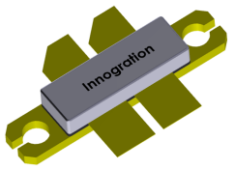
# NX2530RH GaN TRANSISTOR

Document Number: NX2530RH
Preliminary Datasheet V2.1

## Gallium Nitride 28V 300W, RF Power Transistor

**NX2530RH**




### Description

The NX2530RH is a 300W 28V, GaN HEMT, designed for multiple applications with frequencies up to 2.5GHz.

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

•Typical broadband performance (on Innogration wideband fixture with device soldered)

V

| NX2530RH VGS=-2.50V VDS=28V IDQ=400mA CW | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Freq (MHz)** | **Psat (dBm)** | **Psat (W)** | **IDS (A)** | **Pin (dBm)** | **Gain (dB)** | **Eff (%)** | **2nd （dBc）** | **3rd （dBc）** |
| 30 | 52.54 | 179.5 | 9.28 | 38.21 | 14.33 | 69.07 | -30.80 | -10.00 |
| 50 | 52.61 | 182.4 | 9.28 | 38.40 | 14.21 | 70.19 | -39.50 | -10.40 |
| **80** | **53.18** | **208.0** | **10.04** | **33.85** | **19.33** | **73.98** | **-46.00** | **-11.20** |
| **100** | **53.62** | **230.1** | **10.41** | **37.95** | **15.67** | **78.96** | **-33.70** | **-11.70** |
| **200** | **53.73** | **236.0** | **12.12** | **35.90** | **17.83** | **69.56** | **-41.60** | **-12.30** |
| **300** | **53.83** | **241.5** | **13.48** | **36.34** | **17.49** | **64.00** | **-39.10** | **-13.40** |
| **400** | **53.32** | **214.8** | **13.36** | **36.95** | **16.37** | **57.42** | **-28.10** | **-11.70** |
| **500** | **53.34** | **215.8** | **13.45** | **37.41** | **15.93** | **57.30** | **-41.80** | **-11.20** |
| **600** | **53.39** | **218.3** | **12.37** | **36.72** | **16.67** | **63.02** | **-37.20** | **-18.60** |
| **700** | **53.28** | **212.8** | **12.23** | **36.40** | **16.88** | **62.15** | **-33.10** | **-21.30** |
| **800** | **53.51** | **224.4** | **13.80** | **37.83** | **15.68** | **58.07** | **-36.70** | **-26.30** |
| **900** | **53.41** | **219.3** | **14.88** | **38.13** | **15.28** | **52.63** | **-34.50** | **-35.30** |
| **1000** | **53.58** | **228.0** | **14.59** | **38.34** | **15.24** | **55.82** | **-35.00** | **-38.00** |
| **1100** | **53.37** | **217.3** | **13.30** | **38.05** | **15.32** | **58.34** | **-41.70** | **-35.10** |
| **1200** | **53.16** | **207.0** | **12.69** | **39.70** | **13.46** | **58.26** | **-46.10** | **-30.20** |
| 1250 | 53.15 | 206.5 | 12.95 | 40.50 | 12.65 | 56.96 | -51.60 | -36.20 |

### 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 | $V_{DD}$ | 40 | Vdc |
| Maximum Forward Gate Current | Igmax | 72 | 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<br>$T_C$= 85°C, $T_J$=200°C, DC Power Dissipation(See note 1) | $R_{\theta JC\text{-}DC}$ | 0.6 | C/W |

**$R_{\theta JC\text{-}DC}$ 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℃ unless otherwise noted)

**DC Characteristics**

| Characteristic | Conditions | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $V_{GS}$=-8V; $I_{DS}$=72mA | $V_{DSS}$ | 150 | | | V |
| Gate Threshold Voltage | $V_{DS}$ = 28V, $I_D$ =72mA | $V_{GS}$(th) | -4 | - | -2 | V |
| Gate Quiescent Voltage | $V_{DS}$ =28V, $I_{DS}$=200mA, Measured in Functional Test | $V_{GS(Q)}$ | | -2.7 | | V |

**Functional Tests (In Innogration narrow band Test Fixture, 50 ohm system) :** $V_{DD}$ = 28 Vdc, $I_{DQ}$ = 200 mA, f = 1000 MHz, Pulse CW

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| Power Gain @ $P_{sat}$ | Gp | | 16 | | dB |
| Drain Efficiency @ $P_{sat}$ | Eff | | 65 | | % |
| Saturated Power | $P_{sat}$ | | 300 | | W |
| Input Return Loss | IRL | | -7 | | dB |
| Mismatch stress at all phases (Device no damage) | VSWR | | 10:1 | | Ψ |

## 80-1200MHz

**Figure 1: Network analyzer output, S11 and S21**

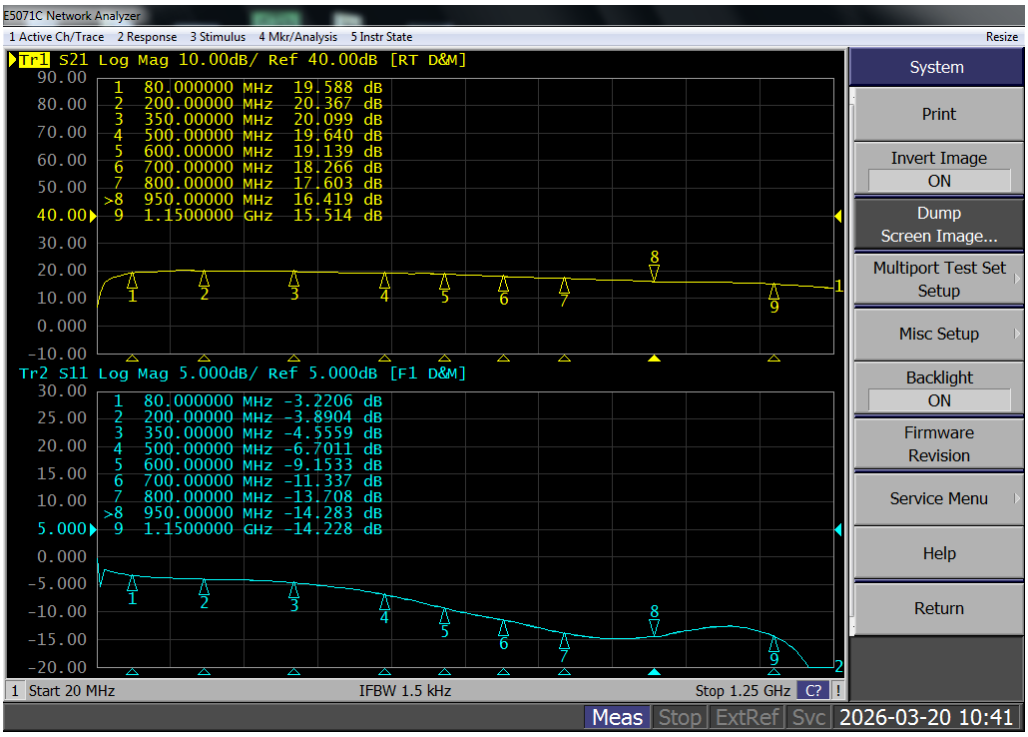
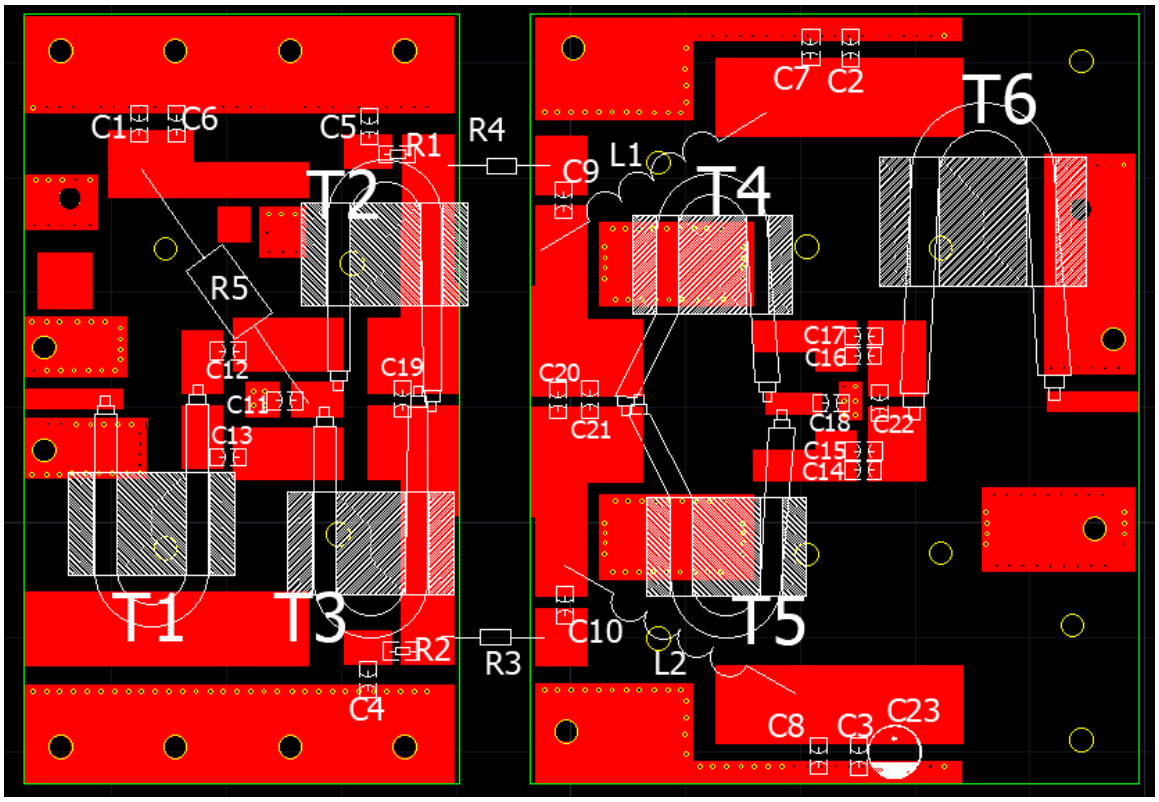


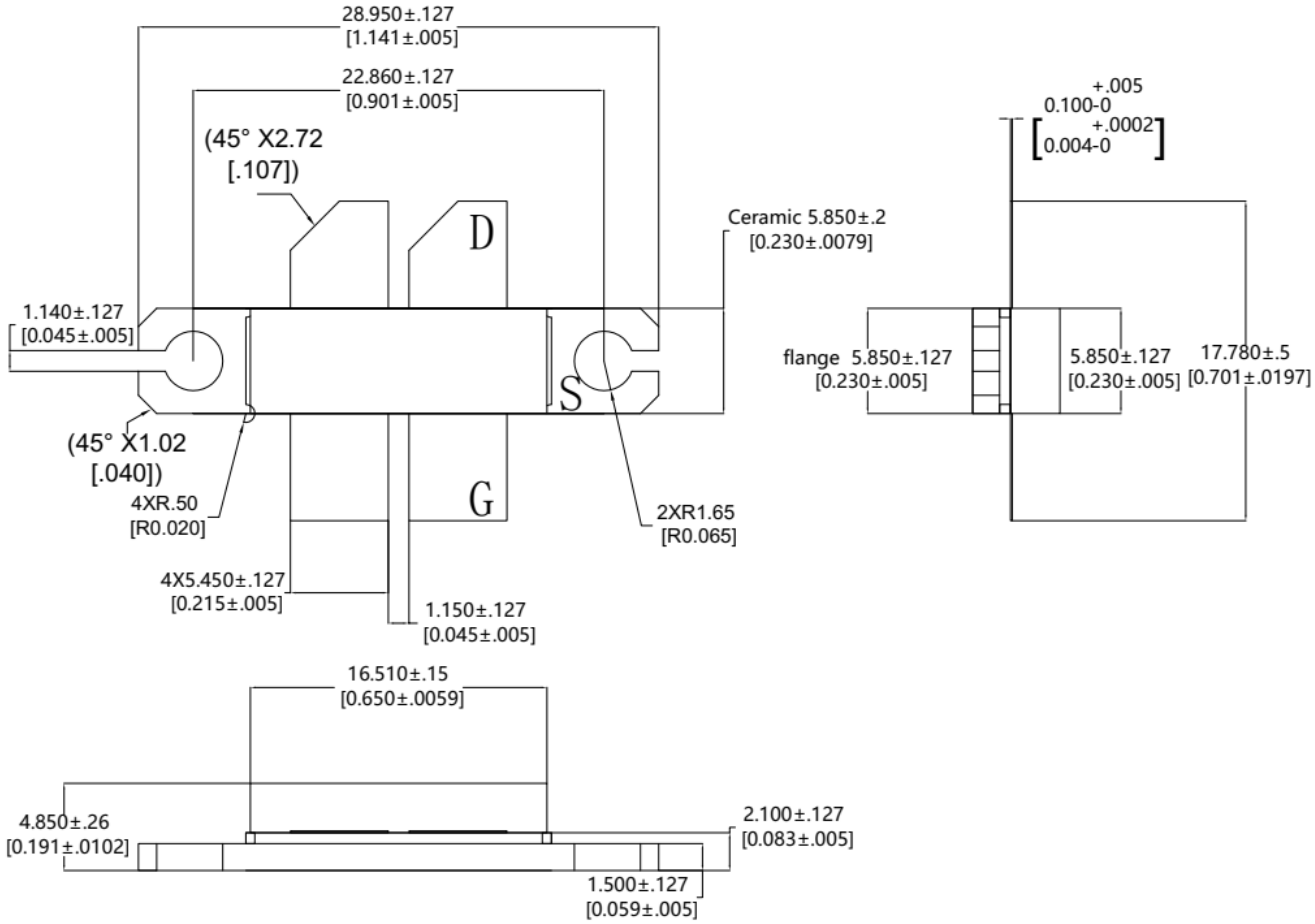

**Figure 2: Picture of application board class AB**



| Component | Description | Suggestion |
|---|---|---|
| C1~C5 | 10uF/200V-1210 | Ceramic multilayer capacitor |
| C6~C8,C11,C18 | 820pF | |
| C9,C10 | 1000pF | |
| C12,C13 | 39pF | |
| C14~C17 | 200pF | |
| C19,C21 | 10pF | |
| C20 | 7.5pF | |
| C22 | 0.5pF | |
| C23 | 470uF/63V | Electrolytic Capacitor |
| R1,R2 | 33Ω-1206 | Chip Resistor |
| R3,R4 | 200Ω | RFT-200 |
| R5 | 300Ω | color ring resistor |
| L1,L2 | 1.5mm wire ， 5mm inner diameter， 5Turns | DIY |
| T1 | 50 ohm-60mm，BN-61-202 | RFSFBU-086-50;BN-61-202 |
| T2,T3 | 16.7 ohm-55mm,BN-61-202 | SFF-16.7-1.5,BN-61-202 |
| T4,T5 | 16.7 ohm-70mm,NX0-60 | SFF-16.7-1.5,NXO-60 |
| T6 | 50 ohm-60mm，NXO-60 | RFSFBU-086-50,NXO-60 |

## Package Outline

**Flanged ceramic package; 2 mounting holes; 4 leads**




| OUTLINE VERSION | REFERENCE | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | |
| PKG-LB | | | | | 05/21/2021 |

**Figure 1. Package Outline PKG-LB(LBB)**

## Revision history

**Table 4. Document revision history**

| Date | Revision | Datasheet Status |
|---|---|---|
| 2022/5/18 | V1.0 | Preliminary datasheet creation |
| 2024/6/12 | V2.0 | Combine NX2530H and NX2530RH and state 2.5GHz supportable |
| 2026/3/20 | V2.1 | Change the carrier application to 80-1200M 200W new result |

**Application data based on HL-22-07/TC-26-08**

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