

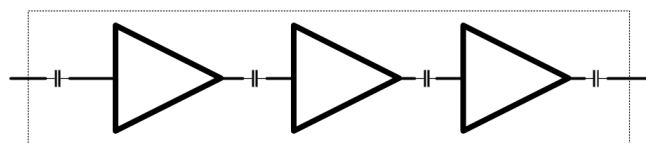
Product Overview

The ASA5003 is a GaN MMIC three-stage power amplifier designed for C-band applications. The amplifier provides 25 dB of power gain, +38.5 dBm of saturated power and 48% PAE from a +25V supply voltage. All data is measured with the chip in a 50 Ohm test fixture connected via two 0.025 mm (1 mil) diameter bondwires of minimal length 0.51 mm (20 mil).

Key Features

1. Integrated DC blocking at RF input/output
2. Frequency Range: 5 GHz to 6 GHz
3. Power Gain: 25 dB
4. PAE: 48%
5. Saturated Output Power: +38.5 dBm
6. 50 Ohm Matched Input/output
7. Die Size: 3.5 x 2.85 x 0.1 mm

Functional Block Diagram



Applications

1. General Communication Applications
2. VSAT
3. Point to Point Radios

Absolute Maximum Rating

Drain Bias Voltage (VDD)	+40 Vdc
Gate Bias Voltage (VGG)	-8 Vdc
Drain Current (ID)	0.8 A
RF Input Power (Pin), CW, 50 Ω , (VDD = +25 V)	20 dBm
Channel Temperature	200 °C
Continuous P _{diss} (T = 85 °C)	12 W
Storage Temperature	-65 to +150 °C

Typical Supply Current vs. VDD

Parameter	Value/Range
VDD	25 V
ID @ VGG=-3.9 V	0 mA
Operating Temperature	-40 to +85 °C

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

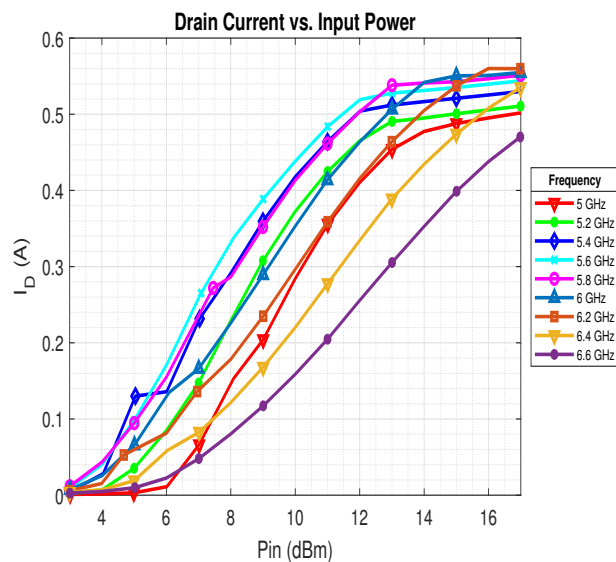
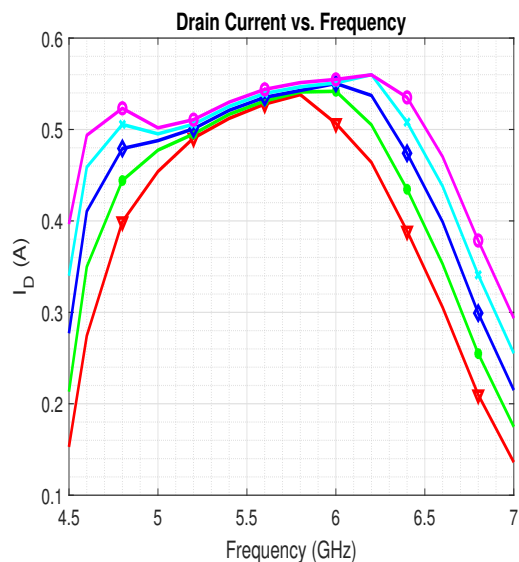
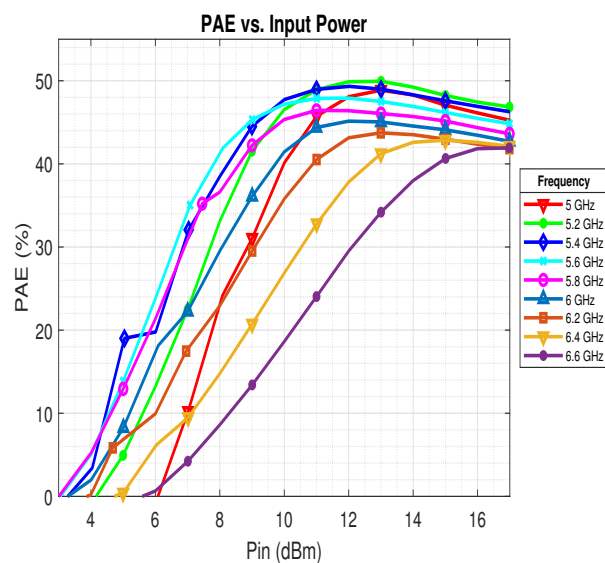
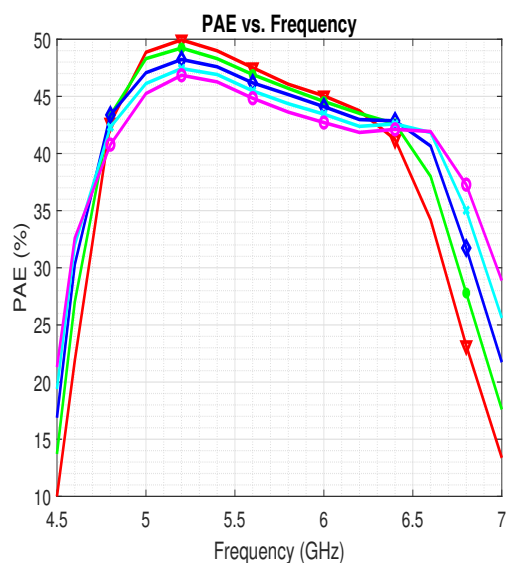
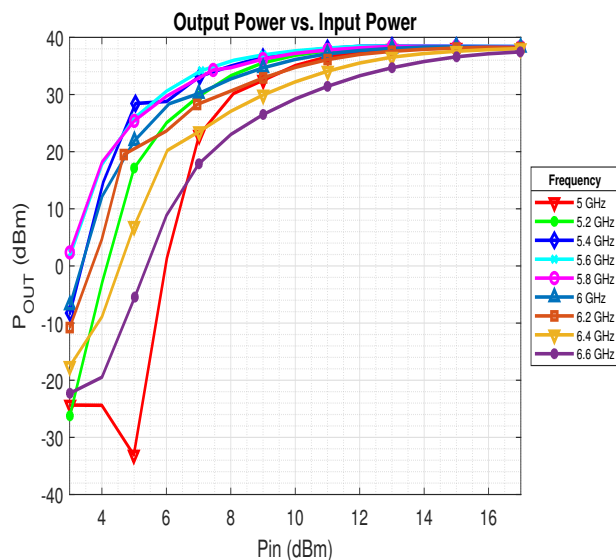
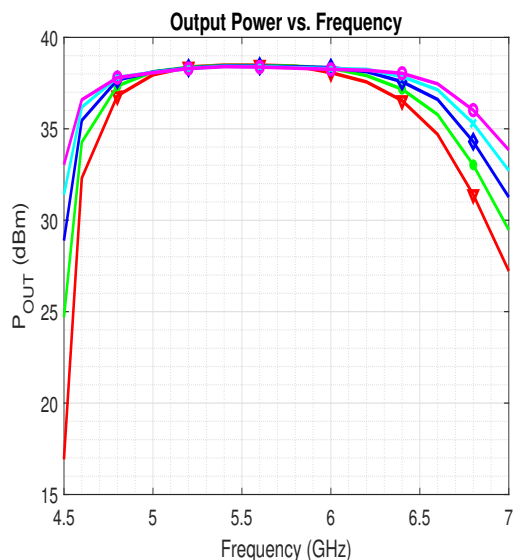
Electrical Specifications

Parameter	Min.	Typ.	Max.	Units
Frequency Range	-	5-6	-	GHz
Power Gain	-	25	-	dB
Small Signal Gain (IDQ = 70 mA)	-	20	-	dB
Input Return Loss	-	15	-	dB
Power Added Efficiency (PAE)	45	47	48	%
Saturated Output Power	-	38.5	-	dBm
Supply Current (with RF)	500	550	600	mA

Test conditions unless otherwise noted: T_{case}=15 °C, VDD=25 V, VGG=-3.9 V, IDQ=0 mA, Z₀=50 Ω , Pin=14 dBm
T_{case} is Cold Plate temperature, and Base Plate temperature (TBP) is 85°C.

Performance Plots – Large Signal

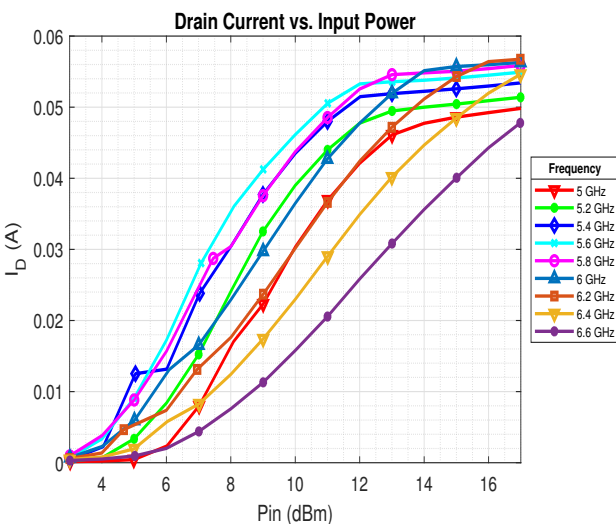
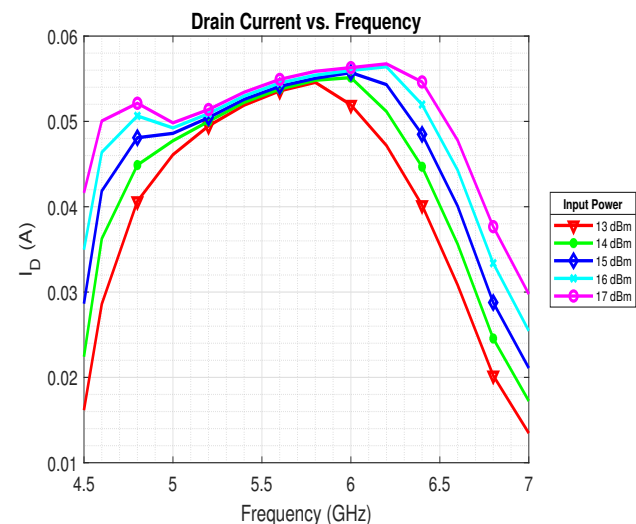
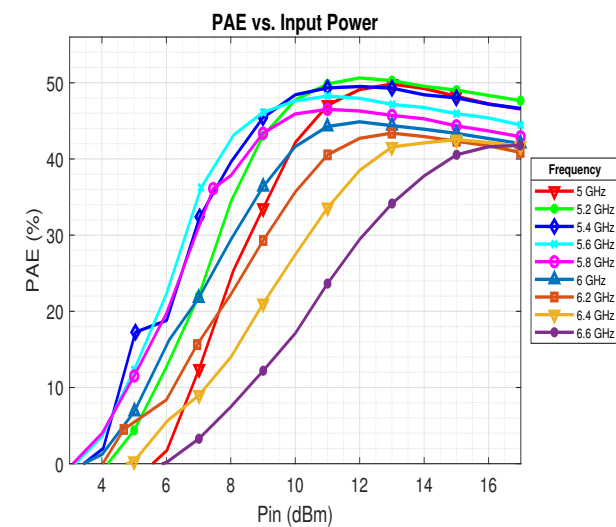
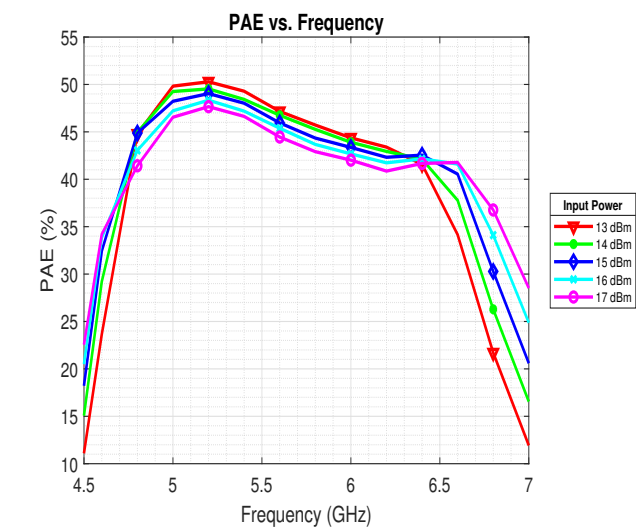
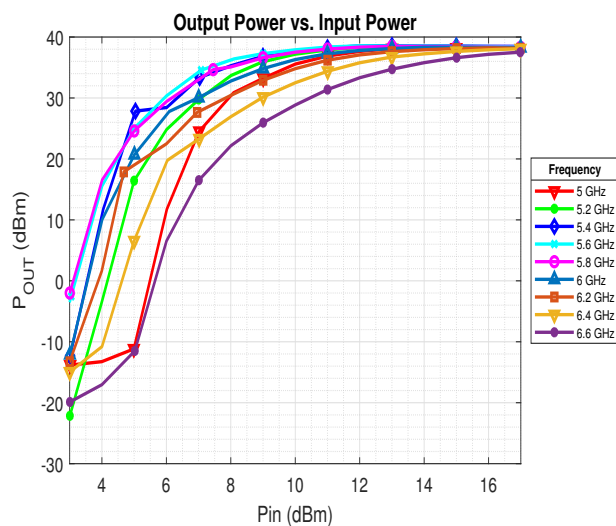
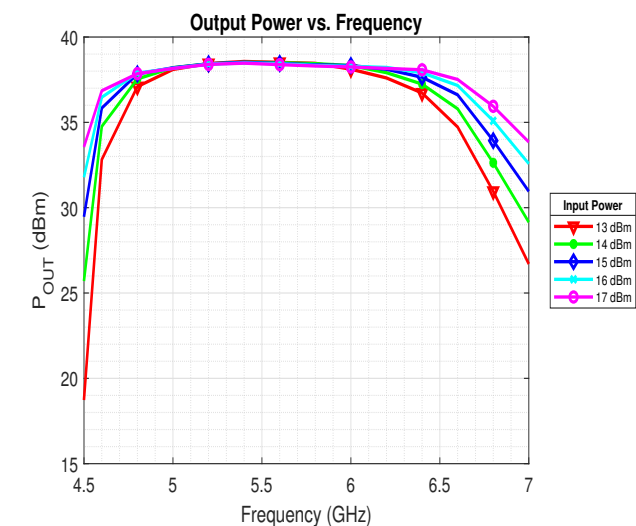
Test conditions unless otherwise noted: $V_{DD}=25\text{ V}$, $V_{GG}=-3.9\text{ V}$, $P_{in}=14\text{ dBm}$, $T_{case}=15\text{ }^{\circ}\text{C}$, CW



Performance Plots – Large Signal

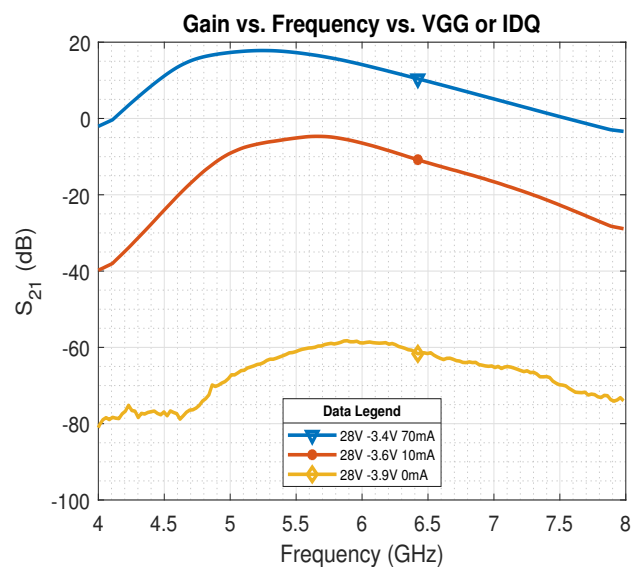
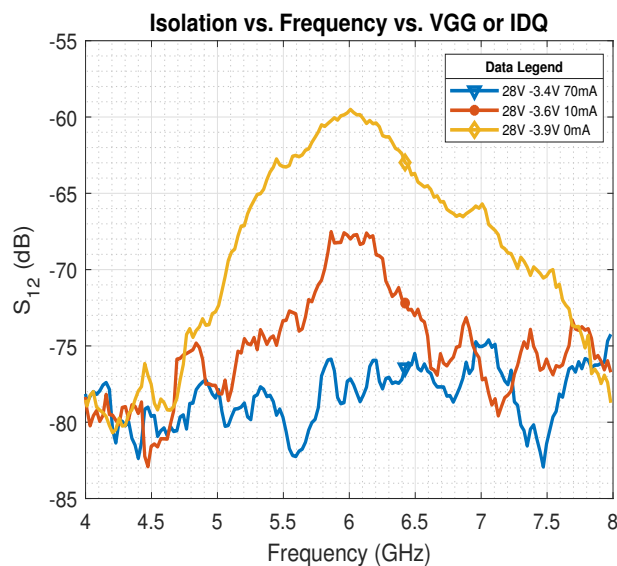
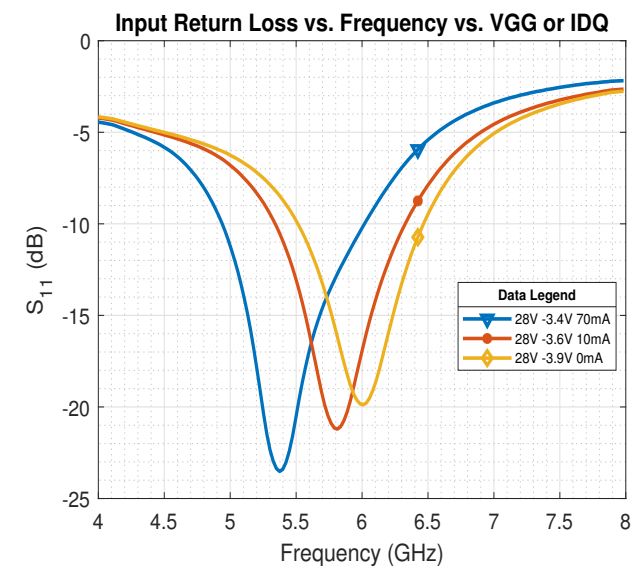
Test conditions unless otherwise noted: $V_{DD}=25\text{ V}$, $V_{GG}=-3.9\text{ V}$, $P_{in}=14\text{ dBm}$, $T_{case}=15\text{ }^{\circ}\text{C}$, 1 KHz

Pulse 10%

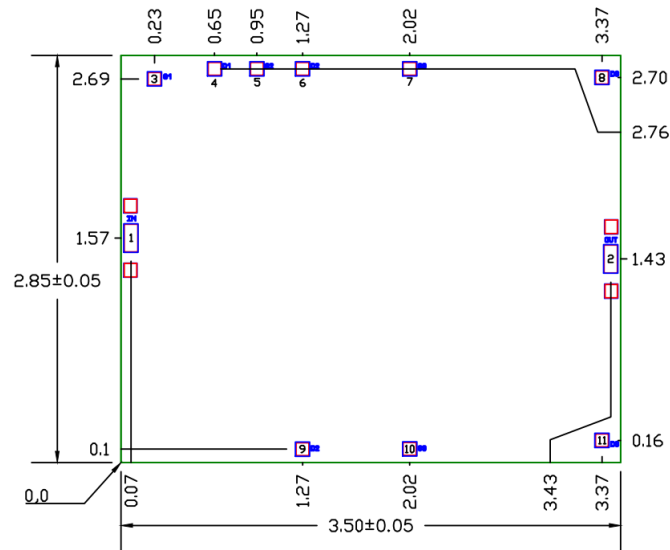


Performance Plots – Small Signal

Test conditions unless otherwise noted: VDD=28 V, Tcase=15 °C



Mechanical Information



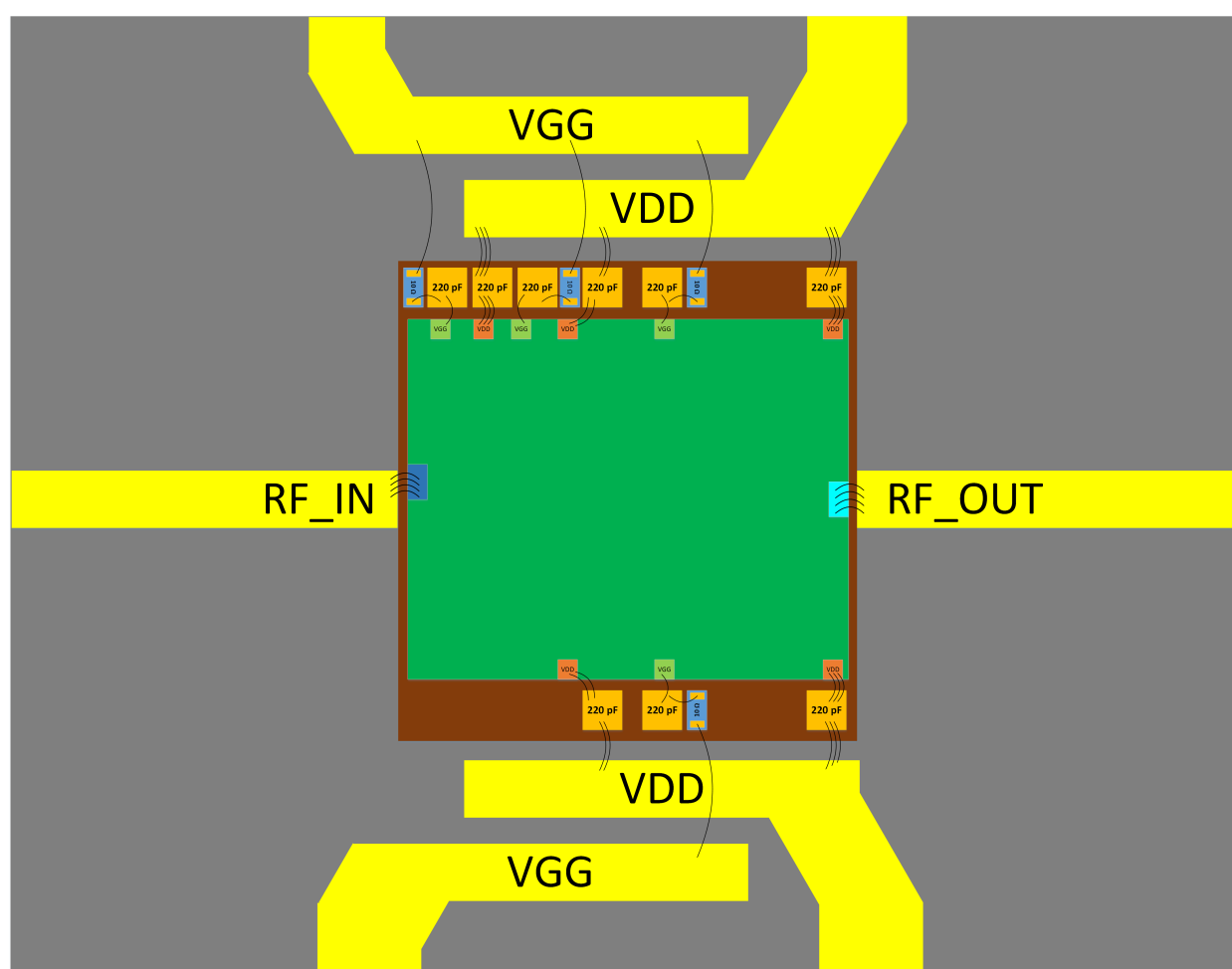
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. CHIP SIZE = 3.50 mm × 2.85 mm (DICING STREET INCLUDED) ± 0.05 mm
3. RF PADS (1,2) = 0.1 × 0.2 mm
4. DC PADS (3,4,5,6,7,8,9,10,11) = 0.1 × 0.1 mm
5. BACKSIDE METALLIZATION: GOLD
6. BACKSIDE METAL IS GROUND
7. BOND PAD METALIZATION: GOLD
8. NO CONNECTION REQUIRED FOR UNLABELED BOND PADS
9. 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.
3,5,7,10	VGG	Negative Supply Voltage for the amplifier.
4,6,8,9,11	VDD	Positive Supply Voltage for the amplifier. External bypass capacitors of 220 pF are required.

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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