PNW254

InGaP HBT Gain Block Amplifier

Features

- 5 - 3000MHz
- 14.5 dB Gain at 1900MHz
- +20 dBm P1dB
- 29 dBm Output IP3
- Single 3.3V Supply Voltage
- Supply Current 30mA
- Lead-free / Green / RoHS-compliant SOT-363 Package

Applications

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

Functional Diagram

*** Marking : P25**

Function	Pin No.
RF IN	3
RF OUT / Bias	6
Ground	1,2,4,5

Description

The PNW254 is a high performance InGaP HBT MMIC Amplifier and high linearity gain block amplifier in a high quality SOT-363 package. The device features excellent Input and output return loss, highly linear performance. 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 PNW254 operates from a single +3.3 voltage supply and has an internal active bias. All devices are 100% RF and DC tested.

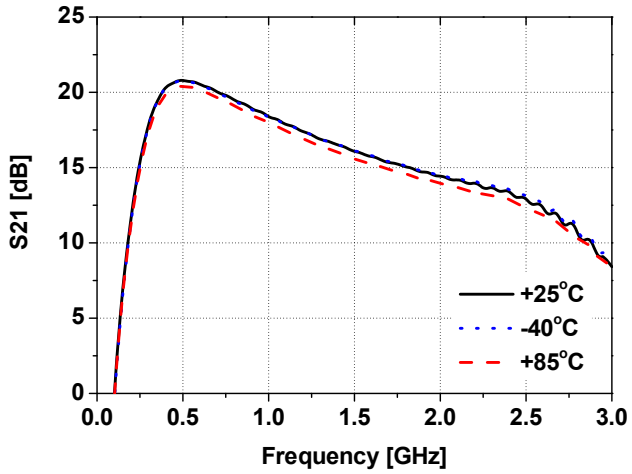
Specifications

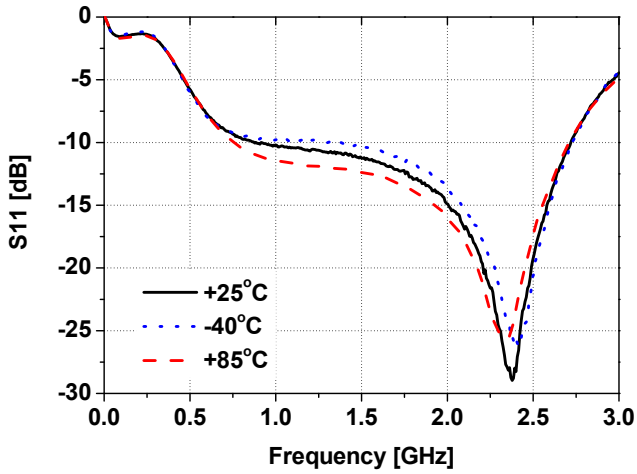
Symbol	Units	Freq.	Min.	Typ.	Max.
S21	dB	75 MHz 900 MHz 1900 MHz 2600 MHz	23 18 13.5 11.5	23.5 18.5 14.5 12	
S11	dB	75 MHz 900 MHz 1900 MHz 2600 MHz		-11 -9 -12 -11	
S22	dB	75 MHz 900 MHz 1900 MHz 2600 MHz		-26 -12 -14 -10	
P1dB	dBm	75 MHz 900 MHz 1900 MHz 2600 MHz		20 19.5 20 19	
OIP3	dBm	75 MHz 900 MHz 1900 MHz 2600 MHz	28 26 28 29	29 27 29 30	
NF	dB	75 MHz 900 MHz 1900 MHz 2600 MHz		2.5 2.3 2.3 3.2	
Icc	mA		25	30	35
Vcc	V			3.3	
Rth	°C/W			40	

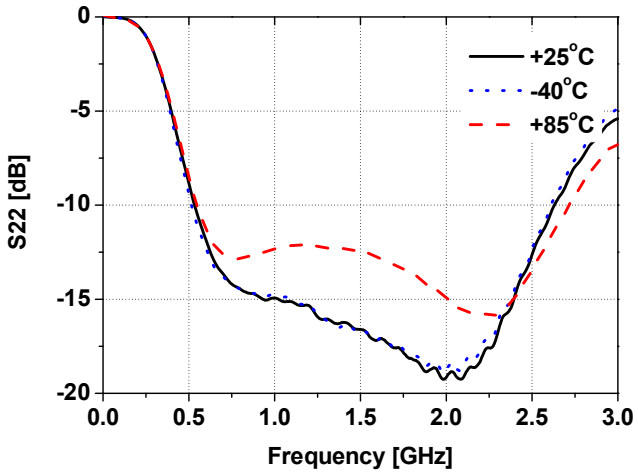
Test Conditions : T=25°C, Supply Voltage=+3.3V, 50ohm System, OIP3 measured with two tones at an output power of -3dBm/tone separated by 1MHz.

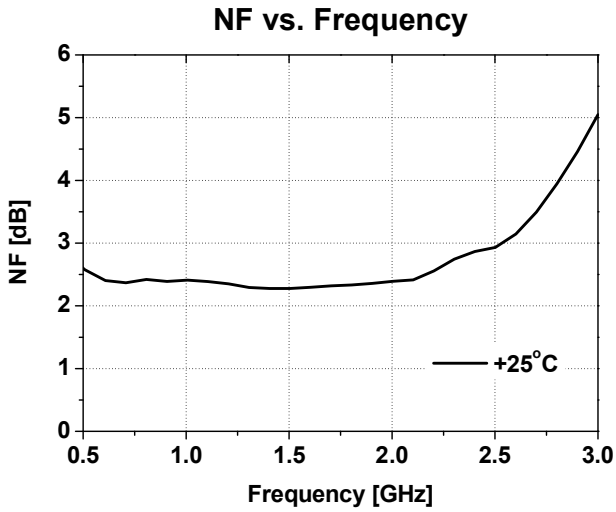
Typical RF Performance for 1.9GHz Tuned Application Circuit

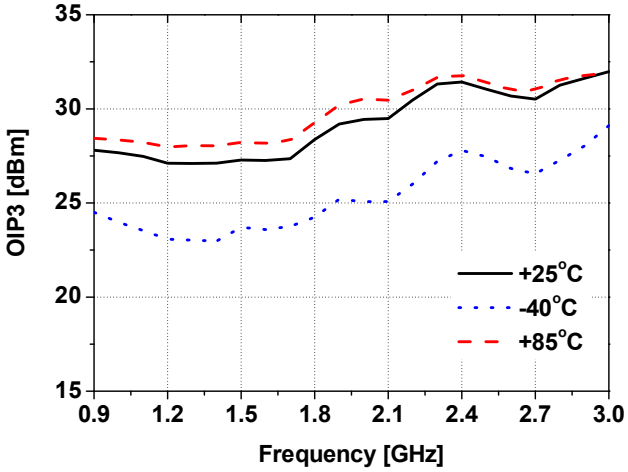
Frequency	MHz	900	1500	1900	2140	2300	2600
S21	dB	18.6	15.9	14.5	13.8	13.3	12.0
S11	dB	-10	-11	-13	-16	-21	-11
S22	dB	-13	-14	-15	-16	-14	-10
P1dB	dBm	19.9	18.0	20.3	20.1	20.2	19.0
OIP3 @-3dBm	dBm	27.5	27.6	29.2	31.7	31.4	30.5
Noise Figure	dB	2.3	2.2	2.3	2.4	2.4	3.2

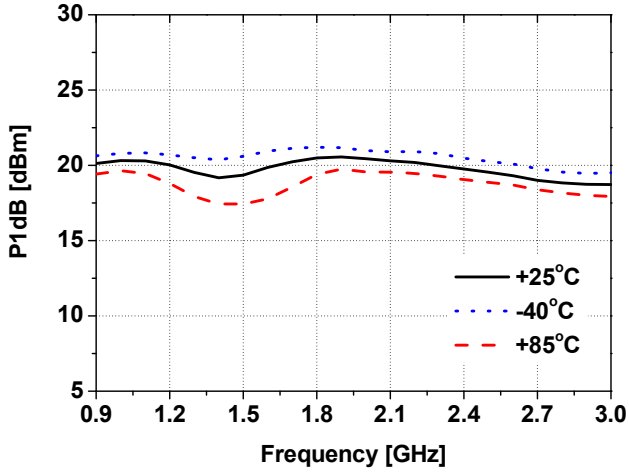


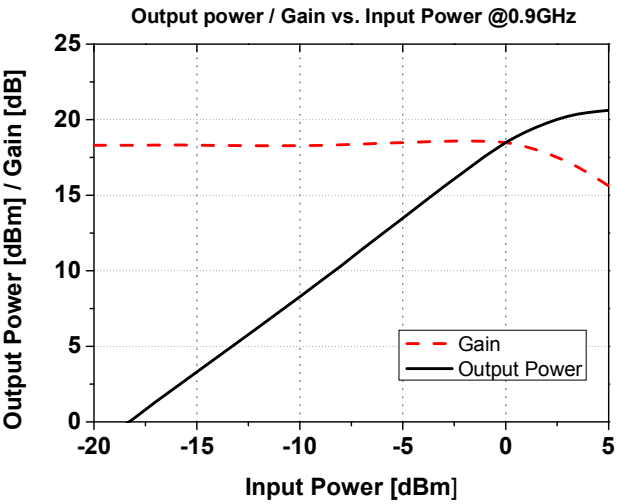


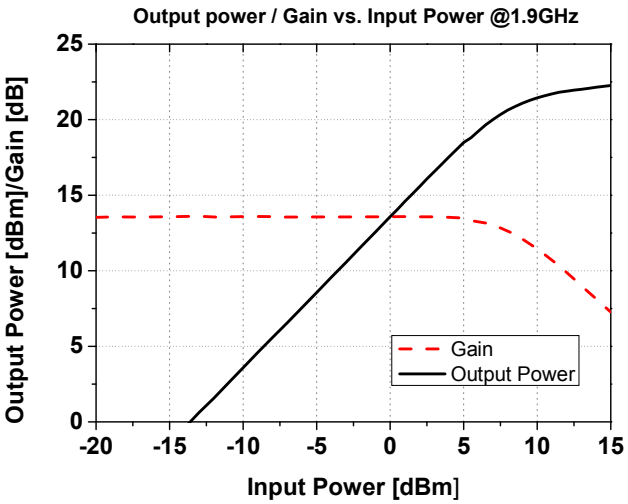




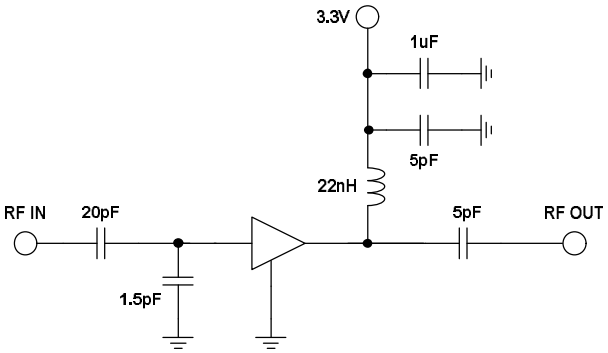








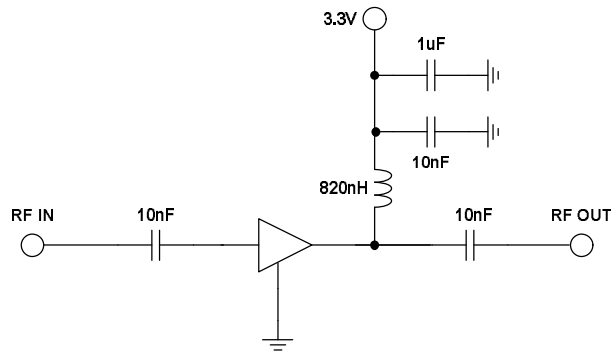
1.9GHz Tuned Application Circuit

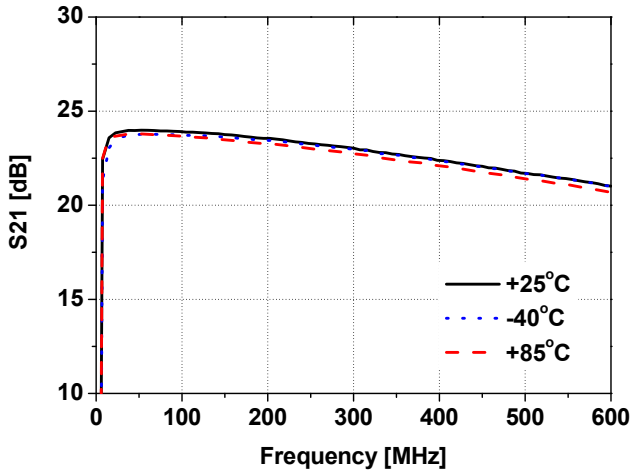


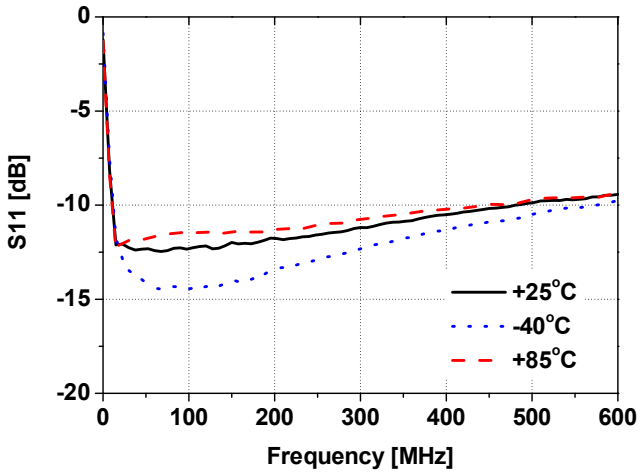
Typical RF Performance for 50MHz – 500MHz Tuned Application Circuit

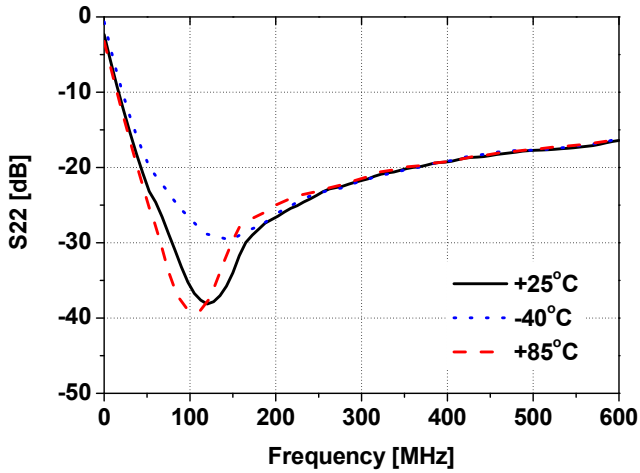
Frequency	MHz	75	125	300	500
S21 : Gain	dB	23.7	23.6	22.7	21.4
S11 : Input Return Loss	dB	-11	-11	-10	-9
S22 : Output Return Loss	dB	-26	-32	-21	-16
Output P1dB	dBm	20.2	20.4	20.4	20.4
Output IP3 @-3dBm	dBm	29.0	31.3	29.4	28.3
Noise Figure	dB	2.5	2.6	3.5	3.5

500MHz Tuned Application Circuit









Absolute Maximum Ratings

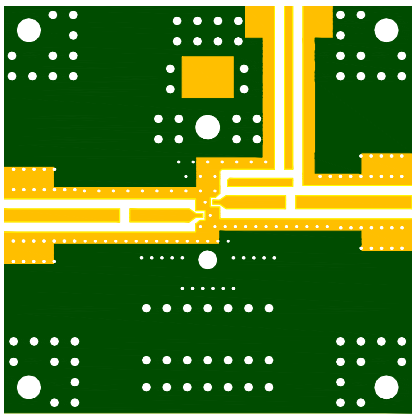
Parameter	Rating	Unit
Device Voltage	+4.5	V
Device Current	100	mA
RF Power Input	25	dBm
Storage Temperature	-55 to +150	°C
Ambient Operating Temperature	-40 to +85	°C
Junction Temperature for >10^6 hours MTTF	185	°C

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

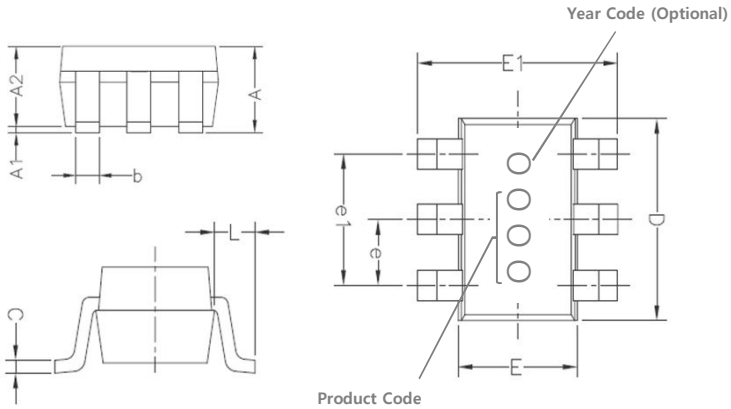
Evaluation Board Layout (4x4)



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-363 Package Outline



Symbol	Millimeters		Inches	
	MIN.	MAX.	MIN.	MAX.
A	0.90	1.10	.036	.044
A1	0.025	0.10	.001	.004
A2	0.875	1.00	.035	.040
b	0.20	0.40	.008	.016
C	0.10	0.15	.004	.006
D	1.90	2.10	.076	.084
E	1.15	1.35	.046	.054
E1	2.00	2.20	.080	.088
e	0.65 BSC.		.026 BSC.	
e1	1.30 BSC.		.052 BSC.	
L	0.425 REF.		.017 REF.	

Note:
1.All dimensions are in millimeters, and the dimensions in inches are for reference only.
2.1mm=40mils=0.04inches

Land Pattern