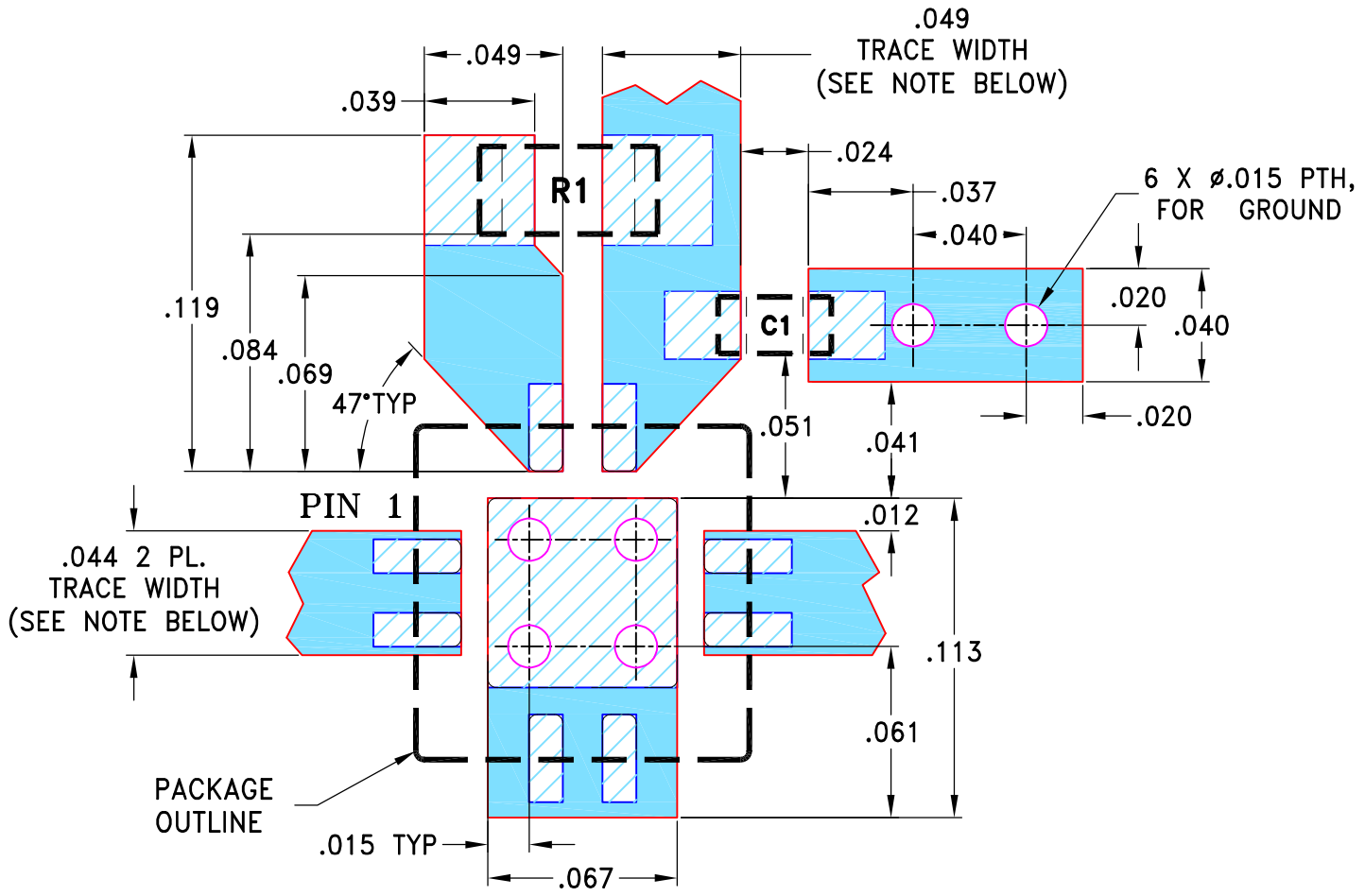
THIRD ANGLE PROJECTION

| REVISIONS | | | | | |
|---|---|---|---|---|---|
| REV | ECN No. | DESCRIPTION | DATE | DR | AUTH |
| OR | M82272 | NEW RELEASE | 08/05/02 | GF | DJ |
| A | M82598 | MODIFIED LAYOUT | 08/12/02 | GF | MM |
| B | M102713 | ADDED "...WITH SMOBC" | 01/14/06 | GF | IL |
| C | ECO-003400 | REMOVED COMP. VALUE, ADDED NOTE REF. TO EVAL. BOARD | 07/23/20 | ITG | IL |

# SUGGESTED MOUNTING CONFIGURATION FOR DQ849 CASE STYLE




RESISTOR R1: 0603 SIZE

CAPACITOR C1: 0402 SIZE

## NOTES:

1. LINE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020±.0015"; COPPER: 1/2 OZ. FOR OTHER MATERIALS LINE WIDTH MAY NEED TO BE MODIFIED.
2. FOR "R1" & "C1" VALUES REFER TO THE CORRESPONDING EVALUATION BOARD TB-186-XX+.
3. 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 | DRAWN | GF | 07/19/02 |
| TOLERANCES ON: | CHECKED | LC | 08/01/02 |
| 2 PL DECIMALS ± | APPROVED | DJ | 08/05/02 |
| 3 PL DECIMALS ± .005 | | | |
| ANGLES ± | | | |
| FRACTIONS ± | | | |



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

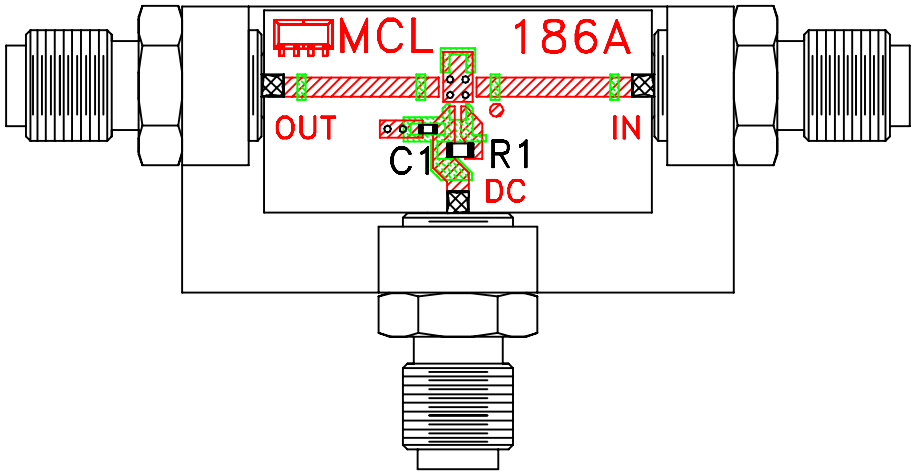
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, DQ849, TB-186-XX+

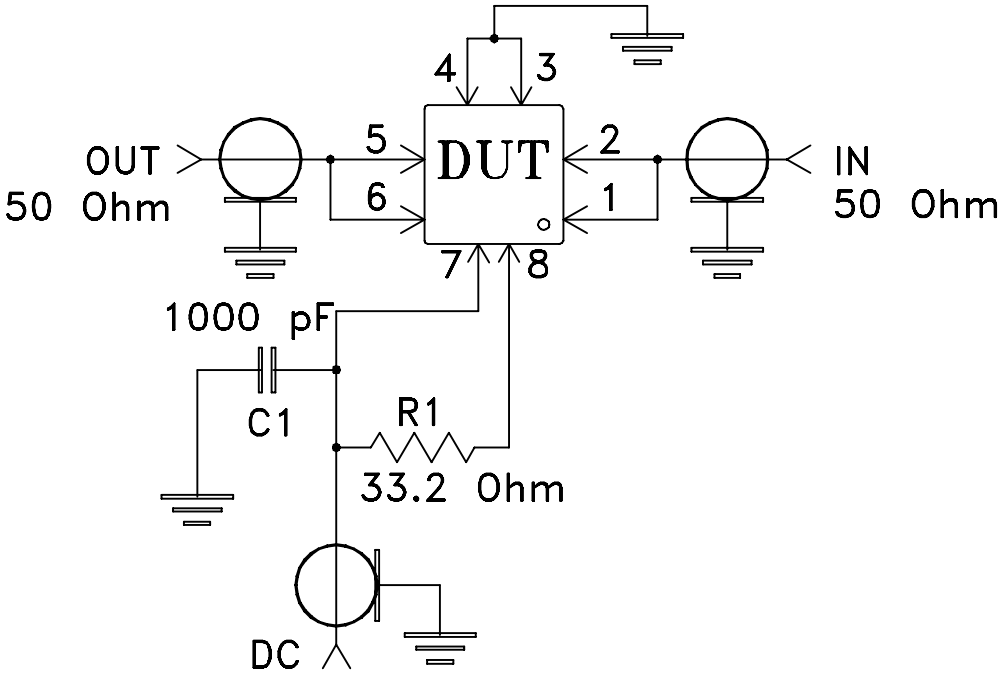
| SIZE | CODE IDENT | DRAWING NO: | REV: |
|---|---|---|---|
| A | 15542 | 98-PL-078 | C |

| FILE: | SCALE: | SHEET: |
|---|---|---|
| 98PL078 | 15:1 | 1 OF 1 |

# Evaluation Board and Circuit




TB-186+




Schematic Diagram

## Notes:

1. SMA Female connectors.
2. PCB Material: Rogers RO4350 or equivalent, Dielectric Constant=3.5, Thickness=.020 inch.
3. Pins 1 and 6 have no internal connecton.
4. Paddle underneath DUt must be grounded.

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# Environmental Specifications ENV08T1

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 or -45° to 85° C or -55° to 105° C or -40° to 105° C or -40° to 95° C<br>Ambient Environment | Individual Model Data Sheet |
| Storage Temperature | -55° to 100° C or -65° to 150°<br>Ambient Environment | Individual Model Data Sheet |
| HTOL | 1000 hours at 125°C | MIL-STD-883, Method 1005, Condition B |
| Thermal Shock | -55° to 100°C, 100 cycles | MIL-STD-202, Method 107, Condition A-3, except +100°C |
| Mechanical Shock | 1.5Kg, 0.5 ms, 5 shock pulses, Y1 direction only | MIL-STD-883, Method 2002, Condition B, except Y1 direction only |
| Vibration (Variable Frequency) | 50g peak | MIL-STD-883, Method 2007, Condition B |
| Autoclave | 15 psig, 100% RH, 121°C, 96 hours | JESD22-A102, Condition C |
| HAST | 130°C, 85% RH, 96 hours | JESD22-A110 |
| Solderability | 10X Magnification | J-STD-002, Para 4.2.5, Test S, 95% Coverage |
| Solder Reflow Heat | Sn-Pb Eutetic Process: 240°C peak<br>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<br>Soak at 85°C/85% RH for 168 hours, Reflow 3 cycles at 260°C peak | J-STD-020 |

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| Specification | Test/Inspection Condition | Reference/Spec |
|---|---|---|
| Marking Resistance to Solvents | Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C;<br>distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C | MIL-STD-202, Method 215 |