GaAs InGaP HBT MMIC BROADBAND AMPLIFIER GAIN BLOCK, DC - 6.0 GHz

Typical Applications

Ideal as a Driver & Amplifier for:

- 2.2 - 2.7 GHz MMDS
- 3.5 GHz Wireless Local Loop
- 5.0 - 6.0 GHz UNII & HiperLAN

Features

P1dB Output Power: +14 dBm

Output IP3: +27 dBm

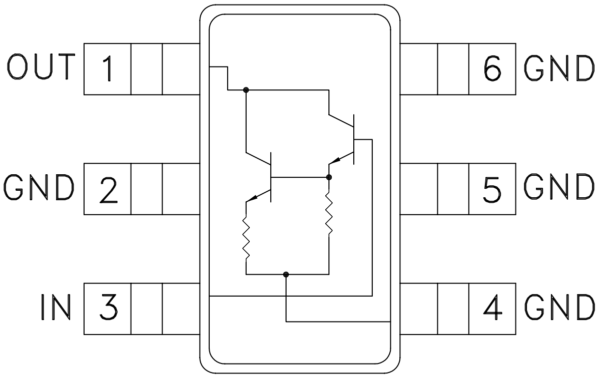
Gain: 17 dB

Single Supply: +5V

High Reliability GaAs HBT Process

Ultra Small Package: SOT26

Functional Diagram



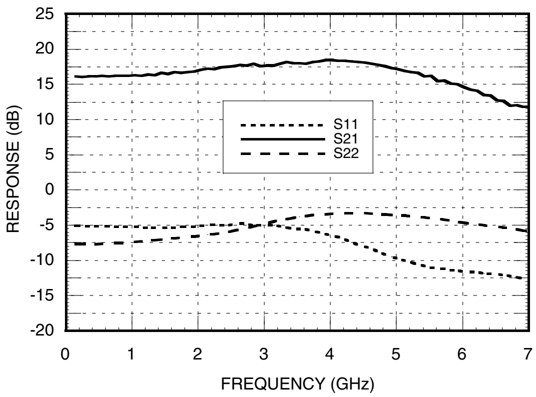
General Description

The HMC313 is a GaAs InGaP Heterojunction Bipolar Transistor (HBT) MMIC amplifier that operates from a single Vcc supply. The surface mount SOT26 amplifier can be used as a broadband gain stage or used with external matching for optimized narrow band applications. With Vcc biased at +5V, the HMC313 offers 17 dB of gain and +15 dBm of saturated power while only requiring 50 mA of current. The “HMC313 Biasing and Impedance Matching Techniques” application note available within the “Application Notes” section offers recommendations for narrow band operation.

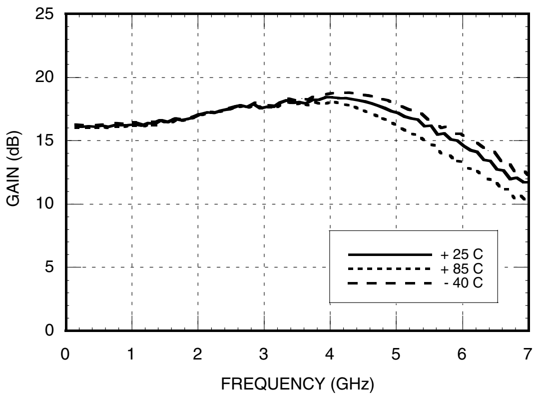
Electrical Specifications, $T_A = +25°$ C

Parameter	Vcc= +5V			Units
	Min.	Typ.	Max.	
Frequency Range	DC - 6			GHz
Gain	14	17	20	dB
Gain Variation Over Temperature		0.02	0.03	dB/ °C
Input Return Loss	3	7		dB
Output Return Loss	2	6		dB
Reverse Isolation	26	30		dB
Output Power for 1dB Compression (P1dB) @ 1.0 GHz	11	14		dBm
Saturated Output Power (Psat) @ 1.0 GHz	12	15		dBm
Output Third Order Intercept (IP3) @ 1.0 GHz	24	27		dBm
Noise Figure		6.5		dB
Supply Current (Icc)		50		mA

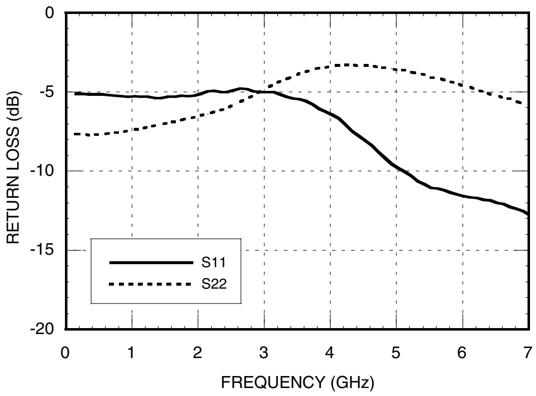
Gain & Return Loss



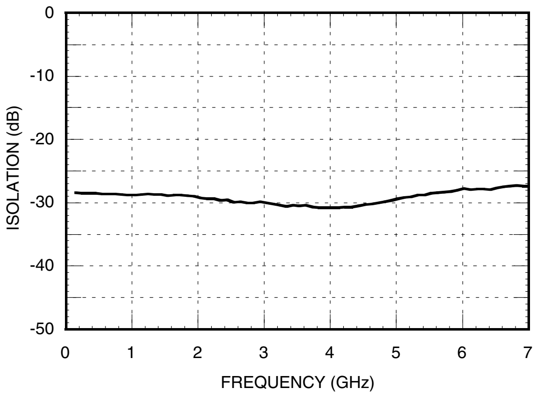
Gain vs. Temperature



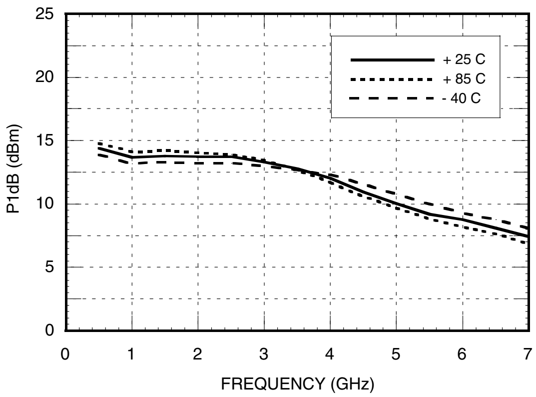
Input & Output Return Loss



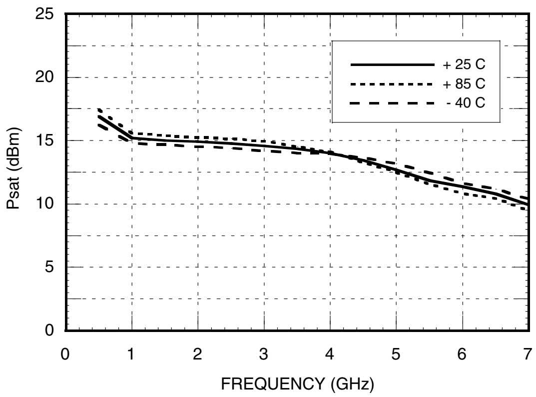
Reverse Isolation



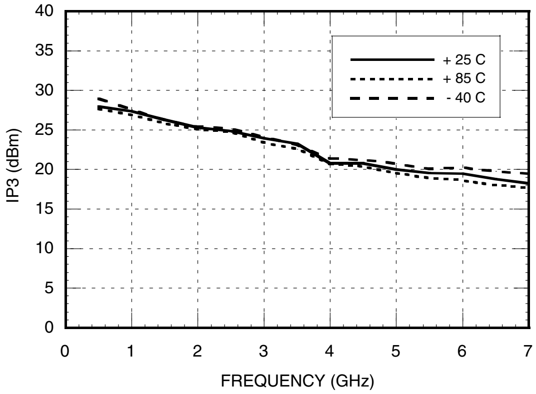
P1dB vs. Temperature



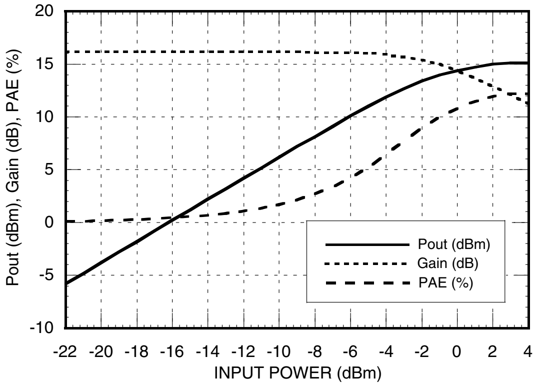
Psat vs. Temperature



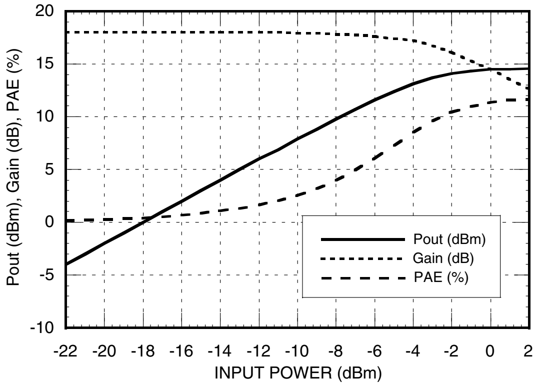
Output IP3 vs. Temperature



Power Compression @ 1.0 GHz



Power Compression @ 3.0 GHz



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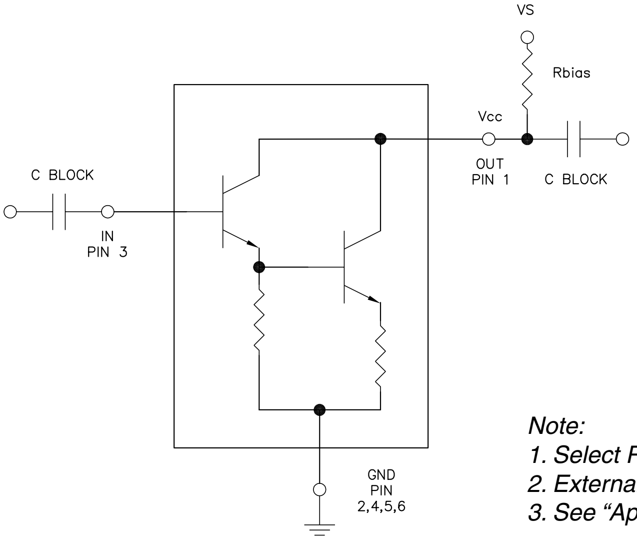
Application Circuit



Absolute Maximum Ratings

Supply Voltage (Vcc)	+5.5 Vdc
Input Power	20 dBm
Channel Temperature (Tc)	150 °C
Continuous Pdiss (T= 85 °C) (derate 3.99 mW/°C above 85 °C)	270 mW
Storage Temperature	-65 to +150° C
Operating Temperature	-40 to +85° C

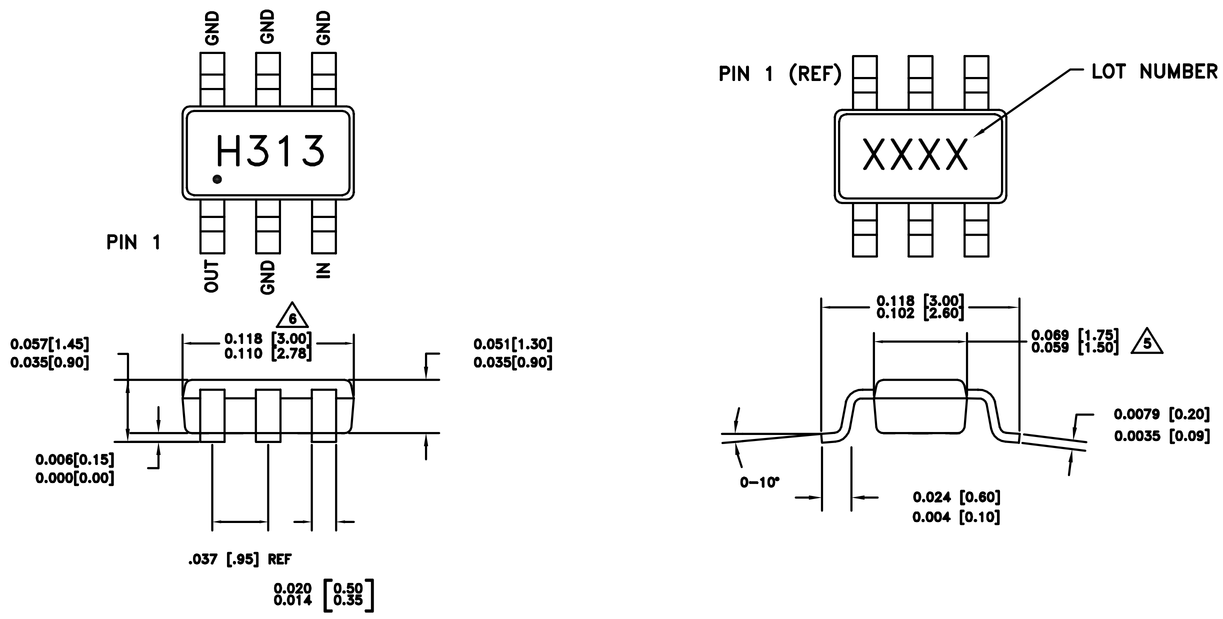
Note:

1. Select Rbias to achieve desired Vcc voltage on Pin 1.

2. External Blocking Capacitors are required on Pins 1 & 3.

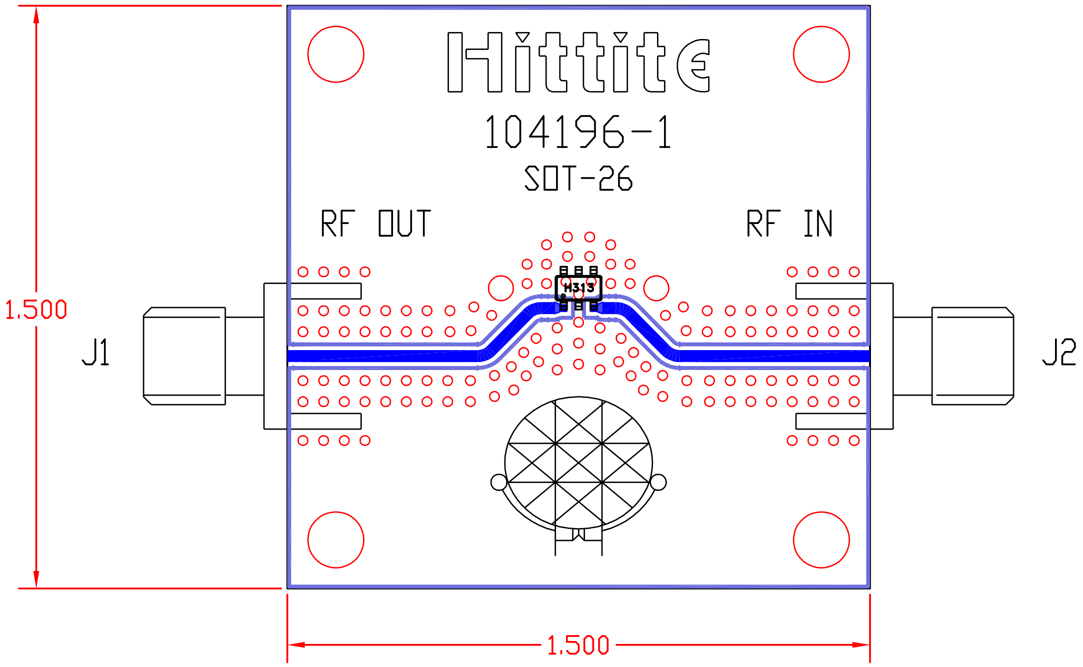
3. See “Application Notes” section for HMC313 Application Circuit.

Outline Drawing



1. MATERIAL:
   - A. PACKAGE BODY - LOW STRESS INJECTION-MOLDED PLASTIC, SILICA & SILICONE INPREGNATED.
   - B. LEADFRAME MATERIAL: COPPER ALLOY
2. PLATING: LEAD-TIN SOLDER PLATE
3. DIMENSIONS ARE IN INCHES (MILLIMETER). UNLESS OTHERWISE SPECIFIED, ALL TOL. ARE ± 0.005 (± 0.13).
4. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE.
5. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25mm PER SIDE.

Evaluation PCB for HMC313



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. 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.

Evaluation Circuit Board Layout Design Details

Item	Description
J1 - J2	PC Mount SMA Connector
U1	HMC313
PCB*	Evaluation PCB 1.5" x 1.5"
* Circuit Board Material: Rogers 4350	

The "HMC313 Biasing and Impedance Matching Techniques" application note is located in the "Application Notes" section of this Designers' Guide.

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Notes: