Low Noise Amplifier

CL0902-L / CL1502-L
CL1802-L / CL2102-L

RFHIC

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

- 2G & 3G Repeater
- Base Station
- PCS, CDMA, W-CDMA
- GSM, DCS, UMTS
- WiMAX, Wibro, WLAN
- RF Sub-Systems

Package Type : CP-16A

Description

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	UNIT	CL0902-L		CL1502-L	CL1802-L	CL2102-L
Frequency Range	MHz	824 ~ 894 (Cellular)	890 ~ 960 (GSM)	1400 ~ 1600	1700 ~ 2000	1850 ~ 2200
Small Signal Gain (S_{21})	dB	21	20	17	16	15
Gain Flatness	dB	±0.5	±0.5	±0.5	±0.5	±1.0
Input Return Loss (S_{11})	dB	-17	-17	-17	-18	-18
Output Return Loss (S_{22})	dB	-8.5	-8.5	-10	-10	-10
1dB Compression Point (P_1dB)	dBm	20	20	21	21	20
Output 3rd Order Intercept Point (OIP3) (TYP.)	dBm	31	31	33	33	33
Noise Figure (TYP.)	dB	0.7	0.7	0.6	0.6	0.6
DC Supply Current (Vdc=+5V)	mA	100	100	90	100	100

Test Condition

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

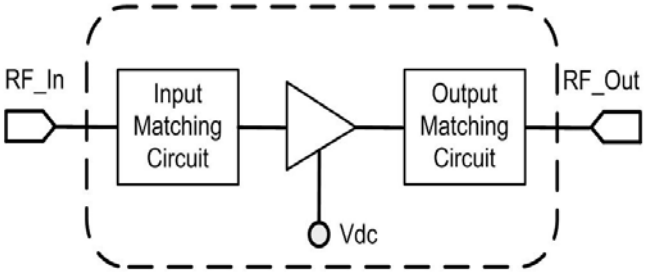
② OIP3 is measured with two tones, at an output power of +0dBm/tone separated by 1MHz.

Absolute Maximum Ratings

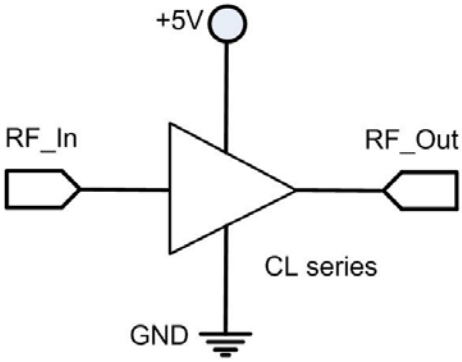
PARAMETER	UNIT	RATING	REMARK
Device Voltage	V	8	-
RF Input Power	dBm	25	-
Operating Temperature	℃	-40 ~ 85	-
Storage Temperature	℃	-50 ~ 125	-

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

Functional Diagram



Application Circuit



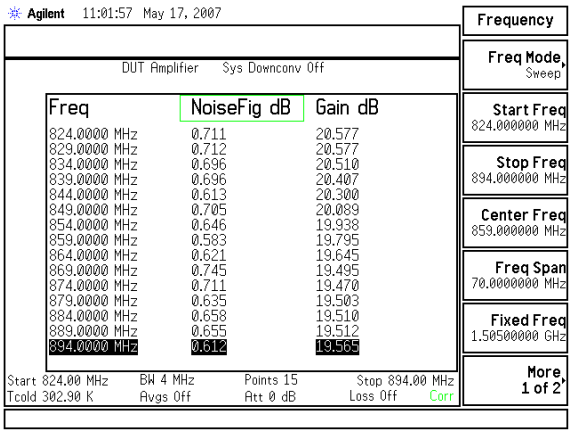
ESD Protection

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;

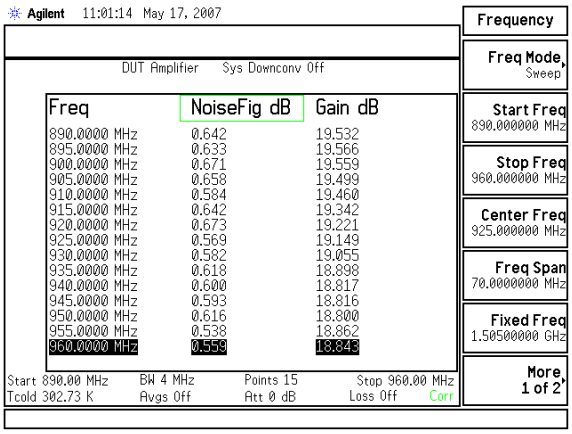
- Person at a workbench should be earthed via a wrist strap and a resistor.
- All mains-powered equipment should be connected to the mains via an earth-leakage switch.
- Equipment cases should be grounded.
- Relative humidity should be maintained between 40% and 50%.
- An ionizer is recommended.
- Keep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

Noise Figure

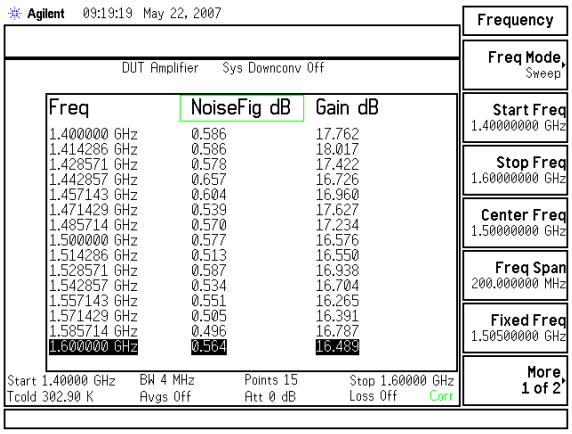
CL0902-L(Cellular)



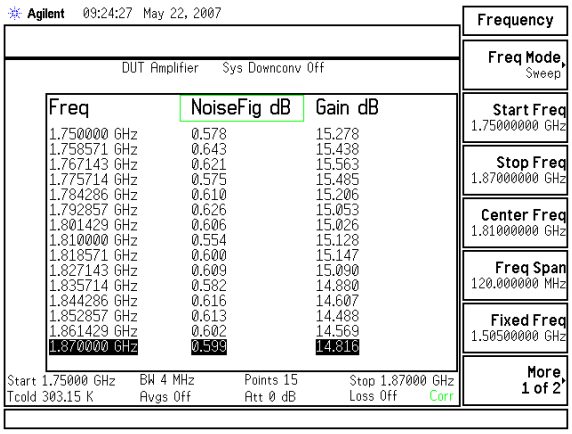
CL0902-L(GSM)



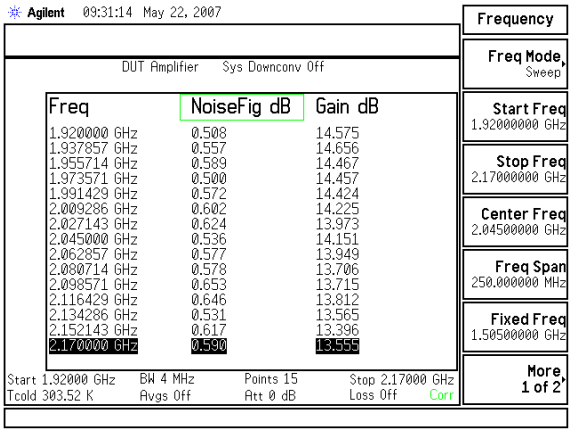
CL1502-L

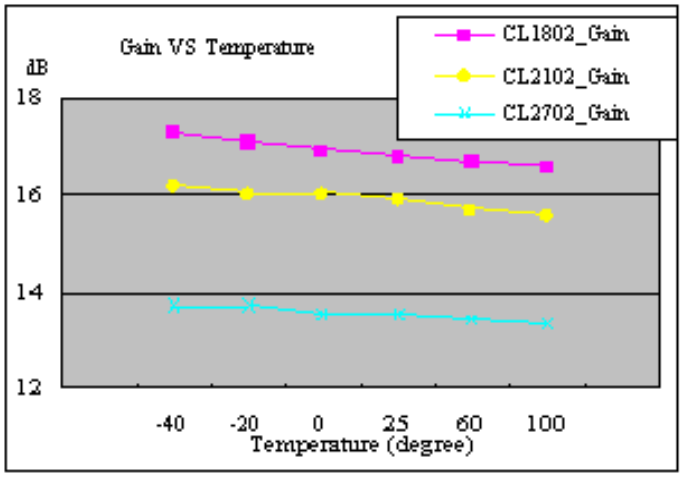


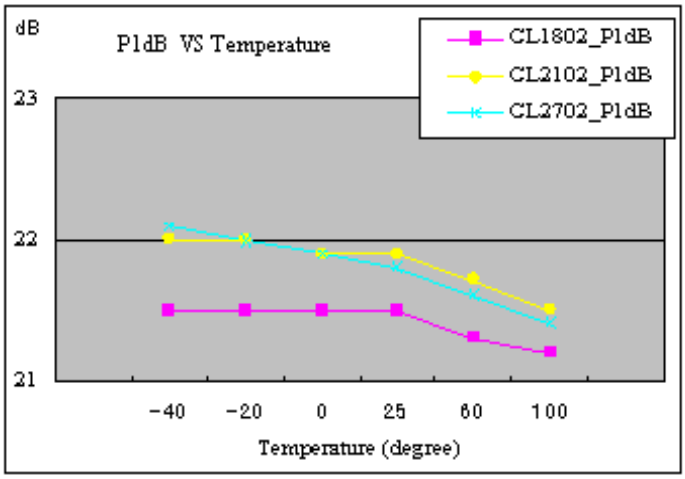
CL1802-L

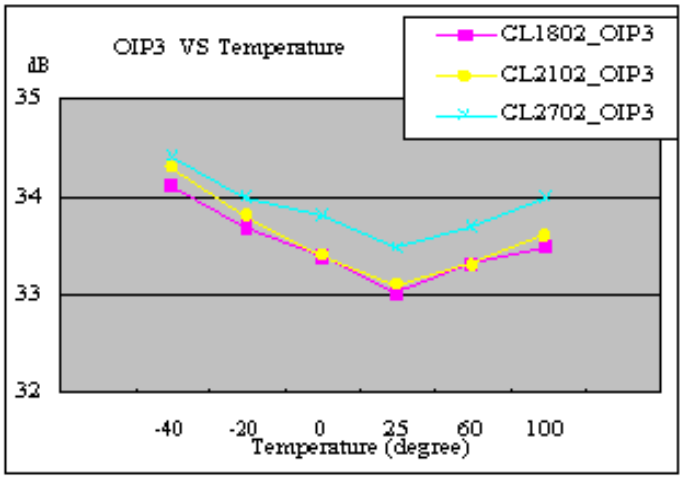


CL2102-L



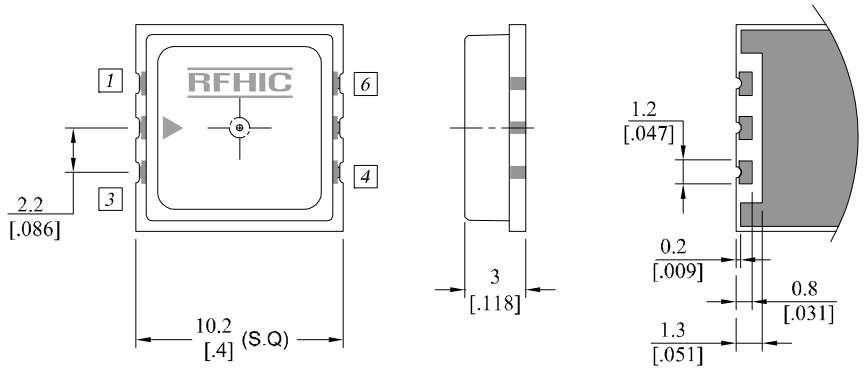

Gain VS Temperature
dB
18
16
14
12
-40
-20
0
25
60
100
Temperature (degree)
CL1802_Gain
CL2102_Gain
CL2702_Gain


dB
P1dB VS Temperature
23
22
21
-40
-20
0
25
60
100
Temperature (degree)
CL1802_P1dB
CL2102_P1dB
CL2702_P1dB


OIP3 VS Temperature
dB
35
34
33
32
-40
-20
0
25
60
100
Temperature (degree)
CL1802_OIP3
CL2102_OIP3
CL2702_OIP3

Package Dimensions (Type: CP-16A)

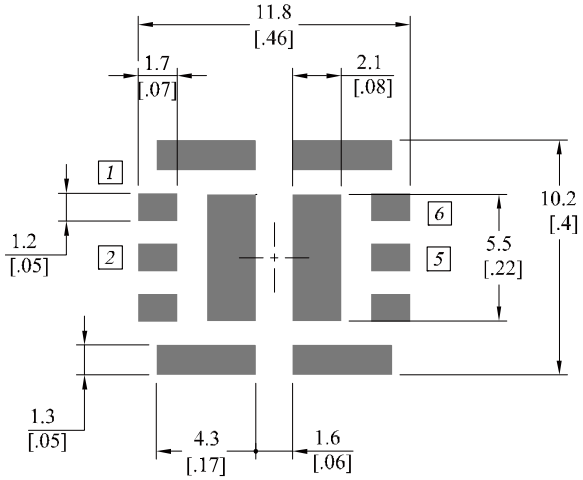
* Unit: mm[inch] | Tolerance ±0.15[.006]



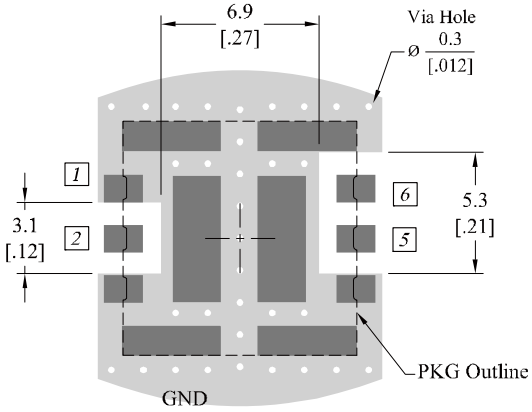
▲ Top View ▲ Side View ▲ Bottom View

Pin Description			
Pin No	**Function**	**Pin No**	**Function**
1	GND	4	GND
2	Input	5	Output
3	GND	6	Vcc

Recommended Pattern



Recommended Mounting Configuration



*** Mounting Configuration Notes**

1. Ground / thermal via holes are critical for the proper performance of this device.
2. Add as much copper as possible to inner and outer layers near the part to ensure optimal thermal performance.
3. Mounting screws can be added near the part to fasten the board to a heatsink. Ensure that the ground / thermal via hole region contacts the heatsink.
4. Do not put solder mask on the backside of the PCB in the region where the board contacts the heatsink.
5. RF trace width depends upon the PCB material and construction.
6. Use 1 oz. Copper minimum.

Revision History

Part Number	Release Date	Version	Modification	Data Sheet Status
CL0902-L CL1502-L CL1802-L CL2102-L	2012.10.19	6.3	New datasheet format	-
CL0902-L CL1502-L CL1802-L CL2102-L	2012.2.18	6.2	-	-