

Driver Amplifier, GaAs MMIC 5 - 14 GHz

Rev. V1

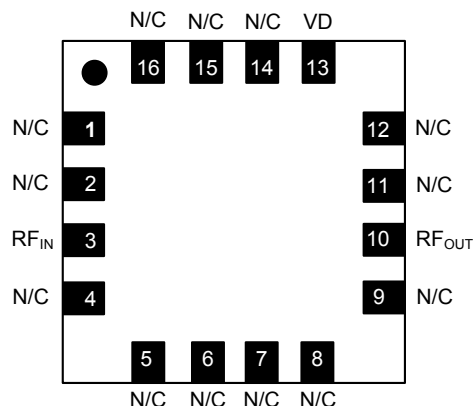
Features

- 20 dB Gain
- 11 dBm P1dB
- Single Bias
- 5 - 7 V, 90 mA Self Bias
- Lead-Free 3 mm, 16-lead QFN
- On-Chip ESD Protection
- RoHS* Compliant

Description

The CMM0511-QT is a 3 stage 5 to 14 GHz driver amplifier packaged in surface mount 3 mm 16-lead QFN package. The device is a self-biased, single bias design with 20 dB gain and 11 dBm P1dB. This MMIC uses an optical pHEMT process.

Block Diagram



Ordering Information¹

| Part Number | Package |
|--------------------|----------------|
| CMM0511-QT-0G0T | 500 piece reel |
| CMM0511-QT-0G00 | Bulk |
| PB-CMM0511-QT-0000 | Sample Board |

1. Reference Application Note M513 for reel size information.

Pin Configuration²

| Pin # | Function | Description |
|---------------------------|-------------------|---------------|
| 1,2,4 - 9,11, 12,14,15,16 | N/C | No Connection |
| 3 | RF _{IN} | RF Input |
| 10 | RF _{OUT} | RF Output |
| 13 | VD | Drain Voltage |
| 17 ³ | GND | Paddle |

2. MACOM recommends connecting No Connection (N/C) package pins to ground.
3. The exposed pad centered on the package bottom must be connected to RF, DC and thermal ground.

Electrical Specifications: Freq. = 5 - 14 GHz, T_A = +25°C, Z₀ = 50 Ω

| Parameter | Units | Min. | Typ. | Max. |
|-------------------|-------|------|------|------|
| Gain | dB | — | 20 | — |
| Input Return Loss | dB | — | 12 | — |
| Output P1dB | dBm | — | 11 | — |
| Output IP3 | dBm | — | 22 | — |
| Bias Voltage | V | — | 5 | 7 |
| Current | mA | — | 90 | 120 |

* Restrictions on Hazardous Substances, compliant to current RoHS EU directive.

Typical Parameters: 6 V, 90 mA

| Parameter | Units | Frequency (GHz) | | | | | |
|--------------------|-------|-----------------|------|------|------|------|------|
| | | 5 | 7 | 9 | 11 | 13 | 14 |
| Gain | dB | 20.5 | 20.5 | 18.5 | 18.5 | 18.5 | 20.0 |
| Input Return Loss | dB | 15.0 | 15.0 | 17.0 | 20.0 | 10.0 | 8.0 |
| Output Return Loss | dB | 14.5 | 15.0 | 11.0 | 11.0 | 9.0 | 9.0 |
| Output P1dB | dBm | 13.0 | 13.0 | 10.0 | 10.0 | 10.0 | 11.5 |
| Output IP3 | dBm | 24.0 | 24.0 | 22.0 | 20.0 | 21.0 | 20.5 |

Absolute Maximum Ratings^{4,5}

| Parameter | Absolute Maximum |
|-----------------------|------------------|
| Input Power | 10 dBm |
| Bias Voltage | 8 V |
| Junction Temperature | +175°C |
| Operating Temperature | -40°C to +85°C |
| Storage Temperature | -55°C to +125°C |

4. Exceeding any one or combination of these limits may cause permanent damage to this device.
5. MACOM does not recommend sustained operation near these survivability limits.

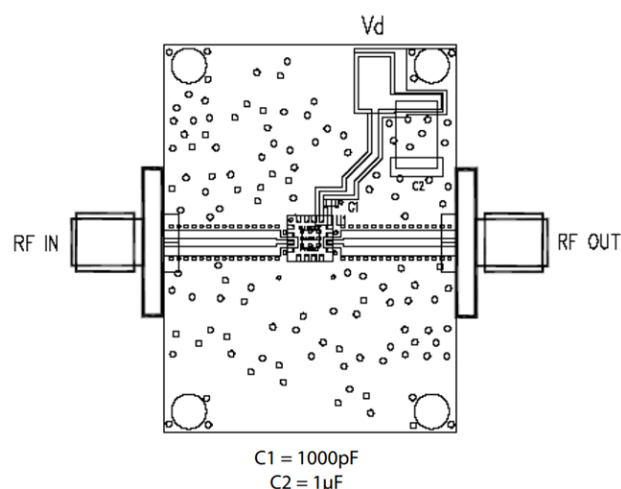
Handling Procedures

Please observe the following precautions to avoid damage:

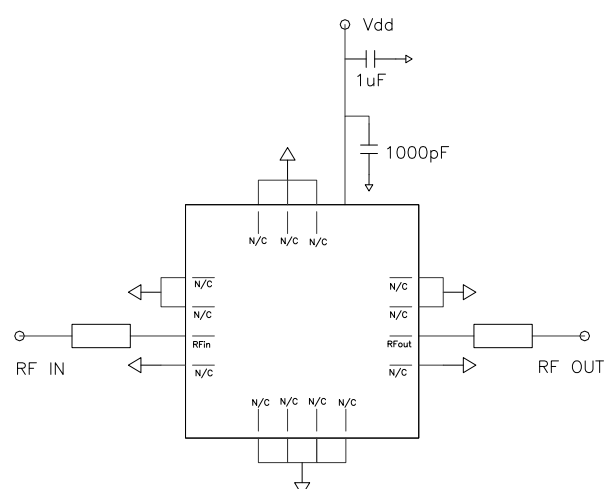
Static Sensitivity

These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

Evaluation Board Layout

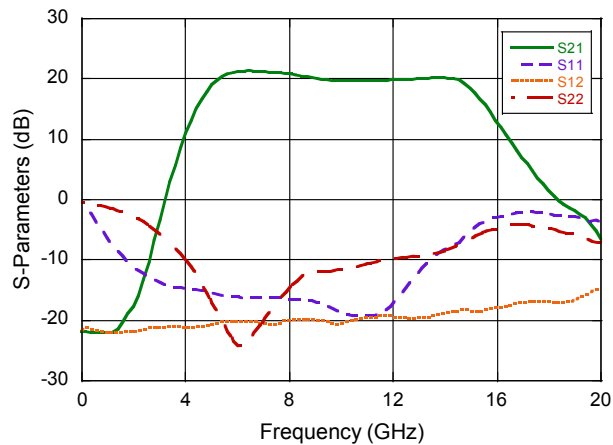


Evaluation Board Schematic

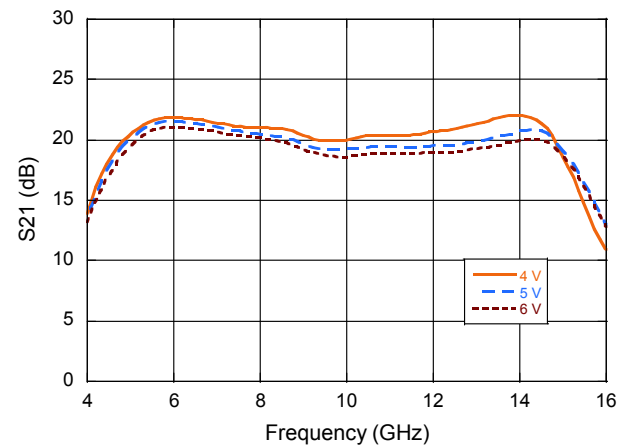


Typical Performance Curves

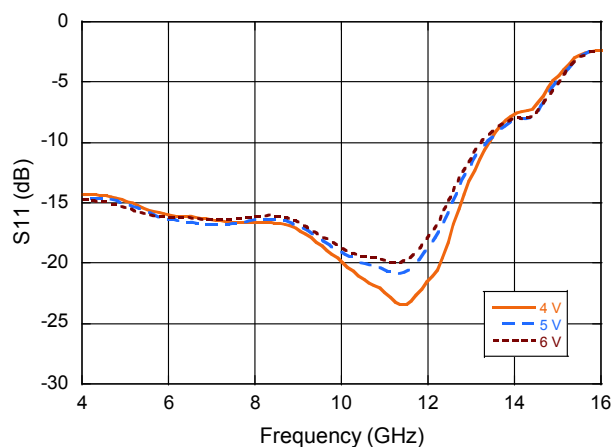
S-Parameters @ 6 V, 102 mA



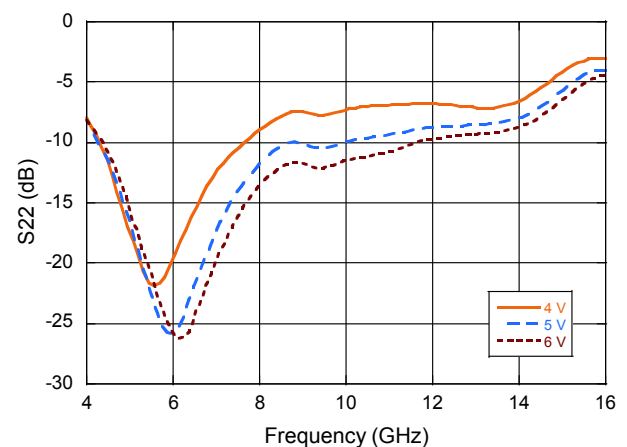
Gain vs. Frequency



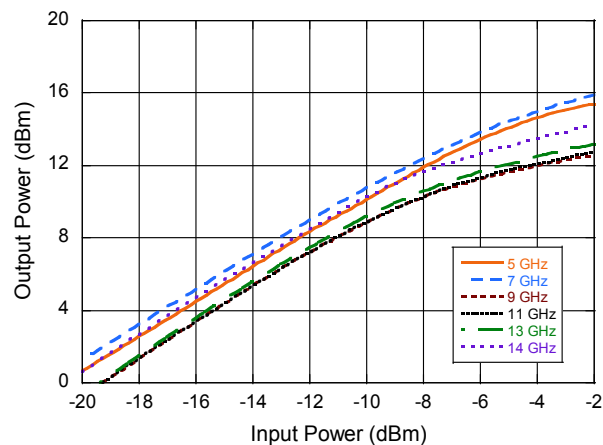
Input Return Loss vs. Frequency



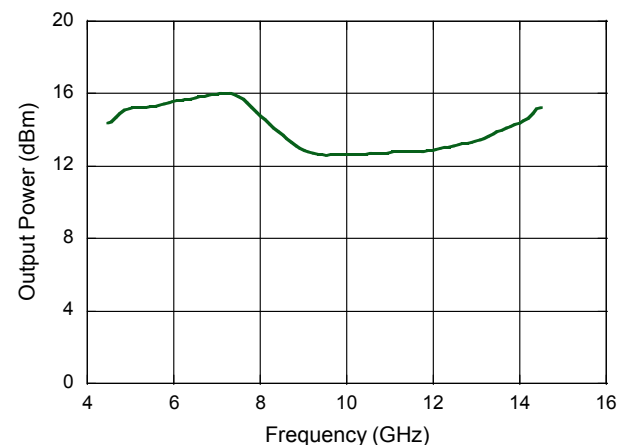
Output Return Loss vs. Frequency



Output Power Vs. Input Power

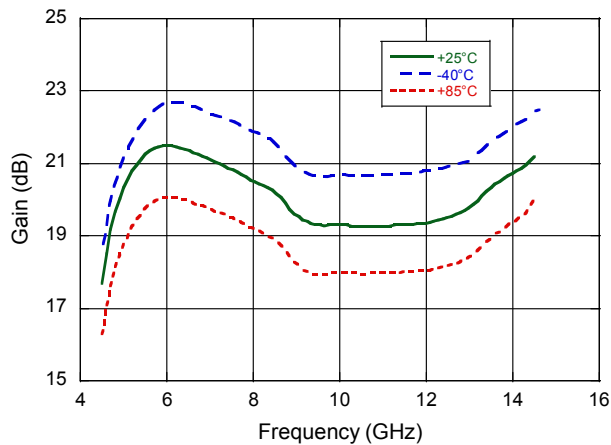


Saturated Output Power vs. Frequency @ 5 V, 90 mA

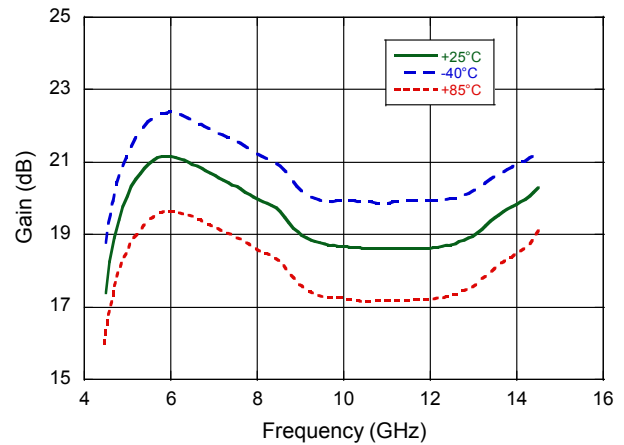


Typical Performance Curves over Temperature

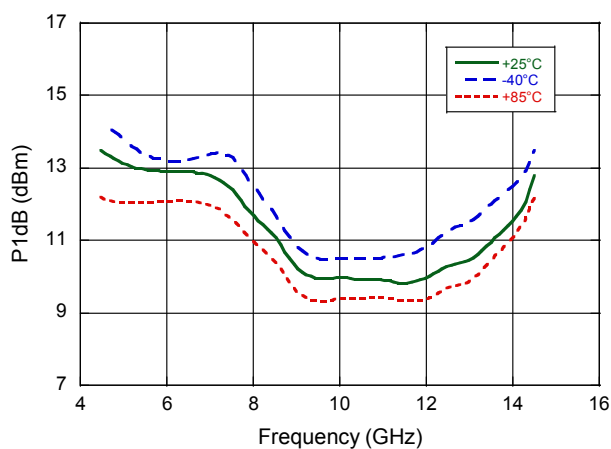
Gain vs. Frequency @ 5 V, 90 mA



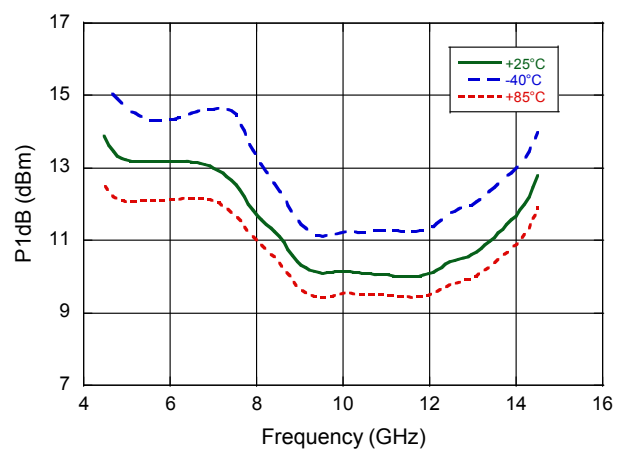
Gain vs. Frequency @ 6 V, 90 mA



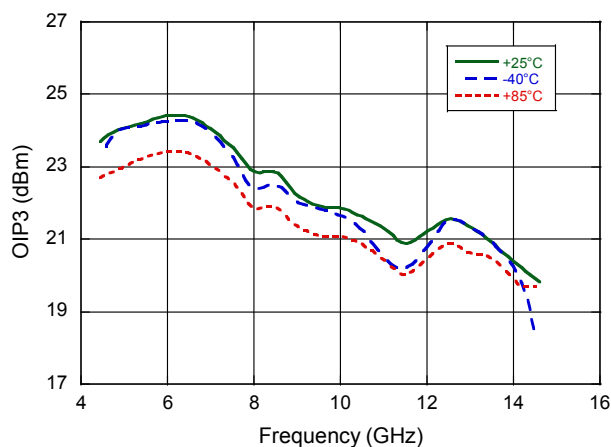
P1dB vs. Frequency @ 5 V, 90 mA



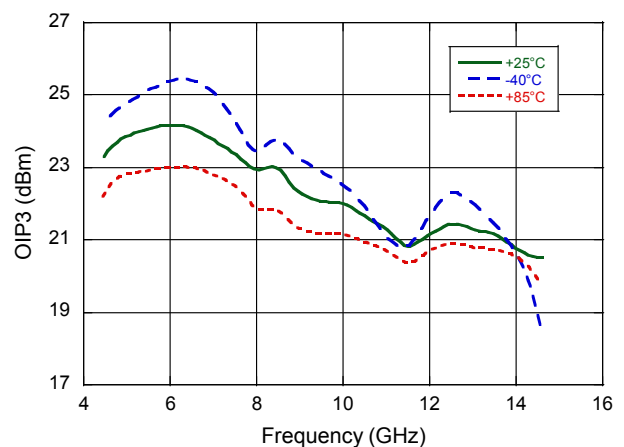
P1dB vs. Frequency @ 6 V, 90 mA



OIP3 vs. Frequency @ 5 V, 90 mA

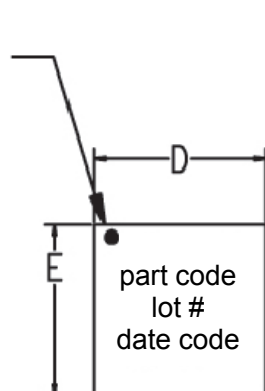


OIP3 vs. Frequency @ 6 V, 90 mA

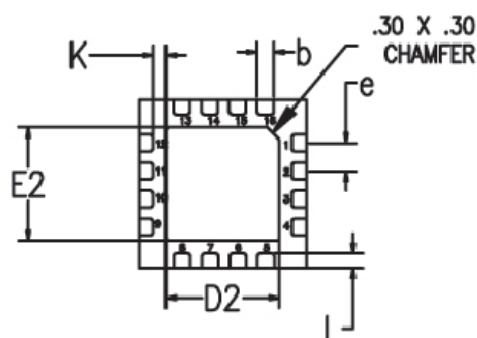
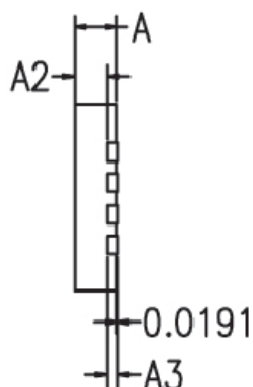


QT (3x3 mm)

Pin 1 Dot
By marking



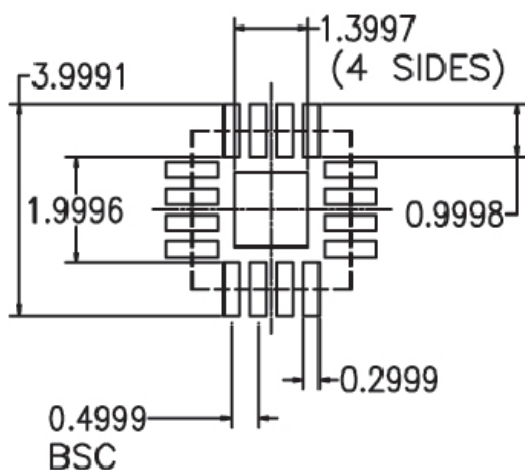
TOP VIEW



BOTTOM VIEW

ALL DIMENSIONS ARE IN mm.

RECOMMENDED SOLDER PAD PITCH AND DIMENSIONS



| | 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 |

VIEWS ARE NOT TO SCALE: USE DIMENSIONS AND TABLE.

Plating is 100% matte tin over copper.

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