

Features

- 42.5 dBm Output IP3
- 31 dBm P1dB
- Gain: 16 dB @ 30 MHz, 13 dB @ 2.1 GHz
- Tunable over Wide Frequency Range
- Class 2 HBM ESD Rating
- Lead-Free SOT-89 Package
- Halogen-Free “Green” Mold Compound
- RoHS* Compliant and 260°C Reflow Compatible

Description

The MAAM-010617 RF driver amplifier is a GaAs MMIC which exhibits high linearity performance over a wide input power range of more than 20 dB. It's tunable over a wide frequency range to optimize the performance based on the end application. The device is biased with a single +5 volt supply and consumes 440 mA typically.

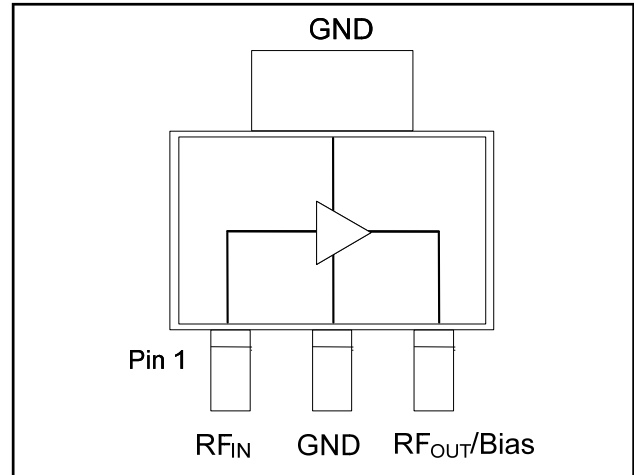
The MAAM-010617 is fabricated using a HBT process to realize low current and high linearity. The process features full passivation for increased performance and reliability.

Ordering Information ^{1,2}

| Part Number | Package |
|--------------------|-----------------|
| MAAM-010617-000000 | Bulk Packaging |
| MAAM-010617-TR3000 | 3000 piece reel |
| MAAM-010617-001SMB | 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 |
|---------|----------------|
| 1 | RF Input |
| 2 | Ground |
| 3 | RF Output/Bias |

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

Electrical Specifications: Freq. = 2140 MHz, T_A = 25°C, V_{CC} = +5 V, Z₀ = 50 Ω

| Parameter | Units | Min. | Typ. | Max. |
|--|-------|------|------|------|
| Gain | dB | 10 | 13 | — |
| Noise Figure | dB | — | 4.5 | — |
| Input Return Loss | dB | — | 18 | — |
| Output Return Loss | dB | — | 18 | — |
| Output P1dB | dBm | — | 31 | — |
| Output IP3 (P _{IN} = +8.5 dBm/Tone, 1 MHz Spacing) | dBm | 38 | 42.5 | — |
| Quiescent Current | mA | — | 420 | — |
| Current (P _{IN} = +11.5 dBm) | mA | — | 430 | 550 |

Maximum Operating Conditions³

| Parameter | Maximum Operating Conditions |
|-----------------------------------|------------------------------|
| Junction Temperature ⁴ | 170°C |
| RF Output Power | 31 dBm |
| Operating Temperature | -40°C to +85°C |

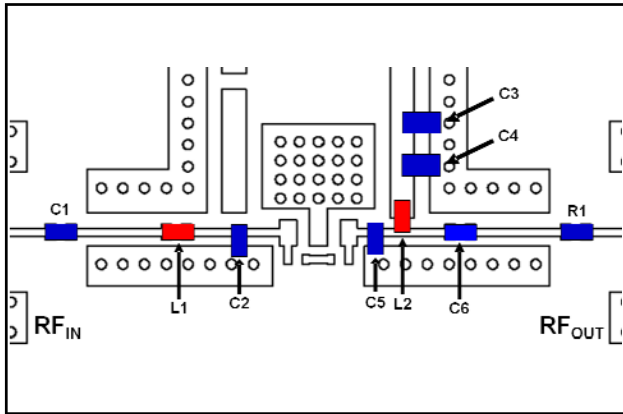
- Operating at nominal conditions with T_J ≤ +170°C will ensure MTTF > 1 x 10⁶ hours.
- Junction Temperature (T_J) = T_A + Θ_{JC} * ((V * I) - (P_{OUT} - P_{IN}))
Typical thermal resistance (Θ_{JC}) = 26° C/W
 - For T_A = 25°C,
T_J = 74 °C @ 5 V, 430 mA, P_{OUT} = 24.5 dBm, P_{IN} = 11.5 dBm
 - For T_A = 85°C,
T_J = 130 °C @ 5 V, 390 mA, P_{OUT} = 24 dBm, P_{IN} = 11.5 dBm

Absolute Maximum Ratings^{5,6}

| Parameter | Absolute Maximum |
|----------------------|------------------|
| RF Output Power | 32 dBm |
| Voltage | 6 volts |
| Storage Temperature | -65°C to +150°C |
| Junction Temperature | 210°C |

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

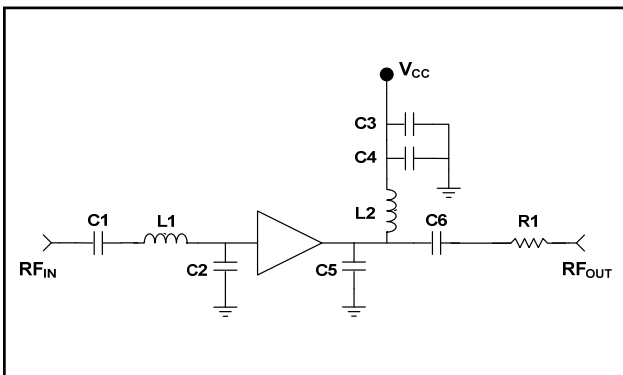
2140 MHz PCB Layout



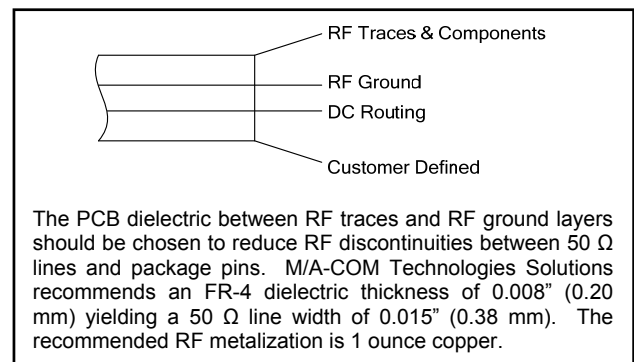
2140 MHz Parts List

| Part | Value | Case Style |
|------|-------------|------------|
| C1 | 39 pF | 0402 |
| C2 | 2.2 pF | 0402 |
| C3 | 0.1 μ F | 0402 |
| C4 | 1000 pF | 0402 |
| C5 | 3 pF | 0402 |
| C6 | 39 pF | 0402 |
| L1 | 6.8 nH | 0402 |
| L2 | 8.2 nH | 0402 |
| R1 | 0 Ω | 0402 |

2140 MHz Application Schematic

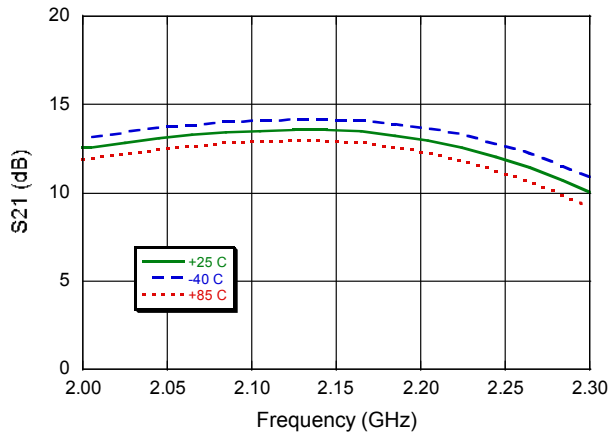


Cross Section View

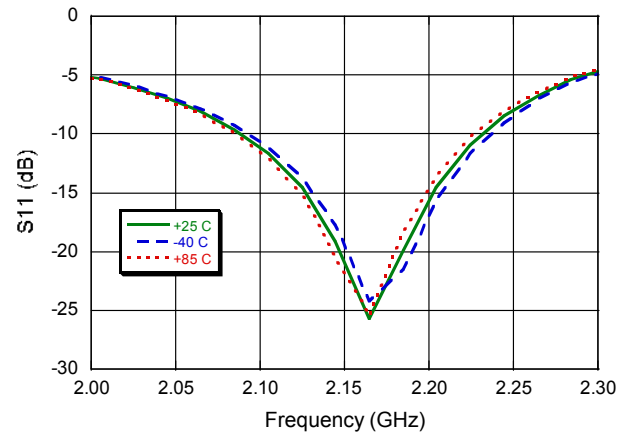


Typical Performance Curves

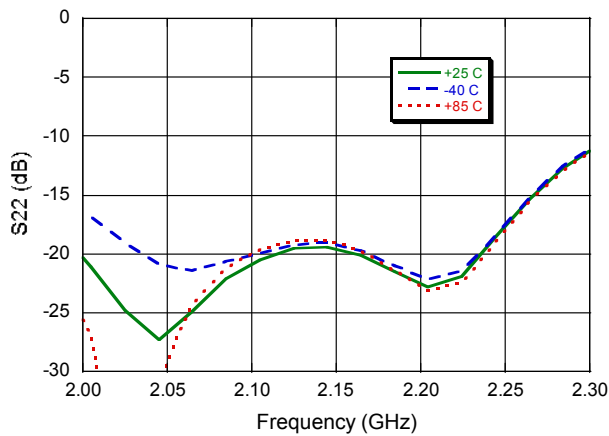
Gain



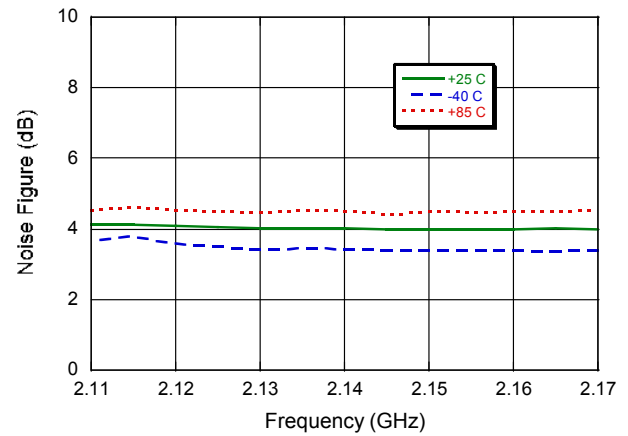
Input Return Loss



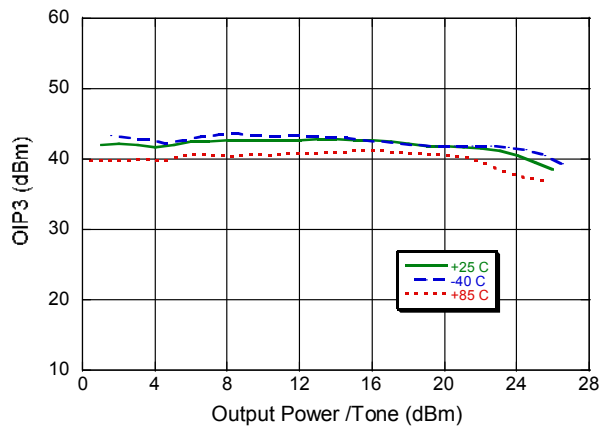
Output Return Loss



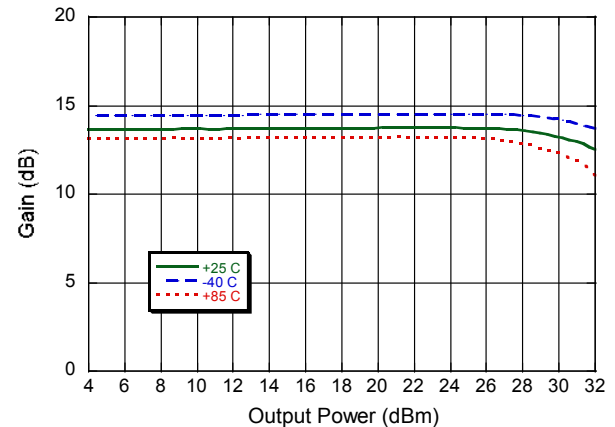
Noise Figure



Output IP3

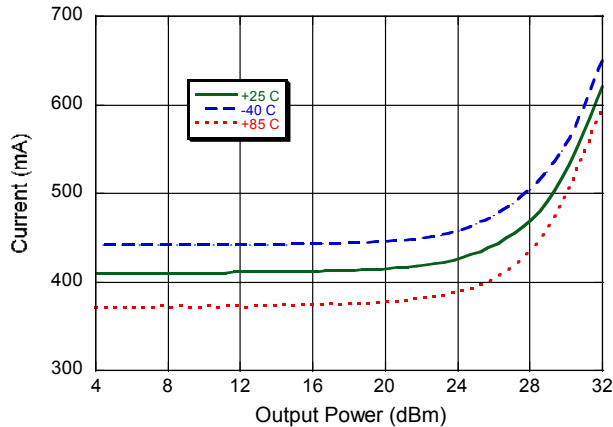


P1dB



Typical Performance Curves

Current



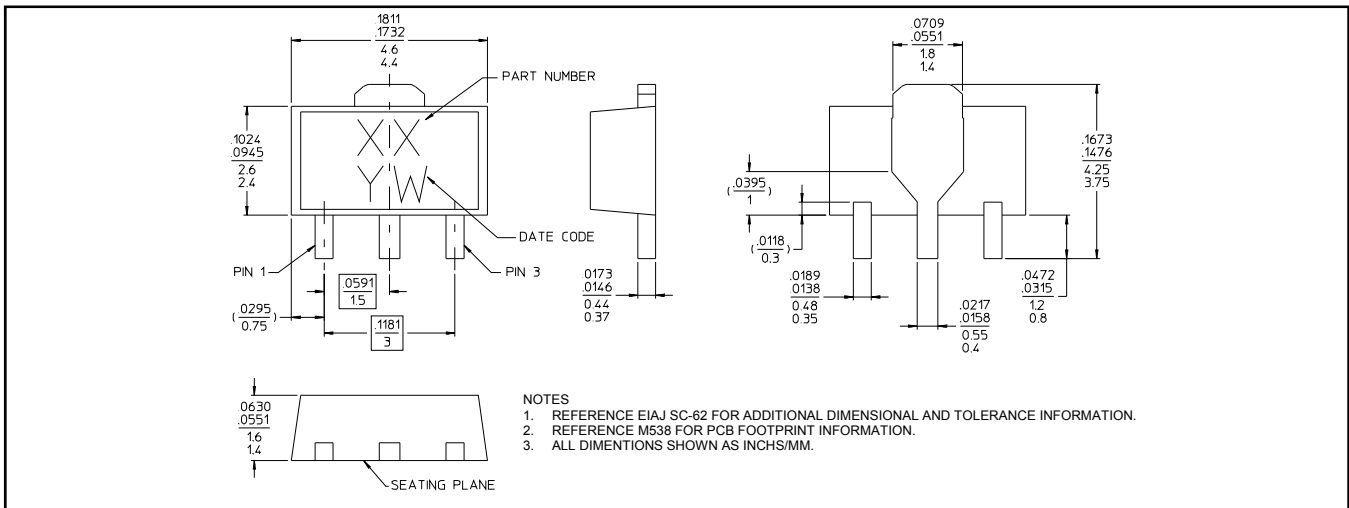
Handling Procedures

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 HBM Class 2 devices.

Lead Free SOT-89 Plastic Package[†]

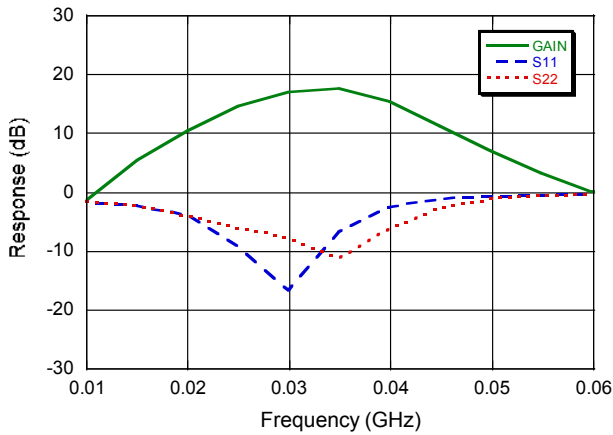


[†] Reference Application Note M538 for lead-free solder reflow recommendations.
Meets JEDEC moisture sensitivity level 1 requirements.
Plating is 100% matte tin over copper.

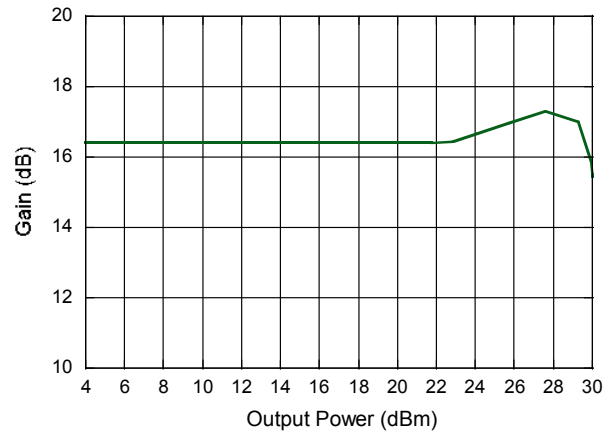
Applications Section

Typical Performance Curves, 30 MHz Configuration

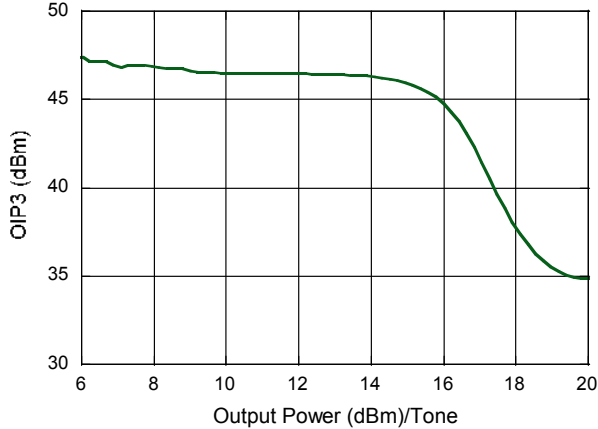
Gain



P1dB

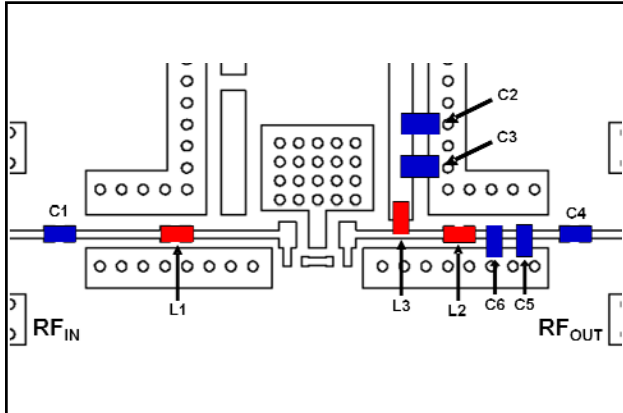


Output IP3

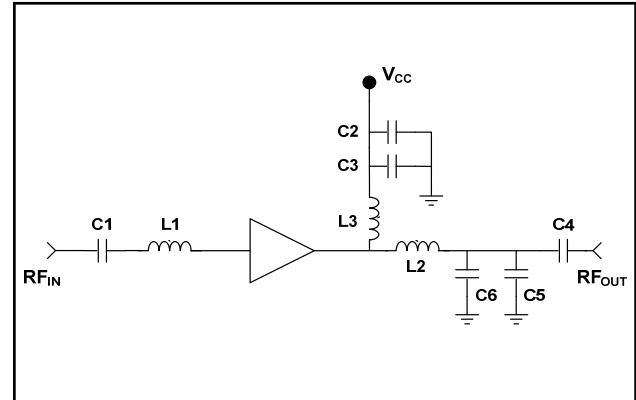


Applications Section

30 MHz PCB Layout



30 MHz Schematic



30 MHz Parts List

| Part | Value | Case Style |
|------------|-------------|------------|
| C1, C2, C4 | 0.1 μ F | 0402 |
| C3 | 1000 pF | 0402 |
| C5 | 120 pF | 0402 |
| C6 | 100 pF | 0402 |
| L1 | 680 nH | 0603 |
| L2, L3 | 82 nH | 0402 |

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