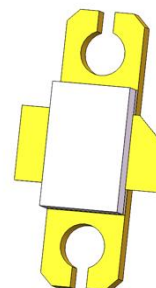


DC-3.0GHz, 125W, 28V, GaN RF Transistor

General Description

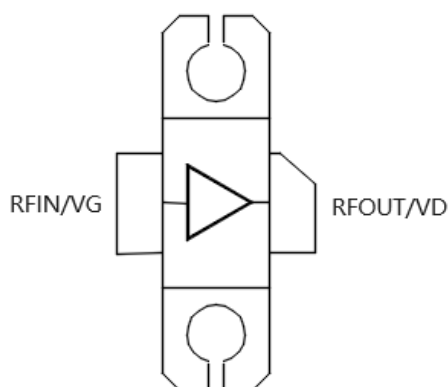
The GNNT3451H is a wideband pre-matched gallium nitride (GaN) high electron mobility transistor (HEMT), The device operates from DC to 3.0GHz with a 28V supply rail. Its typical saturated power is 125W@845MHz(Psat).

The Psat gain is 16dB@845MHz above, and drain efficiency is 59% above. The device is in an industry standard YJ201 ceramic package.



Typical Application Data

- 695MHz-1045MHz: Psat ≥ 50.5dBm
- 400MHz-500MHz: Psat ≥ 50.6dBm



Features

- Operating Frequencies: DC-3.0GHz
- Output Power (Psat): 125W@845 MHz
- Power Gain: 16dB@845MHz
- DE@Psat: 59%@845 MHz
- Operating Voltage: 28 V
- Support CW & Pulse mode

Recommended Operating Conditions

Parameter	Value
Drain-Source Voltage (V_D)	28 V (Typ)
Quiescent Current (I_{DQ})	200 mA (Typ)
Gate-Source Voltage(V_G)	-2.88V (Typ)

Note:

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

Absolute Maximum Ratings

Note:

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

Parameter	Range Value
Drain-Source Breakdown Voltage (V_{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}), $T_A = 25^\circ\text{C}$	40 dBm

RF Characteristics, 695MHz-1045MHz EVB

Note:

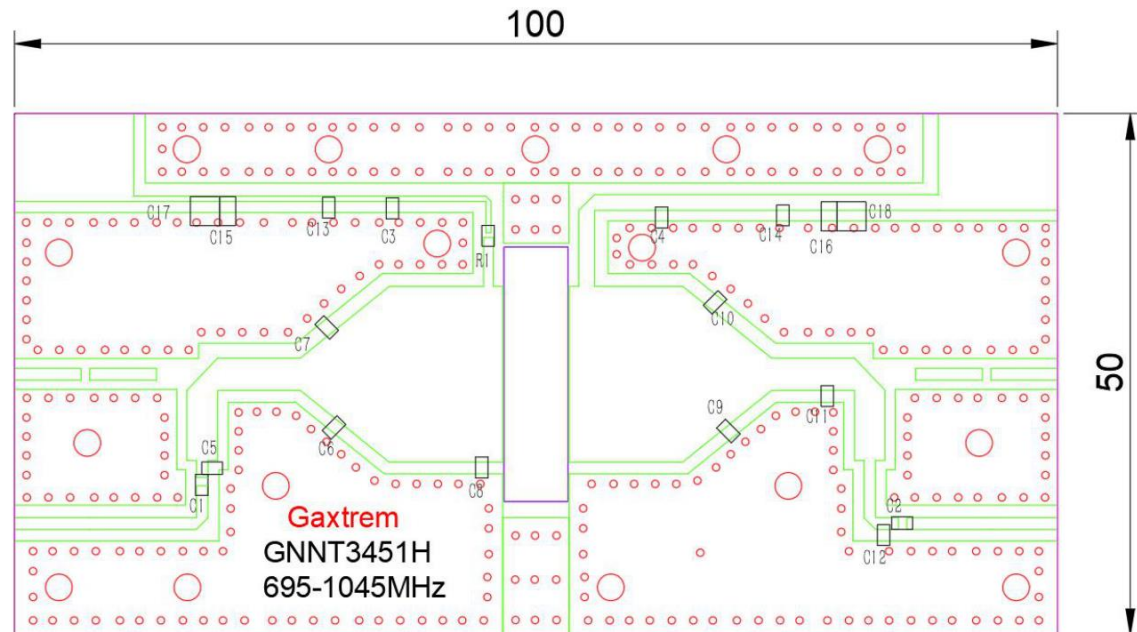
1. Test condition: $T_A = 25^\circ\text{C}$, $V_D = 28\text{V}$, $I_{DQ} = 200\text{ mA}$, CW

Symbol	Parameter	Min	Typ	Max	Unit
G_{LIN}	Linear Gain	-	19	-	dB
P_{sat}	Output Power	112	125	139	W
DE_{sat}	Drain Efficiency	59	60	67	%
G_{sat}	Gain	-	16	-	dB

Thermal Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
$R_{\theta JC}$	Thermal Resistance	-	0.85	-	$^\circ\text{C/W}$

695MHz-1045MHz EVB PCB layout

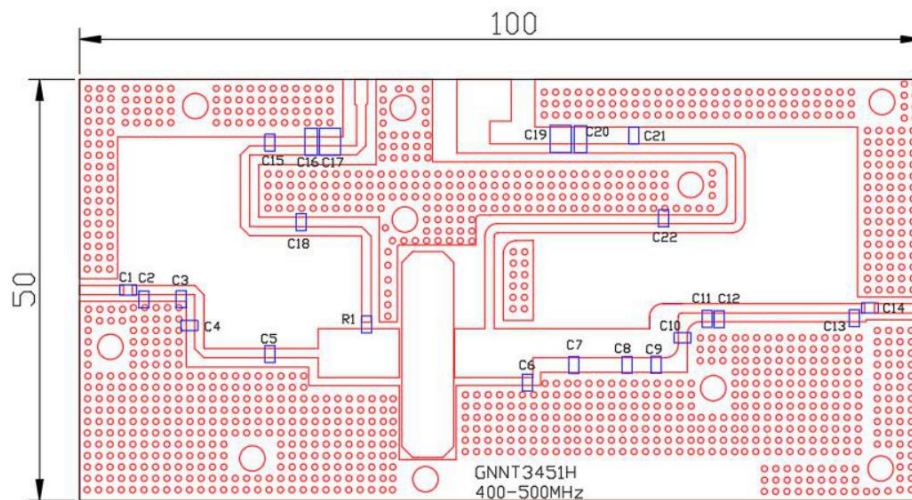


Note:

1. The board material used for the EVB is RO4350B with a thickness of 508 μm (20 mil).
2. Matching circuit dimension about 70.1mm*32.1mm.

695MHz-1045MHz EVB BOM list

Location	Value	Brand	Size
C1,C2,C3,C4	56pF	ATC	600F
C5	8.2pF	ATC	600F
C6	12pF	ATC	600F
C7	15pF	ATC	600F
C8	10pF	ATC	600F
C9,C10	5.6pF	ATC	600F
C11,C12	3.3pF	ATC	600F
C13,C14	1000pF	Murata	1210
C15,C16	100nF	Murata	1206
C17,C18	10uF	Murata	0805
R1	18 Ω	YAGEO	0805
PCB	RO4350B		20mil



Note:

1. The board material used for the EVB is RO4350B with a thickness of 508 μm (20 mil).
2. Matching circuit dimension about 89.2mm*35.1mm.

400MHz-500MHzEVB BOM list

Location	Value	Brand	Size
C1,C14,C18,C22	100pF	ATC	600F
C2	8.2pF	ATC	600F
C3	3.3pF	ATC	600F
C4	15pF	ATC	600F
C5	20pF	ATC	600F
C6,C7,C8,C10	6.8pF	ATC	600F
C9	4.7pF	ATC	600F
C11	2.2pF	ATC	600F
C12	10pF	ATC	600F
C13	3.9pF	ATC	600F
C15,C21	1000pF	Murata	1210
C16,C20	100nF	Murata	1206
C17,C18	10uF	Murata	0805
R1	51 Ω	YAGEO	0805
PCB	RO4350B		20mil

Test Data, 695MHz-1045MHz

Test Condition: $T_A = 25\text{ }^{\circ}\text{C}$, $V_D = 28\text{ V}$, $I_{DQ} = 200\text{ mA}$, CW

Freq(MHz)	Psat(dBm)	Psat(W)	Power Gain(dB)	I_D (A)	DE(%)
695	50.50	112.2	16.2	6.50	61.6%
745	51.16	130.6	17.3	7.46	62.5%
795	51.00	125.9	17.1	7.62	59.0%
845	51.07	127.9	16.6	7.70	59.3%
895	51.45	139.6	16.2	7.80	63.9%
945	51.18	131.2	16.9	7.18	65.3%
995	51.26	133.7	17.5	7.06	67.6%
1045	50.90	123.0	16.1	7.00	62.8%

Test Data, 400MHz-500MHz

Test Condiktion: $T_A = 25\text{ }^{\circ}\text{C}$, $V_D = 28\text{ V}$, $I_{DQ} = 200\text{mA}$, CW

Freq(MHz)	Psat(dBm)	Psat(W)	Power Gain(dB)	I_D (A)	DE(%)
400	50.66	116.41	20.8	7.18	57.91%
450	51.17	130.92	19.7	8.40	55.66%
500	51.13	129.72	19.7	6.83	67.83%

ESD Protection Characteristics

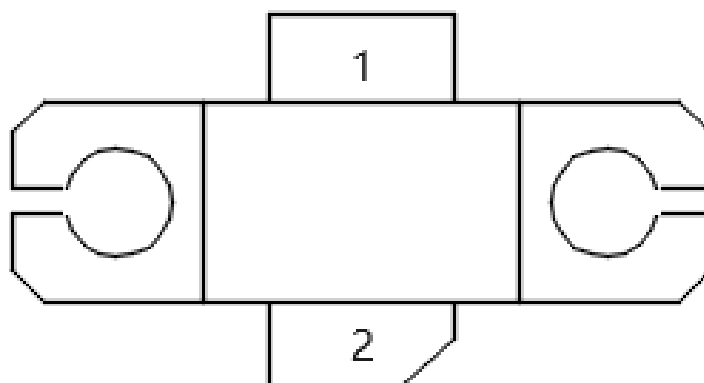
Test Methodology	Class	Standard
Human Body Model	$\pm 225\text{V}$	JEDEC Standard JS-001-2017
Charge Device Model	$\pm 1000\text{V}$	JEDEC Standard JS-002-2018

Solderability

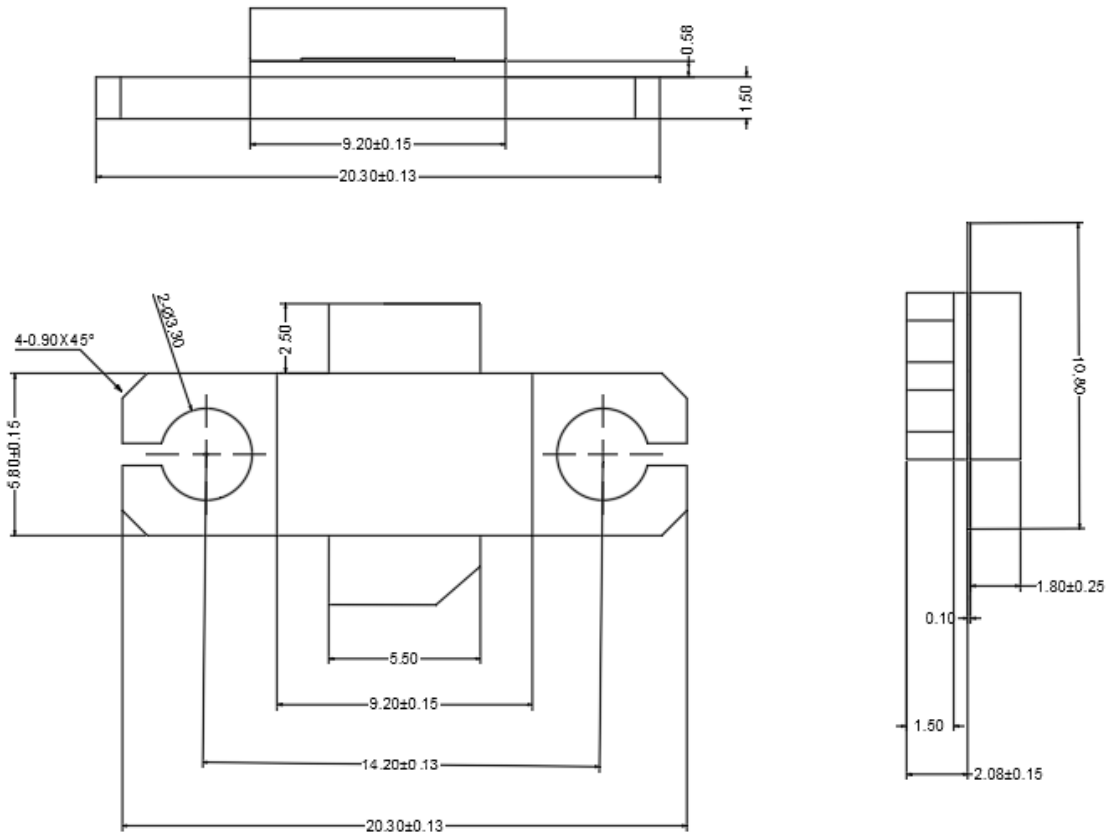
This package is lead-free/RoHS-compliant. The plating material on the leads is NiAu. It is compatible with both lead-free (maximum 260 °C reflow temperature) and tin-lead (maximum 245°C reflow temperature) soldering processes.

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
2025/1/13	1.0	Preliminary Datasheet
2025/2/18	1.1	Add PCB layout