SJM PREWELL

PNW353

Wideband Gain Block

Features

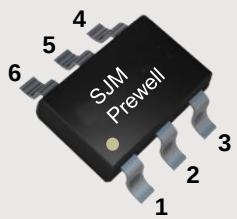
- 400 to 4200MHz
- Gain 17.2dB @ 3500MHz
- P1dB 17.1dBm @ 3500MHz
- OIP3 36.2dBm @3500MHz
- 5GNR ACLR 50dBc 6.6dBm
- Lead-free / Green / RoHS compliant SOT-363 Package

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 PNW353 is a high performance GaAs p-HEMT Amplifier. The features of PNW353 are high linearity, low noise figure and high reliability, ideal for wideband communication systems. The PNW353 is internally matched to 50 Ohms for optimum noise figure and linearity. The PNW353 operates from a single 3.3 voltage supply and has an internal temperature compensation active bias. All devices are 100% RF and DC tested.

Specifications

Parameter	Units	Frequency (MHz)					
		600	900	1900	2600	3500	4200
S21	dB	22.1	21.2	19.7	18.4	17.2	17.2
S11	dB	-14.8	-9.3	-14.0	-29.4	-20.1	-11.5
S22	dB	-14.6	-8.2	-12.6	-10.4	-10.4	-10.7
P1dB	dBm	19.2	18.9	18.3	18.0	17.1	14.8
OIP3 [2]	dBm	32.9	35.4	33.9	33.6	36.2	34.1
NF	dB	1.1	1.0	1.1	1.3	1.4	2.1
LTE 20M ACLR 50dBc	dBm	-	9.4	9.0	8.5 [3]	-	-
5G NR ACLR 50dBc	dBm	-	-	-	-	6.6 [4]	-
V / I	V/mA	3.3 / 63					

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.
3) LTE 20M ACLR 50dBc measured Test Frequency by 2650MHz.
4) 5G NR ACLR 50dBc measured Test Frequency by 3550MHz

Absolute Maximum Ratings

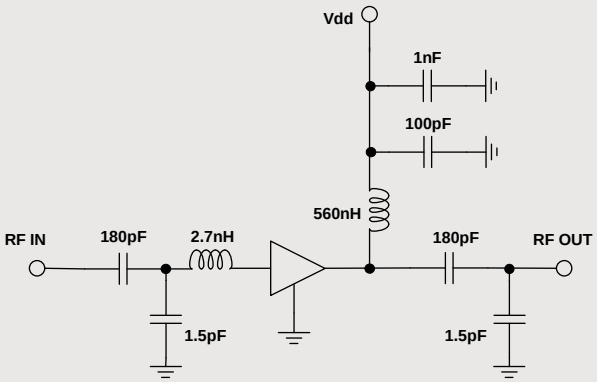
Parameter	Rating	Unit
Device Voltage	7	V
Device Current	150	mA
RF Power Input	20	dBm
Storage Temperature	-55 to 150	°C
Ambient Operating Temperature	-40 to 85	°C
Junction Temperature	185	°C

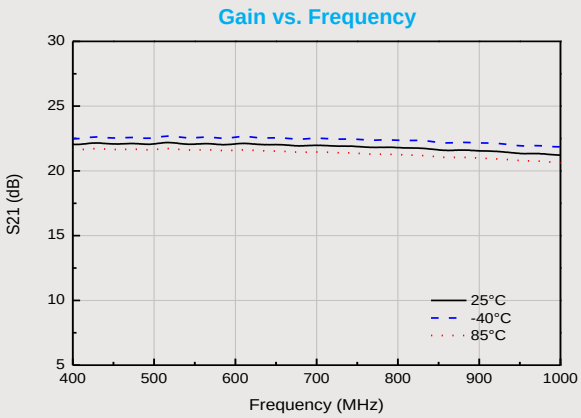
1) Stresses above the maximum values listed have may cause permanent damage to the device.
2) MTTF is more than 100 years.

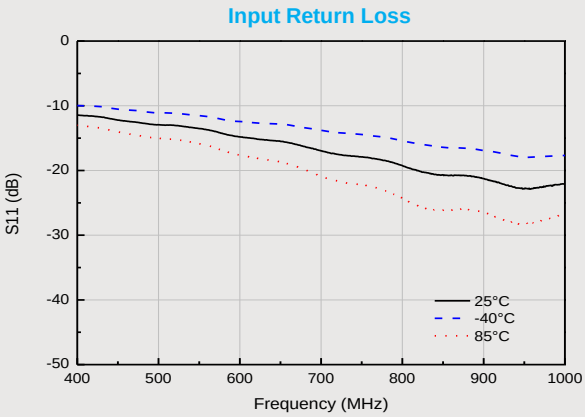
Typical RF Performance for 800MHz Tuned Application Circuit

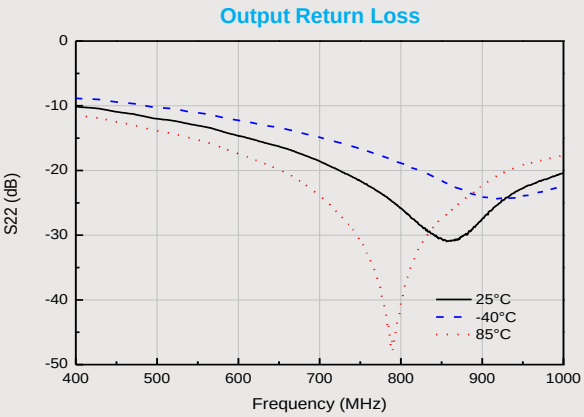
Supply Bias Voltage = 3.3V, Current= 63mA

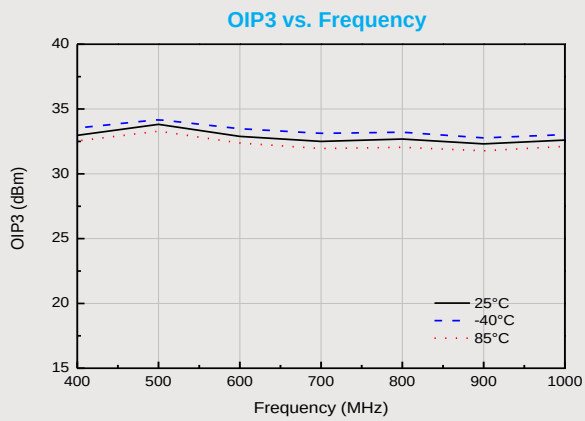
Parameters	Units	Frequency (MHz)				
		400	600	800	900	1000
S21	dB	22.1	22.1	21.8	21.6	21.2
S11	dB	-11.4	-14.8	-19.2	-21.2	-22.0
S22	dB	-10.1	-14.6	-25.8	-27.5	-20.3
P1dB	dBm	19.6	19.2	18.9	19.2	19.1
OIP3 @ 0dBm	dBm	33.0	32.9	32.7	32.3	32.6
NF	dB	1.1	1.1	1.0	1.0	1.0

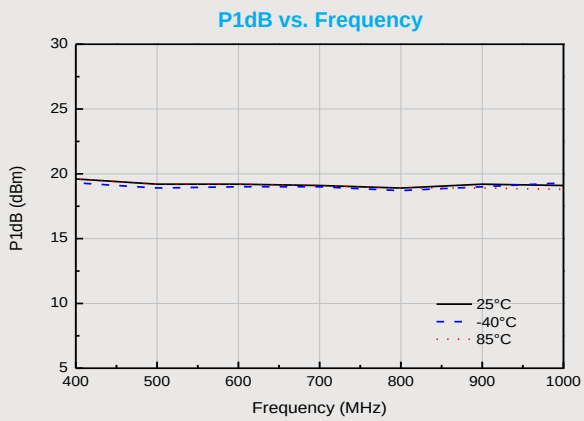




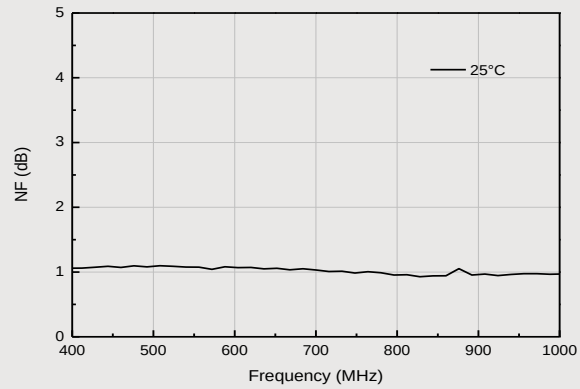




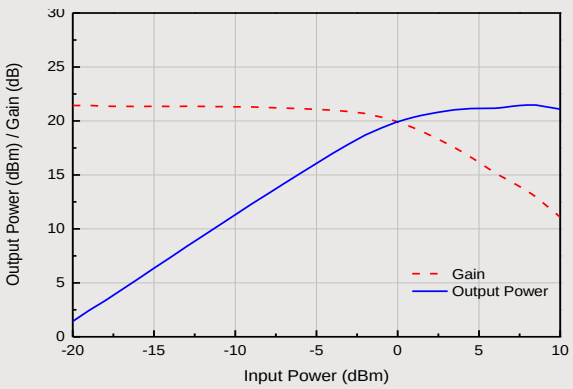




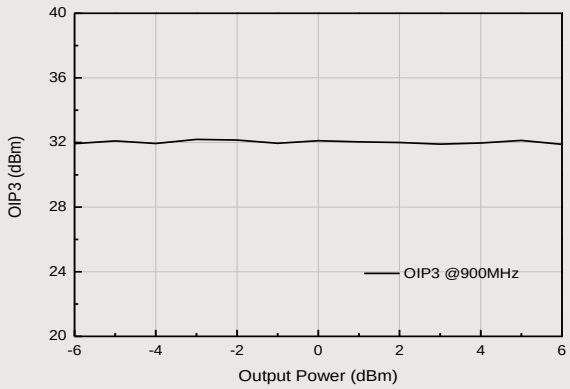
NF vs. Frequency



Output Power / Gain vs Input Power @ 900MHz



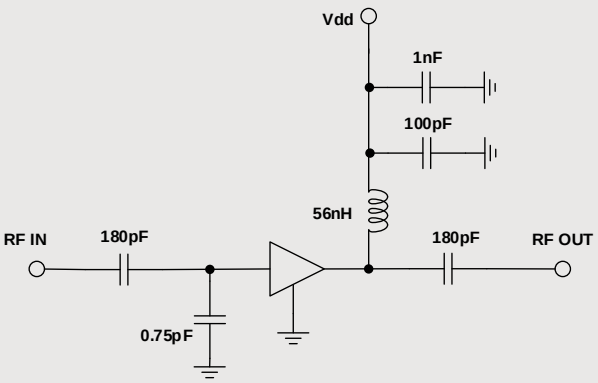
Output IP3 / Tone Power @ 900MHz



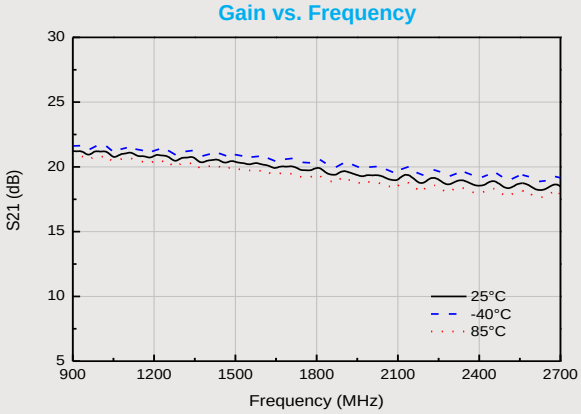
Typical RF Performance for 2100MHz Tuned Application Circuit

Supply Bias Voltage = 3.3V, Current= 63mA

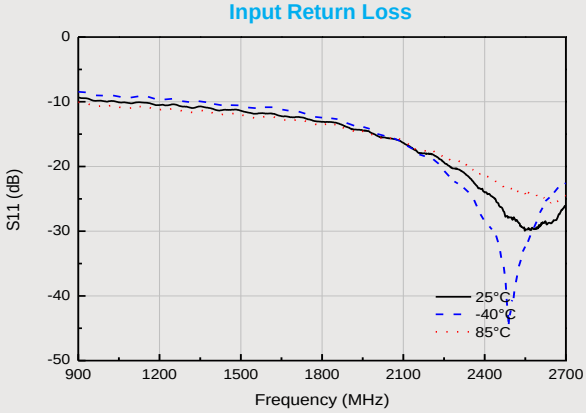
Parameters	Units	Frequency (MHz)			
		900	1900	2100	2600
S21	dB	21.2	19.7	19.0	18.4
S11	dB	-9.3	-14.0	-16.3	-29.4
S22	dB	-8.2	-12.6	-12.9	-10.4
P1dB	dBm	18.9	18.3	18.5	18.0
OIP3 @ 0dBm	dBm	35.4	33.9	33.2	33.6
NF	dB	1.0	1.1	1.2	1.3



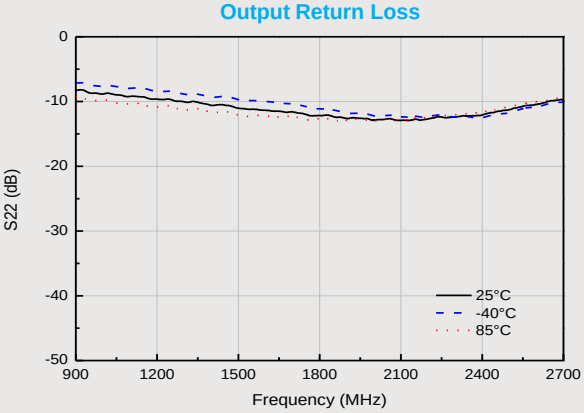
Gain vs. Frequency



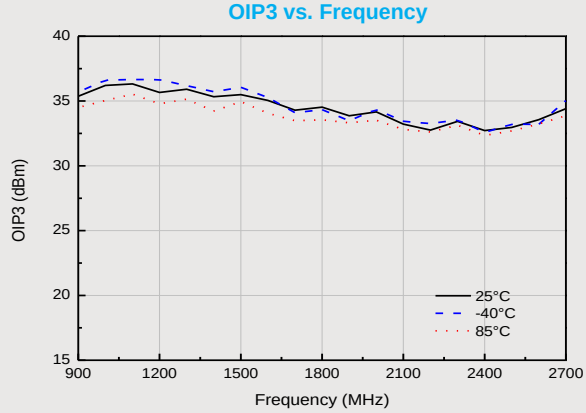
Input Return Loss



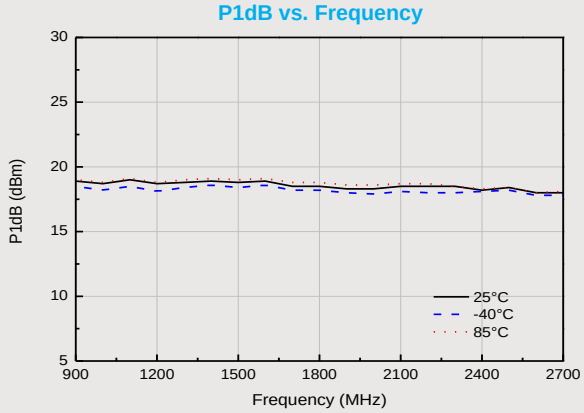
Output Return Loss



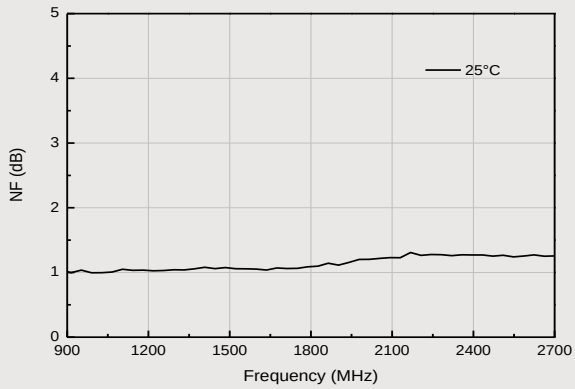
OIP3 vs. Frequency



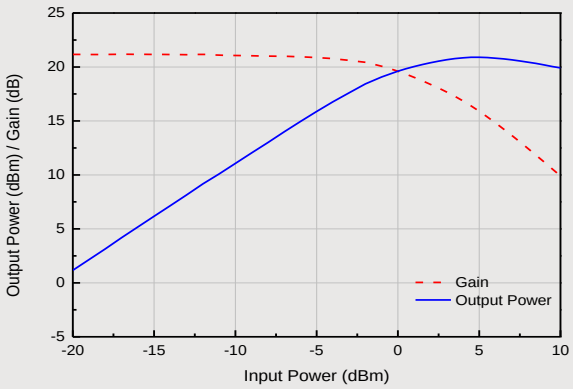
P1dB vs. Frequency



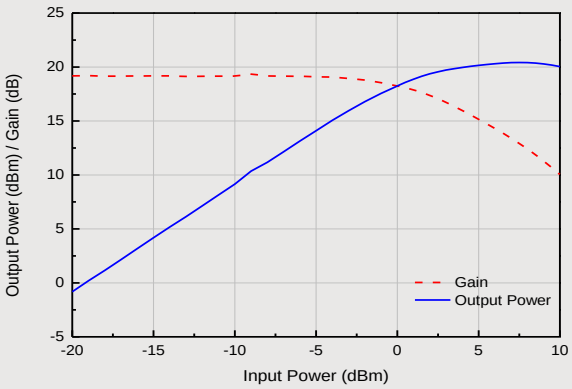
NF vs. Frequency



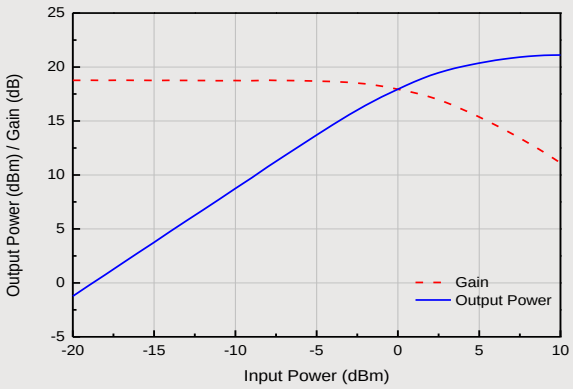
Output Power / Gain vs Input Power @ 900MHz



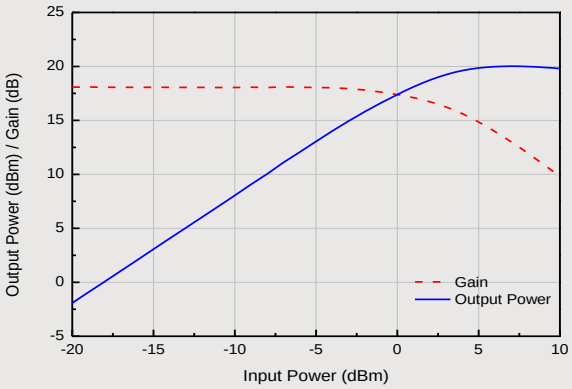
Output Power / Gain vs Input Power @ 1900MHz



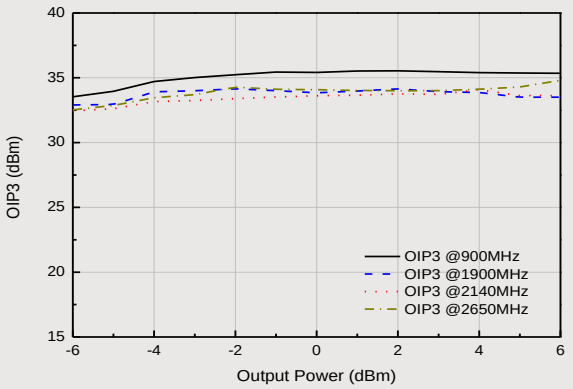
Output Power / Gain vs Input Power @ 2140MHz



Output Power / Gain vs Input Power @ 2650MHz

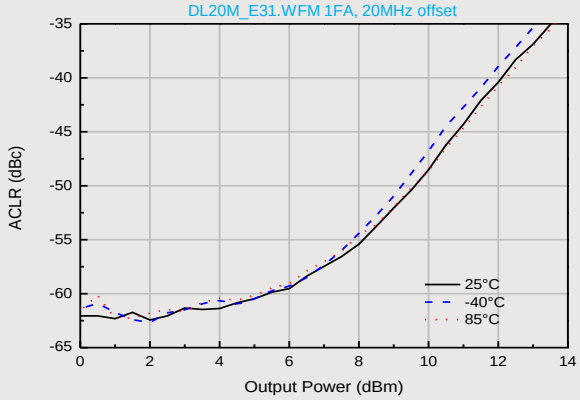


OIP3 vs. Output Power



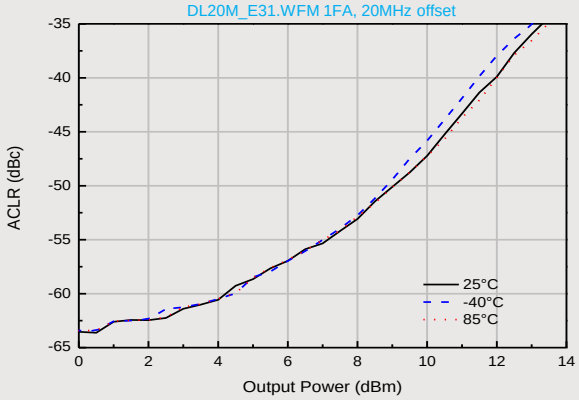
LTE ACLR vs. Output Power @ 900MHz

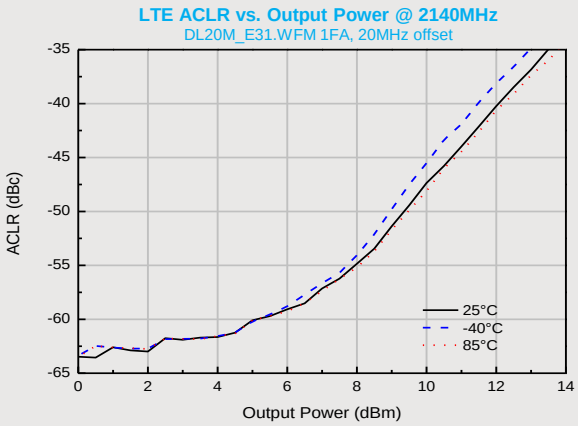
DL20M_E31.WFM 1FA, 20MHz offset

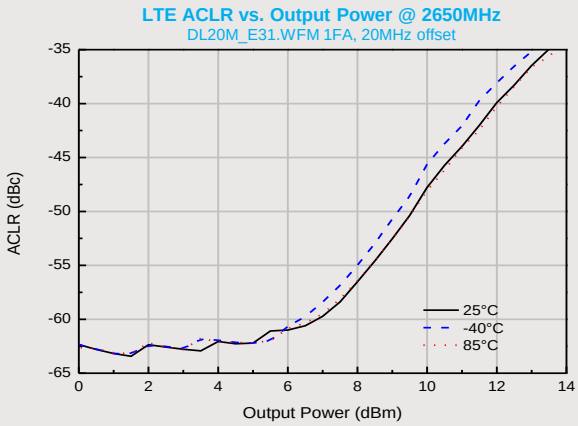


LTE ACLR vs. Output Power @ 1900MHz

DL20M_E31.WFM 1FA, 20MHz offset



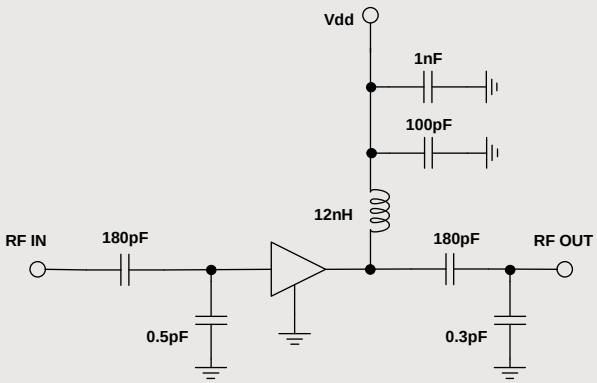

LTE ACLR vs. Output Power @ 2140MHz
DL20M_E31.WFM 1FA, 20MHz offset
ACLR (dBc)
-35
-40
-45
-50
-55
-60
-65
0
2
4
6
8
10
12
14
Output Power (dBm)
25°C
-40°C
85°C


LTE ACLR vs. Output Power @ 2650MHz
DL20M_E31.WFM 1FA, 20MHz offset
ACLR (dBc)
-35
-40
-45
-50
-55
-60
-65
0
2
4
6
8
10
12
14
Output Power (dBm)
25°C
-40°C
85°C

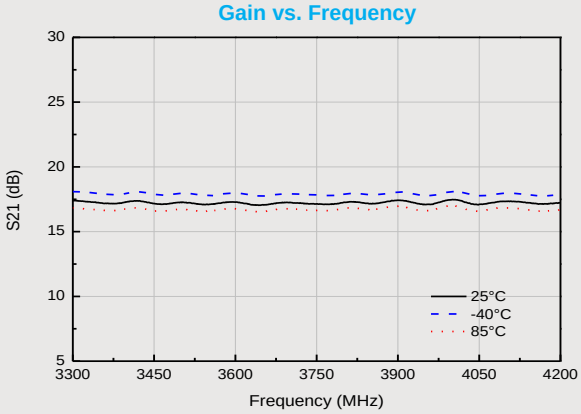
Typical RF Performance for 3500MHz Tuned Application Circuit

Supply Bias Voltage = 3.3V, Current= 63mA

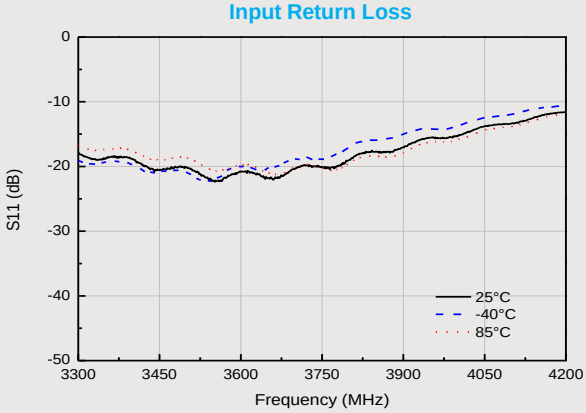
Parameters	Units	Frequency (MHz)			
		3300	3500	3800	4200
S21	dB	17.4	17.2	17.2	17.2
S11	dB	-17.8	-20.1	-19.0	-11.5
S22	dB	-10.2	-10.4	-11.0	-10.7
P1dB	dBm	17.3	17.1	16.1	14.8
OIP3 @ 0dBm	dBm	35.9	36.2	34.6	34.1
NF	dB	1.3	1.4	1.5	2.1



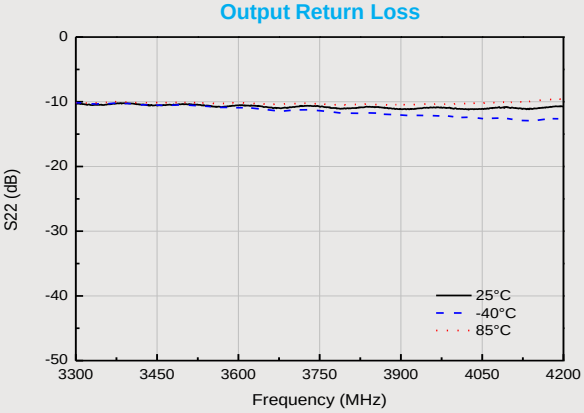
Gain vs. Frequency



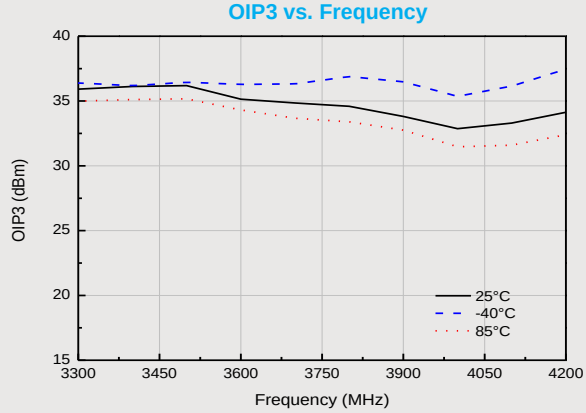
Input Return Loss



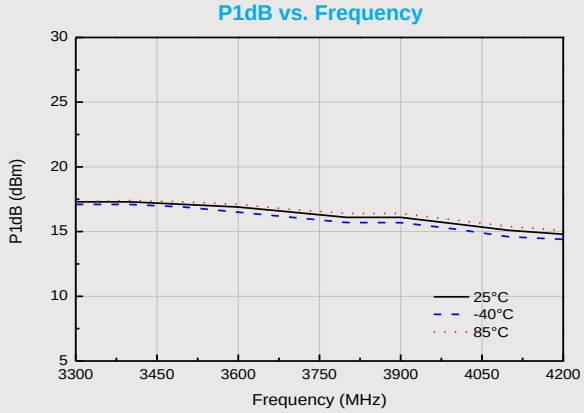
Output Return Loss



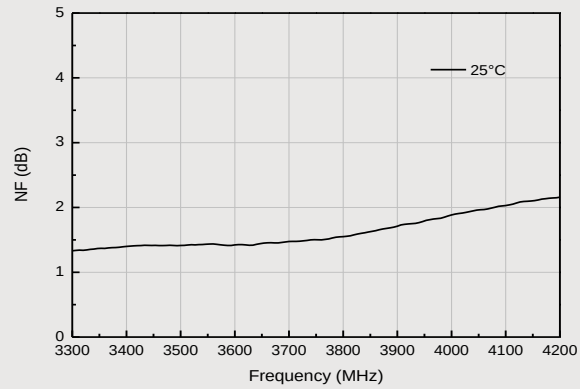
OIP3 vs. Frequency



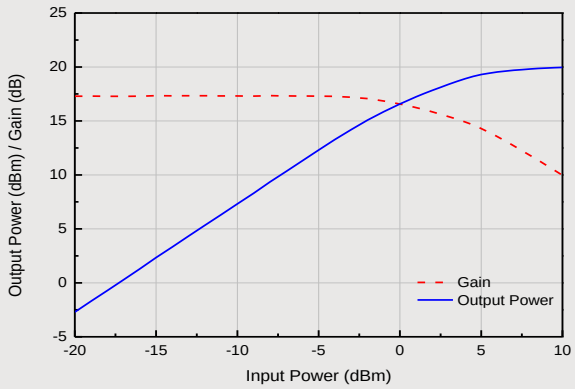
P1dB vs. Frequency



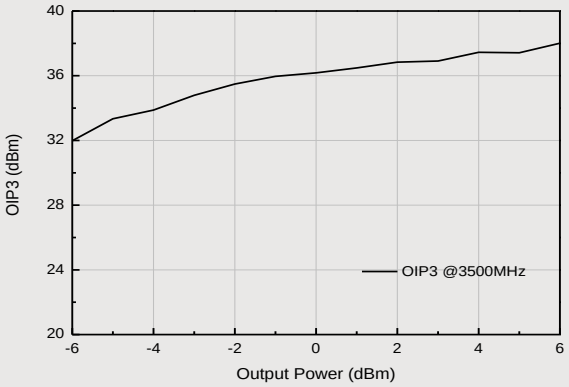
NF vs. Frequency



Output Power / Gain vs Input Power @ 3500MHz

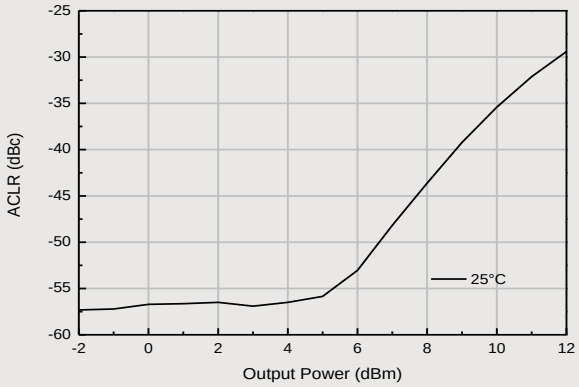


Output IP3 / Tone Power @ 3500MHz



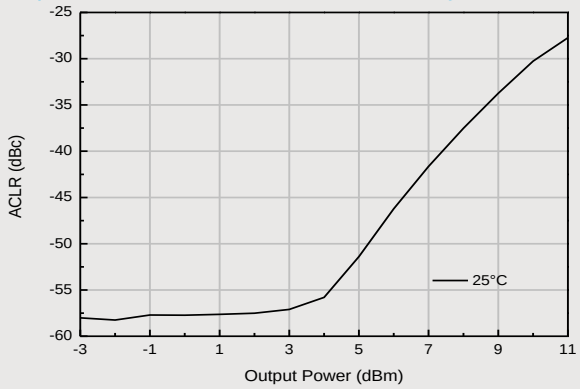
5G NR ACLR vs. Channel Power @3.55GHz

(5G NR Downlink FR1, SCS 30KHz, CBW 100MHz, 256QAM, 100MHz offset)

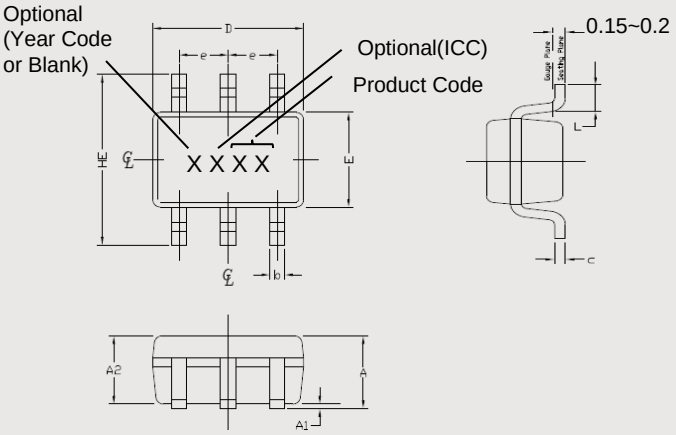


5G NR ACLR vs. Channel Power @3.75GHz

(5G NR Downlink FR1, SCS 30KHz, CBW 100MHz, 256QAM, 100MHz offset)

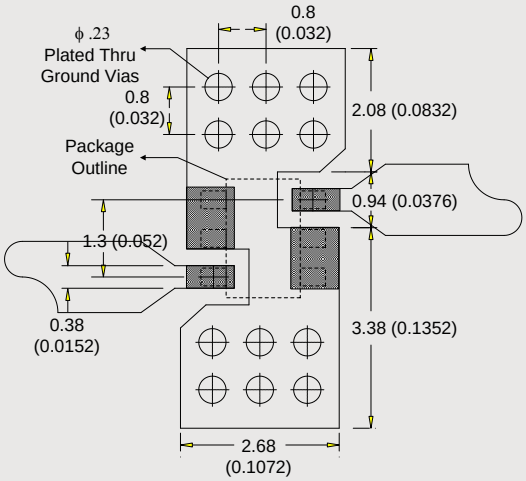


Lead-free /RoHS Compliant / Green SOT-363 Package Outline

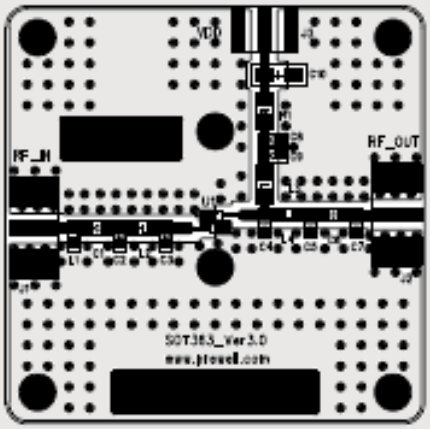


SYMBOL	MIN.	MAX.
E	1.15	1.35
D	1.85	2.25
HE	1.95	2.30
A	0.80	1.10
A2	0.70	1.00
A1	0.00	0.10
e	0.65 BSC	
b	0.15	0.40
c	0.08	0.25
L	0.21	0.26

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.