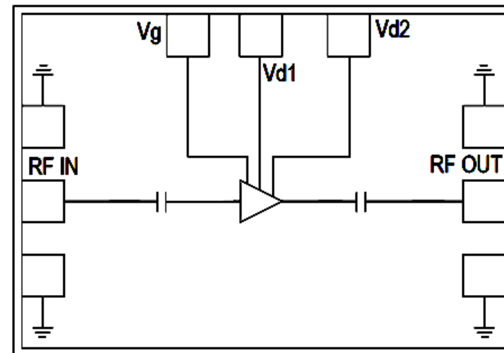
# 13 - 15 GHz Medium Power Amplifier

## Features

- **Frequency Range : 13 - 15GHz**
- **22 dBm output Psat**
- **15 dB Power gain**
- **25% PAE**
- **High IP3**
- **Dual bias operation**
- **No external matching required**
- **DC decoupled input and output**
- **0.5 µm InGaAs pHEMT Technology**
- **Chip dimension: 2.1 x 1.6 x 0.1 mm**

**Functional Diagram**




## Typical Applications

- **RADAR**
- **Military & space**
- **LMDS, VSAT**

## Description

The ASL4034 is a Ku-band Power amplifier with 22dBm power output. The PA with 2 stages of amplification operates in 13 - 15 GHz frequency range and it has a small signal gain of 15dB. The PA has a high IP3 of 32dBm and 25% PAE. The chip operates with dual bias supply voltage. The die is fabricated using a reliable 0.5µm InGaAs pHEMT technology. The Circuit grounds are provided through vias to the backside metallization.

## Absolute Maximum Ratings [1]

| Parameter | Absolute Maximum | Units |
|---|---|---|
| Drain bias voltage (Vd) | +9.5 | volts |
| Drain current (Idq) | 120 | mA |
| RF input power (RFin at Vd=8V) | 20 | dBm |
| Operating temperature | -50 to +85 | °C |
| Storage Temperature | -65 to +150 | °C |

**1**. Operation beyond these limits may cause permanent damage to the component

## Electrical Specifications[1] @ $T_A$ = 25 °C, $V_{d1}$ = $V_{d2}$ = 8V, $V_g$ = -0.9V $Z_o$=50 Ω

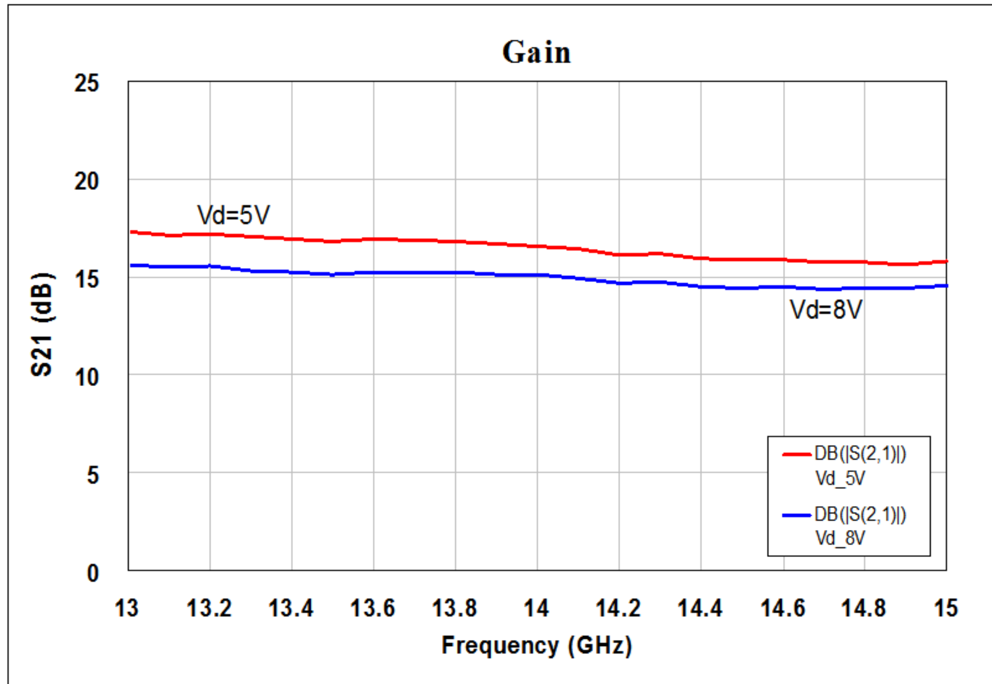
| Parameter | Min. | Typ. | Max. | Units |
|---|---|---|---|---|
| Frequency Range | 13 - 15 | 13 - 15 | 13 - 15 | GHz |
| Gain | 13 | 15 | | dB |
| Gain Flatness | | +/-0.5 | | dB |
| Output Power (P1 dB) | 19.5 | 20.5 | | dBm |
| Input Return Loss | 10 | <-12 | | dB |
| Output Return Loss | | <-8 | | dB |
| Saturated output power (Psat) | 21 | 22 | | dBm |
| Output Third Order Intercept (IP3) | -- | 32 | | dBm |
| Power Added Efficiency (PAE) | -- | 25% | | -- |
| Supply Current (Idq) | | 64 | | mA |

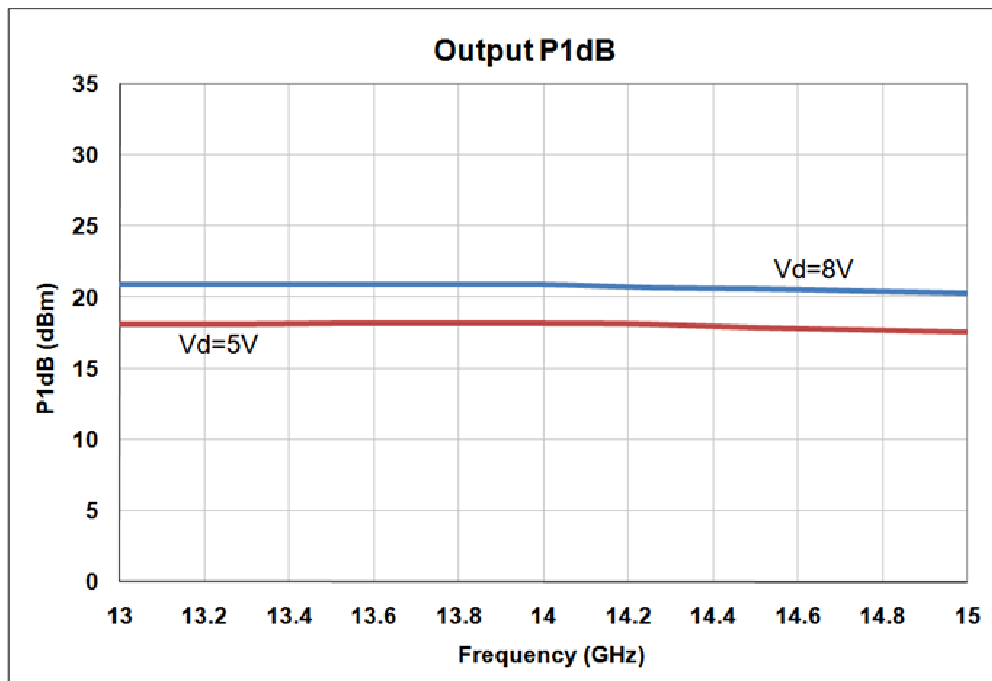
***Note:***

1. Electrical specifications as measured in test fixture.

## Test fixture data

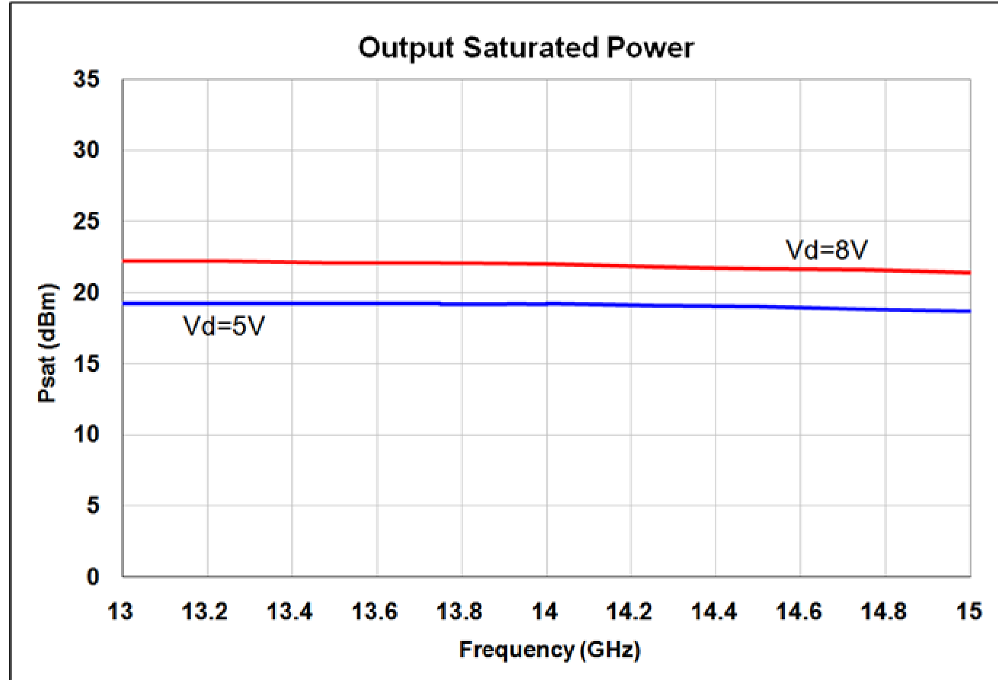
*$V_{d1} = V_{d2} = V_d$, $V_g$ = -0.9V, Total Current (Idq) = 64mA, $T_A$ = 25 °C*

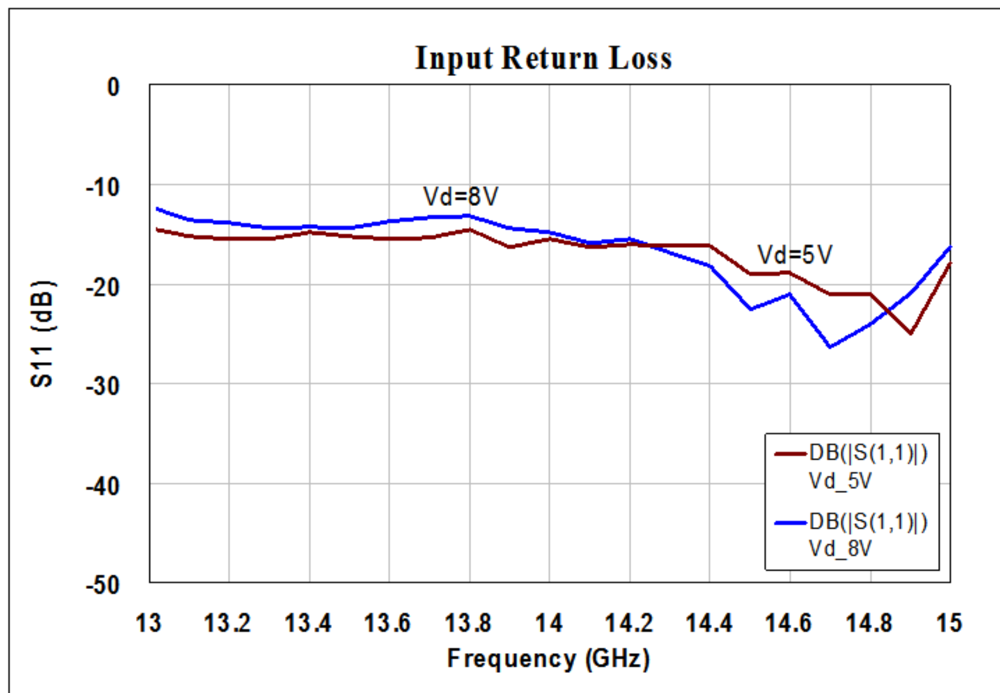


## Test fixture data

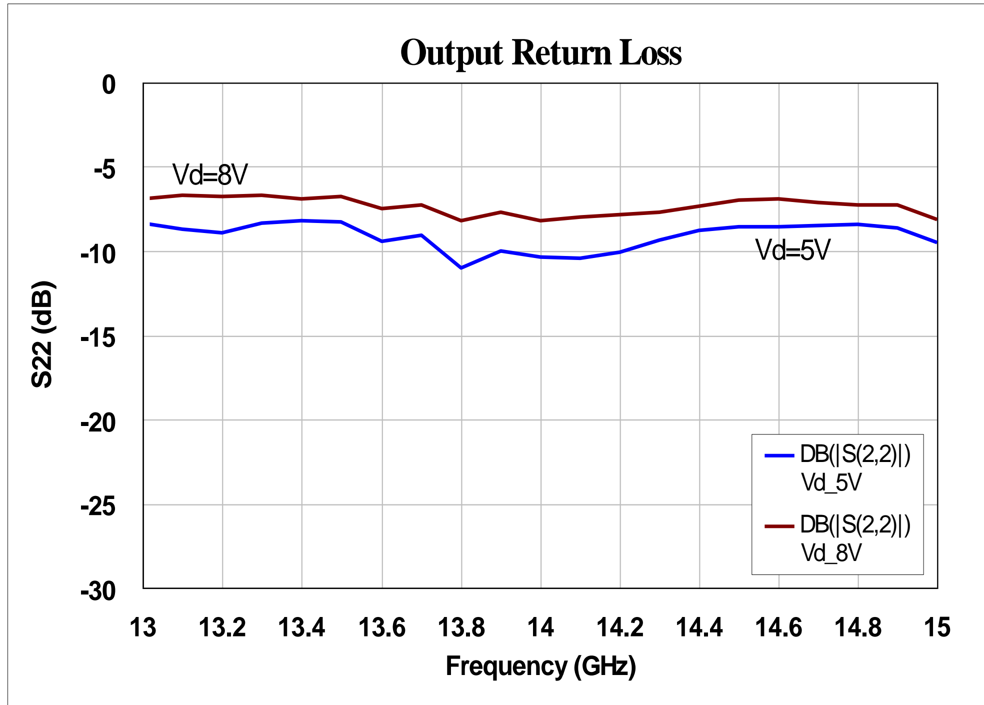
*$V_{d1} = V_{d2} = V_d$, $V_g$ = -0.9V, Total Current (Idq) = 64mA, $T_A$ = 25 °C*

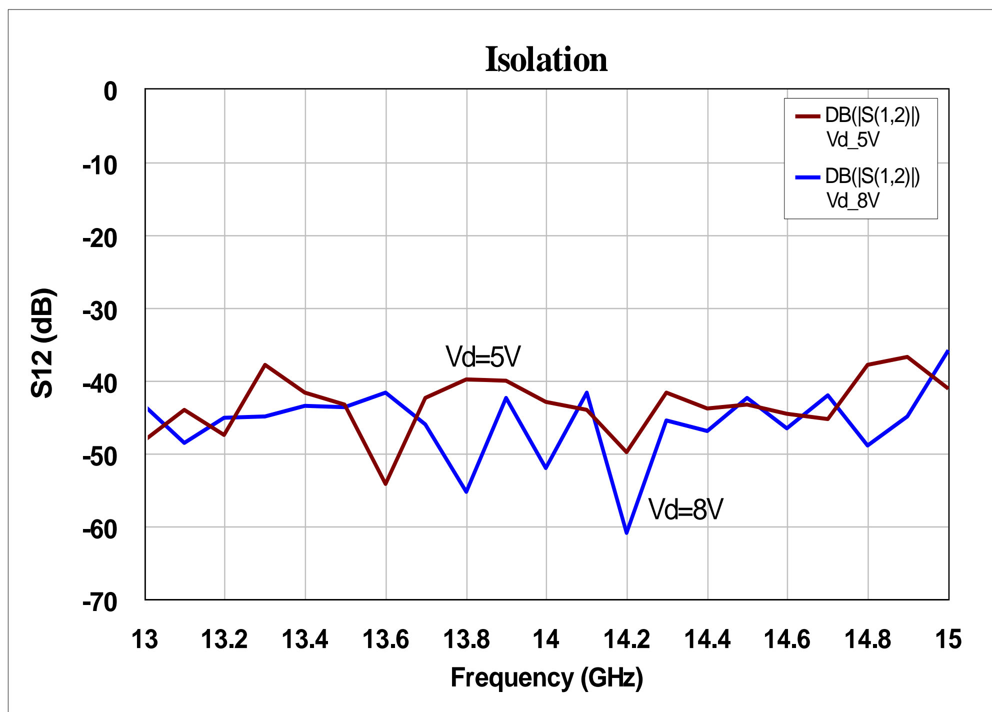


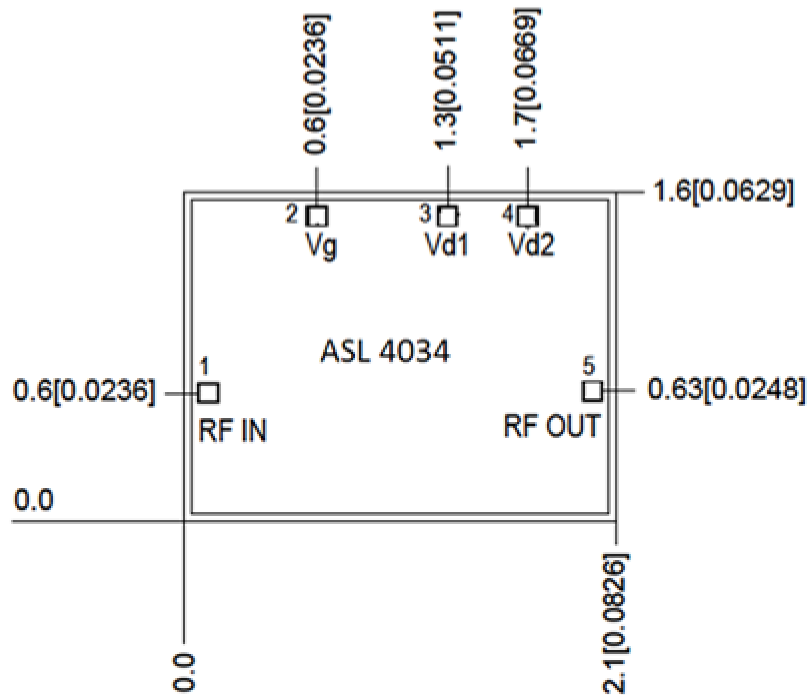
## Test fixture data

*$V_{d1} = V_{d2} = V_d$, $V_g = -0.9V$, $Idq = 64\ mA$, $T_A = 25\ ^oC$*



## Bond Pad Locations

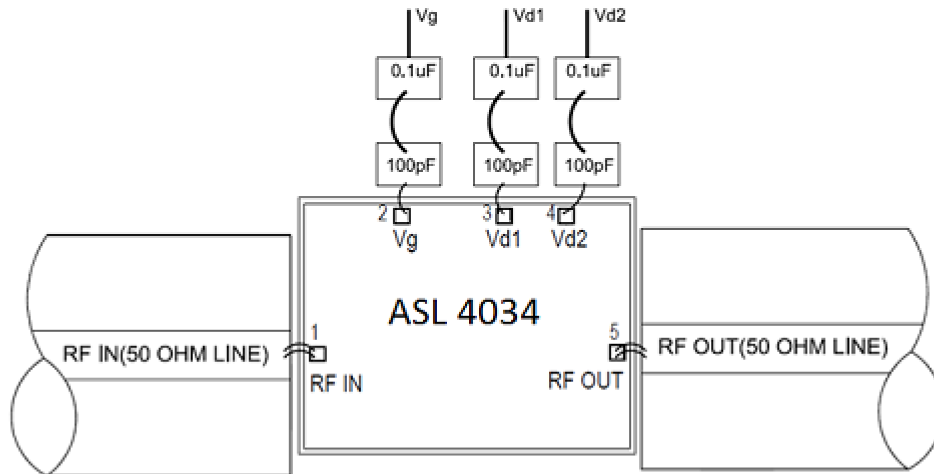



**Units:** millimeters (inches)

**Note:**

1. All RF and DC bond pads are 100µm x 100µm
2. Pad no. 1 : RF IN
3. Pad no. 2 : Common gate voltage ($V_g$)
4. Pad no. 3 : 1st stage drain voltage ($V_{d1}$)
5. Pad no. 4 : 2nd stage drain voltage($V_{d2}$)
6. Pad no. 5 : RF OUT

## Recommended Assembly Diagram




**Note :**

1. Two 1 mil (0.0254mm) bond wires of minimum length should be used for RF input and output.
2. Two 1 mil (0.0254mm) bond wires of minimum length should be used from chip bond pad to 100pF single layer bypass capacitors.
3. Input and output 50 ohm lines are on 5 mil RT Duroid substrate
4. 0.1µF capacitors may be additionally used as a second level of bypass for reliable operation
5. The RF input & output ports are DC decoupled on-chip.

**Die attach:** For Epoxy attachment, use of a two-component conductive epoxy is recommended. An epoxy fillet should be visible around the total die periphery. If Eutectic attachment is preferred, use of fluxless AuSn (80/20) 1-2 mil thick preform solder is recommended. Use of AuGe preform should be strictly avoided.

**Wire bonding:** For DC pad connections use either ball or wedge bonds. For best RF performance, use of 150 - 200µm length of wedge bonds is advised. Single Ball bonds of 250-300µm though acceptable, may cause a deviation in RF performance.

***GaAs MMIC devices are susceptible to Electrostatic discharge. Proper precautions should be observed during handling, assembly & testing***

All information and Specifications are subject to change without prior notice

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