

NU4011H GaN TRANSISTOR

Document Number: NU4011H
Preliminary Datasheet V1.0

Gallium Nitride 28V 110W, RF Power Transistor

Description

The NU4011H is a 110W 28V, GaN HEMT, designed for multiple applications with frequencies up to 3.2GHz.

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)

$V_{DD}=28V$ $I_{DQ}=650mA$, CW.

Freq(MHz)	Gp (dB)	P_{SAT} (W)	Eff (%)
1300	18	110	65

- Typical performance (on Innogration wideband fixture with device soldered)

$V_{DD}=28V$ $I_{DQ}=100mA$, CW.

Freq(MHz)	Pin(dBm)	Psat(dBm)	Psat(W)	IDS(A)	Gp(dB)	Eff(%)
800	34.7	49.14	82	5.48	14.44	53
900	36	49.1	81	4.98	13.1	58
1000	35	49.2	83	4.9	14.2	60
1100	35.2	49.3	85	5.13	14.1	59
1200	35.2	49.35	86	6	14.15	51
1300	35.1	49.8	95	6.53	14.7	52
1400	35.1	50.1	102	6.26	15	58
1500	35	50.2	104	5.82	15.2	64
1600	35.1	50.2	104	5.3	15.1	70
1700	34.9	49.95	98	5.05	15.05	69
1800	35	49.2	83	4.53	14.2	65
1900	35.9	49.3	85	4.86	13.4	62
2000	35.8	49.3	85	5.2	13.5	58
2100	36.8	49.5	89	5.55	12.7	57



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

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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}	24.5	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}	103	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 $T_c = T_{case}$

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}	1.7	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.

Table 3. Electrical Characteristics (T_C = 25°C unless otherwise noted)

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V _{GS} =-8V; I _{DS} =24.5mA	V _{DSS}	150			V
Gate Threshold Voltage	V _{DS} = 28V, I _D =24.5mA	V _{GS(th)}		-2.7		V
Gate Quiescent Voltage	V _{DS} =28V, I _{DS} =100mA, Measured in Functional Test	V _{GS(Q)}		-2.45		V

Functional Tests (In Innogration narrow band Test Fixture, 50 ohm system) :V_{DD} = 28 Vdc, I_{DQ} = 650 mA, f = 1300 MHz, CW

Characteristic	Symbol	Min	Typ	Max	Unit
Power Gain	G _p		18		dB
Drain Efficiency @ P _{SAT}	Eff		65		%
Saturated Power	P _{SAT}		110		W
Input Return Loss	IRL		-7		dB
Mismatch stress at all phases (Device no damage)	VSWR		10:1		Ψ

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Package Outline

Flanged ceramic package; 2 leads

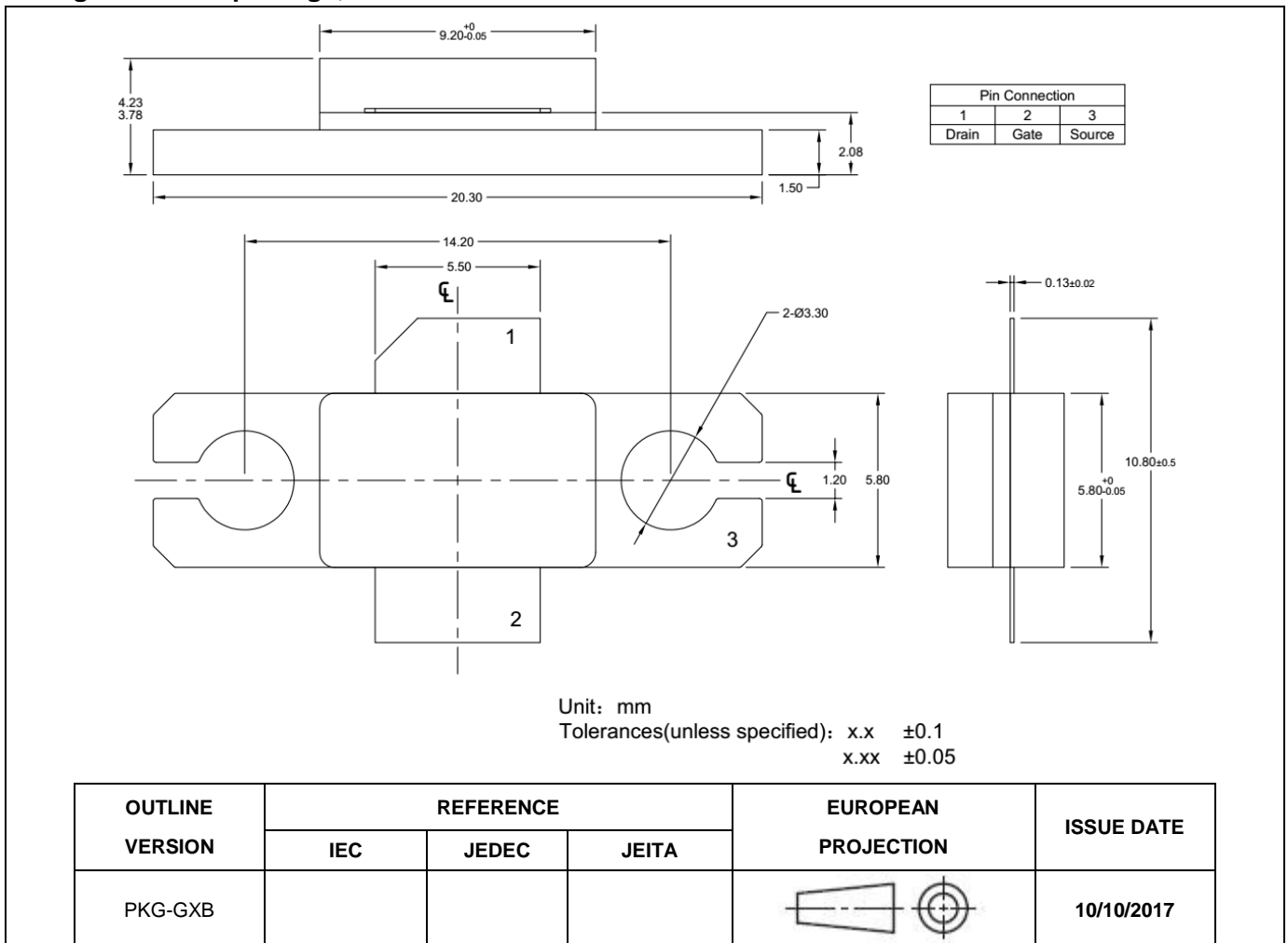


Figure 1. Package Outline PKG-G2E

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2018/10/12	V1.0	Preliminary Datasheet Creation

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