XR5803HS GaN TRANSISTOR

Document Number: XR5803HS
Preliminary Datasheet V2.1

GaN 28V 30W, 1-6GHz Full band RF Power Transistor

Description

The XR5803HS is a 30W 28V GaN HEMT, implemented with unique match topology, enable extremely wideband applications with frequencies from 1 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.

XR5803HS

- Typical **1-6GHz** performance (on Innogration wide band fixture with device soldered)

Vds = 28V,Vgs = -2.18V，Idq = 100mA Signal mode: CW

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
1000	43.5	22.4	47.2	14.15	44.81	30.3	55.1
1500	45.11	32.4	49.9	13.65	46.47	44.4	55.5
2000	45.96	39.5	58.9	14.27	47.26	53.2	66.4
2500	44.92	31.1	64.1	14.53	46.24	42.1	71.0
3000	43.52	22.5	54.9	11.89	45.23	33.4	62.6
3500	44.98	31.5	49.3	10.61	46.14	41.1	52.7
4000	44.69	29.4	44.7	12.4	45.76	37.6	48.0
4500	44.01	25.2	39.5	11.6	45.21	33.2	43.1
5000	44.34	27.2	39.2	12.18	45.53	35.7	42.6
5500	44.92	31.0	42.4	13.01	46.2	41.7	46.1
6000	43.4	21.9	43.6	13.56	45.23	33.4	50.5

- Typical **2-6GHz** performance (on Innogration wide band **miniaturized fixture** with device soldered)

Vds = 28V,Vgs = -2.33V，Idq = 200mA Signal mode: CW

Freq(MHz)	Pin(dBm)	Pout(dBm)	Pout(W)	Ids(A)	Gain(dB)	Eff (%)	2nd (dBc)	3rd (dBc)
2000	**35.80**	**45.00**	**31.6**	**2.02**	**9.2**	**55.9**	**-15.9**	**-17.0**
2400	**35.75**	**45.00**	**31.6**	**2.17**	**9.3**	**52.0**	**-18.7**	**-21.4**
2800	**36.10**	**45.10**	**32.4**	**2.35**	**9.0**	**49.2**	**-20.4**	**-21.7**
3000	**36.20**	**45.07**	**32.1**	**2.51**	**8.9**	**45.7**	**-25.1**	**-24.3**
4000	**36.35**	**45.55**	**35.9**	**2.60**	**9.2**	**49.3**	**/**	**/**
5000	**36.05**	**45.07**	**32.1**	**2.74**	**9.0**	**41.9**	**/**	**/**
6000	**34.60**	**45.00**	**31.6**	**2.42**	**10.4**	**46.7**	**/**	**/**

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	$R_{\theta JC\text{-}DC}$	2.6	°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}=8mA	V_{DSS}	150			V
Gate Threshold Voltage	V_{DS} = 28V, I_D =8mA	V_{GS}(th)		-2.5		V
Gate Quiescent Voltage	V_{DS} =28V, I_{DS}=50mA, Measured in Functional Test	$V_{GS(Q)}$		-2.2		V

1-6GHz

Reference Circuit of Test Fixture Assembly Diagram

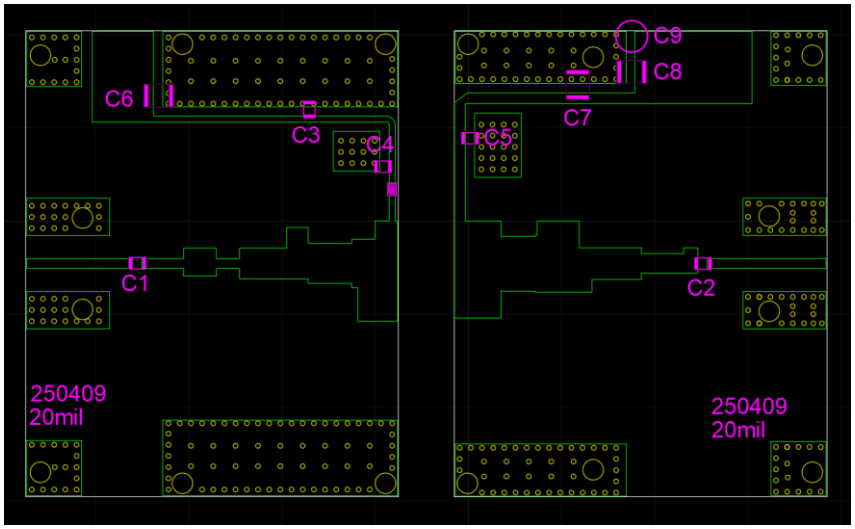
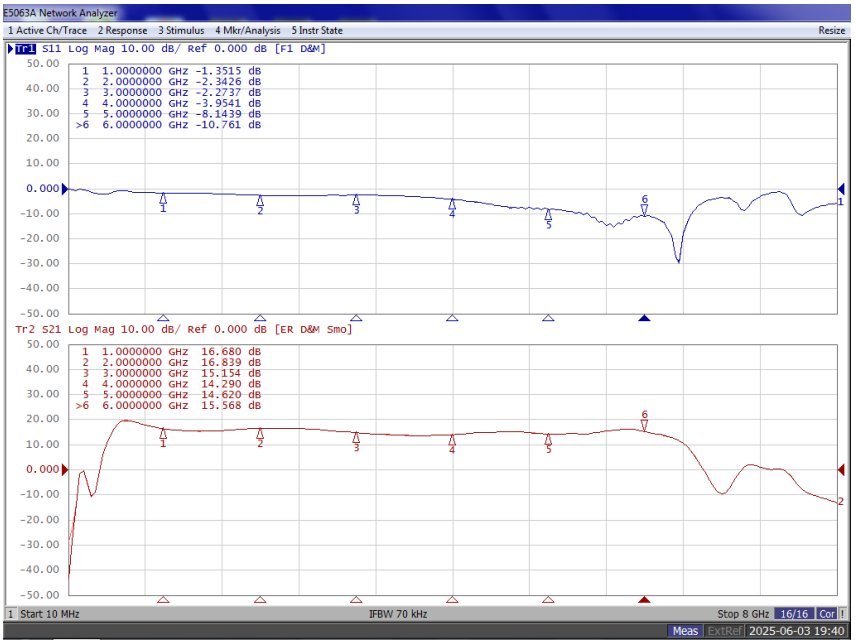


Figure 1. Test Circuit Component Layout (1-6GHz)

Table 4. Test Circuit Component Designations and Values

Component	Value	Quantity
U1	XR5803HS(V2)	1
C1	10pF	1
C2、C3	4.3pF	2
C4、C5	150pF	2
C6、C7、C8	10uF/63V	3
R1	10 Ω	1
C9	470uF/63V	1

Figure 2. Network Analyzer S11/S21 output



2-6GHz

Reference Circuit of Test Fixture Assembly Diagram (Miniaturized design)

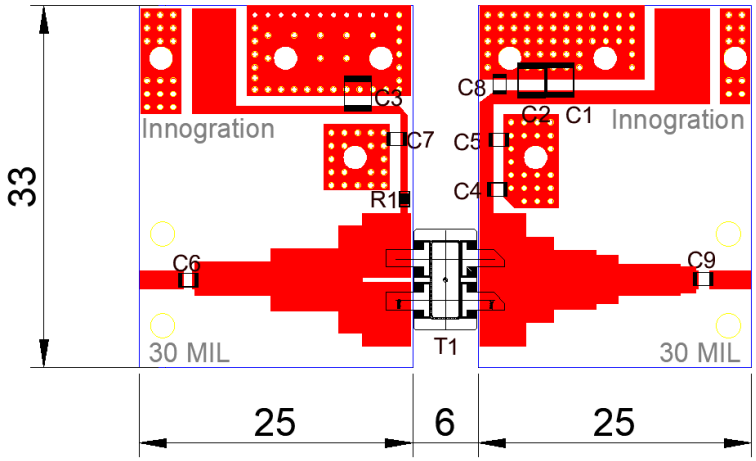
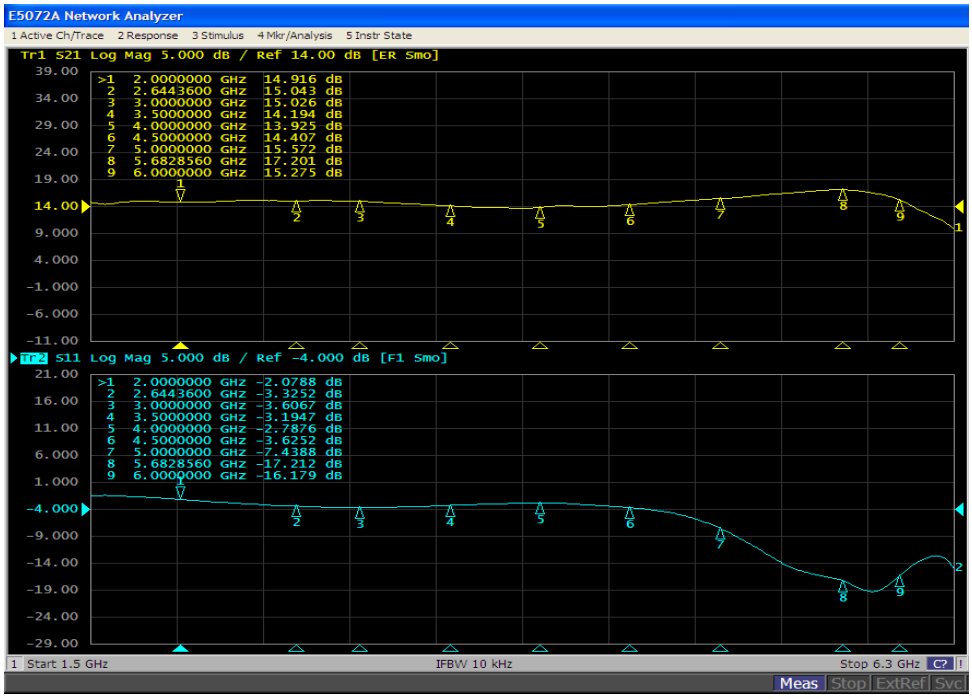


Figure 3. Test Circuit Component Layout (2-6GHz)

Table 5. Test Circuit Component Designations and Values

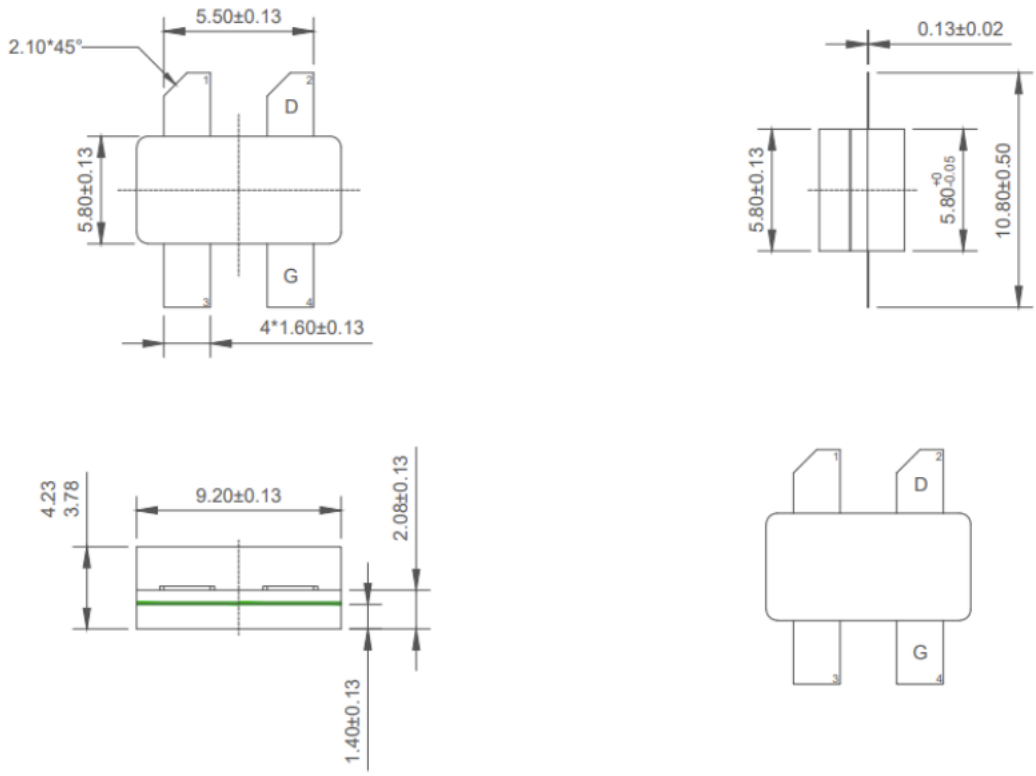
Reference Designator	Description	Quantity	Suggestion
C1, C2, C3	10uF/200V, 0805/1210	3	
C4	100 pF, 0603/0805	1	Beijing YuanLu HongYuan Electronic Technology CO., LTD
C5	51 pF, 0603/0805	1	
C6	6.8 pF, 0603/0805	1	
C7	5.6 pF, 0603/0805	1	
C8, C9	3.9 pF, 0603/0805	2	
R1	10 Ω, 0603/0805	1	Murata

Figure 4. 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
2025/3/27	V1.0	Preliminary datasheet creation, XTAH58030G4H renamed to XR5803HS
2025/6/4	V2.0	Update according to V2 design initiated by GTAH58031G4H
2025/12/5	V2.1	Add 2-6GHz miniaturized circuit application info

Application data based on RXT-25-06,ZYX-25-17, RXT-25-42

Notice