



MMIC SURFACE MOUNT

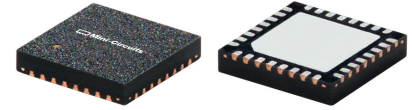
Power Amplifier

PMA5-63-2W+

50Ω 10 to 6000 MHz 2 W P_{SAT}

THE BIG DEAL

- P1dB, Typ. +31.2 dBm
- P_{SAT}, Typ. +33.8 dBm
- Low Noise Figure, Typ. 2.7 dB
- High OIP3, Typ. +44.5 dBm
- Supply Voltage +12 V, 400 mA
- 5x5 mm 32-Lead QFN-Style Package

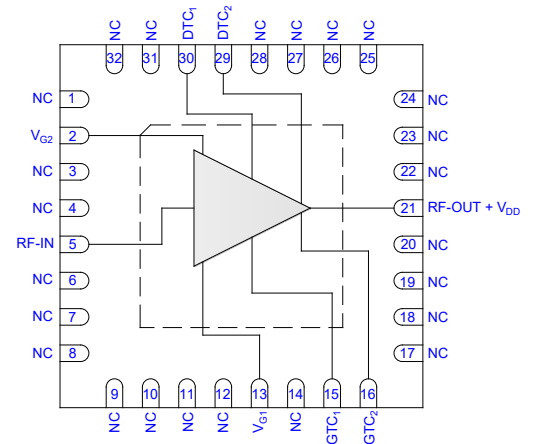


Generic photo used for illustration purposes only

APPLICATIONS

- Test and Measurement Equipment
- Radar, EW, and ECM Defense Systems
- 5G Sub6, MIMO Wireless Infrastructure Systems
- Microwave Radio & VSAT

FUNCTIONAL DIAGRAM



PRODUCT OVERVIEW

The PMA5-63-2W+ is a GaAs MMIC Distributed Power Amplifier operating from 10 to 6000 MHz. The amplifier provides 12 dB of gain, +33.8 dBm saturated output power, and achieves +44.5 dBm output IP3, while operating from a +12 V power supply and consuming 400 mA of quiescent current. In addition, it is internally matched to 50 Ohms and comes in a 5x5 mm 32-Lead QFN-Style package. These characteristics make it ideally suited for wideband test instrumentation and defense systems that require high operating output power, while maintaining very low distortion characteristics.

KEY FEATURES

| Features | Advantages |
|--|--|
| High P1dB (Typ. +31.2 dBm) and P _{SAT} (Typ. +33.8 dBm) | Flat, broadband gain and high output power without high frequency roll-off make this device excellent for wideband systems from 10 to 6000 MHz that require at least 1 W of linear operating output power over the full band. |
| Low Noise Figure Typ. 2.7 dB | High operating output power accompanied with low noise figure enables a significant signal to noise ratio advantage for systems requiring high dynamic range. |
| High OIP3 Typ. +44.5 dBm | High operating OIP3 and low 2nd and 3rd harmonic response provides for very low in-band distortion products, enabling minimal signal degradation in high fidelity measurement systems and demanding communication systems. |
| 5x5 mm 32-Lead QFN-Style Package | 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. |





MMIC SURFACE MOUNT

Power Amplifier

PMA5-63-2W+

50Ω 10 to 6000 MHz 2 W P_{SAT}ELECTRICAL SPECIFICATIONS¹ AT +25°C, V_{DD} = +12 V, UNLESS NOTED OTHERWISE

| Parameter | Condition (MHz) | Min. | Typ. | Max. | Units |
|--|-----------------|------|-------|-------|-------|
| Frequency Range | | 10 | | 6000 | MHz |
| Gain | 10 | | 17.9 | | dB |
| | 2000 | 11.0 | 12.2 | | |
| | 4000 | 10.8 | 12.0 | | |
| | 6000 | 10.0 | 11.9 | | |
| Output Power at 1 dB Compression (P _{1dB}) | 10 | | +28.2 | | dBm |
| | 2000 | | +30.6 | | |
| | 4000 | | +31.2 | | |
| | 6000 | | +30.9 | | |
| Output Power at Saturation (P _{SAT}) ² | 10 | | +32.9 | | dBm |
| | 2000 | | +33.0 | | |
| | 4000 | | +33.8 | | |
| | 6000 | | +33.6 | | |
| Output Third-Order Intercept (P _{OUT} = +20 dBm/Tone) | 10 | | +42.5 | | dBm |
| | 2000 | | +45.0 | | |
| | 4000 | | +44.5 | | |
| | 6000 | | +42.3 | | |
| Output Second-Order Intercept (P _{OUT} = +20 dBm/Tone) | 10 | | +63.1 | | dBm |
| | 2000 | | +44.5 | | |
| | 4000 | | +42.3 | | |
| | 6000 | | +42.1 | | |
| 2nd Harmonic ³ (P _{OUT} = +10 dBm/Tone) | 10 | | -61.0 | | dBc |
| | 2000 | | -42.6 | | |
| | 4000 | | -40.6 | | |
| | 6000 | | -40.0 | | |
| Input Return Loss | 10 | | 23 | | dB |
| | 2000 | | 12 | | |
| | 4000 | | 28 | | |
| | 6000 | | 25 | | |
| Output Return Loss | 10 | | 24 | | dB |
| | 2000 | | 12 | | |
| | 4000 | | 10 | | |
| | 6000 | | 13 | | |
| Isolation | 10 | | 50 | | dB |
| | 2000 | | 46 | | |
| | 4000 | | 41 | | |
| | 6000 | | 37 | | |
| Noise Figure | 500 | | 6.8 | | dB |
| | 2000 | | 3.8 | | |
| | 4000 | | 2.7 | | |
| | 6000 | | 2.7 | | |
| Device Operating Voltage (V _{DD}) | | | +12 | +16 | V |
| Device Operating Current (I _{DD}) ⁴ | | | 400 | | mA |
| Gate Voltage (V _{G1}) ⁵ | | -2.0 | -0.8 | -0.2 | V |
| Gate Current (I _{G1}) | | | 15 | 4,000 | μA |
| Gate Voltage (V _{G2}) | | +2 | +5 | +7.5 | V |
| Gate Current (I _{G2}) | | | 15 | 4,000 | μA |
| DC Current Variation vs. Temperature ⁶ | | | 11 | | μA/°C |

1. Tested on Mini-Circuits Characterization Test Board. See Figure 2. Board loss de-embedded.

2. P_{SAT} defined as when the Output Power changes 0.1 dB per 1 dB change in Input Power.

3. 2nd harmonic measured at 2x the input frequency shown.

4. Current at P_{IN} = -25 dBm. Increases to 650 mA at P_{1dB}.5. Adjust V_{G1} between -2.0 V and -0.5 V to achieve I_{DD} = 400 mA.6. (Current at +85°C - Current at -45°C)/(+130°C). V_{G1} held constant over temperature.



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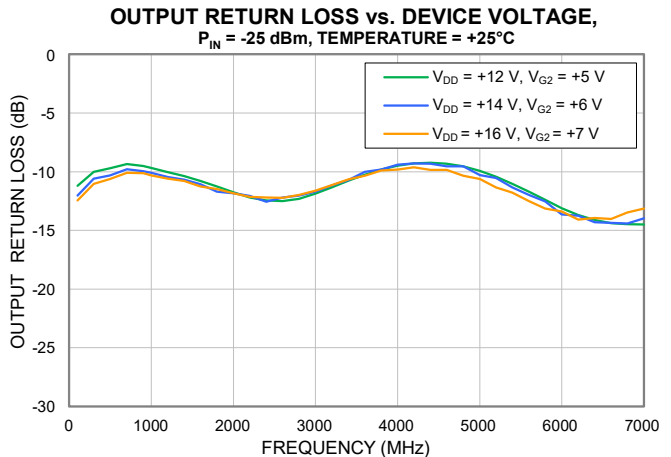
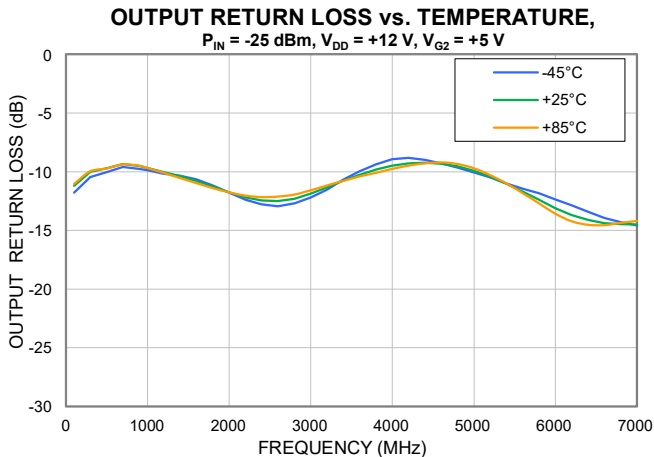
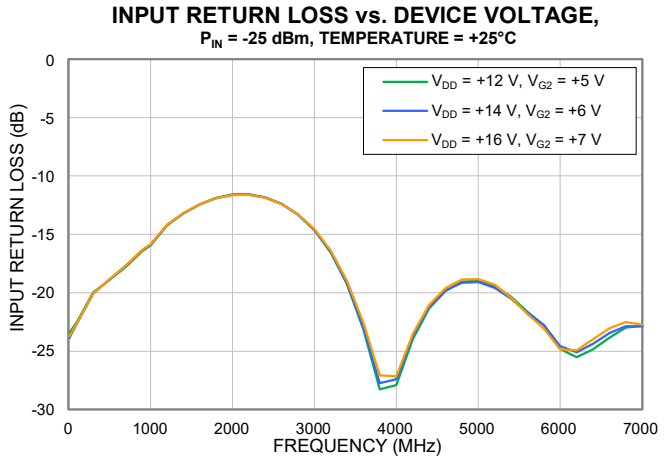
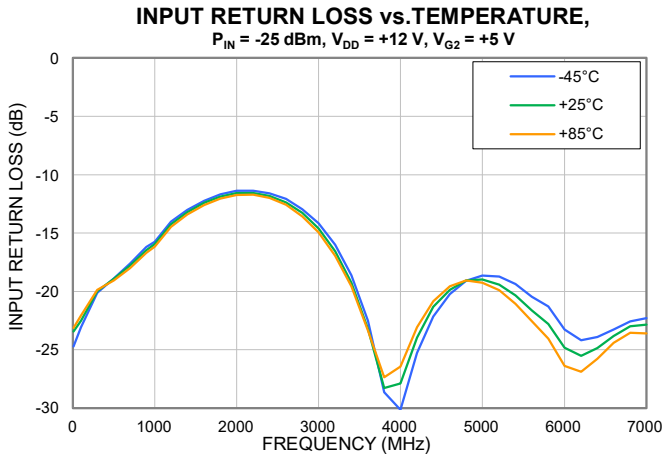
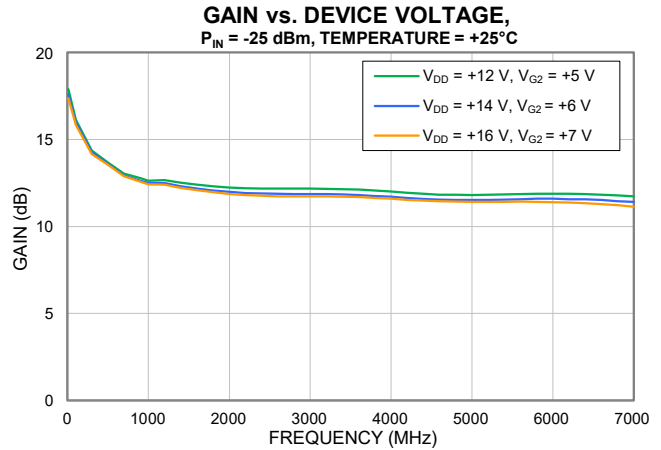
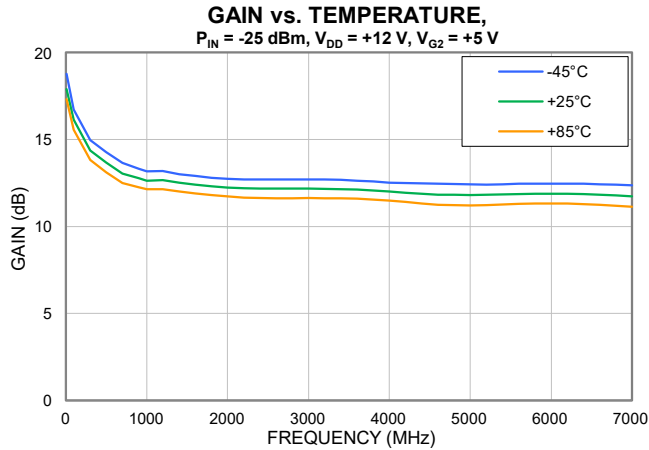
Power Amplifier

PMA5-63-2W+

Mini-Circuits

50Ω 10 to 6000 MHz 2 W P_{SAT}

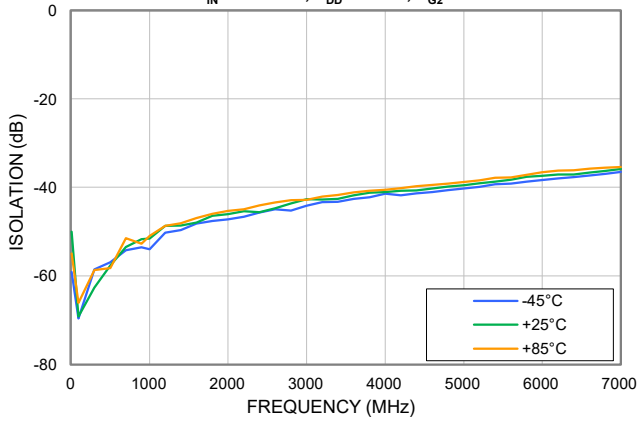
TYPICAL PERFORMANCE GRAPHS



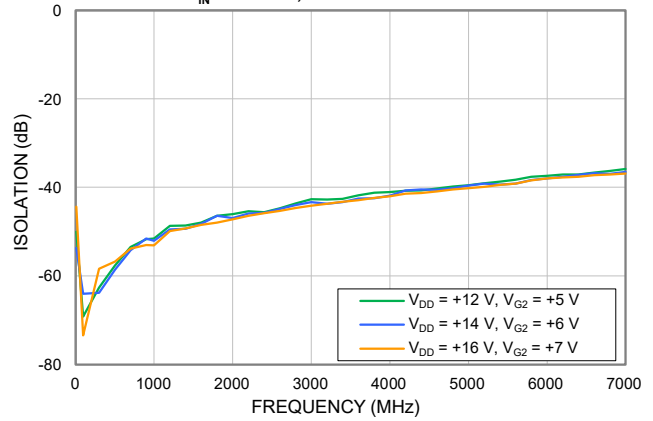


TYPICAL PERFORMANCE GRAPHS

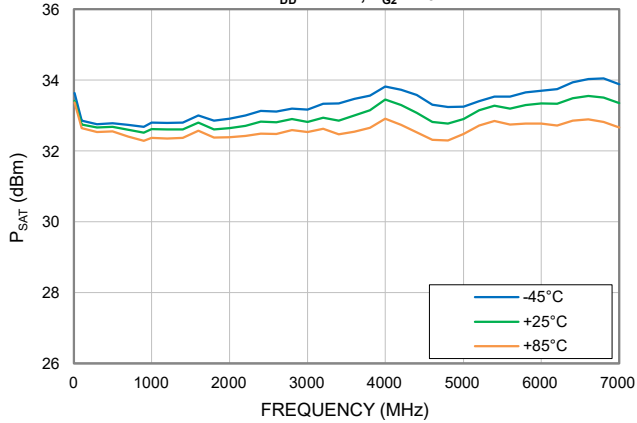
ISOLATION vs. TEMPERATURE,
P_{IN} = -25 dBm, V_{DD} = +12 V, V_{G2} = +5 V



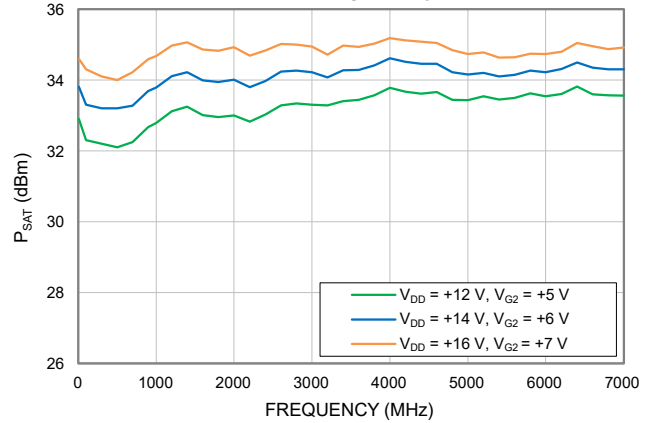
ISOLATION vs. DEVICE VOLTAGE,
P_{IN} = -25 dBm, TEMPERATURE = +25°C



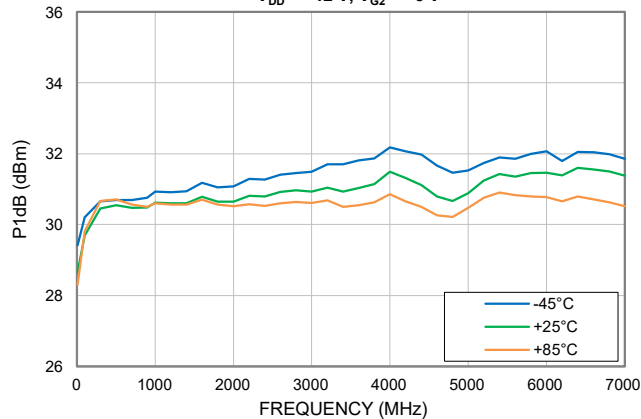
P_{SAT} vs. TEMPERATURE,
V_{DD} = +12 V, V_{G2} = +5 V



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



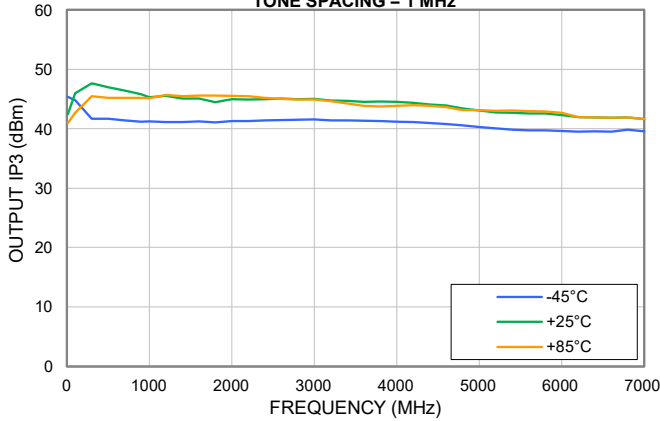
P1dB vs. TEMPERATURE,
V_{DD} = +12 V, V_{G2} = +5 V



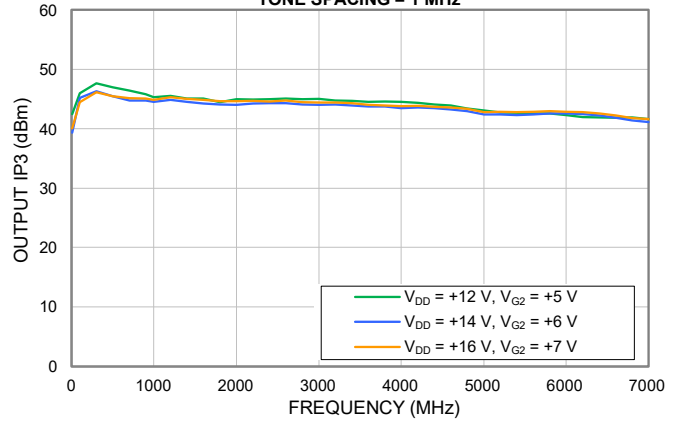


TYPICAL PERFORMANCE GRAPHS

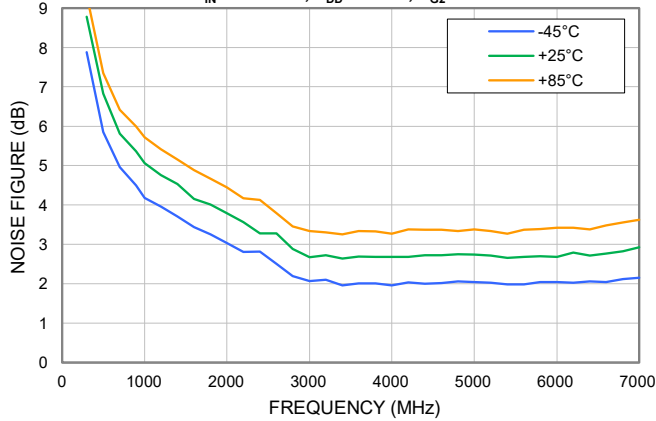
OUTPUT IP3 vs. TEMPERATURE,
P_{OUT} = +20 dBm/TONE, V_{DD} = +12 V, V_{G2} = +5 V
TONE SPACING = 1 MHz



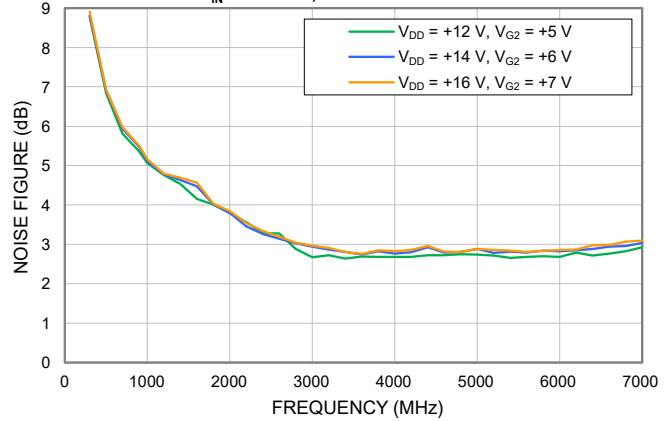
OUTPUT IP3 vs. DEVICE VOLTAGE,
P_{OUT} = +20 dBm/TONE, TEMPERATURE = +25°C
TONE SPACING = 1 MHz



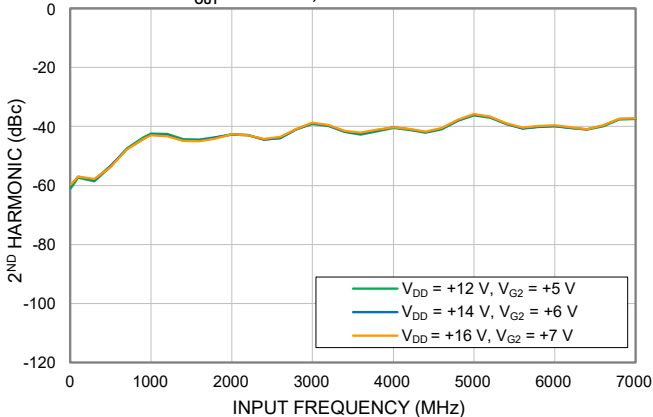
NOISE FIGURE vs. TEMPERATURE,
P_{IN} = -25 dBm, V_{DD} = +12 V, V_{G2} = +5 V



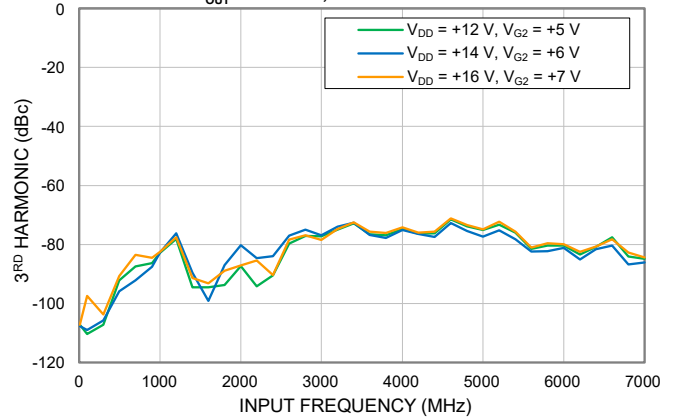
NOISE FIGURE vs. DEVICE VOLTAGE,
P_{IN} = -25 dBm, TEMPERATURE = +25°C



2ND HARMONIC vs. DEVICE VOLTAGE,
P_{OUT} = +10 dBm, TEMPERATURE = +25°C



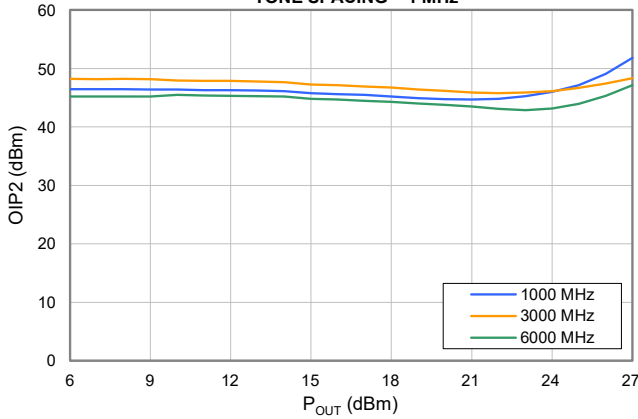
3RD HARMONIC vs. DEVICE VOLTAGE,
P_{OUT} = +10 dBm, TEMPERATURE = +25°C



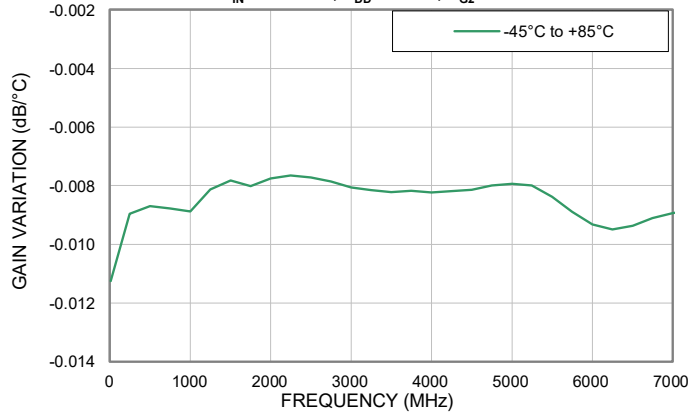


TYPICAL PERFORMANCE GRAPHS

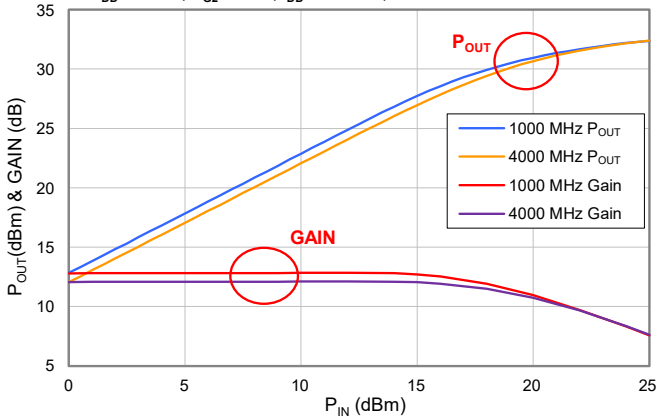
OUTPUT IP2 vs. P_{OUT}/TONE
V_{DD} = +12 V, V_{G2} = +5 V, TEMPERATURE = +25°C,
TONE SPACING = 1 MHz



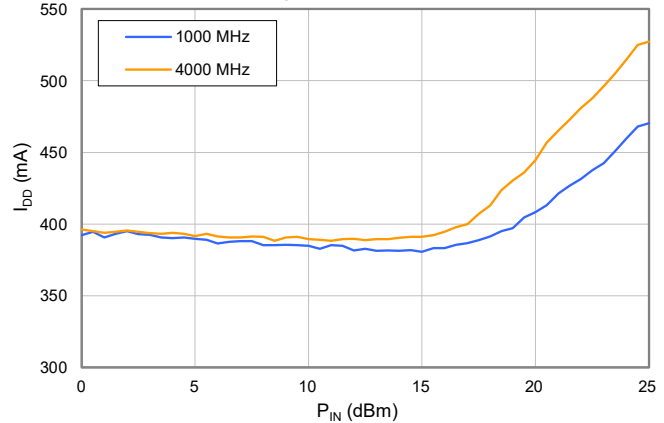
GAIN VARIATION vs. TEMPERATURE,
P_{IN} = -25 dBm, V_{DD} = +12 V, V_{G2} = +5 V



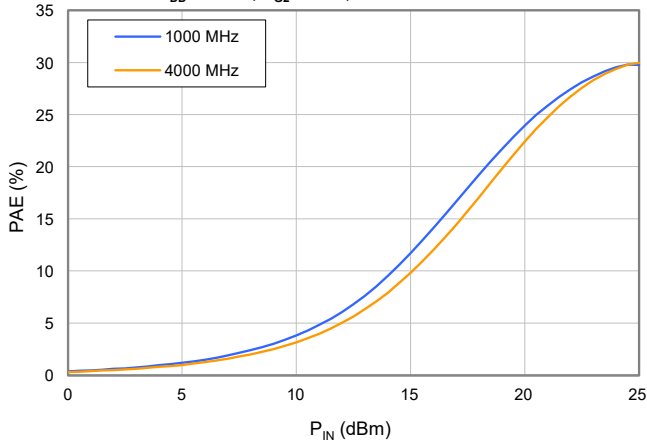
P_{OUT} & GAIN vs. P_{IN}
V_{DD} = +12 V, V_{G2} = +5 V, I_{DD} = 400 mA, TEMPERATURE = +25°C



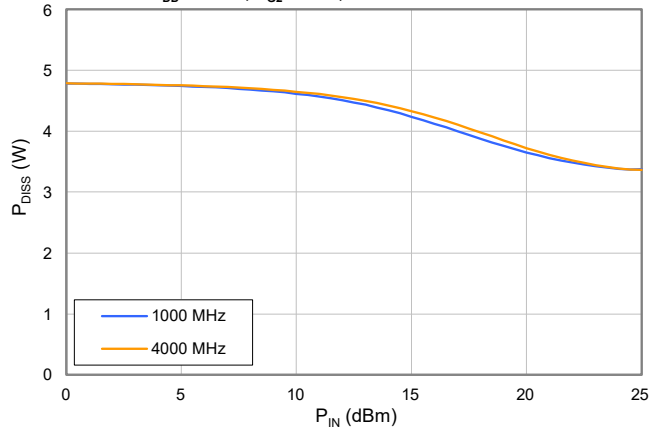
I_{DD} vs. P_{IN}
V_{DD} = +12 V, V_{G2} = +5 V, TEMPERATURE = +25°C



PAE vs. P_{IN}
V_{DD} = +12 V, V_{G2} = +5 V, TEMPERATURE = +25°C



P_{DISS} vs. P_{IN}
V_{DD} = +12 V, V_{G2} = +5 V, TEMPERATURE = +25°C





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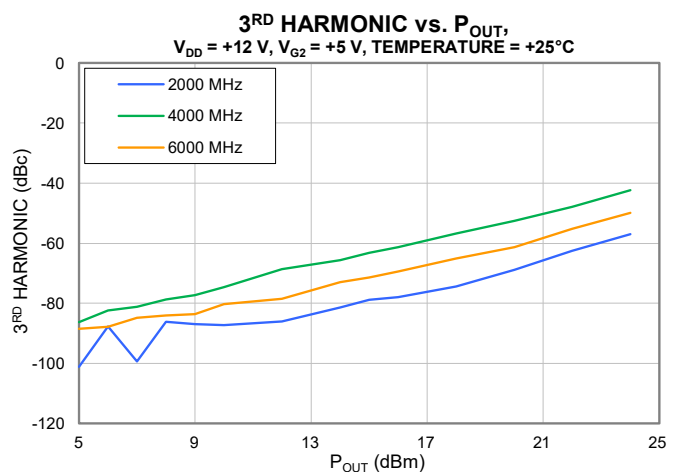
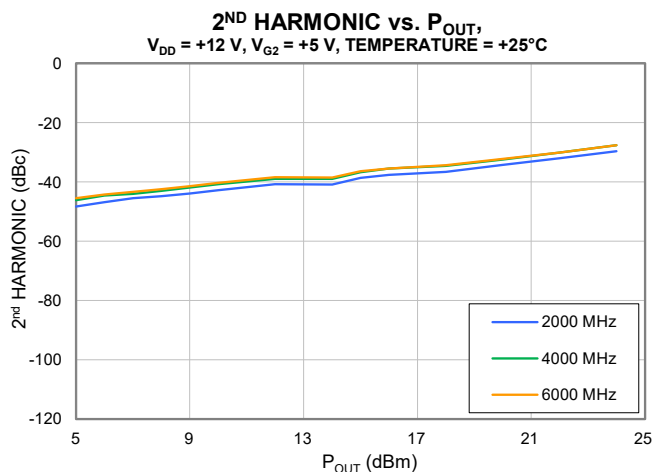
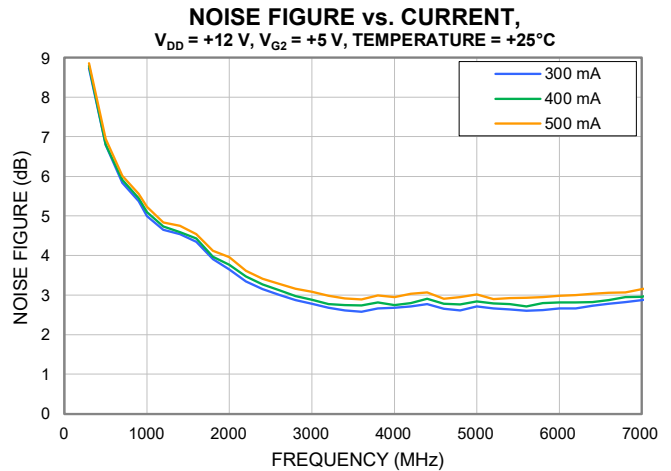
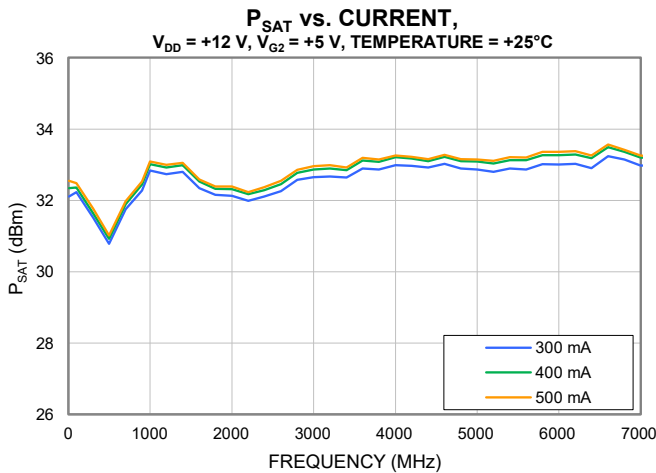
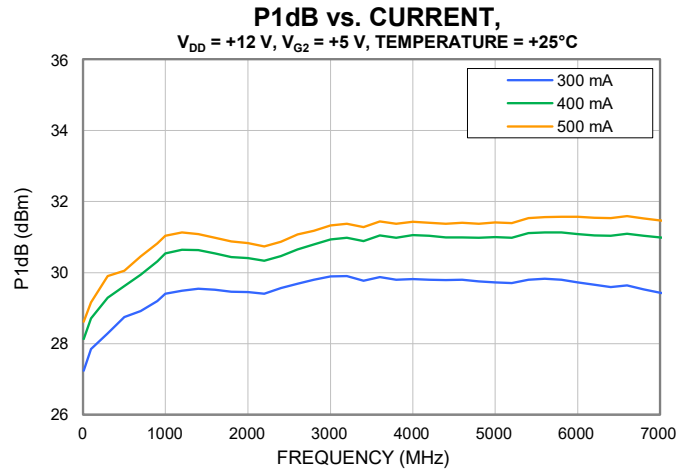
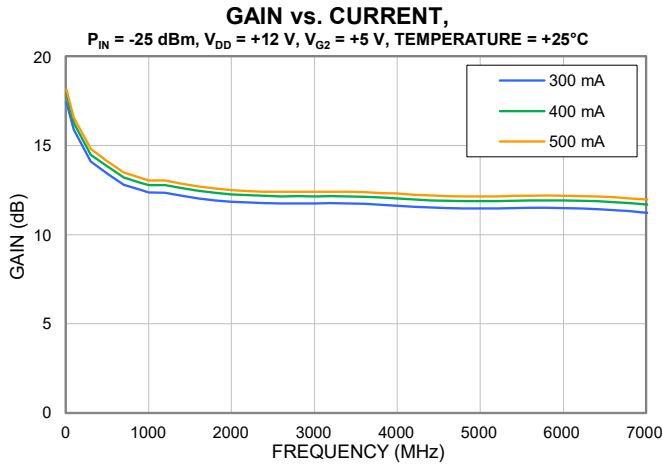
Power Amplifier

PMA5-63-2W+

Mini-Circuits

50Ω 10 to 6000 MHz 2 W P_{SAT}

TYPICAL PERFORMANCE GRAPHS





MMIC SURFACE MOUNT

Power Amplifier

PMA5-63-2W+

50Ω 10 to 6000 MHz 2 W P_{SAT}

ABSOLUTE MAXIMUM RATINGS⁷

| Parameter | Ratings |
|---|-----------------|
| Operating Temperature (ground lead) | -45°C to +85°C |
| Storage Temperature | -65°C to +150°C |
| Junction Temperature ⁸ | +175°C |
| Total Power Dissipation | 10 W |
| Input Power (CW), V _{DD} = +12 V | +31 dBm |
| DC Voltage at RF-OUT + V _{DD} | +16.5 V |
| DC Gate Voltage at V _{G1} | -0.2 V |
| DC Gate Voltage at V _{G2} | +7.5 V |
| DC Gate Current at V _{G1} (I _{G1}) | 4.5 mA |
| DC Gate Current at V _{G2} (I _{G2}) | 4.5 mA |

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

8. Peak temperature on top of Die.

THERMAL RESISTANCE

| Parameter | Ratings |
|--|---------|
| Thermal Resistance (Θ _{JC}) ⁹ | 6°C/W |

9. Θ_{JC} = (Hot Spot Temperature on Die - Temperature at Ground Lead)/Dissipated Power

ESD RATING

| | Class | Voltage Range | Reference Standard |
|-----|-------|--------------------|-----------------------------|
| HBM | 1A | 250 V to < 500 V | ANSI/ESDA/JEDEC JS-001-2023 |
| CDM | C2 | 500 V to < 1,000 V | ANSI/ESDA/JEDEC JS-002-2022 |



ESD HANDLING PRECAUTION: This device is designed to be Class 1A 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





FUNCTIONAL DIAGRAM

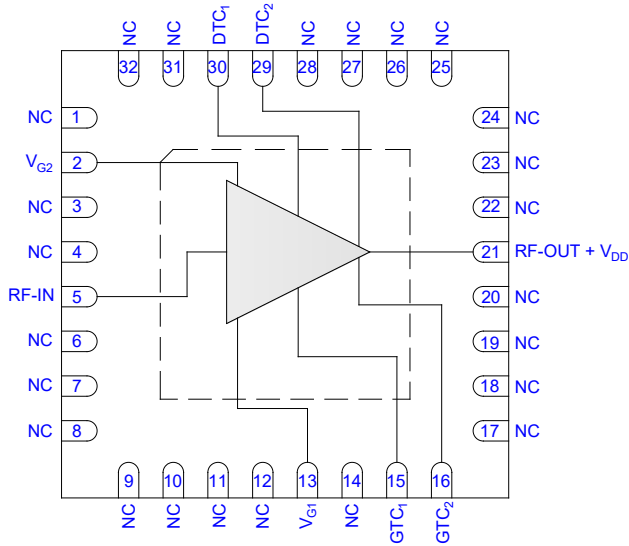


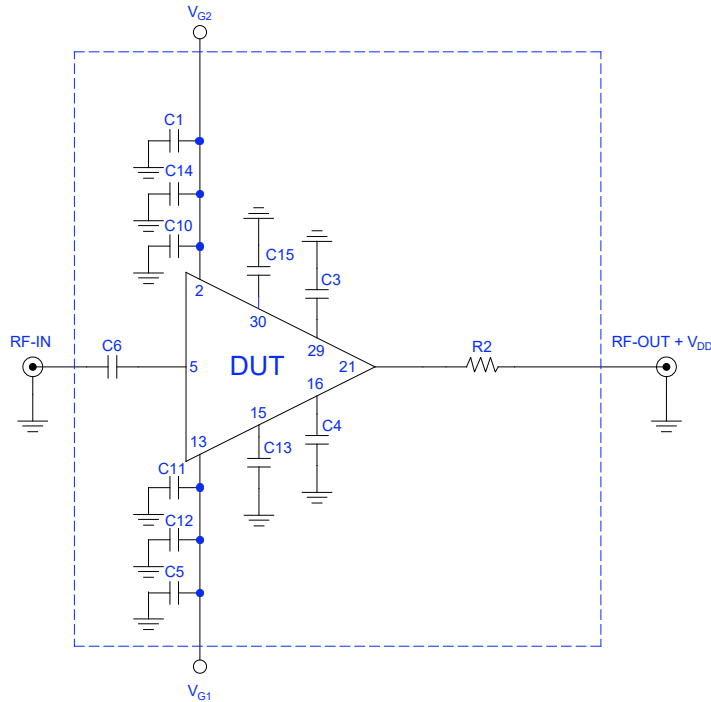
Figure 1. PMA5-63-2W+ Functional Diagram

PAD DESCRIPTION

| Function | Pad Number | Description (Refer to Figure 1) |
|--------------------------|---|--|
| RF-IN | 5 | RF-IN Pad connects to RF Input port. |
| RF-OUT + V _{DD} | 21 | RF-OUT Pad connects to RF Output port. V _{DD} is applied via external bias tee. |
| V _{G1} | 13 | Gate 1 control voltage. |
| V _{G2} | 2 | Gate 2 control voltage. |
| DTC ₁ | 30 | Drain Low Frequency Termination Capacitor (AC GND) |
| DTC ₂ | 29 | Drain Low Frequency Termination Capacitor (AC GND) |
| GTC ₁ | 15 | Gate Low Frequency Termination Capacitor (AC GND) |
| GTC ₂ | 16 | Gate Low Frequency Termination Capacitor (AC GND) |
| NC | 1, 3, 4, 6-12, 14, 17-20, 22-28, 31, 32 | Not used internally. Connected to ground on test board. |
| GND | Paddle | Connects to ground. |



CHARACTERIZATION TEST BOARD



Electrical Parameters and Conditions

Gain, Return Loss, Output Power at 1 dB Compression (P1dB), Output IP3 (OIP3), and Noise Figure measured using N5242B PNA-X Microwave Network Analyzer. Device bias voltage V_{DD} supplied by external Bias-Tee.

Conditions:

1. Gain and Return Loss: P_{IN} = -25 dBm
2. Output IP3 (OIP3): Two tones, spaced 1MHz apart, +20 dBm/Tone at output.

Power ON/ Power OFF Sequence

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

Power ON:

1. Set V_{G1} = -2 V and Turn ON.
2. Set V_{G2} = +5 V and Turn ON.
3. Set V_{DD} = +12 V and Turn ON.
4. Increase V_{G1} to desired I_{DD}.
5. Turn ON RF signal.

Power OFF:

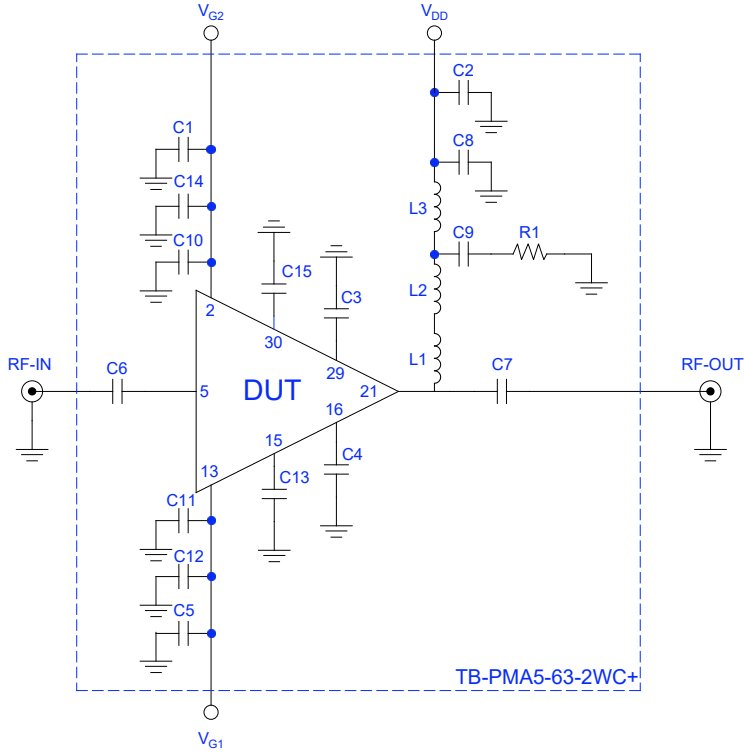
1. Turn OFF RF signal.
2. Decrease V_{G1} to -2 V.
3. Turn OFF V_{DD}.
4. Turn OFF V_{G2}.
5. Turn OFF V_{G1}.

Figure 2. PMA5-63-2W+ Characterization Test Board

| Component | Value | Size | Part Number | Manufacturer |
|--------------------|--------|------|--------------------|-----------------------|
| R2 | 0Ω | 0402 | RK73Z1ETTP | KOA SPEER ELECTRONICS |
| C1, C3, C4, C5 | 4.7 μF | 1206 | 12063C475KAT2A | AVX CORPORATION |
| C6 | 0.1 μF | 0402 | GRM155R71E104KE14D | MURATA |
| C10, C11 | 100 pF | 0402 | GRM1555C1H101JA01D | MURATA |
| C12, C13, C14, C15 | 1 nF | 0402 | GRM1555C1H102JA01D | MURATA |



EVALUATION BOARD



Power ON/ Power OFF Sequence

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

Power ON:

1. Set $V_{G1} = -2$ V and Turn ON.
2. Set $V_{G2} = +5$ V and Turn ON.
3. Set $V_{DD} = +12$ V and Turn ON.
4. Increase V_{G1} to desired I_{DD} .
5. Turn ON RF signal.

Power OFF:

1. Turn OFF RF signal.
2. Decrease V_{G1} to -2 V.
3. Turn OFF V_{DD} .
4. Turn OFF V_{G2} .
5. Turn OFF V_{G1} .

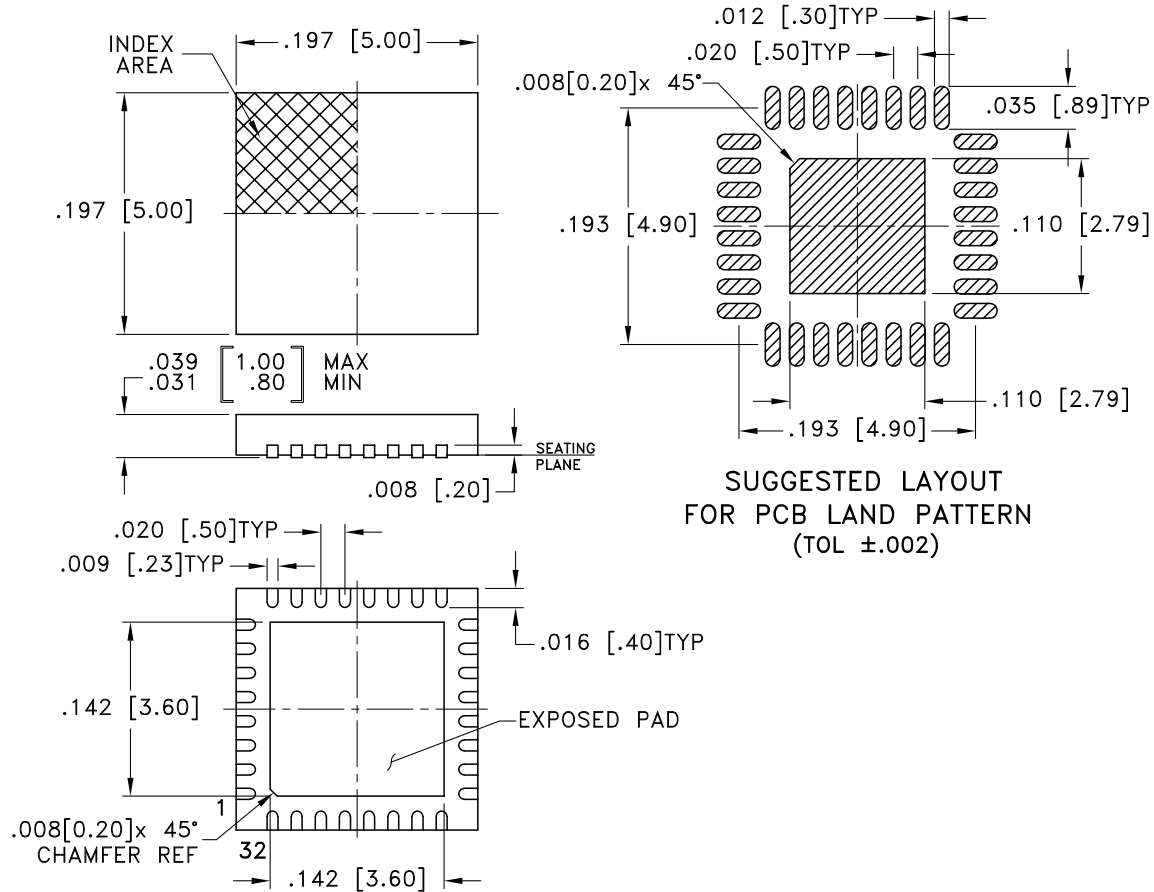
Figure 3. PMA5-63-2W+ Evaluation Board

| Component | Value | Size | Part Number | Manufacturer |
|--------------------|--------|------|--------------------|-----------------------|
| R1 | 301Ω | 0402 | RK73H1ETTP3010F | KOA SPEER ELECTRONICS |
| C1, C2, C3, C4, C5 | 4.7 μF | 1206 | 12063C475KAT2A | AVX CORPORATION |
| C6, C7, C8 | 0.1 μF | 0402 | GRM155R71E104KE14D | MURATA |
| C9, C10, C11 | 100 pF | 0402 | GRM1555C1H101JA01D | MURATA |
| C12, C13, C14, C15 | 1 nF | 0402 | GRM1555C1H102JA01D | MURATA |
| L1, L2 | 36 nH | 0402 | 0402AF-360XJLW | COILCRAFT |
| L3 | 1.1 μH | 1008 | 1008AF-112XKRC | COILCRAFT |



CASE STYLE DRAWING

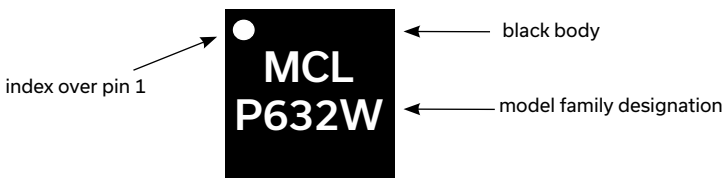
PCB Land Pattern



Weight: .05 grams

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

PRODUCT MARKING



Marking may contain other features or characters for internal lot control



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Power Amplifier

PMA5-63-2W+

50Ω 10 to 6000 MHz 2 W P_{SAT}

ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASHBOARD [CLICK HERE](#)

| | |
|---|--|
| Performance Data & Graphs | Data Graphs S-Parameter (S2P Files) Data Set (.zip file) |
| Case Style | DG1677-10. Plastic package, exposed paddle, Lead Finish: Matte-Tin |
| RoHS Status | Compliant |
| Tape & Reel Standard quantities available on reel | F68-1 7" reels with 10, 50, 100, 200, 500, 1K, or 2K devices |
| Suggested Layout for PCB Design | PL-789 |
| Evaluation Board | TB-PMA5-63-2WC+ 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 conditions

Definitions:

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

TEST CONDITIONS: V_{DD} = +12 V, I_{DD} = 400 mA @ Temperature = +25°C

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP-3 Output | 1dB Comp. Output | 3dB Comp. Output | P _{sat} Output | Noise Figure | 2nd Harmonic | 3rd Harmonic |
|-------|------|-----------|-------------------|--------------------|-----------|---------|-------------|------------------|------------------|-------------------------|--------------|--------------|--------------|
| | | | | | K | Measure | | | | | | | |
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Measure | (dBm) | (dBm) | (dBm) | (dBm) | (dB) | (dBm) | (dBm) |
| 10 | 17.9 | -50.04 | -23.43 | -24.41 | 32.23 | 1.00 | 42.45 | 28.20 | 31.30 | 32.90 | 28.17 | -60.95 | -107.21 |
| 100 | 16.1 | -69.16 | -22.52 | -11.18 | 164.23 | 0.93 | 45.96 | 28.90 | 31.20 | 32.30 | 18.50 | -57.34 | -110.29 |
| 300 | 14.4 | -62.67 | -19.98 | -10.00 | 189.18 | 0.91 | 47.64 | 29.60 | 31.10 | 32.20 | 8.78 | -58.61 | -107.21 |
| 500 | 13.7 | -57.59 | -18.91 | -9.70 | 67.51 | 0.91 | 46.94 | 29.60 | 31.10 | 32.10 | 6.82 | -53.59 | -92.21 |
| 700 | 13.0 | -53.45 | -17.78 | -9.34 | 44.13 | 0.90 | 46.44 | 29.94 | 31.10 | 32.25 | 5.81 | -47.48 | -87.35 |
| 900 | 12.8 | -51.67 | -16.45 | -9.51 | 38.89 | 0.91 | 45.77 | 30.26 | 31.40 | 32.67 | 5.36 | -43.72 | -86.20 |
| 1000 | 12.6 | -51.59 | -15.95 | -9.67 | 39.42 | 0.92 | 45.31 | 30.45 | 31.50 | 32.79 | 5.06 | -42.43 | -82.90 |
| 1200 | 12.7 | -48.68 | -14.25 | -10.03 | 28.86 | 0.93 | 45.55 | 30.65 | 31.60 | 33.12 | 4.76 | -42.49 | -78.16 |
| 1400 | 12.5 | -48.63 | -13.22 | -10.38 | 27.25 | 0.95 | 45.07 | 30.80 | 31.70 | 33.25 | 4.54 | -44.31 | -94.49 |
| 1600 | 12.4 | -47.94 | -12.42 | -10.80 | 25.46 | 0.97 | 45.05 | 30.69 | 31.50 | 33.01 | 4.16 | -44.49 | -94.53 |
| 1800 | 12.3 | -46.43 | -11.88 | -11.27 | 22.52 | 0.98 | 44.47 | 30.62 | 31.50 | 32.96 | 4.01 | -43.68 | -93.69 |
| 2000 | 12.2 | -46.10 | -11.58 | -11.75 | 21.44 | 1.00 | 44.96 | 30.64 | 31.98 | 32.99 | 3.79 | -42.58 | -87.28 |
| 2200 | 12.2 | -45.38 | -11.56 | -12.19 | 20.47 | 1.01 | 44.89 | 30.56 | 31.85 | 32.83 | 3.56 | -42.88 | -94.15 |
| 2400 | 12.2 | -45.61 | -11.82 | -12.44 | 19.69 | 1.01 | 44.98 | 30.74 | 32.06 | 33.03 | 3.27 | -44.40 | -90.42 |
| 2600 | 12.2 | -44.73 | -12.37 | -12.48 | 18.74 | 1.00 | 45.05 | 30.90 | 32.26 | 33.28 | 3.28 | -43.99 | -79.69 |
| 2800 | 12.2 | -43.59 | -13.28 | -12.30 | 17.32 | 0.99 | 44.99 | 30.90 | 32.30 | 33.34 | 2.88 | -41.04 | -77.10 |
| 3000 | 12.2 | -42.70 | -14.62 | -11.86 | 15.75 | 0.97 | 45.04 | 30.90 | 32.30 | 33.30 | 2.67 | -39.10 | -77.20 |
| 3200 | 12.2 | -42.73 | -16.56 | -11.36 | 15.58 | 0.95 | 44.74 | 30.90 | 32.30 | 33.28 | 2.73 | -39.85 | -74.94 |
| 3400 | 12.1 | -42.55 | -19.25 | -10.77 | 15.06 | 0.93 | 44.69 | 31.01 | 32.44 | 33.41 | 2.64 | -41.81 | -72.89 |
| 3600 | 12.1 | -41.85 | -23.19 | -10.26 | 13.88 | 0.91 | 44.51 | 30.99 | 32.45 | 33.45 | 2.69 | -42.81 | -76.56 |
| 3800 | 12.1 | -41.22 | -28.29 | -9.82 | 13.14 | 0.90 | 44.56 | 31.11 | 32.56 | 33.57 | 2.68 | -41.65 | -76.85 |
| 4000 | 12.0 | -41.07 | -27.91 | -9.48 | 13.10 | 0.89 | 44.52 | 31.24 | 32.77 | 33.78 | 2.68 | -40.55 | -74.71 |
| 4200 | 11.9 | -40.76 | -23.95 | -9.28 | 12.29 | 0.89 | 44.35 | 31.16 | 32.71 | 33.67 | 2.68 | -41.14 | -76.22 |
| 4400 | 11.9 | -40.71 | -21.34 | -9.24 | 12.21 | 0.89 | 44.09 | 31.09 | 32.67 | 33.61 | 2.72 | -42.00 | -76.17 |
| 4600 | 11.8 | -40.20 | -19.85 | -9.33 | 11.68 | 0.90 | 43.89 | 31.08 | 32.71 | 33.66 | 2.72 | -40.97 | -71.46 |
| 4800 | 11.8 | -39.78 | -19.06 | -9.54 | 11.06 | 0.91 | 43.39 | 30.96 | 32.51 | 33.45 | 2.74 | -38.06 | -73.85 |
| 5000 | 11.8 | -39.45 | -18.97 | -9.92 | 10.84 | 0.92 | 43.07 | 30.95 | 32.40 | 33.43 | 2.74 | -36.21 | -75.04 |
| 5200 | 11.8 | -39.04 | -19.41 | -10.43 | 10.52 | 0.93 | 42.73 | 31.06 | 32.46 | 33.54 | 2.71 | -37.06 | -73.22 |
| 5400 | 11.8 | -38.75 | -20.35 | -11.04 | 10.12 | 0.94 | 42.70 | 31.00 | 32.33 | 33.45 | 2.65 | -39.22 | -76.02 |
| 5600 | 11.9 | -38.24 | -21.64 | -11.69 | 9.77 | 0.94 | 42.55 | 31.02 | 32.32 | 33.50 | 2.68 | -40.74 | -81.45 |
| 5800 | 11.9 | -37.64 | -22.80 | -12.40 | 9.29 | 0.95 | 42.60 | 31.10 | 32.40 | 33.62 | 2.70 | -40.17 | -80.29 |
| 6000 | 11.9 | -37.41 | -24.81 | -13.12 | 9.05 | 0.96 | 42.32 | 30.93 | 32.28 | 33.55 | 2.69 | -39.98 | -80.28 |
| 6200 | 11.9 | -37.10 | -25.52 | -13.70 | 8.73 | 0.96 | 41.97 | 30.93 | 32.32 | 33.61 | 2.79 | -40.55 | -83.45 |
| 6400 | 11.9 | -37.08 | -24.87 | -14.10 | 8.70 | 0.96 | 41.86 | 31.02 | 32.46 | 33.82 | 2.72 | -41.12 | -80.81 |
| 6600 | 11.8 | -36.64 | -23.83 | -14.38 | 8.43 | 0.96 | 41.83 | 30.88 | 32.35 | 33.59 | 2.77 | -39.95 | -77.61 |
| 6800 | 11.8 | -36.30 | -22.99 | -14.46 | 8.12 | 0.96 | 41.90 | 30.79 | 32.37 | 33.56 | 2.83 | -37.58 | -84.07 |
| 7000 | 11.7 | -35.87 | -22.84 | -14.49 | 7.89 | 0.96 | 41.62 | 30.81 | 32.34 | 33.56 | 2.93 | -37.52 | -84.81 |

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: $V_{DD} = +12\text{ V}$, $I_{DD} = 400\text{ mA}$ @ Temperature = -45°C

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP-3 Output | Noise Figure |
|-------|-------|-----------|-------------------|--------------------|-----------|---------|-------------|--------------|
| | | | | | K | Measure | | |
| (MHz) | (dB) | (dB) | (dB) | (dB) | | | (dBm) | (dB) |
| 10 | 18.77 | -59.10 | -24.73 | -25.09 | 39.31 | 1.00 | 45.38 | 26.11 |
| 100 | 16.72 | -69.60 | -23.07 | -11.76 | 283.96 | 0.94 | 44.80 | 18.89 |
| 300 | 14.96 | -58.55 | -20.11 | -10.46 | 114.88 | 0.92 | 41.69 | 7.88 |
| 500 | 14.26 | -56.92 | -18.89 | -10.05 | 60.67 | 0.91 | 41.69 | 5.85 |
| 700 | 13.64 | -54.23 | -17.61 | -9.59 | 42.29 | 0.91 | 41.40 | 4.96 |
| 900 | 13.31 | -53.53 | -16.21 | -9.77 | 42.03 | 0.92 | 41.17 | 4.50 |
| 1000 | 13.16 | -53.95 | -15.75 | -9.88 | 44.98 | 0.92 | 41.21 | 4.18 |
| 1200 | 13.19 | -50.22 | -14.04 | -10.15 | 30.79 | 0.94 | 41.11 | 3.96 |
| 1400 | 13.01 | -49.62 | -13.02 | -10.34 | 29.16 | 0.95 | 41.10 | 3.71 |
| 1600 | 12.89 | -48.19 | -12.23 | -10.65 | 25.78 | 0.97 | 41.24 | 3.44 |
| 1800 | 12.80 | -47.53 | -11.69 | -11.16 | 24.66 | 0.98 | 41.04 | 3.26 |
| 2000 | 12.74 | -47.18 | -11.39 | -11.79 | 22.50 | 1.00 | 41.25 | 3.03 |
| 2200 | 12.71 | -46.62 | -11.38 | -12.40 | 21.60 | 1.01 | 41.29 | 2.80 |
| 2400 | 12.70 | -45.73 | -11.61 | -12.80 | 20.38 | 1.01 | 41.38 | 2.82 |
| 2600 | 12.70 | -44.96 | -12.07 | -12.93 | 18.96 | 1.01 | 41.44 | 2.51 |
| 2800 | 12.69 | -45.18 | -12.95 | -12.70 | 18.35 | 1.00 | 41.51 | 2.20 |
| 3000 | 12.71 | -44.19 | -14.15 | -12.22 | 16.92 | 0.98 | 41.53 | 2.07 |
| 3200 | 12.69 | -43.36 | -15.99 | -11.54 | 15.84 | 0.96 | 41.42 | 2.11 |
| 3400 | 12.68 | -43.22 | -18.62 | -10.69 | 15.07 | 0.93 | 41.40 | 1.96 |
| 3600 | 12.62 | -42.61 | -22.53 | -9.96 | 14.36 | 0.91 | 41.32 | 2.00 |
| 3800 | 12.58 | -42.24 | -28.62 | -9.37 | 13.57 | 0.89 | 41.28 | 2.00 |
| 4000 | 12.52 | -41.48 | -30.16 | -8.93 | 12.63 | 0.88 | 41.20 | 1.96 |
| 4200 | 12.49 | -41.79 | -25.26 | -8.82 | 12.60 | 0.88 | 41.07 | 2.04 |
| 4400 | 12.47 | -41.33 | -22.14 | -8.99 | 11.90 | 0.88 | 40.97 | 2.00 |
| 4600 | 12.46 | -41.08 | -20.23 | -9.29 | 11.72 | 0.90 | 40.77 | 2.02 |
| 4800 | 12.44 | -40.58 | -19.09 | -9.65 | 11.18 | 0.91 | 40.55 | 2.06 |
| 5000 | 12.43 | -40.23 | -18.63 | -10.08 | 10.85 | 0.92 | 40.31 | 2.04 |
| 5200 | 12.41 | -39.90 | -18.72 | -10.48 | 10.72 | 0.93 | 40.04 | 2.03 |
| 5400 | 12.43 | -39.30 | -19.36 | -11.00 | 10.11 | 0.94 | 39.83 | 1.98 |
| 5600 | 12.45 | -39.20 | -20.44 | -11.44 | 10.08 | 0.94 | 39.72 | 1.99 |
| 5800 | 12.46 | -38.66 | -21.28 | -11.85 | 9.57 | 0.95 | 39.71 | 2.04 |
| 6000 | 12.46 | -38.33 | -23.26 | -12.35 | 9.13 | 0.95 | 39.64 | 2.04 |
| 6200 | 12.46 | -37.99 | -24.19 | -12.86 | 9.03 | 0.95 | 39.51 | 2.03 |
| 6400 | 12.45 | -37.66 | -23.89 | -13.41 | 8.58 | 0.96 | 39.54 | 2.06 |
| 6600 | 12.43 | -37.31 | -23.28 | -13.92 | 8.42 | 0.96 | 39.47 | 2.04 |
| 6800 | 12.40 | -36.93 | -22.56 | -14.31 | 8.17 | 0.96 | 39.84 | 2.12 |
| 7000 | 12.37 | -36.54 | -22.28 | -14.57 | 7.81 | 0.96 | 39.53 | 2.16 |

Typical Performance Data

Definitions:

Input Return Loss = S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = S12 (dB)

Output Return Loss = S22 (dB)

TEST CONDITIONS: $V_{DD} = +12\text{ V}$, $I_{DD} = 400\text{ mA}$ @ Temperature = $+85^{\circ}\text{C}$

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP-3 Output | Noise Figure |
|-------|-------|-----------|-------------------|--------------------|-----------|---------|-------------|--------------|
| | | | | | K | Measure | | |
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Measure | (dBm) | (dB) |
| 10 | 17.31 | -54.93 | -23.13 | -22.40 | 37.91 | 1.00 | 40.97 | 29.59 |
| 100 | 15.56 | -66.07 | -22.09 | -11.04 | 227.57 | 0.93 | 42.70 | 18.58 |
| 300 | 13.83 | -58.68 | -19.88 | -9.97 | 79.49 | 0.91 | 45.47 | 9.34 |
| 500 | 13.12 | -58.23 | -19.06 | -9.72 | 64.24 | 0.91 | 45.14 | 7.35 |
| 700 | 12.49 | -51.44 | -18.01 | -9.38 | 44.13 | 0.90 | 45.18 | 6.42 |
| 900 | 12.26 | -52.75 | -16.69 | -9.47 | 44.15 | 0.91 | 45.17 | 6.00 |
| 1000 | 12.14 | -50.93 | -16.15 | -9.69 | 39.95 | 0.92 | 45.12 | 5.71 |
| 1200 | 12.15 | -48.65 | -14.46 | -10.11 | 30.29 | 0.94 | 45.70 | 5.42 |
| 1400 | 12.00 | -48.11 | -13.41 | -10.53 | 28.00 | 0.95 | 45.50 | 5.15 |
| 1600 | 11.90 | -46.93 | -12.60 | -10.98 | 25.23 | 0.97 | 45.59 | 4.88 |
| 1800 | 11.79 | -45.94 | -12.03 | -11.40 | 23.49 | 0.99 | 45.58 | 4.66 |
| 2000 | 11.72 | -45.32 | -11.74 | -11.75 | 21.06 | 1.00 | 45.55 | 4.45 |
| 2200 | 11.66 | -44.94 | -11.72 | -12.03 | 20.43 | 1.00 | 45.43 | 4.17 |
| 2400 | 11.64 | -44.03 | -12.00 | -12.17 | 18.69 | 1.00 | 45.16 | 4.13 |
| 2600 | 11.63 | -43.44 | -12.59 | -12.13 | 17.74 | 0.99 | 45.03 | 3.79 |
| 2800 | 11.63 | -42.87 | -13.58 | -11.95 | 17.01 | 0.98 | 44.92 | 3.46 |
| 3000 | 11.64 | -42.82 | -14.95 | -11.58 | 16.46 | 0.96 | 44.86 | 3.34 |
| 3200 | 11.63 | -42.09 | -16.94 | -11.18 | 15.47 | 0.95 | 44.61 | 3.31 |
| 3400 | 11.62 | -41.70 | -19.58 | -10.77 | 14.84 | 0.93 | 44.22 | 3.25 |
| 3600 | 11.59 | -41.14 | -23.35 | -10.41 | 13.82 | 0.92 | 43.85 | 3.33 |
| 3800 | 11.55 | -40.78 | -27.36 | -10.09 | 13.32 | 0.91 | 43.72 | 3.33 |
| 4000 | 11.48 | -40.51 | -26.45 | -9.76 | 12.86 | 0.90 | 43.86 | 3.27 |
| 4200 | 11.41 | -40.15 | -23.09 | -9.48 | 12.30 | 0.89 | 43.94 | 3.37 |
| 4400 | 11.31 | -39.73 | -20.84 | -9.29 | 11.82 | 0.89 | 43.83 | 3.37 |
| 4600 | 11.24 | -39.39 | -19.57 | -9.21 | 11.64 | 0.90 | 43.60 | 3.37 |
| 4800 | 11.21 | -39.15 | -19.06 | -9.34 | 11.23 | 0.90 | 43.16 | 3.34 |
| 5000 | 11.21 | -38.78 | -19.25 | -9.70 | 10.79 | 0.91 | 43.10 | 3.37 |
| 5200 | 11.23 | -38.42 | -19.91 | -10.29 | 10.53 | 0.92 | 43.01 | 3.34 |
| 5400 | 11.27 | -37.80 | -21.06 | -11.00 | 9.88 | 0.93 | 43.06 | 3.27 |
| 5600 | 11.30 | -37.72 | -22.53 | -11.82 | 9.95 | 0.94 | 42.97 | 3.37 |
| 5800 | 11.31 | -37.16 | -24.04 | -12.70 | 9.35 | 0.95 | 42.91 | 3.38 |
| 6000 | 11.31 | -36.57 | -26.39 | -13.58 | 9.01 | 0.96 | 42.67 | 3.42 |
| 6200 | 11.31 | -36.22 | -26.87 | -14.22 | 8.75 | 0.96 | 41.97 | 3.42 |
| 6400 | 11.28 | -36.17 | -25.77 | -14.52 | 8.66 | 0.96 | 41.86 | 3.38 |
| 6600 | 11.24 | -35.81 | -24.43 | -14.55 | 8.40 | 0.96 | 41.83 | 3.48 |
| 6800 | 11.19 | -35.50 | -23.55 | -14.36 | 8.05 | 0.96 | 41.90 | 3.55 |
| 7000 | 11.13 | -35.37 | -23.59 | -14.20 | 7.95 | 0.96 | 41.62 | 3.62 |

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} = +12 V, I_{DD} = 400 mA

| FREQ | 1dB Comp. Output | | | 3dB Comp. Output | | | P _{SAT} Output | | |
|-------|------------------|-------|-------|------------------|-------|-------|-------------------------|-------|-------|
| | -45°C | +25°C | +85°C | -45°C | +25°C | +85°C | -45°C | +25°C | +85°C |
| (MHz) | (dBm) | (dBm) | (dBm) | (dBm) | (dBm) | (dBm) | (dBm) | (dBm) | (dBm) |
| 10 | 29.42 | 28.66 | 28.30 | 31.88 | 31.48 | 31.36 | 33.63 | 33.41 | 33.37 |
| 100 | 30.21 | 29.70 | 29.81 | 31.92 | 31.69 | 31.77 | 32.85 | 32.74 | 32.64 |
| 300 | 30.66 | 30.45 | 30.67 | 31.95 | 31.88 | 31.94 | 32.75 | 32.65 | 32.54 |
| 500 | 30.69 | 30.55 | 30.71 | 32.02 | 32.00 | 32.02 | 32.78 | 32.68 | 32.55 |
| 700 | 30.69 | 30.47 | 30.56 | 32.05 | 31.98 | 31.95 | 32.73 | 32.59 | 32.40 |
| 900 | 30.75 | 30.48 | 30.50 | 32.06 | 31.94 | 31.87 | 32.68 | 32.51 | 32.28 |
| 1000 | 30.93 | 30.62 | 30.60 | 32.23 | 32.10 | 32.00 | 32.80 | 32.61 | 32.36 |
| 1200 | 30.91 | 30.59 | 30.56 | 32.19 | 32.04 | 31.94 | 32.78 | 32.60 | 32.35 |
| 1400 | 30.94 | 30.60 | 30.56 | 32.20 | 32.07 | 31.97 | 32.79 | 32.61 | 32.36 |
| 1600 | 31.17 | 30.78 | 30.70 | 32.44 | 32.28 | 32.17 | 33.01 | 32.79 | 32.56 |
| 1800 | 31.05 | 30.65 | 30.56 | 32.33 | 32.13 | 32.02 | 32.85 | 32.60 | 32.38 |
| 2000 | 31.07 | 30.65 | 30.51 | 32.29 | 32.06 | 31.92 | 32.91 | 32.64 | 32.39 |
| 2200 | 31.28 | 30.81 | 30.57 | 32.55 | 32.30 | 32.08 | 33.00 | 32.71 | 32.41 |
| 2400 | 31.28 | 30.80 | 30.52 | 32.55 | 32.28 | 32.04 | 33.12 | 32.82 | 32.49 |
| 2600 | 31.40 | 30.92 | 30.60 | 32.66 | 32.42 | 32.16 | 33.11 | 32.81 | 32.48 |
| 2800 | 31.45 | 30.96 | 30.64 | 32.66 | 32.42 | 32.19 | 33.19 | 32.90 | 32.59 |
| 3000 | 31.49 | 30.92 | 30.61 | 32.70 | 32.40 | 32.18 | 33.17 | 32.82 | 32.53 |
| 3200 | 31.71 | 31.04 | 30.68 | 32.90 | 32.53 | 32.29 | 33.33 | 32.93 | 32.62 |
| 3400 | 31.70 | 30.93 | 30.50 | 32.91 | 32.46 | 32.14 | 33.34 | 32.86 | 32.46 |
| 3600 | 31.81 | 31.03 | 30.54 | 33.08 | 32.66 | 32.28 | 33.47 | 33.00 | 32.54 |
| 3800 | 31.87 | 31.15 | 30.62 | 33.22 | 32.88 | 32.46 | 33.56 | 33.15 | 32.65 |
| 4000 | 32.18 | 31.49 | 30.86 | 33.57 | 33.31 | 32.82 | 33.81 | 33.45 | 32.91 |
| 4200 | 32.07 | 31.32 | 30.66 | 33.53 | 33.19 | 32.66 | 33.72 | 33.30 | 32.73 |
| 4400 | 31.97 | 31.11 | 30.49 | 33.32 | 32.86 | 32.38 | 33.57 | 33.07 | 32.53 |
| 4600 | 31.67 | 30.79 | 30.26 | 32.99 | 32.55 | 32.12 | 33.30 | 32.82 | 32.31 |
| 4800 | 31.46 | 30.67 | 30.22 | 32.86 | 32.46 | 32.06 | 33.24 | 32.77 | 32.29 |
| 5000 | 31.53 | 30.89 | 30.47 | 32.92 | 32.66 | 32.33 | 33.25 | 32.90 | 32.48 |
| 5200 | 31.74 | 31.24 | 30.76 | 33.12 | 32.95 | 32.63 | 33.40 | 33.14 | 32.72 |
| 5400 | 31.89 | 31.43 | 30.90 | 33.26 | 33.10 | 32.78 | 33.54 | 33.27 | 32.84 |
| 5600 | 31.86 | 31.35 | 30.83 | 33.22 | 33.00 | 32.65 | 33.53 | 33.20 | 32.74 |
| 5800 | 31.99 | 31.45 | 30.79 | 33.39 | 33.13 | 32.69 | 33.65 | 33.30 | 32.77 |
| 6000 | 32.07 | 31.47 | 30.77 | 33.47 | 33.20 | 32.70 | 33.69 | 33.34 | 32.77 |
| 6200 | 31.79 | 31.39 | 30.66 | 33.48 | 33.16 | 32.61 | 33.75 | 33.33 | 32.71 |
| 6400 | 32.05 | 31.60 | 30.80 | 33.76 | 33.42 | 32.81 | 33.94 | 33.49 | 32.85 |
| 6600 | 32.05 | 31.55 | 30.71 | 33.89 | 33.51 | 32.86 | 34.02 | 33.55 | 32.89 |
| 6800 | 31.98 | 31.50 | 30.63 | 33.95 | 33.48 | 32.79 | 34.04 | 33.50 | 32.82 |
| 7000 | 31.86 | 31.38 | 30.52 | 33.78 | 33.32 | 32.63 | 33.88 | 33.35 | 32.66 |

Typical Performance Data

Definitions:

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

TEST CONDITIONS: $V_{DD} = +14\text{ V}$, $I_{DD} = 400\text{ mA}$ @ Temperature = +25°C

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP-3 Output | 3dB Comp. Output | Psat Output | Noise Figure | 2nd Harmonic | 3rd Harmonic |
|-------|-------|-----------|-------------------|--------------------|-----------|---------|-------------|------------------|-------------|--------------|--------------|--------------|
| | | | | | K | Measure | | | | | | |
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Measure | (dBm) | (dBm) | (dBm) | (dB) | (dBm) | (dBm) |
| 10 | 17.59 | -53.65 | -23.87 | -24.03 | 31.54 | 1.00 | 39.35 | 31.70 | 33.80 | 28.82 | -59.98 | -107.65 |
| 100 | 15.98 | -64.02 | -22.63 | -12.02 | 117.65 | 0.94 | 45.16 | 32.10 | 33.30 | 30.53 | -57.04 | -108.98 |
| 300 | 14.26 | -63.82 | -20.09 | -10.58 | 135.92 | 0.92 | 46.30 | 32.40 | 33.20 | 8.81 | -58.20 | -105.78 |
| 500 | 13.57 | -58.61 | -18.84 | -10.30 | 79.96 | 0.92 | 45.48 | 32.40 | 33.20 | 6.89 | -53.32 | -95.91 |
| 700 | 12.92 | -54.22 | -17.67 | -9.79 | 51.15 | 0.91 | 44.75 | 32.40 | 33.27 | 5.93 | -47.72 | -92.16 |
| 900 | 12.62 | -51.58 | -16.36 | -9.95 | 38.99 | 0.92 | 44.76 | 32.80 | 33.69 | 5.48 | -44.26 | -87.55 |
| 1000 | 12.49 | -52.05 | -15.87 | -10.10 | 41.84 | 0.92 | 44.49 | 32.90 | 33.79 | 5.11 | -42.77 | -82.79 |
| 1200 | 12.48 | -49.52 | -14.22 | -10.47 | 31.17 | 0.94 | 44.81 | 33.00 | 34.11 | 4.78 | -42.98 | -76.20 |
| 1400 | 12.31 | -49.34 | -13.22 | -10.68 | 31.00 | 0.96 | 44.53 | 33.20 | 34.22 | 4.64 | -44.77 | -89.56 |
| 1600 | 12.17 | -48.25 | -12.45 | -11.07 | 27.75 | 0.97 | 44.24 | 33.00 | 33.99 | 4.47 | -44.80 | -99.10 |
| 1800 | 12.06 | -46.41 | -11.92 | -11.70 | 22.81 | 0.99 | 44.09 | 33.00 | 33.94 | 4.02 | -43.73 | -87.05 |
| 2000 | 11.98 | -46.95 | -11.63 | -11.83 | 24.41 | 1.00 | 44.01 | 33.60 | 34.01 | 3.80 | -42.78 | -80.18 |
| 2200 | 11.92 | -45.92 | -11.60 | -12.04 | 21.86 | 1.00 | 44.20 | 33.42 | 33.80 | 3.46 | -42.96 | -84.66 |
| 2400 | 11.89 | -45.74 | -11.84 | -12.55 | 21.76 | 1.01 | 44.25 | 33.64 | 33.98 | 3.26 | -44.36 | -83.96 |
| 2600 | 11.87 | -44.90 | -12.40 | -12.22 | 19.85 | 0.99 | 44.29 | 33.85 | 34.23 | 3.14 | -43.87 | -77.03 |
| 2800 | 11.87 | -44.00 | -13.30 | -12.02 | 18.02 | 0.98 | 44.10 | 33.91 | 34.27 | 3.02 | -40.91 | -74.91 |
| 3000 | 11.86 | -43.30 | -14.61 | -11.70 | 16.78 | 0.97 | 44.05 | 33.88 | 34.22 | 2.94 | -38.92 | -76.89 |
| 3200 | 11.86 | -43.67 | -16.49 | -11.17 | 17.56 | 0.95 | 44.09 | 33.88 | 34.08 | 2.87 | -39.78 | -73.92 |
| 3400 | 11.84 | -43.38 | -19.16 | -10.69 | 17.04 | 0.93 | 43.89 | 34.02 | 34.27 | 2.80 | -41.74 | -72.56 |
| 3600 | 11.80 | -42.49 | -23.00 | -9.99 | 15.32 | 0.90 | 43.70 | 34.02 | 34.28 | 2.74 | -42.45 | -76.74 |
| 3800 | 11.75 | -42.44 | -27.74 | -9.81 | 15.31 | 0.90 | 43.69 | 34.15 | 34.41 | 2.82 | -41.24 | -77.72 |
| 4000 | 11.70 | -41.87 | -27.43 | -9.41 | 14.29 | 0.89 | 43.49 | 34.42 | 34.61 | 2.77 | -40.36 | -75.01 |
| 4200 | 11.64 | -40.73 | -23.70 | -9.29 | 12.54 | 0.88 | 43.56 | 34.34 | 34.52 | 2.80 | -40.89 | -76.48 |
| 4400 | 11.58 | -40.45 | -21.21 | -9.32 | 12.20 | 0.89 | 43.43 | 34.33 | 34.46 | 2.93 | -41.95 | -77.35 |
| 4600 | 11.55 | -40.55 | -19.80 | -9.54 | 12.42 | 0.90 | 43.23 | 34.40 | 34.46 | 2.79 | -40.72 | -72.63 |
| 4800 | 11.53 | -40.18 | -19.15 | -9.54 | 11.92 | 0.90 | 42.94 | 34.2 | 34.22 | 2.81 | -37.87 | -75.38 |
| 5000 | 11.52 | -39.57 | -19.09 | -10.27 | 11.33 | 0.92 | 42.40 | 34.10 | 34.16 | 2.88 | -36.00 | -77.31 |
| 5200 | 11.53 | -39.16 | -19.57 | -10.54 | 10.86 | 0.92 | 42.38 | 34.26 | 34.20 | 2.78 | -36.89 | -75.24 |
| 5400 | 11.55 | -39.34 | -20.52 | -11.34 | 11.26 | 0.93 | 42.25 | 34.10 | 34.10 | 2.82 | -39.13 | -78.19 |
| 5600 | 11.57 | -39.12 | -21.72 | -11.98 | 11.12 | 0.94 | 42.41 | 34.14 | 34.15 | 2.79 | -40.60 | -82.40 |
| 5800 | 11.59 | -38.33 | -22.75 | -12.54 | 10.21 | 0.95 | 42.58 | 34.3 | 34.3 | 2.84 | -40.01 | -82.31 |
| 6000 | 11.59 | -38.01 | -24.58 | -13.63 | 10.00 | 0.96 | 42.58 | 34.22 | 34.22 | 2.82 | -39.86 | -81.18 |
| 6200 | 11.57 | -37.54 | -25.09 | -13.73 | 9.52 | 0.96 | 42.45 | 34.35 | 34.31 | 2.84 | -40.53 | -85.07 |
| 6400 | 11.55 | -37.20 | -24.38 | -14.31 | 9.21 | 0.96 | 42.21 | 34.59 | 34.49 | 2.88 | -41.04 | -81.60 |
| 6600 | 11.51 | -36.86 | -23.47 | -14.35 | 8.90 | 0.96 | 41.84 | 34.44 | 34.34 | 2.94 | -39.80 | -80.26 |
| 6800 | 11.46 | -36.98 | -22.87 | -14.41 | 9.08 | 0.97 | 41.38 | 34.4 | 34.3 | 2.96 | -37.49 | -86.74 |
| 7000 | 11.41 | -36.52 | -22.87 | -13.99 | 8.62 | 0.96 | 41.11 | 34.39 | 34.30 | 3.03 | -37.44 | -86.09 |

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} = +16 V, I_{DD} = 400 mA @ Temperature = +25°C

| FREQ | Gain | Isolation | Input Return Loss | Output Return Loss | Stability | | IP-3 Output | 3dB Comp. Output | Psat Output | Noise Figure | 2nd Harmonic | 3rd Harmonic |
|-------|-------|-----------|-------------------|--------------------|-----------|---------|-------------|------------------|-------------|--------------|--------------|--------------|
| | | | | | K | Measure | | | | | | |
| (MHz) | (dB) | (dB) | (dB) | (dB) | K | Measure | (dBm) | (dBm) | (dBm) | (dB) | (dBm) | (dBm) |
| 10 | 17.37 | -44.33 | -23.75 | -25.20 | 11.08 | 1.00 | 40.04 | 32.50 | 34.60 | 28.86 | -59.67 | -107.14 |
| 100 | 15.83 | -73.40 | -22.63 | -12.45 | 354.52 | 0.95 | 44.44 | 33.00 | 34.30 | 30.71 | -57.02 | -97.40 |
| 300 | 14.16 | -58.40 | -20.08 | -11.04 | 74.31 | 0.93 | 46.12 | 33.40 | 34.10 | 8.90 | -57.73 | -103.69 |
| 500 | 13.53 | -56.72 | -18.84 | -10.63 | 65.06 | 0.92 | 45.51 | 33.50 | 34.00 | 6.91 | -53.68 | -90.64 |
| 700 | 12.88 | -53.87 | -17.67 | -10.10 | 49.72 | 0.92 | 45.11 | 33.50 | 34.22 | 5.98 | -47.79 | -83.49 |
| 900 | 12.57 | -52.99 | -16.34 | -10.13 | 46.35 | 0.92 | 45.06 | 34.00 | 34.58 | 5.50 | -44.25 | -84.58 |
| 1000 | 12.42 | -53.09 | -15.84 | -10.31 | 47.74 | 0.93 | 44.82 | 34.10 | 34.68 | 5.16 | -43.00 | -82.49 |
| 1200 | 12.42 | -49.82 | -14.17 | -10.57 | 32.60 | 0.95 | 45.32 | 34.10 | 34.97 | 4.79 | -43.24 | -77.59 |
| 1400 | 12.22 | -49.31 | -13.20 | -10.79 | 31.26 | 0.96 | 45.03 | 34.20 | 35.06 | 4.69 | -44.83 | -91.31 |
| 1600 | 12.08 | -48.50 | -12.43 | -11.25 | 28.93 | 0.98 | 44.82 | 34.10 | 34.86 | 4.56 | -44.96 | -93.13 |
| 1800 | 11.96 | -47.91 | -11.90 | -11.46 | 27.28 | 0.99 | 44.63 | 34.00 | 34.83 | 4.03 | -44.10 | -88.87 |
| 2000 | 11.86 | -47.27 | -11.63 | -11.84 | 25.67 | 1.00 | 44.61 | 34.48 | 34.93 | 3.84 | -42.70 | -87.13 |
| 2200 | 11.80 | -46.46 | -11.62 | -12.15 | 23.65 | 1.00 | 44.71 | 34.28 | 34.69 | 3.54 | -42.94 | -85.40 |
| 2400 | 11.76 | -45.85 | -11.86 | -12.20 | 22.23 | 1.00 | 44.55 | 34.41 | 34.84 | 3.34 | -44.21 | -90.27 |
| 2600 | 11.74 | -45.24 | -12.39 | -12.24 | 20.96 | 1.00 | 44.72 | 34.53 | 35.02 | 3.19 | -43.58 | -78.33 |
| 2800 | 11.73 | -44.68 | -13.26 | -11.97 | 19.78 | 0.98 | 44.48 | 34.58 | 35.00 | 3.04 | -40.82 | -76.83 |
| 3000 | 11.72 | -44.18 | -14.55 | -11.61 | 18.80 | 0.97 | 44.42 | 34.51 | 34.95 | 2.96 | -38.73 | -78.46 |
| 3200 | 11.72 | -43.64 | -16.39 | -11.15 | 17.76 | 0.95 | 44.42 | 34.40 | 34.71 | 2.91 | -39.46 | -74.75 |
| 3400 | 11.71 | -43.23 | -18.97 | -10.66 | 16.98 | 0.93 | 44.26 | 34.55 | 34.97 | 2.81 | -41.46 | -72.51 |
| 3600 | 11.68 | -42.84 | -22.61 | -10.36 | 16.32 | 0.91 | 44.03 | 34.47 | 34.94 | 2.75 | -42.08 | -75.56 |
| 3800 | 11.64 | -42.41 | -27.08 | -9.92 | 15.50 | 0.90 | 43.88 | 34.57 | 35.03 | 2.85 | -41.11 | -76.05 |
| 4000 | 11.59 | -42.01 | -27.15 | -9.80 | 14.85 | 0.90 | 43.79 | 34.83 | 35.18 | 2.83 | -40.20 | -74.15 |
| 4200 | 11.54 | -41.48 | -23.50 | -9.62 | 13.96 | 0.89 | 43.84 | 34.70 | 35.12 | 2.86 | -40.78 | -76.01 |
| 4400 | 11.49 | -41.28 | -21.02 | -9.84 | 13.75 | 0.90 | 43.65 | 34.67 | 35.09 | 2.96 | -41.72 | -75.57 |
| 4600 | 11.45 | -40.90 | -19.58 | -9.85 | 13.19 | 0.90 | 43.57 | 34.68 | 35.04 | 2.82 | -40.51 | -71.14 |
| 4800 | 11.43 | -40.46 | -18.88 | -10.34 | 12.70 | 0.92 | 43.34 | 34.47 | 34.85 | 2.80 | -37.65 | -73.47 |
| 5000 | 11.41 | -40.14 | -18.83 | -10.60 | 12.33 | 0.92 | 42.77 | 34.40 | 34.74 | 2.88 | -35.84 | -74.87 |
| 5200 | 11.40 | -39.84 | -19.31 | -11.33 | 12.11 | 0.94 | 42.80 | 34.55 | 34.78 | 2.85 | -36.70 | -72.32 |
| 5400 | 11.41 | -39.45 | -20.42 | -11.77 | 11.68 | 0.94 | 42.76 | 34.43 | 34.64 | 2.84 | -38.91 | -75.72 |
| 5600 | 11.41 | -39.15 | -21.85 | -12.52 | 11.44 | 0.95 | 42.82 | 34.37 | 34.64 | 2.81 | -40.41 | -80.96 |
| 5800 | 11.41 | -38.46 | -23.07 | -13.15 | 10.68 | 0.95 | 42.95 | 34.43 | 34.74 | 2.83 | -39.88 | -79.58 |
| 6000 | 11.39 | -38.01 | -24.87 | -13.40 | 10.21 | 0.96 | 42.89 | 34.40 | 34.73 | 2.85 | -39.59 | -79.94 |
| 6200 | 11.38 | -37.78 | -24.94 | -14.08 | 10.04 | 0.96 | 42.79 | 34.48 | 34.80 | 2.87 | -40.26 | -82.50 |
| 6400 | 11.34 | -37.54 | -23.97 | -13.95 | 9.79 | 0.96 | 42.58 | 34.76 | 35.05 | 2.97 | -40.89 | -80.70 |
| 6600 | 11.28 | -37.28 | -23.04 | -14.03 | 9.56 | 0.96 | 42.22 | 34.72 | 34.95 | 2.98 | -39.58 | -78.21 |
| 6800 | 11.22 | -37.05 | -22.50 | -13.46 | 9.32 | 0.96 | 41.79 | 34.63 | 34.87 | 3.06 | -37.34 | -82.70 |
| 7000 | 11.13 | -36.86 | -22.74 | -13.15 | 9.18 | 0.95 | 41.59 | 34.65 | 34.91 | 3.10 | -37.18 | -84.41 |

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: $V_{DD} = +12\text{ V}$, $I_{DD} = 400\text{ mA}$ @ Temperature = +25°C

| Power | OIP2 (@1 GHz) | OIP2 (@3 GHz) | OIP2 (@6 GHz) |
|-------|------------------|------------------|------------------|
| (dBm) | (dBm) | (dBm) | (dBm) |
| 5 | 46.06 | 47.98 | 45.17 |
| 6 | 46.46 | 48.22 | 45.21 |
| 7 | 46.47 | 48.15 | 45.22 |
| 8 | 46.47 | 48.20 | 45.24 |
| 9 | 46.40 | 48.15 | 45.24 |
| 10 | 46.37 | 47.88 | 45.44 |
| 11 | 46.26 | 47.86 | 45.37 |
| 12 | 46.26 | 47.86 | 45.33 |
| 13 | 46.22 | 47.76 | 45.27 |
| 14 | 46.08 | 47.65 | 45.16 |
| 15 | 45.76 | 47.25 | 44.80 |
| 16 | 45.60 | 47.13 | 44.68 |
| 17 | 45.46 | 46.92 | 44.47 |
| 18 | 45.18 | 46.68 | 44.27 |
| 19 | 44.94 | 46.42 | 43.99 |
| 20 | 44.76 | 46.17 | 43.79 |
| 21 | 44.65 | 45.90 | 43.49 |
| 22 | 44.77 | 45.74 | 43.06 |
| 23 | 45.28 | 45.88 | 42.85 |
| 24 | 46.01 | 46.15 | 43.11 |
| 25 | 47.14 | 46.67 | 43.93 |
| 26 | 49.03 | 47.40 | 45.30 |
| 27 | 51.80 | 48.30 | 47.12 |

Typical Performance Data

TEST CONDITIONS: $V_{DD} = +12\text{ V}$, $V_{G2} = +5\text{ V}$, $I_{DD} = 400\text{ mA}$ @ Temperature = $+25^{\circ}\text{C}$

| FREQ | P _{IN} | Gain |
|-------|-----------------|------|
| (MHz) | (dBm) | (dB) |
| 1000 | 0.00 | 12.8 |
| 1000 | 1.00 | 12.8 |
| 1000 | 2.00 | 12.8 |
| 1000 | 3.00 | 12.8 |
| 1000 | 4.00 | 12.8 |
| 1000 | 5.00 | 12.8 |
| 1000 | 6.0 | 12.8 |
| 1000 | 7.0 | 12.8 |
| 1000 | 8.0 | 12.8 |
| 1000 | 9.0 | 12.8 |
| 1000 | 10.0 | 12.9 |
| 1000 | 12.0 | 12.9 |
| 1000 | 14.0 | 12.8 |
| 1000 | 15.0 | 12.7 |
| 1000 | 16.0 | 12.5 |
| 1000 | 18.0 | 11.9 |
| 1000 | 20.0 | 11.0 |
| 1000 | 22.0 | 9.7 |
| 1000 | 24.0 | 8.3 |
| 1000 | 25.0 | 7.6 |
| 4000 | 0.00 | 12.1 |
| 4000 | 1.00 | 12.1 |
| 4000 | 2.00 | 12.1 |
| 4000 | 3.00 | 12.1 |
| 4000 | 4.00 | 12.1 |
| 4000 | 5.00 | 12.1 |
| 4000 | 6.0 | 12.1 |
| 4000 | 7.0 | 12.1 |
| 4000 | 8.0 | 12.1 |
| 4000 | 9.0 | 12.1 |
| 4000 | 10.0 | 12.1 |
| 4000 | 12.0 | 12.1 |
| 4000 | 14.0 | 12.1 |
| 4000 | 15.0 | 12.1 |
| 4000 | 16.0 | 11.9 |
| 4000 | 18.0 | 11.5 |
| 4000 | 20.0 | 10.8 |
| 4000 | 22.0 | 9.7 |
| 4000 | 24.0 | 8.3 |
| 4000 | 25.0 | 7.6 |
| 8000 | 0.00 | 11.4 |
| 8000 | 1.00 | 11.4 |
| 8000 | 2.00 | 11.4 |
| 8000 | 3.00 | 11.4 |
| 8000 | 4.00 | 11.4 |
| 8000 | 5.00 | 11.4 |
| 8000 | 6.0 | 11.4 |
| 8000 | 7.0 | 11.4 |
| 8000 | 8.0 | 11.4 |
| 8000 | 9.0 | 11.4 |
| 8000 | 10.0 | 11.4 |
| 8000 | 12.0 | 11.4 |
| 8000 | 14.0 | 11.4 |
| 8000 | 15.0 | 11.4 |
| 8000 | 16.0 | 11.3 |
| 8000 | 18.0 | 10.9 |
| 8000 | 20.0 | 10.3 |
| 8000 | 22.0 | 9.5 |
| 8000 | 24.0 | 8.5 |
| 8000 | 25.0 | 7.9 |

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: $V_{DD} = +12\text{ V}$, $I_{DD} = 400\text{ mA}$ @ Temperature = +25°C

| Power | P _{OUT} (@1 GHz) | P _{OUT} (@4 GHz) | I _{DD} (@1 GHz) | I _{DD} (@4 GHz) | P _{DISS} (@1 GHz) | P _{DISS} (@4 GHz) | PAE (@1 GHz) | PAE (@4 GHz) |
|-------|------------------------------|------------------------------|-----------------------------|-----------------------------|-------------------------------|-------------------------------|-----------------|-----------------|
| (dBm) | (dBm) | (dBm) | mA | mA | (dBm) | (dBm) | (%) | (%) |
| 0.00 | 12.85 | 12.07 | 392.27 | 396.15 | 4.78 | 4.78 | 0.38 | 0.32 |
| 0.50 | 13.34 | 12.56 | 394.53 | 394.85 | 4.78 | 4.78 | 0.43 | 0.36 |
| 1.00 | 13.85 | 13.06 | 390.66 | 393.89 | 4.78 | 4.78 | 0.48 | 0.40 |
| 1.50 | 14.35 | 13.56 | 393.24 | 394.53 | 4.77 | 4.78 | 0.54 | 0.45 |
| 2.00 | 14.84 | 14.06 | 394.85 | 395.50 | 4.77 | 4.78 | 0.60 | 0.50 |
| 2.50 | 15.33 | 14.56 | 392.92 | 394.53 | 4.77 | 4.77 | 0.67 | 0.56 |
| 3.00 | 15.84 | 15.06 | 392.59 | 393.56 | 4.76 | 4.77 | 0.76 | 0.63 |
| 3.50 | 16.34 | 15.56 | 390.66 | 393.24 | 4.76 | 4.77 | 0.85 | 0.71 |
| 4.00 | 16.84 | 16.06 | 390.01 | 393.89 | 4.75 | 4.76 | 0.95 | 0.80 |
| 4.50 | 17.34 | 16.56 | 390.66 | 393.24 | 4.75 | 4.76 | 1.07 | 0.89 |
| 5.00 | 17.84 | 17.06 | 389.69 | 391.63 | 4.74 | 4.75 | 1.20 | 1.00 |
| 5.50 | 18.35 | 17.56 | 389.04 | 393.24 | 4.74 | 4.75 | 1.35 | 1.13 |
| 6.00 | 18.85 | 18.07 | 386.46 | 391.30 | 4.73 | 4.74 | 1.51 | 1.26 |
| 6.50 | 19.35 | 18.56 | 387.43 | 390.66 | 4.72 | 4.73 | 1.70 | 1.42 |
| 7.00 | 19.85 | 19.06 | 388.07 | 390.66 | 4.71 | 4.72 | 1.91 | 1.59 |
| 7.50 | 20.36 | 19.56 | 388.07 | 391.30 | 4.70 | 4.71 | 2.14 | 1.79 |
| 8.00 | 20.86 | 20.06 | 385.17 | 390.98 | 4.68 | 4.70 | 2.41 | 2.00 |
| 8.50 | 21.36 | 20.56 | 385.17 | 388.40 | 4.67 | 4.69 | 2.70 | 2.25 |
| 9.00 | 21.87 | 21.06 | 385.49 | 390.66 | 4.65 | 4.68 | 3.04 | 2.52 |
| 9.50 | 22.37 | 21.56 | 385.17 | 390.98 | 4.64 | 4.66 | 3.41 | 2.83 |
| 10.00 | 22.87 | 22.06 | 384.85 | 389.37 | 4.62 | 4.65 | 3.83 | 3.18 |
| 10.50 | 23.38 | 22.56 | 382.59 | 389.04 | 4.59 | 4.63 | 4.30 | 3.56 |
| 11.00 | 23.88 | 23.06 | 385.17 | 388.40 | 4.57 | 4.61 | 4.83 | 4.00 |
| 11.50 | 24.38 | 23.56 | 384.85 | 389.37 | 4.54 | 4.58 | 5.42 | 4.49 |
| 12.00 | 24.88 | 24.06 | 381.62 | 389.69 | 4.51 | 4.56 | 6.07 | 5.03 |
| 12.50 | 25.37 | 24.56 | 382.91 | 388.72 | 4.47 | 4.53 | 6.81 | 5.64 |
| 13.00 | 25.87 | 25.05 | 381.29 | 389.37 | 4.43 | 4.50 | 7.63 | 6.32 |
| 13.50 | 26.35 | 25.54 | 381.62 | 389.37 | 4.39 | 4.46 | 8.53 | 7.07 |
| 14.00 | 26.83 | 26.02 | 381.29 | 390.33 | 4.34 | 4.42 | 9.52 | 7.90 |
| 14.50 | 27.29 | 26.50 | 381.94 | 390.98 | 4.29 | 4.38 | 10.58 | 8.81 |
| 15.00 | 27.74 | 26.97 | 380.65 | 390.98 | 4.24 | 4.33 | 11.71 | 9.81 |
| 15.50 | 28.16 | 27.42 | 383.23 | 392.27 | 4.18 | 4.28 | 12.90 | 10.88 |
| 16.00 | 28.56 | 27.86 | 383.23 | 394.53 | 4.12 | 4.22 | 14.14 | 12.01 |
| 16.50 | 28.94 | 28.27 | 385.49 | 397.76 | 4.06 | 4.17 | 15.39 | 13.20 |
| 17.00 | 29.29 | 28.67 | 386.78 | 400.02 | 4.00 | 4.11 | 16.66 | 14.44 |
| 17.50 | 29.63 | 29.06 | 388.72 | 407.12 | 3.94 | 4.04 | 17.95 | 15.74 |
| 18.00 | 29.94 | 29.43 | 391.30 | 412.94 | 3.88 | 3.98 | 19.24 | 17.09 |
| 18.50 | 30.23 | 29.78 | 395.18 | 423.59 | 3.82 | 3.91 | 20.50 | 18.47 |
| 19.00 | 30.50 | 30.10 | 397.11 | 430.37 | 3.76 | 3.85 | 21.71 | 19.83 |
| 19.50 | 30.74 | 30.40 | 404.54 | 435.86 | 3.70 | 3.79 | 22.86 | 21.14 |
| 20.00 | 30.96 | 30.67 | 408.42 | 444.58 | 3.65 | 3.72 | 23.94 | 22.40 |
| 20.50 | 31.17 | 30.93 | 413.26 | 456.85 | 3.60 | 3.67 | 24.94 | 23.60 |
| 21.00 | 31.35 | 31.16 | 421.33 | 465.24 | 3.56 | 3.61 | 25.86 | 24.73 |
| 21.50 | 31.52 | 31.37 | 426.82 | 472.67 | 3.52 | 3.56 | 26.68 | 25.78 |
| 22.00 | 31.68 | 31.56 | 431.34 | 481.06 | 3.48 | 3.52 | 27.42 | 26.72 |
| 22.50 | 31.82 | 31.74 | 437.47 | 487.84 | 3.45 | 3.48 | 28.08 | 27.56 |
| 23.00 | 31.96 | 31.90 | 442.32 | 496.24 | 3.42 | 3.44 | 28.66 | 28.28 |
| 23.50 | 32.08 | 32.05 | 450.71 | 504.95 | 3.40 | 3.41 | 29.14 | 28.89 |
| 24.00 | 32.20 | 32.18 | 459.75 | 514.64 | 3.38 | 3.39 | 29.53 | 29.39 |
| 24.50 | 32.30 | 32.30 | 467.82 | 524.97 | 3.37 | 3.37 | 29.79 | 29.77 |
| 25.00 | 32.38 | 32.40 | 470.41 | 527.23 | 3.37 | 3.36 | 29.75 | 29.93 |

Typical Performance Data

TEST CONDITIONS: $V_{DD} = +12\text{ V}$, $I_{DD} = 300\text{ mA}$, 400 mA , 500 mA @ Temperature = $+25^\circ\text{C}$

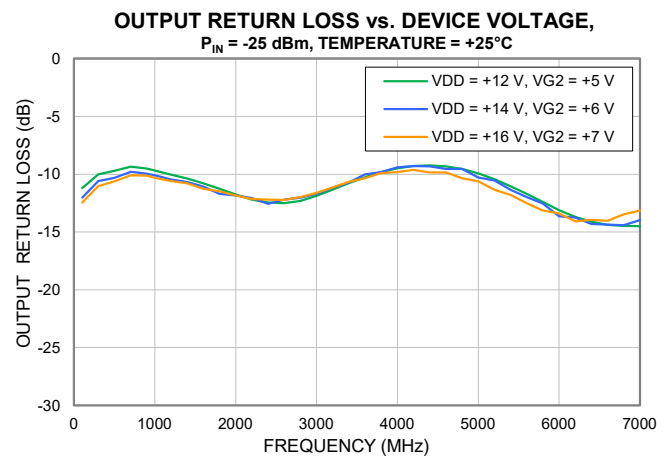
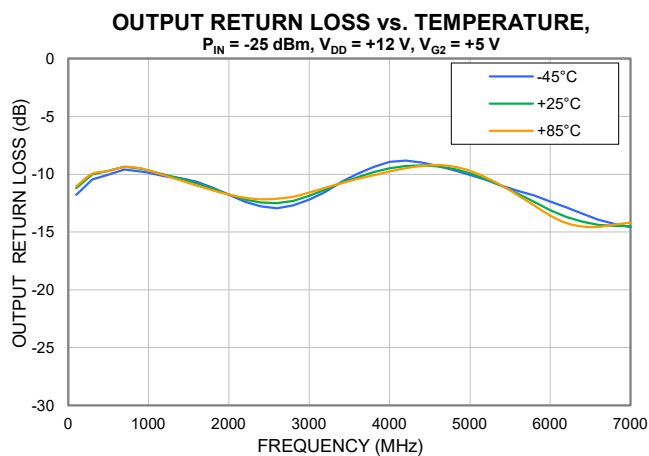
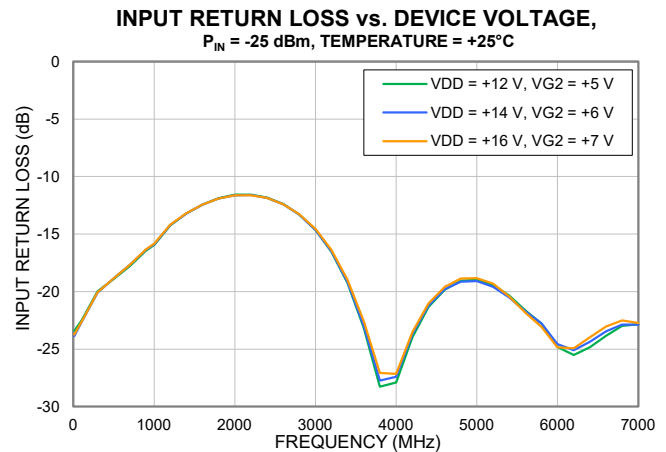
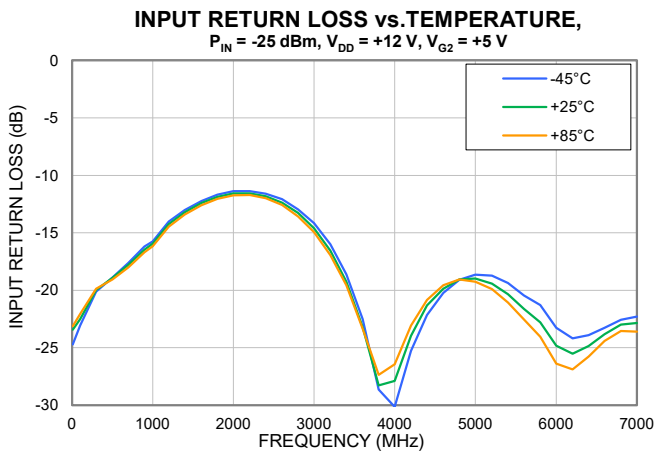
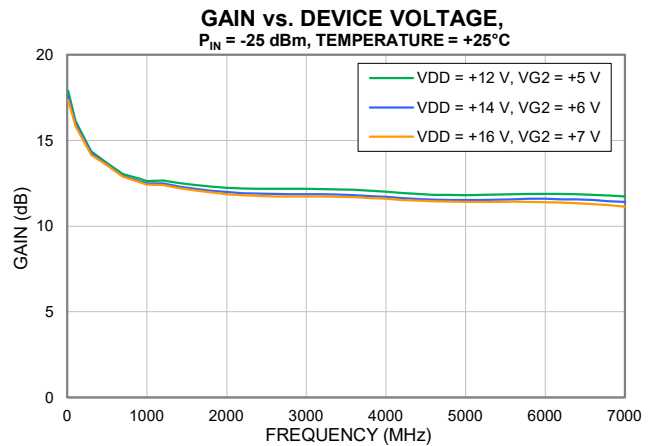
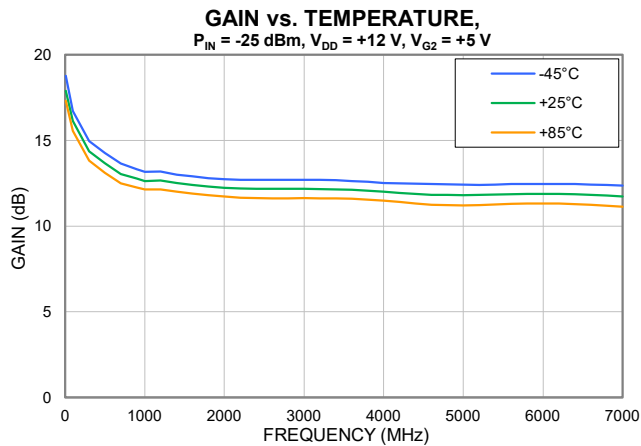
| FREQ | Gain @ 300 mA | Gain @ 400 mA | Gain @ 500 mA | 1dB Comp. Output @ 300 mA | 1dB Comp. Output @ 400 mA | 1dB Comp. Output @ 500 mA | Psat Output @ 300 mA | Psat Output @ 400 mA | Psat Output @ 500 mA | Noise Figure @ 300 mA | Noise Figure @ 400 mA | Noise Figure @ 500 mA |
|-------|------------------|------------------|------------------|------------------------------------|------------------------------------|------------------------------------|----------------------------|----------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|
| (MHz) | (dB) | (dB) | (dB) | (dBm) | (dBm) | (dBm) | (dBm) | (dBm) | (dBm) | (dB) | (dB) | (dB) |
| 10 | 17.4 | 17.9 | 18.1 | 27.24 | 28.13 | 28.62 | 32.11 | 32.35 | 32.55 | 28.64 | 28.71 | 28.90 |
| 100 | 15.9 | 16.3 | 16.6 | 27.85 | 28.71 | 29.15 | 32.24 | 32.36 | 32.48 | 30.81 | 30.77 | 30.42 |
| 300 | 14.1 | 14.5 | 14.8 | 28.29 | 29.29 | 29.90 | 31.52 | 31.65 | 31.78 | 8.73 | 8.79 | 8.85 |
| 500 | 13.4 | 13.8 | 14.1 | 28.74 | 29.62 | 30.05 | 30.78 | 30.92 | 31.02 | 6.79 | 6.81 | 6.95 |
| 700 | 12.8 | 13.2 | 13.5 | 28.92 | 29.94 | 30.45 | 31.75 | 31.90 | 31.98 | 5.84 | 5.91 | 6.02 |
| 900 | 12.5 | 12.9 | 13.2 | 29.20 | 30.31 | 30.81 | 32.28 | 32.45 | 32.53 | 5.37 | 5.44 | 5.55 |
| 1000 | 12.4 | 12.8 | 13.0 | 29.41 | 30.54 | 31.03 | 32.84 | 33.01 | 33.09 | 5.00 | 5.10 | 5.23 |
| 1200 | 12.4 | 12.8 | 13.0 | 29.48 | 30.63 | 31.12 | 32.74 | 32.92 | 33.00 | 4.65 | 4.73 | 4.84 |
| 1400 | 12.2 | 12.6 | 12.8 | 29.54 | 30.62 | 31.09 | 32.80 | 32.98 | 33.05 | 4.54 | 4.60 | 4.75 |
| 1600 | 12.0 | 12.5 | 12.7 | 29.52 | 30.53 | 30.98 | 32.35 | 32.53 | 32.59 | 4.34 | 4.43 | 4.54 |
| 1800 | 11.9 | 12.3 | 12.6 | 29.46 | 30.43 | 30.87 | 32.16 | 32.32 | 32.39 | 3.91 | 3.96 | 4.12 |
| 2000 | 11.8 | 12.3 | 12.5 | 29.44 | 30.41 | 30.83 | 32.13 | 32.31 | 32.39 | 3.65 | 3.76 | 3.95 |
| 2200 | 11.8 | 12.2 | 12.4 | 29.41 | 30.33 | 30.73 | 31.99 | 32.17 | 32.24 | 3.35 | 3.47 | 3.61 |
| 2400 | 11.8 | 12.2 | 12.4 | 29.56 | 30.46 | 30.86 | 32.11 | 32.29 | 32.37 | 3.15 | 3.27 | 3.41 |
| 2600 | 11.7 | 12.2 | 12.4 | 29.69 | 30.65 | 31.07 | 32.25 | 32.46 | 32.55 | 3.01 | 3.12 | 3.28 |
| 2800 | 11.8 | 12.2 | 12.4 | 29.80 | 30.79 | 31.18 | 32.58 | 32.77 | 32.86 | 2.88 | 2.97 | 3.16 |
| 3000 | 11.8 | 12.2 | 12.4 | 29.89 | 30.93 | 31.33 | 32.65 | 32.86 | 32.96 | 2.78 | 2.88 | 3.09 |
| 3200 | 11.8 | 12.2 | 12.4 | 29.90 | 30.97 | 31.37 | 32.67 | 32.89 | 32.99 | 2.68 | 2.78 | 2.98 |
| 3400 | 11.7 | 12.1 | 12.4 | 29.77 | 30.89 | 31.27 | 32.64 | 32.85 | 32.93 | 2.62 | 2.75 | 2.92 |
| 3600 | 11.7 | 12.1 | 12.4 | 29.87 | 31.04 | 31.44 | 32.89 | 33.12 | 33.19 | 2.58 | 2.74 | 2.89 |
| 3800 | 11.7 | 12.1 | 12.3 | 29.80 | 30.98 | 31.37 | 32.87 | 33.09 | 33.14 | 2.66 | 2.82 | 2.99 |
| 4000 | 11.6 | 12.0 | 12.3 | 29.82 | 31.06 | 31.43 | 32.98 | 33.20 | 33.26 | 2.68 | 2.75 | 2.95 |
| 4200 | 11.6 | 12.0 | 12.2 | 29.79 | 31.04 | 31.40 | 32.97 | 33.18 | 33.22 | 2.71 | 2.79 | 3.03 |
| 4400 | 11.5 | 11.9 | 12.2 | 29.79 | 30.99 | 31.37 | 32.92 | 33.10 | 33.15 | 2.78 | 2.91 | 3.06 |
| 4600 | 11.5 | 11.9 | 12.2 | 29.80 | 30.99 | 31.40 | 33.03 | 33.23 | 33.28 | 2.65 | 2.78 | 2.90 |
| 4800 | 11.5 | 11.9 | 12.1 | 29.75 | 30.97 | 31.37 | 32.90 | 33.10 | 33.15 | 2.62 | 2.76 | 2.95 |
| 5000 | 11.5 | 11.9 | 12.1 | 29.72 | 31.00 | 31.41 | 32.87 | 33.09 | 33.15 | 2.71 | 2.84 | 3.02 |
| 5200 | 11.5 | 11.9 | 12.1 | 29.70 | 30.98 | 31.39 | 32.80 | 33.03 | 33.10 | 2.66 | 2.79 | 2.90 |
| 5400 | 11.5 | 11.9 | 12.2 | 29.80 | 31.11 | 31.53 | 32.89 | 33.13 | 33.22 | 2.64 | 2.78 | 2.92 |
| 5600 | 11.5 | 11.9 | 12.2 | 29.83 | 31.13 | 31.56 | 32.87 | 33.13 | 33.20 | 2.60 | 2.71 | 2.93 |
| 5800 | 11.5 | 11.9 | 12.2 | 29.79 | 31.13 | 31.56 | 33.02 | 33.27 | 33.35 | 2.62 | 2.80 | 2.95 |
| 6000 | 11.5 | 11.9 | 12.2 | 29.72 | 31.08 | 31.56 | 33.00 | 33.27 | 33.36 | 2.67 | 2.81 | 2.98 |
| 6200 | 11.5 | 11.9 | 12.2 | 29.66 | 31.05 | 31.54 | 33.03 | 33.29 | 33.38 | 2.66 | 2.81 | 3.00 |
| 6400 | 11.4 | 11.9 | 12.1 | 29.59 | 31.03 | 31.53 | 32.90 | 33.18 | 33.27 | 2.73 | 2.82 | 3.03 |
| 6600 | 11.4 | 11.8 | 12.1 | 29.64 | 31.09 | 31.59 | 33.23 | 33.49 | 33.57 | 2.79 | 2.88 | 3.06 |
| 6800 | 11.3 | 11.8 | 12.0 | 29.52 | 31.04 | 31.52 | 33.14 | 33.36 | 33.42 | 2.83 | 2.96 | 3.07 |
| 7000 | 11.2 | 11.7 | 12.0 | 29.43 | 30.99 | 31.47 | 32.98 | 33.20 | 33.25 | 2.87 | 2.96 | 3.15 |
| 7200 | 11.2 | 11.6 | 11.9 | 29.35 | 30.94 | 31.42 | 32.97 | 33.17 | 33.22 | 2.96 | 3.06 | 3.22 |
| 7400 | 11.1 | 11.5 | 11.8 | 29.32 | 30.89 | 31.37 | 32.90 | 33.09 | 33.15 | 3.00 | 3.08 | 3.30 |
| 7600 | 11.0 | 11.4 | 11.7 | 29.18 | 30.86 | 31.33 | 32.99 | 33.17 | 33.23 | 3.04 | 3.18 | 3.32 |
| 7800 | 10.9 | 11.4 | 11.7 | 29.12 | 30.78 | 31.26 | 32.84 | 33.03 | 33.09 | 3.12 | 3.23 | 3.38 |
| 8000 | 10.8 | 11.3 | 11.6 | 29.04 | 30.64 | 31.13 | 32.81 | 32.99 | 33.05 | 3.17 | 3.27 | 3.46 |

Typical Performance Data

TEST CONDITIONS: $V_{DD} = +12\text{ V}$, $V_{G2} = +5\text{ V}$, $I_{DD} = 400\text{ mA}$ @ Temperature = $+25^\circ\text{C}$

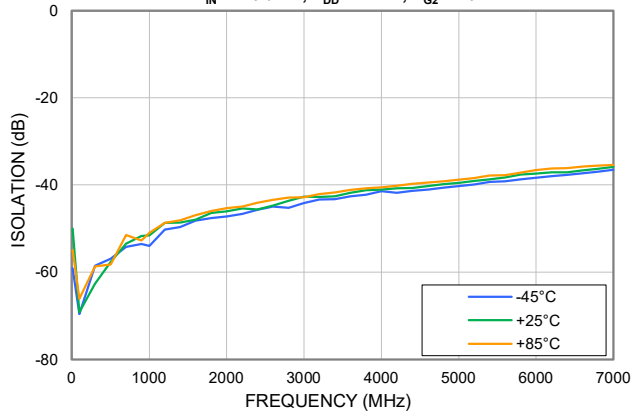
| FREQ | P _{OUT} | 2nd Harmonic | FREQ | P _{OUT} | 3rd Harmonic |
|-------|------------------|--------------|-------|------------------|--------------|
| (MHz) | (dBm) | (dB) | (GHz) | (dBm) | (dB) |
| 2000 | 5.0 | -48.4 | 2.00 | 5.0 | -101.2 |
| 2000 | 6.0 | -46.9 | 2.00 | 6.0 | -87.7 |
| 2000 | 7.0 | -45.6 | 2.00 | 7.0 | -99.4 |
| 2000 | 8.0 | -44.9 | 2.00 | 8.0 | -86.1 |
| 2000 | 9.0 | -44.0 | 2.00 | 9.0 | -87.0 |
| 2000 | 10.0 | -42.9 | 2.00 | 10.0 | -87.3 |
| 2000 | 12.0 | -40.8 | 2.00 | 12.0 | -86.1 |
| 2000 | 14.0 | -41.0 | 2.00 | 14.0 | -81.4 |
| 2000 | 15.0 | -38.7 | 2.00 | 15.0 | -78.9 |
| 2000 | 16.0 | -37.7 | 2.00 | 16.0 | -78.0 |
| 2000 | 18.0 | -36.6 | 2.00 | 18.0 | -74.4 |
| 2000 | 20.0 | -34.4 | 2.00 | 20.0 | -68.9 |
| 2000 | 22.0 | -32.1 | 2.00 | 22.0 | -62.5 |
| 2000 | 24.0 | -29.6 | 2.00 | 24.0 | -57.0 |
| 4000 | 5.00 | -46.3 | 4.00 | 5.00 | -86.3 |
| 4000 | 6.0 | -44.6 | 4.00 | 6.0 | -82.4 |
| 4000 | 7.0 | -44.0 | 4.00 | 7.0 | -81.2 |
| 4000 | 8.0 | -43.0 | 4.00 | 8.0 | -78.8 |
| 4000 | 9.0 | -42.0 | 4.00 | 9.0 | -77.3 |
| 4000 | 10.0 | -40.9 | 4.00 | 10.0 | -74.7 |
| 4000 | 12.0 | -38.9 | 4.00 | 12.0 | -68.6 |
| 4000 | 14.0 | -39.1 | 4.00 | 14.0 | -65.6 |
| 4000 | 15.0 | -36.8 | 4.00 | 15.0 | -63.2 |
| 4000 | 16.0 | -35.6 | 4.00 | 16.0 | -61.3 |
| 4000 | 18.0 | -34.6 | 4.00 | 18.0 | -56.8 |
| 4000 | 20.0 | -32.5 | 4.00 | 20.0 | -52.6 |
| 4000 | 22.0 | -30.2 | 4.00 | 22.0 | -47.9 |
| 4000 | 24.0 | -27.7 | 4.00 | 24.0 | -42.4 |
| 6000 | 5.0 | -45.6 | 6.00 | 5.0 | -88.4 |
| 6000 | 6.0 | -44.4 | 6.00 | 6.0 | -87.8 |
| 6000 | 7.0 | -43.4 | 6.00 | 7.0 | -84.8 |
| 6000 | 8.0 | -42.4 | 6.00 | 8.0 | -84.1 |
| 6000 | 9.0 | -41.5 | 6.00 | 9.0 | -83.6 |
| 6000 | 10.0 | -40.4 | 6.00 | 10.0 | -80.3 |
| 6000 | 12.0 | -38.4 | 6.00 | 12.0 | -78.5 |
| 6000 | 14.0 | -38.6 | 6.00 | 14.0 | -72.9 |
| 6000 | 15.0 | -36.4 | 6.00 | 15.0 | -71.4 |
| 6000 | 16.0 | -35.5 | 6.00 | 16.0 | -69.4 |
| 6000 | 18.0 | -34.4 | 6.00 | 18.0 | -65.1 |
| 6000 | 20.0 | -32.3 | 6.00 | 20.0 | -61.2 |
| 6000 | 22.0 | -30.1 | 6.00 | 22.0 | -55.2 |
| 6000 | 24.0 | -27.7 | 6.00 | 24.0 | -49.8 |

Typical Performance Curves

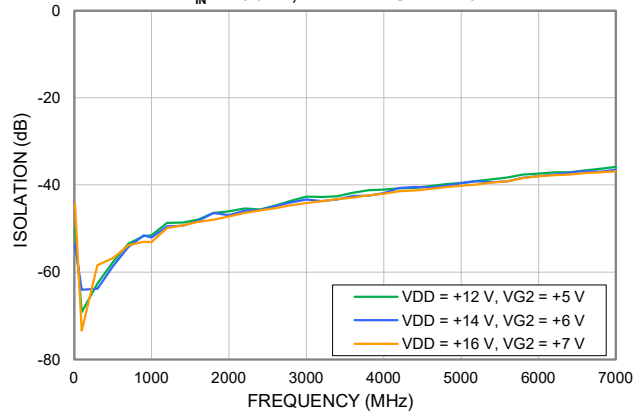


Typical Performance Curves

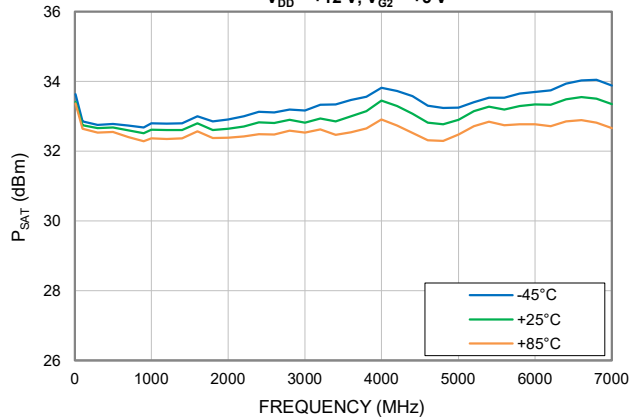
ISOLATION vs. TEMPERATURE,
 $P_{IN} = -25 \text{ dBm}$, $V_{DD} = +12 \text{ V}$, $V_{G2} = +5 \text{ V}$



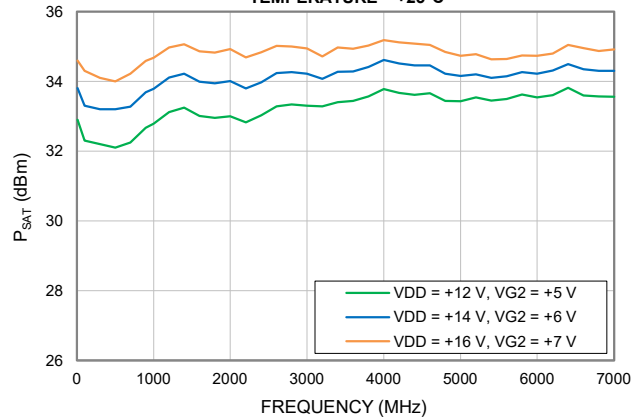
ISOLATION vs. DEVICE VOLTAGE,
 $P_{IN} = -25 \text{ dBm}$, TEMPERATURE = +25°C



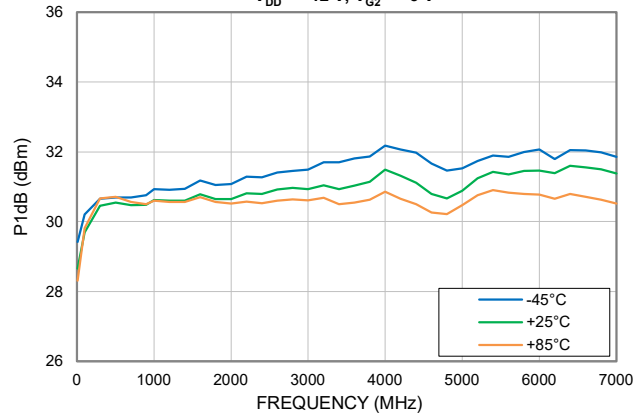
P_{SAT} vs. TEMPERATURE,
 $V_{DD} = +12 \text{ V}$, $V_{G2} = +5 \text{ V}$



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

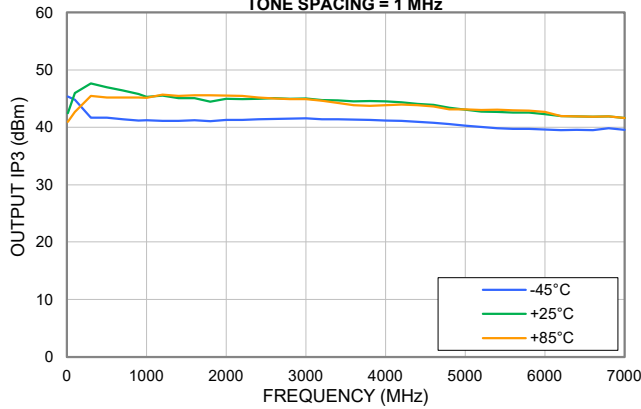


$P1dB$ vs. TEMPERATURE,
 $V_{DD} = +12 \text{ V}$, $V_{G2} = +5 \text{ V}$

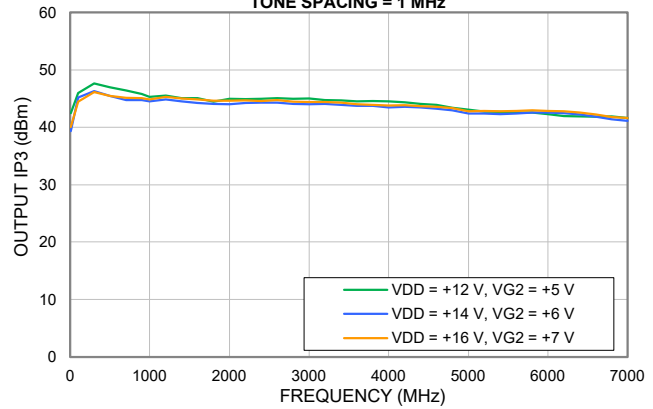


Typical Performance Curves

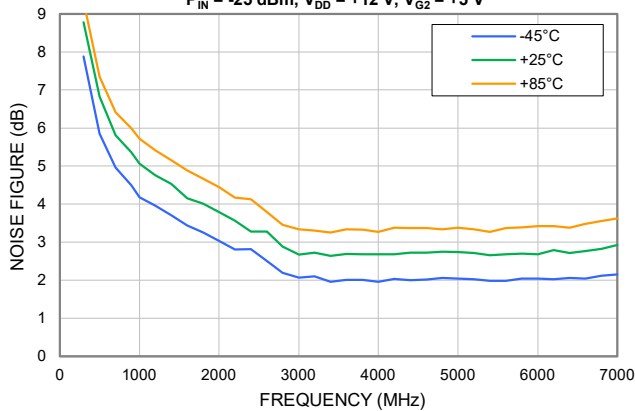
OUTPUT IP3 vs. TEMPERATURE,
 $P_{OUT} = +20 \text{ dBm/TONE}$, $V_{DD} = +12 \text{ V}$, $V_{G2} = +5 \text{ V}$
 TONE SPACING = 1 MHz



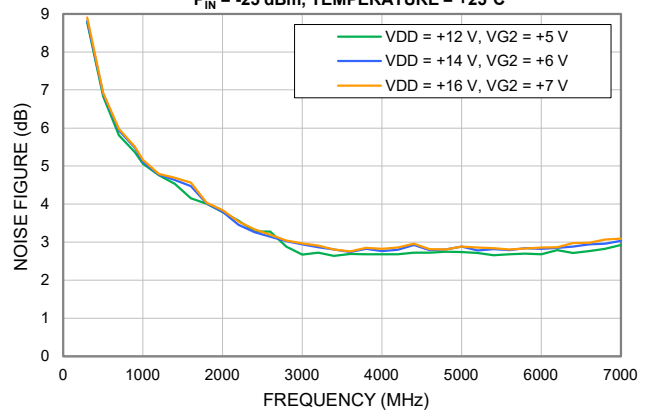
OUTPUT IP3 vs. DEVICE VOLTAGE,
 $P_{OUT} = +20 \text{ dBm/TONE}$, TEMPERATURE = +25°C
 TONE SPACING = 1 MHz



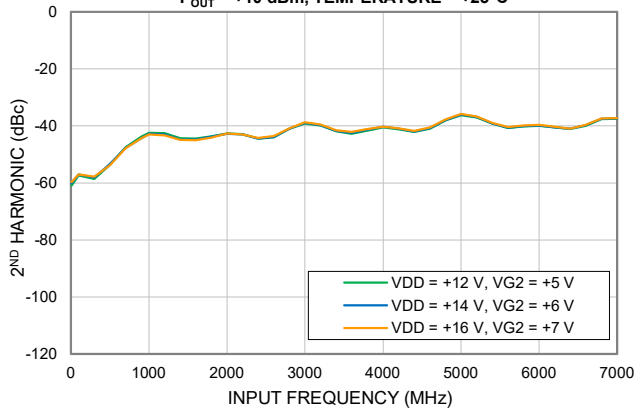
NOISE FIGURE vs. TEMPERATURE,
 $P_{IN} = -25 \text{ dBm}$, $V_{DD} = +12 \text{ V}$, $V_{G2} = +5 \text{ V}$



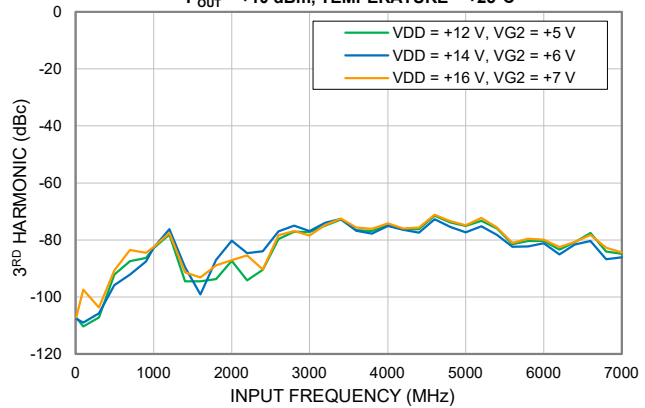
NOISE FIGURE vs. DEVICE VOLTAGE,
 $P_{IN} = -25 \text{ dBm}$, TEMPERATURE = +25°C



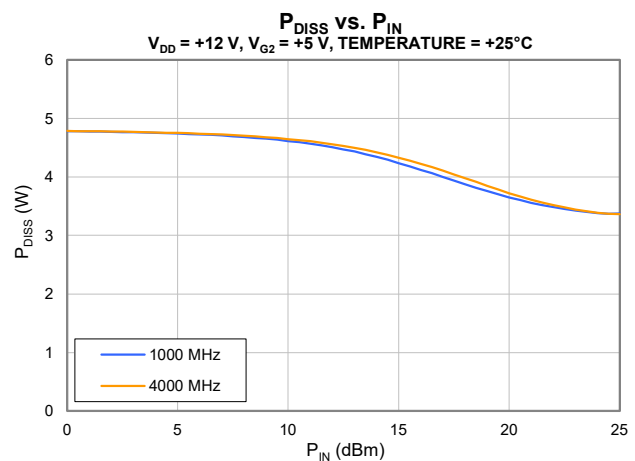
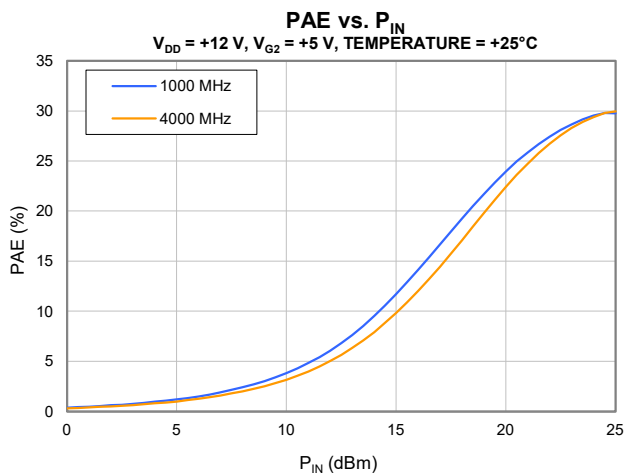
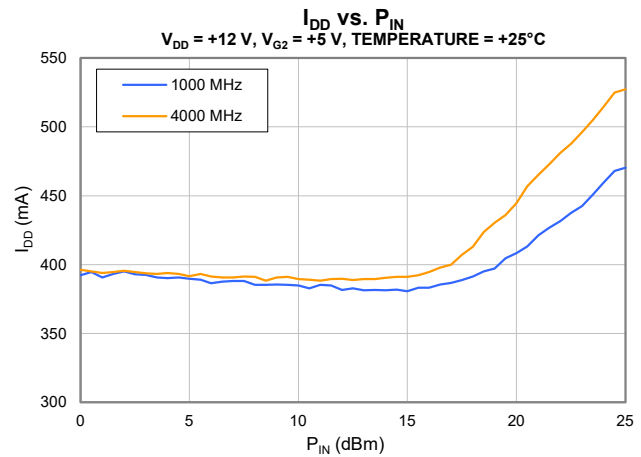
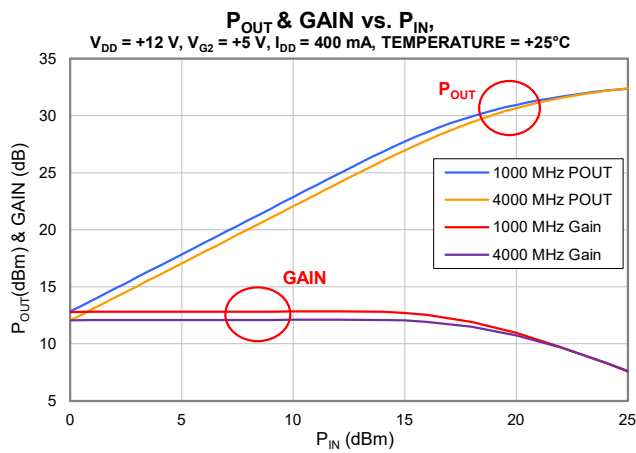
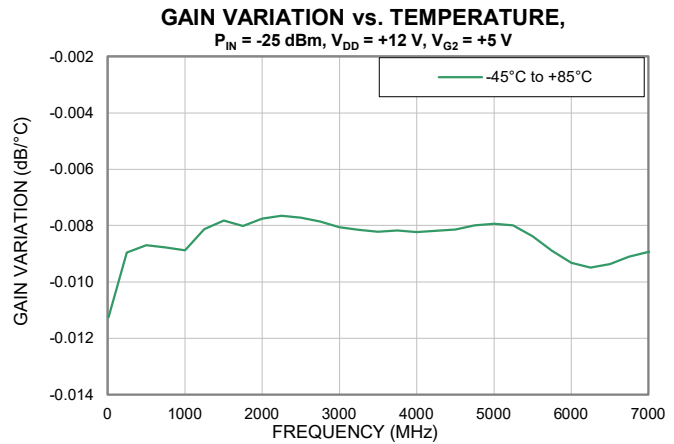
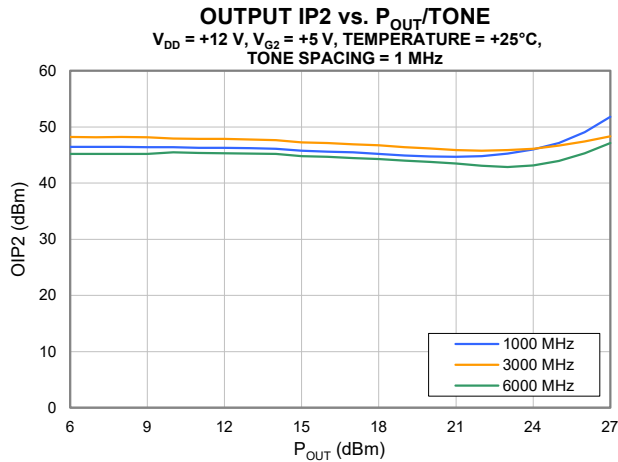
2ND HARMONIC vs. DEVICE VOLTAGE,
 $P_{OUT} = +10 \text{ dBm}$, TEMPERATURE = +25°C



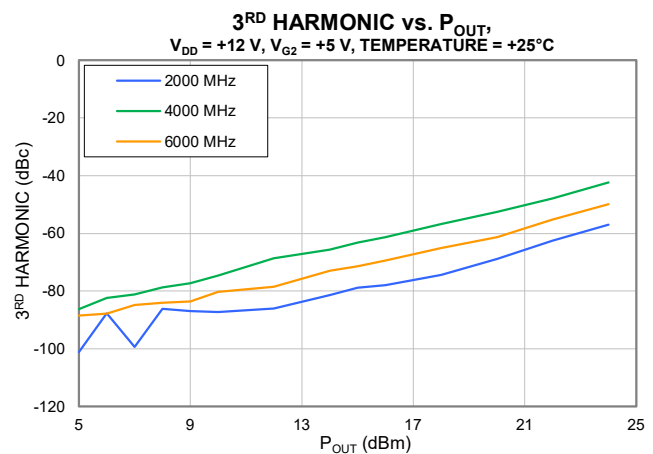
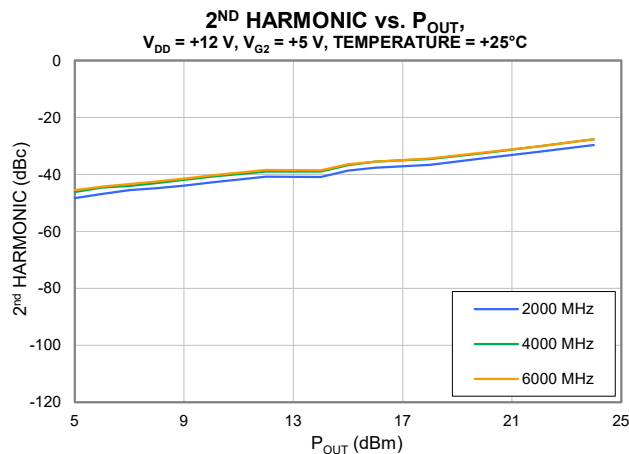
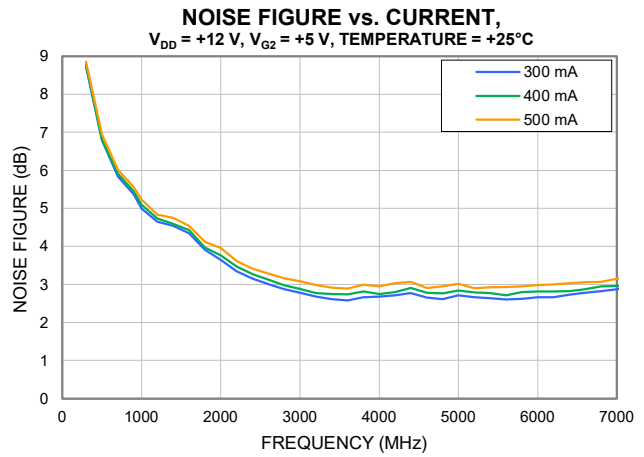
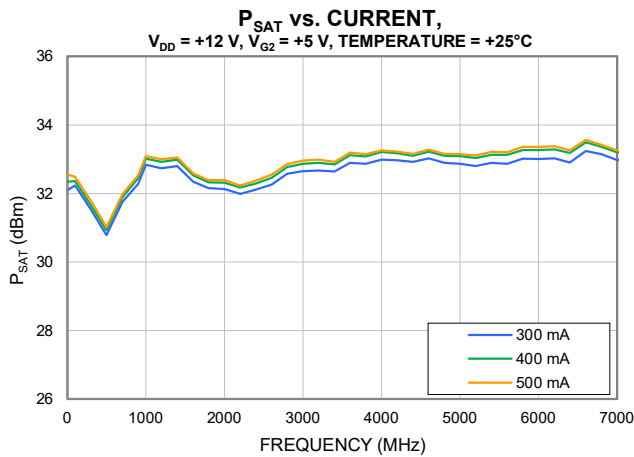
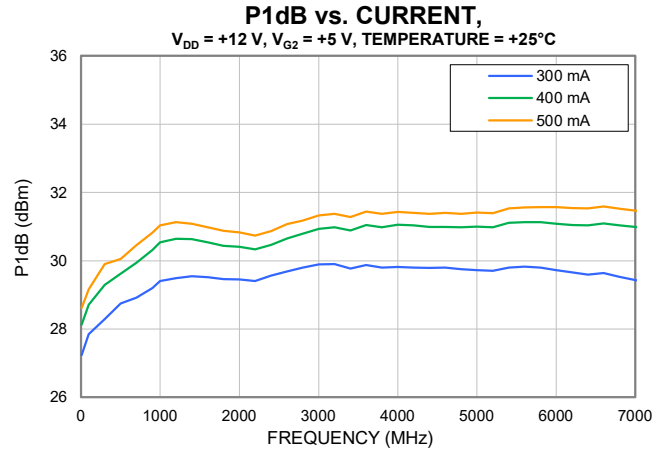
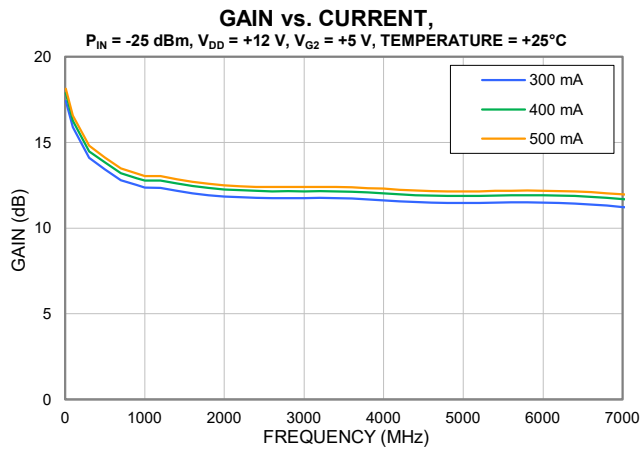
3RD HARMONIC vs. DEVICE VOLTAGE,
 $P_{OUT} = +10 \text{ dBm}$, TEMPERATURE = +25°C

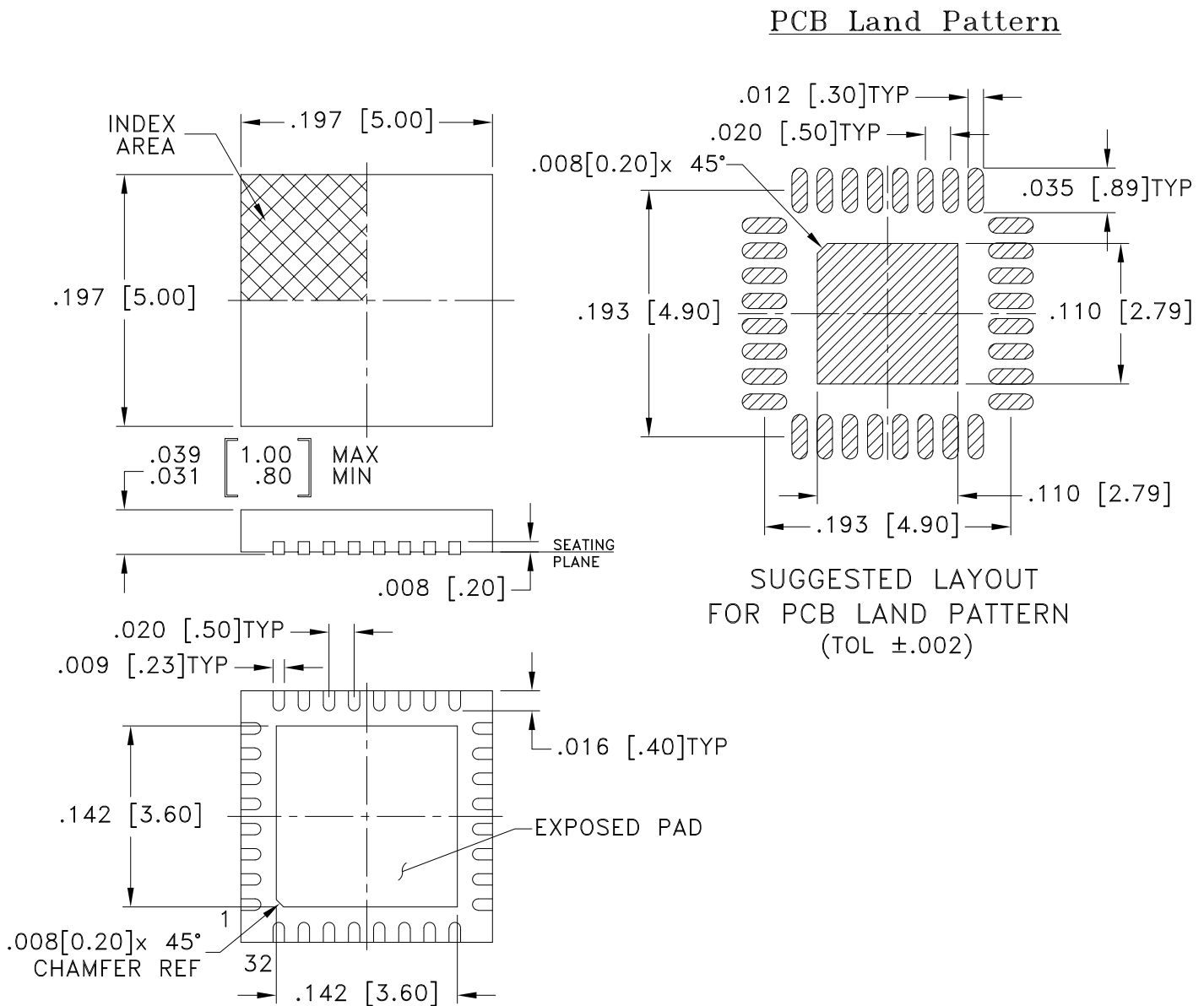


Typical Performance Curves



Typical Performance Curves





Weight: .05 grams

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

Notes:

- Case material: Plastic.
- Termination finish: For RoHS Case Styles: Tin-Silver alloy plate over Nickel barrier transitioning to Matte-Tin. All models, (+) suffix. See Data sheet.
For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.

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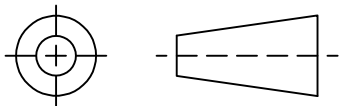
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS

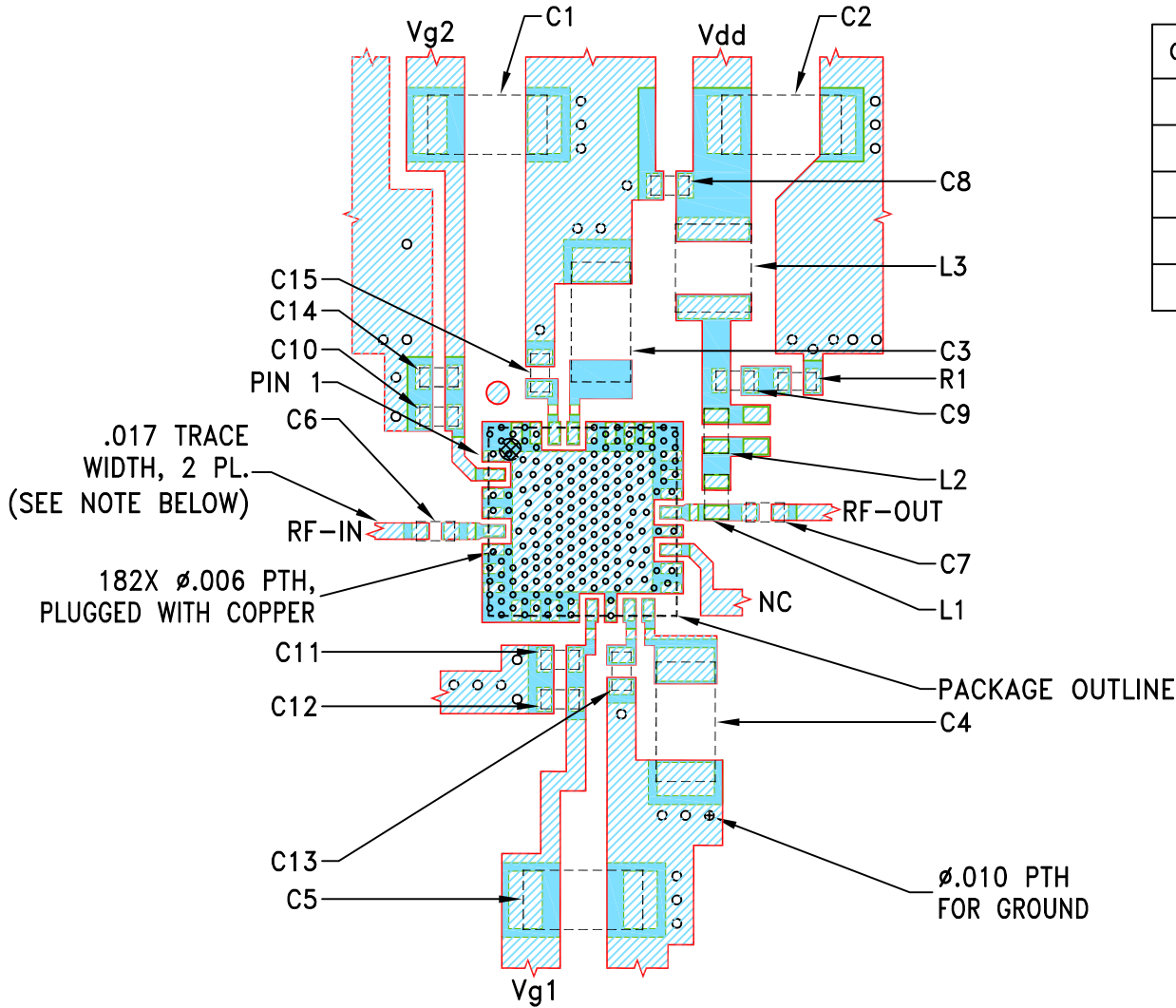
THIRD ANGLE PROJECTION



REVISIONS

| REV | ECN No. | DESCRIPTION | DATE | DR | AUTH |
|-----|------------|-------------|----------|-----|------|
| OR | ECO-022462 | NEW RELEASE | 07/23/24 | ITG | IL |
| | | | | | |
| | | | | | |

SUGGESTED MOUNTING CONFIGURATION FOR DG1677-10 CASE STYLE



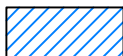
| COMPONENT | SIZE |
|-----------|------|
| R1 | 0402 |
| C1-C5 | 1206 |
| C6-C15 | 0402 |
| L1-L2 | 0402 |
| L3 | 1008 |

NOTES:

- TRACE WIDTH IS SHOWN FOR ROGERS R04003C LoPro FOIL WITH DIELECTRIC THICKNESS .0087".
COPPER: 1 OZ. EACH SIDE. FINAL COPPER THICKNESS SHALL BE 2 OZ.
FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
- CHIP COMPONENT FOOT PRINTS SHOWN FOR REFERENCE, FOR COMPONENT VALUES REFER TO TB-PMA5-63-2WC+.
- 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 | ITG | 07/23/24 |
| TOLERANCES ON: | GF | 07/23/24 |
| 2 PL DECIMALS ± | IL | 07/23/24 |
| 3 PL DECIMALS ± .005 | | |
| ANGLES ± | | |
| FRACTIONS ± | | |



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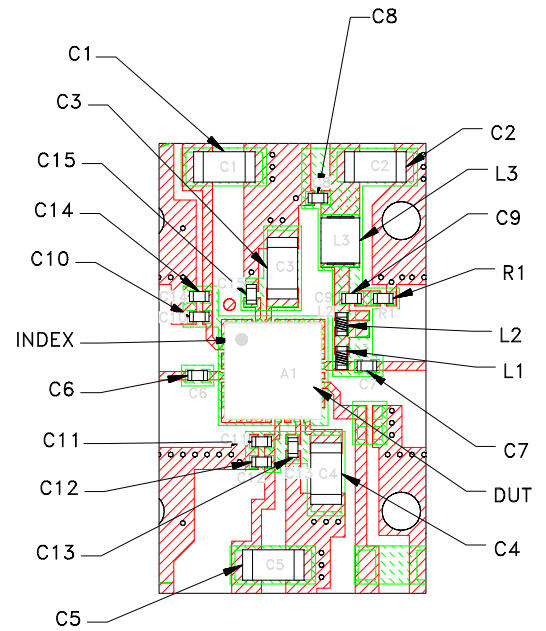
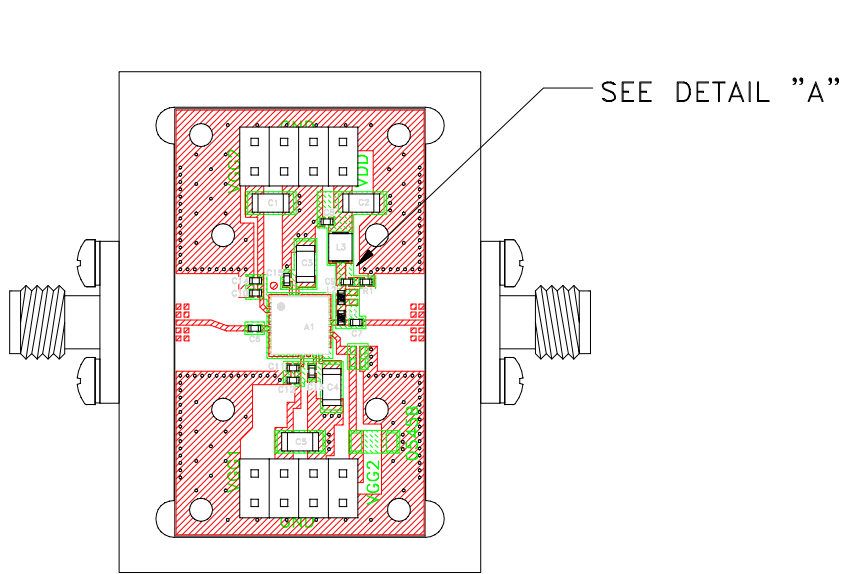
13 Neptune Avenue
Brooklyn NY 11235

PL, DG1677-10, TB-PMA5-63-2WC+

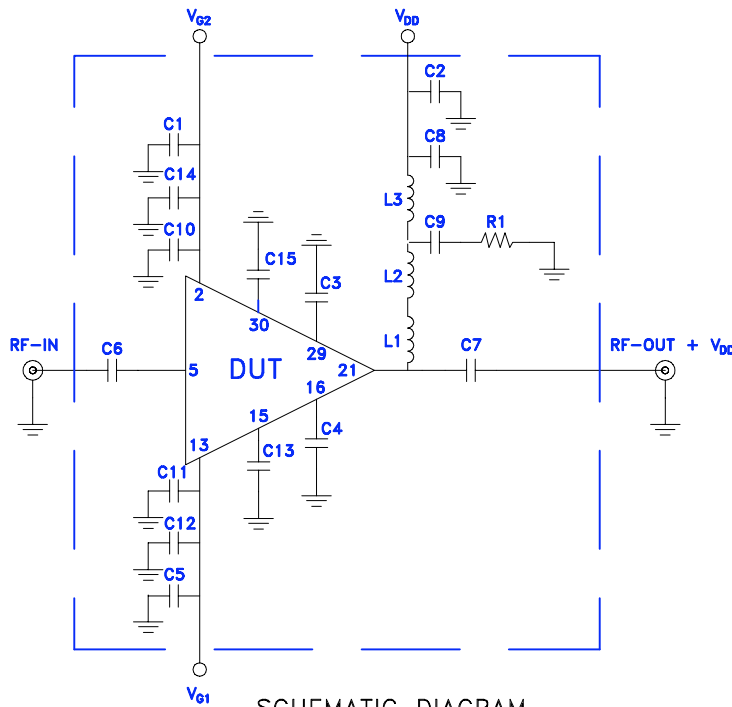
| SIZE | CODE IDENT | DRAWING NO: | REV: |
|-------|------------|-------------|---------------|
| A | 15542 | 98-PL-789 | OR |
| FILE: | 98PL789 | SCALE: 5:1 | SHEET: 1 OF 1 |

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Evaluation Board and Circuit



DETAIL "A"
LOCATION OF INTERCONNECTOR
AND UNITS COMPONENTS
(SCALE 2:1)

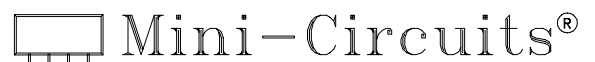


SCHEMATIC DIAGRAM

| Component | Size | Value | PartNumber | Manufacturer |
|-----------------|------|-------|--------------------|-----------------------|
| R1 | 0402 | 301Ω | RK73H1ETTP3010F | KOA SPEER ELECTRONICS |
| C1,C2,C3,C4,C5 | 1206 | 4.7μF | 12063C475KAT2A | AVX CORPORATION |
| C6,C7,C8 | 0402 | 0.1μF | GRM155R71E104KE14D | MURATA |
| C9,C10,C11 | 0402 | 100pF | GRM1555C1H101JA01D | MURATA |
| C12,C13,C14,C15 | 0402 | 1nF | GRM1555C1H102JA01D | MURATA |
| L1,L2 | 0402 | 36nH | 0402AF-360XJLW | COILCRAFT |
| L3 | 1008 | 1.1μH | 1008AF-112XKRC | COILCRAFT |

Notes:

- 2.92mm Female Connectors.
- PCB Material: Roger RO4003C or equivalent,
Dielectric constant=3.38, Thickness=0.0087±.001 inch



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 Ambient Environment | Individual Model Data Sheet |
| Storage Temperature | -55° to 100° C or -65° to 150° 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 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 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; distilled water + proylene glycol monomethyl ether + | MIL-STD-202, Method 215 |



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| Specification | Test/Inspection Condition | Reference/Spec |
|----------------------|----------------------------------|-----------------------|
| | monoethanolamine at 63°C to 70°C | |