

High Linearity Distributed Power Amplifier

0.05 - 6 GHz



MAAP-011307-DIE

Rev. V2

Features

- P1dB Output Power: 29 dBm
- Gain: 12 dB
- Noise Figure: 5 dB
- Output IP3: 41 dBm
- 50 Ω Matched
- RoHS* Compliant

Applications

- ISM / Multi Market

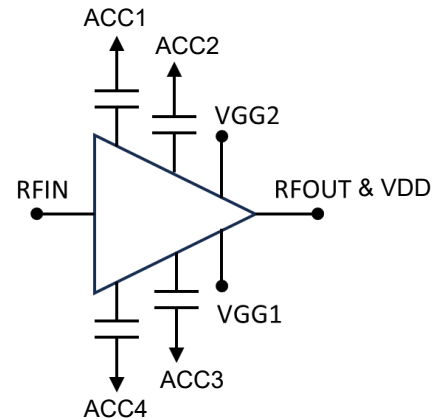
Description

The MAAP-011307-DIE is a wideband amplifier that operates from DC to 6 GHz. The device features 12 dB gain, 29 dBm P1dB and excellent OIP3 performance. This power amplifier also features gate bias adjust pins to change current setting for power or temperature.

Ordering Information

| Part Number | Package |
|-----------------|----------|
| MAAP-011307-DIE | Gel Pack |

Functional Schematic



Pin Configuration

| Pin # | Function |
|-------------|--------------------------------|
| RFIN | RF Input |
| VGG2 | Gate Voltage 2 |
| RFOUT | RF Output and VDD ¹ |
| VGG1 | Gate Voltage 1 |
| ACC1 - ACC4 | Bypass Capacitors ² |

1. Feed drain bias with a bias tee on the RFOUT port.
2. Bypass capacitors should be 1 μ F.

* Restrictions on Hazardous Substances, compliant to current RoHS EU directive.

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Electrical Specifications:

Freq. = 0.05 - 6.0 GHz, $T_A = 25^\circ\text{C}$, $V_{DD} = +12\text{ V}$, $V_{GG1} = -0.8\text{ V}$, $V_{GG2} = +5.2\text{ V}$, $Z_0 = 50\ \Omega$

| Parameter | Test Conditions | Units | Min. | Typ. | Max. |
|----------------------------|---|-------|---------------------|----------------------|------|
| Gain | 1 GHz 2 GHz 6 GHz | dB | 10.0 10.5 9.0 | 12.0 12.5 11.5 | — |
| OIP3 | $P_{IN} = -10\text{ dBm / tone}$, 10 MHz Tone Spacing 1 - 6 GHz | dBm | — | 40.0 | — |
| P1dB | — | dBm | — | 29 | — |
| Noise Figure | 0.05 - 0.7 GHz 0.7 - 6 GHz | dB | — | 12 5 | — |
| Drain Current ³ | — | mA | — | 300 | — |

3. Set quiescent drain current by adjusting the gate potentials. See bias sequencing instructions below.

Recommended Operating Limits

| Parameter | Maximum |
|-------------------------------------|----------------|
| RF Input Power CW | 20 dBm |
| V_{DD} | 14 V |
| V_{GG1} | -3 V to -0.5 V |
| V_{GG2} | 3 V to 5.5 V |
| Operating Temperature | -40°C to +85°C |
| Junction Temperature ^{4,5} | +150°C |

4. Operating at nominal conditions with $T_J \leq 150^\circ\text{C}$ will ensure $\text{MTTF} > 1 \times 10^6$ hours.
5. Junction Temperature ($T_J = T_C + \Theta_{JC} * ((V * I) - (P_{OUT} - P_{IN}))$)
 Typical thermal resistance (Θ_{JC}) = 14°C/W
- a) For $T_C = +25^\circ\text{C}$,
 $T_J = 80.17^\circ\text{C}$ @ 12V, 300 mA, $P_{IN} = 0\text{ dBm}$, $P_{OUT} = 13\text{ dBm}$
- b) For $T_C = +85^\circ\text{C}$,
 $T_J = 133.2^\circ\text{C}$ @ 12V, 365 mA, $P_{IN} = 18\text{ dBm}$, $P_{OUT} = 30\text{ dBm}$

Absolute Maximum Ratings^{6,7}

| Parameter | Absolute Maximum |
|---------------------|------------------|
| RF Input Power CW | 24 dBm |
| V_{DD} | 15 V |
| V_{GG1} | -5 V to -0.4 V |
| V_{GG2} | 1 V to 5.6 V |
| Storage Temperature | -55°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.

Bias Sequencing

Turn ON:

1. Apply V_{GG2} (-0.8 V).
2. Apply V_{GG1} (5.2 V).
3. Apply V_{DD} .
4. Adjust V_{GG2} to get 300 mA IDQ. ($V_{GG1} - V_{GG2}$ should be approximately equal to 6 V).
5. Apply RF.

Turn OFF: Is the reverse order of turn ON.

Handling Procedures

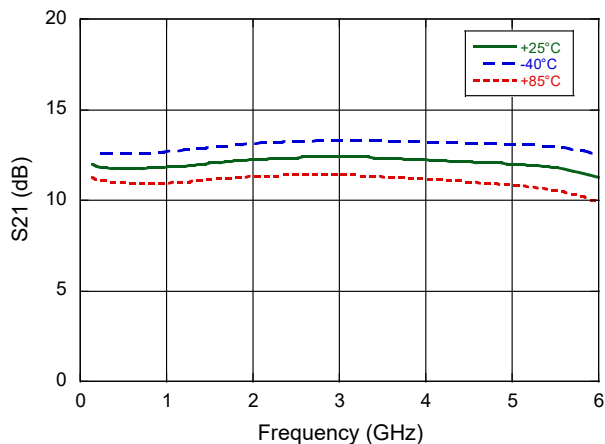
Please observe the following precautions to avoid damage:

Static Sensitivity

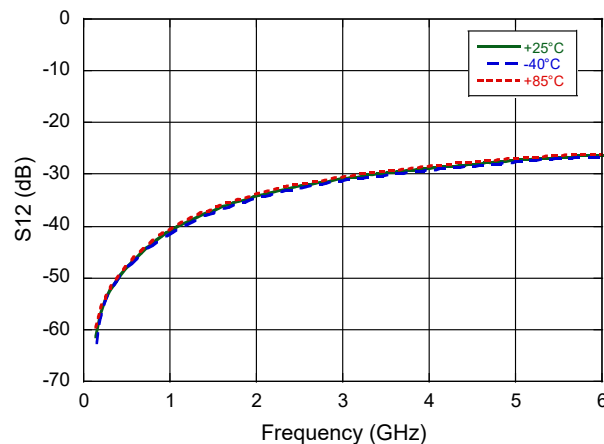
These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

Typical Performance Curves

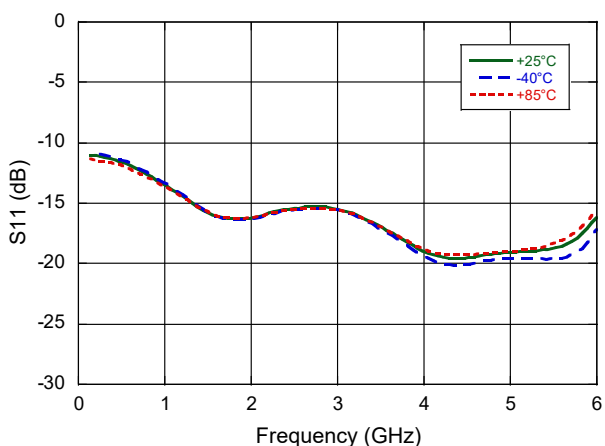
Gain



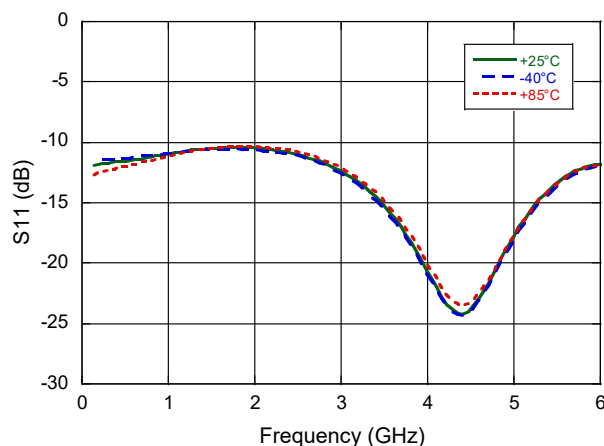
Reverse Isolation



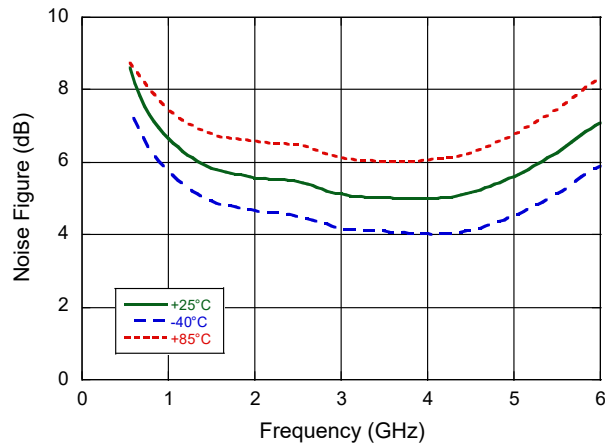
Input Return Loss



Output Return Loss



Noise Figure



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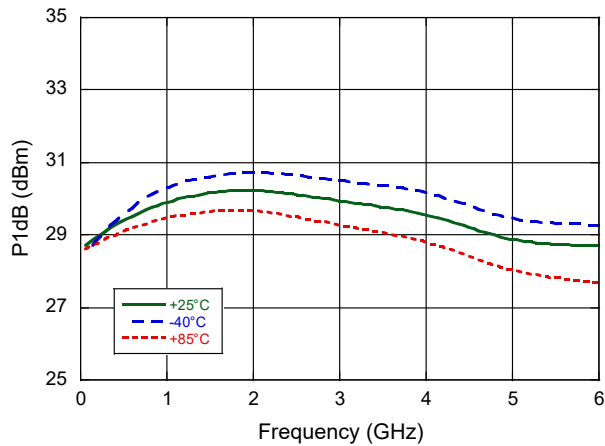


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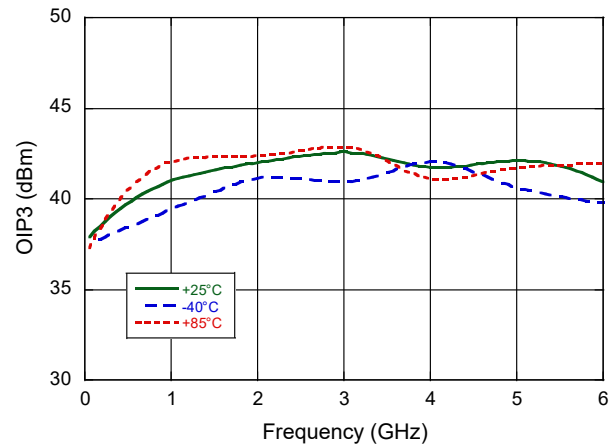
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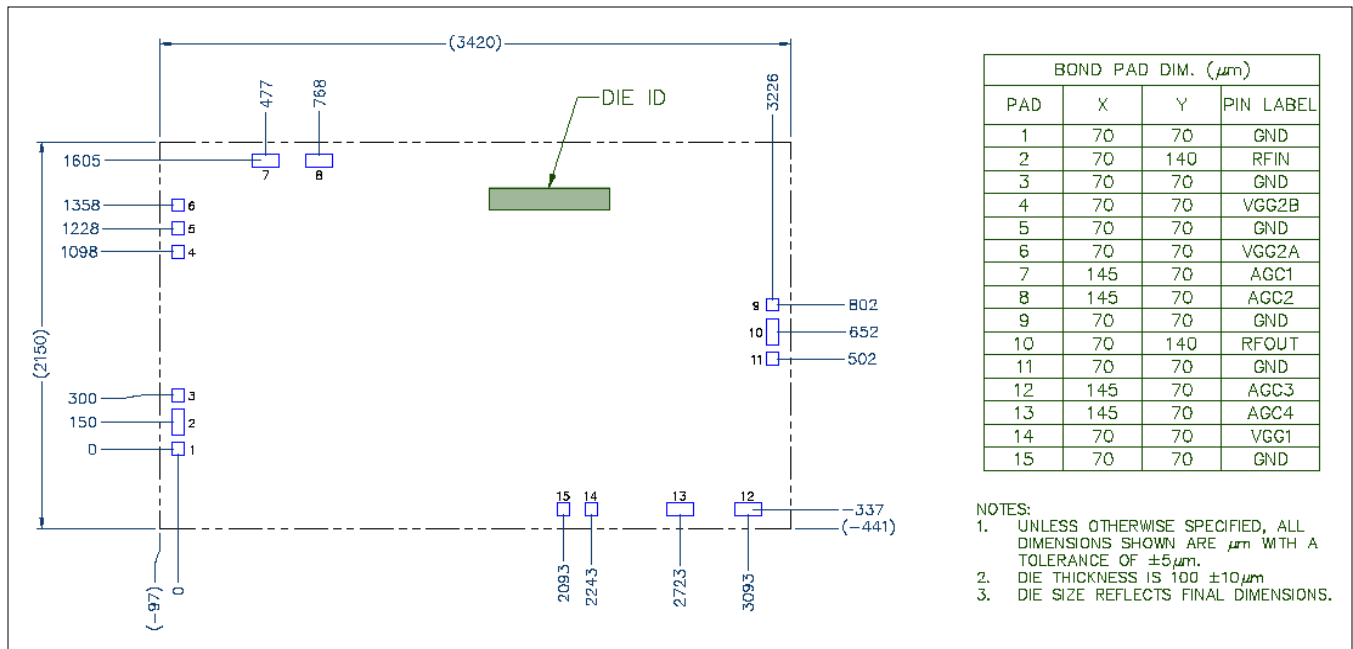
P1dB



OIP3



Outline



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