

NU6008H GaN TRANSISTOR

Document Number: NU6008H
Preliminary Datasheet V1.0

Gallium Nitride 28V 80W, RF Power Transistor

Description

The NU6008H is a 80W 28V, internally matched GaN HEMT, designed for multiple applications with frequencies up to 4GHz.

It can support pulse, CW at saturated condition or any modulation signal at backoff condition.

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



•Typical performance (on Innogration 2.7-3.1GHz wideband fixture with device soldered)

VDS= 28V, Vpeak=-2.62V, Idq=150mA					
Freq (MHz)	P-1(dBm)	P-1Gain (dB)	P-3(dBm)	P-3(W)	Eff (%)
2700	49.75	13.1	50.39	109	55.8
2900	49.27	14.2	50.17	104	61.2
3100	48.64	13.3	49.75	94	63.6

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 _{DSS}	150	Vdc
Gate--Source Voltage	V _{GS}	-10,+2	Vdc
Operating Voltage	V _{DD}	40	Vdc
Maximum Forward Gate Current	I _{gmax}	18	mA
Storage Temperature Range	T _{stg}	-65 to +150	°C
Case Operating Temperature	T _c	+150	°C
Operating Junction Temperature(See note 1)	T _J	+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 _c = 85°C, T _J =200°C, DC Power Dissipation(See note 1)	R _{θJC-DC}	2.4	°C/W

R_{θJC-DC} is tested at only DC condition, it is related to the highest thermal resistor value among all test conditions. It might be differently lower in different RF operation conditions like CW signal ,pulsed RF signal etc.

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Table 3. Electrical Characteristics ($T_C = 25^\circ\text{C}$ unless otherwise noted)

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=-8\text{V}; I_{DS}=18\text{mA}$	V_{DSS}	150			V
Gate Threshold Voltage	$V_{DS} = 28\text{V}, I_D = 18\text{mA}$	$V_{GS(th)}$	-4	-	-2	V
Gate Quiescent Voltage	$V_{DS} = 28\text{V}, I_{DS}=150\text{mA}$, Measured in Functional Test	$V_{GS(Q)}$		-2.6		V

Functional Tests (In Innogration 1.6GHz narrow band Test Fixture, 50 ohm system) : $V_{DD} = 28\text{Vdc}$, $I_{DQ} = 150\text{mA}$, $f = 3.1\text{GHz}$, Pulsed CW

Characteristic	Symbol	Min	Typ	Max	Unit
Power Gain	Gp		11		dB
Drain Efficiency @ P_{SAT}	Eff	60			%
Saturated Power	P_{SAT}	49			dBm
Input Return Loss	IRL		-5		dB
Mismatch stress at all phases (Device no damage)	VSWR		10:1		Ψ

Figure 1: Efficiency and power gain as function of P_{out} : Pulsed CW: 100us width , 10% duty cycle

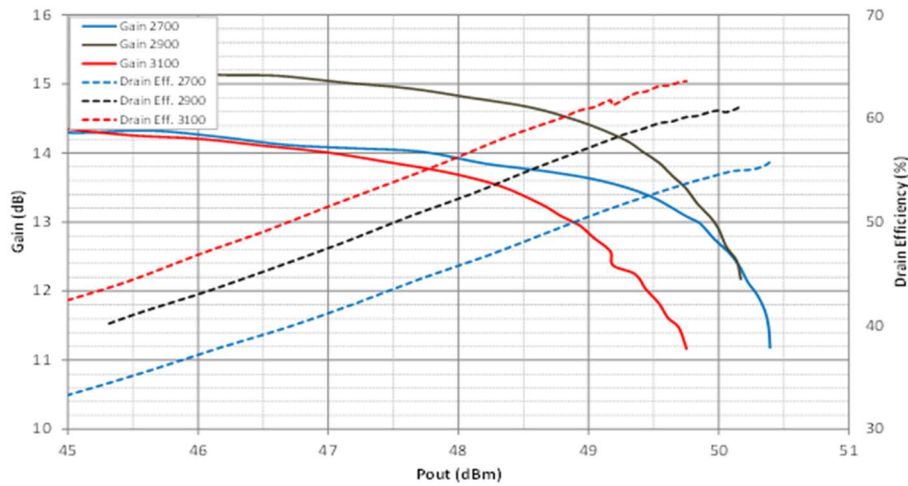
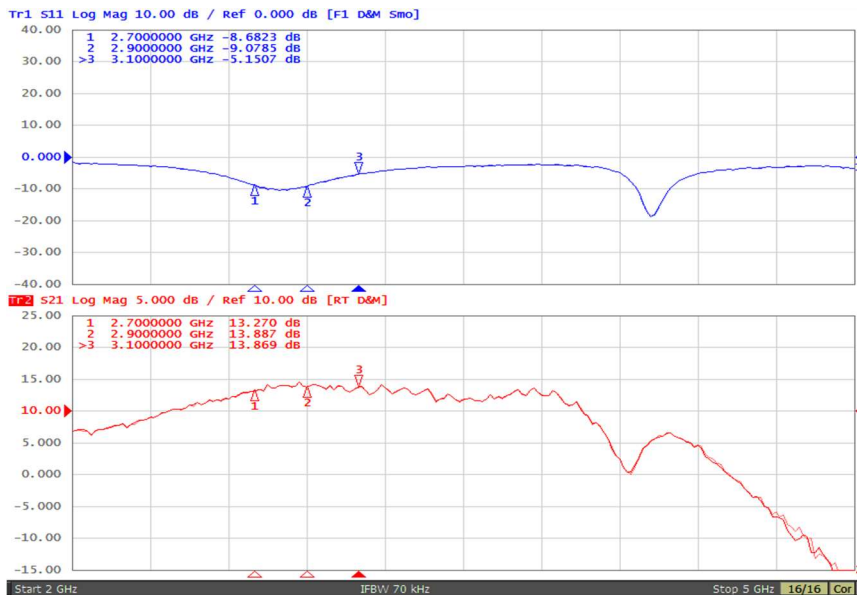


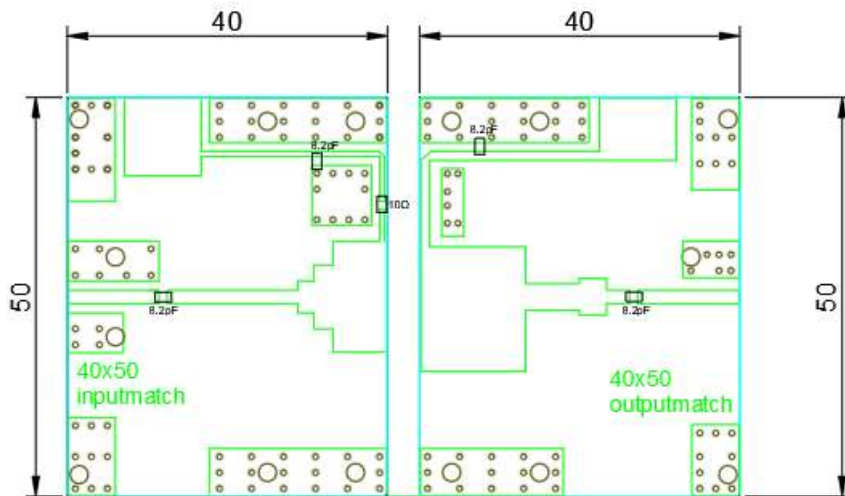
Figure 2. Network Analyzer S11/S21 output ($V_{ds}=28\text{V}, V_{gs}=-2.71\text{V}, I_{dq}=150\text{mA}$, Input Power =0dBm)



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Figure 4: Picture of application board 2.7-3.1GHz class AB (PCB: 20 Mil Rogers 4350, Layout file upon request)



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Package Outline

Flanged ceramic package; 2 leads

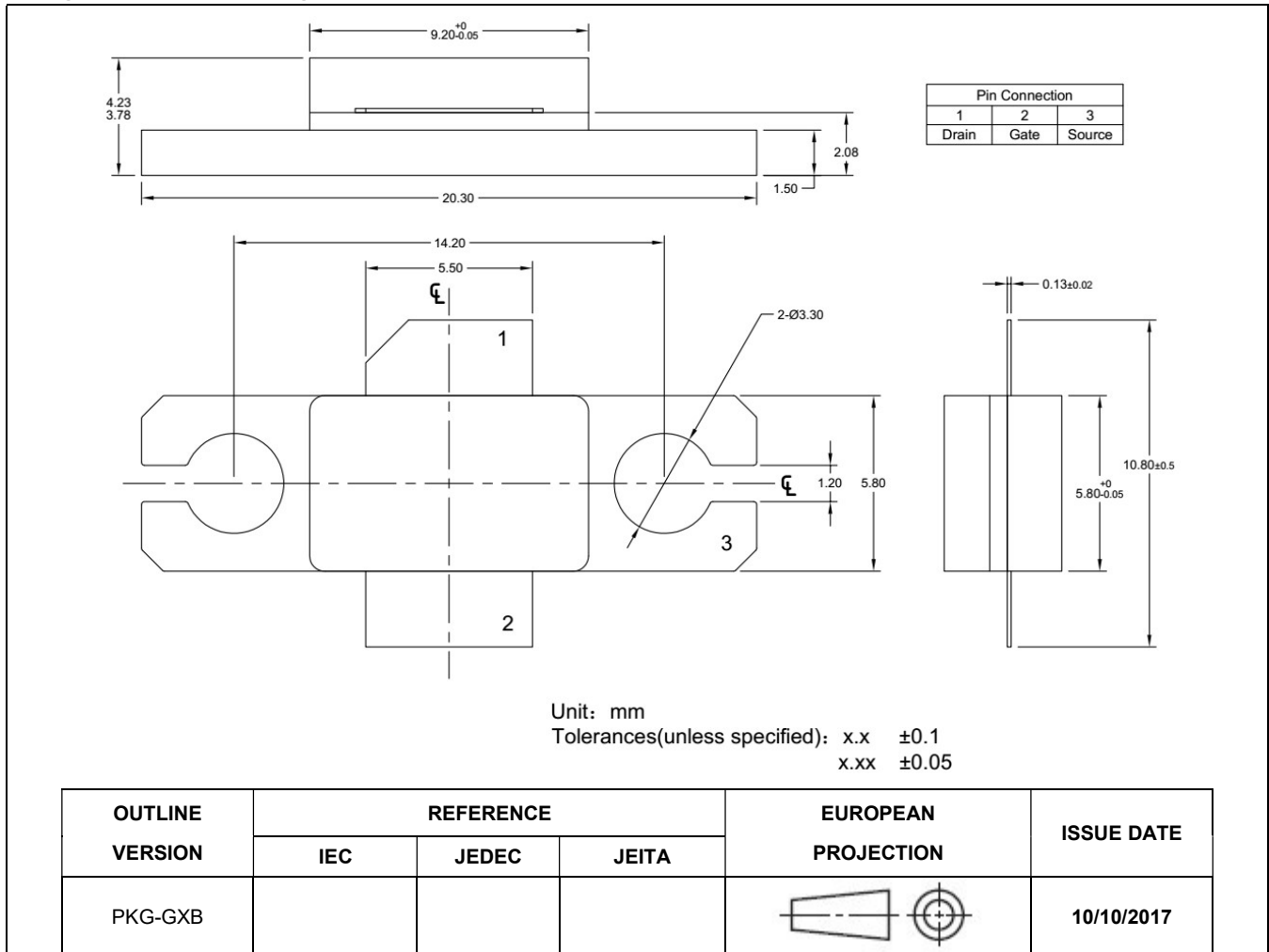


Figure 1. Package Outline PKG-G2E

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Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2021/6/11	V1.0	Preliminary Datasheet Creation

Application data based on HJ-21-09

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