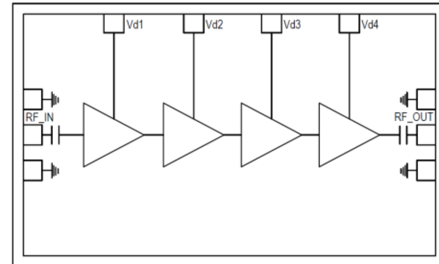
18 – 40 GHz Low Noise Amplifier

Features

- **Frequency Range : 18 - 40GHz**
- **Nominal Gain : 23dB**
- **Noise Figure : 3.5dB**
- **I/O Return Losses : 10dB**
- **Output P1dB : 6dBm**
- **Self-bias operation**
- **DC decoupled Input and Output**
- **Chip Dimension: 1.89mm x 1.98mm x 0.1mm**

Functional diagram



Typical Applications

- Radar
- Military
- Test Equipment and Sensors.

Description

The ASL1038P4-D is a Low Noise Amplifier operating in 18.0 – 40.0GHz frequency range. The LNA uses 4 stages of amplification and provides 23dB of gain with noise figure 3.5dB having input & output return losses better than 10dB. 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 55mA (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	°C
Storage Temperature	-65 to +150	°C

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

Aelius Semiconductors Pte. Ltd., Singapore
Phone: +65 68092093
Fax : +65 63360650
Email: info@aeliussemi.com
URL: www.aeliussemi.com

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

Parameter	Min.	Typ.	Max.	Units
Frequency	18		40	GHz
Gain	-	23	-	dB
Gain Flatness	-	±1.5	-	dB
Noise Figure	2.8	3.5	4.2	dB
Input Return Loss	-	8	-	dB
Output Return Loss	-	10	-	dB
Output Power (P1dB)		6		dBm
Supply Voltage		4		V
Supply Current		55		mA

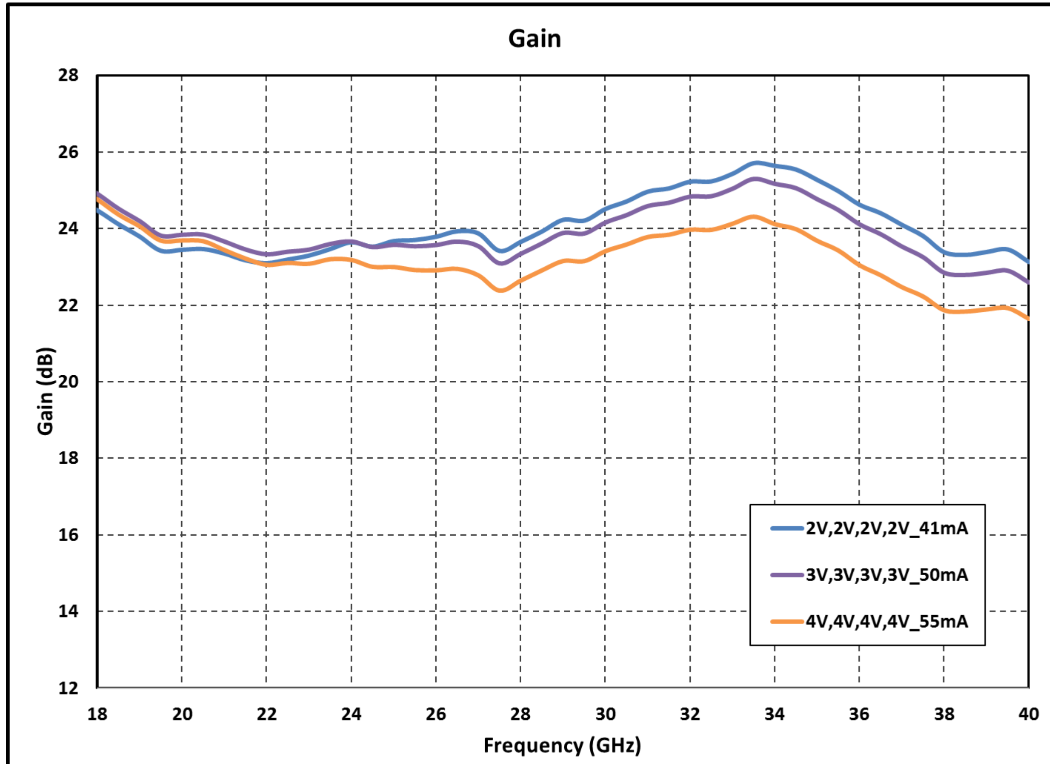
Note:

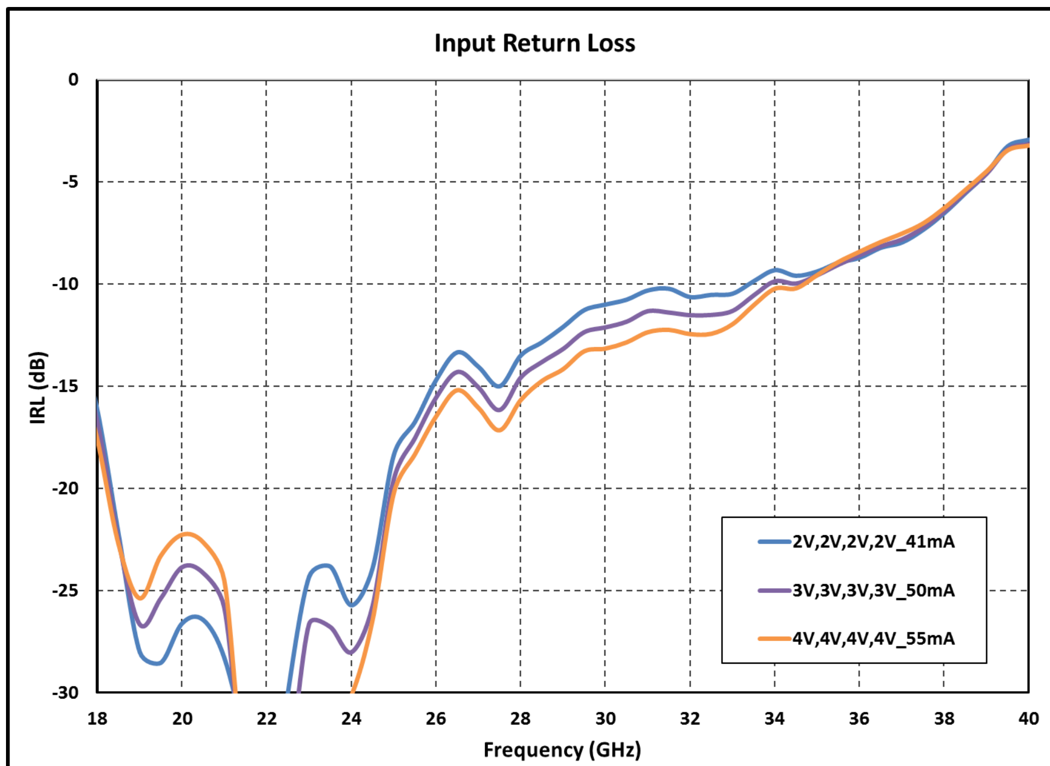
1. The above mentioned electrical specifications are measured On-Wafer.

Phone: +65 68092093
Fax : +65 63360650
Email: info@aeliussemi.com
URL: www.aeliussemi.com

On-wafer Probed data

Vd1= Vd2= Vd3= Vd4= 3V, Total Current = 50 mA, T_A = 25 °C

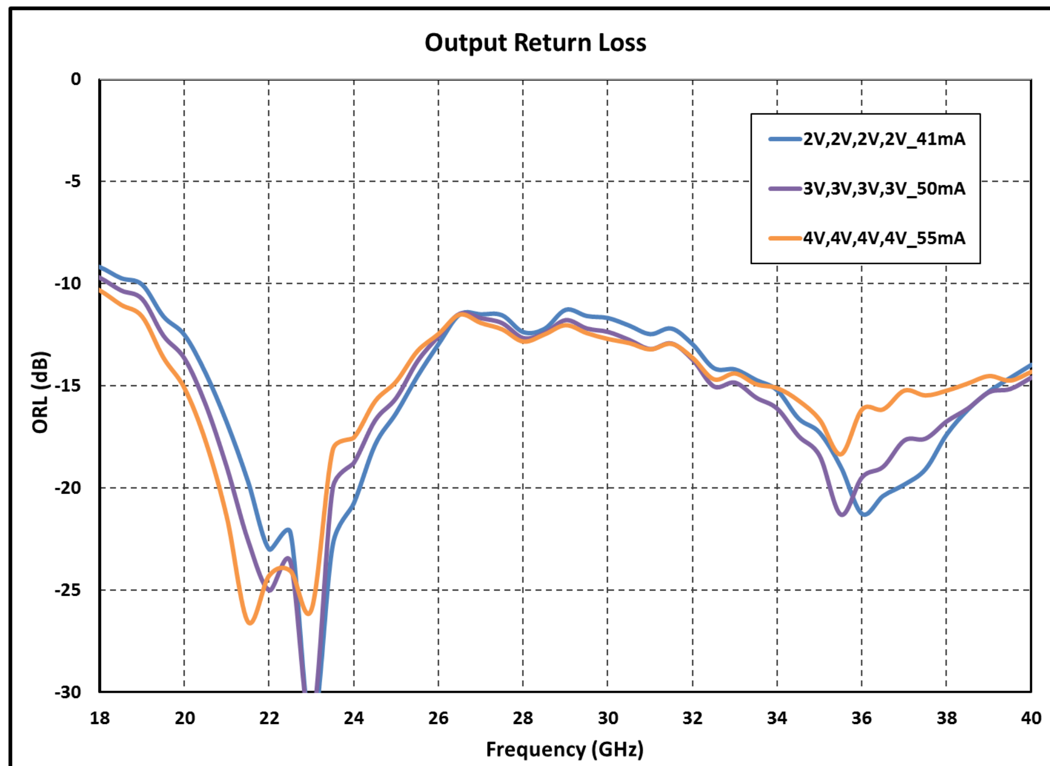


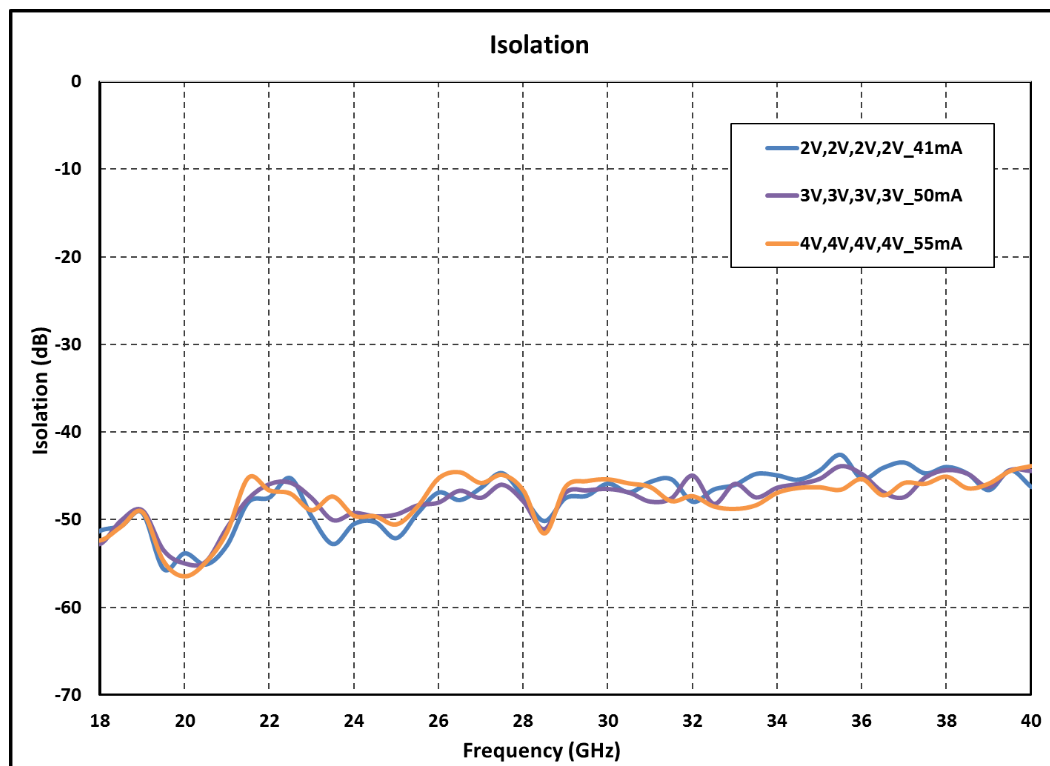


Phone: +65 68092093
Fax : +65 63360650
Email: info@aeliussemi.com
URL: www.aeliussemi.com

On-wafer Probed data

Vd1= Vd2= Vd3= Vd4= 3V, Total Current = 50 mA, $T_A = 25\,^oC$



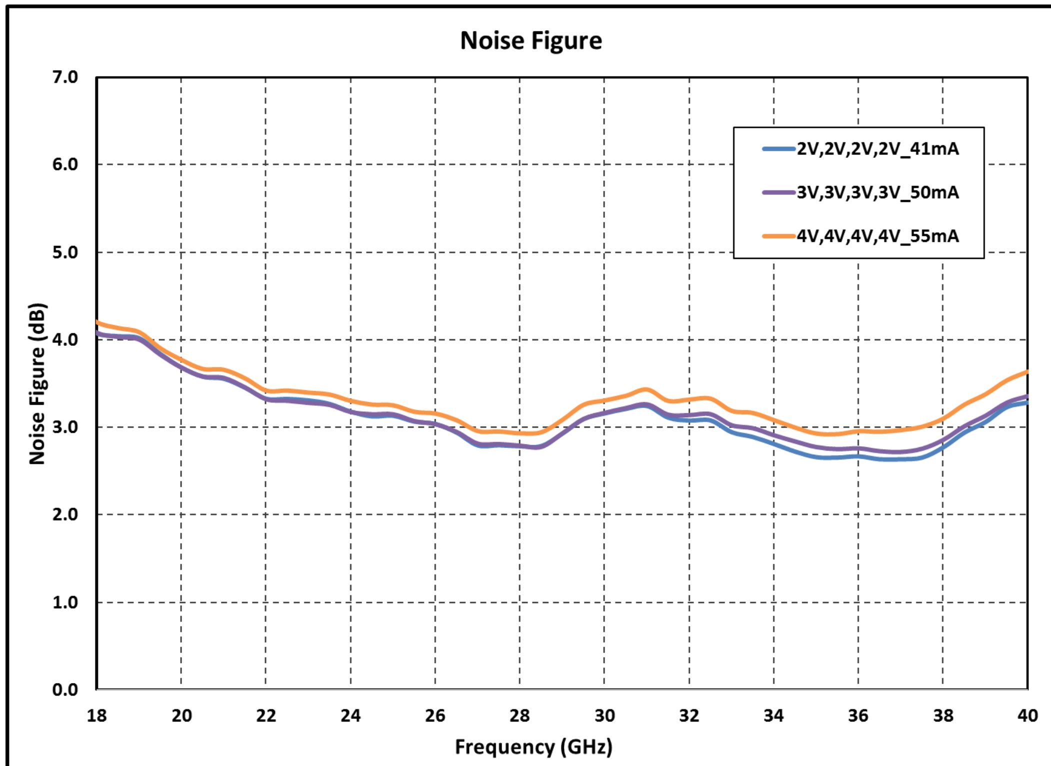


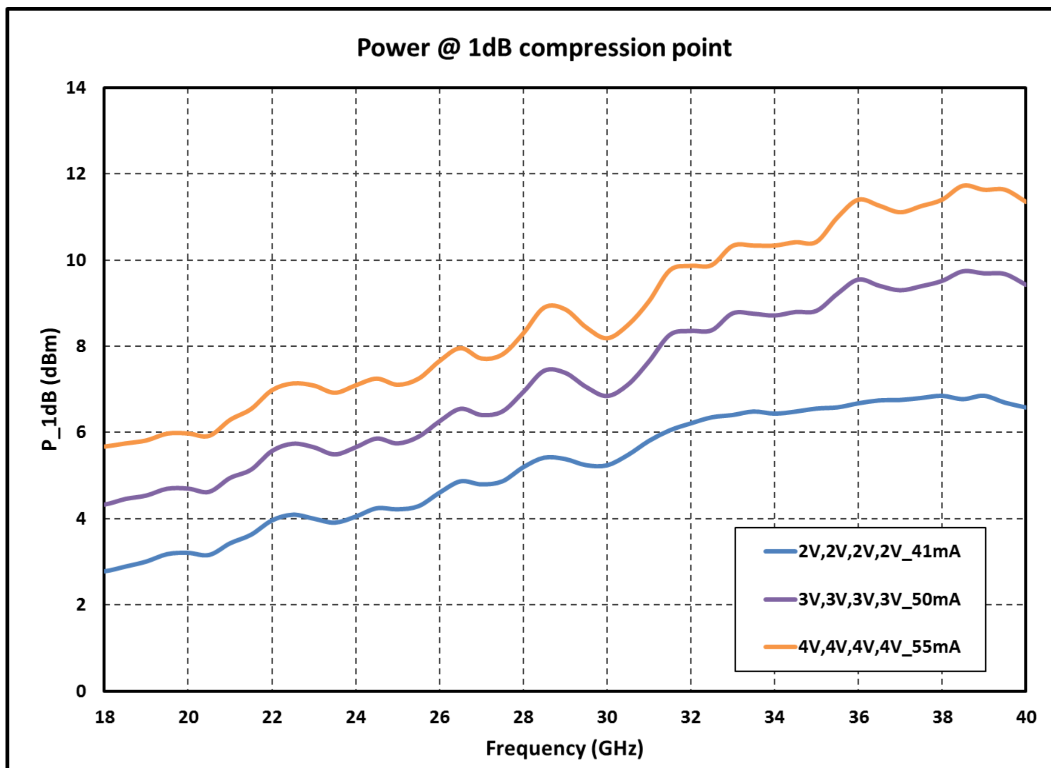
Phone: +65 68092093
Fax : +65 63360650

Email: info@aeliussemi.com
URL: www.aeliussemi.com

On-wafer Probed data

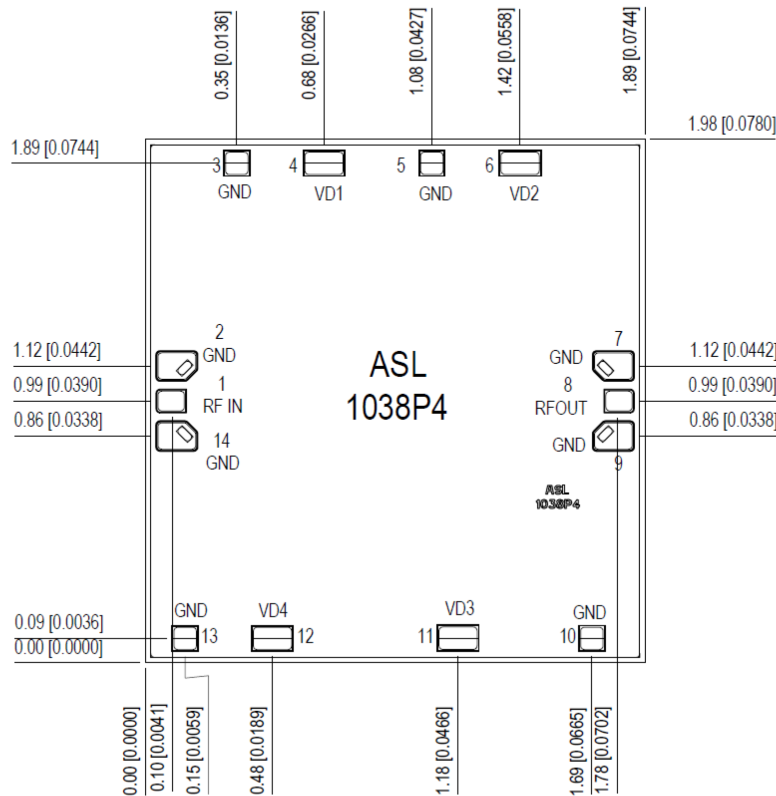
Vd1= Vd2= Vd3= Vd4= 3V, Total Current = 50 mA, T_A = 25 °C





Phone: +65 68092093
Fax : +65 63360650
Email: info@aeliussemi.com
URL: www.aeliussemi.com

Mechanical Characteristics



Units: millimeters (inches)

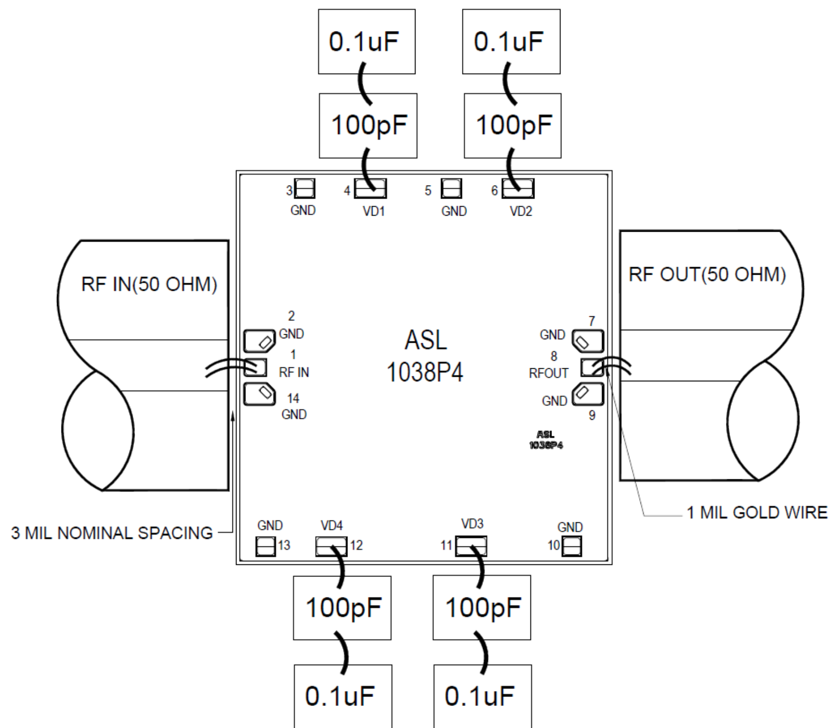
All DC bond pads are 100µm x 100µm

Note:

1. **Pad no. 1 : RF IN**
2. **Pad no. 4 : VD1**
3. **Pad no. 6 : VD2**
4. **Pad no. 8 : RF OUT**
5. **Pad no. 11 : VD3**
6. **Pad no. 12 : VD4**
7. **Pad no. 2, 3, 5, 7, 9, 10, 13, 14: GND**

Phone: +65 68092093
Fax : +65 63360650
Email: info@aeliussemi.com
URL: www.aeliussemi.com

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.

Aelius Semiconductors Pte. Ltd., Singapore

Phone: +65 68092093
Fax : +65 63360650
Email: info@aeliussemi.com
URL: www.aeliussemi.com