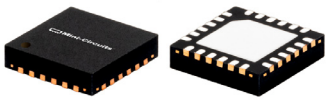
MMIC SURFACE MOUNT

# Wideband Amplifier AVA-6123MP+

50Ω 5.6 to 11.7 GHz Medium Power Driver Amplifier

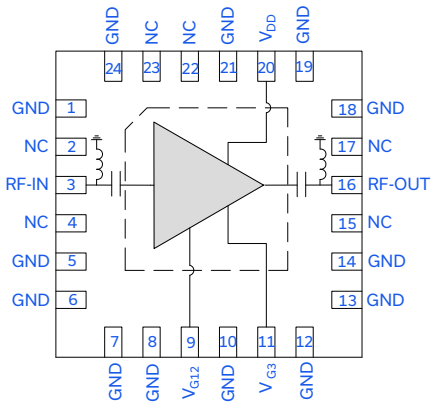
## THE BIG DEAL

- High $P_{SAT}$, Typ. +23.2 dBm
- High Linear Gain, Typ. 22.4 dB
- Bias Condition, +5 V at 140 mA
- 4x4 mm 24-Lead QFN-Style Package



*Generic photo used for illustration purposes only*

## FUNCTIONAL DIAGRAM




## APPLICATIONS

- Back Haul Radio
- Satellite Communications
- Radar, EW, and ECM Defense Systems

## PRODUCT OVERVIEW

The AVA-6123MP+ is a GaAs MMIC multi-stage medium power driver amplifier operating from 5.6 to 11.7 GHz. The amplifier is biased at +5 V and 140 mA quiescent current providing 22.4 dB of Linear Gain and +23.2 dBm of Saturated Output Power. The device is internally DC-blocked, and a DC path to ground is present at the RF input and output ports for ESD protection. AVA-6123MP+ is matched at the input and output to 50Ω and comes in a small, low profile 4x4 mm 24-lead QFN-Style package allowing for easy integration into dense circuit board layouts.

## KEY FEATURES

| Features | Advantages |
|---|---|
| Medium Power, Typ. +23.2 dBm $P_{SAT}$ | Provides high saturated output power required for Back Haul Radio and Radar Systems. |
| High Gain, Typ. 22.4 dB | Reduces the number of devices in the signal chain. |
| 4x4mm 24-Lead QFN-Style Package | A small footprint saves space in dense layouts while providing low inductance, repeatable transitions, and excellent thermal contact to the PCB. Industry standard packaging allows for ease of assembly in high volume manufacturing processes |

REV. OR
ECO-023136
AVA-6123MP+
MCL NY
240923

# Wideband Amplifier AVA-6123MP+

50Ω 5.6 to 11.7 GHz Medium Power Driver Amplifier

## ELECTRICAL SPECIFICATIONS[1] AT +25°C, $V_{DD}$ = +5 V, UNLESS NOTED OTHERWISE

| Parameter | Condition (GHz) | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Frequency Range | | 5.6 | | 11.7 | GHz |
| Gain | 5.6 | | 21.9 | | dB |
| | 7.1 | | 22.4 | | |
| | 8.5 | | 22.4 | | |
| | 10.0 | | 22.6 | | |
| | 11.7 | | 21.6 | | |
| Output Power at 1 dB Compression (P1dB) | 5.6 | | +20.7 | | dBm |
| | 7.1 | | +21.6 | | |
| | 8.5 | | +21.6 | | |
| | 10.0 | | +21.6 | | |
| | 11.7 | | +21.5 | | |
| Output Power at Saturation ($P_{SAT}$)[2] | 5.6 | | +22.9 | | dBm |
| | 7.1 | | +23.3 | | |
| | 8.5 | | +23.2 | | |
| | 10.0 | | +23.5 | | |
| | 11.7 | | +23.1 | | |
| Output Third-Order Intercept ($P_{OUT}$ = +9 dBm/Tone) | 5.6 | | +27.6 | | dBm |
| | 7.1 | | +27.8 | | |
| | 8.5 | | +28.2 | | |
| | 10.0 | | +27.5 | | |
| | 11.7 | | +25.5 | | |
| Input Return Loss | 5.6 | | 19 | | dB |
| | 7.1 | | 17 | | |
| | 8.5 | | 16 | | |
| | 10.0 | | 20 | | |
| | 11.7 | | 20 | | |
| Output Return Loss | 5.6 | | 11 | | dB |
| | 7.1 | | 15 | | |
| | 8.5 | | 18 | | |
| | 10.0 | | 15 | | |
| | 11.7 | | 11 | | |
| Isolation | 5.6 | | 63 | | dB |
| | 7.1 | | 66 | | |
| | 8.5 | | 70 | | |
| | 10.0 | | 61 | | |
| | 11.7 | | 55 | | |
| Noise Figure | 5.6 | | 6.7 | | dB |
| | 7.1 | | 6.1 | | |
| | 8.5 | | 5.9 | | |
| | 10.0 | | 5.7 | | |
| | 11.7 | | 5.2 | | |
| Device Operating Voltage ($V_{DD}$) | | +4 | +5 | +6 | V |
| Device Operating Current ($I_{DD}$)[3] | | | 140 | | mA |
| Gate Voltage ($V_{GG}$)[4] | | -2 | -0.72 | -0.5 | V |
| Device Gate Current ($I_{GG}$)[5] | | | 6 | | µA |
| DC Current Variation vs. Temperature[6] | | | 47.57 | | µA/°C |
| DC Current Variation vs. Voltage[7] | | | +8 | | µA/mV |

1. Tested on Mini-Circuits Characterization Test Board TB-AVA-6123MPC+. See Figure 2. Board loss de-embedded to the device.
2. $P_{SAT}$ is defined as when the Output Power changes 0.1 dB per 1 dB change in Input Power.
3. Current at $P_{IN}$ = -15 dBm. Increases to 152 mA at P1dB.
4. $V_{GG} = V_{G12} = V_{G3}$
5. $I_{GG} = I_{G12} = I_{G3}$
6. (Current at +95°C – Current at -40°C)/(135°C).
7. (Current at +6 V - Current at +4 V)/(+6 V - +4 V)

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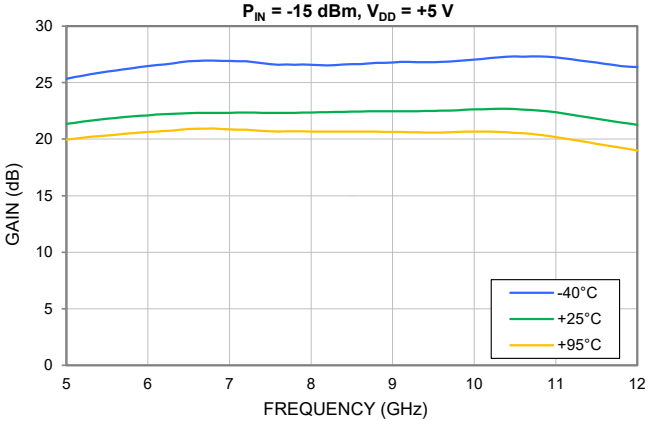
## TYPICAL PERFORMANCE GRAPHS

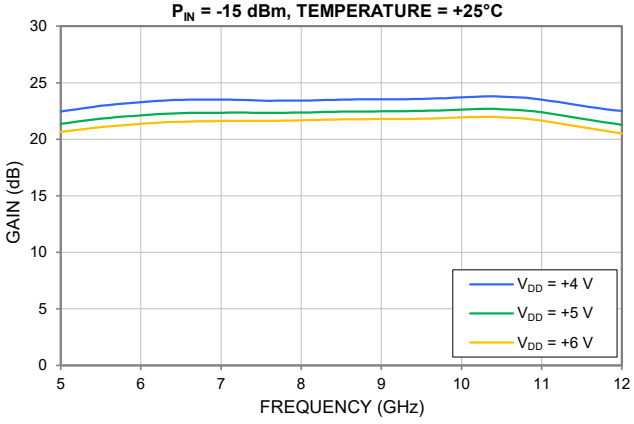
### GAIN vs. TEMPERATURE

$P_{IN}$ = -15 dBm, $V_{DD}$ = +5 V



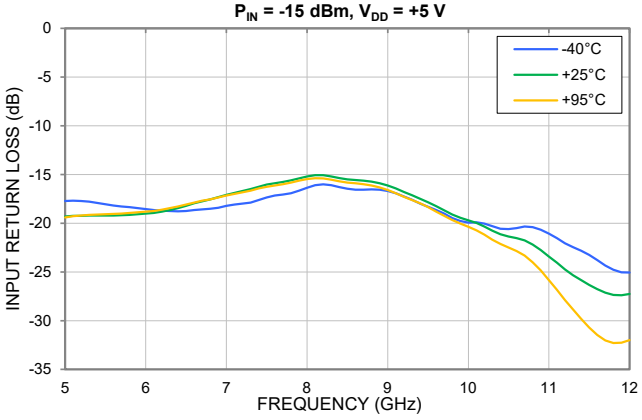

### GAIN vs. DEVICE VOLTAGE

$P_{IN}$ = -15 dBm, TEMPERATURE = +25°C



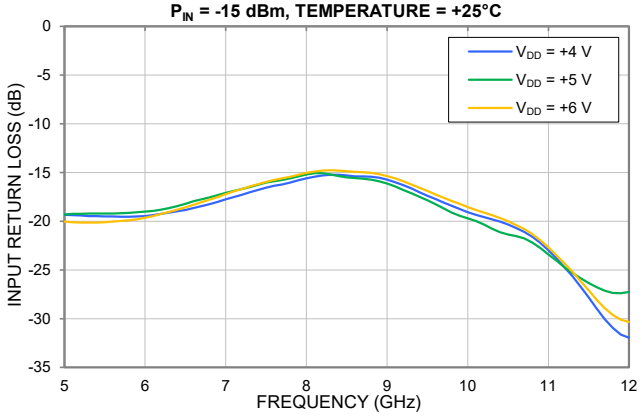

### INPUT RETURN LOSS vs.TEMPERATURE

$P_{IN}$ = -15 dBm, $V_{DD}$ = +5 V



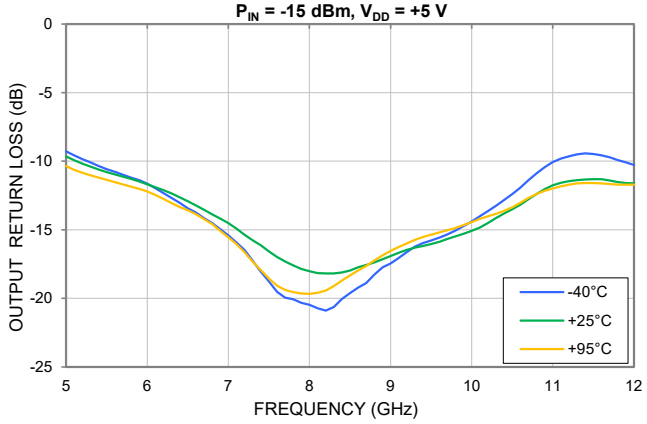

### INPUT RETURN LOSS vs. DEVICE VOLTAGE

$P_{IN}$ = -15 dBm, TEMPERATURE = +25°C



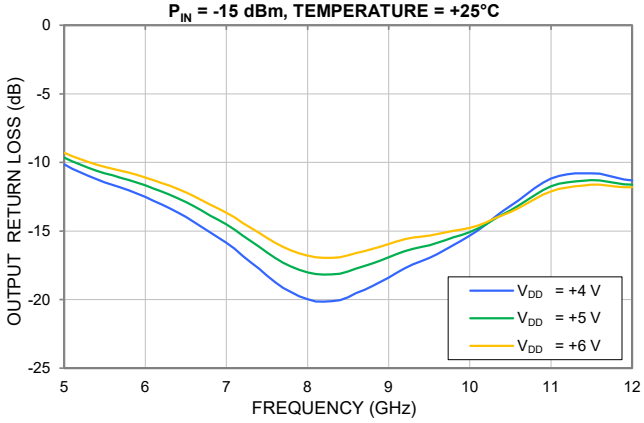

### OUTPUT RETURN LOSS vs. TEMPERATURE

$P_{IN}$ = -15 dBm, $V_{DD}$ = +5 V




### OUTPUT RETURN LOSS vs. DEVICE VOLTAGE

$P_{IN}$ = -15 dBm, TEMPERATURE = +25°C



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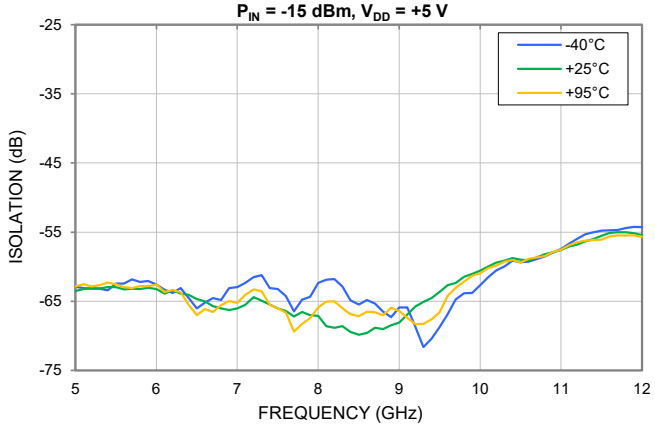
## TYPICAL PERFORMANCE GRAPHS

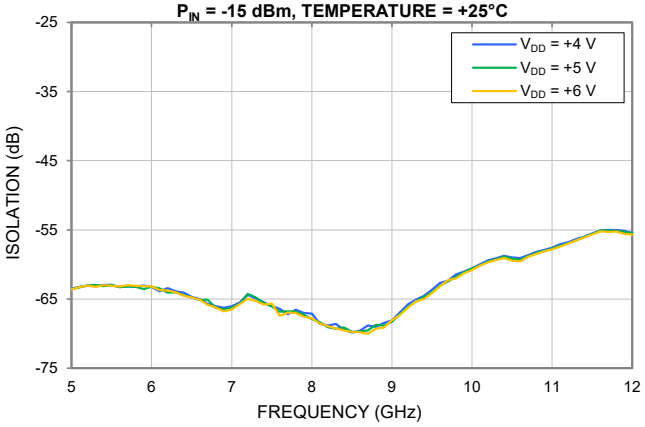
### ISOLATION vs.TEMPERATURE

$P_{IN}$ = -15 dBm, $V_{DD}$ = +5 V



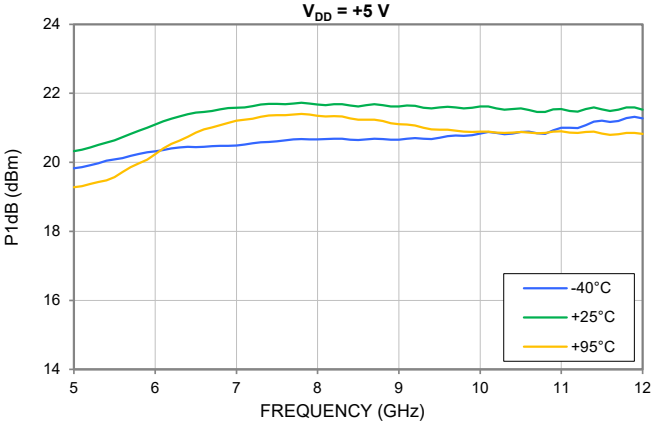

### ISOLATION vs. DEVICE VOLTAGE

$P_{IN}$ = -15 dBm, TEMPERATURE = +25°C



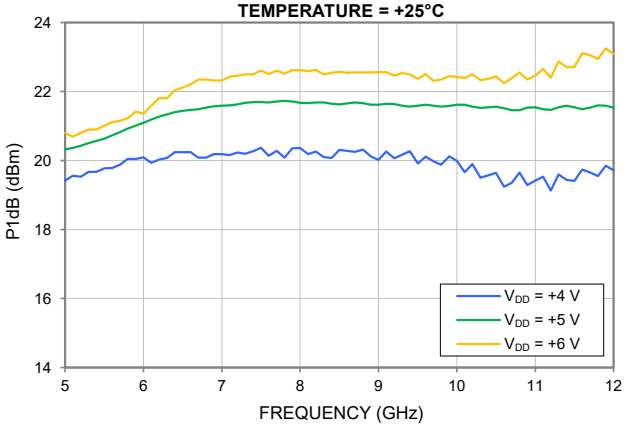

### P1dB vs. TEMPERATURE

$V_{DD}$ = +5 V



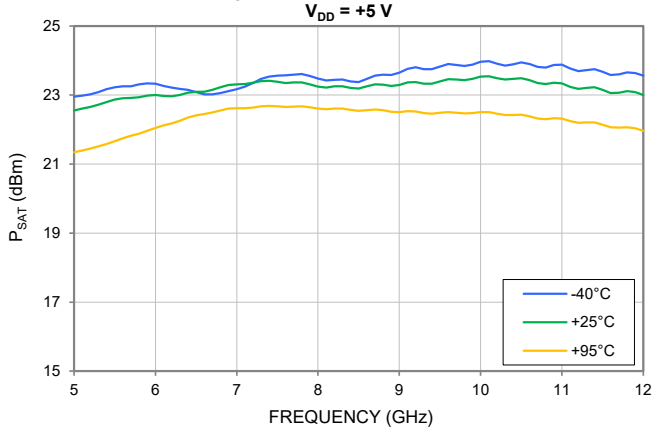

### P1dB vs. DEVICE VOLTAGE

TEMPERATURE = +25°C



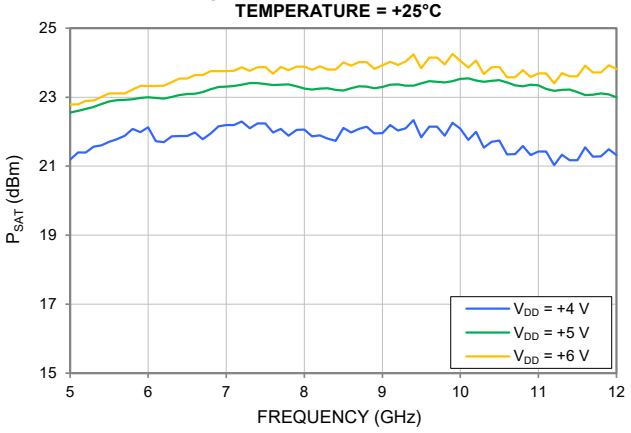

### $P_{SAT}$ vs. TEMPERATURE

$V_{DD}$ = +5 V




### $P_{SAT}$ vs. DEVICE VOLTAGE

TEMPERATURE = +25°C



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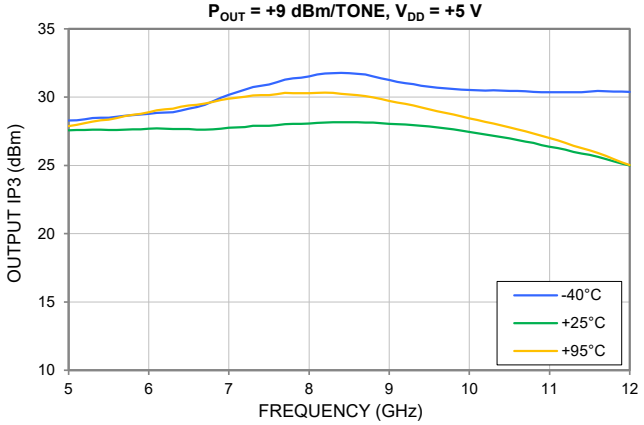
50Ω 5.6 to 11.7 GHz Medium Power Driver Amplifier

## TYPICAL PERFORMANCE GRAPHS

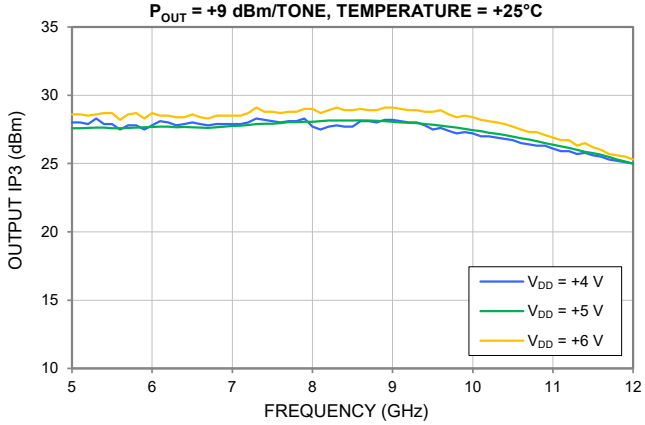
### OUTPUT IP3 vs. TEMPERATURE

$P_{OUT}$ = +9 dBm/TONE, $V_{DD}$ = +5 V



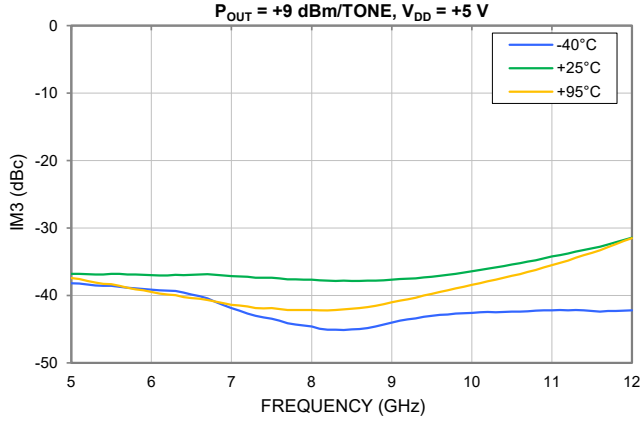

### OUTPUT IP3 vs. DEVICE VOLTAGE

$P_{OUT}$ = +9 dBm/TONE, TEMPERATURE = +25°C



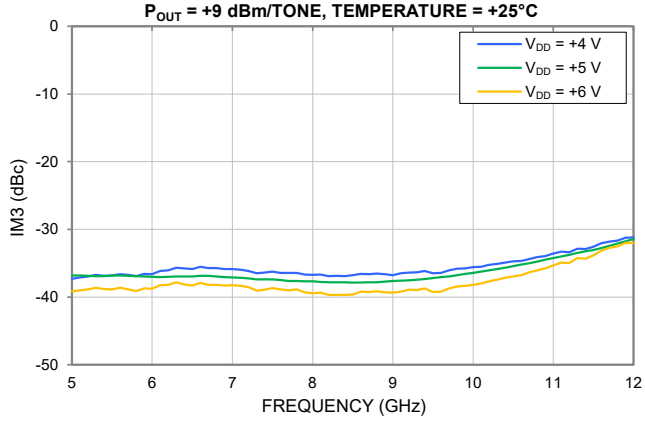

### IM3 vs. TEMPERATURE

$P_{OUT}$ = +9 dBm/TONE, $V_{DD}$ = +5 V



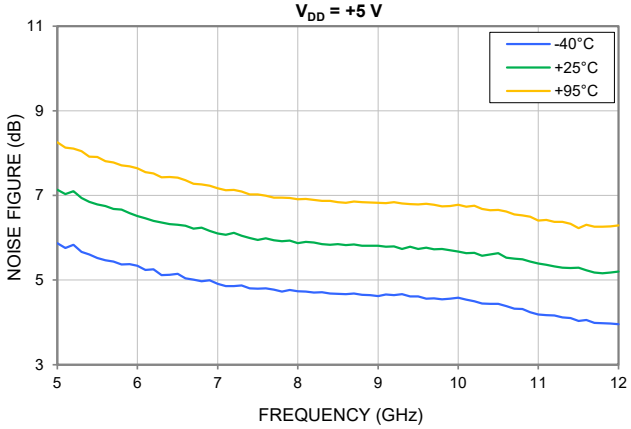

### IM3 vs. DEVICE VOLTAGE

$P_{OUT}$ = +9 dBm/TONE, TEMPERATURE = +25°C



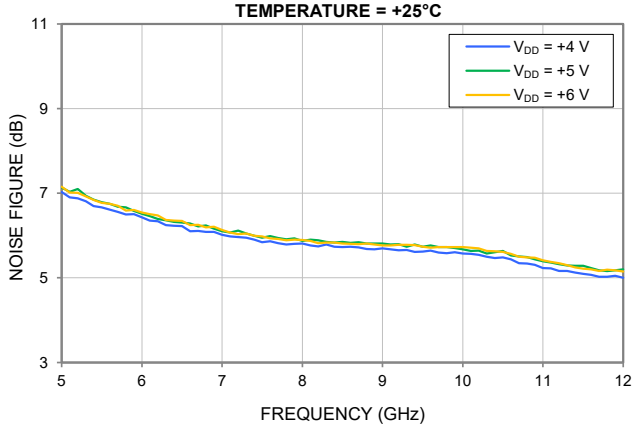

### NOISE FIGURE vs. TEMPERATURE

$V_{DD}$ = +5 V




### NOISE FIGURE vs. DEVICE VOLTAGE

TEMPERATURE = +25°C



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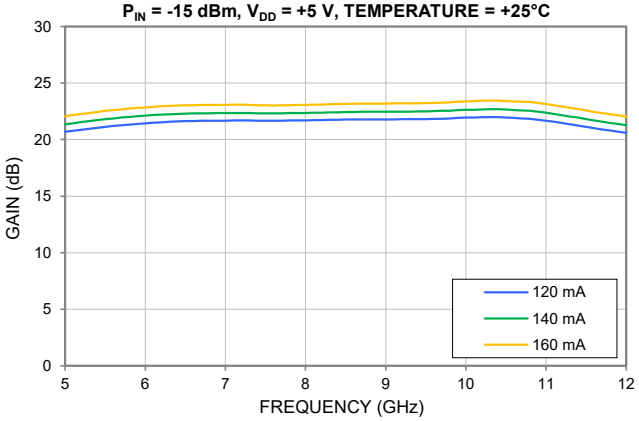
50Ω 5.6 to 11.7 GHz Medium Power Driver Amplifier

## TYPICAL PERFORMANCE GRAPHS

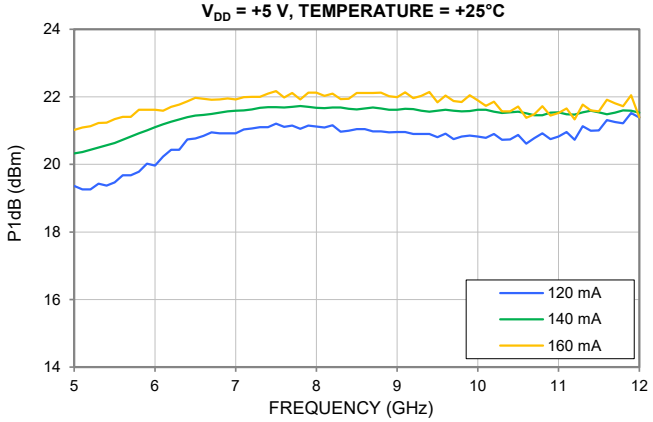
### GAIN vs. CURRENT

$P_{IN}$ = -15 dBm, $V_{DD}$ = +5 V, TEMPERATURE = +25°C



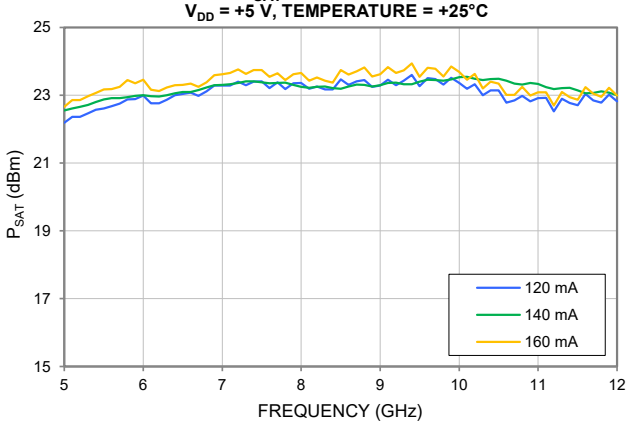

### P1dB vs. CURRENT

$V_{DD}$ = +5 V, TEMPERATURE = +25°C



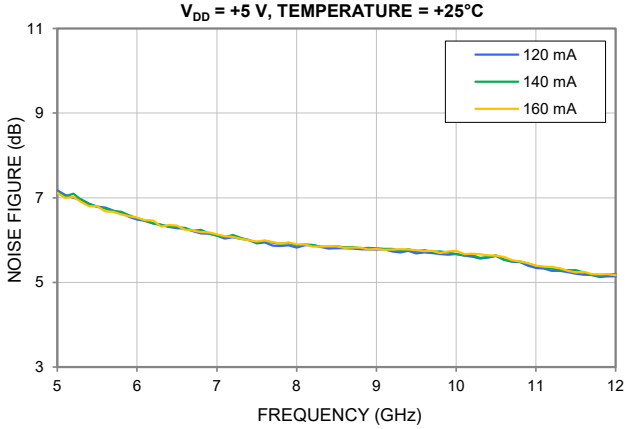

### $P_{SAT}$ vs. CURRENT

$V_{DD}$ = +5 V, TEMPERATURE = +25°C



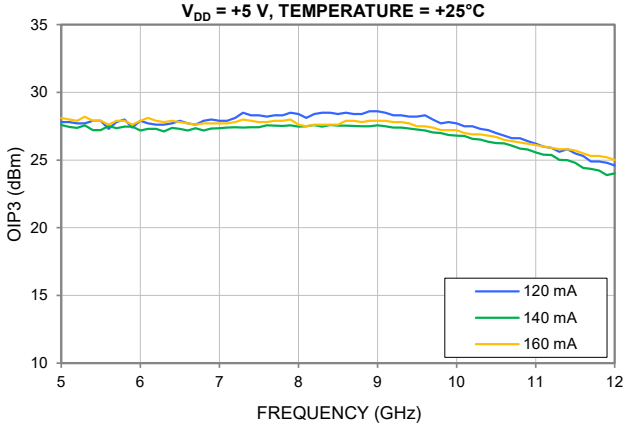

### NOISE FIGURE vs. CURRENT

$V_{DD}$ = +5 V, TEMPERATURE = +25°C



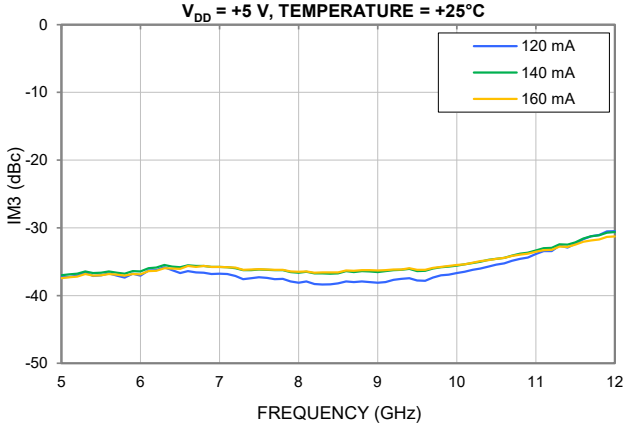

### OIP3 vs. CURRENT

$V_{DD}$ = +5 V, TEMPERATURE = +25°C




### IM3 vs. CURRENT

$V_{DD}$ = +5 V, TEMPERATURE = +25°C



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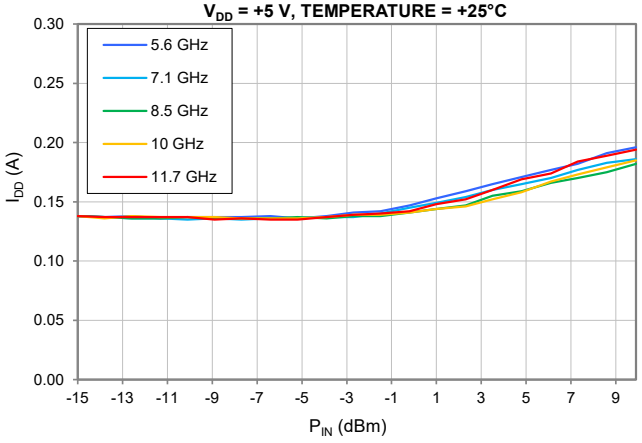
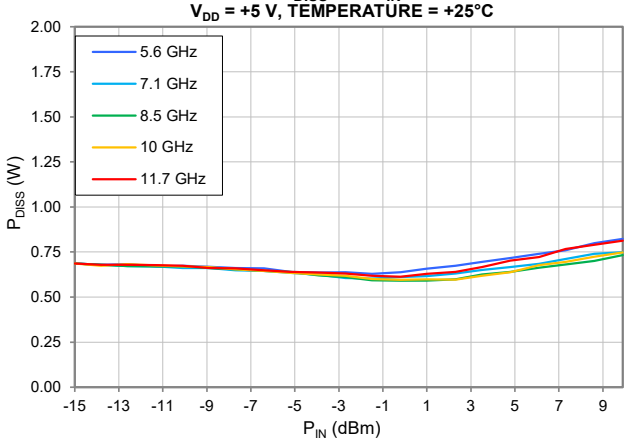
50Ω 5.6 to 11.7 GHz Medium Power Driver Amplifier

## TYPICAL PERFORMANCE GRAPHS

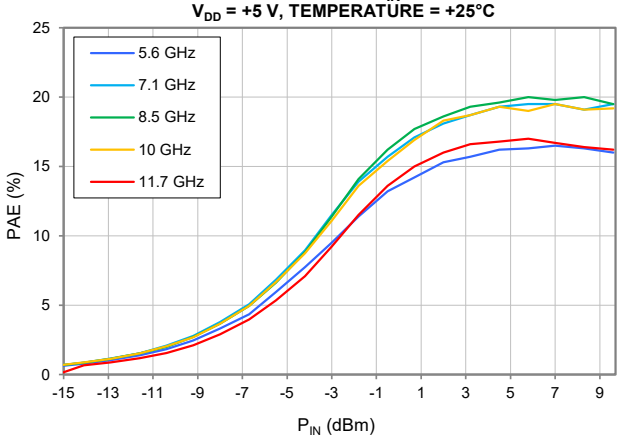
**$I_{DD}$ vs. $P_{IN}$**
$V_{DD}$ = +5 V, TEMPERATURE = +25°C



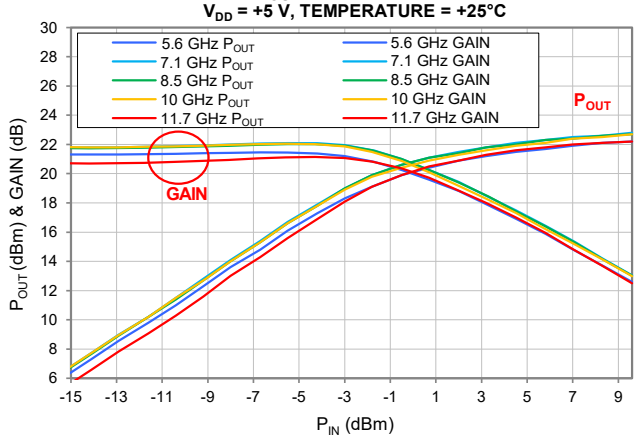

**$P_{DISS}$ vs. $P_{IN}$**
$V_{DD}$ = +5 V, TEMPERATURE = +25°C



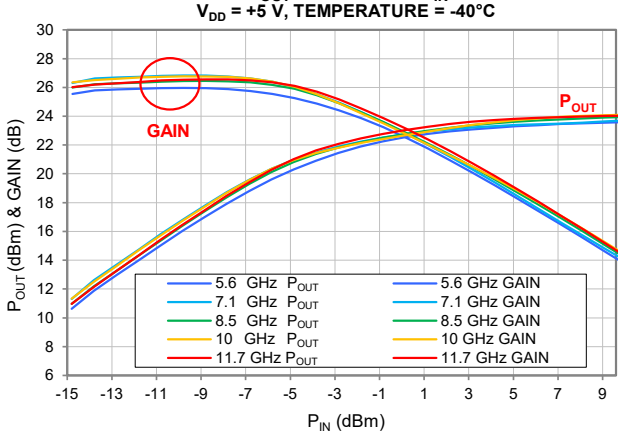

**PAE vs. $P_{IN}$**
$V_{DD}$ = +5 V, TEMPERATURE = +25°C



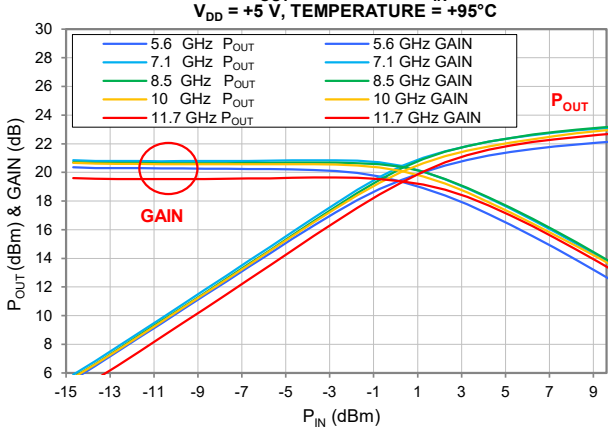

**$P_{OUT}$ & GAIN vs. $P_{IN}$**
$V_{DD}$ = +5 V, TEMPERATURE = +25°C




**$P_{OUT}$ & GAIN vs. $P_{IN}$**
$V_{DD}$ = +5 V, TEMPERATURE = -40°C




**$P_{OUT}$ & GAIN vs. $P_{IN}$**
$V_{DD}$ = +5 V, TEMPERATURE = +95°C



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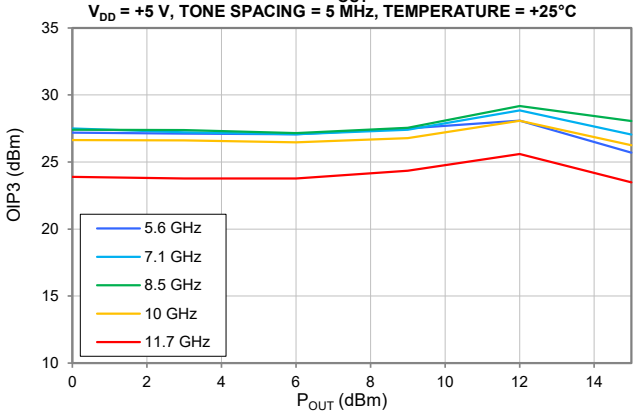
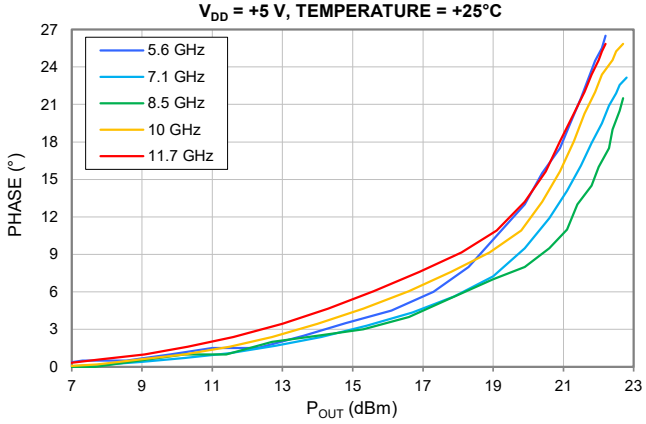
## TYPICAL PERFORMANCE GRAPHS

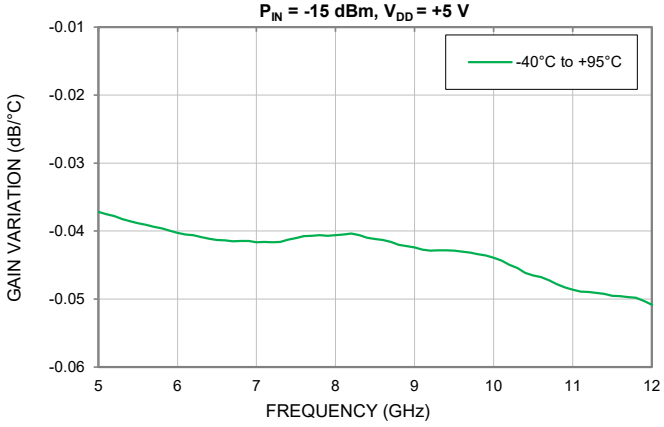
**OIP3 vs. $P_{OUT}$/TONE**
$V_{DD}$ = +5 V, TONE SPACING = 5 MHz, TEMPERATURE = +25°C




**AM - PM**
$V_{DD}$ = +5 V, TEMPERATURE = +25°C




**GAIN VARIATION vs. TEMPERATURE**
$P_{IN}$ = -15 dBm, $V_{DD}$ = +5 V



## ABSOLUTE MAXIMUM RATINGS[8]

| Parameter | Ratings |
|---|---|
| Operating Temperature | -40°C to +95°C |
| Storage Temperature | -65°C to +150°C |
| Junction Temperature[9] | +175°C |
| Total Power Dissipation | 2.4 W |
| Input Power (CW), $V_{DD}$ = +5 V | +22 dBm |
| DC Drain Voltage at $V_{DD}$ | +8 V |
| DC Gate Voltage at $V_{GG} = V_{G12} = V_{G3}$ | -3 V < $V_{GG}$ < -0.2 V |
| DC Drain Current $I_{DD}$ | 300 mA |
| DC Gate Current $I_{GG}$ | 0.6 mA |

8. Permanent damage may occur if any of these limits are exceeded. Maximum ratings are not intended for continuous normal operation.
9. Peak Temperature on top of Die.

## THERMAL RESISTANCE

| Parameter | Ratings |
|---|---|
| Thermal Resistance ($\Theta_{JC}$)[10] | 35.7°C/W |

10. $\Theta_{JC}$= (Hot Spot Temperature on Die - Temperature at Ground Lead)/Dissipated Power

## ESD RATING

| | Class | Voltage Range | Reference Standard |
|---|---|---|---|
| HBM | 1C | 1000 to < 2000 | ANSI/ESDA/JEDEC JS-001-2023 |
| CDM | C3 | ≥ 1000 | ANSI/ESDA/JEDEC JS-002-2022 |

ESD HANDLING PRECAUTION: This device is designed to be Class 1C for HBM. Static charges may easily produce potentials higher than this with improper handling and can discharge into DUT and damage it. As a preventive measure Industry standard ESD handling precautions should be used at all times to protect the device from ESD damage.

## MSL RATING

Moisture Sensitivity: MSL1 in accordance with IPC/JEDEC J-STD-020E/JEDEC J-STD-033C

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## FUNCTIONAL DIAGRAM

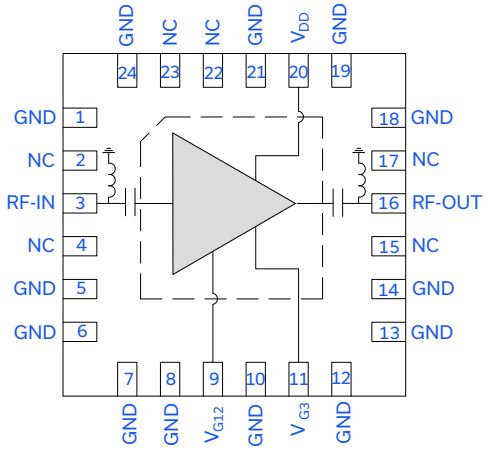



**Figure 1. AVA-6123MP+ Functional Diagram**

## PAD DESCRIPTION

| Function | Pad Number | Description (Refer to Fig 2) |
|---|---|---|
| RF-IN | 3 | RF-IN pad connects to RF Input port. |
| RF-OUT | 16 | RF-OUT pad connects to RF Output port. |
| $V_{DD}$ | 20 | DC Input pad connects to Drain Voltage port. |
| $V_{G12}$ | 9 | DC Input pad connects to First and Second Stage Gate Voltage port. |
| $V_{G3}$ | 11 | DC Input pad connects to Third Stage Gate Voltage port. |
| NC | 2, 4, 15, 17, 22, 23 | Not used internally. Connected to ground on test board. |
| GND | 1, 5-8, 10, 12-14, 18, 19, 21, 24, Paddle | Connects to ground. |

## EVALUATION BOARD

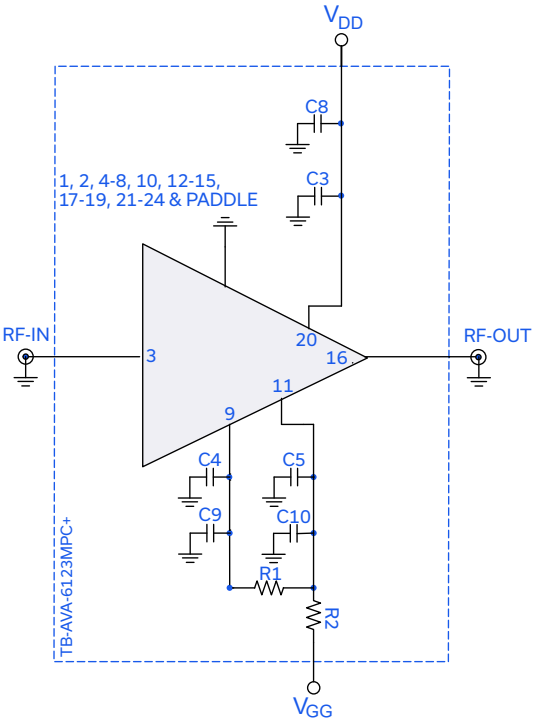



**Figure 2. AVA-6123MP+ Evaluation and Characterization Circuit**

**Electrical Parameters and Conditions**
Gain, Return Loss, Output Power at 1 dB Compression (P1dB), Output IP3 (OIP3), Saturated Output Power ($P_{SAT}$) and Noise Figure measured using N5247B PNA-X Microwave Network Analyzer.

**Conditions:**
a. Gain and Return Loss: $P_{IN}$ = -15 dBm
b. Output IP3 (OIP3): Two tones, spaced 5 MHz apart, +9 dBm/Tone at output

**Power ON/Power OFF Sequence**
Caution: Permanent damage to the device will occur if the Power ON and Power OFF sequences are not followed

**POWER ON:**
1) Set $V_{GG}$ = -2 V. Apply $V_{GG}$.
2) Set $V_{DD}$ = +5 V. Apply $V_{DD}$.
3) Increase $V_{GG}$ to obtain desired $I_{DD}$ as shown in spec table.
4) Apply RF Signal.

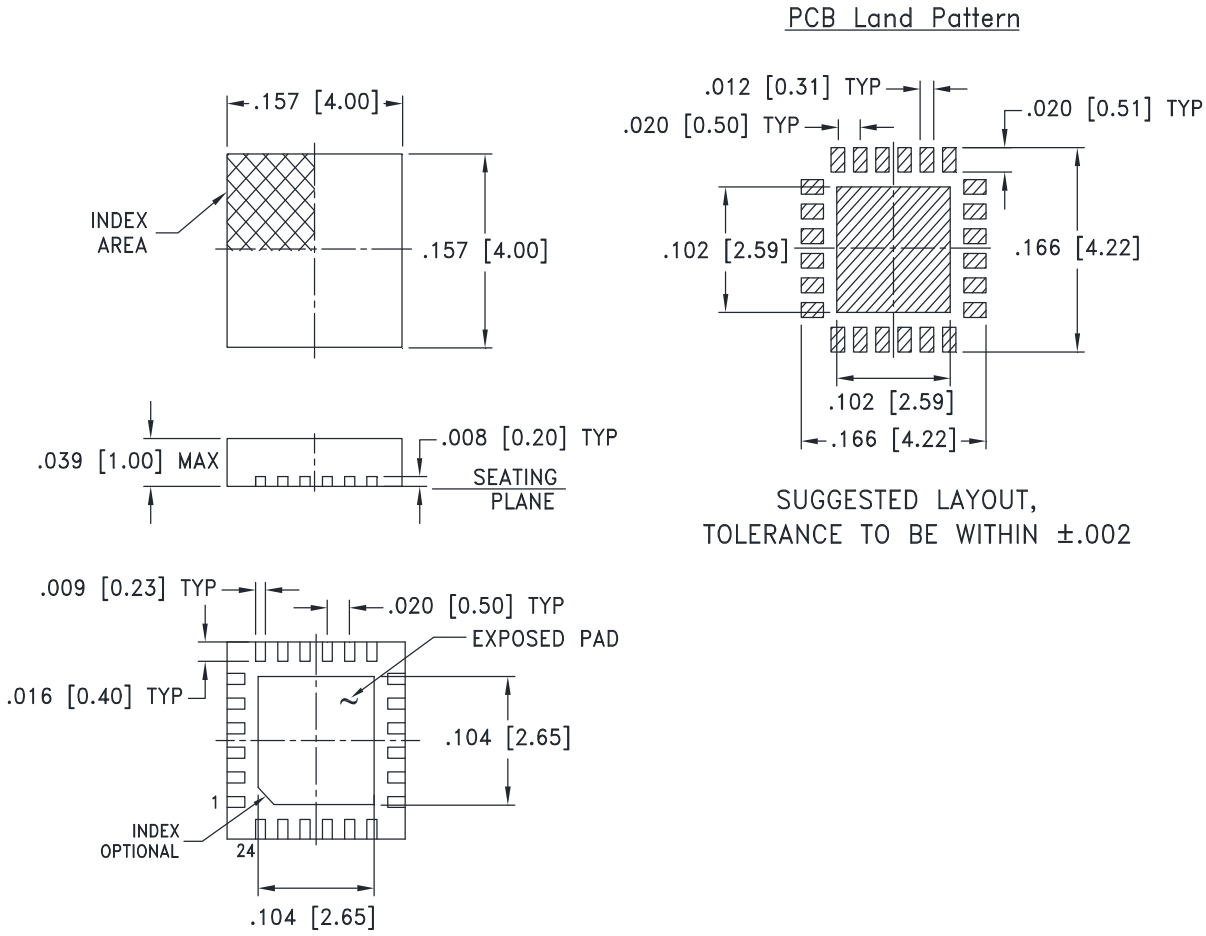
**POWER OFF:**
1) Turn off RF Signal.
2) Adjust $V_{GG}$ down to -2 V.
3) Turn off $V_{DD}$.
4) Turn off $V_{GG}$

| Component | Value | Size | Part Number | Manufacturer |
|---|---|---|---|---|
| C3 – C5 | 0.001 µF | 0402 | GRM1555C1H102JA01D | MURATA |
| C8 – C10 | 0.1 µF | 0402 | GRM155R71E104KE14D | MURATA |
| R1, R2 | 100Ω | 0402 | RK73H1ETTP1000F | KOA SPEER |

# Wideband Amplifier AVA-6123MP+

50Ω 5.6 to 11.7 GHz Medium Power Driver Amplifier

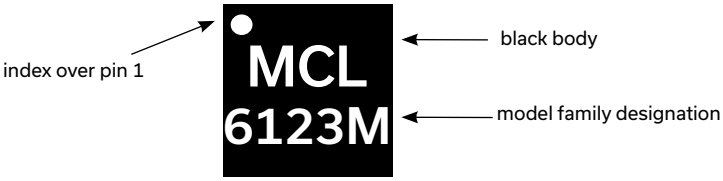
## CASE STYLE DRAWING




Weight: .04 Grams

Dimensions are in inches [mm]. Tolerances in inches: 2 Pl. ± .01; 3 Pl. ± .005 inches

## PRODUCT MARKING




Marking may contain other features or characters for internal lot control

# Wideband Amplifier AVA-6123MP+

50Ω 5.6 to 11.7 GHz Medium Power Driver Amplifier

**ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASHBOARD** CLICK HERE

| | |
|---|---|
| **Performance Data & Graphs** | Data<br>Graphs<br>S-Parameter (S2P Files) Data Set (.zip file) |
| **Case Style** | DG1847 Plastic package, exposed paddle, Lead Finish: Matte-Tin |
| **RoHS Status** | Compliant |
| **Tape & Reel**<br>**Standard quantities available on reel** | F68<br>7" reels with 20, 50, 100, 200, 500, 1K devices |
| **Suggested Layout for PCB Design** | PL-796 |
| **Evaluation Board** | TB-AVA-6123MPC+<br>Gerber File |
| **Environmental Ratings** | ENV08T1 |

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/terms/viewterm.html

## *Typical Performance Data*

**NOTE: Use PDF Bookmarks to view DATA at required**

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

TEST CONDITIONS: $V_{DD}$ = +5 V, $I_{DD}$ = 140 mA @ Temperature = +25°C

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | IP-3 Output | IM3 Output | 1dB Comp. Output | Psat Output | Noise Figure |
|---|---|---|---|---|---|---|---|---|---|
| (GHz) | (dB) | (dB) | (dB) | (dB) | (dBm) | (dBc) | (dBm) | (dBm) | (dB) |
| 5.0 | 21.4 | -63.6 | -19.3 | -9.7 | 27.6 | -36.8 | 20.3 | 22.6 | 7.1 |
| 5.1 | 21.5 | -63.3 | -19.2 | -9.9 | 27.6 | -36.8 | 20.4 | 22.6 | 7.0 |
| 5.2 | 21.6 | -63.0 | -19.2 | -10.2 | 27.6 | -36.8 | 20.4 | 22.7 | 7.1 |
| 5.3 | 21.6 | -63.0 | -19.2 | -10.4 | 27.6 | -36.9 | 20.5 | 22.7 | 6.9 |
| 5.4 | 21.7 | -63.1 | -19.2 | -10.6 | 27.6 | -36.9 | 20.6 | 22.8 | 6.8 |
| 5.5 | 21.8 | -63.0 | -19.2 | -10.8 | 27.6 | -36.8 | 20.6 | 22.9 | 6.8 |
| 5.6 | 21.9 | -63.3 | -19.2 | -11.0 | 27.6 | -36.8 | 20.7 | 22.9 | 6.7 |
| 5.7 | 22.0 | -63.2 | -19.2 | -11.1 | 27.6 | -36.9 | 20.8 | 22.9 | 6.7 |
| 5.8 | 22.0 | -63.2 | -19.1 | -11.3 | 27.6 | -36.9 | 20.9 | 22.9 | 6.7 |
| 5.9 | 22.1 | -63.6 | -19.1 | -11.5 | 27.7 | -36.9 | 21.0 | 23.0 | 6.6 |
| 6.0 | 22.1 | -63.2 | -19.0 | -11.7 | 27.7 | -37.0 | 21.1 | 23.0 | 6.5 |
| 6.1 | 22.2 | -63.5 | -18.9 | -11.9 | 27.7 | -37.1 | 21.2 | 23.0 | 6.5 |
| 6.2 | 22.2 | -64.1 | -18.8 | -12.1 | 27.7 | -37.0 | 21.3 | 23.0 | 6.4 |
| 6.3 | 22.3 | -64.0 | -18.6 | -12.4 | 27.7 | -37.0 | 21.3 | 23.0 | 6.4 |
| 6.4 | 22.3 | -64.4 | -18.4 | -12.6 | 27.7 | -37.0 | 21.4 | 23.1 | 6.3 |
| 6.5 | 22.3 | -64.8 | -18.2 | -12.9 | 27.7 | -36.9 | 21.4 | 23.1 | 6.3 |
| 6.6 | 22.3 | -65.1 | -18.0 | -13.2 | 27.6 | -36.9 | 21.5 | 23.1 | 6.3 |
| 6.7 | 22.3 | -65.1 | -17.8 | -13.5 | 27.6 | -36.9 | 21.5 | 23.2 | 6.2 |
| 6.8 | 22.3 | -66.3 | -17.6 | -13.9 | 27.6 | -36.9 | 21.5 | 23.2 | 6.2 |
| 6.9 | 22.3 | -66.5 | -17.3 | -14.2 | 27.7 | -37.0 | 21.6 | 23.3 | 6.2 |
| 7.0 | 22.3 | -66.2 | -17.1 | -14.5 | 27.7 | -37.1 | 21.6 | 23.3 | 6.1 |
| 7.1 | 22.4 | -65.7 | -16.9 | -14.9 | 27.8 | -37.2 | 21.6 | 23.3 | 6.1 |
| 7.2 | 22.4 | -64.3 | -16.7 | -15.4 | 27.8 | -37.2 | 21.6 | 23.4 | 6.1 |
| 7.3 | 22.4 | -64.8 | -16.5 | -15.8 | 27.9 | -37.4 | 21.7 | 23.4 | 6.1 |
| 7.4 | 22.3 | -65.6 | -16.2 | -16.1 | 27.9 | -37.4 | 21.7 | 23.4 | 6.0 |
| 7.5 | 22.3 | -66.1 | -16.0 | -16.6 | 27.9 | -37.4 | 21.7 | 23.4 | 5.9 |
| 7.6 | 22.3 | -66.9 | -15.9 | -17.0 | 28.0 | -37.5 | 21.7 | 23.4 | 6.0 |
| 7.7 | 22.3 | -66.8 | -15.8 | -17.3 | 28.0 | -37.6 | 21.7 | 23.4 | 5.9 |
| 7.8 | 22.3 | -66.8 | -15.6 | -17.6 | 28.0 | -37.6 | 21.7 | 23.4 | 5.9 |
| 7.9 | 22.4 | -67.3 | -15.4 | -17.8 | 28.1 | -37.7 | 21.7 | 23.3 | 5.9 |
| 8.0 | 22.4 | -67.9 | -15.2 | -18.0 | 28.1 | -37.7 | 21.7 | 23.2 | 5.9 |
| 8.1 | 22.4 | -68.4 | -15.1 | -18.2 | 28.1 | -37.8 | 21.7 | 23.2 | 5.9 |
| 8.2 | 22.4 | -69.1 | -15.1 | -18.2 | 28.1 | -37.8 | 21.7 | 23.3 | 5.9 |
| 8.3 | 22.4 | -69.3 | -15.2 | -18.2 | 28.2 | -37.8 | 21.7 | 23.3 | 5.8 |
| 8.4 | 22.4 | -69.1 | -15.4 | -18.1 | 28.2 | -37.8 | 21.6 | 23.2 | 5.8 |
| 8.5 | 22.4 | -69.8 | -15.5 | -18.0 | 28.2 | -37.8 | 21.6 | 23.2 | 5.9 |
| 8.6 | 22.5 | -69.7 | -15.6 | -17.7 | 28.2 | -37.9 | 21.7 | 23.3 | 5.8 |
| 8.7 | 22.5 | -69.5 | -15.6 | -17.6 | 28.1 | -37.8 | 21.7 | 23.3 | 5.8 |
| 8.8 | 22.5 | -68.7 | -15.7 | -17.4 | 28.1 | -37.8 | 21.7 | 23.3 | 5.8 |
| 8.9 | 22.5 | -68.8 | -15.9 | -17.2 | 28.1 | -37.7 | 21.6 | 23.3 | 5.8 |
| 9.0 | 22.5 | -68.3 | -16.1 | -16.9 | 28.0 | -37.6 | 21.6 | 23.3 | 5.8 |
| 9.1 | 22.5 | -67.1 | -16.4 | -16.7 | 28.0 | -37.6 | 21.6 | 23.4 | 5.8 |
| 9.2 | 22.5 | -66.1 | -16.8 | -16.5 | 28.0 | -37.5 | 21.6 | 23.4 | 5.8 |
| 9.3 | 22.5 | -65.3 | -17.1 | -16.3 | 28.0 | -37.5 | 21.6 | 23.3 | 5.7 |
| 9.4 | 22.5 | -64.7 | -17.5 | -16.2 | 27.9 | -37.3 | 21.6 | 23.3 | 5.8 |
| 9.5 | 22.5 | -64.0 | -17.9 | -16.0 | 27.8 | -37.2 | 21.6 | 23.4 | 5.7 |
| 9.6 | 22.5 | -63.0 | -18.3 | -15.9 | 27.8 | -37.1 | 21.6 | 23.5 | 5.8 |
| 9.7 | 22.5 | -62.4 | -18.7 | -15.7 | 27.7 | -36.9 | 21.6 | 23.4 | 5.7 |
| 9.8 | 22.6 | -61.8 | -19.1 | -15.5 | 27.6 | -36.8 | 21.6 | 23.4 | 5.7 |
| 9.9 | 22.6 | -61.2 | -19.5 | -15.3 | 27.5 | -36.6 | 21.6 | 23.5 | 5.7 |
| 10.0 | 22.6 | -60.6 | -19.7 | -15.1 | 27.5 | -36.4 | 21.6 | 23.5 | 5.7 |
| 10.1 | 22.7 | -60.1 | -20.0 | -14.8 | 27.4 | -36.2 | 21.6 | 23.5 | 5.6 |
| 10.2 | 22.7 | -59.5 | -20.3 | -14.5 | 27.3 | -36.0 | 21.6 | 23.5 | 5.6 |
| 10.3 | 22.7 | -59.3 | -20.8 | -14.1 | 27.2 | -35.9 | 21.5 | 23.4 | 5.6 |
| 10.4 | 22.7 | -58.8 | -21.1 | -13.8 | 27.1 | -35.7 | 21.5 | 23.5 | 5.6 |
| 10.5 | 22.7 | -59.2 | -21.4 | -13.5 | 27.0 | -35.4 | 21.6 | 23.5 | 5.6 |
| 10.6 | 22.6 | -59.3 | -21.5 | -13.2 | 26.9 | -35.2 | 21.5 | 23.4 | 5.5 |
| 10.7 | 22.6 | -58.8 | -21.8 | -12.8 | 26.8 | -35.0 | 21.5 | 23.3 | 5.5 |
| 10.8 | 22.5 | -58.3 | -22.2 | -12.4 | 26.6 | -34.8 | 21.5 | 23.3 | 5.5 |
| 10.9 | 22.5 | -58.1 | -22.7 | -12.0 | 26.5 | -34.5 | 21.5 | 23.4 | 5.4 |
| 11.0 | 22.4 | -57.7 | -23.4 | -11.8 | 26.4 | -34.2 | 21.5 | 23.3 | 5.4 |
| 11.1 | 22.3 | -57.3 | -24.1 | -11.6 | 26.3 | -34.0 | 21.5 | 23.2 | 5.4 |
| 11.2 | 22.2 | -56.9 | -24.7 | -11.5 | 26.1 | -33.8 | 21.5 | 23.2 | 5.3 |
| 11.3 | 22.0 | -56.5 | -25.3 | -11.4 | 26.0 | -33.5 | 21.5 | 23.2 | 5.3 |
| 11.4 | 21.9 | -56.1 | -25.9 | -11.3 | 25.9 | -33.2 | 21.6 | 23.2 | 5.3 |
| 11.5 | 21.8 | -55.6 | -26.3 | -11.3 | 25.8 | -33.0 | 21.5 | 23.1 | 5.3 |
| 11.6 | 21.7 | -55.1 | -26.8 | -11.3 | 25.6 | -32.8 | 21.5 | 23.1 | 5.2 |
| 11.7 | 21.6 | -55.1 | -27.1 | -11.4 | 25.5 | -32.5 | 21.5 | 23.1 | 5.2 |
| 11.8 | 21.5 | -55.1 | -27.4 | -11.5 | 25.3 | -32.1 | 21.6 | 23.1 | 5.2 |
| 11.9 | 21.4 | -55.3 | -27.4 | -11.6 | 25.1 | -31.8 | 21.6 | 23.1 | 5.2 |
| 12.0 | 21.3 | -55.5 | -27.3 | -11.6 | 25.0 | -31.4 | 21.5 | 23.0 | 5.2 |

## *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: $V_{DD}$ = +4 V, $I_{DD}$ = 140 mA @ Temperature = +25°C

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | IP-3 Output | IM3 Output | 1dB Comp. Output | Psat Output | Noise Figure |
|---|---|---|---|---|---|---|---|---|---|
| (GHz) | (dB) | (dB) | (dB) | (dB) | (dBm) | (dBc) | (dBm) | (dBm) | (dB) |
| 5.0 | 22.5 | -63.5 | -19.3 | -10.1 | 28.0 | -37.3 | 19.4 | 21.2 | 7.0 |
| 5.1 | 22.6 | -63.2 | -19.4 | -10.5 | 28.0 | -37.1 | 19.6 | 21.4 | 6.9 |
| 5.2 | 22.7 | -63.1 | -19.4 | -10.7 | 27.9 | -37.0 | 19.5 | 21.4 | 6.9 |
| 5.3 | 22.8 | -63.1 | -19.5 | -11.0 | 28.3 | -36.7 | 19.7 | 21.6 | 6.8 |
| 5.4 | 22.9 | -62.9 | -19.5 | -11.2 | 27.9 | -36.9 | 19.7 | 21.6 | 6.7 |
| 5.5 | 23.0 | -63.0 | -19.5 | -11.5 | 27.9 | -36.8 | 19.8 | 21.7 | 6.7 |
| 5.6 | 23.0 | -63.3 | -19.5 | -11.6 | 27.5 | -36.6 | 19.8 | 21.8 | 6.6 |
| 5.7 | 23.1 | -63.2 | -19.5 | -11.8 | 27.8 | -36.7 | 19.9 | 21.9 | 6.6 |
| 5.8 | 23.2 | -63.2 | -19.5 | -12.1 | 27.8 | -36.9 | 20.1 | 22.1 | 6.5 |
| 5.9 | 23.2 | -63.1 | -19.5 | -12.3 | 27.5 | -36.6 | 20.1 | 22.0 | 6.5 |
| 6.0 | 23.3 | -63.2 | -19.5 | -12.5 | 27.8 | -36.6 | 20.1 | 22.1 | 6.4 |
| 6.1 | 23.3 | -63.9 | -19.4 | -12.8 | 28.1 | -36.2 | 19.9 | 21.7 | 6.4 |
| 6.2 | 23.4 | -63.4 | -19.3 | -13.1 | 28.0 | -36.1 | 20.0 | 21.7 | 6.3 |
| 6.3 | 23.4 | -63.9 | -19.1 | -13.3 | 27.8 | -35.7 | 20.1 | 21.9 | 6.2 |
| 6.4 | 23.5 | -64.1 | -19.0 | -13.7 | 27.9 | -35.8 | 20.2 | 21.9 | 6.2 |
| 6.5 | 23.5 | -64.7 | -18.8 | -14.0 | 28.0 | -35.9 | 20.2 | 21.9 | 6.2 |
| 6.6 | 23.5 | -65.0 | -18.7 | -14.4 | 27.9 | -35.6 | 20.2 | 22.0 | 6.1 |
| 6.7 | 23.5 | -65.7 | -18.5 | -14.7 | 27.8 | -35.7 | 20.1 | 21.8 | 6.1 |
| 6.8 | 23.5 | -66.0 | -18.3 | -15.1 | 27.9 | -35.7 | 20.1 | 21.9 | 6.1 |
| 6.9 | 23.5 | -66.3 | -18.0 | -15.5 | 27.9 | -35.9 | 20.2 | 22.2 | 6.1 |
| 7.0 | 23.5 | -66.1 | -17.8 | -15.9 | 27.9 | -35.9 | 20.2 | 22.2 | 6.0 |
| 7.1 | 23.5 | -65.5 | -17.5 | -16.3 | 27.9 | -36.0 | 20.2 | 22.2 | 6.0 |
| 7.2 | 23.5 | -64.4 | -17.3 | -16.8 | 28.0 | -36.2 | 20.2 | 22.3 | 6.0 |
| 7.3 | 23.5 | -64.9 | -17.0 | -17.3 | 28.3 | -36.5 | 20.2 | 22.1 | 6.0 |
| 7.4 | 23.4 | -65.5 | -16.8 | -17.7 | 28.2 | -36.4 | 20.3 | 22.2 | 5.9 |
| 7.5 | 23.4 | -66.1 | -16.6 | -18.3 | 28.1 | -36.3 | 20.4 | 22.2 | 5.8 |
| 7.6 | 23.4 | -66.4 | -16.4 | -18.7 | 28.0 | -36.4 | 20.1 | 22.0 | 5.9 |
| 7.7 | 23.4 | -67.2 | -16.2 | -19.2 | 28.1 | -36.4 | 20.3 | 22.1 | 5.8 |
| 7.8 | 23.4 | -66.5 | -16.0 | -19.5 | 28.1 | -36.5 | 20.1 | 21.9 | 5.8 |
| 7.9 | 23.4 | -67.0 | -15.8 | -19.8 | 28.3 | -36.7 | 20.4 | 22.1 | 5.8 |
| 8.0 | 23.4 | -67.1 | -15.6 | -20.0 | 27.7 | -36.7 | 20.4 | 22.1 | 5.8 |
| 8.1 | 23.4 | -68.6 | -15.4 | -20.1 | 27.5 | -36.7 | 20.2 | 21.9 | 5.8 |
| 8.2 | 23.5 | -68.8 | -15.3 | -20.2 | 27.7 | -36.9 | 20.3 | 21.9 | 5.7 |
| 8.3 | 23.5 | -68.6 | -15.2 | -20.1 | 27.8 | -36.9 | 20.1 | 21.8 | 5.8 |
| 8.4 | 23.5 | -69.5 | -15.2 | -20.0 | 27.7 | -36.9 | 20.1 | 21.7 | 5.7 |
| 8.5 | 23.5 | -69.8 | -15.3 | -19.8 | 27.7 | -36.8 | 20.3 | 22.1 | 5.7 |
| 8.6 | 23.5 | -69.6 | -15.4 | -19.5 | 28.1 | -36.6 | 20.3 | 22.0 | 5.7 |
| 8.7 | 23.5 | -68.8 | -15.4 | -19.3 | 28.1 | -36.6 | 20.3 | 22.1 | 5.7 |
| 8.8 | 23.5 | -69.0 | -15.4 | -19.0 | 28.0 | -36.5 | 20.3 | 22.1 | 5.7 |
| 8.9 | 23.5 | -68.5 | -15.5 | -18.7 | 28.2 | -36.6 | 20.1 | 22.0 | 5.7 |
| 9.0 | 23.5 | -68.1 | -15.7 | -18.4 | 28.2 | -36.8 | 20.0 | 22.0 | 5.7 |
| 9.1 | 23.5 | -66.9 | -16.0 | -18.0 | 28.1 | -36.5 | 20.3 | 22.2 | 5.7 |
| 9.2 | 23.5 | -65.7 | -16.3 | -17.7 | 28.0 | -36.4 | 20.1 | 22.0 | 5.6 |
| 9.3 | 23.5 | -65.1 | -16.6 | -17.4 | 28.0 | -36.3 | 20.2 | 22.1 | 5.7 |
| 9.4 | 23.6 | -64.5 | -17.0 | -17.2 | 27.8 | -36.2 | 20.3 | 22.3 | 5.6 |
| 9.5 | 23.6 | -63.6 | -17.4 | -17.0 | 27.5 | -36.5 | 19.9 | 21.8 | 5.6 |
| 9.6 | 23.6 | -62.7 | -17.7 | -16.7 | 27.6 | -36.4 | 20.1 | 22.1 | 5.6 |
| 9.7 | 23.6 | -62.4 | -18.1 | -16.4 | 27.4 | -36.1 | 20.0 | 22.1 | 5.6 |
| 9.8 | 23.6 | -61.5 | -18.4 | -16.0 | 27.2 | -35.8 | 19.9 | 21.9 | 5.6 |
| 9.9 | 23.7 | -61.1 | -18.7 | -15.7 | 27.3 | -35.8 | 20.1 | 22.3 | 5.6 |
| 10.0 | 23.7 | -60.6 | -19.1 | -15.4 | 27.2 | -35.6 | 20.0 | 22.1 | 5.6 |
| 10.1 | 23.7 | -60.0 | -19.3 | -15.0 | 27.0 | -35.5 | 19.7 | 21.8 | 5.6 |
| 10.2 | 23.8 | -59.4 | -19.6 | -14.5 | 27.0 | -35.2 | 19.9 | 22.0 | 5.5 |
| 10.3 | 23.8 | -59.1 | -19.8 | -14.0 | 26.9 | -35.1 | 19.5 | 21.5 | 5.5 |
| 10.4 | 23.8 | -58.8 | -20.1 | -13.6 | 26.8 | -34.9 | 19.6 | 21.7 | 5.5 |
| 10.5 | 23.8 | -59.0 | -20.4 | -13.2 | 26.7 | -34.7 | 19.6 | 21.7 | 5.5 |
| 10.6 | 23.7 | -59.1 | -20.7 | -12.8 | 26.5 | -34.7 | 19.2 | 21.3 | 5.4 |
| 10.7 | 23.7 | -58.7 | -21.1 | -12.3 | 26.4 | -34.4 | 19.4 | 21.3 | 5.3 |
| 10.8 | 23.7 | -58.2 | -21.6 | -11.9 | 26.3 | -34.1 | 19.7 | 21.6 | 5.3 |
| 10.9 | 23.6 | -57.9 | -22.2 | -11.5 | 26.3 | -34.0 | 19.3 | 21.3 | 5.3 |
| 11.0 | 23.5 | -57.6 | -23.0 | -11.2 | 26.1 | -33.6 | 19.4 | 21.4 | 5.2 |
| 11.1 | 23.4 | -57.1 | -23.8 | -11.0 | 25.9 | -33.3 | 19.5 | 21.4 | 5.2 |
| 11.2 | 23.3 | -56.8 | -24.7 | -10.9 | 25.9 | -33.4 | 19.1 | 21.0 | 5.2 |
| 11.3 | 23.2 | -56.3 | -25.7 | -10.8 | 25.7 | -32.9 | 19.6 | 21.3 | 5.2 |
| 11.4 | 23.1 | -56.0 | -26.7 | -10.8 | 25.8 | -32.9 | 19.4 | 21.2 | 5.1 |
| 11.5 | 23.0 | -55.5 | -27.8 | -10.8 | 25.6 | -32.6 | 19.4 | 21.2 | 5.1 |
| 11.6 | 22.9 | -55.1 | -28.9 | -10.8 | 25.5 | -32.1 | 19.7 | 21.5 | 5.1 |
| 11.7 | 22.8 | -55.0 | -30.0 | -11.0 | 25.3 | -31.8 | 19.7 | 21.3 | 5.0 |
| 11.8 | 22.7 | -55.0 | -31.0 | -11.1 | 25.2 | -31.7 | 19.6 | 21.3 | 5.0 |
| 11.9 | 22.6 | -55.2 | -31.6 | -11.2 | 25.1 | -31.2 | 19.9 | 21.5 | 5.0 |
| 12.0 | 22.5 | -55.4 | -32.0 | -11.3 | 25.0 | -31.2 | 19.7 | 21.3 | 5.0 |

## *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: $V_{DD}$ = +6 V, $I_{DD}$ = 140 mA @ Temperature = +25°C

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | IP-3 Output | IM3 Output | 1dB Comp. Output | Psat Output | Noise Figure |
|---|---|---|---|---|---|---|---|---|---|
| (GHz) | (dB) | (dB) | (dB) | (dB) | (dBm) | (dBc) | (dBm) | (dBm) | (dB) |
| 5.0 | 20.7 | -63.6 | -20.1 | -9.3 | 28.6 | -39.2 | 20.8 | 22.8 | 7.2 |
| 5.1 | 20.7 | -63.3 | -20.1 | -9.6 | 28.6 | -39.0 | 20.7 | 22.8 | 7.0 |
| 5.2 | 20.8 | -63.0 | -20.1 | -9.8 | 28.5 | -38.9 | 20.8 | 22.9 | 7.0 |
| 5.3 | 20.9 | -63.2 | -20.2 | -10.0 | 28.6 | -38.6 | 20.9 | 22.9 | 6.9 |
| 5.4 | 21.0 | -63.0 | -20.1 | -10.2 | 28.7 | -38.8 | 20.9 | 23.0 | 6.8 |
| 5.5 | 21.1 | -63.1 | -20.1 | -10.3 | 28.7 | -38.9 | 21.0 | 23.1 | 6.8 |
| 5.6 | 21.1 | -63.2 | -20.1 | -10.5 | 28.2 | -38.6 | 21.1 | 23.1 | 6.7 |
| 5.7 | 21.2 | -63.0 | -20.0 | -10.6 | 28.6 | -38.9 | 21.2 | 23.1 | 6.7 |
| 5.8 | 21.3 | -63.1 | -19.9 | -10.8 | 28.7 | -39.1 | 21.2 | 23.2 | 6.6 |
| 5.9 | 21.3 | -63.1 | -19.8 | -10.9 | 28.3 | -38.7 | 21.4 | 23.3 | 6.6 |
| 6.0 | 21.4 | -63.2 | -19.7 | -11.1 | 28.7 | -38.8 | 21.4 | 23.3 | 6.5 |
| 6.1 | 21.4 | -63.7 | -19.5 | -11.3 | 28.5 | -38.2 | 21.6 | 23.3 | 6.5 |
| 6.2 | 21.5 | -63.8 | -19.3 | -11.5 | 28.5 | -38.2 | 21.8 | 23.3 | 6.5 |
| 6.3 | 21.5 | -64.0 | -19.0 | -11.7 | 28.4 | -37.8 | 21.8 | 23.4 | 6.4 |
| 6.4 | 21.5 | -64.5 | -18.8 | -11.9 | 28.4 | -38.2 | 22.0 | 23.5 | 6.4 |
| 6.5 | 21.5 | -64.8 | -18.6 | -12.2 | 28.6 | -38.3 | 22.1 | 23.5 | 6.3 |
| 6.6 | 21.6 | -65.1 | -18.3 | -12.5 | 28.4 | -37.9 | 22.2 | 23.6 | 6.2 |
| 6.7 | 21.6 | -65.9 | -18.1 | -12.8 | 28.3 | -38.2 | 22.4 | 23.6 | 6.3 |
| 6.8 | 21.6 | -66.2 | -17.8 | -13.1 | 28.5 | -38.2 | 22.4 | 23.7 | 6.2 |
| 6.9 | 21.6 | -66.8 | -17.5 | -13.4 | 28.5 | -38.3 | 22.3 | 23.8 | 6.2 |
| 7.0 | 21.6 | -66.5 | -17.2 | -13.7 | 28.5 | -38.3 | 22.3 | 23.8 | 6.1 |
| 7.1 | 21.6 | -65.8 | -16.9 | -14.0 | 28.5 | -38.4 | 22.4 | 23.8 | 6.1 |
| 7.2 | 21.6 | -65.0 | -16.7 | -14.4 | 28.7 | -38.6 | 22.5 | 23.9 | 6.0 |
| 7.3 | 21.6 | -65.3 | -16.4 | -14.8 | 29.1 | -39.1 | 22.5 | 23.8 | 6.0 |
| 7.4 | 21.6 | -65.8 | -16.2 | -15.1 | 28.8 | -38.9 | 22.5 | 23.9 | 6.0 |
| 7.5 | 21.6 | -65.7 | -16.0 | -15.5 | 28.8 | -38.7 | 22.6 | 23.9 | 6.0 |
| 7.6 | 21.6 | -67.4 | -15.8 | -15.9 | 28.7 | -38.9 | 22.5 | 23.7 | 5.9 |
| 7.7 | 21.6 | -67.0 | -15.6 | -16.2 | 28.8 | -39.0 | 22.6 | 23.9 | 5.9 |
| 7.8 | 21.6 | -67.0 | -15.4 | -16.4 | 28.8 | -38.9 | 22.5 | 23.8 | 5.9 |
| 7.9 | 21.7 | -67.6 | -15.2 | -16.6 | 29.0 | -39.3 | 22.6 | 23.9 | 5.9 |
| 8.0 | 21.7 | -67.8 | -15.0 | -16.8 | 29.0 | -39.5 | 22.6 | 23.9 | 5.9 |
| 8.1 | 21.7 | -68.5 | -14.9 | -16.9 | 28.7 | -39.4 | 22.6 | 23.8 | 5.9 |
| 8.2 | 21.7 | -68.9 | -14.8 | -17.0 | 28.9 | -39.7 | 22.6 | 23.9 | 5.8 |
| 8.3 | 21.7 | -69.3 | -14.8 | -17.0 | 29.1 | -39.7 | 22.5 | 23.8 | 5.8 |
| 8.4 | 21.7 | -69.5 | -14.8 | -16.9 | 28.9 | -39.7 | 22.5 | 23.8 | 5.8 |
| 8.5 | 21.8 | -69.8 | -14.9 | -16.8 | 28.9 | -39.6 | 22.6 | 24.0 | 5.8 |
| 8.6 | 21.8 | -69.8 | -14.9 | -16.6 | 29.0 | -39.2 | 22.5 | 23.9 | 5.8 |
| 8.7 | 21.8 | -70.0 | -15.0 | -16.5 | 28.9 | -39.3 | 22.6 | 24.0 | 5.8 |
| 8.8 | 21.8 | -69.3 | -15.0 | -16.3 | 28.9 | -39.2 | 22.6 | 24.0 | 5.8 |
| 8.9 | 21.8 | -69.1 | -15.2 | -16.1 | 29.1 | -39.3 | 22.6 | 23.8 | 5.8 |
| 9.0 | 21.8 | -68.0 | -15.4 | -16.0 | 29.1 | -39.4 | 22.6 | 23.9 | 5.8 |
| 9.1 | 21.8 | -67.3 | -15.6 | -15.8 | 29.0 | -39.2 | 22.6 | 24.0 | 5.8 |
| 9.2 | 21.8 | -66.2 | -15.9 | -15.6 | 28.9 | -38.9 | 22.5 | 23.9 | 5.8 |
| 9.3 | 21.8 | -65.3 | -16.2 | -15.5 | 28.9 | -39.0 | 22.5 | 24.0 | 5.8 |
| 9.4 | 21.8 | -65.0 | -16.6 | -15.4 | 28.8 | -38.7 | 22.5 | 24.2 | 5.8 |
| 9.5 | 21.8 | -64.1 | -16.9 | -15.3 | 28.8 | -39.2 | 22.4 | 23.8 | 5.7 |
| 9.6 | 21.8 | -63.1 | -17.3 | -15.2 | 28.9 | -39.2 | 22.5 | 24.1 | 5.7 |
| 9.7 | 21.8 | -62.3 | -17.6 | -15.1 | 28.6 | -38.7 | 22.3 | 24.1 | 5.7 |
| 9.8 | 21.9 | -62.0 | -17.9 | -15.0 | 28.4 | -38.4 | 22.4 | 23.9 | 5.7 |
| 9.9 | 21.9 | -61.3 | -18.2 | -14.9 | 28.5 | -38.3 | 22.5 | 24.3 | 5.7 |
| 10.0 | 21.9 | -60.8 | -18.5 | -14.8 | 28.4 | -38.2 | 22.4 | 24.1 | 5.7 |
| 10.1 | 22.0 | -60.1 | -18.8 | -14.6 | 28.2 | -38.0 | 22.4 | 23.9 | 5.7 |
| 10.2 | 22.0 | -59.7 | -19.1 | -14.4 | 28.1 | -37.7 | 22.5 | 24.1 | 5.7 |
| 10.3 | 22.0 | -59.4 | -19.4 | -14.1 | 28.0 | -37.4 | 22.3 | 23.7 | 5.6 |
| 10.4 | 22.0 | -59.1 | -19.7 | -13.9 | 27.9 | -37.2 | 22.4 | 23.9 | 5.6 |
| 10.5 | 21.9 | -59.4 | -20.0 | -13.6 | 27.7 | -36.9 | 22.4 | 23.9 | 5.6 |
| 10.6 | 21.9 | -59.5 | -20.4 | -13.3 | 27.5 | -36.8 | 22.2 | 23.6 | 5.6 |
| 10.7 | 21.9 | -58.9 | -20.8 | -13.0 | 27.3 | -36.4 | 22.4 | 23.6 | 5.5 |
| 10.8 | 21.8 | -58.5 | -21.3 | -12.7 | 27.3 | -36.1 | 22.6 | 23.8 | 5.5 |
| 10.9 | 21.7 | -58.1 | -22.0 | -12.4 | 27.1 | -35.8 | 22.4 | 23.6 | 5.5 |
| 11.0 | 21.7 | -57.8 | -22.7 | -12.1 | 26.9 | -35.3 | 22.5 | 23.7 | 5.4 |
| 11.1 | 21.5 | -57.4 | -23.5 | -11.9 | 26.7 | -34.9 | 22.7 | 23.7 | 5.4 |
| 11.2 | 21.4 | -57.0 | -24.3 | -11.8 | 26.7 | -35.0 | 22.4 | 23.4 | 5.4 |
| 11.3 | 21.3 | -56.5 | -25.2 | -11.8 | 26.3 | -34.3 | 22.9 | 23.7 | 5.3 |
| 11.4 | 21.2 | -56.1 | -26.1 | -11.7 | 26.5 | -34.3 | 22.7 | 23.6 | 5.2 |
| 11.5 | 21.1 | -55.7 | -27.1 | -11.6 | 26.2 | -33.9 | 22.7 | 23.6 | 5.2 |
| 11.6 | 21.0 | -55.2 | -28.0 | -11.6 | 26.0 | -33.2 | 23.1 | 23.9 | 5.2 |
| 11.7 | 20.8 | -55.3 | -28.9 | -11.7 | 25.7 | -32.7 | 23.1 | 23.7 | 5.2 |
| 11.8 | 20.7 | -55.3 | -29.6 | -11.8 | 25.6 | -32.5 | 23.0 | 23.7 | 5.2 |
| 11.9 | 20.6 | -55.6 | -30.1 | -11.8 | 25.5 | -32.0 | 23.3 | 23.9 | 5.2 |
| 12.0 | 20.5 | -55.7 | -30.3 | -11.8 | 25.3 | -32.0 | 23.1 | 23.8 | 5.1 |

## *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: $V_{DD}$ = +5 V, $I_{DD}$ = 140 mA @ Temperature = -40°C

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | IP-3 Output | IM3 Output | 1dB Comp. Output | Psat Output | Noise Figure |
|---|---|---|---|---|---|---|---|---|---|
| (GHz) | (dB) | (dB) | (dB) | (dB) | (dBm) | (dBc) | (dBm) | (dBm) | (dB) |
| 5.0 | 25.3 | -62.9 | -17.7 | -9.3 | 28.3 | -38.2 | 19.8 | 23.0 | 5.9 |
| 5.1 | 25.5 | -63.1 | -17.7 | -9.6 | 28.3 | -38.2 | 19.9 | 23.0 | 5.8 |
| 5.2 | 25.6 | -63.2 | -17.7 | -9.8 | 28.4 | -38.4 | 19.9 | 23.0 | 5.8 |
| 5.3 | 25.8 | -63.2 | -17.8 | -10.1 | 28.5 | -38.5 | 20.0 | 23.1 | 5.7 |
| 5.4 | 25.9 | -63.4 | -17.9 | -10.3 | 28.5 | -38.6 | 20.0 | 23.2 | 5.6 |
| 5.5 | 26.0 | -62.4 | -18.1 | -10.6 | 28.5 | -38.6 | 20.1 | 23.2 | 5.5 |
| 5.6 | 26.1 | -62.4 | -18.2 | -10.8 | 28.6 | -38.7 | 20.1 | 23.3 | 5.5 |
| 5.7 | 26.2 | -61.8 | -18.3 | -11.0 | 28.6 | -38.8 | 20.2 | 23.3 | 5.4 |
| 5.8 | 26.3 | -62.2 | -18.4 | -11.2 | 28.7 | -38.9 | 20.2 | 23.3 | 5.4 |
| 5.9 | 26.4 | -62.1 | -18.4 | -11.4 | 28.7 | -39.0 | 20.3 | 23.3 | 5.4 |
| 6.0 | 26.5 | -62.6 | -18.5 | -11.7 | 28.8 | -39.1 | 20.3 | 23.3 | 5.3 |
| 6.1 | 26.5 | -63.3 | -18.6 | -12.0 | 28.8 | -39.2 | 20.4 | 23.3 | 5.2 |
| 6.2 | 26.6 | -63.8 | -18.7 | -12.3 | 28.9 | -39.3 | 20.4 | 23.2 | 5.3 |
| 6.3 | 26.7 | -63.1 | -18.8 | -12.7 | 28.9 | -39.3 | 20.4 | 23.2 | 5.1 |
| 6.4 | 26.8 | -64.5 | -18.8 | -13.0 | 29.0 | -39.6 | 20.4 | 23.1 | 5.1 |
| 6.5 | 26.9 | -66.0 | -18.7 | -13.4 | 29.1 | -39.9 | 20.4 | 23.1 | 5.2 |
| 6.6 | 26.9 | -65.2 | -18.7 | -13.7 | 29.3 | -40.1 | 20.5 | 23.0 | 5.0 |
| 6.7 | 27.0 | -64.5 | -18.6 | -14.2 | 29.4 | -40.4 | 20.5 | 23.0 | 5.0 |
| 6.8 | 27.0 | -64.8 | -18.5 | -14.5 | 29.7 | -40.9 | 20.5 | 23.1 | 5.0 |
| 6.9 | 26.9 | -63.1 | -18.4 | -15.0 | 30.0 | -41.5 | 20.5 | 23.1 | 5.0 |
| 7.0 | 26.9 | -62.9 | -18.2 | -15.4 | 30.2 | -41.9 | 20.5 | 23.2 | 4.9 |
| 7.1 | 26.9 | -62.3 | -18.1 | -15.9 | 30.3 | -42.3 | 20.5 | 23.2 | 4.9 |
| 7.2 | 26.9 | -61.5 | -18.0 | -16.5 | 30.6 | -42.7 | 20.6 | 23.3 | 4.9 |
| 7.3 | 26.8 | -61.2 | -17.9 | -17.2 | 30.7 | -43.0 | 20.6 | 23.5 | 4.9 |
| 7.4 | 26.7 | -63.1 | -17.6 | -18.1 | 30.8 | -43.2 | 20.6 | 23.5 | 4.8 |
| 7.5 | 26.7 | -63.2 | -17.3 | -18.8 | 30.9 | -43.4 | 20.6 | 23.6 | 4.8 |
| 7.6 | 26.6 | -64.3 | -17.2 | -19.5 | 31.1 | -43.7 | 20.6 | 23.6 | 4.8 |
| 7.7 | 26.6 | -66.5 | -17.1 | -19.9 | 31.3 | -44.1 | 20.7 | 23.6 | 4.8 |
| 7.8 | 26.6 | -64.8 | -16.9 | -20.1 | 31.4 | -44.3 | 20.7 | 23.6 | 4.7 |
| 7.9 | 26.6 | -64.4 | -16.7 | -20.3 | 31.4 | -44.4 | 20.7 | 23.6 | 4.8 |
| 8.0 | 26.6 | -62.4 | -16.4 | -20.5 | 31.5 | -44.6 | 20.7 | 23.5 | 4.7 |
| 8.1 | 26.5 | -61.9 | -16.1 | -20.7 | 31.7 | -44.9 | 20.7 | 23.4 | 4.7 |
| 8.2 | 26.5 | -61.8 | -16.0 | -20.9 | 31.7 | -45.1 | 20.7 | 23.4 | 4.7 |
| 8.3 | 26.6 | -62.8 | -16.1 | -20.6 | 31.8 | -45.1 | 20.7 | 23.4 | 4.7 |
| 8.4 | 26.6 | -64.9 | -16.3 | -20.0 | 31.8 | -45.1 | 20.7 | 23.4 | 4.7 |
| 8.5 | 26.6 | -65.5 | -16.5 | -19.6 | 31.7 | -45.1 | 20.7 | 23.4 | 4.7 |
| 8.6 | 26.7 | -64.8 | -16.5 | -19.2 | 31.7 | -45.0 | 20.7 | 23.5 | 4.7 |
| 8.7 | 26.7 | -65.4 | -16.6 | -18.9 | 31.7 | -44.9 | 20.7 | 23.6 | 4.7 |
| 8.8 | 26.8 | -66.5 | -16.5 | -18.3 | 31.5 | -44.6 | 20.7 | 23.6 | 4.7 |
| 8.9 | 26.8 | -67.3 | -16.6 | -17.7 | 31.4 | -44.3 | 20.7 | 23.6 | 4.6 |
| 9.0 | 26.8 | -65.9 | -16.7 | -17.4 | 31.3 | -44.0 | 20.7 | 23.7 | 4.6 |
| 9.1 | 26.8 | -65.9 | -16.9 | -17.1 | 31.1 | -43.7 | 20.7 | 23.8 | 4.7 |
| 9.2 | 26.8 | -68.7 | -17.3 | -16.6 | 31.0 | -43.5 | 20.7 | 23.8 | 4.6 |
| 9.3 | 26.8 | -71.6 | -17.6 | -16.2 | 30.9 | -43.4 | 20.7 | 23.8 | 4.7 |
| 9.4 | 26.8 | -70.4 | -18.0 | -16.0 | 30.8 | -43.2 | 20.7 | 23.7 | 4.6 |
| 9.5 | 26.8 | -68.7 | -18.3 | -15.8 | 30.8 | -43.0 | 20.7 | 23.8 | 4.6 |
| 9.6 | 26.8 | -66.9 | -18.7 | -15.6 | 30.7 | -42.9 | 20.8 | 23.9 | 4.6 |
| 9.7 | 26.9 | -64.7 | -19.0 | -15.3 | 30.7 | -42.8 | 20.8 | 23.9 | 4.6 |
| 9.8 | 26.9 | -63.9 | -19.5 | -15.1 | 30.6 | -42.7 | 20.8 | 23.8 | 4.5 |
| 9.9 | 27.0 | -63.8 | -19.8 | -14.7 | 30.6 | -42.6 | 20.8 | 23.9 | 4.6 |
| 10.0 | 27.0 | -62.7 | -19.9 | -14.4 | 30.5 | -42.6 | 20.8 | 24.0 | 4.6 |
| 10.1 | 27.1 | -61.5 | -19.9 | -14.0 | 30.5 | -42.5 | 20.9 | 24.0 | 4.5 |
| 10.2 | 27.2 | -60.5 | -20.0 | -13.6 | 30.5 | -42.5 | 20.9 | 23.9 | 4.5 |
| 10.3 | 27.2 | -60.0 | -20.3 | -13.2 | 30.5 | -42.5 | 20.8 | 23.9 | 4.5 |
| 10.4 | 27.3 | -59.1 | -20.6 | -12.8 | 30.5 | -42.5 | 20.8 | 23.9 | 4.4 |
| 10.5 | 27.3 | -59.3 | -20.6 | -12.4 | 30.5 | -42.4 | 20.9 | 23.9 | 4.4 |
| 10.6 | 27.3 | -59.3 | -20.5 | -11.9 | 30.4 | -42.4 | 20.9 | 23.9 | 4.4 |
| 10.7 | 27.3 | -58.9 | -20.3 | -11.4 | 30.4 | -42.3 | 20.8 | 23.8 | 4.3 |
| 10.8 | 27.3 | -58.5 | -20.4 | -10.9 | 30.4 | -42.3 | 20.8 | 23.8 | 4.3 |
| 10.9 | 27.3 | -58.0 | -20.7 | -10.4 | 30.4 | -42.2 | 20.9 | 23.9 | 4.2 |
| 11.0 | 27.2 | -57.4 | -21.1 | -10.1 | 30.4 | -42.2 | 21.0 | 23.9 | 4.2 |
| 11.1 | 27.2 | -56.7 | -21.5 | -9.8 | 30.4 | -42.2 | 21.0 | 23.8 | 4.2 |
| 11.2 | 27.1 | -56.0 | -22.0 | -9.6 | 30.4 | -42.2 | 21.0 | 23.7 | 4.2 |
| 11.3 | 27.0 | -55.3 | -22.4 | -9.5 | 30.4 | -42.2 | 21.1 | 23.7 | 4.1 |
| 11.4 | 26.9 | -55.0 | -22.8 | -9.4 | 30.4 | -42.2 | 21.2 | 23.7 | 4.1 |
| 11.5 | 26.8 | -54.8 | -23.2 | -9.5 | 30.4 | -42.3 | 21.2 | 23.7 | 4.0 |
| 11.6 | 26.7 | -54.7 | -23.8 | -9.6 | 30.5 | -42.4 | 21.2 | 23.6 | 4.1 |
| 11.7 | 26.6 | -54.7 | -24.3 | -9.7 | 30.4 | -42.3 | 21.2 | 23.6 | 4.0 |
| 11.8 | 26.5 | -54.4 | -24.8 | -9.9 | 30.4 | -42.3 | 21.3 | 23.7 | 4.0 |
| 11.9 | 26.4 | -54.2 | -25.0 | -10.1 | 30.4 | -42.3 | 21.3 | 23.6 | 4.0 |
| 12.0 | 26.4 | -54.3 | -25.1 | -10.3 | 30.4 | -42.2 | 21.3 | 23.6 | 4.0 |

## *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: $V_{DD}$ = +5 V, $I_{DD}$ = 140 mA @ Temperature = +95°C

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | IP-3 Output | IM3 Output | 1dB Comp. Output | Psat Output | Noise Figure |
|---|---|---|---|---|---|---|---|---|---|
| (GHz) | (dB) | (dB) | (dB) | (dB) | (dBm) | (dBc) | (dBm) | (dBm) | (dB) |
| 5.0 | 20.0 | -62.9 | -19.4 | -10.4 | 27.9 | -37.4 | 19.3 | 21.3 | 8.3 |
| 5.1 | 20.1 | -62.6 | -19.3 | -10.6 | 28.0 | -37.6 | 19.3 | 21.4 | 8.1 |
| 5.2 | 20.1 | -62.9 | -19.2 | -10.8 | 28.1 | -37.8 | 19.4 | 21.5 | 8.1 |
| 5.3 | 20.2 | -62.7 | -19.2 | -11.0 | 28.2 | -38.1 | 19.4 | 21.5 | 8.0 |
| 5.4 | 20.3 | -62.3 | -19.1 | -11.2 | 28.3 | -38.3 | 19.5 | 21.6 | 7.9 |
| 5.5 | 20.3 | -62.5 | -19.1 | -11.4 | 28.3 | -38.4 | 19.6 | 21.7 | 7.9 |
| 5.6 | 20.4 | -62.9 | -19.1 | -11.5 | 28.5 | -38.6 | 19.7 | 21.8 | 7.8 |
| 5.7 | 20.5 | -63.1 | -19.0 | -11.7 | 28.6 | -38.9 | 19.9 | 21.8 | 7.8 |
| 5.8 | 20.5 | -62.8 | -19.0 | -11.9 | 28.7 | -39.1 | 20.0 | 21.9 | 7.7 |
| 5.9 | 20.6 | -62.8 | -18.9 | -12.0 | 28.8 | -39.2 | 20.1 | 22.0 | 7.7 |
| 6.0 | 20.6 | -62.6 | -18.8 | -12.2 | 28.9 | -39.5 | 20.2 | 22.0 | 7.6 |
| 6.1 | 20.7 | -63.6 | -18.7 | -12.5 | 29.0 | -39.7 | 20.4 | 22.1 | 7.6 |
| 6.2 | 20.7 | -63.4 | -18.6 | -12.8 | 29.1 | -39.9 | 20.5 | 22.2 | 7.5 |
| 6.3 | 20.8 | -63.7 | -18.5 | -13.1 | 29.2 | -40.0 | 20.6 | 22.2 | 7.4 |
| 6.4 | 20.9 | -65.5 | -18.3 | -13.3 | 29.3 | -40.2 | 20.7 | 22.3 | 7.4 |
| 6.5 | 20.9 | -67.0 | -18.1 | -13.6 | 29.4 | -40.4 | 20.9 | 22.4 | 7.4 |
| 6.6 | 20.9 | -66.1 | -17.9 | -13.8 | 29.4 | -40.5 | 21.0 | 22.5 | 7.4 |
| 6.7 | 20.9 | -66.6 | -17.7 | -14.2 | 29.5 | -40.7 | 21.0 | 22.5 | 7.3 |
| 6.8 | 21.0 | -65.6 | -17.5 | -14.6 | 29.7 | -40.9 | 21.1 | 22.6 | 7.3 |
| 6.9 | 20.9 | -65.0 | -17.4 | -15.1 | 29.8 | -41.2 | 21.1 | 22.6 | 7.2 |
| 7.0 | 20.9 | -65.3 | -17.2 | -15.5 | 29.9 | -41.4 | 21.2 | 22.6 | 7.2 |
| 7.1 | 20.9 | -64.1 | -17.0 | -16.0 | 30.0 | -41.5 | 21.2 | 22.6 | 7.1 |
| 7.2 | 20.8 | -63.3 | -16.8 | -16.6 | 30.0 | -41.7 | 21.3 | 22.6 | 7.1 |
| 7.3 | 20.8 | -63.6 | -16.6 | -17.3 | 30.1 | -41.9 | 21.3 | 22.7 | 7.1 |
| 7.4 | 20.7 | -65.5 | -16.4 | -17.9 | 30.2 | -41.9 | 21.4 | 22.7 | 7.0 |
| 7.5 | 20.7 | -66.0 | -16.2 | -18.6 | 30.1 | -41.9 | 21.4 | 22.7 | 7.0 |
| 7.6 | 20.7 | -66.7 | -16.1 | -19.1 | 30.2 | -42.0 | 21.4 | 22.7 | 7.0 |
| 7.7 | 20.7 | -69.4 | -16.0 | -19.4 | 30.3 | -42.2 | 21.4 | 22.7 | 7.0 |
| 7.8 | 20.7 | -68.3 | -15.8 | -19.6 | 30.3 | -42.1 | 21.4 | 22.7 | 6.9 |
| 7.9 | 20.7 | -67.5 | -15.6 | -19.7 | 30.3 | -42.2 | 21.4 | 22.6 | 6.9 |
| 8.0 | 20.7 | -65.9 | -15.5 | -19.7 | 30.3 | -42.2 | 21.4 | 22.6 | 6.9 |
| 8.1 | 20.7 | -65.0 | -15.4 | -19.6 | 30.3 | -42.2 | 21.3 | 22.6 | 6.9 |
| 8.2 | 20.7 | -65.0 | -15.4 | -19.4 | 30.3 | -42.2 | 21.3 | 22.6 | 6.9 |
| 8.3 | 20.7 | -66.0 | -15.5 | -19.1 | 30.3 | -42.2 | 21.3 | 22.6 | 6.9 |
| 8.4 | 20.7 | -66.9 | -15.7 | -18.7 | 30.2 | -42.1 | 21.3 | 22.6 | 6.9 |
| 8.5 | 20.7 | -67.2 | -15.8 | -18.3 | 30.2 | -42.0 | 21.2 | 22.5 | 6.8 |
| 8.6 | 20.7 | -66.5 | -15.9 | -18.0 | 30.1 | -41.9 | 21.2 | 22.6 | 6.8 |
| 8.7 | 20.7 | -66.6 | -16.0 | -17.7 | 30.1 | -41.7 | 21.2 | 22.6 | 6.9 |
| 8.8 | 20.7 | -67.0 | -16.1 | -17.2 | 30.0 | -41.5 | 21.2 | 22.6 | 6.8 |
| 8.9 | 20.6 | -65.9 | -16.3 | -16.9 | 29.9 | -41.3 | 21.1 | 22.5 | 6.8 |
| 9.0 | 20.6 | -66.4 | -16.6 | -16.5 | 29.7 | -41.0 | 21.1 | 22.5 | 6.8 |
| 9.1 | 20.6 | -67.4 | -16.9 | -16.3 | 29.6 | -40.8 | 21.1 | 22.5 | 6.8 |
| 9.2 | 20.6 | -68.3 | -17.3 | -16.0 | 29.5 | -40.6 | 21.1 | 22.5 | 6.8 |
| 9.3 | 20.6 | -68.3 | -17.6 | -15.7 | 29.4 | -40.3 | 21.0 | 22.5 | 6.8 |
| 9.4 | 20.6 | -67.6 | -18.0 | -15.5 | 29.2 | -40.0 | 21.0 | 22.5 | 6.8 |
| 9.5 | 20.6 | -66.6 | -18.4 | -15.4 | 29.1 | -39.8 | 21.0 | 22.5 | 6.8 |
| 9.6 | 20.6 | -64.2 | -18.8 | -15.2 | 29.0 | -39.5 | 20.9 | 22.5 | 6.8 |
| 9.7 | 20.6 | -63.0 | -19.3 | -15.0 | 28.8 | -39.2 | 20.9 | 22.5 | 6.8 |
| 9.8 | 20.6 | -62.2 | -19.7 | -14.9 | 28.7 | -39.0 | 20.9 | 22.5 | 6.7 |
| 9.9 | 20.7 | -61.3 | -20.1 | -14.7 | 28.6 | -38.7 | 20.9 | 22.5 | 6.8 |
| 10.0 | 20.7 | -61.0 | -20.4 | -14.4 | 28.4 | -38.4 | 20.9 | 22.5 | 6.8 |
| 10.1 | 20.7 | -60.2 | -20.7 | -14.2 | 28.3 | -38.2 | 20.9 | 22.5 | 6.7 |
| 10.2 | 20.7 | -59.8 | -21.2 | -14.0 | 28.2 | -37.9 | 20.9 | 22.5 | 6.8 |
| 10.3 | 20.7 | -59.3 | -21.7 | -13.8 | 28.1 | -37.6 | 20.9 | 22.4 | 6.7 |
| 10.4 | 20.6 | -59.0 | -22.1 | -13.6 | 27.9 | -37.4 | 20.9 | 22.4 | 6.6 |
| 10.5 | 20.6 | -59.4 | -22.5 | -13.4 | 27.8 | -37.1 | 20.9 | 22.4 | 6.7 |
| 10.6 | 20.5 | -58.8 | -22.9 | -13.0 | 27.6 | -36.8 | 20.9 | 22.4 | 6.6 |
| 10.7 | 20.5 | -58.7 | -23.3 | -12.7 | 27.5 | -36.5 | 20.8 | 22.3 | 6.5 |
| 10.8 | 20.4 | -58.5 | -24.0 | -12.4 | 27.3 | -36.2 | 20.9 | 22.3 | 6.5 |
| 10.9 | 20.3 | -57.9 | -24.9 | -12.2 | 27.2 | -35.8 | 20.9 | 22.3 | 6.5 |
| 11.0 | 20.2 | -57.6 | -25.8 | -12.0 | 27.0 | -35.5 | 20.9 | 22.3 | 6.4 |
| 11.1 | 20.1 | -56.9 | -26.8 | -11.8 | 26.8 | -35.2 | 20.9 | 22.2 | 6.4 |
| 11.2 | 20.0 | -56.5 | -27.9 | -11.7 | 26.7 | -34.8 | 20.9 | 22.2 | 6.4 |
| 11.3 | 19.8 | -56.2 | -28.9 | -11.6 | 26.4 | -34.4 | 20.9 | 22.2 | 6.4 |
| 11.4 | 19.7 | -56.1 | -29.8 | -11.6 | 26.3 | -34.0 | 20.9 | 22.2 | 6.3 |
| 11.5 | 19.6 | -56.1 | -30.7 | -11.6 | 26.1 | -33.7 | 20.8 | 22.1 | 6.2 |
| 11.6 | 19.5 | -55.6 | -31.5 | -11.6 | 25.9 | -33.3 | 20.8 | 22.1 | 6.3 |
| 11.7 | 19.4 | -55.5 | -32.0 | -11.7 | 25.7 | -32.8 | 20.8 | 22.1 | 6.3 |
| 11.8 | 19.3 | -55.5 | -32.3 | -11.7 | 25.5 | -32.4 | 20.9 | 22.1 | 6.3 |
| 11.9 | 19.1 | -55.5 | -32.3 | -11.7 | 25.2 | -31.9 | 20.9 | 22.0 | 6.3 |
| 12.0 | 19.0 | -55.7 | -32.0 | -11.7 | 25.0 | -31.5 | 20.8 | 22.0 | 6.3 |

## *Typical Performance Data*

TEST CONDITIONS: $V_{DD}$ = +5 V, $I_{DD}$ = 120 mA, 140 mA, 160 mA @ Temperature = +25°C

| FREQ | Gain @ 120 mA | Gain @ 140 mA | Gain @ 160 mA | 1dB Comp. Output @ 120 mA | 1dB Comp. Output @ 140 mA | 1dB Comp. Output @ 160 mA | Psat Output @ 120 mA | Psat Output @ 140 mA | Psat Output @ 160 mA |
|---|---|---|---|---|---|---|---|---|---|
| (GHz) | (dB) | (dB) | (dB) | (dBm) | (dBm) | (dBm) | (dBm) | (dBm) | (dBm) |
| 5.0 | 20.7 | 21.4 | 22.1 | 19.4 | 20.3 | 21.0 | 22.2 | 22.6 | 22.7 |
| 5.1 | 20.8 | 21.5 | 22.2 | 19.3 | 20.4 | 21.1 | 22.4 | 22.6 | 22.9 |
| 5.2 | 20.9 | 21.6 | 22.3 | 19.3 | 20.4 | 21.1 | 22.4 | 22.7 | 22.9 |
| 5.3 | 21.0 | 21.6 | 22.4 | 19.4 | 20.5 | 21.2 | 22.5 | 22.7 | 23.0 |
| 5.4 | 21.1 | 21.7 | 22.5 | 19.4 | 20.6 | 21.2 | 22.6 | 22.8 | 23.1 |
| 5.5 | 21.1 | 21.8 | 22.5 | 19.5 | 20.6 | 21.3 | 22.6 | 22.9 | 23.2 |
| 5.6 | 21.2 | 21.9 | 22.6 | 19.7 | 20.7 | 21.4 | 22.7 | 22.9 | 23.2 |
| 5.7 | 21.3 | 22.0 | 22.7 | 19.7 | 20.8 | 21.4 | 22.8 | 22.9 | 23.3 |
| 5.8 | 21.3 | 22.0 | 22.7 | 19.8 | 20.9 | 21.6 | 22.9 | 22.9 | 23.5 |
| 5.9 | 21.4 | 22.1 | 22.8 | 20.0 | 21.0 | 21.6 | 22.9 | 23.0 | 23.4 |
| 6.0 | 21.4 | 22.1 | 22.9 | 20.0 | 21.1 | 21.6 | 23.0 | 23.0 | 23.5 |
| 6.1 | 21.5 | 22.2 | 22.9 | 20.2 | 21.2 | 21.6 | 22.8 | 23.0 | 23.2 |
| 6.2 | 21.5 | 22.2 | 22.9 | 20.4 | 21.3 | 21.7 | 22.8 | 23.0 | 23.1 |
| 6.3 | 21.6 | 22.3 | 23.0 | 20.4 | 21.3 | 21.8 | 22.9 | 23.0 | 23.2 |
| 6.4 | 21.6 | 22.3 | 23.0 | 20.7 | 21.4 | 21.9 | 23.0 | 23.1 | 23.3 |
| 6.5 | 21.6 | 22.3 | 23.0 | 20.8 | 21.4 | 22.0 | 23.0 | 23.1 | 23.3 |
| 6.6 | 21.7 | 22.3 | 23.1 | 20.8 | 21.5 | 21.9 | 23.1 | 23.1 | 23.3 |
| 6.7 | 21.7 | 22.3 | 23.1 | 21.0 | 21.5 | 21.9 | 23.0 | 23.2 | 23.3 |
| 6.8 | 21.7 | 22.3 | 23.1 | 20.9 | 21.5 | 21.9 | 23.1 | 23.2 | 23.4 |
| 6.9 | 21.7 | 22.3 | 23.1 | 20.9 | 21.6 | 22.0 | 23.3 | 23.3 | 23.6 |
| 7.0 | 21.7 | 22.3 | 23.1 | 20.9 | 21.6 | 21.9 | 23.3 | 23.3 | 23.6 |
| 7.1 | 21.7 | 22.4 | 23.1 | 21.0 | 21.6 | 22.0 | 23.3 | 23.3 | 23.7 |
| 7.2 | 21.7 | 22.4 | 23.1 | 21.1 | 21.6 | 22.0 | 23.4 | 23.4 | 23.8 |
| 7.3 | 21.7 | 22.4 | 23.1 | 21.1 | 21.7 | 22.0 | 23.3 | 23.4 | 23.6 |
| 7.4 | 21.7 | 22.3 | 23.1 | 21.1 | 21.7 | 22.1 | 23.4 | 23.4 | 23.7 |
| 7.5 | 21.7 | 22.3 | 23.0 | 21.2 | 21.7 | 22.2 | 23.4 | 23.4 | 23.7 |
| 7.6 | 21.7 | 22.3 | 23.0 | 21.1 | 21.7 | 22.0 | 23.2 | 23.4 | 23.5 |
| 7.7 | 21.7 | 22.3 | 23.0 | 21.2 | 21.7 | 22.1 | 23.4 | 23.4 | 23.7 |
| 7.8 | 21.7 | 22.3 | 23.0 | 21.1 | 21.7 | 21.9 | 23.2 | 23.4 | 23.5 |
| 7.9 | 21.7 | 22.4 | 23.1 | 21.2 | 21.7 | 22.1 | 23.4 | 23.3 | 23.6 |
| 8.0 | 21.7 | 22.4 | 23.1 | 21.1 | 21.7 | 22.1 | 23.4 | 23.2 | 23.7 |
| 8.1 | 21.7 | 22.4 | 23.1 | 21.1 | 21.7 | 22.0 | 23.2 | 23.2 | 23.4 |
| 8.2 | 21.7 | 22.4 | 23.1 | 21.2 | 21.7 | 22.1 | 23.3 | 23.3 | 23.5 |
| 8.3 | 21.8 | 22.4 | 23.1 | 21.0 | 21.7 | 21.9 | 23.2 | 23.3 | 23.4 |
| 8.4 | 21.8 | 22.4 | 23.1 | 21.0 | 21.6 | 21.9 | 23.2 | 23.2 | 23.4 |
| 8.5 | 21.8 | 22.4 | 23.2 | 21.0 | 21.6 | 22.1 | 23.5 | 23.2 | 23.7 |
| 8.6 | 21.8 | 22.5 | 23.2 | 21.0 | 21.7 | 22.1 | 23.3 | 23.3 | 23.6 |
| 8.7 | 21.8 | 22.5 | 23.2 | 21.0 | 21.7 | 22.1 | 23.4 | 23.3 | 23.7 |
| 8.8 | 21.8 | 22.5 | 23.2 | 21.0 | 21.7 | 22.1 | 23.5 | 23.3 | 23.8 |
| 8.9 | 21.8 | 22.5 | 23.2 | 21.0 | 21.6 | 22.0 | 23.3 | 23.3 | 23.6 |
| 9.0 | 21.8 | 22.5 | 23.2 | 21.0 | 21.6 | 22.0 | 23.3 | 23.3 | 23.6 |
| 9.1 | 21.8 | 22.5 | 23.2 | 21.0 | 21.6 | 22.1 | 23.5 | 23.4 | 23.8 |
| 9.2 | 21.8 | 22.5 | 23.2 | 20.9 | 21.6 | 22.0 | 23.3 | 23.4 | 23.7 |
| 9.3 | 21.8 | 22.5 | 23.2 | 20.9 | 21.6 | 22.0 | 23.4 | 23.3 | 23.7 |
| 9.4 | 21.8 | 22.5 | 23.2 | 20.9 | 21.6 | 22.1 | 23.6 | 23.3 | 23.9 |
| 9.5 | 21.8 | 22.5 | 23.2 | 20.8 | 21.6 | 21.8 | 23.3 | 23.4 | 23.5 |
| 9.6 | 21.8 | 22.5 | 23.3 | 20.9 | 21.6 | 22.0 | 23.5 | 23.5 | 23.8 |
| 9.7 | 21.9 | 22.5 | 23.3 | 20.8 | 21.6 | 21.9 | 23.5 | 23.4 | 23.8 |
| 9.8 | 21.9 | 22.6 | 23.3 | 20.8 | 21.6 | 21.9 | 23.3 | 23.4 | 23.6 |
| 9.9 | 21.9 | 22.6 | 23.3 | 20.9 | 21.6 | 22.1 | 23.5 | 23.5 | 23.9 |
| 10.0 | 21.9 | 22.6 | 23.4 | 20.8 | 21.6 | 21.9 | 23.4 | 23.5 | 23.7 |
| 10.1 | 22.0 | 22.7 | 23.4 | 20.8 | 21.6 | 21.7 | 23.2 | 23.5 | 23.5 |
| 10.2 | 22.0 | 22.7 | 23.4 | 20.9 | 21.6 | 21.9 | 23.3 | 23.5 | 23.6 |
| 10.3 | 22.0 | 22.7 | 23.5 | 20.7 | 21.5 | 21.6 | 23.0 | 23.4 | 23.2 |
| 10.4 | 22.0 | 22.7 | 23.5 | 20.7 | 21.5 | 21.6 | 23.1 | 23.5 | 23.4 |
| 10.5 | 22.0 | 22.7 | 23.4 | 20.9 | 21.6 | 21.7 | 23.1 | 23.5 | 23.3 |
| 10.6 | 21.9 | 22.6 | 23.4 | 20.6 | 21.5 | 21.4 | 22.8 | 23.4 | 23.0 |
| 10.7 | 21.9 | 22.6 | 23.4 | 20.8 | 21.5 | 21.5 | 22.9 | 23.3 | 23.0 |
| 10.8 | 21.8 | 22.5 | 23.3 | 20.9 | 21.5 | 21.7 | 23.0 | 23.3 | 23.3 |
| 10.9 | 21.8 | 22.5 | 23.2 | 20.8 | 21.5 | 21.5 | 22.8 | 23.4 | 23.0 |
| 11.0 | 21.7 | 22.4 | 23.2 | 20.8 | 21.5 | 21.5 | 22.9 | 23.3 | 23.1 |
| 11.1 | 21.6 | 22.3 | 23.0 | 21.0 | 21.5 | 21.7 | 22.9 | 23.2 | 23.1 |
| 11.2 | 21.5 | 22.2 | 22.9 | 20.7 | 21.5 | 21.3 | 22.5 | 23.2 | 22.7 |
| 11.3 | 21.4 | 22.0 | 22.8 | 21.1 | 21.5 | 21.8 | 22.9 | 23.2 | 23.1 |
| 11.4 | 21.2 | 21.9 | 22.7 | 21.0 | 21.6 | 21.6 | 22.8 | 23.2 | 22.9 |
| 11.5 | 21.1 | 21.8 | 22.6 | 21.0 | 21.5 | 21.6 | 22.7 | 23.1 | 22.9 |
| 11.6 | 21.0 | 21.7 | 22.5 | 21.3 | 21.5 | 21.9 | 23.0 | 23.1 | 23.2 |
| 11.7 | 20.9 | 21.6 | 22.4 | 21.3 | 21.5 | 21.8 | 22.9 | 23.1 | 23.1 |
| 11.8 | 20.8 | 21.5 | 22.2 | 21.2 | 21.6 | 21.7 | 22.8 | 23.1 | 23.0 |
| 11.9 | 20.7 | 21.4 | 22.1 | 21.5 | 21.6 | 22.1 | 23.0 | 23.1 | 23.2 |
| 12.0 | 20.6 | 21.3 | 22.0 | 21.4 | 21.5 | 21.4 | 22.8 | 23.0 | 23.0 |

## *Typical Performance Data*

TEST CONDITIONS: $V_{DD}$ = +5 V, $I_{DD}$ = 120 mA, 140 mA, 160 mA @ Temperature = +25°C

| FREQ | IP-3 @ 120 mA | IP-3 @ 140 mA | IP-3 @ 160 mA | IM3 @ 120 mA | IM3 @ 140 mA | IM3 @ 160 mA | Noise Figure @ 120 mA | Noise Figure @ 140 mA | Noise Figure @ 160 mA |
|---|---|---|---|---|---|---|---|---|---|
| (GHz) | (dBm) | (dBm) | (dBm) | (dBc) | (dBc) | (dBc) | (dB) | (dB) | (dB) |
| 5.0 | 27.8 | 27.6 | 28.1 | -37.3 | -37.0 | -37.4 | 7.2 | 7.1 | 7.1 |
| 5.1 | 27.8 | 27.5 | 28.0 | -37.2 | -36.9 | -37.3 | 7.1 | 7.0 | 7.0 |
| 5.2 | 27.7 | 27.4 | 27.9 | -37.1 | -36.8 | -37.2 | 7.0 | 7.1 | 7.0 |
| 5.3 | 27.7 | 27.6 | 28.2 | -36.6 | -36.4 | -36.8 | 7.0 | 6.9 | 6.9 |
| 5.4 | 27.9 | 27.2 | 27.9 | -37.1 | -36.7 | -37.0 | 6.9 | 6.8 | 6.8 |
| 5.5 | 27.9 | 27.2 | 27.9 | -37.0 | -36.6 | -37.0 | 6.8 | 6.8 | 6.8 |
| 5.6 | 27.3 | 27.5 | 27.6 | -36.7 | -36.4 | -36.8 | 6.8 | 6.7 | 6.7 |
| 5.7 | 27.8 | 27.3 | 27.9 | -37.1 | -36.6 | -36.9 | 6.7 | 6.7 | 6.7 |
| 5.8 | 28.0 | 27.5 | 27.9 | -37.4 | -36.8 | -37.1 | 6.6 | 6.7 | 6.6 |
| 5.9 | 27.4 | 27.5 | 27.6 | -36.8 | -36.4 | -36.8 | 6.5 | 6.6 | 6.6 |
| 6.0 | 27.9 | 27.2 | 27.9 | -37.0 | -36.5 | -36.9 | 6.5 | 6.5 | 6.5 |
| 6.1 | 27.7 | 27.3 | 28.1 | -36.3 | -35.9 | -36.4 | 6.5 | 6.5 | 6.5 |
| 6.2 | 27.6 | 27.3 | 27.9 | -36.3 | -35.9 | -36.3 | 6.4 | 6.4 | 6.5 |
| 6.3 | 27.6 | 27.1 | 27.8 | -35.8 | -35.5 | -36.0 | 6.4 | 6.4 | 6.3 |
| 6.4 | 27.7 | 27.4 | 27.9 | -36.3 | -35.7 | -36.0 | 6.3 | 6.3 | 6.4 |
| 6.5 | 27.9 | 27.3 | 27.8 | -36.7 | -35.8 | -36.0 | 6.3 | 6.3 | 6.3 |
| 6.6 | 27.7 | 27.2 | 27.7 | -36.4 | -35.5 | -35.7 | 6.3 | 6.3 | 6.2 |
| 6.7 | 27.6 | 27.4 | 27.6 | -36.6 | -35.7 | -35.8 | 6.2 | 6.2 | 6.2 |
| 6.8 | 27.9 | 27.2 | 27.7 | -36.6 | -35.6 | -35.6 | 6.2 | 6.2 | 6.2 |
| 6.9 | 28.0 | 27.3 | 27.7 | -36.8 | -35.8 | -35.8 | 6.2 | 6.2 | 6.2 |
| 7.0 | 27.9 | 27.3 | 27.7 | -36.8 | -35.8 | -35.8 | 6.1 | 6.1 | 6.1 |
| 7.1 | 27.9 | 27.4 | 27.7 | -36.8 | -35.8 | -35.8 | 6.0 | 6.1 | 6.1 |
| 7.2 | 28.1 | 27.4 | 27.8 | -37.1 | -35.9 | -35.9 | 6.1 | 6.1 | 6.1 |
| 7.3 | 28.5 | 27.4 | 28.0 | -37.6 | -36.3 | -36.2 | 6.0 | 6.1 | 6.0 |
| 7.4 | 28.3 | 27.4 | 27.9 | -37.4 | -36.2 | -36.2 | 6.0 | 6.0 | 6.0 |
| 7.5 | 28.3 | 27.4 | 27.8 | -37.3 | -36.2 | -36.1 | 5.9 | 5.9 | 6.0 |
| 7.6 | 28.2 | 27.6 | 27.8 | -37.4 | -36.2 | -36.2 | 5.9 | 6.0 | 6.0 |
| 7.7 | 28.3 | 27.5 | 27.9 | -37.6 | -36.3 | -36.2 | 5.9 | 5.9 | 6.0 |
| 7.8 | 28.3 | 27.5 | 27.9 | -37.5 | -36.2 | -36.2 | 5.9 | 5.9 | 5.9 |
| 7.9 | 28.5 | 27.6 | 28.0 | -37.9 | -36.5 | -36.4 | 5.9 | 5.9 | 5.9 |
| 8.0 | 28.4 | 27.5 | 27.6 | -38.1 | -36.6 | -36.5 | 5.8 | 5.9 | 5.9 |
| 8.1 | 28.1 | 27.5 | 27.5 | -37.9 | -36.5 | -36.4 | 5.9 | 5.9 | 5.9 |
| 8.2 | 28.4 | 27.6 | 27.6 | -38.3 | -36.7 | -36.6 | 5.9 | 5.9 | 5.8 |
| 8.3 | 28.5 | 27.5 | 27.6 | -38.4 | -36.7 | -36.6 | 5.8 | 5.8 | 5.8 |
| 8.4 | 28.5 | 27.6 | 27.6 | -38.4 | -36.8 | -36.6 | 5.8 | 5.8 | 5.9 |
| 8.5 | 28.4 | 27.5 | 27.6 | -38.2 | -36.7 | -36.6 | 5.8 | 5.9 | 5.9 |
| 8.6 | 28.5 | 27.5 | 27.9 | -37.9 | -36.4 | -36.3 | 5.8 | 5.8 | 5.8 |
| 8.7 | 28.4 | 27.5 | 27.9 | -38.0 | -36.5 | -36.4 | 5.8 | 5.8 | 5.8 |
| 8.8 | 28.4 | 27.5 | 27.8 | -37.9 | -36.4 | -36.3 | 5.8 | 5.8 | 5.8 |
| 8.9 | 28.6 | 27.5 | 27.9 | -38.0 | -36.4 | -36.3 | 5.8 | 5.8 | 5.8 |
| 9.0 | 28.6 | 27.6 | 27.9 | -38.1 | -36.5 | -36.3 | 5.8 | 5.8 | 5.8 |
| 9.1 | 28.5 | 27.5 | 27.9 | -38.0 | -36.4 | -36.3 | 5.8 | 5.8 | 5.8 |
| 9.2 | 28.3 | 27.4 | 27.8 | -37.7 | -36.2 | -36.2 | 5.7 | 5.8 | 5.8 |
| 9.3 | 28.3 | 27.4 | 27.8 | -37.6 | -36.2 | -36.1 | 5.7 | 5.7 | 5.8 |
| 9.4 | 28.2 | 27.3 | 27.7 | -37.4 | -36.1 | -36.0 | 5.7 | 5.8 | 5.8 |
| 9.5 | 28.2 | 27.3 | 27.5 | -37.8 | -36.4 | -36.2 | 5.7 | 5.7 | 5.8 |
| 9.6 | 28.3 | 27.2 | 27.5 | -37.8 | -36.4 | -36.2 | 5.7 | 5.8 | 5.7 |
| 9.7 | 28.0 | 27.0 | 27.4 | -37.4 | -36.0 | -35.9 | 5.7 | 5.7 | 5.7 |
| 9.8 | 27.7 | 27.0 | 27.2 | -37.0 | -35.8 | -35.8 | 5.7 | 5.7 | 5.7 |
| 9.9 | 27.8 | 26.8 | 27.2 | -36.9 | -35.7 | -35.6 | 5.7 | 5.7 | 5.7 |
| 10.0 | 27.7 | 26.8 | 27.2 | -36.7 | -35.6 | -35.5 | 5.7 | 5.7 | 5.7 |
| 10.1 | 27.5 | 26.8 | 27.0 | -36.5 | -35.4 | -35.4 | 5.6 | 5.6 | 5.7 |
| 10.2 | 27.5 | 26.6 | 26.9 | -36.2 | -35.2 | -35.1 | 5.6 | 5.6 | 5.7 |
| 10.3 | 27.3 | 26.5 | 26.9 | -36.0 | -35.0 | -34.9 | 5.6 | 5.6 | 5.7 |
| 10.4 | 27.2 | 26.3 | 26.8 | -35.7 | -34.7 | -34.8 | 5.6 | 5.6 | 5.6 |
| 10.5 | 27.0 | 26.3 | 26.7 | -35.4 | -34.6 | -34.6 | 5.6 | 5.6 | 5.6 |
| 10.6 | 26.8 | 26.2 | 26.5 | -35.2 | -34.5 | -34.4 | 5.5 | 5.5 | 5.6 |
| 10.7 | 26.6 | 26.1 | 26.4 | -34.9 | -34.1 | -34.2 | 5.5 | 5.5 | 5.5 |
| 10.8 | 26.6 | 25.8 | 26.3 | -34.6 | -33.8 | -34.0 | 5.5 | 5.5 | 5.5 |
| 10.9 | 26.4 | 25.8 | 26.2 | -34.4 | -33.7 | -33.8 | 5.4 | 5.4 | 5.5 |
| 11.0 | 26.2 | 25.6 | 26.1 | -33.9 | -33.4 | -33.6 | 5.3 | 5.4 | 5.4 |
| 11.1 | 26.0 | 25.4 | 26.0 | -33.4 | -33.0 | -33.3 | 5.3 | 5.4 | 5.4 |
| 11.2 | 25.9 | 25.4 | 25.9 | -33.5 | -33.0 | -33.2 | 5.3 | 5.3 | 5.4 |
| 11.3 | 25.6 | 25.0 | 25.8 | -32.7 | -32.5 | -32.8 | 5.3 | 5.3 | 5.3 |
| 11.4 | 25.8 | 25.0 | 25.8 | -32.9 | -32.5 | -32.8 | 5.2 | 5.3 | 5.3 |
| 11.5 | 25.5 | 24.8 | 25.7 | -32.4 | -32.1 | -32.5 | 5.2 | 5.3 | 5.2 |
| 11.6 | 25.3 | 24.4 | 25.5 | -31.7 | -31.6 | -32.1 | 5.2 | 5.2 | 5.3 |
| 11.7 | 24.9 | 24.4 | 25.3 | -31.3 | -31.3 | -31.9 | 5.2 | 5.2 | 5.2 |
| 11.8 | 24.9 | 24.2 | 25.3 | -31.0 | -31.1 | -31.7 | 5.1 | 5.2 | 5.2 |
| 11.9 | 24.8 | 23.9 | 25.2 | -30.5 | -30.7 | -31.4 | 5.1 | 5.2 | 5.2 |
| 12.0 | 24.6 | 24.0 | 25.0 | -30.5 | -30.6 | -31.3 | 5.1 | 5.2 | 5.2 |

## *Typical Performance Data*

TEST CONDITIONS: $V_{DD}$ = +5 V, $I_{DD}$ = 140 mA @ Temperature = +25°C

| $P_{IN}$ | $P_{OUT}$ (@5.6 GHz) | $P_{OUT}$ (@7.1 GHz) | $P_{OUT}$ (@8.5 GHz) | $P_{OUT}$ (@10 GHz) | $P_{OUT}$ (@11.7 GHz) | $I_{DD}$ (@5.6 GHz) | $I_{DD}$ (@7.1 GHz) | $I_{DD}$ (@8.5 GHz) | $I_{DD}$ (@10.0 GHz) | $I_{DD}$ (@11.7 GHz) |
|---|---|---|---|---|---|---|---|---|---|---|
| (dBm) | (dBm) | (dBm) | (dBm) | (dBm) | (dBm) | (mA) | (mA) | (mA) | (mA) | (mA) |
| -15.3 | 6.1 | 6.5 | 6.5 | 6.5 | 5.4 | 138 | 138 | 138 | 138 | 138 |
| -14.1 | 7.3 | 7.7 | 7.7 | 7.7 | 6.6 | 137 | 137 | 137 | 136 | 137 |
| -12.9 | 8.6 | 9.0 | 8.9 | 9.0 | 7.8 | 138 | 136 | 136 | 138 | 137 |
| -11.6 | 9.8 | 10.2 | 10.2 | 10.2 | 9.1 | 136 | 136 | 136 | 137 | 137 |
| -10.4 | 11.0 | 11.5 | 11.4 | 11.5 | 10.3 | 137 | 135 | 137 | 137 | 137 |
| -9.2 | 12.3 | 12.8 | 12.7 | 12.7 | 11.6 | 137 | 136 | 136 | 137 | 135 |
| -8.0 | 13.6 | 14.1 | 14.0 | 14.0 | 13.0 | 137 | 135 | 136 | 136 | 136 |
| -6.7 | 14.8 | 15.4 | 15.3 | 15.3 | 14.3 | 138 | 136 | 136 | 136 | 135 |
| -5.5 | 16.1 | 16.7 | 16.6 | 16.6 | 15.6 | 136 | 136 | 137 | 136 | 135 |
| -4.2 | 17.3 | 17.9 | 17.8 | 17.8 | 16.9 | 138 | 137 | 136 | 137 | 137 |
| -3.0 | 18.3 | 19.0 | 19.0 | 18.9 | 18.1 | 141 | 137 | 138 | 139 | 139 |
| -1.8 | 19.1 | 19.9 | 19.9 | 19.8 | 19.1 | 142 | 140 | 138 | 139 | 140 |
| -0.5 | 19.9 | 20.6 | 20.6 | 20.4 | 19.9 | 147 | 145 | 141 | 141 | 142 |
| 0.7 | 20.4 | 21.1 | 21.1 | 20.9 | 20.5 | 153 | 149 | 144 | 144 | 148 |
| 2.0 | 20.9 | 21.5 | 21.4 | 21.3 | 20.9 | 159 | 154 | 147 | 146 | 152 |
| 3.2 | 21.2 | 21.8 | 21.8 | 21.6 | 21.3 | 165 | 160 | 155 | 152 | 160 |
| 4.5 | 21.5 | 22.1 | 22.0 | 21.9 | 21.6 | 171 | 165 | 159 | 158 | 169 |
| 5.8 | 21.7 | 22.3 | 22.3 | 22.1 | 21.8 | 177 | 170 | 166 | 167 | 174 |
| 7.0 | 21.9 | 22.5 | 22.4 | 22.4 | 22.0 | 182 | 177 | 170 | 173 | 184 |
| 8.3 | 22.1 | 22.6 | 22.6 | 22.5 | 22.1 | 191 | 183 | 175 | 179 | 189 |
| 9.6 | 22.2 | 22.8 | 22.7 | 22.7 | 22.2 | 196 | 186 | 182 | 185 | 194 |

## *Typical Performance Data*

TEST CONDITIONS: $V_{DD}$ = +5 V, $I_{DD}$ = 140 mA @ Temperature = +95°C

| $P_{IN}$ | $P_{OUT}$ (@5.6 GHz) | $P_{OUT}$ (@7.1 GHz) | $P_{OUT}$ (@8.5 GHz) | $P_{OUT}$ (@10.0 GHz) | $P_{OUT}$ (@11.7 GHz) |
|---|---|---|---|---|---|
| (dBm) | (dBm) | (dBm) | (dBm) | (dBm) | (dBm) |
| -14.7 | 5.5 | 5.9 | 5.7 | 5.7 | 4.6 |
| -13.7 | 6.5 | 6.8 | 6.6 | 6.6 | 5.5 |
| -12.7 | 7.5 | 7.8 | 7.6 | 7.6 | 6.5 |
| -11.7 | 8.5 | 8.8 | 8.6 | 8.6 | 7.5 |
| -10.7 | 9.5 | 9.8 | 9.6 | 9.6 | 8.5 |
| -9.7 | 10.4 | 10.8 | 10.6 | 10.5 | 9.5 |
| -8.7 | 11.4 | 11.8 | 11.6 | 11.5 | 10.5 |
| -7.7 | 12.4 | 12.8 | 12.6 | 12.5 | 11.5 |
| -6.7 | 13.4 | 13.8 | 13.6 | 13.5 | 12.5 |
| -5.7 | 14.4 | 14.8 | 14.6 | 14.5 | 13.5 |
| -4.7 | 15.3 | 15.8 | 15.6 | 15.5 | 14.5 |
| -3.7 | 16.3 | 16.8 | 16.6 | 16.5 | 15.6 |
| -2.7 | 17.2 | 17.8 | 17.6 | 17.5 | 16.6 |
| -1.7 | 18.1 | 18.8 | 18.6 | 18.4 | 17.5 |
| -0.7 | 18.8 | 19.7 | 19.5 | 19.3 | 18.5 |
| 0.3 | 19.5 | 20.4 | 20.3 | 20.0 | 19.3 |
| 1.3 | 20.0 | 21.0 | 20.9 | 20.6 | 20.1 |
| 2.3 | 20.5 | 21.5 | 21.4 | 21.1 | 20.7 |
| 3.2 | 20.9 | 21.8 | 21.8 | 21.5 | 21.2 |
| 4.2 | 21.2 | 22.1 | 22.1 | 21.8 | 21.6 |
| 5.2 | 21.4 | 22.4 | 22.4 | 22.1 | 21.9 |
| 6.2 | 21.6 | 22.6 | 22.6 | 22.3 | 22.1 |
| 7.2 | 21.8 | 22.8 | 22.8 | 22.5 | 22.3 |
| 8.2 | 21.9 | 22.9 | 23.0 | 22.7 | 22.5 |
| 9.2 | 22.1 | 23.1 | 23.1 | 22.9 | 22.6 |
| 10.2 | 22.2 | 23.2 | 23.2 | 23.0 | 22.7 |

## *Typical Performance Data*

TEST CONDITIONS: $V_{DD}$ = +5 V, $I_{DD}$ = 140 mA @ Temperature = -40°C

| $P_{IN}$ | $P_{OUT}$ (@5.6 GHz) | $P_{OUT}$ (@7.1 GHz) | $P_{OUT}$ (@8.5 GHz) | $P_{OUT}$ (@10.0 GHz) | $P_{OUT}$ (@11.7 GHz) |
|---|---|---|---|---|---|
| (dBm) | (dBm) | (dBm) | (dBm) | (dBm) | (dBm) |
| -14.8 | 10.6 | 11.3 | 11.0 | 11.3 | 11.0 |
| -13.8 | 11.9 | 12.6 | 12.2 | 12.5 | 12.1 |
| -12.8 | 12.9 | 13.7 | 13.2 | 13.6 | 13.2 |
| -11.8 | 14.0 | 14.7 | 14.3 | 14.7 | 14.3 |
| -10.8 | 15.0 | 15.8 | 15.4 | 15.7 | 15.4 |
| -9.8 | 16.0 | 16.8 | 16.4 | 16.7 | 16.5 |
| -8.8 | 17.0 | 17.8 | 17.4 | 17.7 | 17.5 |
| -7.8 | 17.9 | 18.7 | 18.4 | 18.7 | 18.5 |
| -6.8 | 18.8 | 19.6 | 19.3 | 19.6 | 19.4 |
| -5.8 | 19.6 | 20.4 | 20.1 | 20.3 | 20.3 |
| -4.9 | 20.3 | 21.0 | 20.8 | 21.0 | 21.0 |
| -3.9 | 20.9 | 21.5 | 21.4 | 21.4 | 21.6 |
| -2.9 | 21.4 | 21.9 | 21.8 | 21.8 | 22.1 |
| -1.9 | 21.9 | 22.2 | 22.2 | 22.1 | 22.4 |
| -0.9 | 22.3 | 22.5 | 22.5 | 22.4 | 22.8 |
| 0.1 | 22.5 | 22.7 | 22.8 | 22.7 | 23.0 |
| 1.1 | 22.8 | 22.9 | 23.0 | 22.9 | 23.3 |
| 2.1 | 22.9 | 23.1 | 23.2 | 23.2 | 23.5 |
| 3.1 | 23.1 | 23.2 | 23.4 | 23.4 | 23.6 |
| 4.1 | 23.2 | 23.3 | 23.5 | 23.6 | 23.7 |
| 5.1 | 23.3 | 23.4 | 23.6 | 23.7 | 23.8 |
| 6.1 | 23.4 | 23.4 | 23.7 | 23.9 | 23.9 |
| 7.1 | 23.5 | 23.5 | 23.8 | 23.9 | 23.9 |
| 8.1 | 23.5 | 23.6 | 23.9 | 24.0 | 24.0 |
| 9.1 | 23.6 | 23.6 | 23.9 | 24.1 | 24.0 |
| 10.1 | 23.6 | 23.7 | 24.0 | 24.1 | 24.0 |

## *Typical Performance Data*

TEST CONDITIONS: $V_{DD}$ = +5 V, $I_{DD}$ = 140 mA @ Temperature = +25°C

| FREQ | $P_{IN}$ | Gain | FREQ | $P_{IN}$ | Gain | FREQ | $P_{IN}$ | Gain |
|---|---|---|---|---|---|---|---|---|
| (GHz) | (dBm) | (dB) | (GHz) | (dBm) | (dB) | (GHz) | (dBm) | (dB) |
| 5.6 | -15.3 | 21.3 | 8.5 | -15.4 | 21.8 | 11.7 | -15.4 | 20.7 |
| 5.6 | -14.1 | 21.3 | 8.5 | -14.2 | 21.7 | 11.7 | -14.2 | 20.7 |
| 5.6 | -12.9 | 21.3 | 8.5 | -12.9 | 21.8 | 11.7 | -13.0 | 20.7 |
| 5.6 | -11.6 | 21.3 | 8.5 | -11.7 | 21.8 | 11.7 | -11.8 | 20.7 |
| 5.6 | -10.4 | 21.4 | 8.5 | -10.5 | 21.8 | 11.7 | -10.5 | 20.8 |
| 5.6 | -9.2 | 21.4 | 8.5 | -9.2 | 21.9 | 11.7 | -9.3 | 20.9 |
| 5.6 | -8.0 | 21.4 | 8.5 | -8.0 | 21.9 | 11.7 | -8.1 | 20.9 |
| 5.6 | -6.7 | 21.5 | 8.5 | -6.8 | 22.0 | 11.7 | -6.8 | 21.0 |
| 5.6 | -5.5 | 21.5 | 8.5 | -5.5 | 22.0 | 11.7 | -5.6 | 21.1 |
| 5.6 | -4.2 | 21.4 | 8.5 | -4.3 | 22.0 | 11.7 | -4.3 | 21.1 |
| 5.6 | -3.0 | 21.2 | 8.5 | -3.0 | 21.9 | 11.7 | -3.0 | 21.1 |
| 5.6 | -1.7 | 20.8 | 8.5 | -1.8 | 21.6 | 11.7 | -1.8 | 20.8 |
| 5.6 | -0.5 | 20.3 | 8.5 | -0.5 | 21.0 | 11.7 | -0.5 | 20.4 |
| 5.6 | 0.7 | 19.6 | 8.5 | 0.7 | 20.3 | 11.7 | 0.7 | 19.7 |
| 5.6 | 2.0 | 18.8 | 8.5 | 2.0 | 19.4 | 11.7 | 1.9 | 18.9 |
| 5.6 | 3.2 | 17.9 | 8.5 | 3.3 | 18.4 | 11.7 | 3.2 | 18.0 |
| 5.6 | 4.5 | 16.9 | 8.5 | 4.5 | 17.4 | 11.7 | 4.5 | 17.0 |
| 5.6 | 5.8 | 15.9 | 8.5 | 5.8 | 16.4 | 11.7 | 5.8 | 15.9 |
| 5.6 | 7.0 | 14.8 | 8.5 | 7.1 | 15.3 | 11.7 | 7.0 | 14.8 |
| 5.6 | 8.3 | 13.7 | 8.5 | 8.3 | 14.2 | 11.7 | 8.3 | 13.7 |
| 5.6 | 9.6 | 12.6 | 8.5 | 9.6 | 13.0 | 11.7 | 9.6 | 12.5 |
| 7.1 | -15.4 | 21.8 | 10.0 | -15.4 | 21.8 | | | |
| 7.1 | -14.1 | 21.8 | 10.0 | -14.2 | 21.8 | | | |
| 7.1 | -12.9 | 21.8 | 10.0 | -12.9 | 21.8 | | | |
| 7.1 | -11.7 | 21.8 | 10.0 | -11.7 | 21.8 | | | |
| 7.1 | -10.5 | 21.9 | 10.0 | -10.5 | 21.9 | | | |
| 7.1 | -9.2 | 21.9 | 10.0 | -9.3 | 21.9 | | | |
| 7.1 | -8.0 | 22.0 | 10.0 | -8.0 | 22.0 | | | |
| 7.1 | -6.7 | 22.1 | 10.0 | -6.8 | 22.0 | | | |
| 7.1 | -5.5 | 22.1 | 10.0 | -5.6 | 22.1 | | | |
| 7.1 | -4.2 | 22.1 | 10.0 | -4.3 | 22.0 | | | |
| 7.1 | -3.0 | 22.0 | 10.0 | -3.0 | 21.9 | | | |
| 7.1 | -1.7 | 21.6 | 10.0 | -1.8 | 21.5 | | | |
| 7.1 | -0.5 | 21.0 | 10.0 | -0.5 | 20.9 | | | |
| 7.1 | 0.7 | 20.3 | 10.0 | 0.7 | 20.1 | | | |
| 7.1 | 2.0 | 19.4 | 10.0 | 1.9 | 19.2 | | | |
| 7.1 | 3.2 | 18.5 | 10.0 | 3.2 | 18.3 | | | |
| 7.1 | 4.5 | 17.5 | 10.0 | 4.5 | 17.3 | | | |
| 7.1 | 5.8 | 16.4 | 10.0 | 5.7 | 16.3 | | | |
| 7.1 | 7.1 | 15.3 | 10.0 | 7.0 | 15.2 | | | |
| 7.1 | 8.3 | 14.2 | 10.0 | 8.3 | 14.1 | | | |
| 7.1 | 9.6 | 13.0 | 10.0 | 9.6 | 13.0 | | | |

## *Typical Performance Data*

TEST CONDITIONS: $V_{DD}$ = +5 V, $I_{DD}$ = 140 mA @ Temperature = +95°C

| FREQ | $P_{IN}$ | Gain | FREQ | $P_{IN}$ | Gain | FREQ | $P_{IN}$ | Gain |
|---|---|---|---|---|---|---|---|---|
| (GHz) | (dBm) | (dB) | (GHz) | (dBm) | (dB) | (GHz) | (dBm) | (dB) |
| 5.6 | -14.7 | 20.4 | 8.5 | -14.7 | 20.7 | 11.7 | -14.7 | 19.6 |
| 5.6 | -13.7 | 20.3 | 8.5 | -13.7 | 20.7 | 11.7 | -13.7 | 19.6 |
| 5.6 | -12.7 | 20.3 | 8.5 | -12.7 | 20.7 | 11.7 | -12.7 | 19.5 |
| 5.6 | -11.7 | 20.3 | 8.5 | -11.7 | 20.7 | 11.7 | -11.7 | 19.5 |
| 5.6 | -10.7 | 20.3 | 8.5 | -10.7 | 20.6 | 11.7 | -10.7 | 19.5 |
| 5.6 | -9.7 | 20.3 | 8.5 | -9.7 | 20.6 | 11.7 | -9.7 | 19.5 |
| 5.6 | -8.7 | 20.3 | 8.5 | -8.7 | 20.6 | 11.7 | -8.7 | 19.5 |
| 5.6 | -7.7 | 20.3 | 8.5 | -7.7 | 20.6 | 11.7 | -7.7 | 19.6 |
| 5.6 | -6.7 | 20.2 | 8.5 | -6.7 | 20.7 | 11.7 | -6.7 | 19.6 |
| 5.6 | -5.7 | 20.2 | 8.5 | -5.7 | 20.7 | 11.7 | -5.7 | 19.6 |
| 5.6 | -4.7 | 20.2 | 8.5 | -4.7 | 20.7 | 11.7 | -4.7 | 19.6 |
| 5.6 | -3.7 | 20.2 | 8.5 | -3.7 | 20.7 | 11.7 | -3.7 | 19.6 |
| 5.6 | -2.7 | 20.1 | 8.5 | -2.7 | 20.7 | 11.7 | -2.7 | 19.6 |
| 5.6 | -1.7 | 20.0 | 8.5 | -1.7 | 20.7 | 11.7 | -1.7 | 19.6 |
| 5.6 | -0.7 | 19.7 | 8.5 | -0.7 | 20.6 | 11.7 | -0.7 | 19.5 |
| 5.6 | 0.3 | 19.4 | 8.5 | 0.3 | 20.4 | 11.7 | 0.3 | 19.4 |
| 5.6 | 1.3 | 18.9 | 8.5 | 1.3 | 20.0 | 11.7 | 1.3 | 19.1 |
| 5.6 | 2.3 | 18.4 | 8.5 | 2.3 | 19.5 | 11.7 | 2.3 | 18.8 |
| 5.6 | 3.2 | 17.8 | 8.5 | 3.2 | 18.9 | 11.7 | 3.2 | 18.3 |
| 5.6 | 4.2 | 17.1 | 8.5 | 4.2 | 18.3 | 11.7 | 4.2 | 17.7 |
| 5.6 | 5.2 | 16.3 | 8.5 | 5.2 | 17.5 | 11.7 | 5.2 | 17.0 |
| 5.6 | 6.2 | 15.6 | 8.5 | 6.2 | 16.8 | 11.7 | 6.2 | 16.2 |
| 5.6 | 7.2 | 14.7 | 8.5 | 7.2 | 16.0 | 11.7 | 7.2 | 15.4 |
| 5.6 | 8.2 | 13.9 | 8.5 | 8.2 | 15.1 | 11.7 | 8.2 | 14.6 |
| 5.6 | 9.2 | 13.0 | 8.5 | 9.2 | 14.2 | 11.7 | 9.2 | 13.7 |
| 5.6 | 10.2 | 12.1 | 8.5 | 10.2 | 13.3 | 11.7 | 10.2 | 12.8 |
| 7.1 | -14.7 | 20.9 | 10.0 | -14.7 | 20.7 | | | |
| 7.1 | -13.7 | 20.8 | 10.0 | -13.7 | 20.6 | | | |
| 7.1 | -12.7 | 20.8 | 10.0 | -12.7 | 20.6 | | | |
| 7.1 | -11.7 | 20.8 | 10.0 | -11.7 | 20.6 | | | |
| 7.1 | -10.7 | 20.8 | 10.0 | -10.7 | 20.6 | | | |
| 7.1 | -9.7 | 20.8 | 10.0 | -9.7 | 20.6 | | | |
| 7.1 | -8.7 | 20.8 | 10.0 | -8.7 | 20.6 | | | |
| 7.1 | -7.7 | 20.8 | 10.0 | -7.7 | 20.6 | | | |
| 7.1 | -6.7 | 20.8 | 10.0 | -6.7 | 20.6 | | | |
| 7.1 | -5.7 | 20.8 | 10.0 | -5.7 | 20.6 | | | |
| 7.1 | -4.7 | 20.8 | 10.0 | -4.7 | 20.6 | | | |
| 7.1 | -3.7 | 20.8 | 10.0 | -3.7 | 20.6 | | | |
| 7.1 | -2.7 | 20.8 | 10.0 | -2.7 | 20.5 | | | |
| 7.1 | -1.7 | 20.8 | 10.0 | -1.7 | 20.5 | | | |
| 7.1 | -0.7 | 20.7 | 10.0 | -0.7 | 20.3 | | | |
| 7.1 | 0.3 | 20.5 | 10.0 | 0.3 | 20.1 | | | |
| 7.1 | 1.3 | 20.1 | 10.0 | 1.3 | 19.7 | | | |
| 7.1 | 2.3 | 19.5 | 10.0 | 2.3 | 19.2 | | | |
| 7.1 | 3.2 | 18.9 | 10.0 | 3.2 | 18.6 | | | |
| 7.1 | 4.2 | 18.2 | 10.0 | 4.2 | 17.9 | | | |
| 7.1 | 5.2 | 17.5 | 10.0 | 5.2 | 17.2 | | | |
| 7.1 | 6.2 | 16.7 | 10.0 | 6.2 | 16.4 | | | |
| 7.1 | 7.2 | 15.9 | 10.0 | 7.2 | 15.6 | | | |
| 7.1 | 8.2 | 15.0 | 10.0 | 8.2 | 14.9 | | | |
| 7.1 | 9.2 | 14.1 | 10.0 | 9.2 | 14.0 | | | |
| 7.1 | 10.2 | 13.3 | 10.0 | 10.2 | 13.2 | | | |

## *Typical Performance Data*

TEST CONDITIONS: $V_{DD}$ = +5 V, $I_{DD}$ = 140 mA @ Temperature = -40°C

| FREQ | $P_{IN}$ | Gain | FREQ | $P_{IN}$ | Gain | FREQ | $P_{IN}$ | Gain |
|---|---|---|---|---|---|---|---|---|
| (GHz) | (dBm) | (dB) | (GHz) | (dBm) | (dB) | (GHz) | (dBm) | (dB) |
| 5.6 | -14.8 | 25.5 | 8.5 | -14.8 | 26.0 | 11.7 | -14.8 | 26.0 |
| 5.6 | -13.8 | 25.8 | 8.5 | -13.8 | 26.2 | 11.7 | -13.8 | 26.2 |
| 5.6 | -12.8 | 25.9 | 8.5 | -12.8 | 26.3 | 11.7 | -12.8 | 26.3 |
| 5.6 | -11.8 | 25.9 | 8.5 | -11.8 | 26.3 | 11.7 | -11.8 | 26.4 |
| 5.6 | -10.8 | 25.9 | 8.5 | -10.8 | 26.4 | 11.7 | -10.8 | 26.5 |
| 5.6 | -9.8 | 26.0 | 8.5 | -9.8 | 26.4 | 11.7 | -9.8 | 26.5 |
| 5.6 | -8.8 | 25.9 | 8.5 | -8.8 | 26.5 | 11.7 | -8.8 | 26.6 |
| 5.6 | -7.8 | 25.9 | 8.5 | -7.8 | 26.4 | 11.7 | -7.8 | 26.6 |
| 5.6 | -6.8 | 25.8 | 8.5 | -6.8 | 26.4 | 11.7 | -6.8 | 26.5 |
| 5.6 | -5.8 | 25.6 | 8.5 | -5.8 | 26.2 | 11.7 | -5.8 | 26.4 |
| 5.6 | -4.8 | 25.3 | 8.5 | -4.8 | 25.9 | 11.7 | -4.8 | 26.1 |
| 5.6 | -3.8 | 24.9 | 8.5 | -3.8 | 25.5 | 11.7 | -3.8 | 25.7 |
| 5.6 | -2.8 | 24.4 | 8.5 | -2.8 | 24.9 | 11.7 | -2.8 | 25.2 |
| 5.6 | -1.8 | 23.9 | 8.5 | -1.8 | 24.3 | 11.7 | -1.8 | 24.5 |
| 5.6 | -0.8 | 23.2 | 8.5 | -0.8 | 23.6 | 11.7 | -0.8 | 23.9 |
| 5.6 | 0.2 | 22.5 | 8.5 | 0.2 | 22.9 | 11.7 | 0.2 | 23.1 |
| 5.6 | 1.2 | 21.7 | 8.5 | 1.2 | 22.1 | 11.7 | 1.2 | 22.4 |
| 5.6 | 2.2 | 20.9 | 8.5 | 2.2 | 21.3 | 11.7 | 2.2 | 21.6 |
| 5.6 | 3.2 | 20.1 | 8.5 | 3.2 | 20.5 | 11.7 | 3.2 | 20.7 |
| 5.6 | 4.2 | 19.2 | 8.5 | 4.2 | 19.6 | 11.7 | 4.2 | 19.9 |
| 5.6 | 5.2 | 18.3 | 8.5 | 5.2 | 18.7 | 11.7 | 5.2 | 19.0 |
| 5.6 | 6.2 | 17.4 | 8.5 | 6.2 | 17.8 | 11.7 | 6.2 | 18.0 |
| 5.6 | 7.2 | 16.5 | 8.5 | 7.2 | 16.9 | 11.7 | 7.2 | 17.1 |
| 5.6 | 8.1 | 15.5 | 8.5 | 8.1 | 16.0 | 11.7 | 8.1 | 16.1 |
| 5.6 | 9.1 | 14.6 | 8.5 | 9.1 | 15.0 | 11.7 | 9.1 | 15.1 |
| 5.6 | 10.2 | 13.6 | 8.5 | 10.2 | 14.0 | 11.7 | 10.2 | 14.2 |
| 7.1 | -14.8 | 26.3 | 10.0 | -14.8 | 26.3 | | | |
| 7.1 | -13.8 | 26.6 | 10.0 | -13.8 | 26.5 | | | |
| 7.1 | -12.8 | 26.7 | 10.0 | -12.8 | 26.6 | | | |
| 7.1 | -11.8 | 26.7 | 10.0 | -11.8 | 26.7 | | | |
| 7.1 | -10.8 | 26.8 | 10.0 | -10.8 | 26.7 | | | |
| 7.1 | -9.8 | 26.8 | 10.0 | -9.8 | 26.8 | | | |
| 7.1 | -8.8 | 26.8 | 10.0 | -8.8 | 26.8 | | | |
| 7.1 | -7.8 | 26.8 | 10.0 | -7.8 | 26.7 | | | |
| 7.1 | -6.8 | 26.6 | 10.0 | -6.8 | 26.6 | | | |
| 7.1 | -5.8 | 26.4 | 10.0 | -5.8 | 26.4 | | | |
| 7.1 | -4.8 | 26.0 | 10.0 | -4.8 | 26.0 | | | |
| 7.1 | -3.8 | 25.5 | 10.0 | -3.8 | 25.5 | | | |
| 7.1 | -2.8 | 24.9 | 10.0 | -2.8 | 24.9 | | | |
| 7.1 | -1.8 | 24.3 | 10.0 | -1.8 | 24.2 | | | |
| 7.1 | -0.8 | 23.6 | 10.0 | -0.8 | 23.5 | | | |
| 7.1 | 0.2 | 22.8 | 10.0 | 0.2 | 22.8 | | | |
| 7.1 | 1.2 | 22.0 | 10.0 | 1.2 | 22.0 | | | |
| 7.1 | 2.2 | 21.2 | 10.0 | 2.2 | 21.3 | | | |
| 7.1 | 3.2 | 20.3 | 10.0 | 3.2 | 20.5 | | | |
| 7.1 | 4.2 | 19.4 | 10.0 | 4.2 | 19.7 | | | |
| 7.1 | 5.2 | 18.5 | 10.0 | 5.2 | 18.9 | | | |
| 7.1 | 6.2 | 17.6 | 10.0 | 6.2 | 18.0 | | | |
| 7.1 | 7.2 | 16.6 | 10.0 | 7.2 | 17.1 | | | |
| 7.1 | 8.1 | 15.7 | 10.0 | 8.1 | 16.2 | | | |
| 7.1 | 9.1 | 14.8 | 10.0 | 9.1 | 15.2 | | | |
| 7.1 | 10.2 | 13.8 | 10.0 | 10.2 | 14.2 | | | |

## *Typical Performance Data*

TEST CONDITIONS: $V_{DD}$ = +5 V, $I_{DD}$ = 140 mA @ Temperature = +25°C

| Power | $P_{DISS}$ (@5.6 GHz) | $P_{DISS}$ (@7.1 GHz) | $P_{DISS}$ (@8.5 GHz) | $P_{DISS}$ (@10 GHz) | $P_{DISS}$ (@11.7 GHz) | PAE (@5.6 GHz) | PAE (@7.1 GHz) | PAE (@8.5 GHz) | PAE (@10.0 GHz) | PAE (@11.7 GHz) |
|---|---|---|---|---|---|---|---|---|---|---|
| (dBm) | (W) | (W) | (W) | (W) | (W) | (%) | (%) | (%) | (%) | (%) |
| -15.3 | 0.69 | 0.69 | 0.69 | 0.69 | 0.69 | 0.6 | 0.6 | 0.6 | 0.6 | 0.0 |
| -14.1 | 0.68 | 0.68 | 0.68 | 0.67 | 0.68 | 0.8 | 0.9 | 0.8 | 0.9 | 0.7 |
| -12.9 | 0.68 | 0.67 | 0.67 | 0.68 | 0.68 | 1.0 | 1.2 | 1.1 | 1.1 | 0.9 |
| -11.6 | 0.67 | 0.67 | 0.67 | 0.68 | 0.68 | 1.4 | 1.5 | 1.5 | 1.5 | 1.2 |
| -10.4 | 0.67 | 0.66 | 0.67 | 0.67 | 0.67 | 1.8 | 2.1 | 2.0 | 2.1 | 1.6 |
| -9.2 | 0.67 | 0.66 | 0.66 | 0.67 | 0.66 | 2.5 | 2.8 | 2.7 | 2.7 | 2.1 |
| -8.0 | 0.66 | 0.65 | 0.66 | 0.66 | 0.66 | 3.3 | 3.8 | 3.7 | 3.7 | 2.9 |
| -6.7 | 0.66 | 0.65 | 0.65 | 0.65 | 0.65 | 4.4 | 5.1 | 5.0 | 5.0 | 4.0 |
| -5.5 | 0.64 | 0.63 | 0.64 | 0.64 | 0.64 | 6.0 | 6.8 | 6.6 | 6.7 | 5.3 |
| -4.2 | 0.64 | 0.62 | 0.62 | 0.63 | 0.64 | 7.7 | 9.0 | 8.8 | 8.7 | 7.1 |
| -3.0 | 0.64 | 0.61 | 0.61 | 0.62 | 0.63 | 9.5 | 11.5 | 11.4 | 11.1 | 9.2 |
| -1.8 | 0.63 | 0.60 | 0.59 | 0.60 | 0.62 | 11.4 | 13.9 | 14.1 | 13.6 | 11.5 |
| -0.5 | 0.64 | 0.61 | 0.59 | 0.60 | 0.61 | 13.2 | 15.7 | 16.2 | 15.4 | 13.6 |
| 0.7 | 0.66 | 0.62 | 0.59 | 0.60 | 0.63 | 14.2 | 17.1 | 17.7 | 16.9 | 15.0 |
| 2.0 | 0.67 | 0.63 | 0.60 | 0.60 | 0.64 | 15.3 | 18.1 | 18.6 | 18.3 | 16.0 |
| 3.2 | 0.70 | 0.65 | 0.63 | 0.62 | 0.67 | 15.7 | 18.7 | 19.3 | 18.7 | 16.6 |
| 4.5 | 0.72 | 0.67 | 0.64 | 0.64 | 0.70 | 16.2 | 19.3 | 19.6 | 19.3 | 16.8 |
| 5.8 | 0.74 | 0.68 | 0.66 | 0.68 | 0.72 | 16.3 | 19.5 | 20.0 | 19.0 | 17.0 |
| 7.0 | 0.76 | 0.71 | 0.68 | 0.70 | 0.77 | 16.5 | 19.5 | 19.8 | 19.5 | 16.7 |
| 8.3 | 0.80 | 0.74 | 0.70 | 0.72 | 0.79 | 16.3 | 19.1 | 20.0 | 19.1 | 16.4 |
| 9.6 | 0.82 | 0.75 | 0.73 | 0.75 | 0.81 | 16.0 | 19.5 | 19.5 | 19.2 | 16.2 |

## *Typical Performance Data*

TEST CONDITIONS: $V_{DD}$ = +5 V, $I_{DD}$ = 140 mA @ Temperature = +25°C

| Power | OIP3 (@5.6 GHz) | OIP3 (@7.1 GHz) | OIP3 (@8.5 GHz) | OIP3 (@10 GHz) | OIP3 (@11.7 GHz) |
|---|---|---|---|---|---|
| (dBm) | (dBm) | (dBm) | (dBm) | (dBm) | (dBm) |
| 0.0 | 27.2 | 27.5 | 27.4 | 26.6 | 23.9 |
| 3.0 | 27.1 | 27.2 | 27.4 | 26.6 | 23.8 |
| 6.0 | 27.1 | 27.1 | 27.2 | 26.5 | 23.8 |
| 9.0 | 27.5 | 27.4 | 27.5 | 26.8 | 24.4 |
| 12.0 | 28.1 | 28.9 | 29.2 | 28.1 | 25.6 |
| 15.0 | 25.7 | 27.0 | 28.1 | 26.3 | 23.5 |

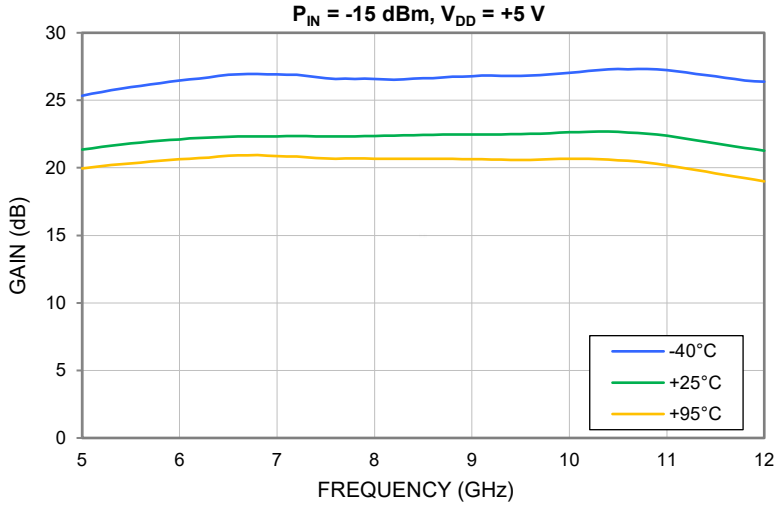
## *Typical Performance Data*

TEST CONDITIONS: $V_{DD}$ = +5 V, $I_{DD}$ = 140 mA @ Temperature = +25°C

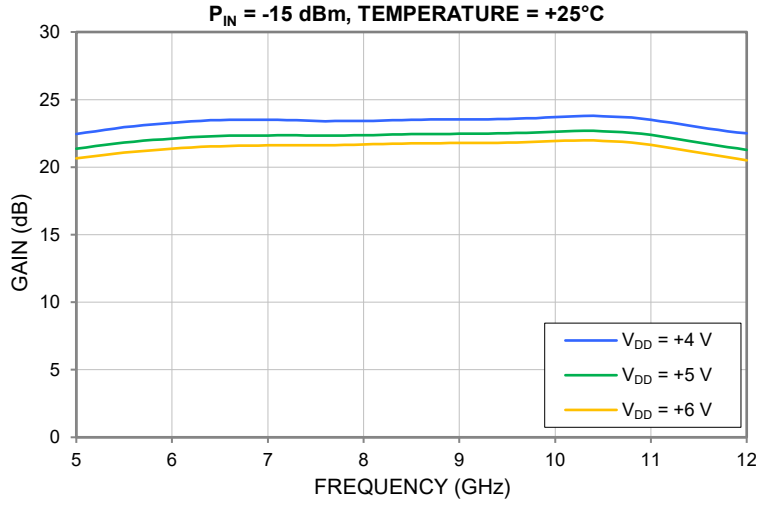
| FREQ | $P_{OUT}$ | Phase | FREQ | $P_{OUT}$ | Phase | FREQ | $P_{OUT}$ | Phase |
|---|---|---|---|---|---|---|---|---|
| (GHz) | (dBm) | (°) | (GHz) | (dBm) | (°) | (GHz) | (dBm) | (°) |
| 5.6 | 6.1 | 0.0 | 8.5 | 6.5 | 0.0 | 11.7 | 5.4 | 0.0 |
| 5.6 | 7.3 | 0.5 | 8.5 | 7.7 | 0.0 | 11.7 | 6.6 | 0.2 |
| 5.6 | 8.6 | 0.5 | 8.5 | 8.9 | 0.5 | 11.7 | 7.8 | 0.6 |
| 5.6 | 9.8 | 1.0 | 8.5 | 10.2 | 1.0 | 11.7 | 9.1 | 1.0 |
| 5.6 | 11.0 | 1.5 | 8.5 | 11.4 | 1.0 | 11.7 | 10.3 | 1.6 |
| 5.6 | 12.3 | 1.5 | 8.5 | 12.7 | 2.0 | 11.7 | 11.6 | 2.4 |
| 5.6 | 13.6 | 2.5 | 8.5 | 14.0 | 2.5 | 11.7 | 13.0 | 3.5 |
| 5.6 | 14.8 | 3.5 | 8.5 | 15.3 | 3.0 | 11.7 | 14.3 | 4.7 |
| 5.6 | 16.1 | 4.5 | 8.5 | 16.6 | 4.0 | 11.7 | 15.6 | 6.1 |
| 5.6 | 17.3 | 6.0 | 8.5 | 17.8 | 5.5 | 11.7 | 16.9 | 7.6 |
| 5.6 | 18.3 | 8.0 | 8.5 | 19.0 | 7.0 | 11.7 | 18.1 | 9.2 |
| 5.6 | 19.1 | 10.5 | 8.5 | 19.9 | 8.0 | 11.7 | 19.1 | 10.9 |
| 5.6 | 19.9 | 13.0 | 8.5 | 20.6 | 9.5 | 11.7 | 19.9 | 13.2 |
| 5.6 | 20.4 | 15.5 | 8.5 | 21.1 | 11.0 | 11.7 | 20.5 | 15.7 |
| 5.6 | 20.9 | 17.5 | 8.5 | 21.4 | 13.0 | 11.7 | 20.9 | 18.1 |
| 5.6 | 21.2 | 19.5 | 8.5 | 21.8 | 14.5 | 11.7 | 21.3 | 20.3 |
| 5.6 | 21.5 | 21.5 | 8.5 | 22.0 | 16.0 | 11.7 | 21.6 | 22.0 |
| 5.6 | 21.7 | 23.0 | 8.5 | 22.3 | 17.5 | 11.7 | 21.8 | 23.4 |
| 5.6 | 21.9 | 24.5 | 8.5 | 22.4 | 19.0 | 11.7 | 22.0 | 24.6 |
| 5.6 | 22.1 | 25.5 | 8.5 | 22.6 | 20.5 | 11.7 | 22.1 | 25.3 |
| 5.6 | 22.2 | 26.5 | 8.5 | 22.7 | 21.5 | 11.7 | 22.2 | 25.9 |
| 7.1 | 6.5 | 0.0 | 10.0 | 6.5 | 0.0 | | | |
| 7.1 | 7.7 | 0.2 | 10.0 | 7.7 | 0.2 | | | |
| 7.1 | 9.0 | 0.4 | 10.0 | 9.0 | 0.6 | | | |
| 7.1 | 10.2 | 0.7 | 10.0 | 10.2 | 1.0 | | | |
| 7.1 | 11.5 | 1.1 | 10.0 | 11.5 | 1.6 | | | |
| 7.1 | 12.8 | 1.7 | 10.0 | 12.7 | 2.4 | | | |
| 7.1 | 14.1 | 2.4 | 10.0 | 14.0 | 3.5 | | | |
| 7.1 | 15.4 | 3.3 | 10.0 | 15.3 | 4.7 | | | |
| 7.1 | 16.7 | 4.4 | 10.0 | 16.6 | 6.1 | | | |
| 7.1 | 17.9 | 5.7 | 10.0 | 17.8 | 7.6 | | | |
| 7.1 | 19.0 | 7.3 | 10.0 | 18.9 | 9.2 | | | |
| 7.1 | 19.9 | 9.5 | 10.0 | 19.8 | 10.9 | | | |
| 7.1 | 20.6 | 11.9 | 10.0 | 20.4 | 13.2 | | | |
| 7.1 | 21.1 | 14.1 | 10.0 | 20.9 | 15.7 | | | |
| 7.1 | 21.5 | 16.1 | 10.0 | 21.3 | 18.1 | | | |
| 7.1 | 21.8 | 17.9 | 10.0 | 21.6 | 20.3 | | | |
| 7.1 | 22.1 | 19.5 | 10.0 | 21.9 | 22.0 | | | |
| 7.1 | 22.3 | 20.9 | 10.0 | 22.1 | 23.4 | | | |
| 7.1 | 22.5 | 21.9 | 10.0 | 22.4 | 24.6 | | | |
| 7.1 | 22.6 | 22.6 | 10.0 | 22.5 | 25.3 | | | |
| 7.1 | 22.8 | 23.2 | 10.0 | 22.7 | 25.9 | | | |

*Typical Performance Curves*

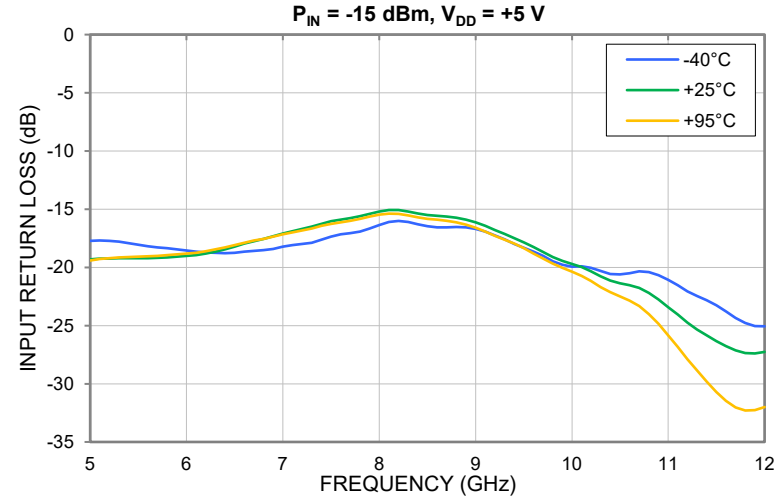
**GAIN vs. TEMPERATURE**
$P_{IN}$ = -15 dBm, $V_{DD}$ = +5 V



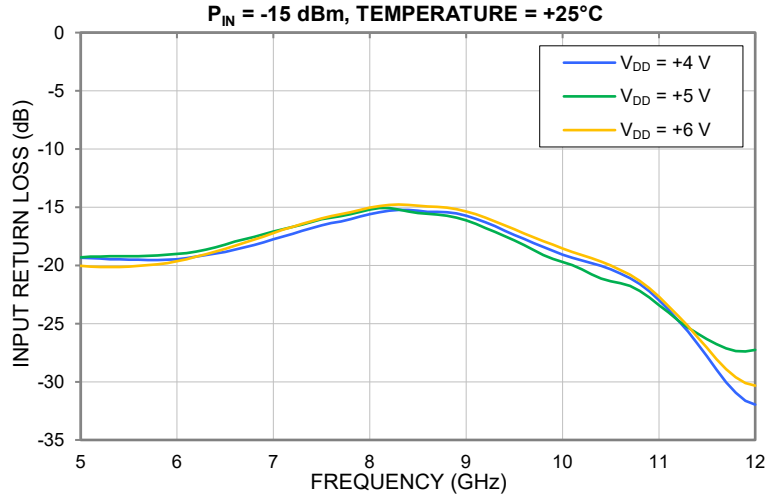

**GAIN vs. DEVICE VOLTAGE**
$P_{IN}$ = -15 dBm, TEMPERATURE = +25°C



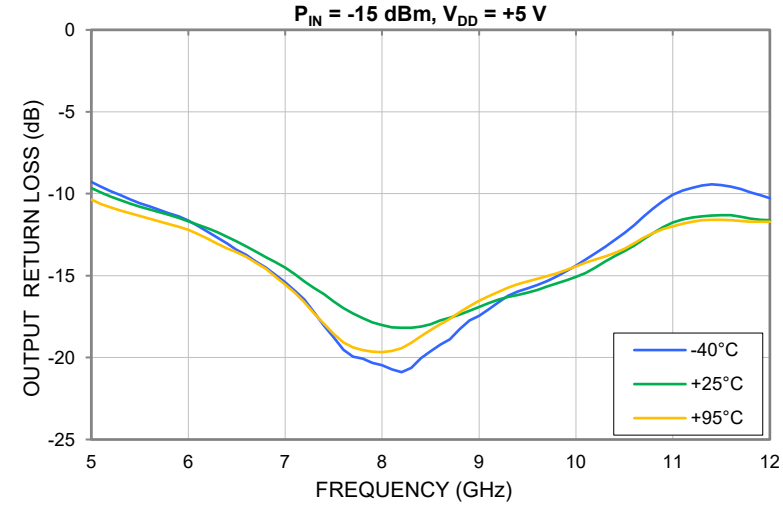

**INPUT RETURN LOSS vs.TEMPERATURE**
$P_{IN}$ = -15 dBm, $V_{DD}$ = +5 V



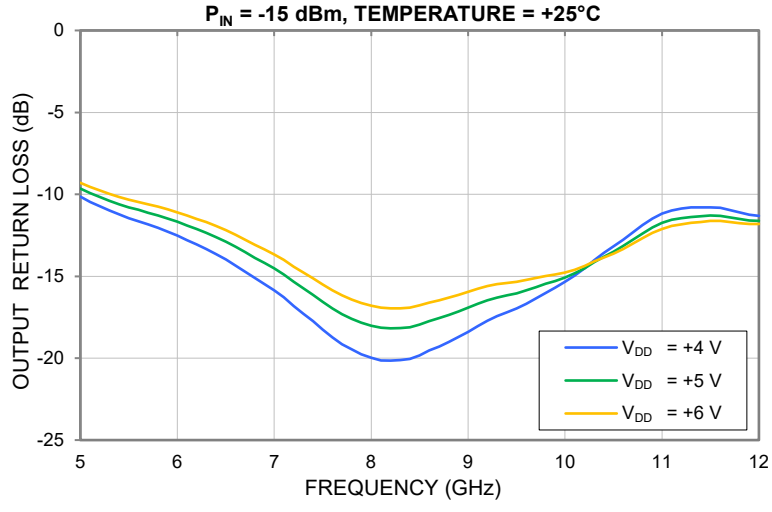

**INPUT RETURN LOSS vs. DEVICE VOLTAGE**
$P_{IN}$ = -15 dBm, TEMPERATURE = +25°C




**OUTPUT RETURN LOSS vs. TEMPERATURE**
$P_{IN}$ = -15 dBm, $V_{DD}$ = +5 V

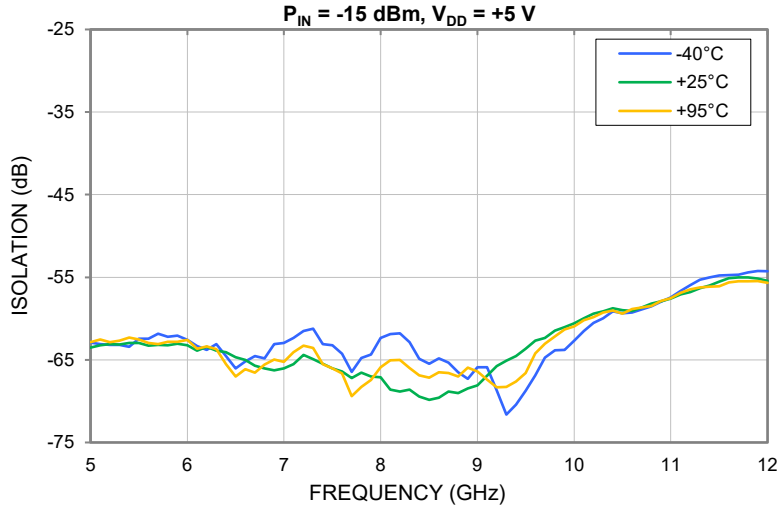



**OUTPUT RETURN LOSS vs. DEVICE VOLTAGE**
$P_{IN}$ = -15 dBm, TEMPERATURE = +25°C

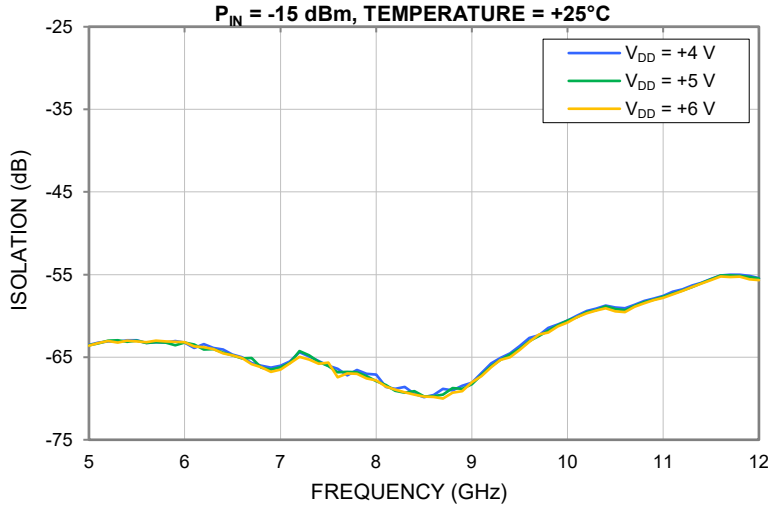


*Typical Performance Curves*

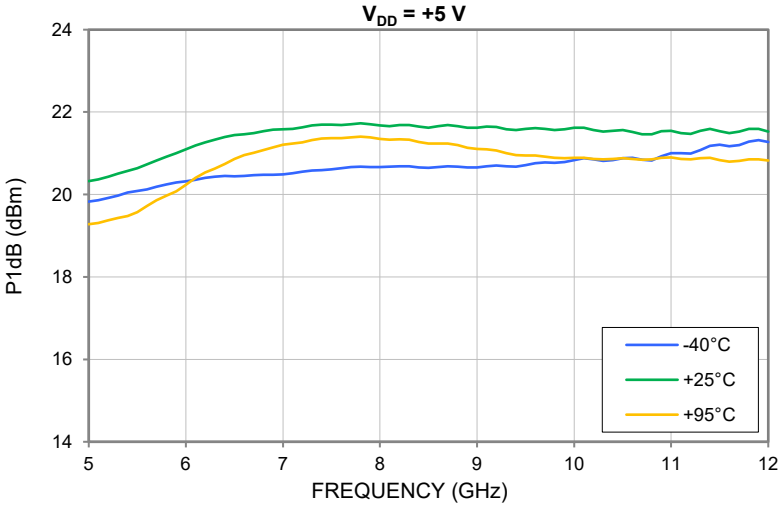
**ISOLATION vs.TEMPERATURE**
**$P_{IN}$ = -15 dBm, $V_{DD}$ = +5 V**



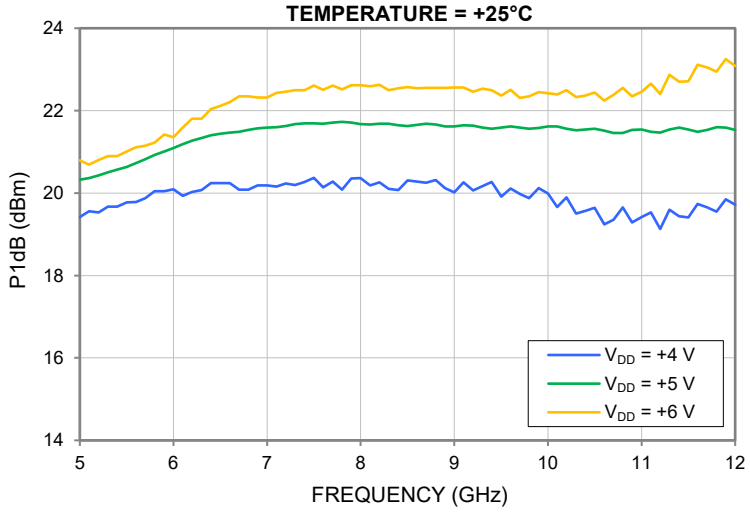

**ISOLATION vs. DEVICE VOLTAGE**
**$P_{IN}$ = -15 dBm, TEMPERATURE = +25°C**



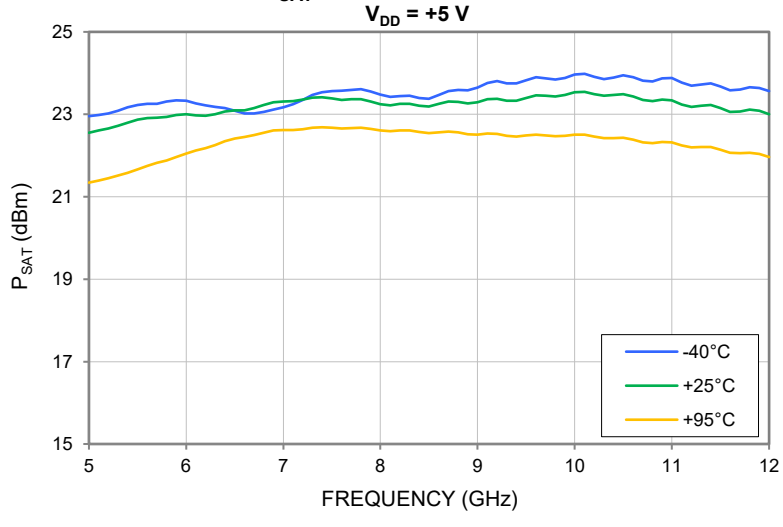

**P1dB vs. TEMPERATURE**
**$V_{DD}$ = +5 V**



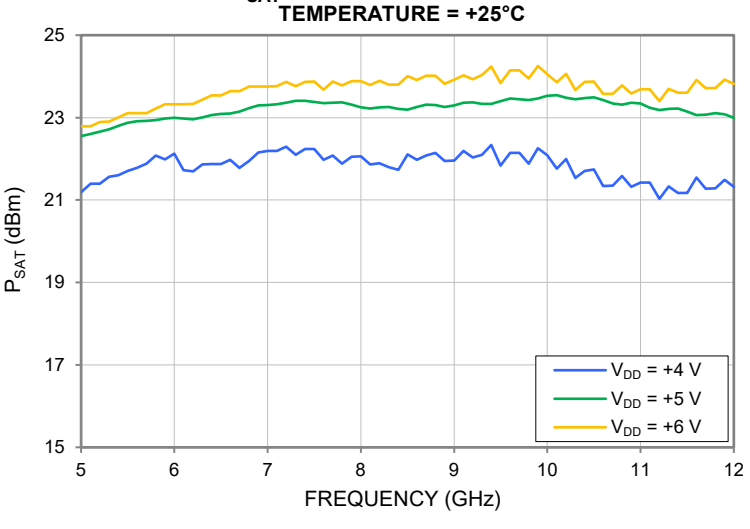

**P1dB vs. DEVICE VOLTAGE**
**TEMPERATURE = +25°C**




**$P_{SAT}$ vs. TEMPERATURE**
**$V_{DD}$ = +5 V**

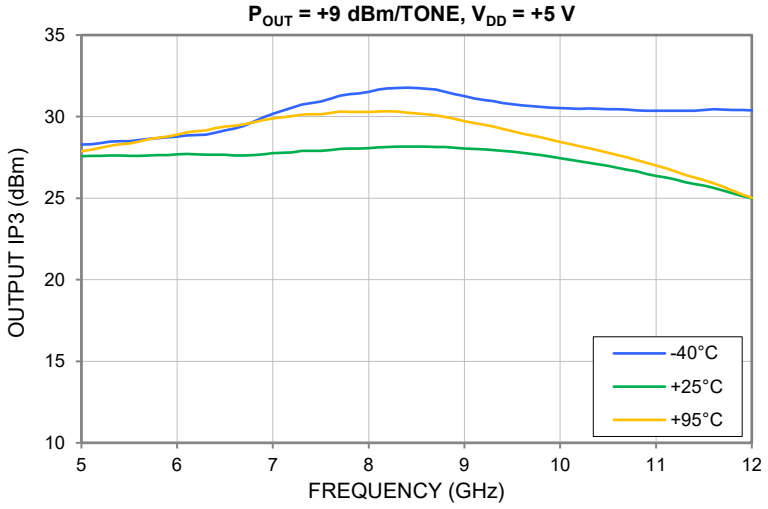



**$P_{SAT}$ vs. DEVICE VOLTAGE**
**TEMPERATURE = +25°C**

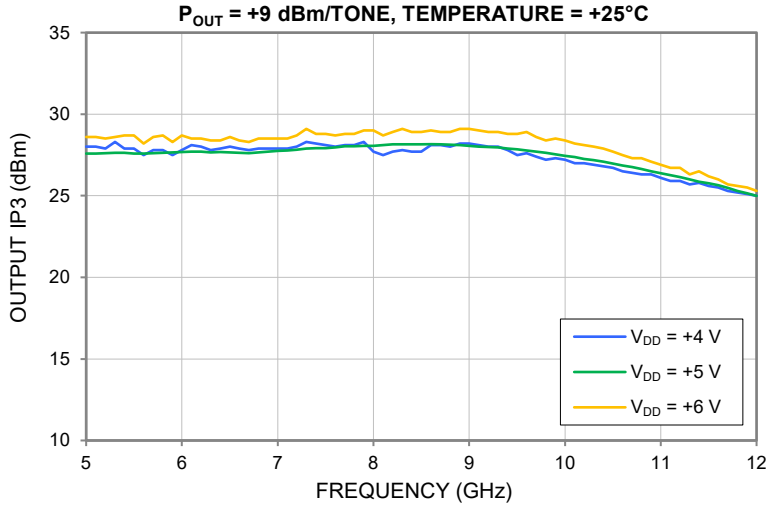


*Typical Performance Curves*

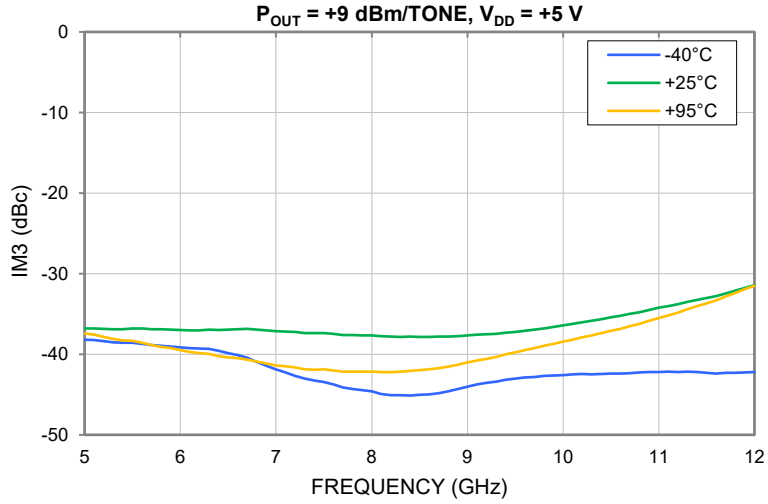
**OUTPUT IP3 vs. TEMPERATURE**
**$P_{OUT}$ = +9 dBm/TONE, $V_{DD}$ = +5 V**



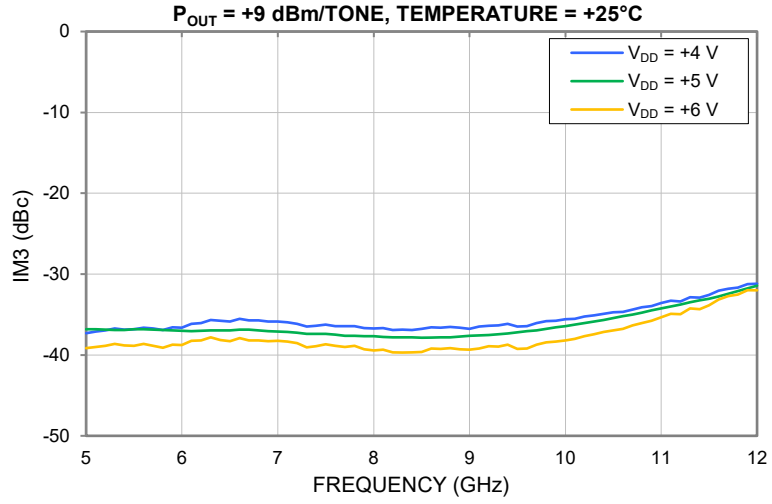

**OUTPUT IP3 vs. DEVICE VOLTAGE**
**$P_{OUT}$ = +9 dBm/TONE, TEMPERATURE = +25°C**



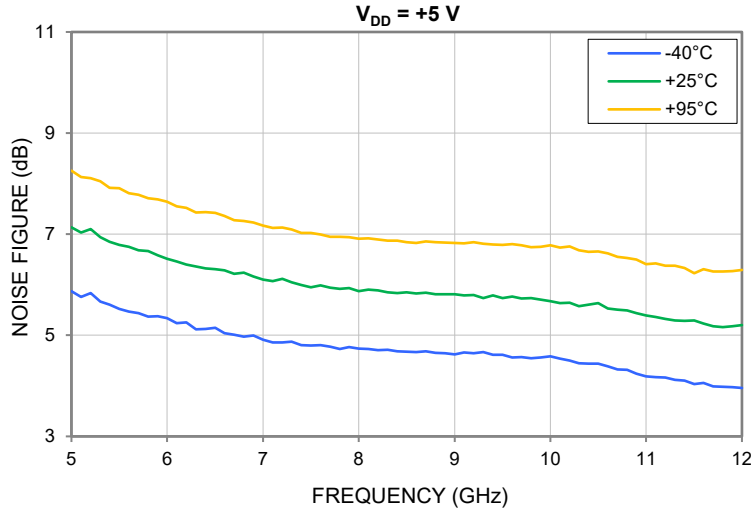

**IM3 vs. TEMPERATURE**
**$P_{OUT}$ = +9 dBm/TONE, $V_{DD}$ = +5 V**



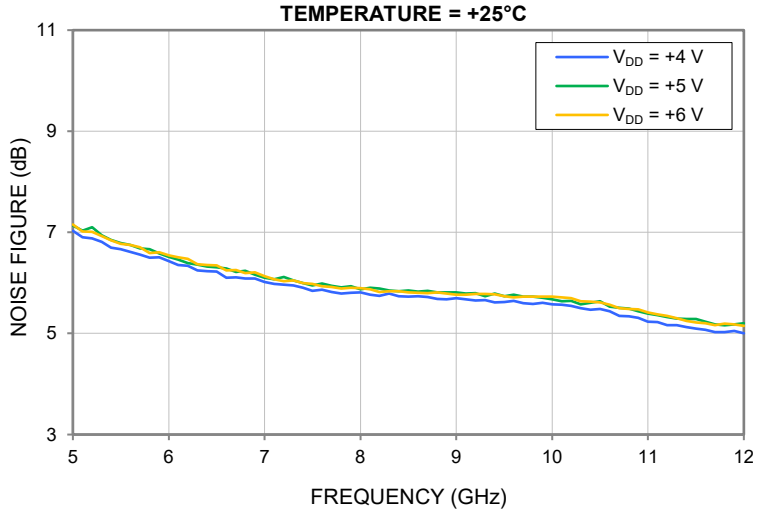

**IM3 vs. DEVICE VOLTAGE**
**$P_{OUT}$ = +9 dBm/TONE, TEMPERATURE = +25°C**




**NOISE FIGURE vs. TEMPERATURE**
**$V_{DD}$ = +5 V**

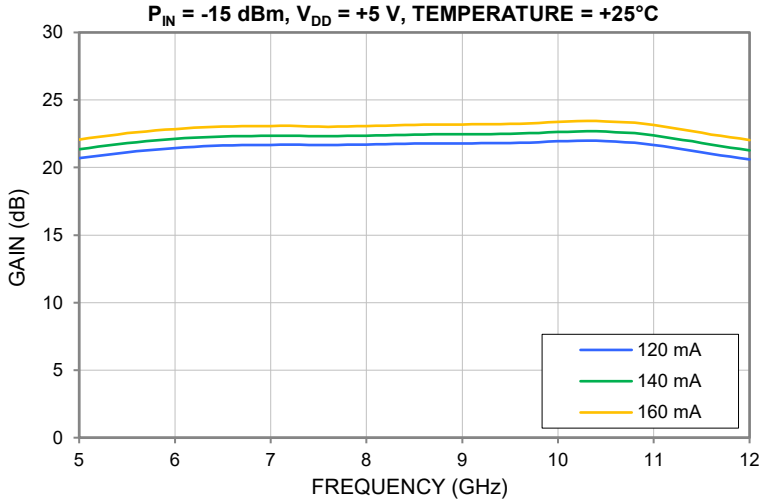



**NOISE FIGURE vs. DEVICE VOLTAGE**
**TEMPERATURE = +25°C**

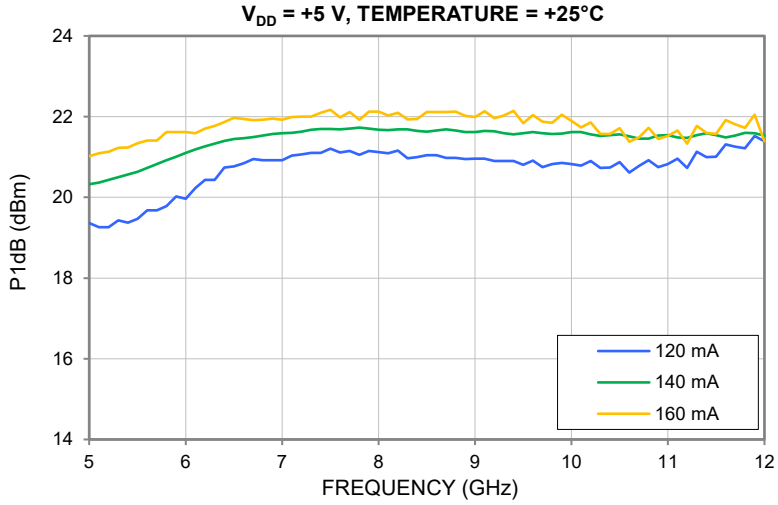


*Typical Performance Curves*

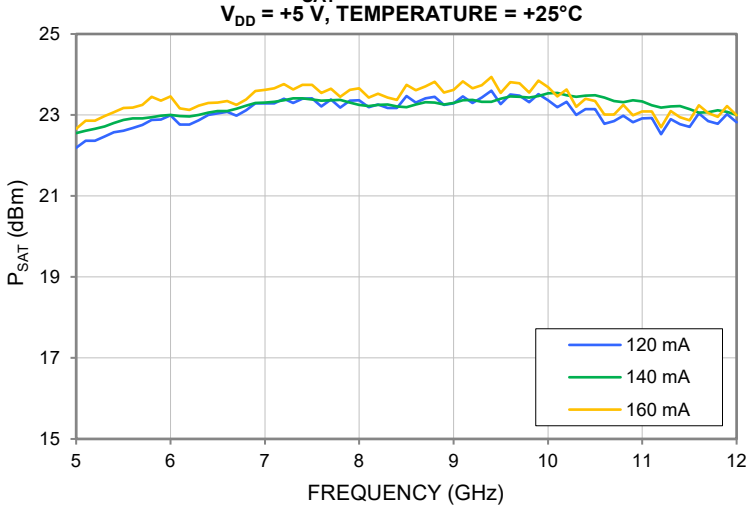
**GAIN vs. CURRENT**
**$P_{IN}$ = -15 dBm, $V_{DD}$ = +5 V, TEMPERATURE = +25°C**



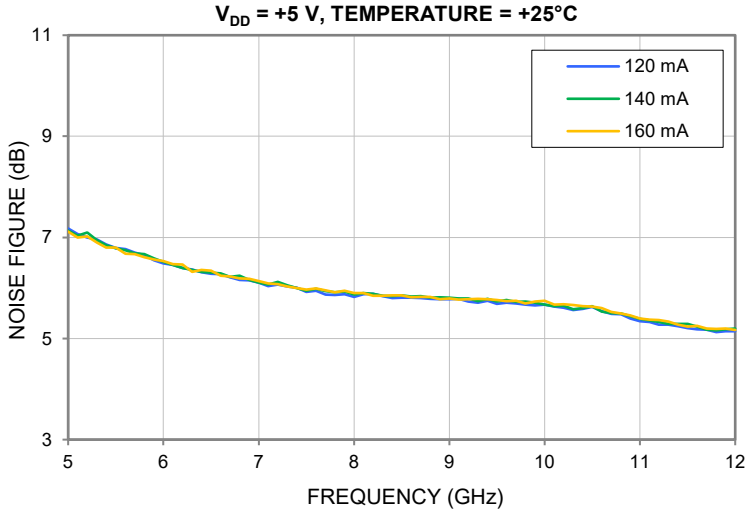

**P1dB vs. CURRENT**
**$V_{DD}$ = +5 V, TEMPERATURE = +25°C**



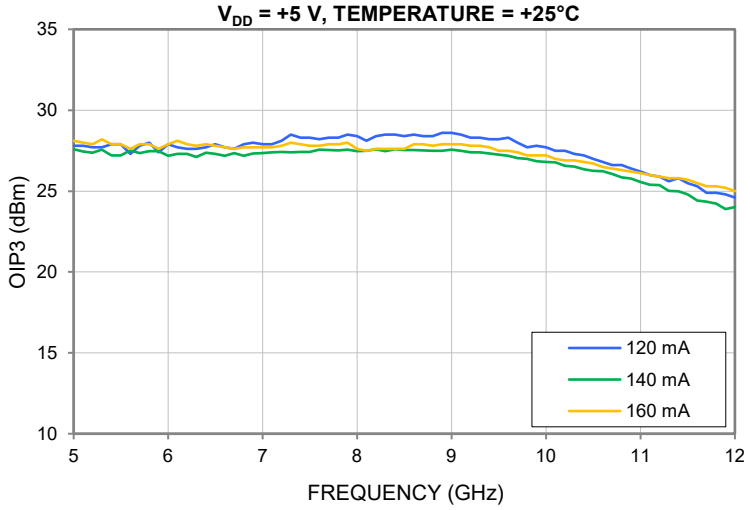

**$P_{SAT}$ vs. CURRENT**
**$V_{DD}$ = +5 V, TEMPERATURE = +25°C**



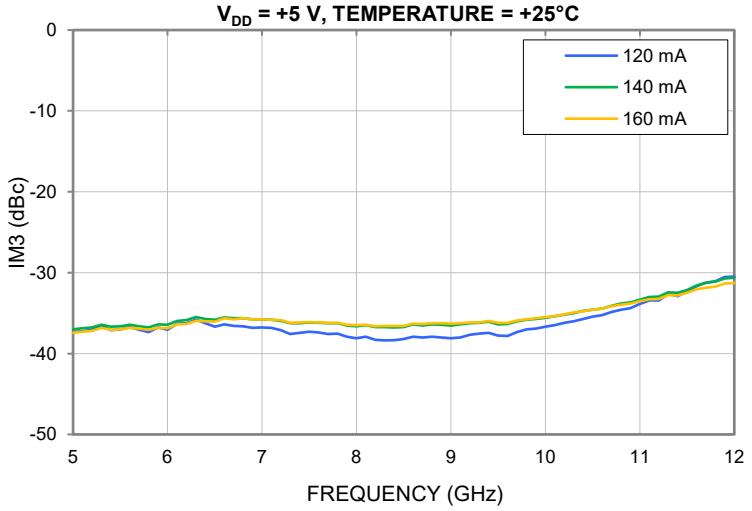

**NOISE FIGURE vs. CURRENT**
**$V_{DD}$ = +5 V, TEMPERATURE = +25°C**




**OIP3 vs. CURRENT**
**$V_{DD}$ = +5 V, TEMPERATURE = +25°C**

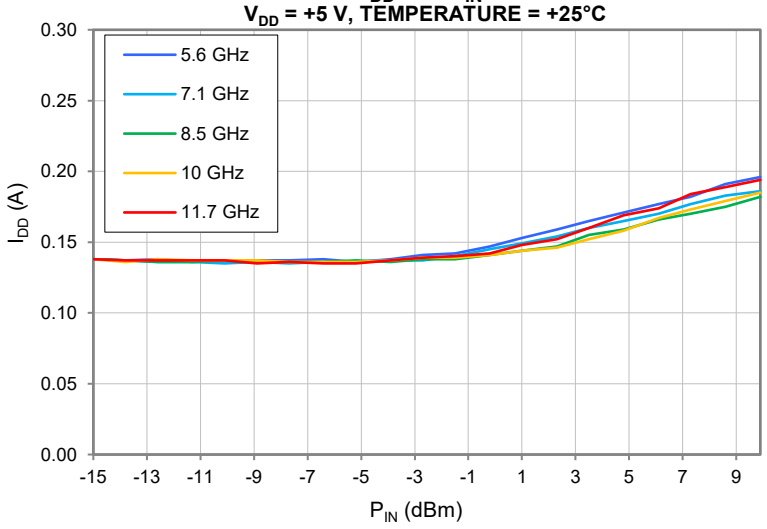



**IM3 vs. CURRENT**
**$V_{DD}$ = +5 V, TEMPERATURE = +25°C**

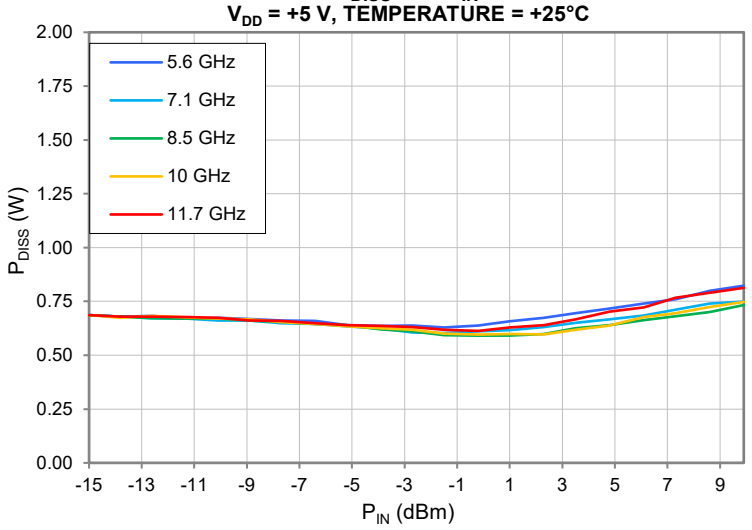


## *Typical Performance Curves*

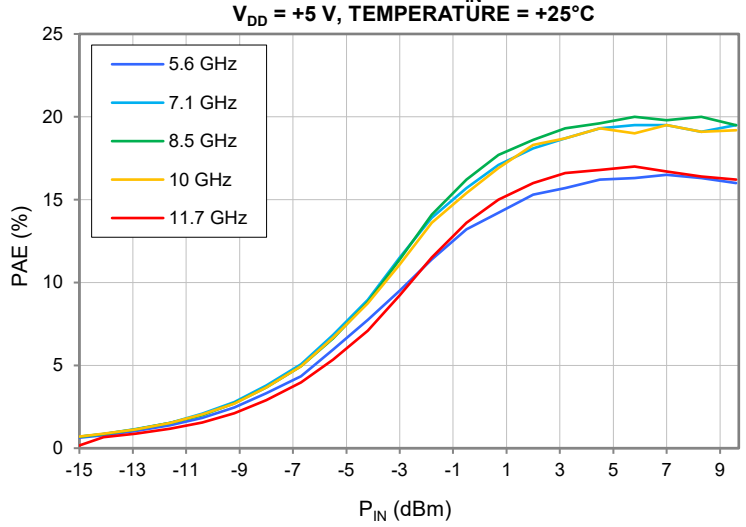
**$I_{DD}$ vs. $P_{IN}$**
**$V_{DD}$ = +5 V, TEMPERATURE = +25°C**



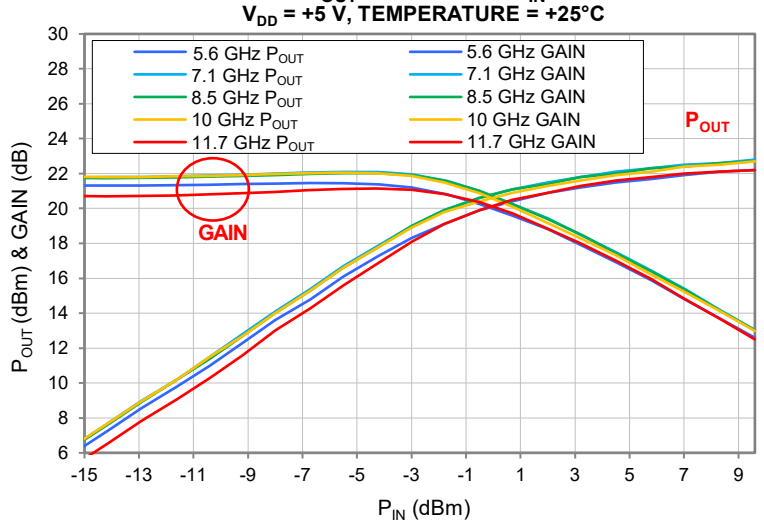

**$P_{DISS}$ vs. $P_{IN}$**
**$V_{DD}$ = +5 V, TEMPERATURE = +25°C**



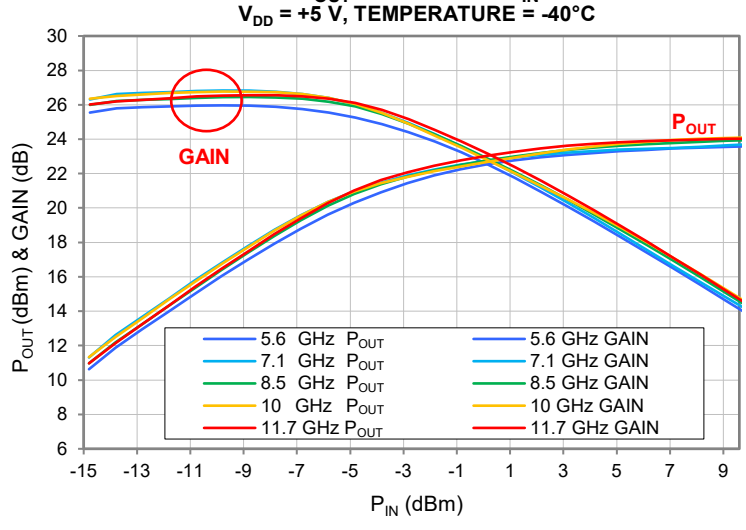

**PAE vs. $P_{IN}$**
**$V_{DD}$ = +5 V, TEMPERATURE = +25°C**



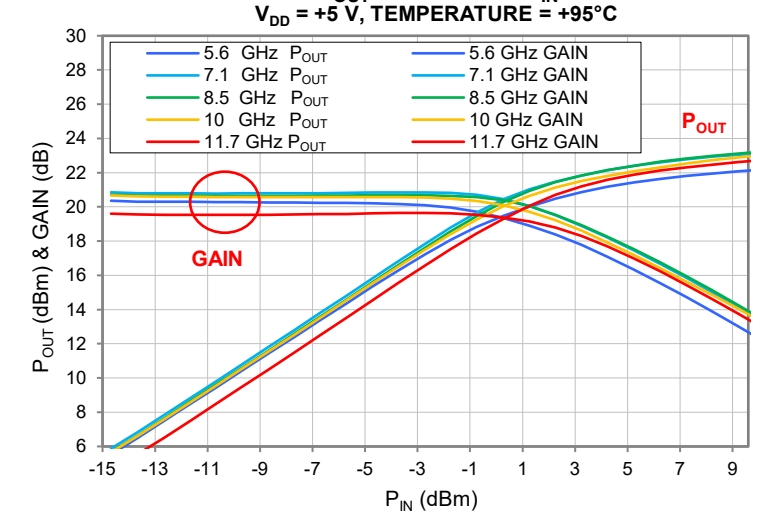

**$P_{OUT}$ & GAIN vs. $P_{IN}$**
**$V_{DD}$ = +5 V, TEMPERATURE = +25°C**




**$P_{OUT}$ & GAIN vs. $P_{IN}$**
**$V_{DD}$ = +5 V, TEMPERATURE = -40°C**

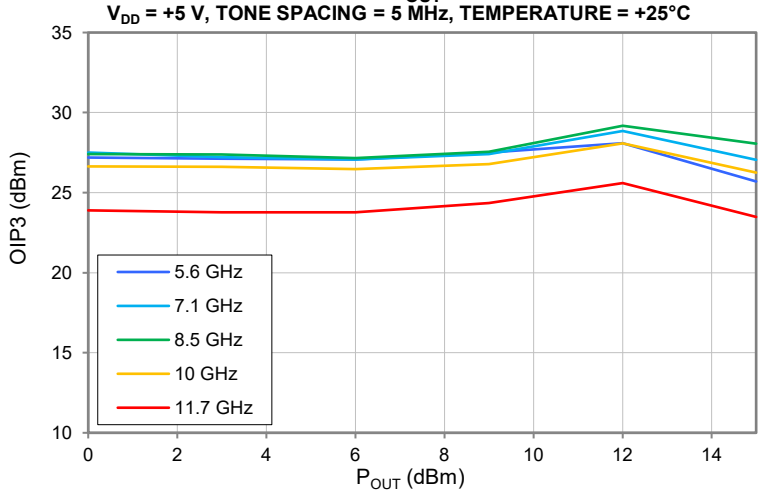



**$P_{OUT}$ & GAIN vs. $P_{IN}$**
**$V_{DD}$ = +5 V, TEMPERATURE = +95°C**

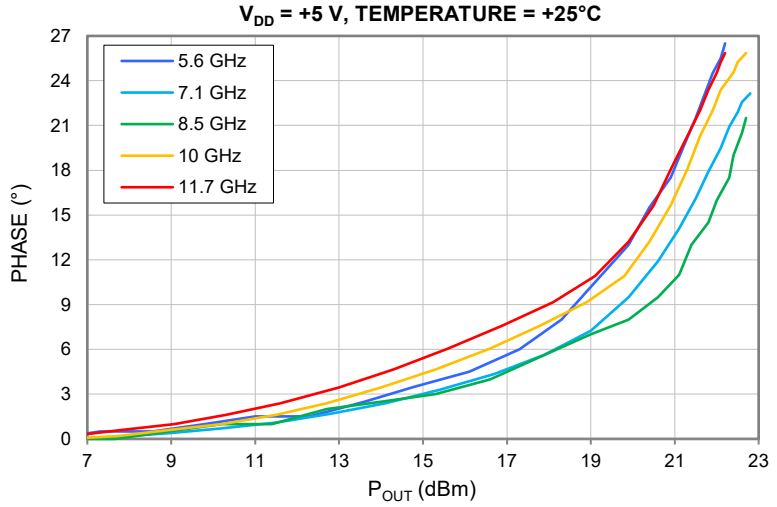


*Typical Performance Curves*

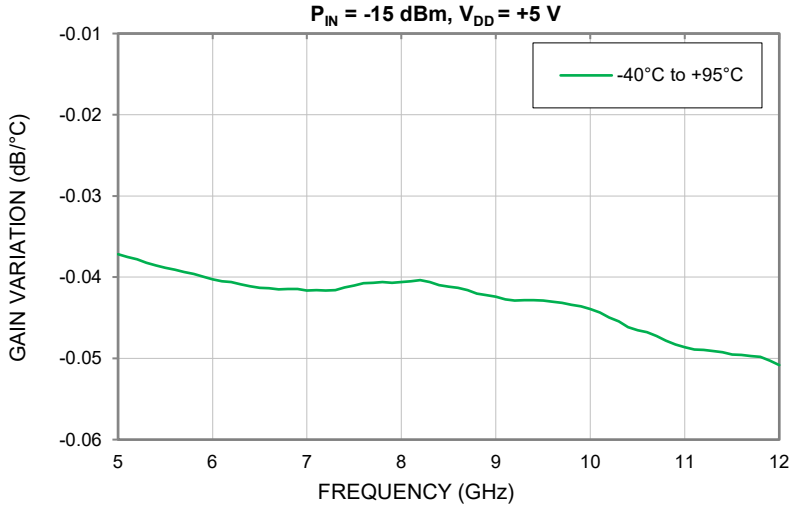
**OIP3 vs. $P_{OUT}$/TONE**
**$V_{DD}$ = +5 V, TONE SPACING = 5 MHz, TEMPERATURE = +25°C**




**AM - PM**
**$V_{DD}$ = +5 V, TEMPERATURE = +25°C**



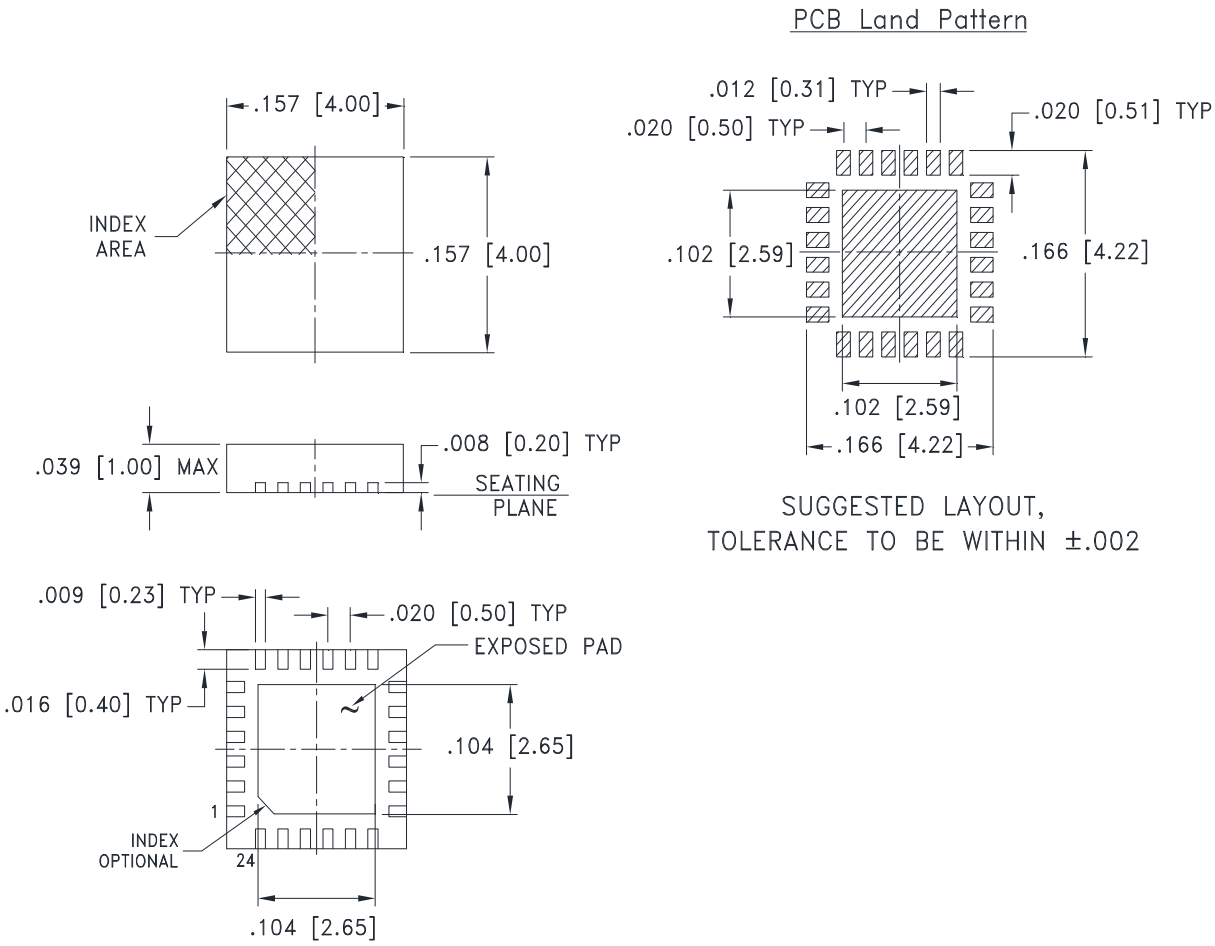

**GAIN VARIATION vs. TEMPERATURE**
**$P_{IN}$ = -15 dBm, $V_{DD}$ = +5 V**



# Case Style DG

**DG1847**

## Outline Dimensions




**Weight: .04 Grams**

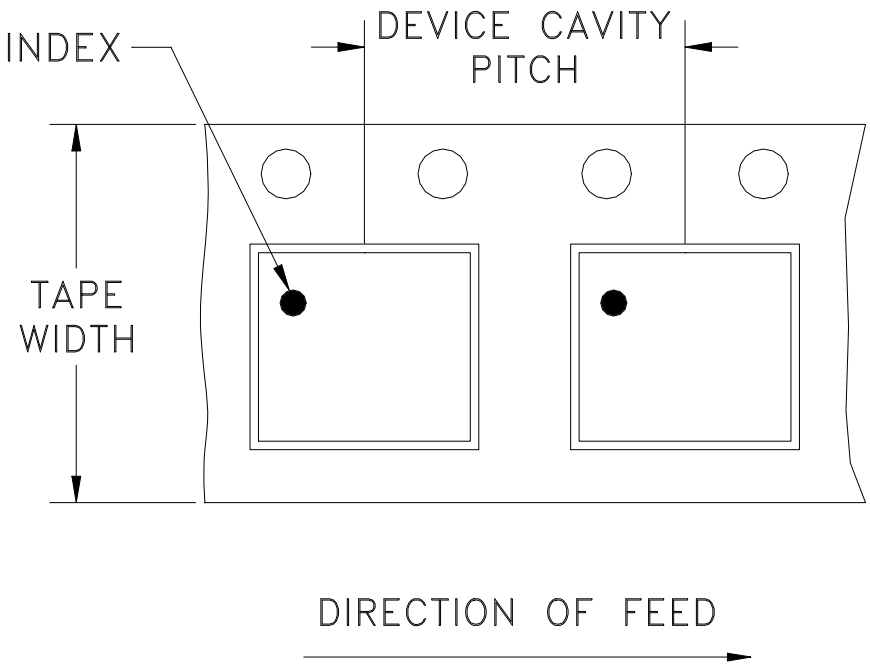
**Dimensions are in inches (mm). Tolerances: 2 Pl. ± .01; 3 Pl. ± .005**

**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 model Data sheet.
   For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.

# Tape & Reel Packaging TR-F68

DEVICE ORIENTATION IN T&R




| Tape Width, mm | Device Cavity Pitch, mm | Reel Size, inches | Devices per Reel see note | |
|---|---|---|---|---|
| 12 | 8 | 7 | Small quantity standard | 20 |
| | | | | 50 |
| | | | | 100 |
| | | | | 200 |
| | | | | 500 |
| | | 7 | Standard | 1000 |
| | | 13 | Standard | 2000 |
| | | | | 3000 |
| | | | | 4000 |

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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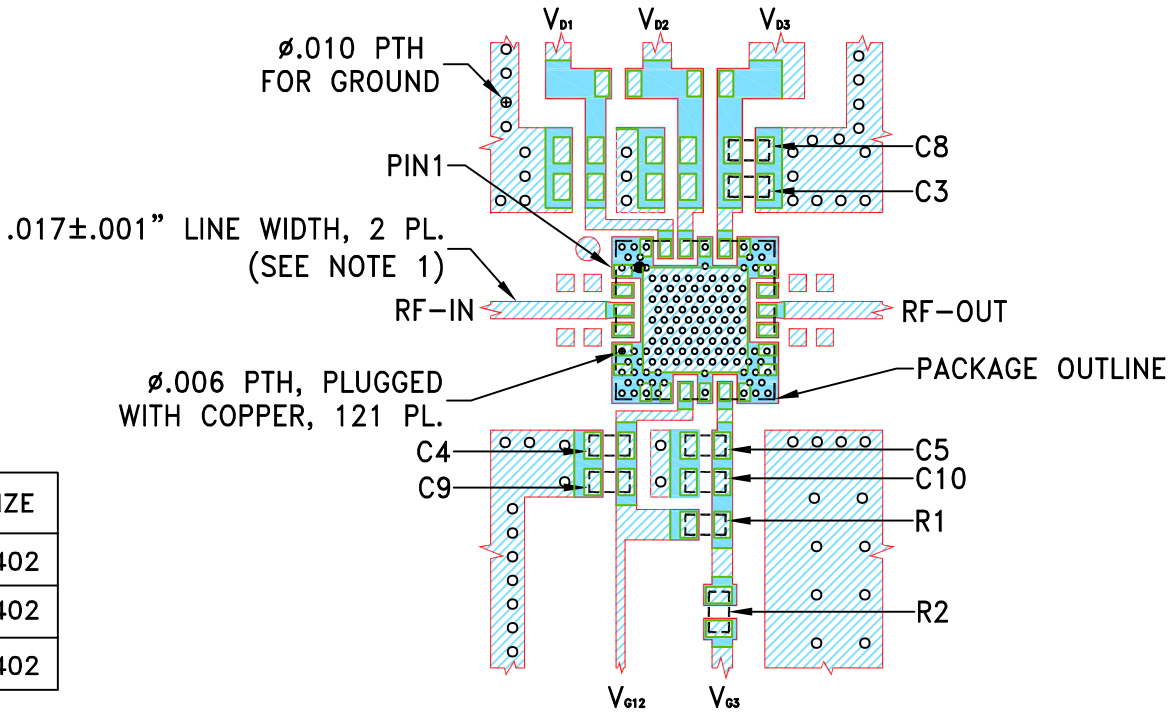
THIRD ANGLE PROJECTION

| REVISIONS | | | | | |
|---|---|---|---|---|---|
| REV | ECN No. | DESCRIPTION | DATE | DR | AUTH |
| OR | ECO-023026 | NEW RELEASE | 09/26/24 | ITG | IL |
| | | | | | |
| | | | | | |
| | | | | | |

# SUGGESTED MOUNTING CONFIGURATION FOR DG1847 CASE STYLE




| COMPONENT | SIZE |
|---|---|
| C3-C5 | 0402 |
| C8-C10 | 0402 |
| R1, R2 | 0402 |

NOTES:

1. TRACE WIDTH & GAP PARAMETERS ARE SHOWN FOR ROGERS RO4003C LoPro FOIL, DIELECTRIC THICKNESS: .0087±.001"; COPPER: 1 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
2. CHIP COMPONENT FOOT PRINTS SHOWN FOR REFERENCE. FOR COMPONENT VALUES REFER TO TB-AVA-6123MPC+.
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 | ITG | 09/26/24 |
| TOLERANCES ON: | CHECKED | GF | 09/26/24 |
| 2 PL DECIMALS ± | APPROVED | IL | 09/26/24 |
| 3 PL DECIMALS ± .005 | | | |
| ANGLES ± | | | |
| FRACTIONS ± | | | |



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

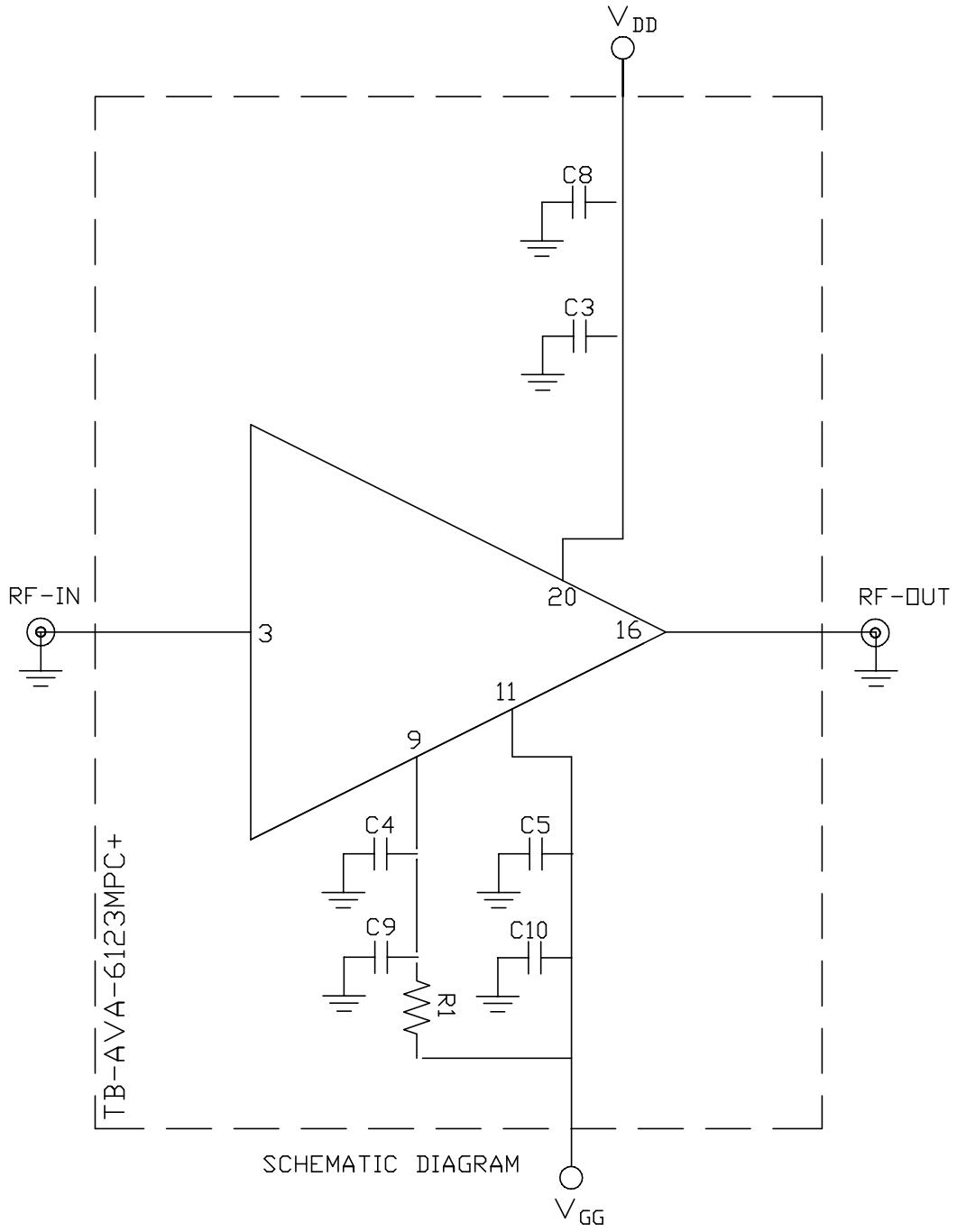

Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235


PL, DG1847, TB-AVA-6123MPC+

| SIZE | CODE IDENT | DRAWING NO: | REV: |
|---|---|---|---|
| A | 15542 | 98-PL-796 | OR |

| FILE: | SCALE: | SHEET: |
|---|---|---|
| 98PL796 | 5:1 | 1 OF 1 |

# Evaluation Board and Circuit




SCHEMATIC DIAGRAM

| Component | Size | Value | PartNumber | Manufacturer |
|---|---|---|---|---|
| R1 | 0402 | 100Ω | RK73H1ETTP1000F | KOA SPEER ELECTRONICS |
| C3–C5 | 0402 | 0.001µF | GRM1555C1H102JA01D | MURATA |
| C8–C10 | 0402 | 0.1µF | GRM155R71E104KE14D | MURATA |

Notes:
1. 2.92mm Female Connectors.
2. PCB Material: Roger RO4003C LOPRO or equivalent, Thickness=0.0087±.001 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<br>Ambient Environment | Individual Model Data Sheet |
| Storage Temperature | -55° to 100° C or -65° to 150°<br>Ambient Environment | Individual Model Data Sheet |
| 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 |
| Marking Resistance to Solvents | Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C;<br>distilled water + proylene glycol monomethyl ether + | MIL-STD-202, Method 215 |

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 |
|---|---|---|
| | monoethanolamine at 63°C to 70°C | |