

HMC963LC4



Typical Applications

This HMC963LC4 is ideal for:

- Point-to-Point Radios
- · Point-to-Multi-Point Radios
- Military & Space
- Test Instrumentation

GaAs pHEMT MMIC LOW NOISE AMPLIFIER, 6 - 26.5 GHz

Features

Low Noise Figure: 2.5 dB High Gain: 22 dB P1dB Output Power: 10 dBm Single Supply Voltage: +3.5V @ 45mA Output IP3: +18 dBm 50 Ohm matched Input/Output 24 Lead 4x4 mm SMT Package: 16mm²

General Description

The HMC963LC4 is a self-biased GaAs MMIC Low Noise Amplifier housed in a leadless 4x4 mm ceramic surface mount package. The amplifier operates between 6 and 26.5 GHz, providing 20 dB of small signal gain, 2.5 dB noise figure, and output IP3 of +18 dBm, while requiring only 45 mA from a +3.5 V supply. The P1dB output power of +10 dBm enables the LNA to function as a LO driver for balanced, I/Q or image reject mixers. The HMC963LC4 also features I/Os that are DC blocked and internally matched to 50 Ohms, making it ideal for high capacity microwave radios and VSAT applications.

Functional Diagram Vdd2 /dd1 N/C N/C N/C



Electrical Specifications, $T_{A} = +25^{\circ}$ C, Vdd1 = Vdd2 = +3.5V, Idd = 45 mA

Parameter	Min.	Тур.	Max.	Units	
Frequency Range	6 - 26.5			GHz	
Gain	16.5	22		dB	
Gain Variation over Temperature		0.03		dB / °C	
Noise Figure ^[1]		2.5	3.5	dB	
Input Return Loss		10		dB	
Output Return Loss		10		dB	
Output Power for 1 dB Compression	7	10		dBm	
Saturated Output Power (Psat)		12		dBm	
Output Third Order Intercept (IP3)		18		dBm	
Supply Current (Idd) (Vdd = 3.5V, Vgg1 = Vgg2 = Open)		45	70	mA	
[1] Board loss subtracted out.					

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HMC963LC4



Broadband Gain & Return Loss



Input Return Loss vs. Temperature



Noise Figure vs. Temperature [1]



[1] Board loss subtracted out.

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Gain vs. Temperature



Output Return Loss vs. Temperature



Output IP3 vs. Temperature



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P1dB vs. Temperature



Reverse Isolation vs. Temperature



Power Compression @ 16 GHz



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Psat vs. Temperature



Power Compression @ 8 GHz



Power Compression @ 24 GHz



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HMC963LC4 v03.0223



Current vs. Input Power @ 16 GHz



GaAs pHEMT MMIC LOW NOISE AMPLIFIER, 6 - 26.5 GHz

Absolute Maximum Ratings

Drain Bias Voltage	+4V	
RF Input Power	0 dBm	
Channel Temperature	150 °C	
Continuous Pdiss (T = 85 °C) (derate 8 mW/°C above 85 °C)	0.52 W	
Thermal Resistance (Channel to ground paddle)	125 °C/W	
Storage Temperature	-65 to +150 °C	
Operating Temperature	-40 to +85 °C	
ESD Sensitivity (HBM)	Class 0 <150 V	

6. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO



ELECTROSTATIC SENSITIVE DEVICE **OBSERVE HANDLING PRECAUTIONS**



Outline Drawing

Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking ^[2]
HMC963LC4	Alumina, White	Gold over Nickel	MSL3 ^[1]	H963 XXXX
[1] Max peak reflow te	mperature of 260 °C			

PCB RF GROUND.

[2] 4-Digit lot number XXXX



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Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1, 2, 4, 15, 17, 18	GND	These pins and package bottom must be connected to RF/DC ground.	
3	RFIN	This pin AC coupled and matched to 50 Ohms	
5 - 14, 20, 22, 24	N/C	No connection necessary. These pins may be connected to RF/DC ground. Performance will not be affected.	
16	RFOUT	This pin AC coupled and matched to 50 Ohms	
19, 21, 23	Vdd1, Vdd2, Vdd3	Power supply voltages for the amplifier. Bypass capacitors are required. See application circuit herein.	Vdd1,2,3

Application Circuit



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