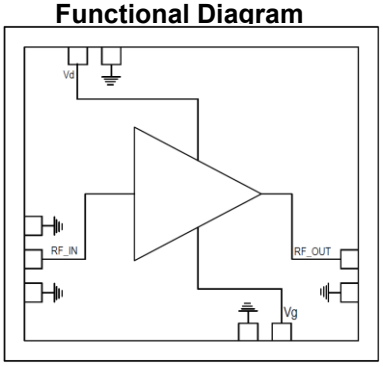
4 - 20GHz GaN Low Noise Amplifier

Features

- **Frequency Range: 4-20 GHz**
- **Gain: 14.5dB (Typ.)**
- **Noise Figure: <6dB (4 – 20 GHz)**
  <5dB (6 – 18 GHz)
- **Output P1dB: 15dBm**
- **Input Return Loss: 10dB**
- **Output Return Loss: 10dB**
- **Die Size:2.1mm×2.2mm×0.1mm**

Functional Diagram



Typical Applications

- Radar
- Military & Space
- Instrumentation

Description

The ASL1048 is a wide band Low noise amplifier which covering frequency from 4 to 20 GHz. It features 15dB Gain with input and output return losses of 10dB. This Amplifier features wider band width with flat gain. The on chip circuit grounds are provided through Vias to the back side metallization.

Absolute Maximum Ratings[1]

Parameter	Absolute Maximum	Units
Drain supply voltage	+32	volts
Drain current (I_{dq})	0.3	A
RF input power at V_d=20V	5	dBm
Operating temperature	-50 to +85	^oC
Storage Temperature	-65 to +150	^oC

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

Electrical Specifications @ T_A = 25°C, Z_o = 50Ω,

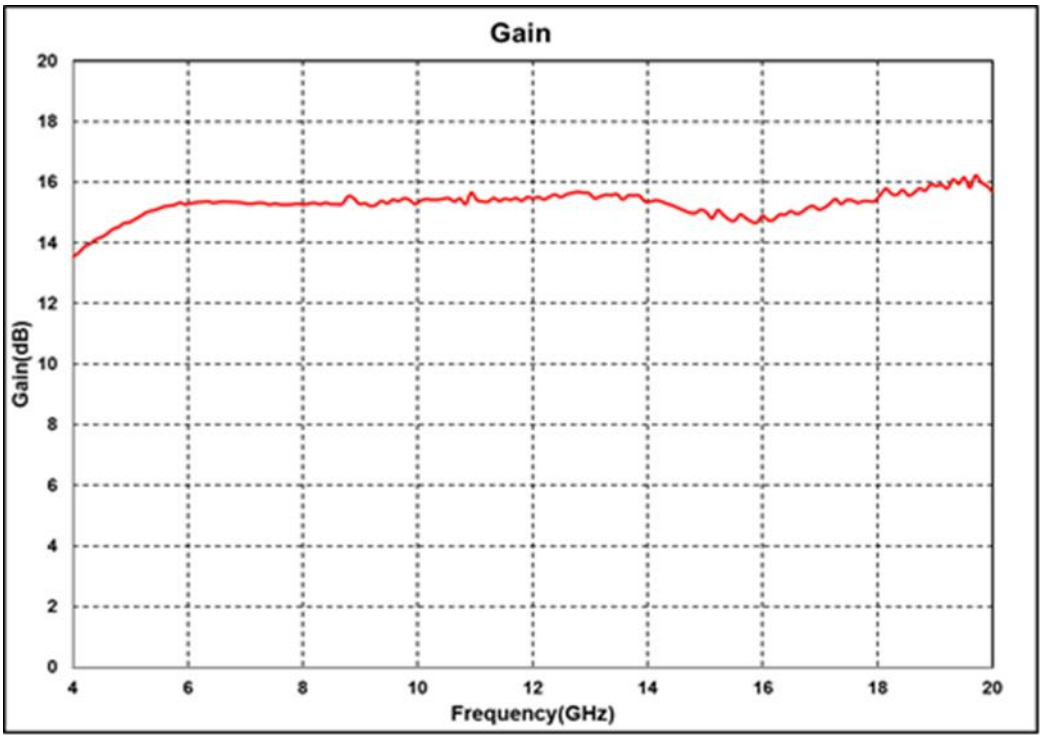
Parameter	Typical Values	Units
Frequency Range	4 - 20	GHz
Gain (6- 20 GHz)	15	dB
Gain Flatness	±0.5	dB
Input Return Loss	min 8	dB
Output Return Loss	min10	dB
P1dB	15	dBm
Voltage	20	V
Current	120	mA

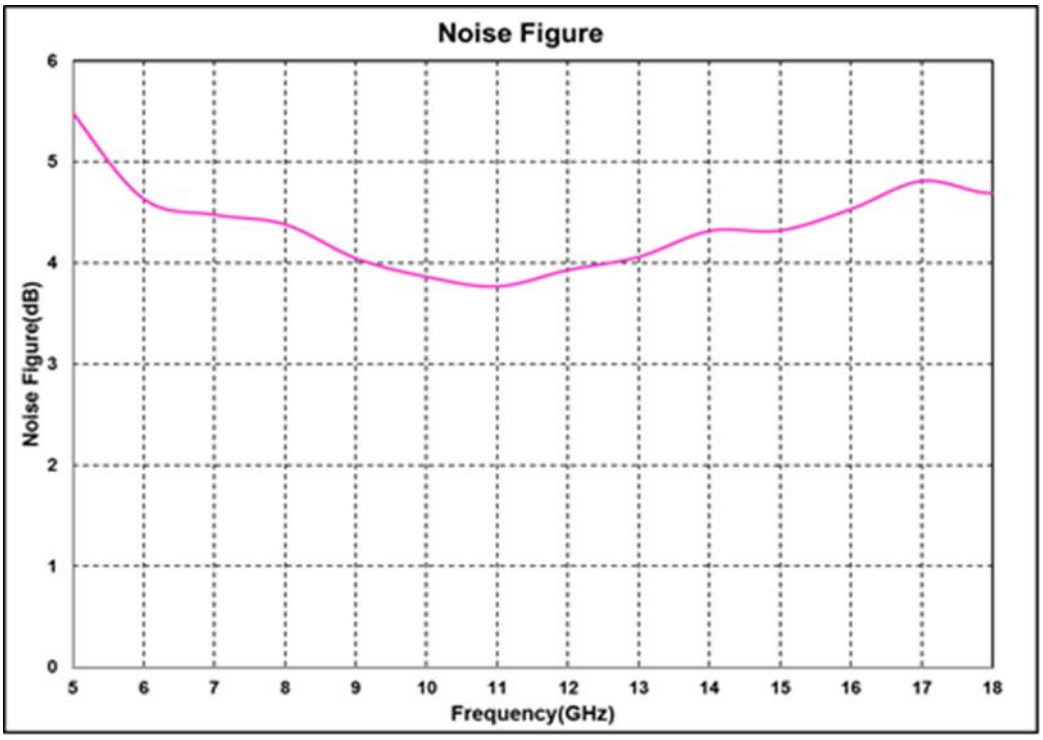
Note:

Vg1 & Vg2 are shorted and adjust Vg between -4V to 0V to achieve Id=120mA (Typical)

Test Fixture Data

T_A = 25 °C, Z_o=50 Ω





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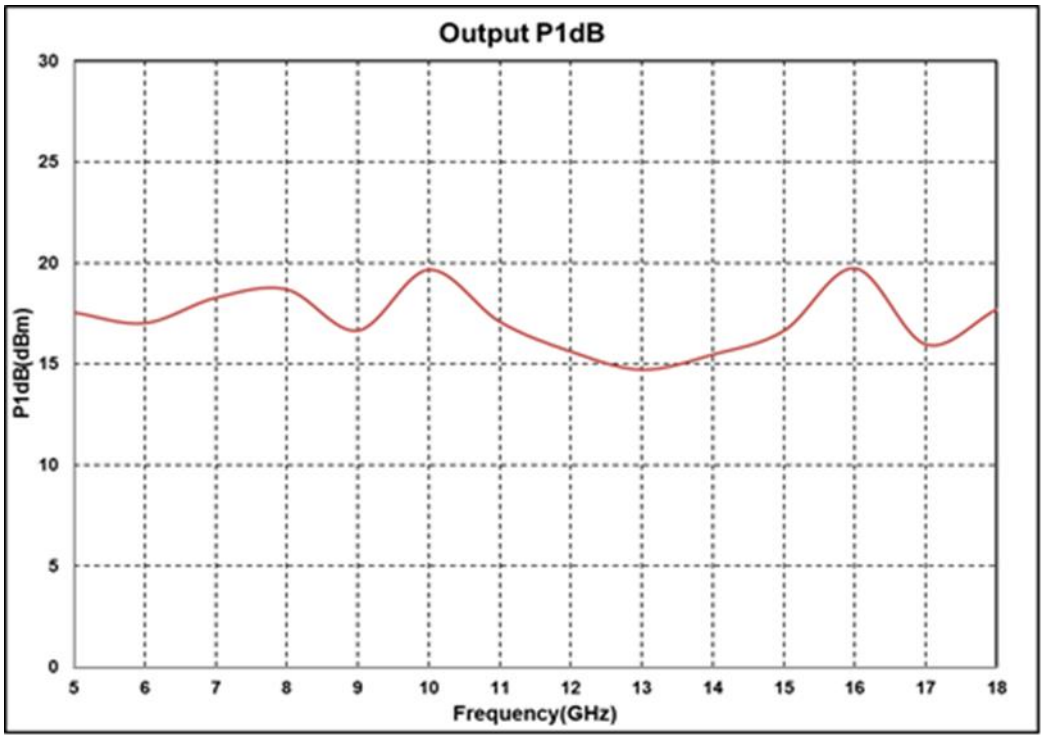

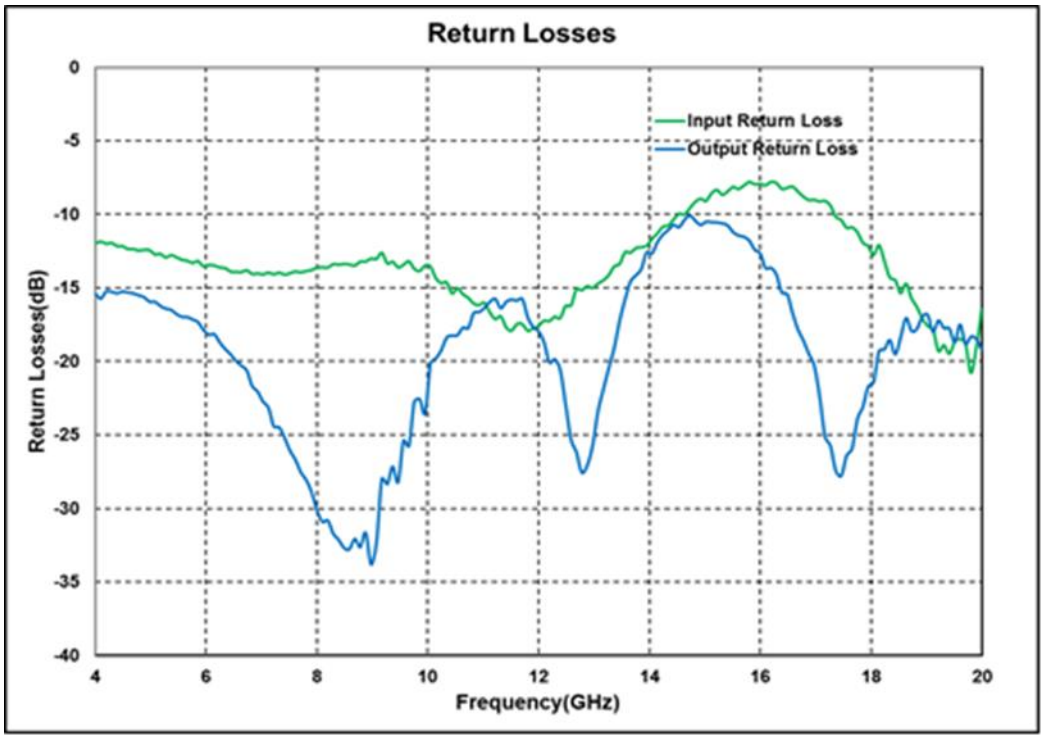

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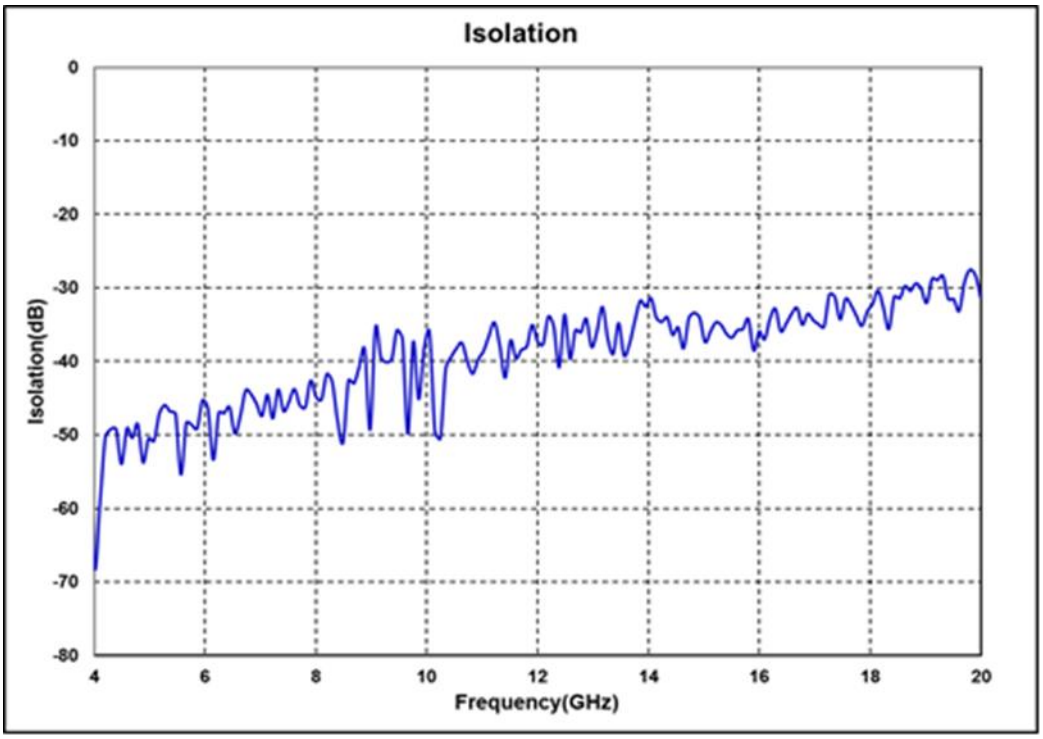
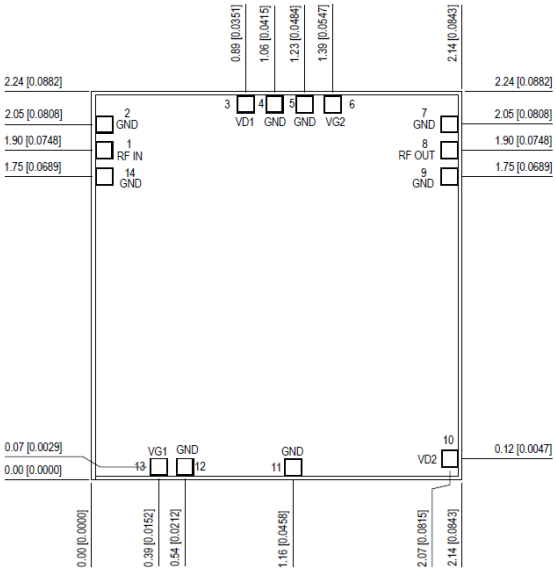


RF and DC Pad Details

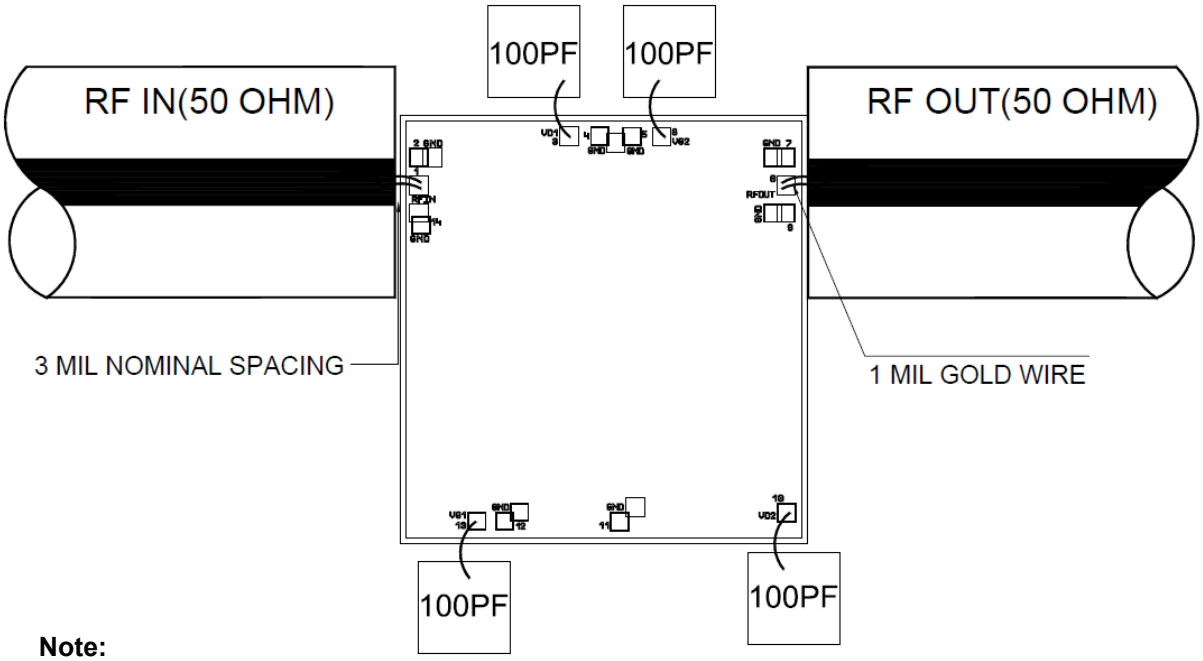


Units : millimeters (inches)

Note :

1. All RF and DC bond pads are 100µm x 100µm
2. Pad no.1 : RF IN
3. Pad no.3 : VD1
4. Pad no.6 : VG2
5. Pad no.8 : RF OUT
6. Pad no.10 : VD2
7. Pad no.13 :VG1
8. Pad no's.2,4,5,7,9,11,12: GND

Recommended Assembly Diagram



Note:

1. Two 1 mil (0.0254mm) bond wires of minimum length should be used for RF input, RF output.
2. Input and output 50 ohm lines are preferably on 5mil or 10mil RT Duroid substrate.
3. The RF input & output ports are DC decoupled on-chip.
4. Coefficient of thermal expansion matching is recommended for reliability purpose.
5. Use high thermal conductive material for die mounting for long term reliability.
6. Maintain base plate temperature less than 70^0C under RF operation for optimum performance.

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 flux less 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.

GaN MMIC devices are susceptible to Electrostatic discharge. Proper precautions should be observed during handling, assembly & testing