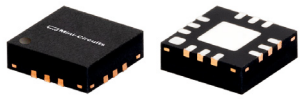
LOW NOISE, HIGH GAIN

# Monolithic Amplifier PMA3-63GLN+

50Ω 1.8 to 6.0 GHz

## THE BIG DEAL

- Flat gain over wideband
- Low noise figure, 0.6 dB typ.
- High gain, up to 29.7 dB typ.
- High IP3, +28.6 dBm typ.
- Excellent gain flatness, ±1.6 dB over 2.5 to 6 GHz
- Low Additive Phase Noise



*Generic photo used for illustration purposes only*

CASE STYLE: DQ1225

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

## APPLICATIONS

- 5G
- WiFi
- WLAN
- UMTS
- LTE
- WiMAX
- S-band Radar
- C-band Satcom

## PRODUCT OVERVIEW

The PMA3-63GLN+ is a PHEMT based wideband, low noise MMIC amplifier with a unique combination of low noise, high IP3, and flat gain over wideband making it ideal for sensitive, high-dynamic-range S-band receiver applications. This design operates on a single +5 V supply, is well matched for 50Ω and comes in a tiny, low profile package (3 x 3 x 0.89mm), accommodating dense circuit board layouts.

## KEY FEATURES

| Feature | Advantages |
|---|---|
| Low noise, 0.6 dB at 2.5 GHz | Enables lower system noise figure performance. |
| Wide bandwidth with flat gain<br>• ±1.6 dB over 2.5 to 5 GHz | Enables a single amplifier to be used in many wideband applications including defense, instrumentation and more. |
| High Gain, 29.7 dB at 2.5 GHz | Enables signal amplification without the need for multiple gain stage. Thus minimize effect of subsequent stages on noise figure. |
| High IP3<br>• +28.6 dBm at 2.5 GHz | Combination of low noise and high IP3 makes this MMIC amplifier ideal for use in low noise receiver front end (RFE) as it gives the user advantages of sensitivity and two-tone IM performance at both ends of the dynamic range. |
| 3 x 3mm 12-lead MCLP package | Tiny footprint saves space in dense layouts while providing low inductance, repeatable transitions, and excellent thermal contact to the PCB. |

REV. B
ECO-010881
PMA3-63GLN+
RS/CP/AM
240401

## ELECTRICAL SPECIFICATIONS[1] AT +25°C AND +5 V, UNLESS NOTED OTHERWISE

| Parameter | Condition (GHz) | $V_{DD}$= +5 V Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Frequency Range | | 1.8 | | 6.0 | GHz |
| Noise Figure | 1.8 | | 0.8 | | dB |
| | 2.5 | | 0.6 | | |
| | 3.5 | | 0.7 | 1.5 | |
| | 5 | | 0.9 | | |
| | 6 | | 1.1 | | |
| Gain | 1.8 | 28.5 | 31.7 | 34.8 | dB |
| | 2.5 | | 29.7 | | |
| | 3.5 | 25 | 27.9 | 30.6 | |
| | 5 | | 26.5 | | |
| | 6 | 22 | 24.9 | 26.9 | |
| Input Return Loss | 1.8 | | 7 | | dB |
| | 2.5 | | 10 | | |
| | 3.5 | | 11 | | |
| | 5 | | 10 | | |
| | 6 | | 12 | | |
| Output Return Loss | 1.8 | | 10 | | dB |
| | 2.5 | | 10 | | |
| | 3.5 | | 10 | | |
| | 5 | | 16 | | |
| | 6 | | 22 | | |
| Output Power at 1dB Compression | 1.8 | | +15.2 | | dBm |
| | 2.5 | | +14.8 | | |
| | 3.5 | +12.4 | +14.1 | | |
| | 5 | | +11.5 | | |
| | 6 | | +10.7 | | |
| Output IP3 | 1.8 | | +28.8 | | dBm |
| | 2.5 | | +28.6 | | |
| | 3.5 | +22.1 | +26.6 | | |
| | 5 | | +23.4 | | |
| | 6 | | +22.3 | | |
| Device Operating Voltage ($V_{DD}$) | | | 5.0 | | V |
| Device Operating Current ($I_{DD}$) | | - | 69 | 80 | mA |
| Device Current Variation vs. Temperature[2] | | | -26.9 | | µA/°C |
| Device Current Variation vs. Voltage | | | 0.006 | | mA/mV |
| Thermal Resistance, junction-to-ground lead | | | 57.3 | | °C/W |

1. Measured on Mini-Circuits Characterization test board TB-PMA3-63GLN+ with tested board loss being deducted. See Characterization Test Circuit (Fig. 1)
2. (Current at 85°C - Current at -45°C)/130

## ABSOLUTE MAXIMUM RATINGS[3]

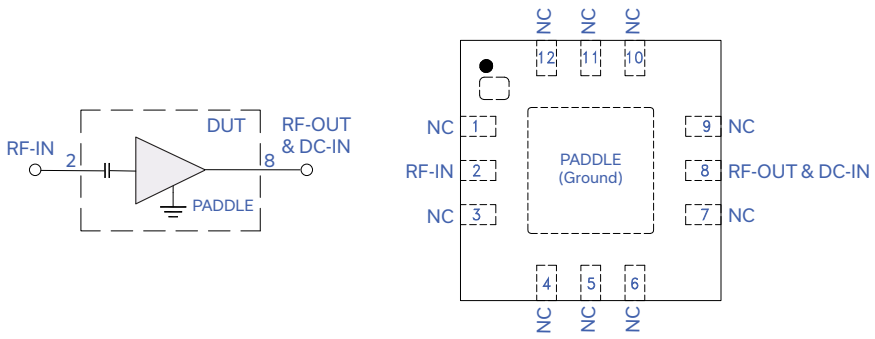
| Parameter | Ratings |
|---|---|
| Operating Temperature (ground lead) | -40°C to +85°C |
| Storage Temperature | -65°C to +150°C |
| Junction Temperature | +150°C |
| Total Power Dissipation | 1.0 W |
| Input Power (CW), Vd=5V | +29 dBm (5 minutes max.)<br>+10 dBm (continuous) |
| DC Voltage | +8.5 V |

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

# Monolithic Amplifier PMA3-63GLN+

50Ω 1.8 to 6.0 GHz

## SIMPLIFIED SCHEMATIC & PAD DESCRIPTION




| Function | Pad Number | Description (Fig. 1) |
|---|---|---|
| RF-IN | 2 | Connects to RF input via C1 |
| RF-OUT & DC-IN | 8 | Connects to RF output via C2 and $V_{DD}$ via L1 |
| Ground | Paddle | Connects to ground |
| No Connection | 1,3 to 7, 9 to 12 | Not used internally. Connected to ground on test board |

## RECOMMENDED APPLICATION AND CHARACTERIZATION TEST CIRCUIT

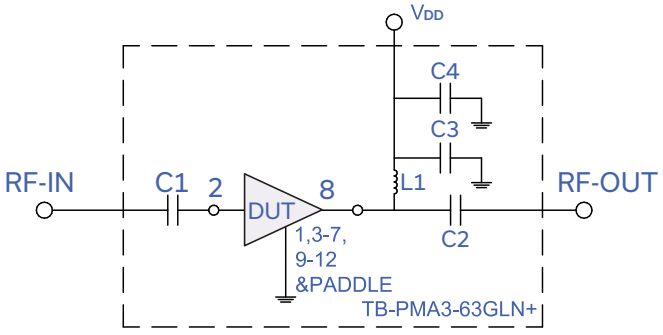
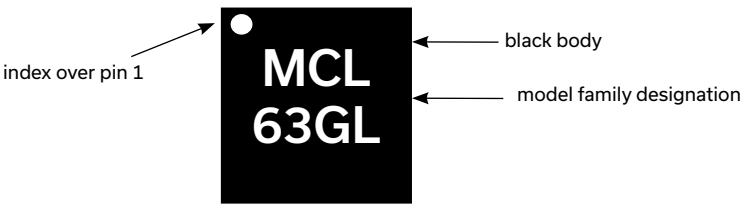



Fig 1. Application and Characterization Circuit
Note: This block diagram is used for characterization. (DUT soldered on Mini-Circuits Characterization test board TB-PMA3-63GLN+) Gain, Return loss, Output power at 1dB compression (P1 dB), output IP3 (OIP3) and noise figure measured using Agilent's N5242A PNA-X microwave network analyzer.

Conditions:
1. Gain and Return Loss: $P_{IN}$= -35dBm
2. Output IP3 (OIP3): Two tones, spaced 1 MHz apart, 0 dBm/tone at output.

| Component | Size | Value | P/N | Manufacturer |
|---|---|---|---|---|
| C1 | 0402 | 22pF | GRM1555C1H220JA01 | Murata |
| C2 | 0402 | 22pF | GRM1555C1H220JA01 | Murata |
| C3 | 0402 | 100pF | GRM1555C1H101JA01 | Murata |
| C4 | 1206 | 22uF | GRM31CR61H106KA12 | Murata |
| L1 | 0402 | 10nH | LQG15HSlONJD2 | Murata |

## PRODUCT MARKING




Marking may contain other features or characters for internal lot control

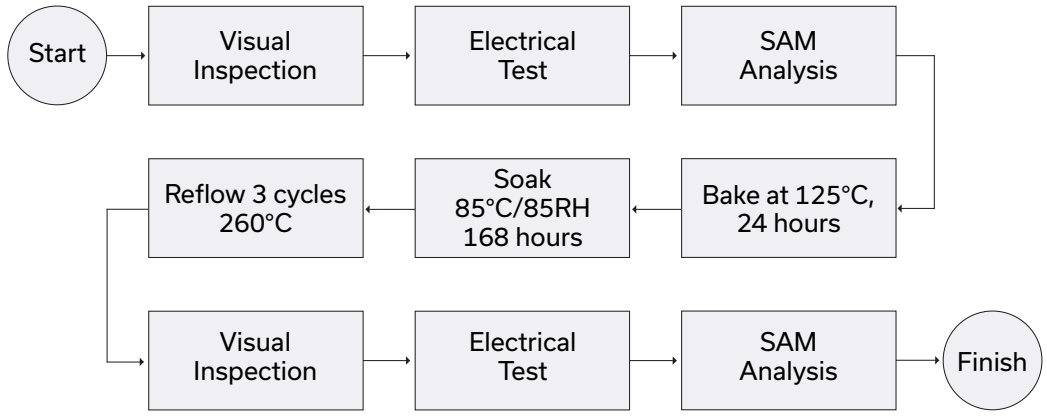
## ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASH BOARD. TO ACCESS CLICK HERE

| | |
|---|---|
| **Performance Data** | Data Table<br>Swept Graphs<br>S-Parameter (S2P Files) Data Set (.zip file) |
| **Case Style** | DQ1225 Plastic package, exposed paddle, lead finish: Matte Tin |
| **Tape & Reel**<br>**Standard quantities available on reel** | F66<br>7" reels with 20, 50, 100, 200, 500, 1K, 2K or 3K devices |
| **Suggested Layout for PCB Design** | PL-611 |
| **Evaluation Board** | TB-PMA3-63GLN+ |
| **Environmental Ratings** | ENV08T1 |

## ESD RATING

Human Body Model (HBM): Class 1C (1000 to <2000V) in accordance with ANSI/ESD STM 5.1 - 2001

## 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.
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

## *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: Vd = 5.00V, Id = 68mA @ Temperature = +25°C

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP-3 Output | 1dB Comp. Output | Noise Figure |
|---|---|---|---|---|---|---|---|---|---|
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Measure | (dBm) | (dBm) | (dB) |
| 1000 | 28.96 | 52.36 | 3.95 | 17.77 | 4.35 | 1.38 | 24.83 | 13.28 | 1.87 |
| 1100 | 30.17 | 49.93 | 3.89 | 17.90 | 2.90 | 1.37 | 25.66 | 14.05 | 1.58 |
| 1200 | 31.06 | 50.25 | 3.97 | 15.68 | 2.72 | 1.35 | 26.81 | 14.41 | 1.40 |
| 1300 | 31.61 | 48.01 | 4.16 | 13.71 | 2.08 | 1.29 | 27.06 | 14.57 | 1.22 |
| 1400 | 31.91 | 45.64 | 4.51 | 12.28 | 1.61 | 1.22 | 27.77 | 14.88 | 1.11 |
| 1500 | 32.01 | 44.30 | 4.92 | 11.39 | 1.44 | 1.15 | 28.17 | 15.25 | 0.99 |
| 1600 | 31.99 | 45.26 | 5.39 | 10.76 | 1.64 | 1.12 | 28.44 | 15.44 | 0.90 |
| 1700 | 31.81 | 43.30 | 5.93 | 10.41 | 1.43 | 1.05 | 28.49 | 15.28 | 0.84 |
| 1800 | 31.62 | 43.07 | 6.47 | 10.21 | 1.45 | 1.03 | 28.73 | 15.17 | 0.78 |
| 1900 | 31.36 | 41.74 | 6.97 | 10.16 | 1.37 | 0.98 | 28.97 | 15.32 | 0.72 |
| 2000 | 31.11 | 43.55 | 7.44 | 10.07 | 1.68 | 1.00 | 29.10 | 15.39 | 0.68 |
| 2100 | 30.83 | 42.11 | 7.87 | 10.09 | 1.53 | 0.97 | 29.28 | 15.06 | 0.69 |
| 2200 | 30.55 | 40.72 | 8.40 | 10.15 | 1.41 | 0.93 | 29.09 | 15.15 | 0.61 |
| 2300 | 30.29 | 40.83 | 8.76 | 10.16 | 1.48 | 0.93 | 29.42 | 15.50 | 0.63 |
| 2400 | 30.02 | 40.80 | 9.14 | 10.25 | 1.53 | 0.93 | 28.97 | 15.30 | 0.62 |
| 2500 | 29.76 | 39.29 | 9.49 | 10.29 | 1.39 | 0.89 | 28.67 | 14.82 | 0.59 |
| 2600 | 29.52 | 39.60 | 9.75 | 10.35 | 1.46 | 0.90 | 28.17 | 14.76 | 0.63 |
| 2700 | 29.27 | 40.10 | 10.02 | 10.37 | 1.58 | 0.91 | 28.06 | 14.98 | 0.65 |
| 2800 | 29.07 | 39.90 | 10.23 | 10.38 | 1.59 | 0.90 | 27.77 | 14.79 | 0.64 |
| 2900 | 28.86 | 39.09 | 10.41 | 10.41 | 1.50 | 0.89 | 28.04 | 15.00 | 0.65 |
| 3000 | 28.68 | 39.60 | 10.65 | 10.47 | 1.62 | 0.90 | 27.72 | 14.82 | 0.71 |
| 3100 | 28.52 | 39.17 | 10.80 | 10.43 | 1.58 | 0.89 | 27.41 | 14.57 | 0.64 |
| 3200 | 28.37 | 39.19 | 10.95 | 10.51 | 1.61 | 0.90 | 27.13 | 14.12 | 0.69 |
| 3300 | 28.24 | 38.70 | 10.98 | 10.50 | 1.56 | 0.89 | 27.28 | 14.28 | 0.65 |
| 3400 | 28.14 | 39.21 | 10.98 | 10.54 | 1.65 | 0.90 | 26.89 | 14.27 | 0.68 |
| 3500 | 28.01 | 39.04 | 10.92 | 10.62 | 1.65 | 0.90 | 26.42 | 14.12 | 0.69 |
| 3600 | 27.89 | 38.83 | 10.90 | 10.66 | 1.63 | 0.90 | 26.42 | 13.75 | 0.73 |
| 3700 | 27.76 | 38.34 | 10.87 | 10.81 | 1.59 | 0.90 | 26.11 | 13.60 | 0.70 |
| 3800 | 27.66 | 39.69 | 10.75 | 10.88 | 1.82 | 0.93 | 25.68 | 13.19 | 0.71 |
| 3900 | 27.56 | 39.09 | 10.71 | 11.08 | 1.74 | 0.92 | 25.62 | 12.97 | 0.68 |
| 4000 | 27.47 | 38.47 | 10.63 | 11.28 | 1.66 | 0.92 | 25.60 | 13.25 | 0.73 |
| 4100 | 27.38 | 39.42 | 10.59 | 11.48 | 1.84 | 0.94 | 25.04 | 12.88 | 0.73 |
| 4200 | 27.30 | 38.73 | 10.45 | 11.68 | 1.73 | 0.93 | 24.80 | 12.64 | 0.75 |
| 4300 | 27.23 | 39.19 | 10.30 | 11.99 | 1.83 | 0.95 | 24.91 | 12.64 | 0.76 |
| 4400 | 27.13 | 38.61 | 10.27 | 12.38 | 1.75 | 0.95 | 24.32 | 12.30 | 0.78 |
| 4500 | 27.06 | 39.32 | 10.12 | 12.78 | 1.90 | 0.97 | 23.97 | 12.00 | 0.81 |
| 4600 | 26.96 | 38.69 | 10.11 | 13.26 | 1.81 | 0.97 | 23.95 | 12.04 | 0.82 |
| 4700 | 26.87 | 39.07 | 10.08 | 13.78 | 1.90 | 0.98 | 23.35 | 11.51 | 0.83 |
| 4800 | 26.77 | 38.87 | 10.09 | 14.39 | 1.90 | 0.99 | 23.77 | 11.58 | 0.83 |
| 4900 | 26.68 | 38.81 | 10.01 | 15.19 | 1.91 | 0.99 | 23.62 | 11.53 | 0.84 |
| 5000 | 26.54 | 38.49 | 9.99 | 16.13 | 1.89 | 1.00 | 23.36 | 11.52 | 0.88 |
| 5100 | 26.43 | 38.54 | 10.04 | 17.13 | 1.93 | 1.01 | 22.68 | 11.05 | 0.92 |
| 5200 | 26.29 | 38.60 | 10.09 | 18.57 | 1.98 | 1.01 | 23.28 | 11.53 | 0.94 |
| 5300 | 26.13 | 38.46 | 10.21 | 20.04 | 1.99 | 1.02 | 22.98 | 11.30 | 0.94 |
| 5400 | 25.96 | 39.01 | 10.37 | 21.54 | 2.16 | 1.03 | 22.39 | 10.99 | 0.97 |
| 5500 | 25.78 | 39.05 | 10.55 | 23.14 | 2.22 | 1.03 | 21.78 | 10.34 | 1.00 |
| 5600 | 25.62 | 38.94 | 10.70 | 25.36 | 2.24 | 1.03 | 22.53 | 10.89 | 1.04 |
| 5700 | 25.42 | 38.40 | 10.96 | 27.43 | 2.17 | 1.02 | 22.31 | 10.62 | 1.05 |
| 5800 | 25.21 | 38.89 | 11.29 | 26.02 | 2.34 | 1.03 | 22.20 | 10.63 | 1.11 |
| 5900 | 24.99 | 38.67 | 11.60 | 23.91 | 2.35 | 1.02 | 22.50 | 10.92 | 1.10 |
| 6000 | 24.75 | 39.74 | 12.01 | 21.44 | 2.71 | 1.02 | 22.08 | 10.67 | 1.16 |

## *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: Vd = 4.75V, Id = 65mA @ Temperature = +25°C

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP-3 Output | 1dB Comp. Output | Noise Figure |
|---|---|---|---|---|---|---|---|---|---|
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Measure | (dBm) | (dBm) | (dB) |
| 1000 | 28.74 | 50.70 | 3.90 | 17.77 | 3.66 | 1.38 | 24.22 | 12.91 | 1.89 |
| 1100 | 29.97 | 50.83 | 3.85 | 17.93 | 3.25 | 1.38 | 25.04 | 13.57 | 1.58 |
| 1200 | 30.87 | 48.66 | 3.90 | 15.68 | 2.29 | 1.36 | 26.18 | 14.05 | 1.40 |
| 1300 | 31.44 | 48.74 | 4.09 | 13.70 | 2.22 | 1.31 | 26.35 | 14.20 | 1.24 |
| 1400 | 31.75 | 46.32 | 4.40 | 12.28 | 1.74 | 1.23 | 27.05 | 14.41 | 1.13 |
| 1500 | 31.86 | 46.05 | 4.83 | 11.37 | 1.71 | 1.19 | 27.58 | 14.79 | 1.00 |
| 1600 | 31.84 | 44.25 | 5.27 | 10.78 | 1.48 | 1.12 | 27.92 | 14.86 | 0.90 |
| 1700 | 31.67 | 43.61 | 5.82 | 10.43 | 1.45 | 1.08 | 27.87 | 14.82 | 0.84 |
| 1800 | 31.48 | 42.19 | 6.35 | 10.26 | 1.33 | 1.03 | 28.03 | 14.71 | 0.80 |
| 1900 | 31.23 | 41.45 | 6.82 | 10.19 | 1.35 | 0.98 | 28.40 | 14.86 | 0.72 |
| 2000 | 30.98 | 41.19 | 7.35 | 10.16 | 1.35 | 0.97 | 28.34 | 14.93 | 0.68 |
| 2100 | 30.70 | 40.73 | 7.76 | 10.16 | 1.36 | 0.95 | 28.70 | 14.60 | 0.68 |
| 2200 | 30.42 | 41.15 | 8.28 | 10.27 | 1.49 | 0.95 | 28.30 | 14.69 | 0.62 |
| 2300 | 30.16 | 39.75 | 8.58 | 10.26 | 1.35 | 0.92 | 28.46 | 14.92 | 0.63 |
| 2400 | 29.90 | 40.26 | 9.01 | 10.37 | 1.45 | 0.93 | 28.11 | 14.72 | 0.59 |
| 2500 | 29.63 | 39.64 | 9.39 | 10.41 | 1.45 | 0.91 | 27.65 | 14.36 | 0.61 |
| 2600 | 29.40 | 40.60 | 9.61 | 10.49 | 1.62 | 0.93 | 27.28 | 14.30 | 0.64 |
| 2700 | 29.14 | 40.11 | 9.92 | 10.53 | 1.60 | 0.92 | 27.63 | 14.51 | 0.65 |
| 2800 | 28.93 | 39.52 | 10.13 | 10.50 | 1.55 | 0.91 | 26.60 | 14.21 | 0.66 |
| 2900 | 28.72 | 39.05 | 10.34 | 10.55 | 1.53 | 0.89 | 27.40 | 14.42 | 0.66 |
| 3000 | 28.55 | 39.44 | 10.54 | 10.65 | 1.62 | 0.90 | 27.16 | 14.35 | 0.71 |
| 3100 | 28.39 | 39.00 | 10.71 | 10.62 | 1.58 | 0.90 | 26.71 | 13.98 | 0.65 |
| 3200 | 28.23 | 39.31 | 10.87 | 10.66 | 1.65 | 0.91 | 26.44 | 13.65 | 0.71 |
| 3300 | 28.10 | 39.28 | 10.90 | 10.66 | 1.67 | 0.91 | 26.66 | 13.81 | 0.65 |
| 3400 | 27.99 | 38.84 | 10.90 | 10.71 | 1.62 | 0.90 | 26.11 | 13.79 | 0.70 |
| 3500 | 27.87 | 38.81 | 10.93 | 10.82 | 1.65 | 0.90 | 25.79 | 13.52 | 0.71 |
| 3600 | 27.74 | 39.14 | 10.83 | 10.83 | 1.71 | 0.91 | 25.71 | 13.15 | 0.73 |
| 3700 | 27.61 | 39.29 | 10.82 | 10.98 | 1.77 | 0.92 | 25.43 | 13.00 | 0.70 |
| 3800 | 27.51 | 38.78 | 10.72 | 11.13 | 1.70 | 0.92 | 24.96 | 12.82 | 0.71 |
| 3900 | 27.40 | 38.95 | 10.68 | 11.32 | 1.75 | 0.92 | 24.71 | 12.48 | 0.70 |
| 4000 | 27.32 | 39.49 | 10.62 | 11.48 | 1.86 | 0.94 | 24.81 | 12.75 | 0.72 |
| 4100 | 27.22 | 38.48 | 10.57 | 11.71 | 1.71 | 0.93 | 24.44 | 12.39 | 0.75 |
| 4200 | 27.14 | 38.71 | 10.44 | 11.91 | 1.76 | 0.94 | 24.18 | 12.14 | 0.76 |
| 4300 | 27.06 | 39.16 | 10.31 | 12.21 | 1.86 | 0.96 | 24.22 | 12.03 | 0.77 |
| 4400 | 26.95 | 38.55 | 10.30 | 12.58 | 1.79 | 0.95 | 23.72 | 11.69 | 0.80 |
| 4500 | 26.88 | 38.93 | 10.18 | 12.98 | 1.87 | 0.96 | 23.27 | 11.50 | 0.79 |
| 4600 | 26.78 | 38.76 | 10.14 | 13.51 | 1.87 | 0.97 | 23.35 | 11.53 | 0.81 |
| 4700 | 26.69 | 39.02 | 10.14 | 14.02 | 1.94 | 0.98 | 22.78 | 11.11 | 0.83 |
| 4800 | 26.58 | 38.37 | 10.10 | 14.67 | 1.85 | 0.98 | 23.20 | 11.08 | 0.83 |
| 4900 | 26.48 | 38.66 | 10.08 | 15.47 | 1.93 | 0.99 | 23.04 | 11.02 | 0.87 |
| 5000 | 26.34 | 39.25 | 10.09 | 16.30 | 2.09 | 1.01 | 22.80 | 11.01 | 0.89 |
| 5100 | 26.22 | 38.77 | 10.16 | 17.41 | 2.02 | 1.01 | 22.13 | 10.42 | 0.91 |
| 5200 | 26.07 | 38.79 | 10.22 | 18.66 | 2.07 | 1.02 | 22.72 | 11.00 | 0.98 |
| 5300 | 25.91 | 38.84 | 10.34 | 20.09 | 2.13 | 1.02 | 22.45 | 10.88 | 0.98 |
| 5400 | 25.74 | 39.05 | 10.52 | 21.46 | 2.22 | 1.03 | 21.88 | 10.47 | 0.98 |
| 5500 | 25.56 | 38.33 | 10.74 | 22.82 | 2.12 | 1.02 | 21.39 | 9.81 | 1.01 |
| 5600 | 25.39 | 38.99 | 10.91 | 24.15 | 2.31 | 1.03 | 22.08 | 10.48 | 1.02 |
| 5700 | 25.19 | 38.67 | 11.10 | 25.43 | 2.29 | 1.02 | 21.80 | 10.31 | 1.06 |
| 5800 | 24.98 | 39.03 | 11.44 | 24.24 | 2.44 | 1.02 | 21.68 | 10.10 | 1.12 |
| 5900 | 24.76 | 39.06 | 11.83 | 22.45 | 2.51 | 1.02 | 22.00 | 10.61 | 1.12 |
| 6000 | 24.52 | 39.01 | 12.24 | 20.62 | 2.57 | 1.01 | 21.69 | 10.24 | 1.17 |

## *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: Vd = 5.25V, Id = 70mA @ Temperature = +25°C

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP-3 Output | 1dB Comp. Output | Noise Figure |
|---|---|---|---|---|---|---|---|---|---|
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Measure | (dBm) | (dBm) | (dB) |
| 1000 | 29.14 | 51.73 | 3.97 | 17.70 | 4.00 | 1.37 | 25.35 | 13.77 | 1.86 |
| 1100 | 30.35 | 50.27 | 3.96 | 17.95 | 2.97 | 1.37 | 26.11 | 14.43 | 1.57 |
| 1200 | 31.22 | 49.83 | 4.05 | 15.71 | 2.59 | 1.34 | 27.22 | 14.89 | 1.38 |
| 1300 | 31.77 | 48.89 | 4.24 | 13.74 | 2.25 | 1.29 | 27.42 | 15.03 | 1.21 |
| 1400 | 32.05 | 45.72 | 4.60 | 12.29 | 1.60 | 1.22 | 28.01 | 15.34 | 1.11 |
| 1500 | 32.14 | 45.44 | 5.04 | 11.36 | 1.60 | 1.16 | 28.52 | 15.71 | 1.00 |
| 1600 | 32.11 | 42.90 | 5.51 | 10.82 | 1.31 | 1.08 | 28.91 | 15.78 | 0.89 |
| 1700 | 31.93 | 43.98 | 6.05 | 10.42 | 1.50 | 1.07 | 28.82 | 15.73 | 0.82 |
| 1800 | 31.73 | 42.29 | 6.56 | 10.17 | 1.36 | 1.00 | 29.13 | 15.72 | 0.78 |
| 1900 | 31.47 | 41.88 | 7.08 | 10.08 | 1.36 | 0.98 | 29.46 | 15.77 | 0.72 |
| 2000 | 31.22 | 41.92 | 7.59 | 10.03 | 1.44 | 0.96 | 29.52 | 15.83 | 0.66 |
| 2100 | 30.94 | 41.32 | 8.01 | 10.02 | 1.42 | 0.94 | 29.82 | 15.50 | 0.69 |
| 2200 | 30.66 | 41.24 | 8.51 | 10.11 | 1.46 | 0.94 | 29.47 | 15.59 | 0.61 |
| 2300 | 30.39 | 41.15 | 8.89 | 10.10 | 1.52 | 0.93 | 30.01 | 15.94 | 0.62 |
| 2400 | 30.13 | 40.60 | 9.23 | 10.17 | 1.48 | 0.92 | 29.57 | 15.74 | 0.61 |
| 2500 | 29.87 | 39.70 | 9.62 | 10.23 | 1.42 | 0.89 | 28.94 | 15.26 | 0.57 |
| 2600 | 29.64 | 39.40 | 9.90 | 10.24 | 1.43 | 0.88 | 28.64 | 15.31 | 0.62 |
| 2700 | 29.38 | 39.80 | 10.13 | 10.27 | 1.52 | 0.90 | 28.07 | 15.54 | 0.64 |
| 2800 | 29.18 | 39.72 | 10.34 | 10.28 | 1.54 | 0.90 | 28.75 | 15.23 | 0.63 |
| 2900 | 28.97 | 39.30 | 10.48 | 10.30 | 1.52 | 0.89 | 28.57 | 15.45 | 0.64 |
| 3000 | 28.80 | 39.83 | 10.72 | 10.38 | 1.63 | 0.90 | 28.28 | 15.27 | 0.69 |
| 3100 | 28.64 | 39.42 | 10.85 | 10.33 | 1.59 | 0.89 | 28.07 | 15.01 | 0.63 |
| 3200 | 28.48 | 39.47 | 11.04 | 10.37 | 1.63 | 0.90 | 27.92 | 14.69 | 0.69 |
| 3300 | 28.36 | 38.86 | 11.07 | 10.38 | 1.57 | 0.88 | 27.94 | 14.85 | 0.64 |
| 3400 | 28.26 | 39.87 | 11.05 | 10.42 | 1.74 | 0.90 | 27.62 | 14.96 | 0.66 |
| 3500 | 28.13 | 39.88 | 11.01 | 10.48 | 1.76 | 0.91 | 27.01 | 14.46 | 0.68 |
| 3600 | 28.01 | 39.08 | 10.93 | 10.52 | 1.65 | 0.90 | 26.96 | 14.20 | 0.72 |
| 3700 | 27.89 | 38.86 | 10.88 | 10.65 | 1.64 | 0.90 | 26.75 | 14.06 | 0.71 |
| 3800 | 27.79 | 38.73 | 10.81 | 10.82 | 1.64 | 0.90 | 26.38 | 13.65 | 0.70 |
| 3900 | 27.69 | 39.03 | 10.74 | 10.94 | 1.70 | 0.92 | 26.08 | 13.55 | 0.68 |
| 4000 | 27.61 | 38.69 | 10.65 | 11.10 | 1.67 | 0.91 | 26.24 | 13.83 | 0.70 |
| 4100 | 27.52 | 38.96 | 10.60 | 11.32 | 1.74 | 0.92 | 25.71 | 13.35 | 0.72 |
| 4200 | 27.45 | 38.96 | 10.47 | 11.53 | 1.74 | 0.93 | 25.47 | 13.11 | 0.73 |
| 4300 | 27.38 | 39.78 | 10.31 | 11.84 | 1.90 | 0.96 | 25.62 | 13.01 | 0.75 |
| 4400 | 27.28 | 38.85 | 10.25 | 12.18 | 1.76 | 0.95 | 25.07 | 12.78 | 0.79 |
| 4500 | 27.21 | 38.37 | 10.16 | 12.57 | 1.70 | 0.95 | 24.60 | 12.48 | 0.81 |
| 4600 | 27.11 | 39.03 | 10.11 | 13.12 | 1.84 | 0.97 | 24.65 | 12.52 | 0.80 |
| 4700 | 27.03 | 38.73 | 10.06 | 13.62 | 1.81 | 0.97 | 24.13 | 12.12 | 0.81 |
| 4800 | 26.93 | 38.78 | 10.02 | 14.22 | 1.84 | 0.98 | 24.39 | 12.06 | 0.81 |
| 4900 | 26.84 | 38.32 | 9.96 | 15.04 | 1.79 | 0.98 | 24.31 | 12.02 | 0.85 |
| 5000 | 26.72 | 38.48 | 9.92 | 15.97 | 1.84 | 1.00 | 24.07 | 12.02 | 0.87 |
| 5100 | 26.61 | 39.04 | 9.98 | 16.95 | 1.98 | 1.01 | 23.38 | 11.44 | 0.91 |
| 5200 | 26.47 | 38.42 | 10.00 | 18.38 | 1.90 | 1.01 | 23.95 | 11.92 | 0.93 |
| 5300 | 26.31 | 38.17 | 10.14 | 19.97 | 1.90 | 1.01 | 23.67 | 11.80 | 0.95 |
| 5400 | 26.14 | 38.13 | 10.28 | 21.62 | 1.93 | 1.01 | 23.04 | 11.38 | 0.95 |
| 5500 | 25.97 | 39.01 | 10.45 | 23.49 | 2.16 | 1.03 | 22.44 | 10.71 | 0.97 |
| 5600 | 25.81 | 39.03 | 10.61 | 26.19 | 2.21 | 1.03 | 23.25 | 11.38 | 1.00 |
| 5700 | 25.62 | 38.53 | 10.83 | 29.09 | 2.15 | 1.03 | 22.98 | 11.24 | 1.04 |
| 5800 | 25.41 | 38.97 | 11.11 | 27.87 | 2.31 | 1.03 | 22.83 | 11.02 | 1.08 |
| 5900 | 25.19 | 38.86 | 11.50 | 24.91 | 2.34 | 1.02 | 23.10 | 11.42 | 1.09 |
| 6000 | 24.95 | 39.16 | 11.86 | 22.09 | 2.48 | 1.02 | 22.73 | 11.05 | 1.15 |

## *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: Vd = 5.00V, Id = 69mA @ Temperature = -45°C

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP-3 Output | 1dB Comp. Output | Noise Figure |
|---|---|---|---|---|---|---|---|---|---|
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Measure | (dBm) | (dBm) | (dB) |
| 1000 | 30.37 | 52.75 | 3.44 | 18.26 | 3.55 | 1.43 | 26.20 | 13.85 | 1.23 |
| 1100 | 31.54 | 51.62 | 3.55 | 18.88 | 2.80 | 1.42 | 26.80 | 14.48 | 1.03 |
| 1200 | 32.36 | 51.44 | 3.76 | 16.28 | 2.63 | 1.37 | 27.71 | 14.88 | 0.90 |
| 1300 | 32.83 | 48.49 | 4.13 | 13.94 | 1.91 | 1.29 | 27.89 | 14.96 | 0.78 |
| 1400 | 33.04 | 47.54 | 4.60 | 12.36 | 1.75 | 1.22 | 28.42 | 15.19 | 0.70 |
| 1500 | 33.06 | 43.94 | 5.15 | 11.44 | 1.29 | 1.12 | 28.90 | 15.51 | 0.61 |
| 1600 | 32.96 | 45.08 | 5.74 | 10.75 | 1.51 | 1.08 | 29.25 | 15.63 | 0.51 |
| 1700 | 32.72 | 43.14 | 6.35 | 10.36 | 1.34 | 1.01 | 29.32 | 15.50 | 0.47 |
| 1800 | 32.47 | 43.19 | 6.89 | 10.12 | 1.41 | 0.98 | 29.35 | 15.33 | 0.47 |
| 1900 | 32.17 | 42.25 | 7.47 | 9.98 | 1.34 | 0.96 | 29.69 | 15.46 | 0.39 |
| 2000 | 31.89 | 41.86 | 8.01 | 9.90 | 1.36 | 0.93 | 29.72 | 15.48 | 0.35 |
| 2100 | 31.58 | 42.36 | 8.43 | 9.82 | 1.48 | 0.94 | 29.91 | 15.13 | 0.36 |
| 2200 | 31.28 | 41.12 | 8.97 | 9.84 | 1.38 | 0.90 | 29.83 | 15.18 | 0.29 |
| 2300 | 31.00 | 41.05 | 9.31 | 9.77 | 1.43 | 0.89 | 30.20 | 15.39 | 0.32 |
| 2400 | 30.73 | 41.23 | 9.64 | 9.81 | 1.49 | 0.90 | 29.96 | 15.20 | 0.28 |
| 2500 | 30.45 | 40.34 | 10.03 | 9.81 | 1.42 | 0.88 | 29.39 | 14.68 | 0.29 |
| 2600 | 30.21 | 40.07 | 10.20 | 9.79 | 1.43 | 0.87 | 29.17 | 14.74 | 0.33 |
| 2700 | 29.95 | 40.35 | 10.47 | 9.78 | 1.50 | 0.88 | 28.46 | 14.96 | 0.34 |
| 2800 | 29.74 | 39.89 | 10.68 | 9.72 | 1.47 | 0.87 | 28.67 | 14.63 | 0.34 |
| 2900 | 29.53 | 40.07 | 10.91 | 9.75 | 1.53 | 0.88 | 28.40 | 14.72 | 0.33 |
| 3000 | 29.35 | 39.85 | 11.05 | 9.78 | 1.54 | 0.87 | 28.24 | 14.65 | 0.38 |
| 3100 | 29.19 | 39.86 | 11.24 | 9.66 | 1.56 | 0.87 | 27.99 | 14.28 | 0.34 |
| 3200 | 29.04 | 39.31 | 11.38 | 9.66 | 1.52 | 0.85 | 27.85 | 13.94 | 0.39 |
| 3300 | 28.93 | 39.46 | 11.47 | 9.62 | 1.55 | 0.86 | 27.97 | 14.12 | 0.35 |
| 3400 | 28.84 | 39.69 | 11.49 | 9.62 | 1.59 | 0.87 | 27.52 | 14.11 | 0.38 |
| 3500 | 28.72 | 39.20 | 11.40 | 9.65 | 1.53 | 0.87 | 27.03 | 13.85 | 0.38 |
| 3600 | 28.60 | 39.09 | 11.33 | 9.69 | 1.53 | 0.87 | 26.93 | 13.60 | 0.40 |
| 3700 | 28.48 | 39.51 | 11.25 | 9.71 | 1.62 | 0.88 | 26.76 | 13.34 | 0.37 |
| 3800 | 28.37 | 39.00 | 11.13 | 9.79 | 1.56 | 0.87 | 26.25 | 12.93 | 0.37 |
| 3900 | 28.27 | 38.86 | 11.07 | 9.90 | 1.56 | 0.87 | 26.01 | 12.72 | 0.36 |
| 4000 | 28.20 | 39.62 | 10.92 | 10.00 | 1.69 | 0.90 | 26.23 | 13.11 | 0.38 |
| 4100 | 28.12 | 38.79 | 10.76 | 10.11 | 1.57 | 0.89 | 25.69 | 12.64 | 0.39 |
| 4200 | 28.05 | 40.03 | 10.62 | 10.23 | 1.79 | 0.91 | 25.41 | 12.37 | 0.40 |
| 4300 | 27.98 | 39.42 | 10.36 | 10.40 | 1.68 | 0.92 | 25.55 | 12.28 | 0.42 |
| 4400 | 27.89 | 39.26 | 10.29 | 10.68 | 1.68 | 0.92 | 25.02 | 12.08 | 0.45 |
| 4500 | 27.83 | 38.62 | 10.13 | 10.91 | 1.60 | 0.91 | 24.68 | 11.78 | 0.44 |
| 4600 | 27.75 | 38.67 | 9.95 | 11.23 | 1.62 | 0.93 | 24.64 | 11.85 | 0.44 |
| 4700 | 27.68 | 37.99 | 9.88 | 11.61 | 1.54 | 0.92 | 24.06 | 11.46 | 0.45 |
| 4800 | 27.60 | 38.72 | 9.79 | 11.99 | 1.67 | 0.95 | 24.42 | 11.39 | 0.45 |
| 4900 | 27.53 | 38.38 | 9.67 | 12.59 | 1.64 | 0.95 | 24.22 | 11.38 | 0.46 |
| 5000 | 27.42 | 38.74 | 9.59 | 13.19 | 1.72 | 0.97 | 23.99 | 11.30 | 0.49 |
| 5100 | 27.34 | 38.74 | 9.58 | 13.97 | 1.74 | 0.98 | 23.27 | 10.85 | 0.51 |
| 5200 | 27.23 | 38.11 | 9.48 | 14.96 | 1.66 | 0.99 | 23.93 | 11.35 | 0.55 |
| 5300 | 27.09 | 38.35 | 9.56 | 15.95 | 1.74 | 1.00 | 23.54 | 11.24 | 0.54 |
| 5400 | 26.95 | 38.43 | 9.65 | 17.14 | 1.79 | 1.00 | 22.91 | 10.74 | 0.54 |
| 5500 | 26.81 | 38.32 | 9.77 | 18.43 | 1.81 | 1.01 | 22.37 | 10.07 | 0.57 |
| 5600 | 26.67 | 38.08 | 9.92 | 20.20 | 1.80 | 1.01 | 23.16 | 10.75 | 0.57 |
| 5700 | 26.52 | 38.01 | 10.06 | 23.07 | 1.83 | 1.02 | 22.83 | 10.64 | 0.60 |
| 5800 | 26.34 | 38.57 | 10.26 | 27.75 | 1.98 | 1.03 | 22.71 | 10.44 | 0.64 |
| 5900 | 26.14 | 38.31 | 10.51 | 32.26 | 1.98 | 1.02 | 23.05 | 10.88 | 0.62 |
| 6000 | 25.92 | 38.32 | 10.82 | 31.79 | 2.03 | 1.02 | 22.64 | 10.65 | 0.66 |

## *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: Vd = 4.75V, Id = 66mA @ Temperature = -45°C

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP-3 Output | 1dB Comp. Output | Noise Figure |
|---|---|---|---|---|---|---|---|---|---|
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Measure | (dBm) | (dBm) | (dB) |
| 1000 | 30.19 | 52.42 | 3.40 | 18.26 | 3.46 | 1.44 | 24.22 | 13.37 | 1.24 |
| 1100 | 31.38 | 51.51 | 3.49 | 18.79 | 2.81 | 1.42 | 25.04 | 14.11 | 1.03 |
| 1200 | 32.21 | 48.89 | 3.69 | 16.12 | 1.98 | 1.37 | 26.18 | 14.41 | 0.90 |
| 1300 | 32.70 | 49.58 | 4.02 | 13.94 | 2.11 | 1.31 | 26.35 | 14.50 | 0.78 |
| 1400 | 32.92 | 45.91 | 4.50 | 12.39 | 1.49 | 1.22 | 27.05 | 14.73 | 0.69 |
| 1500 | 32.94 | 45.26 | 5.07 | 11.41 | 1.47 | 1.14 | 27.58 | 15.04 | 0.61 |
| 1600 | 32.85 | 46.20 | 5.59 | 10.72 | 1.65 | 1.12 | 27.92 | 15.17 | 0.52 |
| 1700 | 32.61 | 43.05 | 6.22 | 10.39 | 1.30 | 1.03 | 27.87 | 14.94 | 0.48 |
| 1800 | 32.37 | 43.03 | 6.79 | 10.15 | 1.38 | 1.00 | 28.03 | 14.88 | 0.44 |
| 1900 | 32.07 | 42.48 | 7.37 | 10.02 | 1.39 | 0.96 | 28.40 | 14.89 | 0.39 |
| 2000 | 31.79 | 40.75 | 7.92 | 9.95 | 1.24 | 0.91 | 28.34 | 14.91 | 0.35 |
| 2100 | 31.49 | 40.34 | 8.33 | 9.88 | 1.26 | 0.88 | 28.70 | 14.56 | 0.35 |
| 2200 | 31.18 | 40.94 | 8.79 | 9.90 | 1.37 | 0.91 | 28.30 | 14.61 | 0.30 |
| 2300 | 30.90 | 40.51 | 9.15 | 9.86 | 1.37 | 0.89 | 28.46 | 14.82 | 0.31 |
| 2400 | 30.63 | 40.58 | 9.53 | 9.86 | 1.42 | 0.89 | 28.11 | 14.61 | 0.28 |
| 2500 | 30.35 | 40.38 | 9.85 | 9.86 | 1.45 | 0.88 | 27.65 | 14.10 | 0.32 |
| 2600 | 30.12 | 39.94 | 10.12 | 9.89 | 1.42 | 0.88 | 27.28 | 14.15 | 0.32 |
| 2700 | 29.86 | 40.21 | 10.38 | 9.84 | 1.50 | 0.88 | 27.63 | 14.26 | 0.32 |
| 2800 | 29.65 | 39.62 | 10.59 | 9.82 | 1.45 | 0.87 | 26.60 | 13.91 | 0.32 |
| 2900 | 29.43 | 39.97 | 10.77 | 9.84 | 1.54 | 0.88 | 27.40 | 13.99 | 0.34 |
| 3000 | 29.25 | 39.89 | 10.97 | 9.88 | 1.55 | 0.88 | 27.16 | 14.05 | 0.38 |
| 3100 | 29.09 | 39.82 | 11.14 | 9.75 | 1.57 | 0.87 | 26.71 | 13.67 | 0.33 |
| 3200 | 28.93 | 39.65 | 11.30 | 9.76 | 1.58 | 0.87 | 26.44 | 13.20 | 0.38 |
| 3300 | 28.82 | 39.39 | 11.40 | 9.71 | 1.55 | 0.87 | 26.66 | 13.38 | 0.34 |
| 3400 | 28.73 | 39.03 | 11.43 | 9.73 | 1.52 | 0.86 | 26.11 | 13.49 | 0.37 |
| 3500 | 28.61 | 39.45 | 11.37 | 9.76 | 1.60 | 0.87 | 25.79 | 13.10 | 0.38 |
| 3600 | 28.49 | 39.74 | 11.23 | 9.76 | 1.66 | 0.88 | 25.71 | 12.85 | 0.40 |
| 3700 | 28.36 | 38.90 | 11.22 | 9.85 | 1.55 | 0.87 | 25.43 | 12.59 | 0.37 |
| 3800 | 28.26 | 39.77 | 11.08 | 9.88 | 1.70 | 0.89 | 24.96 | 12.30 | 0.39 |
| 3900 | 28.16 | 39.00 | 10.99 | 10.01 | 1.60 | 0.88 | 24.71 | 12.08 | 0.35 |
| 4000 | 28.08 | 38.60 | 10.84 | 10.14 | 1.55 | 0.88 | 24.81 | 12.35 | 0.38 |
| 4100 | 28.00 | 38.82 | 10.72 | 10.24 | 1.60 | 0.89 | 24.44 | 12.00 | 0.39 |
| 4200 | 27.92 | 39.23 | 10.57 | 10.34 | 1.67 | 0.90 | 24.18 | 11.74 | 0.40 |
| 4300 | 27.86 | 38.30 | 10.36 | 10.53 | 1.54 | 0.90 | 24.22 | 11.52 | 0.41 |
| 4400 | 27.76 | 38.99 | 10.27 | 10.78 | 1.66 | 0.92 | 23.72 | 11.44 | 0.44 |
| 4500 | 27.70 | 38.92 | 10.10 | 11.02 | 1.67 | 0.92 | 23.27 | 11.14 | 0.44 |
| 4600 | 27.62 | 38.70 | 10.00 | 11.41 | 1.66 | 0.93 | 23.35 | 11.21 | 0.44 |
| 4700 | 27.55 | 39.02 | 9.88 | 11.75 | 1.72 | 0.95 | 22.78 | 10.81 | 0.44 |
| 4800 | 27.46 | 38.74 | 9.77 | 12.13 | 1.70 | 0.95 | 23.20 | 10.77 | 0.45 |
| 4900 | 27.38 | 39.13 | 9.70 | 12.70 | 1.79 | 0.97 | 23.04 | 10.75 | 0.46 |
| 5000 | 27.28 | 38.24 | 9.63 | 13.37 | 1.67 | 0.96 | 22.80 | 10.77 | 0.47 |
| 5100 | 27.19 | 38.82 | 9.60 | 14.07 | 1.78 | 0.99 | 22.13 | 10.32 | 0.52 |
| 5200 | 27.08 | 38.44 | 9.58 | 15.07 | 1.75 | 0.99 | 22.72 | 10.70 | 0.54 |
| 5300 | 26.94 | 38.77 | 9.64 | 16.14 | 1.85 | 1.00 | 22.45 | 10.58 | 0.54 |
| 5400 | 26.80 | 38.25 | 9.74 | 17.26 | 1.79 | 1.00 | 21.88 | 10.20 | 0.53 |
| 5500 | 26.64 | 38.61 | 9.84 | 18.51 | 1.90 | 1.01 | 21.39 | 9.54 | 0.55 |
| 5600 | 26.50 | 38.38 | 9.99 | 20.16 | 1.89 | 1.02 | 22.08 | 10.10 | 0.57 |
| 5700 | 26.35 | 38.14 | 10.15 | 23.10 | 1.89 | 1.02 | 21.80 | 9.99 | 0.58 |
| 5800 | 26.16 | 38.47 | 10.36 | 27.05 | 2.00 | 1.03 | 21.68 | 9.89 | 0.62 |
| 5900 | 25.97 | 38.65 | 10.63 | 29.97 | 2.09 | 1.03 | 22.00 | 10.34 | 0.64 |
| 6000 | 25.74 | 38.92 | 10.94 | 29.36 | 2.21 | 1.03 | 21.69 | 10.10 | 0.66 |

## *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: Vd = 5.25V, Id = 72mA @ Temperature = -45°C

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP-3 Output | 1dB Comp. Output | Noise Figure |
|---|---|---|---|---|---|---|---|---|---|
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Measure | (dBm) | (dBm) | (dB) |
| 1000 | 30.52 | 51.89 | 3.51 | 18.24 | 3.20 | 1.42 | 26.55 | 14.20 | 1.24 |
| 1100 | 31.68 | 53.55 | 3.61 | 18.94 | 3.49 | 1.41 | 27.20 | 14.94 | 1.00 |
| 1200 | 32.49 | 51.43 | 3.83 | 16.34 | 2.60 | 1.36 | 28.06 | 15.22 | 0.90 |
| 1300 | 32.95 | 48.58 | 4.21 | 14.02 | 1.93 | 1.28 | 28.31 | 15.40 | 0.78 |
| 1400 | 33.15 | 45.60 | 4.70 | 12.41 | 1.46 | 1.19 | 28.93 | 15.63 | 0.68 |
| 1500 | 33.16 | 44.42 | 5.28 | 11.46 | 1.37 | 1.11 | 29.43 | 16.05 | 0.60 |
| 1600 | 33.05 | 43.82 | 5.85 | 10.82 | 1.35 | 1.05 | 29.80 | 16.06 | 0.51 |
| 1700 | 32.80 | 45.19 | 6.47 | 10.32 | 1.61 | 1.04 | 29.73 | 15.94 | 0.46 |
| 1800 | 32.56 | 43.49 | 7.07 | 10.15 | 1.42 | 1.00 | 29.86 | 15.77 | 0.44 |
| 1900 | 32.26 | 42.83 | 7.61 | 9.98 | 1.43 | 0.95 | 30.13 | 15.90 | 0.40 |
| 2000 | 31.97 | 41.61 | 8.15 | 9.86 | 1.32 | 0.92 | 30.24 | 15.80 | 0.35 |
| 2100 | 31.66 | 41.75 | 8.58 | 9.79 | 1.38 | 0.92 | 30.33 | 15.56 | 0.36 |
| 2200 | 31.36 | 41.98 | 9.05 | 9.86 | 1.48 | 0.92 | 30.54 | 15.61 | 0.30 |
| 2300 | 31.08 | 40.47 | 9.38 | 9.72 | 1.34 | 0.87 | 30.61 | 15.83 | 0.32 |
| 2400 | 30.81 | 40.69 | 9.75 | 9.76 | 1.42 | 0.88 | 30.61 | 15.64 | 0.28 |
| 2500 | 30.53 | 40.90 | 10.15 | 9.75 | 1.48 | 0.89 | 29.97 | 15.23 | 0.29 |
| 2600 | 30.29 | 40.97 | 10.33 | 9.76 | 1.54 | 0.89 | 29.74 | 15.18 | 0.32 |
| 2700 | 30.03 | 40.21 | 10.63 | 9.76 | 1.48 | 0.87 | 29.73 | 15.41 | 0.34 |
| 2800 | 29.83 | 40.38 | 10.77 | 9.69 | 1.53 | 0.88 | 28.85 | 15.20 | 0.33 |
| 2900 | 29.62 | 39.58 | 10.96 | 9.66 | 1.45 | 0.86 | 29.26 | 15.17 | 0.35 |
| 3000 | 29.44 | 39.27 | 11.13 | 9.68 | 1.44 | 0.86 | 29.05 | 15.23 | 0.38 |
| 3100 | 29.28 | 40.24 | 11.33 | 9.63 | 1.59 | 0.88 | 28.60 | 14.86 | 0.33 |
| 3200 | 29.12 | 40.05 | 11.53 | 9.60 | 1.60 | 0.87 | 28.46 | 14.53 | 0.39 |
| 3300 | 29.01 | 39.35 | 11.56 | 9.54 | 1.52 | 0.85 | 28.66 | 14.82 | 0.35 |
| 3400 | 28.92 | 38.93 | 11.55 | 9.54 | 1.47 | 0.85 | 28.29 | 14.70 | 0.37 |
| 3500 | 28.81 | 39.13 | 11.48 | 9.58 | 1.52 | 0.86 | 27.90 | 14.44 | 0.39 |
| 3600 | 28.69 | 39.66 | 11.38 | 9.58 | 1.61 | 0.87 | 27.49 | 14.07 | 0.41 |
| 3700 | 28.56 | 39.72 | 11.35 | 9.65 | 1.64 | 0.88 | 27.48 | 13.94 | 0.36 |
| 3800 | 28.47 | 38.93 | 11.22 | 9.73 | 1.53 | 0.87 | 26.96 | 13.64 | 0.36 |
| 3900 | 28.37 | 39.04 | 11.09 | 9.82 | 1.57 | 0.87 | 26.71 | 13.44 | 0.36 |
| 4000 | 28.29 | 39.57 | 10.94 | 9.95 | 1.66 | 0.89 | 26.89 | 13.71 | 0.38 |
| 4100 | 28.21 | 38.87 | 10.81 | 10.06 | 1.56 | 0.89 | 26.41 | 13.24 | 0.37 |
| 4200 | 28.14 | 39.34 | 10.64 | 10.17 | 1.65 | 0.90 | 26.21 | 12.98 | 0.39 |
| 4300 | 28.08 | 38.80 | 10.40 | 10.30 | 1.57 | 0.90 | 26.24 | 12.89 | 0.40 |
| 4400 | 27.99 | 39.00 | 10.29 | 10.60 | 1.62 | 0.91 | 25.73 | 12.68 | 0.43 |
| 4500 | 27.94 | 38.76 | 10.13 | 10.81 | 1.60 | 0.91 | 25.40 | 12.40 | 0.45 |
| 4600 | 27.86 | 38.72 | 10.00 | 11.16 | 1.61 | 0.93 | 25.30 | 12.45 | 0.44 |
| 4700 | 27.79 | 38.90 | 9.88 | 11.52 | 1.65 | 0.94 | 24.77 | 12.07 | 0.44 |
| 4800 | 27.71 | 38.87 | 9.77 | 11.93 | 1.67 | 0.95 | 25.02 | 11.90 | 0.43 |
| 4900 | 27.64 | 38.78 | 9.68 | 12.49 | 1.67 | 0.96 | 24.85 | 11.88 | 0.44 |
| 5000 | 27.54 | 39.45 | 9.56 | 13.06 | 1.81 | 0.98 | 24.66 | 11.90 | 0.47 |
| 5100 | 27.46 | 38.13 | 9.53 | 13.89 | 1.63 | 0.97 | 24.01 | 11.47 | 0.50 |
| 5200 | 27.35 | 38.49 | 9.49 | 14.88 | 1.70 | 0.99 | 24.59 | 11.96 | 0.52 |
| 5300 | 27.21 | 38.35 | 9.51 | 15.89 | 1.71 | 1.00 | 24.24 | 11.75 | 0.53 |
| 5400 | 27.08 | 38.58 | 9.63 | 17.07 | 1.79 | 1.01 | 23.58 | 11.36 | 0.53 |
| 5500 | 26.93 | 38.65 | 9.72 | 18.38 | 1.84 | 1.01 | 23.04 | 10.69 | 0.55 |
| 5600 | 26.79 | 38.56 | 9.86 | 20.06 | 1.86 | 1.02 | 23.85 | 11.37 | 0.54 |
| 5700 | 26.65 | 38.78 | 9.98 | 23.04 | 1.94 | 1.03 | 23.46 | 11.15 | 0.58 |
| 5800 | 26.47 | 38.23 | 10.17 | 27.74 | 1.88 | 1.02 | 23.45 | 11.05 | 0.62 |
| 5900 | 26.27 | 38.48 | 10.45 | 33.87 | 1.98 | 1.03 | 23.79 | 11.49 | 0.61 |
| 6000 | 26.05 | 38.80 | 10.74 | 34.73 | 2.10 | 1.03 | 23.30 | 11.14 | 0.65 |

## *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: Vd = 5.00V, Id = 66mA @ Temperature = +85°C

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP-3 Output | 1dB Comp. Output | Noise Figure |
|---|---|---|---|---|---|---|---|---|---|
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Measure | (dBm) | (dBm) | (dB) |
| 1000 | 27.91 | 50.09 | 4.34 | 17.42 | 4.02 | 1.34 | 24.05 | 13.26 | 2.42 |
| 1100 | 29.14 | 49.13 | 4.22 | 17.61 | 3.10 | 1.34 | 24.71 | 13.93 | 2.06 |
| 1200 | 30.06 | 48.54 | 4.19 | 15.58 | 2.60 | 1.32 | 25.83 | 14.33 | 1.83 |
| 1300 | 30.67 | 47.10 | 4.30 | 13.66 | 2.09 | 1.28 | 26.45 | 14.53 | 1.63 |
| 1400 | 31.03 | 46.86 | 4.51 | 12.36 | 1.97 | 1.25 | 27.14 | 14.90 | 1.49 |
| 1500 | 31.19 | 45.31 | 4.85 | 11.46 | 1.69 | 1.19 | 27.54 | 15.20 | 1.35 |
| 1600 | 31.22 | 43.98 | 5.21 | 10.92 | 1.51 | 1.14 | 27.85 | 15.32 | 1.24 |
| 1700 | 31.09 | 43.47 | 5.71 | 10.57 | 1.52 | 1.10 | 27.76 | 15.21 | 1.15 |
| 1800 | 30.94 | 42.35 | 6.20 | 10.40 | 1.42 | 1.05 | 27.97 | 15.25 | 1.09 |
| 1900 | 30.72 | 42.18 | 6.67 | 10.34 | 1.48 | 1.03 | 28.19 | 15.42 | 1.03 |
| 2000 | 30.50 | 41.45 | 7.16 | 10.37 | 1.44 | 1.00 | 28.14 | 15.40 | 0.97 |
| 2100 | 30.24 | 40.52 | 7.59 | 10.40 | 1.39 | 0.97 | 28.39 | 15.21 | 0.97 |
| 2200 | 29.98 | 40.01 | 8.07 | 10.56 | 1.38 | 0.95 | 27.99 | 15.20 | 0.89 |
| 2300 | 29.73 | 41.15 | 8.47 | 10.61 | 1.61 | 0.96 | 28.19 | 15.46 | 0.91 |
| 2400 | 29.48 | 40.62 | 8.81 | 10.69 | 1.59 | 0.95 | 27.71 | 15.38 | 0.86 |
| 2500 | 29.22 | 39.54 | 9.18 | 10.80 | 1.49 | 0.93 | 27.58 | 15.02 | 0.87 |
| 2600 | 28.99 | 39.35 | 9.49 | 10.95 | 1.50 | 0.93 | 27.30 | 14.96 | 0.90 |
| 2700 | 28.74 | 39.15 | 9.78 | 11.01 | 1.53 | 0.92 | 26.73 | 15.05 | 0.92 |
| 2800 | 28.54 | 39.54 | 9.99 | 11.08 | 1.63 | 0.92 | 27.27 | 14.88 | 0.93 |
| 2900 | 28.33 | 38.78 | 10.18 | 11.11 | 1.55 | 0.91 | 27.37 | 14.98 | 0.92 |
| 3000 | 28.16 | 38.97 | 10.40 | 11.24 | 1.62 | 0.92 | 27.12 | 14.91 | 0.97 |
| 3100 | 28.00 | 38.83 | 10.61 | 11.29 | 1.62 | 0.92 | 26.78 | 14.66 | 0.91 |
| 3200 | 27.84 | 38.87 | 10.73 | 11.38 | 1.67 | 0.92 | 26.55 | 14.21 | 0.96 |
| 3300 | 27.71 | 39.46 | 10.81 | 11.42 | 1.79 | 0.93 | 26.69 | 14.47 | 0.94 |
| 3400 | 27.59 | 39.29 | 10.83 | 11.52 | 1.78 | 0.93 | 26.10 | 14.45 | 0.97 |
| 3500 | 27.46 | 38.45 | 10.80 | 11.61 | 1.67 | 0.92 | 25.80 | 14.18 | 1.01 |
| 3600 | 27.33 | 38.53 | 10.75 | 11.71 | 1.71 | 0.93 | 25.73 | 13.80 | 1.01 |
| 3700 | 27.19 | 38.67 | 10.75 | 11.89 | 1.76 | 0.93 | 25.42 | 13.65 | 1.00 |
| 3800 | 27.09 | 39.07 | 10.65 | 12.05 | 1.84 | 0.95 | 25.00 | 13.34 | 1.00 |
| 3900 | 26.97 | 38.72 | 10.60 | 12.28 | 1.81 | 0.95 | 24.93 | 13.11 | 0.99 |
| 4000 | 26.88 | 39.14 | 10.58 | 12.54 | 1.90 | 0.96 | 24.88 | 13.26 | 1.02 |
| 4100 | 26.78 | 39.03 | 10.51 | 12.82 | 1.91 | 0.96 | 24.48 | 12.89 | 1.05 |
| 4200 | 26.69 | 38.47 | 10.43 | 13.16 | 1.83 | 0.96 | 24.22 | 12.65 | 1.06 |
| 4300 | 26.60 | 38.23 | 10.31 | 13.54 | 1.80 | 0.97 | 24.17 | 12.51 | 1.08 |
| 4400 | 26.48 | 38.79 | 10.31 | 13.97 | 1.94 | 0.98 | 23.78 | 12.26 | 1.13 |
| 4500 | 26.40 | 39.34 | 10.21 | 14.54 | 2.08 | 0.99 | 23.32 | 11.95 | 1.14 |
| 4600 | 26.28 | 38.59 | 10.22 | 15.15 | 1.96 | 0.99 | 23.42 | 11.97 | 1.15 |
| 4700 | 26.18 | 38.80 | 10.24 | 15.80 | 2.03 | 1.00 | 22.85 | 11.54 | 1.17 |
| 4800 | 26.05 | 38.16 | 10.22 | 16.57 | 1.93 | 1.00 | 23.25 | 11.62 | 1.19 |
| 4900 | 25.94 | 38.55 | 10.22 | 17.52 | 2.04 | 1.01 | 23.05 | 11.55 | 1.20 |
| 5000 | 25.79 | 38.53 | 10.27 | 18.60 | 2.08 | 1.01 | 22.77 | 11.40 | 1.24 |
| 5100 | 25.65 | 38.66 | 10.34 | 19.83 | 2.14 | 1.02 | 22.17 | 10.90 | 1.29 |
| 5200 | 25.48 | 38.53 | 10.45 | 21.33 | 2.16 | 1.02 | 22.73 | 11.47 | 1.34 |
| 5300 | 25.30 | 38.76 | 10.60 | 22.62 | 2.26 | 1.03 | 22.47 | 11.21 | 1.37 |
| 5400 | 25.11 | 38.81 | 10.81 | 23.50 | 2.33 | 1.03 | 21.93 | 10.77 | 1.36 |
| 5500 | 24.92 | 39.64 | 10.99 | 23.69 | 2.60 | 1.03 | 21.42 | 10.23 | 1.41 |
| 5600 | 24.73 | 39.03 | 11.24 | 23.88 | 2.50 | 1.03 | 22.08 | 10.77 | 1.43 |
| 5700 | 24.51 | 38.84 | 11.53 | 22.74 | 2.51 | 1.02 | 21.78 | 10.59 | 1.46 |
| 5800 | 24.29 | 39.62 | 11.88 | 20.80 | 2.80 | 1.02 | 21.70 | 10.36 | 1.54 |
| 5900 | 24.05 | 39.17 | 12.35 | 19.31 | 2.75 | 1.01 | 22.06 | 10.73 | 1.55 |
| 6000 | 23.80 | 39.17 | 12.79 | 17.80 | 2.82 | 1.01 | 21.63 | 10.46 | 1.60 |

## *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: Vd = 4.75V, Id = 63mA @ Temperature = +85°C

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP-3 Output | 1dB Comp. Output | Noise Figure |
|---|---|---|---|---|---|---|---|---|---|
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Measure | (dBm) | (dBm) | (dB) |
| 1000 | 27.69 | 50.64 | 4.30 | 17.48 | 4.34 | 1.35 | 23.45 | 12.70 | 2.41 |
| 1100 | 28.94 | 50.82 | 4.16 | 17.64 | 3.80 | 1.35 | 24.15 | 13.51 | 2.07 |
| 1200 | 29.87 | 48.05 | 4.12 | 15.60 | 2.48 | 1.33 | 25.39 | 13.90 | 1.81 |
| 1300 | 30.49 | 47.41 | 4.21 | 13.69 | 2.17 | 1.30 | 25.90 | 14.11 | 1.63 |
| 1400 | 30.86 | 45.42 | 4.43 | 12.37 | 1.74 | 1.23 | 26.44 | 14.36 | 1.47 |
| 1500 | 31.03 | 43.46 | 4.76 | 11.49 | 1.44 | 1.17 | 26.92 | 14.67 | 1.35 |
| 1600 | 31.07 | 43.26 | 5.12 | 10.96 | 1.42 | 1.14 | 27.36 | 14.90 | 1.21 |
| 1700 | 30.95 | 42.99 | 5.61 | 10.63 | 1.46 | 1.10 | 27.19 | 14.79 | 1.13 |
| 1800 | 30.80 | 42.29 | 6.09 | 10.47 | 1.43 | 1.06 | 27.46 | 14.71 | 1.10 |
| 1900 | 30.58 | 40.59 | 6.55 | 10.46 | 1.28 | 1.01 | 27.71 | 14.88 | 1.03 |
| 2000 | 30.36 | 41.30 | 7.02 | 10.47 | 1.44 | 1.00 | 27.52 | 14.86 | 0.96 |
| 2100 | 30.11 | 41.67 | 7.45 | 10.48 | 1.54 | 1.01 | 27.63 | 14.68 | 0.97 |
| 2200 | 29.84 | 40.54 | 7.92 | 10.67 | 1.47 | 0.97 | 27.33 | 14.78 | 0.89 |
| 2300 | 29.59 | 40.12 | 8.32 | 10.69 | 1.48 | 0.95 | 27.72 | 14.92 | 0.91 |
| 2400 | 29.34 | 39.76 | 8.69 | 10.81 | 1.49 | 0.94 | 27.37 | 14.83 | 0.88 |
| 2500 | 29.08 | 39.58 | 9.12 | 10.94 | 1.52 | 0.93 | 26.78 | 14.48 | 0.88 |
| 2600 | 28.85 | 39.02 | 9.38 | 11.05 | 1.48 | 0.92 | 26.72 | 14.42 | 0.91 |
| 2700 | 28.60 | 39.47 | 9.67 | 11.13 | 1.59 | 0.94 | 26.88 | 14.63 | 0.91 |
| 2800 | 28.40 | 39.57 | 9.92 | 11.23 | 1.65 | 0.94 | 26.32 | 14.34 | 0.92 |
| 2900 | 28.19 | 38.87 | 10.12 | 11.33 | 1.60 | 0.92 | 26.62 | 14.55 | 0.93 |
| 3000 | 28.01 | 39.82 | 10.36 | 11.48 | 1.78 | 0.94 | 26.50 | 14.36 | 0.97 |
| 3100 | 27.85 | 39.53 | 10.50 | 11.47 | 1.77 | 0.93 | 26.21 | 14.10 | 0.93 |
| 3200 | 27.68 | 38.88 | 10.69 | 11.59 | 1.70 | 0.93 | 25.81 | 13.90 | 0.98 |
| 3300 | 27.55 | 39.39 | 10.74 | 11.63 | 1.81 | 0.93 | 25.93 | 13.92 | 0.95 |
| 3400 | 27.43 | 39.14 | 10.77 | 11.70 | 1.79 | 0.94 | 25.52 | 14.02 | 0.97 |
| 3500 | 27.30 | 38.27 | 10.77 | 11.82 | 1.67 | 0.93 | 25.12 | 13.62 | 0.99 |
| 3600 | 27.16 | 38.78 | 10.71 | 11.93 | 1.79 | 0.93 | 24.98 | 13.24 | 1.02 |
| 3700 | 27.03 | 38.80 | 10.72 | 12.14 | 1.82 | 0.94 | 24.81 | 13.08 | 1.00 |
| 3800 | 26.92 | 38.85 | 10.63 | 12.33 | 1.84 | 0.95 | 24.27 | 12.78 | 1.00 |
| 3900 | 26.80 | 38.56 | 10.63 | 12.56 | 1.82 | 0.95 | 24.18 | 12.55 | 0.99 |
| 4000 | 26.70 | 39.17 | 10.58 | 12.78 | 1.95 | 0.96 | 24.21 | 12.81 | 1.03 |
| 4100 | 26.60 | 37.96 | 10.50 | 13.07 | 1.76 | 0.95 | 23.78 | 12.32 | 1.06 |
| 4200 | 26.50 | 39.19 | 10.46 | 13.39 | 2.01 | 0.97 | 23.46 | 12.08 | 1.06 |
| 4300 | 26.41 | 39.13 | 10.39 | 13.76 | 2.02 | 0.98 | 23.57 | 11.93 | 1.09 |
| 4400 | 26.29 | 38.64 | 10.38 | 14.26 | 1.97 | 0.98 | 23.00 | 11.68 | 1.14 |
| 4500 | 26.19 | 39.35 | 10.27 | 14.75 | 2.13 | 1.00 | 22.58 | 11.36 | 1.14 |
| 4600 | 26.07 | 39.06 | 10.29 | 15.39 | 2.10 | 1.00 | 22.65 | 11.50 | 1.16 |
| 4700 | 25.96 | 38.62 | 10.29 | 16.04 | 2.04 | 1.00 | 22.10 | 11.07 | 1.17 |
| 4800 | 25.83 | 38.83 | 10.35 | 16.84 | 2.12 | 1.01 | 22.51 | 11.03 | 1.20 |
| 4900 | 25.71 | 38.88 | 10.32 | 17.76 | 2.17 | 1.02 | 22.33 | 11.07 | 1.21 |
| 5000 | 25.56 | 38.45 | 10.36 | 18.72 | 2.12 | 1.01 | 22.09 | 10.91 | 1.26 |
| 5100 | 25.41 | 38.68 | 10.48 | 19.86 | 2.21 | 1.02 | 21.44 | 10.41 | 1.32 |
| 5200 | 25.25 | 38.54 | 10.59 | 20.98 | 2.22 | 1.02 | 22.02 | 10.87 | 1.34 |
| 5300 | 25.06 | 38.86 | 10.73 | 22.08 | 2.35 | 1.03 | 21.77 | 10.61 | 1.36 |
| 5400 | 24.87 | 38.74 | 10.96 | 22.37 | 2.38 | 1.02 | 21.20 | 10.29 | 1.38 |
| 5500 | 24.67 | 38.73 | 11.21 | 22.37 | 2.44 | 1.02 | 20.70 | 9.63 | 1.41 |
| 5600 | 24.48 | 38.73 | 11.40 | 22.39 | 2.49 | 1.02 | 21.45 | 10.18 | 1.43 |
| 5700 | 24.26 | 39.14 | 11.71 | 21.48 | 2.67 | 1.02 | 21.15 | 10.00 | 1.48 |
| 5800 | 24.03 | 39.04 | 12.06 | 19.87 | 2.71 | 1.02 | 21.09 | 9.77 | 1.54 |
| 5900 | 23.80 | 39.78 | 12.53 | 18.57 | 3.02 | 1.01 | 21.34 | 10.26 | 1.55 |
| 6000 | 23.54 | 39.59 | 13.03 | 17.29 | 3.04 | 1.00 | 21.01 | 10.00 | 1.60 |

## *Typical Performance Data*

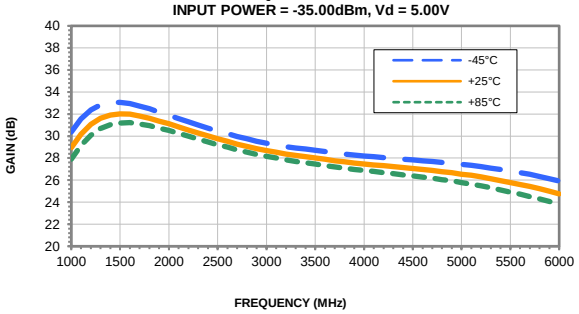
**Definitions:**
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5.25V, Id = 69mA @ Temperature = +85°C

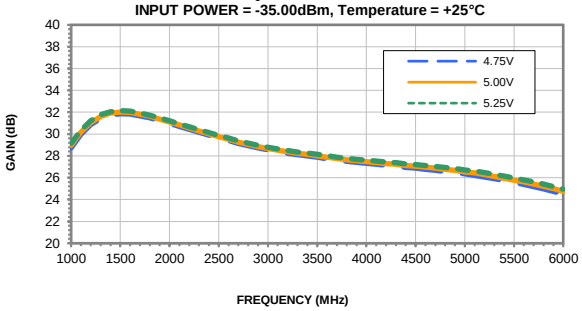
| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP-3 Output | 1dB Comp. Output | Noise Figure |
|---|---|---|---|---|---|---|---|---|---|
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Measure | (dBm) | (dBm) | (dB) |
| 1000 | 28.09 | 50.61 | 4.38 | 17.38 | 4.20 | 1.34 | 24.64 | 13.64 | 2.40 |
| 1100 | 29.32 | 51.75 | 4.27 | 17.54 | 4.11 | 1.34 | 25.28 | 14.42 | 2.06 |
| 1200 | 30.23 | 50.29 | 4.25 | 15.56 | 3.10 | 1.33 | 26.26 | 14.80 | 1.81 |
| 1300 | 30.83 | 47.39 | 4.37 | 13.64 | 2.13 | 1.28 | 26.79 | 15.00 | 1.63 |
| 1400 | 31.18 | 46.90 | 4.61 | 12.34 | 1.98 | 1.24 | 27.38 | 15.35 | 1.47 |
| 1500 | 31.33 | 46.27 | 4.94 | 11.45 | 1.87 | 1.19 | 27.91 | 15.66 | 1.34 |
| 1600 | 31.35 | 43.72 | 5.32 | 10.87 | 1.48 | 1.12 | 28.21 | 15.88 | 1.23 |
| 1700 | 31.22 | 43.07 | 5.82 | 10.52 | 1.46 | 1.07 | 28.09 | 15.77 | 1.14 |
| 1800 | 31.07 | 43.27 | 6.30 | 10.37 | 1.55 | 1.06 | 28.33 | 15.68 | 1.08 |
| 1900 | 30.84 | 41.63 | 6.76 | 10.33 | 1.41 | 1.00 | 28.72 | 15.86 | 1.02 |
| 2000 | 30.61 | 41.50 | 7.25 | 10.28 | 1.44 | 0.99 | 28.66 | 15.96 | 0.96 |
| 2100 | 30.36 | 39.96 | 7.69 | 10.32 | 1.31 | 0.94 | 28.99 | 15.65 | 0.96 |
| 2200 | 30.09 | 40.35 | 8.15 | 10.46 | 1.43 | 0.94 | 28.40 | 15.64 | 0.89 |
| 2300 | 29.84 | 40.02 | 8.53 | 10.48 | 1.43 | 0.93 | 28.62 | 16.01 | 0.89 |
| 2400 | 29.59 | 40.04 | 8.91 | 10.58 | 1.49 | 0.93 | 28.36 | 15.81 | 0.85 |
| 2500 | 29.34 | 40.15 | 9.29 | 10.69 | 1.56 | 0.93 | 28.15 | 15.46 | 0.88 |
| 2600 | 29.11 | 40.16 | 9.60 | 10.78 | 1.60 | 0.94 | 27.79 | 15.40 | 0.91 |
| 2700 | 28.86 | 39.51 | 9.87 | 10.86 | 1.57 | 0.92 | 28.21 | 15.62 | 0.91 |
| 2800 | 28.66 | 40.21 | 10.07 | 10.93 | 1.71 | 0.93 | 27.32 | 15.33 | 0.91 |
| 2900 | 28.45 | 39.24 | 10.30 | 11.01 | 1.60 | 0.92 | 27.99 | 15.55 | 0.91 |
| 3000 | 28.28 | 39.12 | 10.48 | 11.09 | 1.62 | 0.92 | 27.79 | 15.37 | 0.96 |
| 3100 | 28.13 | 39.16 | 10.67 | 11.10 | 1.65 | 0.92 | 27.49 | 15.10 | 0.93 |
| 3200 | 27.96 | 39.80 | 10.82 | 11.18 | 1.80 | 0.93 | 27.07 | 14.78 | 0.97 |
| 3300 | 27.83 | 39.74 | 10.84 | 11.26 | 1.81 | 0.93 | 27.27 | 14.93 | 0.92 |
| 3400 | 27.72 | 39.11 | 10.87 | 11.31 | 1.73 | 0.92 | 26.91 | 14.91 | 0.96 |
| 3500 | 27.59 | 38.87 | 10.85 | 11.43 | 1.71 | 0.92 | 26.55 | 14.63 | 0.98 |
| 3600 | 27.47 | 39.56 | 10.81 | 11.54 | 1.86 | 0.94 | 26.42 | 14.38 | 1.01 |
| 3700 | 27.33 | 38.10 | 10.80 | 11.72 | 1.64 | 0.92 | 26.19 | 14.11 | 0.98 |
| 3800 | 27.23 | 39.27 | 10.66 | 11.90 | 1.86 | 0.94 | 25.76 | 13.81 | 1.00 |
| 3900 | 27.12 | 38.36 | 10.67 | 12.11 | 1.72 | 0.93 | 25.54 | 13.47 | 0.98 |
| 4000 | 27.03 | 39.07 | 10.57 | 12.34 | 1.86 | 0.95 | 25.65 | 13.74 | 1.01 |
| 4100 | 26.93 | 38.81 | 10.53 | 12.62 | 1.84 | 0.95 | 25.24 | 13.48 | 1.04 |
| 4200 | 26.84 | 38.27 | 10.39 | 12.94 | 1.76 | 0.95 | 24.91 | 13.25 | 1.05 |
| 4300 | 26.76 | 38.82 | 10.31 | 13.32 | 1.88 | 0.97 | 25.00 | 12.99 | 1.07 |
| 4400 | 26.65 | 38.99 | 10.27 | 13.74 | 1.94 | 0.98 | 24.48 | 12.75 | 1.12 |
| 4500 | 26.56 | 38.11 | 10.23 | 14.23 | 1.80 | 0.97 | 23.98 | 12.44 | 1.13 |
| 4600 | 26.45 | 39.01 | 10.16 | 14.90 | 1.99 | 1.00 | 24.09 | 12.47 | 1.13 |
| 4700 | 26.35 | 38.59 | 10.17 | 15.61 | 1.94 | 1.00 | 23.54 | 12.15 | 1.16 |
| 4800 | 26.23 | 38.95 | 10.21 | 16.41 | 2.05 | 1.01 | 23.88 | 12.12 | 1.18 |
| 4900 | 26.12 | 38.55 | 10.16 | 17.43 | 2.00 | 1.01 | 23.70 | 12.05 | 1.20 |
| 5000 | 25.97 | 38.31 | 10.15 | 18.51 | 1.99 | 1.01 | 23.45 | 11.91 | 1.24 |
| 5100 | 25.84 | 38.69 | 10.24 | 19.89 | 2.10 | 1.02 | 22.80 | 11.41 | 1.28 |
| 5200 | 25.68 | 38.36 | 10.31 | 21.46 | 2.07 | 1.02 | 23.45 | 11.87 | 1.32 |
| 5300 | 25.50 | 38.42 | 10.47 | 23.08 | 2.14 | 1.02 | 23.16 | 11.72 | 1.33 |
| 5400 | 25.32 | 38.41 | 10.68 | 24.35 | 2.18 | 1.02 | 22.54 | 11.28 | 1.35 |
| 5500 | 25.12 | 38.70 | 10.91 | 24.99 | 2.31 | 1.03 | 22.08 | 10.74 | 1.39 |
| 5600 | 24.93 | 38.66 | 11.06 | 25.22 | 2.35 | 1.03 | 22.78 | 11.16 | 1.41 |
| 5700 | 24.72 | 39.05 | 11.38 | 23.80 | 2.51 | 1.03 | 22.47 | 11.11 | 1.45 |
| 5800 | 24.49 | 39.92 | 11.74 | 21.58 | 2.83 | 1.03 | 22.33 | 10.87 | 1.51 |
| 5900 | 24.26 | 39.00 | 12.18 | 19.90 | 2.63 | 1.01 | 22.69 | 11.36 | 1.53 |
| 6000 | 24.01 | 38.82 | 12.62 | 18.30 | 2.65 | 1.01 | 22.26 | 10.98 | 1.58 |

## *Typical Performance Curves*

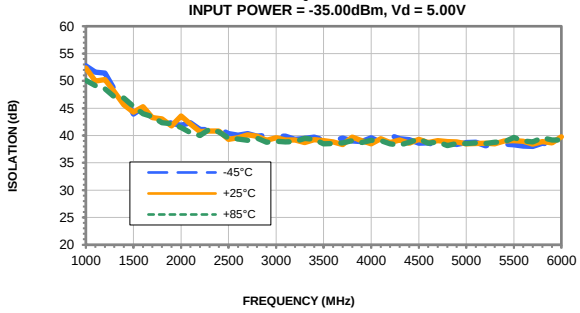
GAIN vs. FREQUENCY & TEMPERATURE
INPUT POWER = -35.00dBm, Vd = 5.00V



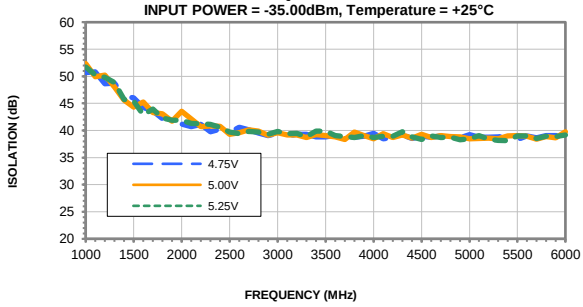

GAIN vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -35.00dBm, Temperature = +25°C



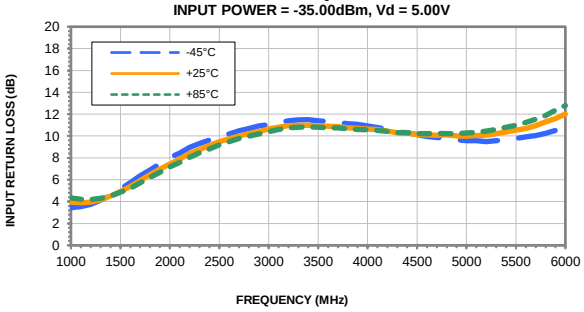

ISOLATION vs. FREQUENCY & TEMPERATURE
INPUT POWER = -35.00dBm, Vd = 5.00V



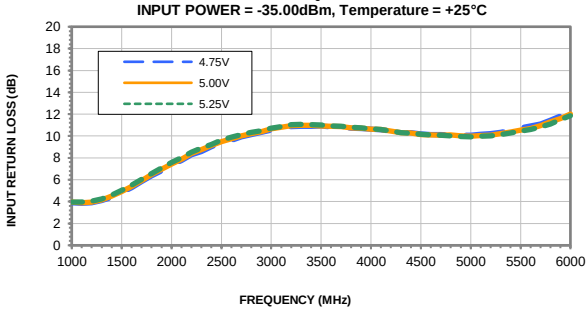

ISOLATION vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -35.00dBm, Temperature = +25°C



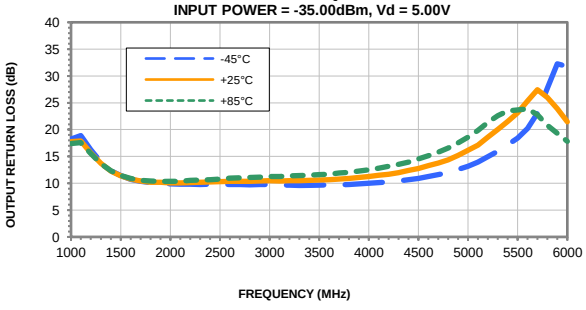

INPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE
INPUT POWER = -35.00dBm, Vd = 5.00V



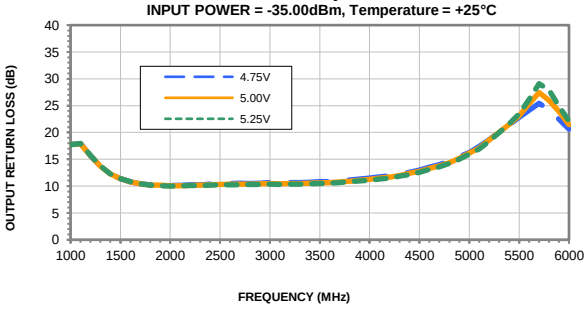

INPUT RETURN LOSS vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -35.00dBm, Temperature = +25°C




OUTPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE
INPUT POWER = -35.00dBm, Vd = 5.00V

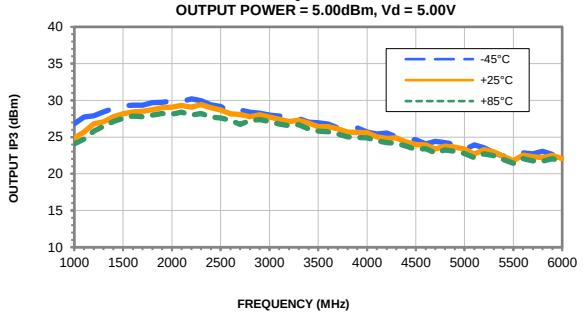



OUTPUT RETURN LOSS vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -35.00dBm, Temperature = +25°C

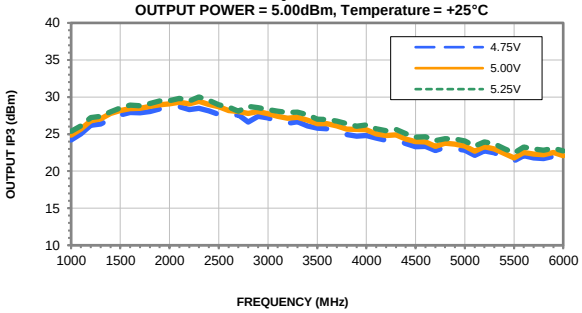


## Typical Performance Curves

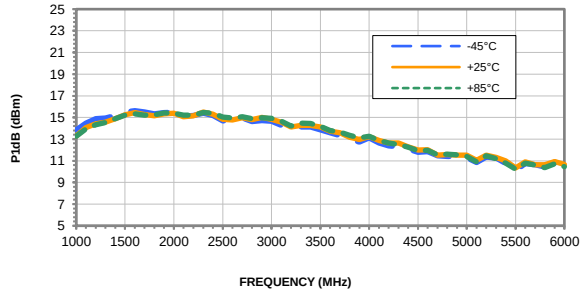
OUTPUT IP3 vs. FREQUENCY & TEMPERATURE
OUTPUT POWER = 5.00dBm, Vd = 5.00V



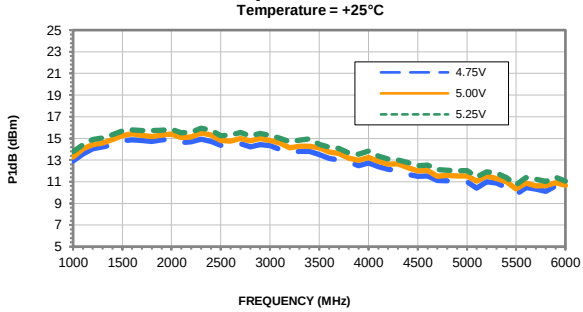

OUTPUT IP3 vs. FREQUENCY & DEVICE VOLTAGE
OUTPUT POWER = 5.00dBm, Temperature = +25°C



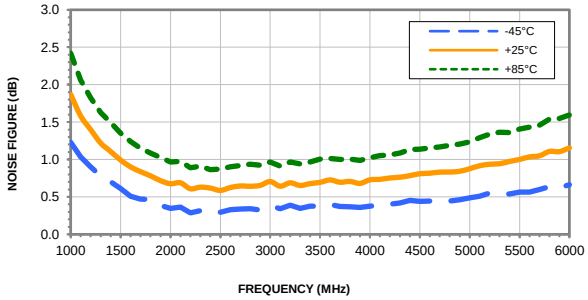

P1dB vs. FREQUENCY & TEMPERATURE
Vd = 5.00V



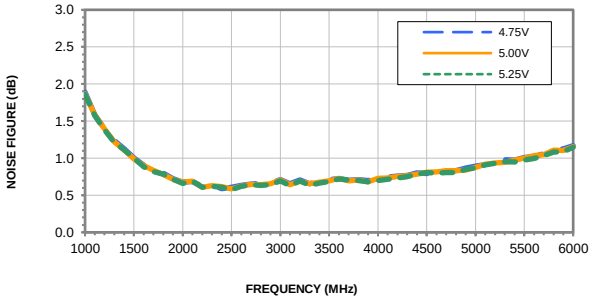

P1dB vs. FREQUENCY & DEVICE VOLTAGE
Temperature = +25°C




NOISE FIGURE vs. FREQUENCY & TEMPERATURE
Vd = 5.00V



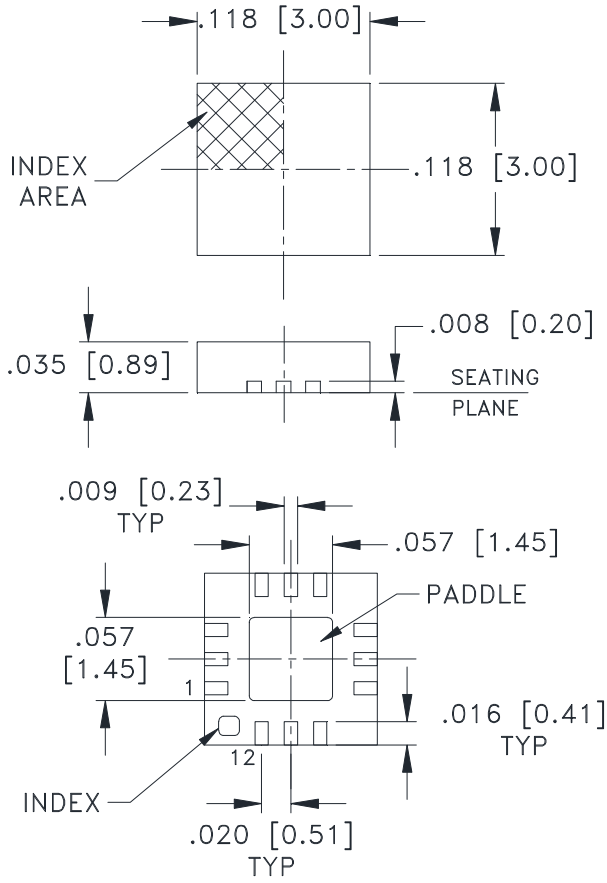

NOISE FIGURE vs. FREQUENCY & DEVICE VOLTAGE
Temperature = +25°C

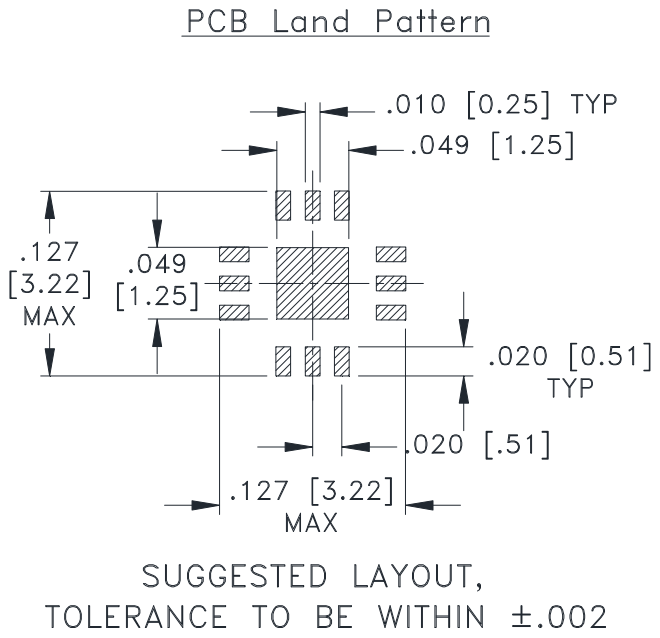


# Case Style DQ

**DQ1225**

## Outline Dimensions




**Weight: .02 Grams**

**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. All models, (+) suffix. See Data sheet.
   - For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.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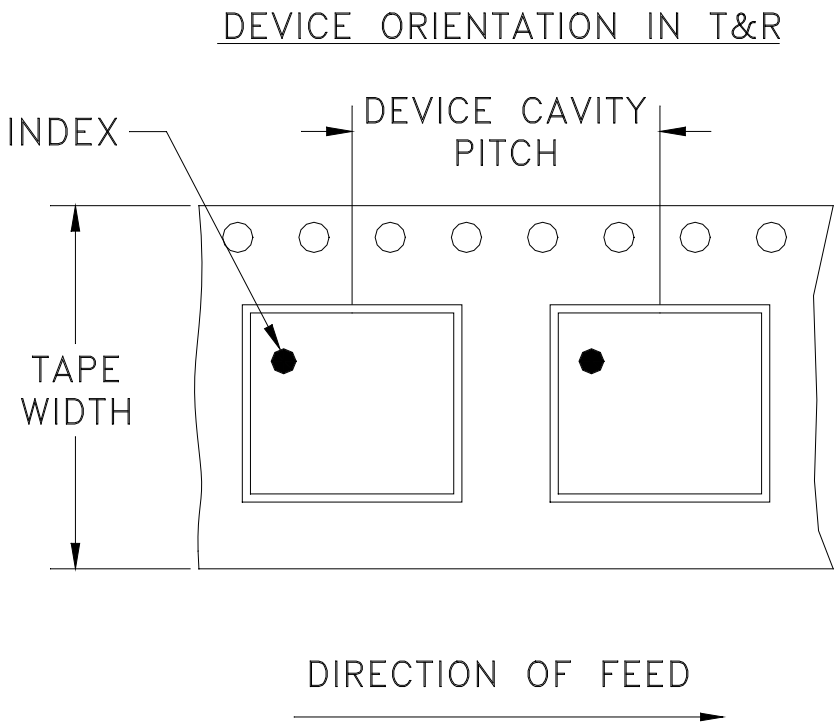
# Tape & Reel Packaging TR-F66




| Tape Width, mm | Device Cavity Pitch, mm | Reel Size, inches | Devices per Reel see note | |
|---|---|---|---|---|
| 8 | 4 | 7 | Small quantity standard | 20 |
| | | | | 50 |
| | | | | 100 |
| | | | | 200 |
| | | | | 500 |
| | | 7 | Standard | 1000, 2000, 3000 |

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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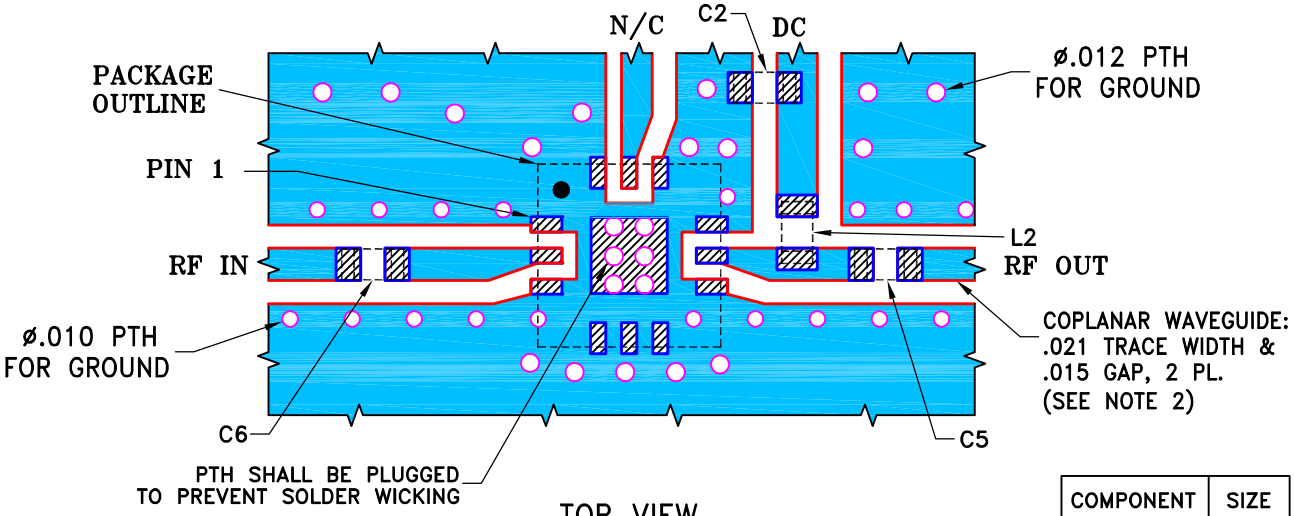
THIRD ANGLE PROJECTION

| REVISIONS | | | | | |
|---|---|---|---|---|---|
| REV | ECN No. | DESCRIPTION | DATE | DR | AUTH |
| OR | M170202 | NEW RELEASE | 10/02/18 | GF | GH |
| A | M171004 | UPDATED TEST BOARDS | 11/15/18 | ITG | GH |
| | | | | | |
| | | | | | |

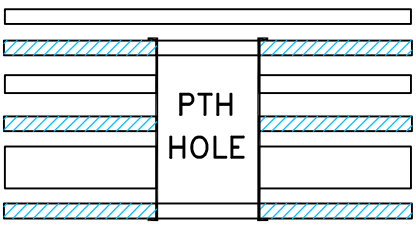
## SUGGESTED MOUNTING CONFIGURATION FOR DQ1225 CASE STYLE, "12AM02" PIN CODE




TOP VIEW

| COMPONENT | SIZE |
|---|---|
| C2,C5,C6,L2 | 0402 |

### STACK-UP DIAGRAM




-TOP SOLDER MASK
-COPPER LAYER 1, 0.5 OZ.
-CORE, 0.010", ROGERS RO4350B
-COPPER LAYER 2, 0.5 OZ.
-CORE+PREPREG, FR4 (THICKNESS AS REQUIRED)
-COPPER LAYER 3, 0.5 OZ.

1. TOTAL FINISHED THICKNESS 0.065" ± 10%.
2. PTH HOLES PRESENT FROM COPPER LAYER 1 TO 3.

### NOTES:

1. PCB IS MULTILAYER PCB, SEE STACK-UP DIAGRAM.
2. TRACE WIDTH & GAP PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .010"±.001"; COPPER: 1/2 OZ. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
3. CHIP COMPONENT FOOT PRINTS SHOWN FOR REFERENCE. FOR COMPONENT VALUES REFER TO TB-PMA3-63GLN+ OR TB-PMA3-352GLN+.
4. COPPER LAYERS L2 & L3 OF THE PCB ARE CONTINUOUS GROUND PLANES.

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 | 09/26/18 |
| TOLERANCES ON: | CHECKED | IL | 09/26/18 |
| 2 PL DECIMALS ± | APPROVED | GH | 10/02/18 |
| 3 PL DECIMALS ± .005 | | | |
| ANGLES ± | | | |
| FRACTIONS ± | | | |



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

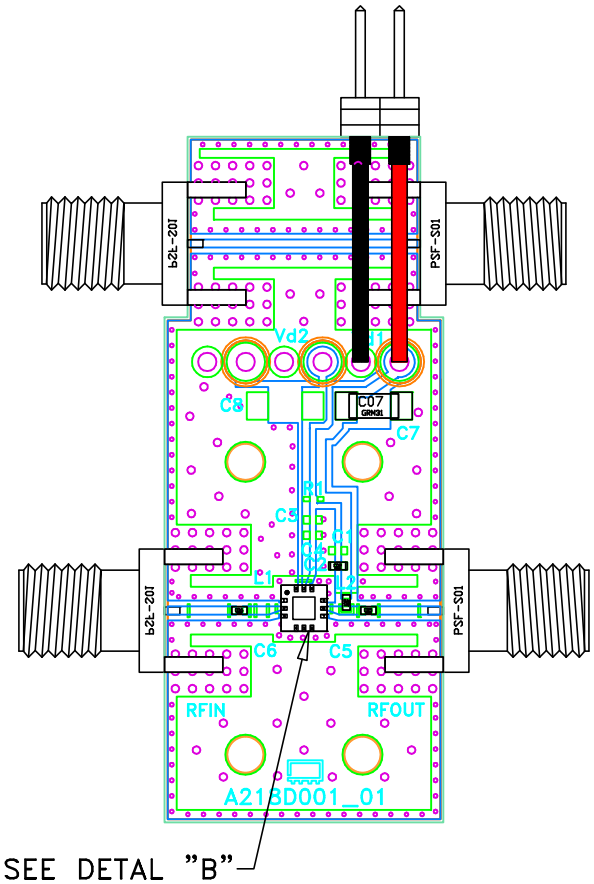
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

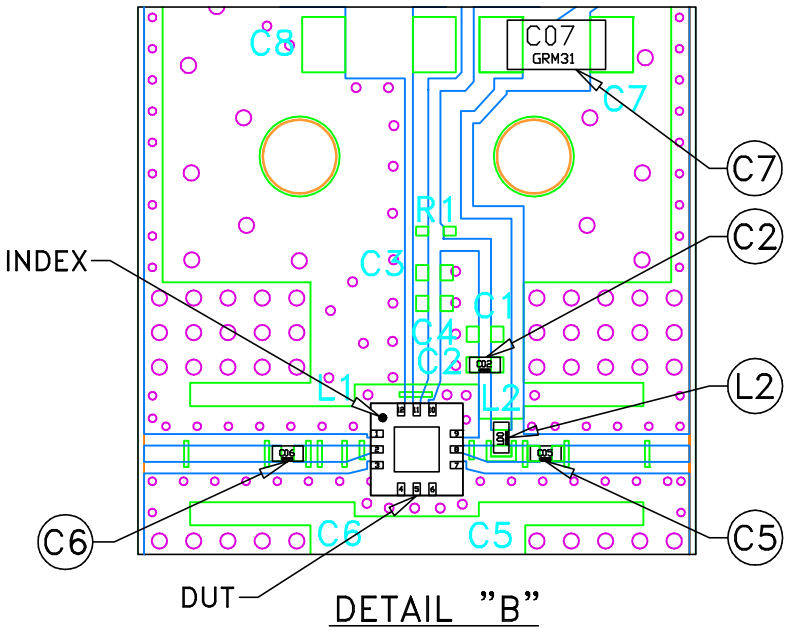
PL, 12AM02, DQ1225, TB-PMA3-XXXGLN+

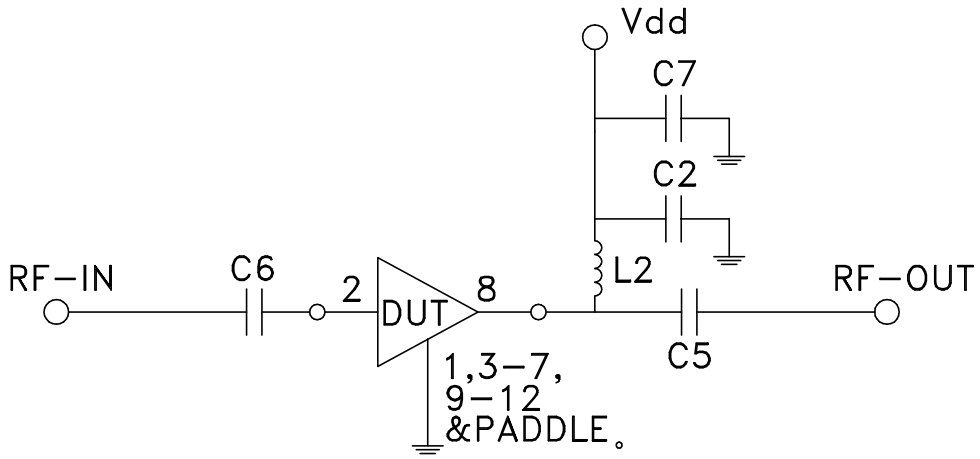
| SIZE | CODE IDENT | DRAWING NO: | REV: |
|---|---|---|---|
| A | 15542 | 98-PL-611 | A |

| FILE: | SCALE: | SHEET: |
|---|---|---|
| 98PL611 | 8:1 | 1 OF 1 |

# Evaluation Board and Circuit




Schematic Diagram

| Component | Size | Value | Part Number | Manufacturer |
|---|---|---|---|---|
| C2 | 0402 | 100pF | GRM1555C1H101JA01D | Murata |
| C5 | 0402 | 22pF | GRM1555C1H220JA01D | Murata |
| C6 | 0402 | 22pF | GRM1555C1H220JA01D | Murata |
| C7 | 1206 | 10uF | GRM31CR61H106KA12L | Murata |
| L2 | 0402 | 10nH | LQG15HS10NJ02D | Murata |

NOTES:

1. SMA Female Connectors.
2. PCB Material: Roger RO4350B or equivalent, Dielectric constant=3.5, Thickness=0.01 inch

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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 |

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 |
|---|---|---|
| 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 |