v01.0701

HMC287MS8

GaAs MMIC LOW NOISE AMPLIFIER with AGC, 2.3 - 2.5 GHz

Typical Applications

LNA for Spread Spectrum Applications:

- BLUETOOTH
- HomeRF
- 802.11 WLAN
- 2.5 GHz Radios

Features

Gain: 21 dB

Noise Figure: 2.5 dB

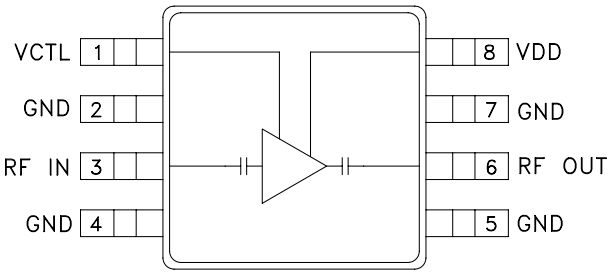
Gain Adjustment: 30 dB

Single Positive Supply: +3V

No External Components

Ultra Small Package: MSOP8G

Functional Diagram



General Description

The HMC287MS8 is a low cost Low Noise Amplifier (LNA) offering 21 dB of gain and a 2.5 dB noise figure from a single positive +3V supply that requires only 9 mA. The HMC287MS8G can be used as a variable gain LNA, offering 30 dB of gain control, which is controlled with a 0 to 3V analog voltage. The typical output 1dB compression point is +3 dBm and OIP3 is +7 dBm when in the maximum gain state. The compact LNA design utilizes on-chip matching for repeatable gain and noise figure performance and eliminates the need for external matching circuitry to reduce the overall size of the LNA function.

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

Parameter	Min.	Typ.	Max.	Units
Frequency Range		2.3 - 2.5		GHz
Gain	15	21	27	dB
Gain Variation Over Temperature		0.03	0.04	dB/°C
Gain Adjustment Range (Vctl 0 to +3V)		30		dB
Noise Figure (Vctl = 0V)		2.5	3.0	dB
Input Return Loss	5	10		dB
Output Return Loss	3	6		dB
Output 1 dB Compression (P1dB)	-2	3		dBm
Output Third Order Intercept (IP3)	3	7		dBm
Control Voltage (Vctl)	0		Vdd	Vdc
Supply Current (Idd)(Vdd = +3.0 Vdc)		9	15	mA

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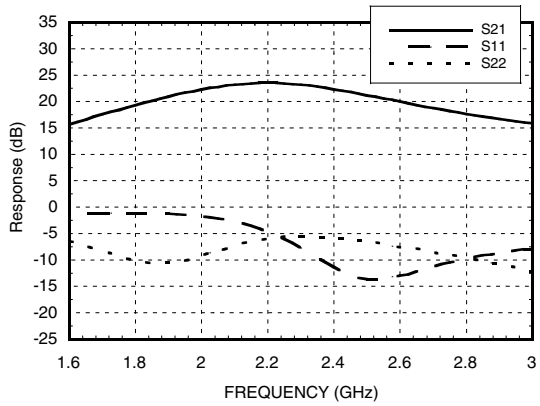
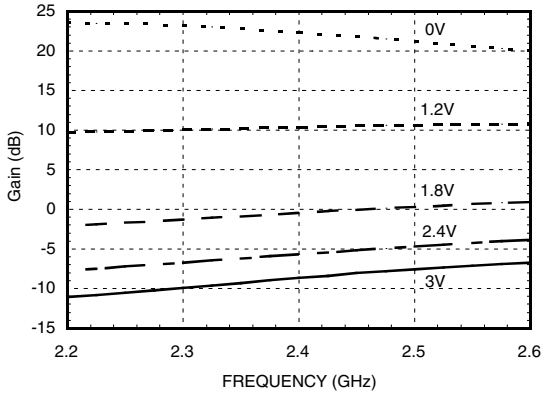
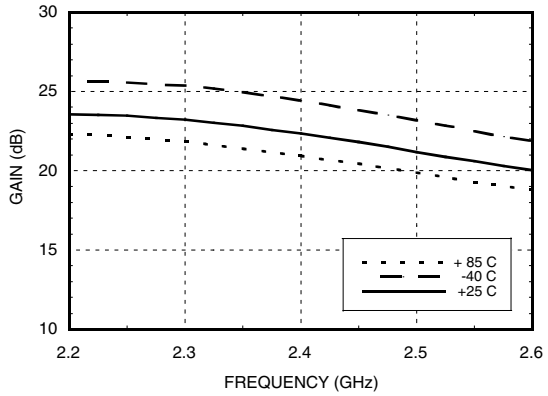
Broadband Gain & Return Loss, Vctl = 0V



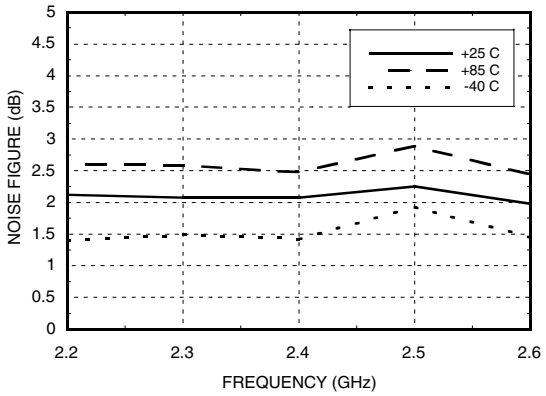
Gain Over Control Voltage Range



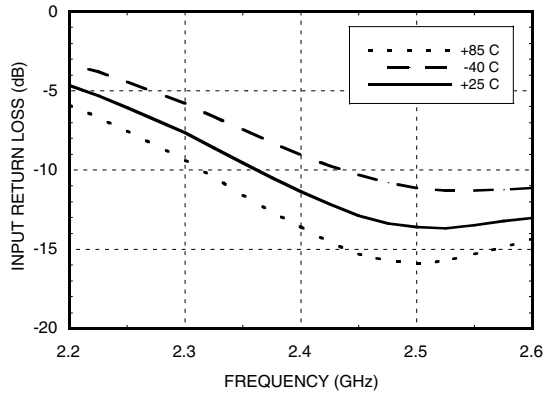
Gain vs. Temperature, Vctl = 0V



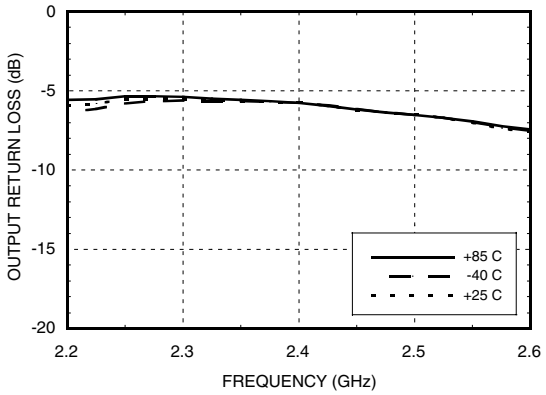
Noise Figure vs. Temperature, Vctl = 0V



Input Return Loss vs. Temperature, Vctl = 0V



Output Return Loss vs. Temperature, Vctl = 0V



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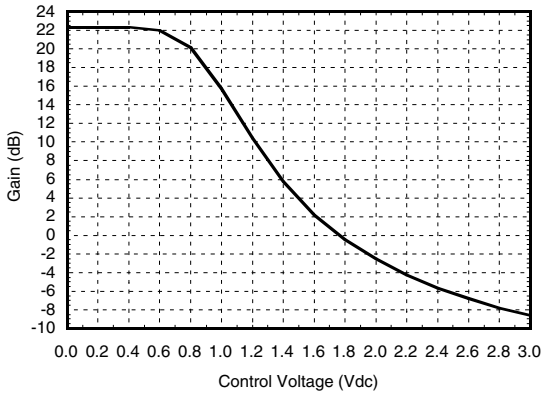
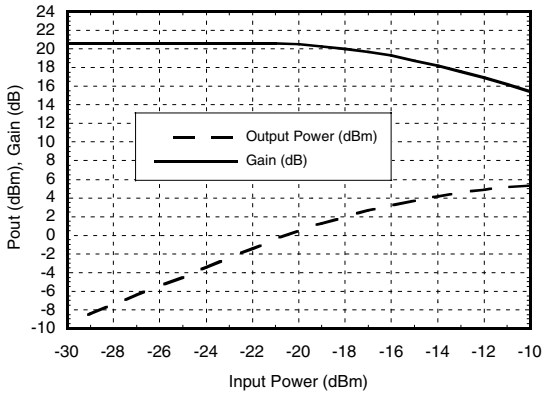
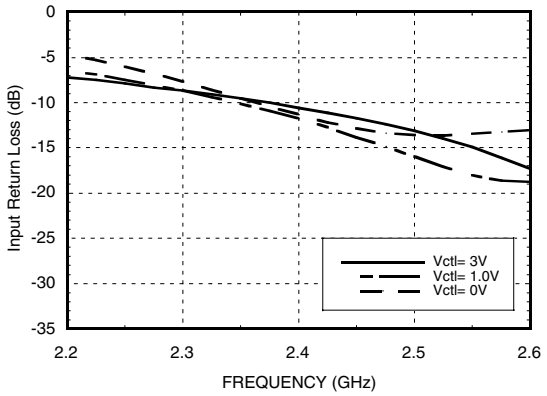
Gain vs. Control Voltage@ 2.4 GHz



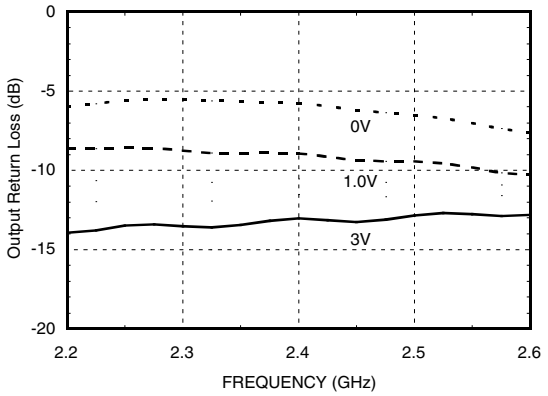
Power Compression@ 2.4 GHz, Vctl = 0V



Input Return Loss Over Control Voltage Range



Output Return Loss Over Control Voltage Range

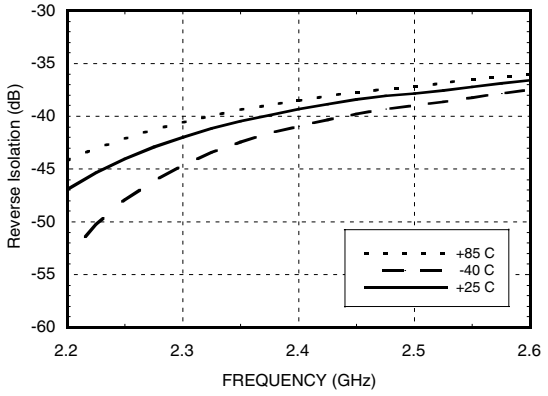


Noise Figure and Output IP3 vs. Control Voltage

	Frequency = 2.4 GHz	
VCTL	Noise Figure	OIP3 (dBm)*
0V	2.5	7.1
1.7V	4.0	-4.4
3.0V	10.0	-12.9

* Two-tone input power = -30 dBm per tone.

Reverse Isolation vs. Temperature, Vctl = 0V



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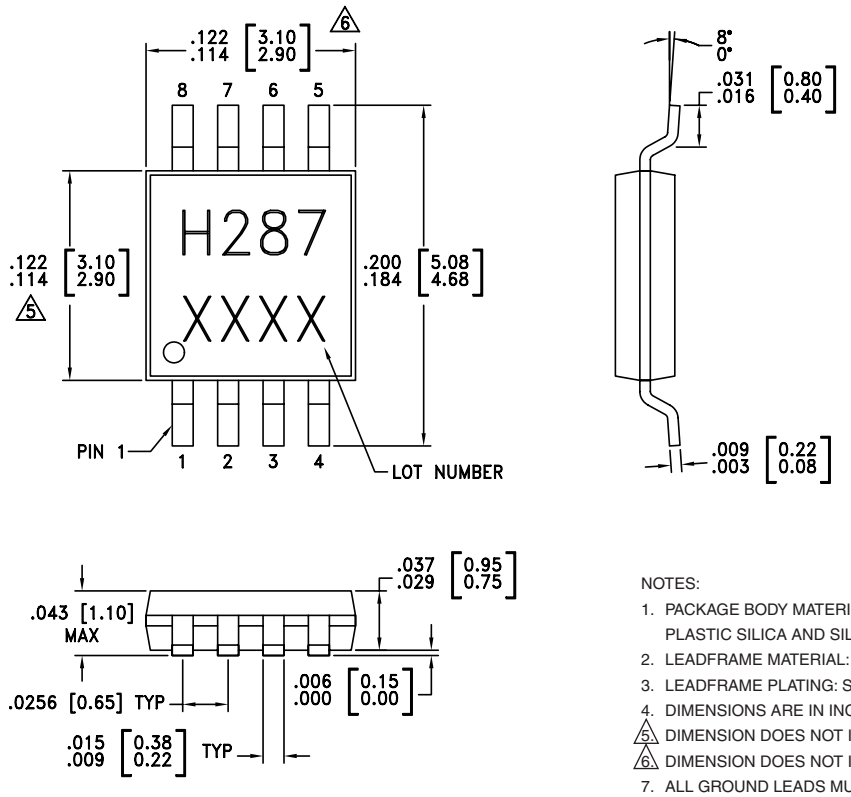
Absolute Maximum Ratings

Drain Bias Voltage (Vdd)	+7.0 Vdc
Control Voltage Range (Vctl)	-0.2V to Vdd
RF Input Power (RFin)(Vdd = +3.0 Vdc)	0 dBm
Channel Temperature	150 °C
Continuous Pdiss (T = 85 °C) (derate 5.62 mW/°C above 85 °C)	0.365 W
Thermal Resistance (channel to lead)	178 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C

Gain Control

Vctl (Vdc)	Gain State	Typical Ictl (uA)
0.0	Maximum	25
1.5	Middle	25
Vdd	Minimum	25

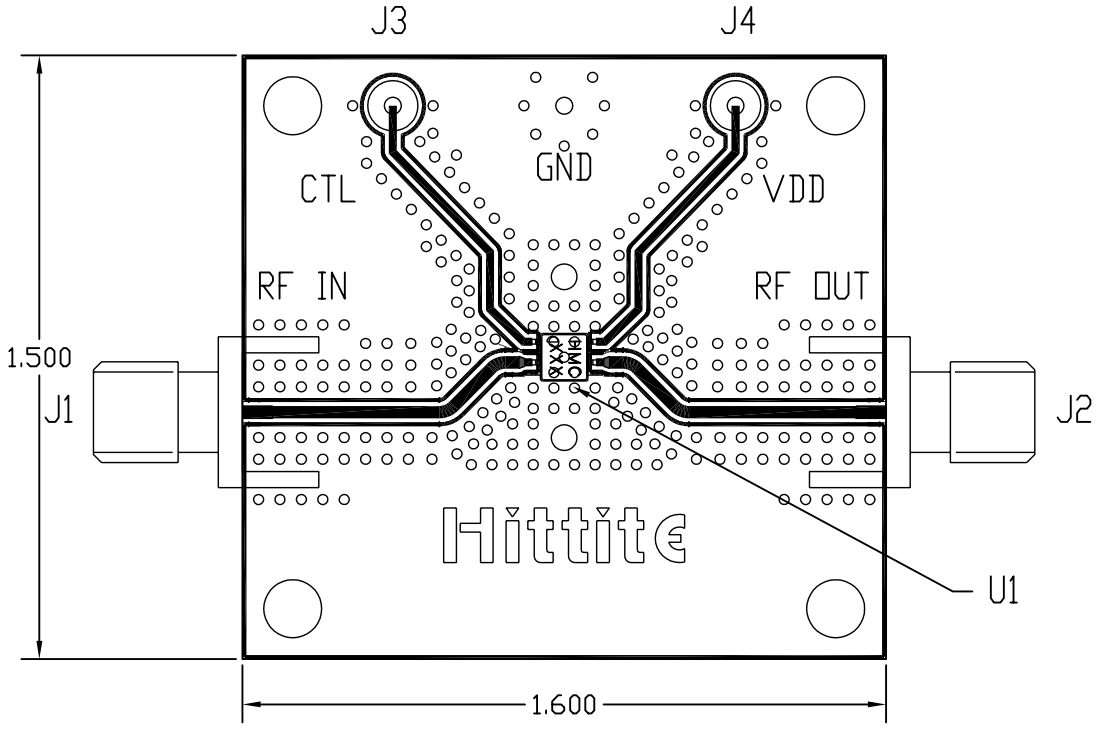
Outline Drawing



NOTES:

1. PACKAGE BODY MATERIAL: LOW STRESS INJECTION MOLDED PLASTIC SILICA AND SILICON IMPREGNATED.
2. LEADFRAME MATERIAL: COPPER ALLOY
3. LEADFRAME PLATING: Sn/Pb SOLDER
4. DIMENSIONS ARE IN INCHES [MILLIMETERS].
5. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE.
6. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25mm PER SIDE.
7. ALL GROUND LEADS MUST BE SOLDERED TO PCB RF GROUND.

Evaluation PCB



List of Material

Item	Description
J1, J2	PC Mount SMA Connector
J3, J4	DC Pin
U1	HMC287MS8 Amplifier
PCB*	Evaluation Board 1.6" x 1.5"
*Circuit Board Material: Rogers 4350	

The circuit board used in the final 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 circuit board shown is available from Hittite upon request.

Notes: