

NU6007H GaN TRANSISTOR

Document Number: NU6007H
Preliminary Datasheet V1.1

Gallium Nitride 28V 70W, RF Power Transistor

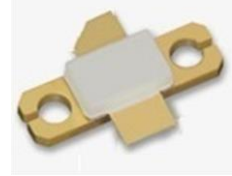
Description

The NU6007H is a 70W 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.

In typical broadband application from 0.5-3GHz or 0.1-0.5GHz, it can deliver >50W across the full band with higher efficiency and gain

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

NU6007H



- Typical performance (on Innogration 0.5-3GHz wideband fixture with device soldered)

NU6007HS ^{V0} V _{gs} =-2.52V V _{ds} =28V Id _q =120mA CW								
Freq (MHz)	Psat (dBm)	Psat (W)	IDS (A)	Pin (dBm)	Gain (dB)	Eff (%)	2th (dBc)	3th (dBc)
100	48.90	77.6	3.74	27.82	21.08	74.13	-9.20	-13.30
150	47.60	57.5	2.68	26.85	20.75	76.68	-13.40	-16.70
200	48.30	67.6	3.05	27.95	20.35	79.17	-13.80	-14.20
250	47.75	59.6	2.68	28.72	19.03	79.38	-10.20	-18.00
300	48.23	66.5	4.05	28.83	19.40	58.67	-14.00	-15.00
350	48.71	74.3	3.59	26.85	21.86	73.92	19.30	-33.50
400	48.56	71.8	3.64	27.46	21.10	70.43	-24.70	-46.00
450	49.32	85.5	4.37	28.57	20.75	69.88	-17.70	-46.00
500	48.41	69.3	3.99	27.88	20.53	62.07	-25.00	-31.00

Recommended driver: ITEH40001P3

- Typical performance (on Innogration 0.5-3GHz wideband fixture with device soldered)

NU6007HS ^{V0} V _{gs} =-2.41V V _{ds} =28V Id _q =390mA CW						
Freq (MHz)	Psat (dBm)	Psat (W)	IDS (A)	Pin (dBm)	Gain (dB)	Eff (%)
500	47.38	54.7	4.11	35.10	12.28	47.53
600	48.52	71.1	4.75	37.00	11.52	53.47
700	48.94	78.3	4.64	38.27	10.67	60.30
800	48.91	77.8	4.00	38.05	10.86	69.47
900	48.40	69.2	3.41	37.53	10.87	72.46
1000	48.07	64.1	3.37	37.37	10.70	67.95
1100	48.10	64.6	3.54	36.72	11.38	65.14
1200	48.42	69.5	4.10	37.80	10.62	60.54
1300	48.32	67.9	3.81	37.47	10.85	63.67
1400	47.78	60.0	3.39	36.90	10.88	63.19
1500	47.47	55.8	3.35	36.82	10.65	59.54

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1600	48.64	73.1	4.33	37.93	10.71	60.31
1700	48.79	75.7	4.37	37.74	11.05	61.85
1800	48.79	75.7	4.40	35.85	12.94	61.43
1900	48.53	71.3	4.10	35.82	12.71	62.10
2000	47.86	61.1	3.79	36.87	10.99	57.57
2100	47.65	58.2	3.83	37.29	10.36	54.28
2200	47.75	59.6	4.09	37.30	10.45	52.01
2300	47.60	57.5	4.03	37.04	10.56	51.00
2400	47.79	60.1	4.19	36.50	11.29	51.24
2500	47.88	61.4	4.17	36.72	11.16	52.57
2600	47.90	61.7	4.13	37.10	10.80	53.32
2700	47.60	57.5	4.00	37.37	10.23	51.38
2800	47.78	60.0	4.19	36.52	11.26	51.12
2900	48.08	64.3	4.26	36.54	11.54	53.88
3000	47.79	60.1	3.89	37.30	10.49	55.19

Recommended driver: G2MAH0133-12

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_{DS}	150	Vdc
Gate--Source Voltage	V_{GS}	-10,+2	Vdc
Operating Voltage	V_{DD}	40	Vdc
Maximum Forward Gate Current	I_{gmax}	16	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 $T_c=85^{\circ}\text{C}$, $T_j=200^{\circ}\text{C}$, DC Power Dissipation(See note 1)	$R_{\theta JC-DC}$	1.6	°C/W

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$R_{\theta JC-DC}$ 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 ($T_C = 25^{\circ}C$ unless otherwise noted)

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = -8V$; $I_{DS} = 16mA$	V_{DSS}	150			V
Gate Threshold Voltage	$V_{DS} = 28V$, $I_D = 16mA$	$V_{GS(th)}$	-4	-	-2	V
Gate Quiescent Voltage	$V_{DS} = 28V$, $I_{DS} = 400mA$, Measured in Functional Test	$V_{GS(Q)}$		-2.4		V

0.5-3GHz

Figure 1. Network Analyzer S11/S21 output ($V_{DS} = 28V$, $V_{GS} = -2.71V$, $I_{DQ} = 150mA$, Input Power = 0dBm)

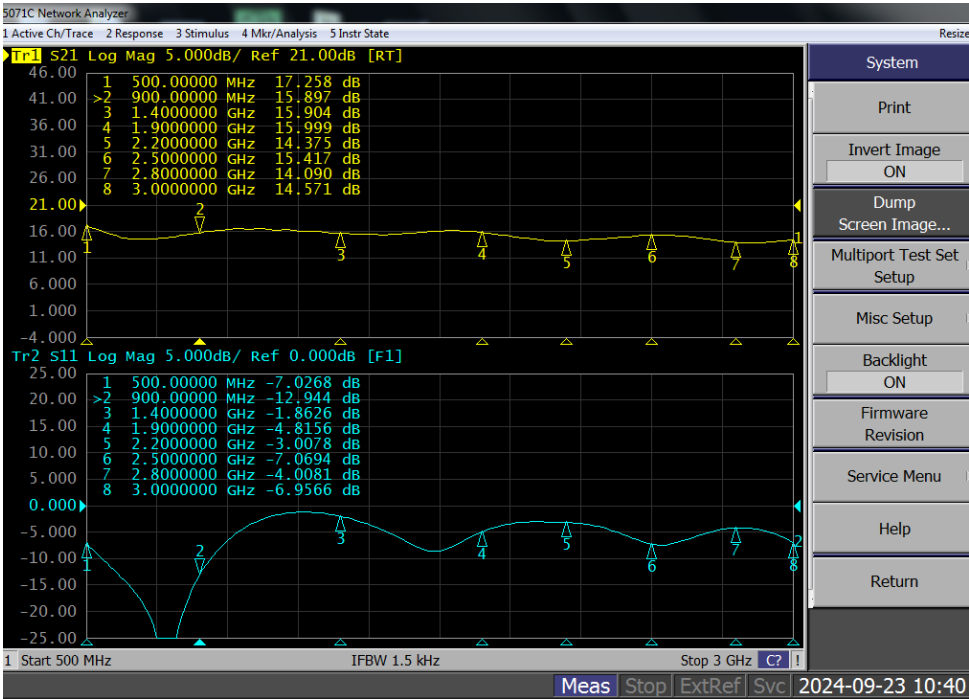
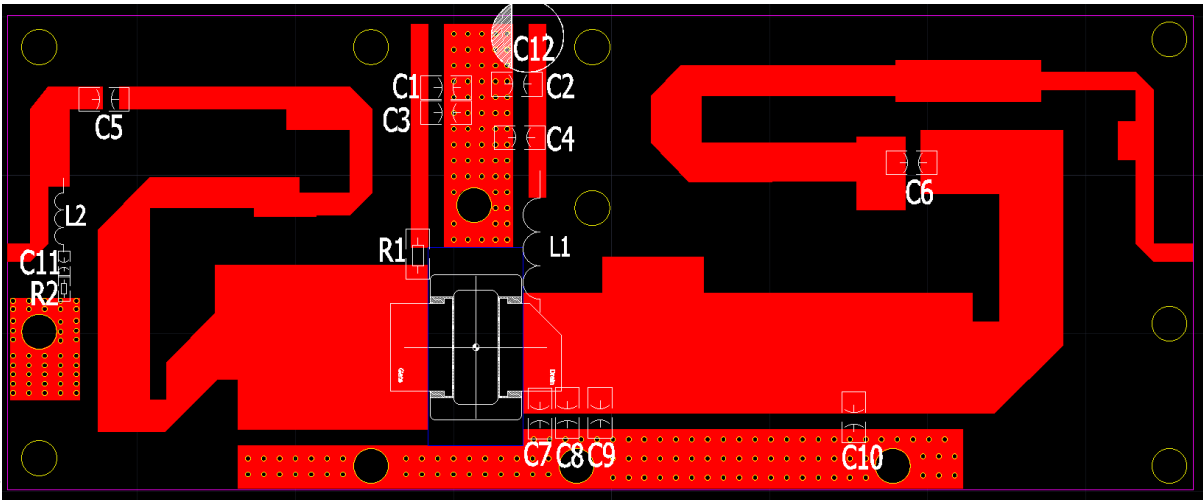


Figure 2: Picture of application board (PCB: 20 Mil Rogers 4350, Layout file upon request)



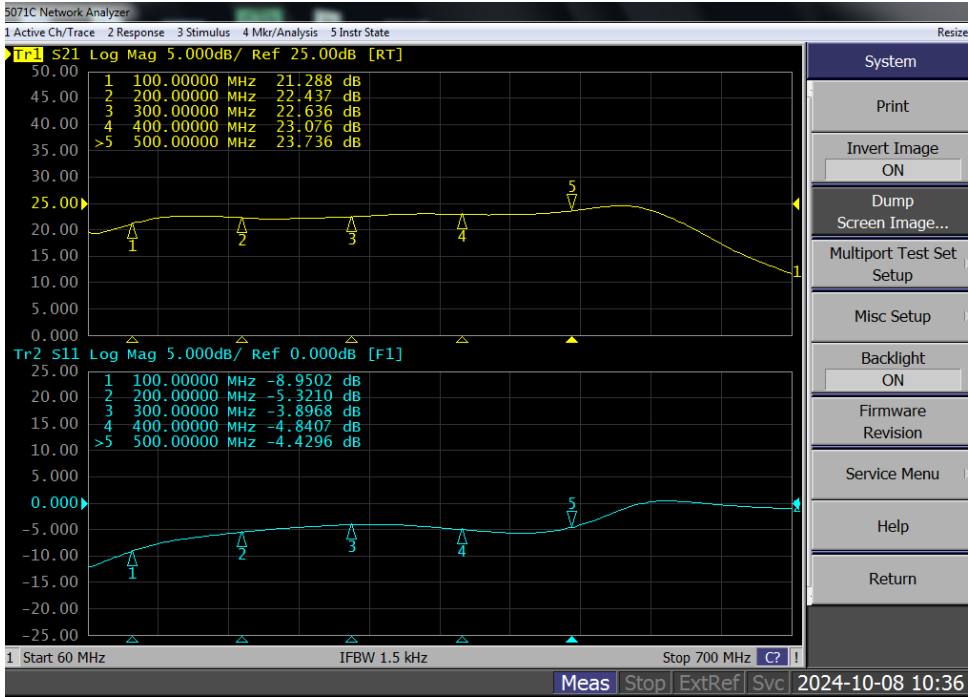
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Component	Description	Suggestion
C1, C2	10uF/200V-1210	Ceramic multilayer capacitor
C3,C4	68pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ101111
C5	24pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ100505
C6	24pf	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ300709
C7	1.8pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ301111
C8,C9,C10	0.5pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ301111
C11	6.8pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ100505
C12	470uF/63V	Electrolytic Capacitor
L1	1mm wire, 3mm innerdiameter, 4turns	DIY
L2	8.2nH-0805	/
R1	51 Ω -1206	Chip Resistor
R2	50 Ω	RFT-50-60
PCB	20Mil Rogers4350	

0.1-0.5GHz

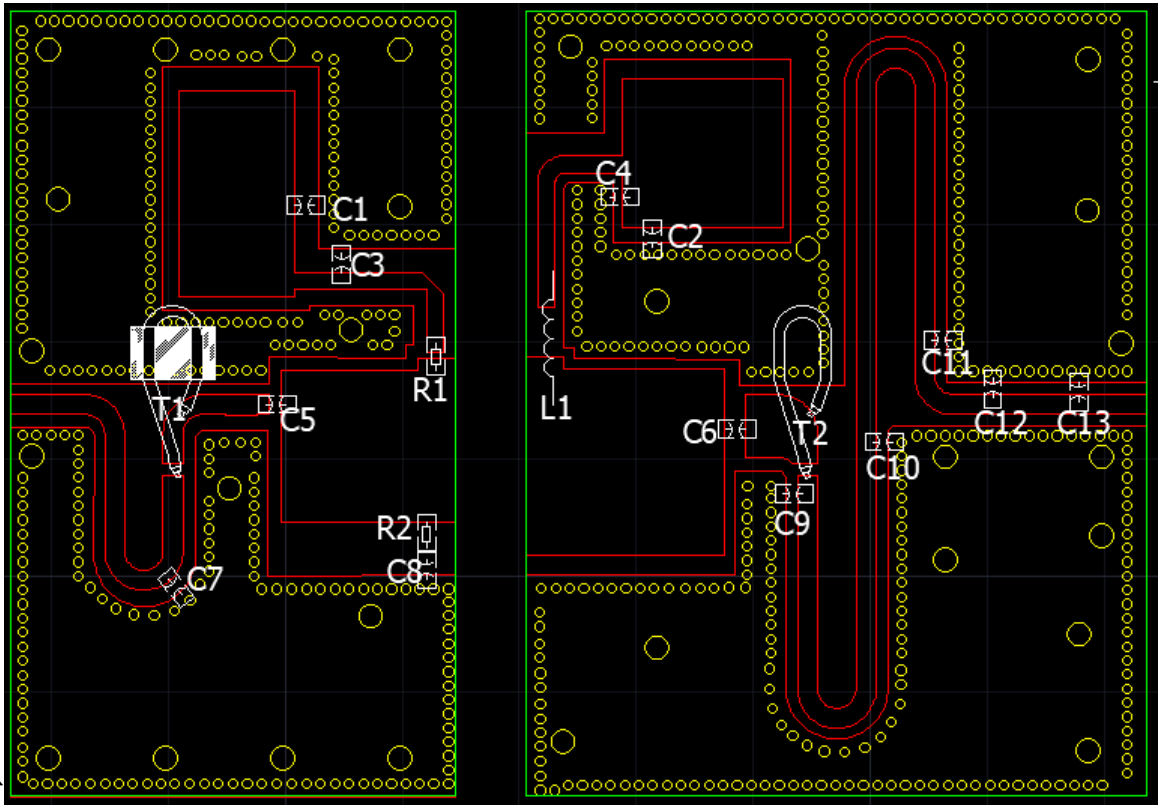
Figure 3. Network Analyzer S11/S21 output (Vds=28V,Vgs=-2.71V,Idq=150mA, Input Power =0dBm)



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Figure 4: Picture of application board (PCB: 30 Mil Rogers 4350, Layout file upon request)



Component	Description	Suggested Manufacturer
C1, C2	10uF/200V-1210	Ceramic multilayer capacitor
C3,C4,C8	10nF/200V-1812	Ceramic multilayer capacitor
C5	560pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ101111
C6	200pf	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ101111
C7	3.9pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ101111
C9	8.2pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ101111
C10,C12	2pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ101111
C11,C13	1pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ101111
L1	1mm wire, 3mm innerdiameter, 5turns	DIY
T1	12.5ohm -45mm;BN-61-1502	SFF-12.5-1.5,BN-61-1502
T2	12.5ohm-45mm	SFF-12.5-1.5
R1,R2	51 Ω -1206	Chip Resistor
PCB	30Mil Rogers4350	

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Package Outline

Flanged ceramic package; 2 leads

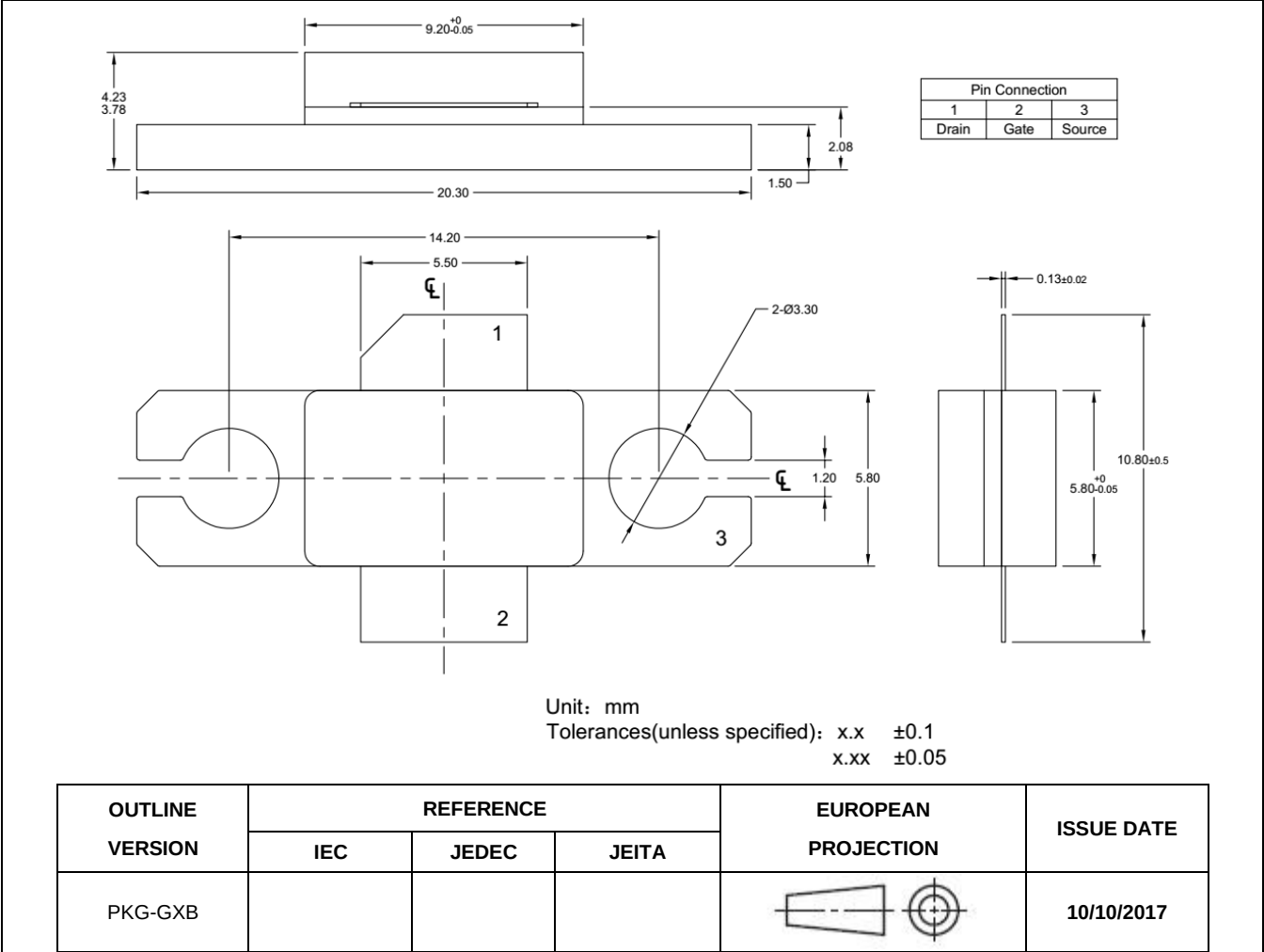


Figure 1. Package Outline PKG-G2E

Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2024/9/23	V1.0	Preliminary Datasheet Creation
2024/10/8	V1.1	Add 0.1-0.5GHz app data

Application data based on TC-24-60/63

Notice

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