



Gallium Nitride 50V, 50W, 4-5GHz RF Power Transistor

Description

The STAV50050C6 is a 50watt, GaN HEMT, ideal for general applications from 4 to 5GHz.

It features high gain, wide band and low cost, in 10*6mm plastic open cavity package, enabling surface mounted on PCB through grounding vias or soldered on heatsink directly.

There is no guarantee of performance when this part is used outside of stated frequencies.

- Typical Class AB pulse CW performance across 4..8-5.0GHz:

Pulse width=20us, duty cycle=10% (On innogrations application board with device soldered)

FREQ (MHZ)	P1dB(dBm)	P1dB(W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB(dBm)	P3dB(W)	P3dB Eff(%)
4800	45.65	36.74	49.27	16.4	47.48	55.94	56.44
4900	45.29	33.8	48.57	16.38	47.31	53.79	56.97
5000	45.37	34.46	48.98	15.62	47.27	53.32	56.07



Applications

- 5G wireless infrastructure
- Wideband or narrowband power amplifier
- C band pulsed 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

Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V _{DSS}	+200	Vdc
Gate--Source Voltage	V _{GS}	-8 to +0.5	Vdc
Operating Voltage	V _{DD}	55	Vdc
Maximum gate current	I _{gs}	5	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 = 85°C, at Pavg=2W WCDMA 1 carrier	R _{θJC}	5.2	°C /W



Table 3. Electrical Characteristics (TA = 25°C unless otherwise noted)

DC Characteristics (measured on wafer prior to packaging)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	VGS=-8V; IDS=5mA	V _{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 5mA	V _{GS(th)}	-4	-3	-2	V
Gate Quiescent Voltage	VDS =50V, IDS=50mA, Measured in Functional Test	V _{GS(Q)}		-3		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	4.8GHz, Pout=50W pulse CW All phase, No device damages	VSWR		10:1		

Figure 1: Pin definitions (Top view)

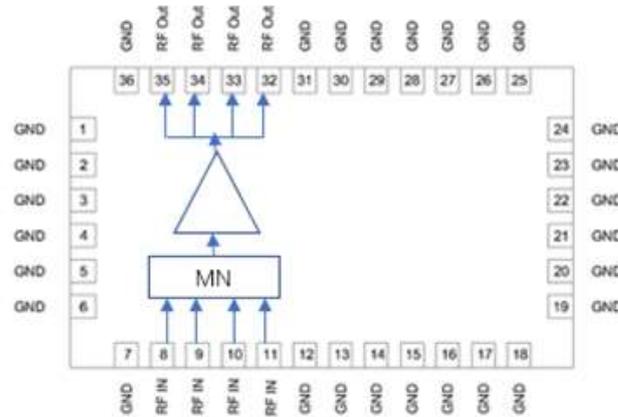


Figure 2: Efficiency and power gain as function of Pout (Measured on 4.8-5.0GHz application board)



Figure 3: Network plot for S11/S21



Figure 4: Picture of application board of 4.8-5.0GHz

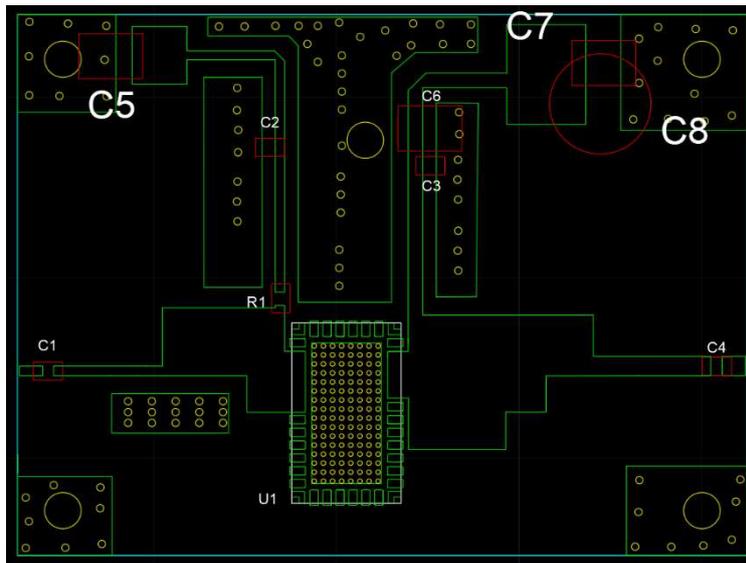


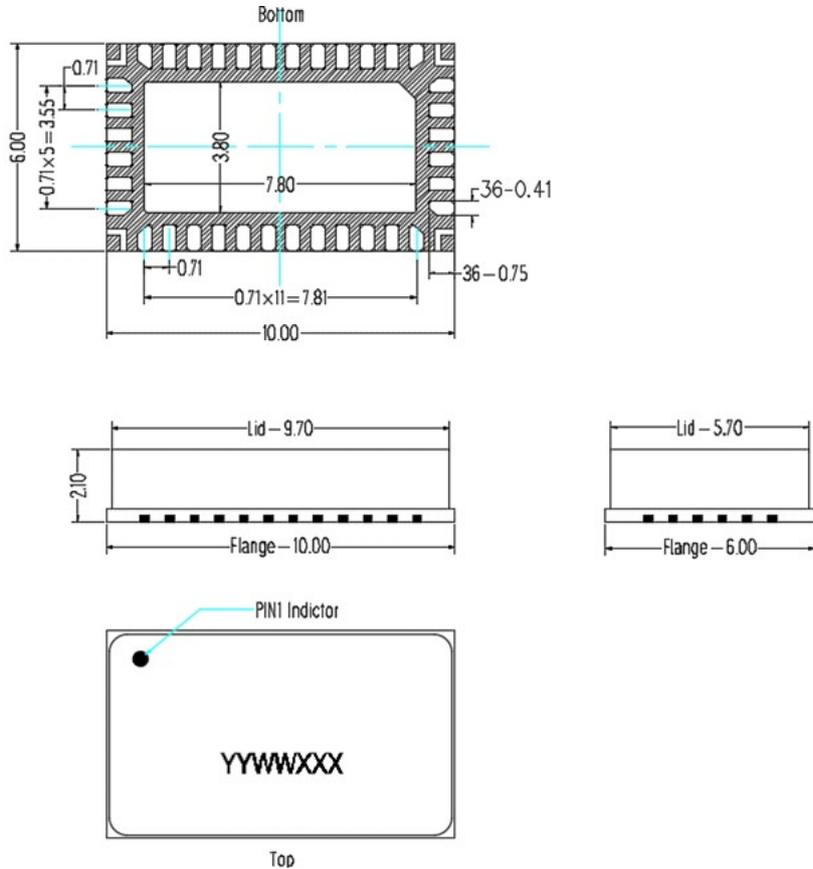
Table 4. Bill of materials of application board (PCB layout upon request)

Component	Value	Description
PCB	RO4350B 20mils	
U1	STAV50050C6	1
C1、C2、C3、C4	3.9pF	4
C5、C6、C7	10uF/63V	3
R1	10Ω	1
C8	470uF/63V	1



Package Dimensions

10*6 Plastic Package



Notes:

- 1. All dimensions are in mm;
- 2. The tolerances unless specified are ±0.2mm.

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2022/7/21	V1.0	Preliminary Datasheet Creation
2023/9/18	V1.1	Modify the input/output pins diagram on page 2

Application data based on: ZYX-22-07

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