NR5802HS GaN TRANSISTOR

Document Number: NR5802HS
Preliminary Datasheet V1.0

GaN 28V 20W, 0.7-6GHz Full band RF Power Transistor

Description

The NR5802HS is a 20W 28V GaN HEMT, implemented with unique match topology, enable extremely wideband applications with frequencies from 0.7 to 6GHz. It can support CW, and pulse or any modulation format.

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

NR5802HS

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

Vds = 28V,Vgs = -2.4V，Idq = 100mA Signal mode: CW

Freq(MHz)	Pin(dBm)	Pout(dBm)	Pout(W)	Ids(A)	Gain(dB)	Eff(%)	2nd (dBc)	3rd(dBc)
700	33.5	43.3	21.1	1.04	9.8	72.6	-13.9	-13.8
1000	33.6	44.6	28.5	1.44	11.0	70.7	-15.1	-15.0
1500	31.7	43.1	20.4	1.06	11.4	68.8	-20.5	-15.6
2000	34.2	43.0	20.0	1.66	8.8	42.9	-11.1	-13.6
2500	35.4	43.2	20.9	1.86	7.8	40.1	-8.6	-17.8
3000	36.5	43.1	20.4	1.20	6.6	60.8	-10.8	-30.0
3500	36.5	43.7	23.4	1.70	7.2	49.2	-17.3	-21.7
4000	36.5	43.4	21.6	1.86	6.9	41.5	/	/
4500	36.5	43.6	22.6	2.15	7.1	37.6	/	/
5000	36.5	43.7	23.2	1.71	7.2	48.4	/	/
5500	35.9	43.3	21.3	1.88	7.4	40.6	/	/
6000	34.2	43.1	20.4	1.57	8.9	46.4	/	/

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	8	mA
Storage Temperature Range	Tstg	-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	RθJC-DC	4.2	℃/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)		-2.5		V
Gate Quiescent Voltage	V_{DS} =28V, I_{DS}=100mA, Measured in Functional Test	$V_{GS(Q)}$		-2.4		V

0.7-6GHz
Reference Circuit of Test Fixture Assembly Diagram

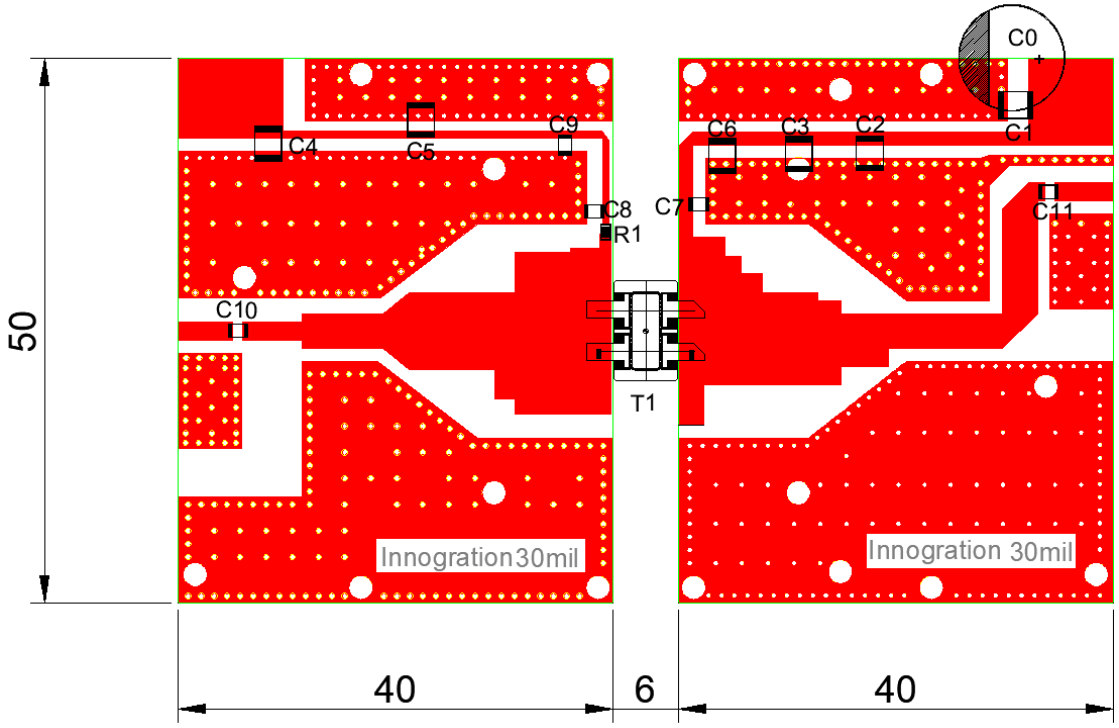
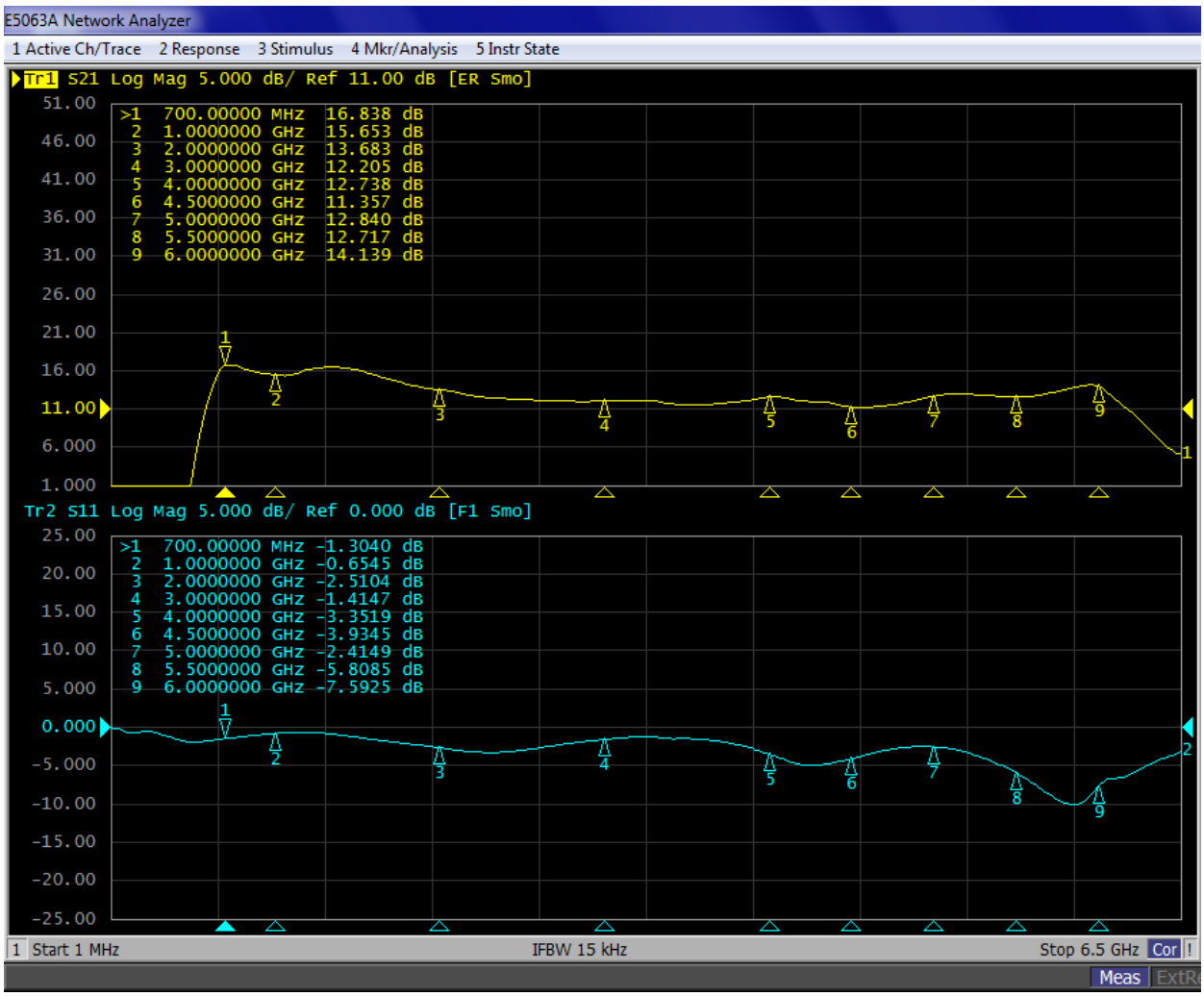


Figure 1. Test Circuit Component Layout (0.7-6GHz)

Table 4. Test Circuit Component Designations and Values

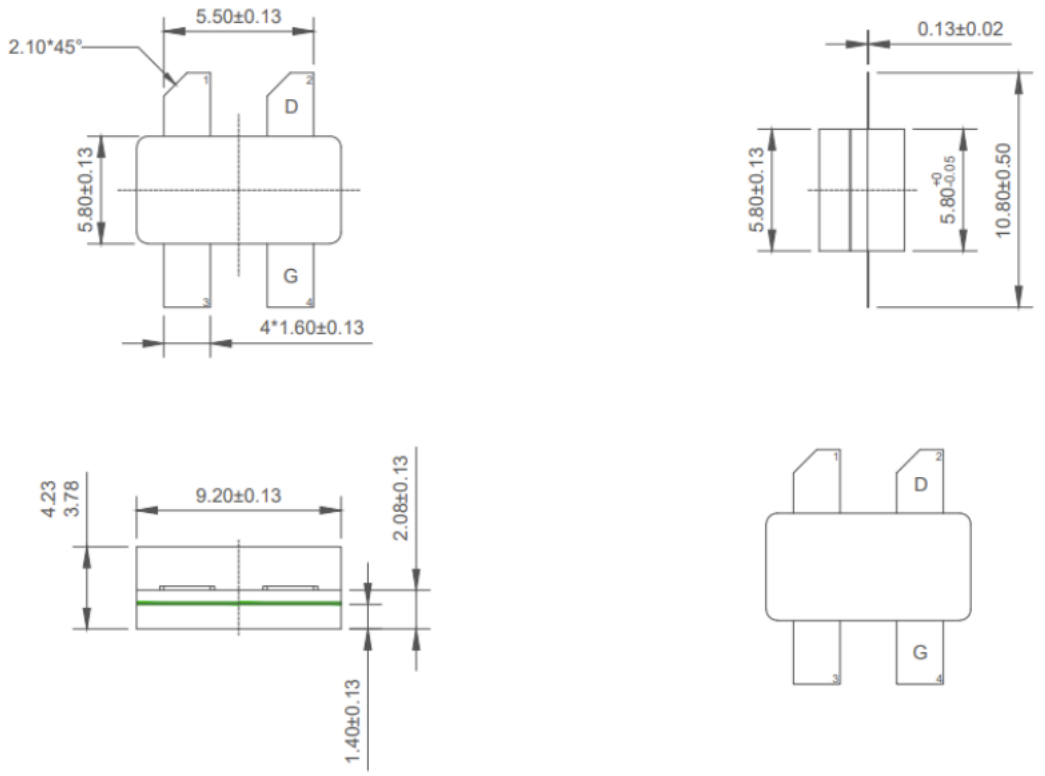
Component	Description	Suggestion
C0	470uF/63V	Electrolytic Capacitor
C1, C2, C3, C4, C5	10uF	1210
C6	200pF	MQ301111
C7, C8	100pF	MQ400805
C9,C11	5.1pF	
C10	6.8pF	
R1	Chip Resistor,10Ω	0603
PCB	Rogers 4350b, thickness 30 mils, 1oz copper	

Figure 2. Network Analyzer S11/S21 output



Package Outline

Earless ceramic package; 4 leads



OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-G4/G4H					3/10/2025

Figure 1. Package Outline PKG-G4/G4H

Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2025/5/19	V1.0	Preliminary datasheet creation, potentially to replace NU5802H for broader bandwidth

Application data based on RXT-25-06

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