

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 : 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	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 3 rd 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 ($V_{dc}=+5V$)	mA	100	100	90	100	100

Test Condition

- ① Supply voltage = +5V, 50ohm System, $T_a = 25^\circ C$
- ② OIP3 is measured with two tones, at an output power of +0dBm/tone separated by 1MHz.

Noise Figure

CL0902-L(Cell)

* Agilent 11:01:57 May 17, 2007			
DUT Amplifier Sys Downconv Off			
Freq	NoiseFig dB	Gain dB	
824.0000 MHz	0.711	20.577	
829.0000 MHz	0.712	20.577	
834.0000 MHz	0.696	20.510	
839.0000 MHz	0.696	20.407	
844.0000 MHz	0.613	20.300	
849.0000 MHz	0.705	20.089	
854.0000 MHz	0.646	19.938	
859.0000 MHz	0.583	19.795	
864.0000 MHz	0.621	19.645	
869.0000 MHz	0.745	19.495	
874.0000 MHz	0.711	19.470	
879.0000 MHz	0.635	19.503	
884.0000 MHz	0.658	19.510	
889.0000 MHz	0.655	19.512	
894.0000 MHz	0.612	19.535	
Start 824.00 MHz	BW 4 MHz	Points 15	Stop 894.00 MHz
Tcold 302.90 K	Avg Off	Att 0 dB	Loss Off Corr
Frequency			
Freq Mode Sweep			
Start Freq 824.000000 MHz			
Stop Freq 894.000000 MHz			
Center Freq 859.000000 MHz			
Freq Span 70.000000 MHz			
Fixed Freq 1.50500000 GHz			
More 1 of 2			

CL0902-L(GSM)

* Agilent 11:01:14 May 17, 2007			
DUT Amplifier Sys Downconv Off			
Freq	NoiseFig dB	Gain dB	
890.0000 MHz	0.642	19.532	
895.0000 MHz	0.633	19.566	
900.0000 MHz	0.671	19.559	
905.0000 MHz	0.658	19.499	
910.0000 MHz	0.584	19.460	
915.0000 MHz	0.642	19.342	
920.0000 MHz	0.673	19.221	
925.0000 MHz	0.569	19.149	
930.0000 MHz	0.582	19.055	
935.0000 MHz	0.618	18.898	
940.0000 MHz	0.600	18.817	
945.0000 MHz	0.593	18.816	
950.0000 MHz	0.616	18.800	
955.0000 MHz	0.538	18.862	
960.0000 MHz	0.559	18.843	
Start 890.00 MHz	BW 4 MHz	Points 15	Stop 960.00 MHz
Tcold 302.73 K	Avg Off	Att 0 dB	Loss Off Corr
Frequency			
Freq Mode Sweep			
Start Freq 890.000000 MHz			
Stop Freq 960.000000 MHz			
Center Freq 925.000000 MHz			
Freq Span 70.000000 MHz			
Fixed Freq 1.50500000 GHz			
More 1 of 2			

CL1502-L

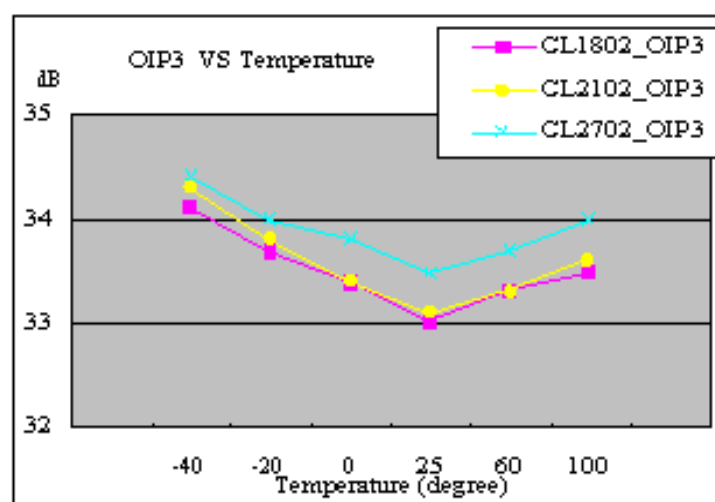
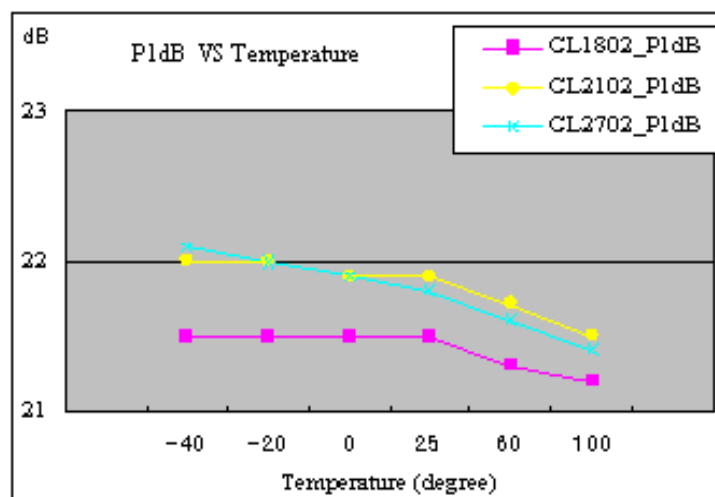
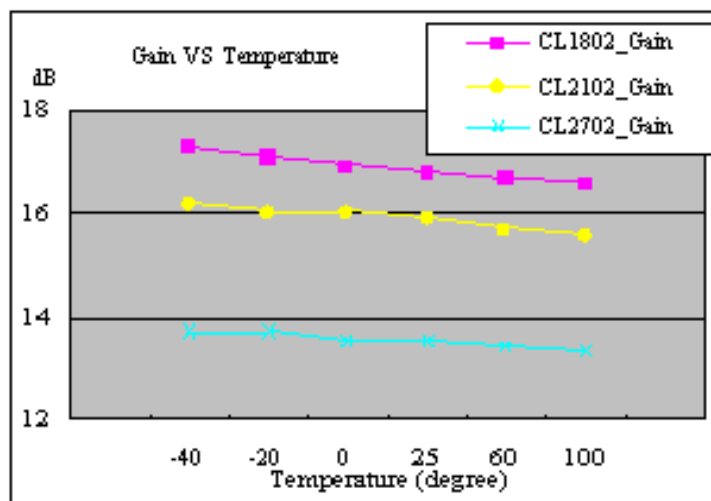
* Agilent 09:19:19 May 22, 2007			
DUT Amplifier Sys Downconv Off			
Freq	NoiseFig dB	Gain dB	
1.400000 GHz	0.586	17.762	
1.414286 GHz	0.586	18.017	
1.428571 GHz	0.578	17.422	
1.442857 GHz	0.657	16.726	
1.457143 GHz	0.604	16.960	
1.471429 GHz	0.539	17.627	
1.485714 GHz	0.570	17.234	
1.500000 GHz	0.577	16.576	
1.514286 GHz	0.513	16.550	
1.528571 GHz	0.587	16.938	
1.542857 GHz	0.534	16.704	
1.557143 GHz	0.551	16.265	
1.571429 GHz	0.505	16.391	
1.585714 GHz	0.496	16.787	
1.600000 GHz	0.564	16.488	
Start 1.40000 GHz	BW 4 MHz	Points 15	Stop 1.60000 GHz
Tcold 302.90 K	Avg Off	Att 0 dB	Loss Off Corr
Frequency			
Freq Mode Sweep			
Start Freq 1.40000000 GHz			
Stop Freq 1.60000000 GHz			
Center Freq 1.50000000 GHz			
Freq Span 200.000000 MHz			
Fixed Freq 1.50500000 GHz			
More 1 of 2			

CL1802-L

* Agilent 09:24:27 May 22, 2007			
DUT Amplifier Sys Downconv Off			
Freq	NoiseFig dB	Gain dB	
1.750000 GHz	0.578	15.278	
1.758571 GHz	0.643	15.438	
1.767143 GHz	0.621	15.563	
1.775714 GHz	0.575	15.485	
1.784286 GHz	0.610	15.206	
1.792857 GHz	0.626	15.053	
1.801429 GHz	0.606	15.026	
1.810000 GHz	0.554	15.128	
1.818571 GHz	0.600	15.147	
1.827143 GHz	0.609	15.090	
1.835714 GHz	0.582	14.880	
1.844286 GHz	0.616	14.607	
1.852857 GHz	0.613	14.488	
1.861429 GHz	0.602	14.569	
1.870000 GHz	0.599	14.816	
Start 1.75000 GHz	BW 4 MHz	Points 15	Stop 1.87000 GHz
Tcold 303.15 K	Avg Off	Att 0 dB	Loss Off Corr
Frequency			
Freq Mode Sweep			
Start Freq 1.75000000 GHz			
Stop Freq 1.87000000 GHz			
Center Freq 1.81000000 GHz			
Freq Span 120.000000 MHz			
Fixed Freq 1.50500000 GHz			
More 1 of 2			

CL2102-L

* Agilent 09:31:14 May 22, 2007			
DUT Amplifier Sys Downconv Off			
Freq	NoiseFig dB	Gain dB	
1.920000 GHz	0.508	14.575	
1.937857 GHz	0.557	14.656	
1.955714 GHz	0.589	14.467	
1.973571 GHz	0.500	14.457	
1.991429 GHz	0.572	14.424	
2.009286 GHz	0.602	14.225	
2.027143 GHz	0.624	13.973	
2.045000 GHz	0.536	14.151	
2.062857 GHz	0.577	13.949	
2.080714 GHz	0.578	13.706	
2.098571 GHz	0.653	13.715	
2.116429 GHz	0.646	13.812	
2.134286 GHz	0.531	13.565	
2.152143 GHz	0.617	13.396	
2.170000 GHz	0.590	13.555	
Start 1.92000 GHz	BW 4 MHz	Points 15	Stop 2.17000 GHz
Tcold 303.52 K	Avg Off	Att 0 dB	Loss Off Corr
Frequency			
Freq Mode Sweep			
Start Freq 1.92000000 GHz			
Stop Freq 2.17000000 GHz			
Center Freq 2.04500000 GHz			
Freq Span 250.000000 MHz			
Fixed Freq 1.50500000 GHz			
More 1 of 2			

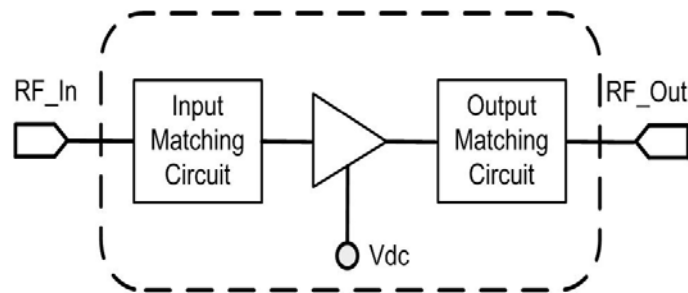


Absolute Maximum Ratings*

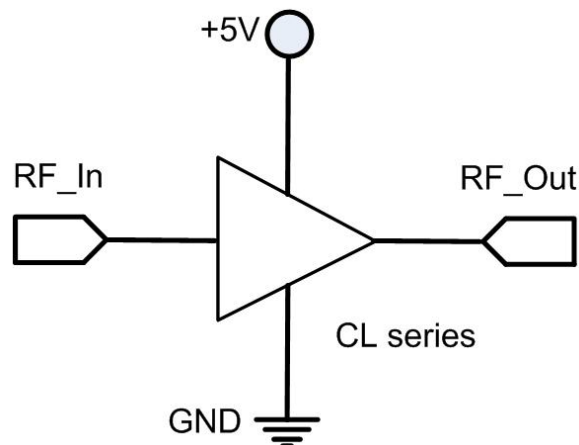
PARAMETER	Unit	Rating	Remark
Device Voltage	V	+8	
RF Input Power	dBm	+25	
Operating Temperature	°C	-40 to +85	
Storage Temperature	°C	-50 to +125	

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

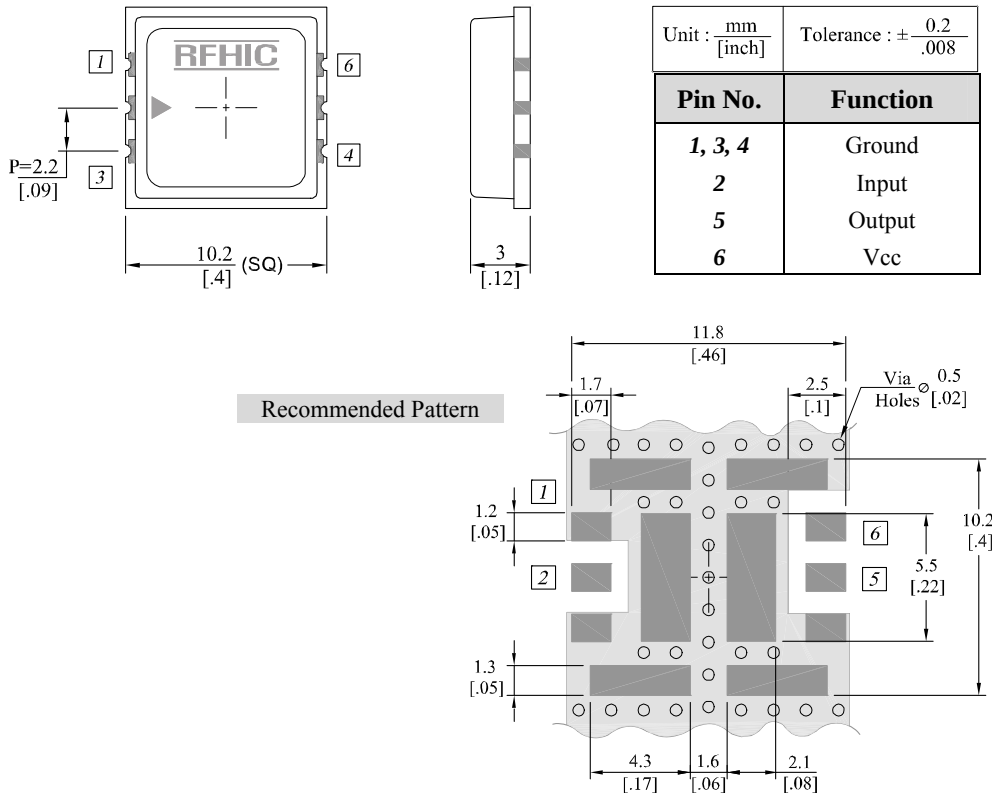
Functional Diagram



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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