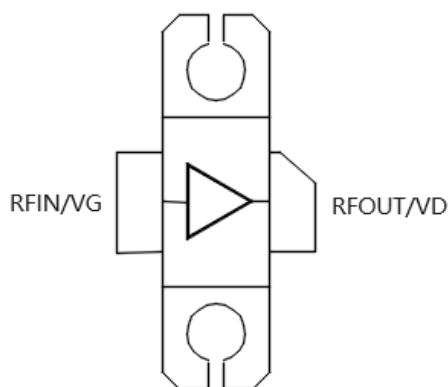
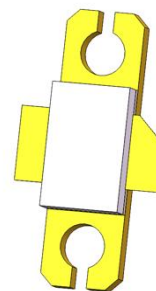


DC-3.0GHz, 80W, 28V, GaN RF Transistor

General Description

The GNNT3149H is a wideband pre-matched gallium nitride (GaN) high electron mobility transistor (HEMT), The device operates from DC to 3.0GHz with a 28V supply rail. Its typical saturated power is 80W@3.0GHz (P_{sat}). The P_{sat} gain is 12dB@3.0GHz above, and drain efficiency is 55% above. The device is in an industry standard YJ201 ceramic package.



Features

- Operating Frequencies: DC-3.0GHz
- Output Power (P_{sat}): 80W@3.0GHz
- Power Gain: 12dB@3.0GHz
- $DE@P_{sat}$: 55%@3.0GHz
- Operating Voltage: 28 V
- Support CW & Pulse mode

Typical Application Data

- (24V) 0.7GHz-3.0GHz: $P_{sat} \geq 46.1\text{dBm}$
- (28V) 0.5GHz-3.0GHz: $P_{sat} \geq 46.6\text{dBm}$
- (32V) 0.5GHz-3.0GHz: $P_{sat} \geq 47.9\text{dBm}$
- (28V) 1.6GHz-1.63GHz: $P_{sat} \geq 50\text{dBm}$
- (28V) 1.98GHz-2.01GHz: $P_{sat} \geq 49.6\text{dBm}$

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}), $T_A = 25^\circ\text{C}$	41 dBm

RF Characteristics, 0.7GHz-3.0GHz EVB

Note:

1. Test condition: $T_A = 25^\circ\text{C}$, $V_D = 28\text{V}$, $I_{DQ} = 150\text{ mA}$, CW

Symbol	Parameter	Min	Typ	Max	Unit
G_{LIN}	Linear Gain	-	13.5	-	dB
P_{sat}	Output Power	45	55	75	W
DE_{sat}	Drain Efficiency	46	50	72	%
G_{sat}	Gain	-	10.5	-	dB

Thermal Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
$R_{\theta JC}$	Thermal Resistance	-	1	-	$^\circ\text{C}/\text{W}$

Test Data, 0.7GHz-3.0GHz

Test Condition: TA = 25 °C, VD = 24 V, IDQ = 150 mA, CW

Freq(MHz)	Psat(dBm)	Psat(W)	Power Gain(dB)	ID(A)	DE(%)
0.7	47.0	50.12	11.3	3.50	59.67
0.8	46.8	47.86	11.6	3.10	64.33
0.9	46.8	47.86	11.3	3.00	66.48
1.0	47.0	50.12	9.9	3.00	69.61
1.1	46.1	40.74	9.9	2.35	72.23
1.2	46.1	40.74	9.4	2.40	70.73
1.3	46.2	41.69	9.6	2.55	68.12
1.4	46.7	46.77	9.7	3.50	55.68
1.5	47.9	61.66	10.7	4.40	58.39
1.6	46.5	44.67	10.95	2.90	64.18
1.7	46.4	43.65	9.6	2.80	64.96
1.8	46.2	41.69	10.2	3.40	51.09
1.9	47.4	54.95	9.9	4.00	57.24
2.0	46.6	45.71	11.9	3.75	50.79
2.1	46.6	45.71	11.7	3.80	50.12
2.2	46.4	43.65	12.0	3.55	51.23
2.3	46.5	44.67	11.2	3.75	49.63
2.4	46.7	46.77	11.4	4.00	48.72
2.5	46.7	46.77	10.9	3.80	51.29
2.6	46.3	42.66	10.9	3.80	46.77
2.7	46.7	46.77	11.5	4.10	47.53
2.8	46.6	45.71	11.8	3.80	50.12
2.9	46.2	41.69	11.2	3.75	46.32
3.0	46.3	42.66	10.9	3.70	48.04

Test Data, 0.5GHz-3.0GHz EVB

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

Freq(MHz)	Psat(dBm)	Psat(W)	Power Gain(dB)	ID(A)	DE(%)
0.5	46.6	45.71	10.8	2.72	60.02
0.6	47.64	58.08	11.3	3.23	64.22
0.7	48.5	70.79	11.05	3.5	72.24
0.8	48.2	66.07	10.8	3.4	69.4
0.9	48.7	74.13	10.7	4.07	65.05
1.0	48.15	65.31	10.8	3.64	64.08
1.1	48.6	72.44	10.6	4.4	58.8
1.2	48.7	74.13	10.8	4.45	59.5
1.3	48.5	70.79	10.5	4.1	61.67
1.4	48.4	69.18	10.9	3.86	64.01
1.5	47.7	58.88	11.3	3.17	66.34
1.6	48	63.1	11.1	3.4	66.28
1.7	47.7	58.88	12	3	70.1
1.8	46.9	48.98	11.6	2.9	60.32
1.9	48.8	75.86	12.3	4.2	64.5
2.0	48.3	67.61	12	3.9	61.91
2.1	47.5	56.23	11.7	3.46	58.05
2.2	47.7	58.88	11.2	3.7	56.84
2.3	47.3	53.7	10.5	3.65	52.55
2.4	47	50.12	10.7	3.84	46.61
2.5	47.5	56.23	11.2	4.24	47.37
2.6	47.2	52.48	11.7	4.05	46.28
2.7	47.5	56.23	12.3	4.26	47.14
2.8	47.65	58.21	12.5	4.2	49.5
2.9	47.5	56.23	12.4	4.02	49.96
3.0	47.6	57.54	12.1	4.2	48.93

Test Data, 0.5GHz-3.0GHz EVB

Test Condition: TA = 25 °C, VD = 32 V, IDQ = 200 mA, CW

Freq(MHz)	Psat(dBm)	Psat(W)	Power Gain(dB)	ID(A)	DE(%)
0.5	48.1	64.57	10.4	3.37	59.87
0.6	49.2	83.18	10.7	4.1	63.4
0.7	49.55	90.16	11	4.09	68.89
0.8	49.11	81.47	10.8	3.73	68.26
0.9	49.23	83.75	11.6	4.12	63.53
1.0	49.4	87.1	11.7	4.15	65.58
1.1	48.6	72.44	11.1	3.87	58.5
1.2	49.3	85.11	10.8	4.86	54.73
1.3	49.75	94.41	10.9	5.57	52.97
1.4	49.98	99.54	11.6	5.78	53.82
1.5	50.22	105.2	12	5.64	58.29
1.6	49.63	91.73	12.4	4.56	62.86
1.7	49.01	79.62	12.3	3.67	67.69
1.8	48.07	64.12	13.4	3.67	54.6
1.9	49.65	92.26	12	4.49	64.21
2.0	49.46	88.31	13.2	4.39	62.86
2.1	48.56	71.78	12.6	3.85	58.26
2.2	48.27	67.14	12.3	3.77	55.66
2.3	48.25	66.83	12.5	3.99	52.35
2.4	48.02	63.39	11.9	4.08	48.55
2.5	47.92	61.94	11.1	4.36	44.4
2.6	48.45	69.98	12.6	4.69	46.63
2.7	48.25	66.83	13.6	4.26	49.03
2.8	48.17	65.61	13.8	4.35	47.14
2.9	48.51	70.96	14.5	4.3	51.57
3.0	48.1	64.57	14	3.96	50.95

Test Data, 1.6GHz-1.63GHz EVB

Test Condition: TA = 25 °C, V_D =28 V, I_{DQ} =80mA, CW

Freq(MHz)	Psat(dBm)	Psat(W)	Power Gain(dB)	I _D (A)	DE(%)
1600	50.4	109.65	16.3	5.9	66.37
1610	50.2	104.71	16.3	5.45	68.62
1620	50.06	101.39	16.3	5.15	70.31
1630	50	100	16.1	5	71.43

Test Data, 1.98GHz-2.01GHz EVB

Test Condition: TA = 25 °C, V_D =28 V, I_{DQ} =80mA, CW

Freq(MHz)	Psat(dBm)	Psat(W)	Power Gain(dB)	I _D (A)	DE(%)
1980	49.8	95.5	15.1	5.75	59.32
1990	49.8	95.5	15.1	5.61	60.8
2000	49.7	93.33	15	5.4	61.72
2010	49.6	91.2	15	5.22	62.4

ESD Protection Characteristics

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

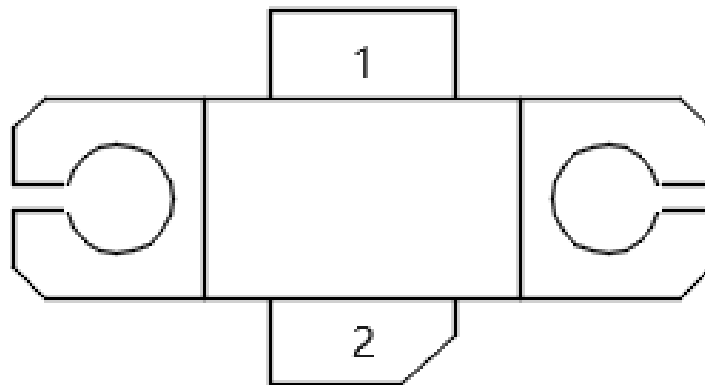
Solderability

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.

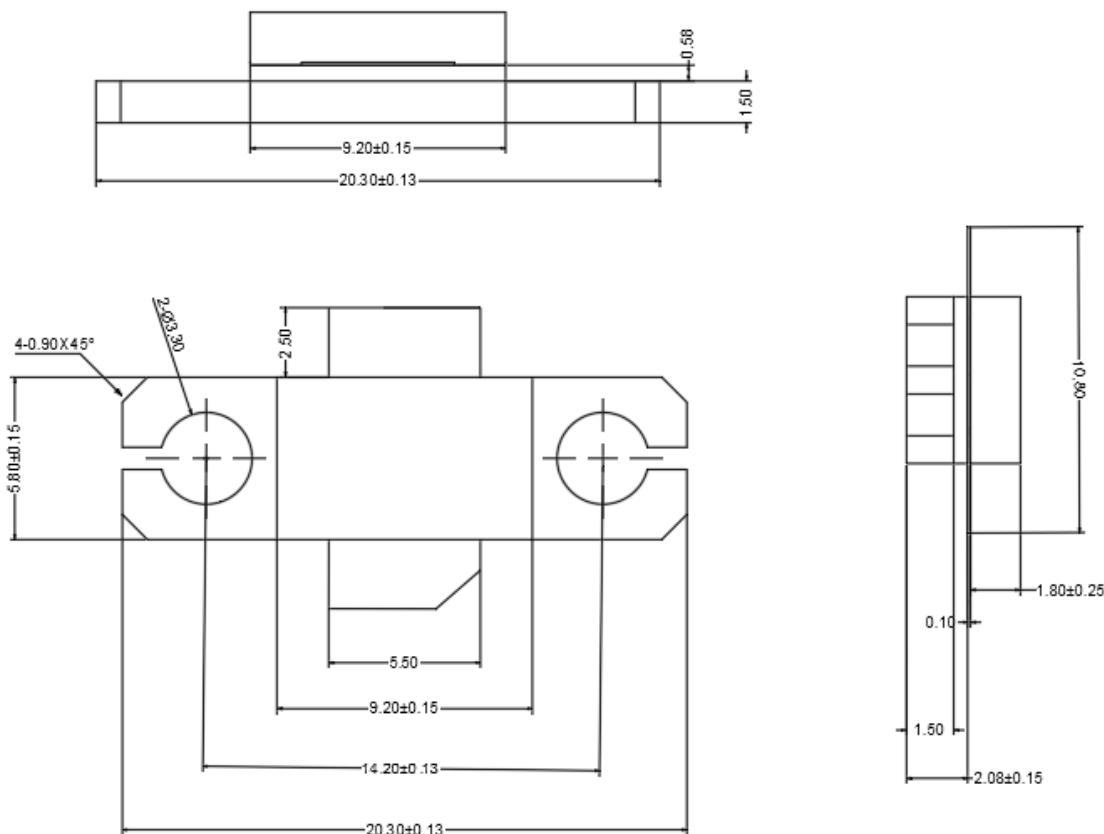
RoHS Compliance

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



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
2025/2/8	1.2	Update Test Data