

# NU5803H GaN TRANSISTOR

Document Number: NU5803H  
Preliminary Datasheet V1.0

## Gallium Nitride 32V 25W, 1-6GHz RF Power Transistor

### Description

The NU5803H is a 25W 32V GaN HEMT, implemented with patented match topology at both input and output side, enable extremely wideband applications with frequencies from 1 to 6GHz. It can support CW, and pulse or any modulation format. It can also work at lower voltage with decreased power capability, typically 20W at 28V across the same full band. There is no guarantee of performance when this part is used in applications designed Outside of these frequencies.



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

VDS=32V VGS=-2.46V IDQ=160mA CW						
Freq(MHz)	Psat(dBm)	Psat(W)	IDS(A)	Pin(dBm)	Gain(dB)	Eff(%)
1000	44.77	30.0	1.66	34.41	10.36	56.46
1200	45.06	32.1	1.86	34.46	10.6	53.87
1400	45.13	32.6	2.11	35.25	9.88	48.26
1600	45.47	35.2	2.21	35.4	10.07	49.83
1800	45.32	34.0	2.42	35.09	10.23	43.96
2000	45.64	36.6	2.79	36.25	9.39	41.04
2200	45.4	34.7	2.88	36.1	9.3	37.62
2400	45.18	33.0	3.02	35.64	9.54	34.11
2600	44.83	30.4	3.35	35.96	8.87	28.37
2800	45.26	33.6	3.28	35.45	9.81	31.99
3000	45.37	34.4	3.26	36.86	8.51	33.01
3200	45.6	36.3	3.08	36.92	8.68	36.84
3400	45.4	34.7	3.25	36.4	9	33.34
3600	45.56	36.0	3.05	35	10.56	36.86
3800	46.99	50.0	3.42	36.27	10.72	45.69
4000	46.72	47.0	2.97	35.44	11.28	49.44
4200	45.14	32.7	2.2	35.47	9.67	46.39
4400	45.34	34.2	2.28	34.79	10.55	46.87
4600	45.26	33.6	2.63	37.06	8.2	39.89
4800	45.4	34.7	2.75	37.6	7.8	39.40
5000	44.84	30.5	2.8	37.3	7.54	34.02
5200	44.93	31.1	2.92	37.56	7.37	33.30
5400	45.26	33.6	3.2	37.8	7.46	32.79
5600	45.67	36.9	3.01	36	9.67	38.31
5800	45.49	35.4	2.98	34.64	10.85	37.12
6000	44.92	31.0	2.78	34.21	10.71	34.90

**Note: Data under 28V upon request, resulting lower output power**

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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>	36	Vdc
Maximum Forward Gate Current	I <sub>gmax</sub>	9	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
2. Bias Conditions should also satisfy the following expression:  $P_{diss} < (T_j - T_c) / R_{JC}$  and  $T_c = T_{case}$

**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>	2.4	°C/W

**Table 3. Electrical Characteristics (TC = 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> =9mA	V <sub>DSS</sub>	150			V
Gate Threshold Voltage	V <sub>DS</sub> = 28V, I <sub>D</sub> =9mA	V <sub>GS(th)</sub>		-2.7		V
Gate Quiescent Voltage	V <sub>DS</sub> =28V, I <sub>DS</sub> =160mA, Measured in Functional Test	V <sub>GS(Q)</sub>		-2.47		V

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## Reference Circuit of Test Fixture Assembly Diagram

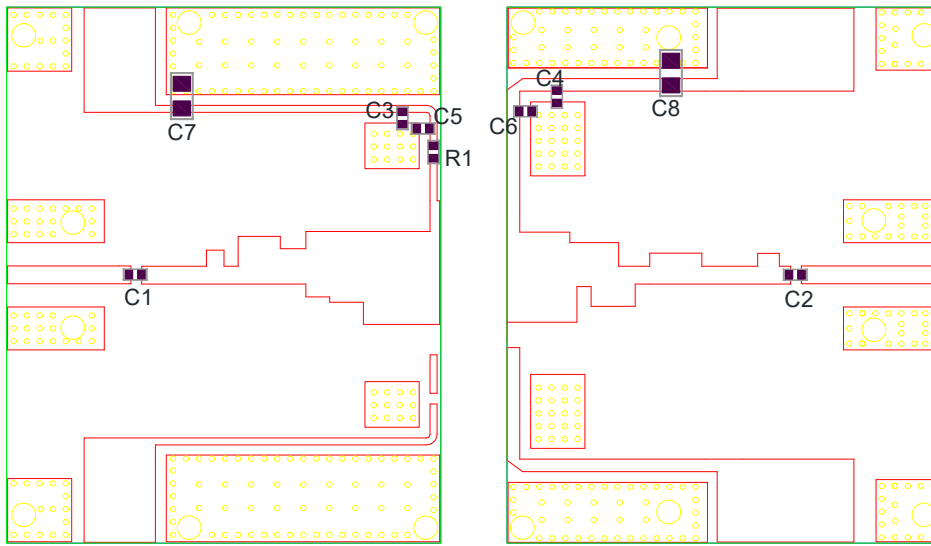
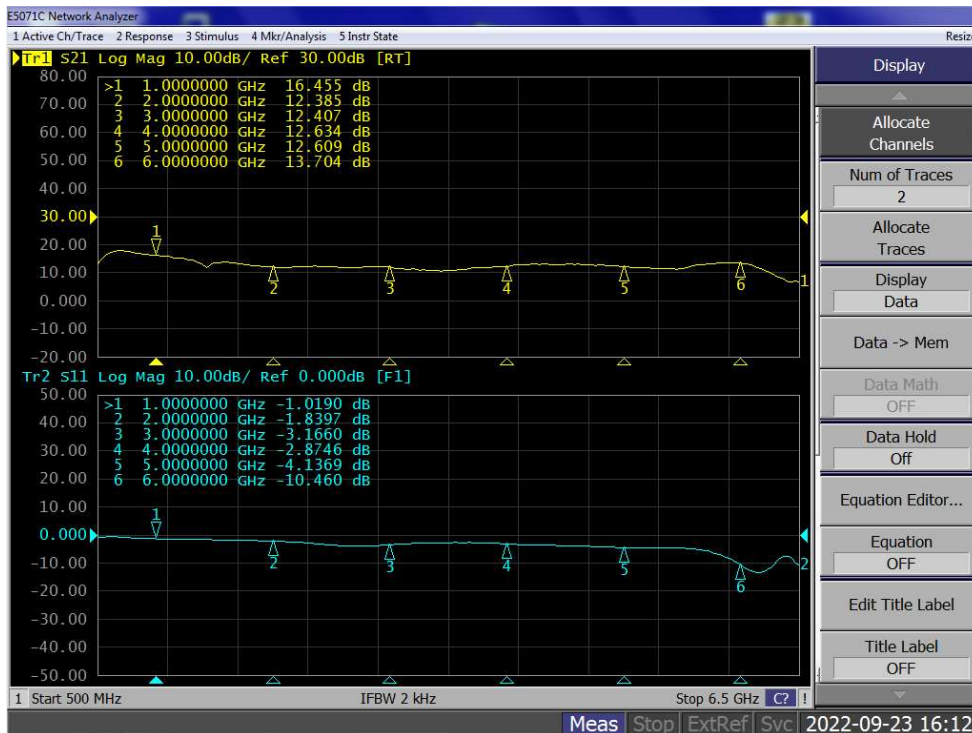


Figure 1. Test Circuit Component Layout (1-6GHz)

Table 4. Test Circuit Component Designations and Values

Component	Description	Suggestion
C1~C4	5.6pF	DLC75D
C5,C6	100pF	DLC75D
C7,C8	10uF	10uF/50V
R1	Chip Resistor,10ohm	1206
PCB	20Mil RO4350B	

Figure 2. Network Analyzer S11/S21 output



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## Package Outline

Flanged ceramic package; 2 leads

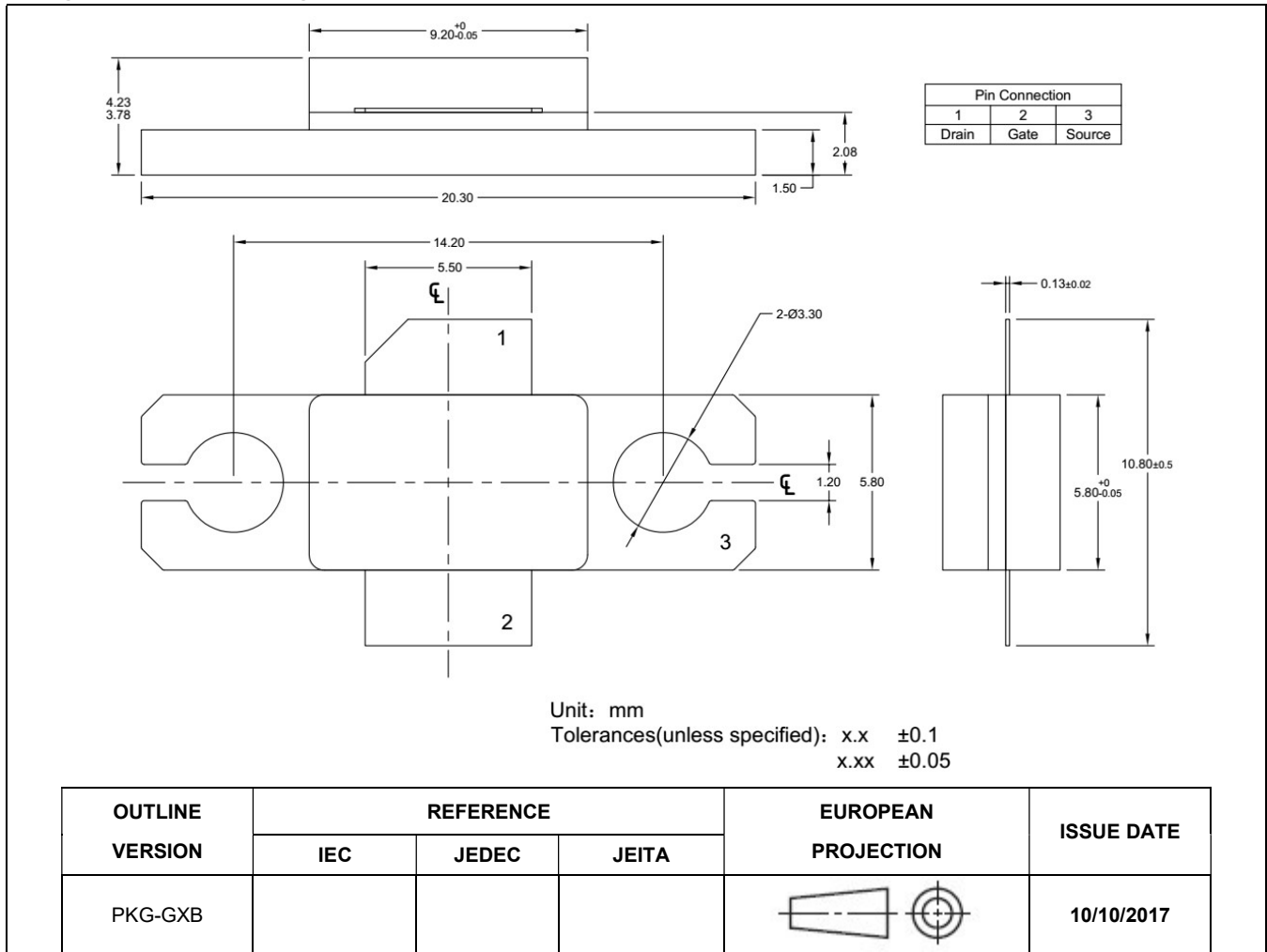


Figure 1. Package Outline PKG-G2E

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## Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2022/9/27	V1.0	Preliminary datasheet creation, GTAH58035G2 renamed to NU5804H

Application data based on HL-22-40

### Notice

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