SJM PREWELL

PNW351

Wideband Gain Block

Features

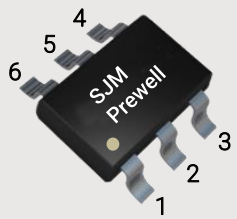
- 500 to 4200MHz
- Gain 23.5dB @ 900MHz
- P1dB 14.8dBm @ 1900MHz
- OIP3 32.5dBm @1900MHz
- Lead-free / Green / RoHS compliant SOT-363 Package

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 / Bias 6
GND 1,2,4,5



ESD/MSL

1 ESD sensitive device. Observe handling precautions.

2 HBM: Class 1C , JESD22-A114

3 CDM: Class C3 , JESD22-C101F

4 MSL 1, J-STD-020

Description

The PNW351 is a high performance InGaP HBT MMIC Amplifier and high linearity gain block amplifier in a high quality SOT-363 package. The PNW351 has excellent input/output return loss and high linear, high gain 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 PNW351 operates from a single voltage supply and has an internal active bias. All devices are 100% RF and DC tested.

Specifications

Parameter	Units	Frequency (MHz)				
		900	1900	2600	3500	3700
S21	dB	23.5	21.5	20.5	19.5	19.5
S11	dB	-11	-13	-12	-15	-18
S22	dB	-9	-11	-11	-10	-11
P1dB	dBm	14.0	14.8	14.8	13.4	13.2
OIP3	dBm	31.5	32.5	30.5	28.5	26.5
NF	dB	3.2	3.3	3.7	3.7	3.9
V / I	V/mA	3.3 / 47				
Rth	°C/W	43				

1) Test Conditions : T=25°C, Supply Voltage=3.3V, 50ohm System
2) OIP3 measured with two tones at an output power of 0dBm/tone separated by 1MHz.

Absolute Maximum Ratings

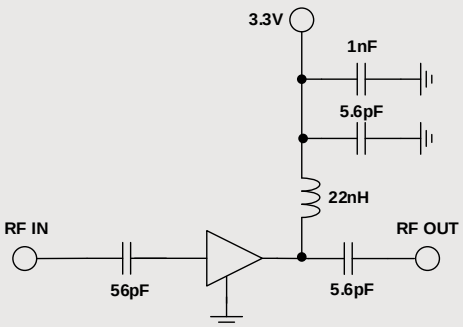
Parameter	Rating	Unit
Device Voltage	3.8	V
Device Current	100	mA
RF Power Input	20	dBm
Storage Temperature	-55 to 150	°C
Ambient Operating Temperature	-40 to 85	°C
Junction Temperature	185	°C

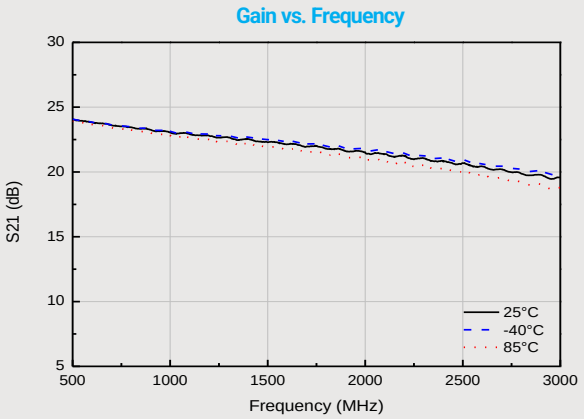
1) Stresses above the maximum values listed have may cause permanent damage to the device.
2) MTTF is more than 100 years.
3) Operation above operating voltage (3.3V) for extended periods may reduce reliability

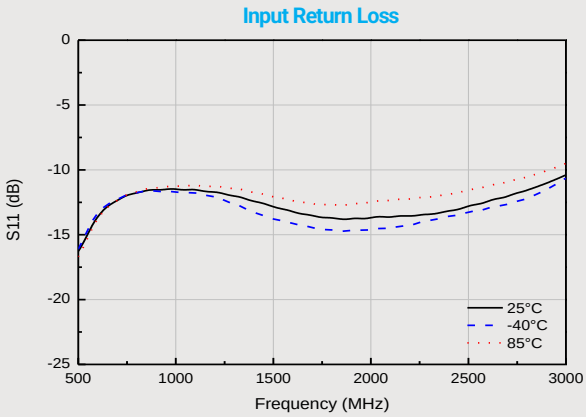
Typical RF Performance for 500MHz ~ 3000MHz Tuned Application Circuit

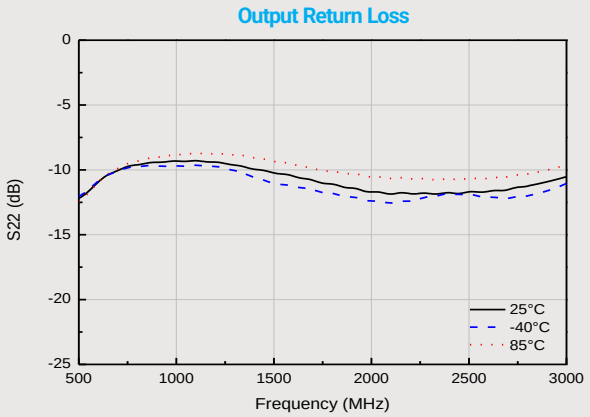
Supply Bias Voltage = 3.3V, Current= 47mA

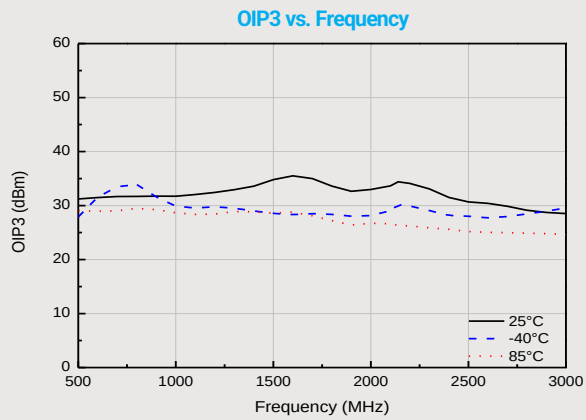
Parameters	Units	Frequency (MHz)						
		500	900	1500	1900	2300	2600	3000
S21	dB	24.0	23.5	22.5	21.5	21.0	20.5	19.5
S11	dB	-15.7	-11.5	-12.9	-13.5	-13.3	-12.5	-10.5
S22	dB	-11.7	-9.5	-10.3	-11.5	-11.8	-11.5	-10.5
P1dB	dBm	12.0	14.0	14.0	14.8	14.8	14.8	13.6
OIP3 @ 0dBm	dBm	31.1	31.5	34.5	32.5	33.0	30.5	28.5
NF	dB	3.3	3.2	3.2	3.3	3.4	3.7	4.0

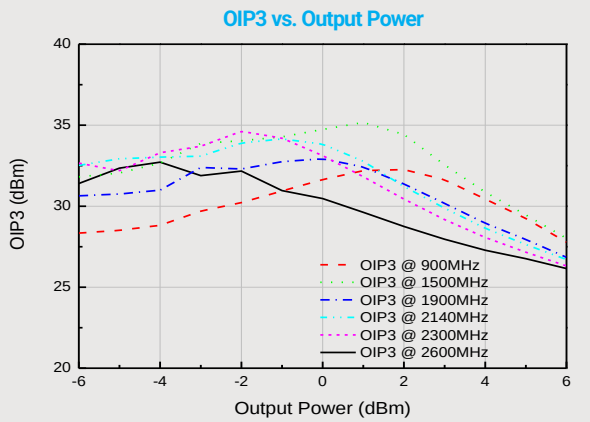




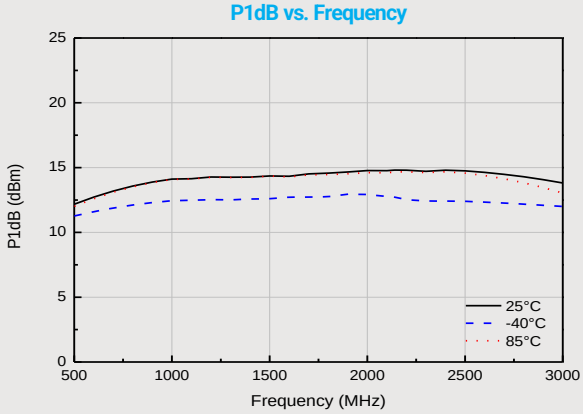




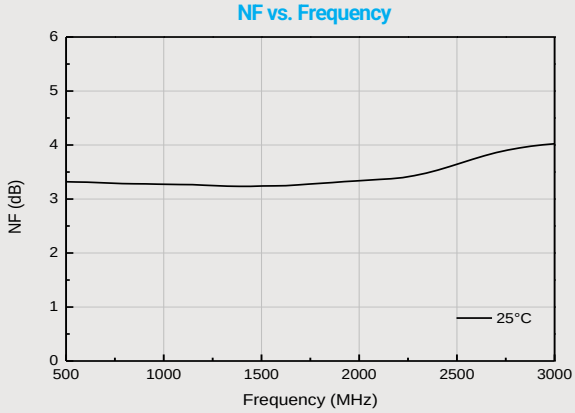




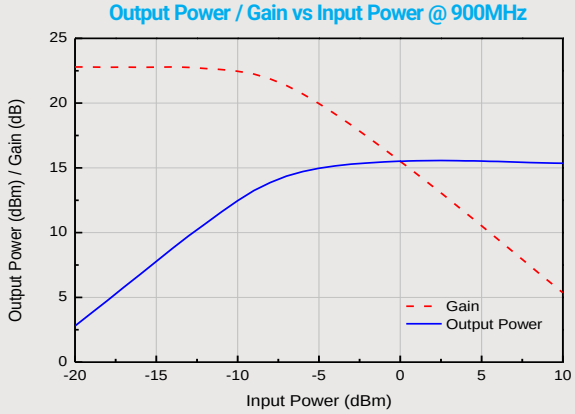
P1dB vs. Frequency



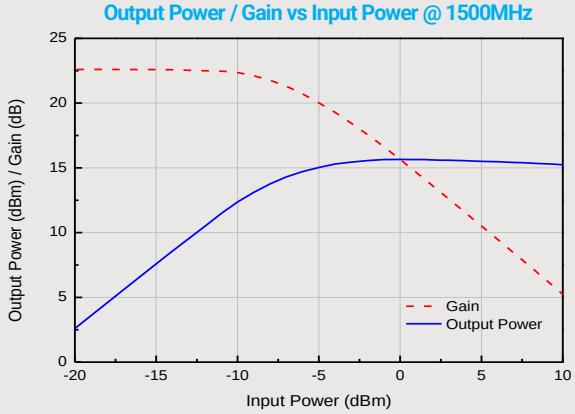
NF vs. Frequency



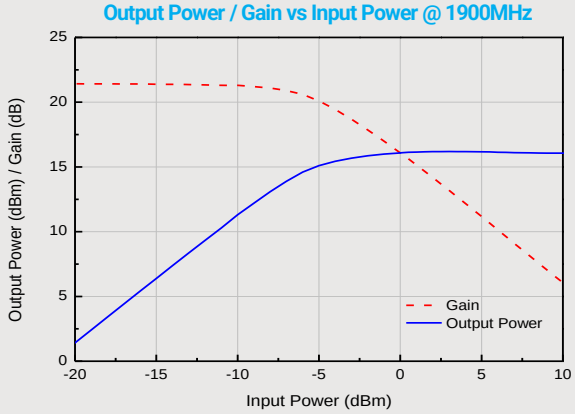
Output Power / Gain vs Input Power @ 900MHz



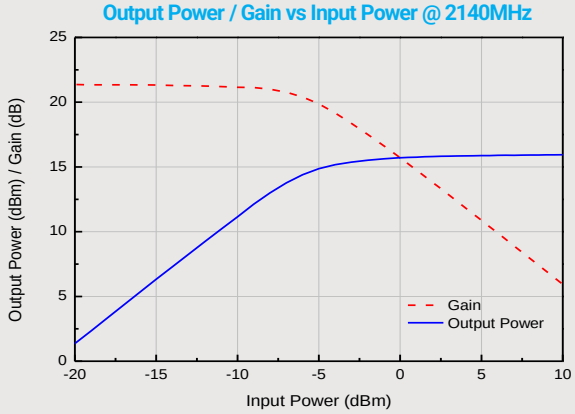
Output Power / Gain vs Input Power @ 1500MHz



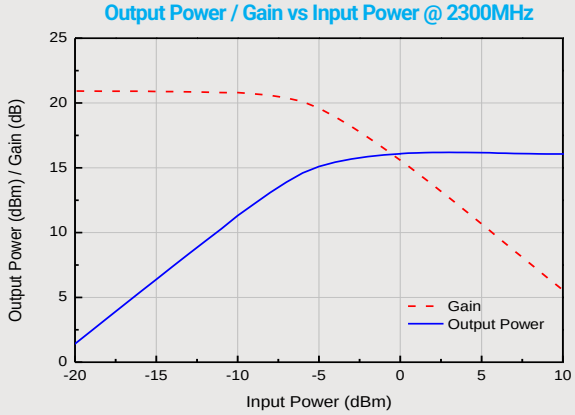
Output Power / Gain vs Input Power @ 1900MHz



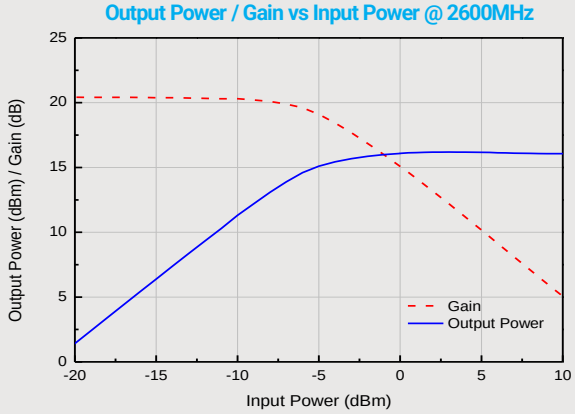
Output Power / Gain vs Input Power @ 2140MHz



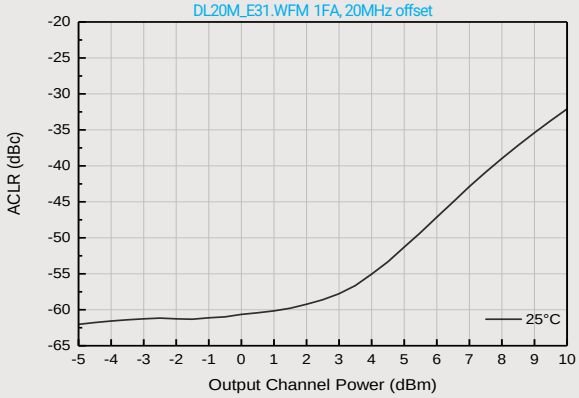
Output Power / Gain vs Input Power @ 2300MHz



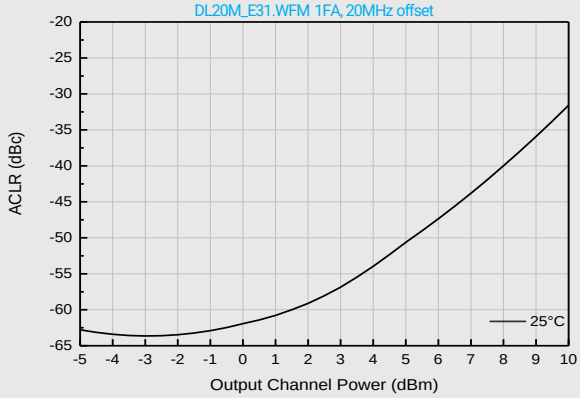
Output Power / Gain vs Input Power @ 2600MHz



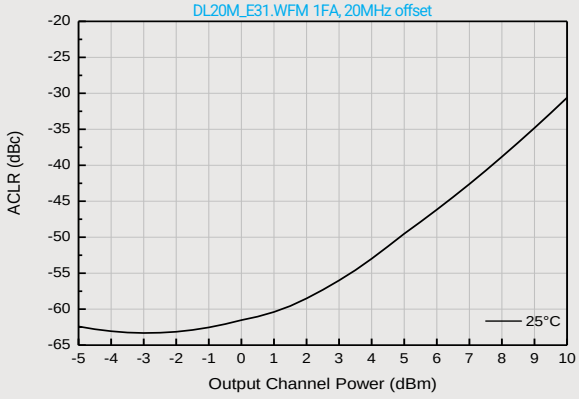
LTE ACLR vs. Output Power @ 900MHz
DL20M_E31.WFM 1FA, 20MHz offset



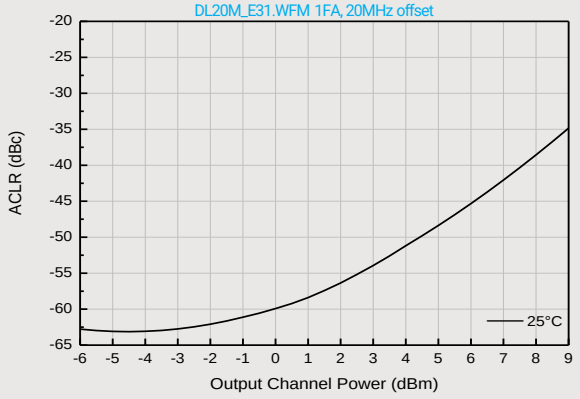
LTE ACLR vs. Output Power @ 1900MHz
DL20M_E31.WFM 1FA, 20MHz offset



LTE ACLR vs. Output Power @ 2140MHz
DL20M_E31.WFM 1FA, 20MHz offset



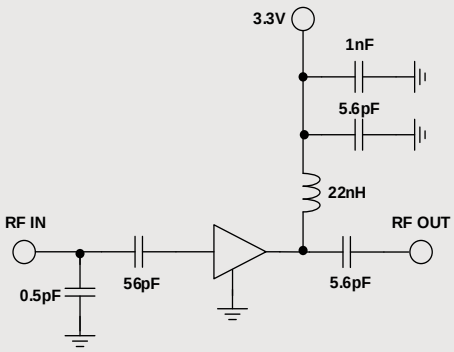
LTE ACLR vs. Output Power @ 2650MHz
DL20M_E31.WFM 1FA, 20MHz offset



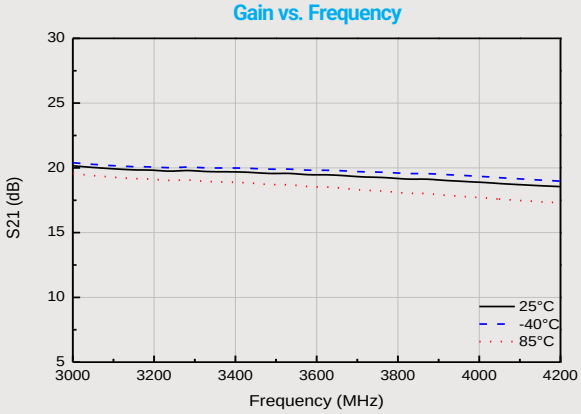
Typical RF Performance for 3000MHz ~ 4200MHz Tuned Application Circuit

Supply Bias Voltage = 3.3V, Current= 47mA

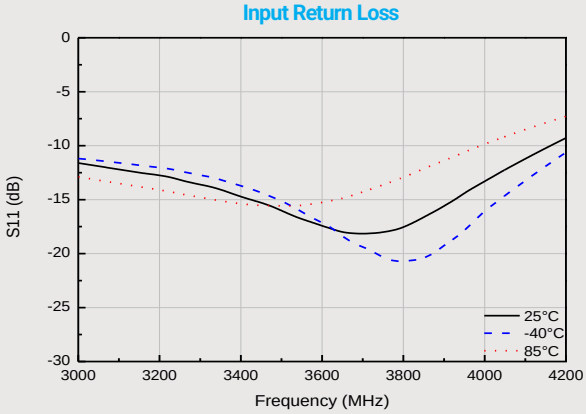
Parameters	Units	Frequency(MHz)				
		3400	3600	3800	4000	4200
S21	dB	19.5	19.3	19.0	18.6	18.4
S11	dB	-14.5	-17.5	-17.5	-13.5	-9.5
S22	dB	-10.2	-11.2	-12.0	-13.0	-13.0
P1dB	dBm	13.7	13.7	14.0	12.2	10.8
OIP3@0dBm	dBm	29.3	27.2	26.4	25.1	24.5
NF	dB	3.6	3.7	3.9	4.1	4.6



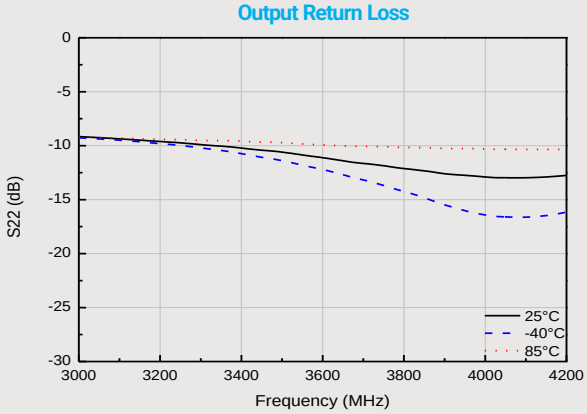
Gain vs. Frequency



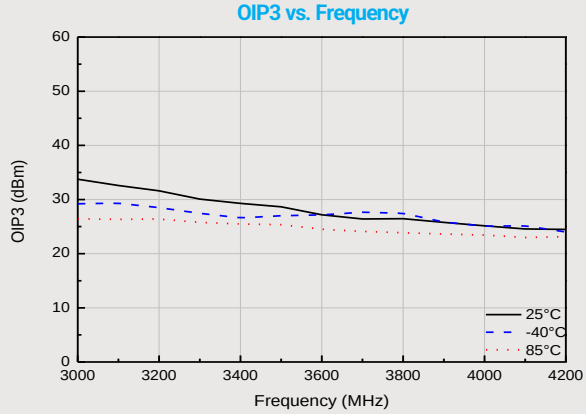
Input Return Loss



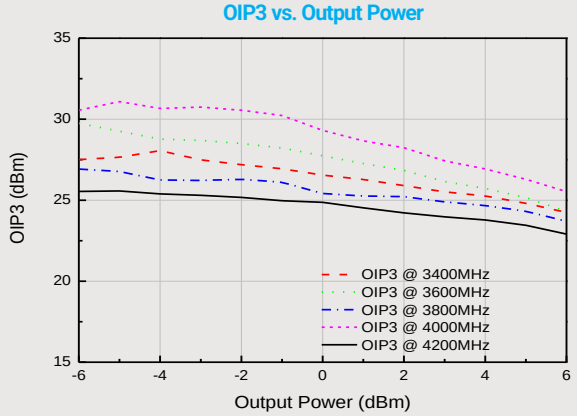
Output Return Loss



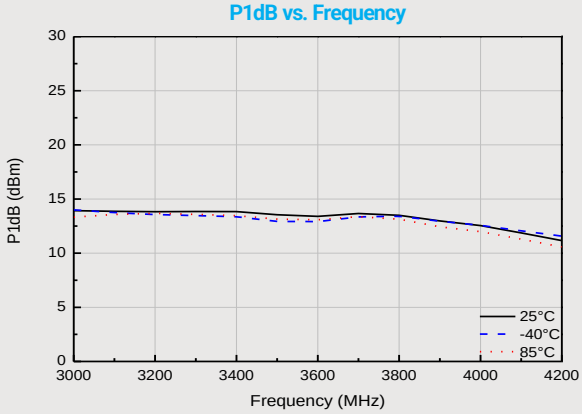
OIP3 vs. Frequency



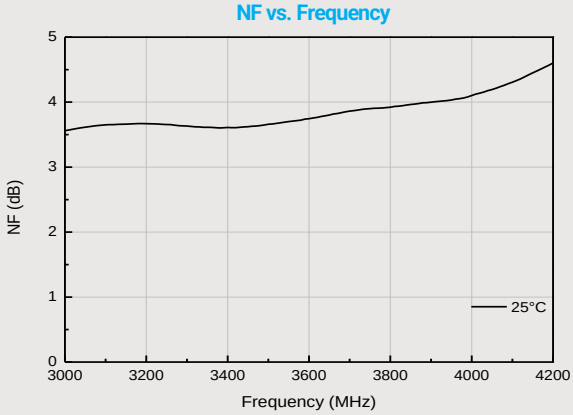
OIP3 vs. Output Power



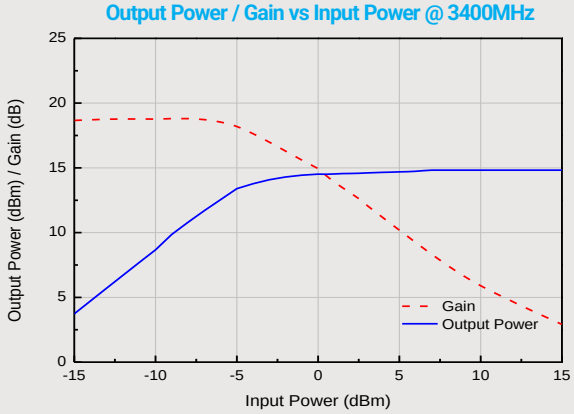
P1dB vs. Frequency



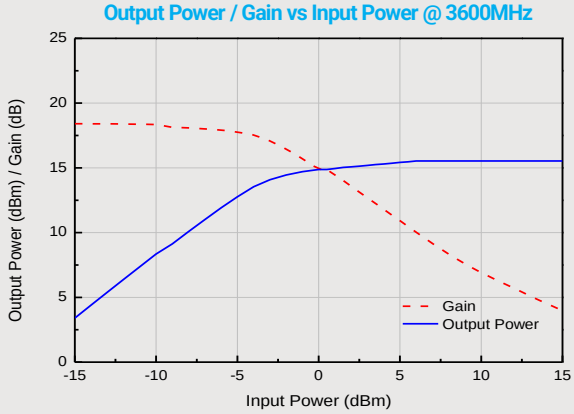
NF vs. Frequency



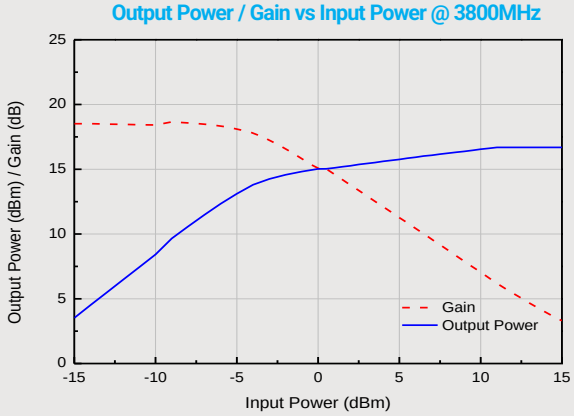
Output Power / Gain vs Input Power @ 3400MHz



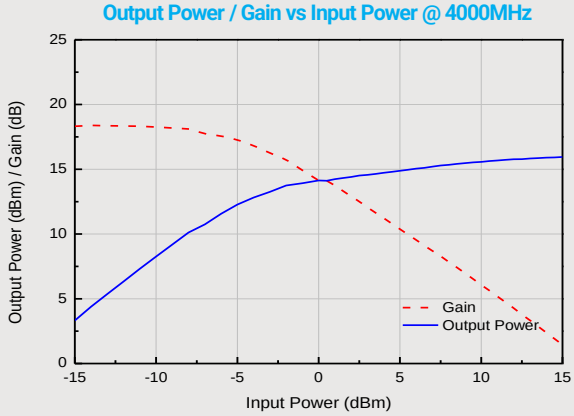
Output Power / Gain vs Input Power @ 3600MHz



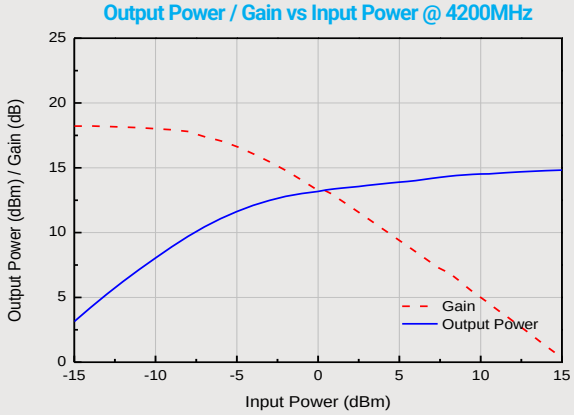
Output Power / Gain vs Input Power @ 3800MHz



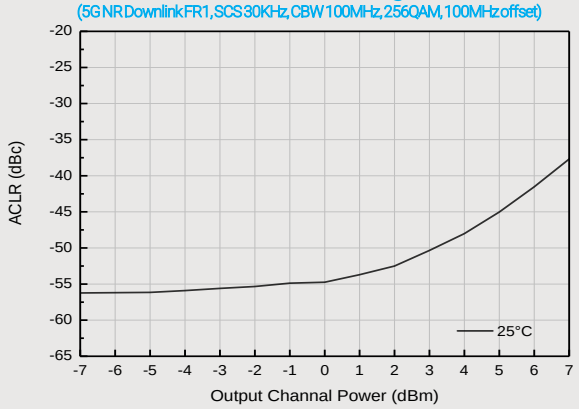
Output Power / Gain vs Input Power @ 4000MHz

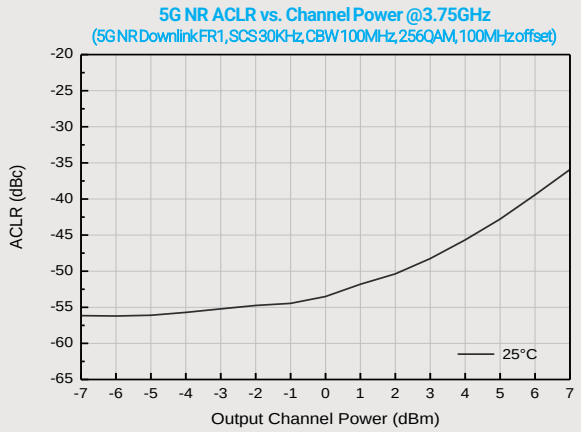


Output Power / Gain vs Input Power @ 4200MHz

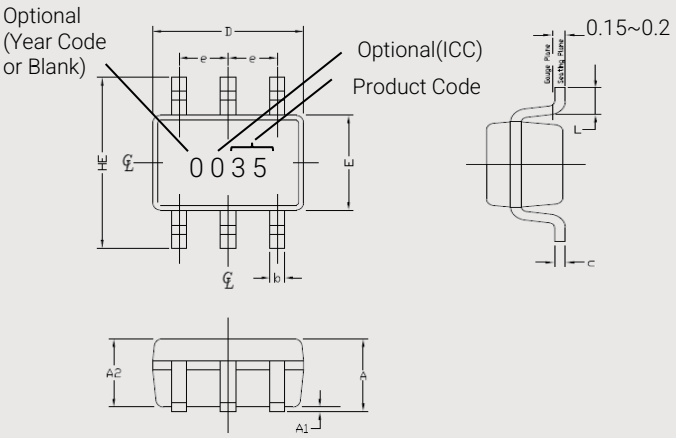


5G NR ACLR vs. Channel Power @3.55GHz
(5G NR Downlink FR1, SCS 30KHz, CBW 100MHz, 256QAM, 100MHz offset)



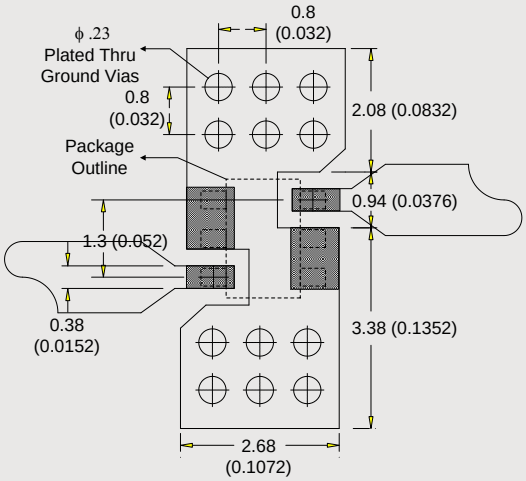

5G NR ACLR vs. Channel Power @3.75GHz
(5G NR Downlink FR1, SCS 30KHz, CBW 100MHz, 256QAM, 100MHz offset)
ACLR (dBc)
-20
-25
-30
-35
-40
-45
-50
-55
-60
-65
-7
-6
-5
-4
-3
-2
-1
0
1
2
3
4
5
6
7
Output Channel Power (dBm)
25°C

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

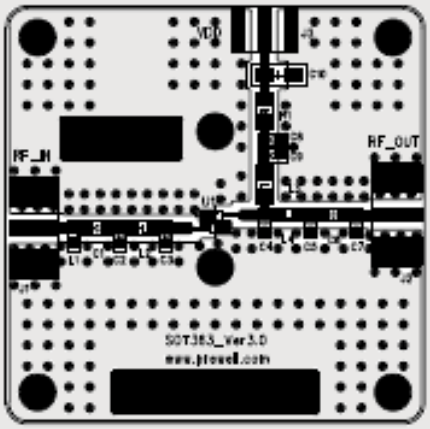


SYMBOL	MIN.	MAX.
E	1.15	1.35
D	1.85	2.25
HE	1.95	2.30
A	0.80	1.10
A2	0.70	1.00
A1	0.00	0.10
e	0.65 BSC	
b	0.15	0.40
c	0.08	0.25
L	0.21	0.41

Land Pattern



Evaluation Board Layout (40x40)



Mounting Instructions

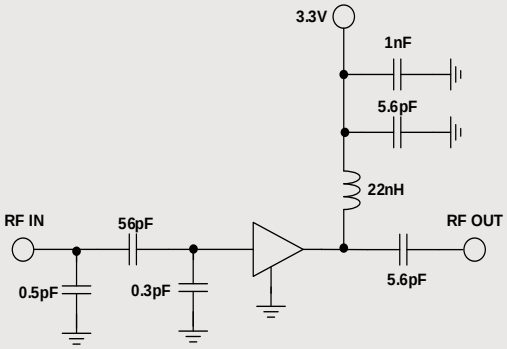
1 Use a large ground pad area with many plated through-holes as shown.
2 We recommend 1 oz copper minimum.
3 Measurement for our data sheet was made on 0.8mm thick FR-4 Board.
4 RF trace width depends on the board material and construction.
5 Add mounting screws near the part to fasten the board to a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

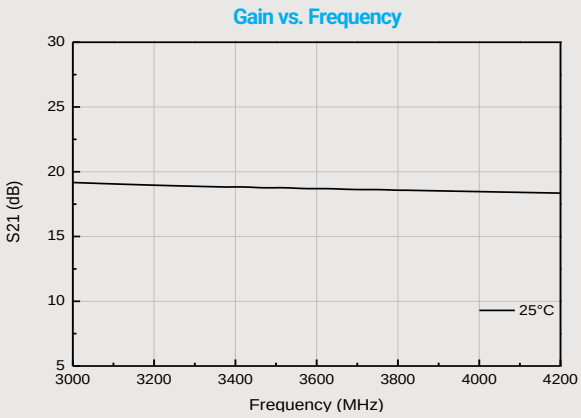
Gain flatness at 3GHz range can be improved by additional matching components:

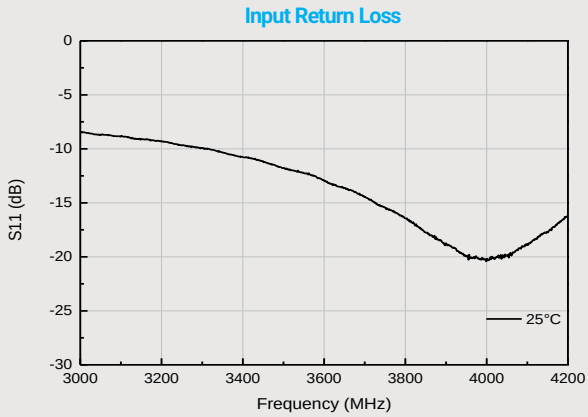
Typical RF Performance for 3000MHz ~ 4200MHz Tuned Application Circuit

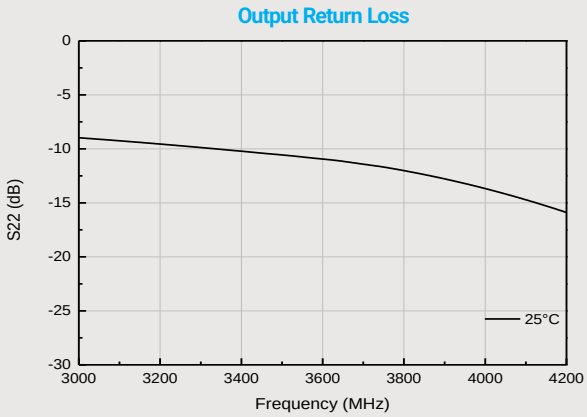
Supply Bias Voltage = 3.3V, Current= 47mA

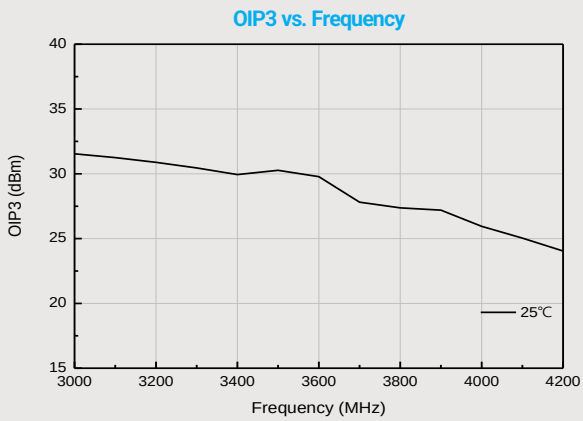
Parameters	Units	Frequency(MHz)				
		3400	3600	3800	4000	4200
S21	dB	18.6	18.5	18.5	18.2	18.2
S11	dB	-10.5	-12.9	-16.4	-20.2	-16.2
S22	dB	-10.5	-10.9	-12.0	-13.8	-15.8
P1dB	dBm	14.0	13.5	13.0	12.3	11.9
OIP3@0dBm	dBm	30.0	29.8	27.3	24.3	24.0
NF	dB	3.6	3.7	3.8	3.8	4.2

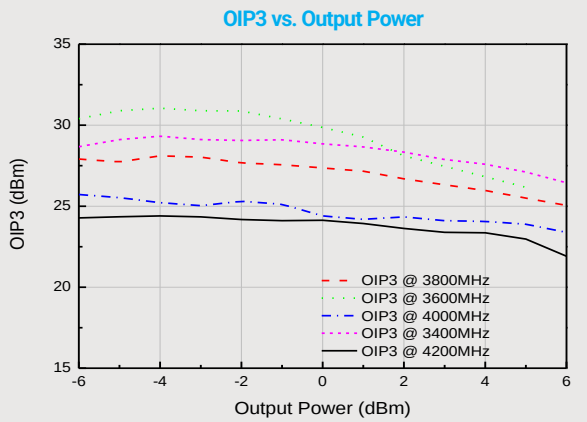






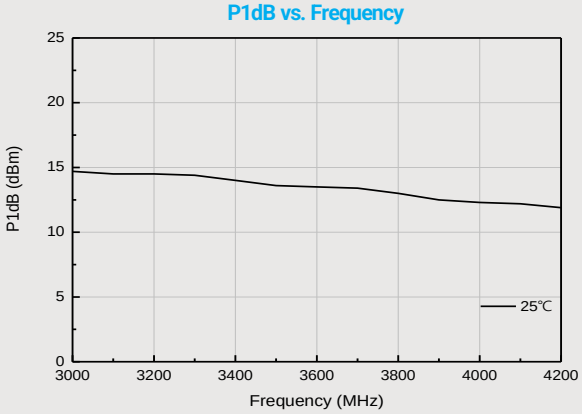




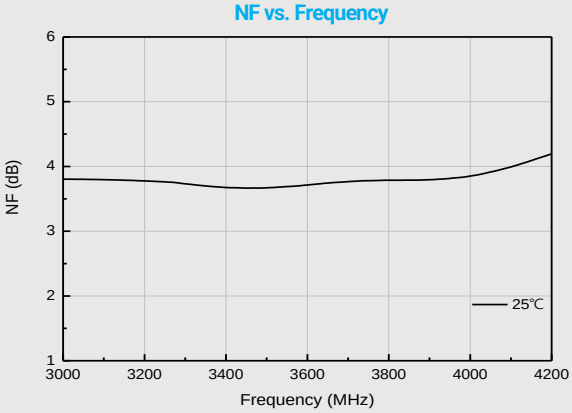


Application Note

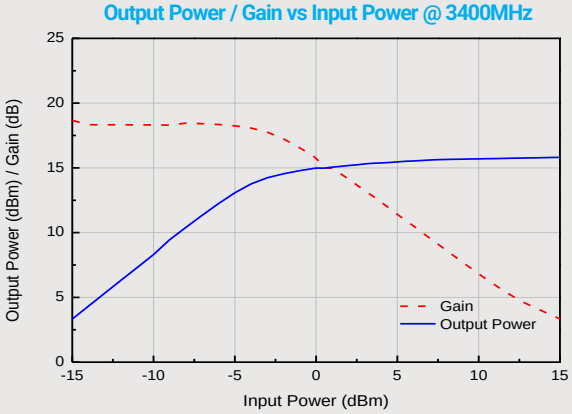
P1dB vs. Frequency



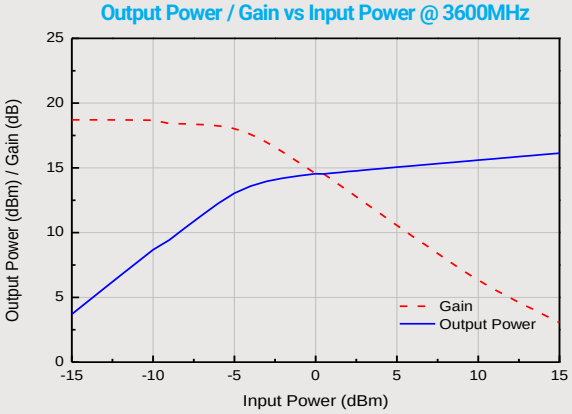
NF vs. Frequency



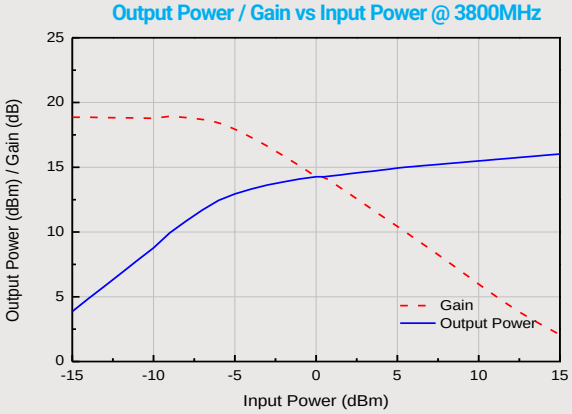
Output Power / Gain vs Input Power @ 3400MHz



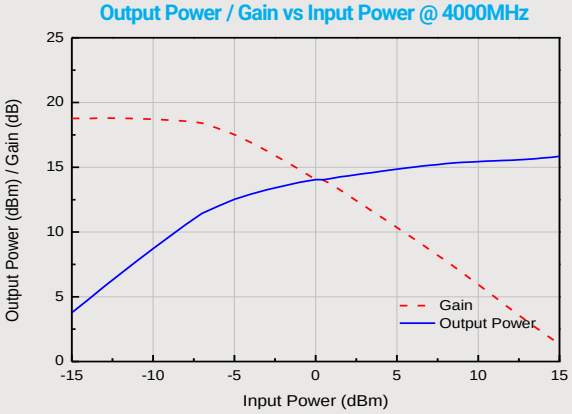
Output Power / Gain vs Input Power @ 3600MHz



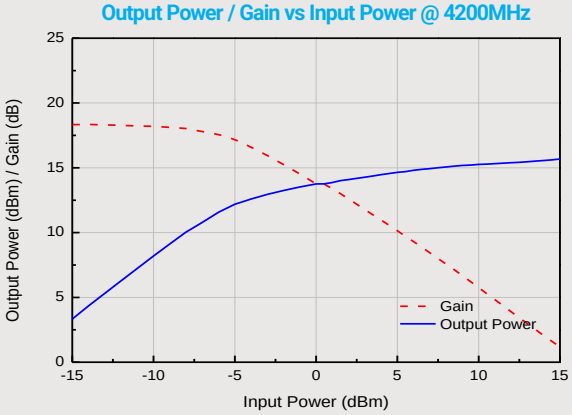
Output Power / Gain vs Input Power @ 3800MHz



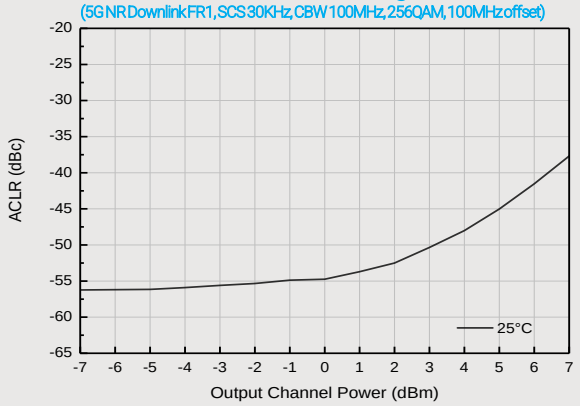
Output Power / Gain vs Input Power @ 4000MHz

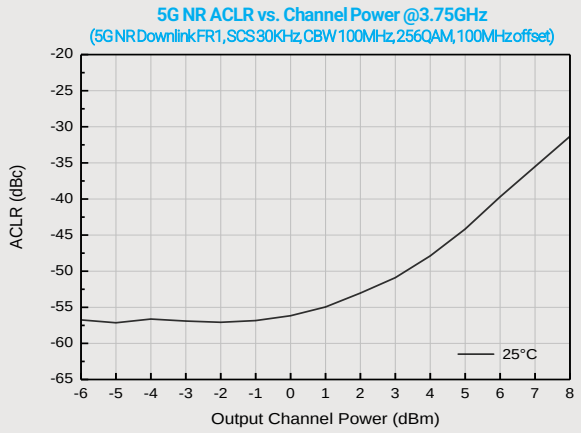


Output Power / Gain vs Input Power @ 4200MHz



5G NR ACLR vs. Channel Power @3.55GHz
(5G NR Downlink FR1, SCS 30KHz, CBW 100MHz, 256QAM, 100MHz offset)




5G NR ACLR vs. Channel Power @3.75GHz
(5G NR Downlink FR1, SCS 30KHz, CBW 100MHz, 256QAM, 100MHz offset)
ACLR (dBc)
-20
-25
-30
-35
-40
-45
-50
-55
-60
-65
-6
-5
-4
-3
-2
-1
0
1
2
3
4
5
6
7
8
Output Channel Power (dBm)
25°C

Contact Information

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