# MAAM-009560

## RF Driver Amplifier
## 250 - 4000 MHz

Rev. V1

### Features

- Output Intercept Point of +42 dBm over a 20 dB Input Power Range
- Broadband Operation
- Lead-Free SOT-89 Package
- Halogen-Free "Green" Mold Compound
- RoHS* Compliant and 260°C Reflow Compatible
- Class 2 ESD Rating

### Description

The MAAM-009560 RF driver amplifier is a GaAs MMIC which exhibits exceptional linearity performance over a >20 dB dynamic range, as well as featuring high gain in a lead-free miniature SOT-89 surface mount plastic package. The device is biased with a single +5 volt supply and consumes 225 mA typically.

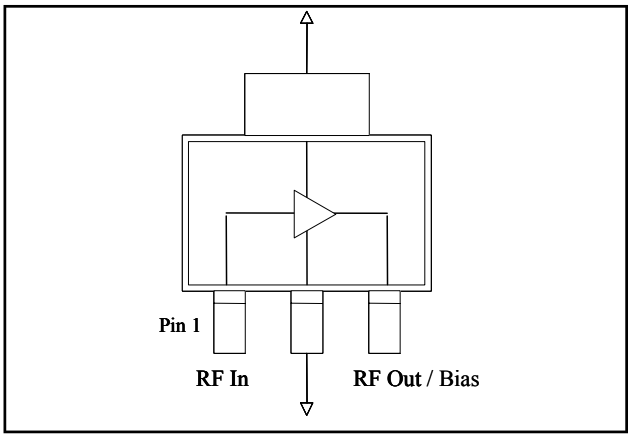
The MAAM-009560 is fabricated using an HBT process to realize low current and high linearity. The process features full passivation for increased performance and reliability.

### Ordering Information [1,2]

| Part Number | Package |
|---|---|
| MAAM-009560-000000 | Bulk Packaging |
| MAAM-009560-TR3000 | 3000 piece reel |
| MAAM-009560-001SMB | Sample Board |

1. Reference Application Note M513 for reel size information.
2. All sample boards include 5 loose parts.

### Functional Schematic




### Pin Configuration

| Pin No. | Function | Pin No. | Function |
|---|---|---|---|
| 1 | RF Input | 3 | RF Output/Bias |
| 2 | Ground | | |

### Maximum Operating Conditions [3]

| Parameter | Maximum Operating Conditions |
|---|---|
| Junction Temperature[4] | 170 °C |
| RF Output Power | 28 dBm |
| Operating Temperature | -40 °C to +85 °C |

3. These operating conditions will ensure MTTF > 1 x $10^6$ hours.
4. Junction Temperature ($T_J$) = $T_A$ + Θjc * (($V * I$) - ($P_{OUT}$ - $P_{IN}$))
   Typical thermal resistance (Θjc) = 47° C/W
   a) For $T_A$ = 25°C,
   $T_J$ = 73 °C @ 5 V, 225 mA, $P_{OUT}$ = 20 dBm, $P_{IN}$ = 5 dBm
   b) For $T_A$ = 85°C,
   $T_J$ = 123 °C @ 5 V, 180 mA, $P_{OUT}$ = 20 dBm, $P_{IN}$ = 5.5 dBm

### Absolute Maximum Ratings [5,6]

| Parameter | Absolute Maximum |
|---|---|
| RF Output Power | 29 dBm |
| Voltage | 6 volts |
| Storage Temperature | -65 °C to +150 °C |
| Junction Temperature | 210 °C |

5. Exceeding any one or combination of these limits may cause permanent damage to this device.
6. M/A-COM Technology Solutions does not recommend sustained operation near these survivability limits.

* Restrictions on Hazardous Substances, European Union Directive 2002/95/EC.





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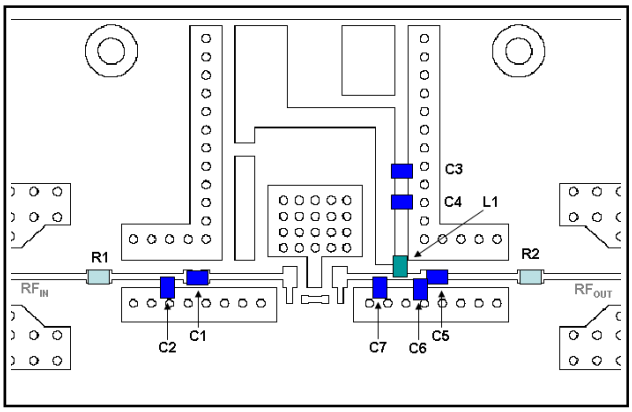
RF Driver Amplifier
250 - 4000 MHz

Rev. V1

## Electrical Specifications: Freq. = 2140 MHz, $T_A$ = 25°C, $V_{CC}$ = +5 V, $Z_0$ = 50 Ω

| Parameter | Units | Min. | Typ. | Max. |
|---|---|---|---|---|
| Gain | dB | 14 | 15 | — |
| Noise Figure | dB | — | 3 | — |
| Input Return Loss | dB | — | 15 | — |
| Output Return Loss | dB | — | 17 | — |
| Output P1dB | dBm | — | 28.5 | — |
| Output IP3 | dBm | 40 | 42 | — |
| Quiescent Current | mA | — | 220 | — |
| Current ($P_{IN}$ = 0 dBm) | mA | — | 225 | 325 |

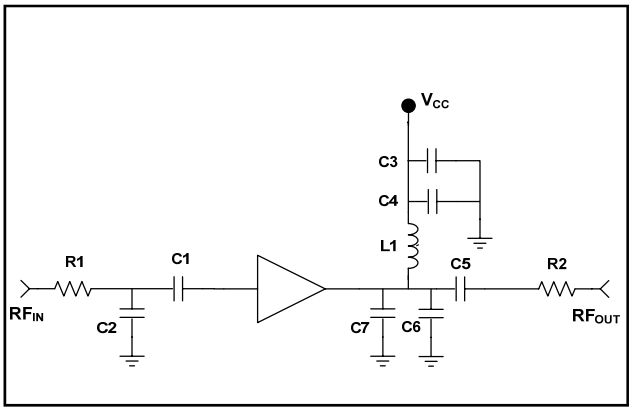
## 2140 MHz PCB Layout



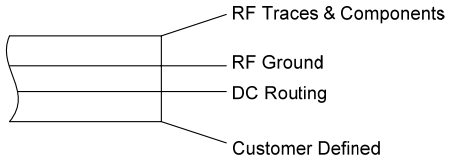

## Parts List

| Part | Value | Case Style |
|---|---|---|
| C1 | 1.8 pF | 0402 |
| C2 | 2.2 pF | 0402 |
| C3 | 0.1 µF | 0402 |
| C4 | 1000 pF | 0402 |
| C5 | 39 pF | 0402 |
| C6 | 1 pF | 0402 |
| C7 | 2 pF | 0402 |
| L1 | 3.6 nH | 0402 |
| R1, R2 | 0 Ω | 0402 |

## 2140 Schematic




## Cross Section View




The PCB dielectric between RF traces and RF ground layers should be chosen to reduce RF discontinuities between 50 Ω lines and package pins. M/A-COM recommends an FR-4 dielectric thickness of 0.008" (0.20 mm) yielding a 50 Ω line width of 0.015" (0.38 mm). The recommended RF metalization is 1 ounce copper.





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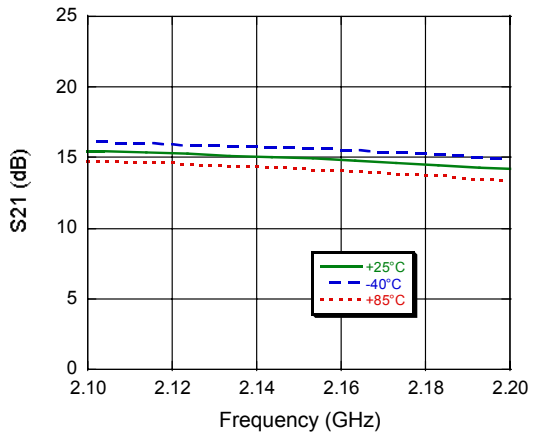
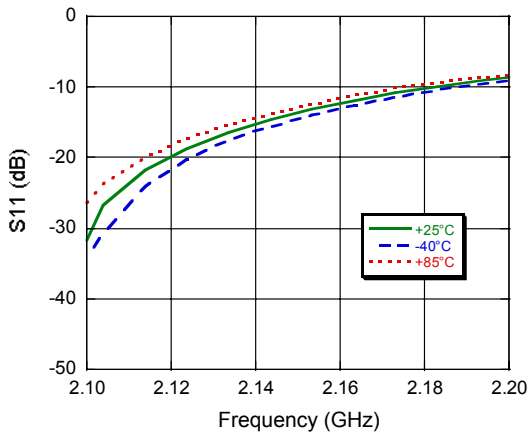
## Typical Performance Curves, 2140 MHz Configuration

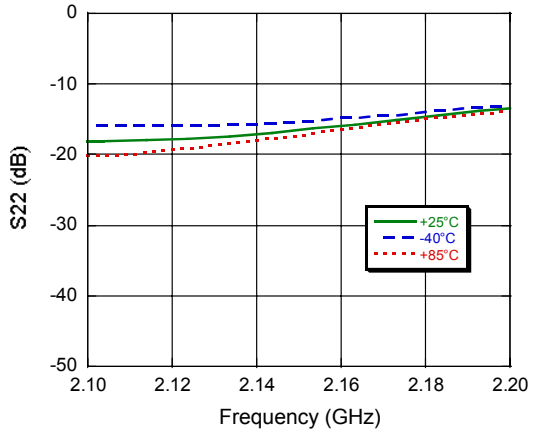
***Gain***



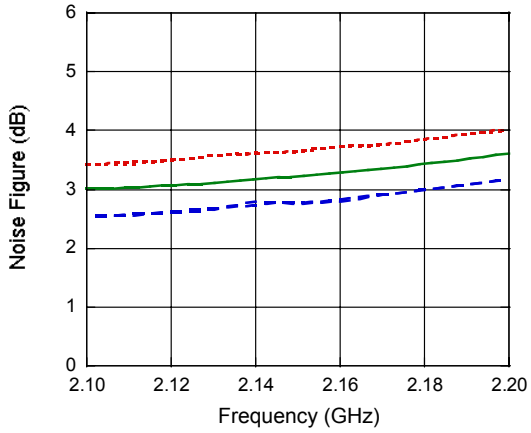

***Input Return Loss***



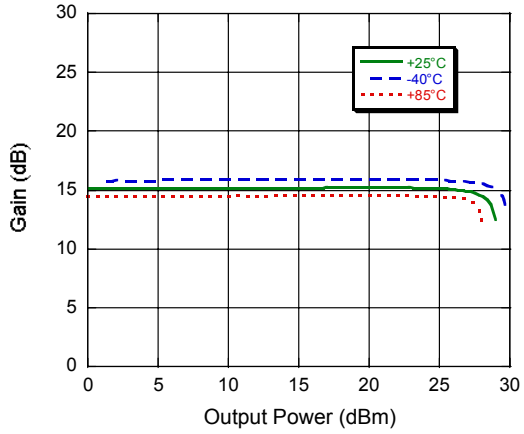

***Output Return Loss***



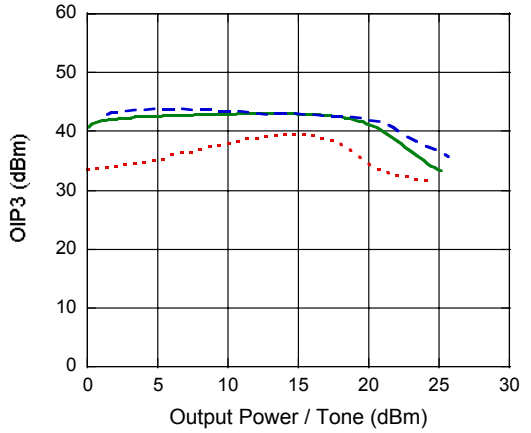

***Noise Figure***




***P1dB***

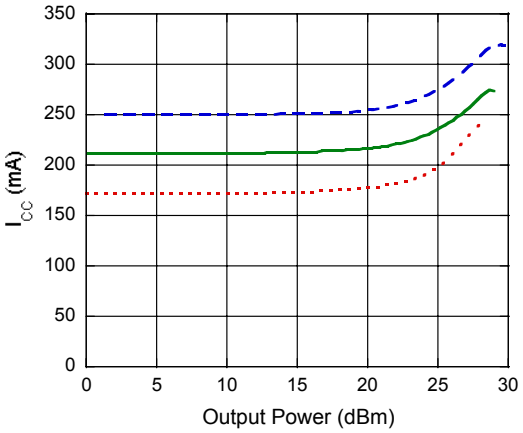



***Output IP3***



## Typical Performance Curves, 2140 MHz Configuration

***Current***



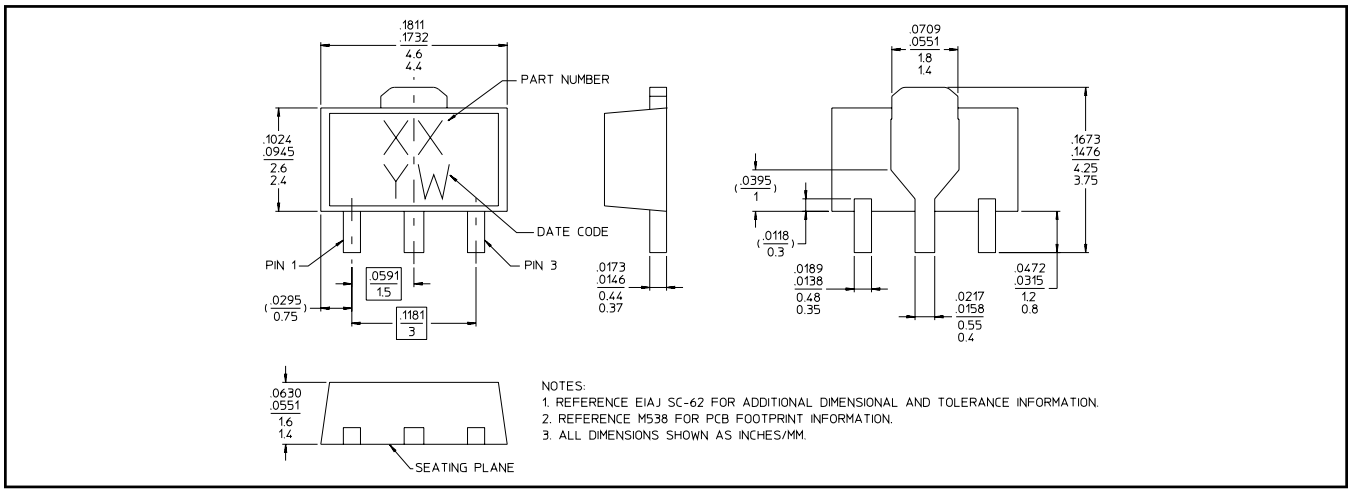

## Handling Procedures

Please observe the following precautions to avoid damage:

## Static Sensitivity

Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these class 2 devices.

## *Lead-Free* SOT-89 Plastic Package†




† Reference Application Note M538 for lead-free solder reflow recommendations.
Meets JEDEC moisture sensitivity level 1 requirements.
Plating is 100% matte tin over copper.





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