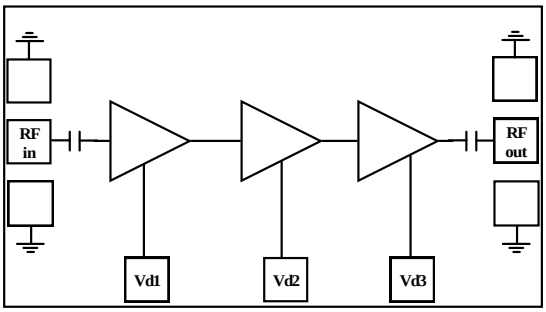
8.5-10.5 GHz Low Noise Amplifier

Features

- **Frequency Range : 8.5-10.5 GHz**
- **Low Noise Figure < 1.5 dB**
- **30 dB nominal gain**
- **14 dBm P_{1dB}**
- **High IP3**
- **Input Return Loss > 10 dB**
- **Output Return Loss > 10 dB**
- **Single supply operation**
- **No external matching required**
- **DC decoupled input and output**
- **0.15 µm InGaAs pHEMT Technology**
- **Chip dimension: 3.3 x 2.9 x 0.1 mm**

Functional Diagram



Typical Applications

- **RADAR**
- **Military**
- **Test Equipment and sensors**
- **Point-to-Point Radios, Point-to-Multi-Point Radios & VSATS**

Description

The ASL1016 is a three stage ultra low noise amplifier that operates from 8.5-10.5 GHz. The LNA features 30 dB gain and has a typical mid-band noise figure of 1.3 dB. The LNA has nominal input/output return losses of 10 dB. The nominal P1dB is 14 dBm. The LNA operates on a single positive supply. The die is fabricated using a reliable 0.15µm InGaAs pHEMT technology. The Circuit grounds on the die are provided through vias to backside metallization.

The Aelius ASL1016 performs well as a low noise amplifier in receive applications and as a driver or buffer amplifier where high gain, excellent linearity and low power consumption are important.

Absolute Maximum Ratings(1)

Parameter	Absolute Maximum	Units
Drain Voltage	+6	V
Input RF Power	+10	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

Electrical Specifications @ T_A = 25 °C, V_{d1} = 2V, V_{d2} = V_{d3}= 4V Z_o =50 Ω

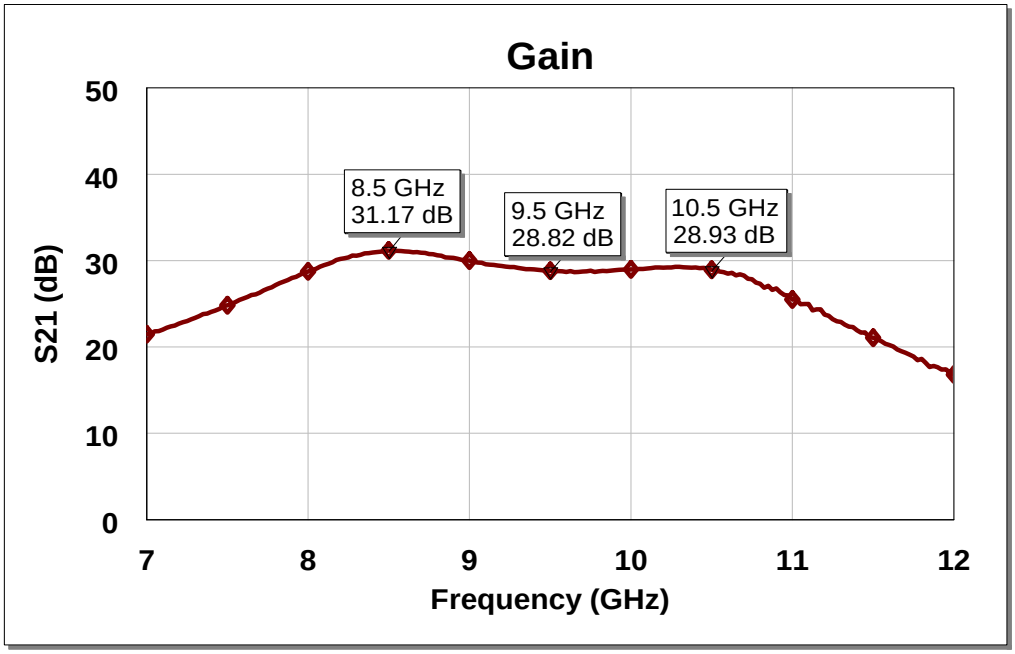
Parameter	Typ	Units
Frequency Range	8.5 -10.5	GHz
Gain	30	dB
Gain Flatness	±1.2	dB
Noise Figure	1.5	dB
Input Return Loss	10	dB
Output Return Loss	10	dB
Output Power (P1dB)	+14	dBm
Saturated Output Power (Psat)	+17	dBm
Output Third Order Intercept (IP3)	27	dBm
Supply Current (Id) (Vd1 = 2V, Vd2= Vd3 = 4V)	75	mA

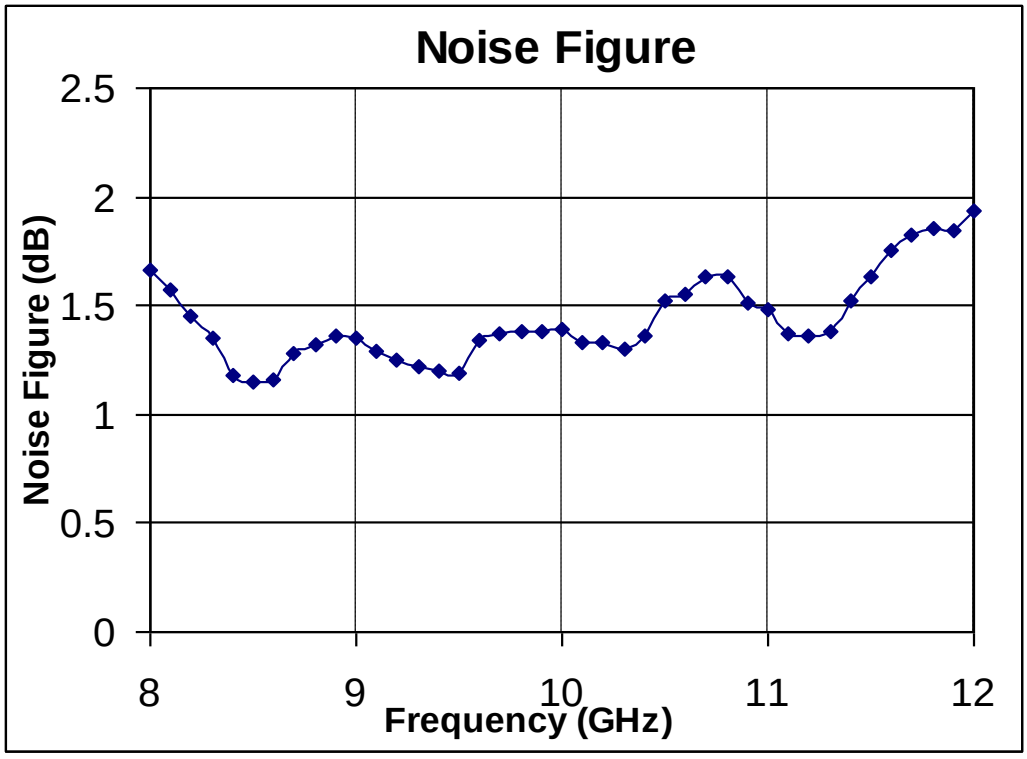
Note:

1. Electrical specifications as measured in a test fixture.

Test fixture data

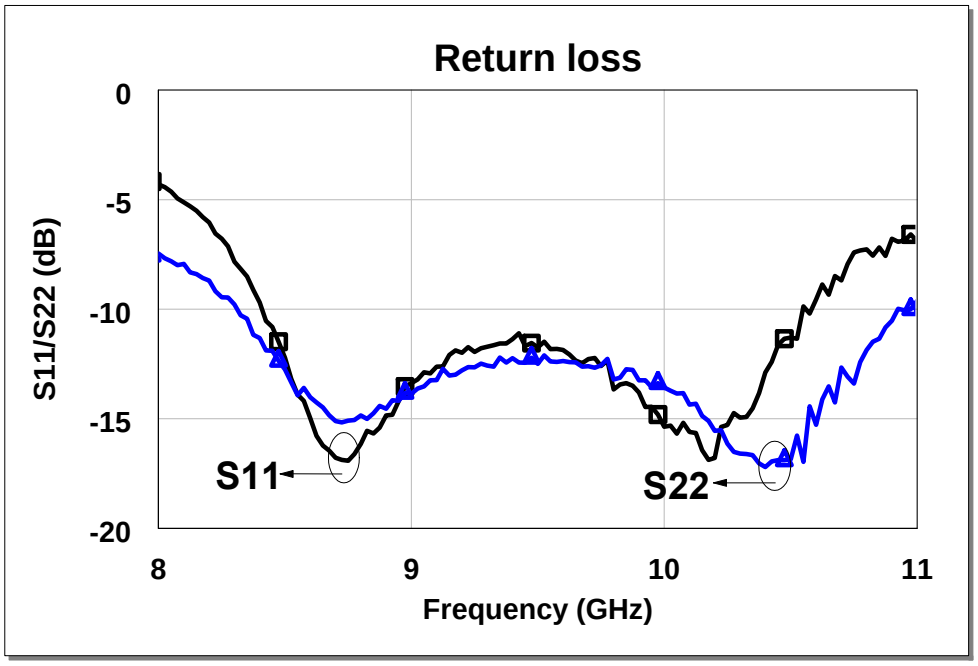
Vd1=2V, Vd2=Vd3=4V, Total Current =75ma, T_A = 25 °C

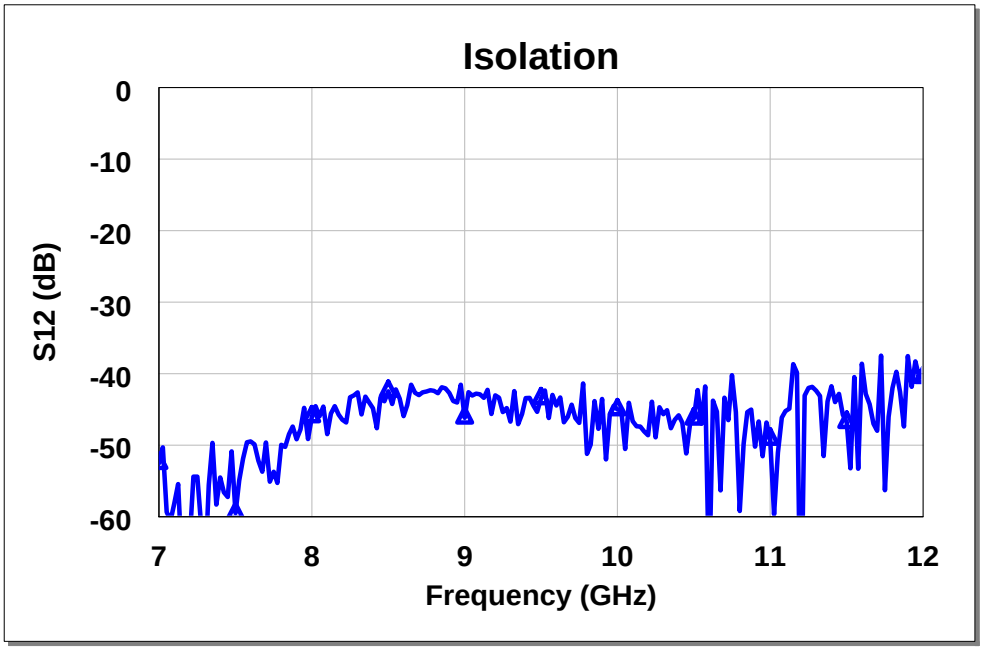




Test fixture data

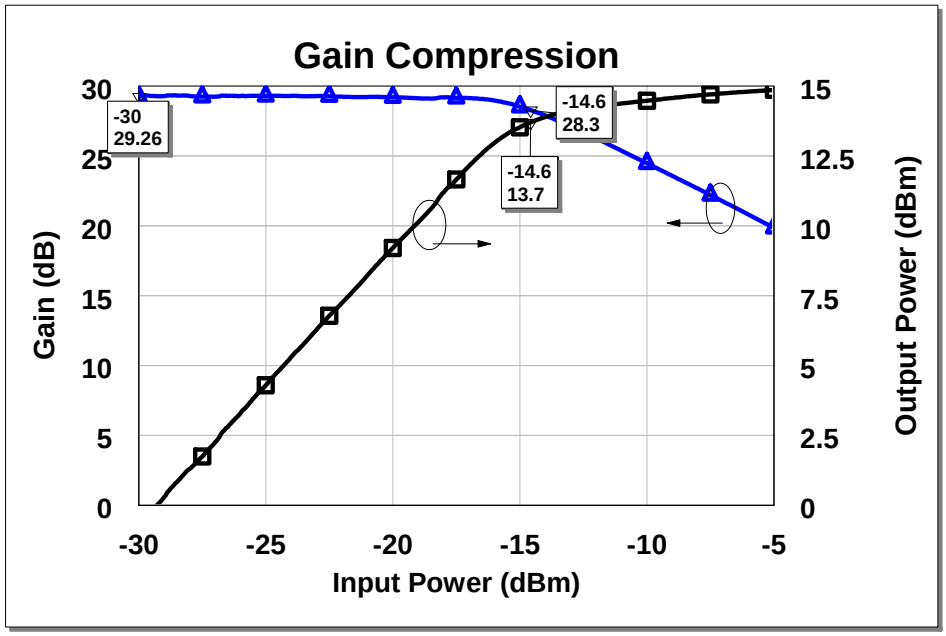
Vd1=2V, Vd2 = Vd3 = 4V, Total Current =75ma, T_A = 25 °C



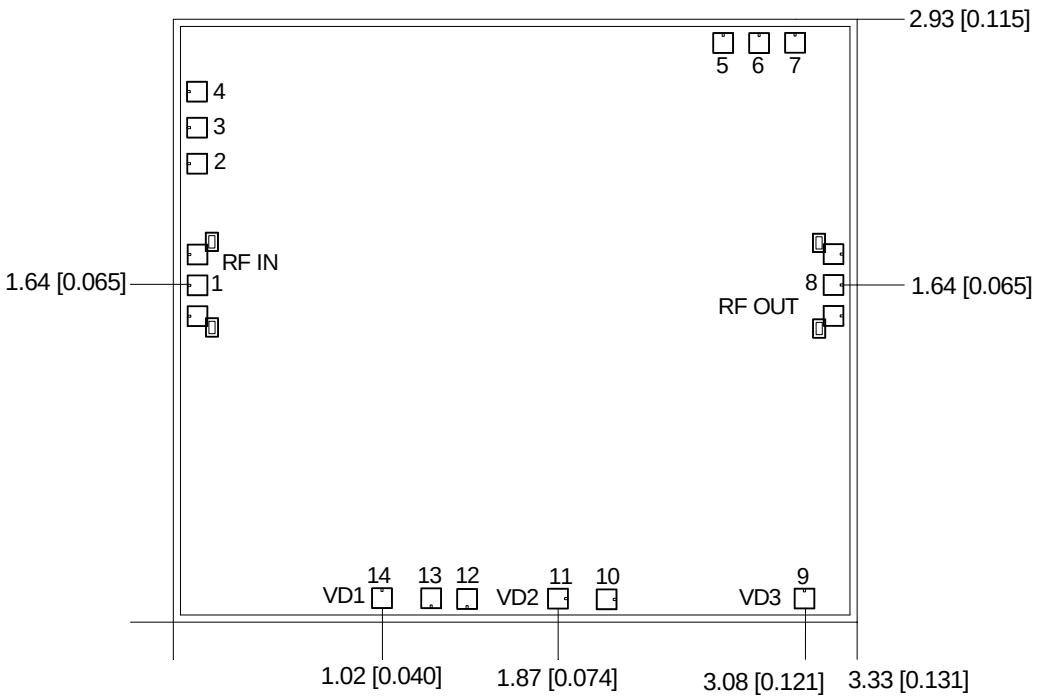


Test fixture data

Vd1=2V, Vd2 = Vd3 = 4V, Total Current =75ma, T_A = 25 °C



Mechanical Characteristics



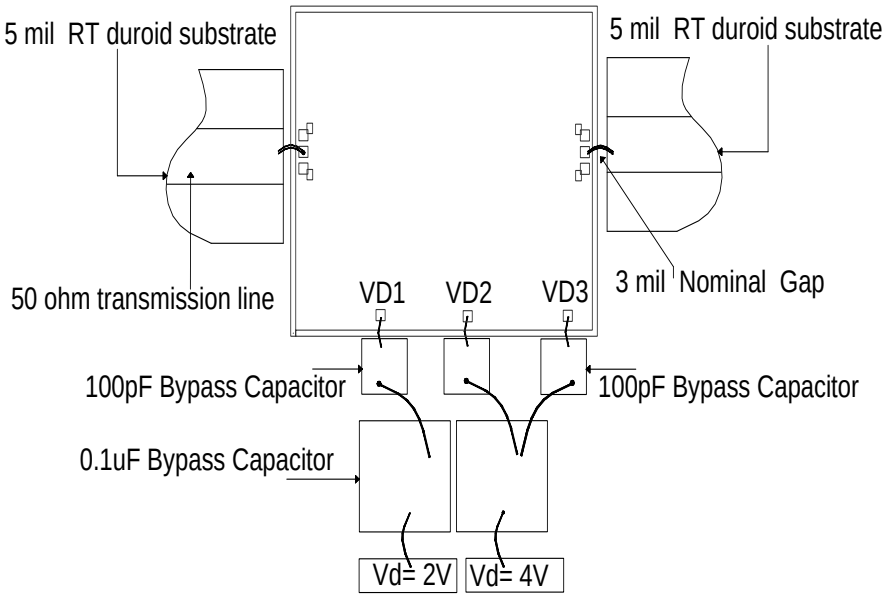
Units: Millimeters [Inches]

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

Note:

1. **Pad no. 14: Vd1**
2. **Pad no. 11: Vd2**
3. **Pad no. 9 : Vd3**
5. **Pad no. 1 : RF Input**
6. **Pad no. 8 : RF Output**

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 capacitor.
3. Input and output 50 ohm lines are on 5 mil substrate.
4. 0.1 µF capacitors may be additionally used as a second level of bypass 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