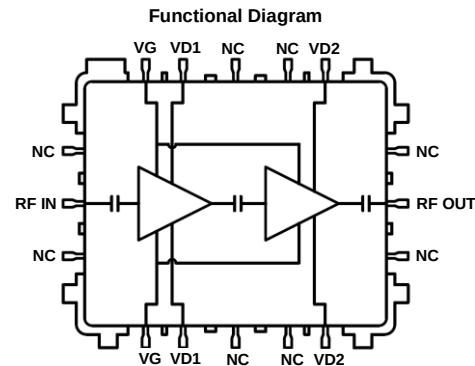


2.8 – 3.5 GHz GaN 100 Watt Power Amplifier MMIC

Features

- ◆ Frequency Range : 2.8 – 3.5 GHz
- ◆ Small Signal Gain : 27 dB
- ◆ Power Gain : 20 dB
- ◆ Psat : 50 dBm (Pulsed)
- ◆ Efficiency : > 38 %
- ◆ Drain Voltage : 50 V (Pulsed)
- ◆ Drain Bias Current : 170 mA (average @ 10 % DC)
- ◆ Package Size : 11.71 mm x 9.76 mm



Typical Applications

- ◆ Weather Radar
- ◆ Air Traffic Control
- ◆ Defense Radar

The Aelius ASL4061C is a packaged MMIC based two-stage 100 W Power Amplifier with operating frequency range of 2.8 to 3.5 GHz. Input and output of the amplifier are matched to the 50 Ohm line impedance. The saturated output power of 50 dBm is achieved in pulsed operating condition with power gain of 20 dB and power added efficiency greater than 38%. The MMIC power amplifier is developed using highly reliable AlGaIn/GaN HEMT process.

Absolute Maximum Ratings¹

Parameter	Absolute Maximum	Units
Drain supply voltage	60	volts
Gate bias voltage (Vgs)	-4 to -2.2	V
RF input power at Vd = 50 V	36	dBm
Operating temperature	-50 to +85	°C
Storage temperature	-65 to +150	°C

1. Operation beyond these limits may cause permanent damage to the component.

Typical Electrical Specifications

 $T_A = 25\text{ }^{\circ}\text{C}$, $Z_0 = 50\text{ }\Omega$, $V_d = 50\text{ V}$ (Pulsed condition: $PW = 100\text{ }\mu\text{s}$, $DC = 10\%$)

S.N.	Parameter	Typical Value	Units
1	Frequency	2.8 – 3.5	GHz
2	Small Signal Gain	27	dB
3	Input Return Loss	10	dB
4	Output Return Loss	10	dB
5	Saturated Output Power	50	dBm
6	Power Gain	20	dB
7	PAE	38	%
8	Drain Voltage (V_d)	50	V
9	Quiescent Current (I_{dq} , avg.)	170	mA
10	Saturated Current (avg.)	500	mA
11	Package Size	11.71 x 9.76	mm x mm

Notes:

1. Adjust V_g between -3.0 V to -2.5 V to achieve required I_{dq} .
2. Results presented in this data sheet are measured data which are tested in fixture recommended in this document.

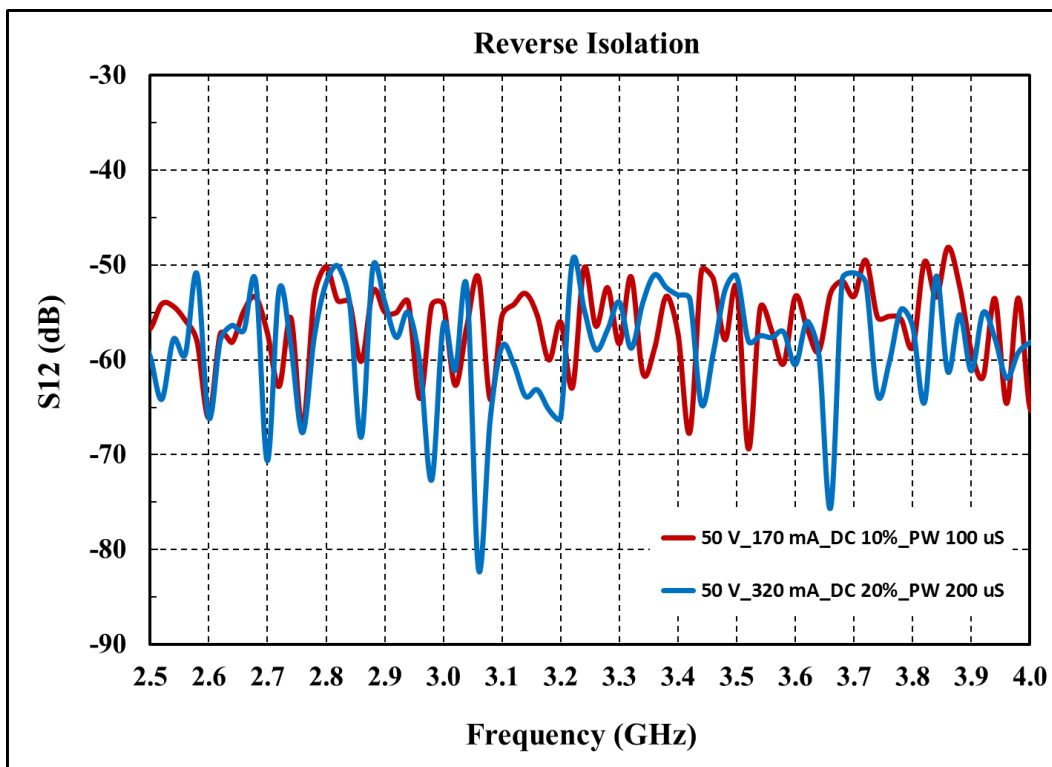
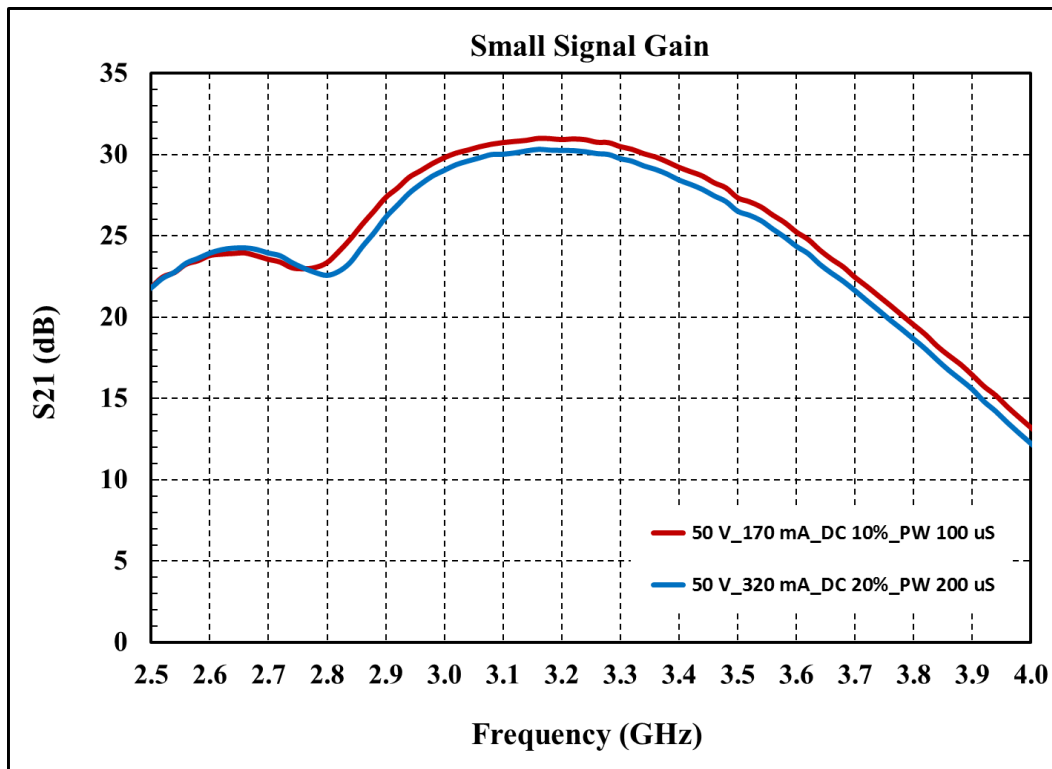
Thermal Characteristics

 $Z_0 = 50\text{ }\Omega$, $Freq = 3.3\text{ GHz}$, Different Case Temperatures and Duty Cycles

S.N.	Case Temperature T_c ($^{\circ}\text{C}$)	Duty Cycle (%)	Pulse Width (μs)	Drain Voltage V_d (V)	Drain Current I_d (mA)	Gate Voltage V_g (V)	Junction Temperature T_j ($^{\circ}\text{C}$)	Thermal Resistance Θ_{jc} ($^{\circ}\text{C}/\text{watt}$) Pulsed	Pin (dBm)	Pout (dBm) @3.3 GHz	Quiescent Current I_{dq} (mA)
1	50	10	100	50	560	-2.60	79	0.168	30.0	50.30	180
2	75	10	100	50	530	-2.62	104	0.176	30.0	50.00	180
3	75	10	200	50	520	-2.58	105	0.188	30.0	50.00	180
4	75	20	200	50	960	-2.60	133	0.388	30.0	49.56	310
5	75	30	300	50	1340	-2.58	166	0.632	30.0	49.00	430
6	80	10	100	50	520	-2.58	110	0.188	30.0	50.00	180
7	85	10	100	50	520	-2.58	115	0.185	30.0	49.90	180
8	85	20	200	50	940	-2.58	140	0.377	30.0	49.50	310

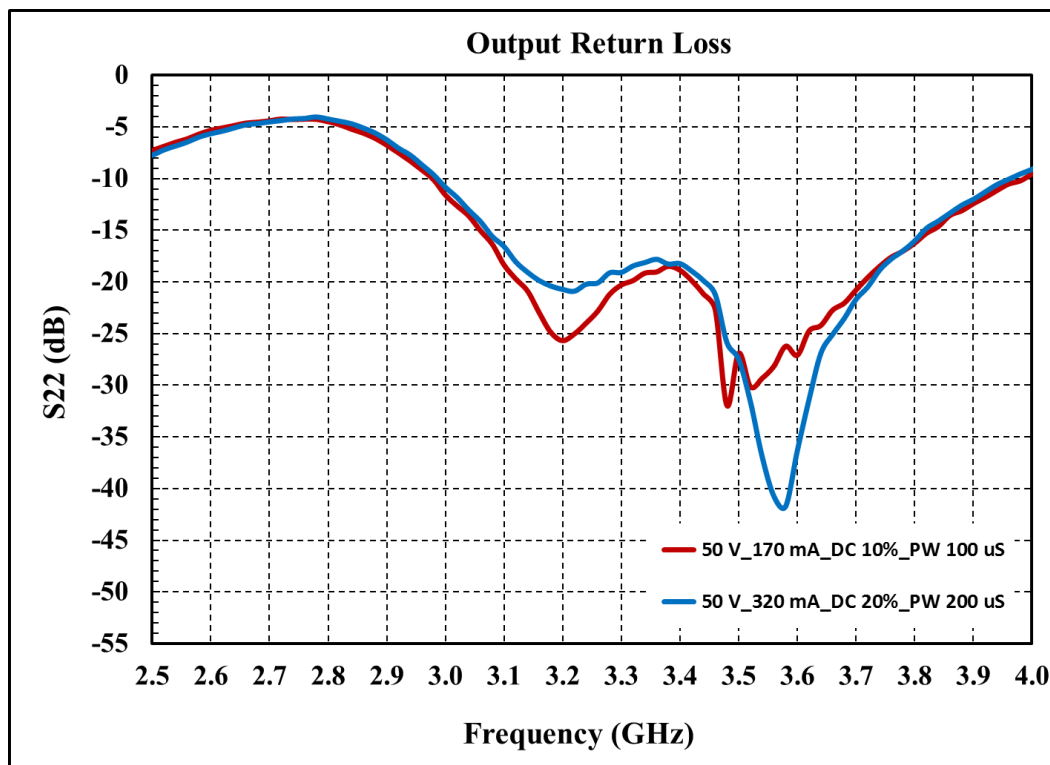
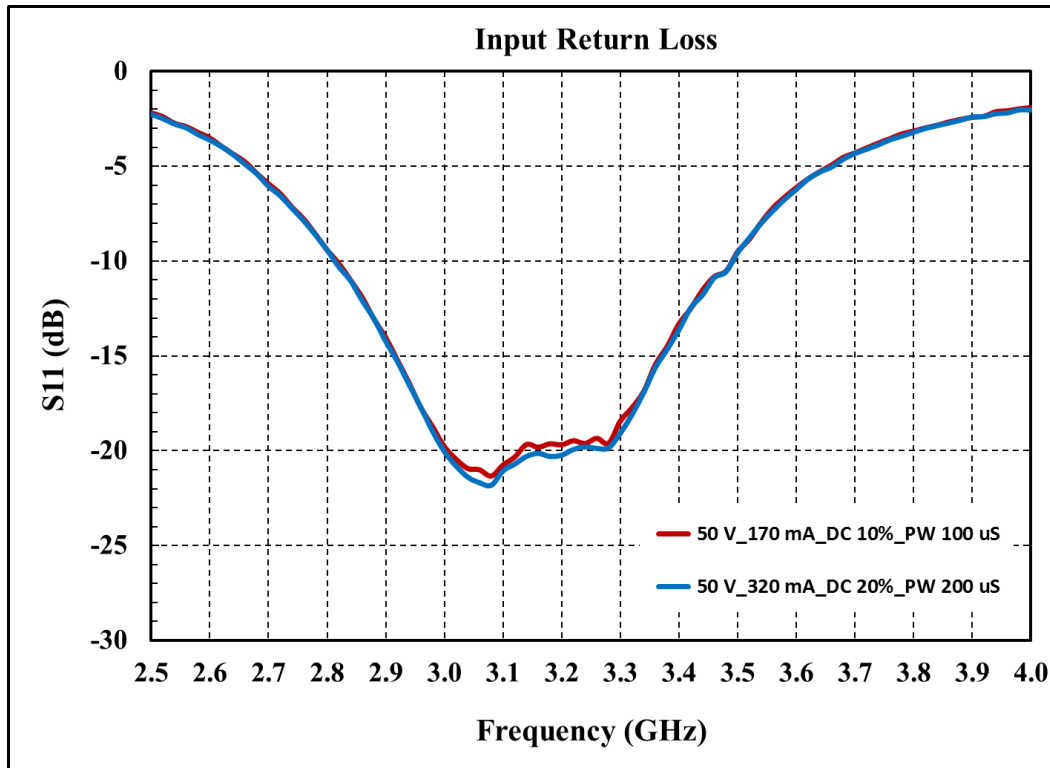
Small Signal S-Parameters

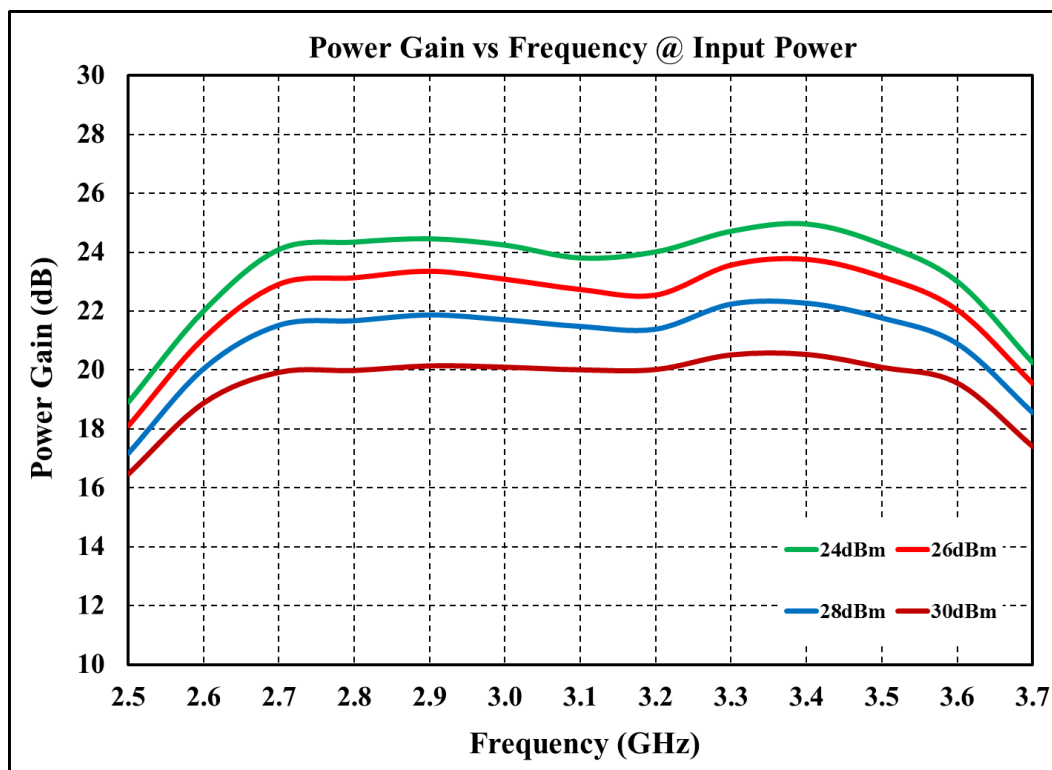
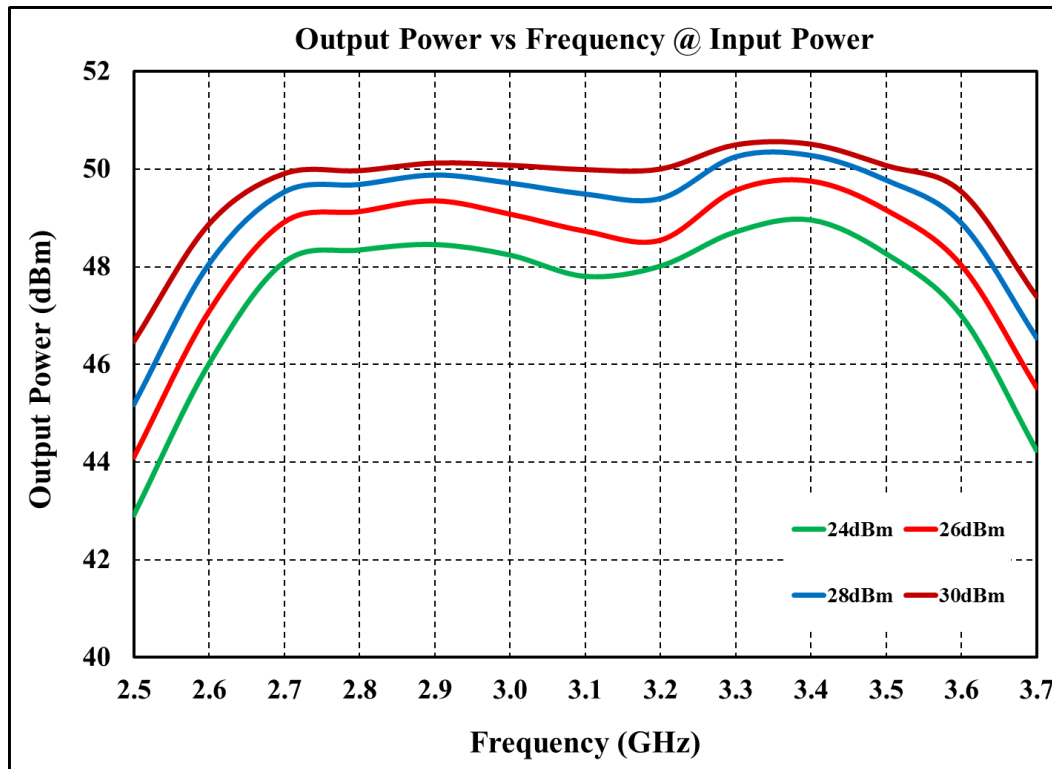
Test Ambient Temp. = 25 °C, $Z_o = 50 \Omega$, $V_d = 50 \text{ V}$ (Pulsed)

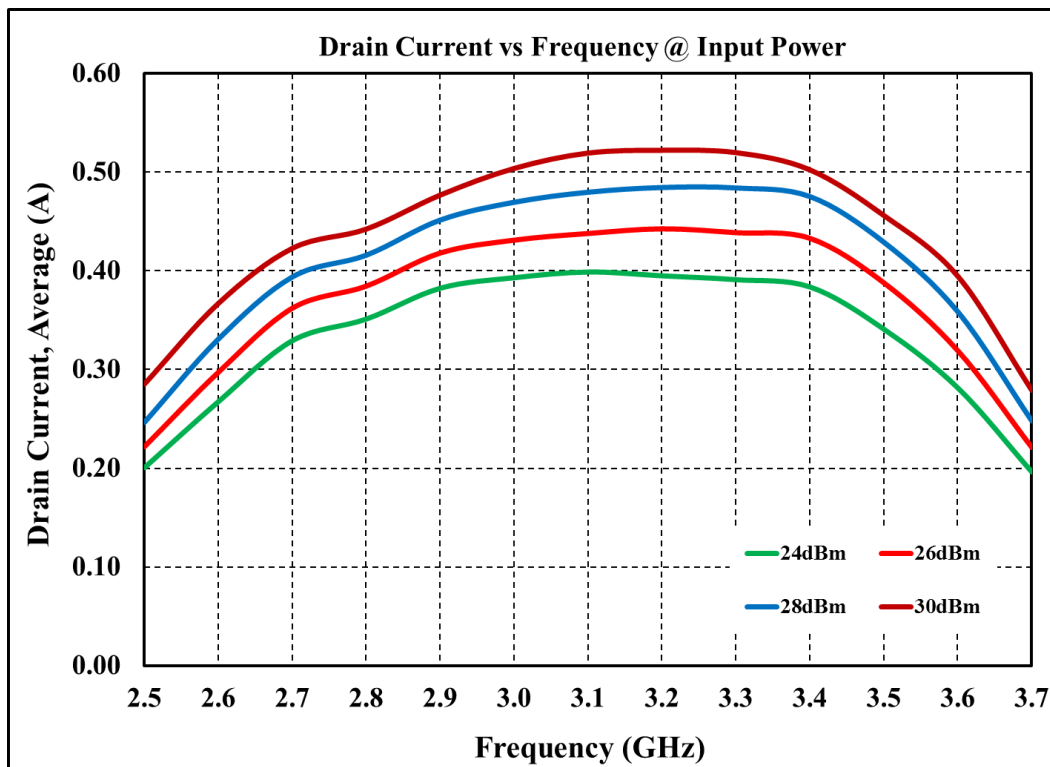
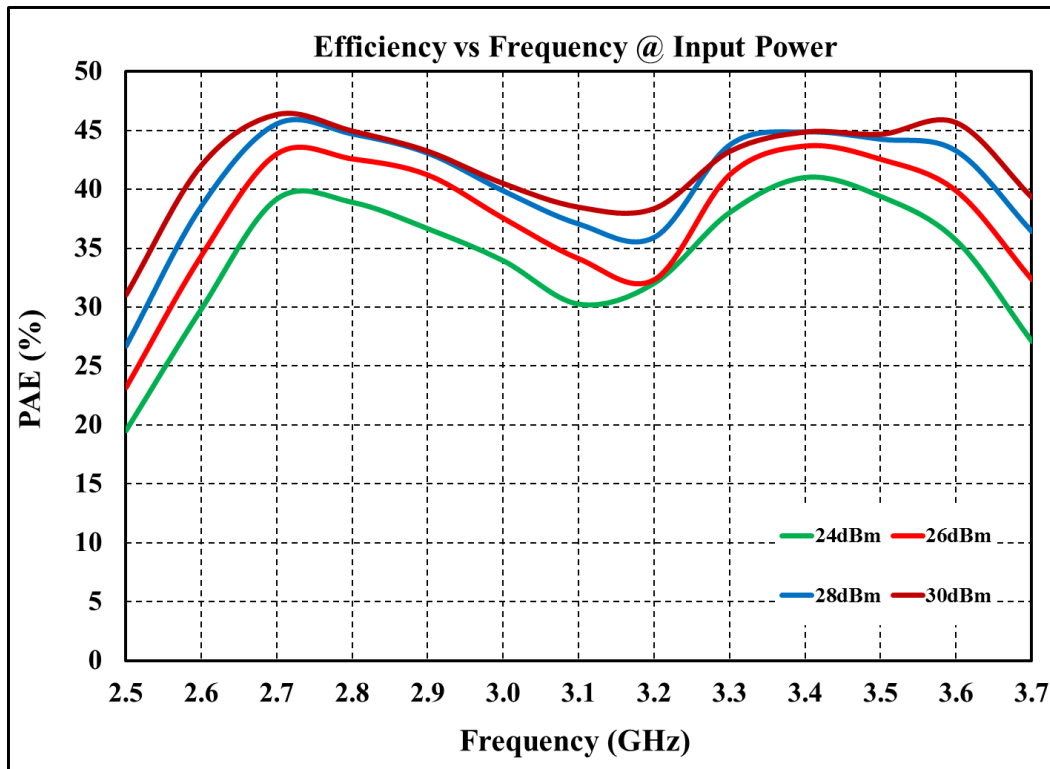


Small Signal S-Parameters

Test Ambient Temp. = 25 °C, $Z_0 = 50 \Omega$, $V_d = 50 \text{ V}$ (pulsed)

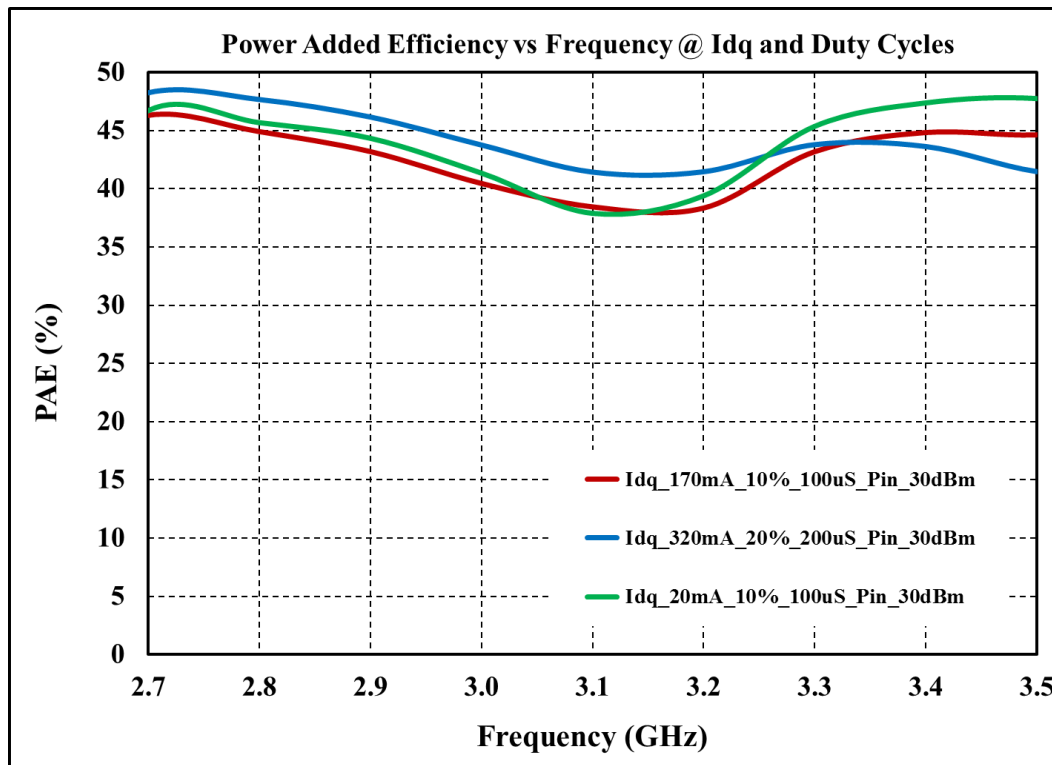
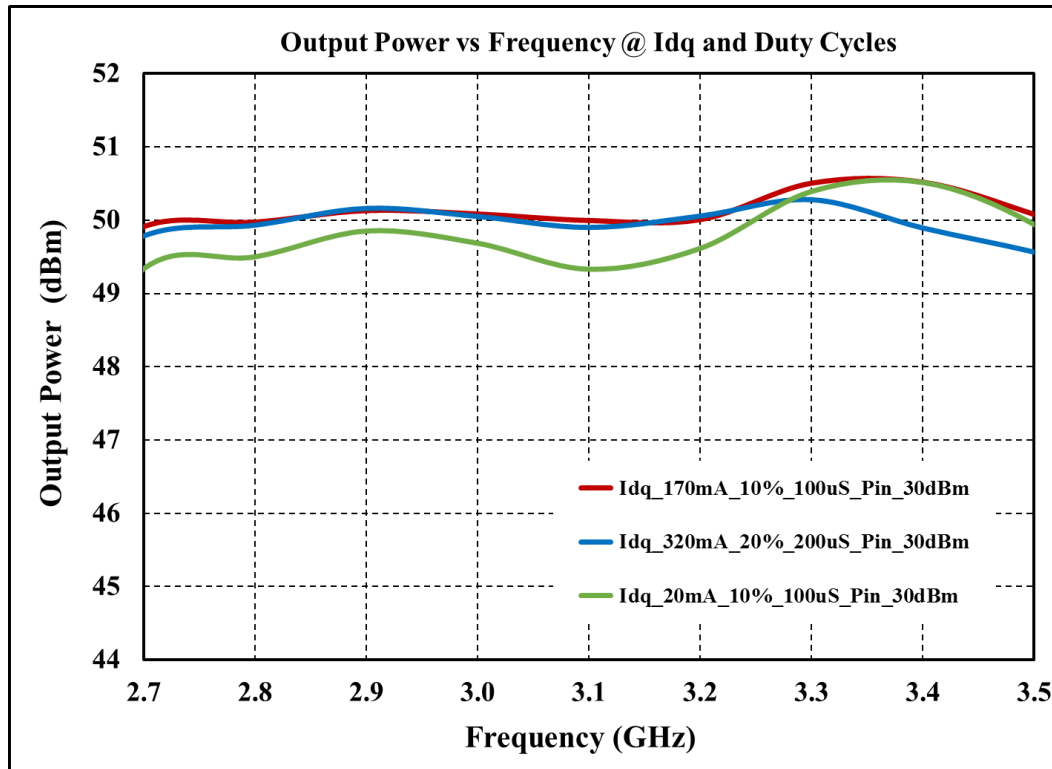


Power Measurements: $I_{dq} = 170\text{ mA}$
 $T_A = 25\text{ }^{\circ}\text{C}$, $Z_o = 50\text{ }\Omega$, $V_d = 50\text{ V}$, $\text{Pulse Width} = 100\text{ }\mu\text{s}$, $\text{Duty Cycle} = 10\%$


Power Measurements: $I_{dq} = 170 \text{ mA}$
 $T_A = 25^\circ\text{C}$, $Z_o = 50 \Omega$, $V_d = 50 \text{ V}$, Pulse Width = 100 μs , Duty Cycle = 10%


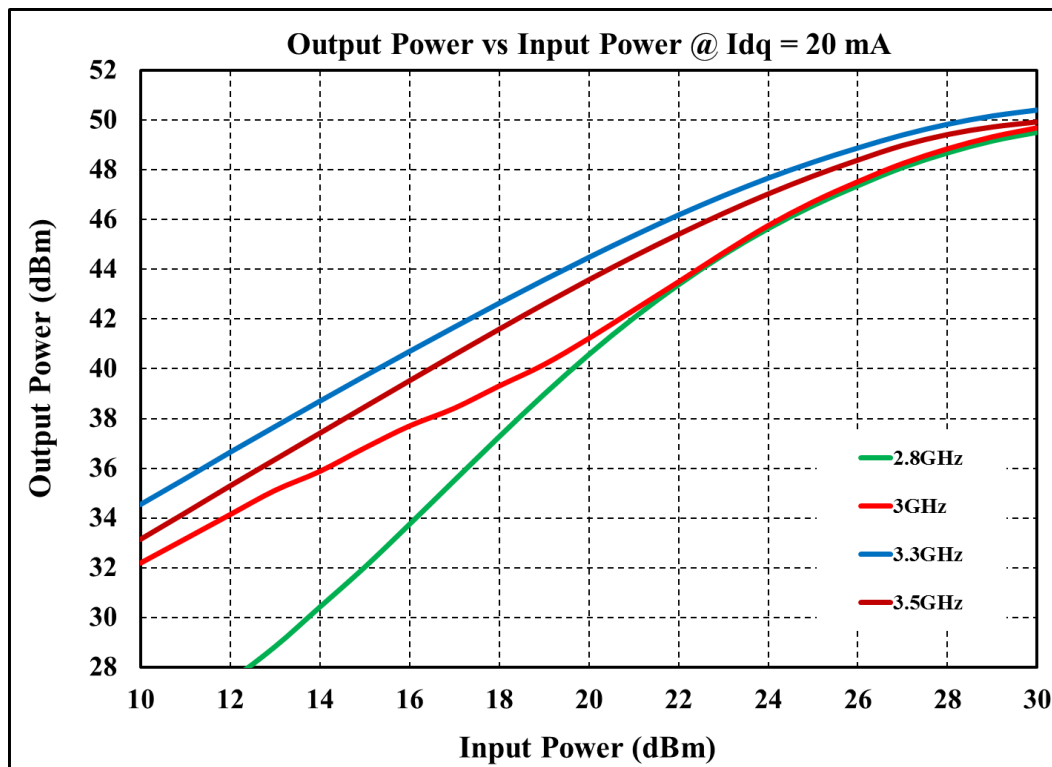
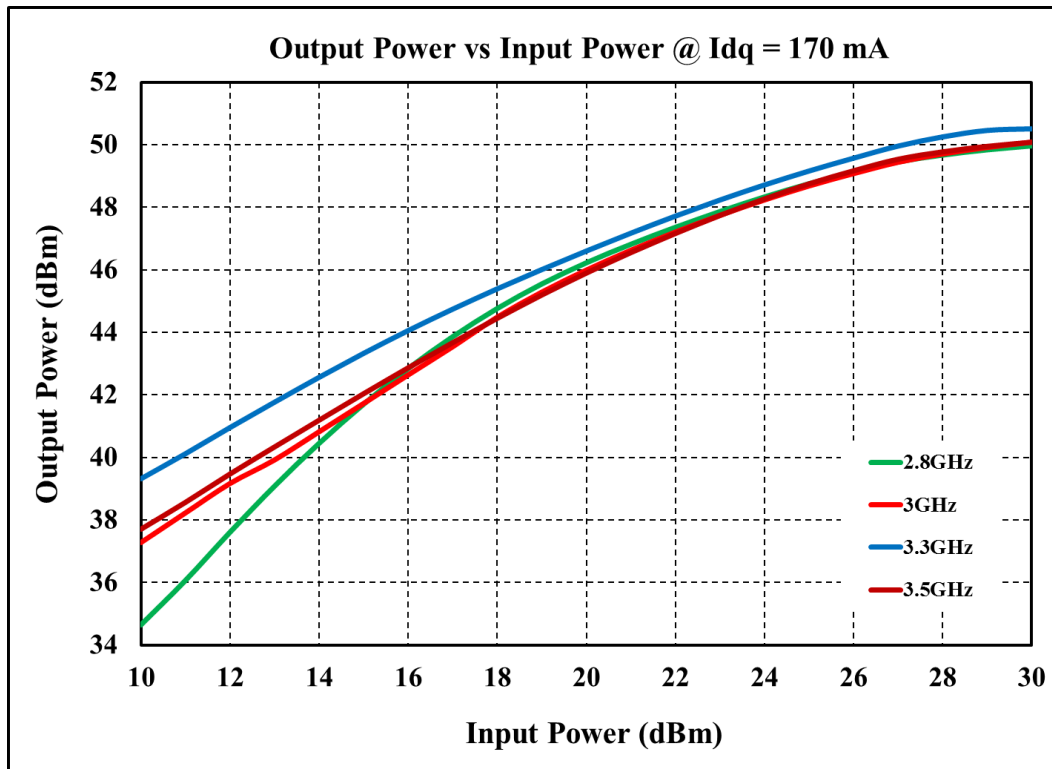
Power Measurements for Different Idq and Duty Cycles

$T_A = 25\text{ }^{\circ}\text{C}$, $Z_o = 50\text{ }\Omega$, $V_d = 50\text{ V}$



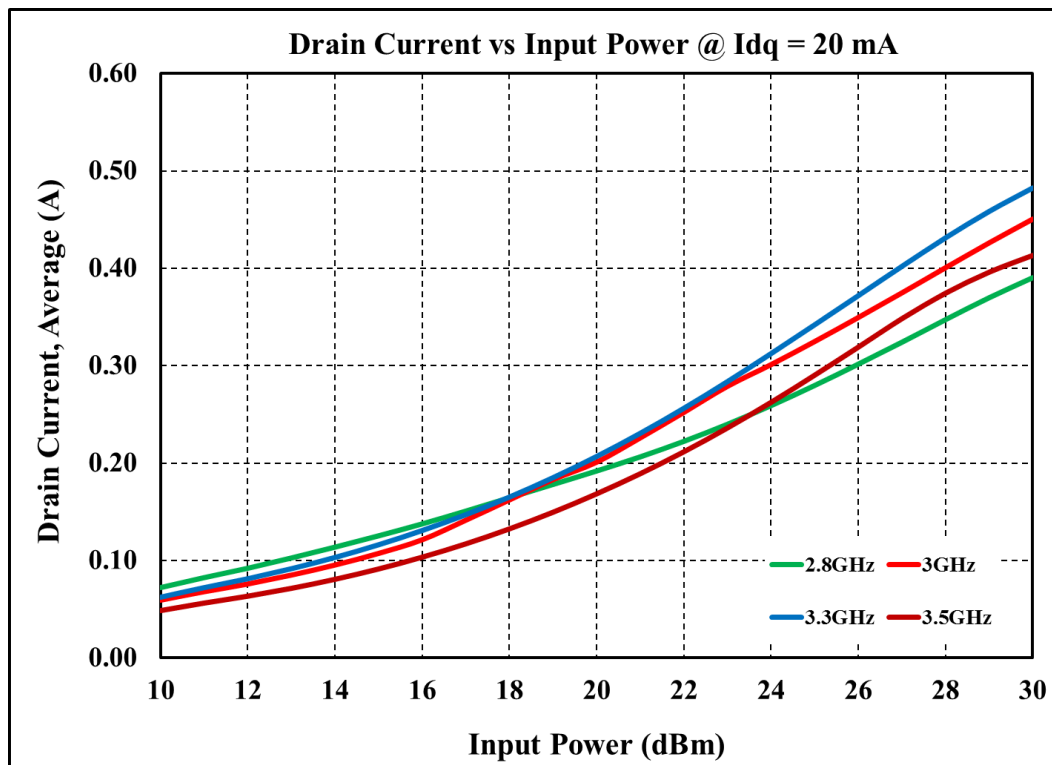
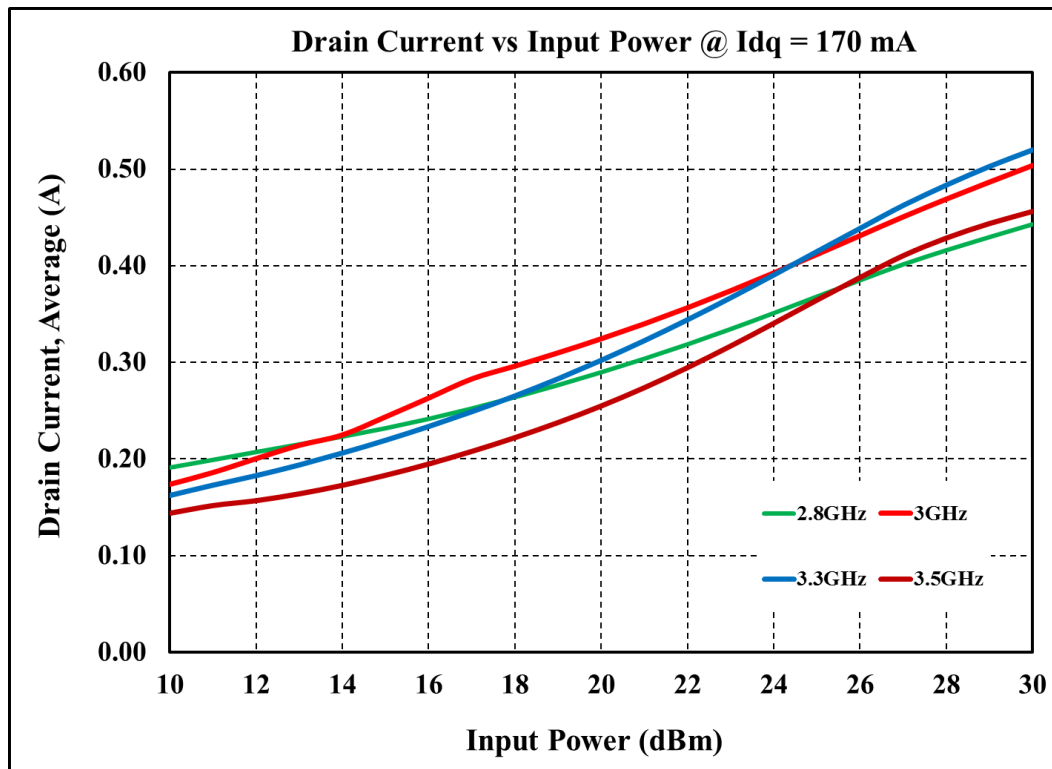
Output Power vs Input power for Different Idq

$T_A = 25\text{ }^{\circ}\text{C}$, $Z_o = 50\text{ }\Omega$, $V_d = 50\text{ V}$, $PW = 100\text{ }\mu\text{S}$, $DC = 10\%$



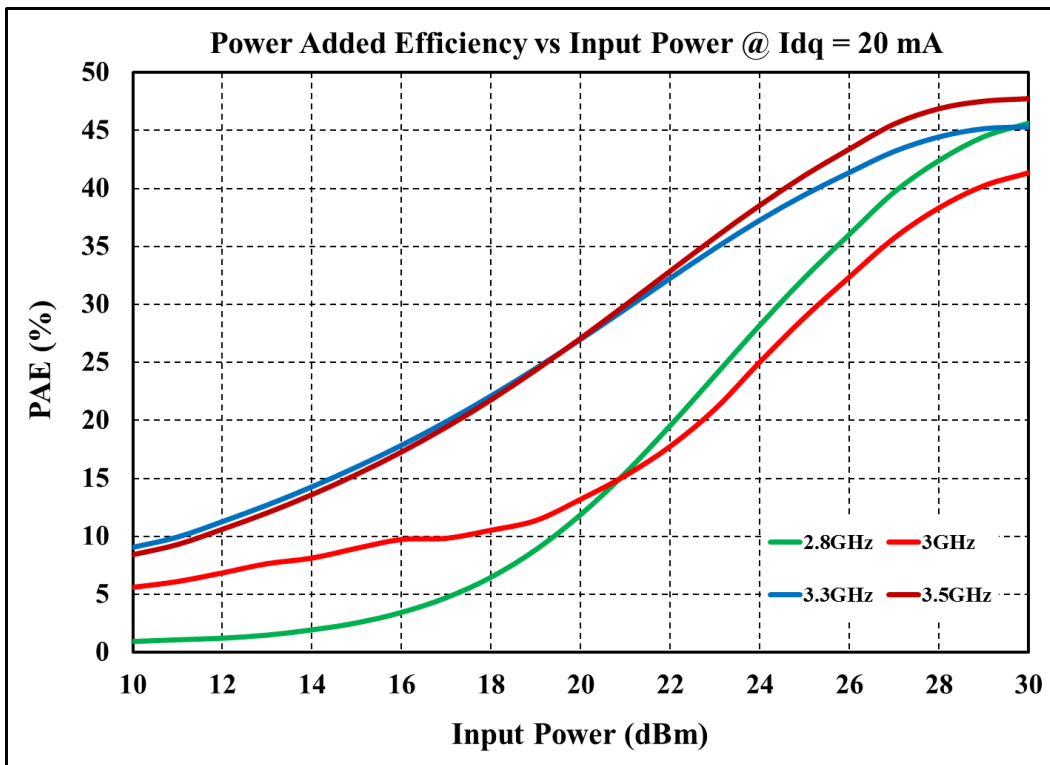
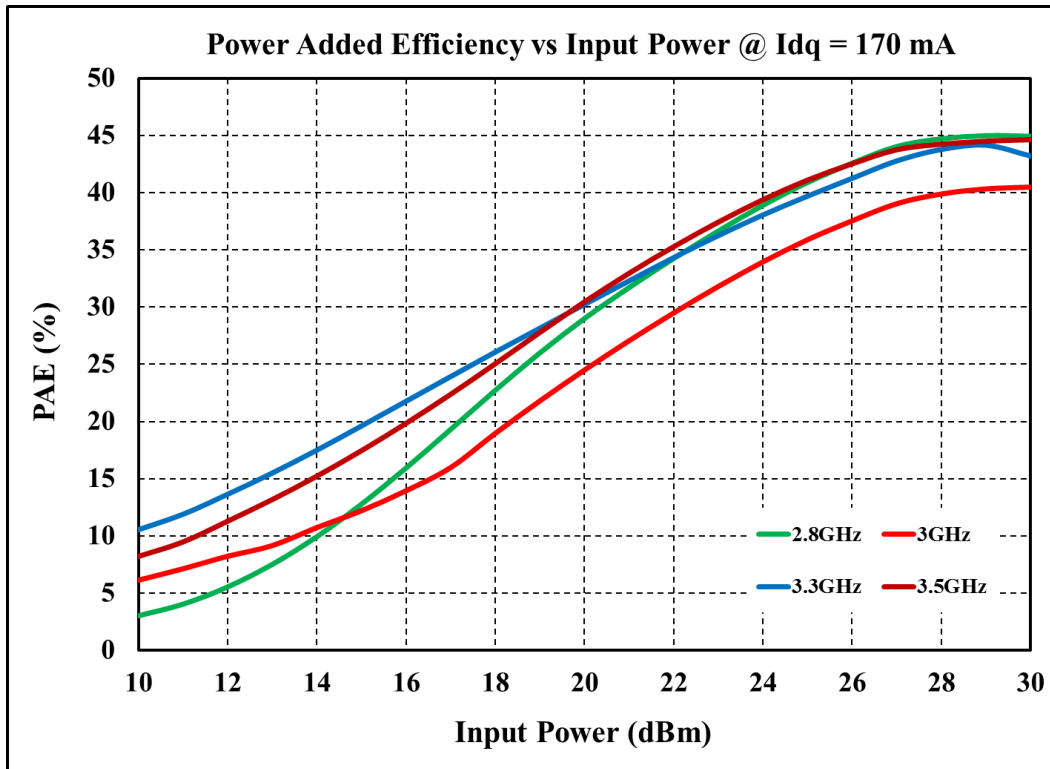
Drain Current vs Input Power

$T_A = 25^\circ\text{C}$, $Z_o = 50\ \Omega$, $V_d = 50\ \text{V}$, $PW = 100\ \mu\text{s}$, $DC = 10\%$



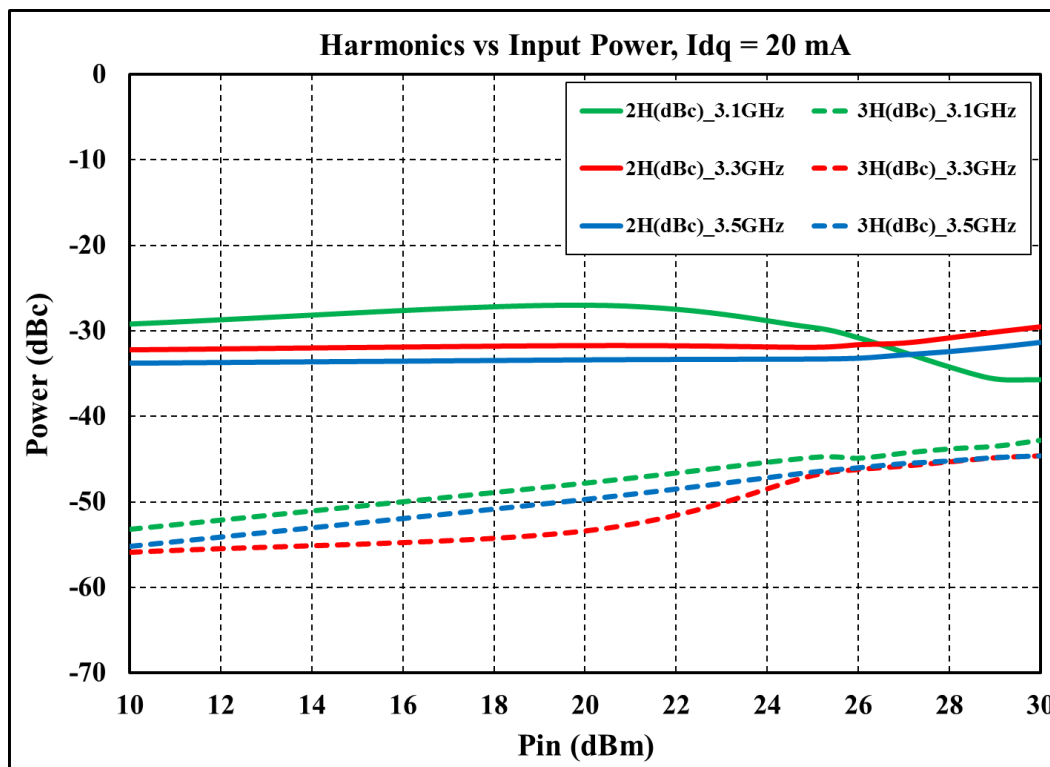
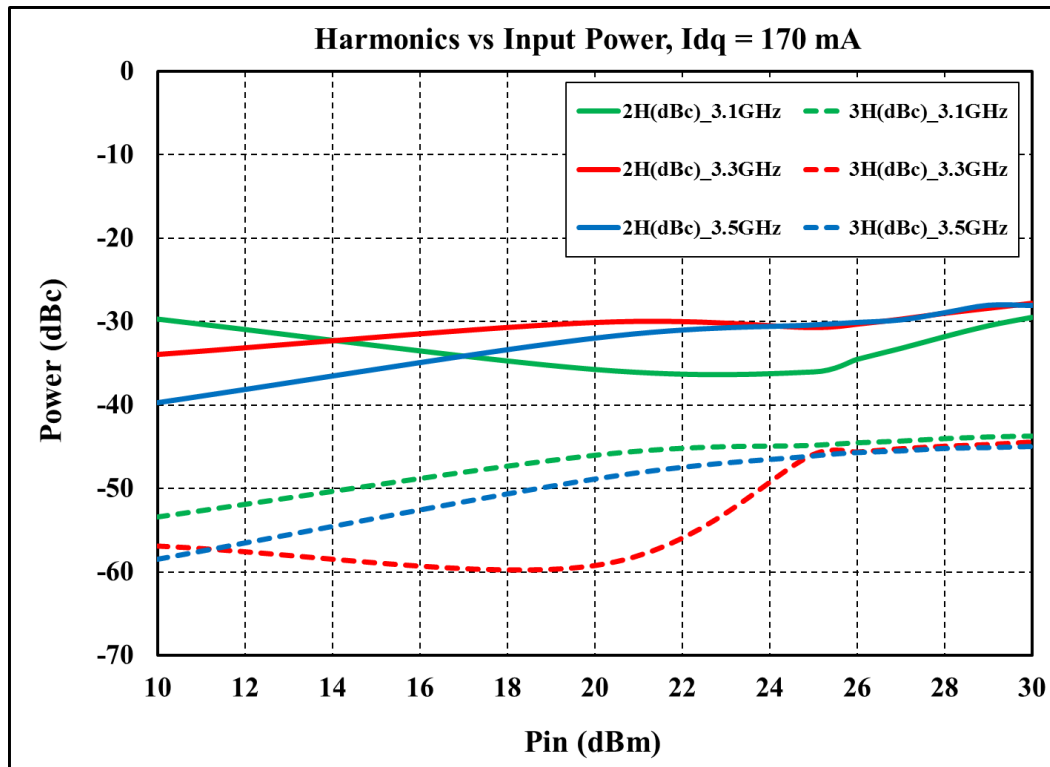
Power Added Efficiency vs Input Power

$T_A = 25\text{ }^{\circ}\text{C}$, $Z_o = 50\text{ }\Omega$, $V_d = 50\text{ V}$, $PW = 100\text{ }\mu\text{S}$, $DC = 10\%$



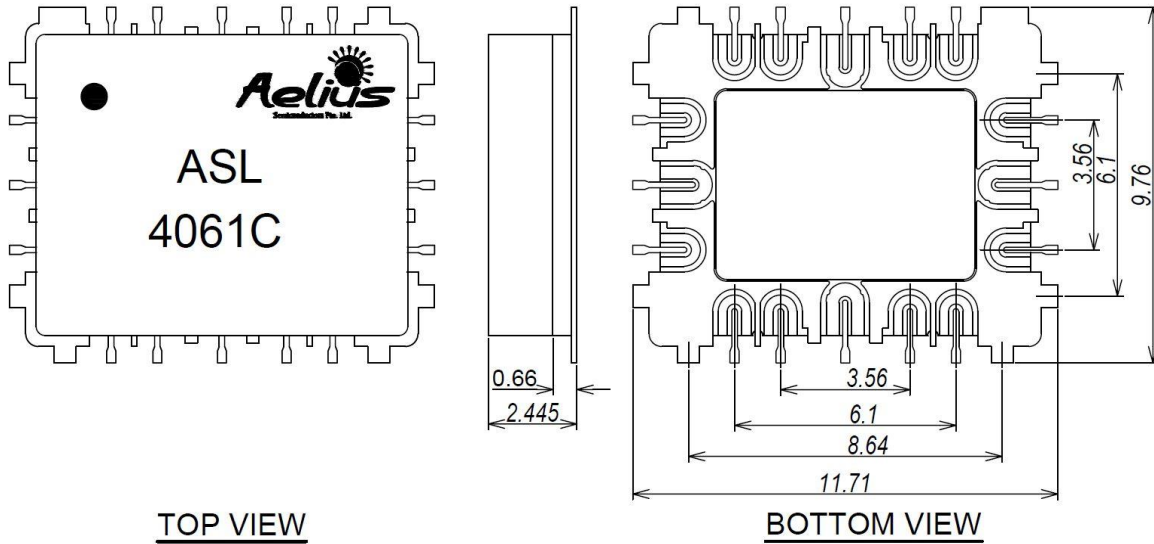
Harmonics Compression @ Different Idq

$T_A = 25\text{ }^{\circ}\text{C}$, $Z_o = 50\text{ }\Omega$, $V_d = 50\text{V}$, $PW = 100\text{ }\mu\text{S}$, $DC = 10\%$

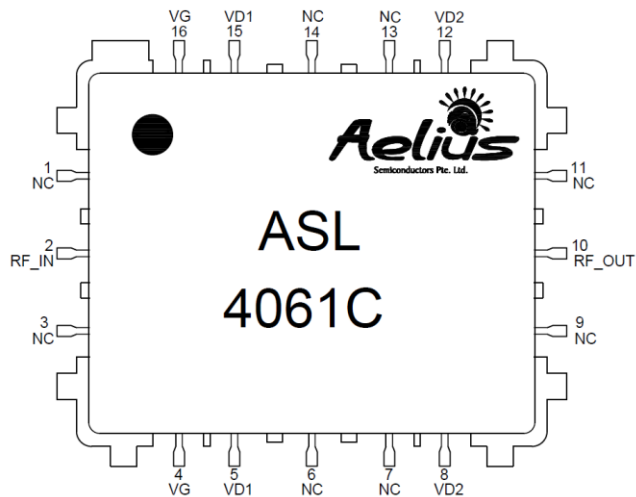


Package Dimensions and Pin Configuration

Package Over view:



Pin configuration:

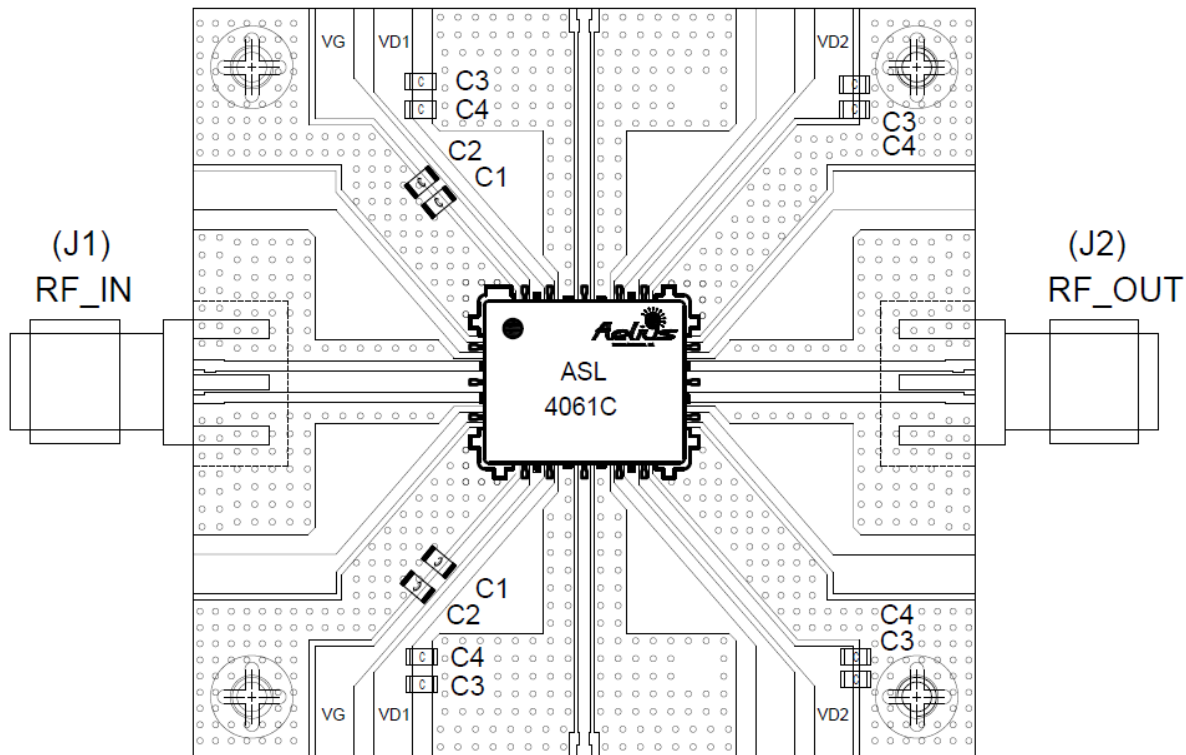


Units: millimeters

Note:

- Pin no. 2 : RF IN
- Pin no. 10 : RF Out
- Pin no. 4,16 : Vg
- Pin no. 5,15 : Vd1
- Pin no. 8,12 : Vd2
- Other Pins : NC

Recommended Test Assembly Diagram



Components	Component Value	Description
C1	1 K pF	Cap, 0603C, 16 V, 2 nos., at gate bias lines
C2	0.1 uF	Cap, 0603C, 16 V, 2 nos., at gate bias lines
C3	1 K pF	Cap, 0603C, 50 V, 4 nos., at drain bias lines
C4	0.1 uF	Cap, 0603C, 50 V, 4 nos., at drain bias lines

Note:

1. The PCB with input and output 50 Ohm lines are implemented on 20 mil, RO 4350 substrate.
2. Use electrically and thermally conductive material for the attachment of package to heat sink.
3. Additional 47 uF capacitor is recommended at gate bias line.



GaN MMIC devices are susceptible to electrostatic discharge. Proper precautions should be taken during handling, assembly & testing

All information and Specifications are subject to change without prior notice. Before using the product, Please download and refer to latest datasheet from the website.