Low Noise Amplifier

CL0901-L / CL1501-L
CL1801-L / CL2101-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	CL0901-L		CL1501-L	CL1801-L	CL2101-L
Frequency Range	MHz	824 ~ 894 (Cellular)	890 ~ 960 (GSM)	1400 ~ 1600	1700 ~ 2000	1850 ~ 2200
Small Signal Gain (S_{21})	dB	19	18	16	15.5	14
Gain Flatness	dB	±0.5	±0.5	±0.5	±0.5	±1.0
Input Return Loss (S_{11})	dB	-18	-18	-18	-18	-18
Output Return Loss (S_{22})	dB	-10	-10	-10	-10	-10
1dB Compression Point (P_1dB)	dBm	14	14	15	16	16
Output 3rd Order Intercept Point (OIP3) (TYP.)	dBm	27	27	27	27	27
Noise Figure (TYP.)	dB	0.5	0.5	0.7	0.6	0.7
DC Supply Current (Vdc=+5V)	mA	65	65	45	45	45

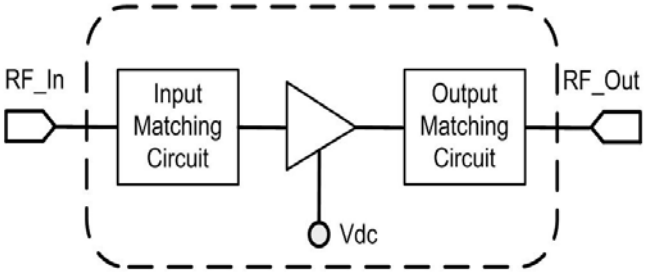
Test Condition
① Supply voltage = +5V, 50ohm System, Ta = 25℃
② OIP3 is measured with two tones, at an output power of +0dBm/tone separated by 1MHz.

Absolute Maximum Ratings

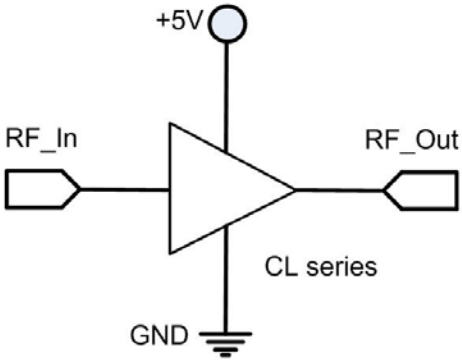
PARAMETER	UNIT	RATING	REMARK
Device Voltage	V	8	-
RF Input Power	dBm	25	-
Operating Temperature	℃	-40 ~ 85	-
Storage Temperature	℃	-50 ~ 125	-

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

Functional Diagram



Application Circuit



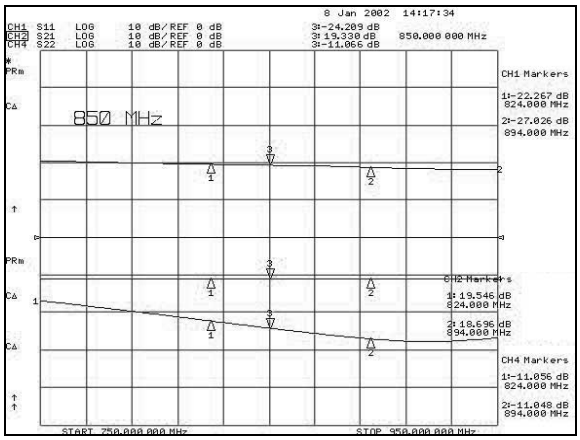
ESD Protection

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;

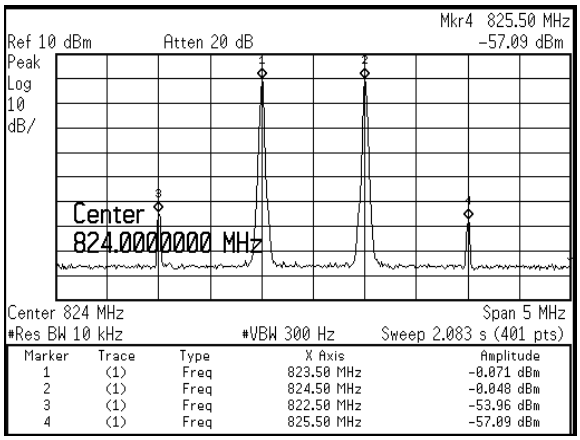
- Person at a workbench should be earthed via a wrist strap and a resistor.
- All mains-powered equipment should be connected to the mains via an earth-leakage switch.
- Equipment cases should be grounded.
- Relative humidity should be maintained between 40% and 50%.
- An ionizer is recommended.
- Keep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

CL0901-L (Cellular)

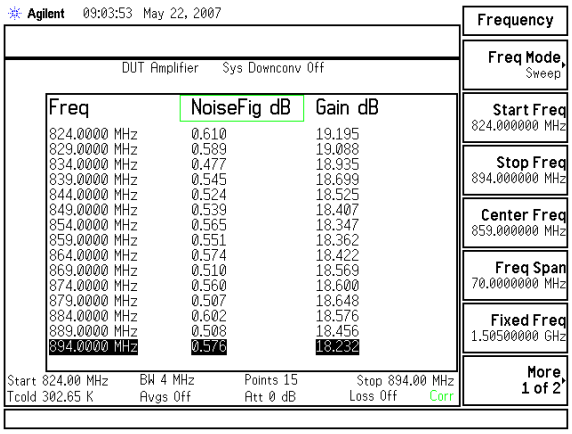
S-Parameter



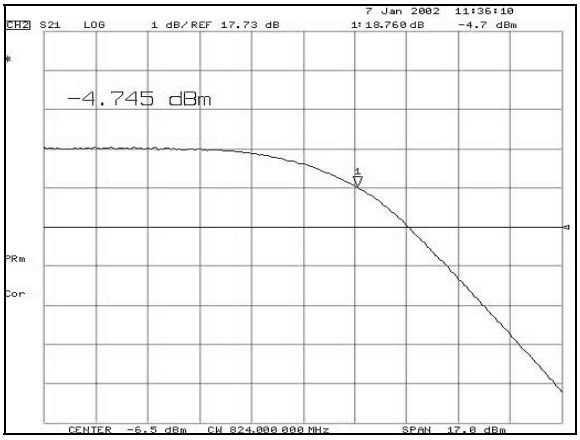
OIP3



Noise Figure

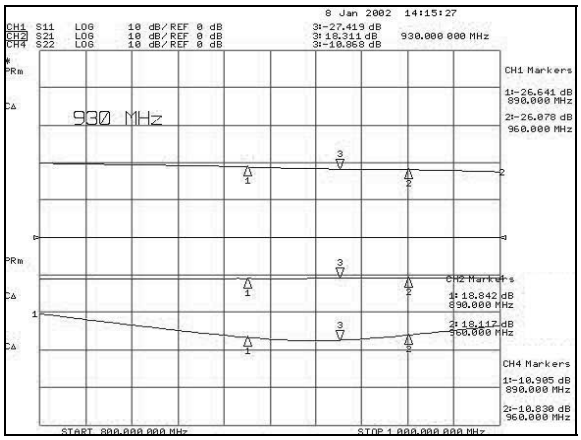


P1dB

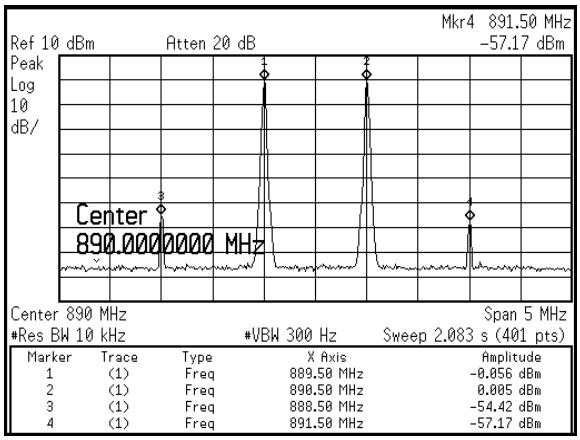


CL0901-L (GSM)

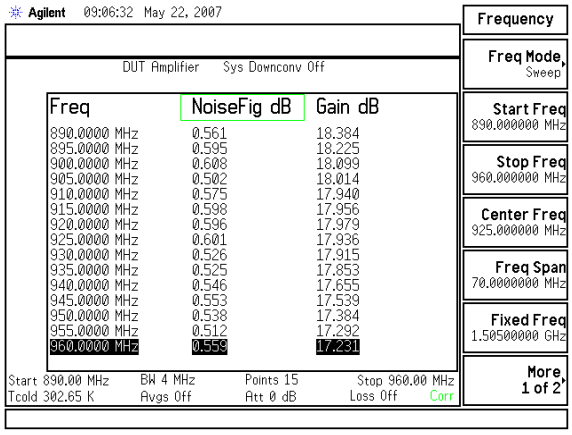
S-Parameter



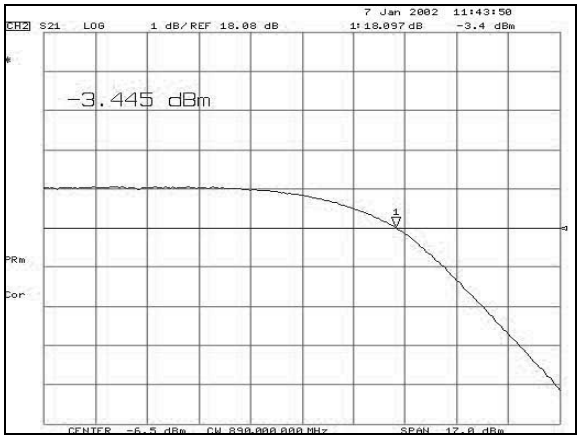
OIP3



Noise Figure

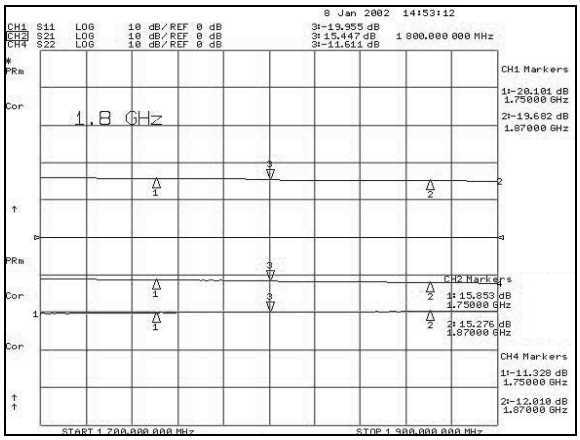


P1dB

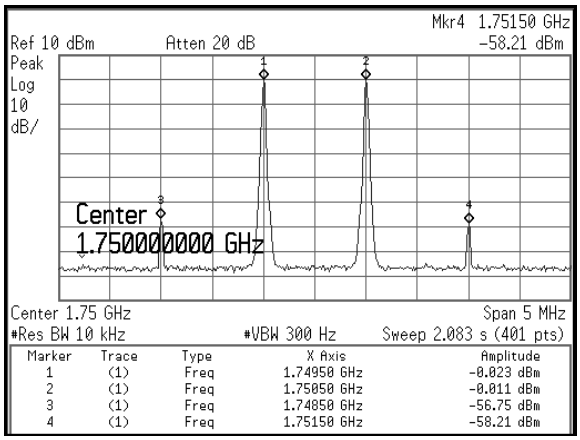


CL1801-L (PCS)

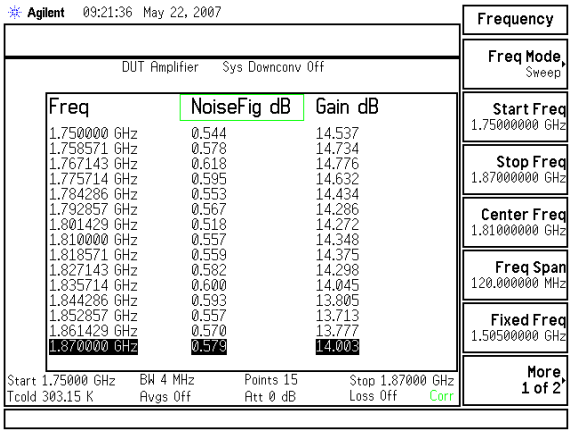
S-Parameter



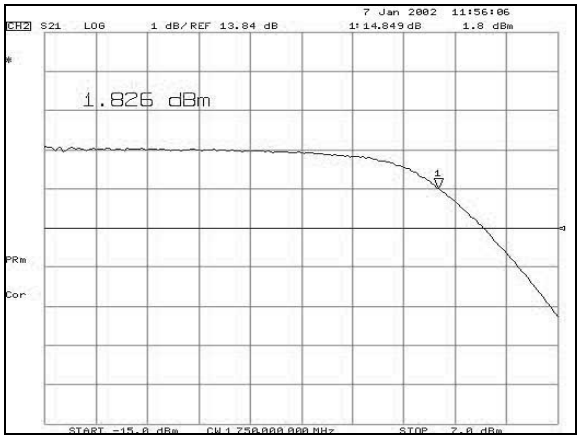
OIP3



Noise Figure

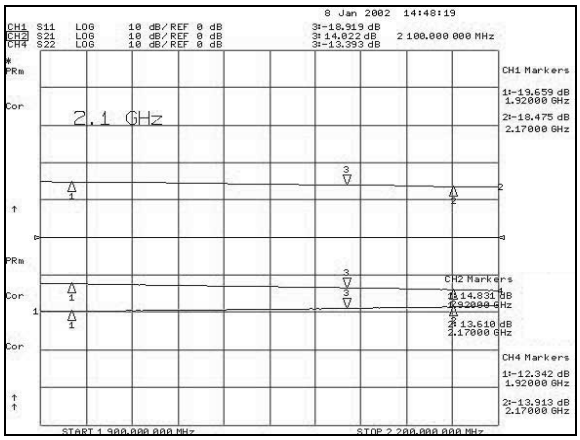


P1dB

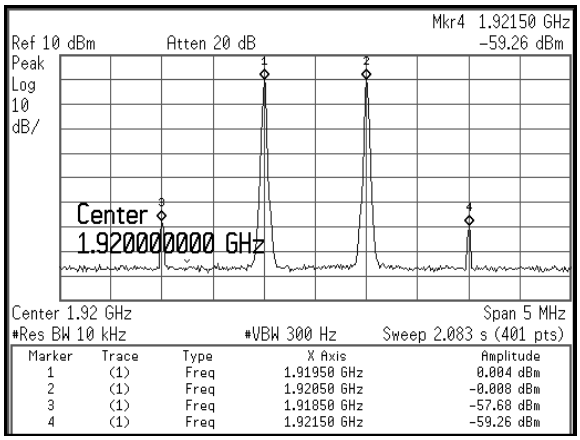


CL2101-L (IMT2000)

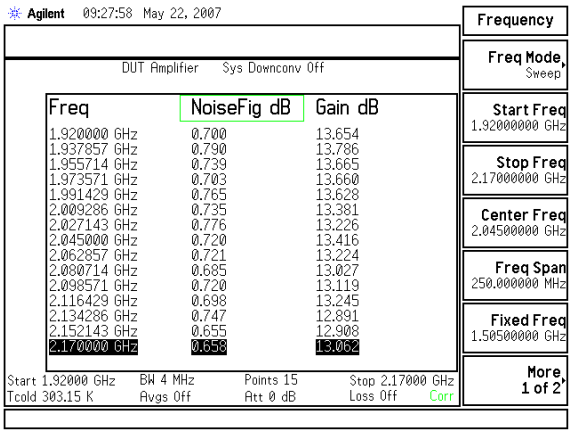
S-Parameter



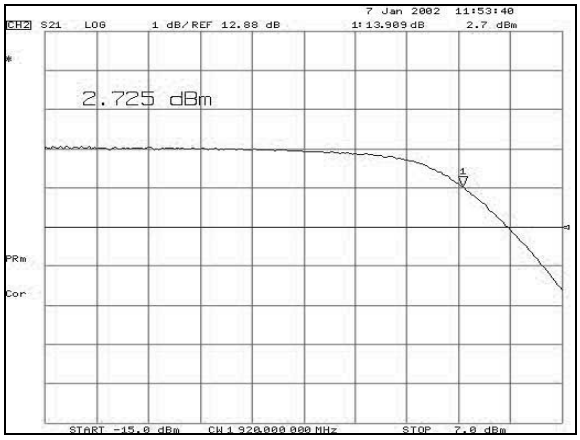
OIP3

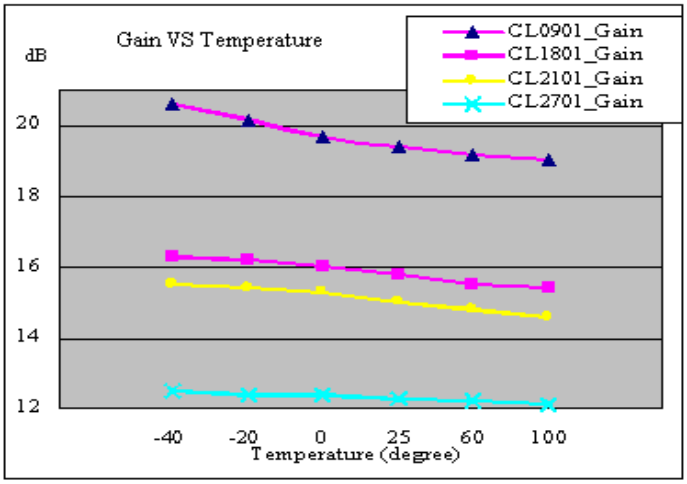


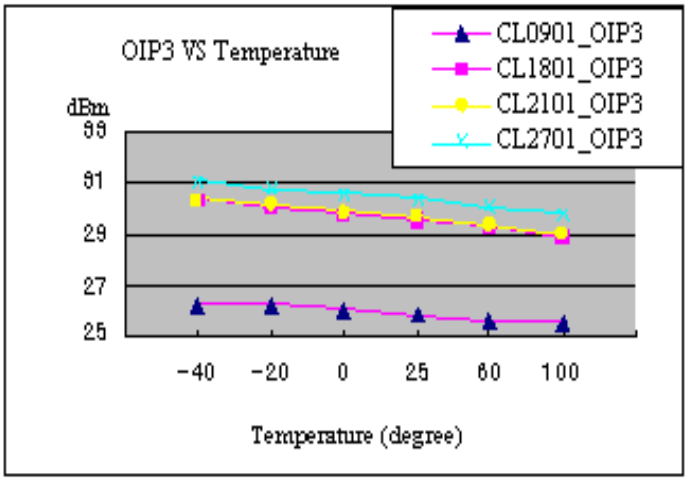
Noise Figure

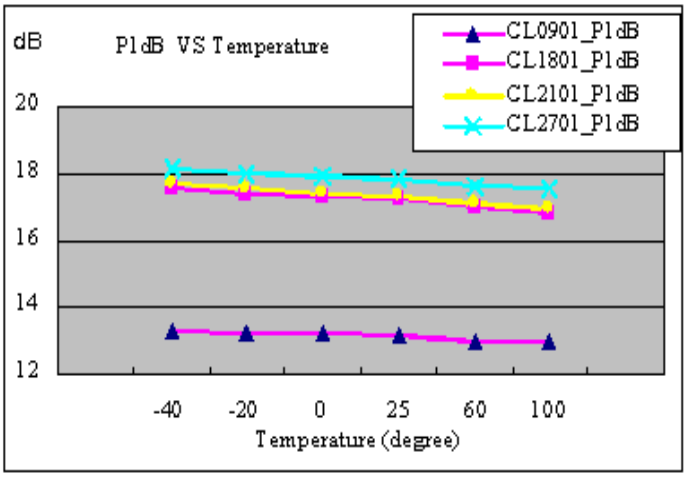


P1dB



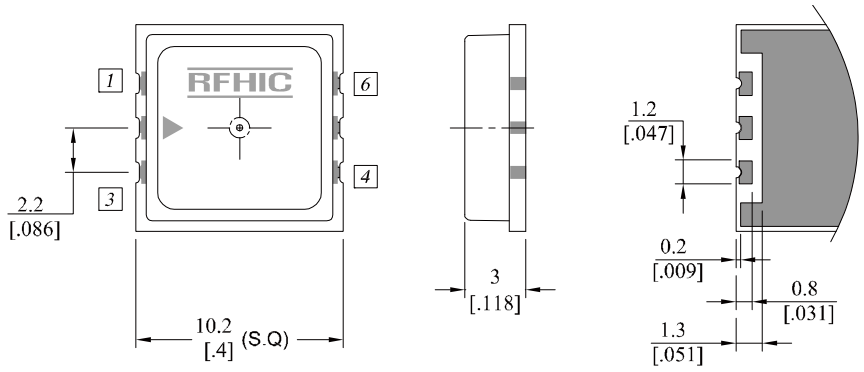

Gain VS Temperature
dB
CL0901_Gain
CL1801_Gain
CL2101_Gain
CL2701_Gain
20
18
16
14
12
-40
-20
0
25
60
100
Temperature (degree)


OIP3 VS Temperature
dBm
CL0901_OIP3
CL1801_OIP3
CL2101_OIP3
CL2701_OIP3
31
29
27
25
-40
-20
0
25
60
100
Temperature (degree)


P1dB VS Temperature
dB
CL0901_P1dB
CL1801_P1dB
CL2101_P1dB
CL2701_P1dB
20
18
16
14
12
-40
-20
0
25
60
100
Temperature (degree)

Package Dimensions (Type: CP-16A)

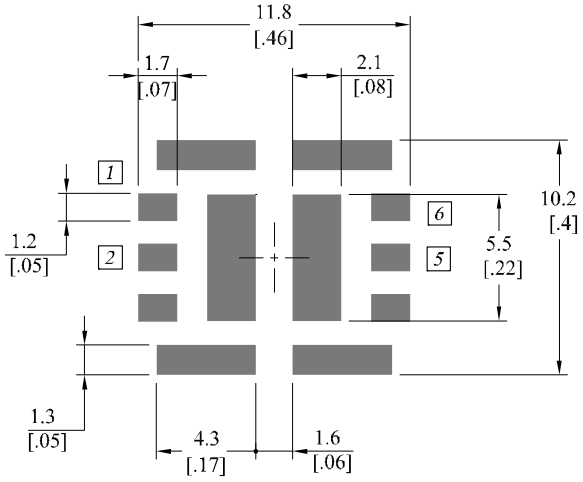
* Unit: mm[inch] | Tolerance ±0.15[.006]



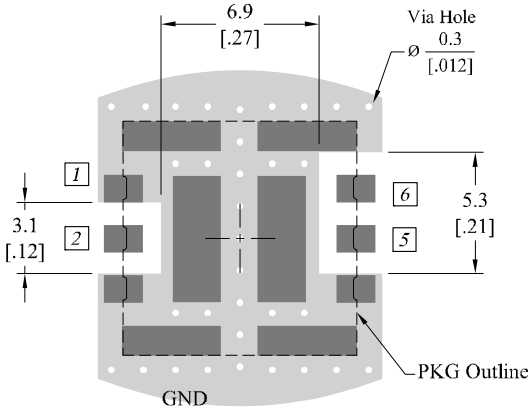
▲ Top View ▲ Side View ▲ Bottom View

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
CL0901-L CL1501-L CL1801-L CL2101-L	2012.10.19	6.3	New datasheet format	-
CL0901-L CL1501-L CL1801-L CL2101-L	2012.2.18	6.2	-	-