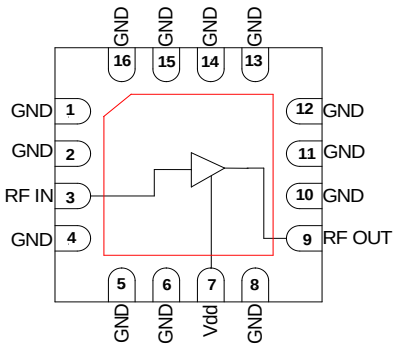
0.5 – 4.0 GHz Broadband Low Noise Amplifier

Features

- **Frequency Range: 0.5 – 4.0 GHz**
- **Better than 2.0dB Noise Figure**
- **14 dB Nominal Gain**
- **20 dBm Nominal P1dB @ 4V operation**
- **Input Return Loss > 10 dB**
- **Output Return Loss > 12 dB**
- **Single supply operation**
- **Nominal Bias : 3V@ 90mA**
- **0.15µm InGaAs pHEMT Technology**
- **QFN Plastic package: 3mm x 3mm x 0.8mm**

Functional Diagram



Typical Applications

- **Cellular system**
- **Base stations**
- **Narrow Band Applications from 800MHz to 3GHz**
- **Communication receivers and transmitters.**

Description

The ASL1002P3 broadband MMIC LNA operates from 0.5 - 4.0 GHz. The MMIC employs a single stage self-biased amplifier design featuring 50 Ohm input/output impedance. The RF input and output are DC coupled to facilitate low frequency operation. The amplifier operates on a single +3V supply. 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 17dBm. 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. To minimize board area the design is offered in a low profile (3mm x 3mm) QFN package.

Absolute Maximum Ratings (1)

Parameter	Absolute Maximum	Units
Positive DC Supply	6	V
RF Input Power	20	dBm
Supply current	175	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

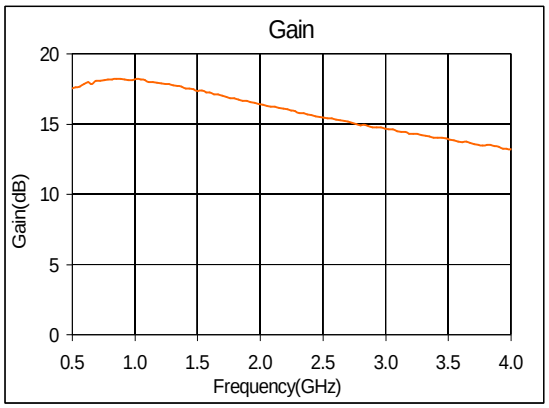
Parameter	Min.	Typ.	Max.	Units
Frequency	0.5	-	4.0	GHz
Gain	-	16	-	dB
Gain Flatness	-	± 2	-	dB
Noise Figure	-	1.6	-	dB
Input Return Loss	10	12	-	dB
Output Return Loss	10	12	-	dB
Output Power (P1dB)	16	17	-	dBm
Output Third Order Intercept(IP3)	-	25	-	dBm
Supply Current	75	90	105	mA

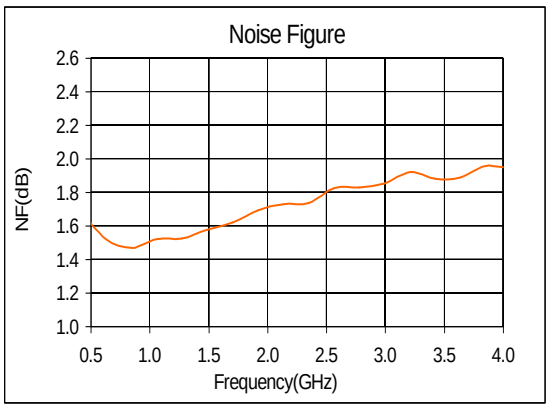
Note:

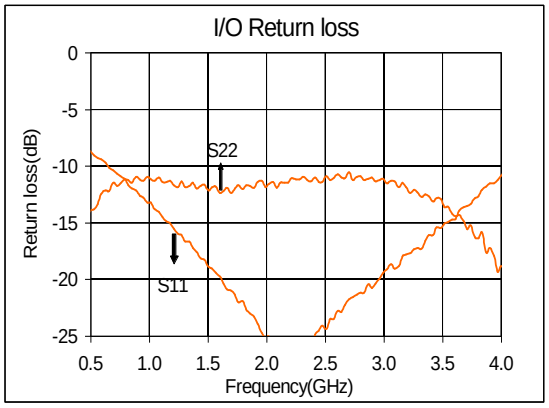
1. Electrical specifications as measured in test fixture.

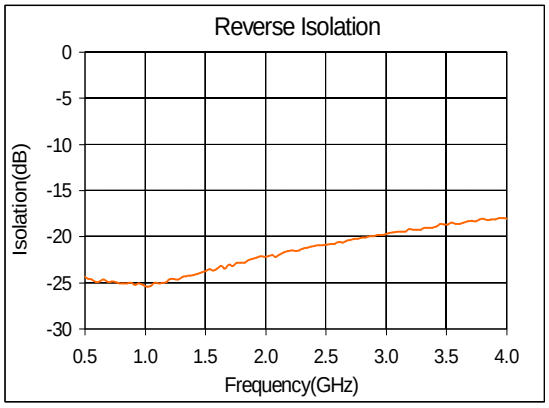
Test fixture data

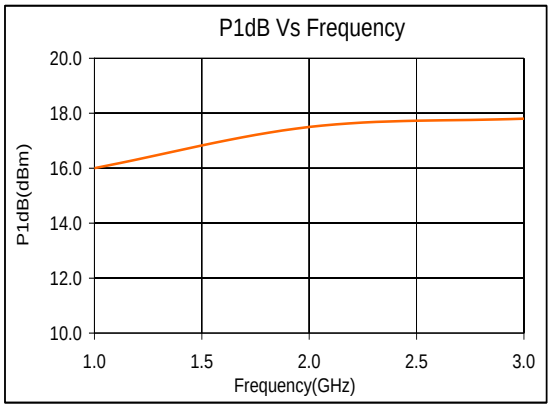
Vd = 3V, Total Current = 90mA, T_A = 25 °C





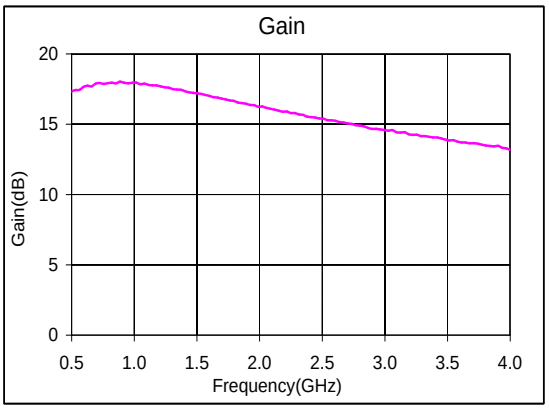


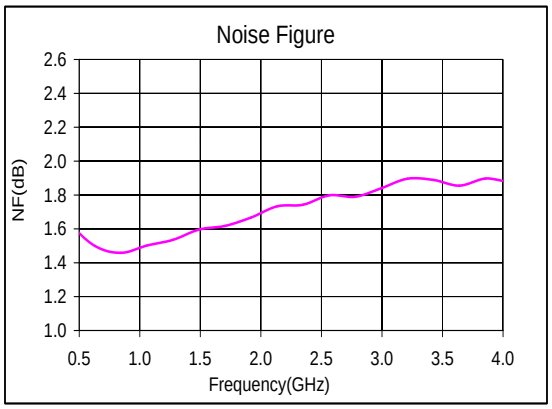


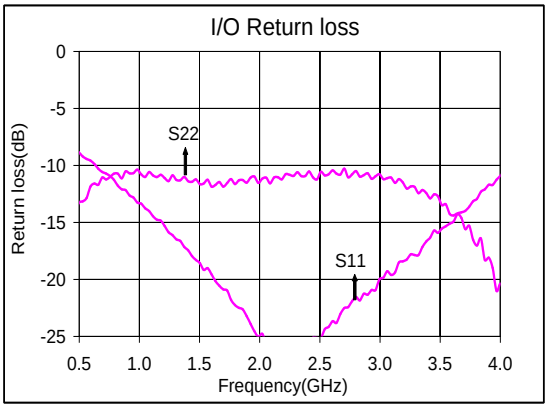


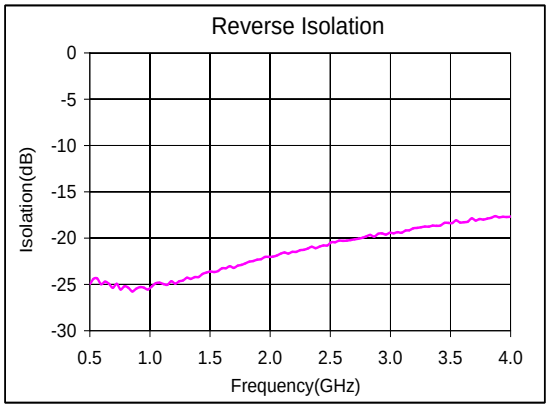
Test fixture data

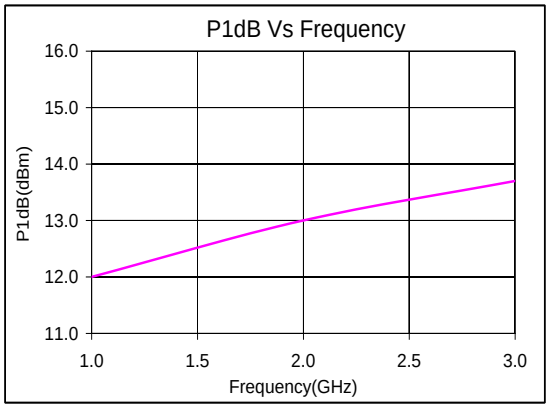
Vd= 2V, Total Current = 80 mA, T_A = 25 °C





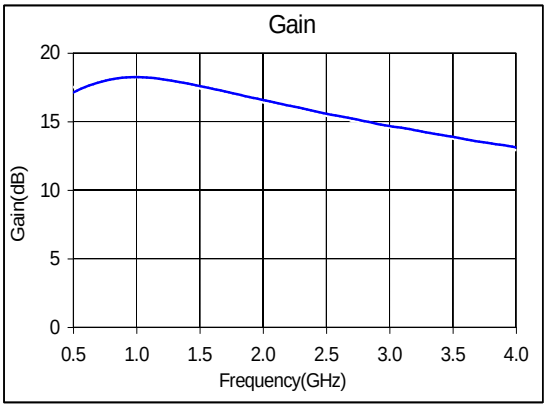


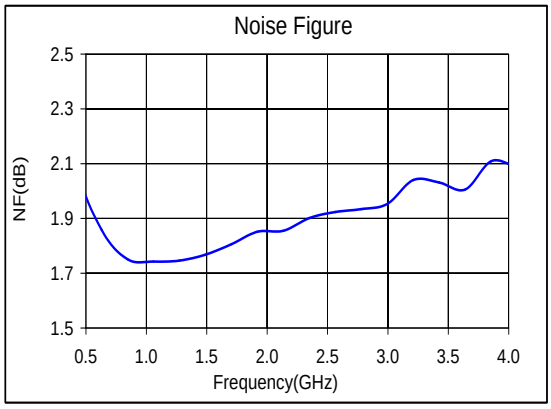


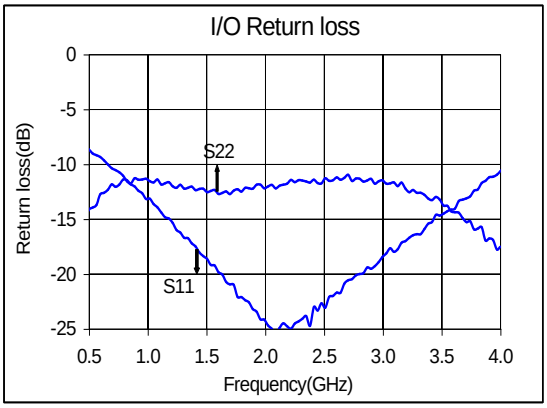


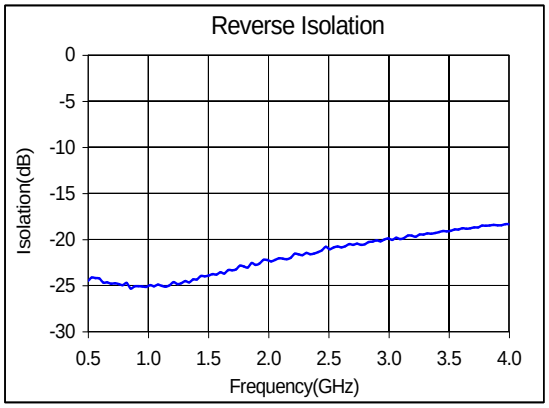
Test fixture data

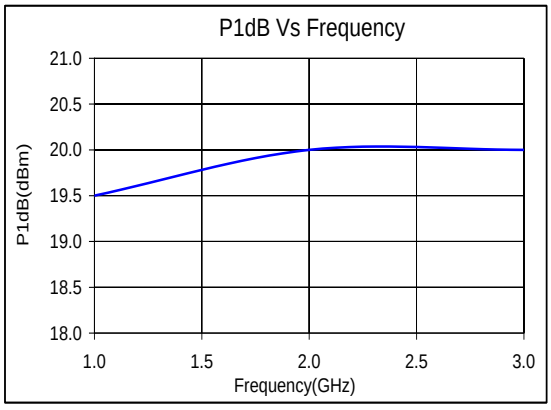
Vd = 4V, Total Current = 100 mA, T_A = 25 °C



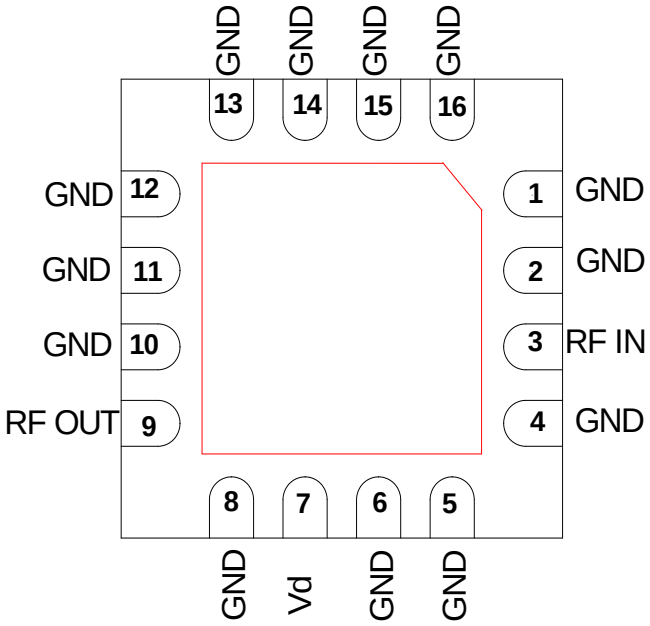








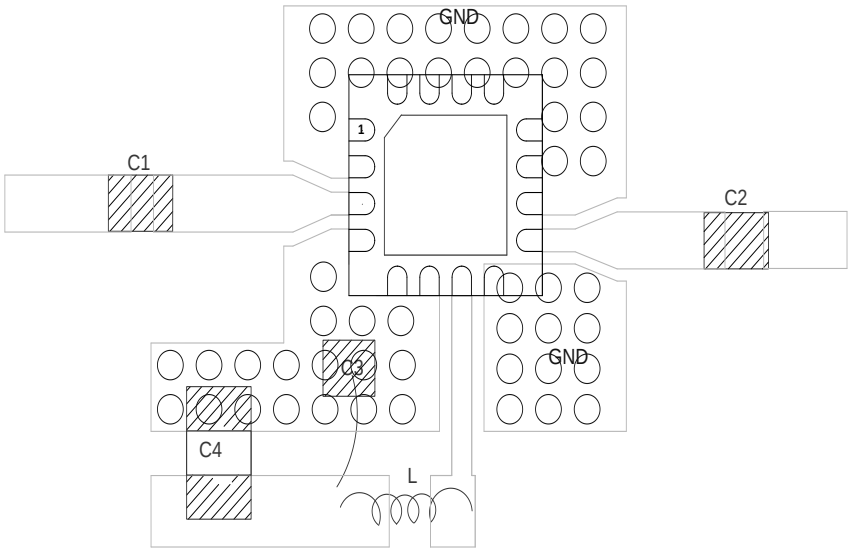
Pin Configuration



Pin Designations

Symbol	Pin No.	Description
GND	1, 2,4-6, 8,10 -16	Ground
RF In	3	RF Input
Vd	7	Drain Voltage Input
RF Out	9	RF output

Test Board pattern



QFN mounted on test pattern

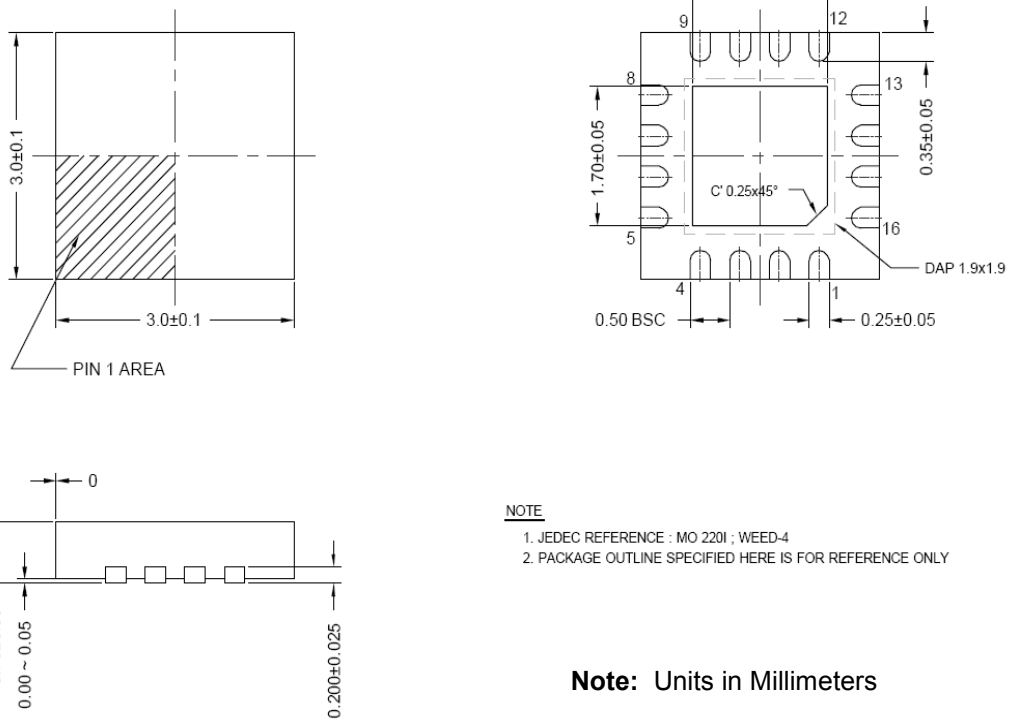
List of components

Component	value	Part No.
L	68nH	Any standard Air core inductor or equivalent hand-wound part
C1	100pF	ATC(116RL101M100TT) or equivalent
C2	100pF	ATC(116RL101M100TT) or equivalent
C3	470pF	ATC(116UK471M100TT) or equivalent
C4	0.1µF	0603/0402 chip capacitor

Note:

1. Input and output 50 ohm lines are on 10 mil RT duroid substrate
2. 0.1 µF capacitors may be additionally used as a second level of bypass for reliable operation
3. All capacitors shown in the assembly diagram (except 0.1µF) are single layer capacitors.
4. The use of Multilayer capacitors and inductors with smaller footprint (0402) is suggested only for frequencies < 2.0 GHz.

Package Outline



NOTE

1. JEDEC REFERENCE : MO 220I ; WEED-4
2. PACKAGE OUTLINE SPECIFIED HERE IS FOR REFERENCE ONLY

Note: Units in Millimeters

ATTENTION
OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES

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