

SJM PREWELL
PG751
Wideband Gain Block

Features

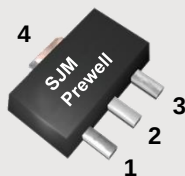
- 30 to 4200MHz
- Gain 18.7dB @ 3500MHz
- P1dB 19.5dBm @ 3500MHz
- OIP3 37.1dBm @ 3500MHz
- 5GNR ACLR 50dBc 9.6dBm
- Lead-free / Green / RoHS compliant SOT-89 Package

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 1C , JESD22-A114
- 3 CDM: Class C3 , JESD22-C101F
- 4 MSL 3, J-STD-020

Description

The PG751 is a high performance GaAs p-HEMT Amplifier. The features of PG751 are high linearity, low noise figure and high reliability, ideal for wideband communication systems. The PG751 is internally matched to 50 Ohms for optimum noise figure and linearity. The PG751 operates from a single 5 / 3.3 voltage supply and has an internal temperature compensation active bias. All devices are 100% RF and DC tested.

Specifications

Parameter (V/I _ 5V/91mA)	Units	Frequency (MHz)				
		70	900	2100	3500	4200
S21	dB	25.0	23.6	20.8	18.7	18.6
S11	dB	-21.1	-13.9	-22.9	-16.7	-15.7
S22	dB	-18.2	-24.1	-24.1	-14.7	-22.5
P1dB	dBm	20.3	20.2	19.7	19.5	17.4
OIP3	dBm	37.1	36.4	37.3	37.1	36.7
NF	dB	0.7	0.9	1.1	1.2	1.5
LTE 20M ACLR 50dBc	dBm	-	11.5	11.5	10.5	-
5G NR ACLR 50dBc	dBm	-	-	-	9.6	-

Parameter (V/I _ 3.3V/59mA)	Units	Frequency (MHz)				
		70	900	2100	3500	4200
S21	dB	24.5	23.2	20.4	18.3	18.1
S11	dB	-19.9	-13.2	-20.2	-15.4	-14.3
S22	dB	-21.4	-28.0	-21.2	-16.6	-19.5
P1dB	dBm	17.5	17.6	17.0	16.8	14.8
OIP3	dBm	33.2	33.1	33.6	33.1	28.3
NF	dB	0.7	0.8	1.0	1.1	1.3
LTE 20M ACLR 50dBc	dBm	-	8.0	8.0	8.0	-
5G NR ACLR 50dBc	dBm	-	-	-	7.0	-

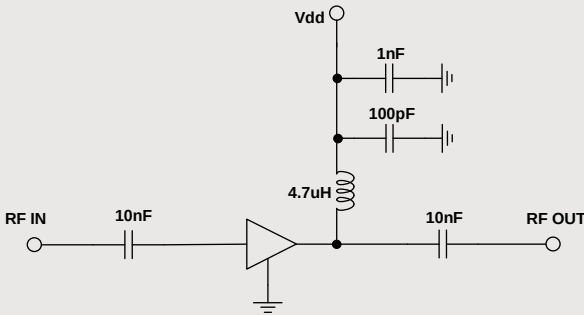
- 1) Test Conditions : T=25°C, Supply Voltage= 5V or 3.3V, 50ohm System
- 2) OIP3 measured with two tones at an output power of 5dBm/tone separated by 1MHz.

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

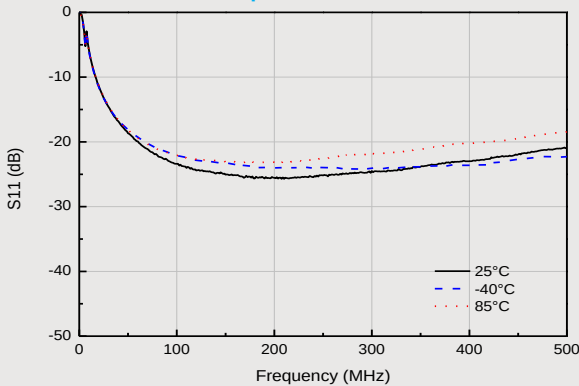
- 1) Stresses above the maximum values listed have may cause permanent damage to the device.
- 2) MTTF is more than 100 years.

Typical RF Performance for 30 – 500MHz Tuned Application Circuit
Supply Bias Voltage = 5V, Current= 91mA

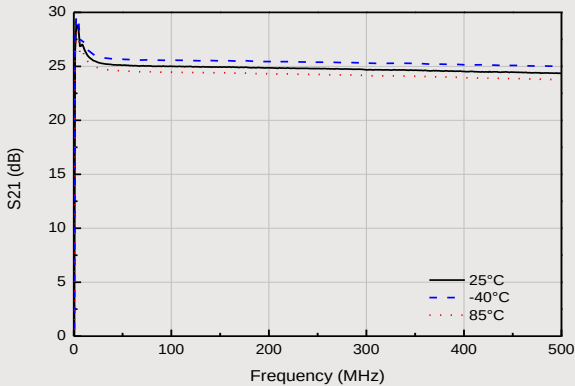


Parameters	Units	Frequency (MHz)	
		70	140
S21	dB	25.0	25.0
S11	dB	-21.1	-24.9
S22	dB	-18.2	-18.5
P1dB	dBm	20.3	20.4
OIP3 @ 5dBm	dBm	37.1	36.7
NF	dB	0.7	0.7

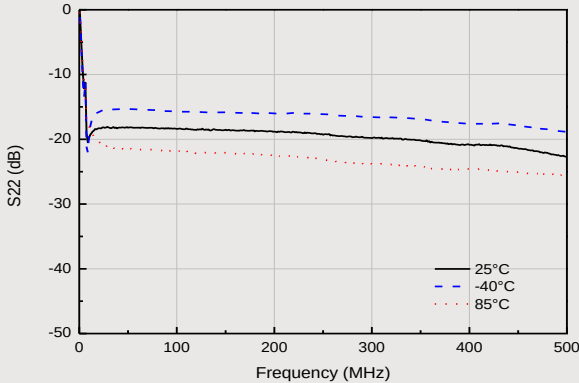
Input Return Loss



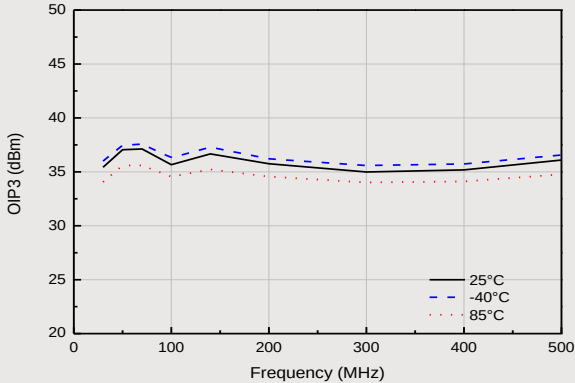
Gain vs. Frequency



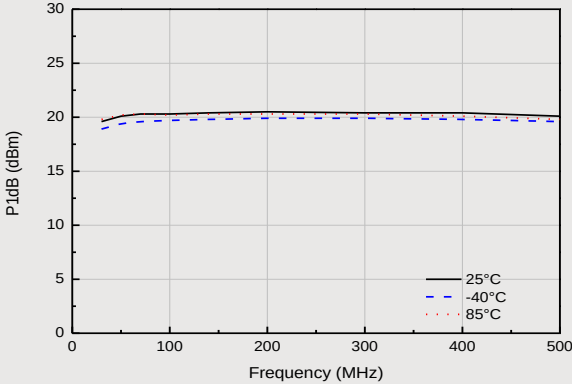
Output Return Loss



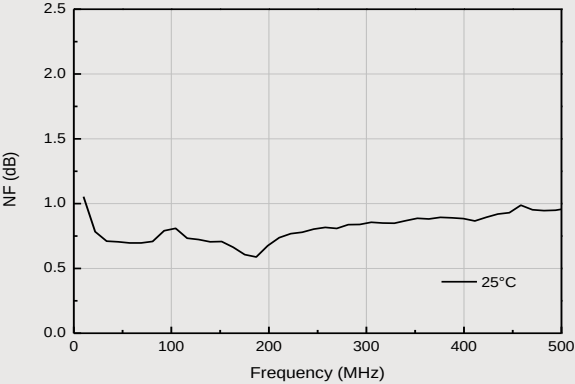
OIP3 vs Frequency



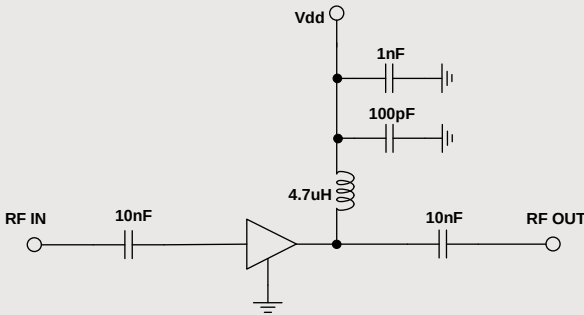
P1dB vs Frequency



NF vs Frequency

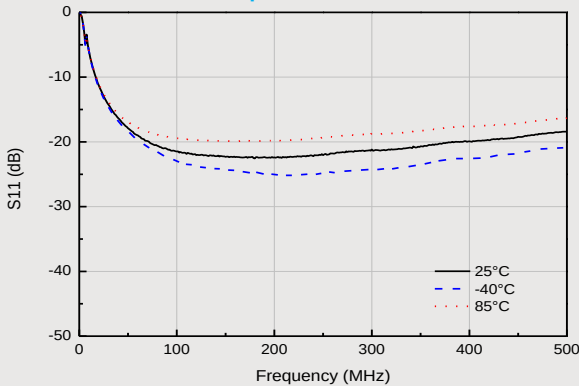


Typical RF Performance for 30 – 500MHz Tuned Application Circuit
Supply Bias Voltage = 3.3V, Current= 59mA

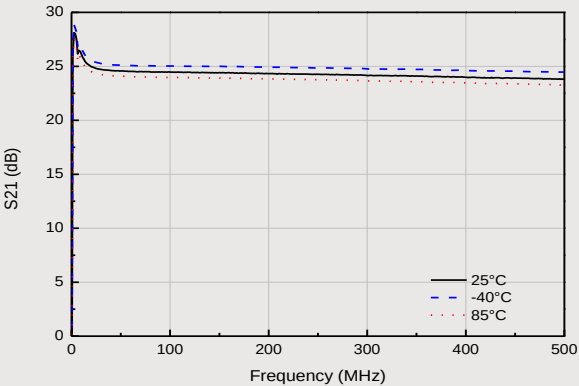


Parameters	Units	Frequency (MHz)	
		70	140
S21	dB	24.5	24.4
S11	dB	-19.9	-22.3
S22	dB	-21.4	-21.8
P1dB	dBm	17.5	17.6
OIP3 @ 5dBm	dBm	33.2	32.7
NF	dB	0.7	0.7

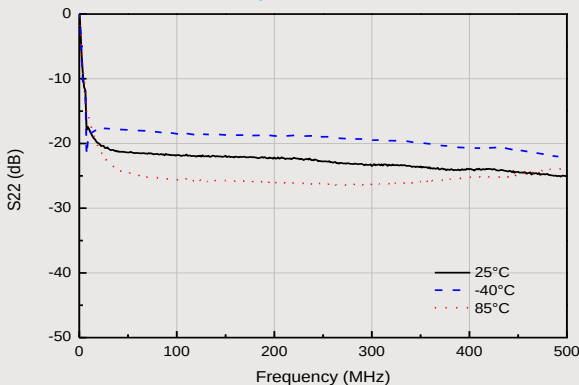
Input Return Loss



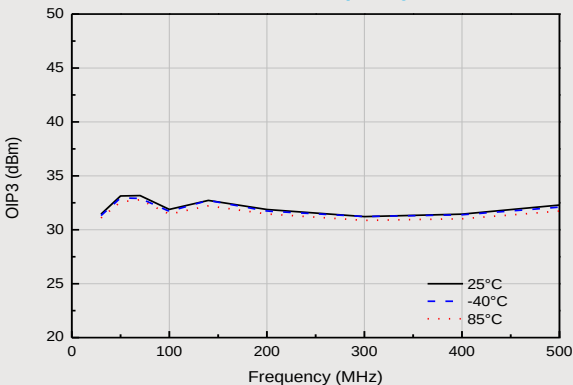
Gain vs. Frequency



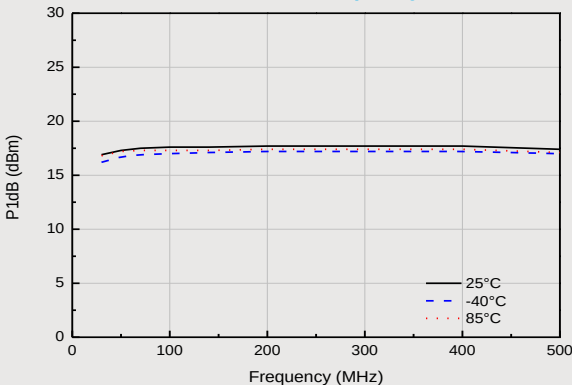
Output Return Loss



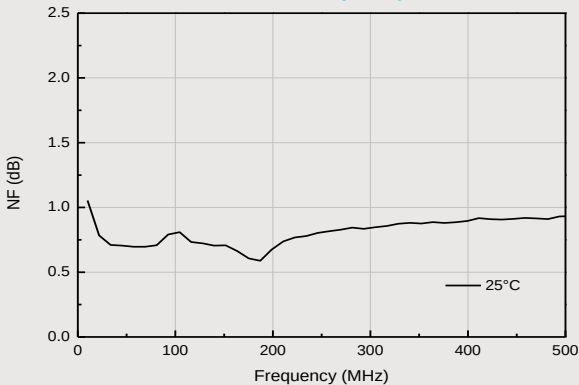
OIP3 vs Frequency



P1dB vs Frequency

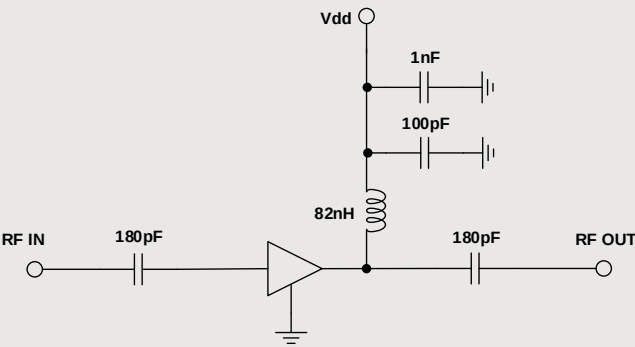


NF vs Frequency

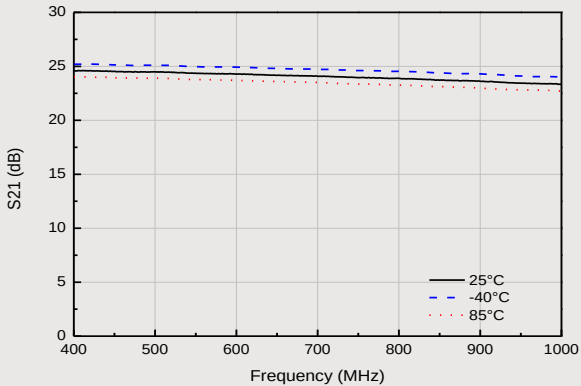


Typical RF Performance for 800MHz Tuned Application Circuit
Supply Bias Voltage = 5V, Current= 91mA

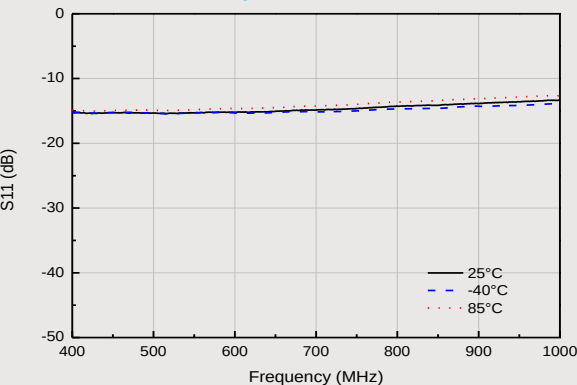
Parameters	Units	Frequency (MHz)			
		400	600	800	900
S21	dB	24.6	24.3	23.9	23.6
S11	dB	-15.2	-15.2	-14.3	-13.9
S22	dB	-15.5	-18.2	-21.7	-24.1
P1dB	dBm	20.7	20.5	20.5	20.2
OIP3 @ 5dBm	dBm	35.8	36.6	36.2	36.4
NF	dB	0.9	1.0	0.9	0.9



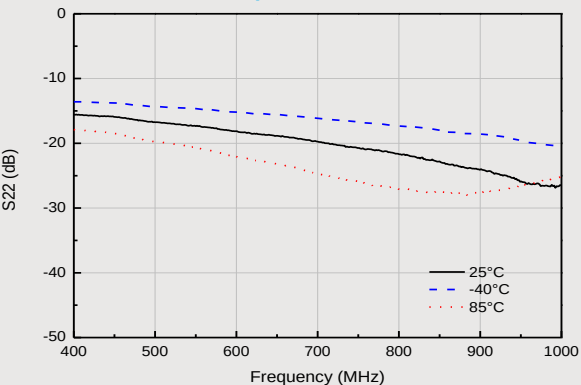
Gain vs. Frequency



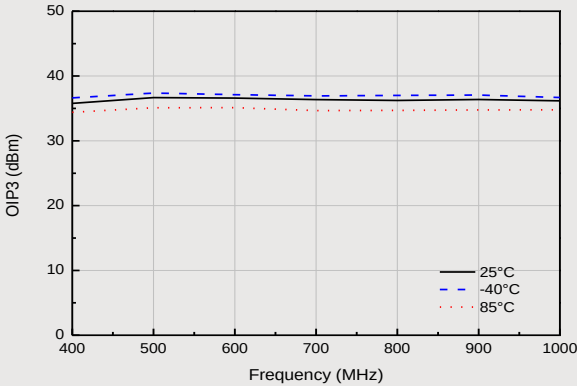
Input Return Loss



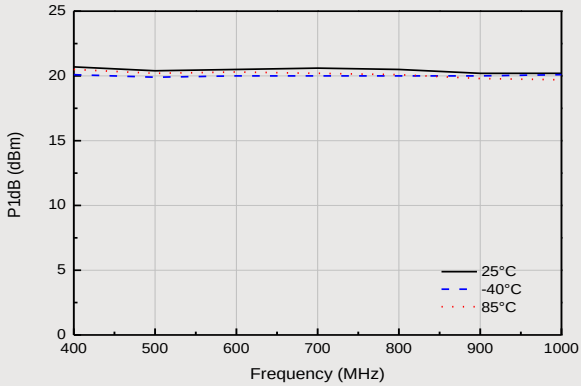
Output Return Loss



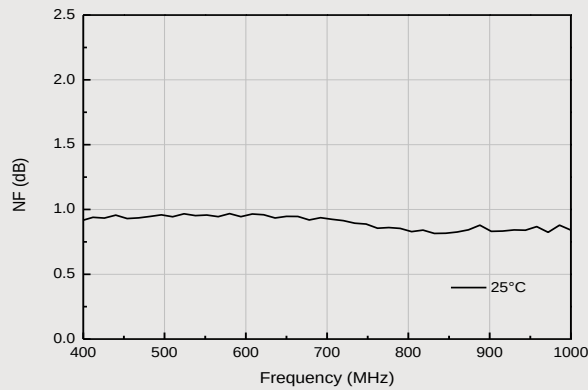
OIP3 vs. Frequency



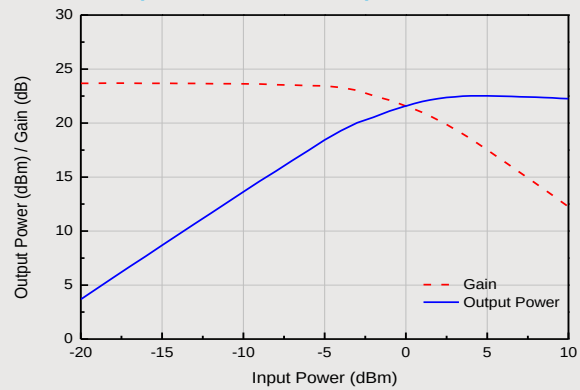
P1dB vs. Frequency



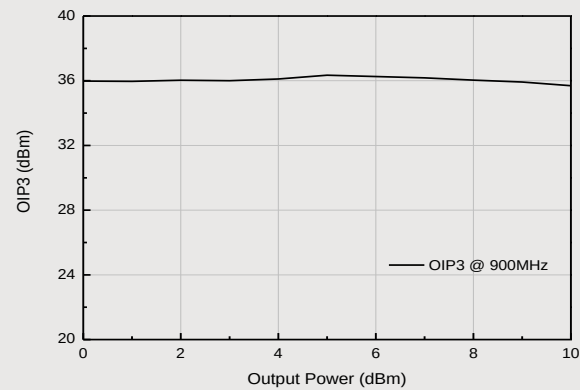
NF vs. Frequency



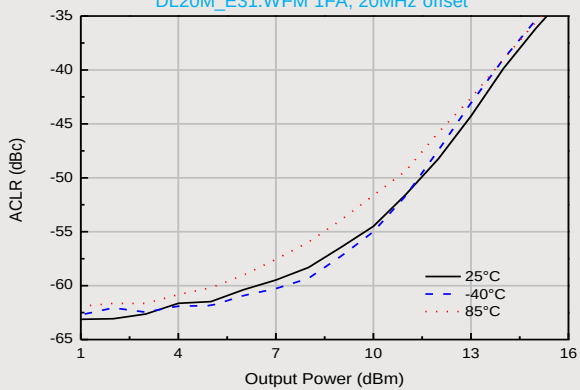
Output Power / Gain vs Input Power @ 900MHz



Output IP3 / Tone Power @ 900MHz

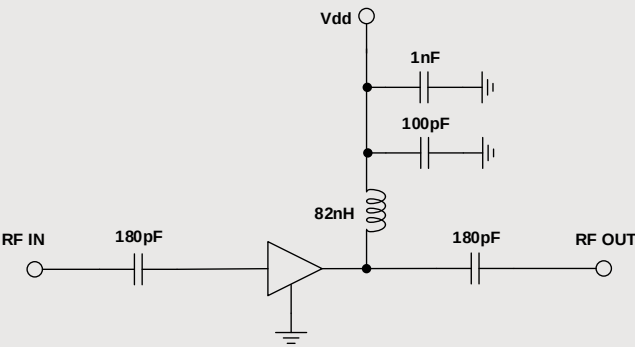


LTE ACLR vs. Output Power @ 900MHz
DL20M_E31.WFM 1FA, 20MHz offset

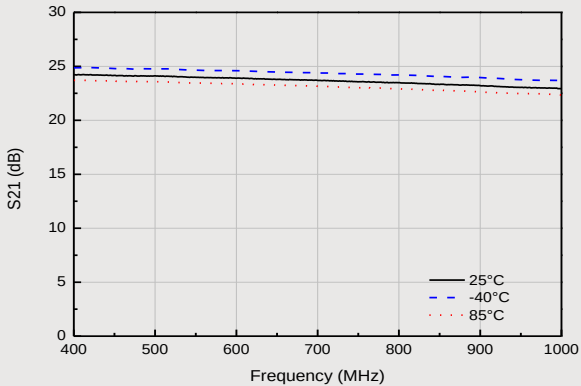


Typical RF Performance for 800MHz Tuned Application Circuit
Supply Bias Voltage = 3.3V, Current= 59mA

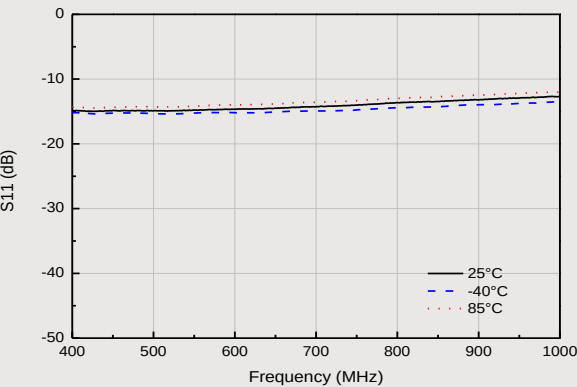
Parameters	Units	Frequency (MHz)			
		400	600	800	900
S21	dB	24.2	23.9	23.5	23.2
S11	dB	-14.8	-14.7	-13.7	-13.2
S22	dB	-16.8	-20.2	-24.8	-28.0
P1dB	dBm	17.8	17.7	17.7	17.6
OIP3 @ 5dBm	dBm	32.3	33.0	33.0	33.1
NF	dB	0.9	0.9	0.8	0.8



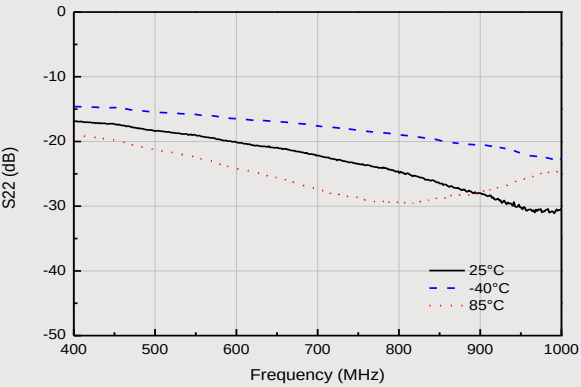
Gain vs. Frequency



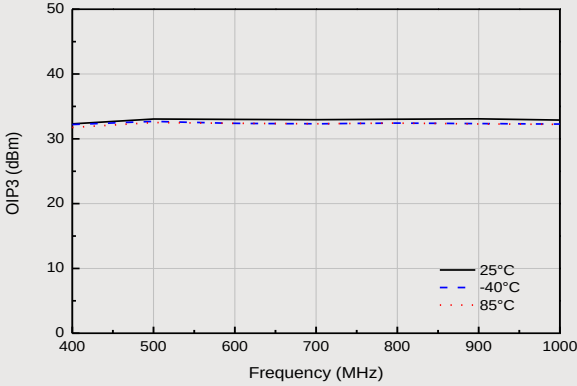
Input Return Loss



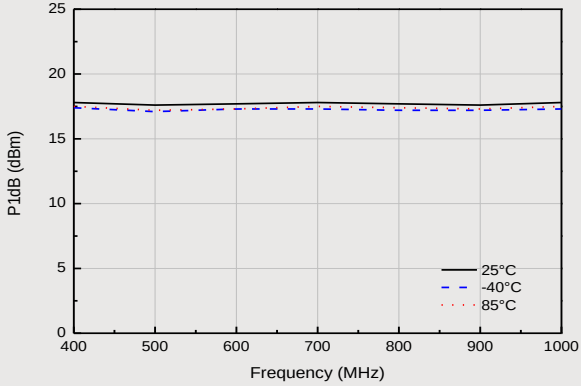
Output Return Loss



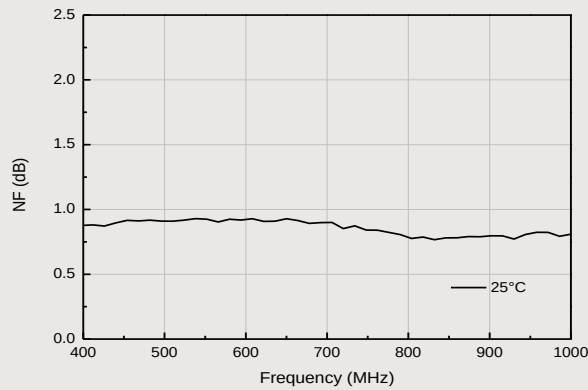
OIP3 vs. Frequency



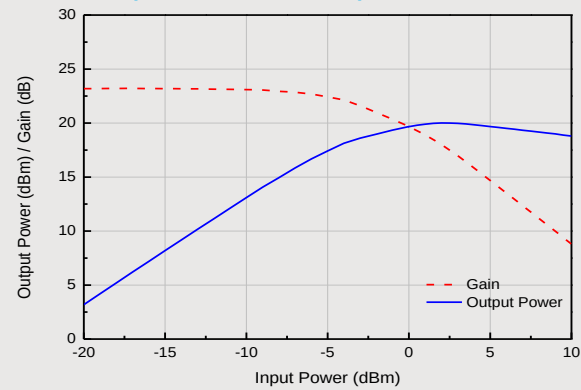
P1dB vs. Frequency



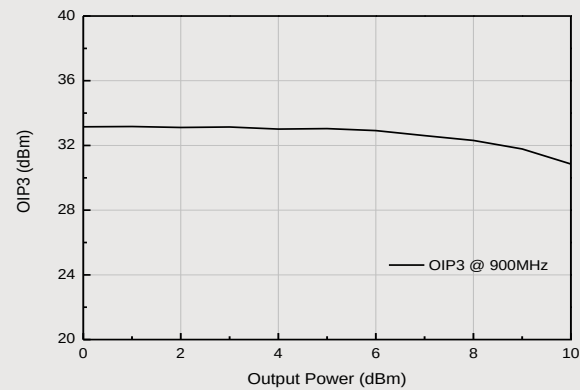
NF vs. Frequency



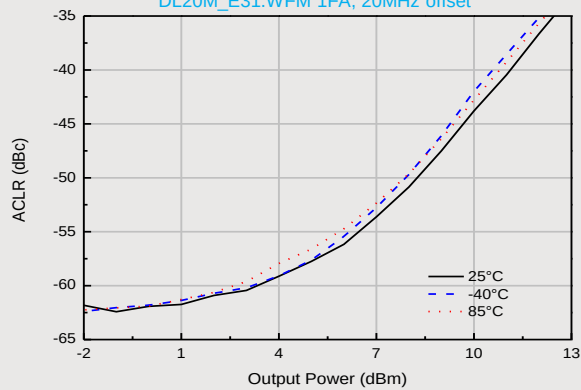
Output Power / Gain vs Input Power @ 900MHz



Output IP3 / Tone Power @ 900MHz

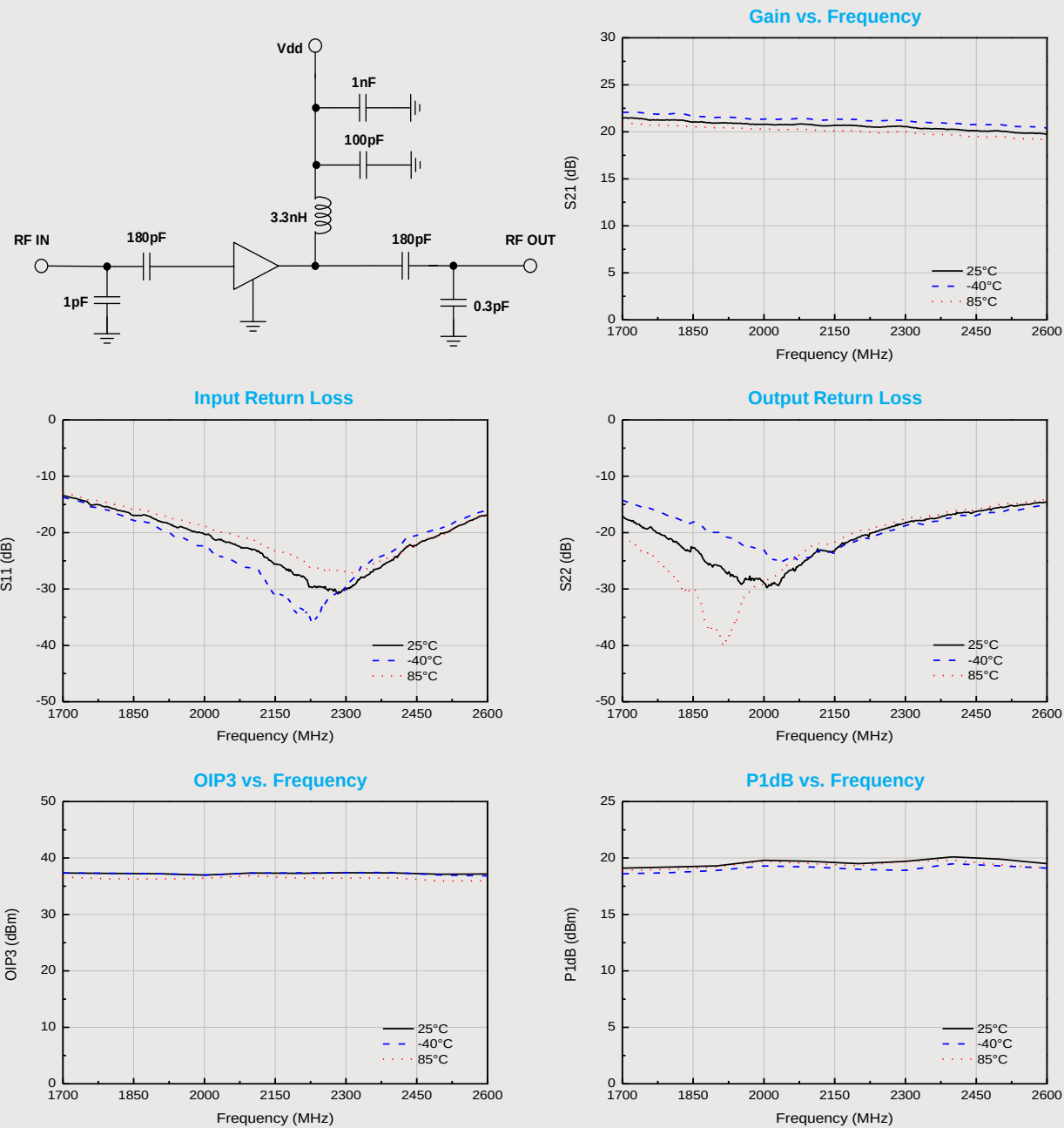


LTE ACLR vs. Output Power @ 900MHz
DL20M_E31.WFM 1FA, 20MHz offset

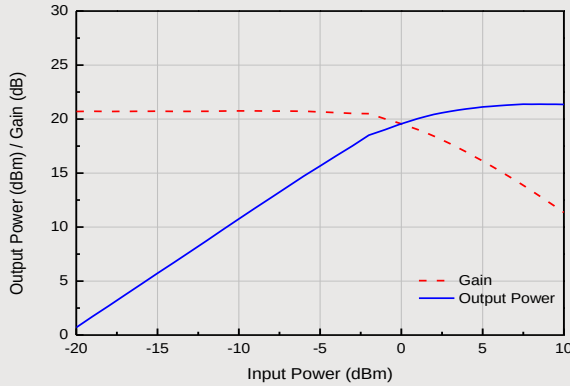


Typical RF Performance for 2300MHz Tuned Application Circuit
 Supply Bias Voltage = 5V, Current= 91mA

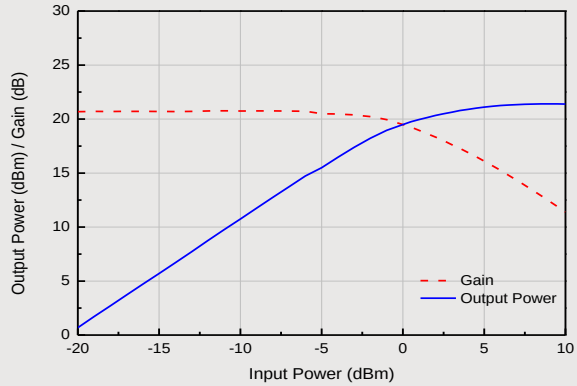
Parameters	Units	Frequency (MHz)			
		1700	2100	2300	2600
S21	dB	21.5	20.8	20.5	19.7
S11	dB	-13.5	-22.9	-30.0	-16.9
S22	dB	-17.0	-24.1	-18.3	-14.5
P1dB	dBm	19.1	19.7	19.7	19.5
OIP3 @ 5dBm	dBm	37.4	37.3	37.4	37.2
NF	dB	0.9	1.1	1.1	1.2



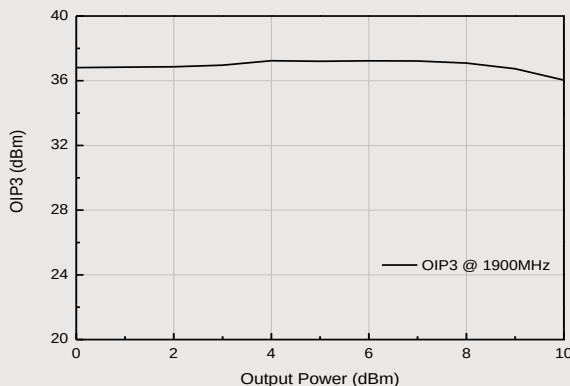
Output Power / Gain vs Input Power @ 1900MHz



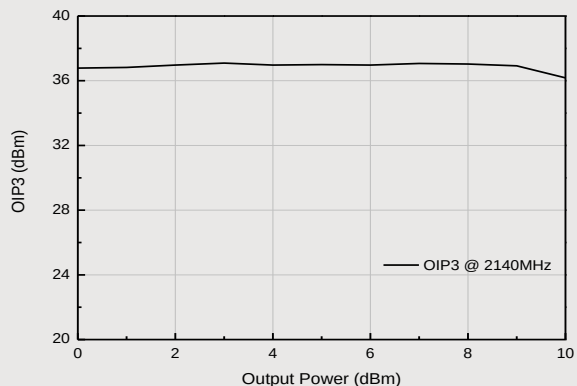
Output Power / Gain vs Input Power @ 2140MHz



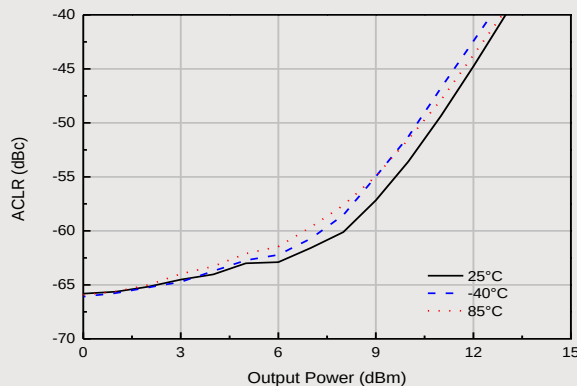
Output IP3 / Tone Power @ 1900MHz



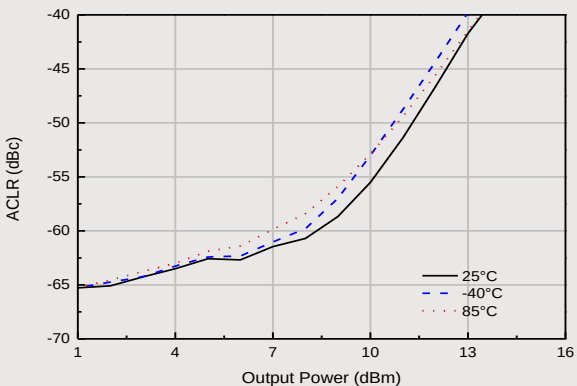
Output IP3 / Tone Power @ 2140MHz



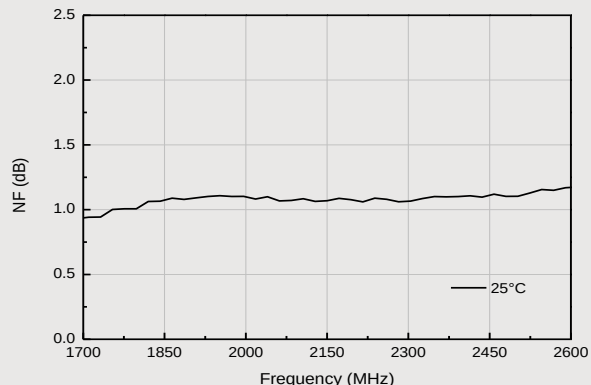
LTE ACLR vs. Output Power @ 1900MHz
DL20M_E31.WFM 1FA, 20MHz offset



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

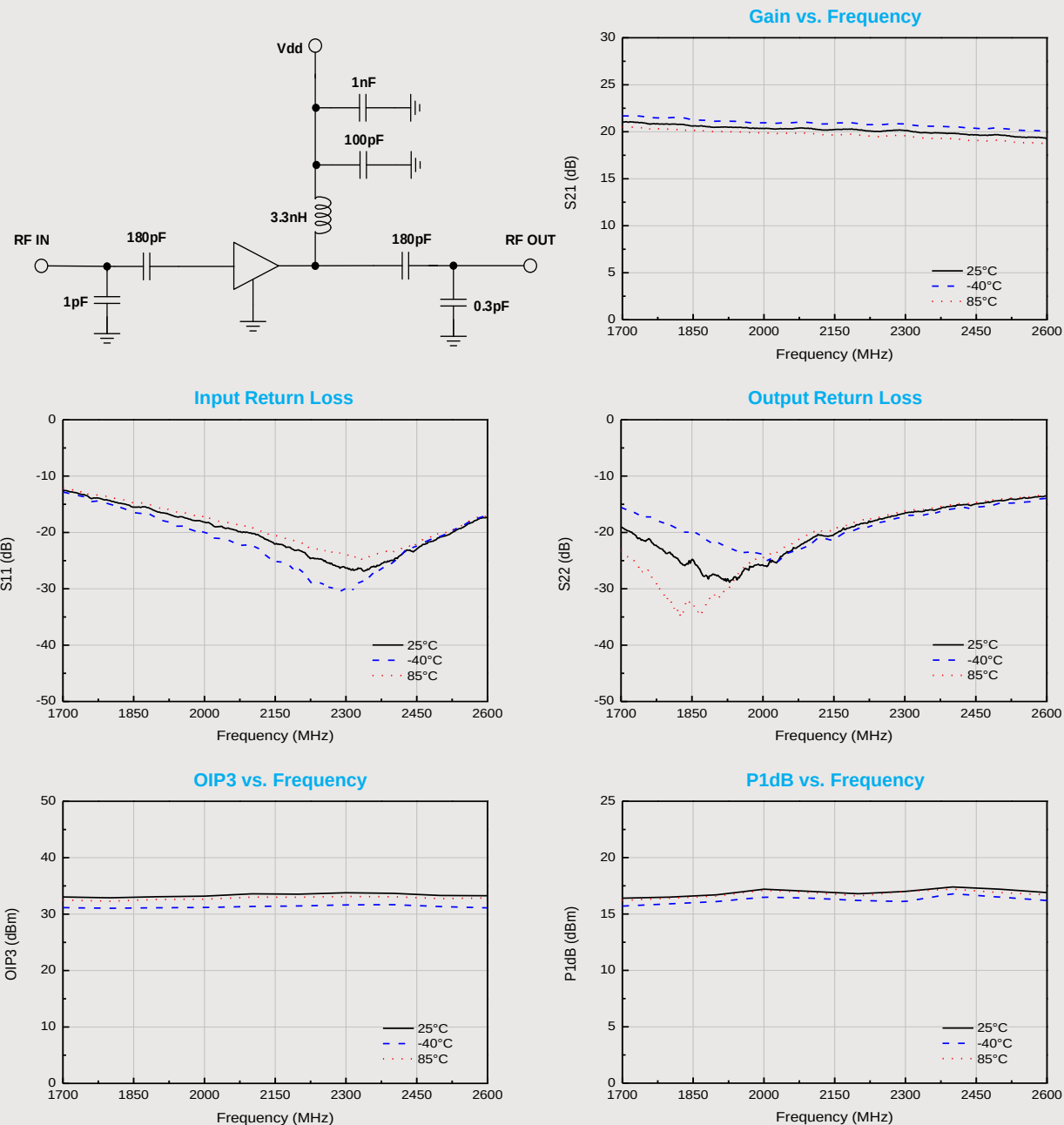


NF vs. Frequency

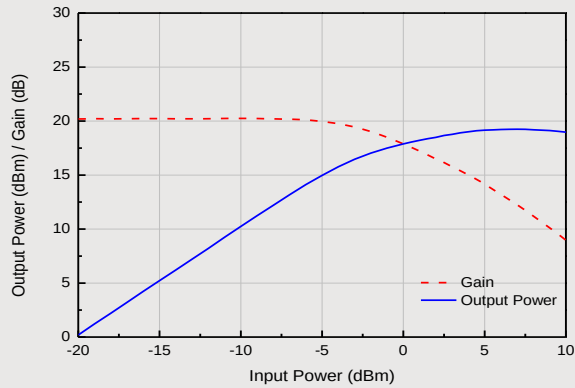


Typical RF Performance for 2300MHz Tuned Application Circuit
Supply Bias Voltage = 3.3V, Current= 59mA

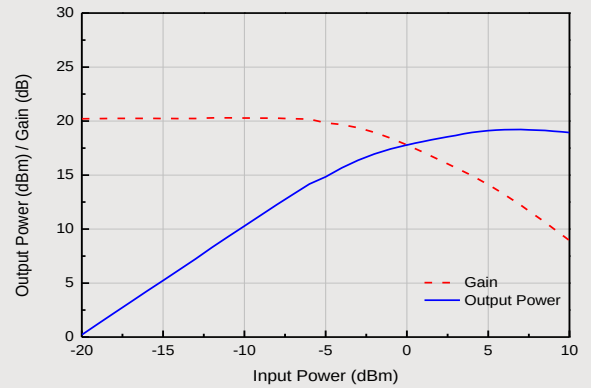
Parameters	Units	Frequency (MHz)			
		1700	2100	2300	2600
S21	dB	21.0	20.4	20.1	19.3
S11	dB	-12.5	-20.2	-26.4	-17.3
S22	dB	-18.9	-21.2	-16.6	-13.5
P1dB	dBm	16.4	17.0	17.0	16.9
OIP3 @ 5dBm	dBm	33.0	33.6	33.8	33.3
NF	dB	0.9	1.0	1.0	1.1



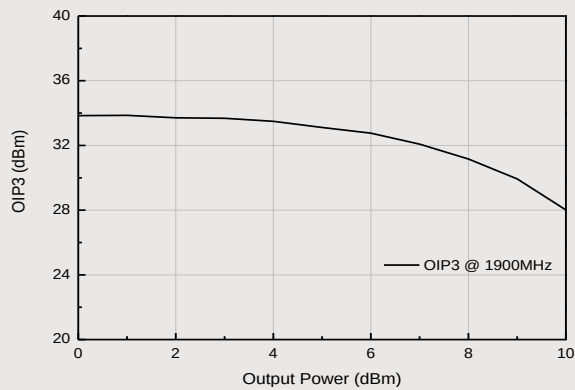
Output Power / Gain vs Input Power @ 1900MHz



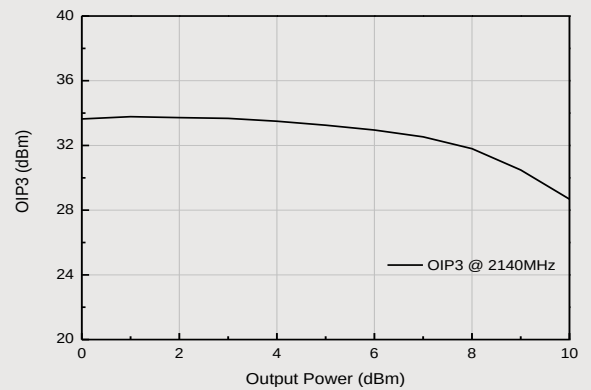
Output Power / Gain vs Input Power @ 2140MHz



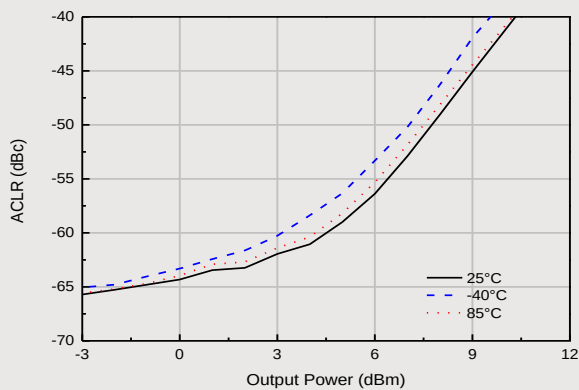
Output IP3 / Tone Power @ 1900MHz



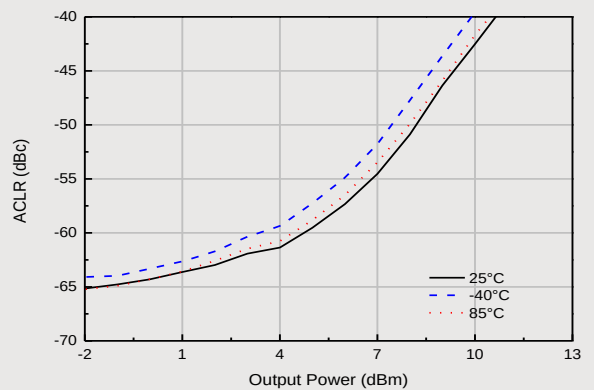
Output IP3 / Tone Power @ 2140MHz



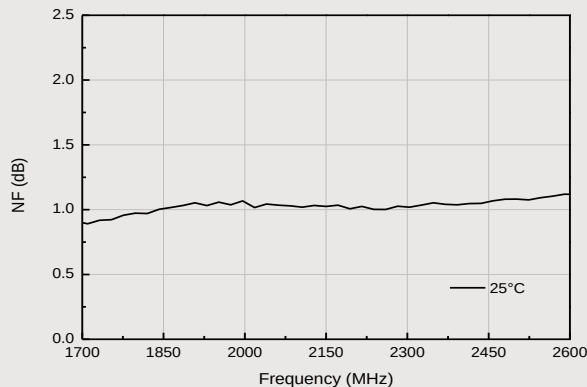
LTE ACLR vs. Output Power @ 1900MHz
DL20M_E31.WFM 1FA, 20MHz offset



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

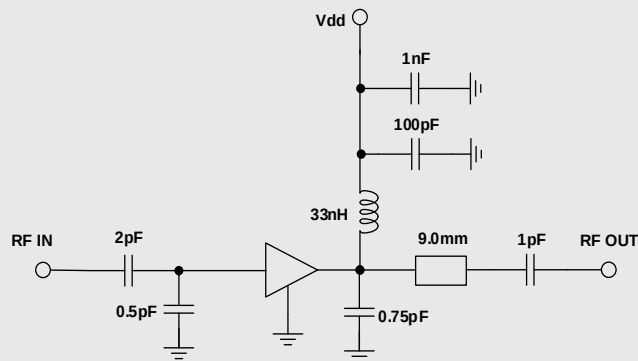


NF vs. Frequency

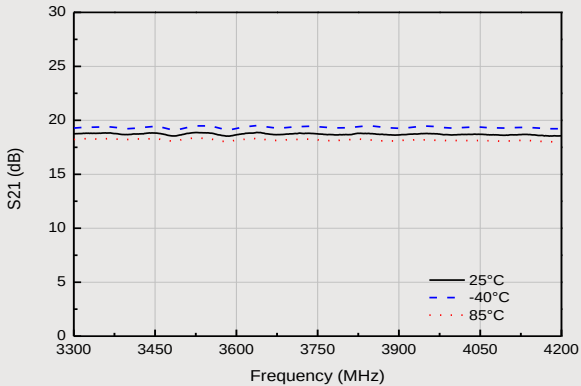


Typical RF Performance for 3500MHz Tuned Application Circuit
Supply Bias Voltage = 5V, Current= 91mA

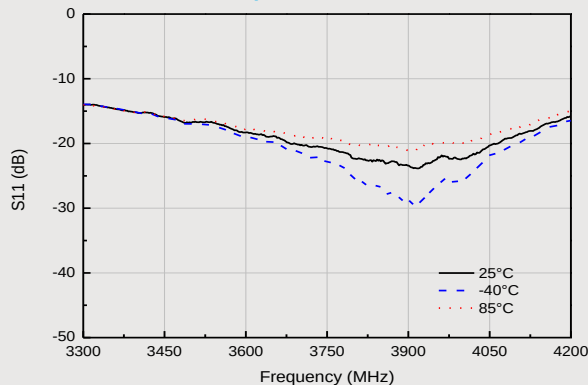
Parameters	Units	Frequency (MHz)			
		3300	3500	3800	4200
S21	dB	18.7	18.7	18.7	18.6
S11	dB	-14.0	-16.7	-22.4	-15.7
S22	dB	-11.4	-14.7	-19.7	-22.5
P1dB	dBm	19.1	19.5	19.2	17.4
OIP3 @ 5dBm	dBm	36.7	37.1	36.7	36.7
NF	dB	1.1	1.2	1.2	1.5



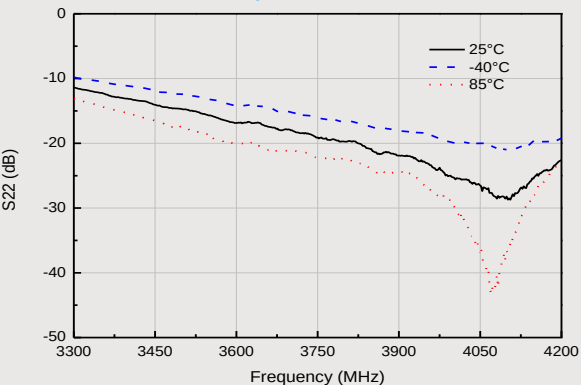
Gain vs. Frequency



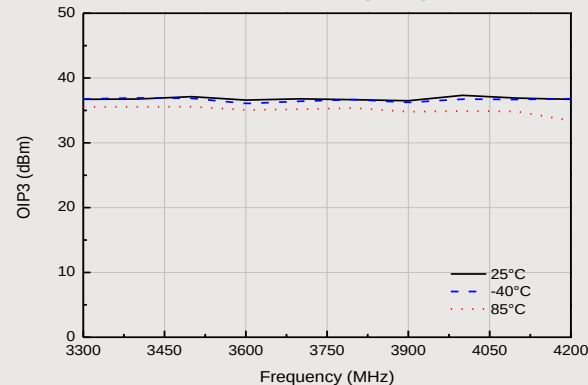
Input Return Loss



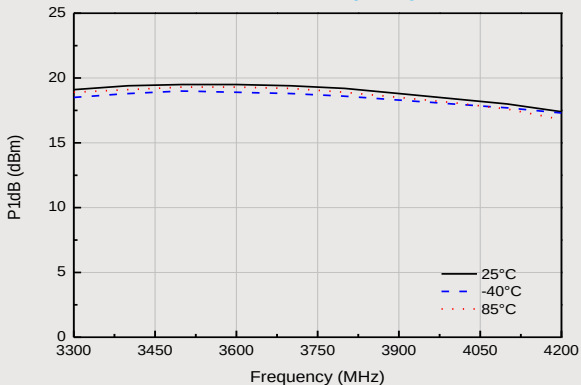
Output Return Loss



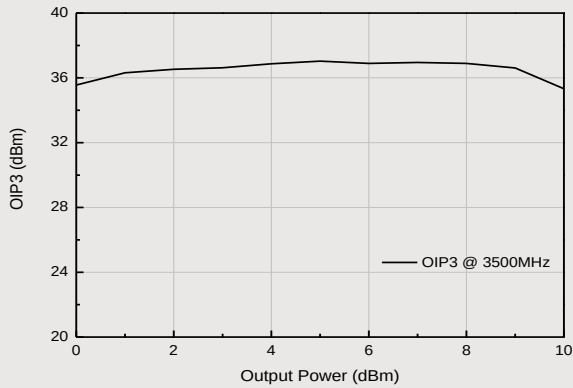
OIP3 vs. Frequency



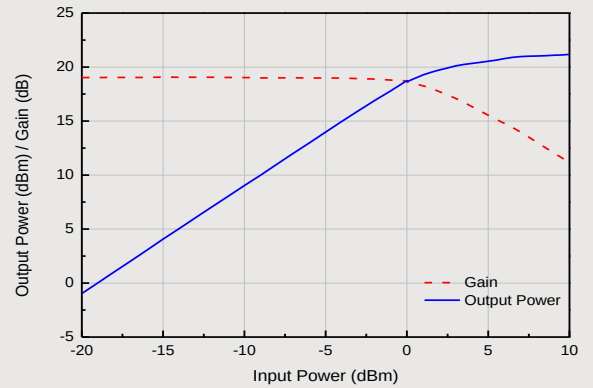
P1dB vs. Frequency



Output IP3 / Tone Power @ 3500MHz

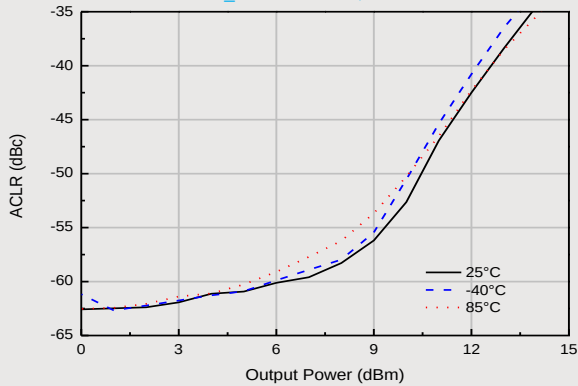


Output Power / Gain vs Input Power @ 3500MHz



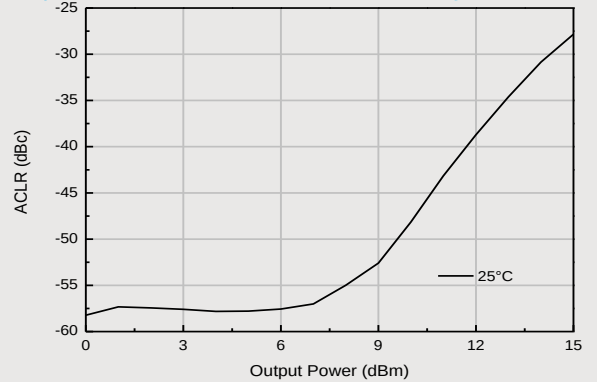
LTE ACLR vs. Output Power @ 3500MHz

DL20M_E31.WFM 1FA, 20MHz offset



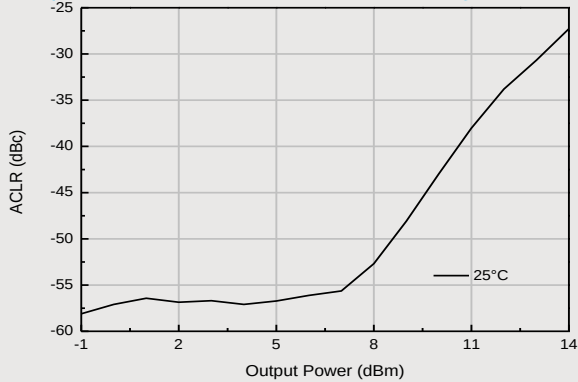
5G NR ACLR vs. Channel Power @ 3.55GHz

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

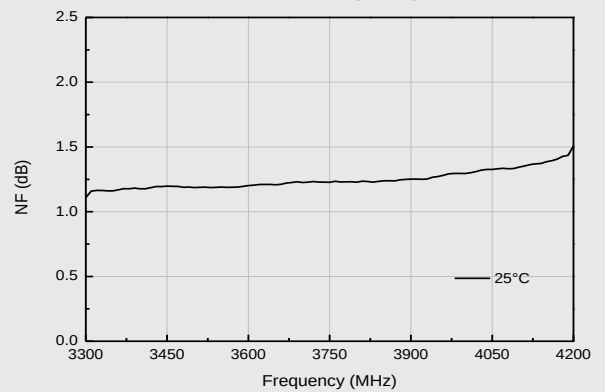


5G NR ACLR vs. Channel Power @ 3.75GHz

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

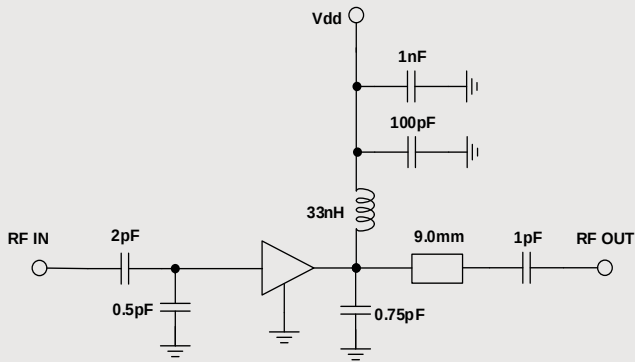


NF vs. Frequency

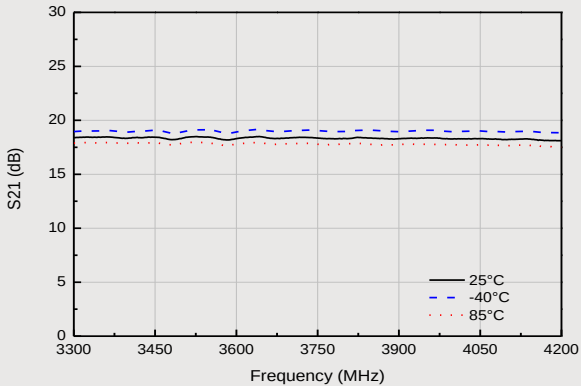


Typical RF Performance for 3500MHz Tuned Application Circuit
Supply Bias Voltage = 3.3V, Current= 59mA

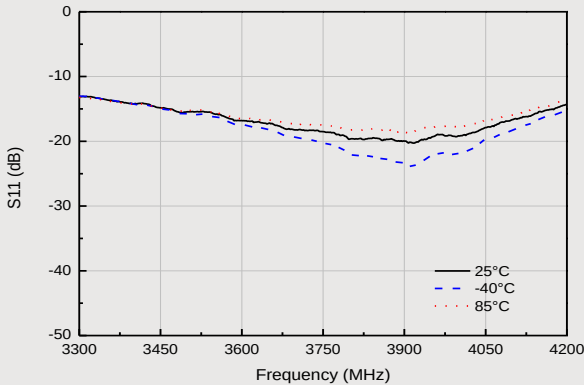
Parameters	Units	Frequency (MHz)			
		3300	3500	3800	4200
S21	dB	18.4	18.3	18.3	18.1
S11	dB	-13.1	-15.4	-19.7	-14.3
S22	dB	-12.5	-16.6	-23.8	-19.5
P1dB	dBm	16.3	16.8	16.5	14.8
OIP3 @ 5dBm	dBm	32.8	33.1	31.9	28.3
NF	dB	1.1	1.1	1.2	1.3



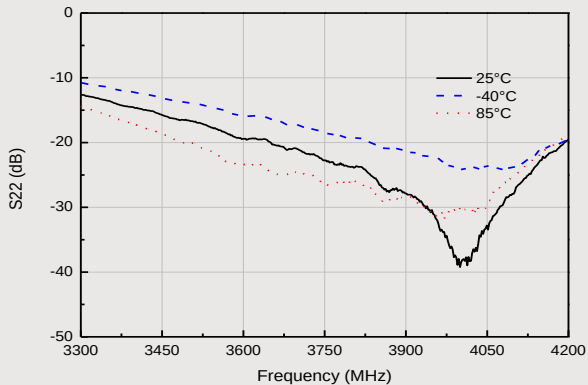
Gain vs. Frequency



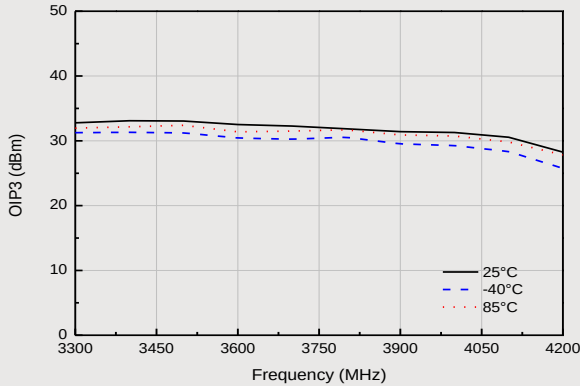
Input Return Loss



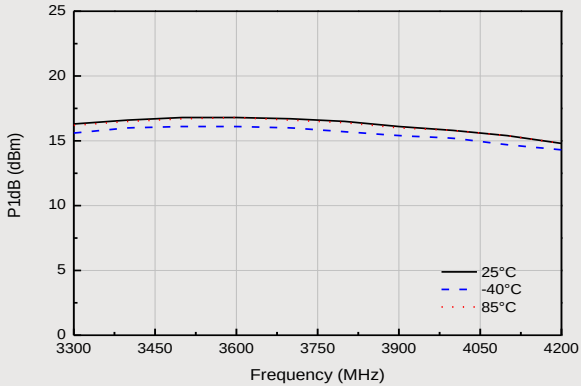
Output Return Loss



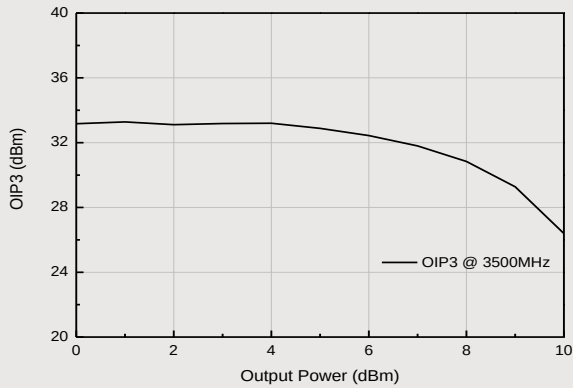
OIP3 vs. Frequency



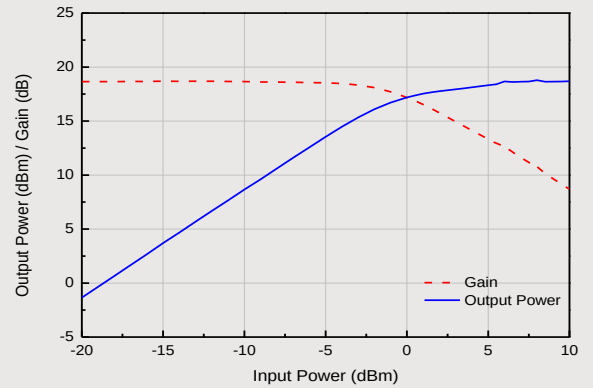
P1dB vs. Frequency



Output IP3 / Tone Power @ 3500MHz

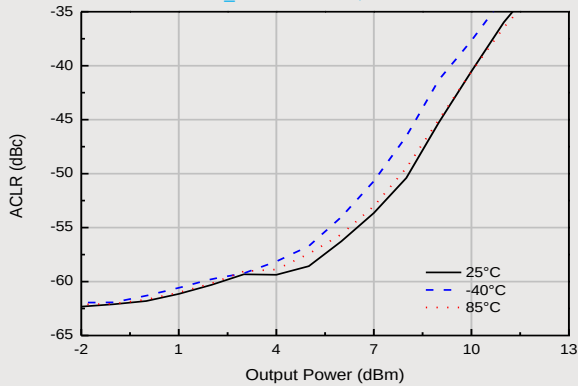


Output Power / Gain vs Input Power @ 3500MHz



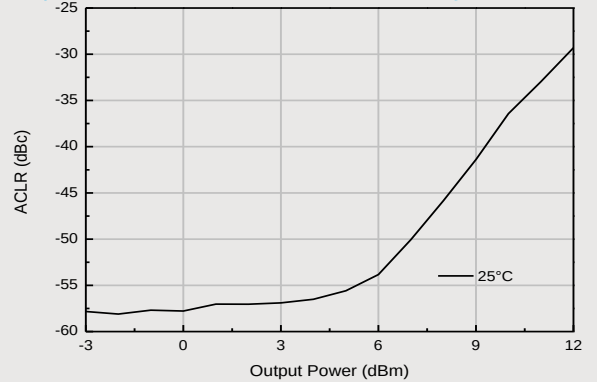
LTE ACLR vs. Output Power @ 3500MHz

DL20M_E31.WFM 1FA, 20MHz offset



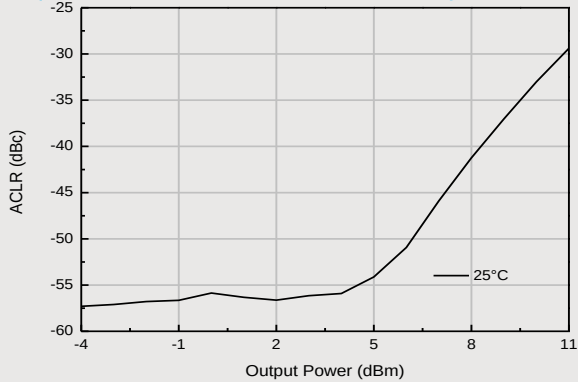
5G NR ACLR vs. Channel Power @ 3.55GHz

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

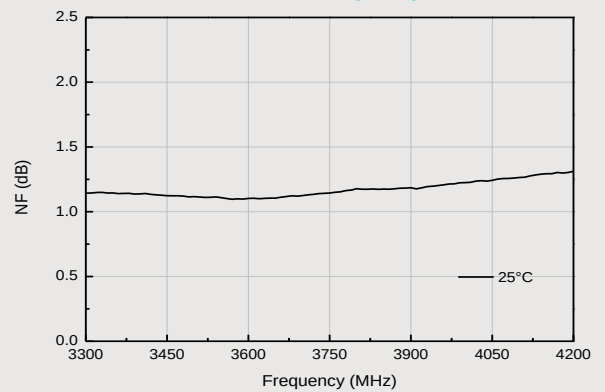


5G NR ACLR vs. Channel Power @ 3.75GHz

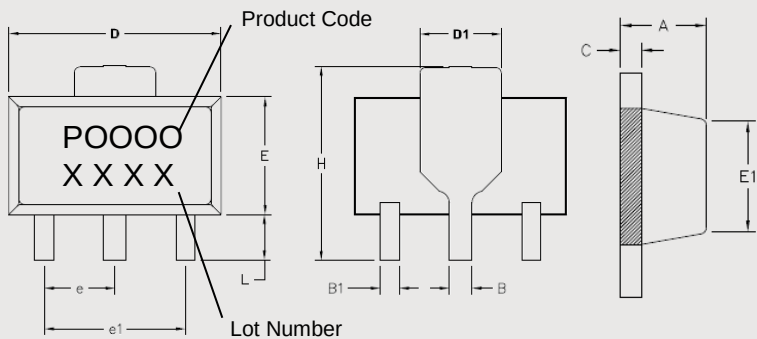
(5G NR Downlink FR1, SCS 30KHz, CBW 100MHz, 256QAM, 100MHz offset)



NF vs. Frequency

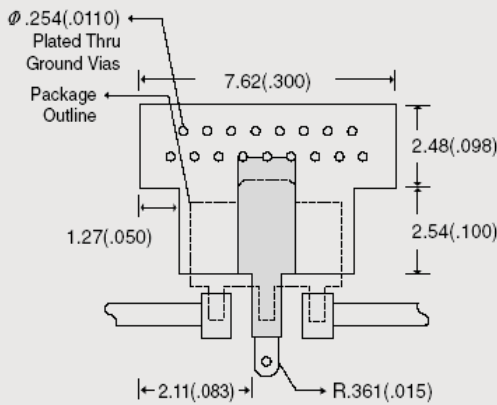


Lead-free /RoHS Compliant / Green SOT-89 Package Outline

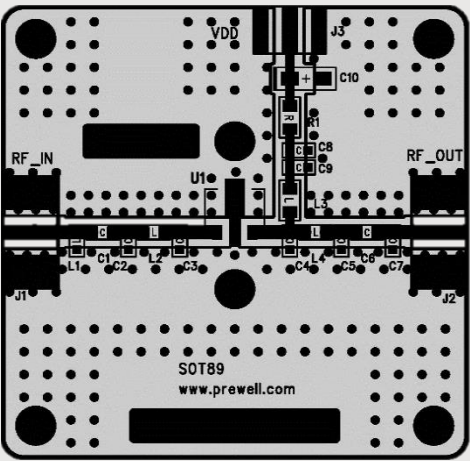


REF.	DIMENSIONS (mm)	
	Min.	Max.
A	1.40	1.60
B	0.43	0.58
B1	0.36	0.54
C	0.35	0.46
D	4.30	4.70
D1	1.50	1.87
E	2.29	2.70
E1	2.13	2.18
e	1.5	
e1	3.0	
H	3.43	5.10
L	0.74	1.20

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.