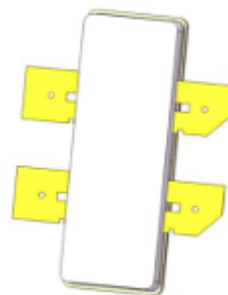


4.9-6.0GHz, 125W, 28V, GaN RF Transistor

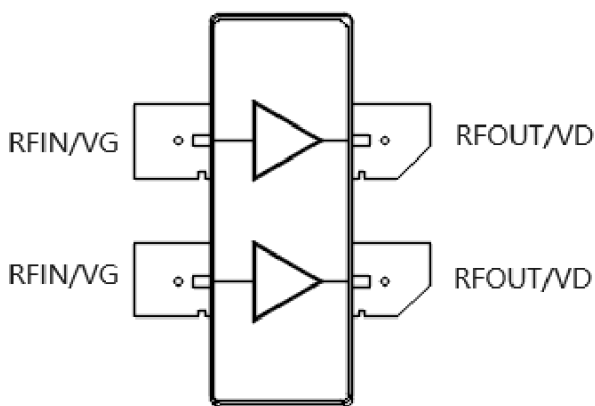
General Description

The GNNT6051HP is a wideband pre-matched gallium nitride (GaN) high electron mobility transistor (HEMT), The device operates from 4.9GHz to 6.0GHz with a 28V supply rail. Its typical saturated power is 125W@6.0GHz(P_{sat}). The P_{sat} gain is 9.5dB@6GHz above, drain efficiency is 50% above. The device is in an industry standard YJ802 ceramic package.



Typical Application Data

- 5.7GHz-5.9GHz: $P_{sat} \geq 51\text{dBm}$



Recommended Operating Conditions

Parameter	Value
Drain-Source Voltage (V_D)	28 V (Typ)
Quiescent Current (I_{DQ})	200mA (Typ)
Gate-Source Voltage(V_G)	-2.33 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 .

Features

- Operating Frequencies: 4.9-6.0GHz
- Output Power (P_{sat}): 125W@6.0GHz
- Power Gain: 9.5dB@6.0GHz
- $DE@P_{sat}$: 50%@6.0GHz
- Operating Voltage: 28 V
- Support CW & Pulse mode

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}), $T_A = 25^\circ \text{C}$	44 dBm

RF Characteristics, 5.7GHz-5.9GHz EVB

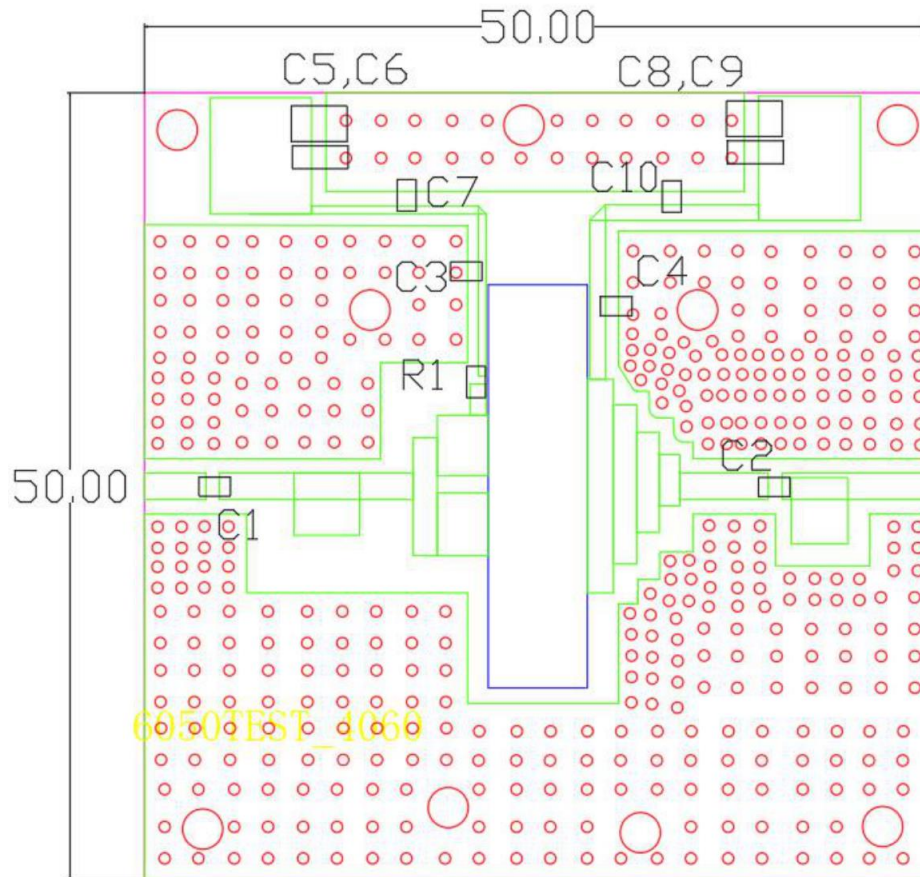
Note:

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	-	13	-	dB
P_{sat}	Output Power	-	125	-	W
DE_{sat}	Drain Efficiency	-	50	-	%
G_{sat}	Gain	-	9.5	-	dB

Thermal Characteristics

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



Note:

1. The board material used for EVB is RO4350B with thickness of 762um (30mil)
2. Matching circuit dimensions about 40.8mm*35.3mm.

5.7GHz-5.9GHzEVB BOM list

Location	Value	Brand	Size
C1,C2,C3,C4	3.0pF	ATC	600F
C5,C8	10uF	Murata	1210
C6,C9	100nF	Murata	1206
C7,C10	1000pF	Murata	0805
R1	30Ω	YAGEO	0805
PCB	RO4350B		30mil

Test Data, 5.7GHz-5.9GHz

Test Condition: TA = 25 °C, VD = 28 V, IDQ = 200 mA, CW

Freq(GHz)	Psat(dBm)	Psat(W)	Power Gain(dB)	ID(A)	DE(%)
5.7	51.4	138.04	9.50	9.58	51.46%
5.8	51.6	144.54	9.60	9.70	53.22%
5.9	51.7	147.91	9.80	9.50	55.61%

ESD Protection Characteristics

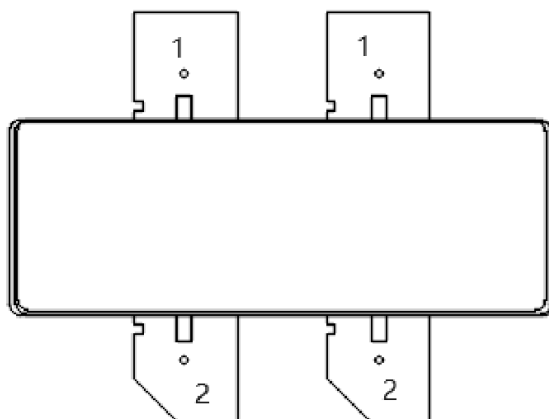
Test Methodology	Class	Standard
Human Body Model	± 225V	JEDEC Standard JS-001-2017
Charge Device Model	± 1000V	JEDEC Standard JS-002-2018

Solderability

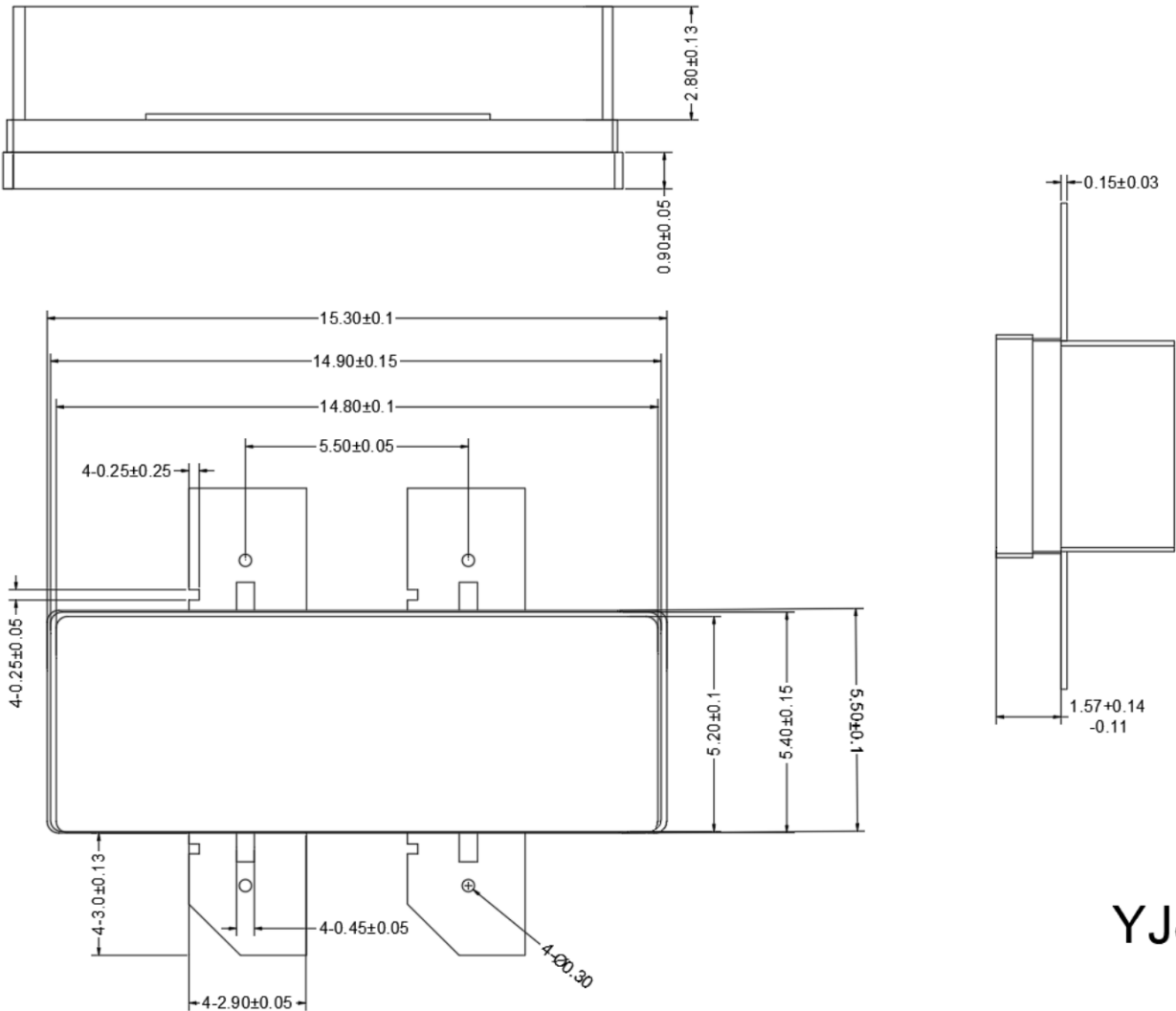
This package is lead-free/RoHS-compliant. The plating material on the leads is NiAu. It is compatible with both lead-free (maximum 260 °C reflow temperature) and tin-lead (maximum 245°C reflow temperature) soldering processes.

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	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



YJ802

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

Revision History

Data	Revision	Datasheet Status
2024/4/8	1.0	Preliminary Datasheet
2024/6/13	1.1	Uniform format
2024/10/30	1.2	Update test data
2025/2/18	1.3	Add PCB layout