

# SU5905H GaN TRANSISTOR

Document Number: SU5905H  
Preliminary Datasheet V1.0

## Gallium Nitride 28V 30W, 3-6GHz RF Power Transistor

### Description

The SU5905H is a 30W 28V GaN HEMT, implemented with patented match topology at both input and output side, enable extremely wideband applications with frequencies from 3 to 6GHz. It can support CW, and pulse or any modulation format. When operated at higher voltage like 32V, it can deliver increased power like 40W across the full band.

There is no guarantee of performance when this part is used in applications designed Outside of these frequencies.



• Typical CW performance (on Innogration wide band fixture with device soldered)

Freq(MHz)	Pin(dBm)	Psat(dBm)	Psat(W)	IDS(A)	Gain(dB)	Eff(%)
3000	38.7	45.7	36.0	2.08	7.0	63.1
3100	38.2	45.9	38.6	2.05	7.6	67.3
3200	38.1	45.9	38.8	1.98	7.8	70.0
3300	36.8	46.5	44.5	2.40	9.7	66.2
3400	37.5	47.1	51.6	2.80	9.6	65.9
3500	38.2	47.3	53.7	3.01	9.1	63.7
3600	38.6	47.4	54.3	3.10	8.8	62.6
3700	38.0	47.1	51.5	3.06	9.1	60.1
3800	38.7	47.5	55.6	3.27	8.7	60.7
3900	38.5	47.4	55.0	3.26	9.0	60.2
4000	38.2	47.2	52.5	3.08	9.1	60.9
4100	37.7	46.8	48.3	2.88	9.2	59.9
4200	37.9	46.9	49.2	2.80	9.0	62.8
4300	37.3	46.5	44.7	2.48	9.2	64.3
4400	37.6	46.4	43.9	2.47	8.8	63.4
4500	37.4	46.3	42.8	2.53	8.9	60.4
4600	37.8	46.4	43.7	2.70	8.6	57.7
4700	37.7	46.5	44.3	2.76	8.8	57.3
4800	37.5	46.5	44.4	2.85	9.0	55.6
4900	37.6	46.3	42.9	2.93	8.7	52.2
5000	37.5	46.3	42.2	2.97	8.8	50.7
5100	37.6	46.4	44.0	3.09	8.8	50.8
5200	38.0	46.7	47.1	3.29	8.8	51.1
5300	38.3	47.2	52.7	3.55	8.9	53.0
5400	38.6	47.6	57.4	3.64	9.0	56.3
5500	38.8	47.6	57.1	3.57	8.8	57.2
5600	38.7	47.5	55.8	3.45	8.8	57.8
5700	37.4	46.8	47.4	2.93	9.3	57.8
5800	38.1	46.3	42.3	2.78	8.1	54.3
5900	37.8	45.8	38.4	2.66	8.0	51.5
6000	38.7	45.6	36.6	2.64	7.0	49.6

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## Applications and Features

- Suitable for wireless communication infrastructure, wideband amplifier, EMC testing, ISM etc.
- High Efficiency and Linear Gain Operations
- Thermally Enhanced Industry Standard Package
- High Reliability Metallization Process
- Excellent thermal Stability and Excellent Ruggedness
- Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

## Important Note: Proper Biasing Sequence for GaN HEMT Transistors

### Turning the device ON

1. Set VGS to the pinch-off (VP) voltage, typically -5 V
2. Turn on VDS to nominal supply voltage (28V)
3. Increase VGS until IDS current is attained
4. Apply RF input power to desired level

### Turning the device OFF

1. Turn RF power off
2. Reduce VGS down to VP, typically -5 V
3. Reduce VDS down to 0 V
4. Turn off VGS

**Table 1. Maximum Ratings (Not simultaneous, TC = 25°C unless otherwise noted)**

Rating	Symbol	Value	Unit
Drain--Source Voltage	V <sub>DSS</sub>	150	Vdc
Gate--Source Voltage	V <sub>GS</sub>	-10,+2	Vdc
Operating Voltage	V <sub>DD</sub>	32	Vdc
Maximum Forward Gate Current	I <sub>gmax</sub>	12.6	mA
Storage Temperature Range	T <sub>stg</sub>	-65 to +150	°C
Case Operating Temperature	T <sub>c</sub>	+150	°C
Operating Junction Temperature(See note 1)	T <sub>j</sub>	+225	°C

1. Continuous operation at maximum junction temperature will affect MTTF

**Table 2. Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case T <sub>c</sub> = 85°C, T <sub>j</sub> =200°C,FEA	R <sub>θJC-DC</sub>	2.1	°C/W

**Table 3. Electrical Characteristics (T<sub>C</sub> = 25°C unless otherwise noted)**

### DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V <sub>GS</sub> =-8V; I <sub>DS</sub> =12.6mA	V <sub>DSS</sub>	150			V
Gate Threshold Voltage	V <sub>DS</sub> = 28V, I <sub>D</sub> =12.6mA	V <sub>GS(th)</sub>		-2.7		V
Gate Quiescent Voltage	V <sub>DS</sub> =28V, I <sub>DS</sub> =100mA, Measured in Functional Test	V <sub>GS(Q)</sub>		-3.05		V

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## Reference Circuit of Test Fixture Assembly Diagram

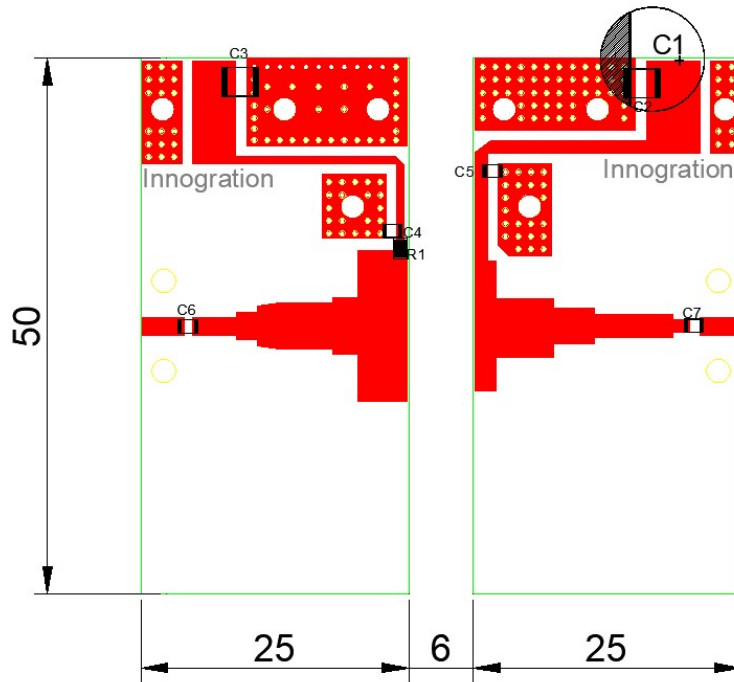
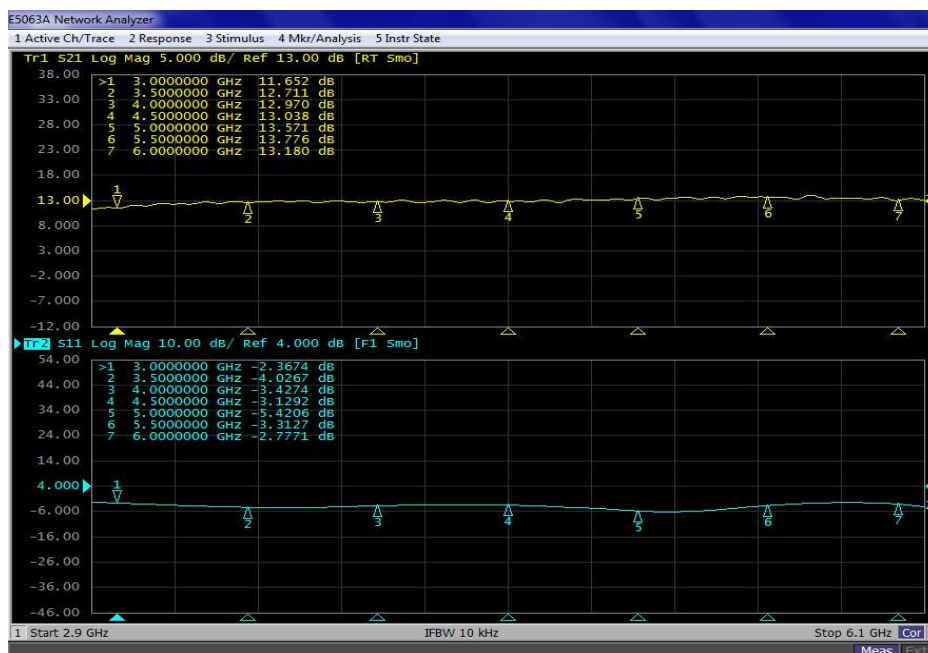


Figure 1. Test Circuit Component Layout (3-6GHz)

Table 4. Test Circuit Component Designations and Values

Component	Description	Suggestion
C1	1000uF/63V	
C2,C3	10uF	1210
C4,C5,C6,C7	3.9pF	MQ300805
R1	Chip Resistor, 10Ω	0805
PCB	30 mils Rogers 4350b	

Figure 2. Network Analyzer S11/S21 output (Vgs=-3.05V, Vds=28V, Idq=100mA)



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## Package Outline

Flanged ceramic package; 2 leads

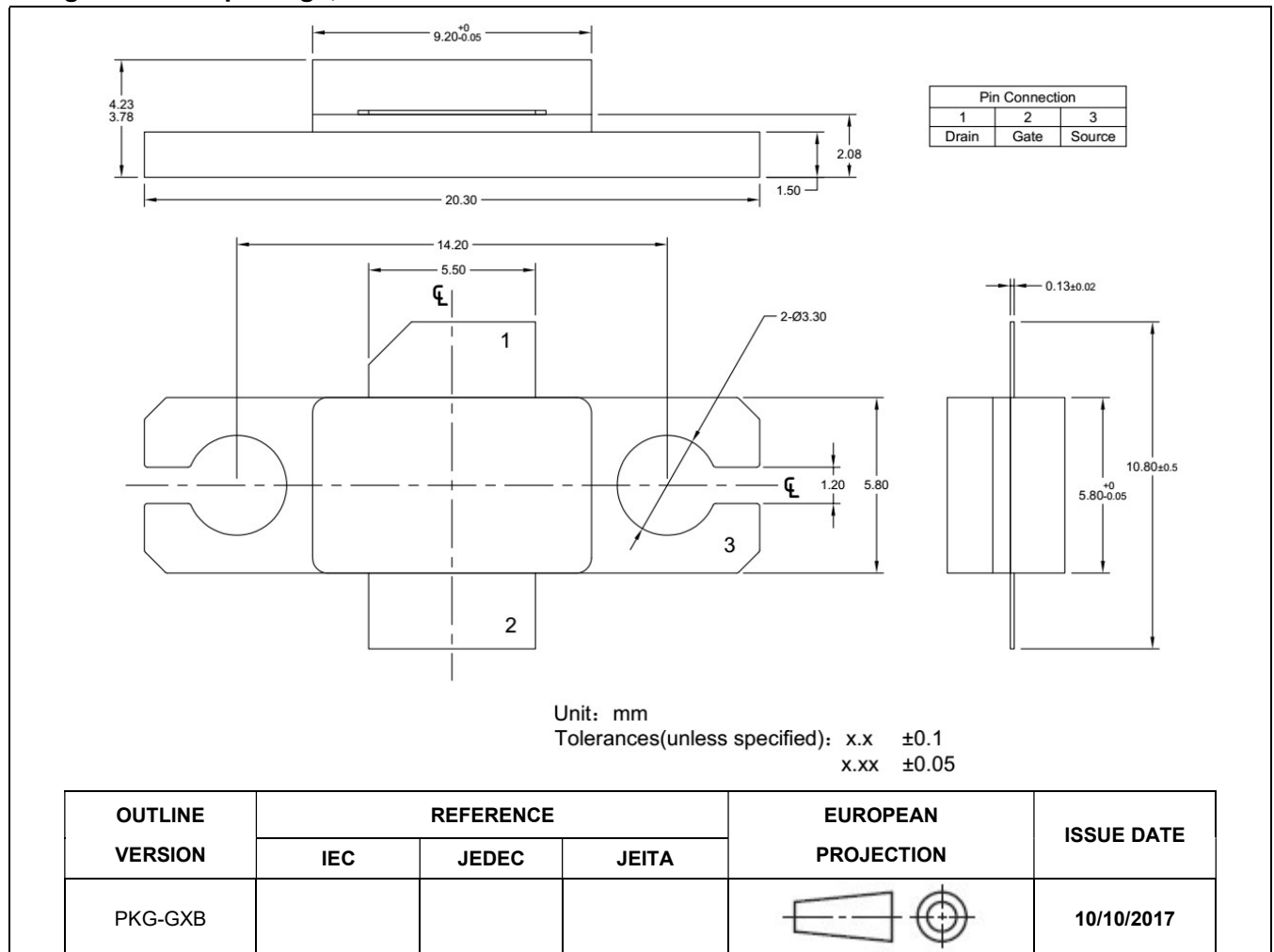


Figure 1. Package Outline PKG-G2E

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## Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2023/11/2	V1.0	Preliminary datasheet creation

Application data based on RXT-23-43

### Notice

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