# HMC751LC4

v01.0514

## SMT PHEMT LOW NOISE AMPLIFIER, 17 - 27 GHz

## Typical Applications

The HMC751LC4 is ideal for:

- Point-to-Point Radios
- Point-to-Multi-Point Radios & VSAT
- Test Equipment and Sensors
- Military

## Features

Noise Figure: 2.2 dB

Gain: 25 dB

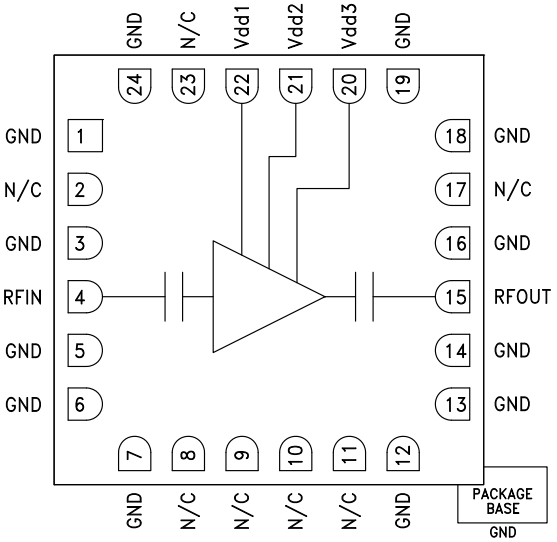
OIP3: +25 dBm

Single Supply: +4V @ 73 mA

50 Ohm Matched Input/Output

RoHS Compliant 4 x 4 mm Package

## Functional Diagram




## General Description

The HMC751LC4 is a high dynamic range GaAs pHEMT MMIC Low Noise Amplifier (LNA) housed in a leadless “Pb free” RoHS compliant SMT package. The HMC751LC4 provides 25 dB of small signal gain, 2.2 dB of noise figure and output IP3 of +25 dBm. The P1dB output power of +13 dBm also enables the LNA to function as a LO driver for balanced, I/Q or image reject mixers. The HMC751LC4 allows the use of surface mount manufacturing techniques.

## Electrical Specifications, $T_A$ = +25° C, Vdd 1, 2, 3 = +4V

| Parameter | Min. | Typ. | Max. | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|---|
| Frequency Range | | 17 - 20 | | | 20 - 27 | | GHz |
| Gain | 22 | 24 | | 23 | 25 | | dB |
| Gain Variation Over Temperature | | 0.025 | | | 0.028 | | dB/ °C |
| Noise Figure | | 2.2 | 2.8 | | 2.0 | 2.6 | dB |
| Input Return Loss | | 17 | | | 15 | | dB |
| Output Return Loss | | 16 | | | 15 | | dB |
| Output Power for 1 dB Compression (P1dB) | | 13 | | | 13 | | dBm |
| Saturated Output Power (Psat) | | 15 | | | 15 | | dBm |
| Output Third Order Intercept (IP3) | | 25 | | | 25 | | dBm |
| Supply Current (Idd)(Vdd = +4V) | 50 | 73 | 90 | 50 | 73 | 90 | mA |



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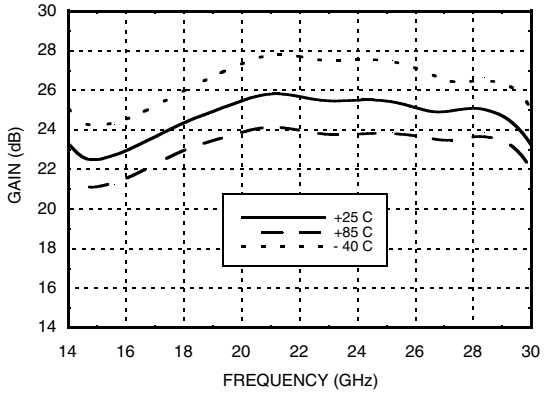
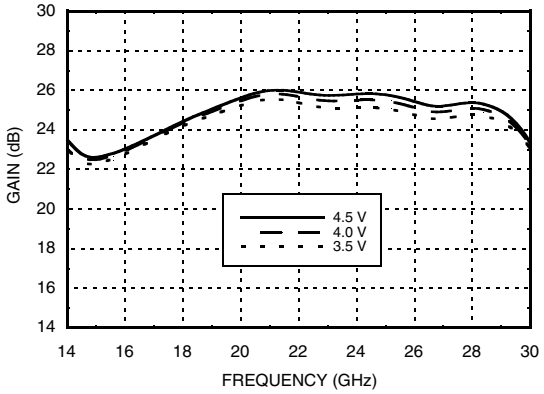
## SMT PHEMT LOW NOISE AMPLIFIER, 17 - 27 GHz

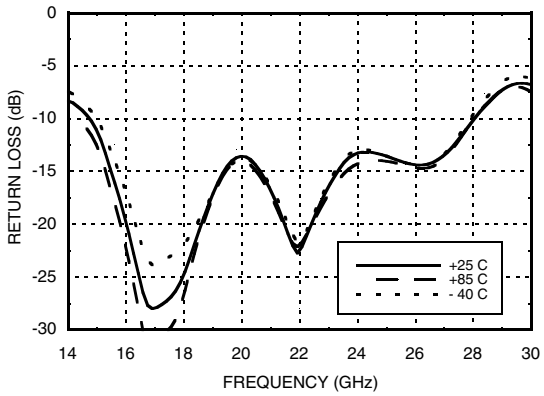
### Gain vs. Temperature



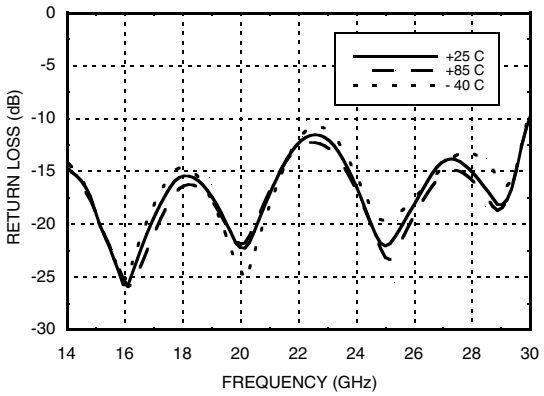

### Gain vs. Supply Voltage



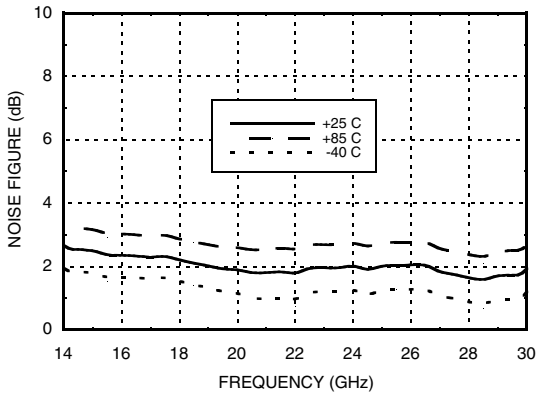

### Input Return Loss vs. Temperature



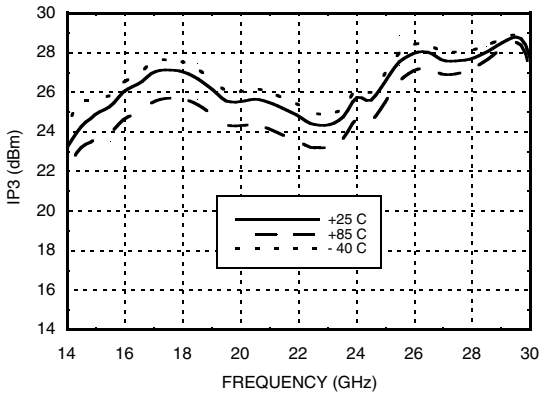

### Output Return Loss vs. Temperature




### Noise Figure vs. Temperature




### Output IP3 vs. Temperature





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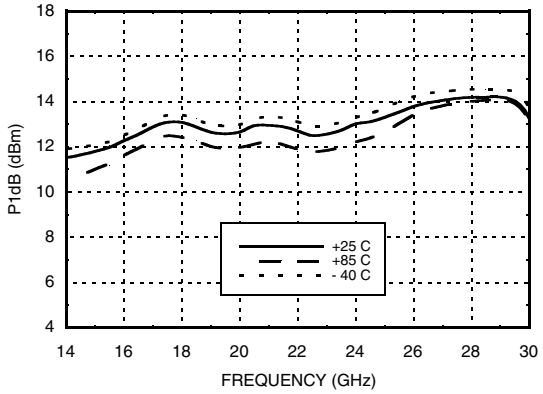
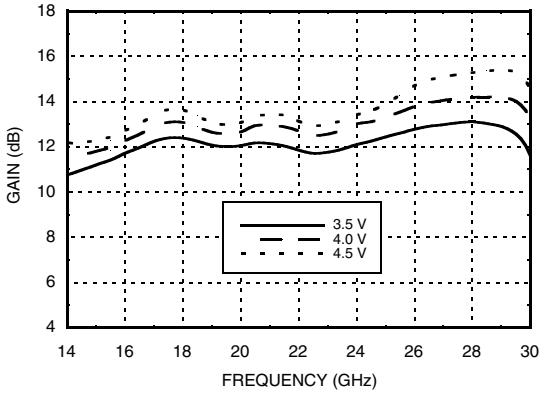
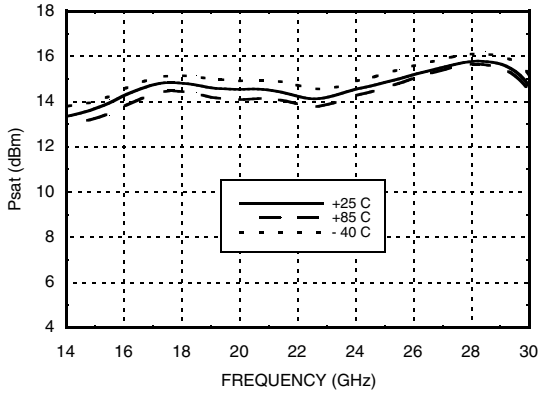
### P1dB vs. Temperature



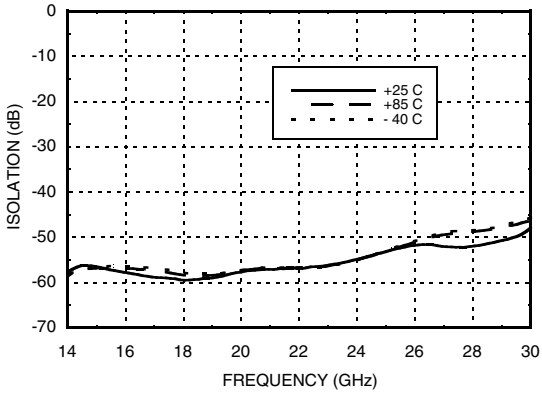

### P1dB vs. Supply Voltage



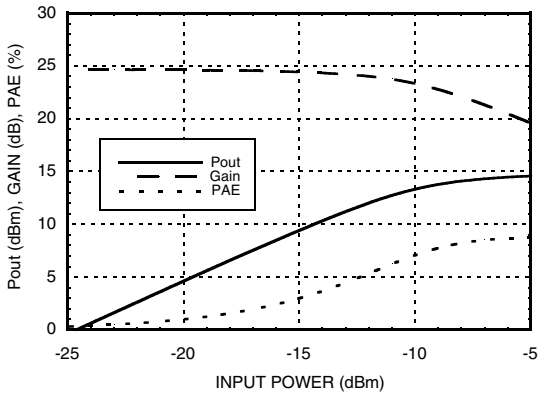

### Psat vs. Temperature




### Reverse Isolation vs. Temperature




### Power Compression @ 21 GHz



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## Absolute Maximum Ratings

| | |
|---|---|
| Drain Bias Voltage (Vdd1, Vdd2, Vdd3) | +5.5 Vdc |
| RF Input Power (RFIN)(Vdd = +4 Vdc) | -5 dBm |
| Channel Temperature | 175 °C |
| Continuous Pdiss (T= 85 °C) (derate 11.2 mW/°C above 85 °C) | 1 W |
| Thermal Resistance (channel to ground paddle) | 89 °C/W |
| Storage Temperature | -65 to +150 °C |
| Operating Temperature | -40 to +85 °C |

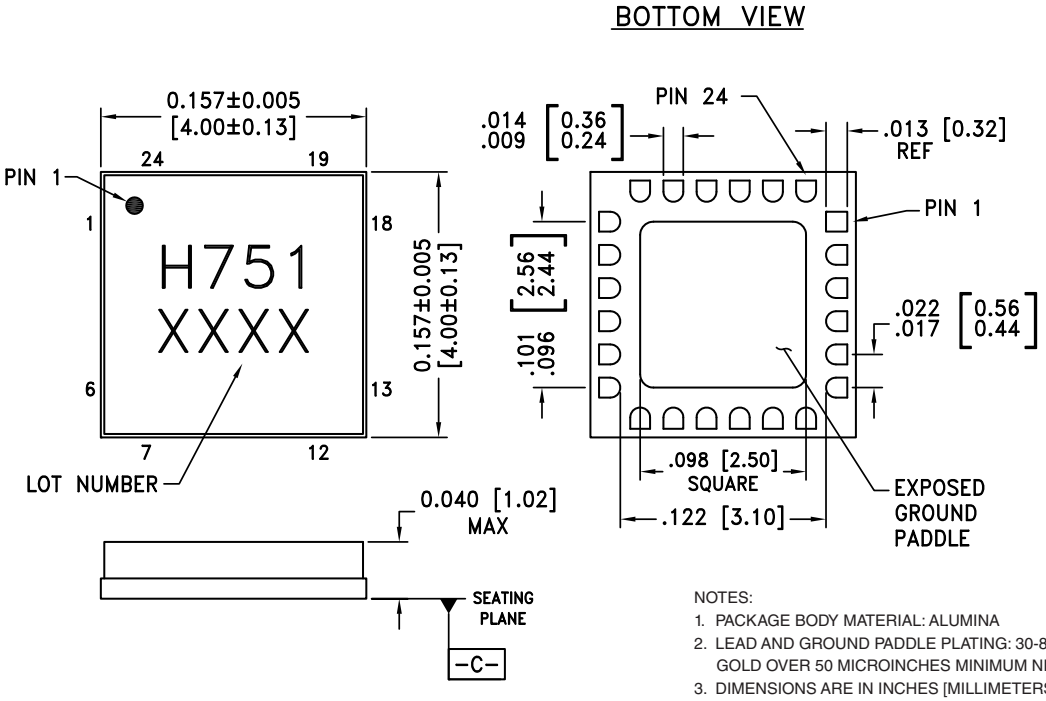
## Typical Supply Current vs. Vdd

| Vdd (Vdc) | Idd (mA) |
|---|---|
| +3.5 | 69 |
| +4.0 | 73 |
| +4.5 | 77 |

*Note: Amplifier will operate over full voltage range shown above.*

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

## Outline Drawing




NOTES:

1. PACKAGE BODY MATERIAL: ALUMINA
2. LEAD AND GROUND PADDLE PLATING: 30-80 MICROINCHES GOLD OVER 50 MICROINCHES MINIMUM NICKEL
3. DIMENSIONS ARE IN INCHES [MILLIMETERS]
4. LEAD SPACING TOLERANCE IS NON-CUMULATIVE
5. PACKAGE WARP SHALL NOT EXCEED 0.05mm DATUM
6. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND

## Package Information

| Part Number | Package Body Material | Lead Finish | MSL Rating | Package Marking [2] |
|---|---|---|---|---|
| HMC751LC4 | Alumina, White | Gold over Nickel | MSL3 [1] | H751<br>XXXX |

[1] Max peak reflow temperature of 260 °C
[2] 4-Digit lot number XXXX



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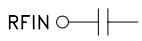
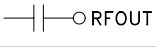
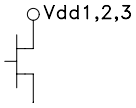
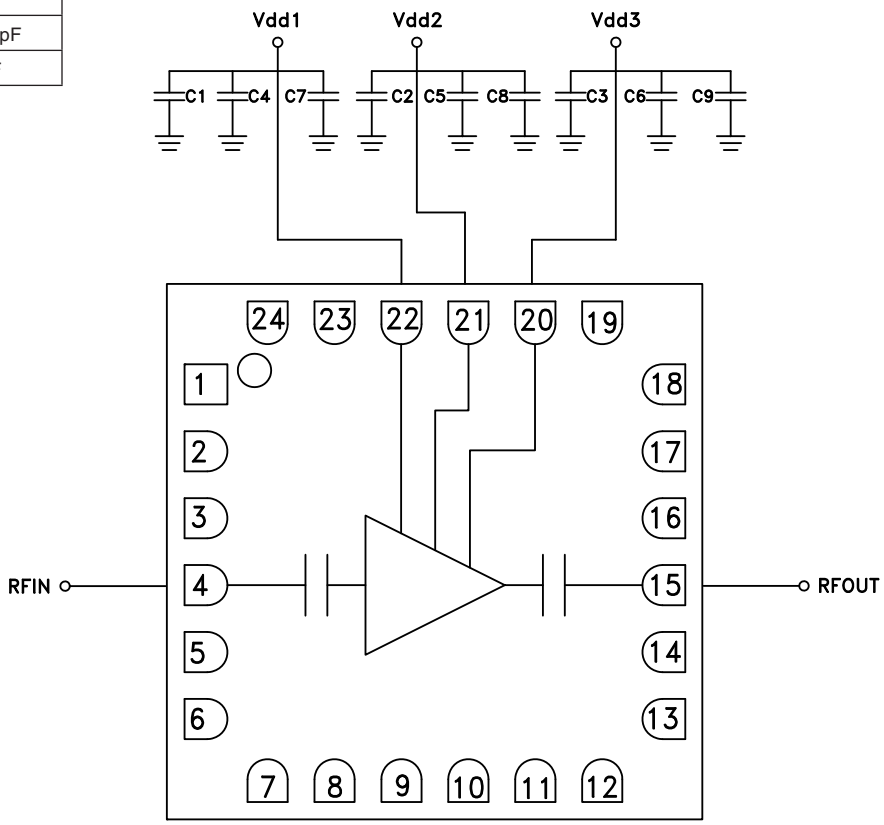
## Pin Descriptions

| Pin Number | Function | Description | Interface Schematic |
|---|---|---|---|
| 1, 3, 5 - 7, 12 - 14, 16, 18, 19, 24 | GND | These pins and package bottom must be connected to RF/DC ground. |   |
| 2, 8 - 11, 17, 23 | N/C | This pin may be connected to RF/DC ground. Performance will not be affected. | |
| 4 | RFIN | This pin is AC coupled and matched to 50 Ohms. |   |
| 15 | RFOUT | This pin is AC coupled and matched to 50 Ohms. |   |
| 22, 21, 20 | Vdd1, 2, 3 | Power Supply Voltage for the amplifier. External bypass capacitors of 100 pF, 1,000 pF and 2.2 µF are required. |   |

## Application Circuit

| Component | Value |
|---|---|
| C1, C2, C3 | 100 pF |
| C4, C5, C6 | 1,000 pF |
| C7, C8, C9 | 2.2 µF |



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