



GaN 100W,2.3-6.5GHz ,28~32V,RF Power Transistor

Description

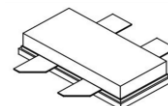
The STAH60101BY4 is a 28V 100W device, both input and output matched GaN HEMT, ideal for multiple applications within 2.3 to 6.5GHz. It can support CW and pulse CW , and any other modulation signals

In its typical wideband application, it can deliver > 50-60W Psat across the full band of 2.3 to 6.5GHz within 28~32V.

- Typical performance across 2-6GHz class AB application circuit with device soldered

Vds=28V Vgs=-3.18V Idq=100mA

STAH60101BY4



Freq(GHz)	Pin(dBm)	Psat(dBm)	Psat(W)	Ids(A)	Gain(dB)	Eff(%)
2.2	41.0	47.2	52.8	4.10	6.2	46.0
2.3	41.4	47.9	61.1	4.77	6.4	45.7
2.4	42.2	48.4	69.5	6.05	6.2	41.0
2.5	42.0	48.7	74.1	7.23	6.7	36.6
2.6	41.9	47.9	61.9	7.06	6.0	31.3
2.7	41.3	48.0	63.4	7.34	6.7	30.8
2.8	41.9	48.7	73.5	7.67	6.8	34.2
2.9	40.9	48.2	66.2	7.88	7.3	30.0
3.0	41.3	48.2	66.2	7.72	6.9	30.6
3.1	42.4	48.7	73.8	8.57	6.3	30.8
3.2	41.2	47.4	55.0	6.45	6.2	30.4
3.3	41.3	47.7	59.0	6.68	6.4	31.6
3.4	42.6	49.6	90.4	7.52	6.9	42.9
3.5	42.6	49.7	92.7	7.52	7.1	44.0
3.6	42.4	49.6	90.8	7.02	7.2	46.2
3.7	42.2	48.9	77.8	6.32	6.7	44.0
3.8	42.1	48.8	75.2	6.02	6.7	44.6
3.9	42.2	48.8	76.4	6.02	6.6	45.3
4.0	42.7	49.5	88.5	6.55	6.8	48.3
4.1	42.1	49.3	84.1	6.44	7.2	46.7
4.2	41.2	49.3	85.9	6.60	8.2	46.5
4.3	40.2	49.3	84.5	6.56	9.1	46.0
4.4	41.3	48.6	72.3	6.18	7.3	41.8
4.5	41.0	47.5	56.8	5.70	6.6	35.6
4.6	42.0	48.4	69.3	6.25	6.4	39.6
4.7	41.6	48.5	70.0	6.25	6.9	40.0
4.8	42.3	49.5	88.1	6.85	7.2	45.9
4.9	41.9	49.9	97.3	6.92	8.0	50.2
5.0	41.8	49.8	95.3	6.47	8.0	52.6
5.1	41.9	49.6	91.4	6.00	7.7	54.4
5.2	42.5	49.5	89.5	5.64	7.0	56.7
5.3	42.4	49.3	84.7	5.34	6.8	56.7
5.4	42.1	48.9	77.4	4.87	6.8	56.8
5.5	41.1	48.4	69.7	4.42	7.4	56.3
5.6	41.3	48.3	67.0	4.35	7.0	55.0
5.7	40.9	48.2	65.3	4.79	7.2	48.7
5.8	41.6	48.6	72.3	6.19	7.0	41.7
5.9	41.5	48.3	68.1	6.20	6.9	39.2
6.0	41.1	47.8	60.4	5.65	6.7	38.2
6.1	41.7	48.3	67.0	6.01	6.6	39.8
6.2	40.6	48.4	68.7	6.11	7.8	40.2
6.3	41.4	48.2	66.7	6.09	6.9	39.1
6.4	41.5	47.9	61.2	5.93	6.4	36.9
6.5	41.1	47.3	54.1	5.76	6.3	33.5

Applications

- S and C band power amplifier
- 5G wideband power amplifier



Important Note: Proper Biasing Sequence for GaN HEMT Transistors

Turning the device ON

1. Set VGS to the pinch-off (VP) voltage, typically -5 V
2. Turn on VDS to nominal supply voltage
3. Increase VGS until IDS current is attained
4. Apply RF input power to desired level

Turning the device OFF

1. Turn RF power off
2. Reduce VGS down to VP, typically -5 V
3. Reduce VDS down to 0 V
4. Turn off VGS

Figure 1: Pin Connection definition

Transparent top view (Backside grounding for source)

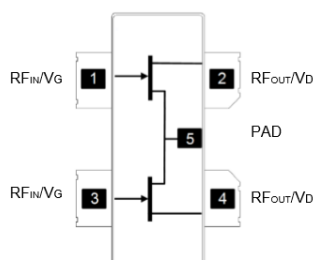


Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DS}	+150	Vdc
Gate--Source Voltage	V_{GS}	-10 to +2	Vdc
Operating Voltage	V_{DD}	36	Vdc
Maximum gate current	I_{gs}	25.2	mA
Storage Temperature Range	T_{stg}	-65 to +150	°C
Case Operating Temperature	T_C	+150	°C
Operating Junction Temperature	T_J	+225	°C

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case by FEA $T_C = 25^\circ\text{C}$, at $P_{out} = 100\text{W}$ CW at 4GHz	$R_{\theta JC}$	1.2	°C /W

Table 3. Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

DC Characteristics (measured on wafer prior to packaging)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = -8\text{V}$; $I_{DS} = 25.2\text{mA}$	V_{DSS}		150		V
Gate Threshold Voltage	$V_{DS} = 10\text{V}$, $I_D = 25.2\text{mA}$	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	$V_{DS} = 28\text{V}$, $I_{DS} = 100\text{mA}$, Measured in Functional Test	$V_{GS(Q)}$		-3.18		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	4GHz, $P_{out} = 100\text{W}$ Pulsed CW All phase, No device damages	VSWR		10:1		

Typical performance 2300-6500MHz

Figure 3: Picture of application board ,class AB

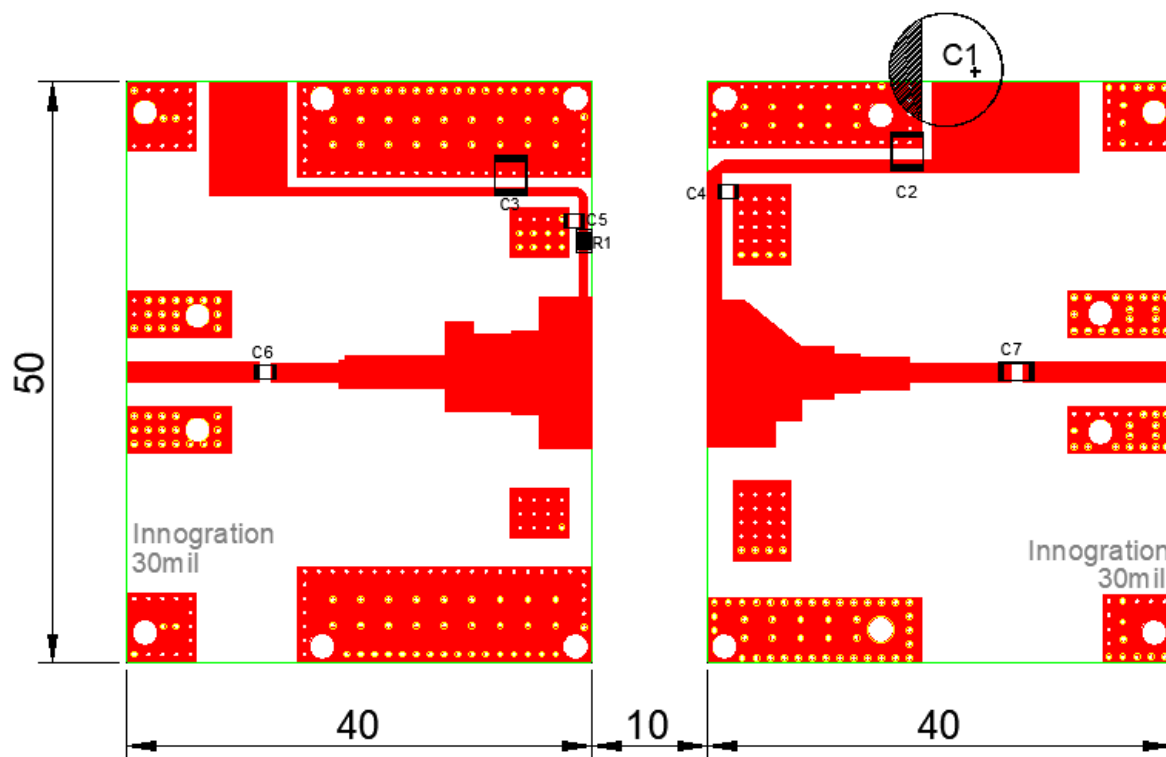
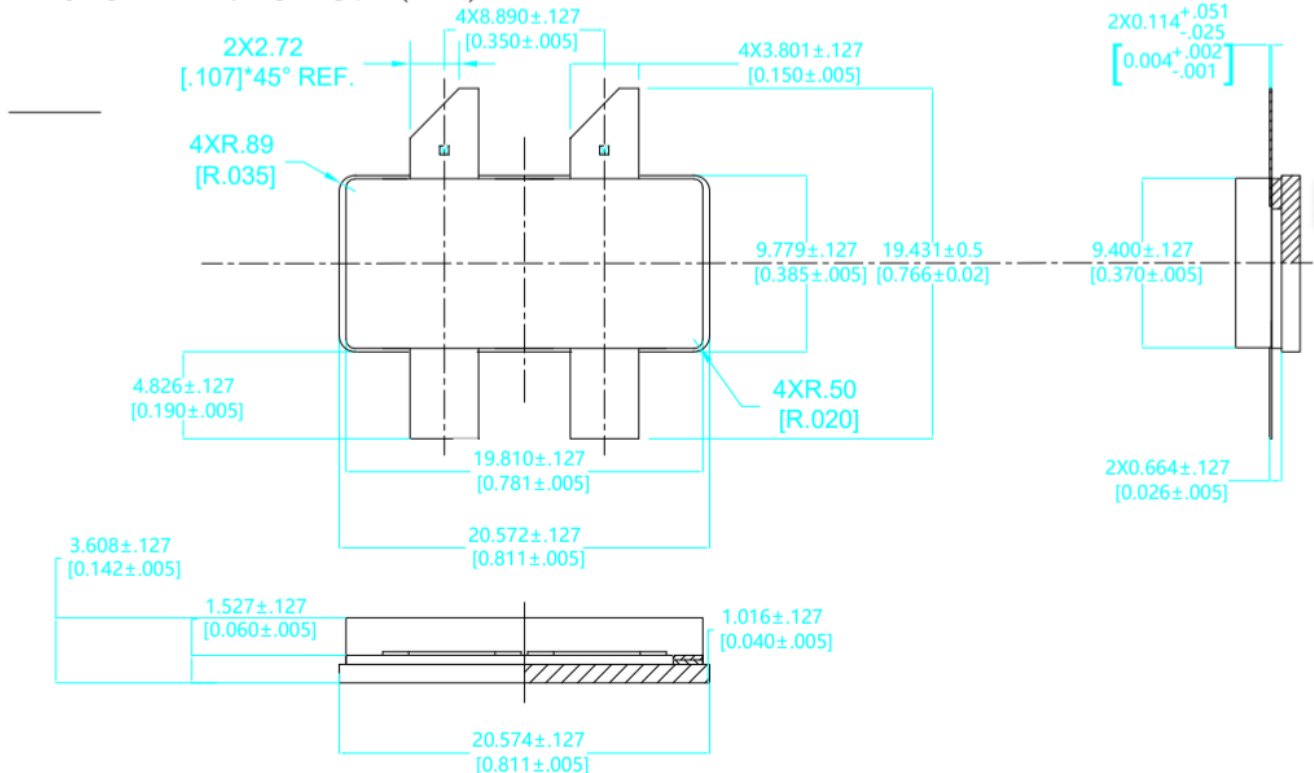


Table 4. Bill of materials of application board (PCB layout upon request)

Component	Description	Suggestion
C1	2200uF/63V	
C2,C3	10uF	1210
C4,C5,C6	4.7pF	MQ300805
C7	4.7pF	MQ301111
R1	Chip Resistor, 10Ω	0805
PCB	30 mil Rogers 4350b	



INP-648-4EL (SCMC) (BY4)



Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2023/12/28	V1.0	Product Datasheet Creation
2024/11/15	V1.1	Modify the typo of naming from GTAH to STAH

Application data based on: RXT-23-51

Notice

Specifications are subject to change without notice. Innegration believes the information within the data sheet to be reliable. Innegration makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose.

“Typical” parameter is the average values expected by Innegration in quantities and are provided for information purposes only. It can and do vary in different applications and related performance can vary over time. All parameters should be validated by customer’s technical experts for each application.

Innegration products are not designed, intended or authorized for use as components in applications intended for surgical implant into the body or to support or sustain life, in applications in which the failure of the Innegration product could result in personal injury or death or in applications for planning, construction, maintenance or direct operation of a nuclear facility.

For any concerns or questions related to terms or conditions, please check with Innegration and authorized distributors

Copyright © by Innegration (Suzhou) Co.,Ltd.