SJM PREWELL

PNW355

Wideband Gain Block

Features

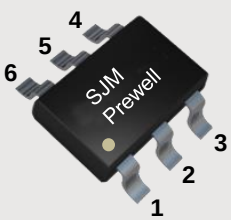
- 30 to 5000MHz
- Gain 17.7dB @ 3500MHz
- P1dB 17.9dBm @ 3500MHz
- OIP3 33.7dBm @ 3500MHz
- 5GNR ACLR 50dBc 7dBm
- Lead-free / Green / RoHS compliant SOT-363 Package

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 PNW355 is a high performance GaAs p-HEMT Amplifier. The features of PNW355 are high linearity, low noise figure and high reliability, ideal for wideband communication systems. The PNW355 is internally matched to 50 Ohms for optimum noise figure and linearity. The PNW355 operates from a single 3.3 voltage supply and has an internal temperature compensation active bias. All devices are 100% RF and DC tested.

Specification

Parameter (V/I_3.3V/52mA)	Units	Frequency (MHz)					
		70	800	2100	3500	4300	4800
S21	dB	24.5	23.2	19.9	17.7	17.1	18.0
S11	dB	-19.0	-14.0	-17.9	-14.9	-10.7	-11.3
S22	dB	-24.8	-21.8	-13.6	-10.8	-10.4	-12.8
P1dB	dBm	17.4	17.8	17.4	17.9	17.1	14.4
OIP3	dBm	32.4	32.0	32.7	33.7	32.3	26.9
NF	dB	0.7	0.8	1.0	1.2	1.3	1.6
LTE 20M ACLR 50dBc	dBm	-	(900MHz) 7.6	(2140MHz) 8.3	(3500MHz) 7.0	-	(4750MHz) 4.4
5G NR ACLR 50dBc	dBm	-	-	-	(3450MHz) 7.0	-	(4750MHz) 4.0

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	5.3	V
Device Current	100	mA
RF Power Input	20	dBm
Storage Temperature	-55 to 150	℃
Ambient Operating Temperature	-40 to 85	℃
Junction Temperature	185	℃

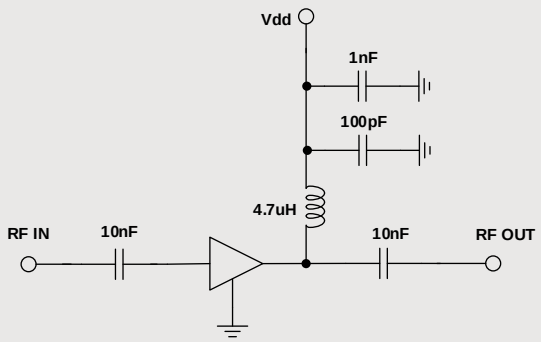
1) Stresses above the maximum values listed have may cause permanent damage to the device.

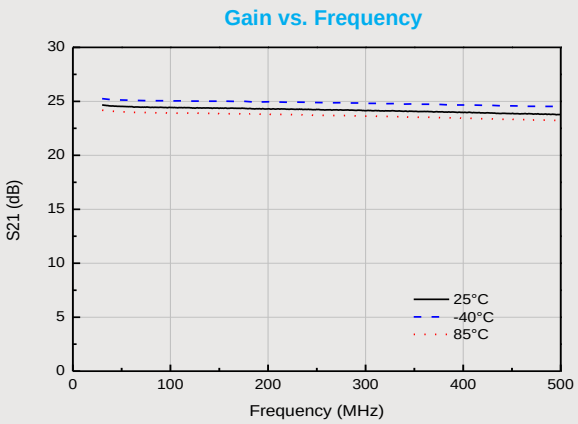
2) MTTF is more than 100 years.

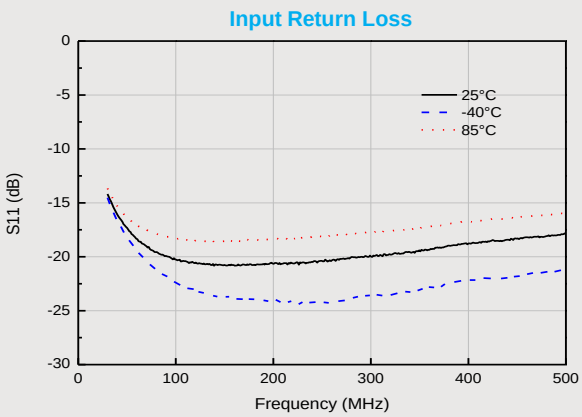
Typical RF Performance for 30 – 500MHz Tuned Application Circuit

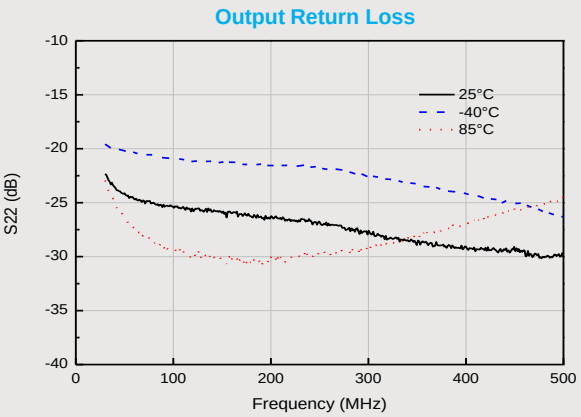
Supply Bias Voltage = 3.3V, Current= 52mA

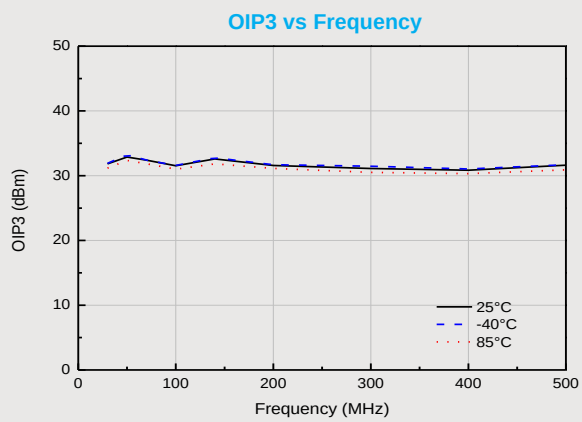
Parameters	Units	Frequency (MHz)				
		30	70	140	300	500
S21	dB	24.7	24.5	24.4	24.1	23.8
S11	dB	-14.2	-19.0	-20.7	-20.0	-17.9
S22	dB	-22.3	-24.8	-25.8	-27.6	-30.0
P1dB	dBm	16.7	17.4	17.6	17.7	17.4
OIP3 @ 0dBm	dBm	31.8	32.4	32.6	31.1	31.6
NF	dB	0.7	0.7	0.7	0.9	0.9

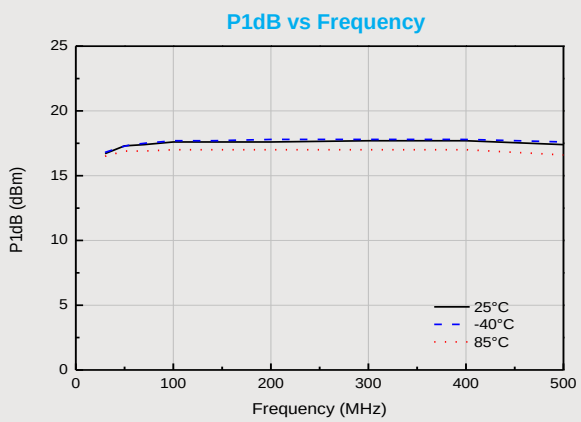




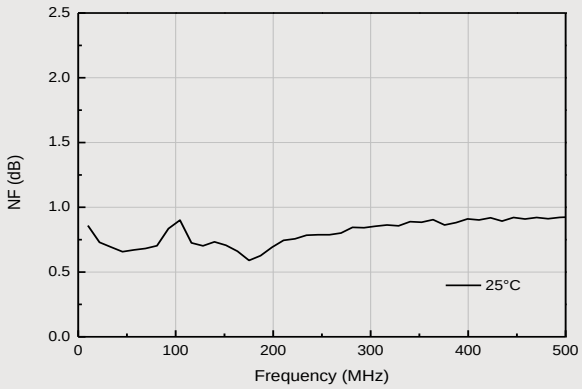








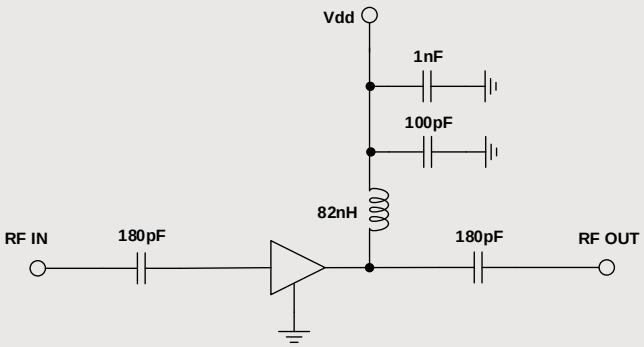
NF vs. Frequency

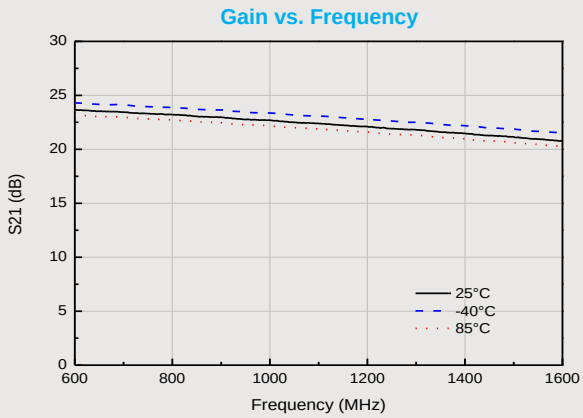


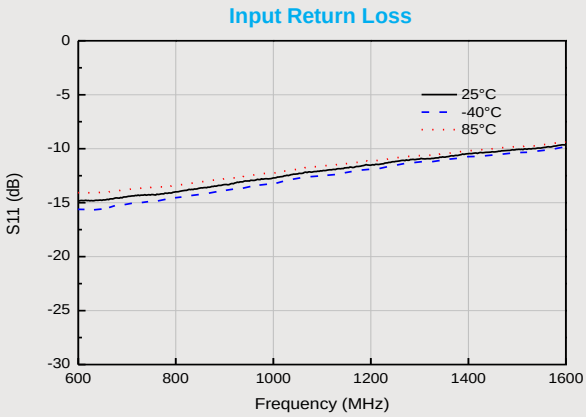
Typical RF Performance for 800MHz Tuned Application Circuit

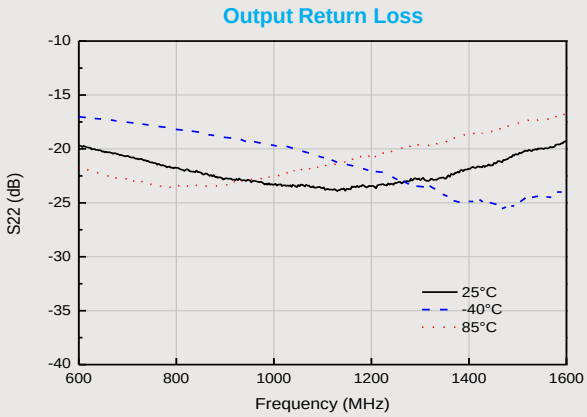
Supply Bias Voltage = 3.3V, Current= 52mA

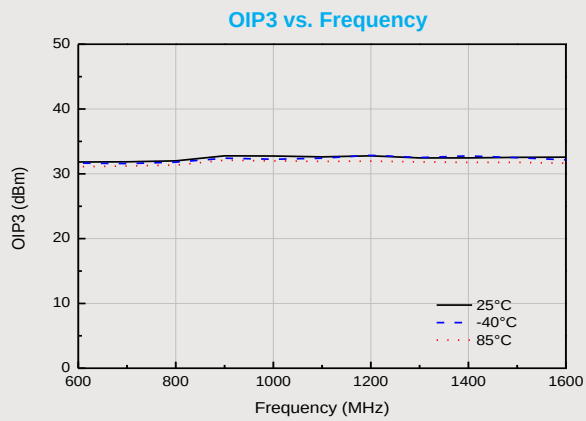
Parameters	Units	Frequency (MHz)				
		600	800	1000	1300	1600
S21	dB	23.7	23.2	22.7	21.8	20.7
S11	dB	-14.8	-14.0	-12.7	-11.0	-9.6
S22	dB	-19.7	-21.8	-23.3	-22.9	-19.3
P1dB	dBm	17.7	17.8	18.0	17.9	17.6
OIP3 @ 0dBm	dBm	31.8	32.0	32.8	32.5	32.6
NF	dB	0.9	0.8	0.8	0.9	1.0

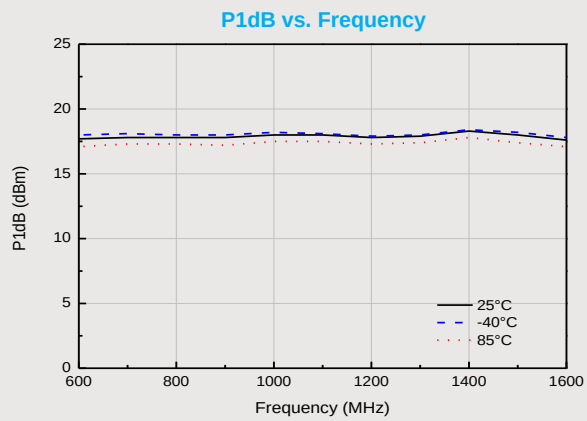




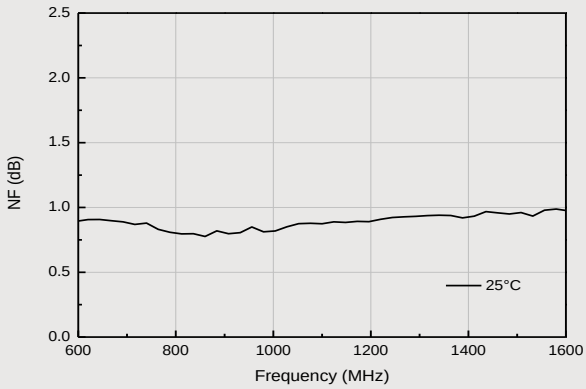




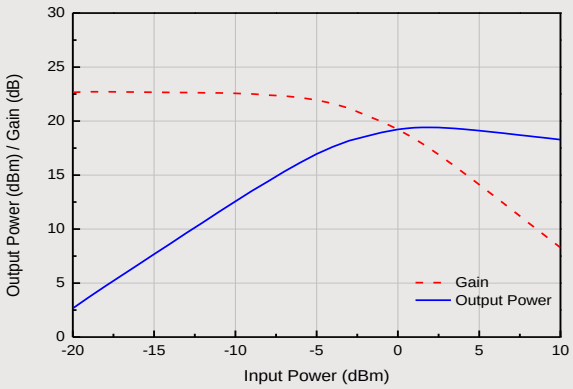




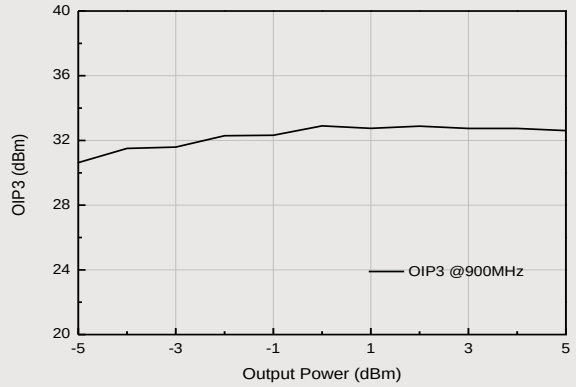
NF vs. Frequency



Output Power / Gain vs Input Power @ 900MHz

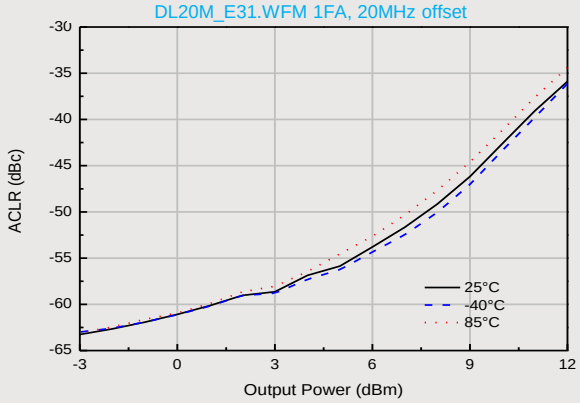


Output IP3 / Tone Power @ 900MHz



LTE ACLR vs. Output Power @ 900MHz

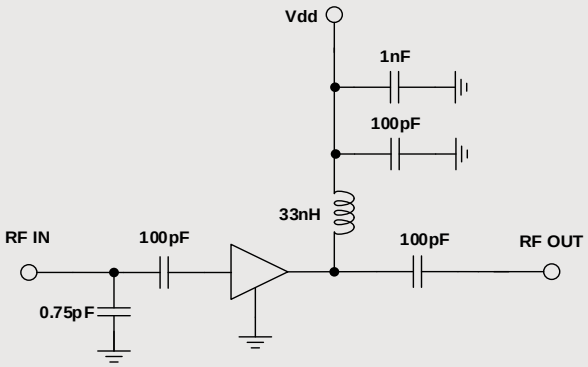
DL20M_E31.WFM 1FA, 20MHz offset

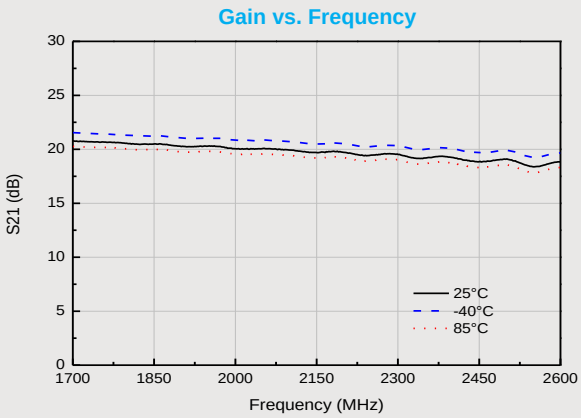


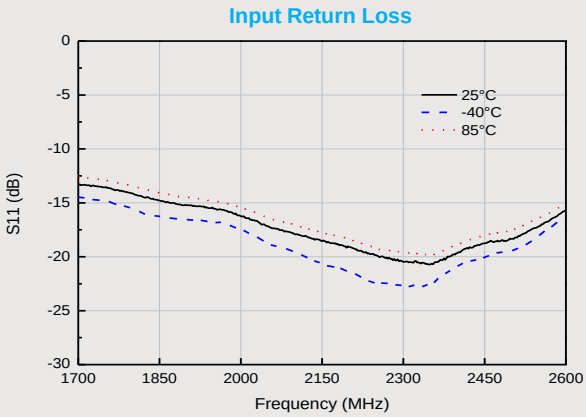
Typical RF Performance for 2300MHz Tuned Application Circuit

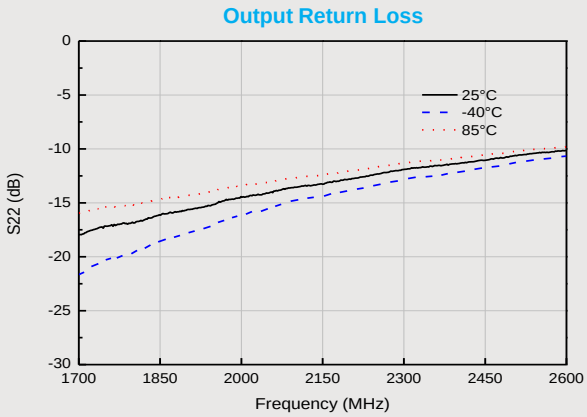
Supply Bias Voltage = 3.3V, Current= 52mA

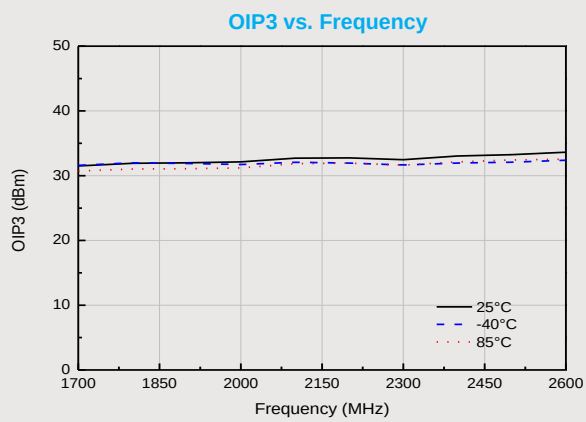
Parameters	Units	Frequency (MHz)			
		1700	2100	2300	2600
S21	dB	20.8	19.9	19.5	18.8
S11	dB	-13.3	-17.9	-20.5	-15.7
S22	dB	-18.0	-13.6	-11.9	-10.1
P1dB	dBm	17.4	17.4	17.4	17.2
OIP3 @ 0dBm	dBm	31.5	32.7	32.5	33.6
NF	dB	0.9	1.0	1.1	1.2

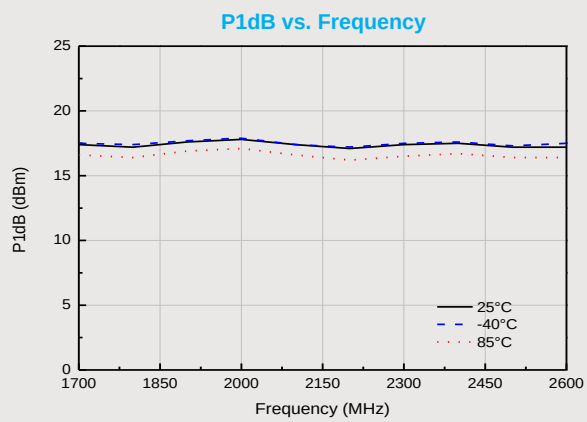




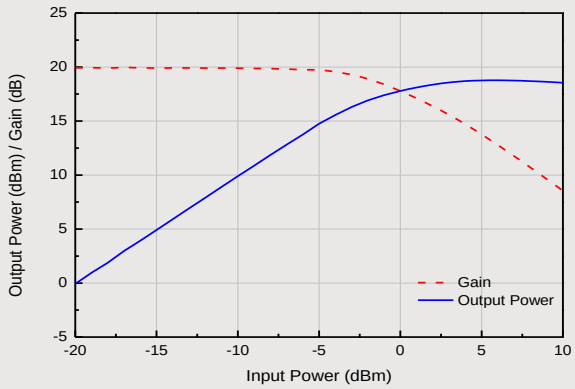




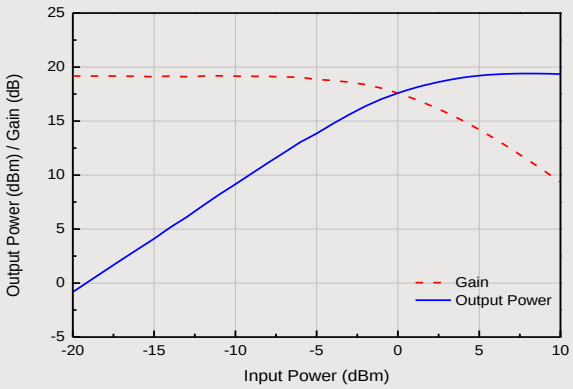




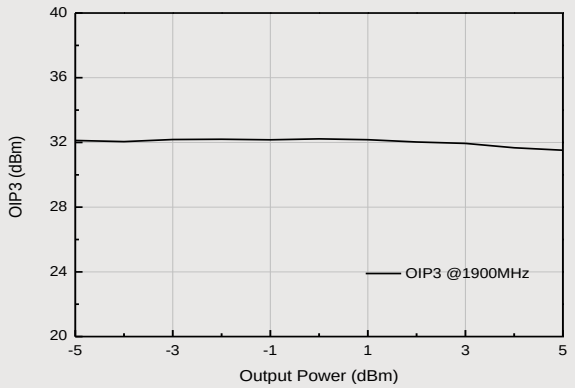
Output Power / Gain vs Input Power @ 1900MHz



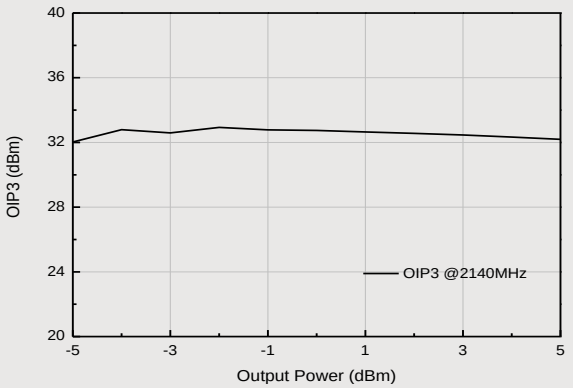
Output Power / Gain vs Input Power @ 2140MHz



Output IP3 / Tone Power @ 1900MHz

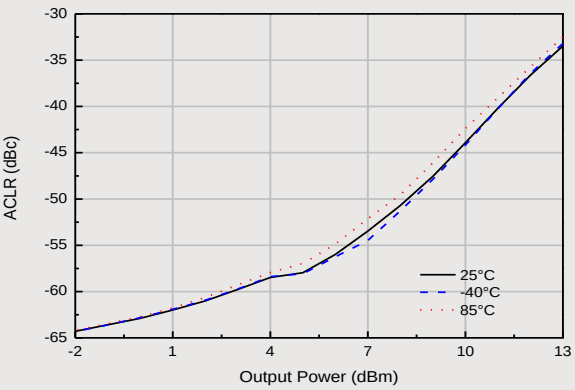


Output IP3 / Tone Power @ 2140MHz



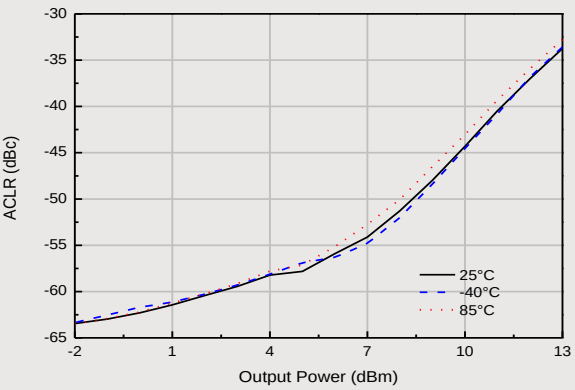
LTE ACLR vs. Output Power @ 1900MHz

DL20M_E31.WFM 1FA, 20MHz offset

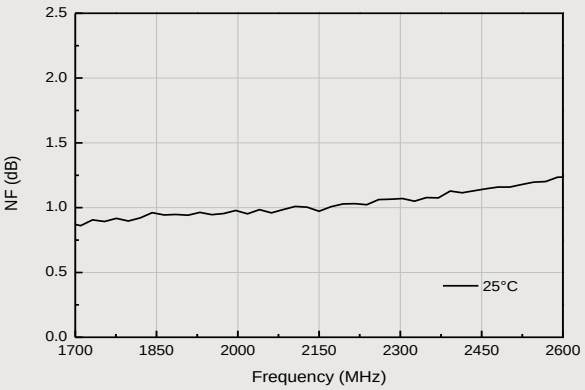


LTE ACLR vs. Output Power @ 2140MHz

DL20M_E31.WFM 1FA, 20MHz offset



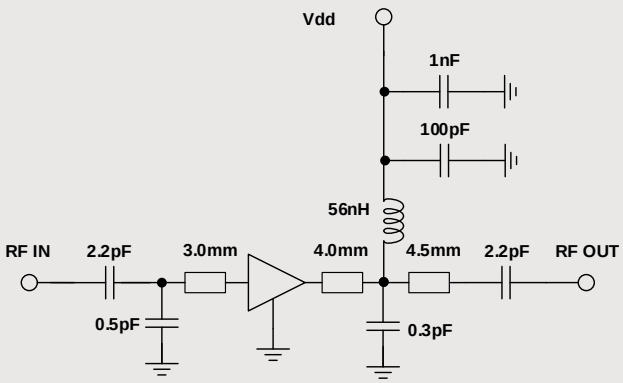
NF vs. Frequency

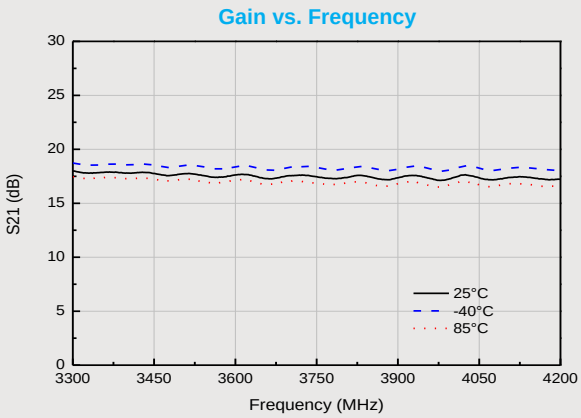


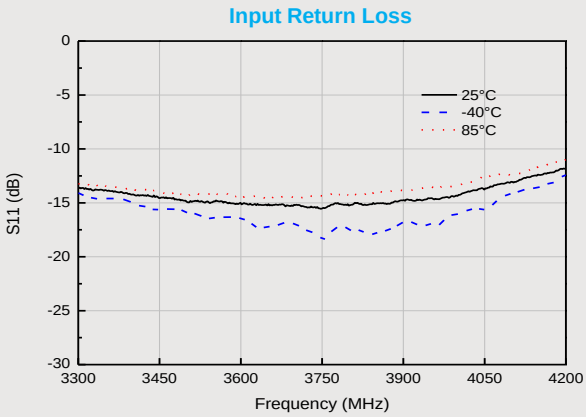
Typical RF Performance for 3500MHz Tuned Application Circuit

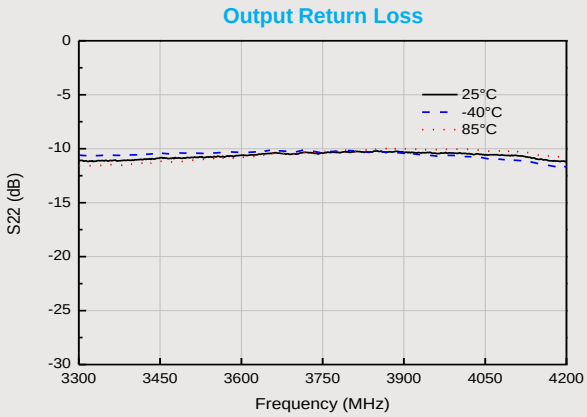
Supply Bias Voltage = 3.3V, Current= 52mA

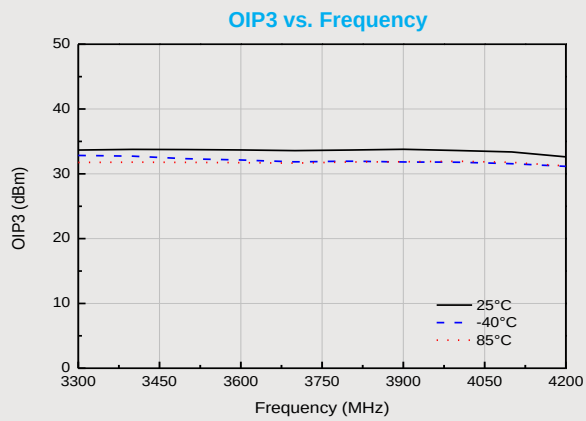
Parameters	Units	Frequency (MHz)			
		3300	3500	3800	4200
S21	dB	18.0	17.7	17.4	17.2
S11	dB	-13.6	-14.9	-15.3	-11.8
S22	dB	-11.1	-10.8	-10.3	-11.2
P1dB	dBm	17.9	17.9	17.3	16.8
OIP3 @ 0dBm	dBm	33.7	33.7	33.7	32.6
NF	dB	1.1	1.2	1.2	1.5

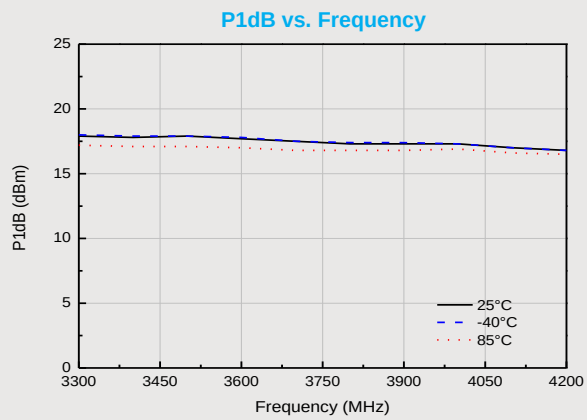




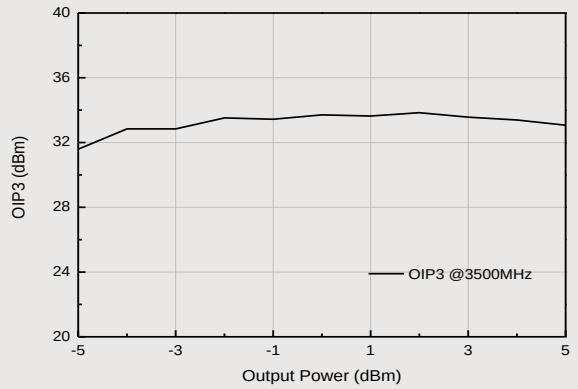




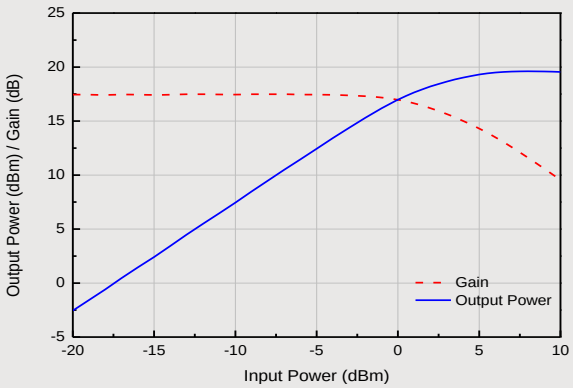




Output IP3 / Tone Power @ 3500MHz

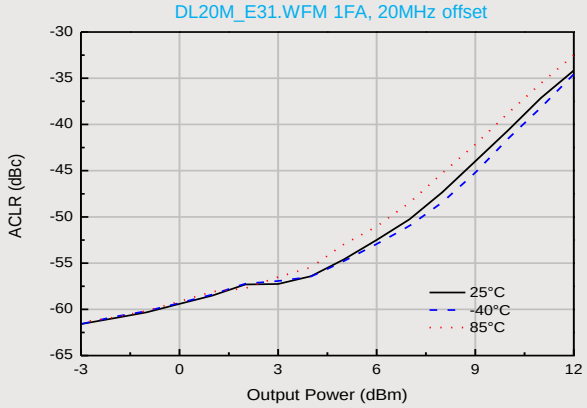


Output Power / Gain vs Input Power @ 3500MHz



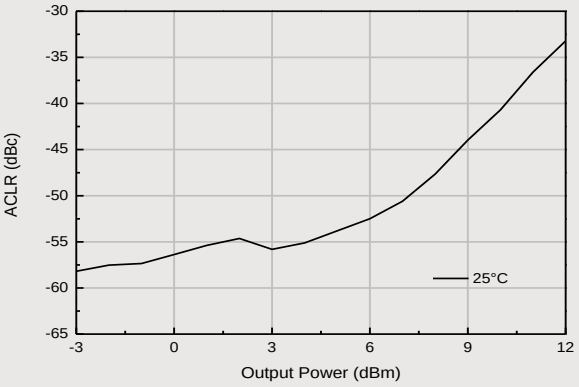
LTE ACLR vs. Output Power @ 3500MHz

DL20M_E31.WFM 1FA, 20MHz offset

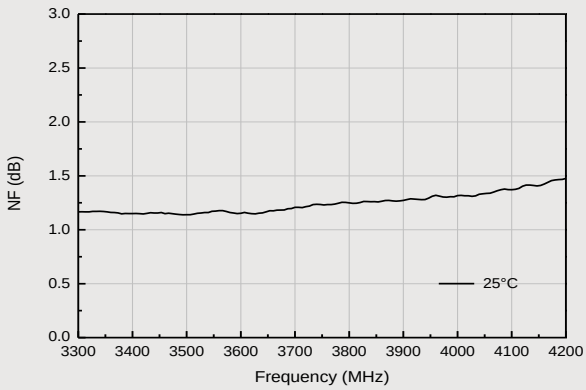


5G NR ACLR vs. Channel Power @3.45GHz

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



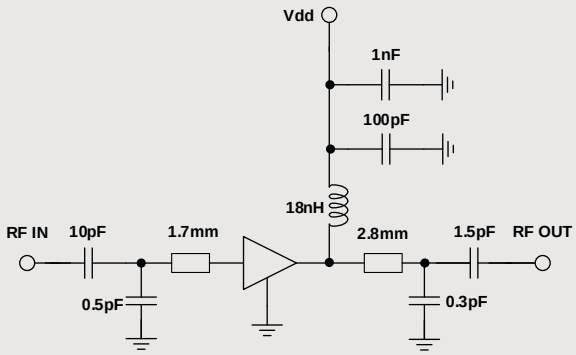
NF vs. Frequency

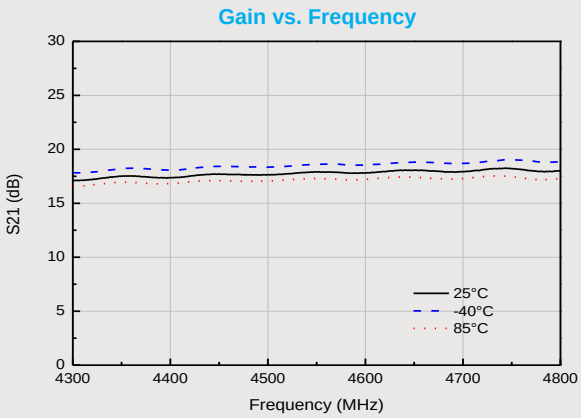


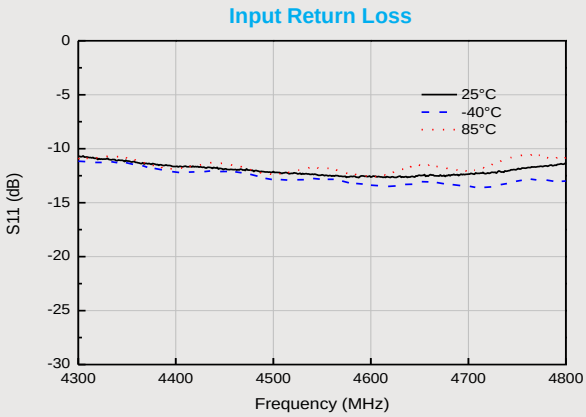
Typical RF Performance for 4750MHz Tuned Application Circuit

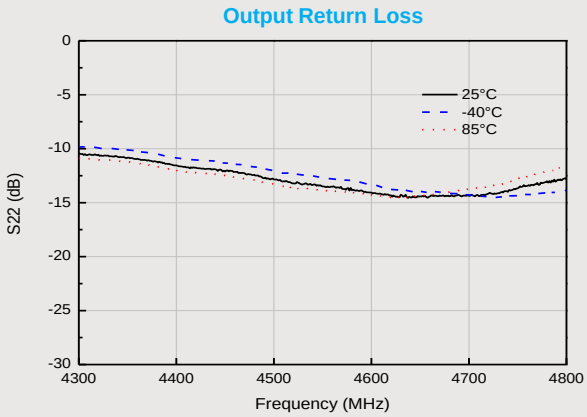
Supply Bias Voltage = 3.3V, Current= 52mA

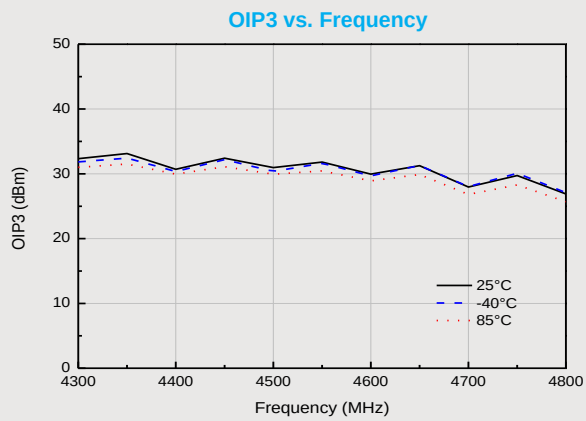
Parameters	Units	Frequency (MHz)			
		4300	4500	4700	4800
S21	dB	17.1	17.7	17.9	18.0
S11	dB	-10.7	-12.1	-12.4	-11.3
S22	dB	-10.4	-12.8	-14.4	-12.8
P1dB	dBm	17.1	16.1	15.1	14.4
OIP3 @ 0dBm	dBm	32.3	31.0	28.0	26.9
NF	dB	1.3	1.3	1.5	1.6

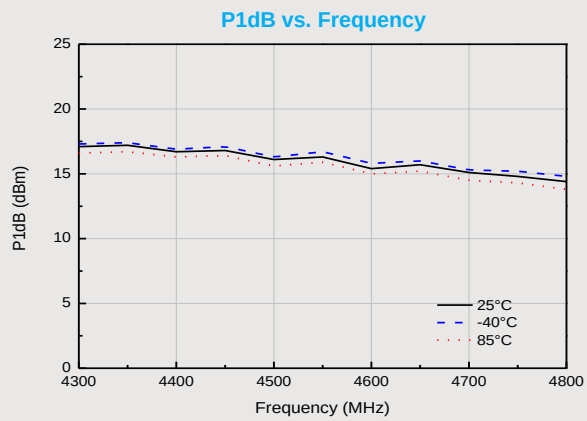




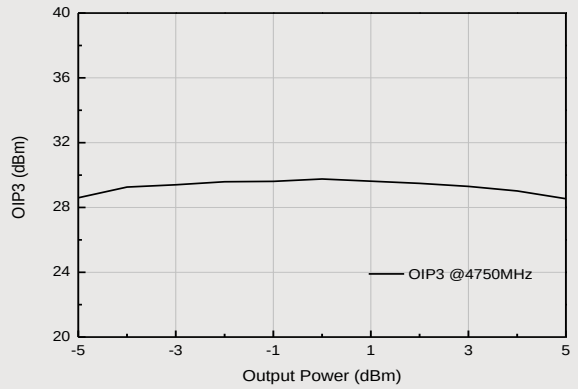




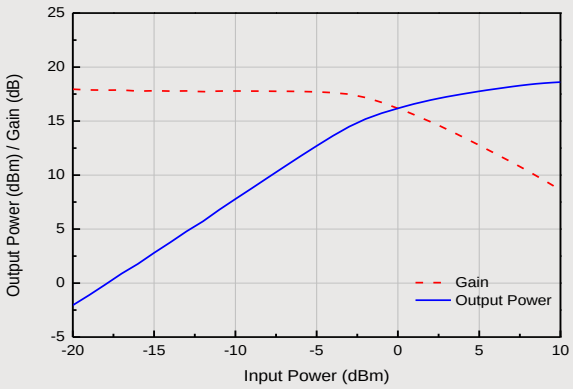




Output IP3 / Tone Power @ 4750MHz

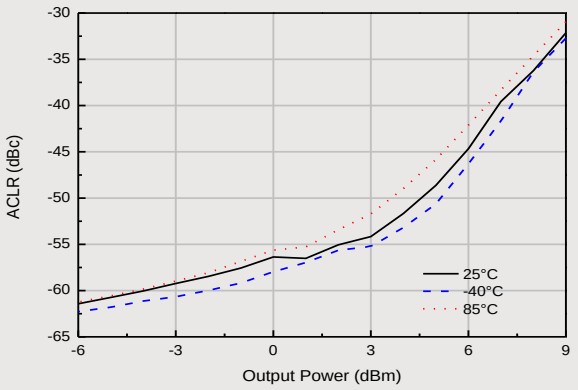


Output Power / Gain vs Input Power @ 4750MHz



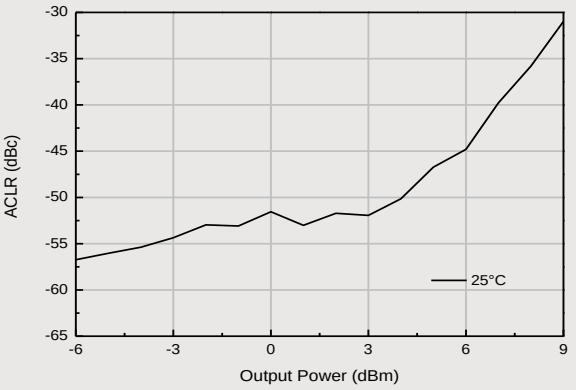
LTE ACLR vs. Output Power @ 4750MHz

DL20M_E31.WFM 1FA, 20MHz offset

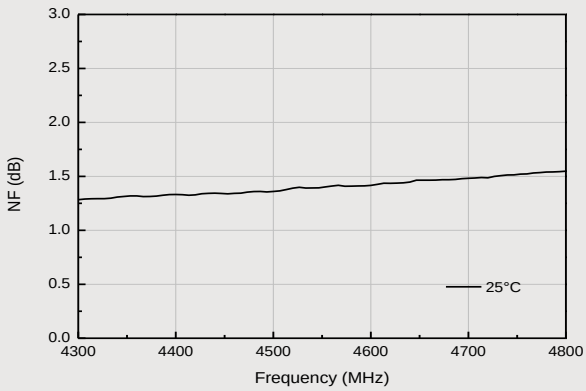


5G NR ACLR vs. Channel Power @4.75GHz

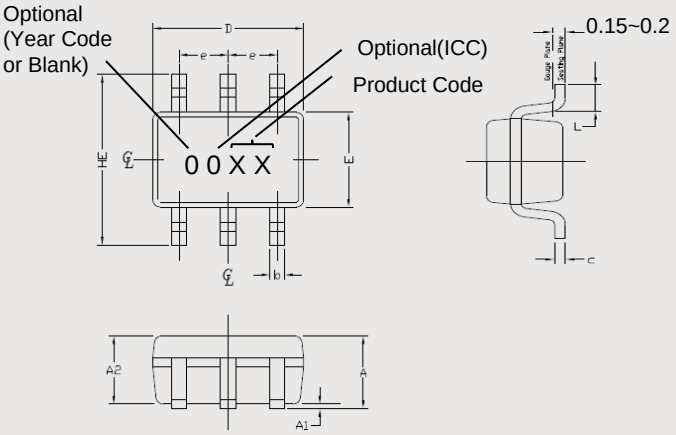
(5G NR Downlink FR1, SCS 30KHz, CBW 100MHz, 256QAM, 100MHz offset)



NF vs. Frequency

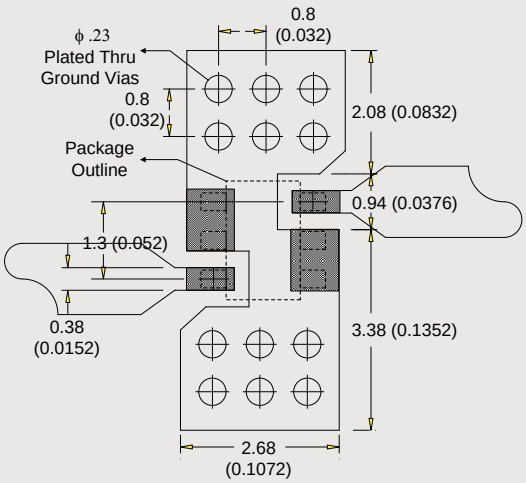


Lead-free /RoHS Compliant / Green SOT-363 Package Outline

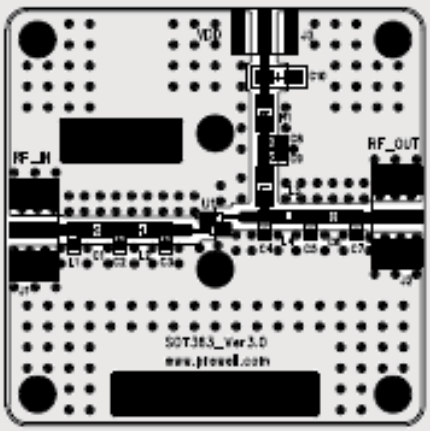


SYMBOL	MIN.	MAX.
E	1.15	1.35
D	1.85	2.25
HE	1.95	2.30
A	0.80	1.10
A2	0.70	1.00
A1	0.00	0.10
e	0.65 BSC	
b	0.15	0.40
c	0.08	0.25
L	0.21	0.26

Land Pattern



Evaluation Board Layout (40x40)



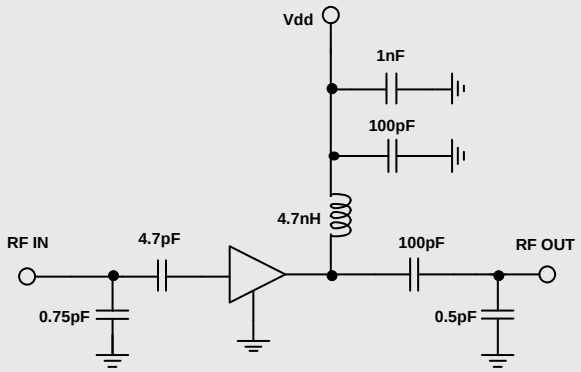
Mounting Instructions

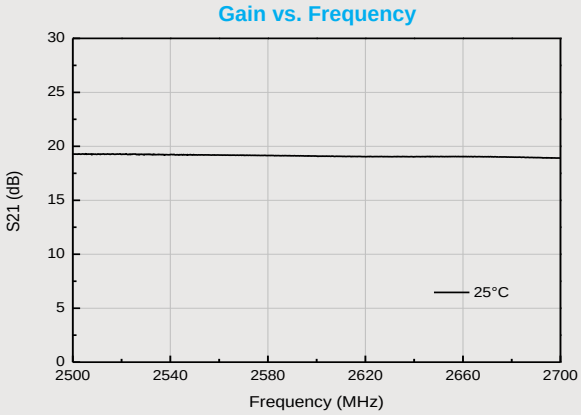
1. Use a large ground pad area with many plated through-holes as shown.
2. We recommend 1 oz copper minimum.
3. Measurement for our data sheet was made on 0.8mm thick FR-4 Board.
4. RF trace width depends on the board material and construction.
5. Add mounting screws near the part to fasten the board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

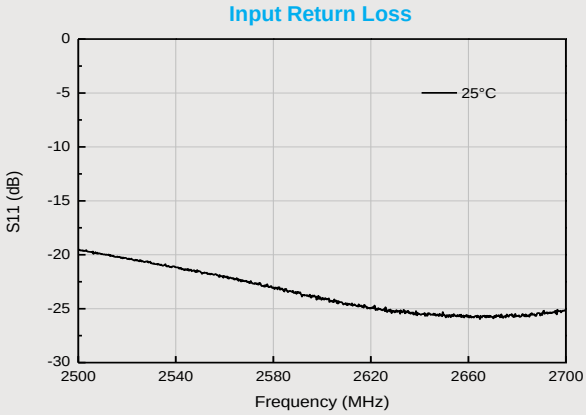
Typical RF Performance for 2600MHz Tuned Application Circuit

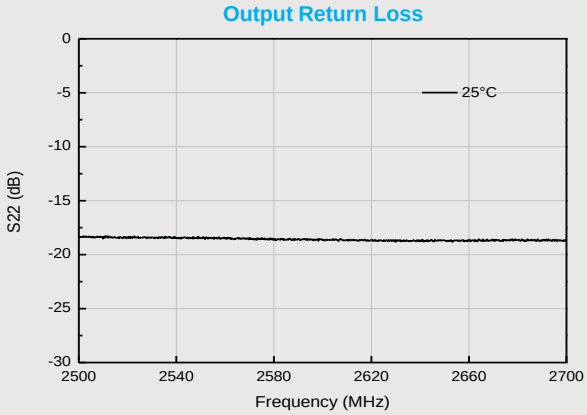
Supply Bias Voltage = 3.3V, Current= 52mA

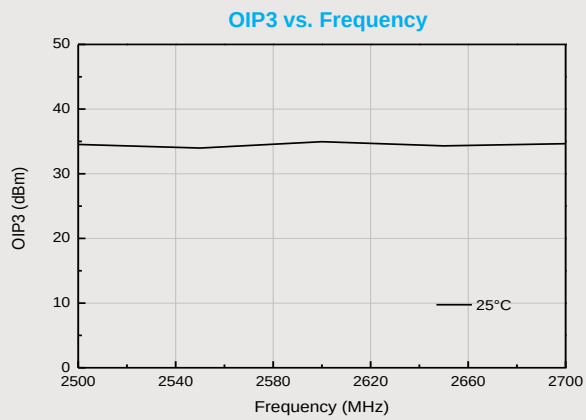
Parameters	Units	Frequency (MHz)			
		2500	2600	2650	2700
S21	dB	19.3	19.1	19.0	18.9
S11	dB	-19.5	-24.1	-25.6	-25.2
S22	dB	-18.3	-18.6	-18.7	-18.7
P1dB	dBm	17.5	17.4	17.3	17.3
OIP3 @ 0dBm	dBm	34.5	35.0	34.3	34.7
NF	dB	1.1	1.1	1.2	1.1

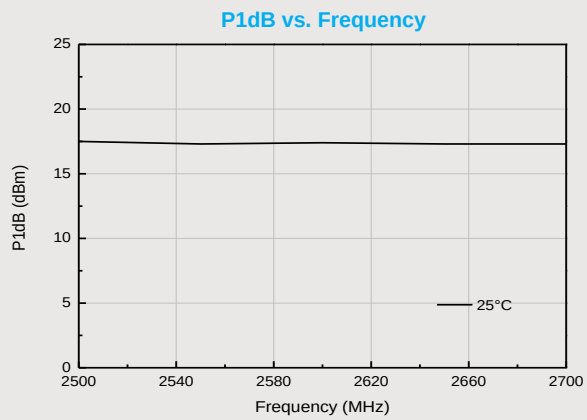






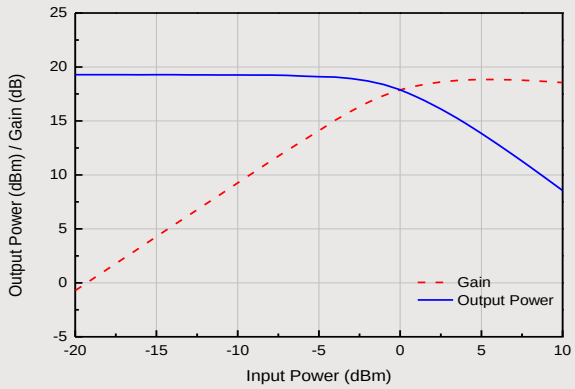




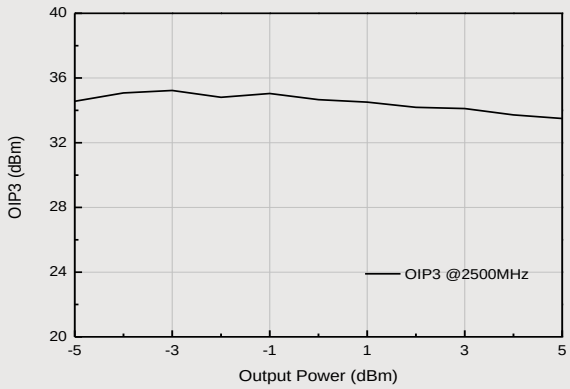


Application Note

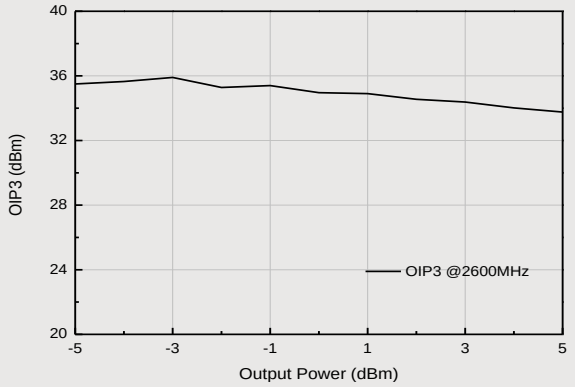
Output Power / Gain vs Input Power @ 2600MHz



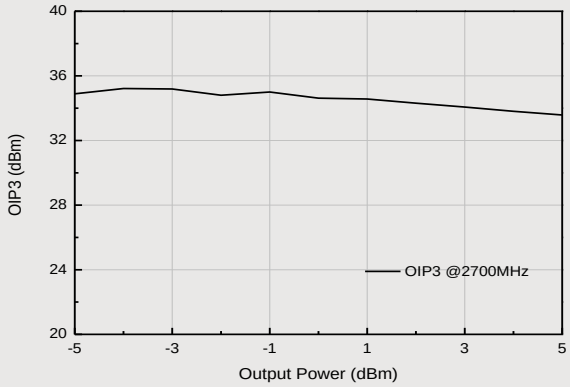
Output IP3 / Tone Power @ 2500MHz



Output IP3 / Tone Power @ 2600MHz

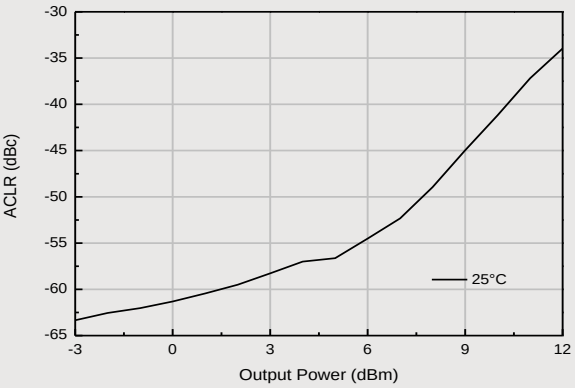


Output IP3 / Tone Power @ 2700MHz



LTE ACLR vs. Output Power @ 2600MHz

DL20M_E31.WFM 1FA, 20MHz offset



NF vs. Frequency

