

High Linearity Distributed Power Amplifier

0.05 - 6 GHz



MAAP-011307-DIE

Rev. V3

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

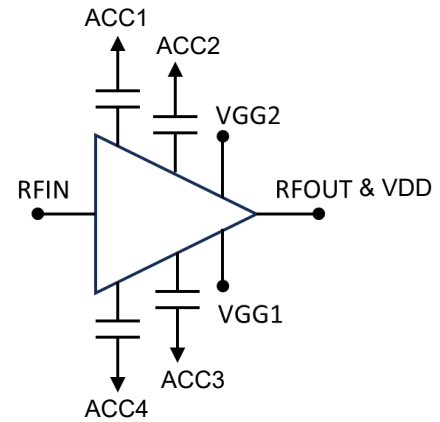
Description

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 $MTTF > 1 \times 10^6$ hours.
5. Junction Temperature ($T_J = T_C + \Theta_{JC} * ((V * I) - (P_{OUT} - P_{IN}))$)
Typical thermal resistance (Θ_{JC}) = 14°C/W
- For $T_C = +25^\circ\text{C}$,
 $T_J = 80.17^\circ\text{C}$ @ 12V, 300 mA, $P_{IN} = 0\text{ dBm}$, $P_{OUT} = 13\text{ dBm}$
 - 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:

- Apply -2.5 V to Vgg1
- Apply +5.2 V to Vgg2
- Apply +12 V to V_{DD}
- Adjust V_{GG1} more positive until $I_{DQ} = 300\text{ mA}$ ⁸
- Apply RF.

Turn OFF: Is the reverse order of turn ON.

- $V_{GG1} - V_{GG2}$ should be approximately equal to 6V when $I_{DQ} = 300\text{ mA}$.

Handling Procedures

Please observe the following precautions to avoid damage:

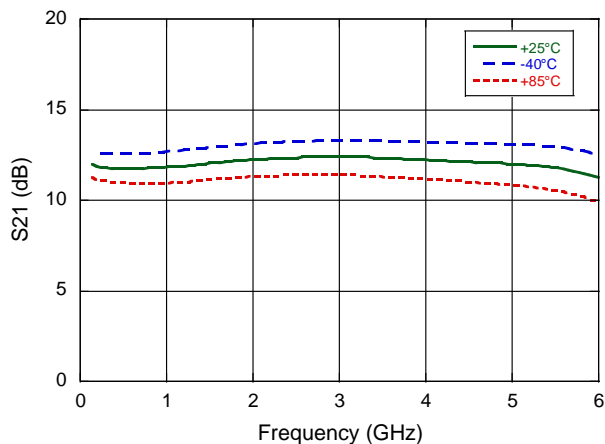
Static Sensitivity

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.

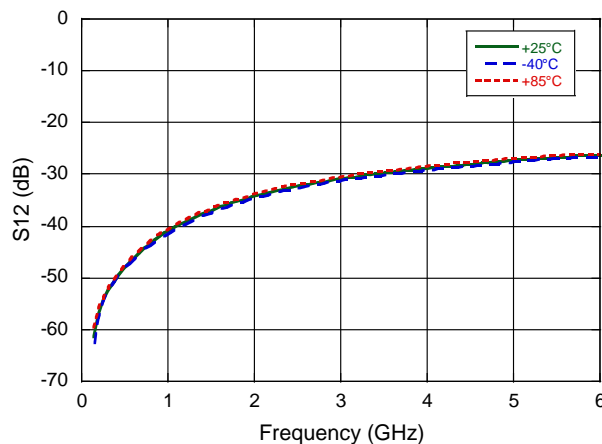
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Typical Performance Curves

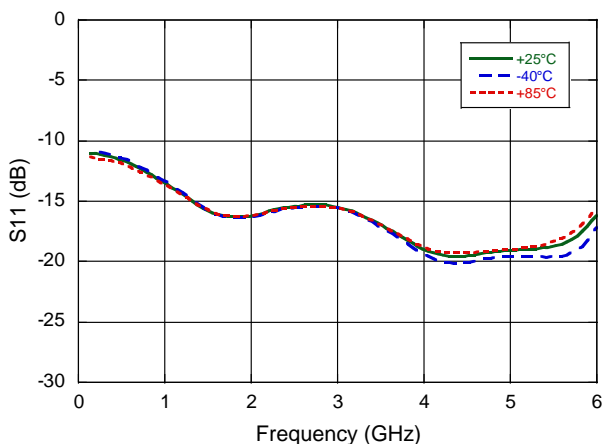
Gain



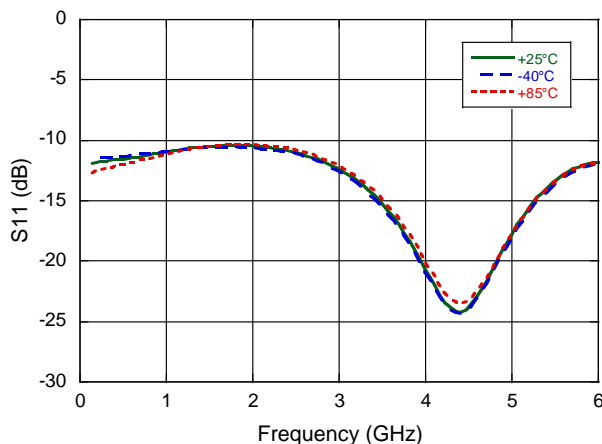
Reverse Isolation



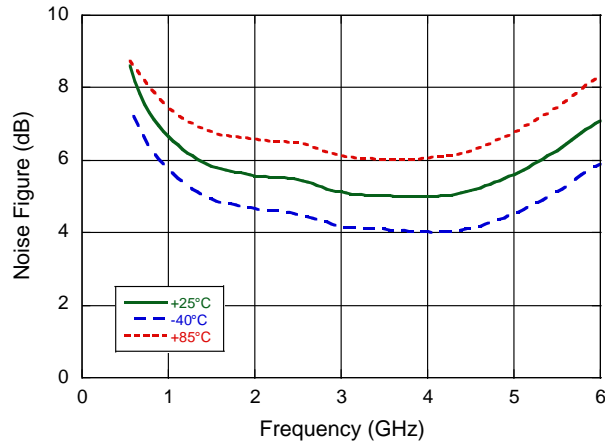
Input Return Loss



Output Return Loss



Noise Figure



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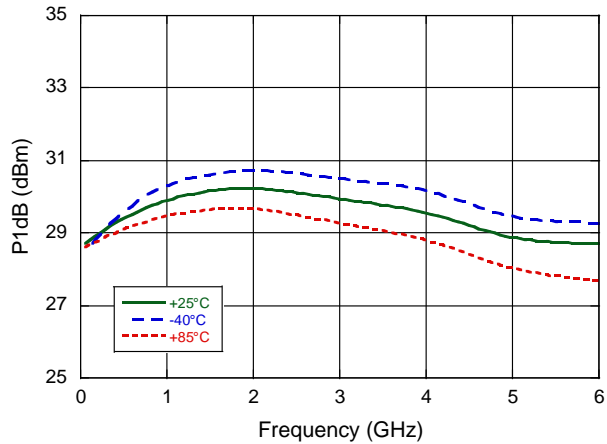


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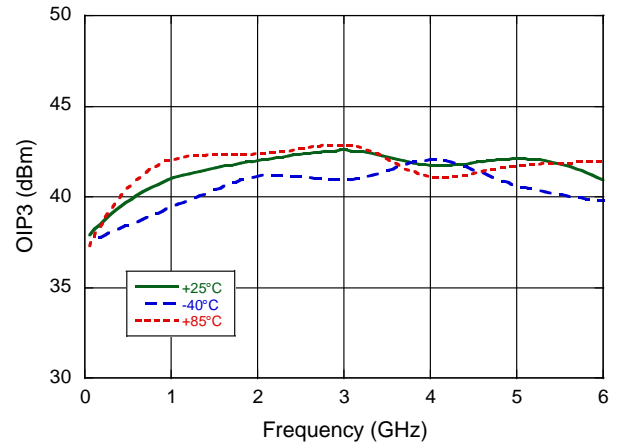
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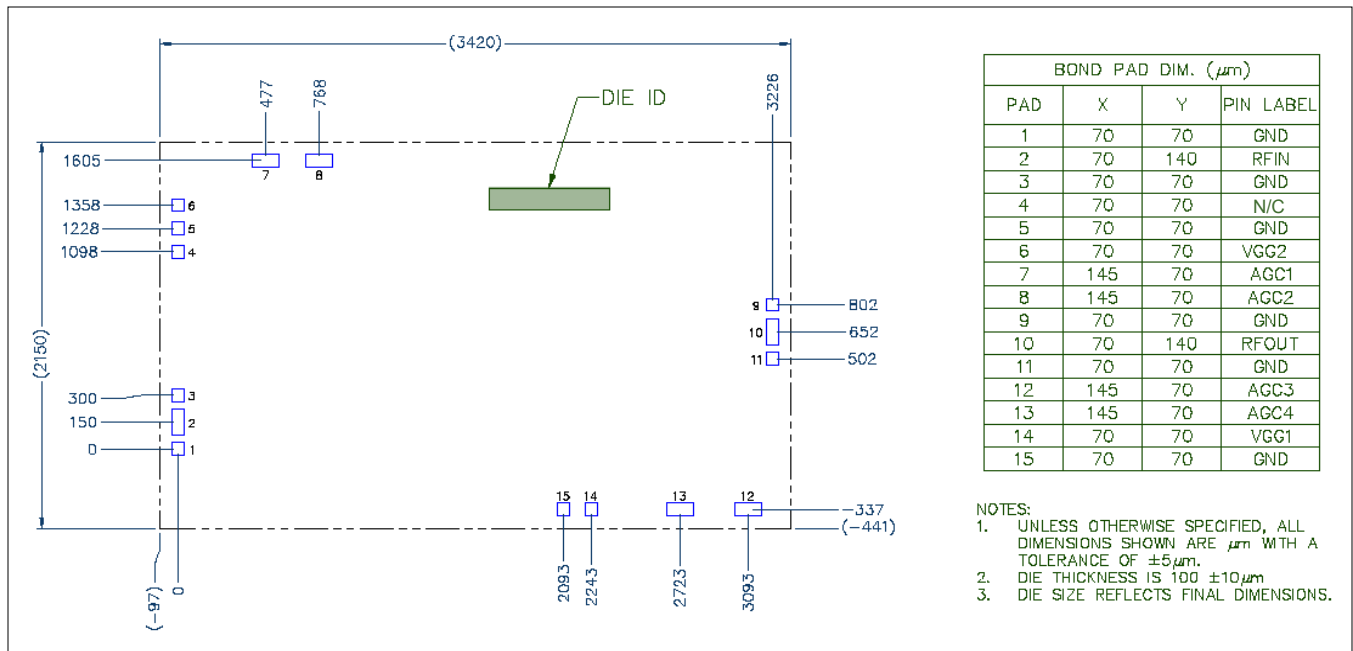
P1dB



OIP3



Outline



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