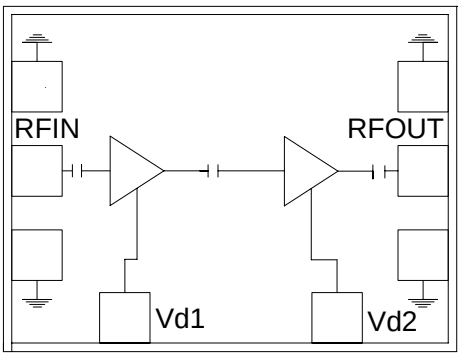
2.7 - 3.7 GHz Low Noise Amplifier

Features

- **Frequency Range : 2.7 – 3.7GHz**
- **Low Noise Figure < 1.4 dB**
- **26 dB High gain**
- **18 dBm Medium Power output**
- **High IP3**
- **Input Return Loss > 5 dB**
- **Output Return Loss > 15 dB**
- **Single supply operation**
- **No external matching required**
- **DC decoupled input and output**
- **0.15 µm InGaAs pHEMT Technology**
- **Chip dimension: 2.7 x 2.1 x 0.1 mm**

Functional Diagram



Typical Applications

- **RADAR**
- **Military & space**
- **VSAT**

Description

The AMT2122051 is S-band Low noise amplifier with a medium power output. The LNA uses 2 stages of amplification and operates in 2.7 – 3.7 GHz frequency range. The LNA features 26 dB of gain with a low noise figure of 1.4 dB and typical input and output return losses of 5 dB and 15 dB respectively. The LNA is unique in delivering a medium power output of 18 dBm. This feature enables it to be used in high gain applications with enhanced linearity requirements. The chip operates from a single positive supply voltage. The die is fabricated using a reliable 0.15µm InGaAs pHEMT technology. The Circuit grounds are provided through vias to the backside metallization.

Absolute Maximum Ratings(1)

Parameter	Absolute Maximum	Units
Drain bias voltage (Vd)	+6	volts
RF input power (RFin at Vd=4V)	18	dBm
Operating temperature	-50 to +85	^{o}C
Storage Temperature	-65 to +150	^{o}C

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

Electrical Specifications[1] @ T_A = 25 °C, V_{d1} = V_{d2} = 4V Z_o =50 Ω

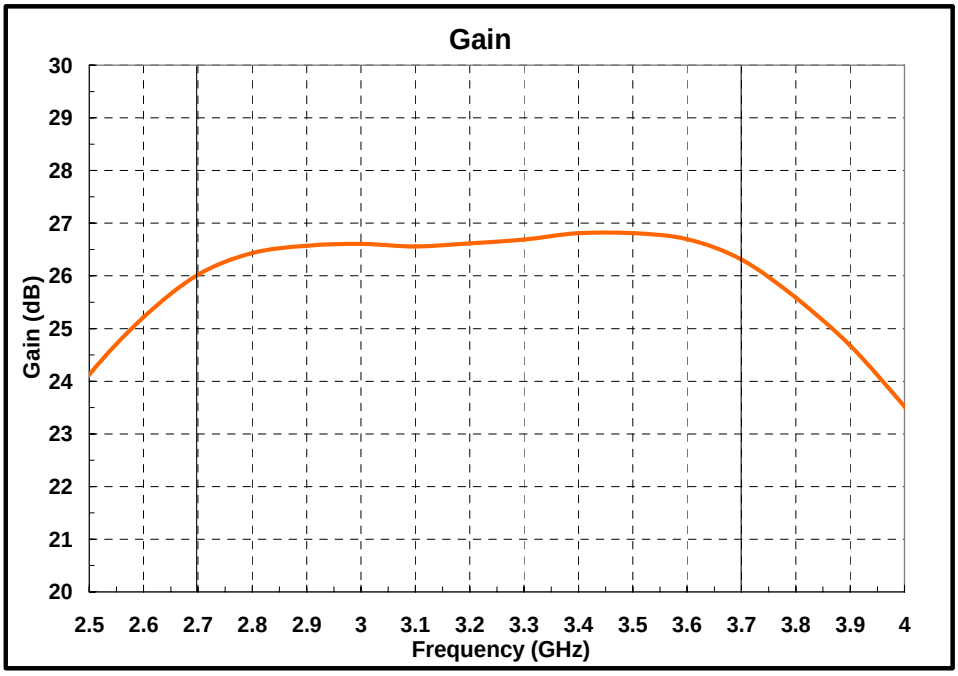
Parameter	Typ.			Units
Frequency Range	2.7 – 3.1	3.1 – 3.5	2.7 - 3.7	GHz
Gain	26	26.5	26.5	dB
Gain Flatness	+0.5	± 0.2	± 0.5	dB
Noise Figure	1.4	1.4	1.6	dB
Input Return Loss	5	11	5	dB
Output Return Loss	15	15	12	dB
Output Power (P1 dB)	18	19	18	dBm
Saturated output power (Psat)	-	21	-	dBm
Output Third Order Intercept (IP3)	-	30	-	dBm
Supply Current	-	110	-	mA

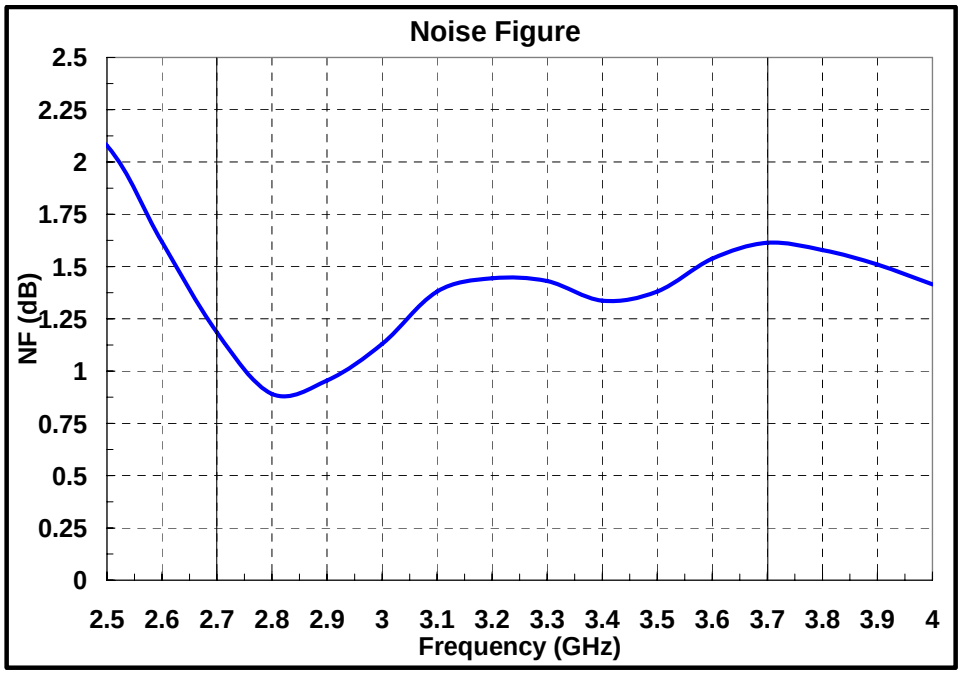
Note:

1. Electrical specifications are measured in a test fixture.

Test fixture data

Vd1=Vd2 = 4V, Total Current =110ma, T_A = 25 °C





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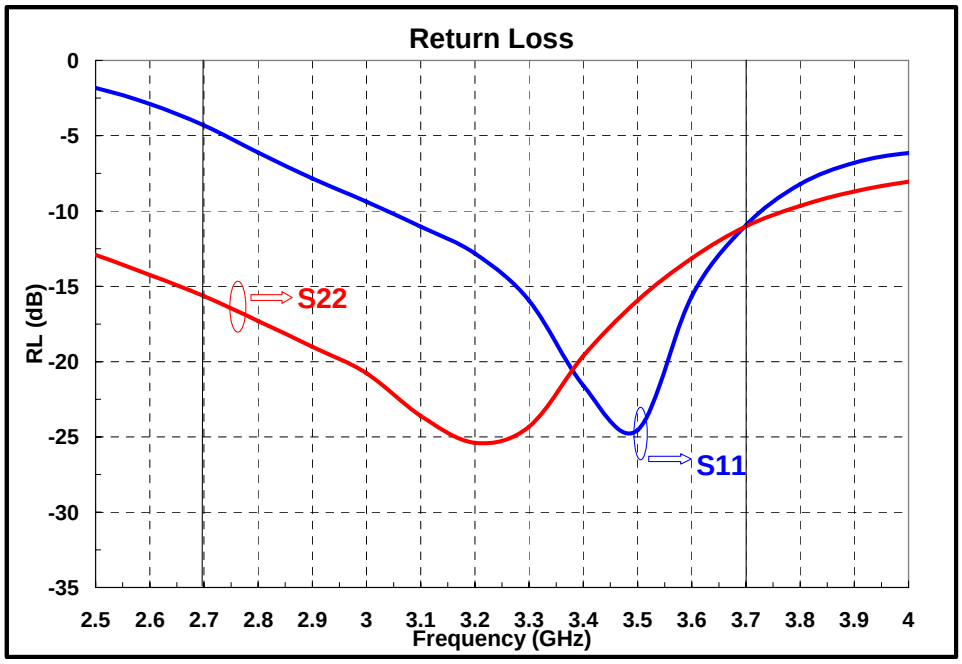

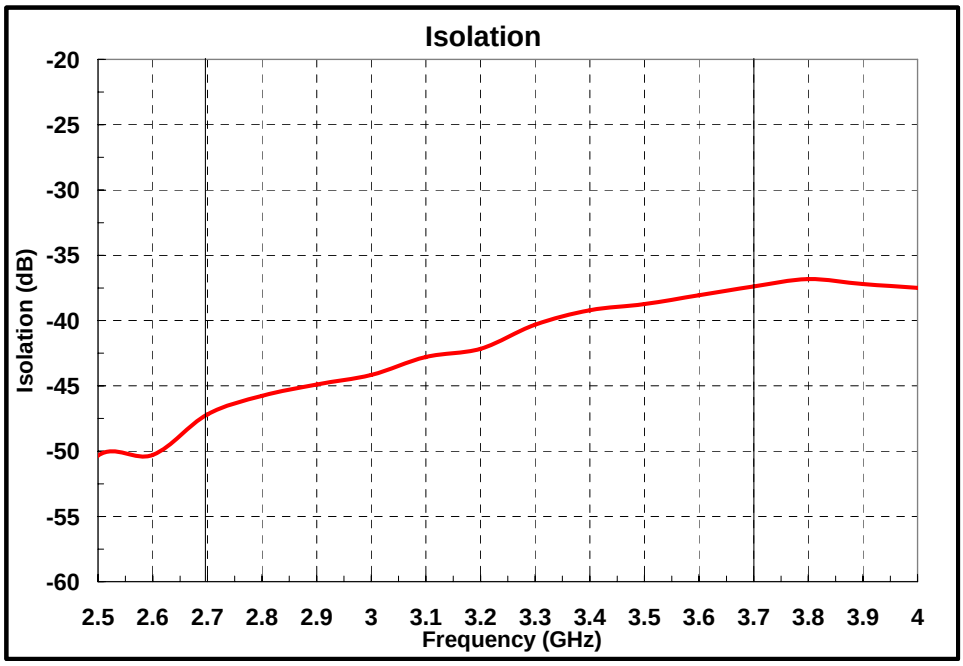

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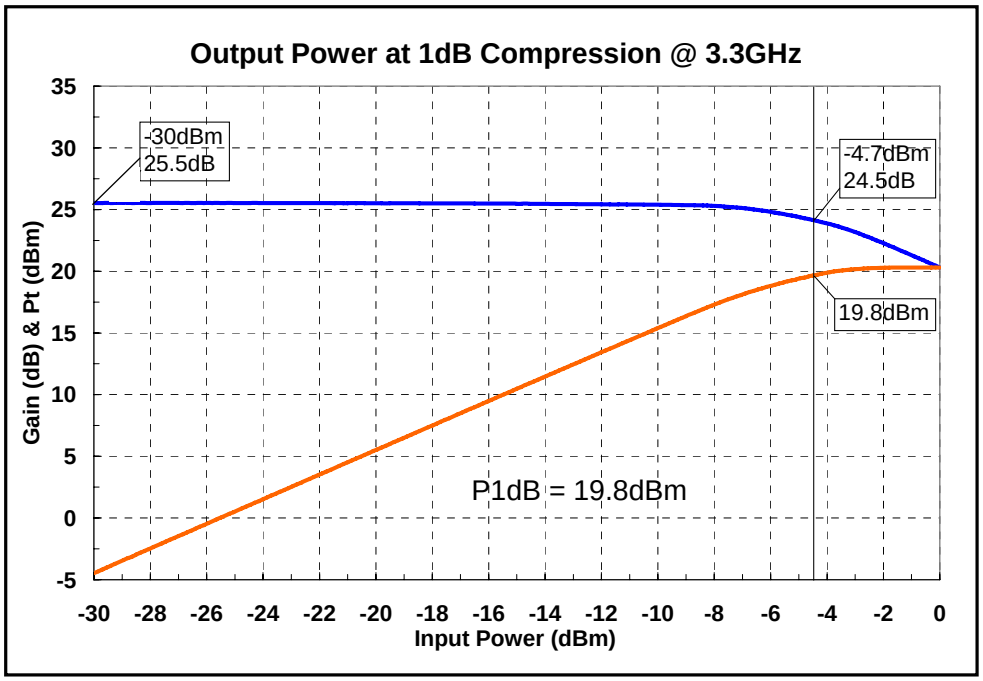
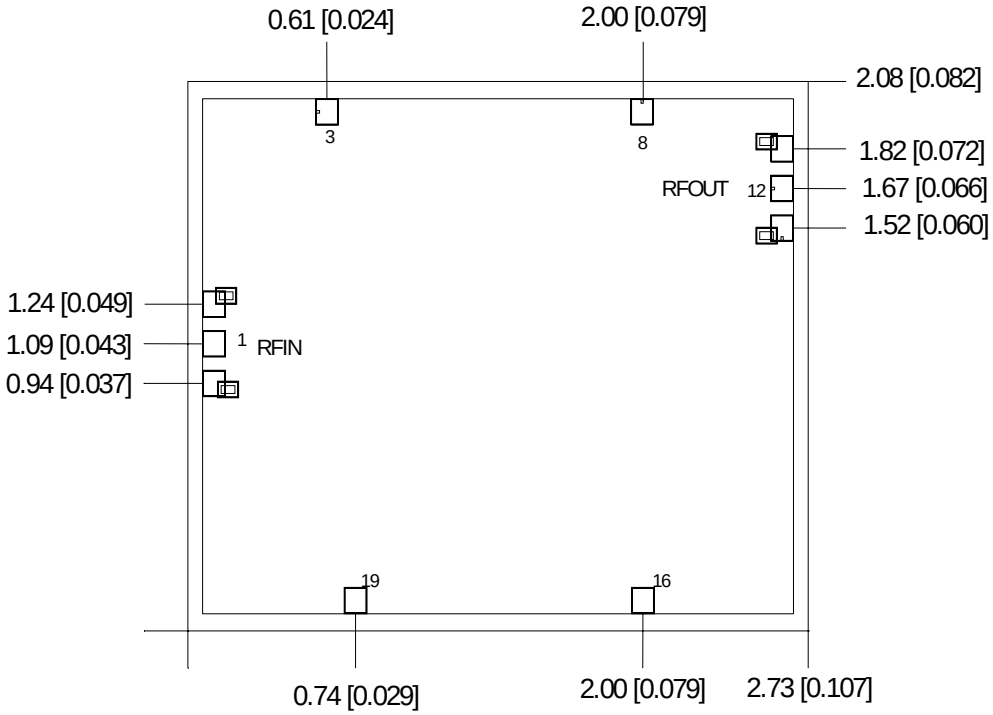


Mechanical Characteristics



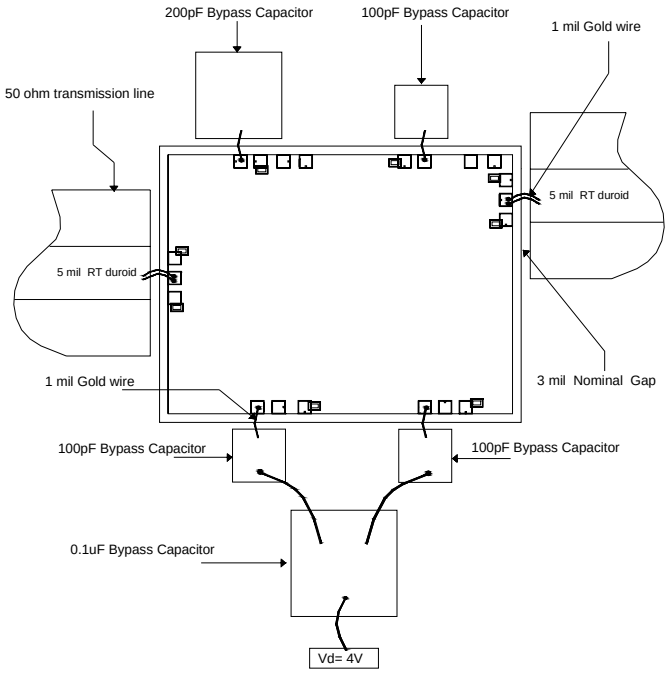
Units: Millimeters [Inches]

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

Note:

1. **Pad no. 19: Vd1**
2. **Pad no. 16: Vd2**
3. **Pad no. 3 : 1st stage source bypass**
4. **Pad no. 8 : 2nd stage source bypass**
5. **Pad no. 1 : RF Input**
6. **Pad no. 12 : 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