SJM PREWELL

PG615

Wideband Gain Block

Features

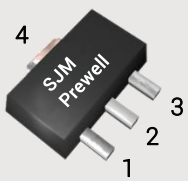
- 5 to 4000MHz
- Gain 22.3dB @ 900MHz
- P1dB 20.6dBm @ 70MHz
- OIP3 35.9dBm @ 70MHz
- Lead-free / Green / RoHS compliant SOT-89 Package

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 1 RF OUT / Bias 3
GND 2,4



ESD/MSL

1 ESD sensitive device. Observe handling precautions.

2 HBM: Class 2, JESD22-A114

3 CDM: Class C3 , JESD22-C101F

4 MSL 3, J-STD-020

Description

The PG615 is a high performance InGaP HBT MMIC Amplifier and consists of Darlington pair amplifiers. The PG615 features high linear performance, wideband operation and high reliability. The PG615 is designed for enabling to stable performance over temperature using an internal active bias and temperature compensated circuit. The PG615 operates from a single voltage supply and requires only two DC-blocking capacitors and an inductor for operation. A bias resistor is not required, the device biased directly from single supply voltage. The device is a general purpose buffer amplifier that offers high dynamic range in a low cost surface-mounted plastic SOT-89 package. All devices are 100% RF and DC tested.

Specifications

Parameter	Units	Frequency (MHz)					
		70	900	1900	2100	2600	3600
S21	dB	22.1	22.3	21.5	21.2	20.4	20.0
S11	dB	-18	-29	-34	-35	-19	-19
S22	dB	-10	-15	-11	-12	-12	-8
P1dB	dBm	20.6	19.0	17.8	17.5	17.1	17.7
OIP3	dBm	35.9	33.6	31.8	31.3	30.3	28.1
NF	dB	3.8	3.1	3.4	3.4	3.5	4.3
V / I	V/mA	5 / 69					
Rth	°C/W	54					

1) Test Conditions : T=25°C, Supply Voltage=5V, 50ohm System
2) OIP3 measured with two tones at an output power of 3dBm/tone separated by 1MHz.

Absolute Maximum Ratings

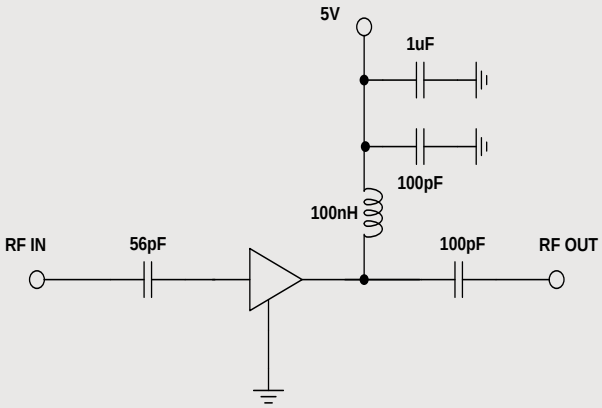
Parameter	Rating	Unit
Device Voltage	7.0	V
Device Current	160	mA
RF Power Input	20	dBm
Storage Temperature	-55 to 150	°C
Ambient Operating Temperature	-40 to 85	°C
Junction Temperature	186	°C

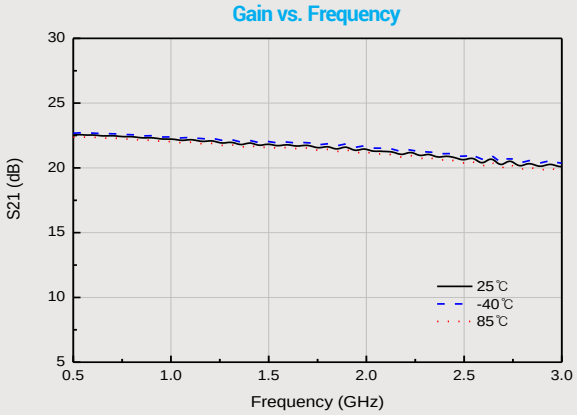
1) Stresses above the maximum values listed have may cause permanent damage to the device.
2) MTTF is more than 100 years.

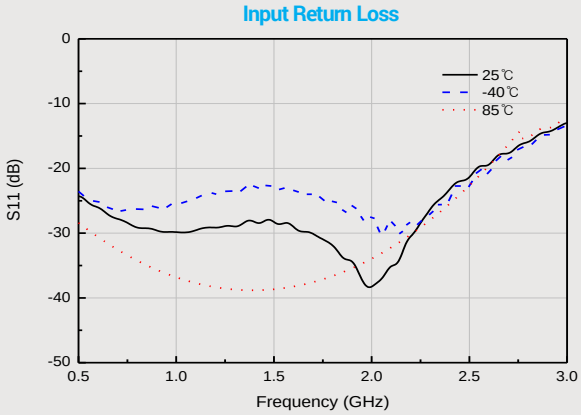
Typical RF Performance for 1.9GHz Tuned Application Circuit

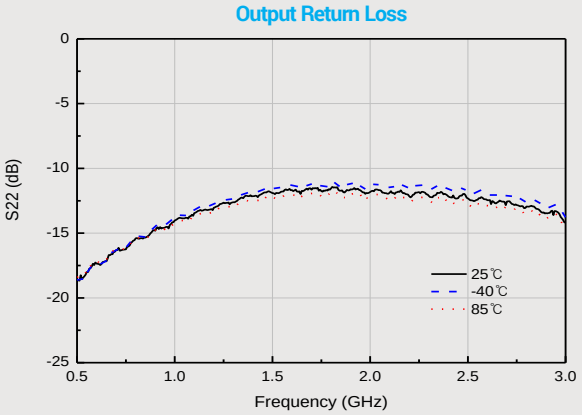
Supply Bias Voltage = 5V, Current= 69mA

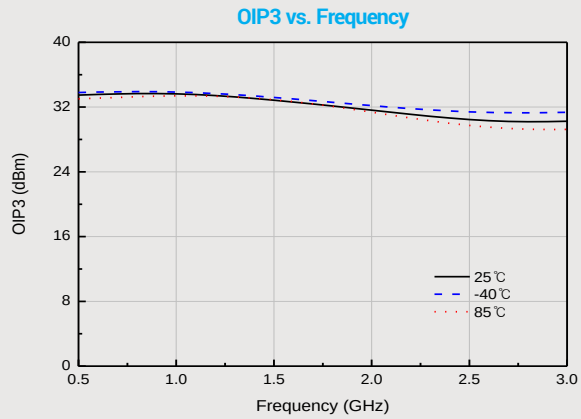
Parameters	Units	Frequency(MHz)						
		900	1500	1900	2100	2300	2600	3000
S21	dB	22.3	21.8	21.5	21.2	21.0	20.4	20.1
S11	dB	-29	-28	-34	-35	-26	-19	-13
S22	dB	-15	-12	-11	-12	-12	-12	-14
P1dB	dBm	19.0	18.5	17.8	17.5	17.2	17.1	17.1
OIP3@3dBm	dBm	33.6	32.8	31.8	31.3	30.8	30.3	30.2
NF	dB	3.1	3.3	3.4	3.4	3.4	3.5	3.7

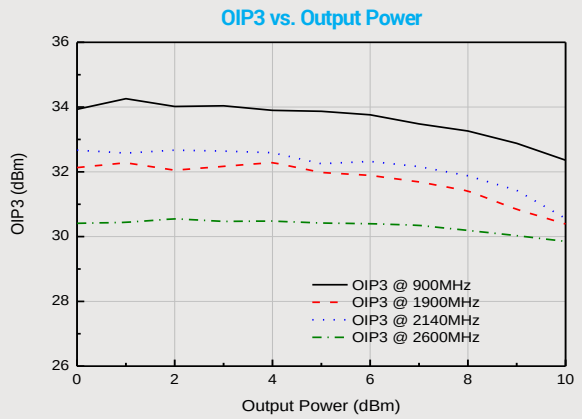




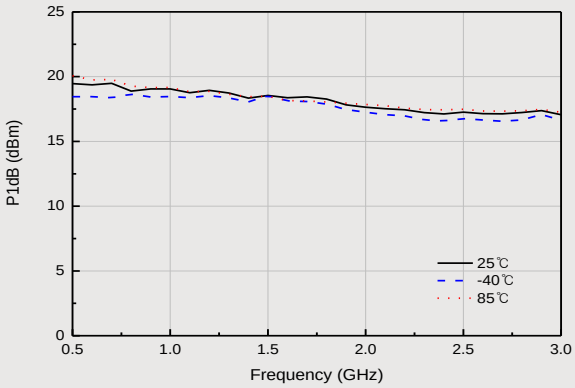




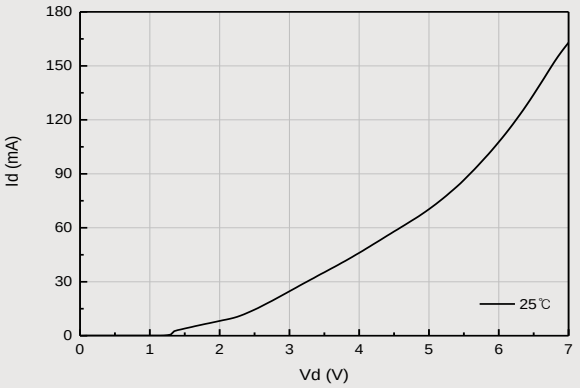




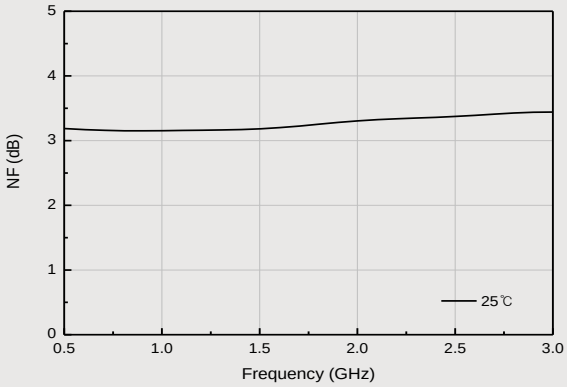
P1dB vs. Frequency



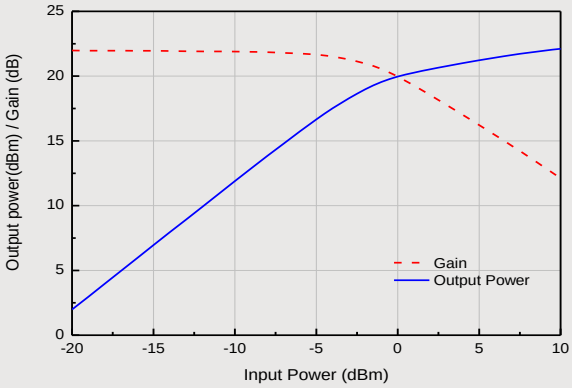
Id vs. Vd



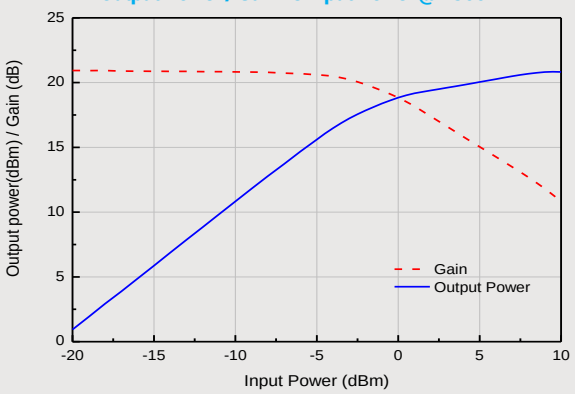
NF vs. Frequency



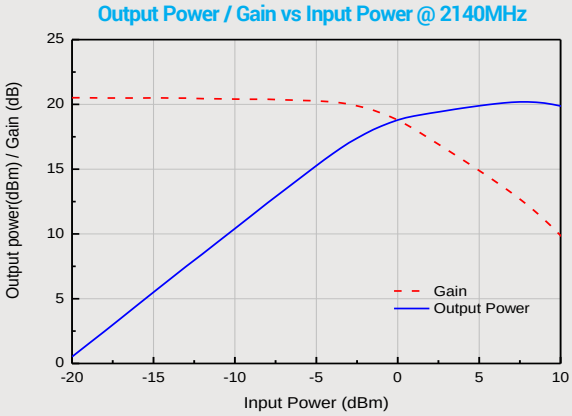
Output Power / Gain vs Input Power @ 900MHz



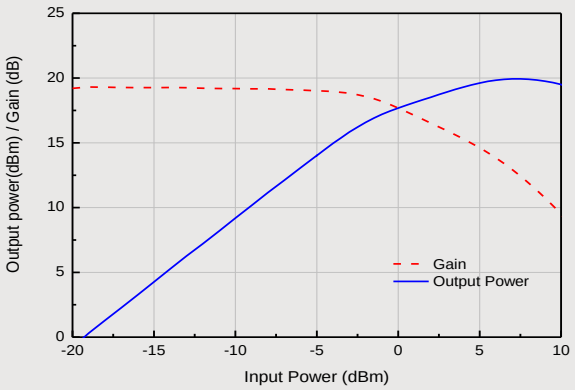
Output Power / Gain vs Input Power @ 1900MHz



Output Power / Gain vs Input Power @ 2140MHz

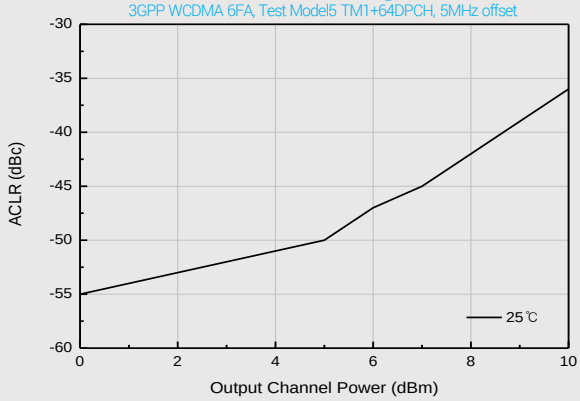


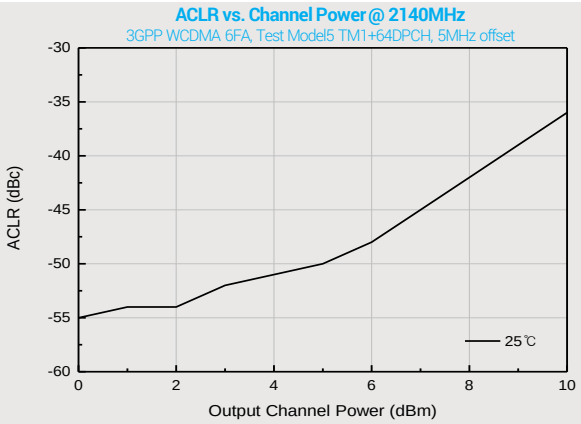
Output Power / Gain vs Input Power @ 2600MHz



ACLR vs. Channel Power @ 1830MHz

3GPP WCDMA 6FA, Test Model5 TM1+64DPCH, 5MHz offset

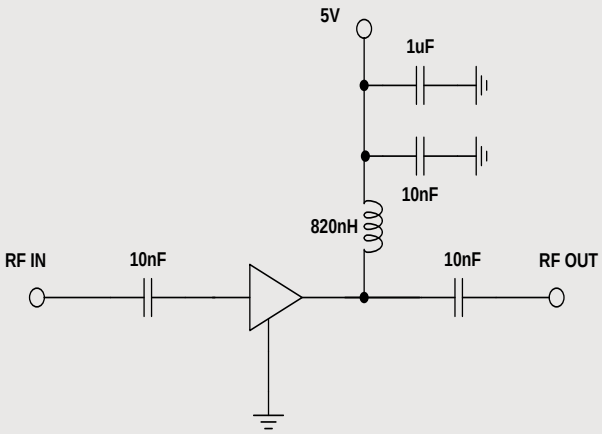


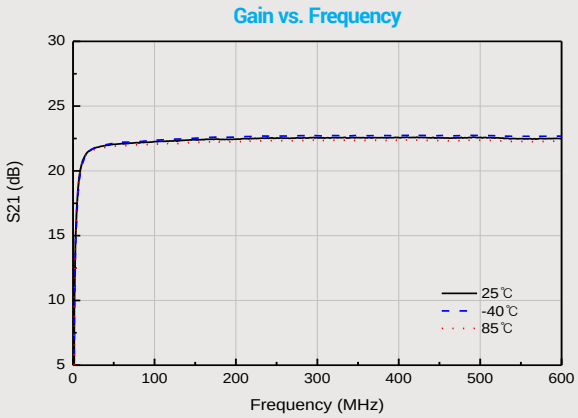

ACLR vs. Channel Power @ 2140MHz
3GPP WCDMA 6FA, Test Model5 TM1+64DPCH, 5MHz offset
ACLR (dBc)
-30
-35
-40
-45
-50
-55
-60
0
2
4
6
8
10
Output Channel Power (dBm)
25℃

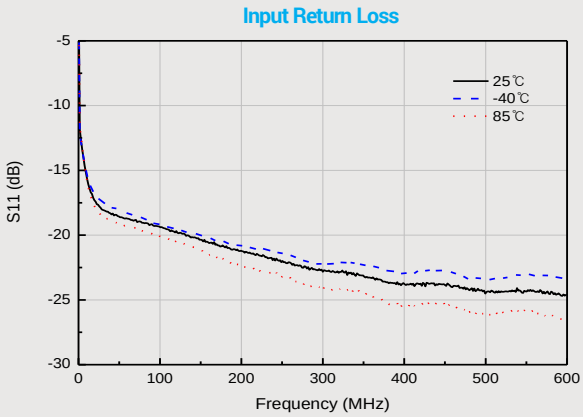
Typical RF Performance for 50MHz-500MHz Tuned Application Circuit

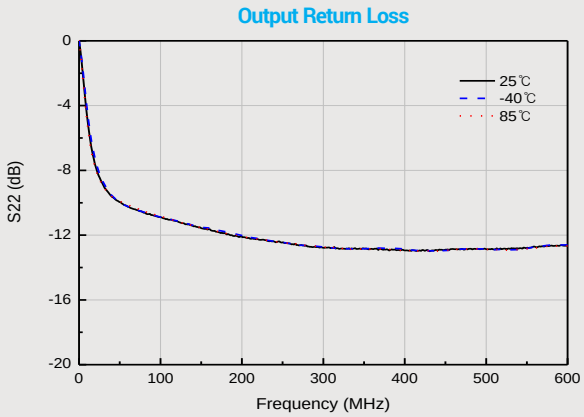
Supply Bias Voltage = 5V, Current= 69mA

Parameters	Units	Frequency (MHz)			
		70	140	250	500
S21	dB	22.1	22.3	22.5	22.5
S11	dB	-18	-20	-22	-24
S22	dB	-10	-11	-12	-12
P1dB	dBm	20.6	20.7	20.3	19.2
OIP3 @ 3dBm	dBm	35.9	36.6	36.0	33.8
NF	dB	3.8	3.6	3.5	3.5

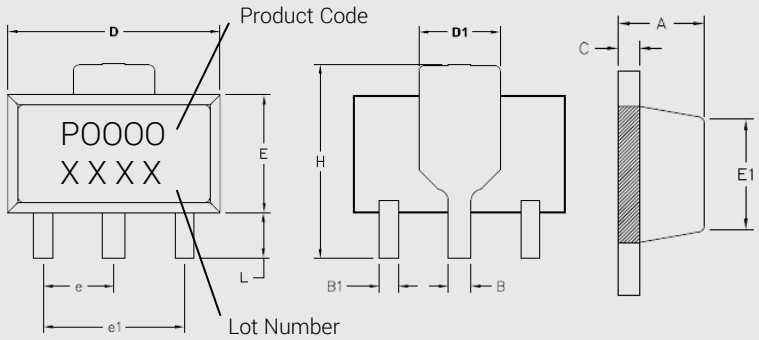






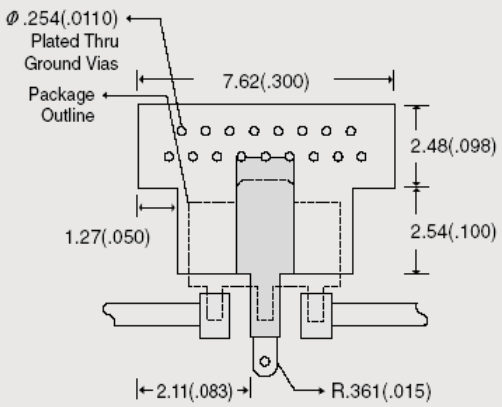


Lead-free /RoHS Compliant / Green SOT-89 Package Outline

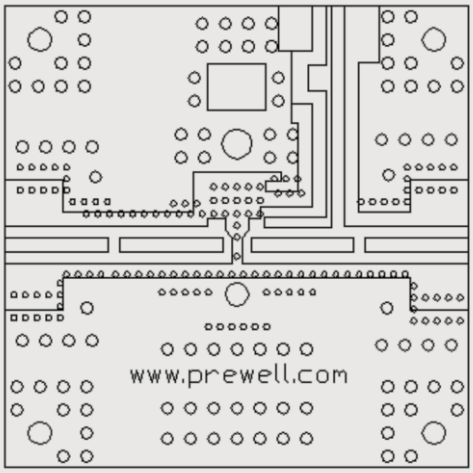


REF.	DIMENSIONS (mm)	
	Min.	Max.
A	1.40	1.60
B	0.43	0.58
B1	0.36	0.54
C	0.35	0.46
D	4.30	4.70
D1	1.50	1.87
E	2.29	2.70
E1	2.13	2.18
e	1.5	
e1	3.0	
H	3.43	5.10
L	0.74	1.20

Land Pattern



Evaluation Board Layout (40x40)



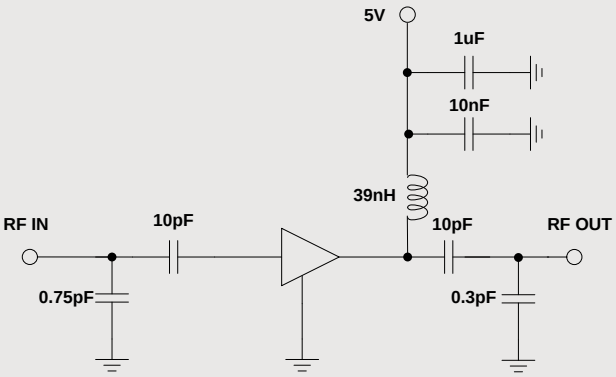
Mounting Instructions

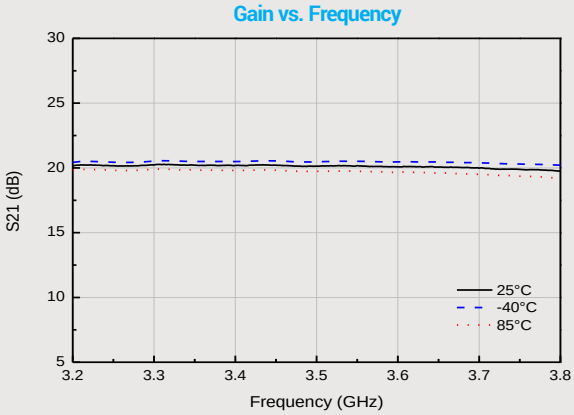
1 Use a large ground pad area with many plated through-holes as shown.
2 We recommend 1 oz copper minimum.
3 Measurement for our data sheet was made on 0.8mm thick FR-4 Board.
4 RF trace width depends on the board material and construction.
5 Add mounting screws near the part to fasten the board to a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

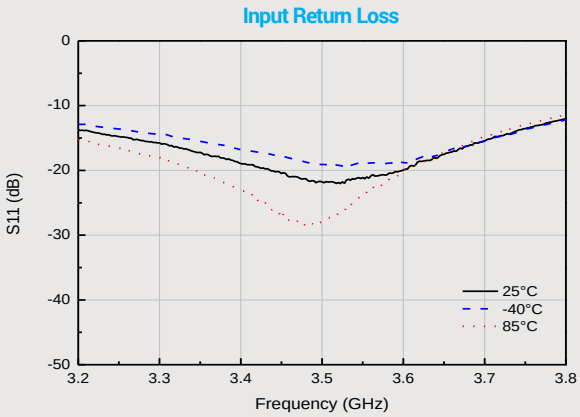
Typical RF Performance for 3.5GHz Tuned Application Circuit

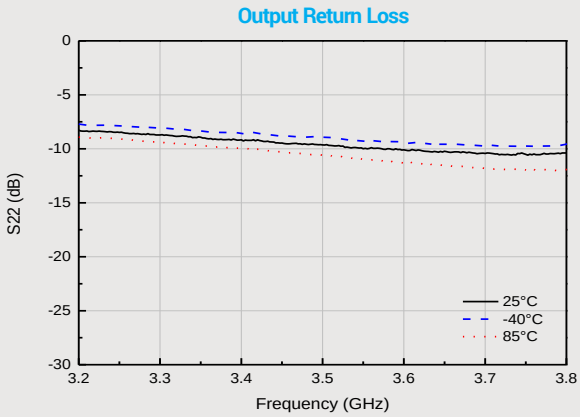
Supply Bias Voltage = 5V, Current= 69mA

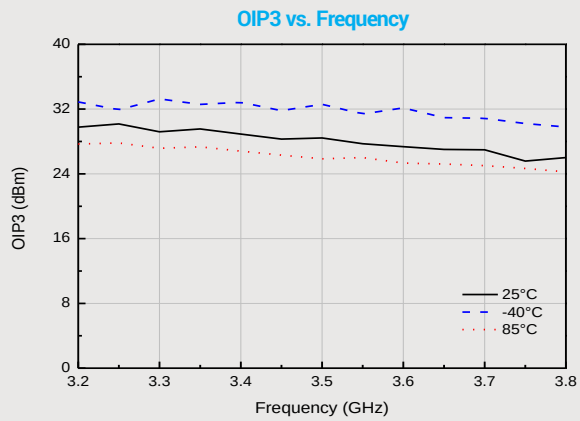
Parameters	Units	Frequency (MHz)			
		3200	3400	3600	3800
S21	dB	20.1	20.2	20.0	19.6
S11	dB	-14	-18	-19	-12
S22	dB	-7	-9	-8	-10
P1dB	dBm	17.6	17.7	17.7	18.0
OIP3 @ 3dBm	dBm	30.9	29.5	28.1	27.1
NF	dB	4.3	4.2	4.3	4.5

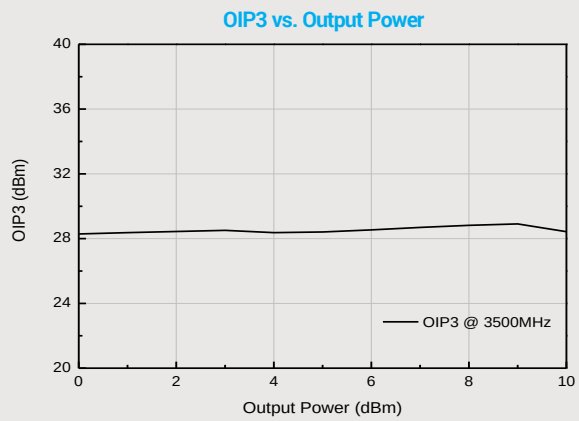




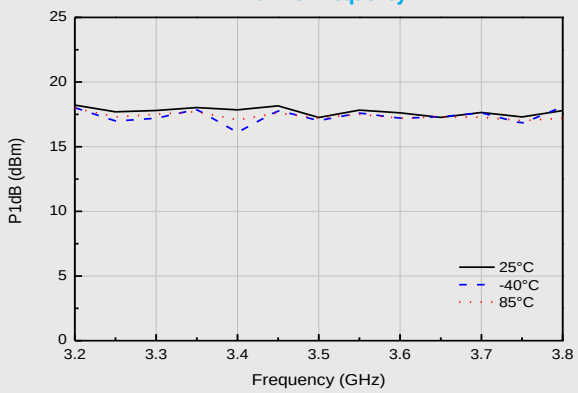




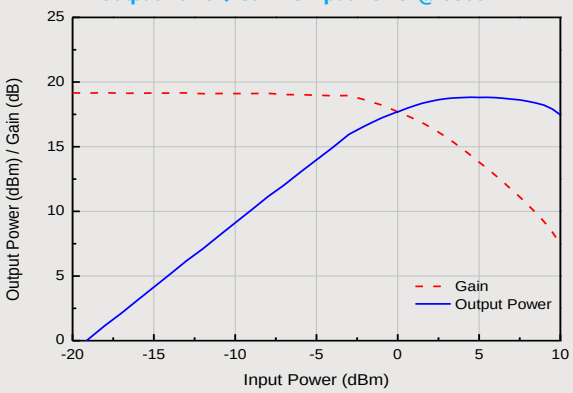




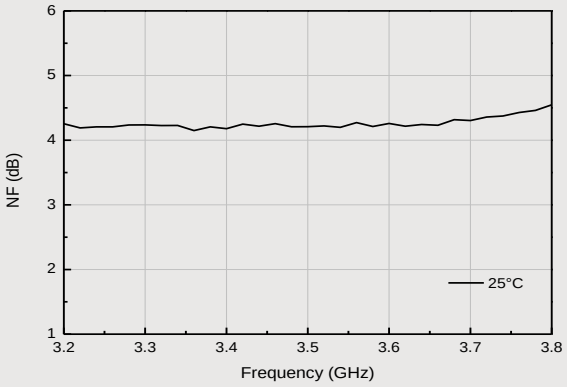
P1dB vs. Frequency



Output Power / Gain vs Input Power @ 3500MHz

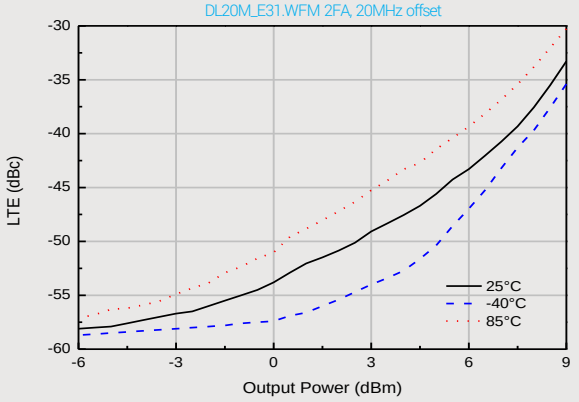


NF vs. Frequency



LTE ACLR vs. Output Power @ 3500MHz

DL20M_E31.WFM 2FA, 20MHz offset



New Evaluation Board Layout (40x40)