

# NU4005H GaN TRANSISTOR

Document Number: NU4005H  
Preliminary Datasheet V1.0

## Gallium Nitride 28V 50W, RF Power Transistor

### Description

The NU4005H is a 50W , GaN HEMT, designed for multiple applications with frequencies up to 4GHz.

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

- Typical performance (on Innogration narrow band fixture with device soldered)

$V_{DD}=28V$   $I_{DQ}=300mA$ , CW.

Frequency(MHz)	Gp (dB)	P <sub>1dB</sub> (W)	Efficiency (%)
1300	19	50	70



### 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	$I_{gmax}$	14	mA
Storage Temperature Range	$T_{stg}$	-65 to +150	°C
Case Operating Temperature	$T_c$	+150	°C
Operating Junction Temperature(See note 1)	$T_j$	+200	°C
Total Device Power Dissipation (Derated above 25°C, see note 2)	$P_{diss}$	60	W

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  $T_c = T_{case}$**

# NU4005H GaN TRANSISTOR

Document Number: NU4005H  
Preliminary Datasheet V1.0

**Table 2. Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case $T_C = 85^\circ\text{C}$ , $T_J = 200^\circ\text{C}$ , DC Power Dissipation(See note 1)	$R_{\theta\text{JC-DC}}$	3.2	C/W

- $R_{\theta\text{JC-DC}}$  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.

**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	$V_{\text{GS}} = -8\text{V}$ ; $I_{\text{DS}} = 14\text{mA}$	$V_{\text{DSS}}$	150			V
Gate Threshold Voltage	$V_{\text{DS}} = 28\text{V}$ , $I_{\text{D}} = 14\text{mA}$	$V_{\text{GS(th)}}$		-2.7		V
Gate Quiescent Voltage	$V_{\text{DS}} = 28\text{V}$ , $I_{\text{DS}} = 300\text{mA}$ , Measured in Functional Test	$V_{\text{GS(Q)}}$		-2.4		V

**Functional Tests (In Innogration broadband Test Fixture, 50 ohm system) :**  $V_{\text{DD}} = 28\text{Vdc}$ ,  $I_{\text{DQ}} = 300\text{mA}$ ,  $f = 1300\text{MHz}$ , CW

Characteristic	Symbol	Min	Typ	Max	Unit
Power Gain@ $P_{1\text{dB}}$	Gp		19		dB
Drain Efficiency @ $P_{1\text{dB}}$	Eff	65	70		%
1dB compressed power	$P_{\text{SAT}}$	45	50		W
Input Return Loss	IRL		-7		dB
Mismatch stress at all phases (Device no damage)	VSWR		10:1		$\Psi$

# NU4005H GaN TRANSISTOR

Document Number: NU4005H  
Preliminary Datasheet V1.0

## Package Outline

Flanged ceramic package; 2 leads

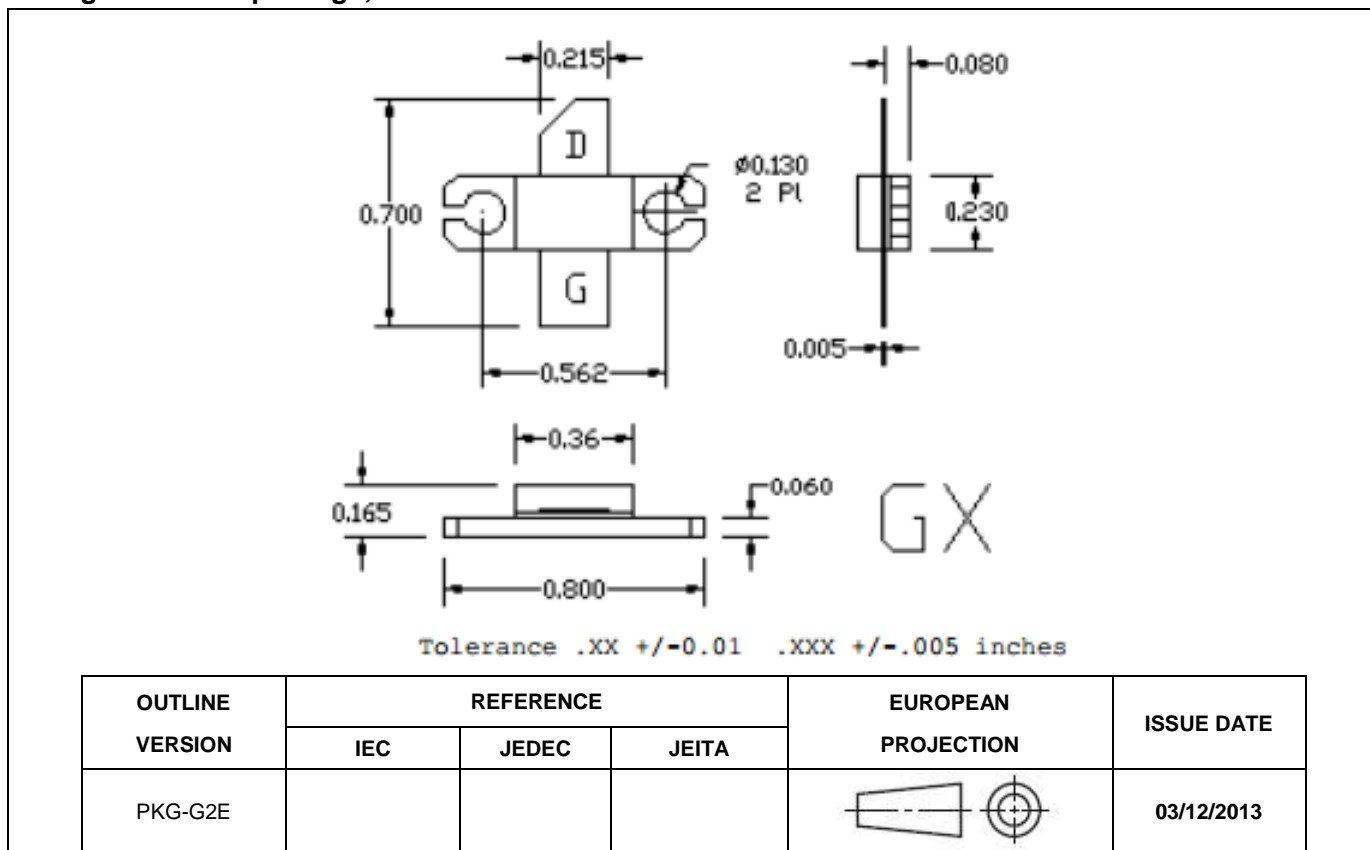


Figure 1. Package Outline PKG-G2E

# NU4005H GaN TRANSISTOR

Document Number: NU4005H  
Preliminary Datasheet V1.0

## Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2017/3/10	V1.0	Objective Datasheet Creation
2017/6/19	V1.0	Preliminary Datasheet Creation

### Notice

Specifications are subject to change without notice. Innogration believes the information within the data sheet to be reliable. Innogration makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose.

“Typical” parameter is the average values expected by Innogration in quantities and are provided for information purposes only. It can and do vary in different applications and related performance can vary over time. All parameters should be validated by customer’s technical experts for each application.

Innogration products are not designed, intended or authorized for use as components in applications intended for surgical implant into the body or to support or sustain life, in applications in which the failure of the Innogration product could result in personal injury or death or in applications for planning, construction, maintenance or direct operation of a nuclear facility.

For any concerns or questions related to terms or conditions, please check with Innogration and authorized distributors

Copyright © by Innogration (Suzhou) Co.,Ltd.