# MAAM-011182

## 75 Ω, 8 V RF Amplifier
## 45 - 1218 MHz

Rev. V2

### Features

- Single stage, single ended, 8 V, 130 mA
- 18 dB Flat Gain
- Low Noise
- Low Distortion Performance
- Lead-Free 2 mm 8-lead PDFN Plastic Package
- Halogen-Free “Green” Mold Compound
- RoHS* Compliant

### Description

The MAAM-011182 is an RF amplifier assembled in a 2 mm 8-lead PDFN plastic package. This amplifier provides 18 dB of ultra flat gain while biased at 8 volts. The amplifier provides excellent linearity.

The MAAM-011182 provides high gain, low noise and low distortion making it ideally suited for 75 Ω infrastructure applications.

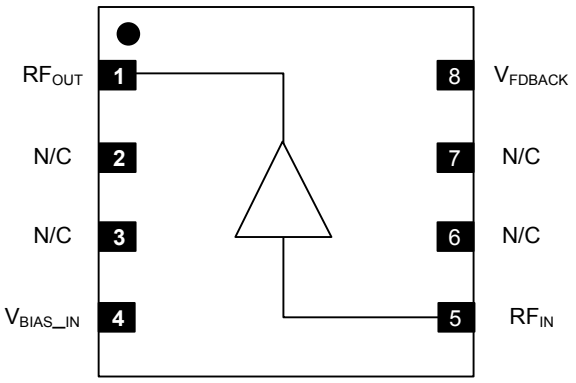
The MAAM-011182 is fabricated using GaAs pHEMT technology.

### Ordering Information[1,2]

| Part Number | Package |
|---|---|
| MAAM-011182 | Bulk Packaging |
| MAAM-011182-TR1000 | 1000 Part Reel |
| MAAM-011182-TR3000 | 3000 Part Reel |
| MAAM-011182-001SMB | Sample Board |

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

### Functional Schematic




### Pin Configuration[3]

| Pin No. | Pin Name | Function |
|---|---|---|
| 1 | $RF_{OUT}$ | RF Output (75 Ω) |
| 2 | N/C | No Connection |
| 3 | N/C | No Connection |
| 4 | $V_{BIAS_IN}$ | Regulator Bias Input |
| 5 | $RF_{IN}$ | RF Input (75 Ω) |
| 6 | N/C | No Connection |
| 7 | N/C | No Connection |
| 8 | $V_{FDBACK}$ | Feedback Path |
| 9 | Pad[3] | RF and DC Ground |

3. The exposed pad centered on the package bottom must be connected to RF and DC ground.

* Restrictions on Hazardous Substances, European Union Directive 2011/65/EU.



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## 75 Ω, 8 V RF Amplifier
## 45 - 1218 MHz



### Electrical Specifications: Freq. = 50 - 1218 MHz, $T_A$ = 25°C, $V_{DD}$= 8 V, $Z_0$ = 75 Ω

| Parameter | Test Conditions | Units | Min. | Typ. | Max. |
|---|---|---|---|---|---|
| Gain | 1218 MHz | dB | 18 | 18.5 | 19 |
| Tilt | 50 - 1218 MHz | dB | 0 | 0.3 | 1 |
| Reverse Isolation | — | dB | — | 21.5 | — |
| Input Return Loss | — | dB | — | 20 | — |
| Output Return Loss | — | dB | — | 19 | — |
| Noise Figure | 50 - 100 MHz<br>100 - 1218 MHz | dB | —<br>— | 2.7<br>2.5 | 3.8<br>3.0 |
| Output IP2 | 50 - 1200 MHz, tone spacing 6 MHz, $P_{OUT}$ per tone = -10 dBm | dBm | — | 66 | — |
| Output IP3 | 50 - 1200 MHz, tone spacing 6 MHz, $P_{OUT}$ per tone = -10 dBm | dBm | — | 38 | — |
| P1dB | — | dBm | — | 24 | — |
| Composite Triple Beat, CTB | 79 channels, 0 dB Tilt, 34 dBmV per channel output QAM to 1200 MHz | dBc | — | 76 | -74 |
| Composite Second Order, CSO | 79 channels, 0 dB Tilt, 34 dBmV per channel output QAM to 1200 MHz | dBc | — | 68 | -66 |
| $I_{DD}$ | $V_{DD}$ = 8V | mA | 125 | 130 | 135 |

### Absolute Maximum Ratings[4,5,6,7]

| Parameter | Absolute Maximum |
|---|---|
| Max Input Power | 12 dBm |
| Operating Voltage | 10 volts |
| Operating Temperature | -40°C to +85°C |
| Storage Temperature | -65°C to +150°C |

4. Exceeding any one or combination of these limits may cause permanent damage to this device.
5. MACOM does not recommend sustained operation near these survivability limits.
6. These operating conditions will ensure MTTF > 1 x $10^6$ hours.
7. Junction Temperature ($T_J$) = Case Temperature ($T_C$) + Θjc*(V*I)
   Typical thermal resistance ($Θ_{JC}$) = 43.3°C/W.
   a) For $T_C$ = 25°C,
   $T_J$ = 71.7°C @ 8 V, 135 mA
   b) For $T_C$ = 85°C,
   $T_J$ = 131.7°C @ 8 V, 135 mA

### 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 Class1A, CDM Class IV devices.



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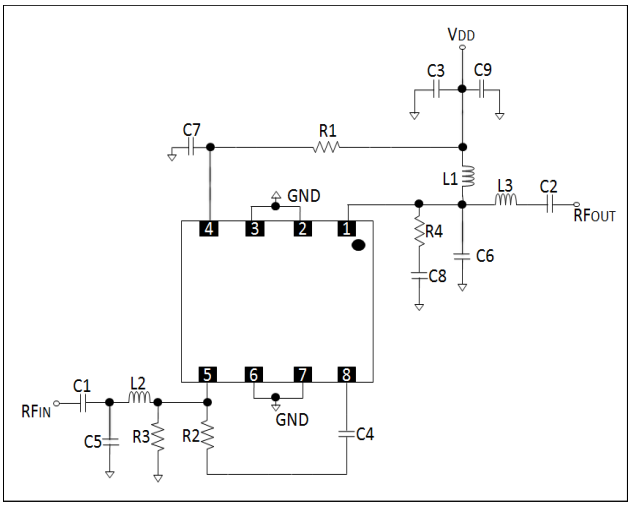
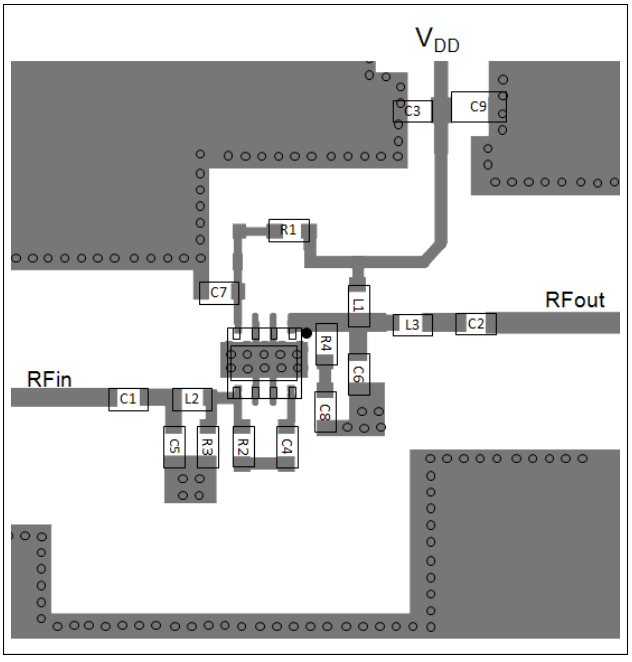
## Schematic Including Off-Chip Components




## Recommended PCB Layout

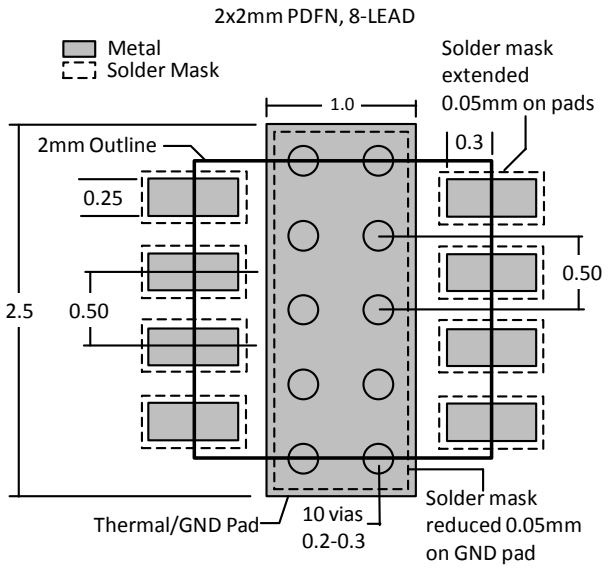



## Parts List[8]

| Component | Value | Package |
|---|---|---|
| C1,C4,C7 | 10 nF | 0402 |
| C2 | 150 pF | 0402 |
| C3 | 100 nF | 0402 |
| C5 | 0.9 pF | 0402 |
| C6 | 0.4 pF | 0402 |
| C8 | 0.6 pF | 0402 |
| C9 | 1 µF | 0603 |
| L1 | Ferrite Bead | 0402 |
| L2 | 10 nH | 0402 |
| L3 | 5.6 nH | 0402 |
| R1 | 1.6 kΩ | 0402 |
| R2 | 360 Ω | 0402 |
| R3 | 910 Ω | 0402 |
| R4 | 300 Ω | 0402 |

8. Ferrite Bead from Murata, part number BLM15HD182SN.

## PCB Land Pattern



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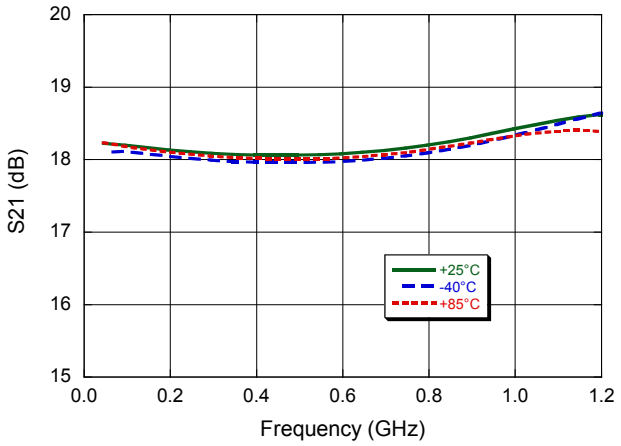
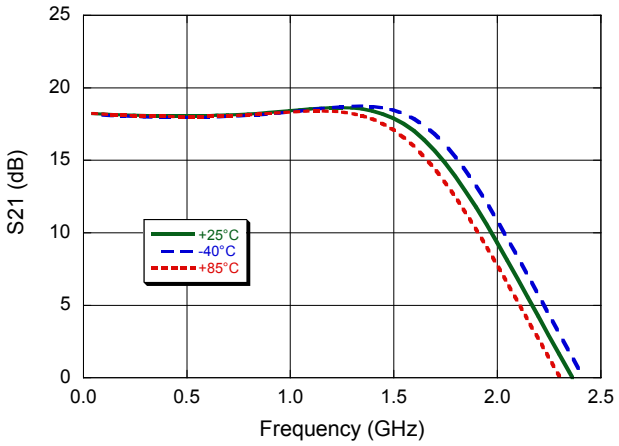
## Typical Performance Curves: $V_{DD}$ = 8 V

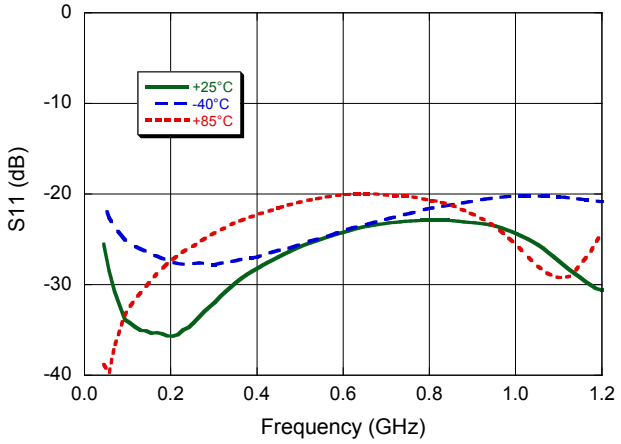
### *Gain to 1.218 GHz*



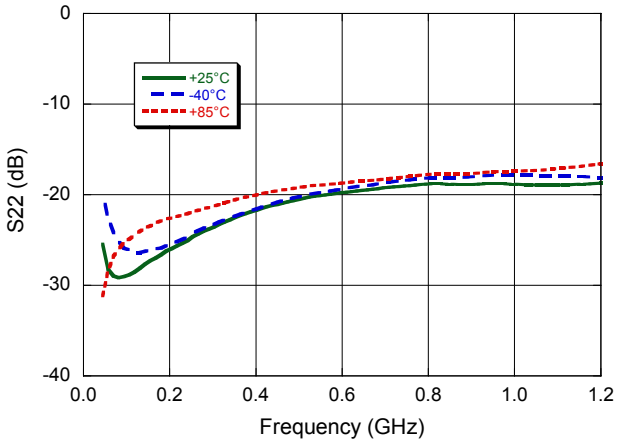

### *Gain to 2.5 GHz*



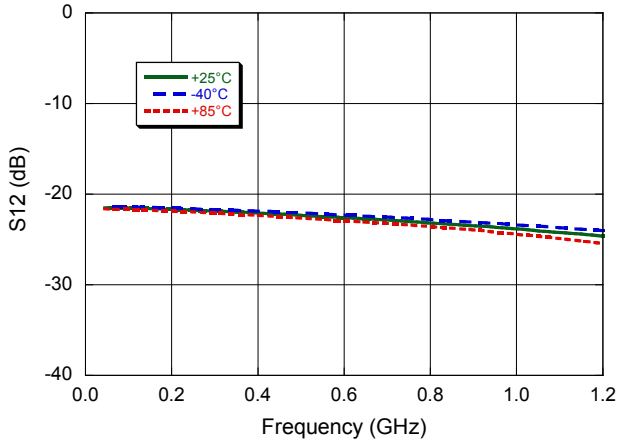

### *Input Return Loss*



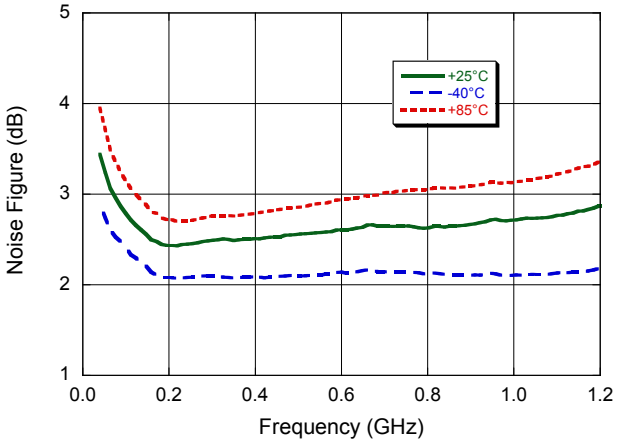

### *Output Return Loss*




### *Reverse Isolation*




### *Noise Figure*



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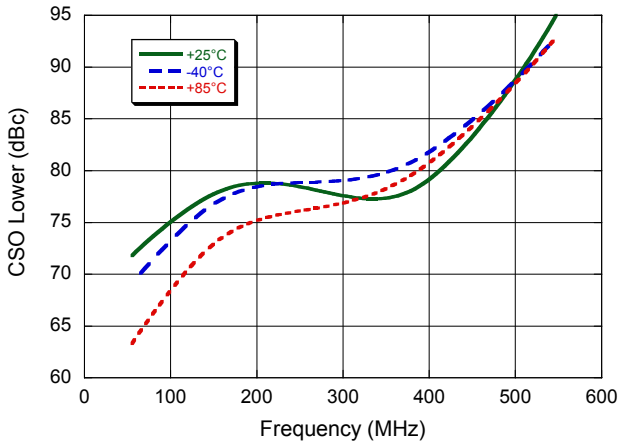
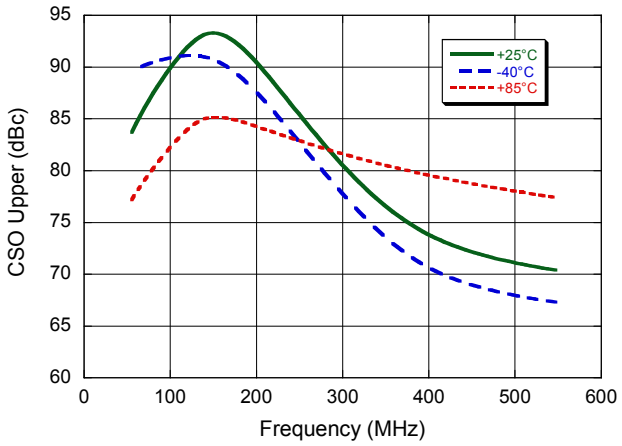
## Typical Performance Curves: $V_{DD}$ = 8 V

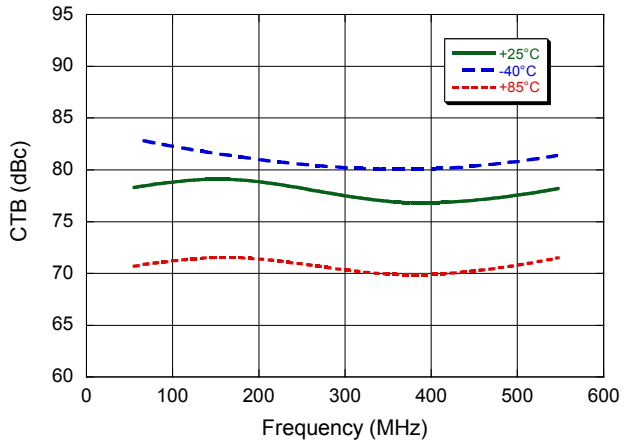
***CSO Lower***
***79 ch , 0 dB tilt, 34 dBmV per ch***




***CSO Upper***
***79 ch , 0 dB tilt, 34 dBmV per ch***




***CTB***
***79 ch , 0 dB tilt, 34 dBmV per ch***



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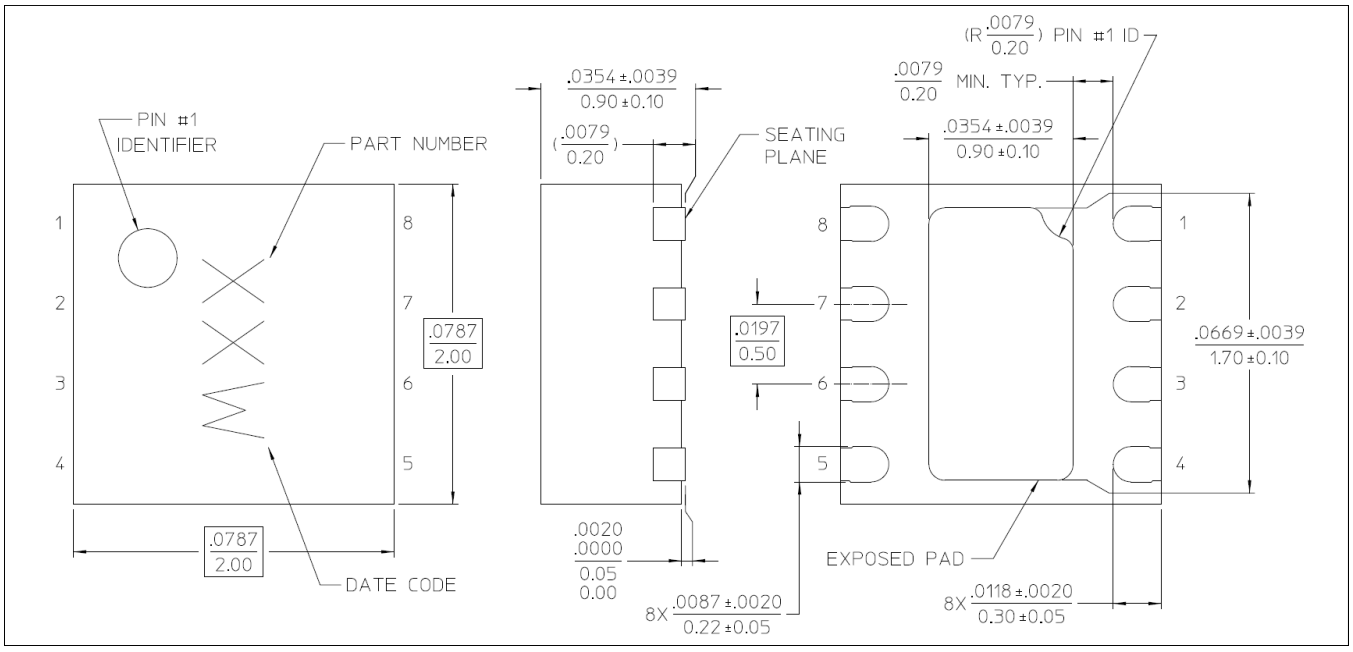
## *Lead Free* 2 mm 8-lead PDFN†




† Reference Application Note S2083 for lead-free solder reflow recommendations.
Meets JEDEC moisture sensitivity level 1 requirements.
Plating is 100% matte tin over copper.



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