

Linear Power Amplifier
2.4 - 2.5 GHz, 802.11b/g

MAAP-008015
V1

Features

- Ideal for 802.11b/g
- +23 dBm P1dB typical at 3.3 V
- 31 dB Gain typical
- 802.11b compliant to 20 dBm P_{OUT}
- 802.11g compliant to 16 dBm P_{OUT}
- Micro-Amp Shutdown
- Integrated Detector
- SiGe Process: Lowest Cost Solution
- Operates from 1.5 V to 4.0 V
- Lead-Free 3 mm 12-Lead PQFN Package
- 100% Matte Tin Plating over Copper
- Halogen-Free “Green” Mold Compound
- RoHS* Compliant 260°C Reflow Compatible

Description

The MAAP-008015 is a three stage power amplifier, designed for 2.4 GHz linear applications. This power amplifier is available in a lead free 3 mm 12-lead PQFN plastic package. The MAAP-008015 also features an integrated power detector.

Ordering Information¹

| Part Number | Package |
|--------------------|---|
| MAAP-008015-TR3000 | 3000 piece reel |
| MAAP-008015-001SMB | Sample Test Board (Includes 5 Samples) |

1. Reference Application Note M513 for reel size information.

Handling Procedures

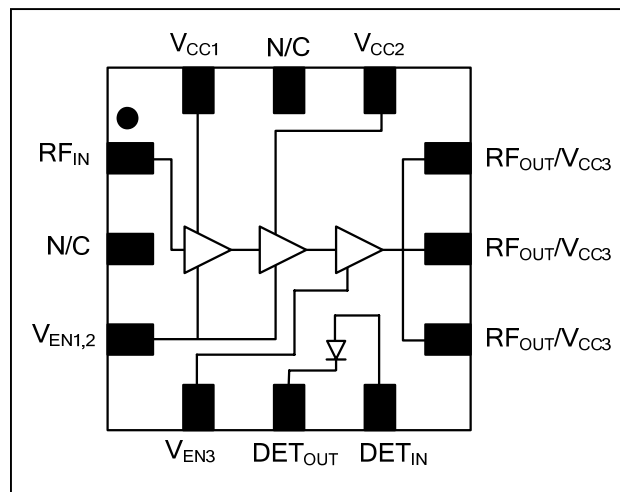
Please observe the following precautions to avoid damage:

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 devices.

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

Functional Schematic



Pin Configuration

| Pin No. | Pin Name | Description |
|---------|--------------------------------------|-----------------------------|
| 1 | RF _{IN} | RF Input |
| 2 | N/C | No Connect |
| 3 | V _{EN1,2} | Power Enable |
| 4 | V _{EN3} | Power Enable |
| 5 | DET _{OUT} | Detector Output |
| 6 | DET _{IN} | Detector Input |
| 7 | RF _{OUT} / V _{CC3} | RF Output, 3rd Stage Supply |
| 8 | RF _{OUT} / V _{CC3} | RF Output, 3rd Stage Supply |
| 9 | RF _{OUT} / V _{CC3} | RF Output, 3rd Stage Supply |
| 10 | V _{CC2} | 2nd Stage Supply |
| 11 | N/C | No Connect |
| 12 | V _{CC1} | 1st Stage Supply |
| Pad | Paddle ² | RF & DC Ground |

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

Linear Power Amplifier
2.4 - 2.5 GHz, 802.11b/g

MAAP-008015
V1

Electrical Specifications: F = 2.45 GHz, V_{CC} = 3.3 V, V_{EN} = 2.5 V, T_A = 25°C, Z₀ = 50 Ω

| Parameter | Test Conditions | Units | Min. | Typ. | Max. |
|----------------------|--|-------|------|------|------|
| Gain | | dB | 29 | 31 | 33 |
| Input Return Loss | | dB | — | 9 | — |
| Forward Isolation | | dB | — | 50 | — |
| P1dB | | dBm | — | 23 | — |
| Supply Voltage | V _{CC1} , V _{CC2} , V _{CC3} | V | — | 3.3 | — |
| Bias Voltage | V _{EN} | V | — | 2.5 | — |
| Current | Idle | mA | 30 | 43 | 55 |
| | P _{OUT} = 16 dBm, Modulated ³ | mA | — | 65 | — |
| | P _{OUT} = 16 dBm, C.W. | mA | 60 | 85 | 100 |
| Off Current | V _{EN} = 0 V | μA | — | 3 | 20 |
| Control Current | V _{EN} Current | mA | — | 3 | 5 |
| Harmonics | 2fo @ -15 dBm Input Power | dBc | — | -26 | — |
| | 3fo @ -15 dBm Input Power | dBc | — | -75 | — |
| Duty Cycle | | % | — | 100 | — |
| Linear Output Power | DSS source; compliance with 802.11b EVM=2.5%, OFDM, QAM-64, 54 Mbps | dBm | — | 20 | — |
| | | dBm | — | 16 | — |
| Detector Output | P _{OUT} = 16 dBm, C.W. | V | 1.35 | 1.5 | 1.75 |
| Detector Sensitivity | Up to P _{OUT} = 16 dBm | mV/dB | — | 110 | — |

3. EVM=2.5%, OFDM, QAM-64, 54 Mbps.

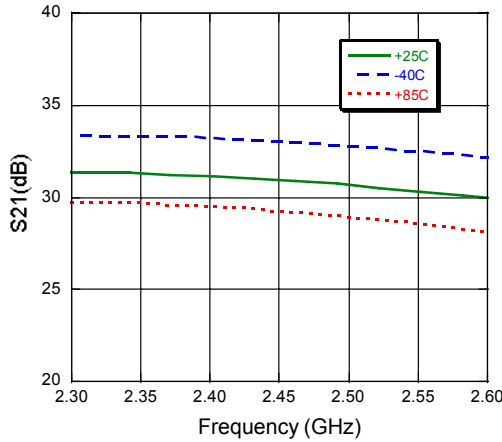
Absolute Maximum Ratings^{4,5}

| Parameter | Absolute Maximum |
|---------------------------|------------------|
| Input Power | + 5 dBm |
| Operating Supply Voltage | +4.0 Volts |
| Operating Control Voltage | +3.0 Volts |
| Operating Temperature | -20°C to +85°C |
| Channel Temperature | +150°C |
| Storage Temperature | -40°C to +150°C |

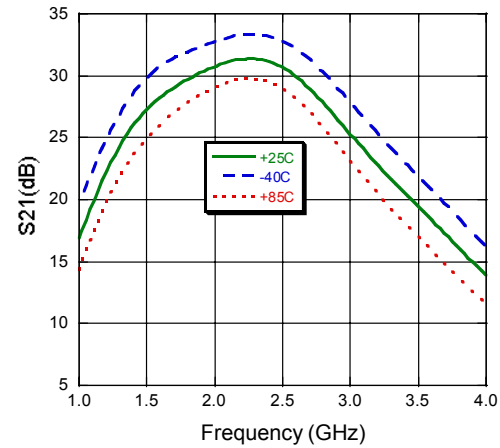
4. Exceeding any one or combination of these limits may cause permanent damage to this device.
5. M/A-COM does not recommend sustained operation near these survivability limits.

Typical Performance Curves: $V_{CC} = 3.3\text{ V}$, $V_{EN} = 2.5\text{ V}$, over Temperature

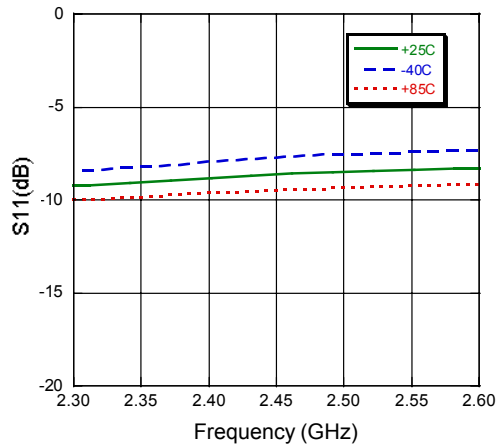
S_{21} vs. Frequency (2.3 GHz - 2.6 GHz) -Gain



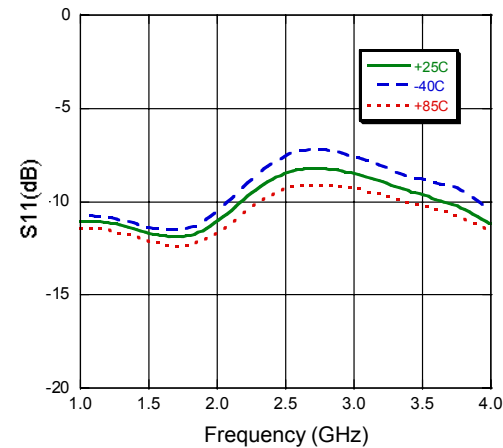
S_{21} vs. Frequency -Gain



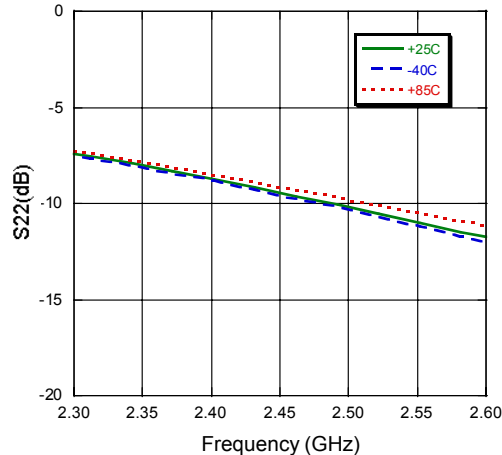
S_{11} vs. Frequency (2.3 GHz - 2.6 GHz)



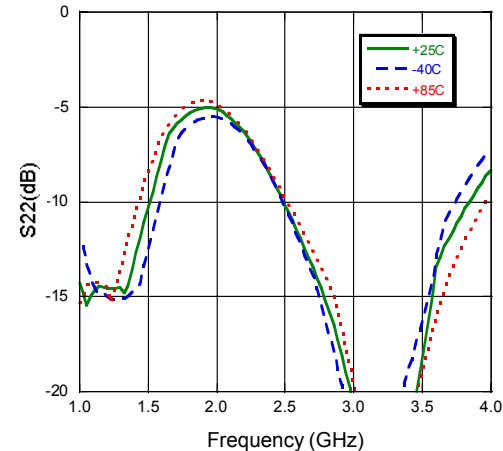
S_{11} vs. Frequency



S_{22} vs. Frequency (2.3 GHz - 2.6 GHz)

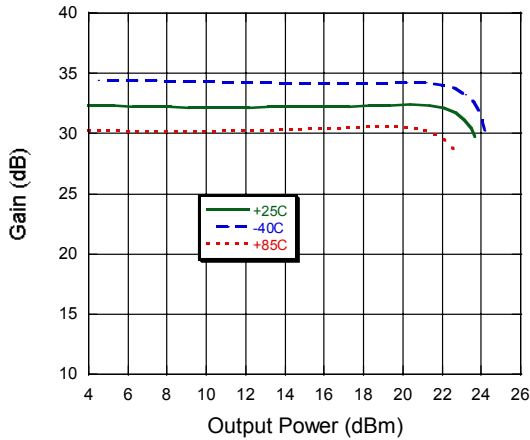


S_{22} vs. Frequency

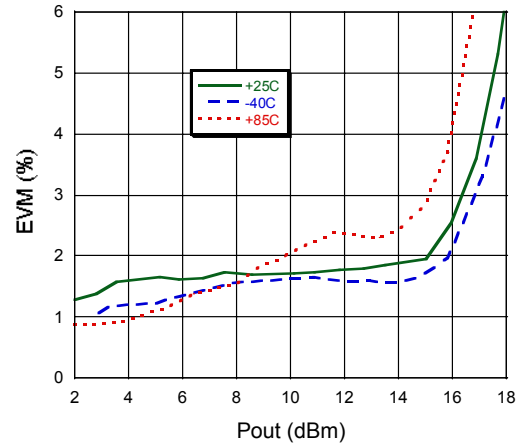


Typical Performance Curves: $V_{CC} = 3.3\text{ V}$, $V_{EN} = 2.5\text{ V}$

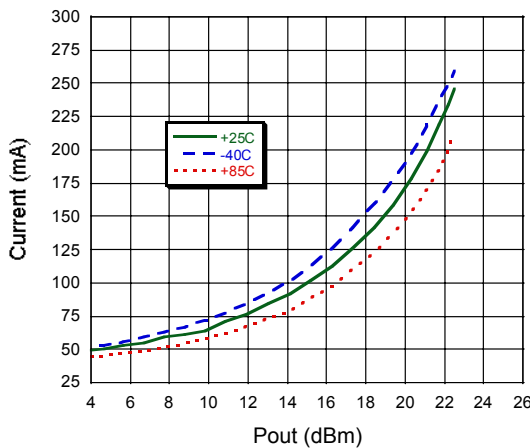
***P*_{1dB} at 2.45 GHz**



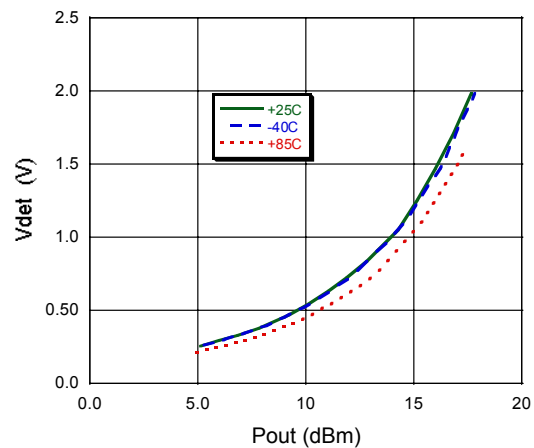
***EVM* vs. *P*_{OUT}, OFDM, QAM-64, 54 Mbps**



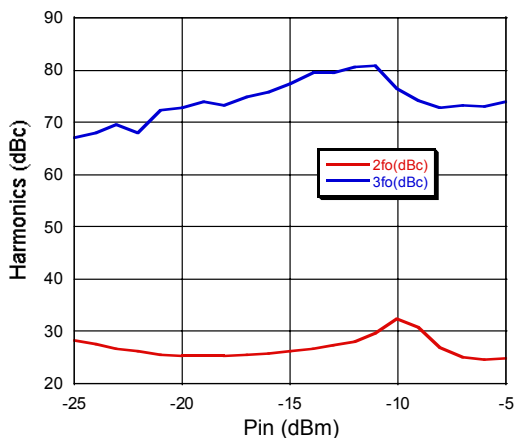
***C.W.* Current vs. *P*_{OUT} over Temperature at 2.45 GHz**



***V*_{DET} vs. *P*_{OUT} over Temperature at 2.45 GHz**



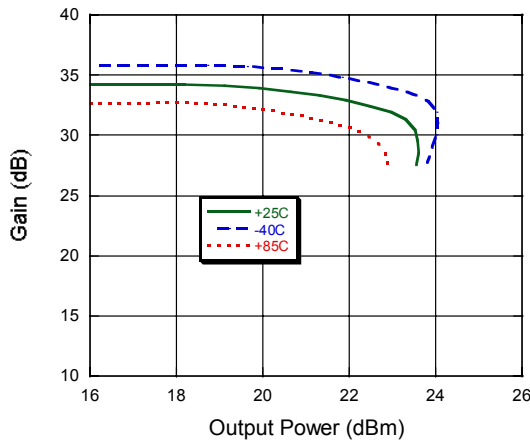
Harmonics



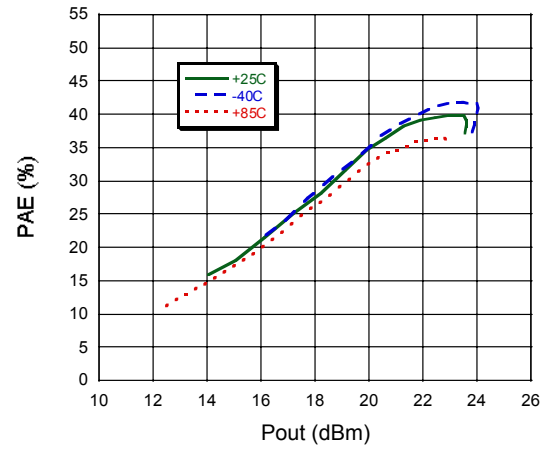
Applications Section

Typical Performance Curves, 900 MHz Configuration

P1dB



PAE



Current

