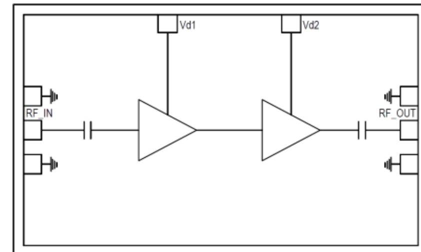
# 18 – 40 GHz Low Noise Amplifier

## Features

- **Frequency Range : 18-40 GHz**
- **Nominal Gain : 12.5 dB**
- **Noise Figure : 3 dB**
- **I/O Return Losses : 15 dB**
- **Self-bias operation**
- **DC decoupled Input and Output**
- **Chip Dimension: 1.95mm x 1.85mm x 0.1mm**

**Functional Diagram**




## Typical Applications

- Radar
- Military
- Test Equipment and Sensors.

## Description

The ASL1032 is a Low Noise Amplifier operating in 18.0 – 40.0 GHz frequency range. The LNA uses two stages of amplification and provides 12.5dB of gain with noise figure of less than 3dB having input & output return losses better than 15dB. The LNA operates on +2V, +3V or +4V DC supply with a current consumption of 41mA (typ). The circuit grounds on the die are provided through vias to the backside metallization.

## Absolute Maximum Ratings[1]

| Parameter | Absolute Maximum | Units |
|---|---|---|
| Positive DC voltage | +6 | V |
| RF input power | +20 | dBm |
| Supply Current | 100 | mA |
| Operating Temperature | -55 to +85 | °C |
| Storage Temperature | -65 to +150 | °C |

**1**. Operation beyond these limits may cause permanent damage to the component.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## Electrical Specifications @ $T_A$ = 25 °C, $Z_o$ = 50Ω,

| Parameter | Min. | Typ. | Max. | Units |
|---|---|---|---|---|
| Frequency | 18 | | 40 | GHz |
| Gain (1) | | 12.5 | | dB |
| Gain Flatness(1) | - | ±0.6 | - | dB |
| Noise Figure (1) | | 3 | | dB |
| Input Return Loss (1) | - | 15 | - | dB |
| Output Return Loss (1) | - | 20 | - | dB |
| Output Power ($P_1$dB) (2) | | 8 | | dBm |
| Supply Voltage | | 2 | | V |
| Supply Current | | 41 | | mA |

***Note:***

1. Electrical specifications as measured On-wafer
2. P1dB value shown above is simulated data & is yet to be measured


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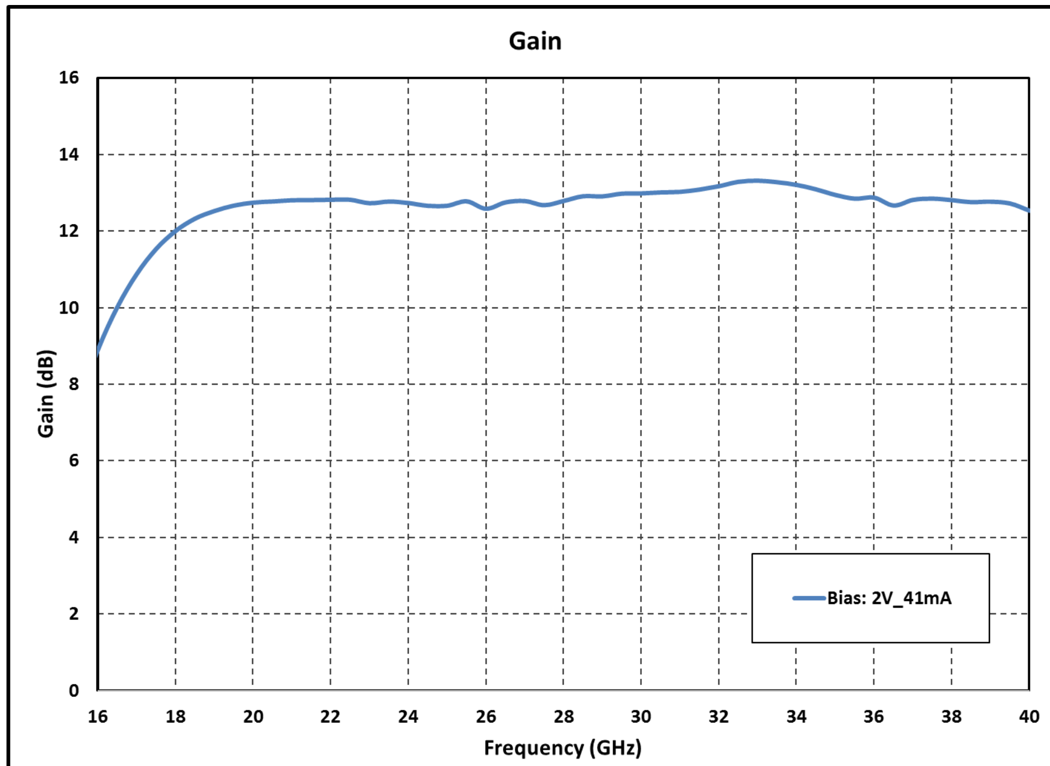
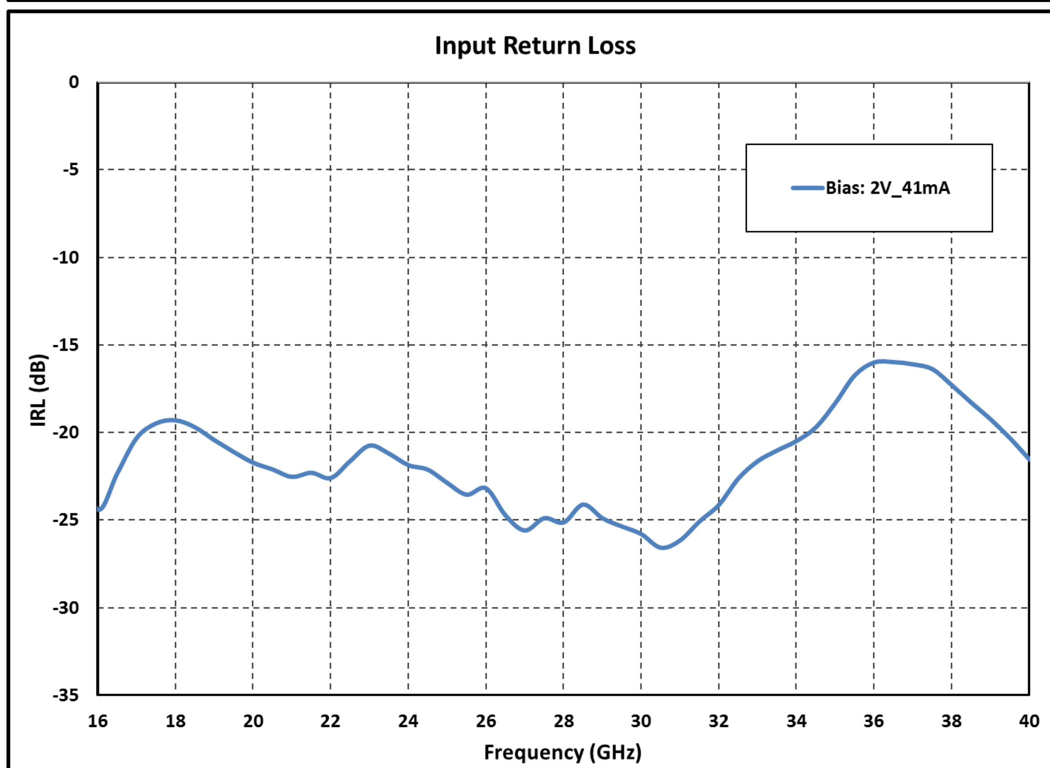
## On-wafer Probed data

*Vd1= Vd2= 2V, Total Current = 41 mA,* $T_A = 25\ ^oC$





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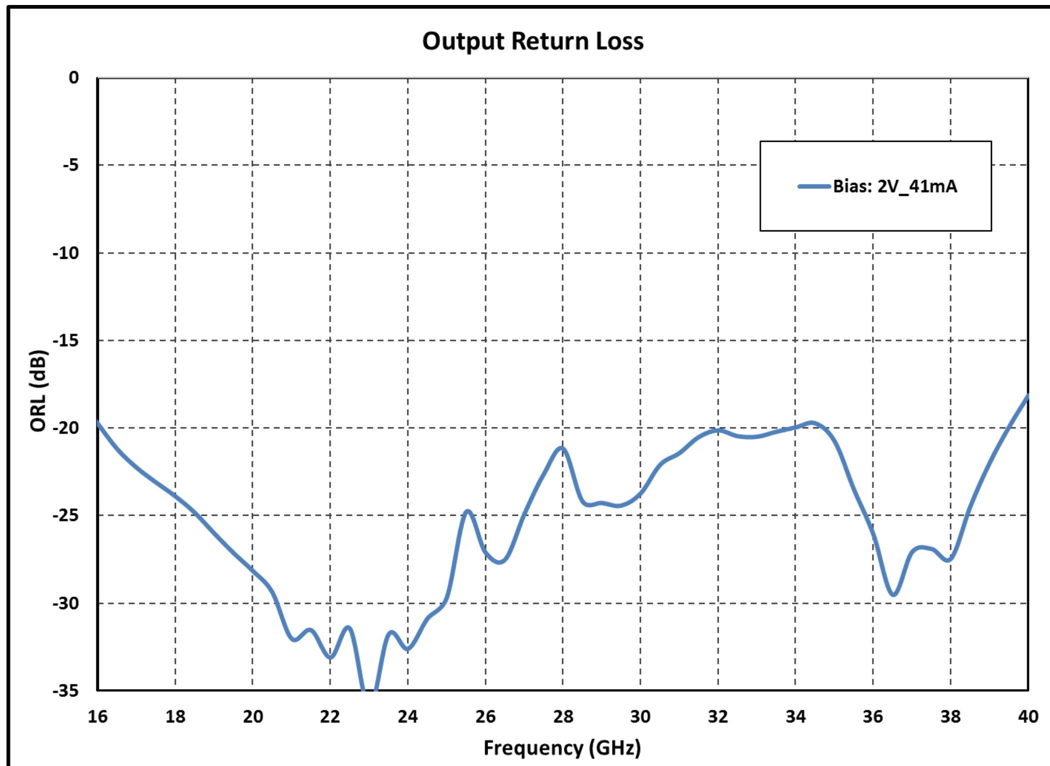


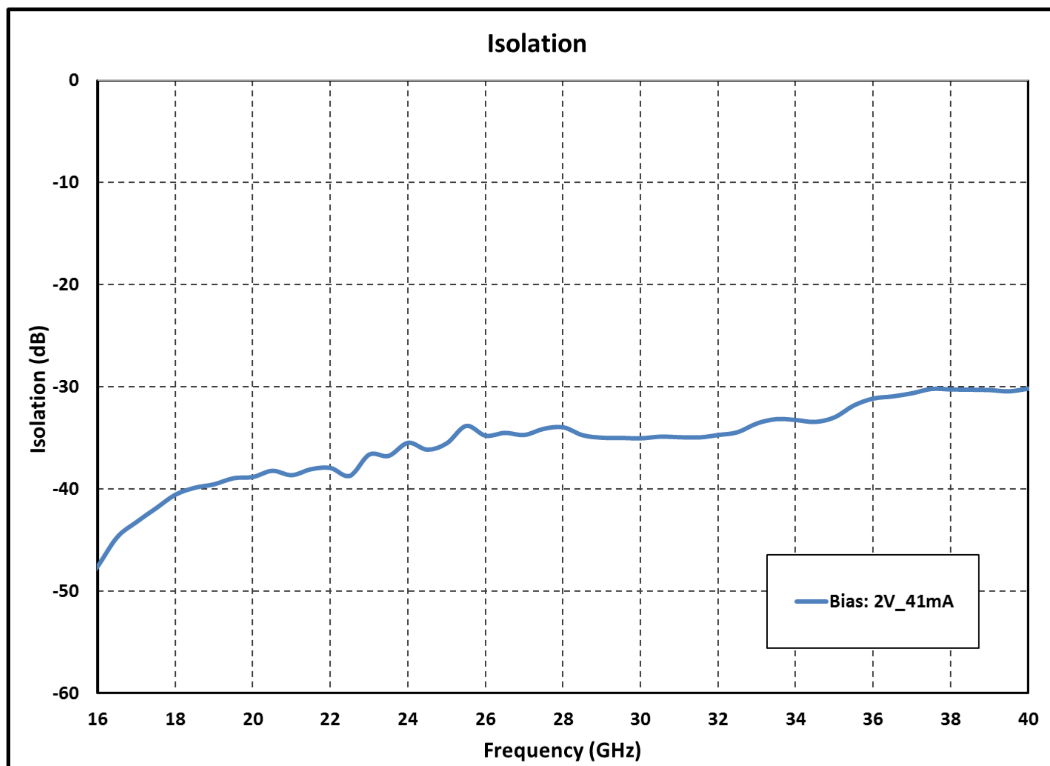




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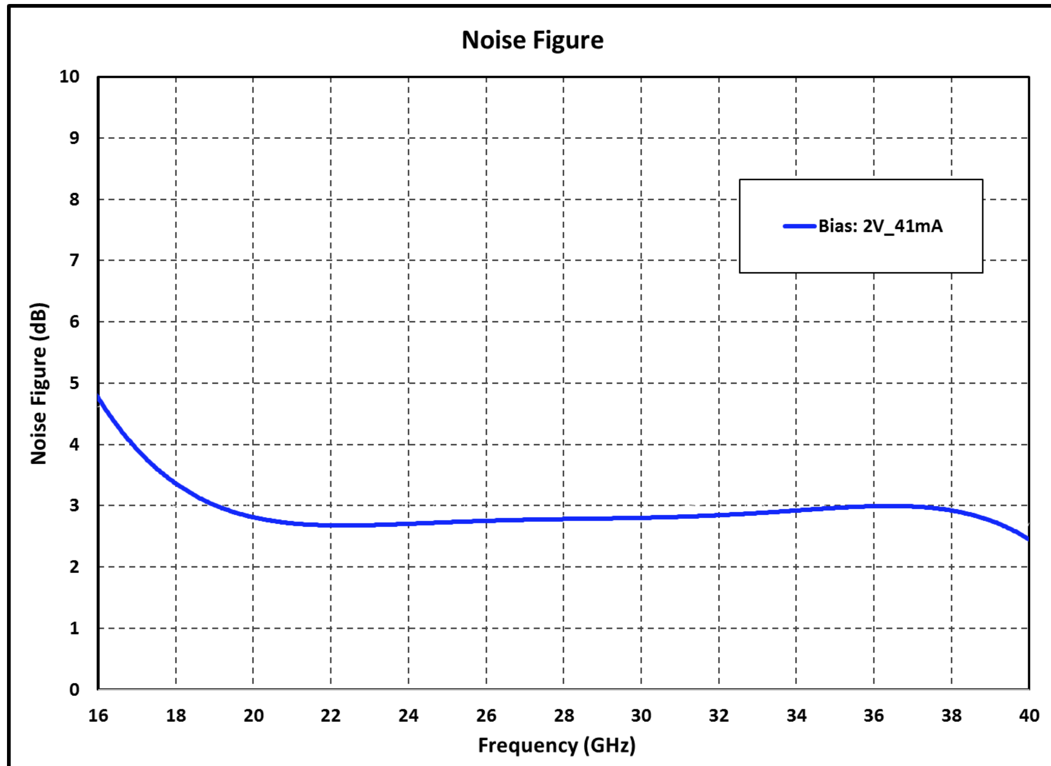



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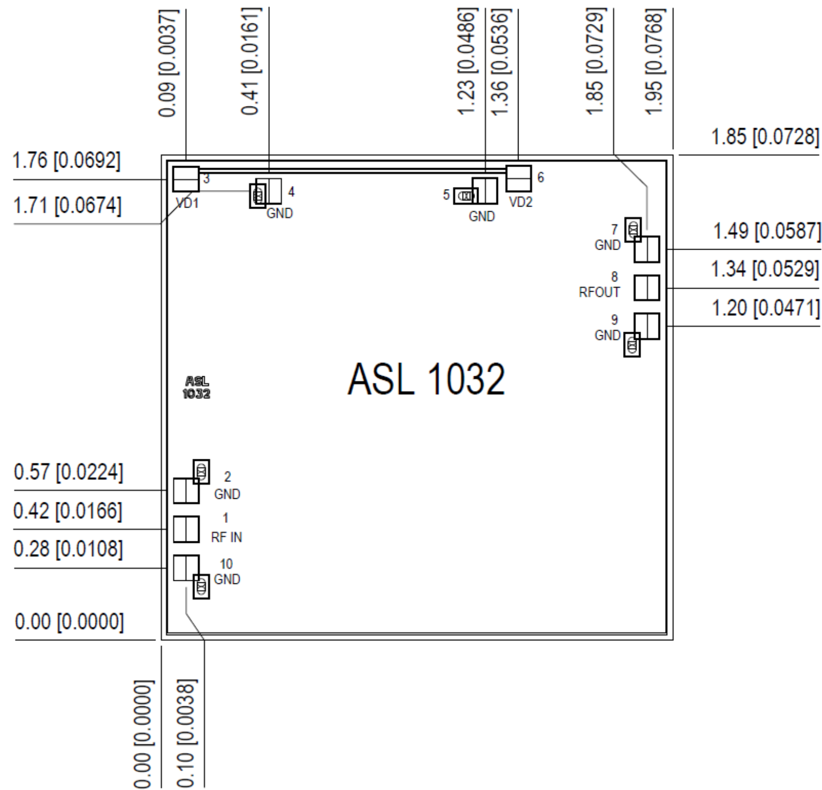
## Mechanical Characteristics




**Units: millimeters (inches)**

**All RF and DC bond pads are 100µm x 100µm**

**Note:**

1. **Pad no. 1 : RF IN**
2. **Pad no. 3 : VD1**
3. **Pad no. 6 : VD2**
4. **Pad no. 8 : RF OUT**
5. **Pad no. 2, 4, 5, 7, 9, 10: GND**



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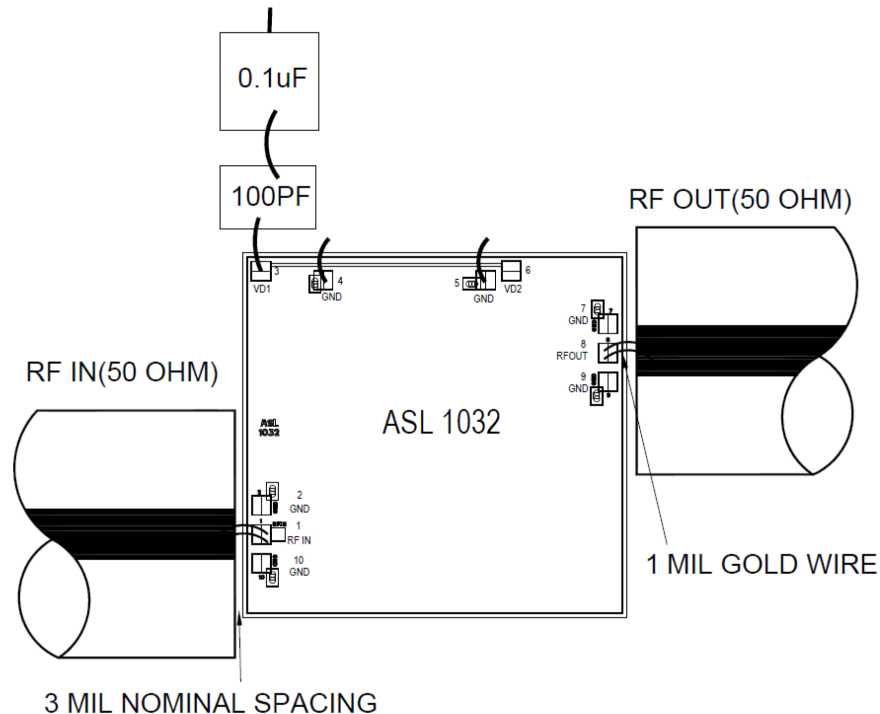
## Recommended Assembly Diagram




**Note:**

1. Two 1 mil (0.0254mm) bond wires of minimum length should be used for RF input and output.
2. 100pF and 0.1 µF capacitors may be additionally used as a second level of bypass at the power supplies for reliable operation.

**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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