

HBT DRIVER AMPLIFIER 0.7 - 4.0 GHz

FEBRUARY 2001

v00.1100

Features

P1dB Output Power: + 18 dBm

Output IP3: +29 dBm

Single Supply: 5V

Ultra Small SOT26 Package



General Description

The HMC314 is a GaAs InGaP Heterojunction Bipolar Transistor (HBT) MMIC amplifier that operates from a single positive supply. This amplifier also incorporates a power down feature. When the "Vpd" pin is held low, the amplifier will shut down. The surface mount SOT26 amplifier can be used as a broadband gain stage for wideband applications. The amplifier provides 12 dB of gain and +22 dBm of saturated power while operating from a single positive +5v supply. The HMC314 is optimized in gain and return loss for the MMDS (2.2-2.7 GHz) and Wireless Local Loop Applications (3.5 GHz) bands. At a height of 1.45mm, the SOT26 is ideal for low profile portable wireless devices and WLAN systems.

Guaranteed Performance, -40 to +85 Deg C

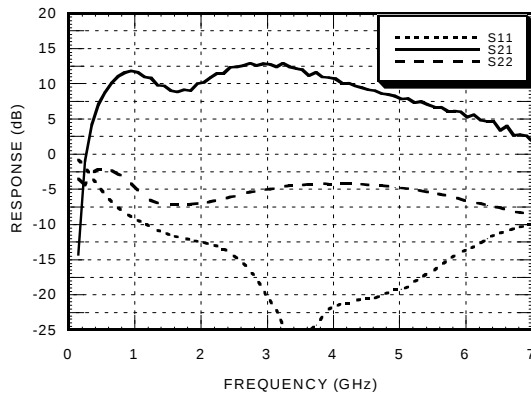
Parameter	Vs= +5V, R _{BIAS} = 10 Ohm			
	Min.	Typ.	Max.	Units
Frequency Range	0.7 - 4.0			GHz
Gain @ 25 °C	7	12	16	dB
Gain Variation over Temperature		0.015	0.025	dB/ °C
Input Return Loss	6	12		dB
Output Return Loss	2	6		dB
Reverse Isolation	22	30		dB
Output Power for 1dB Compression (P1dB) @ 1 GHz	15	18		dBm
Saturated Output Power (Psat) @ 1 GHz	19	22		dBm
Output Third Order Intercept (IP3) @ 1 GHz	26	29		dBm
Switching Speed On/Off		60		ns
Supply Current (Icc)		150		mA
Control Voltage (Vpd)		0/5		Volts
Control Current (Ipd)		.001/12		mA

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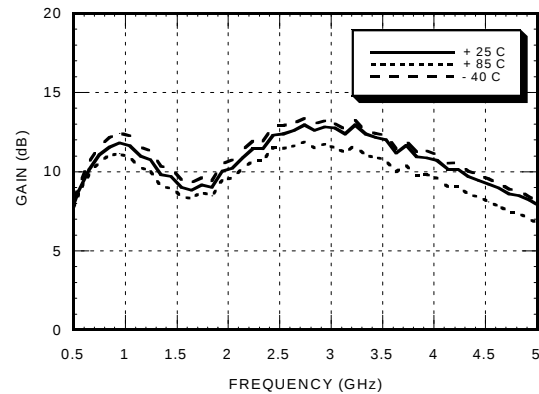
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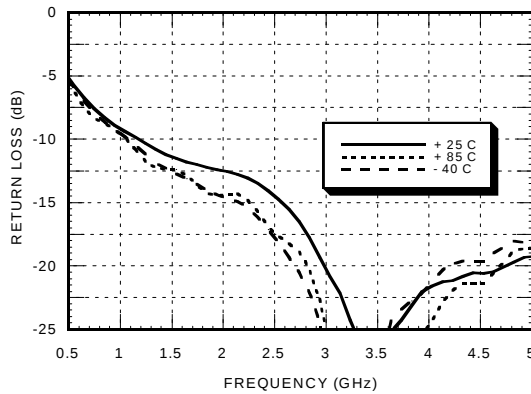
Gain & Return Loss



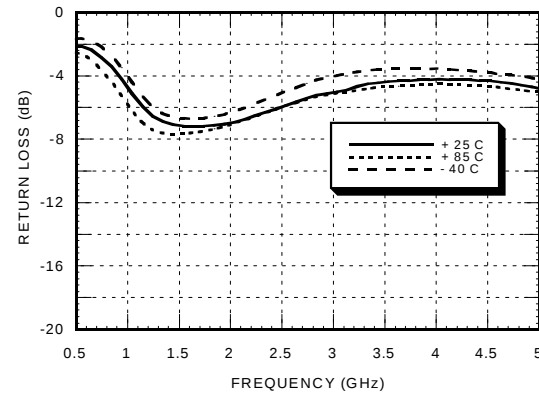
Gain vs. Temperature



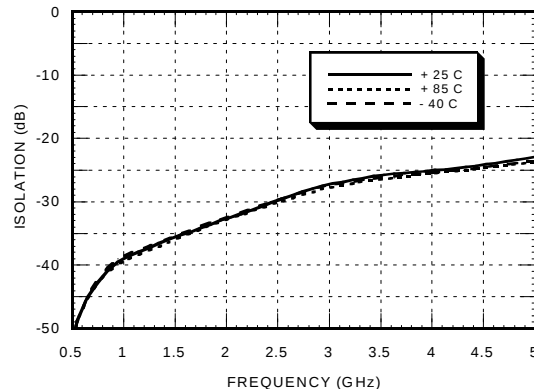
Input Return Loss vs. Temperature



Output Return Loss vs. Temperature



Reverse Isolation vs. Temperature



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SMT



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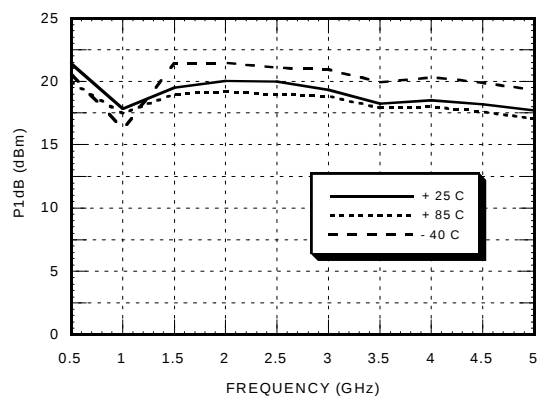
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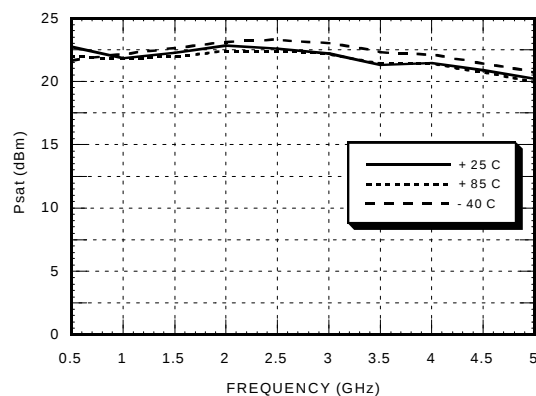
SMT



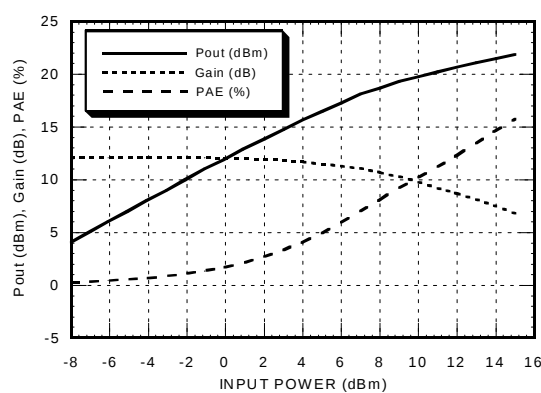
P1dB vs. Temperature



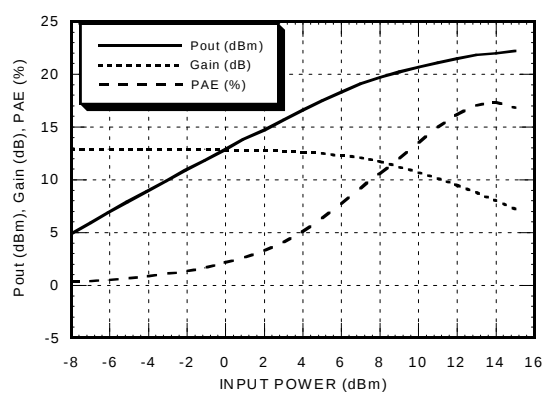
Psat vs. Temperature



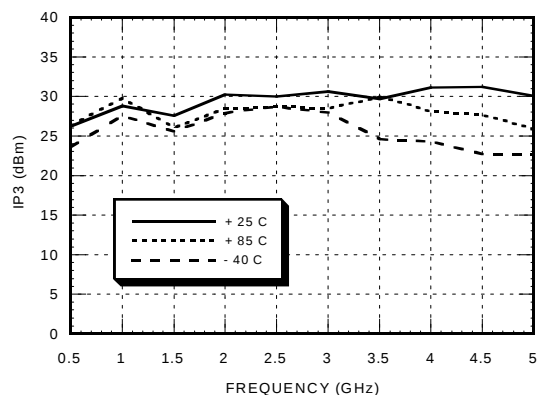
Power Compression @ 1 GHz



Power Compression @ 3 GHz



Output IP3 vs. Temperature

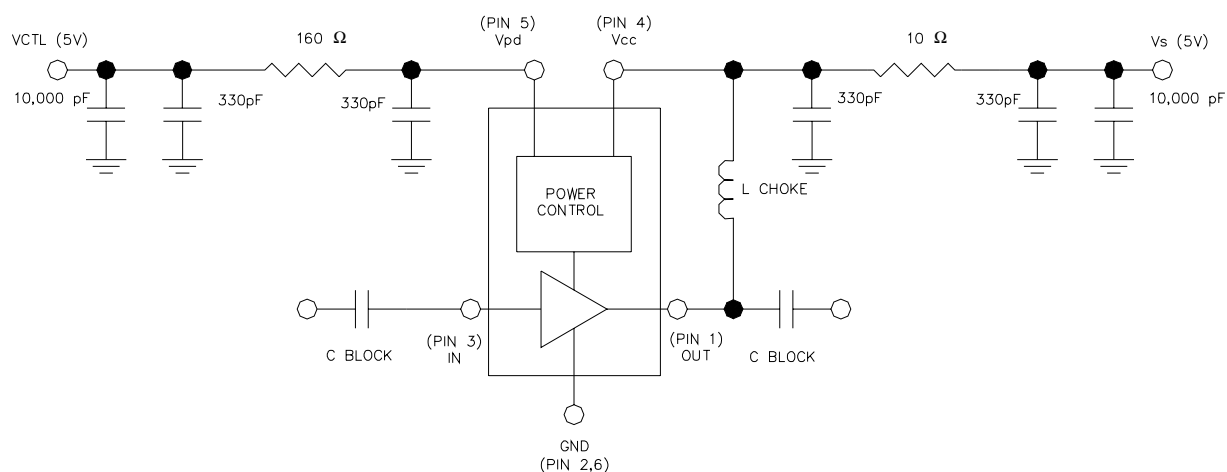


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Schematic



Note:

1. Requires a 10Ω resistor (R_{BIAS}) in series with the Vcc line and a 160Ω resistor in series with the Vpd line.
2. Requires blocking capacitors on Pins 1 and 3.
3. Requires bypass capacitors on Vcc and Vpd line as shown.

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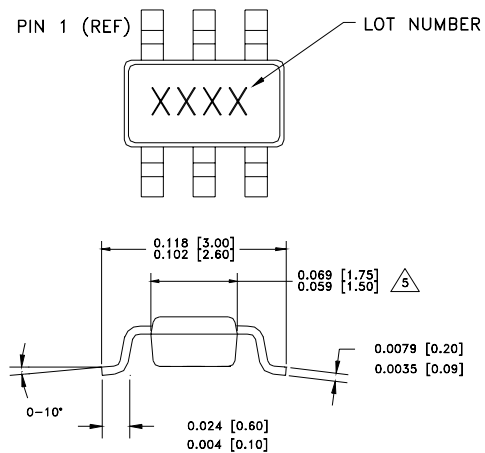
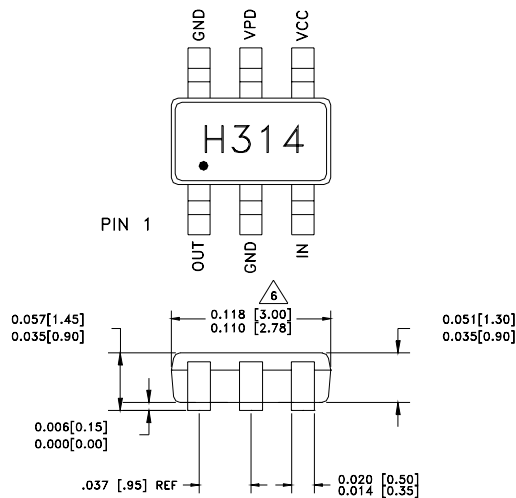
Absolute Maximum Ratings

Supply Voltage (Vcc)	+5.0 Vdc
Input Power (RFin)(Vcc= +5V)	+20 dBm
Channel Temperature (Tc)	175 °C
Continuous P _{diss} (Ta= 85° C) (derate 4.76 mW/ °C above 85° C)	428 mW
Storage Temperature	-65 to +150 °C
Operating Temperature	-55 to +85 °C

Truth Table

V _s	V _{CTL}	I _s	I _{CTL}	State
5V	5V	150 mA	12 mA	On
5V	0V	<1 µA	<1 µA	Power Down

Outline



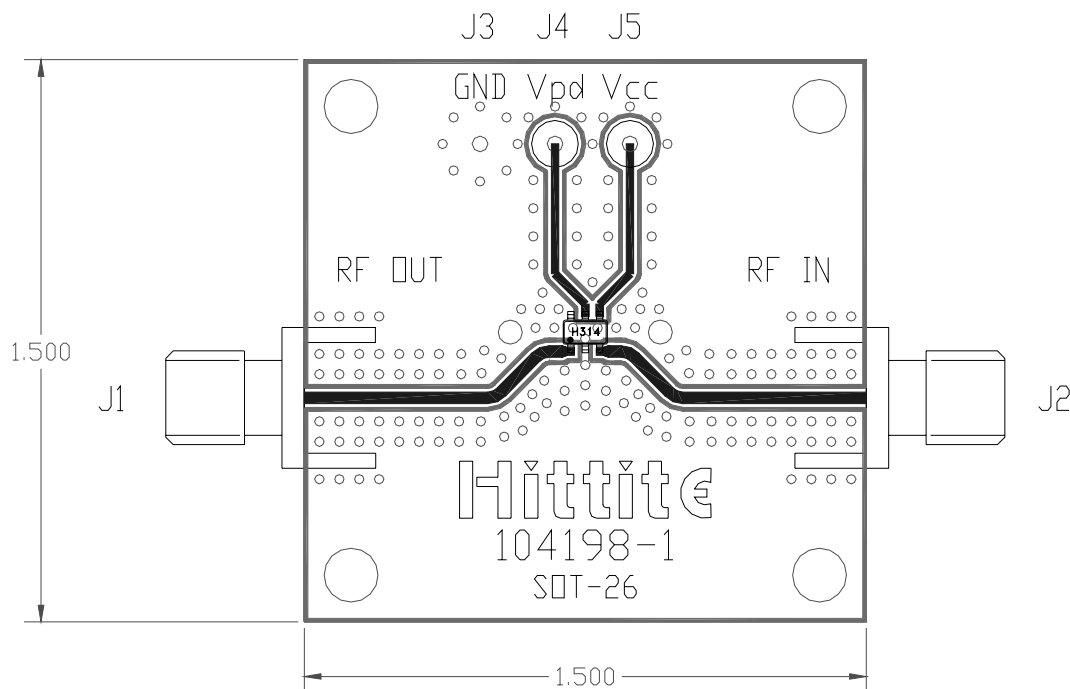
- MATERIAL:
 - PACKAGE BODY - LOW STRESS INJECTION-MOLDED PLASTIC.
 - LEADFRAME & PADDLE MATERIAL: COPPER ALLOY
- PLATING: LEAD & PADDLE- TIN SOLDER PLATE
- DIMENSIONS ARE IN INCHES (MILLIMETERS).
UNLESS OTHERWISE SPECIFIED ALL TOL. ARE ±0.005(±0.13).
- CHARACTERS TO HELVETICA MEDIUM, .020 HIGH
DIMENSION 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 HMC314



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.

Evaluation Circuit Board Layout Design Details

Item	Description
J1 - J2	PC Mount SMA Connector
J3, J4, J5	DC Pin
U1	HMC314
PCB*	104198 Evaluation PCB 1.5" x 1.5"
*Circuit Board Material: Rogers 4350	

