

### **Product Features**

- GaAs p-HEMT chip on board
- No matching circuit needed
- High Maximum input power(+25dBm)
- High IP3 & Low Noise
- Single Supply Voltage (+5V)
- Surface Mount Hybrid Type
- Tape & Reel Packaging
- Small Size, High Heatsink
- Alumina Substrate
- Pb Free / RoHS Standard

# Applications

- Repeater
- Base Station
- RF Sub-Systems
- WiMAX, Radar system



Package : CP-16A

# Descriptions

RFHIC's LOW Noise Amplifier series are all hybrid LNA type products which includes all matching for the convenience of customers. CL series are focused on giving lowest noise possible. The structure of the device is built with GaAs p-HEMT die attached on a ceramic thick film substrate. The device is still smaller than the area one would use for the application notes all together. Depending on the part number, one can use this in different frequency applications. All LNA hybrids are possible to have custom frequency & spec without any additional NRE cost involved.

All RFHIC products are RoHS compliant.

## **Electrical Specifications**

Parameter	Units	CL3501-L	CL3502-L
Frequency Range	MHz	3100 ~ 3600	3100 ~ 3600
Small Signal Gain (S <sub>21</sub> ) (at 3300MHz)	dB	10	10.5
Gain Flatness	dB	±1.0	±1.0
Input Return Loss (S <sub>11</sub> )	dB	-16	-16
Output Return Loss (S <sub>22</sub> )	dB	-12	-12
1dB Compression Point (P <sub>1</sub> dB)	dBm	15	21
Output 3 <sup>rd</sup> Order Intercept Point (OIP3) (TYP.)	dBm	31	36
Noise Figure (TYP.)	dB	1.0	1.0
DC Supply Current (Vdc=+5V)	mA	45	100

### **Test Condition**

① Supply voltage = +5V, 50ohm System, Ta = 25 °C

2 OIP3 is measured with two tones, at an output power of +0dBm/tone separated by 1MHz.

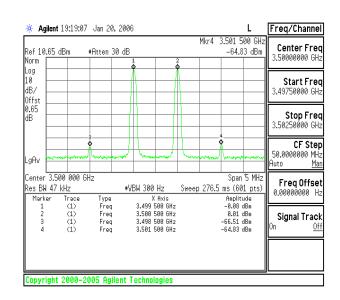
### • Tel : 82-31-250-5011



CL3501-L

#### 29 Sep 2009 16:53:00 2:-34.299 dB 2: 10.146 dB 2:-15.863 dB 2:-10.294 dB CH1 S11 CH2 S21 CH3 S12 CH4 S22 \* PRm 10 dB/REF 0 dB 10 dB/REF 0 dB 10 dB/REF 0 dB 10 dB/REF 0 dB L06 L06 L06 3 300.000 000 MHz CH1 Markers CH3 Markers 1:-19.814 dB 1:-16.872 dB 3.10000 GHz 3.10000 GHz CΔ 3-26.320 dB 3-15.082 dB 3.50000 GHz 3.50000 GHz 4:-22.814 dB 4:-14.863 dB 3.60000 GHz 3.60000 GHz CΔ 2 ↑ ↑ 4 Δ 4 PRm 2 H2 Marke 4 s CH4 Markers CΔ Ť A 1:10,196 dB 1:-8,4575 dB 4 3,10000 GHz 3,10000 GHz Â 3: 9.5577 dB 3:-11.490 dB 3.50000 GHz 3.50000 GHz 4 CΔ Why 4: 9.3456 dB 4:-11.770 dB 3.60000 GHz 3.60000 GHz N ↑ ↑ START 3 000.000 000 MHz STOP 3 700.000 000 MHz

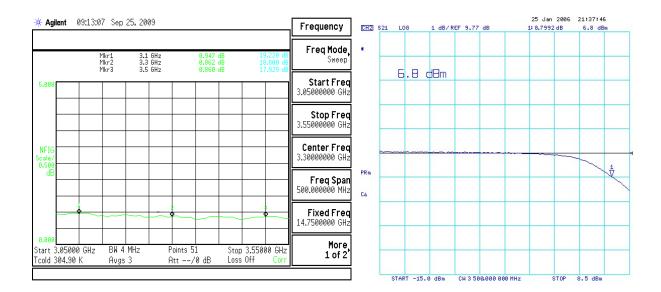
### S-Parameter



**OIP3** 

### **Noise Figure**





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rfsales@rfhic.com

All specifications may change without notice.

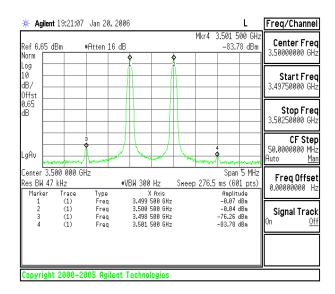


CL3502-L

#### 29 Sep 2009 15:24:17 CH1 S11 L06 CH2 S21 L06 CH3 S12 L06 CH4 S22 L06 \* PRm 2:-19.432 dB 2: 10.652 dB 2:-15.995 dB 2:-11.052 dB 10 dB/REF 0 dB 10 dB/REF 0 dB 10 dB/REF 0 dB 10 dB/REF 0 dB 3 300.000 000 MHz CH1 Markers CH3 Markers 1=13.887 dB 1=17.464 dB 3.10000 GHz 3.10000 GHz CΔ 3-18.300 dB 3-15.103 dB 3.50000 GHz 3.50000 GHz 4:-16.032 dB 4:-15.028 dB 3.60000 GHz 3.60000 GHz CΔ ₽ 1 1 4 Å 4 PRm H2 Markt s CH4 Markers CΔ Í 1: 10.544 dB 1:-8.4881 dB 3.10000 GHz 3.10000 GHz 3:10.150 dB 3:-11.966 dB 3.50000 GHz 3.50000 GHz C۵ 4:10.035 dB 4:-11.659 dB 3.60000 GHz 3.60000 GHz ↑ ↑ START 3 000.000 000 MHz STOP 3 700.000 000 MHz

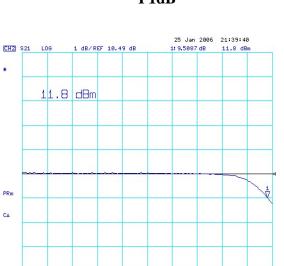
**S-Parameter** 

### **OIP3**



## **Noise Figure**

0.975 dB 0.885 dB 0.842 dB



BW 4 MHz

Avgs 3

Points 51

Att --/0 dB

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₩ Agilent 12:25:43 Sep 24, 2009

5.00

NET

Start 3.05000 GHz

cold 304.83 K

Mkr1 Mkr2 Mkr3

3.1 GHz 3.3 GHz 3.5 GHz

Frequency

Freq Mode

Start Freq 3.05000000 GHz

3.30000000 GHz

Freq Span 500.000000 MHz

Fixed Freq 14.7500000 GHz

Stop 3.55000 GHz Loss Off Corr

More

1 of 2

Stop Freq 3.55000000 GH: Center Freq

Sween

\*

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STOP 12.3 dBm

Version 6.2

CW 3 500.000 000 MHz

START -15.0 dBm

### P1dB

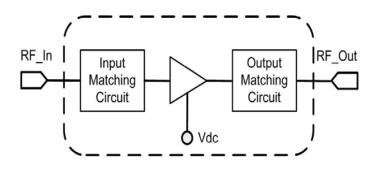


# **Absolute Maximum Ratings\***

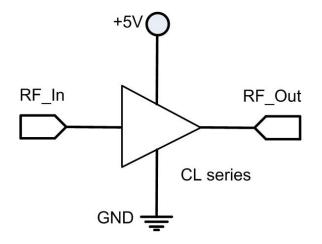
PARAMETER	Unit	Rating	Remark
Device Voltage	V	+8	
RF Input Power	dBm	+25	
Operating Temperature	°C	-40 to +85	
Storage Temperature	Ĵ	-50 to +125	

\* Operation of this device in excess of any one of these parameters may cause permanent damage.

### **Functional Diagram**

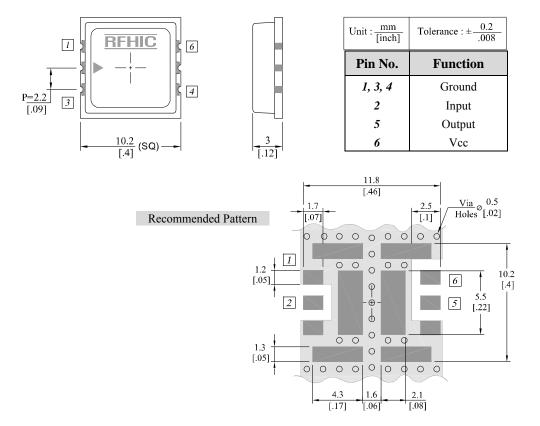


## **Application Circuit**





Package Dimensions (Type: CP-16A)



### **ESD** Protection

Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices. Some of the precautions recommended are;

- Person at a workbench should be earthed via a wrist strap and a resistor.
- All mains-powered equipment should be connected to the mains via an earth-leakage switch.
- Equipment cases should be grounded.
- Relative humidity should be maintained between 40% and 50%.
- An ionizer is recommended.
- Keep static materials, such as plastic envelopes and plastic trays etc. away from the workbench.

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