

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.

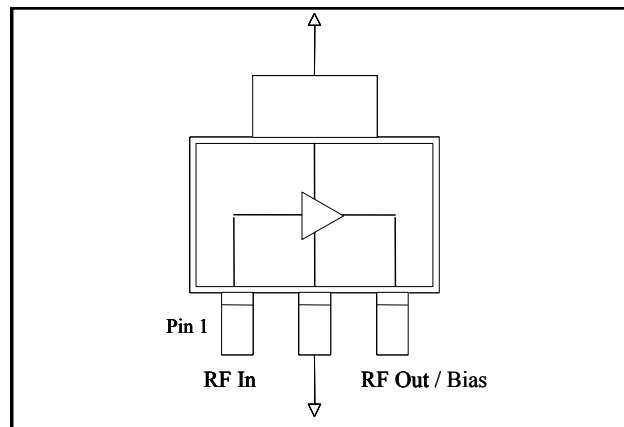
The MAAM-009560 is fabricated using an HBT process to realize low current and high linearity. The process features full passivation for increased performance and reliability.

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 10⁶ hours.
4. Junction Temperature (T_J) = $T_A + \Theta_{jc} * ((V * I) - (P_{OUT} - P_{IN}))$
Typical thermal resistance (Θ_{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 ^{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.

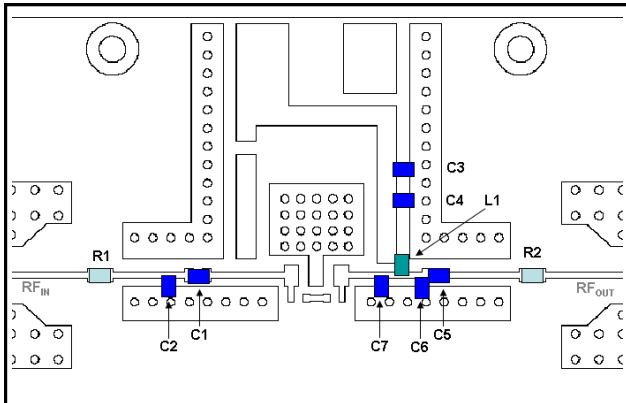
RF Driver Amplifier 250 - 4000 MHz

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

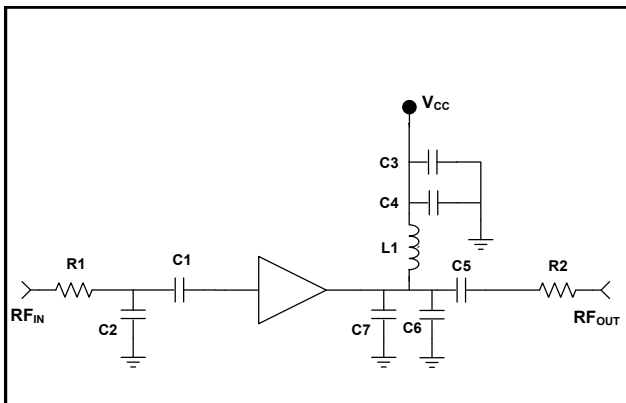
2140 MHz PCB Layout



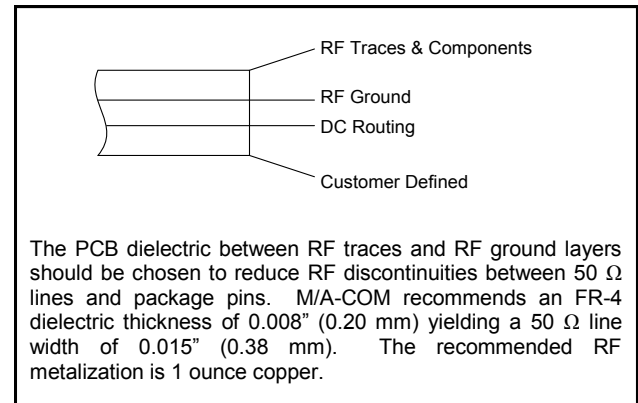
Parts List

Part	Value	Case Style
C1	1.8 pF	0402
C2	2.2 pF	0402
C3	0.1 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

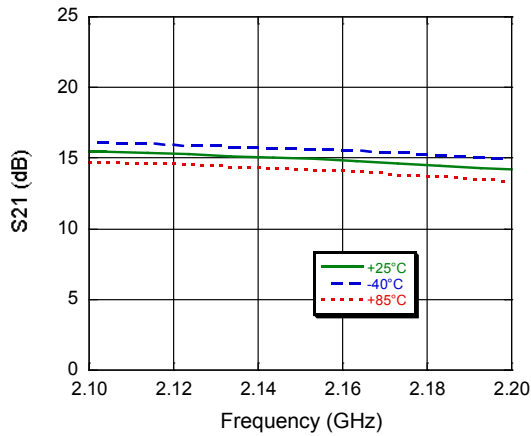


Cross Section View

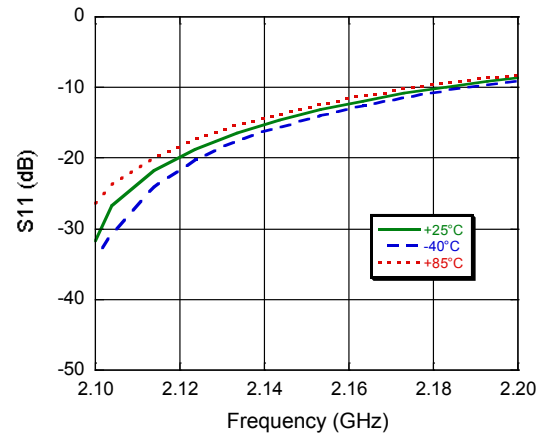


Typical Performance Curves, 2140 MHz Configuration

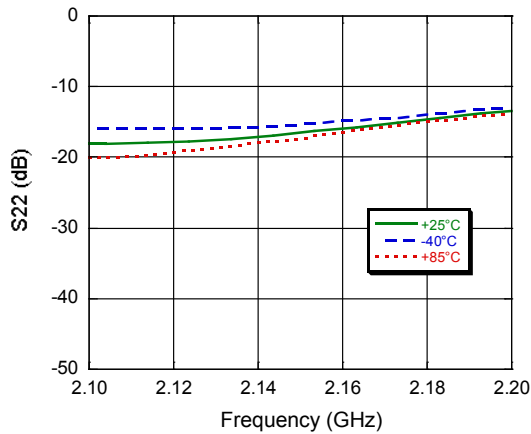
Gain



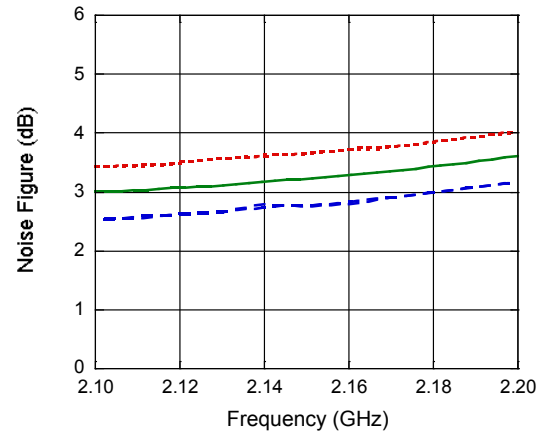
Input Return Loss



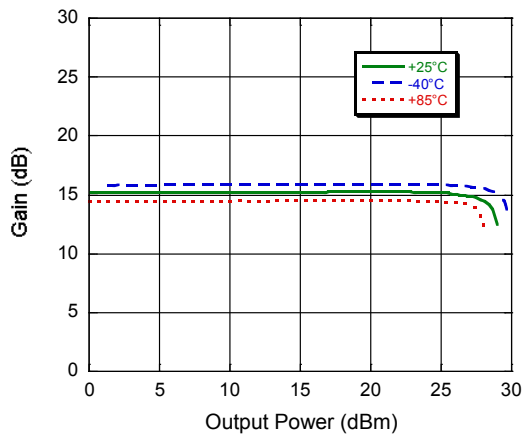
Output Return Loss



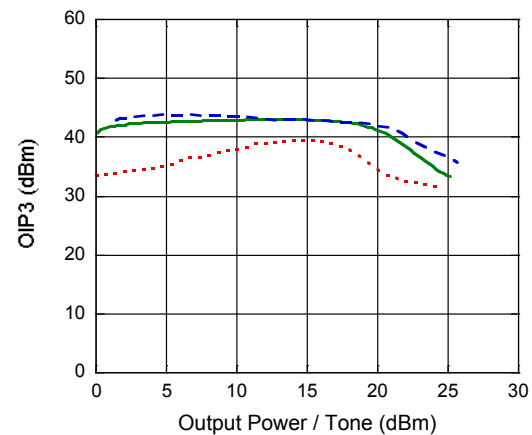
Noise Figure



P1dB

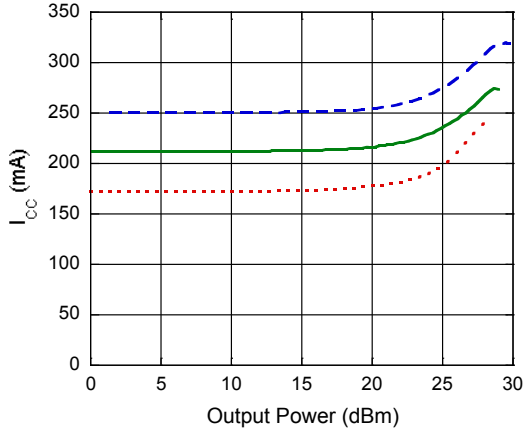


Output IP3



Typical Performance Curves, 2140 MHz Configuration

Current



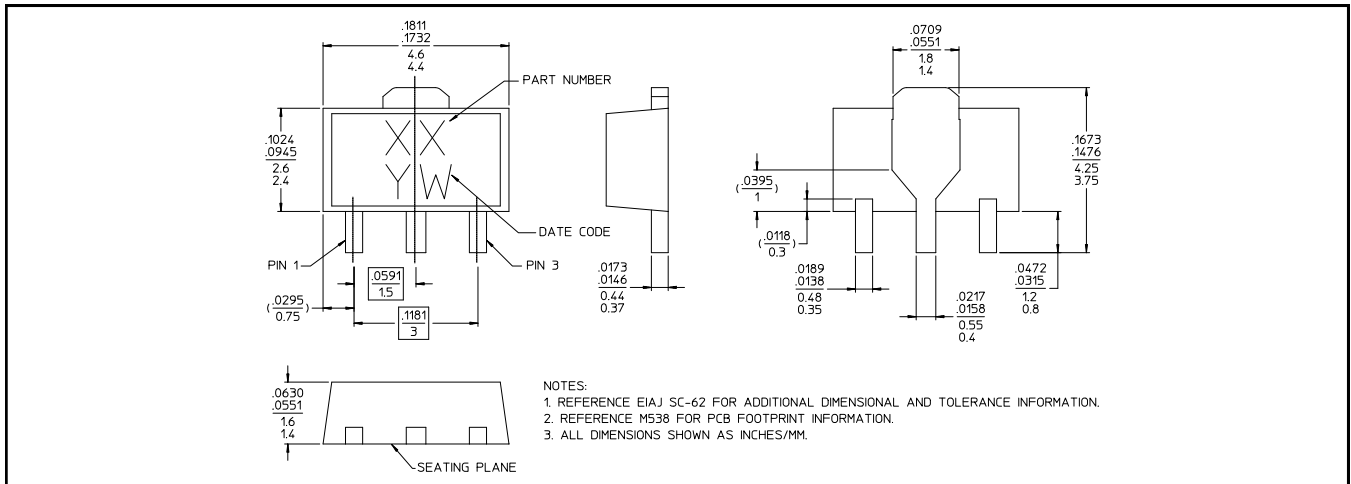
Handling Procedures

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.

M/A-COM Technology Solutions Inc. All rights reserved.

Information in this document is provided in connection with M/A-COM Technology Solutions Inc ("MACOM") products. These materials are provided by MACOM as a service to its customers and may be used for informational purposes only. Except as provided in MACOM's Terms and Conditions of Sale for such products or in any separate agreement related to this document, MACOM assumes no liability whatsoever. MACOM assumes no responsibility for errors or omissions in these materials. MACOM may make changes to specifications and product descriptions at any time, without notice. MACOM makes no commitment to update the information and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to its specifications and product descriptions. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document.

THESE MATERIALS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, RELATING TO SALE AND/OR USE OF MACOM PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, CONSEQUENTIAL OR INCIDENTAL DAMAGES, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. MACOM FURTHER DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. MACOM SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS, WHICH MAY RESULT FROM THE USE OF THESE MATERIALS.

MACOM products are not intended for use in medical, lifesaving or life sustaining applications. MACOM customers using or selling MACOM products for use in such applications do so at their own risk and agree to fully indemnify MACOM for any damages resulting from such improper use or sale.

5

M/A-COM Technology Solutions Inc. (MACOM) and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.
Visit www.macom.com for additional data sheets and product information.