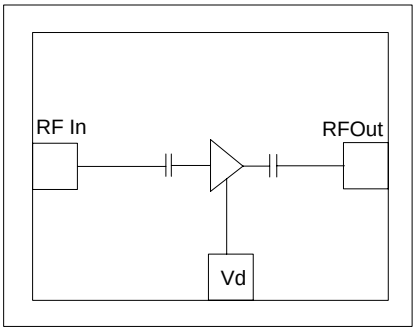
0.5 - 4 GHz Broadband Low Noise Amplifier

Features

- **Frequency Range: 0.5 - 4GHz**
- **Better than 2dB Noise Figure**
- **Input and Output are DC decoupled**
- **Single supply operation**
- **14 dB Nominal Gain**
- **14dBm Nominal P1dB**
- **Input Return Loss > 12 dB**
- **Output Return Loss > 15 dB**
- **Nominal Bias : 3V@ 40mA**
- **0.15-um InGaAs pHEMT Technology**
- **Chip Size : 1.5 mm x 1.1 mm x 0.1 mm**

Functional Diagram



Typical Applications

- **Cellular system**
- **Base stations**
- **Narrow Band Applications from 800MHz to 4GHz**
- **Communication receivers and transmitters.**

Description

The AMT2122082 is a broadband MMIC LNA operating from 0.5 - 4GHz. The MMIC employs a single stage self-biased amplifier design featuring 50 Ohm input/output impedance. The amplifier operates on a single +3V supply. The LNA features 14dB of nominal gain and has a typical mid-band noise figure of 2.1 dB. The Amplifier can also be operated at 2V for lower current operation and at 4V for a higher power output requirement. The LNA features midband input/output return loss of 14dB and a nominal P1dB of 14dBm. In addition to being used as the first stage, the LNA's excellent linearity encourages its usage in the succeeding stages of a receiver chain. The die is fabricated using a reliable Low noise 0.15um InGaAs pHEMT process. The circuit grounds are provided through vias to the backside metallization.

Absolute Maximum Ratings (1)

Parameter	Absolute Maximum	Units
Positive DC Supply	6	V
RF Input Power	20	dBm
Supply current	100	mA
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 (1) @ T_A = 25 °C, Vd = +3V, Z_o =50 Ω

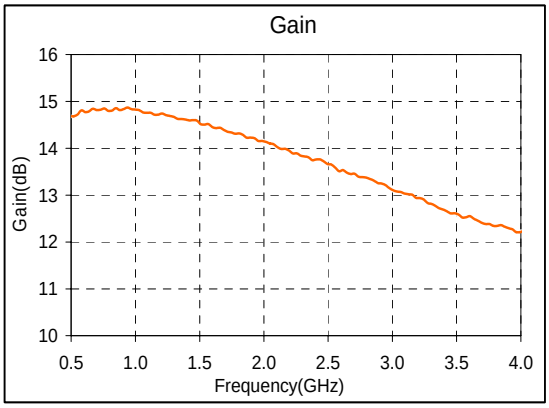
Parameter	Min.	Typ.	Max.	Units
Frequency	0.5	-	4.0	GHz
Gain	-	16	-	dB
Gain Flatness	-	±1.75	-	dB
Noise Figure(max)	-	2.2	-	dB
Input Return Loss	-	15	-	dB
Output Return Loss	-	15	-	dB
Output Power (P1dB)	-	14	-	dBm
Output Third Order Intercept(IP3)	-	22	-	dBm
Supply Current	35	40	65	mA

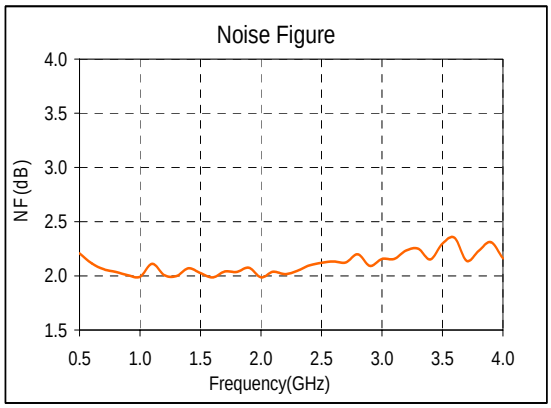
Note:

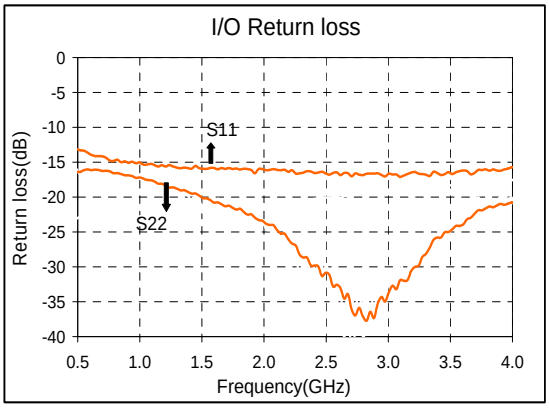
1. Electrical specifications as measured in test fixture.

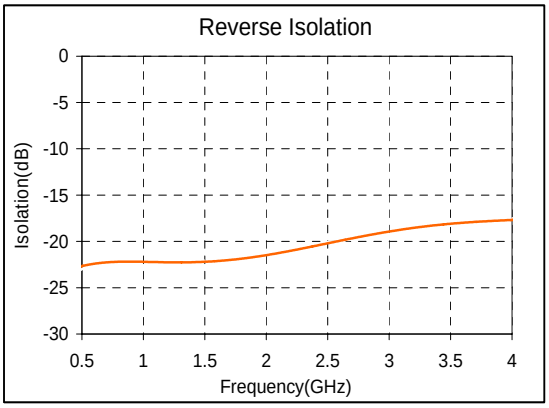
Test fixture data

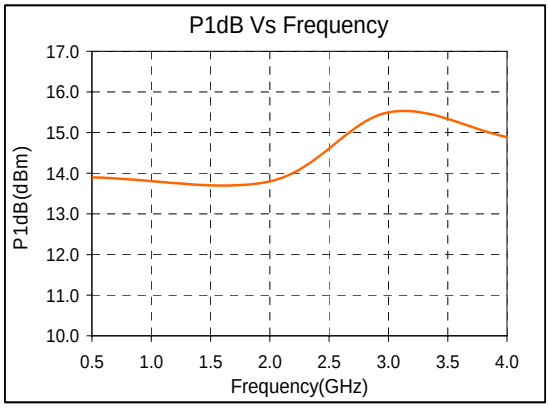
Vd = 3V, Total Current =40 mA, T_A = 25 °C





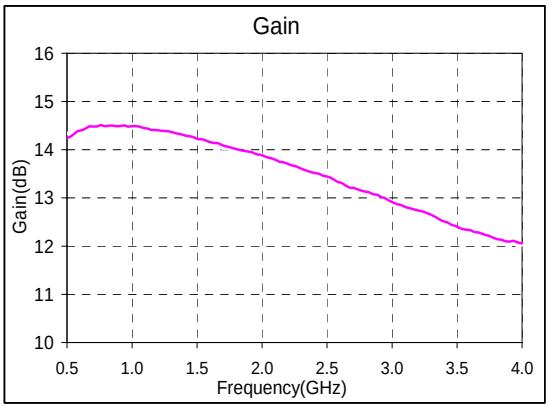


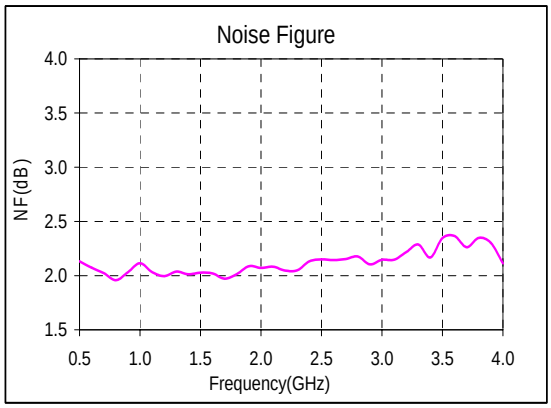


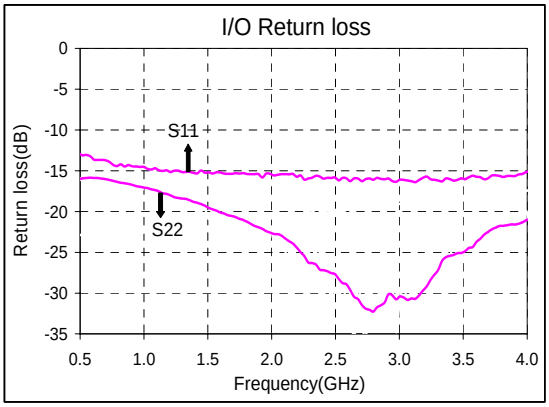


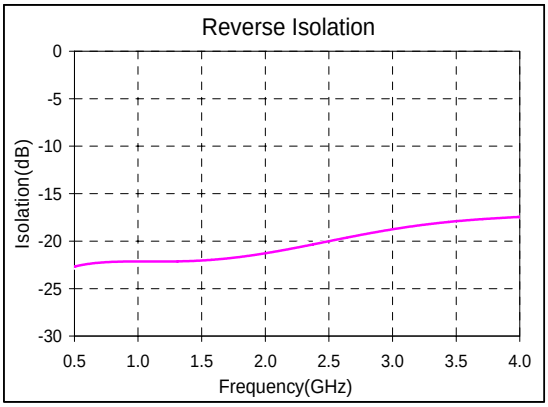
Test fixture data

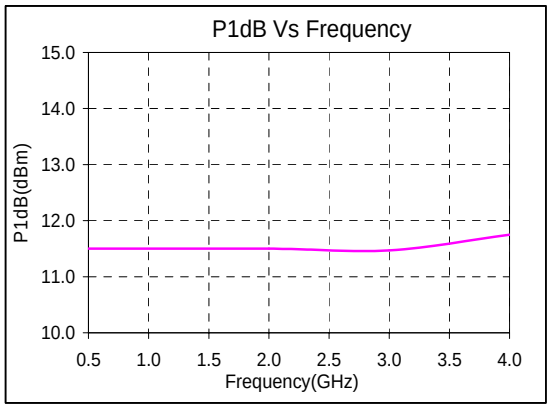
Vd = 2V, Total Current =35 mA, T_A = 25 °C





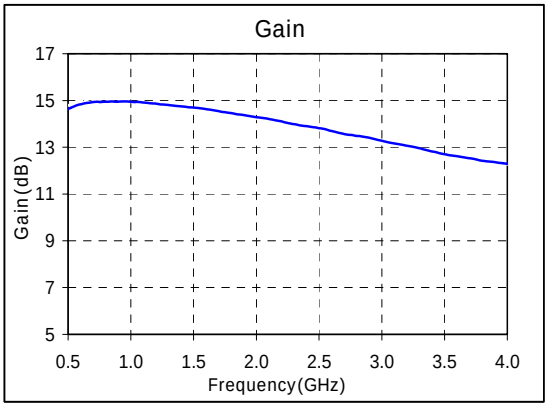


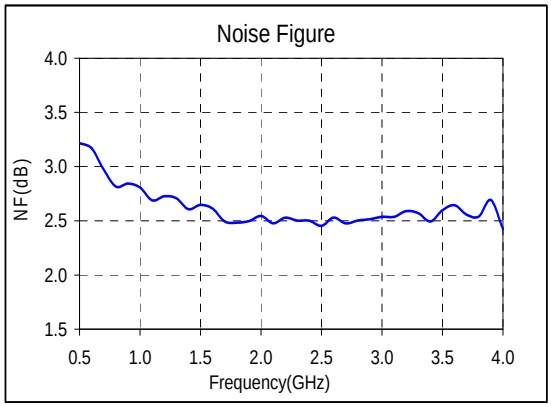


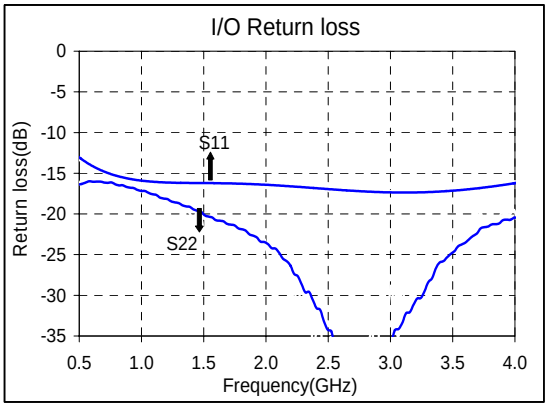


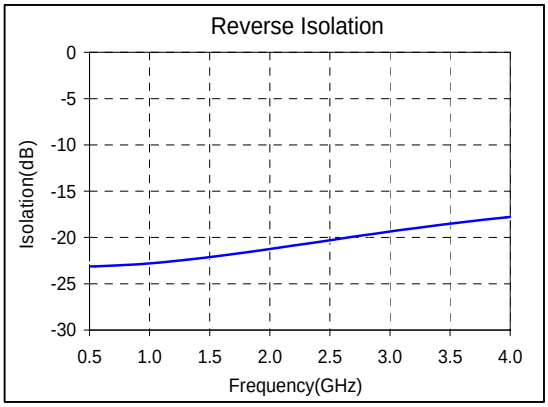
Test fixture data

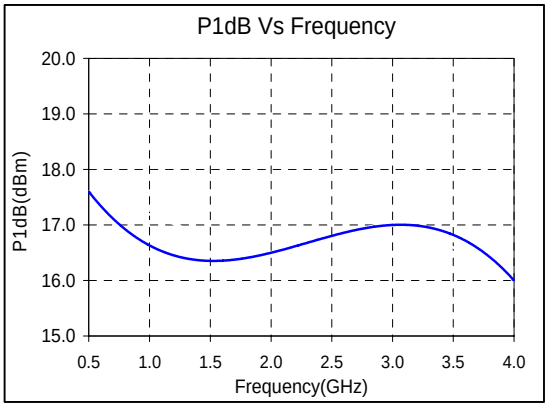
Vd = 4V, Total Current = 50 mA, T_A = 25 °C



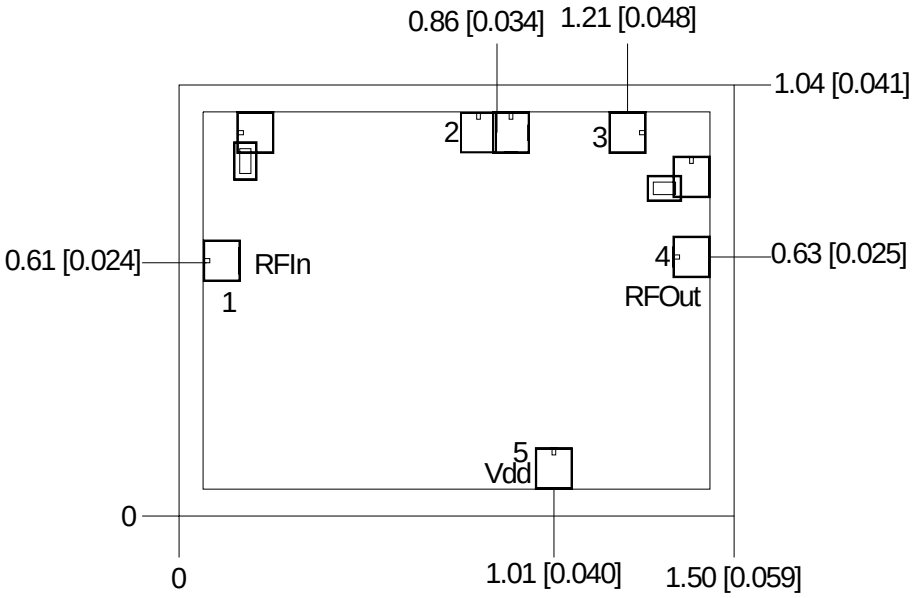








Mechanical Characteristics

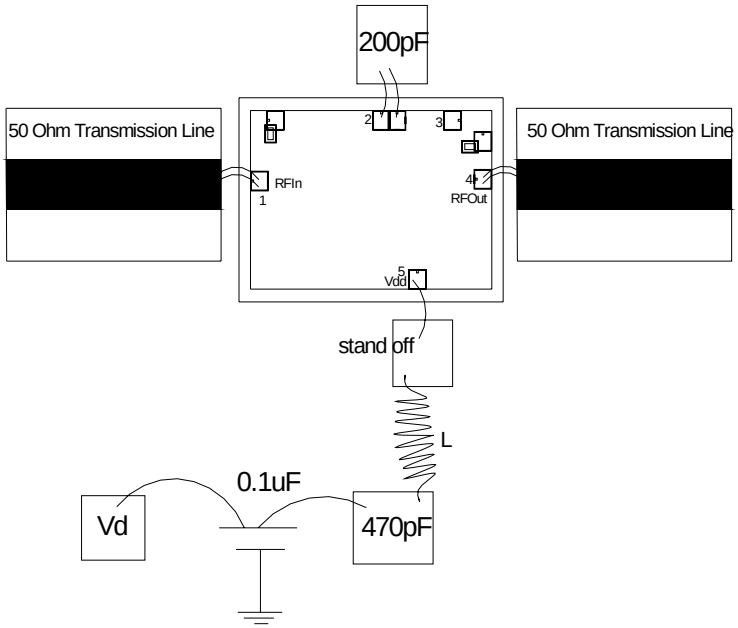


Units: millimeters (inches)

Note:

1. All RF and DC bond pads are 100µm x 100µm
2. Pad no. 1 : RF In
3. Pad no. 2: Source bypass (200 pF)
4. Pad no. 3: Optional pad
5. Pad no. 4: RF Out
6. Pad no. 5: Vd

Recommended Assembly Diagram



Note :

1. Two one mil (0.0254mm) bond wires of minimum length should be used for RF input, Output and from chip bond pad to 200pF source bypass capacitor.
2. The value of L (RF Choke) is ~ 68nH; an air core inductor should preferably be used for operation beyond 2GHz.
3. All capacitors shown in the assembly diagram (except 0.1µF) are single layer capacitors.
4. The use of Multilayer capacitors and chip inductors with smaller footprint (0402) is suggested only for frequencies < 2.0 GHz.
5. 0.1uF capacitor may be additionally used as second level of bypass for reliable operation.
6. The RF input & output ports are DC decoupled on-chip.

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