

800-2700 MHz High Dynamic Range Amplifier

Features

- ✕ +17 dBm Output Power
- ✕ <2.2 dB Noise Figure
- ✕ Low Current: 70 mA, Typ.
- ✕ Single +3V to +6V Supply
- ✕ DC Blocked >2:1 VSWR
- ✕ Low-Cost SOIC-8 Plastic Package

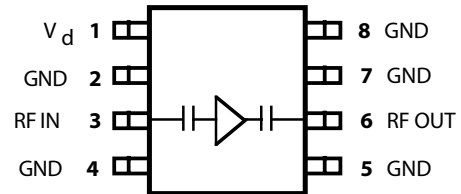
Applications

- ✕ Power Amplifier Drivers
- ✕ PCS Medium Power Amplifiers
- ✕ Medium Power WLANs
- ✕ Base Station Receivers

Description

The Mimix CMM2308 is a high dynamic range, pin-compatible, second source for the TriQuint® 9132 and the Mini-Circuits® VNA. Providing comparable gain and lower noise figure than either of the existing standard amplifiers at 25% less drain current, the CMM2308 is an excellent choice for power sensitive applications, while delivering more design margin. Packaged in a low-cost surface mount SOIC-8 package, the CMM2308 will drop into existing designs and offers improved features and performance.

Functional Block Diagram



Absolute Maximum Ratings

| | |
|-----------------------|-------------------|
| Drain Voltage (+Vd) | +7 V |
| Drain Current (Id) | 150 mA |
| RF Input Power | 15 dBm |
| Power Dissipation | 1.0 W |
| Thermal Resistance | 55 °C/W |
| Storage Temperature | -65 °C to +150 °C |
| Operating Temperature | -40 °C to +80 °C |
| Channel Temperature | 175 °C |
| Soldering Temperature | 260 °C for 5 Sec |

Recommended Operating Conditions

| Parameter | Typ | Units | Parameter | Typ | Units |
|---------------------|------------|-------|----------------------------------|------------|-------|
| Drain Voltage (+Vd) | 3.0 to 6.0 | Volts | Operating Temperature (PC Board) | -40 to +70 | °C |

Electrical Characteristics

The following specifications are guaranteed at room temperature with drain voltage (+Vd) = 5.0 V ±5% at 2.5 GHz.

| Parameter | Condition | Min | Typ | Max | Units |
|---------------------------------|----------------|------|------|------|-------|
| Frequency Range | | 800 | | 2700 | MHz |
| Small Signal Gain | | 17.5 | 19.0 | | dB |
| Noise Figure | 1.8 to 2.5 GHz | | 2.2 | | dB |
| Power Output @ 1 dB Compression | | 15.5 | 17.0 | | dBm |
| Output 3rd Order Intercept | | | 27 | | dBm |
| Input Return Loss | | | 10 | | dB |
| Output Return Loss | | | 10 | | dB |
| DC Supply Current | | | 70 | 80 | mA |
| Supply Voltage | | 3 | 5 | 6 | V |

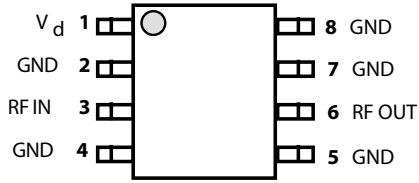
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Connection Diagram and Pin Description

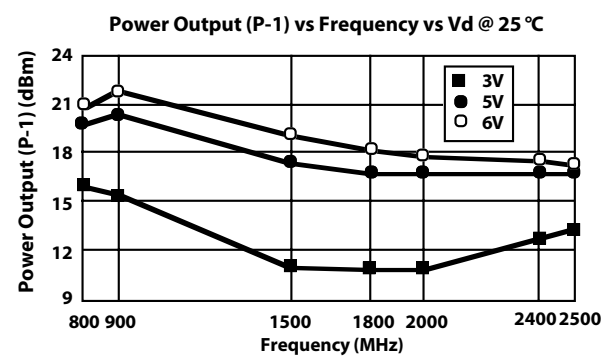
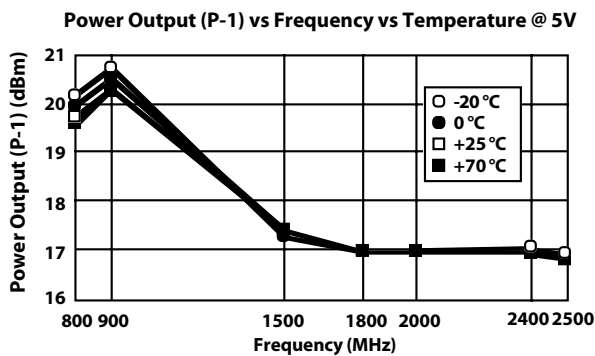
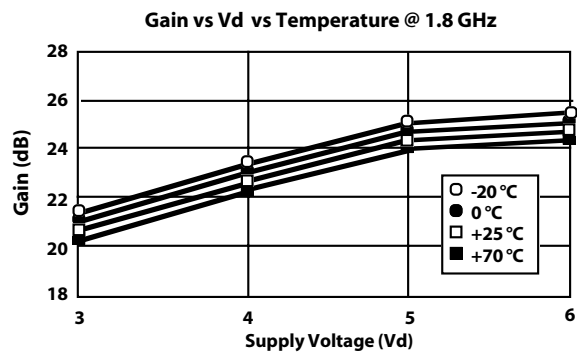
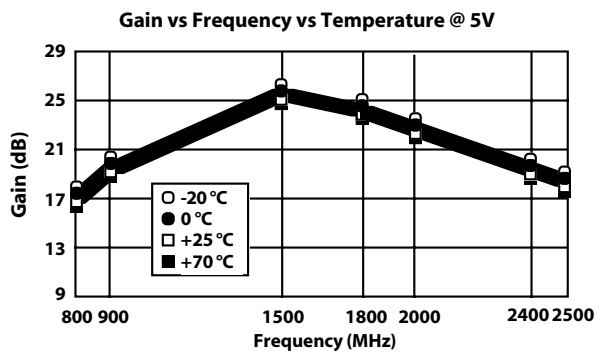
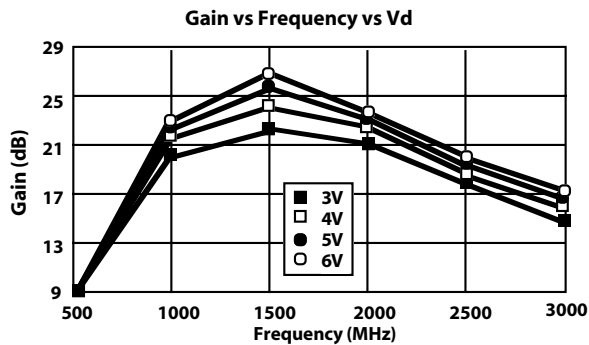
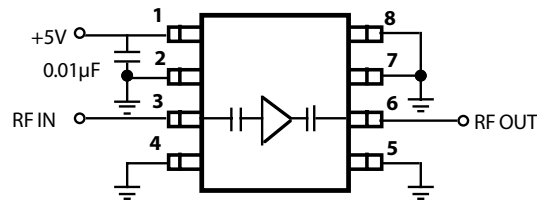


| Pin # | Name | Description |
|-------|-----------------|---|
| 1 | +V _d | Drain voltage. Connect to positive supply |
| 2 | GND | Ground |
| 3 | RF IN | RF input (Internally DC blocked) |
| 4 | GND | Ground |
| 5 | GND | Ground |
| 6 | RF OUT | RF output (Internally DC blocked) |
| 7 | GND | Ground |
| 8 | GND | Ground |

Typical Performance

The following typical performance parameters were tested in the test circuit shown at room temperature and with a drain voltage (+V_d) = 5 V, unless otherwise specified.

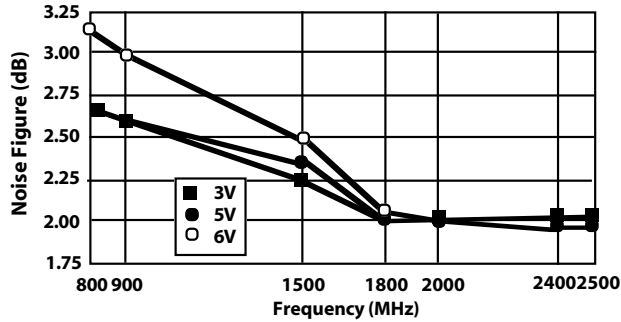
Test Circuit Diagram



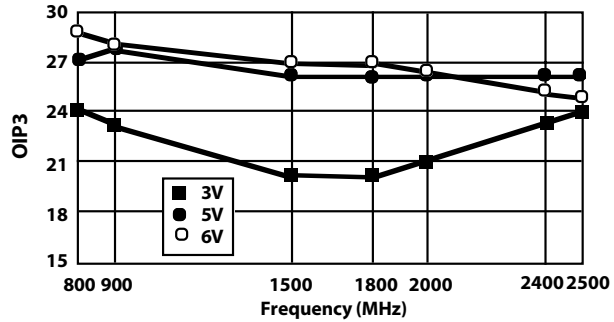
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Typical Performance (cont.)

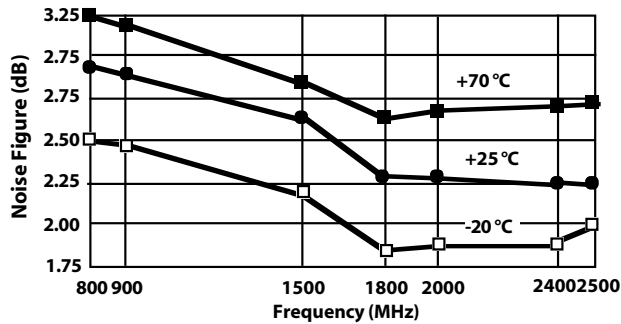
Noise Figure vs Frequency vs Vd @ 25 °C



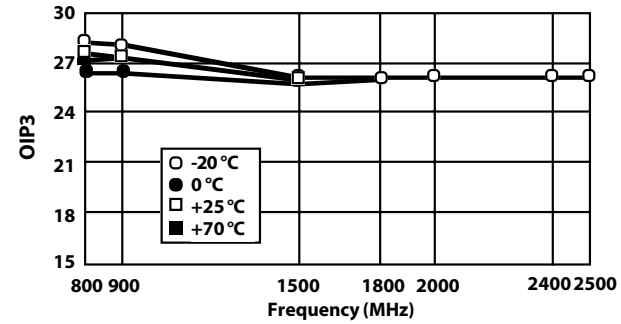
OIP3 vs Frequency vs Vd @ 25 °C



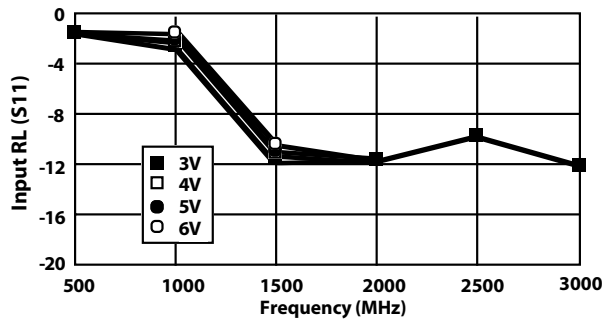
Noise Figure vs Frequency vs Temperature @ 5V



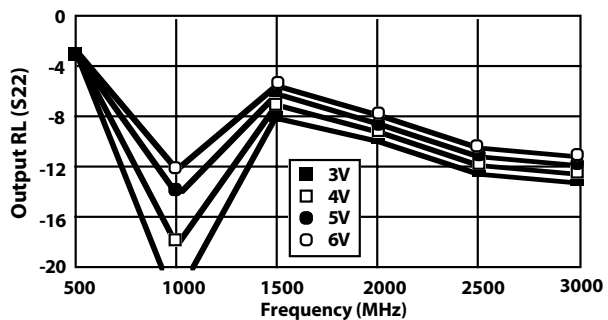
OIP3 vs Frequency vs Temperature @ 5V



S11 vs Frequency vs Vd

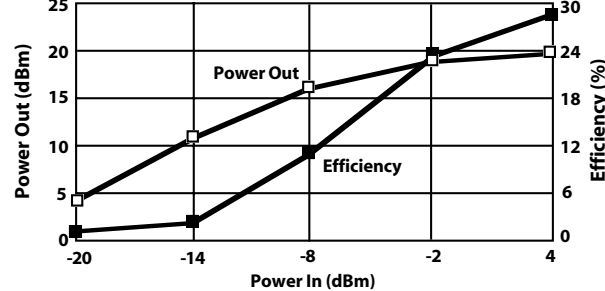


S22 vs Frequency vs Vd

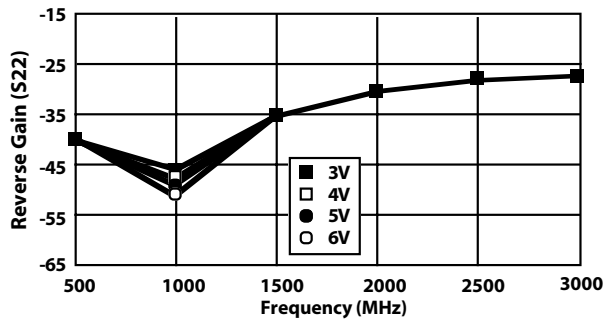


Power In vs Power Out & Efficiency

Vd = 4.8 V & Frequency = 1.88 GHz



S12 vs Frequency vs Vd



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Test Configuration and Evaluation

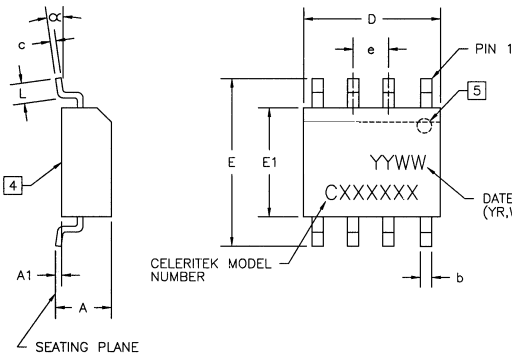
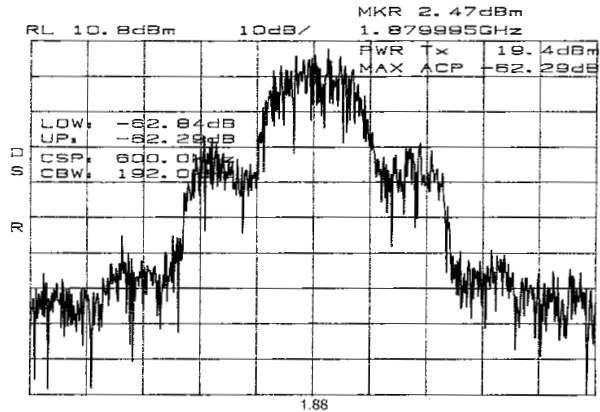
Mimix tests the CMM2308 on an FR4 PC test board. FR4 was chosen for its low loss characteristics at frequencies up to 2.5 GHz. Plated through hole connections from the top of the board to the backside ground plane minimizes inductance in the ground connections. These through hole connections are as close as possible to each ground pin.

For evaluation purposes Mimix offers a prototype evaluation board (PB-CMM2308-AJ) for the CMM2308. Please call the factory or a local representative for more information.

Handling Precaution

Microwave devices are sensitive to electrostatic discharge. Proper precautions should be taken to avoid ESD damage.

Adjacent Channel Power $\pi/4$ DQPSK Modulation, $V_d = 4.8$ V



NOTES: (UNLESS OTHERWISE SPECIFIED)

1. DIMENSIONS ARE IN MILLIMETERS [INCHES].
2. LEAD MATERIAL: COPPER
3. BODY MATERIAL: PLASTIC (EPOXY).
4. COUNTRY OF ORIGIN, IF OTHER THAN U.S., SHALL BE MARKED ON THIS SURFACE.
5. PIN 1 IDENTIFICATION IS A DOT OR BEVELED EDGE.

| DIMENSION | MINIMUM | NOMINAL | MAXIMUM |
|-----------|--------------|-------------|--------------|
| A | 1.35[0.053] | 1.63[0.064] | 1.75[0.069] |
| A1 | 0.10[0.004] | 0.15[0.006] | 0.20[0.008] |
| b | 0.35[0.014] | | 0.45[0.018] |
| c | 0.19[0.007] | | 0.22[0.009] |
| D | 4.80[0.188] | 4.90[0.193] | 5.00[0.197] |
| E | 5.80[0.228] | 5.99[0.236] | 6.20[0.244] |
| E1 | 3.80[0.150] | 3.91[0.154] | 4.00[0.158] |
| e | | 1.27[0.050] | |
| L | 0.508[0.020] | 0.64[0.025] | 1.143[0.045] |
| α | 0° | | 8° |

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Handling and Assembly Information

CAUTION! - Mimix Broadband MMIC Products contain gallium arsenide (GaAs) which can be hazardous to the human body and the environment. For safety, observe the following procedures:

- Do not ingest.
- Do not alter the form of this product into a gas, powder, or liquid through burning, crushing, or chemical processing as these by-products are dangerous to the human body if inhaled, ingested, or swallowed.
- Observe government laws and company regulations when discarding this product. This product must be discarded in accordance with methods specified by applicable hazardous waste procedures.

Life Support Policy - Mimix Broadband's products are not authorized for use as critical components in life support devices or systems without the express written approval of the President and General Counsel of Mimix Broadband. As used herein: (1) Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user. (2) A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

Package Attachment - This packaged product from Mimix Broadband is provided as a rugged surface mount package compatible with high volume solder installation. Care should be taken not to apply heavy pressure to the top or base material to avoid package damage. Vacuum tools or other suitable pick and place equipment may be used to pick and place this part. Care should be taken to ensure that there are no voids or gaps in the solder connection so that good RF, DC and ground connections are maintained. Voids or gaps can eventually lead not only to RF performance degradation, but reduced reliability and life of the product due to thermal stress.

Mimix Lead-Free RoHS Compliant Program - Mimix has an active program in place to meet customer and governmental requirements for eliminating lead (Pb) and other environmentally hazardous materials from our products. All Mimix RoHS compliant components are form, fit and functional replacements for their non-RoHS equivalents. Lead plating of our RoHS compliant parts is 100% matte tin (Sn) over copper alloy and is backwards compatible with current standard SnPb low-temperature reflow processes as well as higher temperature (260°C reflow) "Pb Free" processes.

Ordering Information

The CMM2308 is available in a surface mount SOIC-8 plastic package.

Part Number for Ordering

CMM2308-AJ-0G00
CMM2308-AJ-0G0T
PB-CMM2308-AJ-0000

Package

Matte Tin finished RoHS compliant SOIC-8 package in bulk quantity
Matte Tin finished RoHS compliant SOIC-8 package in tape and reel
Evaluation Board