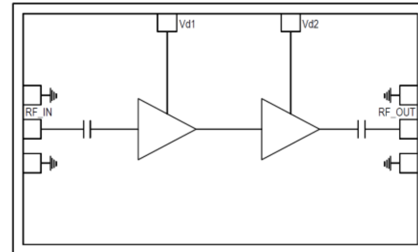
20 – 40 GHz Low Noise Amplifier

Features

- **Frequency Range : 20 - 40GHz**
- **Nominal Gain : 12dB**
- **Noise Figure : 3.0dB**
- **Output P1dB : 6dBm**
- **Self-bias operation**
- **DC decoupled Input and Output**
- **Chip Dimension: 1.38mm x 1.13mm x 0.1mm**

Functional Diagram



Typical Applications

- Radar
- Military
- Test Equipment and Sensors.

Description

The ASL1028 is a Low Noise Amplifier operating in 20.0 – 40.0 GHz frequency range. The LNA uses two stages of amplification and provides 12dB of gain with noise figure of less than 3dB having input & output return losses better than 7dB. The LNA has P1dB of 6dBm over the entire operating frequency band and operates either on +3V or +4V DC supply with a current consumption of 28mA (typ)@3V operation. 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
Operating Temperature	-55 to +85	^oC
Storage Temperature	-65 to +150	^oC

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	20		40	GHz
Gain	-	12	-	dB
Gain Flatness	-	±1	-	dB
Noise Figure	2.5	3.0	4.0	dB
Input Return Loss	-	7	-	dB
Output Return Loss	-	7	-	dB
Output Power (P1dB)		6/7(2)		dBm
Supply Voltage		3		V
Supply Current		28		mA

Note:

1. The above mentioned electrical specifications are measured On-Wafer
2. 7dBm P1dB can be achieved for drain supply voltage at 4V.

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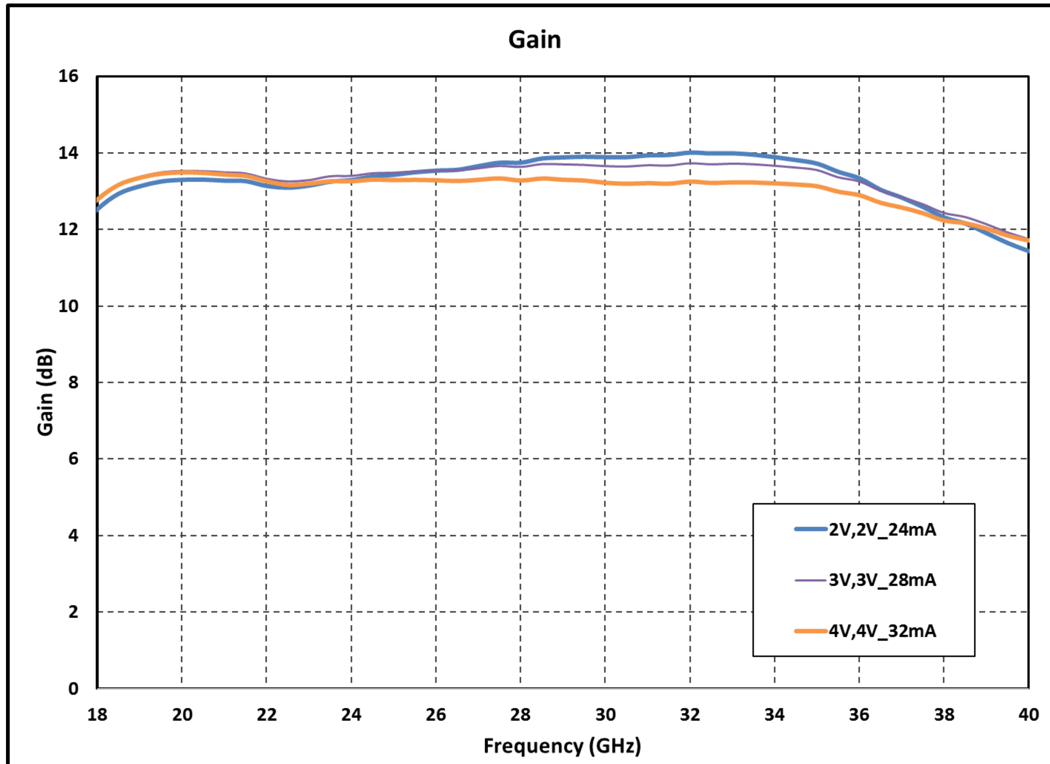
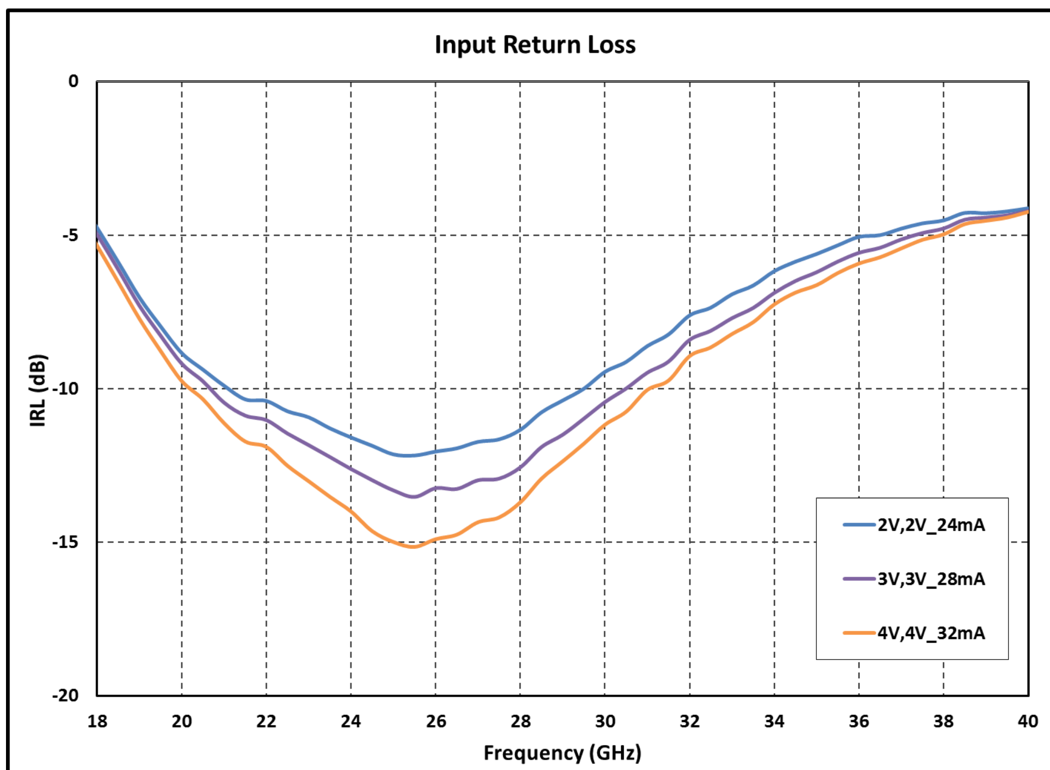
On-wafer Probed data

Vd1= Vd2= 3V, Total Current = 28 mA, T_A = 25 ºC





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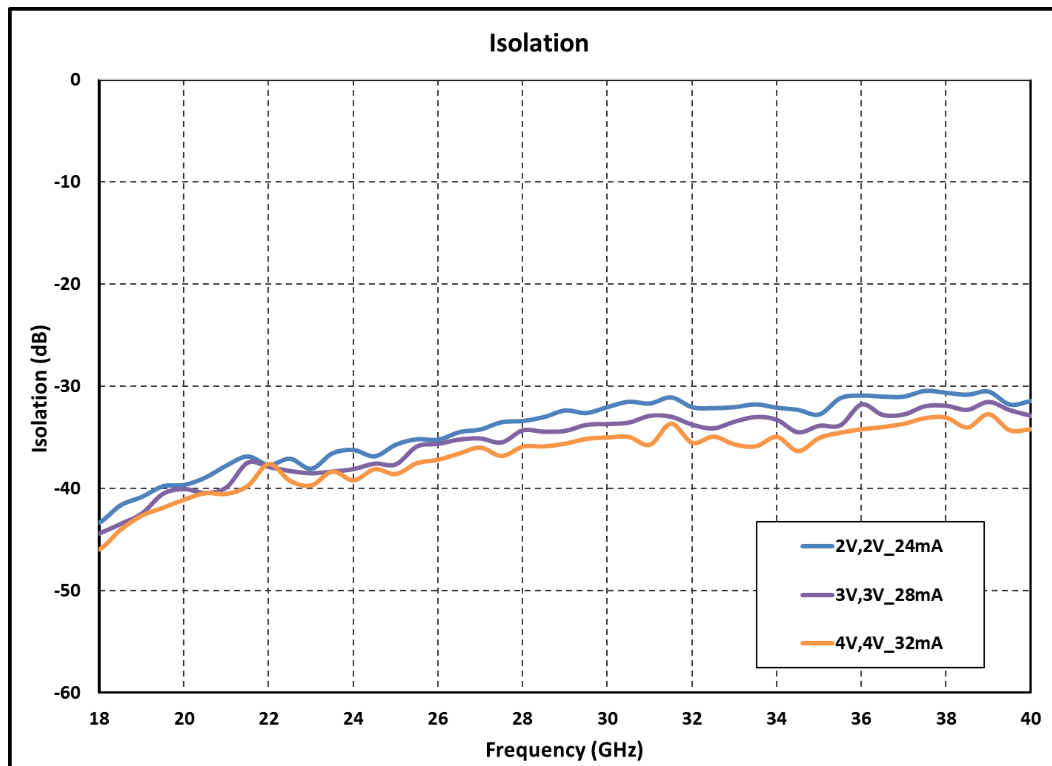

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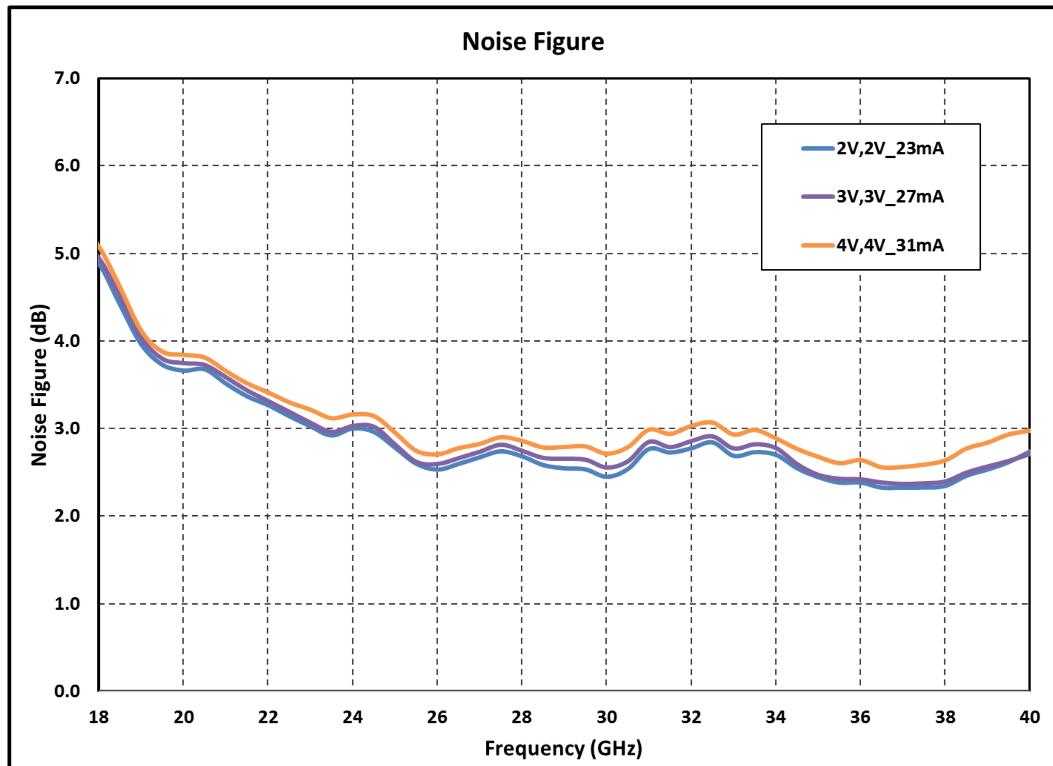

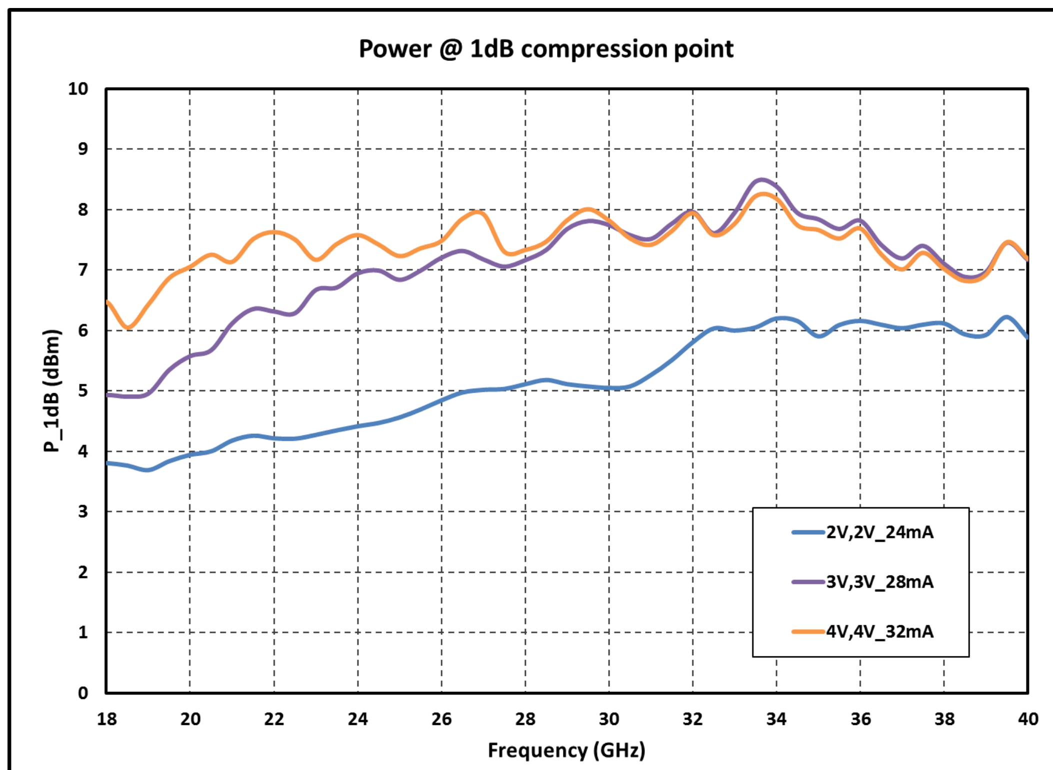

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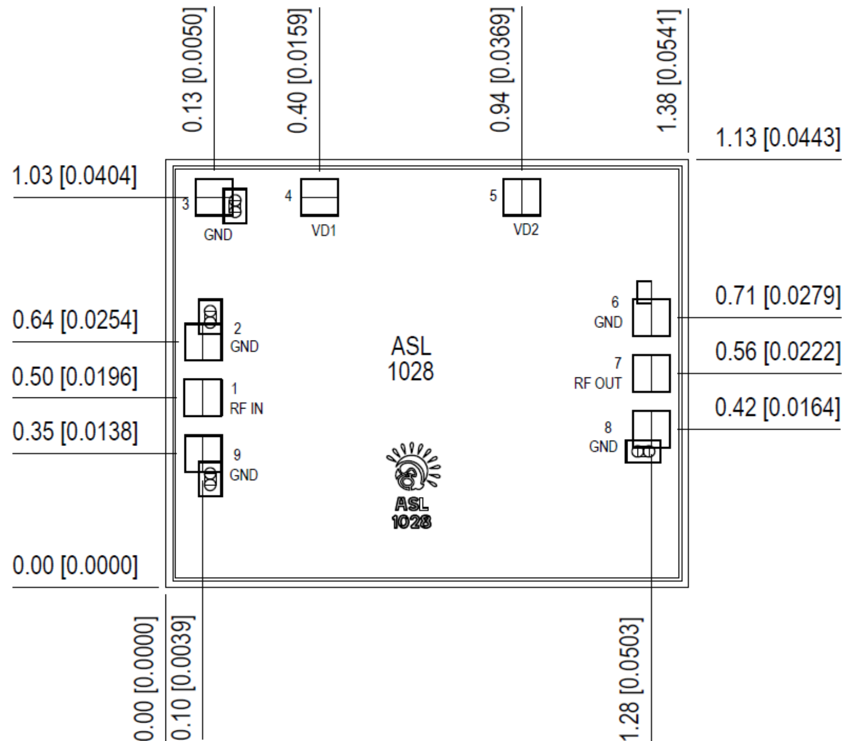
Mechanical Characteristics



Units: millimeters (inches)

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

Note:

1. **Pad no. 1 : RF in**
2. **Pad no. 4 : Vd1**
3. **Pad no. 5 : Vd2**
4. **Pad no. 7 : RF OUT**
5. **Pad no. 2, 3, 6, 8, 9 : GND**

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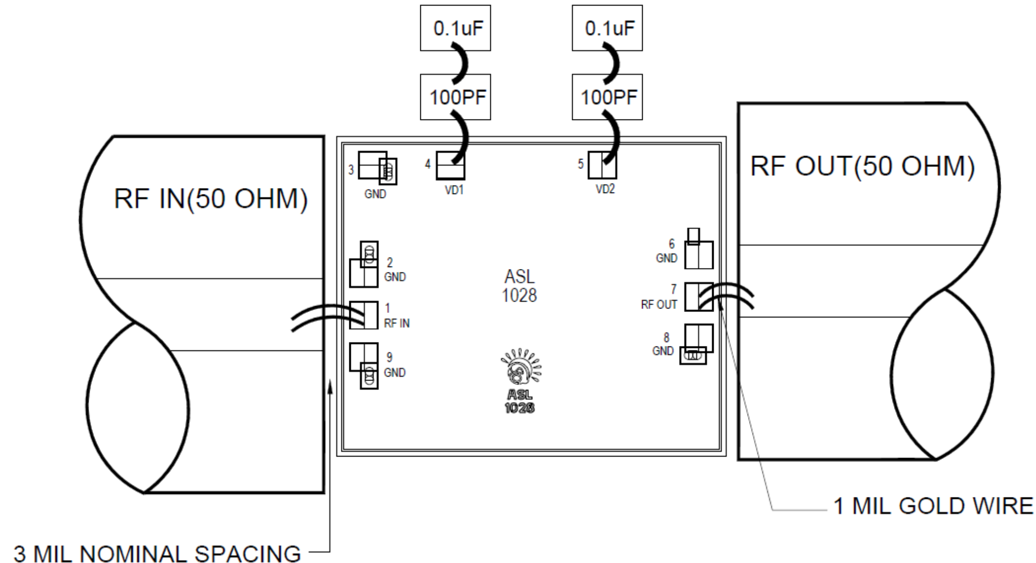
Recommended Assembly Diagram



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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