GaAs PHEMT MEDIUM POWER AMPLIFIER, 17 - 24 GHz

Typical Applications

The HMC498LC4 is ideal for use as a LNA or Driver amplifier for:

- Point-to-Point Radios
- Point-to-Multi-Point Radios & VSAT
- Test Equipment & Sensors
- Military End-Use

Features

Output IP3: +36 dBm

Saturated Power: +26 dBm @ 23% PAE

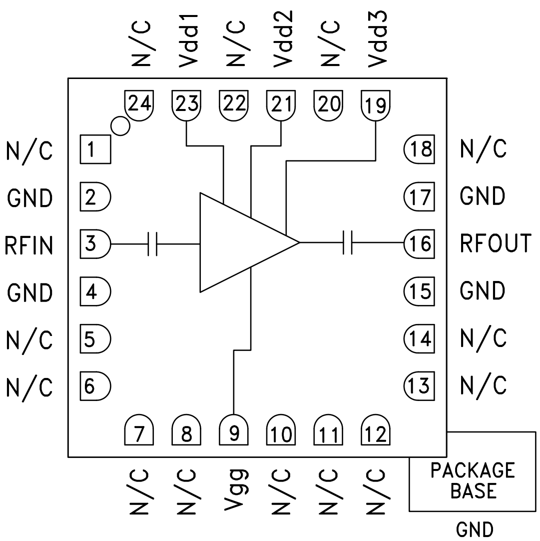
Gain: 22 dB

+5V @ 250 mA Supply

50 Ohm Matched Input/Output

RoHS Compliant 4x4 mm SMT Package

Functional Diagram



General Description

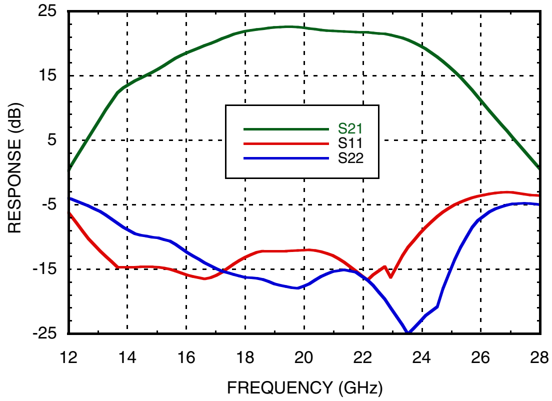
The HMC498LC4 is a high dynamic range GaAs PHEMT MMIC Medium Power Amplifier housed in a leadless “Pb free” SMT package. Operating from 17 to 24 GHz, the amplifier provides 22 dB of gain, +26 dBm of saturated power and 23% PAE from a +5V supply voltage. Noise figure is 4 dB while output IP3 is +36 dBm typical enabling the HMC498LC4 to function as a low noise front end as well as a driver amplifier. The RF I/Os are DC blocked and matched to 50 Ohms for ease of use. The HMC498LC4 eliminates the need for wire bonding, allowing use of surface mount manufacturing techniques.

Electrical Specifications, T_A = +25° C, Vdd1, 2, 3 = 5V, Idd = 250 mA*

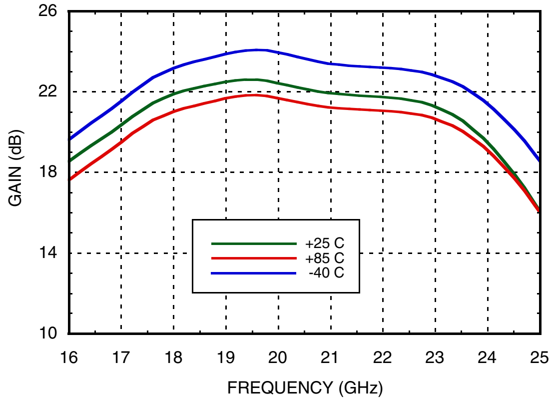
Parameter	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Units
Frequency Range		17 - 19			19 - 23			23 - 24		GHz
Gain	18	22		20	22.5		18	21		dB
Gain Variation Over Temperature		0.02	0.03		0.02	0.03		0.02	0.03	dB/ °C
Input Return Loss		13			13			10		dB
Output Return Loss		15			15			20		dB
Output Power for 1 dB Compression (P1dB)	22	25		21.5	24.5		22.5	25.5		dBm
Saturated Output Power (Psat)		26.5			25.5			26.5		dBm
Output Third Order Intercept (IP3)		35			36			35.5		dBm
Noise Figure		4.0			4.0			4.5		dB
Supply Current (Idd)(Vdd = +5V, Vgg = -0.8V Typ.)		250			250			250		mA

* Adjust Vgg between -2 to 0V to achieve Idd = 250 mA typical.

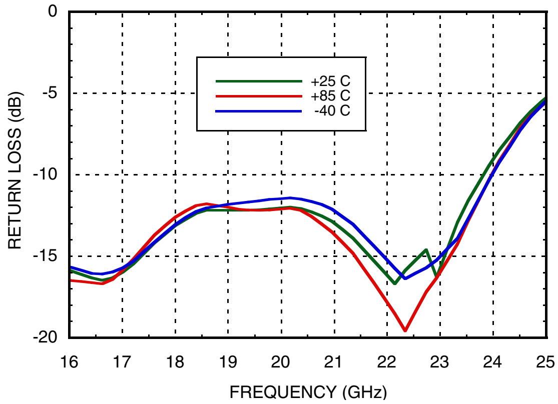
Broadband Gain & Return Loss



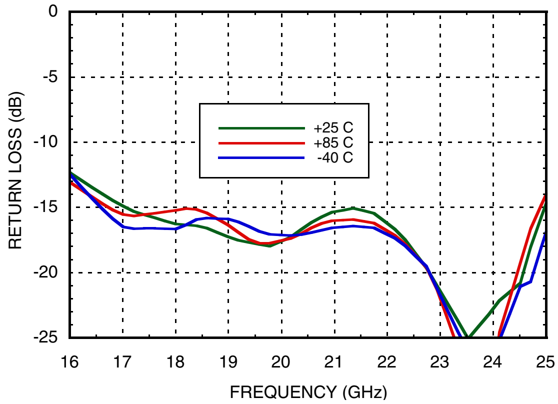
Gain vs. Temperature



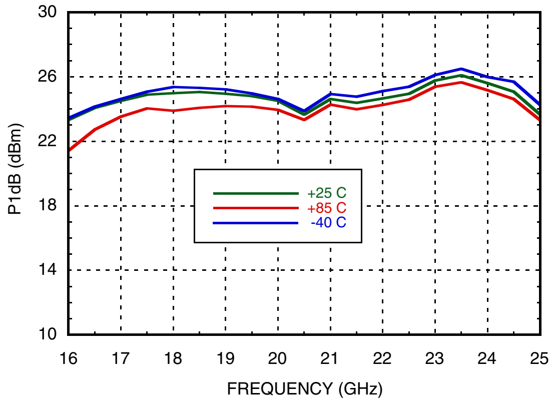
Input Return Loss vs. Temperature



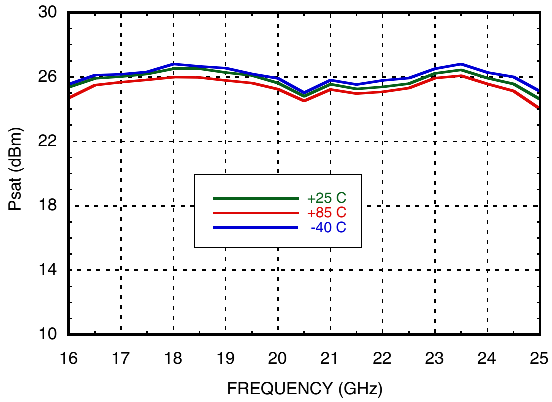
Output Return Loss vs. Temperature



P1dB vs. Temperature



Psat vs. Temperature



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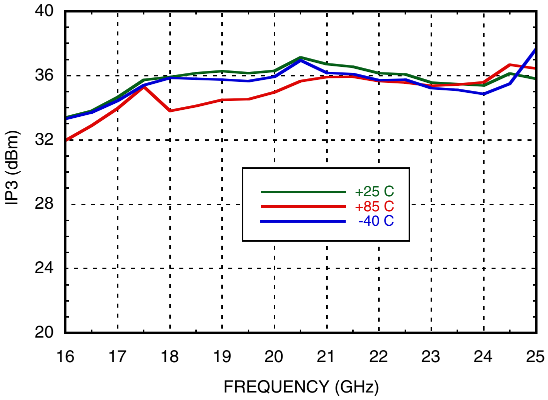
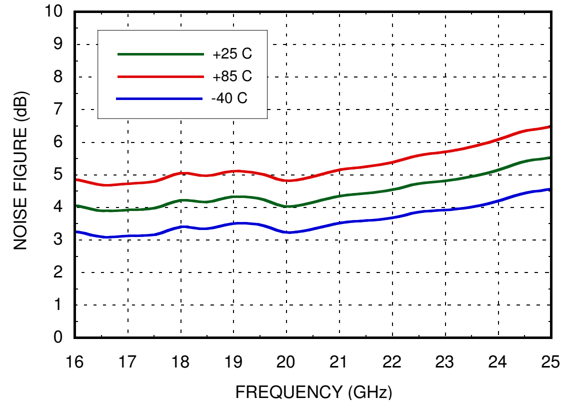
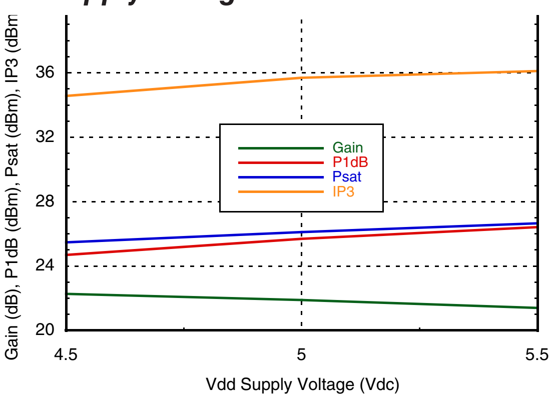
Output IP3 vs. Temperature



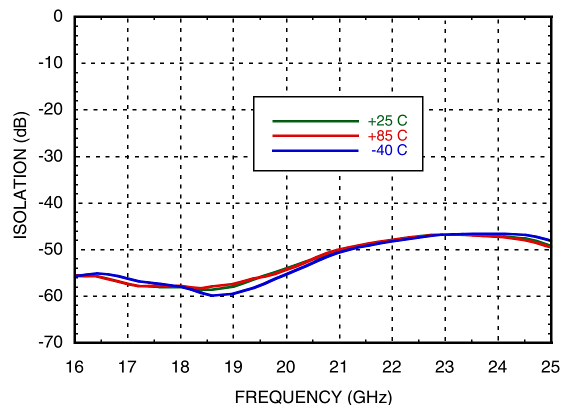
Noise Figure vs. Temperature



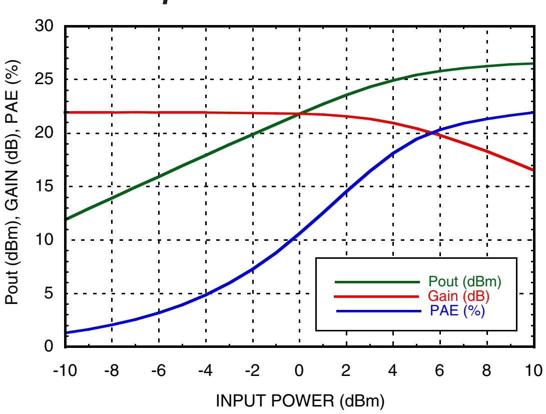
Gain, Power & OIP3 vs. Supply Voltage @ 23 GHz



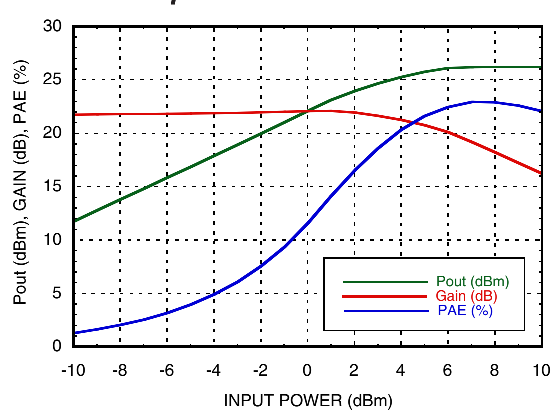
Reverse Isolation vs. Temperature



Power Compression @ 18 GHz



Power Compression @ 23 GHz



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Absolute Maximum Ratings

Drain Bias Voltage (Vdd1, Vdd2, Vdd3)	+5.5 Vdc
Gate Bias Voltage (Vgg)	-4.0 to 0 Vdc
RF Input Power (RFIN)(Vdd = +5Vdc)	+10 dBm
Channel Temperature	175 °C
Continuous Pdiss (T= 85 °C) (derate 18 mW/°C above 85 °C)	1.62 W
Thermal Resistance (channel to ground paddle)	55.6 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C
ESD Sensitivity (HBM)	Class 1A

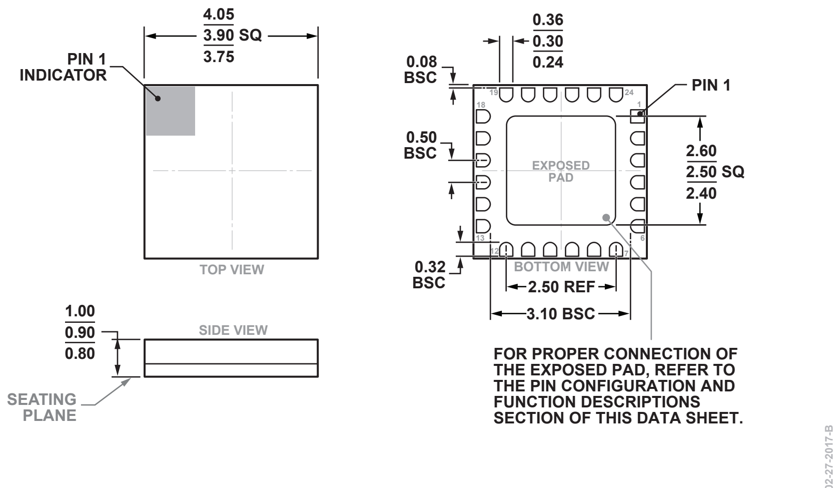
Typical Supply Current vs. Vdd

Vdd (Vdc)	Idd (mA)
+4.5	239
+5.0	250
+5.5	262

Note: Amplifier will operate over full voltage ranges shown above. Vgg adjusted to achieve Idd= 250 mA at +5V.

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Outline Drawing



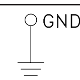
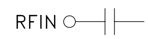
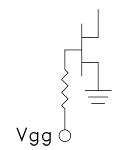
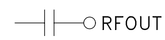
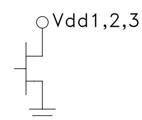
24-Terminal Ceramic Leadless Chip Carrier [LCC]
(E-24-1)
Dimensions shown in millimeters.

Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking [2]
HMC498LC4	Alumina, White	Gold over Nickel	MSL3 [1]	H498 XXXX

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

Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1, 5 - 8, 10 - 14, 18, 20, 22, 24	N/C	These pins are not connected internally; however, all data shown herein was measured with these pins connected to RF/DC ground externally.	
2, 4, 15, 17	GND	Package bottom has an exposed metal paddle that must also be connected to RF/DC ground.	
3	RFIN	This pin is AC coupled and matched to 50 Ohms.	
9	Vgg	Gate control for amplifier. Adjust to achieve Id of 250 mA. Please follow “MMIC Amplifier Biasing Procedure” Application Note. External bypass capacitors of 100 pF, 1000 pF and 2.2 µF are required.	
16	RFOUT	This pin is AC coupled and matched to 50 Ohms.	
23, 21, 19	Vdd1, Vdd2, Vdd3	Power Supply Voltage for the amplifier. External bypass capacitors of 100 pF, 1000pF, and 2.2 µF are required.	

Application Circuit