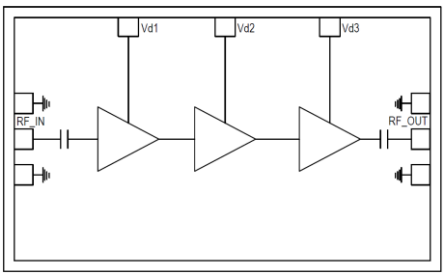
18 – 40 GHz Low Noise Amplifier

Features

- **Frequency Range : 18 - 40GHz**
- **Nominal Gain : 17dB**
- **Noise Figure : 3.5dB**
- **I/O Return Losses : 10dB**
- **Output P1dB : 5.5dBm**
- **Self-bias operation**
- **DC decoupled Input and Output**
- **Chip Dimension: 1.89mm x 1.10mm x 0.1mm**

Functional diagram



Typical Applications

- Radar
- Military
- Test Equipment and Sensors.

Description

The ASL1030P4-D is a Low Noise Amplifier operating in 18.0 – 40.0 GHz frequency range. The LNA uses 3 stages of amplification and provides 17dB of gain with noise figure of less than 3.5dB having input & output return losses better than 10dB. The LNA has P1dB of 5.5dBm over the entire operating frequency band and operates either on +3V or 4V DC supply with a current consumption of 50mA(typ)@4V 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	^{o}C
Storage Temperature	-65 to +150	^{o}C

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

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Electrical Specifications @ T_A = 25 °C, Vd = +4V, Z_o = 50Ω,

Parameter	Min.	Typ.	Max.	Units
Frequency	18		40	GHz
Gain	-	17	-	dB
Gain Flatness	-	±1	-	dB
Noise Figure	3.0	3.5	4.0	dB
Input Return Loss	5	12	15	dB
Output Return Loss	-	12	-	dB
Output Power (P1dB)		5.5		dBm
Supply Voltage		4		V
Supply Current		50		mA

Note:

1. The above mentioned electrical specifications are measured On-Wafer.

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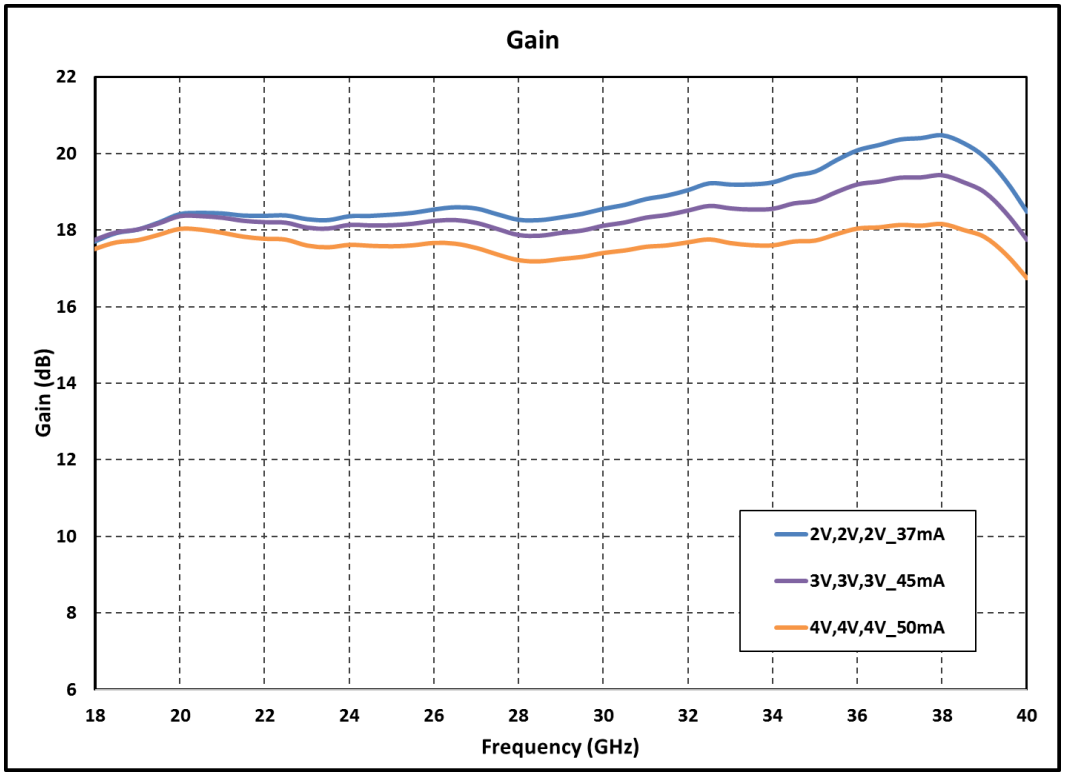
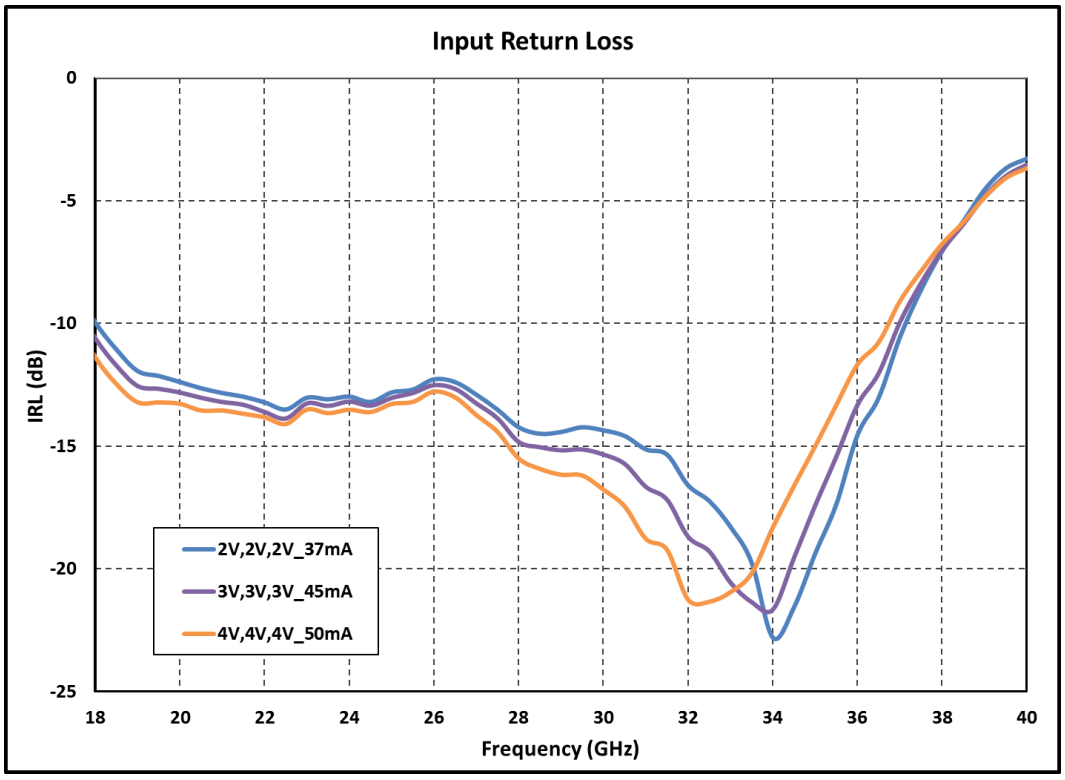
On-wafer Probed data

Vd1= Vd2= Vd3= 3V, Total Current = 45 mA, T_A = 25 ^oC





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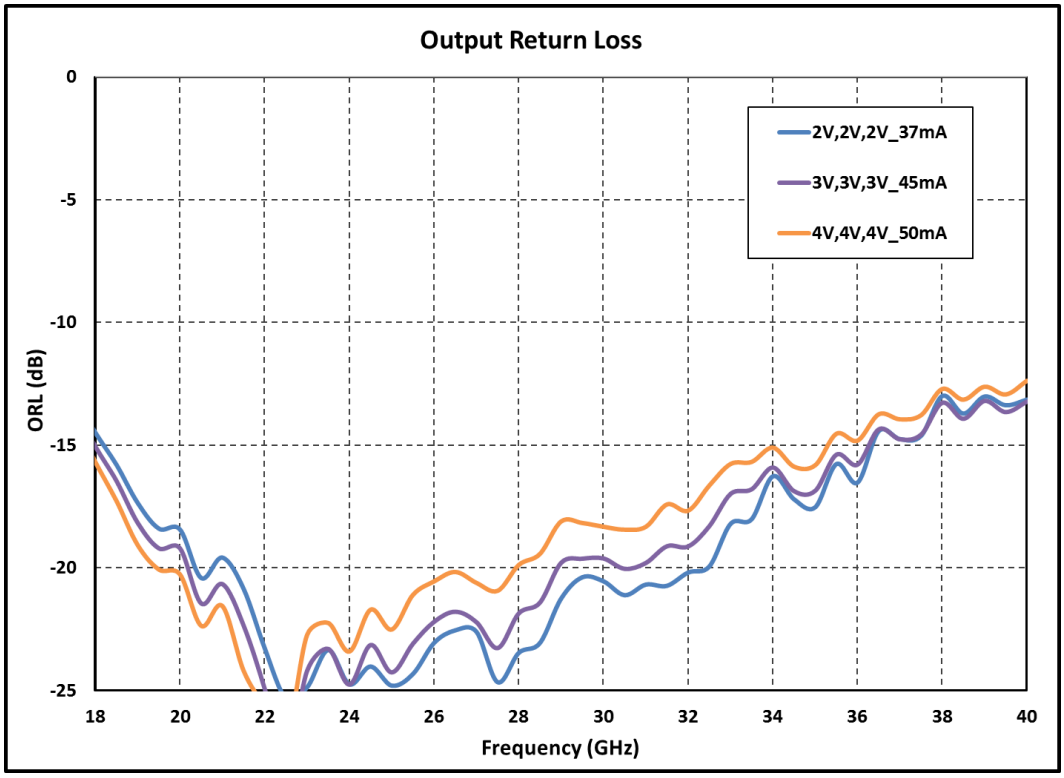

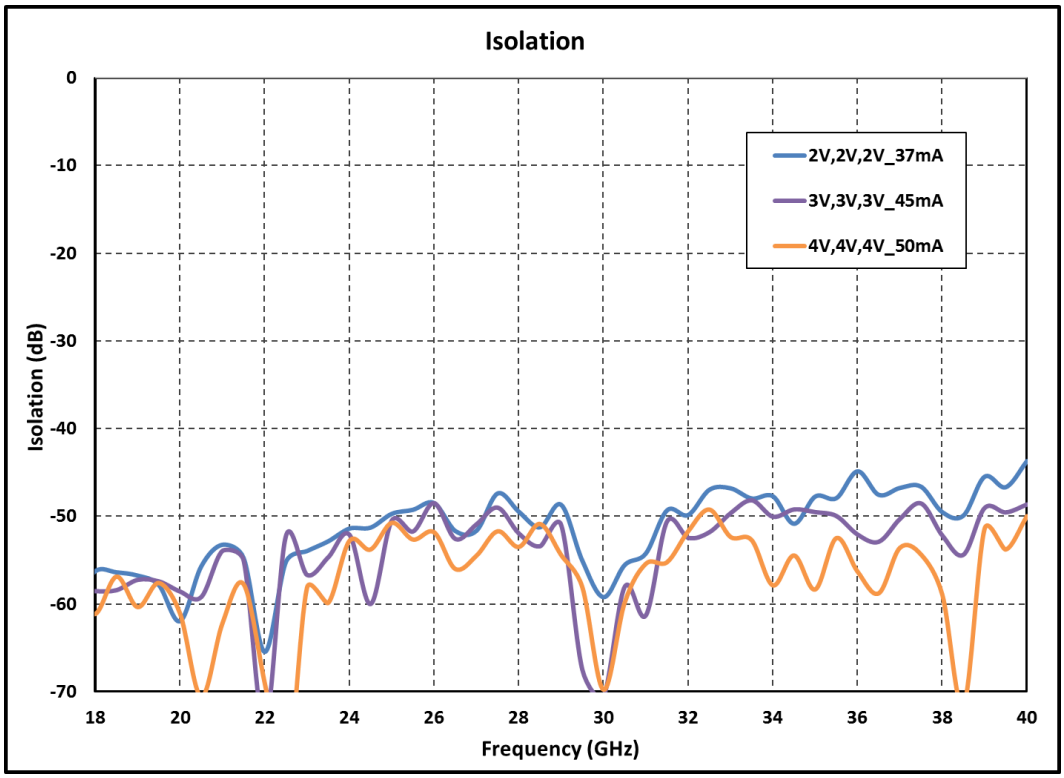

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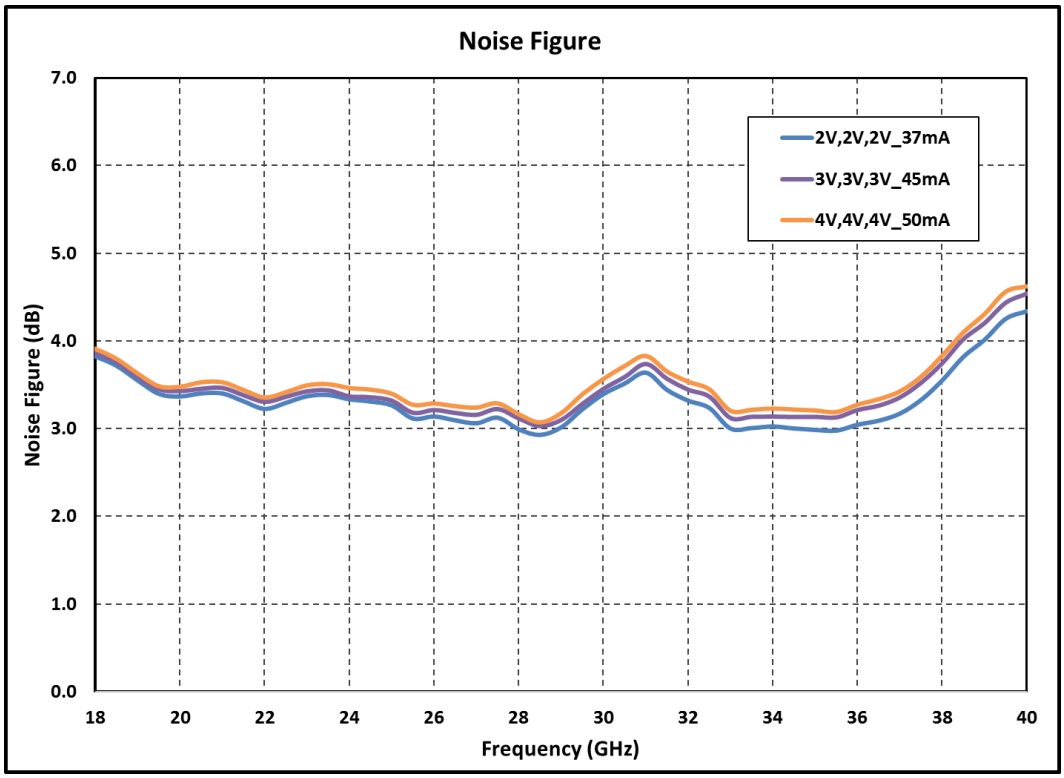

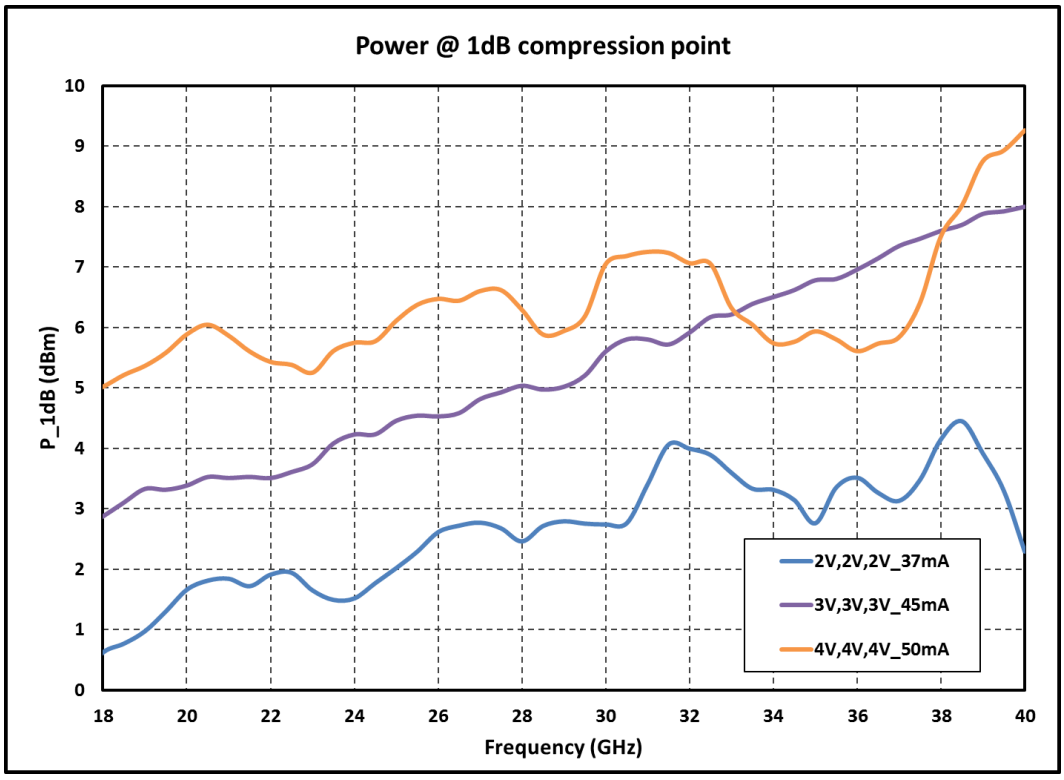

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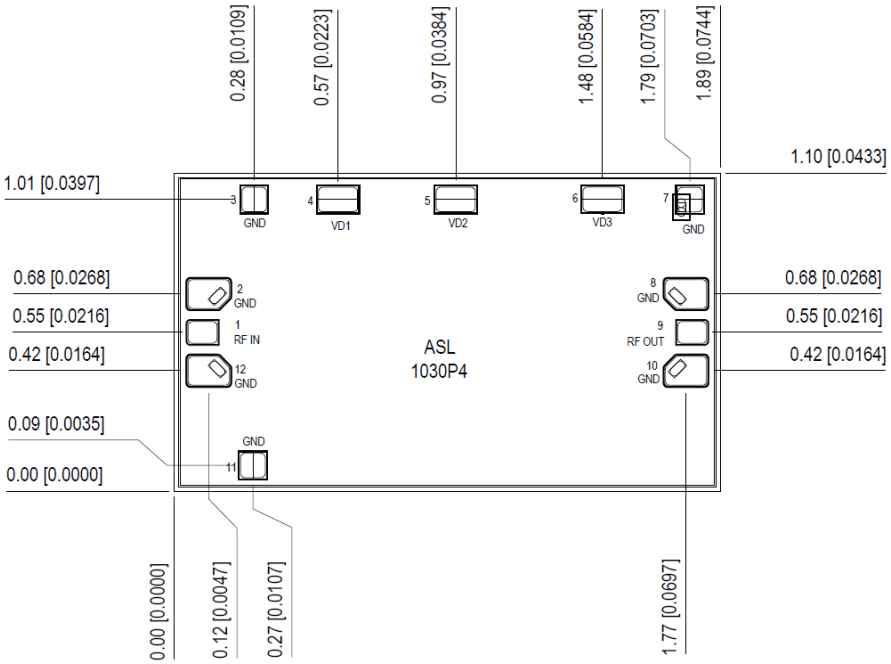
Mechanical Characteristics



Units: millimeters (inches)

All 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. 6 : VD3**
5. **Pad no. 9 : RF OUT**
6. **Pad no. 2, 3, 7, 8, 10, 11, 12 : GND**

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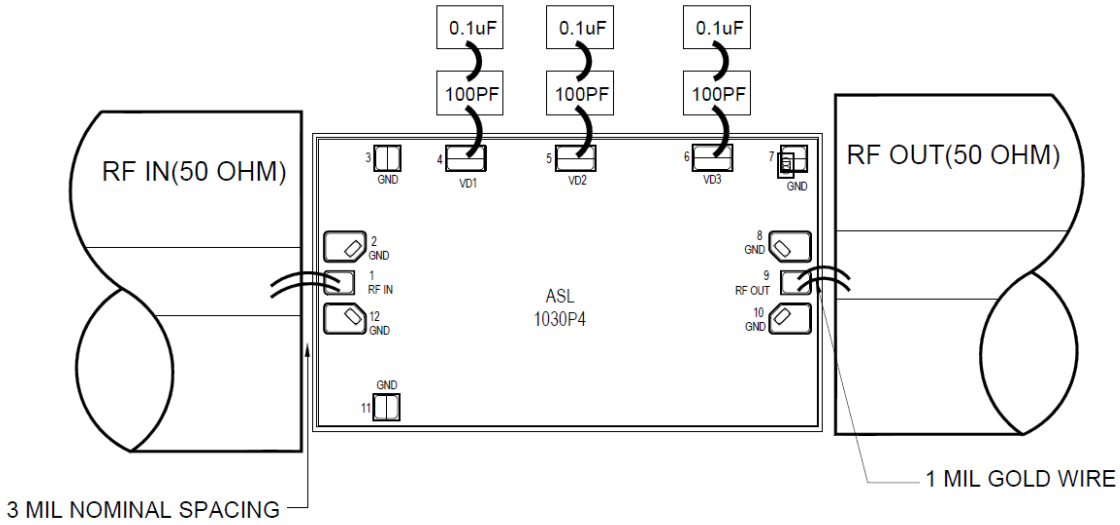
Recommended Assembly Diagram



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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