PG451

InGaP HBT Gain Block Amplifier

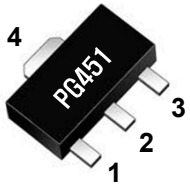
Features

- 300 - 3000MHz
- 16.3 dB Gain at 1900MHz
- +22.8 dBm P1dB
- 38 dBm Output IP3
- Single 4V Supply Voltage
- Supply Current 73mA
- Lead-free / Green / RoHS-compliant SOT-89 Package

Applications

- Broadband Gain Block
- Mobile Infrastructure
- Cellular, GSM
- PCS, WCDMA, WiBro, WiMax
- W-LAN / ISM
- RFID / Fixed Wireless

Functional Diagram



*** Marking : PG451**

Function	Pin No.
RF IN	1
RF OUT / Bias	3
Ground	2,4

Description

The PG451 is a high performance InGaP HBT MMIC Amplifier and high linearity gain block amplifier in a high quality SOT-89 package. The device features excellent output IP3, high input loss and output loss. The device can be easily matched to obtain optimum power and linearity. The product is targeted for use as low-current gain block amplifier for wireless infrastructure applications. The PG451 operates from a single +4 voltage supply and has an internal active bias. All devices are 100% RF and DC tested.

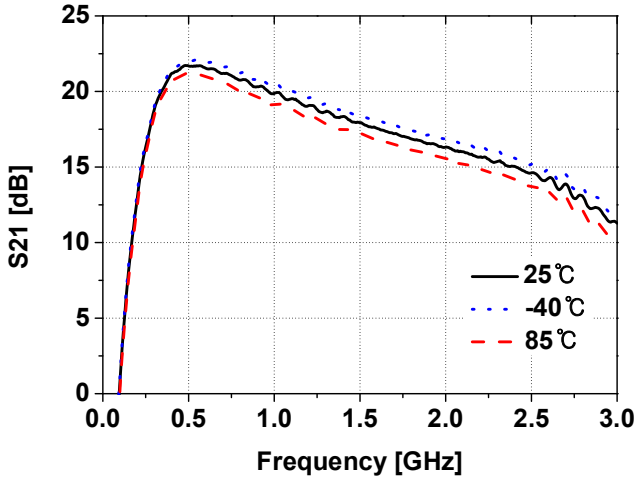
Specifications

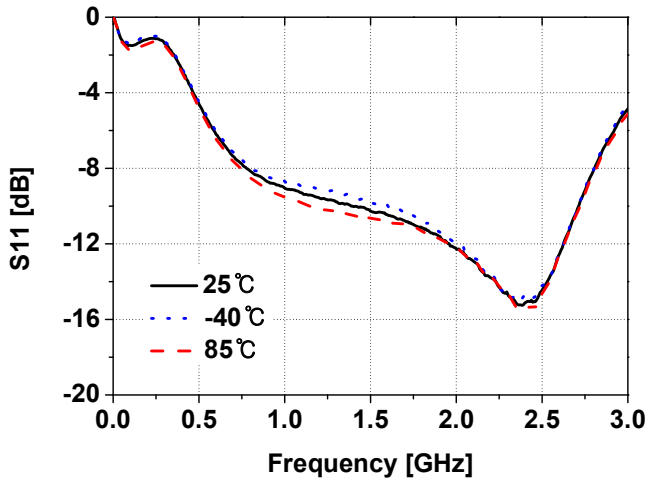
Symbol	Units	Freq.	Min.	Typ.	Max.
S21	dB	900 MHz 1900 MHz 2100 MHz 2600 MHz		20.0 16.3 15.7 14.0	
S11	dB	900 MHz 1900 MHz 2100 MHz 2600 MHz		-8 -11 -13 -11	
S22	dB	900 MHz 1900 MHz 2100 MHz 2600 MHz		-11 -19 -19 -11	
P1dB	dBm	900 MHz 1900 MHz 2100 MHz 2600 MHz		21.5 22.5 22.5 21.4	
OIP3	dBm	900 MHz 1900 MHz 2100 MHz 2600 MHz		36.0 39.2 38.0 34.5	
NF	dB	900 MHz 1900 MHz 2100 MHz 2600 MHz		3.6 3.4 3.4 4.0	
Icc	mA		66	73	80
Vcc	V			4	
Rth	°C/W			40	

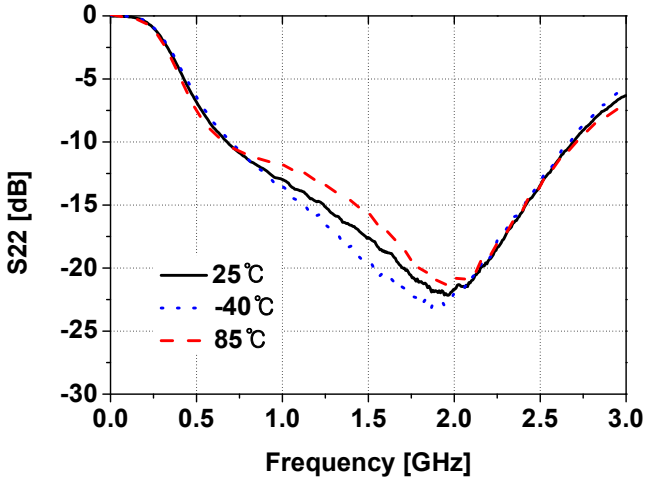
Test Conditions : T=25°C, Supply Voltage=+4V, 50ohm System, OIP3 measured with two tones at an output power of +4dBm/tone separated by 1MHz.

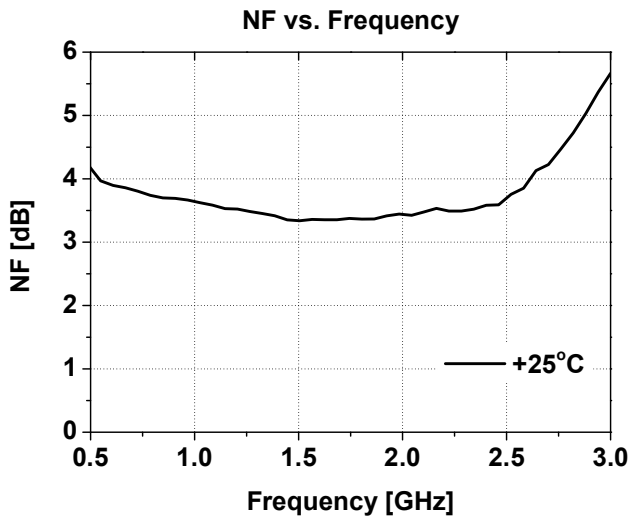
Typical RF Performance for 1.9GHz Tuned Application Circuit

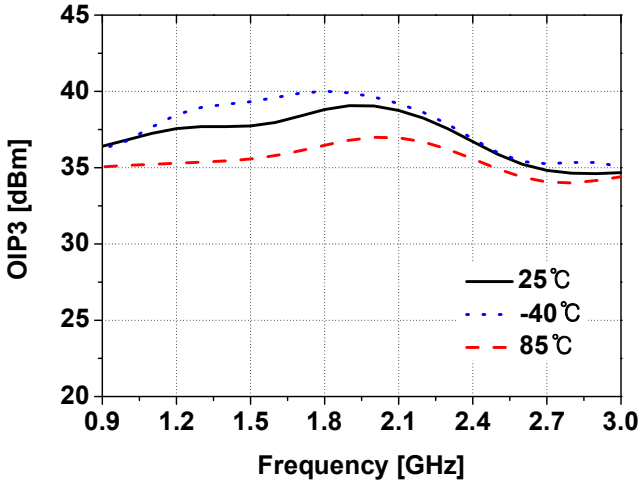
Frequency	MHz	900	1500	1900	2140	2300	2600
S21	dB	20.0	17.7	16.3	15.5	15.0	14.0
S11	dB	-8	-10	-11	-13	-14	-11
S22	dB	-11	-17	-19	-20	-17	-11
P1dB	dBm	21.5	22.7	22.5	22.5	22.0	21.4
OIP3 @+4dBm	dBm	36.0	37.3	39.2	38.0	37.5	34.5
Noise Figure	dB	3.6	3.3	3.4	3.4	3.5	4.0

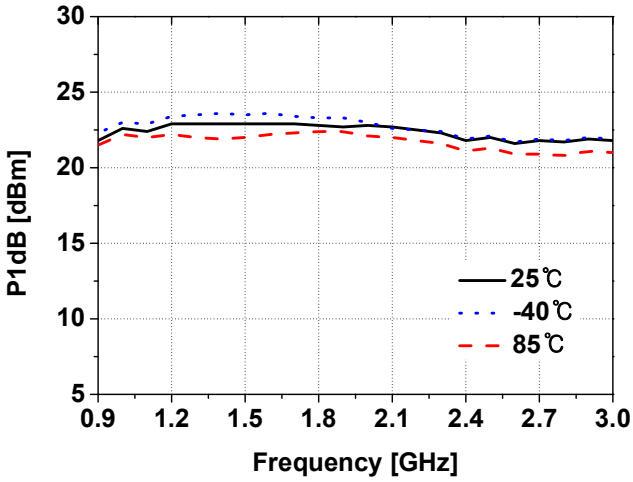


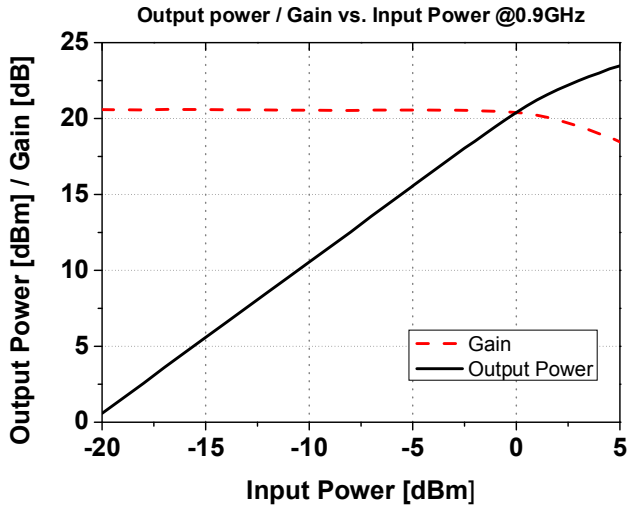


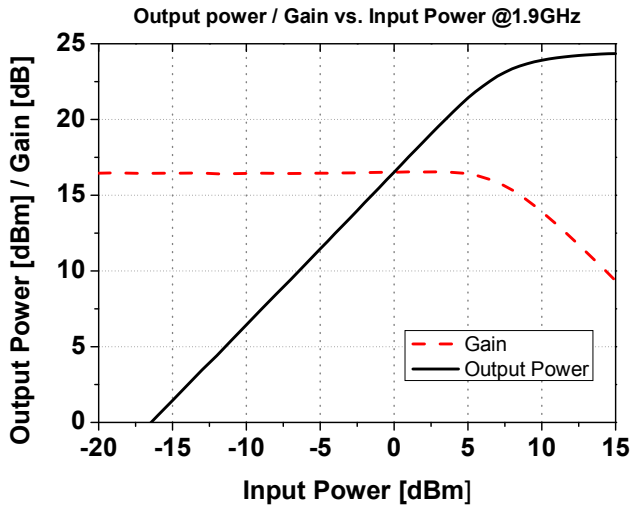




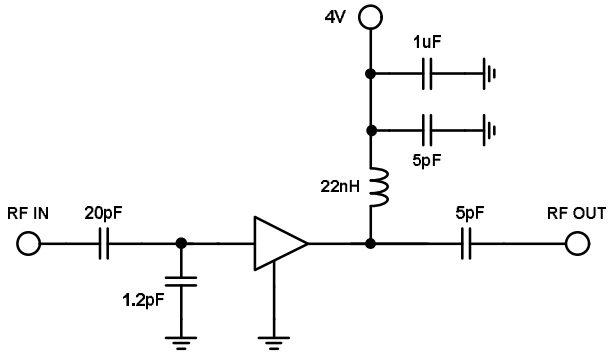








1.9GHz Tuned Application Circuit



Absolute Maximum Ratings

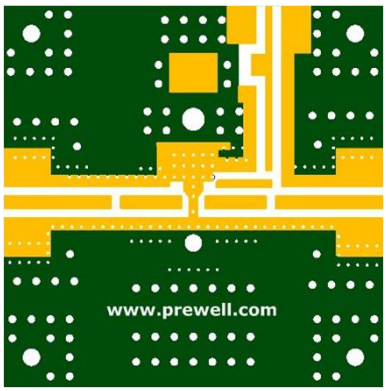
Parameter	Rating	Unit
Device Voltage	+5.0	V
Device Current	120	mA
RF Power Input	20	dBm
Storage Temperature	-55 to +150	°C
Ambient Operating Temperature	-40 to +85	°C
Junction Temperature for >10^6 hours MTTF	187	°C

Operation of this device above any of these parameters may cause permanent damage.

ESD / MSL Ratings

1. ESD sensitive device. Observe Handling Precautions.
2. ESD Rating : Class 2 (Passes at 2000V min.) Human Body Model (HBM), JESD22-A114
3. ESD Rating : Class IV (Passes at 1000V min.) Charged Device Model (CDM), JESD22-C101
4. MSL (Moisture Sensitive Level) Rating : Level 1 at +260°C Convection reflow, J-STD-020

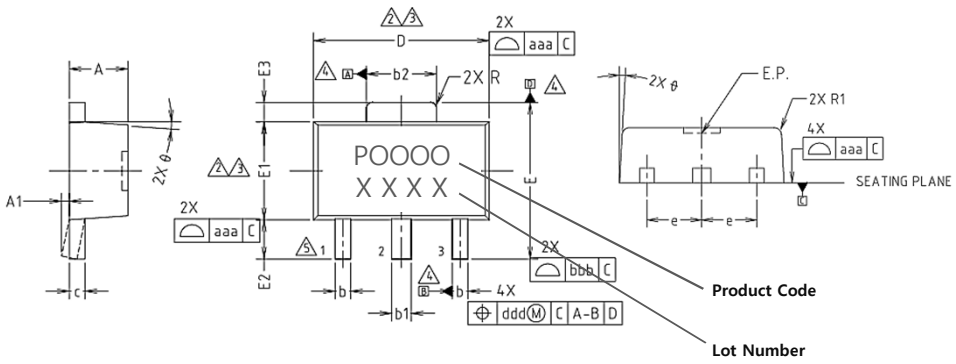
Evaluation Board Layout (4x4)



Mounting Instructions

1. Use a large ground pad area with many plated through-holes as shown.
2. We recommend 1 oz copper minimum.
3. Measurement for our data sheet was made on 0.8mm thick FR-4 Board.
4. Add as much copper as possible to inner and outer layers near the part to ensure optimal thermal performance.
5. RF trace width depends on the board material and construction.
6. Add mounting screws near the part to fasten the board to a heatsink.

Lead-free /RoHS Compliant / Green SOT-89 Package Outline



SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	1.40	1.50	1.60	
A1	0.00	–	0.10	
b	0.38	0.42	0.48	
b1	0.48	0.52	0.58	
b2	1.79	1.82	1.87	
c	0.40	0.42	0.46	
D	4.40	4.50	4.70	2,3
E	3.70	4.00	4.30	
E1	2.40	2.50	2.70	2,3
E2	0.80	1.00	1.20	
E3	0.40	0.50	0.60	
e	1.50 TYP.			
θ	4° TYP.			
R	0.15 TYP.			
R1	–	–	0.20	

SYMBOL	TOLERANCES OF FORM AND POSITION	NOTE
aaa	0.15	
bbb	0.20	
ccc	0.10	
ddd	0.10	

Land Pattern