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

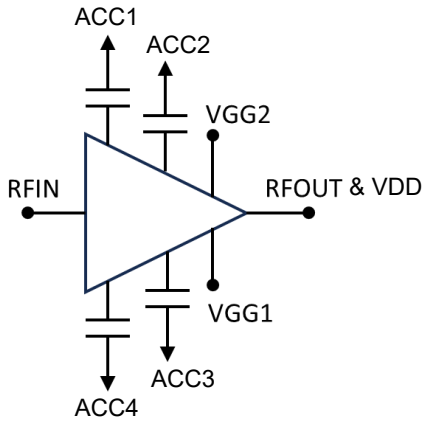
Description

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 µF.

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

Electrical Specifications:
Freq. = 0.05 - 6.0 GHz, T_A = 25°C, V_{DD} = +12 V, V_{GG1} = -0.8 V, V_{GG2} = +5.2 V, Z_0 = 50 Ω

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 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	-40ºC to +85ºC
Junction Temperature[4,5]	+150ºC

4. Operating at nominal conditions with $T_J \leq 150°C$ will ensure MTTF > 1 x 10^6 hours.
5. Junction Temperature (T_J) = T_C + Θ_{JC} * ((V * I) - (P_{OUT} - P_{IN}))
   Typical thermal resistance (Θ_{JC}) = 14°C/W
   a) For T_C = +25°C,
   T_J = 80.17°C @ 12V, 300 mA, P_{IN} = 0 dBm, P_{OUT} = 13 dBm
   b) For T_C = +85°C,
   T_J = 133.2°C @ 12V, 365 mA, P_{IN} = 18 dBm, P_{OUT} = 30 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 VGG2 (-0.8 V).
2. Apply VGG1 (5.2 V).
3. Apply VDD.
4. Adjust VGG2 to get 300 mA IDQ. (VGG1 - VGG2 should be approximately equal to 6 V).
5. Apply RF.

Turn OFF: Is the reverse order of turn ON.

Handling Procedures

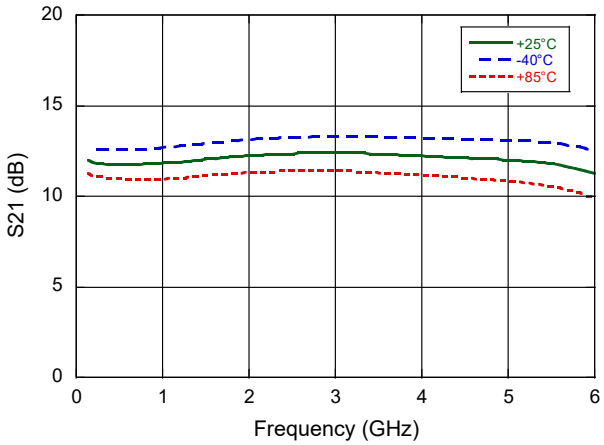
Please observe the following precautions to avoid damage:

Static Sensitivity

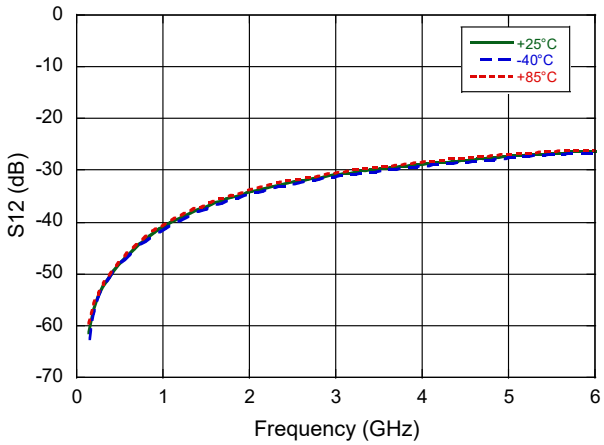
These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

Typical Performance Curves

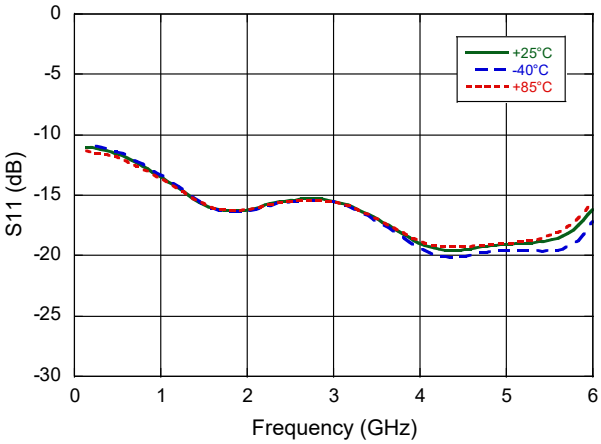
Gain



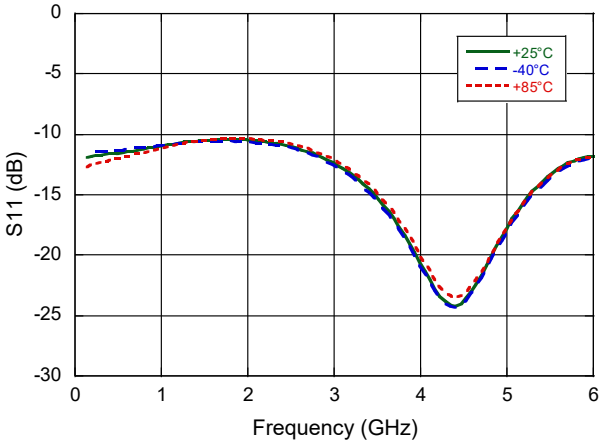
Reverse Isolation



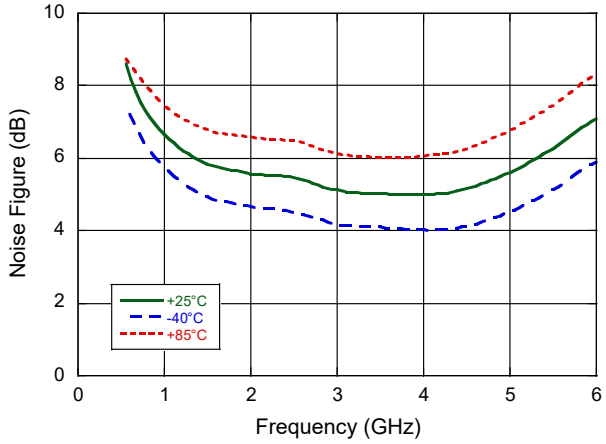
Input Return Loss



Output Return Loss

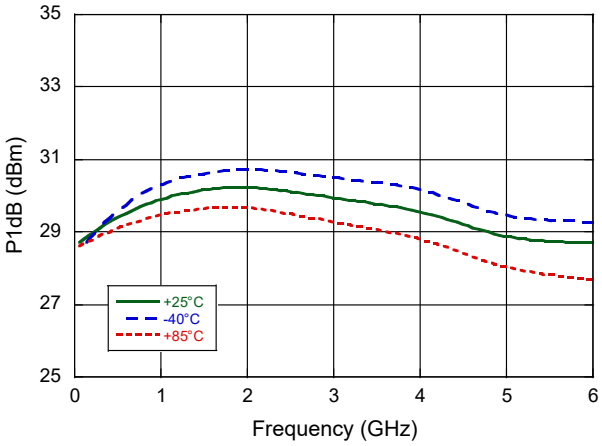


Noise Figure

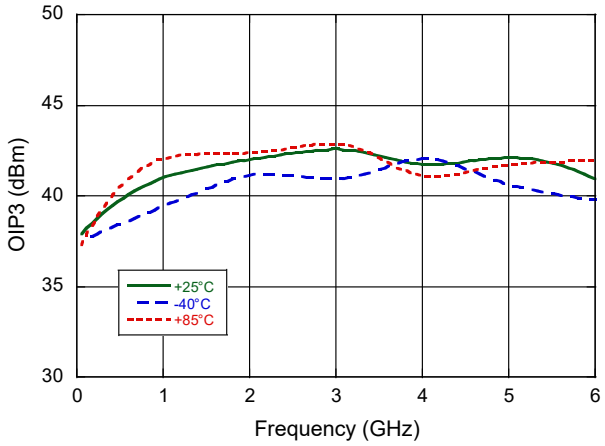


Typical Performance Curves

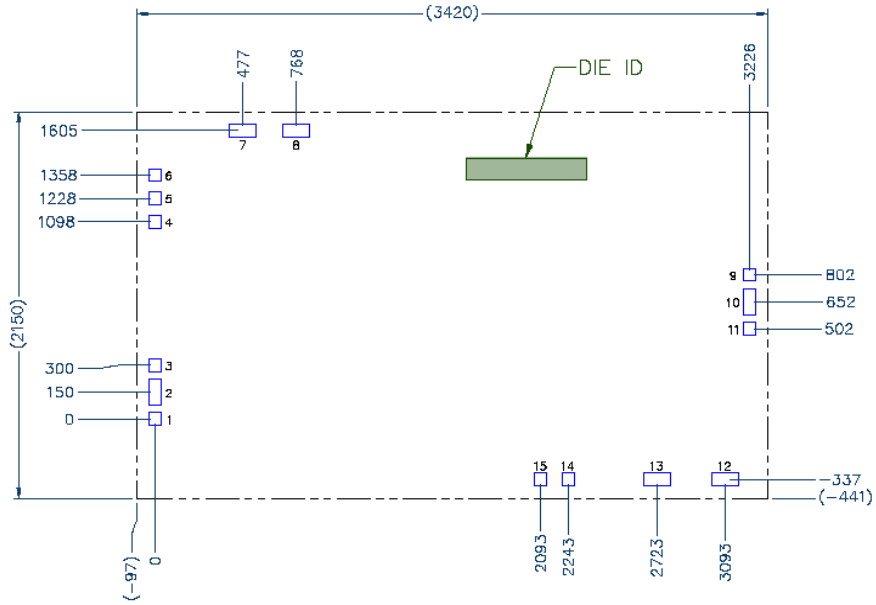
P1dB



OIP3



Outline



BOND PAD DIM. (μm)			
PAD	X	Y	PIN LABEL
1	70	70	GND
2	70	140	RFIN
3	70	70	GND
4	70	70	VGG2B
5	70	70	GND
6	70	70	VGG2A
7	145	70	AGC1
8	145	70	AGC2
9	70	70	GND
10	70	140	RFOUT
11	70	70	GND
12	145	70	AGC3
13	145	70	AGC4
14	70	70	VGG1
15	70	70	GND

NOTES:
1. UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS SHOWN ARE μm WITH A TOLERANCE OF ±5μm.
2. DIE THICKNESS IS 100 ±10μm
3. DIE SIZE REFLECTS FINAL DIMENSIONS.