SJM PREWELL

PW450

Wideband Gain Block

Features

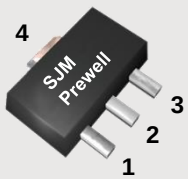
- 5 to 3000MHz
- Gain 18.7dB @ 75MHz
- P1dB 18.7dBm @ 75MHz
- OIP3 36.6dBm @ 75MHz
- Lead-free / Green / RoHS compliant SOT-89 Package

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 PW450 is a high performance InGaP HBT MMIC Amplifier and consists of Darlington pair amplifiers. The features of PW450 are high linear performance, wideband operation and high reliability. The PW450 operates from a single voltage supply and requires only two DC-blocking capacitors, a bias resistor and an inductor for operation. 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)					
		75	900	1900	2300	2600	3600
S21	dB	18.7	18.2	17.2	16.7	15.8	15.7
S11	dB	-19	-17	-20	-23	-20	-23
S22	dB	-14	-17	-12	-11	-10	-12
P1dB	dBm	18.7	18.7	18.1	17.9	17.2	14.6
OIP3	dBm	36.6	34.8	31.6	30.7	30.0	26.7
NF	dB	3.2	3.7	3.9	3.9	4.1	4.4
V / I	V/mA	4.94 / 69					
Rth	°C/W	57					

1) Test Conditions : T=25°C, Supply Voltage=5V, Rbias=0.5ohm, 50ohm System
2) OIP3 measured with two tones at an output power of 3dBm/tone separated by 1MHz.

Absolute Maximum Ratings

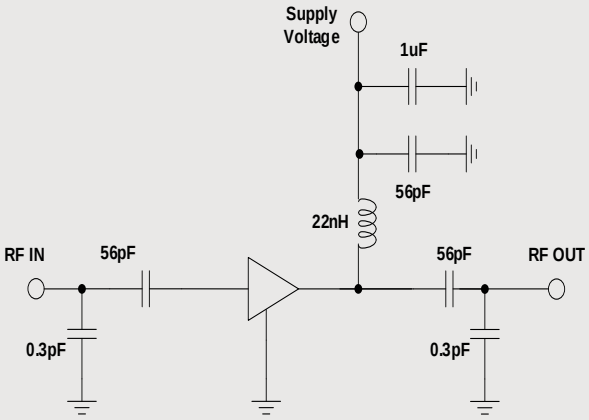
Parameter	Rating	Unit
Supply Voltage	10	V
Supply Current	220	mA
RF Power Input	10	dBm
Storage Temperature	-55 to 150	°C
Ambient Operating Temperature	-40 to 85	°C
Junction Temperature	187	°C

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 = 6V, R(bias)= 15 ohm, Current= 69mA

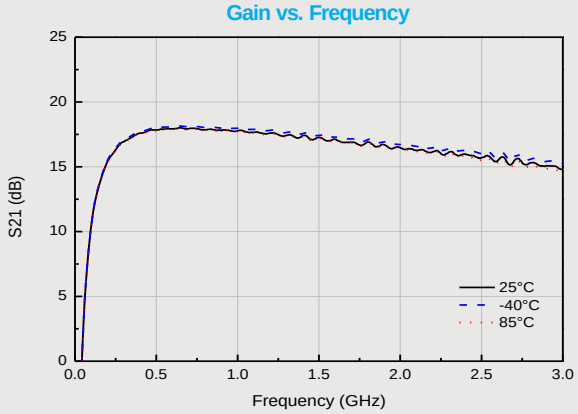
Parameters	Units	Frequency (MHz)						
		500	900	1500	1900	2300	2600	3000
S21	dB	18.2	18.2	17.5	17.2	16.7	15.8	14.8
S11	dB	-12	-17	-19	-20	-23	-20	-13
S22	dB	-12	-17	-13	-12	-11	-10	-10
P1dB	dBm	18.5	18.7	18.5	18.1	17.9	17.2	15.8
OIP3 @ 3dBm	dBm	35.5	34.8	33.3	31.6	30.7	30.0	28.1
NF	dB	3.7	3.7	3.8	3.9	3.9	4.1	4.1



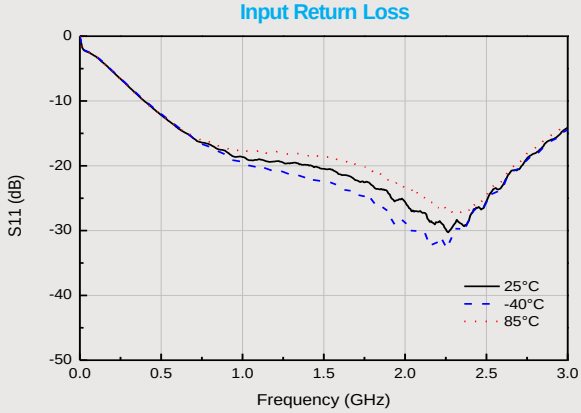
Recommended Bias Values

Supply Voltage (V)	R bias Value (ohm)	Size
5	0.5	0805
5.3	5.1	0805
6	15	0805
7	30	1210
8	45	1210
9	58	2010
10	73	2010
12	100	2512

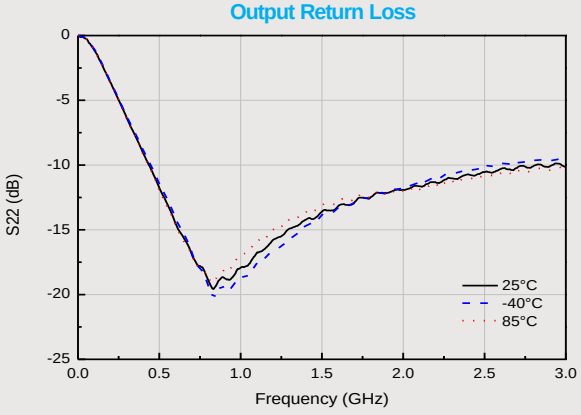
Gain vs. Frequency



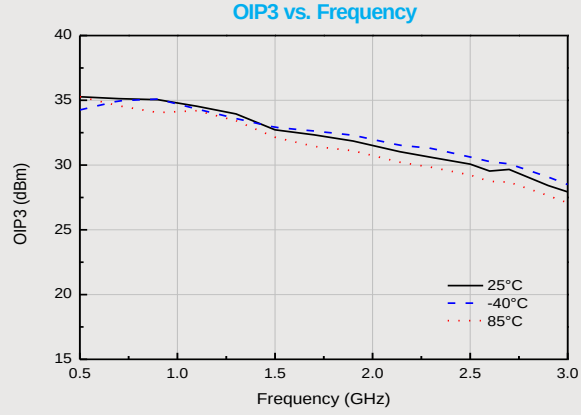
Input Return Loss



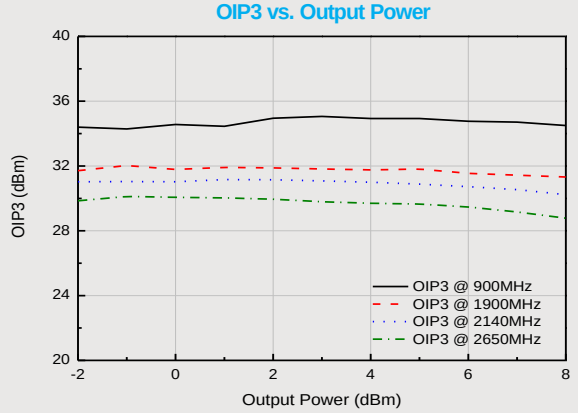
Output Return Loss



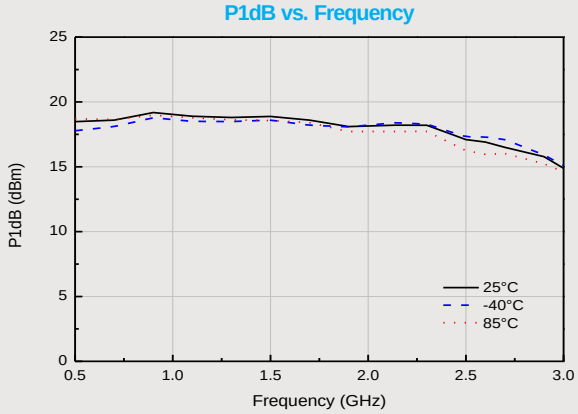
OIP3 vs. Frequency



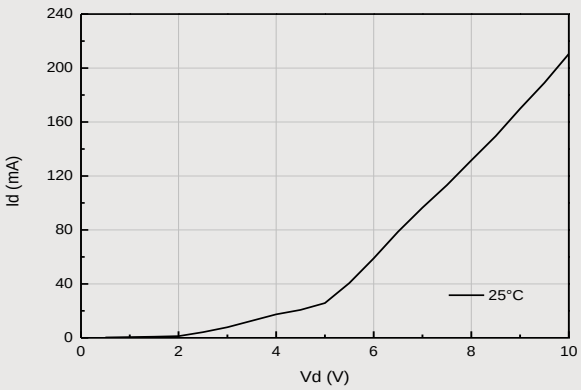
OIP3 vs. Output Power



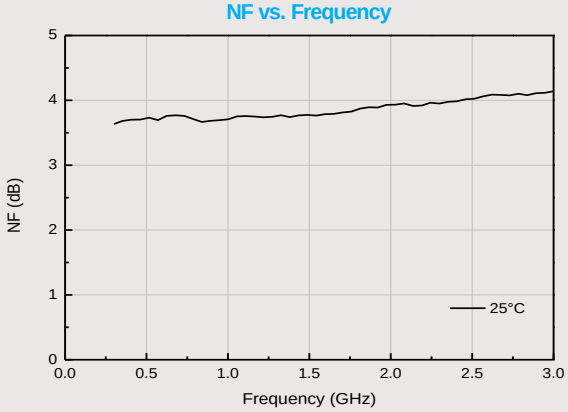
P1dB vs. Frequency



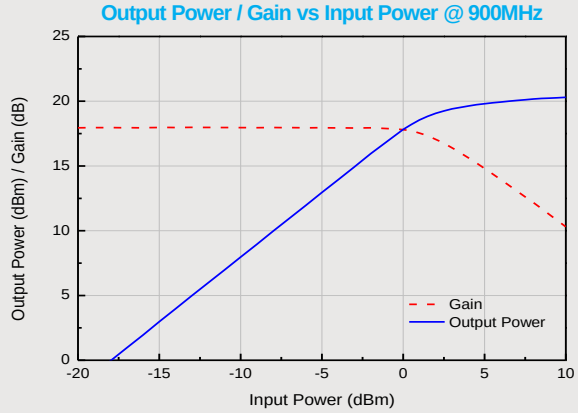
Id vs. Vd



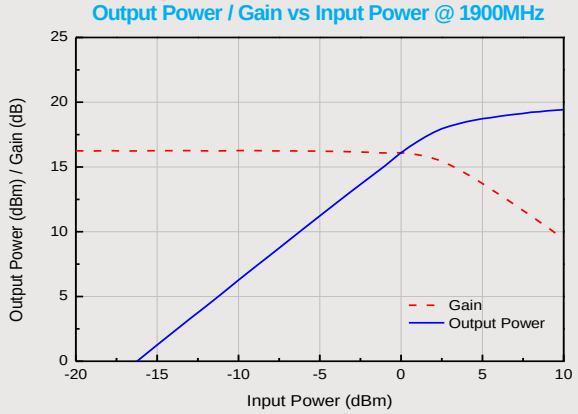
NF vs. Frequency



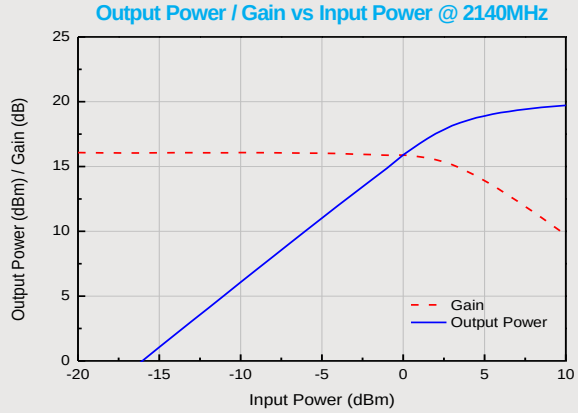
Output Power / Gain vs Input Power @ 900MHz



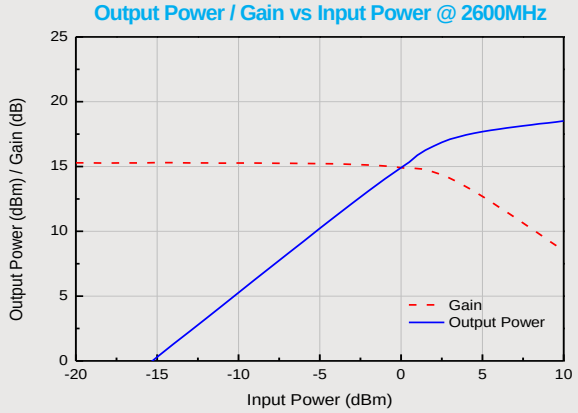
Output Power / Gain vs Input Power @ 1900MHz



Output Power / Gain vs Input Power @ 2140MHz

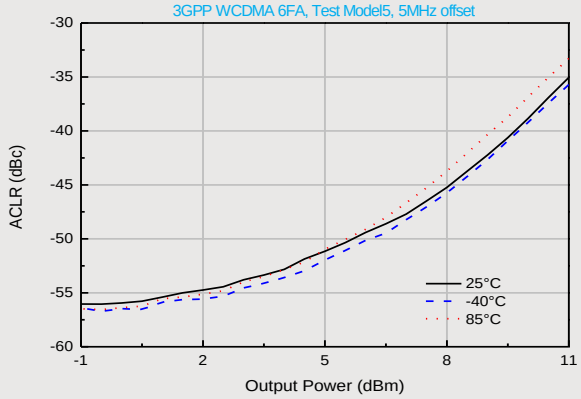


Output Power / Gain vs Input Power @ 2600MHz



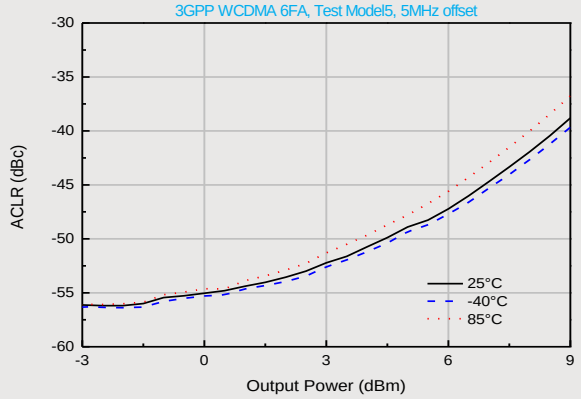
WCDMA ACLR vs. Output Power @ 1850MHz

3GPP WCDMA 6FA, Test Model5, 5MHz offset



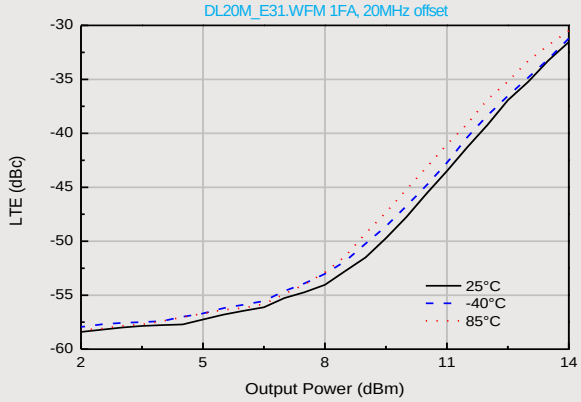
WCDMA ACLR vs. Output Power @ 2140MHz

3GPP WCDMA 6FA, Test Model5, 5MHz offset



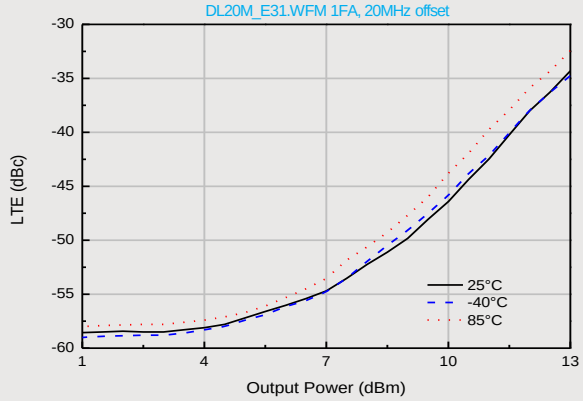
LTE ACLR vs. Output Power @ 900MHz

DL20M_E31.WFM 1FA, 20MHz offset



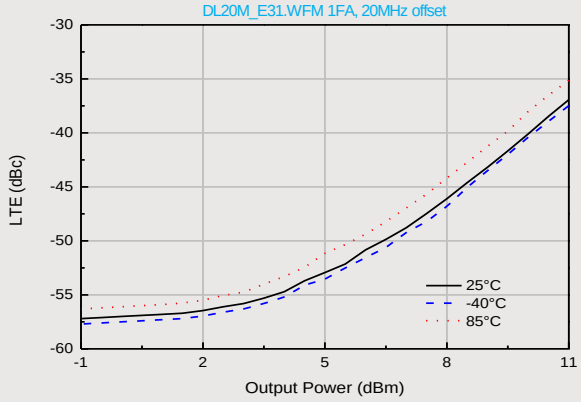
LTE ACLR vs. Output Power @ 1850MHz

DL20M_E31.WFM 1FA, 20MHz offset



LTE ACLR vs. Output Power @ 2650MHz

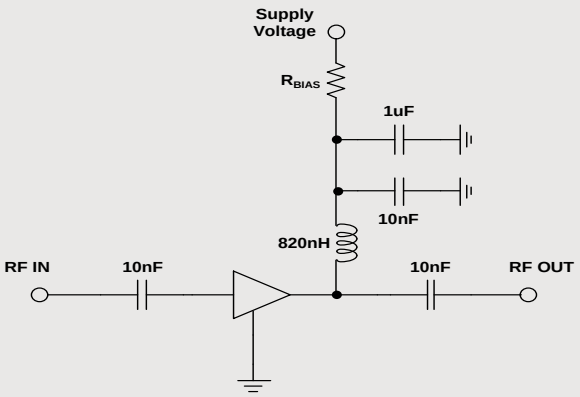
DL20M_E31.WFM 1FA, 20MHz offset

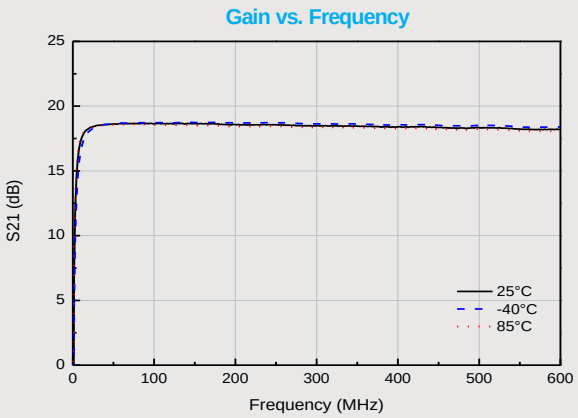


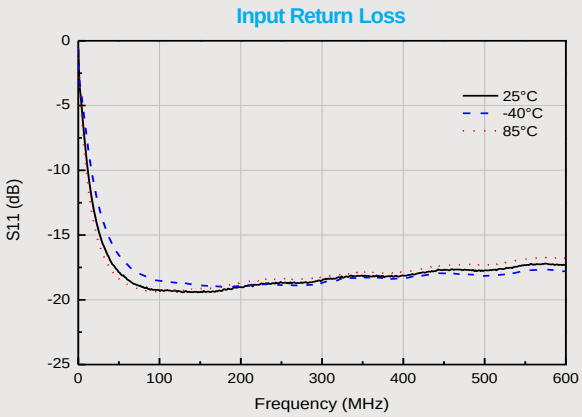
Typical RF Performance for 50 -500MHz Tuned Application Circuit

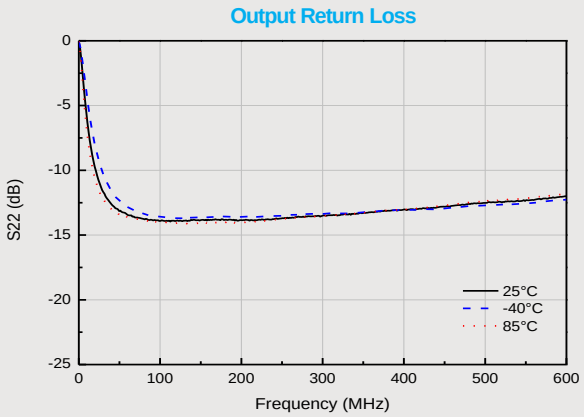
Supply Bias Voltage = 6V, R(bias)= 15 ohm, Current= 69mA

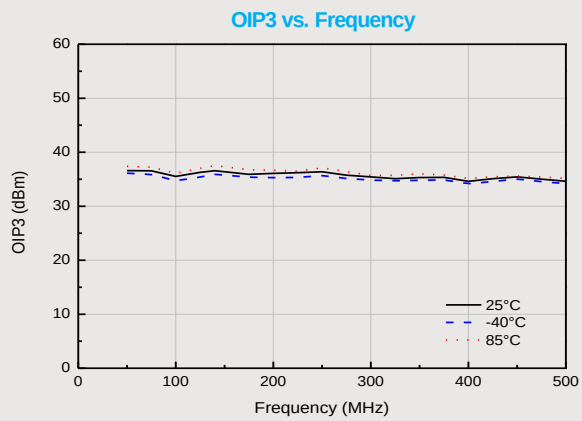
Parameters	Units	Frequency (MHz)			
		75	125	300	500
S21	dB	18.7	18.6	18.5	18.7
S11	dB	-19	-19	-18	-18
S22	dB	-14	-14	-13	-13
P1dB	dBm	18.7	18.8	18.9	18.6
OIP3 @ 3dBm	dBm	36.6	36.3	35.4	35.2
NF	dB	3.2	3.3	3.4	3.5

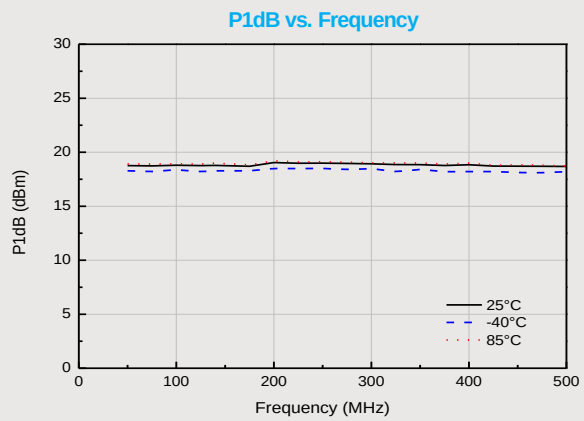




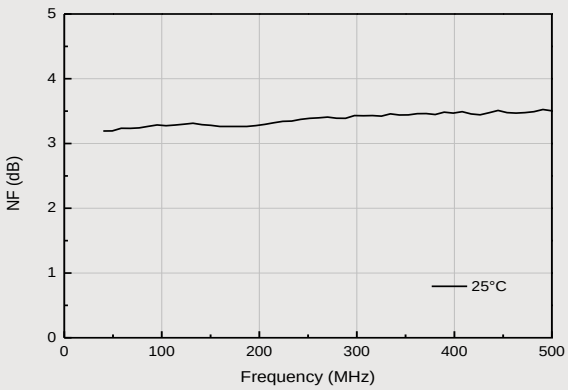








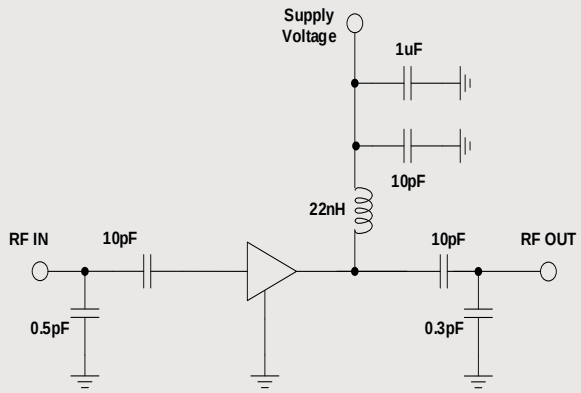
NF vs. Frequency

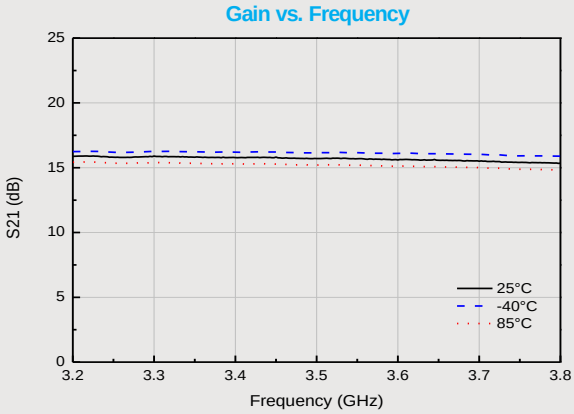


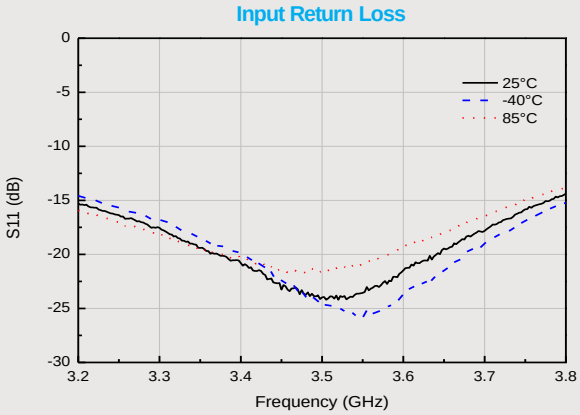
Typical RF Performance for 3.5GHz Tuned Application Circuit

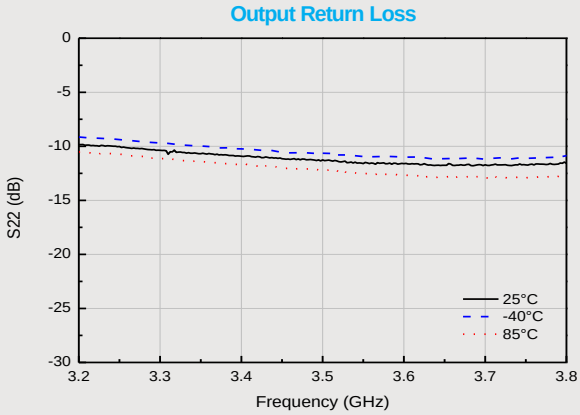
Supply Bias Voltage = 6V, R(bias)= 15 ohm, Current= 69mA

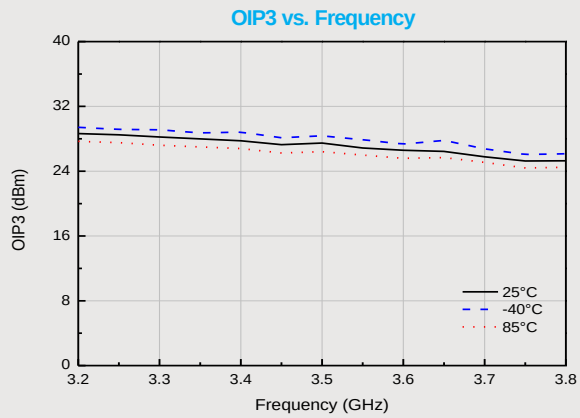
Parameters	Units	Frequency (MHz)			
		3200	3400	3600	3800
S21	dB	16.0	15.9	15.7	15.3
S11	dB	-15	-20	-23	-15
S22	dB	-11	-11	-12	-12
P1dB	dBm	15.9	15.3	14.6	14.0
OIP3 @ 3dBm	dBm	29.1	28.0	26.7	26.5
NF	dB	4.3	4.1	4.4	4.5

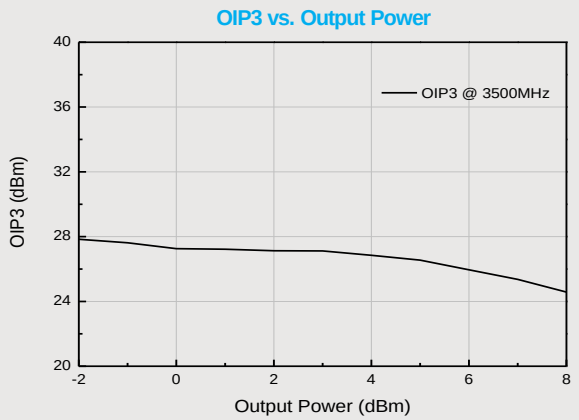




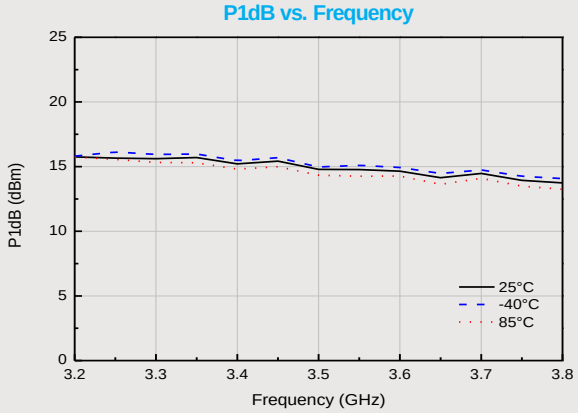




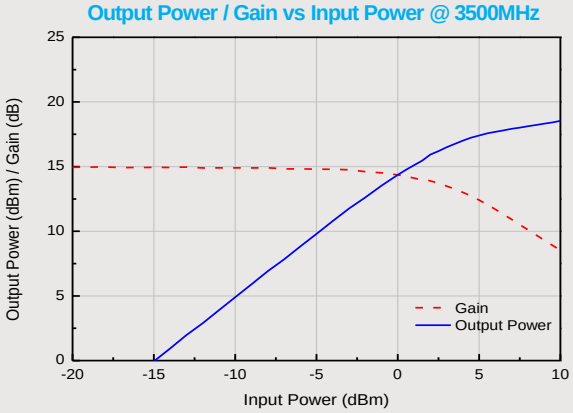




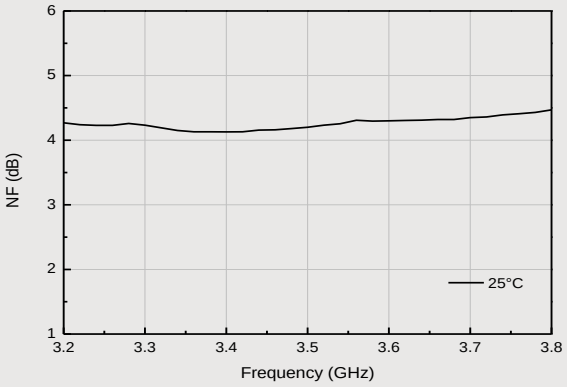
P1dB vs. Frequency



Output Power / Gain vs Input Power @ 3500MHz

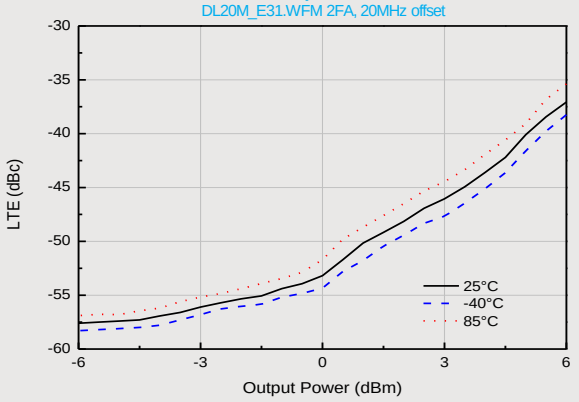


NF vs. Frequency

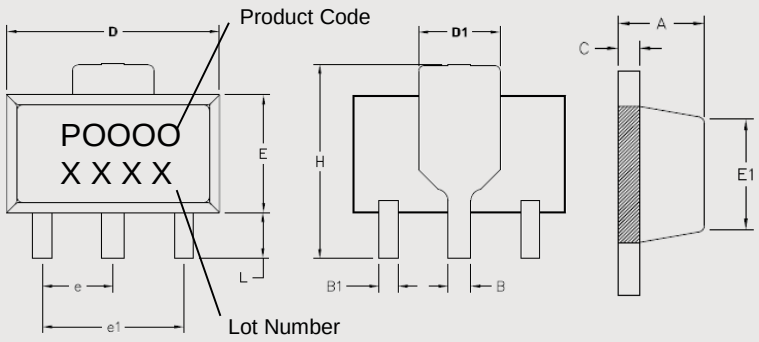


LTE ACLR vs. Output Power @ 3500MHz

DL20M_E31.WFM 2FA, 20MHz offset

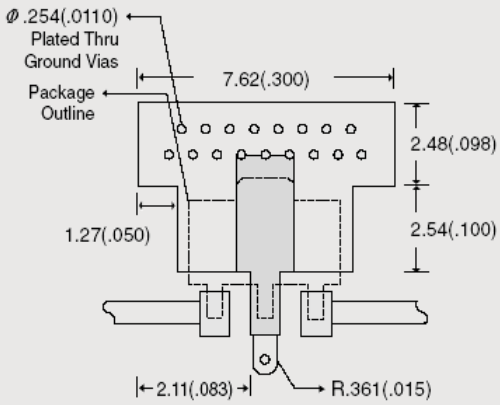


Lead-free /RoHS Compliant / Green SOT-89 Package Outline

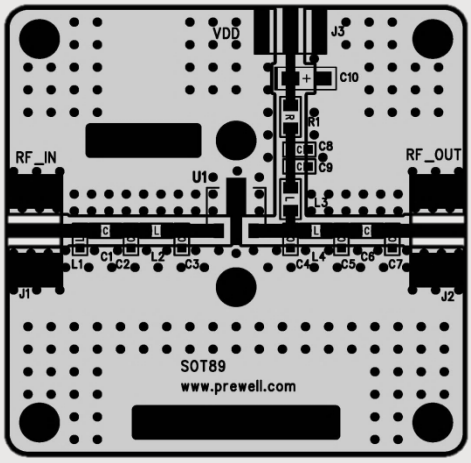


REF.	DIMENSIONS (mm)	
	Min.	Max.
A	1.40	1.60
B	0.43	0.58
B1	0.36	0.54
C	0.35	0.46
D	4.30	4.70
D1	1.50	1.87
E	2.29	2.70
E1	2.13	2.18
e	1.5	
e1	3.0	
H	3.43	5.10
L	0.74	1.20

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.