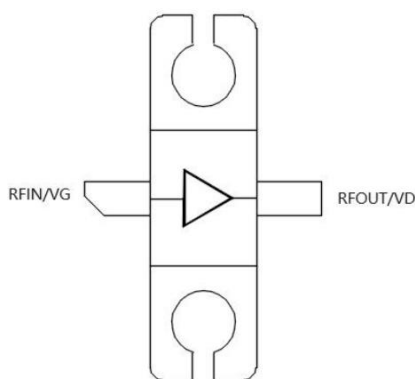
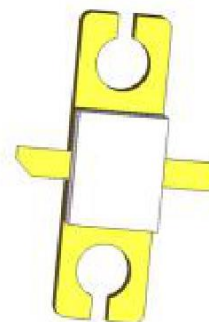


DC-6.0GHz, 25W, 28V, GaN RF Transistor

General Description

The GNNT6044H is a wideband pre-matched gallium nitride (GaN) high electron mobility transistor (HEMT), The device operates from DC to 6.0GHz with a 28V supply rail. Its typical saturated power is 25W@1.5GHz (P_{sat}). The P_{sat} gain is 15dB@1.5GHz above, and drain efficiency is 60% above. The device is in an industry standard YJ203 ceramic package.



Features

- Operating Frequencies: DC-6.0GHz
- Output Power (P_{sat}): 25W@1.5GHz
- Power Gain: 15dB@1.5GHz
- $DE@P_{sat}$: 60%@1.5GHz
- Operating Voltage: 28 V
- Support CW & Pulse mode

Typical Application Data

- 1.4GHz-1.8GHz: $P_{sat} \geq 44\text{dBm}$
- 2.9GHz-3.4GHz: $P_{sat} \geq 43\text{dBm}$

Recommended Operating Conditions

Parameter	Value
Drain-Source Voltage (V_D)	28 V (Typ)
Quiescent Current (I_{DQ})	130 mA (Typ)
Gate-Source Voltage(V_G)	-2.45 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 (Pin), $T_A = 25^\circ \text{C}$	35dBm

RF Characteristics, 1.4GHz-1.8GHz EVB

Note:

1. Test condition: $T_A = 25^\circ \text{C}$, $V_D = 28\text{V}$, $I_{DQ} = 130 \text{mA}$, CW

Symbol	Parameter	Min	Typ	Max	Unit
G_{LIN}	Linear Gain	-	19	-	dB
P_{sat}	Output Power	-	25	-	W
DE_{sat}	Drain Efficiency	58	60	-	%
G_{sat}	Gain	15	16	-	dB

RF Characteristics, 2.9GHz-3.4GHz EVB

Note:

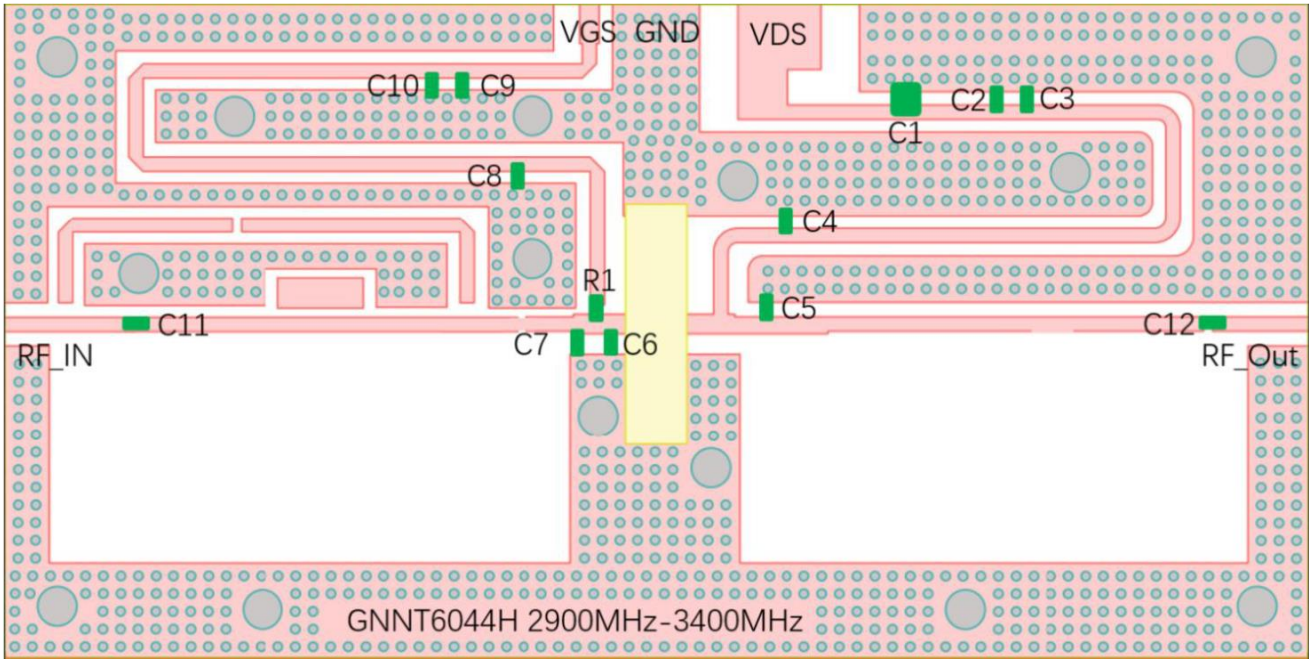
1. Test condition: $T_A = 25^\circ \text{C}$, $V_D = 28\text{V}$, $I_{DQ} = 130 \text{mA}$, CW

Symbol	Parameter	Min	Typ	Max	Unit
G_{LIN}	Linear Gain	-	14	-	dB
P_{sat}	Output Power	20	22	-	W
DE_{sat}	Drain Efficiency	55	60	-	%
G_{sat}	Gain	10.5	11	-	dB

Thermal Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
$R_{\theta JC}$	Thermal Resistance	-	4.6	-	°C/W

2.9GHz-3.4GHzEVB PCB Layout



Note:

1. The board material used for the EVB is RO4350B with a thickness of 508 μm (20 mil).

2.9GHz-3.4GHzEVB BOM List

Location	Value	Quantity	Brand	Size
C1	10uF	1	Murata	1812
C2,C9	100nF	2	Murata	0805
C3,C10	1000pF	2	Murata	0805
C4,C8,C11,C12	10pF	4	ATC	600F
C5	0.9pF	1	ATC	600F
C6	1.3pF	1	ATC	600F
C7	0.5pF	1	ATC	600F
R1	10Ω	1	Murata	0805
	100uF	1		AEC

Test Data, 1.4GHz-1.8GHz

Test Condition: TA = 25 °C, V_D =28 V, I_{DQ} = 130 mA, CW

Freq(GHz)	Psat(dBm)	Psat(W)	Power Gain(dB)	I _D (A)	DE(%)
1.4	44.13	25.88	15.51	1.57	58.88%
1.5	44.09	25.64	15.81	1.54	59.47%
1.6	44.07	25.53	16.60	1.55	58.82%
1.7	44.20	26.30	17.14	1.49	63.05%
1.8	44.35	27.23	17.24	1.57	61.94%

Test Data, 2.9GHz-3.4GHz

Test Condition: TA = 25 °C, V_D =28 V, I_{DQ} = 130 mA, CW

Freq(GHz)	Psat(dBm)	Psat(W)	Power Gain(dB)	I _D (A)	DE(%)
2.9	43.6	22.91	11.5	1.46	56.04%
3.0	43.8	23.99	11.5	1.45	59.08%
3.1	43.4	21.88	11.2	1.39	56.21%
3.2	43.1	20.42	11.6	1.30	56.09%
3.3	42.7	18.62	11.3	1.18	56.36%
3.4	43.4	21.88	11.2	1.18	66.22%

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

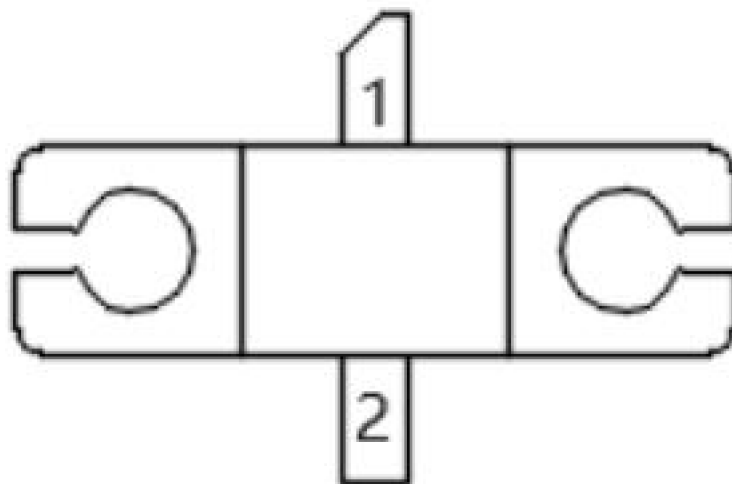
Solderability

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.

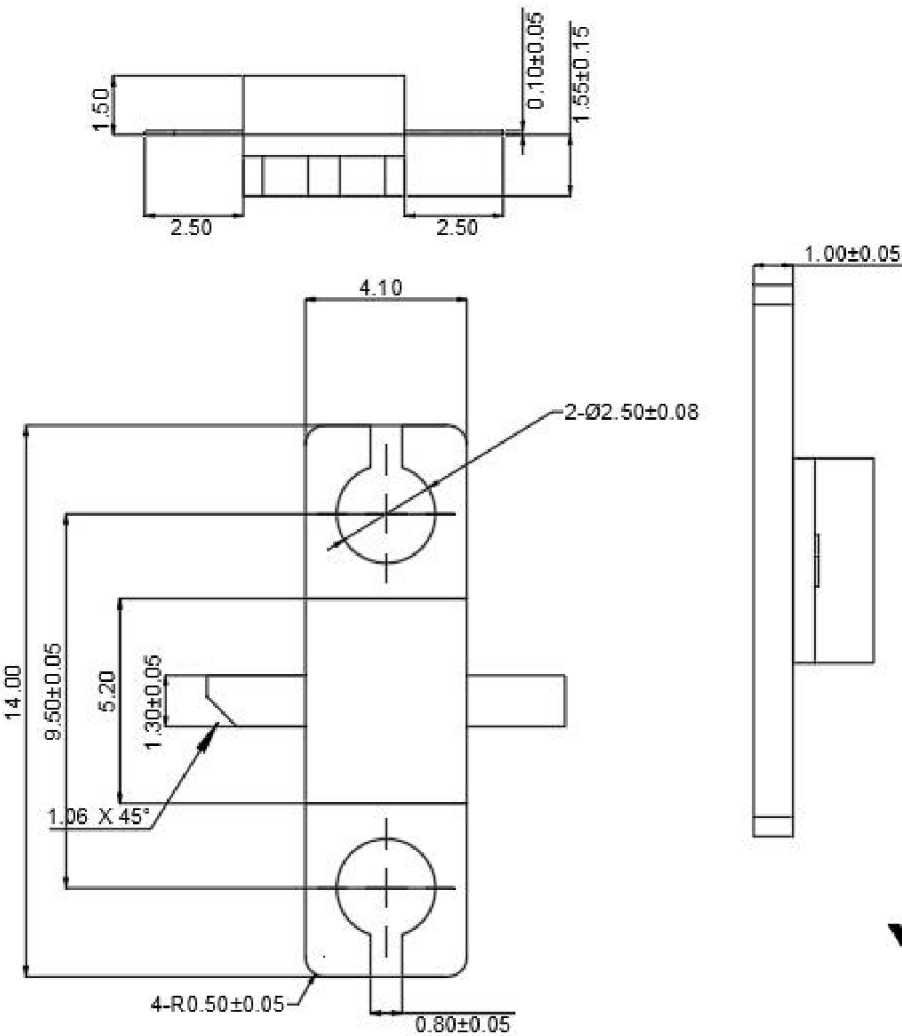
RoHS Compliance

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



YJ203

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

Revision History

Data	Revision	Datasheet Status
2023/9/20	1.0	Preliminary Datasheet
2024/3/10	2.0	Rectify the errors
2024/6/12	2.1	Uniform Format