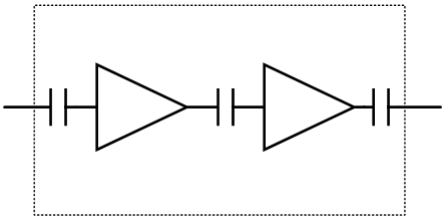
Product Overview

The ASA6010 is a GaN MMIC two-stage driver amplifier designed for X-band applications. The amplifier provides 18.6 dB of power gain, 26.7 dBm of saturated power and 31.8% PAE from a +25 V supply voltage. All data is measured with the chip in a 50 Ohm test fixture connected via four 0.025 mm (1 mil) diameter bond wires of minimal length 0.4 mm.

Key Features

1. Integrated DC blocking at RF input/output
2. Frequency Range: 8 GHz to 10.5 GHz
3. Power Gain: 18.6 dB (1st stage AB and others C)
4. PAE: 31.8%
5. Saturated Output Power: +26.7 dBm
6. 50 Ohm Matched Input/output
7. Die Size: 1.49 x 1.0 x 0.1 mm

Functional Block Diagram



Applications

1. General Communication Applications
2. VSAT
3. LO Driver for Mixers
4. Point to Point Radios

Absolute Maximum Rating

Drain Bias Voltage (VDD)	+40 Vdc
Gate Bias Voltage (VGG)	-8 Vdc
Drain Current (ID)	0.1 A
RF Input Power (Pin),CW,50 Ω,(VDD = +25 V)	21 dBm
Channel Temperature	200 °C
Continuous Pdiss(T = 85 °C)	1.5 W
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C

Typical Supply Current vs. VDD

	VDD=25 V
VGG=-3.0 V	0 mA
VGG=-4.52 V	0 mA

1. Currents are measured at 15 °C.
2. The typical operation of amplifier is for supply voltages VGG =-3.9 V and VDD =+25 V.


ELECTROSTATIC SENSITIVE DEVICE OBSERVE HANDLING PRECAUTIONS

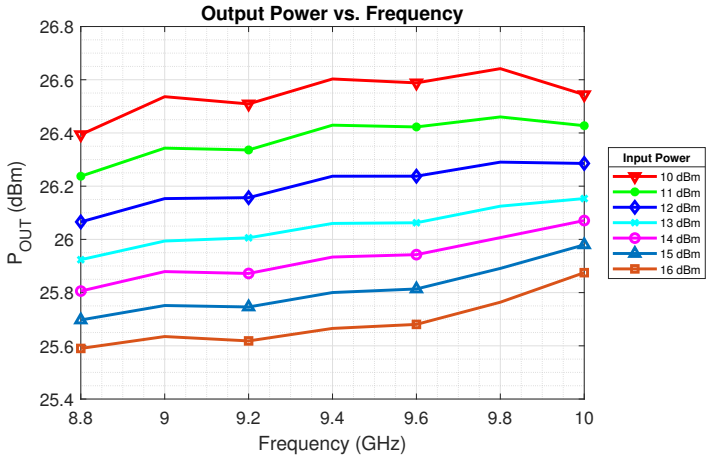
Electrical Specifications

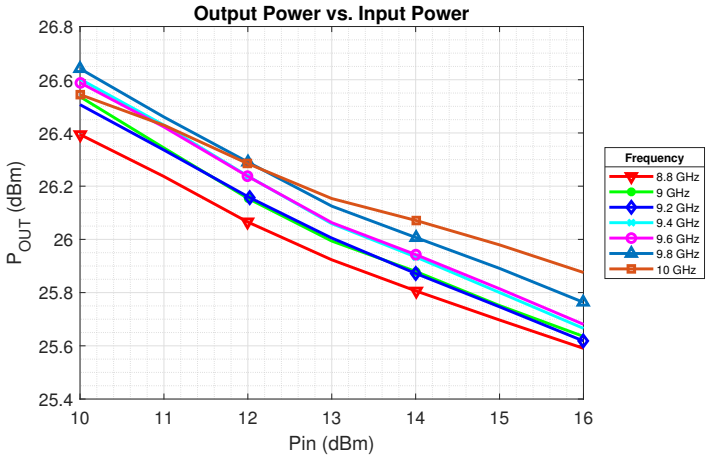
Parameter	Min.	Typ.	Max.	Units
Frequency Range	-	8-10.5	-	GHz
Power Gain	-	18	-	dB
Small Signal Gain (IDQ = 21 mA)	-	8.5	-	dB
Input Return Loss	-	12	-	dB
Power Added Efficiency (PAE)	30.7	30	31.8	%
Saturated Output Power	26	26.6	26.7	dBm
Supply Current (with RF)	55	60	63	mA

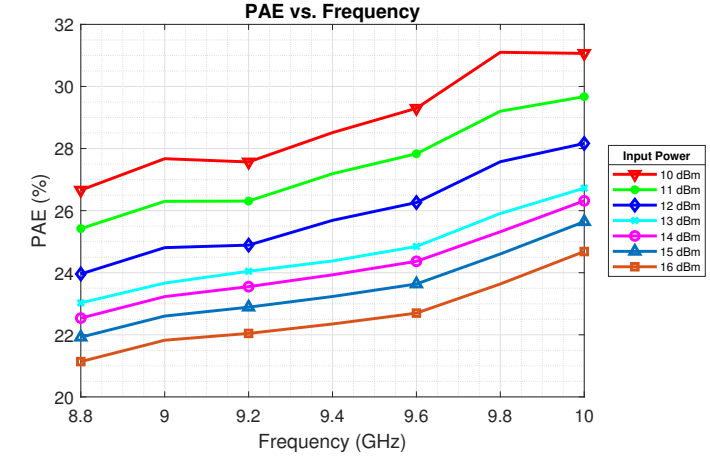
Test conditions unless otherwise noted: Tcase= 15 °C, VDD=25 V, VGG=-3.9 V, IDQ=0 mA, Z0=50 Ω, Pin=9 dBm
Tcase is Cold Plate temperature, and Base Plate temperature (TBP) is 85°C.

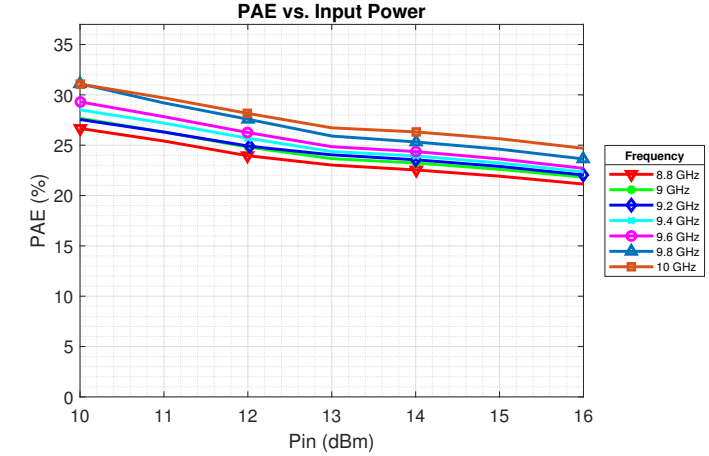
Performance Plots – Large Signal

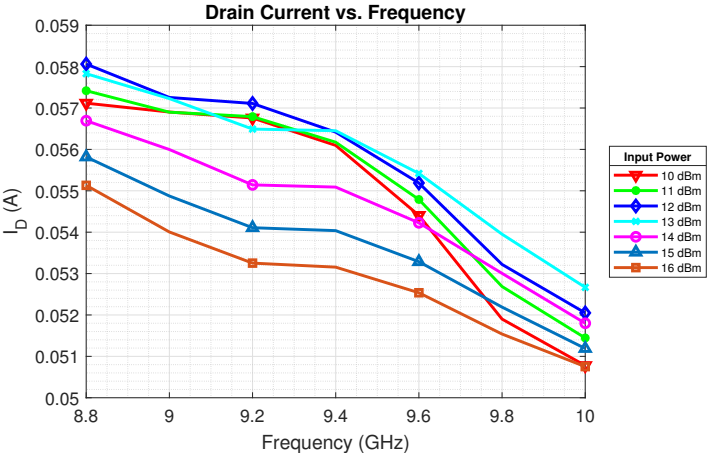
Test conditions unless otherwise noted:VDD=25 V, VGG=-3.9 V, Pin=9 dBm, Tcase=15 °C, CW

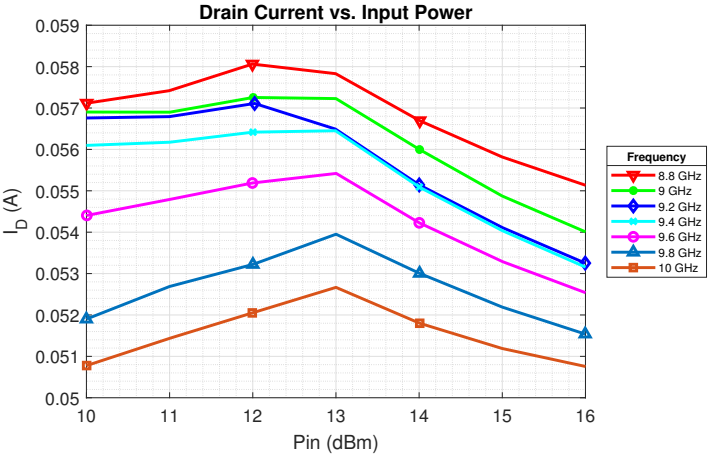






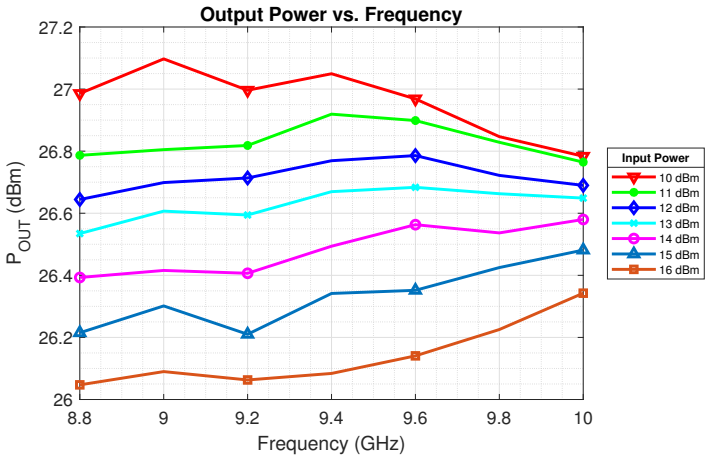


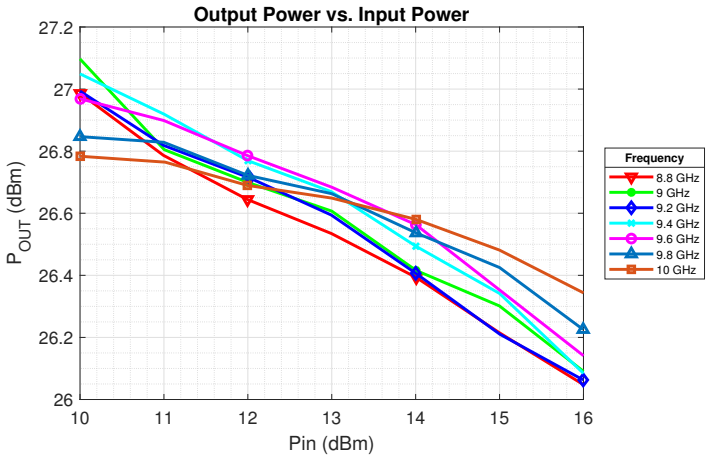


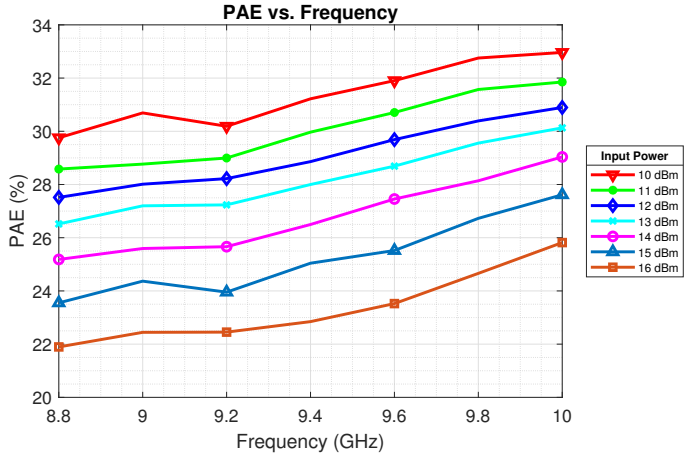


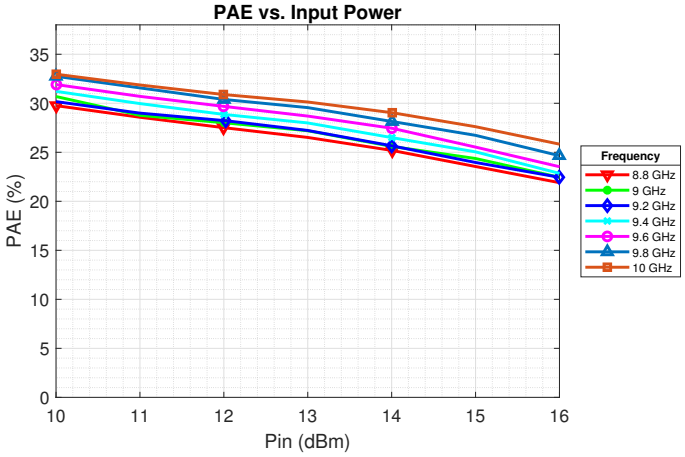
Performance Plots – Large Signal

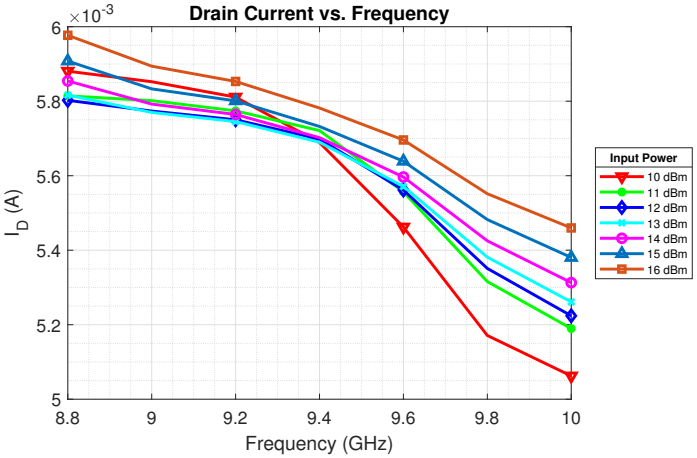
Test conditions unless otherwise noted:VDD=25 V, VGG=-3.9 V, Pin=9 dBm, Tcase=15 °C, 1 KHz Pulse 10%

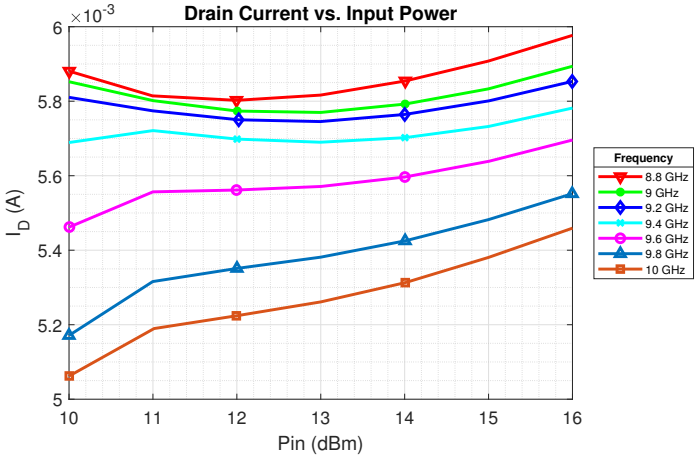






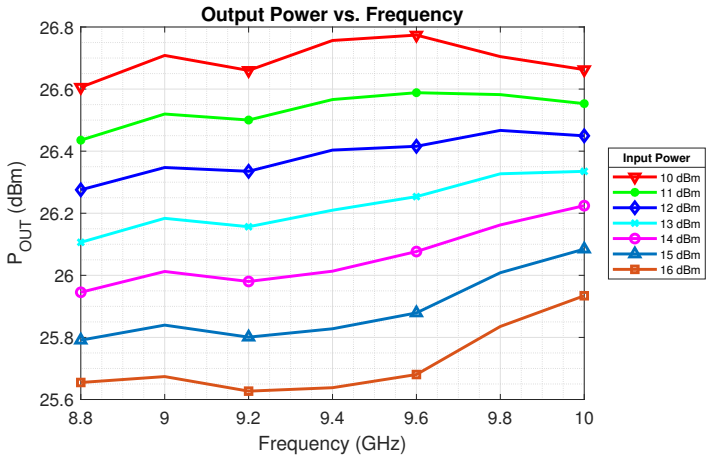


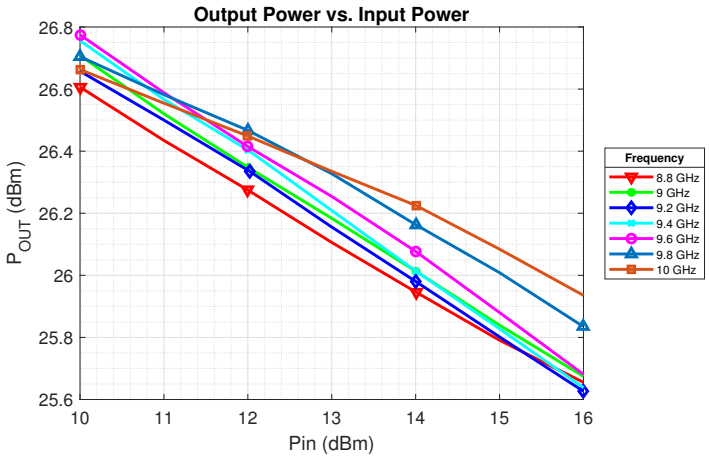


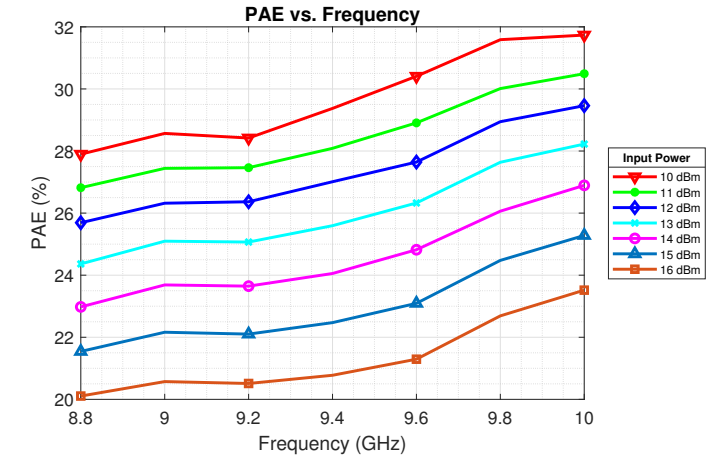


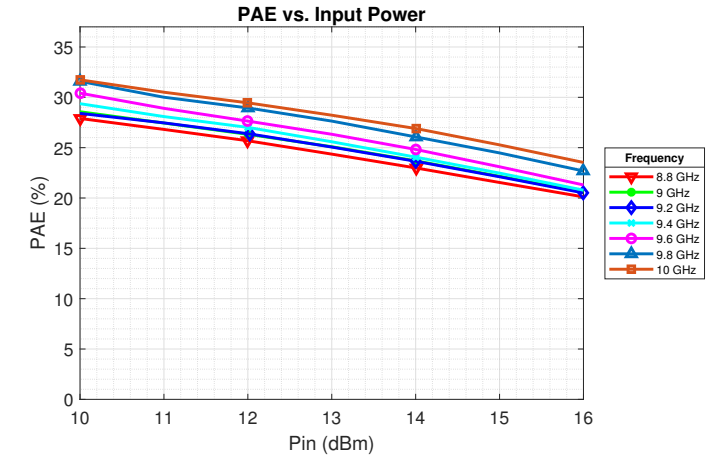
Performance Plots – Large Signal

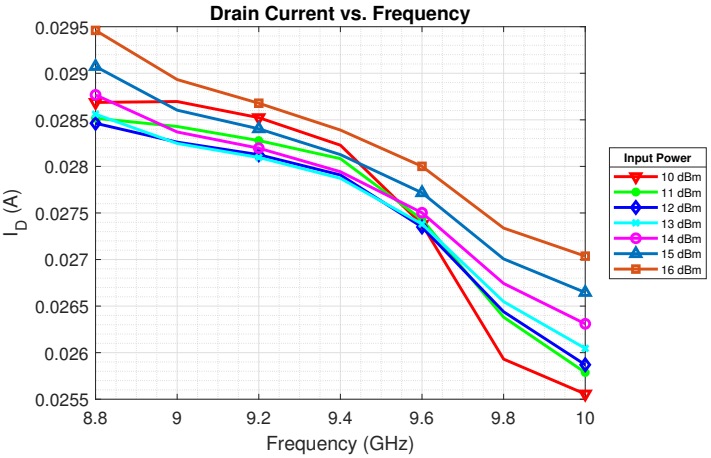
Test conditions unless otherwise noted:VDD=25 V, VGG=-3.9 V, Pin=9 dBm, Tcase=15 °C, 1 KHz Pulse 50%

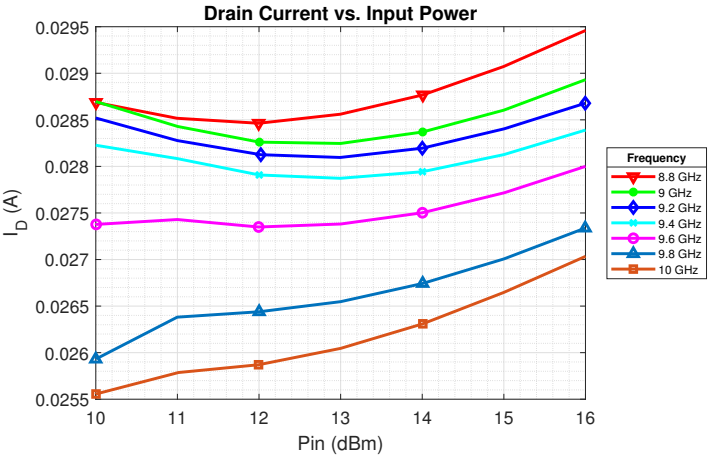






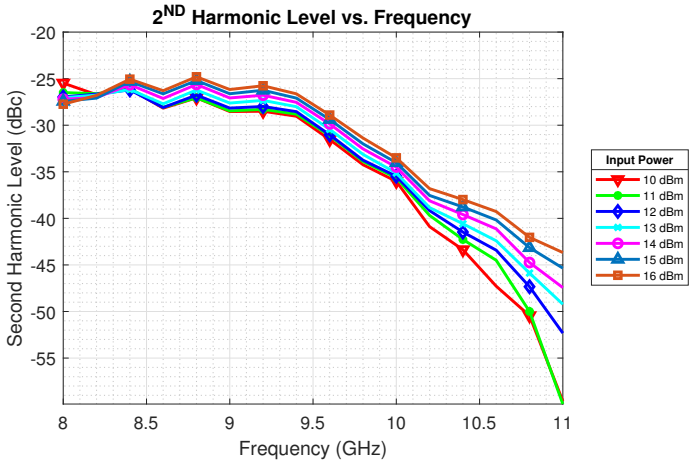


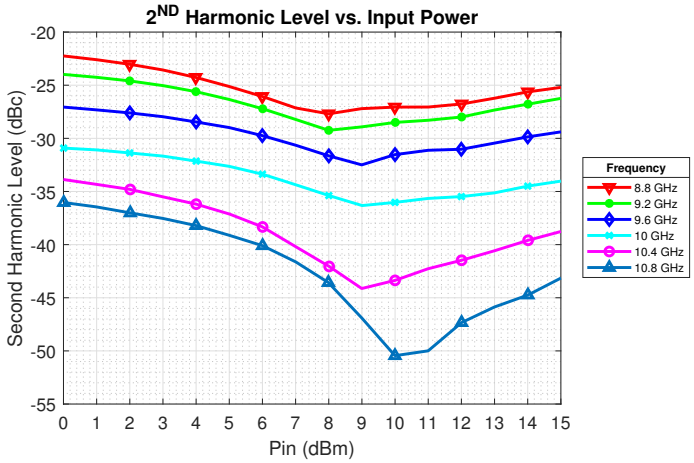




Performance Plots – Linearity

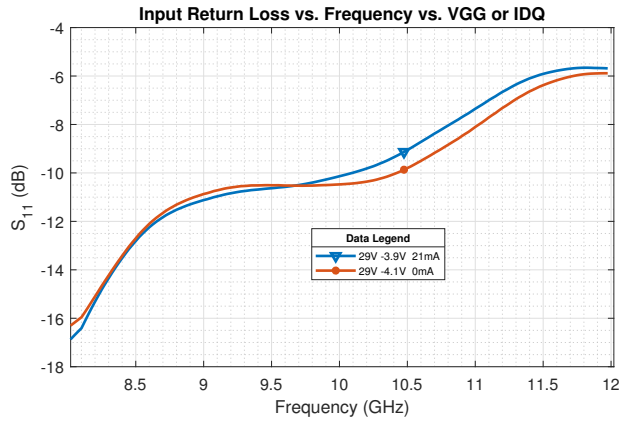
Test conditions unless otherwise noted:VDD=25 V, VGG=-3.9 V, Pin=9 dBm, Tcase=15°C

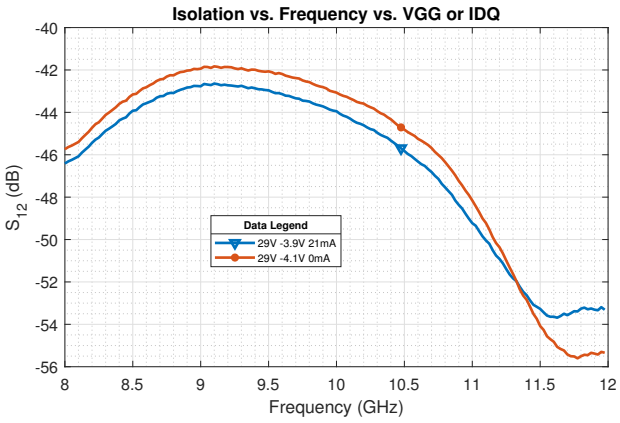


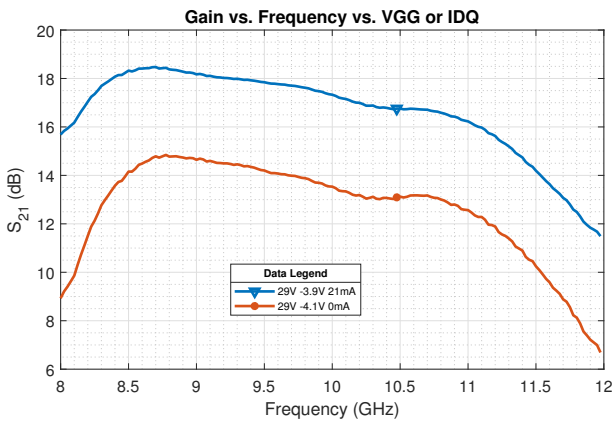


Performance Plots – Small Signal

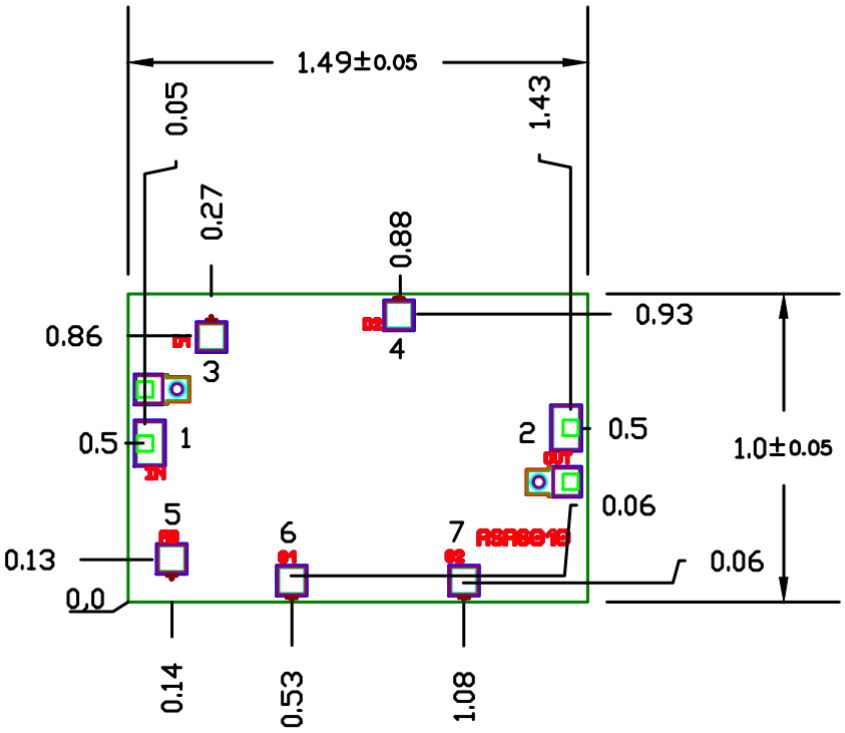
Test conditions unless otherwise noted:VDD=25 V, Tcase=15 °C







Mechanical Information



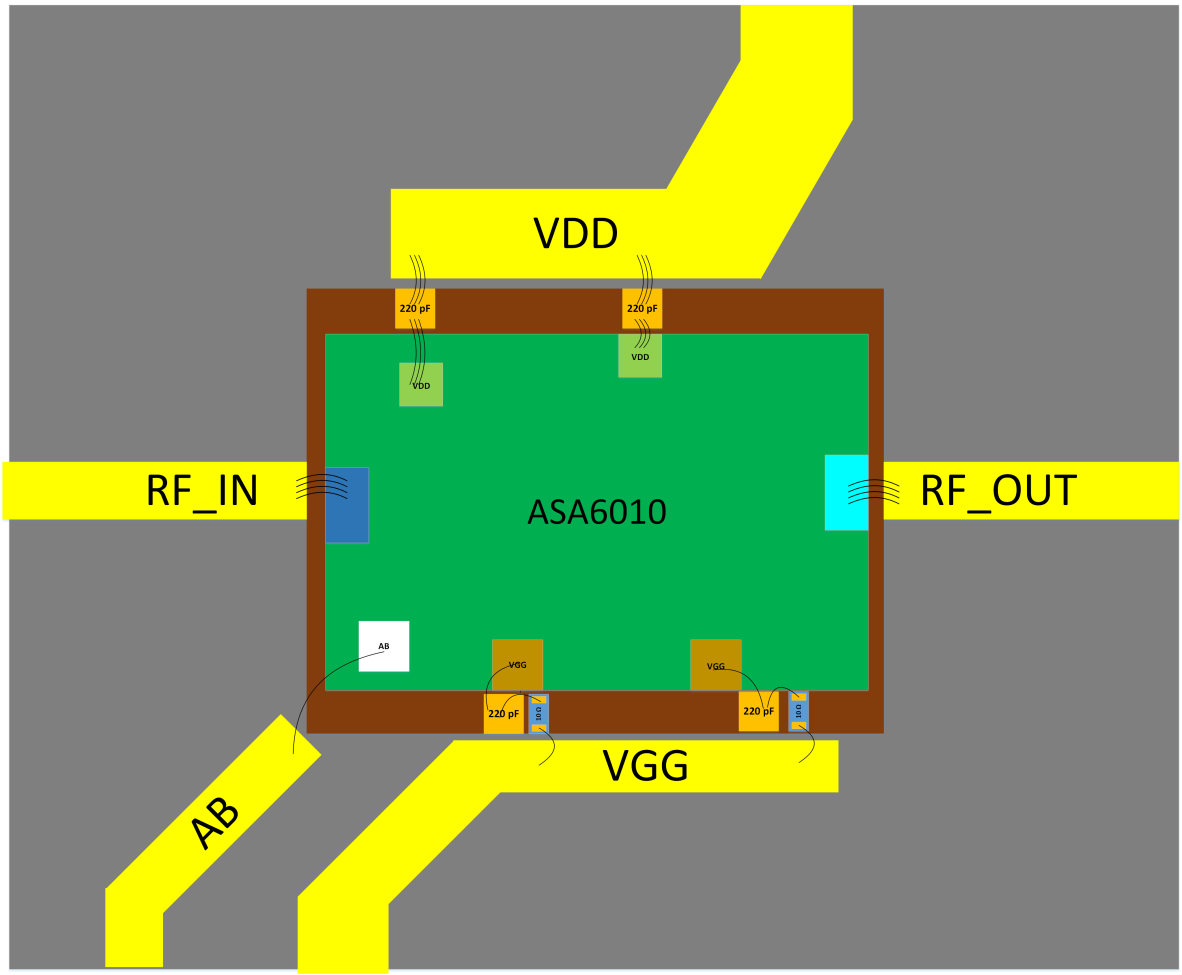
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. CHIP SIZE = 1.49 mm × 1.0 mm (DICING STREET INCLUDED) ± 0.05 mm
3. RF pads (1,2) = 0.1 × 0.15 mm
4. DC pads (5) = 0.1 × 0.1 mm
5. DC pads (3,4,6,7) = 0.1 × 0.1 mm
6. BACKSIDE METALLIZATION: GOLD
7. BACKSIDE METAL IS GROUND
8. BOND PAD METALIZATION: GOLD
9. NO CONNECTION REQUIRED FOR UNLABELED BOND PADS
10. OVERALL DIE SIZE ±50 µm

Bond Pad Description

1	RF-IN	This pad is AC coupled and matched to 50 Ohms.
2	RF-OUT	This pad is AC coupled and matched to 50 Ohms.
3,4	VDD	Positive Supply Voltage for the amplifier. External bypass capacitors of 220 pF are required.
5	AB	AB Pin should be connected to GND so that the first stage biased in class AB.
6,7	VGG	Negative Supply Voltage for the amplifier.

Assembly Diagram



Assembly Notes

Component Placement and Adhesive Attachment Assembly Notes:

1. Use vacuum collet to pick up the die.
2. The force should be controlled during placement and mounting specially no force should be applied to air bridges.

Reflow process assembly notes:

1. Use CMC or MoCu carrier to decrease thermal expansion mechanical stress
2. Use AuSn (80/20) solder and limit exposure to temperatures above 300 °C to 3-4 minutes, maximum.
3. An alloy station or conveyor furnace with reducing atmosphere should be used.
4. Do not use any kind of flux.
5. Devices must be stored in a dry nitrogen atmosphere.
6. Use Au bond wire.

Contact Information

For the latest specifications, additional product information:
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