RF Driver Amplifier, 28.5 dBm P1dB
100 - 4000 MHz

MAAM-009560

Rev. V4

Features

- Broadband Operation
- Output P1dB: 28.5 dBm
- Output IP3: 42 dBm
- Single Supply: 5 V
- Lead-Free SOT-89 Package
- RoHS* Compliant
- Class 2 ESD Rating

Applications

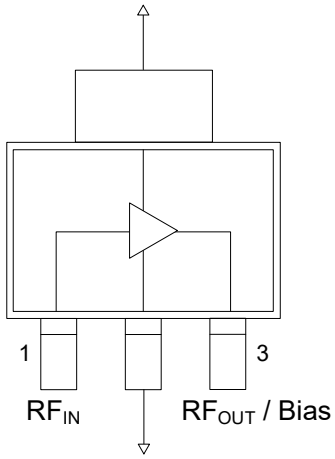
- ISM
- Wireless Networking & Communication

Description

The MAAM-009560 RF driver amplifier is a GaAs MMIC which exhibits exceptional linearity performance of 42 dBm Output IP3, 28.5 dBm P1dB, 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 #	Function
1	RF Input
2	Ground
3	RF Output/Bias

Ordering Information[1,2]

Part Number	Package
MAAM-009560-000000	Bulk Packaging
MAAM-009560-TR1000	1000 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, compliant to current RoHS EU directive.

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[3]	dBm	—	28.5	—
Output IP3	dBm	40	42	—
Quiescent Current	mA	—	220	—
Current (P_{IN} = 0 dBm)	mA	—	225	—

3. Output P1dB is lower than 28.5 dBm at < 250 MHz

Maximum Operating Conditions[4]

Parameter	Maximum Operating Conditions
RF Output Power	28 dBm
Junction Temperature[5]	170 °C
Operating Temperature	-40 °C to +105 °C

4. These operating conditions will ensure MTTF > 1 x 10^6 hours.
5. 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} = 5.0 dBm
   b) For T_A = 85°C,
   T_J = 123 °C @ 5 V, 180 mA, P_{OUT} = 20 dBm, P_{IN} = 5.5 dBm
   c) For T_A = 105°C,
   T_J = 140 °C @ 5 V, 170 mA, P_{OUT} = 20 dBm, P_{IN} = 5.7 dBm

Absolute Maximum Ratings[6,7]

Parameter	Absolute Maximum
RF Output Power	30 dBm
Voltage	6 volts
Junction Temperature	210 °C
Storage Temperature	-65 °C to +150 °C

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

Handling Procedures

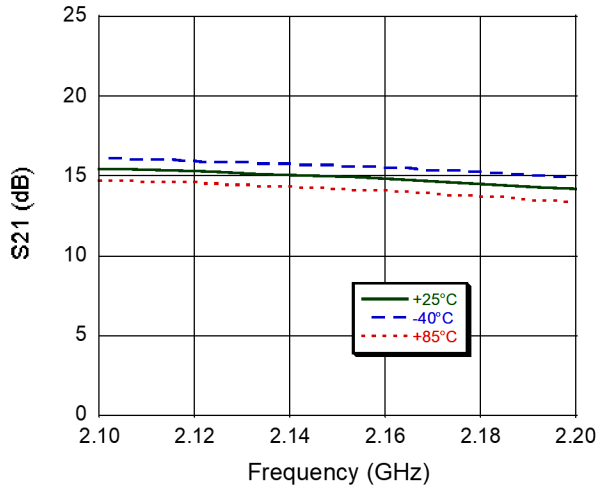
Please observe the following precautions to avoid damage:

Static Sensitivity

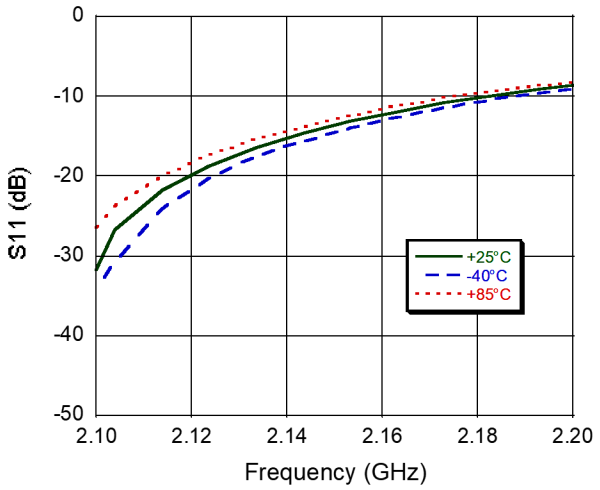
These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these Class 2 devices.

Typical Performance Curves, 2140 MHz Configuration

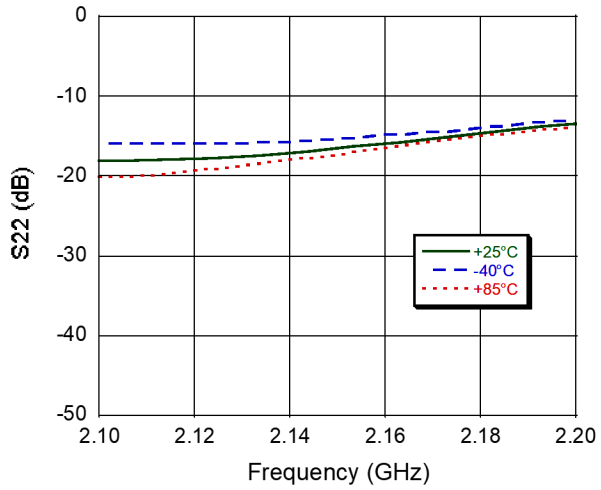
Gain



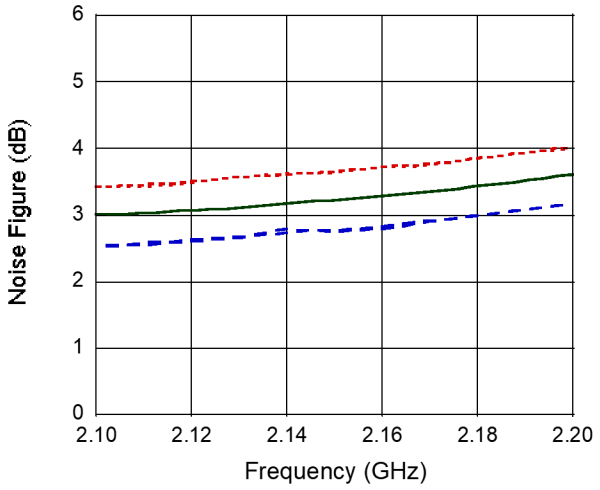
Input Return Loss



Output Return Loss

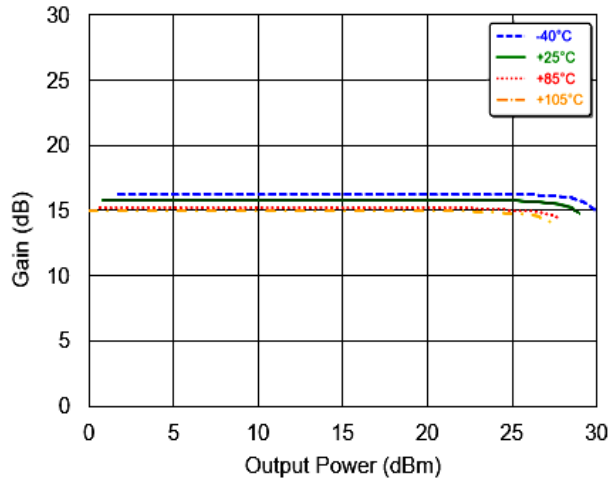


Noise Figure

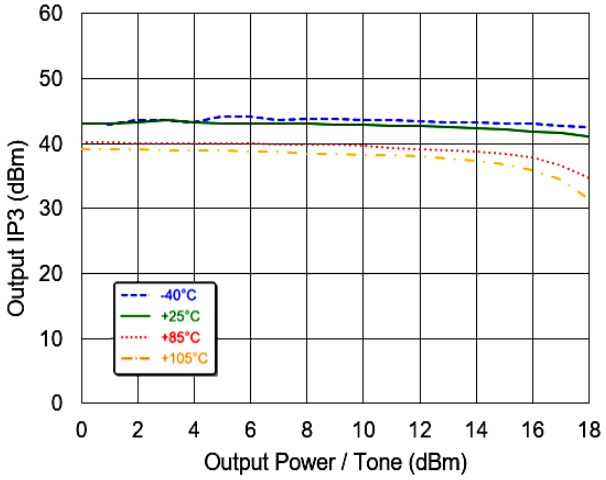


Typical Performance Curves, 2140 MHz Configuration

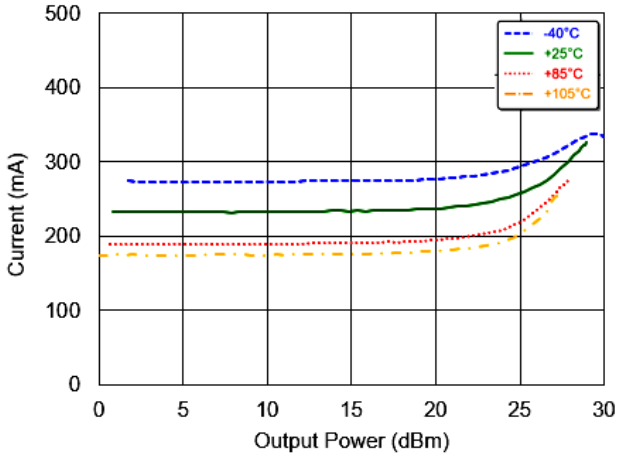
P1dB



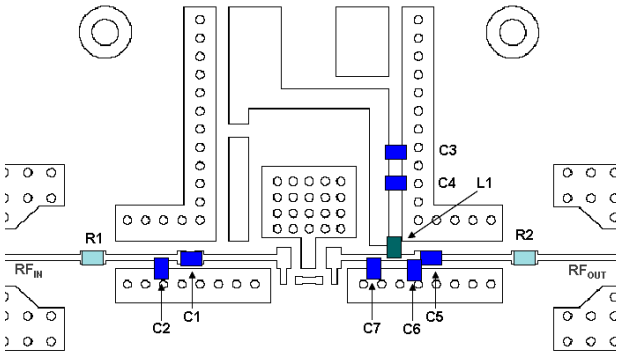
Output IP3



Current



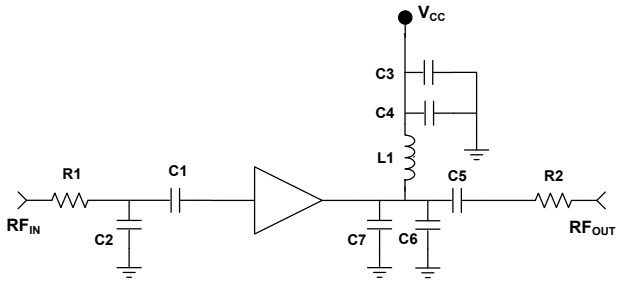
2140 MHz PCB Layout



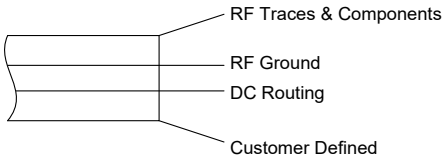
Parts List

Part	Value	Case Style
C1	2.4 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

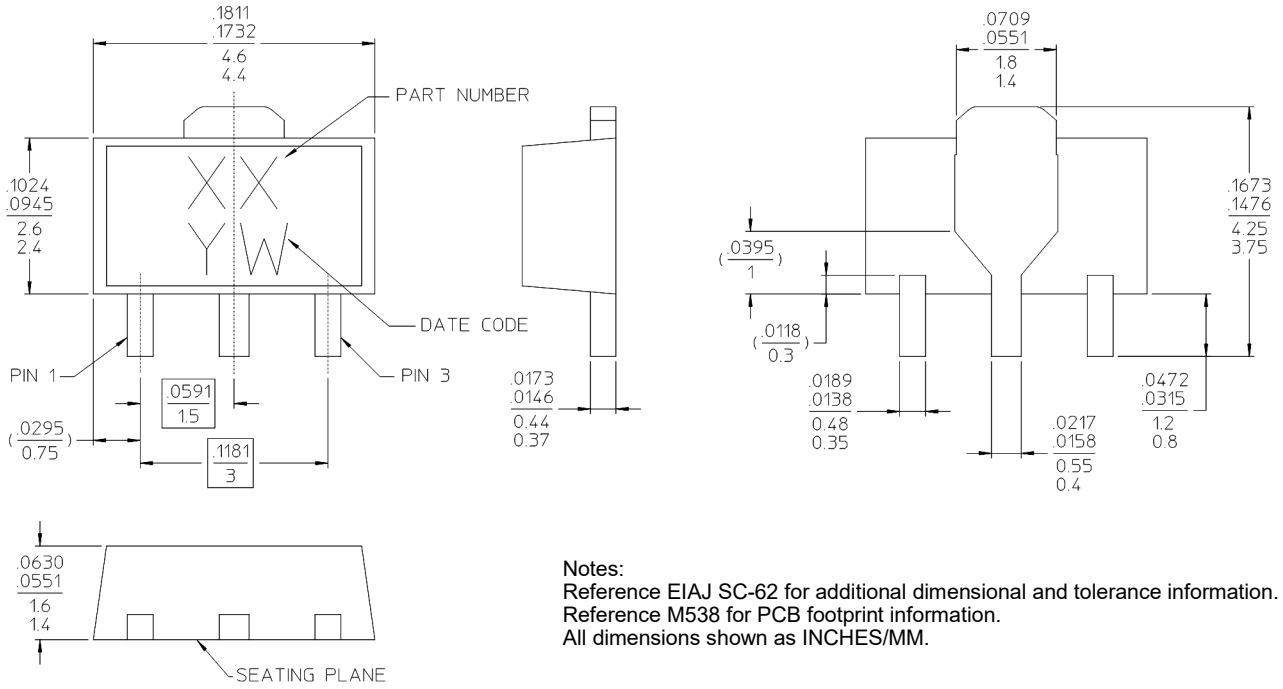


Cross Section View



The PCB dielectric between RF traces and RF ground layers should be chosen to reduce RF discontinuities between 50 Ω lines and package pins. MACOM 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.

Lead-Free SOT-89 Plastic Package†



Notes:
Reference EIAJ SC-62 for additional dimensional and tolerance information.
Reference M538 for PCB footprint information.
All dimensions shown as INCHES/MM.

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

Revision History

Rev	Date	Change Description
V4	8/12/25	Update the lowest frequency range and output P1dB comment.