

11.0-20.0 GHz GaAs MMIC Packaged Driver Amplifier

March 2010 - Rev 13-Mar-10

Mimix
BROADBAND™

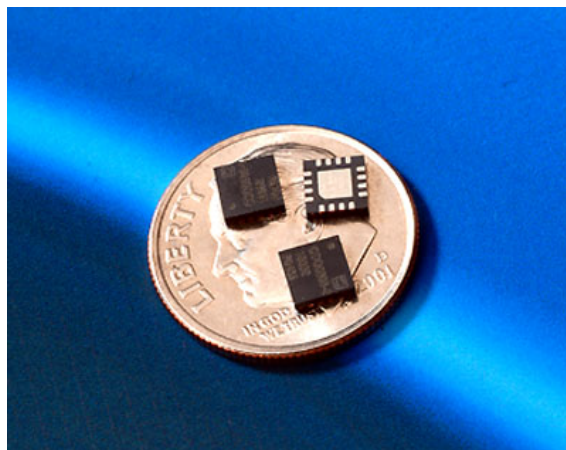
CMM1118-QT
RoHS

Features

- ✕ 20 dB Gain
- ✕ 14 dBm P1dB
- ✕ 3x3 QFN Package
- ✕ Single Power Supply
- ✕ 5-7 V, 110 mA Self Bias
- ✕ On-Chip ESD Protection

Circuit Description

Mimix Broadband's 3 stage 11.0 to 20.0 GHz driver amplifier is packaged in surface mount 3x3 QFN package. The device is a self-biased, single supply design with 20 dB gain and 14 dBm P1dB. This MMIC uses Mimix Broadband's optical pHEMT process.



Absolute Maximum Ratings

| | |
|----------------------------|-------------------|
| Supply Voltage | +8 V |
| RF Input Power | +10 dBm |
| Storage Temperature (Tstg) | -55 °C to +125 °C |
| Junction Temperature | 175 °C |
| Operating Temperature | -40 °C to +85°C |

Electrical Characteristics (T=25°C)

| Parameter | Units | Min. | Typ. | Max. |
|-------------------|-------|------|------|------|
| Frequency Range | GHz | 11 | | 20 |
| Gain | dB | 17 | 20 | |
| Gain Delta | dB | | 3 | |
| Output P1dB | dBm | 10 | 14 | |
| Output IP3 | dBm | | 22 | |
| Input Return Loss | dB | | -8 | |
| Current | mA | | | 130 |
| Supply Voltage | V | | 5 | 7 |

Typical Parameters (5V)

| Parameter | Units | Typical | | | |
|----------------|-------|---------|-----|----|-----|
| Frequency | GHz | 11 | 14 | 17 | 20 |
| Gain | dB | 21 | 20 | 18 | 20 |
| IP Return Loss | dB | -20 | -12 | -8 | -5 |
| Op Return Loss | dB | -11 | -15 | -6 | -12 |
| P1dB | dBm | 11 | 12 | 14 | 16 |
| OIP3 | dBm | 22 | 22 | 22 | 20 |

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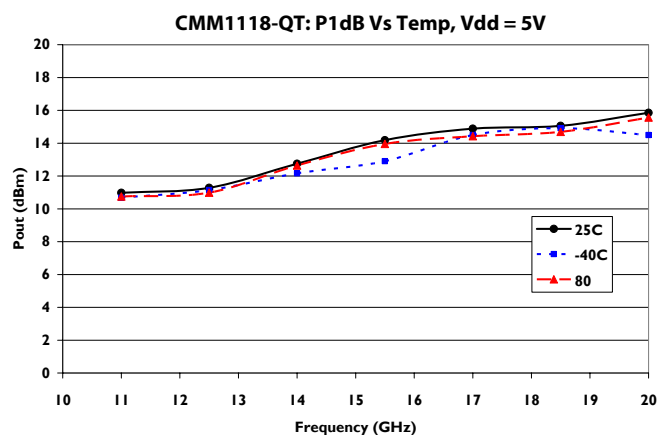
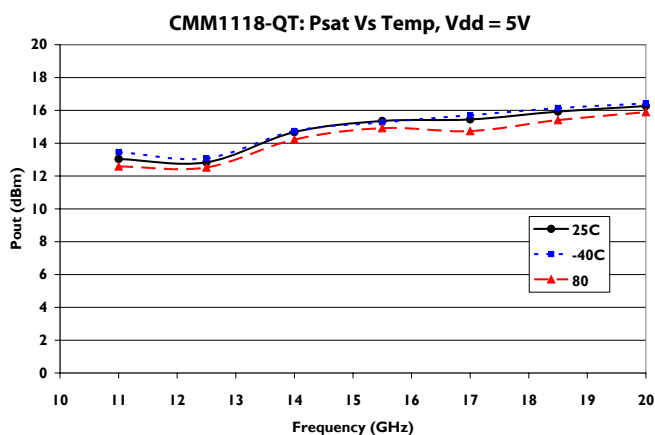
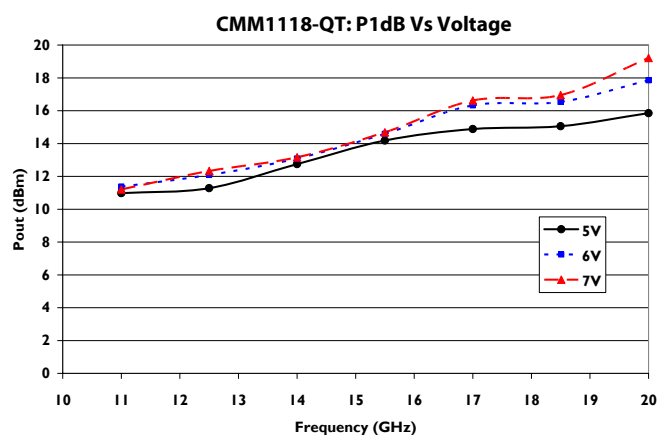
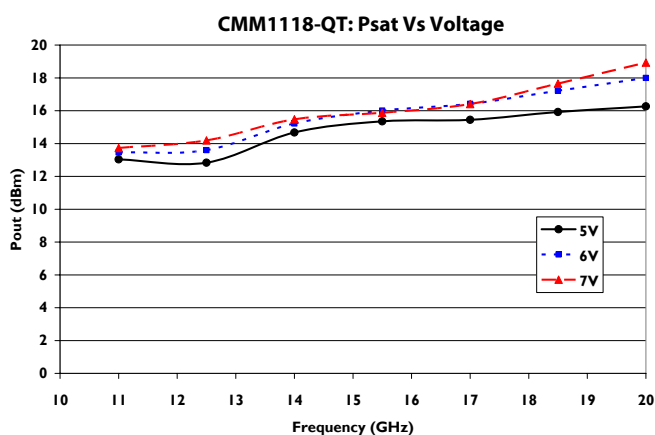
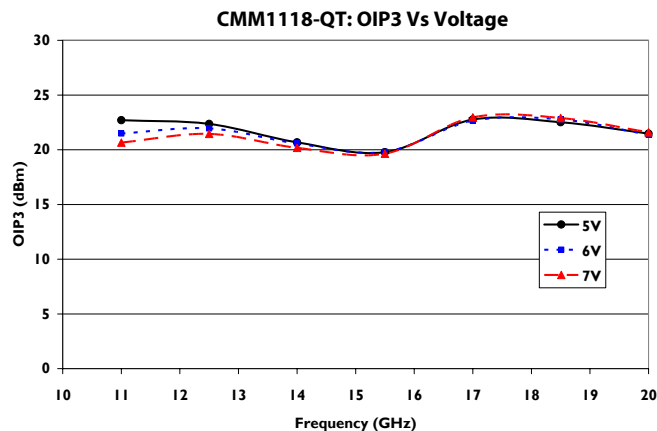
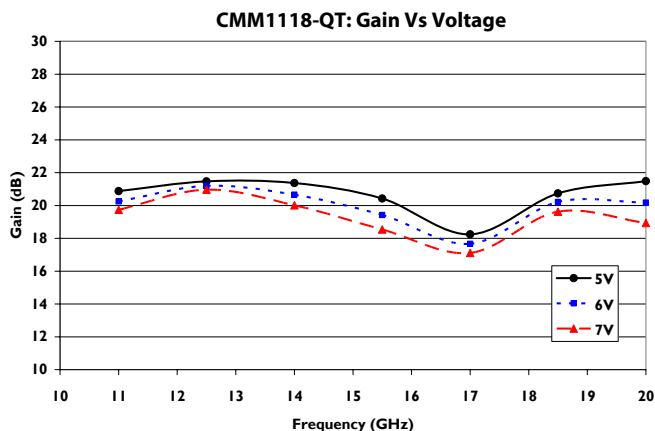
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Driver Amplifier Measurements



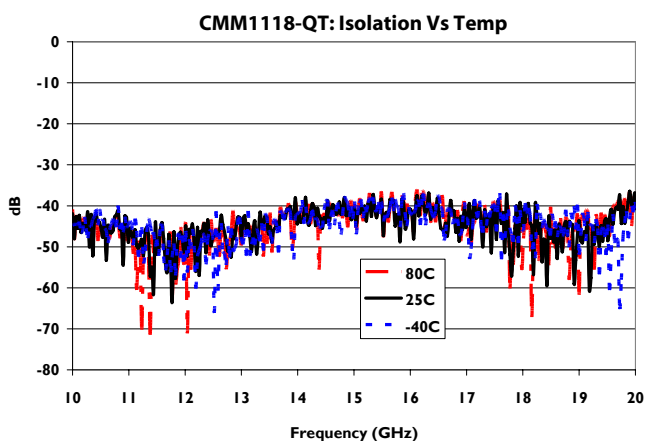
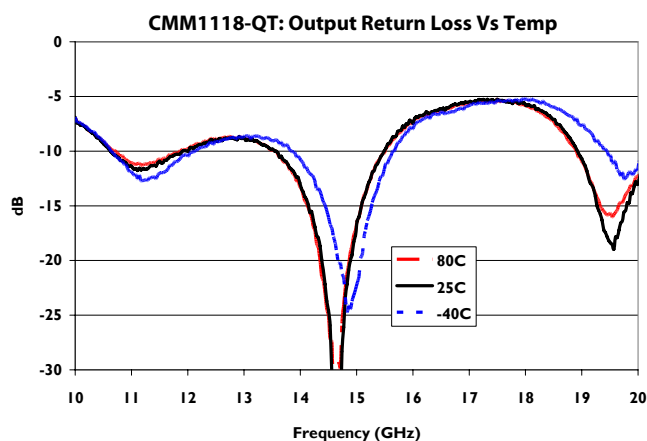
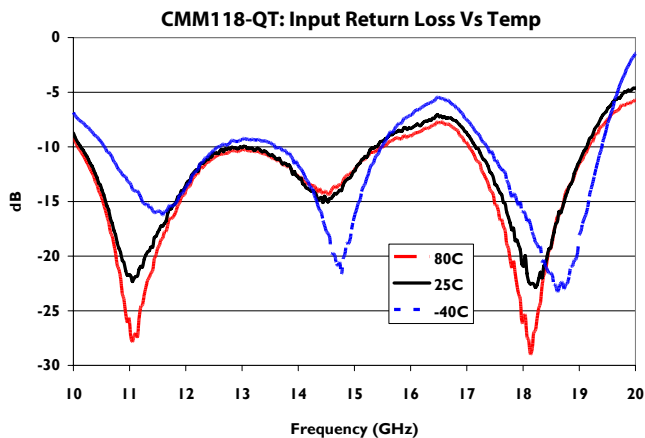
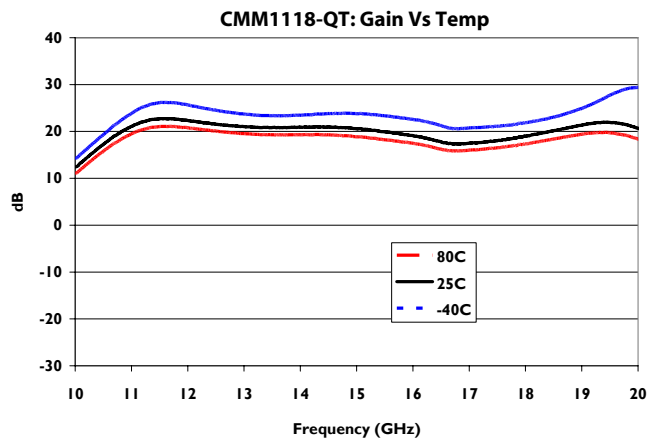
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Driver Amplifier Measurements



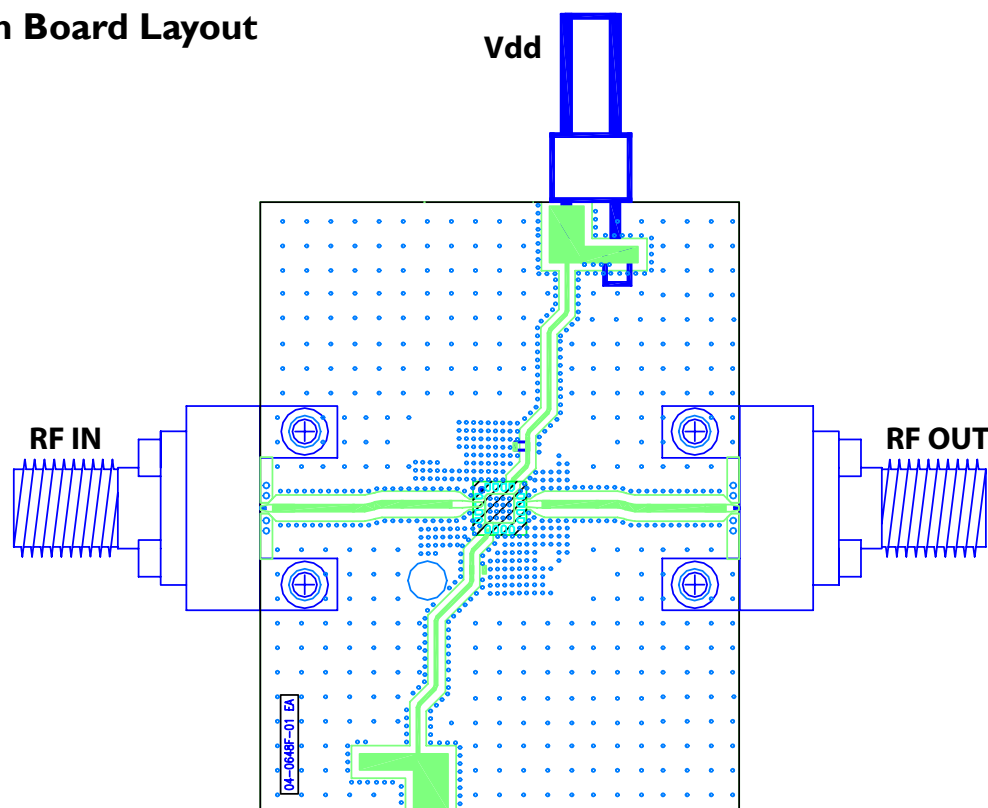
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Evaluation Board Layout



Pin Assignment and Description

| Pin # | Function | Description |
|--------|-----------|--|
| Pin 1 | NC | No connection pin. It is recommended to RF ground this pin |
| Pin 2 | RF INPUT | DC coupled. If voltage is present at the input line then a DC blocking capacitor is required |
| Pin 3 | NC | No connection pin. It is recommended to RF ground this pin |
| Pin 4 | NC | No connection pin. It is recommended to RF ground this pin |
| Pin 5 | NC | No connection pin. It is recommended to RF ground this pin |
| Pin 6 | NC | No connection pin. It is recommended to RF ground this pin |
| Pin 7 | NC | No connection pin. It is recommended to RF ground this pin |
| Pin 8 | NC | No connection pin. It is recommended to RF ground this pin |
| Pin 9 | NC | No connection pin. It is recommended to RF ground this pin |
| Pin 10 | NC | No connection pin. It is recommended to RF ground this pin |
| Pin 11 | RF OUTPUT | DC coupled. If voltage is present at the input line then a DC blocking capacitor is required |
| Pin 12 | NC | No connection pin. It is recommended to RF ground this pin |
| Pin 13 | Vdd | Positive voltage supply. External bypass capacitors are required |
| Pin 14 | NC | No connection pin. It is recommended to RF ground this pin |
| Pin 15 | NC | No connection pin. It is recommended to RF ground this pin |
| Pin 16 | NC | No connection pin. It is recommended to RF ground this pin |

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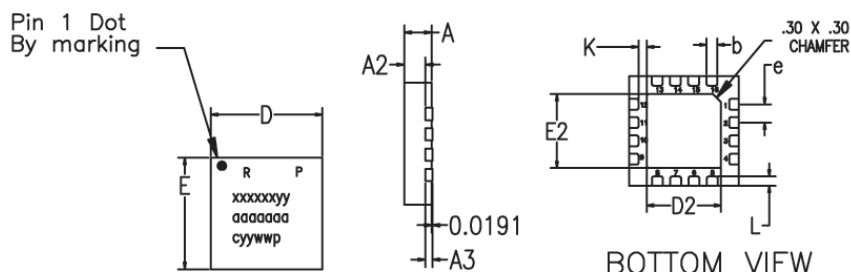
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Package Outline and Assembly

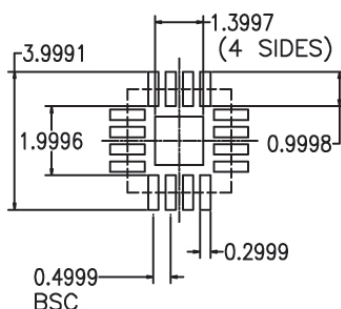
QT (3x3 mm)



MARKINGS:
PIN 1/BOM REV/PLATING
MIMIX PART/MODEL NO.
WAFER LOT NUMBER
DATE CODE

TOP VIEW

RECOMMENDED SOLDER PAD PITCH AND DIMENSIONS



Note:

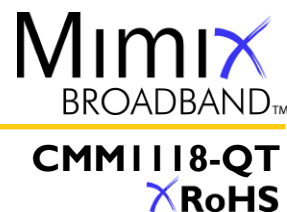
1. ALL DIMENSIONS ARE IN mm.

| | MIN | TYP | MAX |
|----|----------|------|------|
| A | 0.80 | 0.90 | 1.00 |
| A3 | 0.20 REF | | |
| A2 | 0.00 | 0.65 | 1.00 |
| b | 0.20 | 0.25 | 0.30 |
| K | 0.20 | — | — |
| D | 3.00 BSC | | |
| E | 3.00 BSC | | |
| e | 0.50 | | |
| D2 | 1.50 | 1.65 | 1.80 |
| E2 | 1.50 | 1.65 | 1.80 |
| L | 0.16 | 0.26 | 0.36 |

1. VIEWS ARE NOT TO SCALE: USE DIMENSIONS AND TABLE.

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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. 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.

Typical Reflow Profiles

| Reflow Profile | SnPb | Pb Free |
|---------------------------------|-------------------------|-------------------------|
| Ramp Up Rate | 3-4 °C/sec | 3-4 °C/sec |
| Activation Time and Temperature | 60-120 sec @ 140-160 °C | 60-180 sec @ 170-200 °C |
| Time Above Melting Point | 60-150 sec | 60-150 sec |
| Max Peak Temperature | 240 °C | 265 °C |
| Time Within 5 °C of Peak | 10-20 sec | 10-20 sec |
| Ramp Down Rate | 4-6 °C/sec | 4-6 °C/sec |

Factory Automation and Identification

| Mimix Designator | Package Type | Number of leads offered | W Tape Width | P ₁ Component Pitch | P ₀ Hole Pitch | Reel Diameter | Units per Reel |
|------------------|--------------|-------------------------|--------------|--------------------------------|---------------------------|---------------|----------------|
| -QT | QFN (3x3mm) | 16 | 12mm | 8mm | 4mm | 329mm (13in) | 2000 |

Component Orientation: Parts are to be oriented with the PIN 1 closest to the tape's round sprocket holes on the tape's trailing edge.

Note: Tape and Reel packaging is ordered with a -000T suffix. Package is available in 500 unit reels through designated sales channels. Minimum order quantities should be discussed with your local sales representative.

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

Part Number for Ordering

CMM1118-QT-0G00
CMM1118-QT-0G0T
PB-CMM1118-0000

Description

Matte Tin finished RoHS compliant 3x3 QFN in bulk quantity
Matte Tin finished RoHS compliant 3x3 QFN in tape and reel
Evaluation Board



Caution: ESD Sensitive
Appropriate precautions in handling, packaging
and testing devices must be observed.

Proper ESD procedures should be followed when handling this device.

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