HMC635LC4

v02.0218

GaAs PHEMT MMIC DRIVER AMPLIFIER, 18 - 40 GHz

Typical Applications

The HMC635LC4 is ideal for:

- Point-to-Point Radios
- Point-to-Multi-Point Radios & VSAT
- LO Driver for Mixers
- Military & Space

Features

Gain: 18.5 dB [2]

P1dB: +22 dBm [2]

Output IP3: +27 dBm

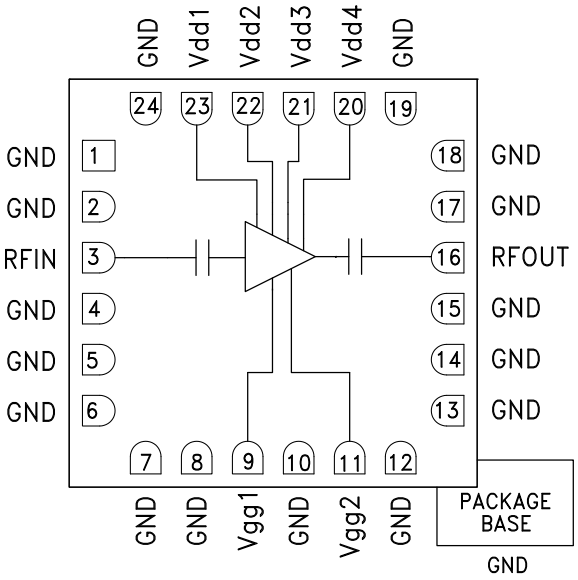
Saturated Power: +23.5 dBm @ 15% PAE [2]

Supply Voltage: +5V @ 280 mA

50 Ohm Matched Input/Output

24 Lead Ceramic 4x4mm SMT Package: $16mm^2$

Functional Diagram



General Description

The HMC635LC4 is a GaAs PHEMT MMIC Driver Amplifier die which operates between 18 and 40 GHz. The amplifier provides 18.5 dB of gain, +27 dBm Output IP3, and +22 dBm of output power at 1 dB gain compression, while requiring 280 mA from a +5V supply. Ideal as a driver amplifier for microwave radio applications, or as an LO driver for mixers operating between 18 and 40 GHz, the HMC635LC4 is capable of providing up to +23.5 dBm of saturated output power at 15% PAE. The amplifier's I/Os are DC blocked and internally matched to 50 Ohms making it ideal for integration into Multi-Chip-Modules (MCMs).

Electrical Specifications

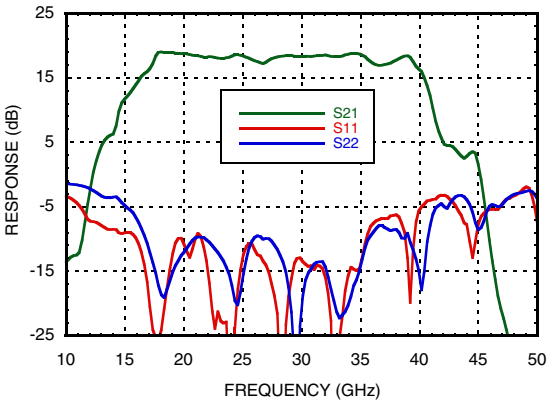
T_A = +25° C, Vdd= Vdd1, 2, 3, 4 = +5V, Idd= Idd1 + Idd2 + Idd3 + Idd4 = 280mA [1]

Parameter	Min.	Typ.	Max.	Min.	Typ.	Max.	Units
Frequency Range		18 - 36			36 - 40		GHz
Gain [2]	15	18.5		15	17.5		dB
Gain Variation Over Temperature		0.045	0.06		0.045	0.06	dB/ °C
Input Return Loss		13			7		dB
Output Return Loss		10			7		dB
Output Power for 1 dB Compression (P1dB) [2]	19	22		16	21		dBm
Saturated Output Power (Psat) [2]		23.5			21.5		dBm
Output Third Order Intercept (IP3)	22	27		21	26		dBm
Noise Figure [2]		7			7		dB
Total Supply Current (Idd1 + Idd2 + Idd3 + Idd4)		280			280		mA

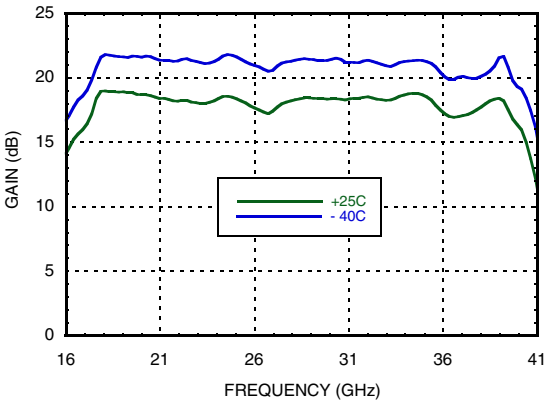
[1] Adjust Vgg1 = Vgg2 between -2 to 0V to achieve Idd= 280 mA Typical.
[2] Board loss subtracted out for gain, power and noise figure measurements.

For price, delivery, and to place orders: Analog Devices, Inc., One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106
Phone: 781-329-4700 • Order online at www.analog.com
Application Support: Phone: 1-800-ANALOG-D

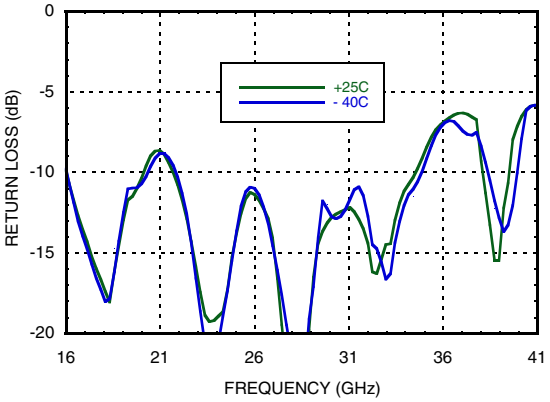
Broadband Gain & Return Loss [1]



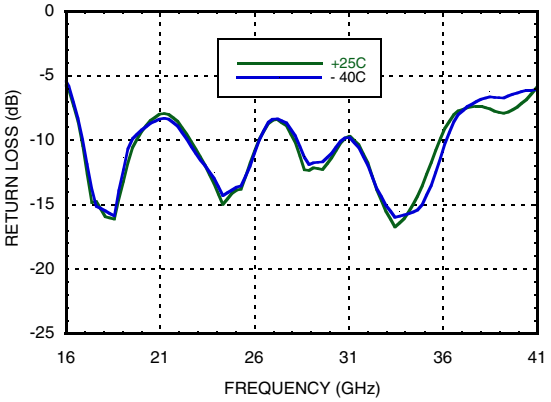
Gain vs. Temperature [1]



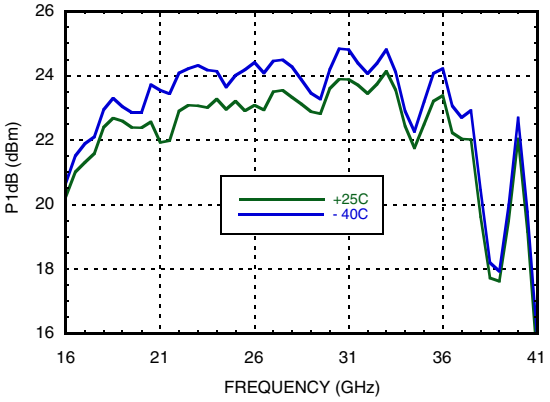
Input Return Loss vs. Temperature



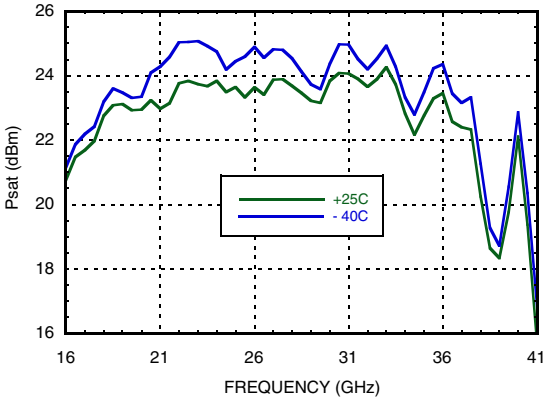
Output Return Loss vs. Temperature



P1dB vs. Temperature [1]

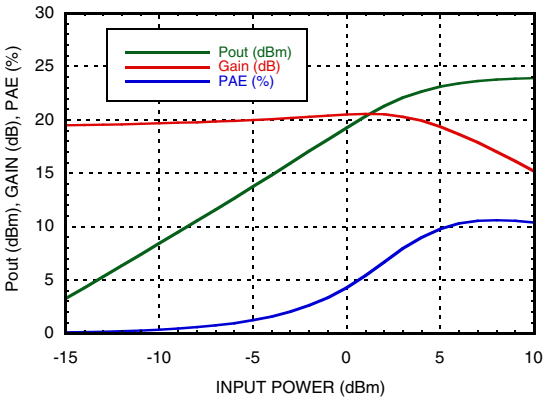


Psat vs. Temperature [1]

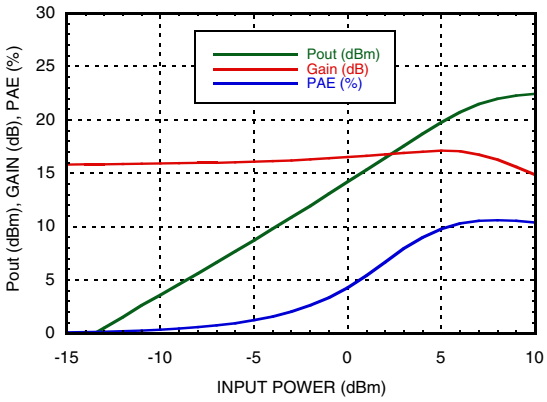


[1] Board loss subtracted out for gain, power and noise figure measurements.

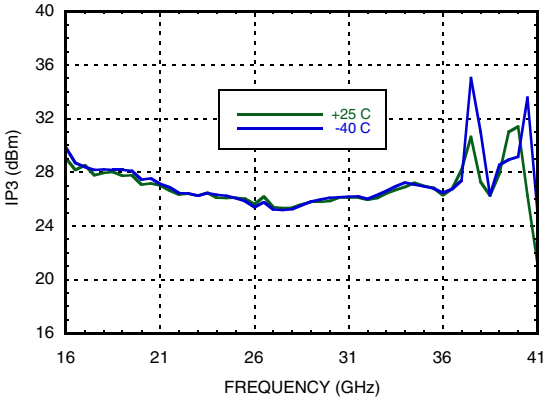
Power Compression @ 30 GHz [1]



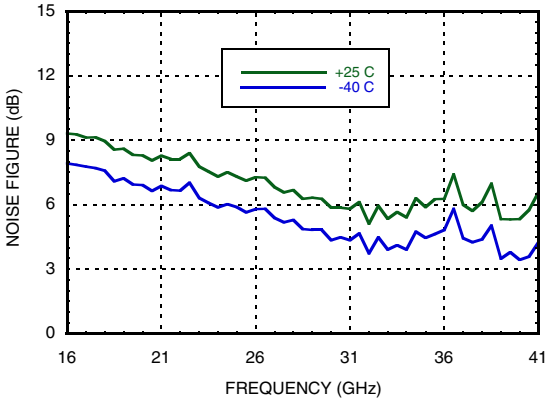
Power Compression @ 40 GHz [1]



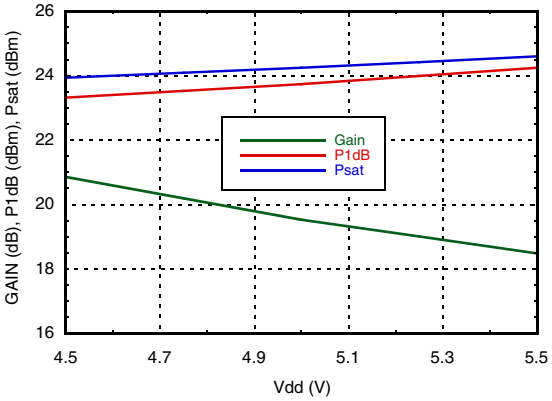
Output IP3 vs. Temperature



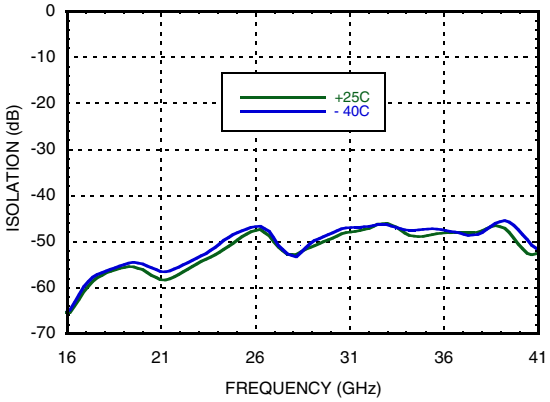
Noise Figure vs. Temperature [1]



Gain & Power vs. Supply Voltage @ 30 GHz [1]



Reverse Isolation vs. Temperature



[1] Board loss subtracted out for gain, power and noise figure measurements.

GaAs PHEMT MMIC DRIVER AMPLIFIER, 18 - 40 GHz

Absolute Maximum Ratings

Drain Bias Voltage (Vdd1, 2, 3, 4)	+5.5V
Gate Bias Voltage (Vgg1, Vgg2)	-3 to 0V
RF Input Power (RFIN)(Vdd = +5 Vdc)	15 dBm
Channel Temperature	175 °C
Continuous Pdiss (T= 70 °C) (derate 15.1 mW/°C above 70 °C)	1.575 W
Thermal Resistance (channel to package base)	66.4 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-55 to +85 °C

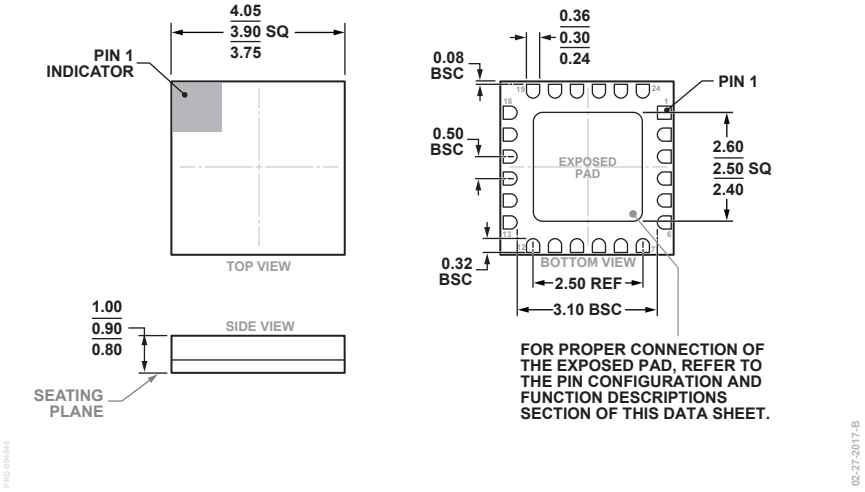
Typical Supply Current vs. Vdd

Vdd (V)	Idd (mA)
4.5	277
5.0	280
5.5	286

Note: Amplifier will operate over full voltage ranges shown above

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Outline Drawing



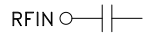
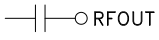
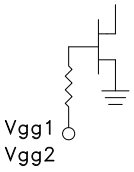
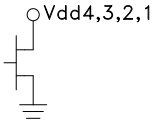
24-Terminal Ceramic Leadless Chip Carrier [LCC]
(E-24-1)
Dimensions shown in millimeters.

Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking [2]
HMC635LC4	Alumina, White	Gold over Nickel	MSL3 [1]	H635 XXXX

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

Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1, 2, 4 - 8, 10, 12 - 15, 17 - 19, 24, Ground Paddle	GND	These pins and package bottom must be connected to RF/DC ground	
3	RFIN	This pad is AC coupled and matched to 50 Ohms.	
16	RFOUT	This pad is AC coupled and matched to 50 Ohms.	
9, 11	Vgg1, Vgg2	Gate control for amplifier, please follow "MMIC Amplifier Biasing Procedure" application note. See assembly diagram for required external components.	
20 - 23	Vdd4 - Vdd1	Power Supply Voltage for the amplifier. See assembly diagram for required external components.	

Application Circuit