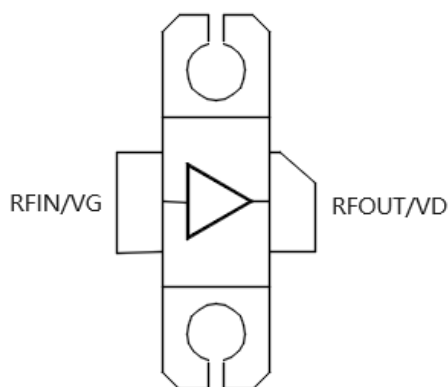
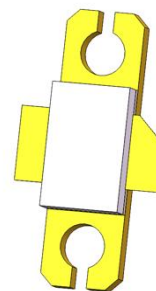


DC-5.0GHz, 80W, 28V, GaN RF Transistor

General Description

The GNNT5149H is a wideband pre-matched gallium nitride (GaN) high electron mobility transistor (HEMT), The device operates from DC to 5.0GHz with a 28V supply rail. Its typical saturated power is 80W@5.0GHz (P_{sat}). The P_{sat} gain is 10dB@5.0GHz above, and drain efficiency is 55% above. The device is in an industry standard YJ201 ceramic package.



Features

- Operating Frequencies: DC-5.0GHz
- Output Power (P_{sat}): 80W@5.0GHz
- Power Gain: 10dB@5.0GHz
- $DE@P_{sat}$: 55%@5.0GHz
- Operating Voltage: 28 V
- Support CW & Pulse mode

Typical Application Data

- (24V) 3GHz-5GHz: $P_{sat} \geq 46.1\text{dBm}$
- (28V) 4.4GHz-5GHz: $P_{sat} \geq 49\text{dBm}$
- (28V) 3.2GHz-3.3GHz: $P_{sat} \geq 49\text{dBm}$

Recommended Operating Conditions

Parameter	Value
Drain-Source Voltage (V_D)	28 V (Typ)
Quiescent Current (I_{DQ})	150 mA (Typ)
Gate-Source Voltage (V_G)	-2.3 V (Typ)

Note:

- 1.All the RF spec tested under recommended conditions.
- 2.Bias-up Procedure : Set V_G to the pinch-off (V_P) voltage, typically -5 V, then turn on V_D to nominal supply voltage (28V)
- 3.Bias-down Procedure : Turn off RF signal, then turn off V_D and wait 1 second to allow drain capacitor dissipation, turn off V_G .

Absolute Maximum Ratings

Note:

1. Operating outside the rated range may cause irreversible damage to the device.

Parameter	Range Value
Drain-Source Breakdown Voltage (BV_{DS})	120 V
Drain-Source Voltage Range, (V_D)	20 to 32 V
Gate-Source Voltage Range, (V_G)	-10 to +1 V
Operating Temperature Range	-40 to 125°C
Storage Temperature Range	-65 to 150°C
Maximum Input Power, CW (P_{in}), $T_A = 25^\circ\text{C}$	42 dBm

RF Characteristics, 3.0GHz-5.0GHz EVB

Note:

1. Test condition: $T_A = 25^\circ\text{C}$, $V_D = 24\text{V}$, $I_{DQ} = 150\text{ mA}$, CW

Symbol	Parameter	Min	Typ	Max	Unit
G_{LIN}	Linear Gain	-	10	-	dB
P_{sat}	Output Power	40	55	75	W
DE_{sat}	Drain Efficiency	35	45	55	%
G_{sat}	Gain	-	7	-	dB

Thermal Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
$R_{\theta JC}$	Thermal Resistance	-	1.0	-	$^\circ\text{C/W}$

Test Data, 3GHz-5GHz

Test Condition: TA = 25 °C, VD = 24 V, IDQ = 150 mA, CW (When VD = 28V, Psat +1.3dB)

Freq(GHz)	Psat(dBm)	Psat(W)	Power Gain(dB)	ID(A)	DE(%)
3.0	46.10	40.74	6.80	4.27	39.75%
3.1	46.60	45.71	7.00	5.30	35.93%
3.2	47.50	56.23	7.50	6.30	37.19%
3.3	48.00	63.10	7.90	6.30	41.73%
3.4	48.00	63.10	7.80	6.10	43.10%
3.5	48.00	63.10	7.60	6.10	43.10%
3.6	48.30	67.61	7.10	6.10	46.18%
3.7	48.70	74.13	8.40	5.75	53.72%
3.8	48.50	70.79	7.90	5.30	55.66%
3.9	48.50	70.79	7.50	5.40	54.63%
4.0	48.00	63.10	8.80	4.80	54.77%
4.1	47.70	58.88	7.30	4.90	50.07%
4.2	47.20	52.48	7.10	5.10	42.88%
4.3	47.60	57.54	7.50	5.50	43.59%
4.4	47.10	51.29	7.00	5.60	38.16%
4.5	47.20	52.48	7.00	6.00	36.44%
4.6	47.70	58.88	7.50	5.90	41.59%
4.7	47.30	53.70	7.30	5.97	37.48%
4.8	47.30	53.70	6.80	6.10	36.68%
4.9	47.70	58.88	7.10	5.60	43.81%
5.0	47.50	56.23	7.00	5.40	43.39%

Test Data, 4.4GHz-5.0GHz EVB

Test Condiktion: TA = 25 °C, VD = 28 V, IDQ = 150 mA, CW

Freq(GHz)	Psat(dBm)	Psat(W)	Power Gain(dB)	ID(A)	DE(%)
4.4	49.58	90.78	11.33	6.01	53.95%
4.5	49.45	88.10	12.40	5.40	58.27%
4.6	49.30	85.11	13.10	4.98	61.04%

4.7	49.20	83.18	13.00	5.25	56.58%
4.8	49.10	81.28	12.63	5.02	57.83%
4.9	49.00	79.43	10.46	5.15	55.09%
5.0	49.13	81.85	10.85	5.45	53.63%

Test Data, 3.2GHz-3.3GHz EVB

Test Condition: TA = 25 °C, V_D =28 V, I_{DQ} = 150mA, CW

Freq(GHz)	Psat(dBm)	Psat(W)	Power Gain(dB)	I _D (A)	DE(%)
3.20	49.30	85.11	10.50	5.80	52.41%
3.25	49.30	85.11	10.30	5.75	52.87%
3.30	49.20	83.18	10.30	5.60	53.05%

ESD Protection Characteristics

Test Methodology	Class	Standard
Human Body Model	±225V	JEDEC Standard JS-001-2017
Charge Device Model	±1000V	JEDEC Standard JS-002-2018

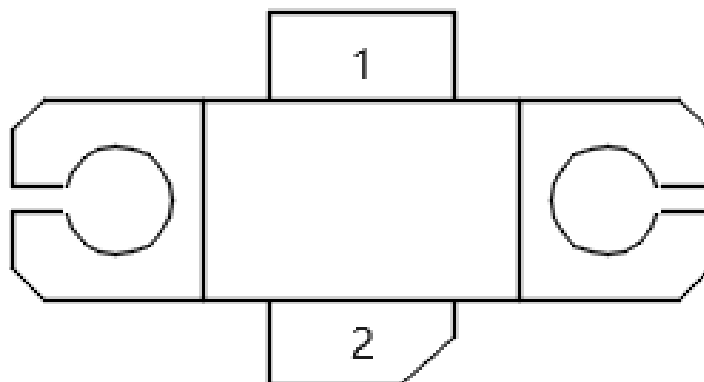
Solderability

This package is lead-free/RoHS-compliant. The plating material on the leads is NiAu. It is compatible with both lead-free (maximum 260 °C reflow temperature) and tin-lead (maximum 245°C reflow temperature) soldering processes.

RoHS Compliance

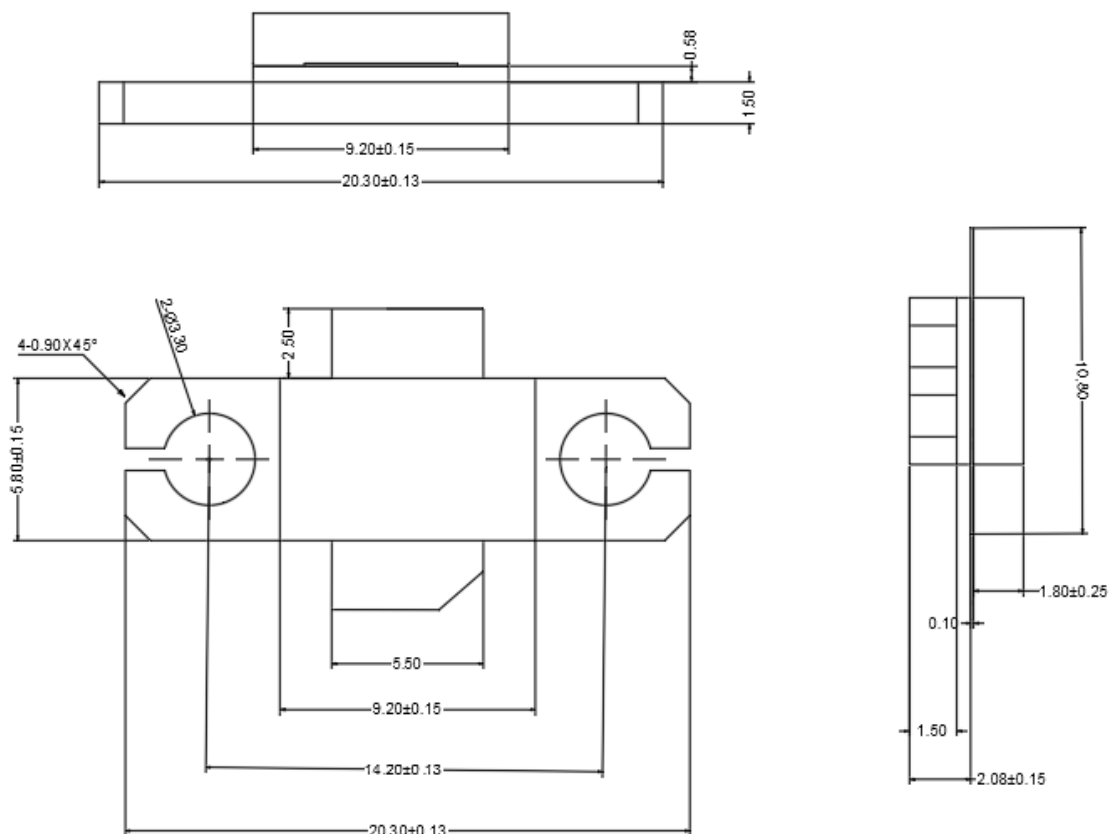
This part is compliant with 2015/863/ and EU 2011/65/EC RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment).

Pin Configuration



PIN	Symbol	Description
1	V_G / RF IN	Gate voltage / RF Input to be matched to 50 ohms;
2	V_D / RF OUT	Drain voltage / RF Output to be matched to 50 ohms
--	Source	Source connected to ground, It needs to be welded onto the substrate under the window of PCB

Package Dimensions



YJ201

Note:

1. All dimensions are in millimeters.
2. All dimension tolerances are +/- 0.10 or +/- 0.20 mm.

Revision History

Data	Revision	Datasheet Status
2024/8/1	1.0	Preliminary Datasheet
2024/8/8	1.1	Update Test Data
2025/3/10	1.2	Update Test Data
2025/3/26	3.0	Update Test Data