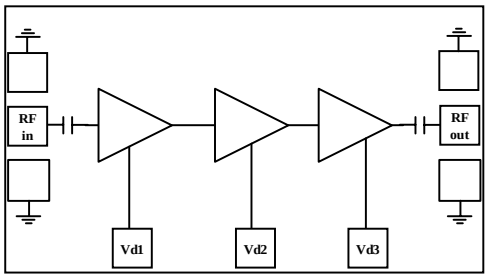
8 - 18 GHz Wideband Low Noise Amplifier

Features

- **Frequency Range : 8.0 – 18.0GHz**
- **23dB Nominal gain**
- **Low Midband Noise Figure < 2 dB**
- **Input Return Loss > 12 dB**
- **Output Return Loss > 12 dB**
- **Single +3V Operation**
- **DC decoupled input and output**
- **0.15 µm InGaAs pHEMT Technology**
- **Chip dimension: 3.0 x 2.1 x 0.1 mm**

Functional Diagram



Typical Applications

- **Radar**
- **Military**
- **Test equipment and sensors**

Description

The AMT2152021 is a Low Noise Amplifier operating in 8.0 – 18.0 GHz frequency range. The LNA uses 3 stages of amplification and provides 23 dB of gain with an impressive mid-band noise figure of less than 2 dB. The amplifier is very well matched to 50Ω over the entire operating bandwidth typical input and output return losses better than 12 dB. The LNA has a minimum P1 dB of 10 dBm. The amplifier operates on a single +3V DC supply and requires no external components for reliable operation. The Circuits grounds on the die are provided through vias to the backside metallization. The die is fabricated using a reliable 0.15µm pHEMT technology.

Absolute Maximum Ratings(1)

Parameter	Absolute Maximum	Units
Positive DC voltage	+7	V
RF input power	+16	dBm
Supply Current	150	mA
Storage Temperature	-55 to +150	^{o}C
Operating Temperature	-40 to +85	^{o}C

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

Electrical Specifications @ T_A = 25 °C, Zo =50Ω; Vd1 = Vd2 = Vd3 = 3V

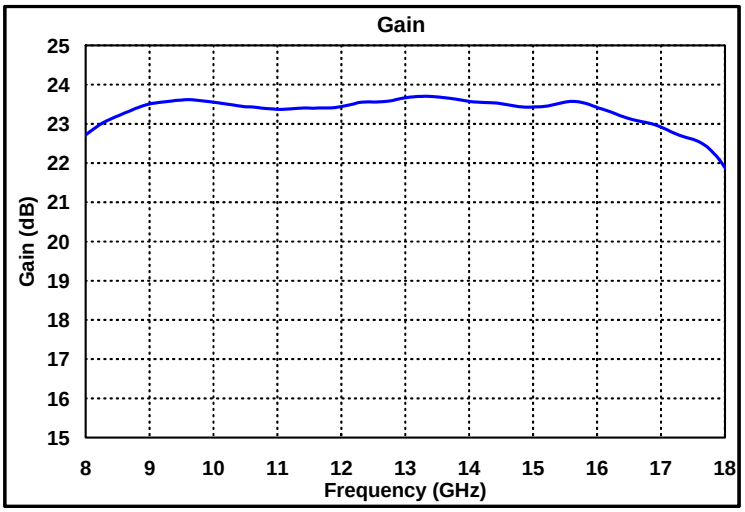
Parameter	Min.	Typ.	Max.	Units
Frequency Range	8.0	–	18.0	GHz
Gain (1)	21	23	25	dB
Gain Flatness(1)	-	± 0.8	-	dB
Noise Figure (mid-band)	-	2	2.5	dB
Input Return Loss(1)	10	12	-	dB
Output Return Loss (1)	10	12	-	dB
Output Power @ 1 dB compression (3)	7	9	-	dBm
Third Order Intercept Point	-	19	-	dBm
Supply Current	60	75	90	mA

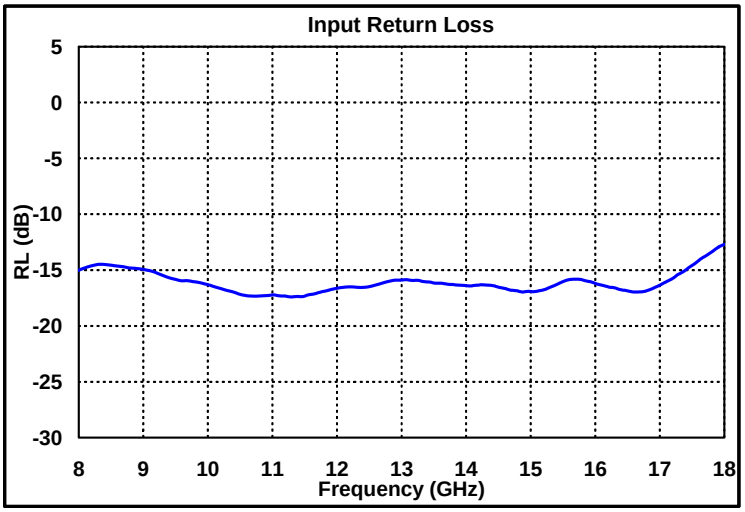
Note:

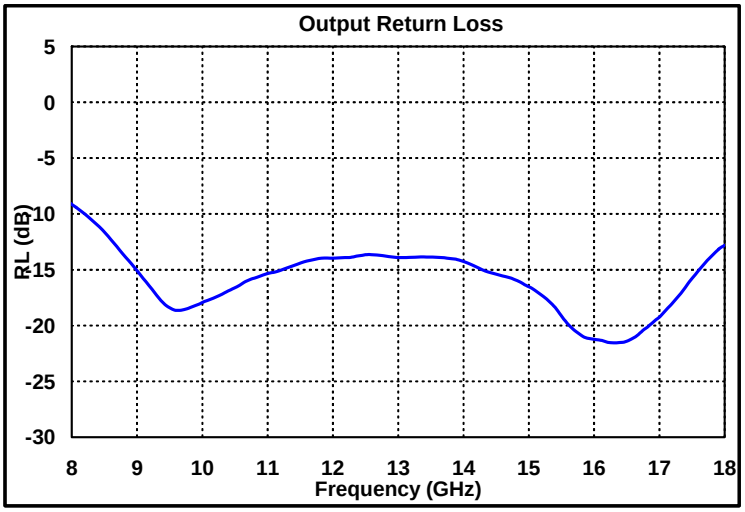
1. Measured on-wafer.
2. Test Fixture measurements
3. Measurement at 8GHz

On-Wafer data

Vd1 = Vd2 = Vd3 = 3V, Current =75 mA, T_A = 25 °C

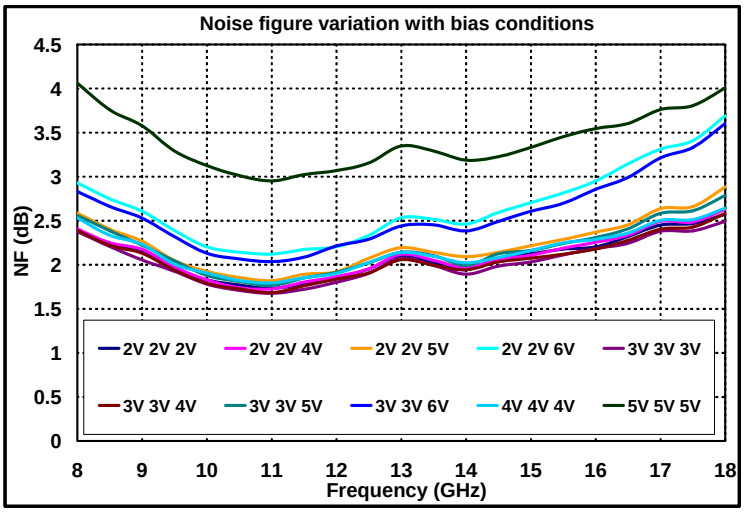


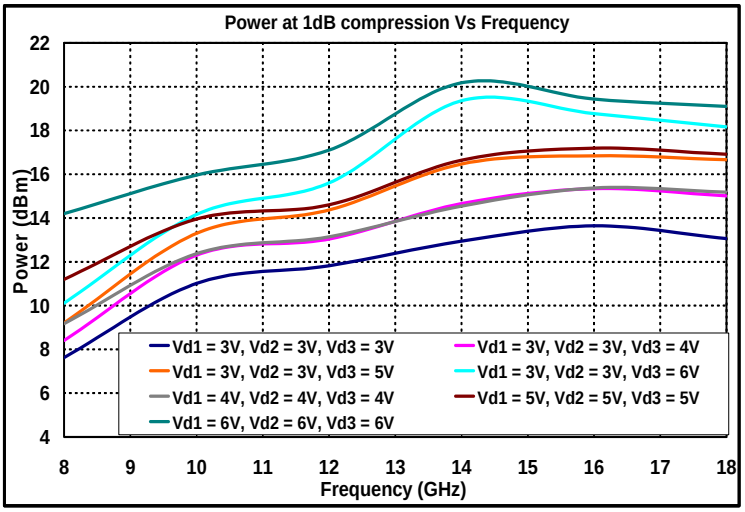




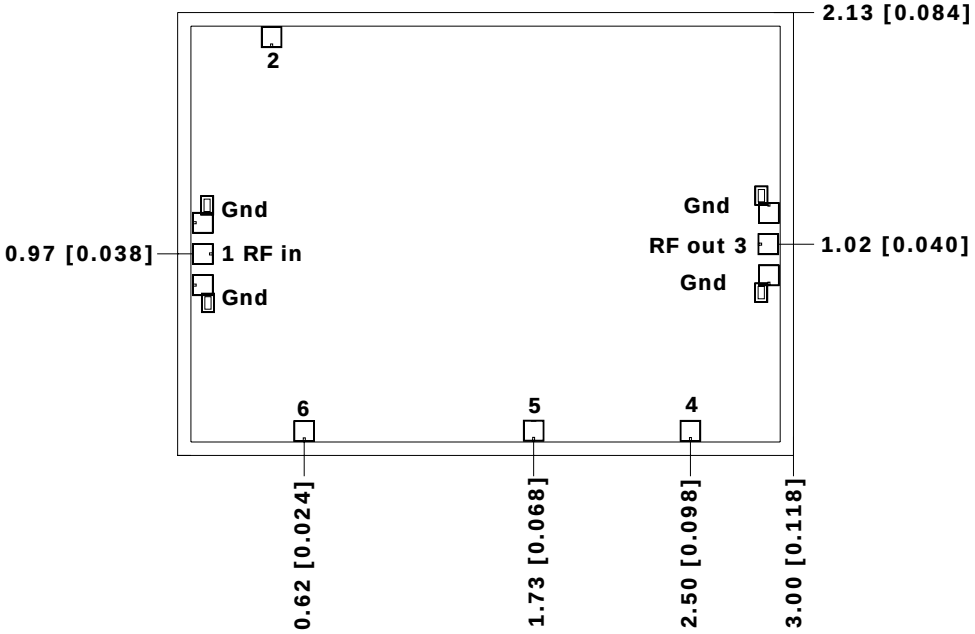
Test Fixture data

T_A = 25 °C





Mechanical Characteristics

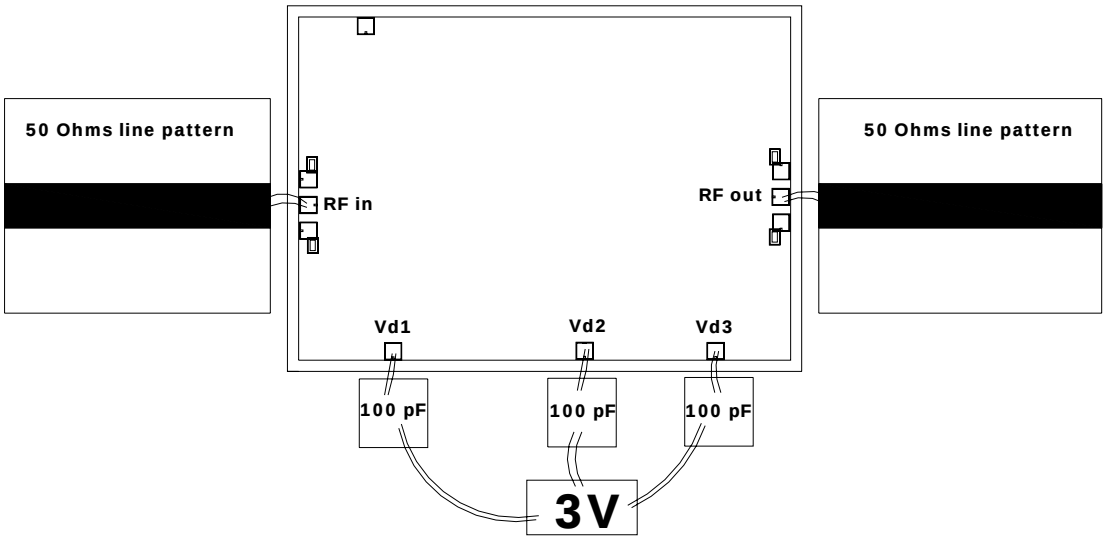


Units: millimeters (inches)

Note:

1. All RF and DC bond pads are 100µm x 100µm
2. Pad no. 1 : RF In
3. Pad no. 2 : NC
4. Pad no. 3 : RF Out
5. Pad no. 4 : Vd3
6. Pad no. 5 : Vd2
7. Pad no. 6 : Vd1

Recommended Assembly Diagram



Note:

1. Two 1 mil (0.0254mm) bond wires of minimum length should be used for RF input and output.
2. 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