

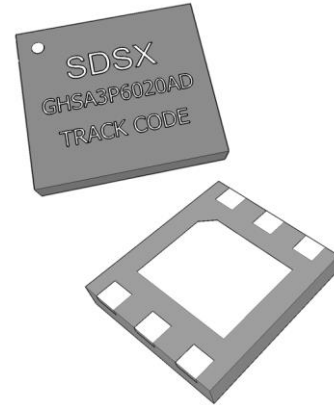
# GHSA3P6020AD

20W, 50V, DC-3.8GHz GaN RF Transistor

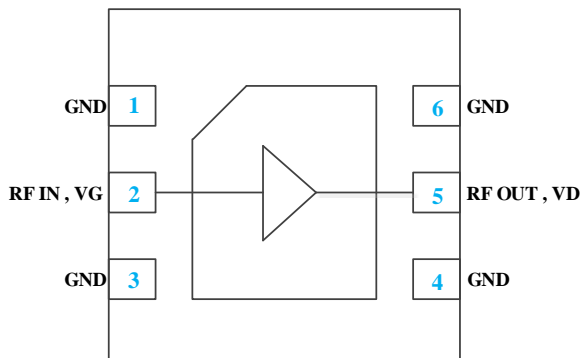


## Product Overview

The GHSA3P6020AD is a typical 20W (P3dB) at +50 V transistor, discrete GaN on SiC HEMT. Ideal for applications in massive MIMO systems, outdoor small cells and remote radio heads in the frequency range from DC to 3.8 GHz. Available in DFN outline.



## Functional Block Diagram



## Product Features

- Frequency: DC to 3.8 GHz
  - Typical Output Power (P3dB)<sup>1</sup>: 20 W
  - Linear Gain<sup>1</sup>: 20.4 dB
  - Typical DE 3dB<sup>1</sup>: 74 %
  - Operating Voltage: 50 V
  - Low thermal resistance package
  - CW and Pulse capable
- Note 1: @ 2.6 GHz

## Applications

- Base station
- Radio relay station
- Military radar
- Civilian radar
- Test instrumentation
- Wideband or narrowband amplifiers
- Jammers
- Microwave oven



## Absolute Maximum Ratings<sup>1</sup>

Parameter	Rating	Units
Breakdown Voltage, $BV_{DG}$ $T = 25\text{ }^{\circ}\text{C}$	150	V
Gate Voltage Range, $V_G$ $T = 25\text{ }^{\circ}\text{C}$	-10,1.3	V
RF Input Power, Pulse (10% Duty Cycle, 100 $\mu\text{s}$ Width), 2.6 GHz, $T = 25\text{ }^{\circ}\text{C}$	+33	dBm
Storage Temperature	-65 to +150	$^{\circ}\text{C}$

Notes:

1. Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability.

## Recommended Operating Conditions<sup>1</sup>

Parameter	Min	Type	Max	Units
Drain Voltage Range, VD	25	50	55	V
Drain Bias Current, IDQ	-	36	-	mA
Gate Voltage, $V_G^2$	-3.4	-2.9	-2.3	V

Notes:

1. Electrical performance is measured under conditions noted in the electrical specifications table. Specifications are not guaranteed over all recommended operating conditions.

2. To be adjusted to desired  $I_{DQ}$ .

## Thermal and Reliability Information – DC

Parameter	Conditions	Values	Units
Thermal Resistance, $IR^1(\theta_{JC})$	TDB	TDB	$^{\circ}\text{C}/\text{W}$



## Handling Precaution

Electrostatic Discharge (ESD) Classifications				
Parameter	Symbol	Class	Test Methodology	Typical Values
Human Body Model	HBM	1A	JEDEC JS-001-2017	>450V
Charged Device Model	CDM	C2a	JEDEC JS-002-2018	>700V
Moisture Sensitivity Level	MSL	Level 1	IPC/JEDEC Standard J-STD-020	

## Pulsed Characterization – EVB Performance – Power Tuned<sup>1</sup>

Parameter	Typical Values	Units
Frequency, F	2.6	GHz
Linear Gain, $G_{LIN}$	19.2	dB
Output Power at 3dB compression point, $P_{3dB}$	44.6	dBm
Drain-Efficiency at 3dB compression point	66.7	%
Gain at 3dB compression point	16.2	dB

Notes:

1. Test conditions unless otherwise noted:  $V_D = +50$  V,  $I_{DQ} = 36$  mA, Pulsed (10% Duty Cycle, 100  $\mu$ s Width), Temp = +25 °C.

## Pulsed Characterization – EVB Performance – Efficiency Tuned<sup>1</sup>

Parameter	Typical Values	Units
Frequency, F	2.6	GHz
Linear Gain, $G_{LIN}$	20.4	dB
Output Power at 3dB compression point, $P_{3dB}$	43.8	dBm
Drain-Efficiency at 3dB compression	74	%
Gain at 3dB compression point	17.4	dB

Notes:

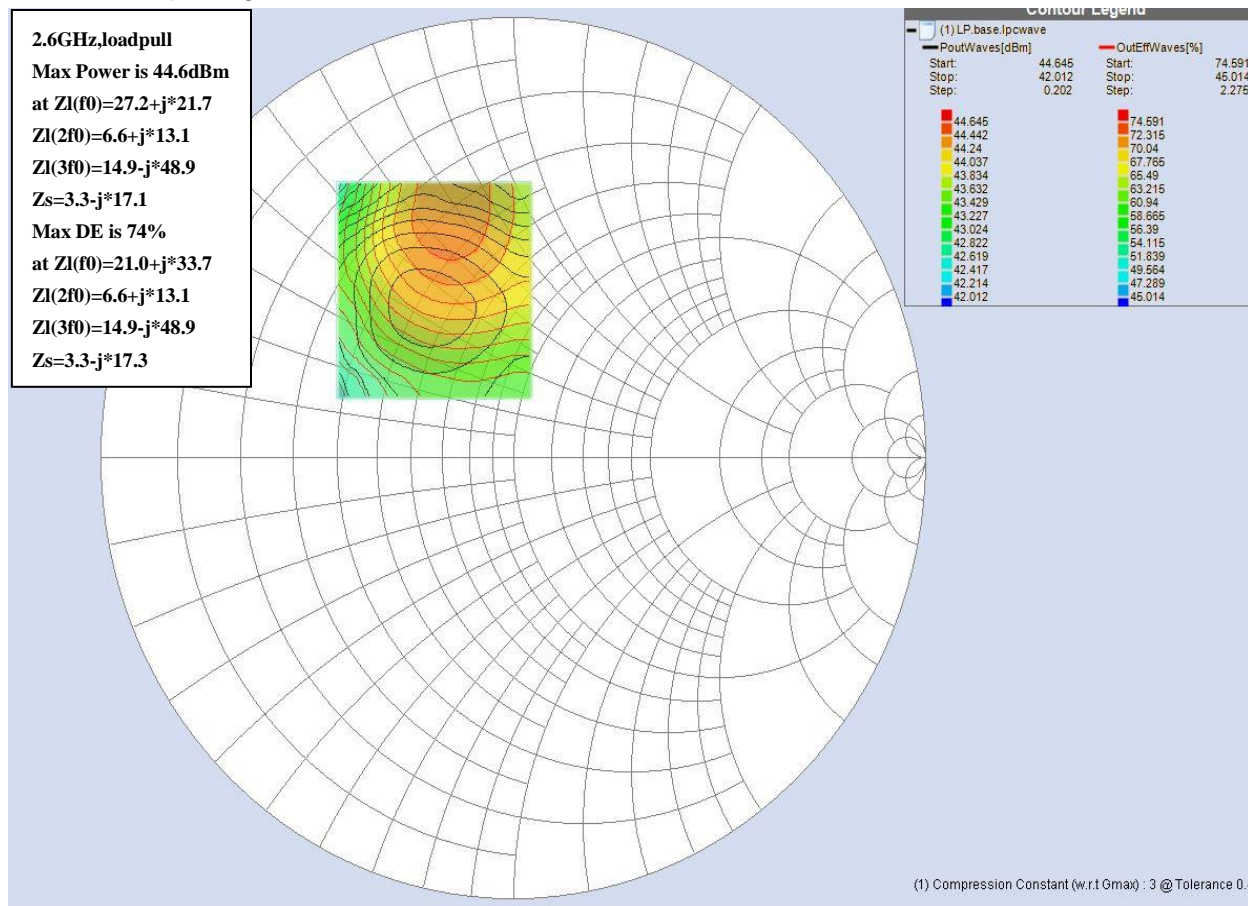
1. Test conditions unless otherwise noted:  $V_D = +50$  V,  $I_{DQ} = 36$  mA, Pulsed (10% Duty Cycle, 100  $\mu$ s Width), Temp = +25 °C.



## Load-Pull Smith Charts<sup>1</sup>

Notes:

1.  $V_D = 50\text{ V}$ ,  $I_{DQ} = 36\text{ mA}$ , 100 us PW, 10% DC pulsed. Performance is at 3dB gain compression referenced to peak gain.



# GHSA3P6020AD

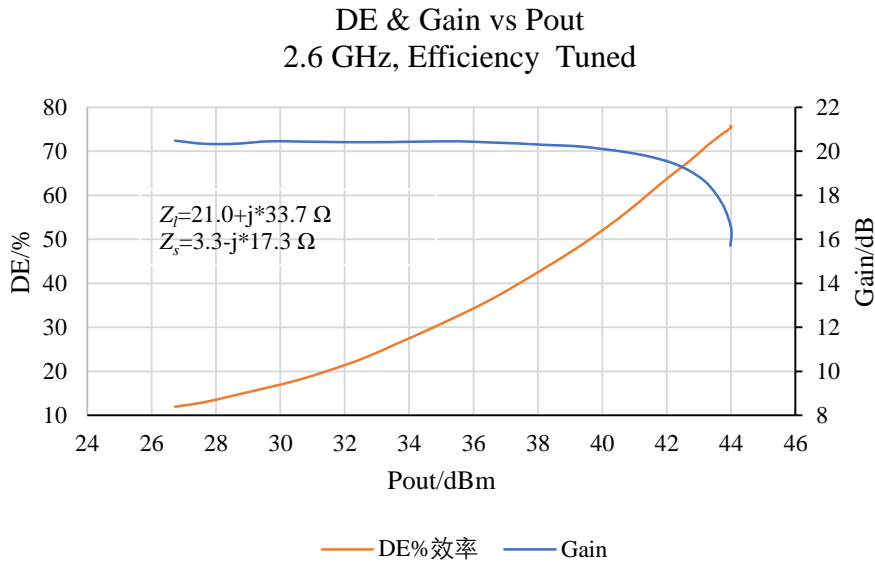
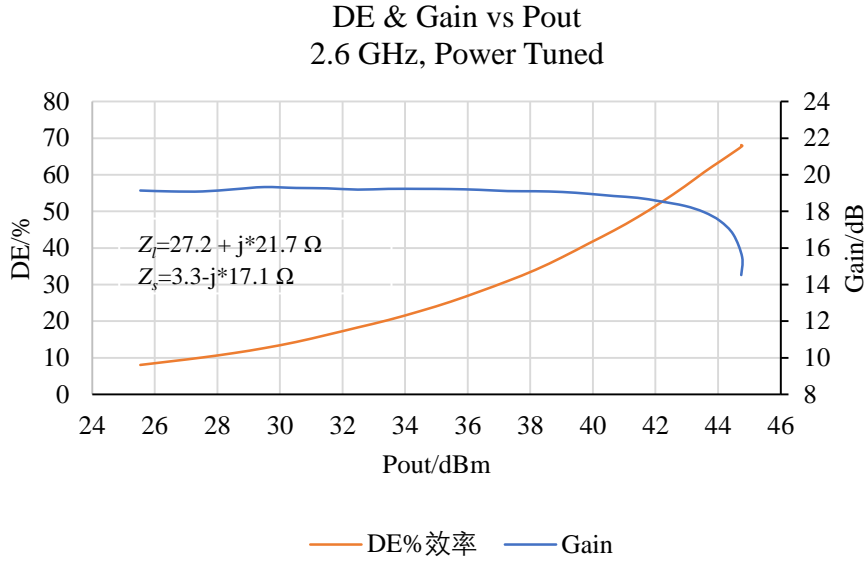
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## Typical Performance – Load-Pull Drive-up<sup>1</sup>

Notes:

1.  $V_D = 50\text{ V}$ ,  $I_{DQ} = 36\text{ mA}$ ,  $100\text{ }\mu\text{s PW}$ ,  $10\%$  DC pulsed. Performance is at 3dB gain compression referenced to peak gain.

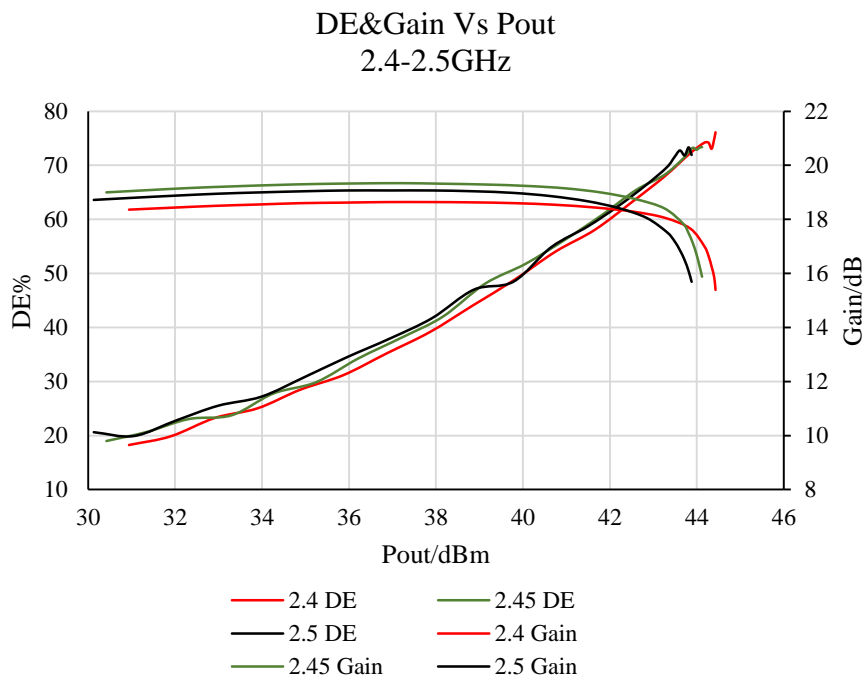




## RF Characterization 2.4-2.5GHz EVB Performance<sup>1</sup>

Notes:

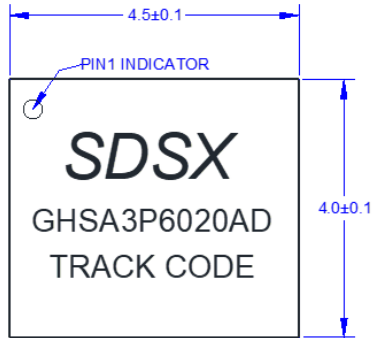
1.  $V_D = 50\text{ V}$ ,  $I_{DQ} = 36\text{ mA}$ ,  $100\text{ }\mu\text{s PW}$ ,  $10\%$  DC pulsed. Performance is at 3dB gain compression referenced to peak gain.



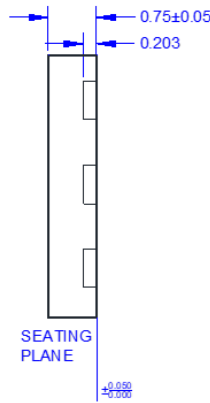


## Package Marking and Dimensions

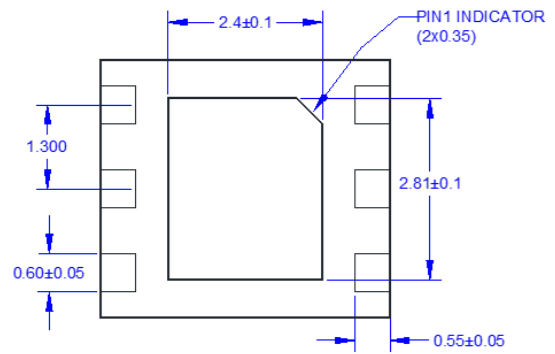
Marking: SDSX Logo



Top VIEW

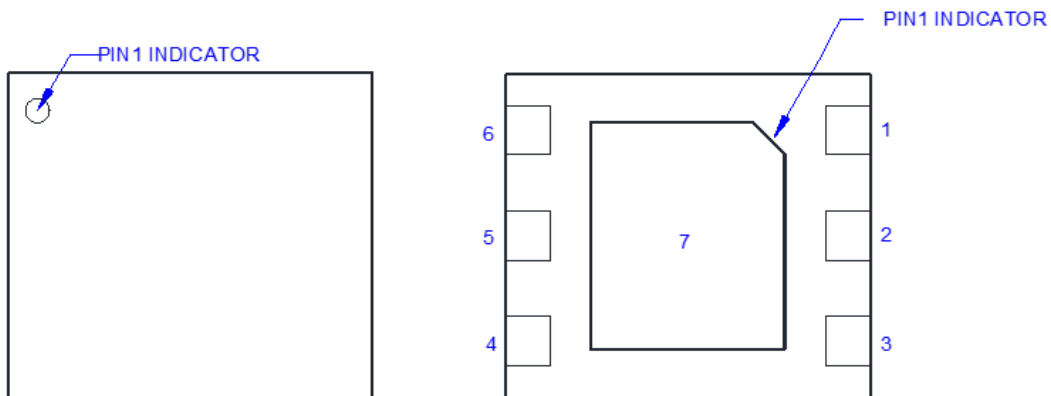


SIDE VIEW



BOTTOM VIEW

## Pin Configuration and Description



Top VIEW

BOTTOM VIEW

Pin Number	Label	Description
1	NC	NC
2	RF IN, Vg	RF Input, Gate Bias
3	NC	NC
4	NC	NC
5	RF Out, Vd	RF Output, Drain Bias
6	NC	NC
7(Back Paddle)	GND	RF and DC Ground

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## Contact Information

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