

SJM PREWELL
PNW254
Wideband Gain Block

Features

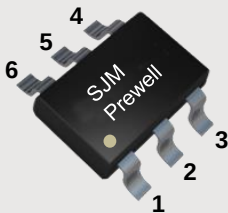
- 5 to 3000MHz
- Gain 23.7dB @ 75MHz
- P1dB 20.3dBm @ 1900MHz
- OIP3 30.5dBm @ 2600MHz
- Supply Current 30mA
- Lead-free / Green /RoHS  compliant SOT-363 Package

Applications

- Base station / Repeater / Mobile / Automotive / Military
 - FDD-LTE, TD-LTE, TDS-CDMA, CDMA, WCDMA, WiMAX, PCS, GSM, GPS, GPRS, TETRA
- IoT / Broadcasting / WLAN
 - FM, DMB, DVB, ISM

Functional Diagram

RF IN	3	RF OUT /	6
GND	1,2,4,5	Bias	



ESD/MSL

- 1 ESD sensitive device. Observe handling precautions.
- 2 HBM: Class 1C , JESD22-A114
- 3 CDM: Class C3 , JESD22-C101F
- 4 MSL 3, J-STD-020

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 PNW254 has excellent input/output return loss and high linear performance. The device can be easily matched to obtain optimum power and linearity. The product is targeted for using 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

Parameter	Units	Frequency (MHz)			
		75	900	1900	2600
S21	dB	23.7	18.6	14.5	12.0
S11	dB	-11	-10	-13	-11
S22	dB	-26	-13	-15	-10
P1dB	dBm	20.2	19.9	20.3	19.0
OIP3	dBm	29.0	27.5	29.2	30.5
NF	dB	2.5	2.3	2.3	3.2
V/I	V/mA	3.3/ 30			
Rth	°CW	40			

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

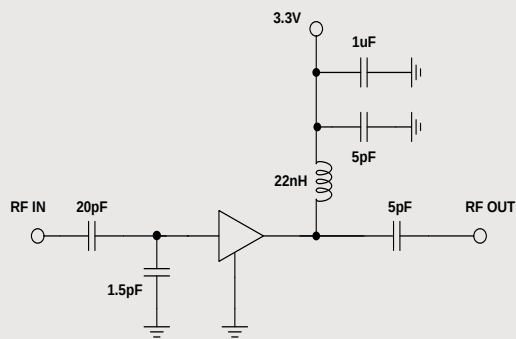
Absolute Maximum Ratings

Parameter	Rating	Units
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	185	°C

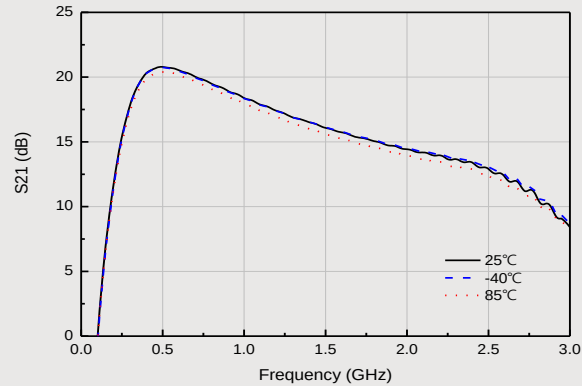
- 1) Stresses above the maximum values listed have may cause permanent damage to the device.
2) MTTF is more than 100 years.

Typical RF Performance for 1.9GHz Tuned Application Circuit
Supply Bias Voltage = 3.3V, Current= 30mA

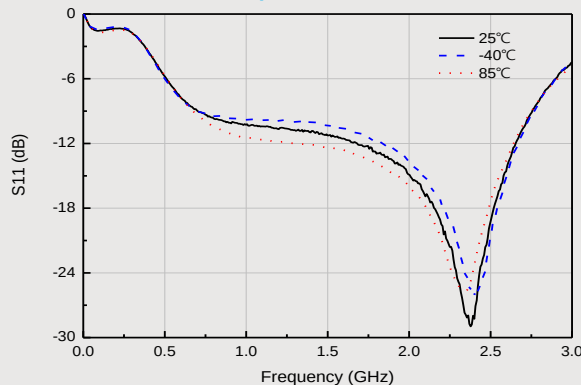
Parameters	Units	Frequency (MHz)					
		900	1500	1900	2140	2300	2600
S21	dB	18.6	15.9	14.5	13.8	13.3	12.0
S11	dB	-10	-11	-13	-16	-21	-11
S22	dB	-13	-14	-15	-16	-14	-10
P1dB	dBm	19.9	18.0	20.3	20.1	20.2	19.0
OIP3 @ -3dBm	dBm	27.5	27.6	29.2	31.7	31.4	30.5
NF	dB	2.3	2.2	2.3	2.4	2.4	3.2



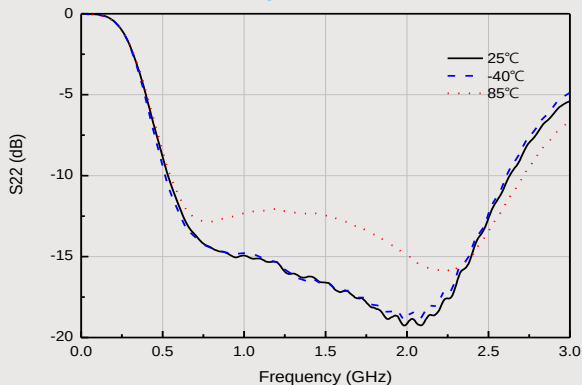
Gain vs. Frequency



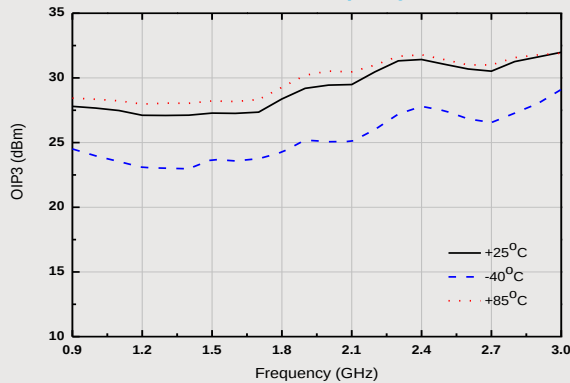
Input Return Loss



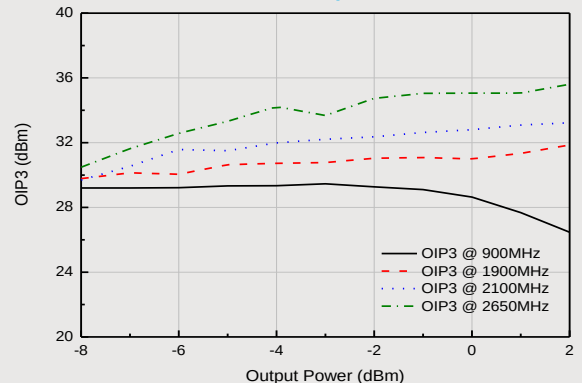
Output Return Loss



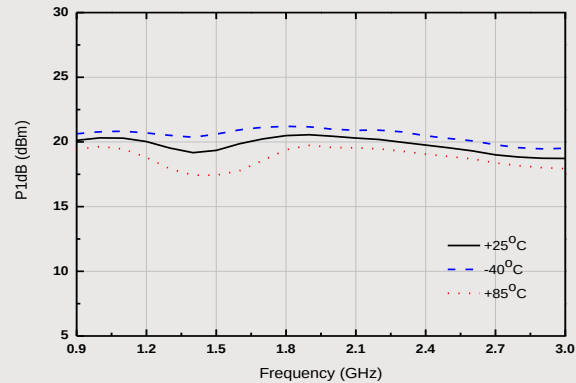
OIP3 vs. Frequency



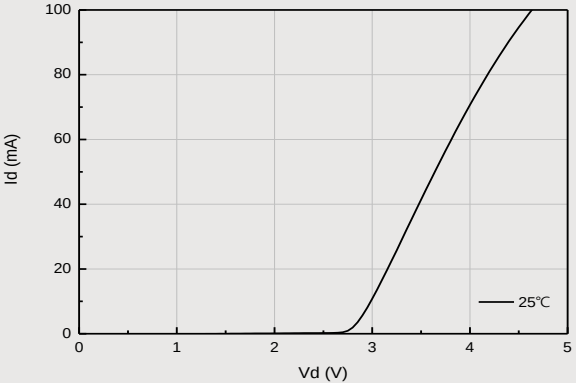
OIP3 vs. Output Power



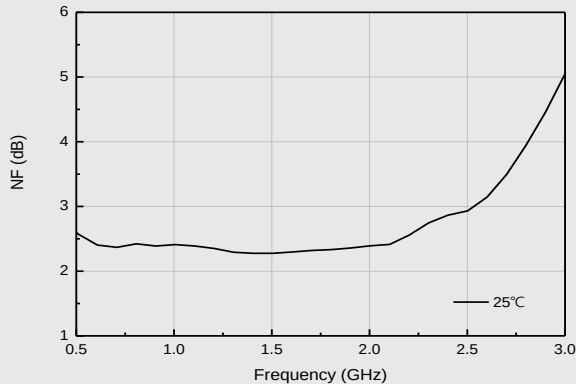
P1dB vs. Frequency



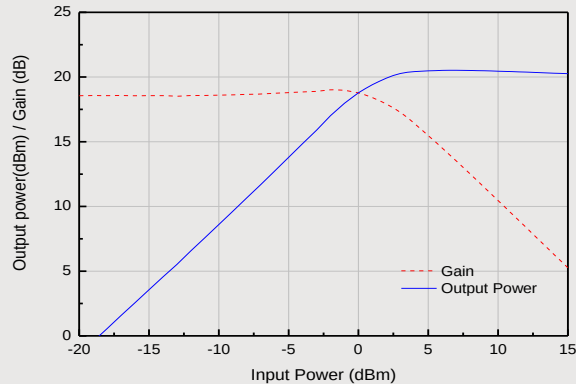
Id vs. Vd



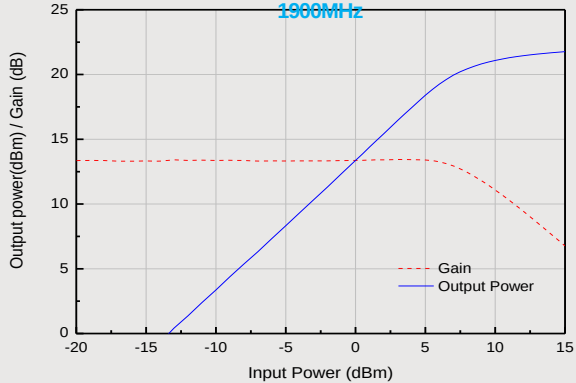
NF vs. Frequency



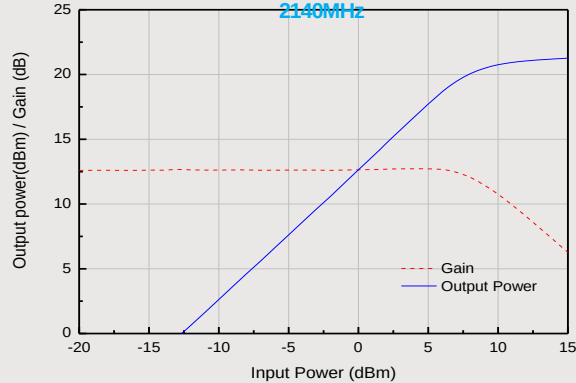
Output Power / Gain vs. Input Power @ 900MHz



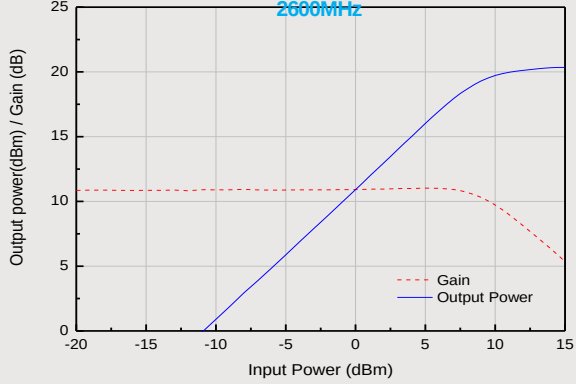
Output Power / Gain vs. Input Power @
1900MHz



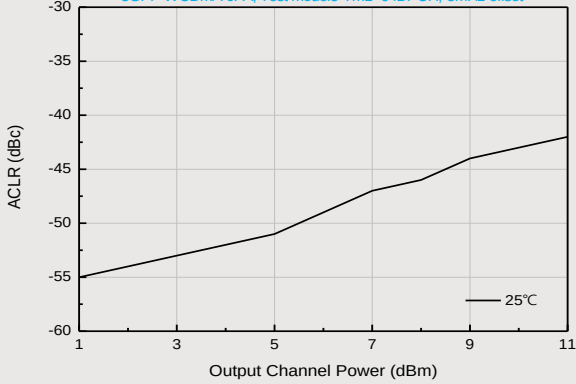
Output Power / Gain vs. Input Power @
2140MHz

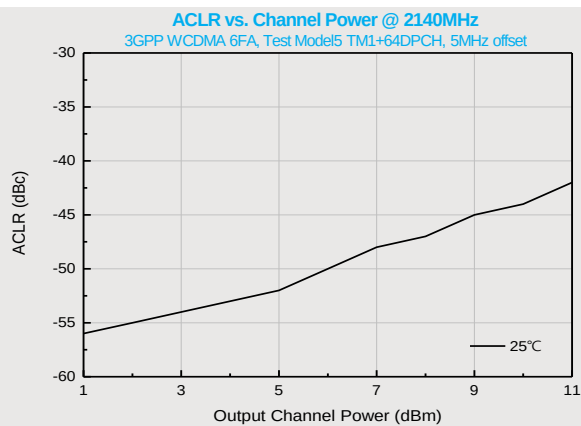


Output Power / Gain vs. Input Power @
2600MHz



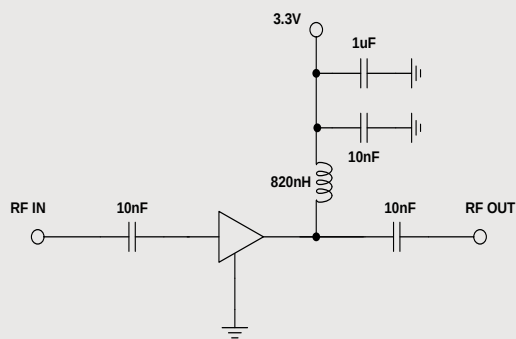
ACLR vs. Channel Power @ 1850MHz
 3GPP WCDMA 6FA, Test Model5 TM1+64DPCH, 5MHz offset



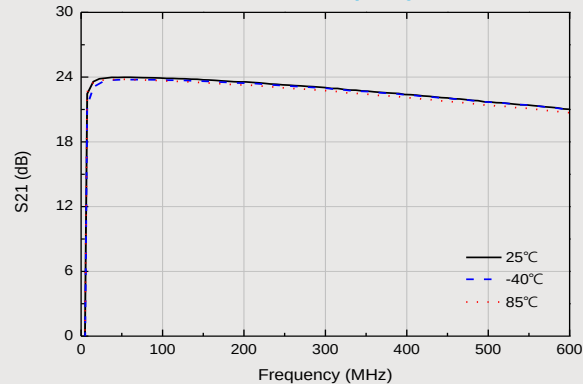


Typical RF Performance for 50MHz-500MHz Tuned Application Circuit
Supply Bias Voltage = 3.3V, Current= 30mA

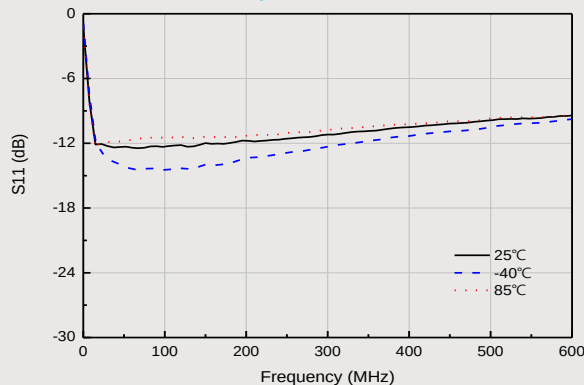
Parameters	Units	Frequency (MHz)			
		75	125	300	500
S21	dB	23.7	23.6	22.7	21.4
S11	dB	-11	-11	-10	-9
S22	dB	-26	-32	-21	-16
P1dB	dBm	20.2	20.4	20.4	20.4
OIP3 @ -3dBm	dBm	29.0	31.3	29.4	28.3
NF	dB	2.5	2.6	3.5	3.5



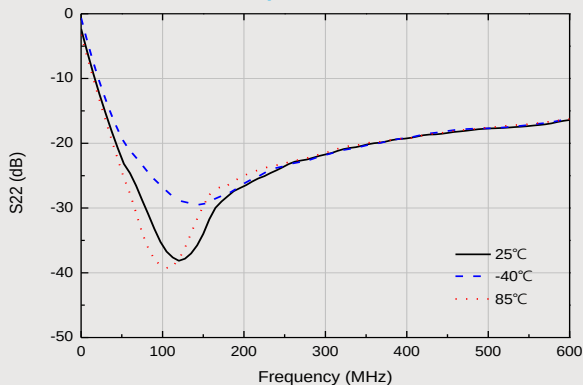
Gain vs. Frequency



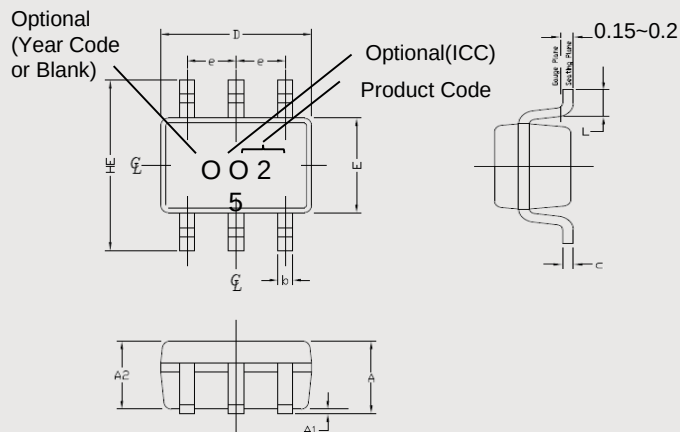
Input Return Loss



Output Return Loss

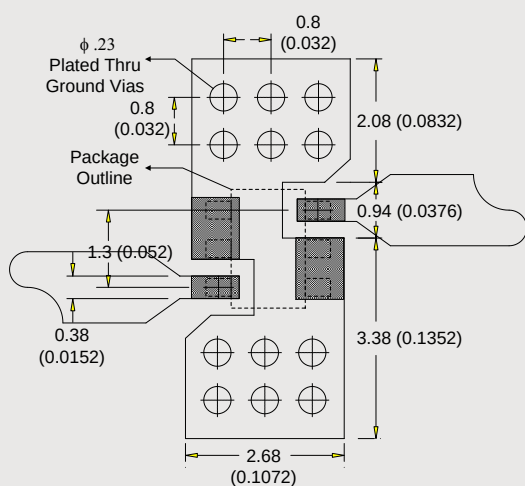


Lead-free /RoHS Compliant / Green SOT-363 Package Outline

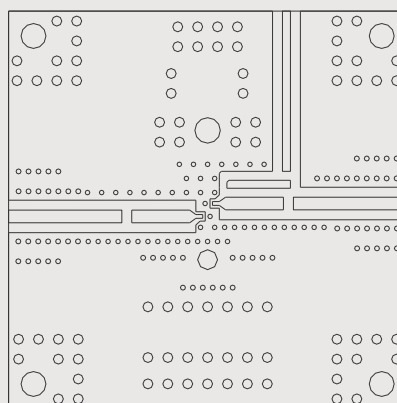


SYMBOL	MIN.	MAX.
E	1.15	1.35
D	1.85	2.25
HE	1.95	2.30
A	0.80	1.10
A2	0.70	1.00
A1	0.00	0.10
e	0.65 BSC	
b	0.15	0.40
c	0.08	0.25
L	0.21	0.26

Land Pattern



Evaluation Board Layout (40x40)



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 RF trace width depends on the board material and construction.
- 5 Add mounting screws near the part to fasten the board to a heatsink.
- 6 Add as much copper as possible to inner and outer layers near the part to ensure optimal thermal performance.