

## RF Driver Amplifier 250 - 4000 MHz

Rev. V1

### Features

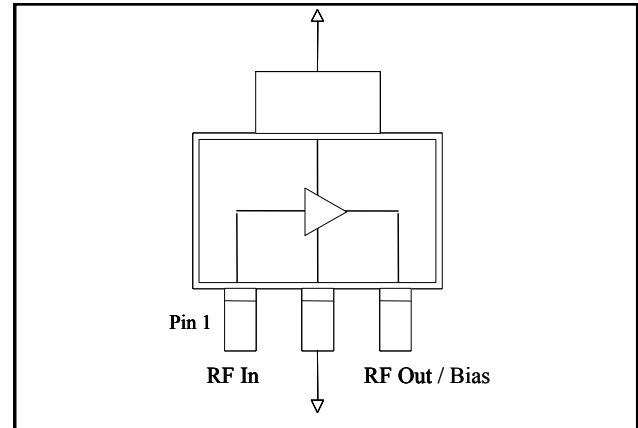
- Output Intercept Point of +42 dBm over a 20 dB Input Power Range
- Broadband Operation
- Lead-Free SOT-89 Package
- Halogen-Free “Green” Mold Compound
- RoHS\* Compliant and 260°C Reflow Compatible
- Class 2 ESD Rating

### 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.

### Functional Schematic



### Pin Configuration

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

### Maximum Operating Conditions<sup>3</sup>

Parameter	Maximum Operating Conditions
Junction Temperature <sup>4</sup>	170 °C
RF Output Power	28 dBm
Operating Temperature	-40 °C to +85 °C

3. These operating conditions will ensure MTTF > 1 x 10<sup>6</sup> hours.

4. Junction Temperature ( $T_J$ ) =  $T_A + \Theta_{jc} * ((V * I) - (P_{OUT} - P_{IN}))$

Typical thermal resistance ( $\Theta_{jc}$ ) = 47° C/W

a) For  $T_A = 25^\circ\text{C}$ ,

$T_J = 73^\circ\text{C}$  @ 5 V, 225 mA,  $P_{OUT} = 20$  dBm,  $P_{IN} = 5$  dBm

b) For  $T_A = 85^\circ\text{C}$ ,

$T_J = 123^\circ\text{C}$  @ 5 V, 180 mA,  $P_{OUT} = 20$  dBm,  $P_{IN} = 5.5$  dBm

### Absolute Maximum Ratings<sup>5,6</sup>

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.

### Ordering Information<sup>1,2</sup>

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.

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

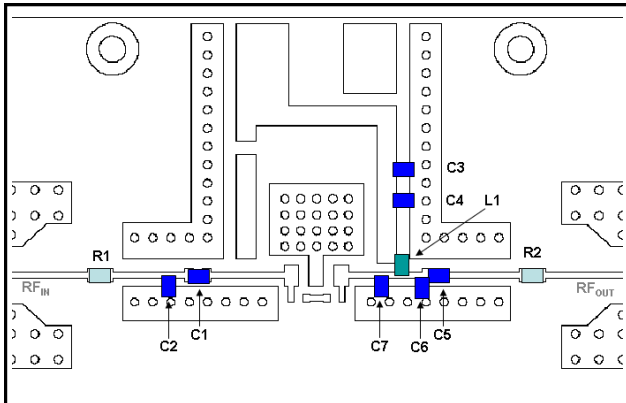
## RF Driver Amplifier 250 - 4000 MHz

Rev. V1

**Electrical Specifications: Freq. = 2140 MHz,  $T_A = 25^\circ\text{C}$ ,  $V_{CC} = +5\text{ V}$ ,  $Z_0 = 50\ \Omega$**

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 ( $P_{IN} = 0\text{ dBm}$ )	mA	—	225	325

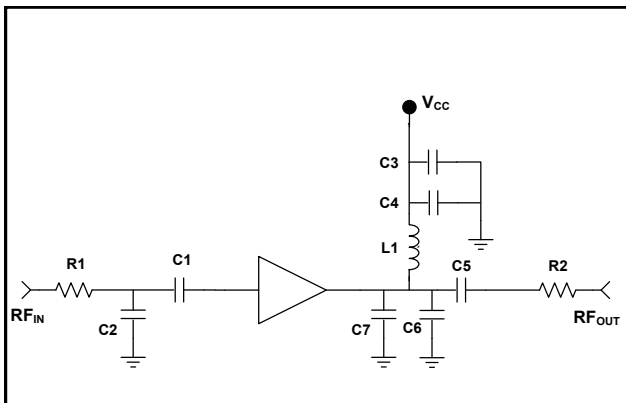
### 2140 MHz PCB Layout



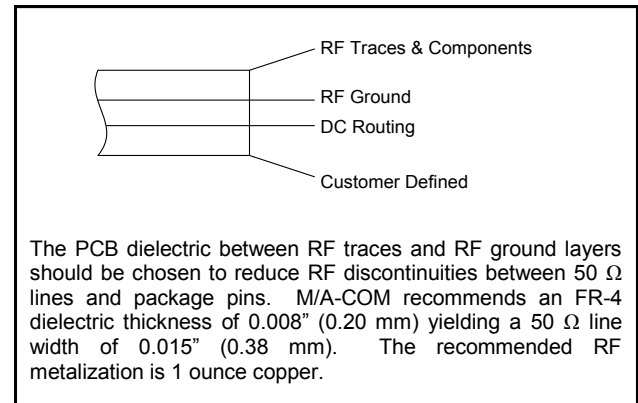
### Parts List

Part	Value	Case Style
C1	1.8 pF	0402
C2	2.2 pF	0402
C3	0.1 $\mu\text{F}$	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 $\Omega$	0402

### 2140 Schematic

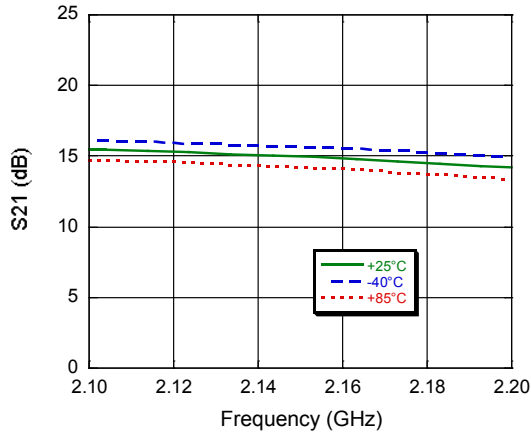


### Cross Section View

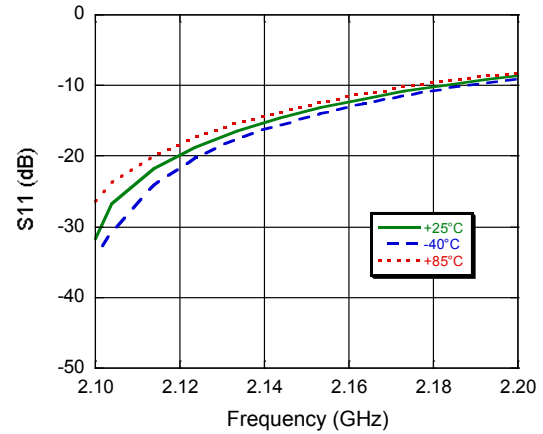


## Typical Performance Curves, 2140 MHz Configuration

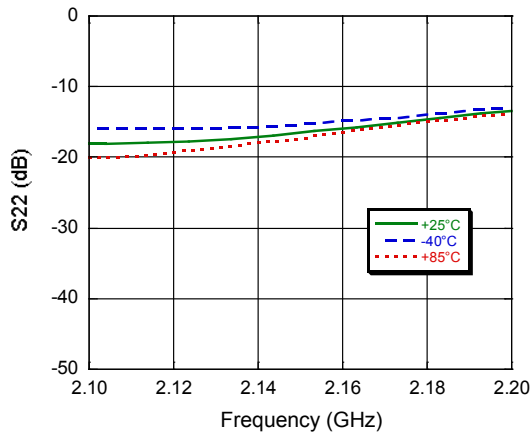
**Gain**



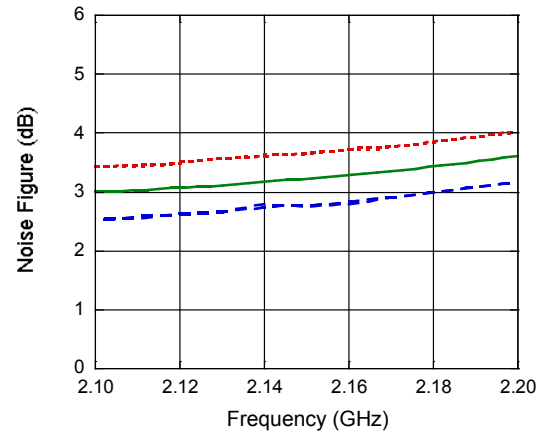
**Input Return Loss**



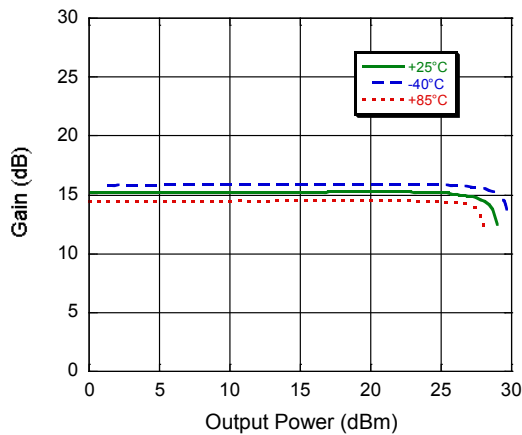
**Output Return Loss**



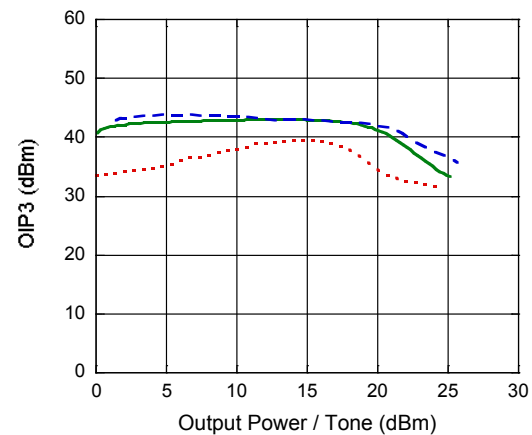
**Noise Figure**



**P1dB**

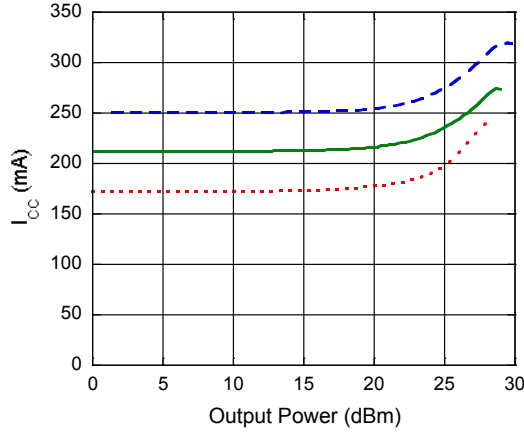


**Output IP3**



## Typical Performance Curves, 2140 MHz Configuration

### Current



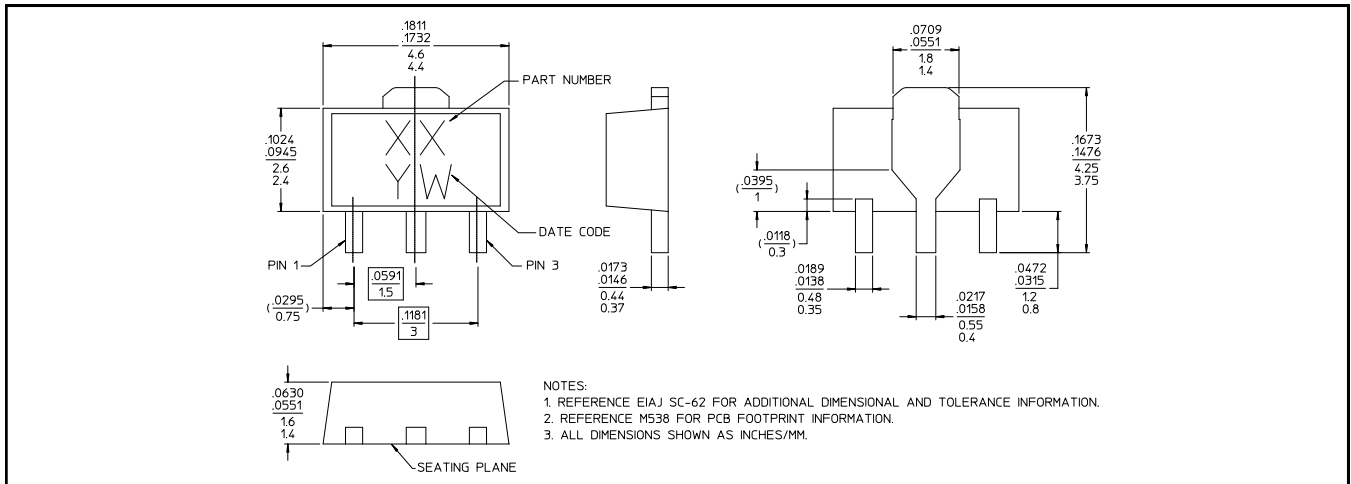
### Handling Procedures

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<sup>†</sup>



<sup>†</sup> 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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