

GENERAL PURPOSE 30 mW GaAs AMPLIFIER 1.3 - 3.0 GHz

FEBRUARY 2001

v00.0900

Features

P1dB Output Power:
+ 15 dBm @ +5V

Single Supply: +3V or +5V

Requires No External Components

RF Ports Contain DC Blocks

Ultra Small SOT26 Package



General Description

The HMC308 is a low cost MESFET MMIC amplifier that operates from a single +3 to +5V Vdd supply. The surface mount SOT26 amplifier can be used as a broadband amplifier stage or used with external matching for optimized narrow band applications. With Vdd biased at +3V, the HMC308 offers 16 dB of gain and +15 dBm of saturated output power while requiring only 40mA of current. This amplifier is ideal as a driver amplifier for transmitters or for usage as a local oscillator (LO) amplifier to increase drive levels for passive mixers in the PCS, DECT, WCDMA or 2.2 - 2.7 GHz MMDS bands. The amplifier occupies 0.118" x 0.118", making it ideal for compact radio designs.

Guaranteed Performance, -40 to +85 deg C

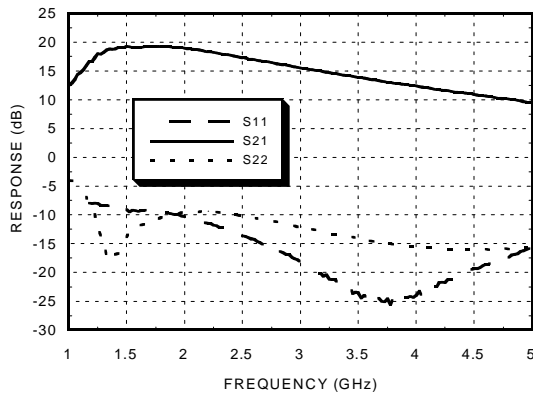
Parameter	Vdd= +5V			Vdd= +5V			Vdd= +3V			Units
	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
Frequency Range	1.3 - 2.3			2.3 - 2.5			2.3 - 3.0			GHz
Gain @ 25° C	16	19	22	15	17	20	13	16	19	dB
Gain Variation over Temperature		0.03	0.04		0.03	0.04		0.03	0.04	dB/ °C
Gain Flatness (Over Any 200 MHz BW)		± 1.0			± 1.0			± 1.0		dB
Input Return Loss	7	10		9	12		9	12		dB
Output Return Loss	7	10		7	10		7	10		dB
Reverse Isolation	35	40		33	38		33	38		dB
Output Power for 1dB Compression (P1dB)	12	15		12	15		9	12		dBm
Saturated Output Power (Psat)	15	18		15	18		12	15		dBm
Output Third Order Intercept (OIP3)	22	27		23	27		19	24		dBm
Noise Figure		9			9			9		dB
Recommended Supply Voltage (Vdd)	4.75	5.0	5.25	4.75	5.0	5.25	2.75	3.0	3.25	Vdc
Supply Current (Idd)		40	50		40	50		35	41	mA

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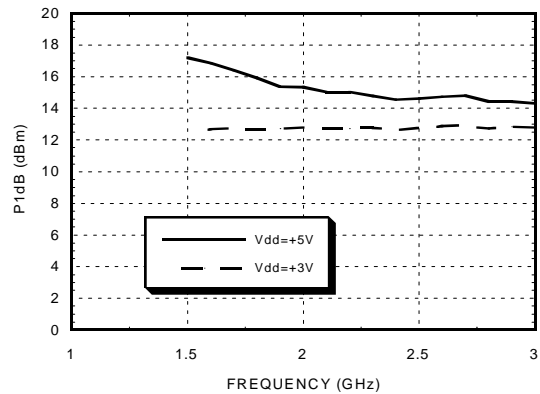
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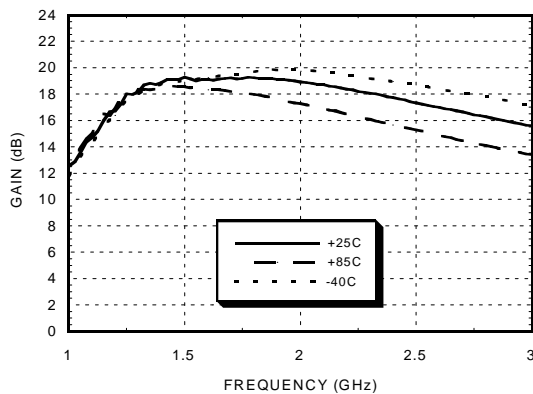
Broadband Gain & Return Loss @ Vdd = +5V



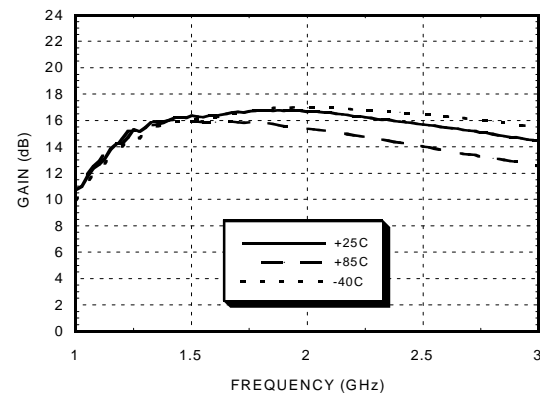
P1dB vs. Vdd Bias



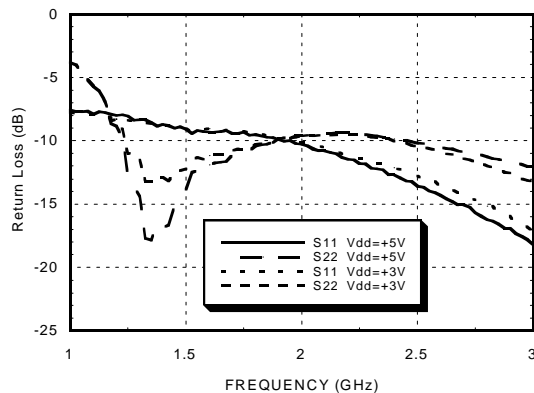
Gain vs. Temperature @ Vdd = +5V



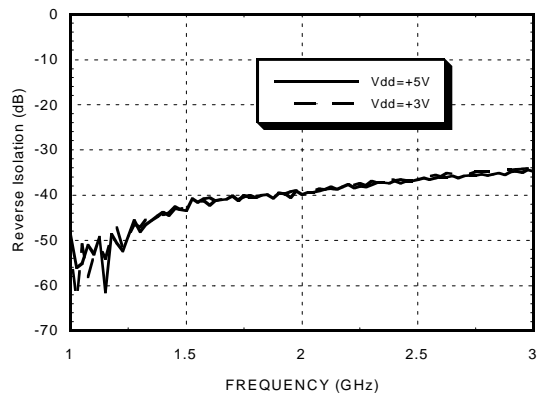
Gain vs. Temperature @ Vdd = +3V




Input & Output Return Loss vs Vdd Bias



Reverse Isolation vs Vdd Bias



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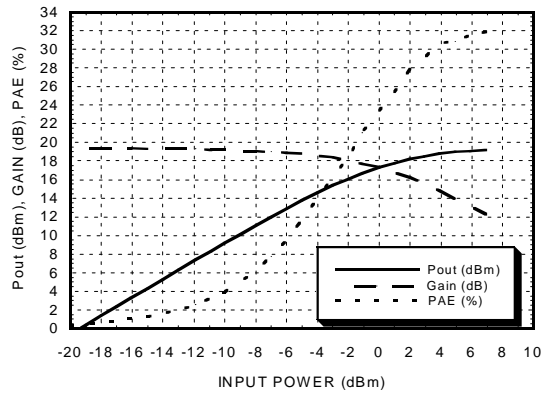


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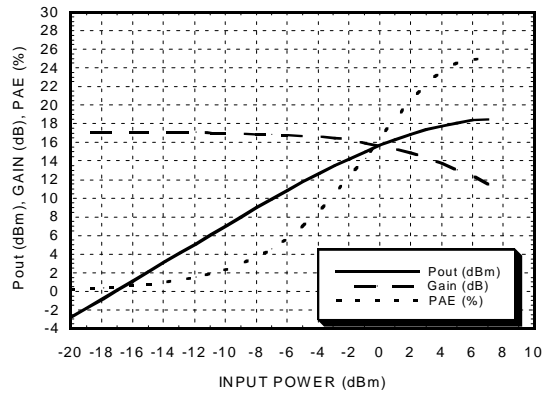
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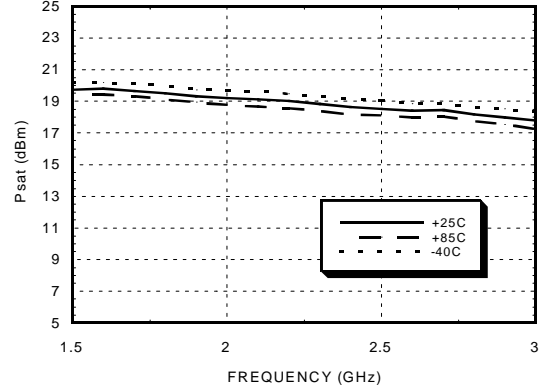
Power Compression
@ 2.0 GHz Vdd= +5V



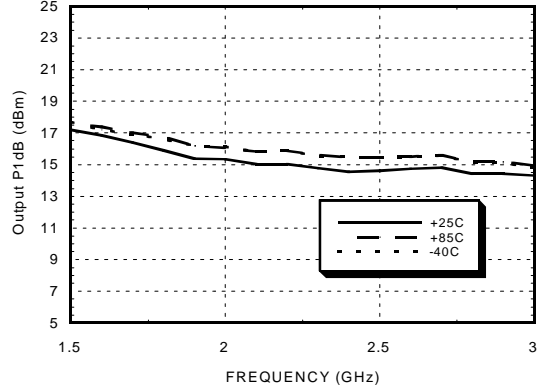
Power Compression
@ 2.5 GHz Vdd= +5V



Psat vs. Temperature @ Vdd= +5V



P1dB vs. Temperature @ Vdd= +5V



Output IP3 (dBm) vs. Temperature @ Vdd= +5V

	Frequency (GHz)		
Temperature	1.5	2.0	2.5
-40 °C	27.6	27.8	27.2
+25 °C	28.5	28.3	27.7
+85 °C	28.9	29.8	28.0

*Two-tone input power = -20 dBm each tone.
All levels in dBm*

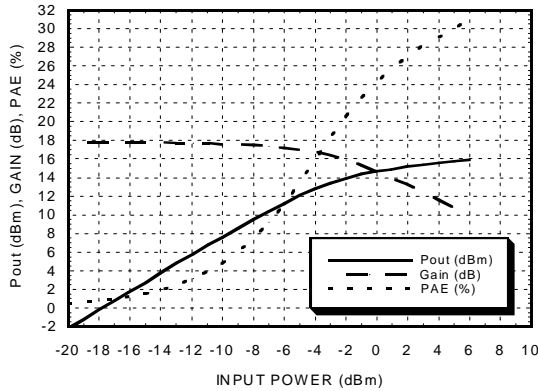
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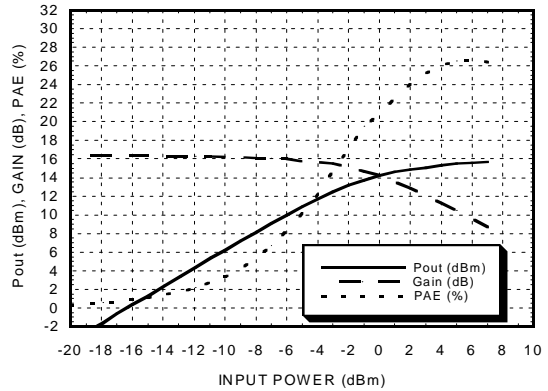
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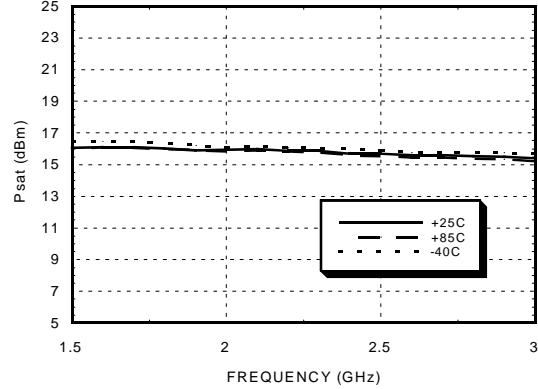
**Power Compression
@ 2.0 GHz Vdd= +3V**



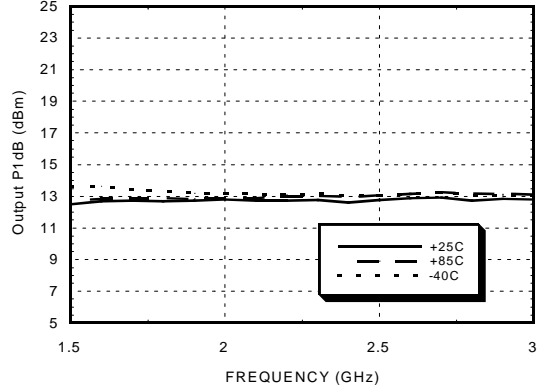
**Power Compression
@ 2.5 GHz Vdd= +3V**



**Psat vs.
Temperature @ Vdd= +3V**



**P1dB vs.
Temperature @ Vdd= +3V**



**Output IP3 (dBm) vs.
Temperature @ Vdd= +3V**

	Frequency (GHz)		
Temperature	1.5	2.0	2.5
-40 °C	22.7	23.7	23.6
+25 °C	23.9	25.2	24.8
+85 °C	24.4	25.5	25.3

*Two-tone input power = -20 dBm each tone.
All levels in dBm*

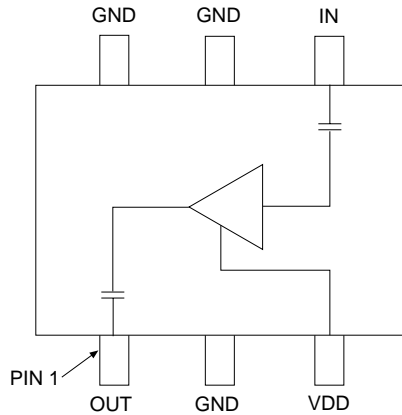
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Functional Diagram

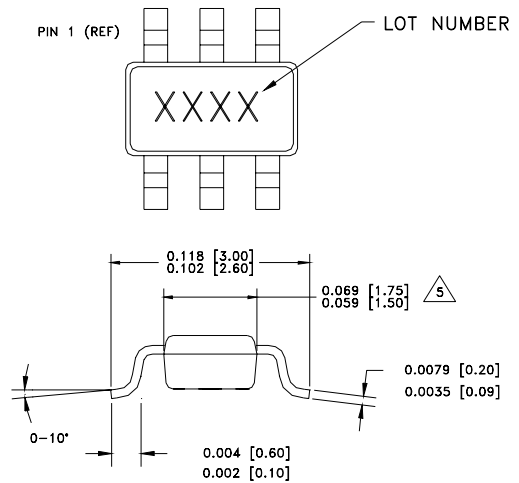
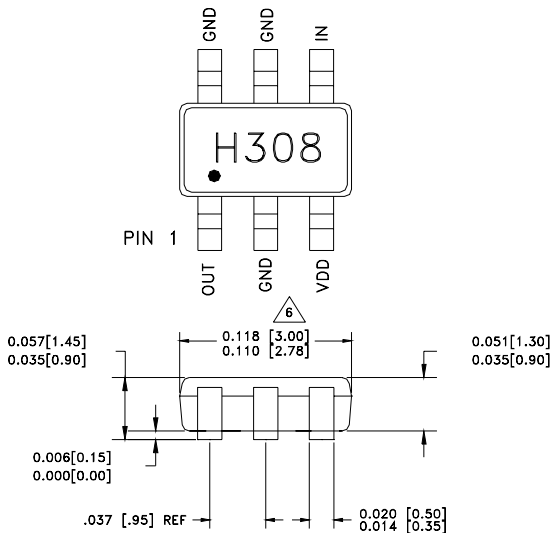


Absolute Maximum Ratings

Supply Voltage (Vdd)	+7.0 Vdc
Input Power (RF _{in})(Vdd = +5V)	+10 dBm
Channel Temperature (T _c)	175 °C
Continuous P _{diss} (T _a = 85 °C) (derate 5.05 mW/°C above 85 °C)	455 mW
Storage Temperature	-65 to +150 °C
Operating Temperature	-55 to +85 °C

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Outline



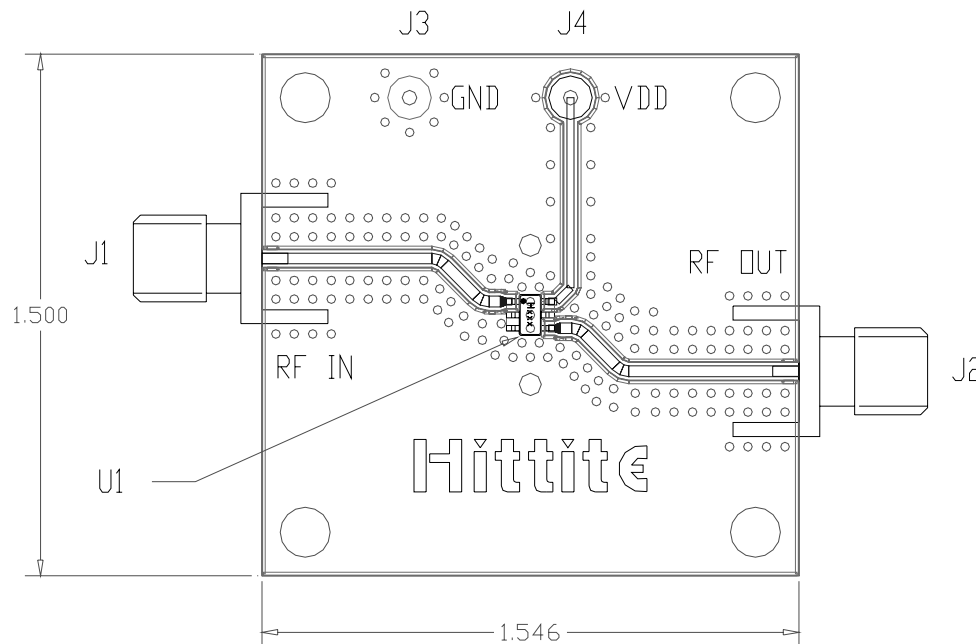
- MATERIAL:
 - PACKAGE BODY - LOW STRESS INJECTION-MOLDED PLASTIC, SILICA & SILICONE IMPREGNATED.
 - LEADFRAME & PADDLE MATERIAL: COPPER ALLOY.
- PLATING : LEAD & PADDLE- TIN SOLDER PLATE
- DIMENSIONS ARE IN INCHES (MILLIMETERS), UNLESS OTHERWISE SPECIFIED ALL TOL. ARE ±0.005 (±0.13).
- CHARACTERS TO BE HELVETICA MEDIUM, .020 HIGH WHITE INK, LOCATED APPROXIMATELY AS SHOWN.
 - DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15 MM PER SIDE.
 - DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25 MM PER SIDE.

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Evaluation PCB for HMC308



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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 should be connected directly to the ground plane similar to that shown above. A sufficient number of VIA holes should be used to connect the top and bottom ground planes. The evaluation circuit board as shown is available from Hittite upon request.

List of Material

Item	Description
J1, J2	PC Mount SMA RF Connector
J3, J4	DC Pins
U1	HMC308 Amplifier
PCB*	Eval Board 1.5" x 1.55"
*Circuit Board Material: Rogers 4350	