NU5802H GaN TRANSISTOR

Document Number: NU5802H
Preliminary Datasheet V1.0

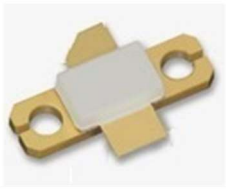
Gallium Nitride 28V 15W, 1-6GHz RF Power Transistor

Description

The NU5802H is a 15W 28V 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 higher voltage like 32V with increased power capability, across the same full band.

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

NU5802H



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

Vgs=-2.27V,Vds=28V,Idq =200mA, CW

Freq(MHz)	Pout(dBm)	Pout(W)	IDS(A)	Pin(dBm)	Gain(dB)	Eff(%)
1000	42.63	18.3	1.154	31.08	11.55	56.71
1100	42.79	19.0	1.286	31.15	11.64	52.80
1200	42.89	19.5	1.348	32.95	9.94	51.54
1300	42.87	19.4	1.357	32.76	10.11	50.96
1400	42.98	19.9	1.455	33.00	9.98	48.75
1500	43.07	20.3	1.426	32.96	10.11	50.78
1600	43.05	20.2	1.392	33.20	9.85	51.78
1700	43.30	21.4	1.519	32.00	11.30	50.27
1800	42.65	18.4	1.380	32.45	10.20	47.64
1900	42.70	18.6	1.302	32.69	10.01	51.08
2000	43.28	21.3	1.413	32.61	10.67	53.79
2100	43.66	23.2	1.519	33.49	10.17	54.61
2200	42.90	19.5	1.289	32.70	10.20	54.02
2300	43.40	21.9	1.376	33.85	9.55	56.78
2400	43.11	20.5	1.246	32.59	10.52	58.66
2500	43.01	20.0	1.200	32.78	10.23	59.52
2600	43.05	20.2	1.244	32.78	10.27	57.95
2700	42.80	19.1	1.282	32.76	10.04	53.08
2800	42.81	19.1	1.324	33.16	9.65	51.52
2900	42.69	18.6	1.316	32.32	10.37	50.42
3000	42.89	19.5	1.335	33.19	9.70	52.04
3100	42.63	18.3	1.529	33.91	8.72	42.80
3200	42.23	16.7	1.733	34.21	8.02	34.44
3300	43.01	20.0	1.937	33.35	9.66	36.87
3400	42.70	18.6	1.776	31.70	11.00	37.45
3500	42.95	19.7	1.876	31.87	11.08	37.55
3600	42.85	19.3	1.926	32.31	10.54	35.74
3700	42.90	19.5	1.938	32.45	10.45	35.93
3800	43.03	20.1	1.970	33.47	9.56	36.42
3900	42.89	19.5	1.907	33.59	9.30	36.43

4000	42.82	19.1	1.938	34.30	8.52	35.28
4100	42.86	19.3	1.919	34.24	8.62	35.96
4200	42.80	19.1	1.869	33.01	9.79	36.41
4300	42.86	19.3	1.857	32.97	9.89	37.16
4400	43.23	21.0	1.754	33.53	9.70	42.84
4500	43.12	20.5	1.764	34.03	9.09	41.53
4600	43.48	22.3	1.800	33.70	9.78	44.21
4700	43.67	23.3	1.811	33.78	9.89	45.91
4800	43.55	22.6	1.815	33.92	9.63	44.56
4900	43.65	23.2	1.864	35.20	8.45	44.40
5000	43.96	24.9	1.872	34.99	8.97	47.48
5100	43.70	23.4	1.740	33.98	9.72	48.12
5200	43.80	24.0	1.781	33.29	10.51	48.10
5300	43.68	23.3	1.794	33.56	10.12	46.45
5400	43.76	23.8	1.791	33.14	10.62	47.40
5500	43.60	22.9	1.698	32.17	11.43	48.18
5600	43.75	23.7	1.734	31.84	11.91	48.84
5700	43.74	23.7	1.811	32.37	11.37	46.66
5800	43.45	22.1	1.758	31.20	12.25	44.96
5900	43.32	21.5	1.756	32.15	11.17	43.68
6000	43.39	21.8	1.850	33.48	9.91	42.14

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}	36	Vdc
Maximum Forward Gate Current	Igmax	9	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**
2. **Bias Conditions should also satisfy the following expression: Pdiss < (Tj – Tc) / RJC and Tc = Tcase**

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case T_C= 85°C, T_J=200°C,FEA	$R_{\theta JC\text{-}DC}$	4.2	°C/W

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

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{GS}=-8V; I_{DS}=5mA	V_{DSS}	150			V
Gate Threshold Voltage	V_{DS} = 28V, I_D =5mA	V_{GS}(th)	-4	-2.7	-3	V
Gate Quiescent Voltage	V_{DS} =28V, I_{DS}=200mA, Measured in Functional Test	$V_{GS(Q)}$		-2.27		V

Reference Circuit of Test Fixture Assembly Diagram

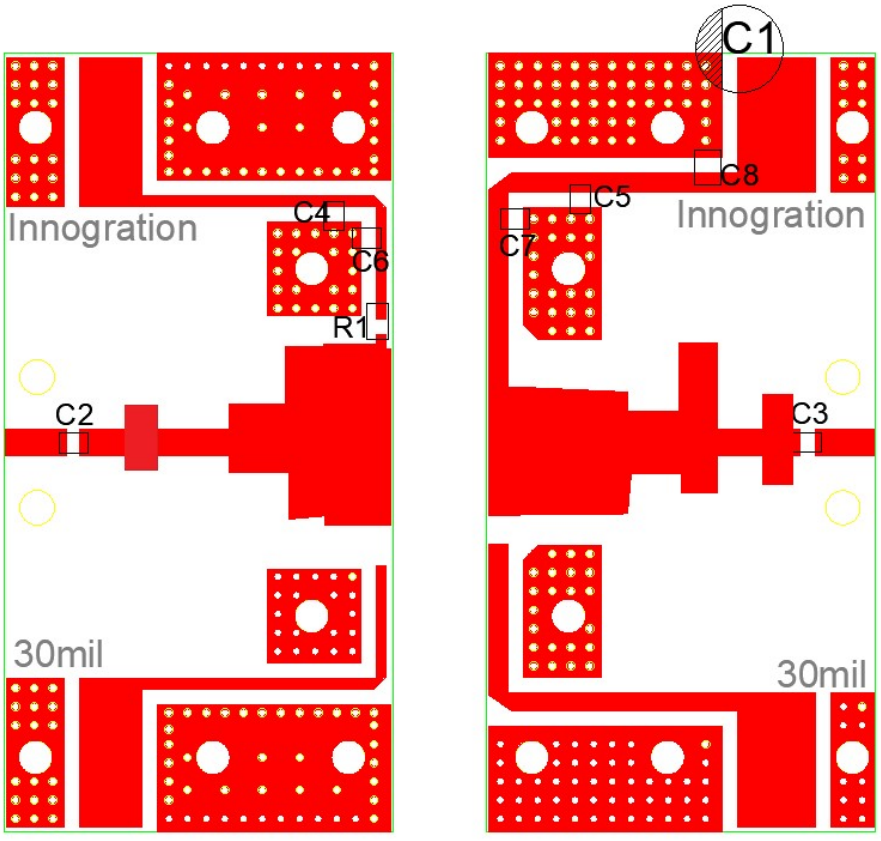


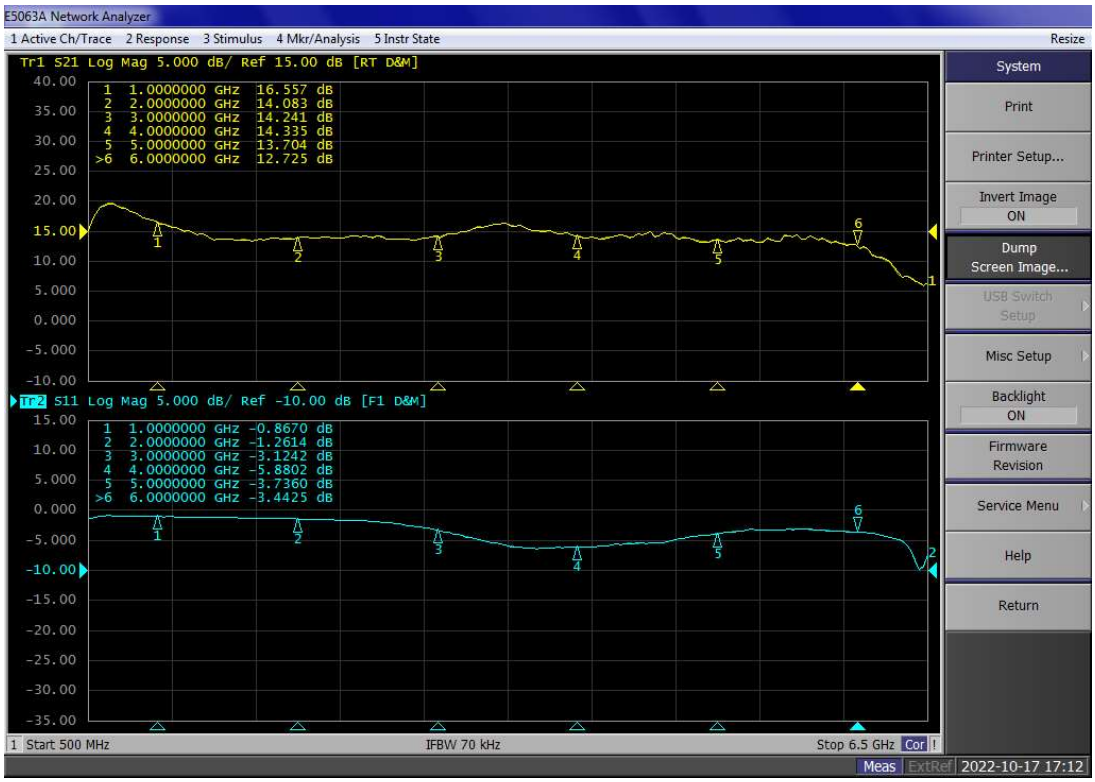
Figure 1. Test Circuit Component Layout (1-6GHz)

Table 4. Test Circuit Component Designations and Values

Component	Description	Suggestion
C2,C3,C4,C5	5.6pF	DLC70B
C6,C7	100pF	DLC70B

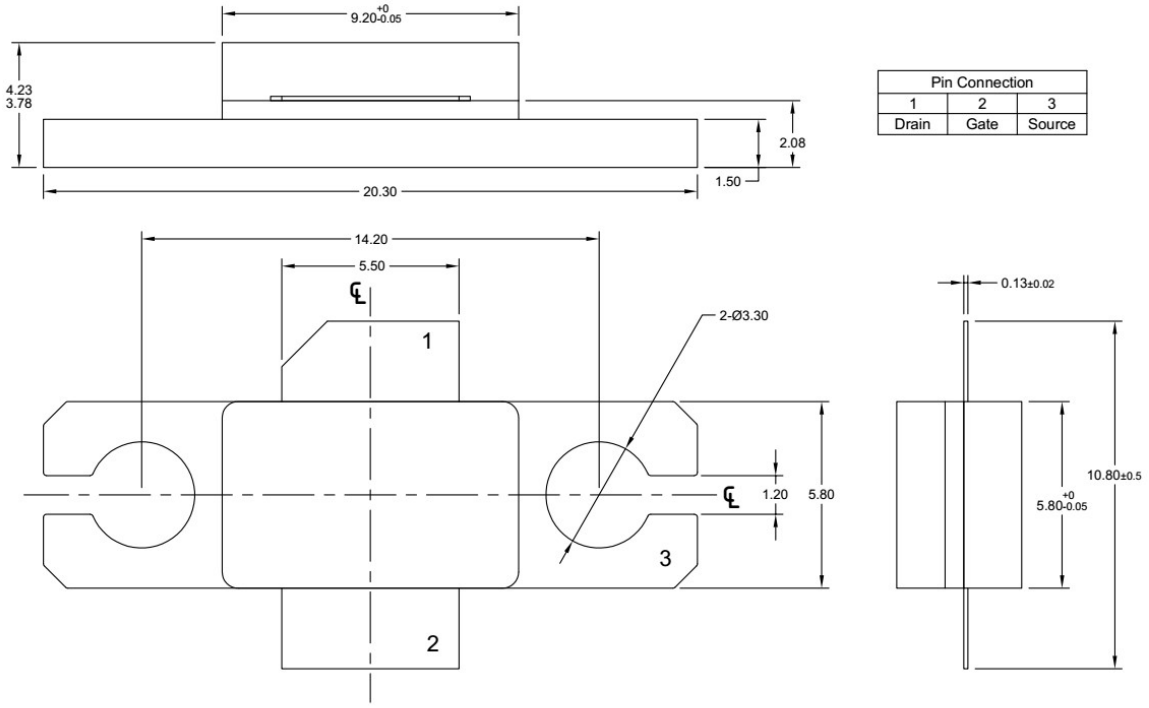
C8	10uF/50V	
C1	470uF/63V	
R1	Chip Resistor,10Ω	1206
PCB	30mil Rogers 4350B	

Figure 2. Network Analyzer S11/S21 output



Package Outline

Flanged ceramic package; 2 leads



OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-GXB					10/10/2017

Figure 1. Package Outline PKG-G2E

Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2022/10/17	V1.0	Preliminary datasheet creation

Application data based on RXT-22-05

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