HMC342LC4

v04.0514

GaAs PHEMT MMIC LOW NOISE AMPLIFIER, 13 - 25 GHz

Typical Applications

The HMC342LC4 is ideal for:

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

Features

Noise Figure: 3.5 dB

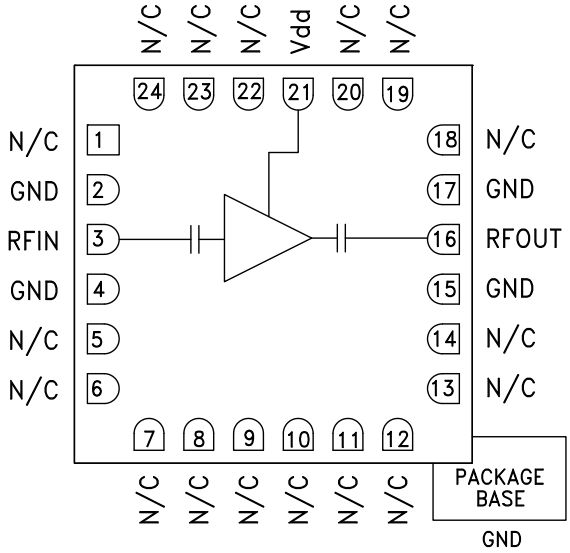
Gain: 22 dB

Single Positive Supply: +3V @ 43 mA

50 Ohm Matched Input/Output

RoHS Compliant 4x4 mm SMT Package

Functional Diagram



General Description

The HMC342LC4 is a GaAs pHEMT MMIC Low Noise Amplifier housed in a leadless 4x4 mm RoHS compliant SMT package. Operating from 13 to 25 GHz, the amplifier provides 22 dB of gain and +19 dBm of output IP3 from a single +3V supply. The low noise figure performance of 3.5 dB is ideal for receive and transmit pre-driver applications. The RF I/Os are DC blocked and matched to 50 Ohms for ease of use. The HMC342LC4 allows the use of surface mount manufacturing techniques and requires no external matching components.

Electrical Specifications, T_A = +25° C, Vdd = +3V, Idd = 43 mA

Parameter	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Units
Frequency Range		13 - 18			18 - 22			22 - 25		GHz
Gain	19	22		17	20		16	19		dB
Gain Variation Over Temperature		0.025	0.035		0.025	0.035		0.025	0.035	dB/ °C
Noise Figure		3.5	4.0		3.5	4.0		3.5	4.5	dB
Input Return Loss		15			15			10		dB
Output Return Loss		15			20			15		dB
Output Power for 1 dB Compression (P1dB)		7			8			9		dBm
Saturated Output Power (Psat)		9			11			11.5		dBm
Output Third Order Intercept (IP3)		16			19			20		dBm
Supply Current (Idd) (Vdd = +3V)		43			43			43		mA

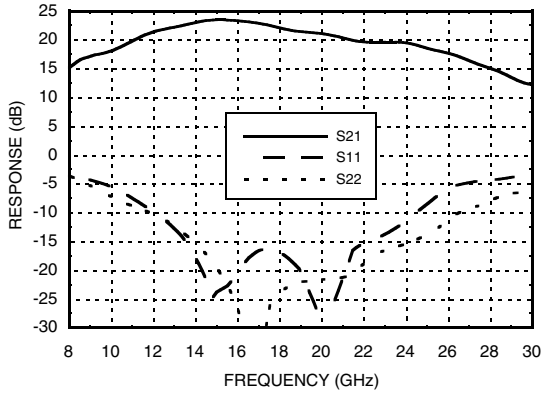
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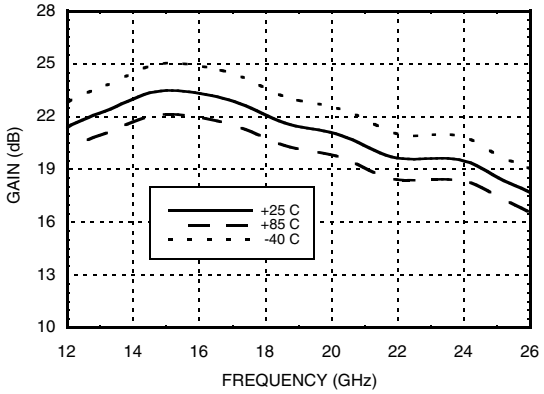
RoHS✓ EARTH FRIENDLY

GaAs PHEMT MMIC LOW NOISE AMPLIFIER, 13 - 25 GHz

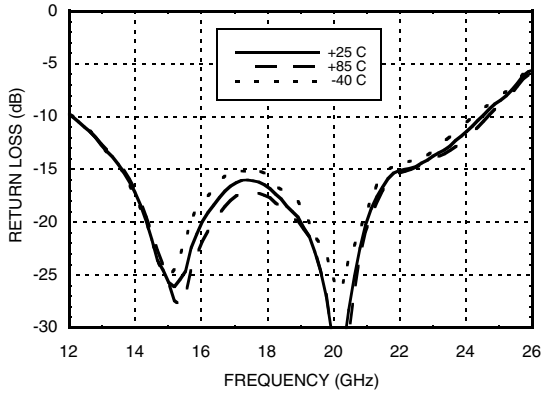
Broadband Gain & Return Loss



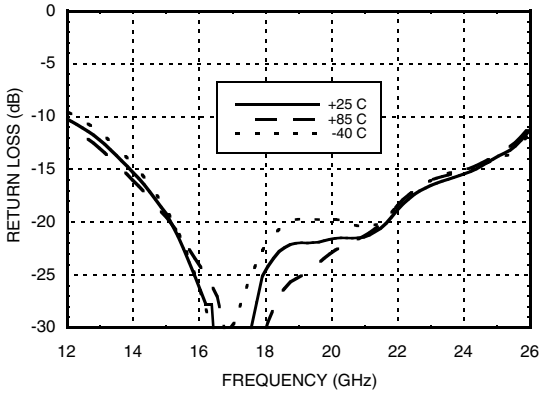
Gain vs. Temperature



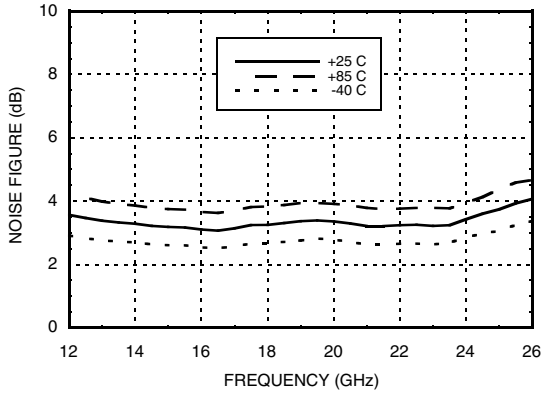
Input Return Loss vs. Temperature



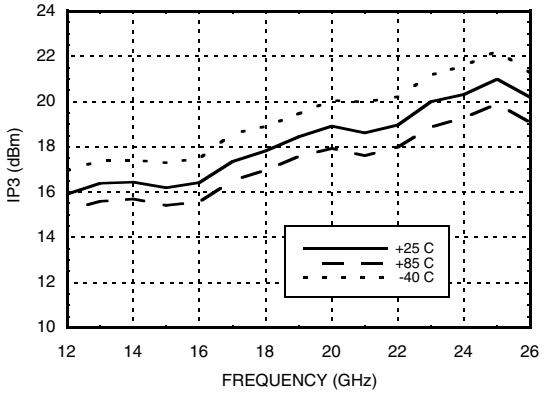
Output Return Loss vs. Temperature



Noise Figure vs. Temperature



Output IP3 vs. Temperature



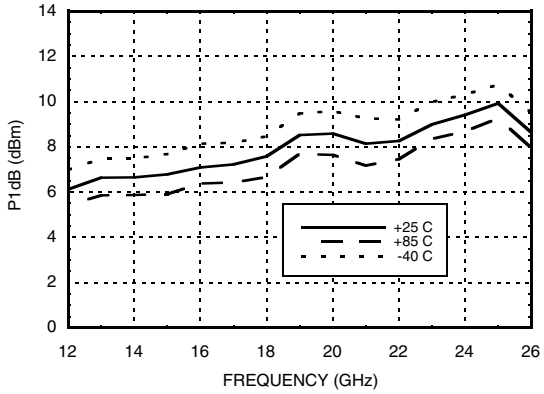
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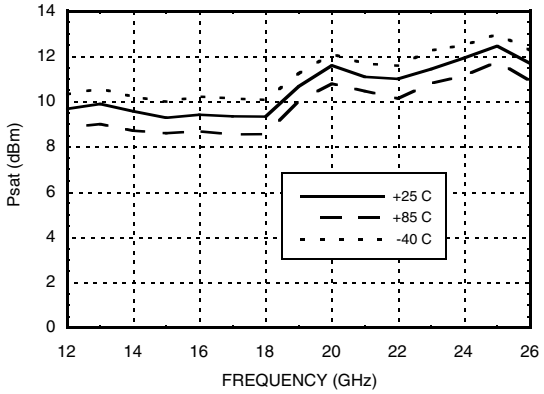
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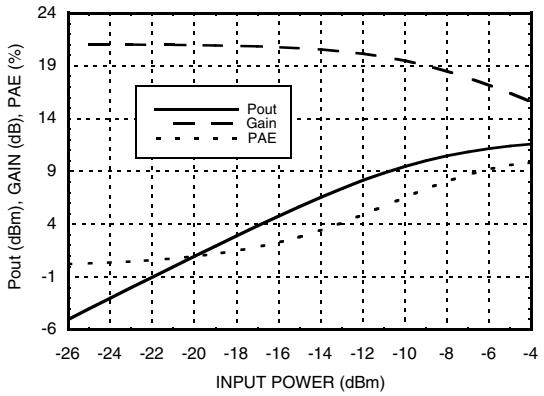
P1dB vs. Temperature



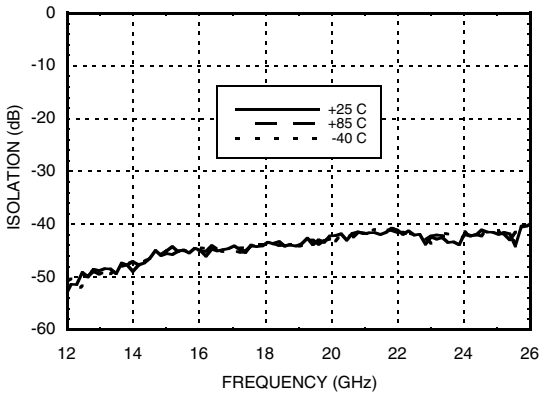
Psat vs. Temperature



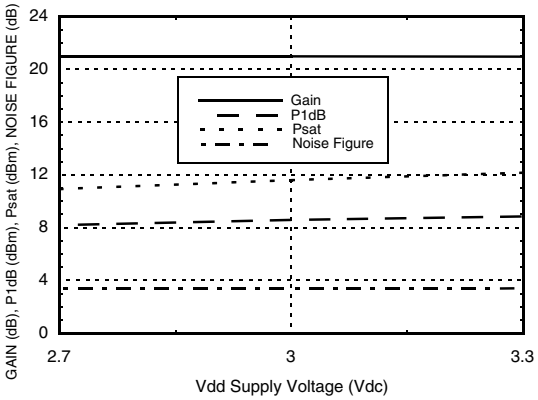
Power Compression @ 20 GHz



Reverse Isolation vs. Temperature



Gain, Power & Noise Figure vs. Supply Voltage @ 20 GHz



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Absolute Maximum Ratings

Drain Bias Voltage (Vdd)	+5.5 Vdc
RF Input Power (RFIN)(Vdd = +3.0 Vdc)	0 dBm
Channel Temperature	175 °C
Continuous Pdiss (T= 85 °C) (derate 3.62 mW/°C above 85 °C)	0.326 W
Thermal Resistance (channel to ground paddle)	276 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C

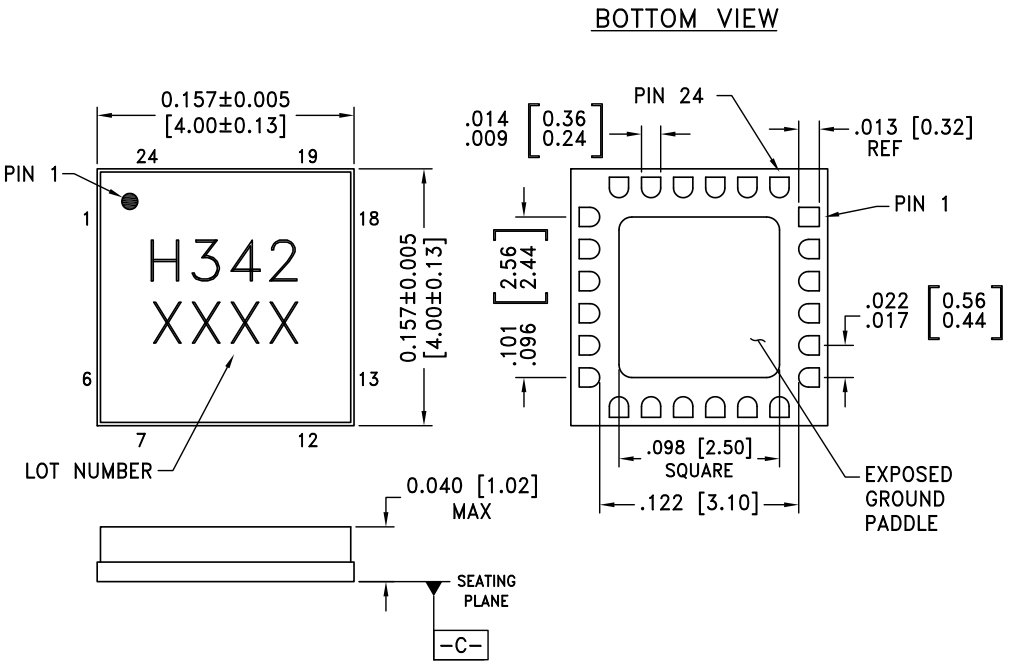
Typical Supply Current vs. Vdd

Vdd (Vdc)	Idd (mA)
+2.7	42
+3.0	43
+3.3	44

Note: Amplifier will operate over full voltage ranges shown above.

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Outline Drawing



NOTES:

1. PACKAGE BODY MATERIAL: ALUMINA.
2. LEAD AND GROUND PADDLE PLATING: GOLD FLASH OVER NICKEL.
3. DIMENSIONS ARE IN INCHES (MILLIMETERS).
4. LEAD SPACING TOLERANCE IS NON-CUMULATIVE.
5. PACKAGE WARP SHALL NOT EXCEED 0.05MM DATUM –C–
6. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.

Package Information

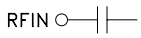
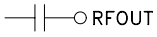
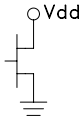
Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking [2]
HMC342LC4	Alumina, White	Gold over Nickel	MSL3 [1]	H342 XXXX

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

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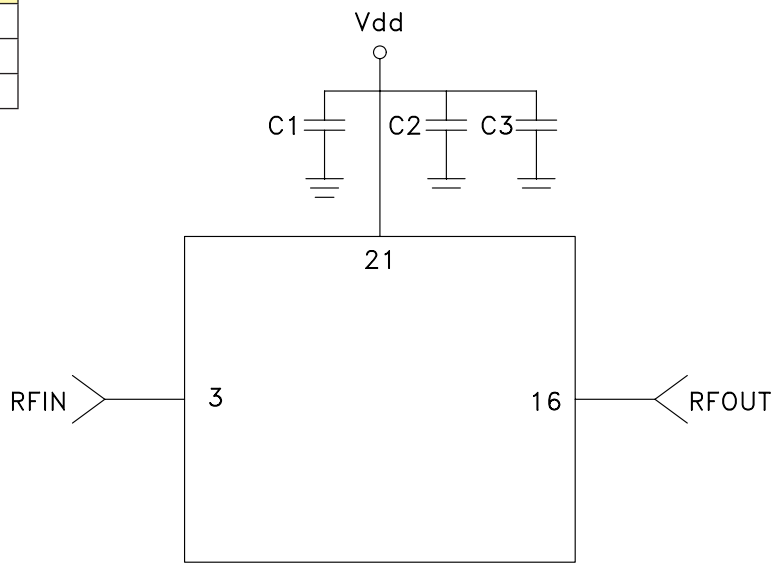
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Pin Descriptions

Pin Number	Function	Description	Interface Schematic
1, 5 - 14, 18 - 20, 22 - 24	N/C	No connection required. These pins may be connected to RF/DC ground without affecting performance.	
2, 4, 15, 17	GND	Package base has an exposed metal ground that must also be connected to RF/DC ground.	
3	RFIN	This pin is AC coupled and matched to 50 Ohms.	
16	RFOUT	This pin is AC coupled and matched to 50 Ohms.	
21	Vdd	Power Supply Voltage for the amplifier. External bypass capacitors of 100 pF, 1000pF, and 2.2 µF are required.	

Application Circuit

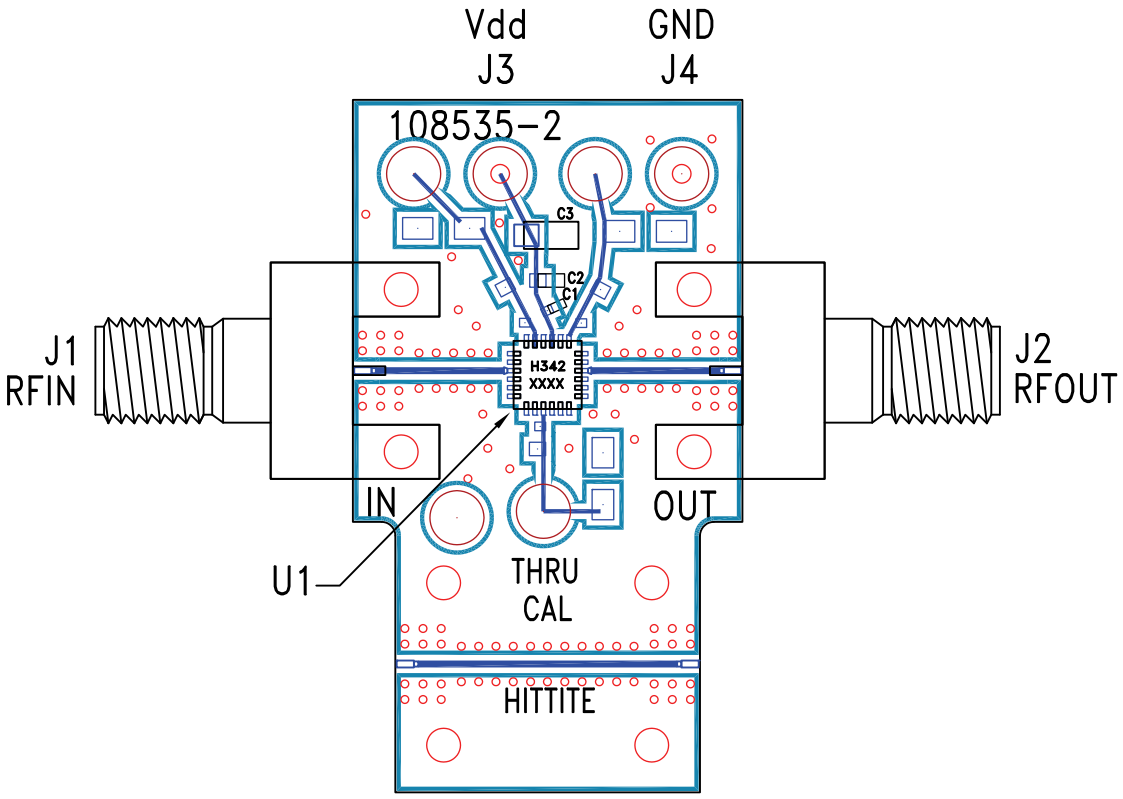
Component	Value
C1	100 pF
C2	1,000 pF
C3	2.2 µF



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Evaluation PCB



List of Materials for Evaluation PCB 110209 [1]

Item	Description
J1, J2	2.92 mm PC mount K-connector
J3, J4	DC Pin
C1	100 pF capacitor, 0402 Pkg..
C2	1,000 pF Capacitor, 0603 Pkg..
C3	2.2µF Capacitor, Tantalum
U1	HMC342LC4 Amplifier
PCB [2]	108535 Evaluation PCB

[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: Rogers 4350.

The circuit board used in this application should use RF circuit design techniques. Signal lines should have 50 Ohm impedance while the package ground leads and exposed paddle should be connected directly to the ground plane similar to that shown. A sufficient number of via holes should be used to connect the top and bottom ground planes. The evaluation board should be mounted to an appropriate heat sink. The evaluation circuit board shown is available from Hittite upon request.

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