



## Gallium Nitride 50V, 80W, 3.7-4.2GHz RF Power Transistor

### Description

The STAV42082C6 is a 80watt, GaN HEMT, ideal for general applications from 3.7 to 4.2GHz. 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 3.7-4.0GHz:

V<sub>ds</sub> = 50V , I<sub>dq</sub> = 100mA, Pulse width=20us, duty cycle=10%

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff (%)	P1dB Gain (dB)	P3dB (dBm)	P3dB (W)	P3dB Eff (%)
3700.00	48.82	76.29	51.33	16.48	49.93	98.37	54.69
3800.00	48.66	73.38	53.92	16.40	49.82	95.89	58.12
3900.00	48.19	65.95	54.99	16.30	49.57	90.60	59.98
4000.00	47.98	62.82	59.20	16.35	49.15	82.21	63.50



### Applications

- 5G, 4G wireless infrastructure
- Wideband or narrowband power amplifier
- Test instruments
- Jammer

### Important Note: Proper Biasing Sequence for GaN HEMT Transistors

#### Turning the device ON

1. Set V<sub>GS</sub> to the pinch-off (V<sub>P</sub>) voltage, typically -5 V
2. Turn on V<sub>DS</sub> to nominal supply voltage
3. Increase V<sub>GS</sub> until I<sub>DS</sub> current is attained
4. Apply RF input power to desired level

#### Turning the device OFF

1. Turn RF power off
2. Reduce V<sub>GS</sub> down to V<sub>P</sub>, typically -5 V
3. Reduce V<sub>DS</sub> down to 0 V
4. Turn off V<sub>GS</sub>

Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V <sub>DSS</sub>	+200	Vdc
Gate--Source Voltage	V <sub>GS</sub>	-8 to +0.5	Vdc
Operating Voltage	V <sub>DD</sub>	55	Vdc
Maximum gate current	I <sub>gs</sub>	10	mA
Storage Temperature Range	T <sub>stg</sub>	-65 to +150	°C
Case Operating Temperature	T <sub>C</sub>	+150	°C
Operating Junction Temperature	T <sub>J</sub>	+225	°C

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case by FEA T <sub>C</sub> = 85°C, at P <sub>avg</sub> =6W WCDMA 1 carrier	R <sub>θJC</sub>	3.1	°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=10mA	V <sub>DSS</sub>		200		V
Gate Threshold Voltage	VDS =10V, ID = 10mA	V <sub>GS(th)</sub>	-4	-3	-2	V
Gate Quiescent Voltage	VDS =50V, IDS=120mA, Measured in Functional Test	V <sub>GS(Q)</sub>		-3.17		V

**Ruggedness Characteristics**

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	3.8GHz, Pout=80W pulse CW All phase, No device damages	VSWR		10:1		

**Figure 1: Pin Definition(Top View)**



Pin No.	Symbol	Description
8,9,10,11,14,15,16,17	Vgs/RF In	Vgs and RF input
26,27,28,29,32,33,34,35	Vds/RF out	Vds and RF output
2,5,7,12,13,18,20,23,25,30,31,36	GND	DC/RF Ground
Others	NC	No connection
Package Base	GND	DC/RF Ground.



Figure 2: Efficiency and power gain as function of Pout (Measured on 3.7-4.0GHz application board)

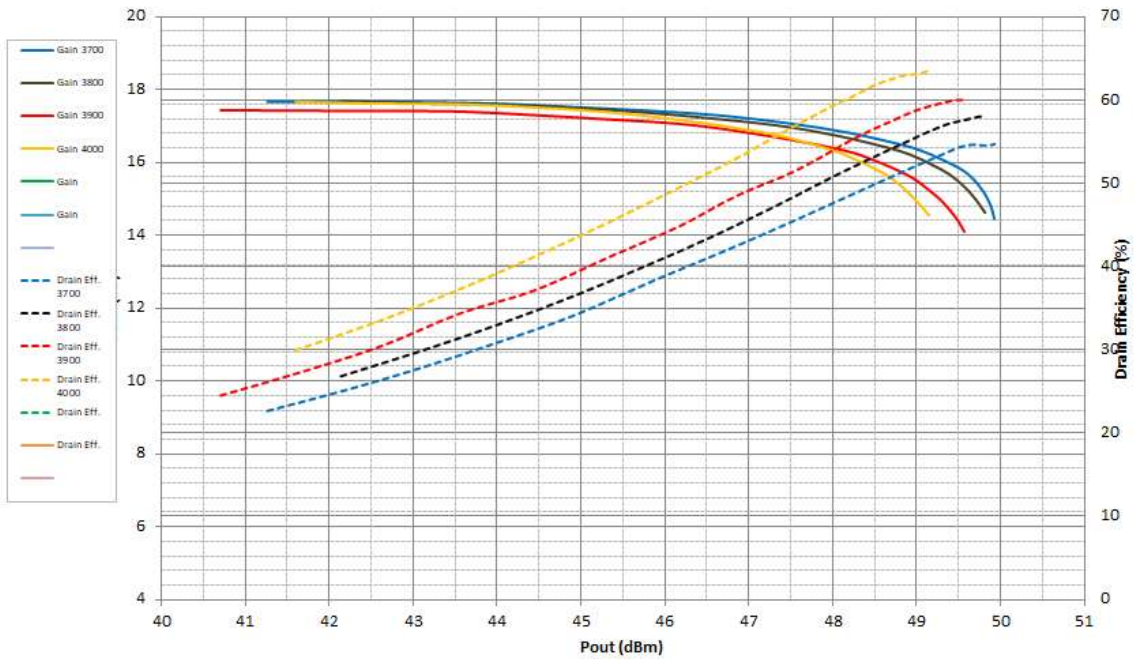


Figure 3: Network plot for S11/S21

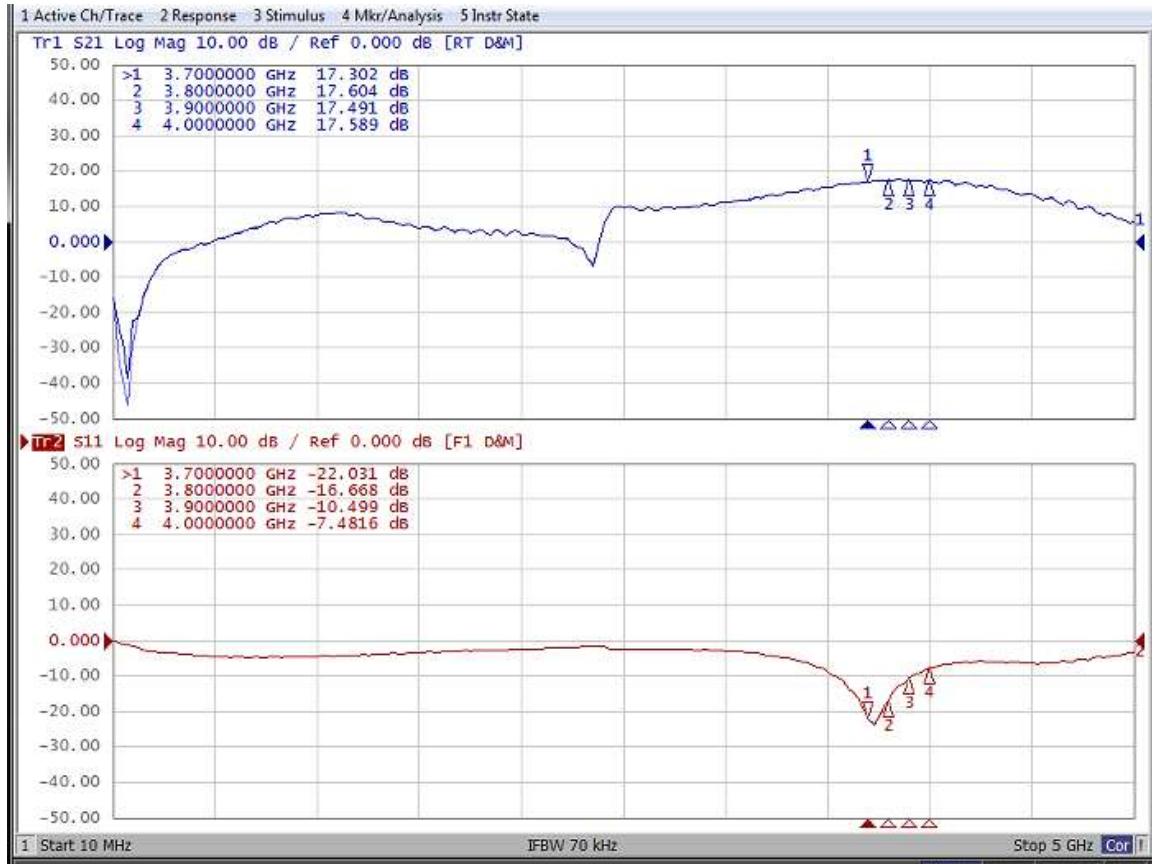
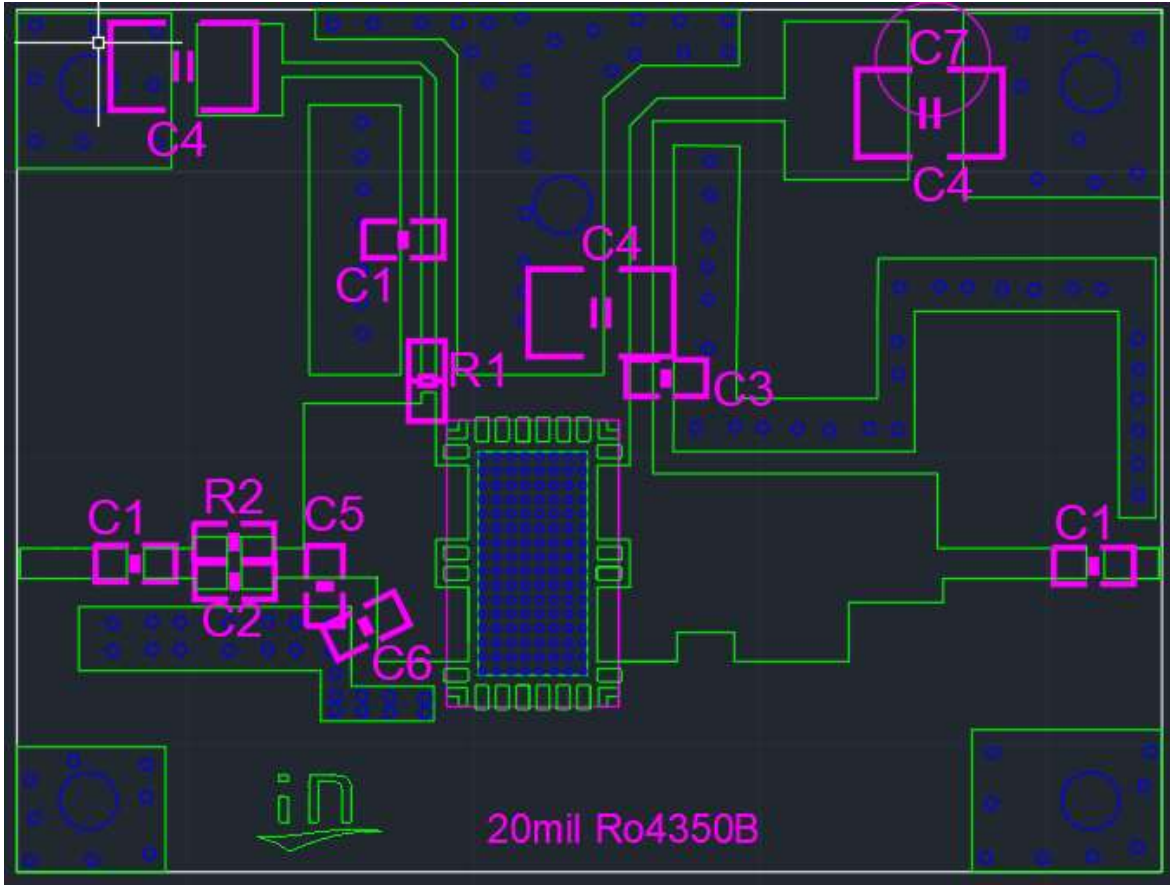


Figure 4: Picture of application board of 3.7-4.0GHz

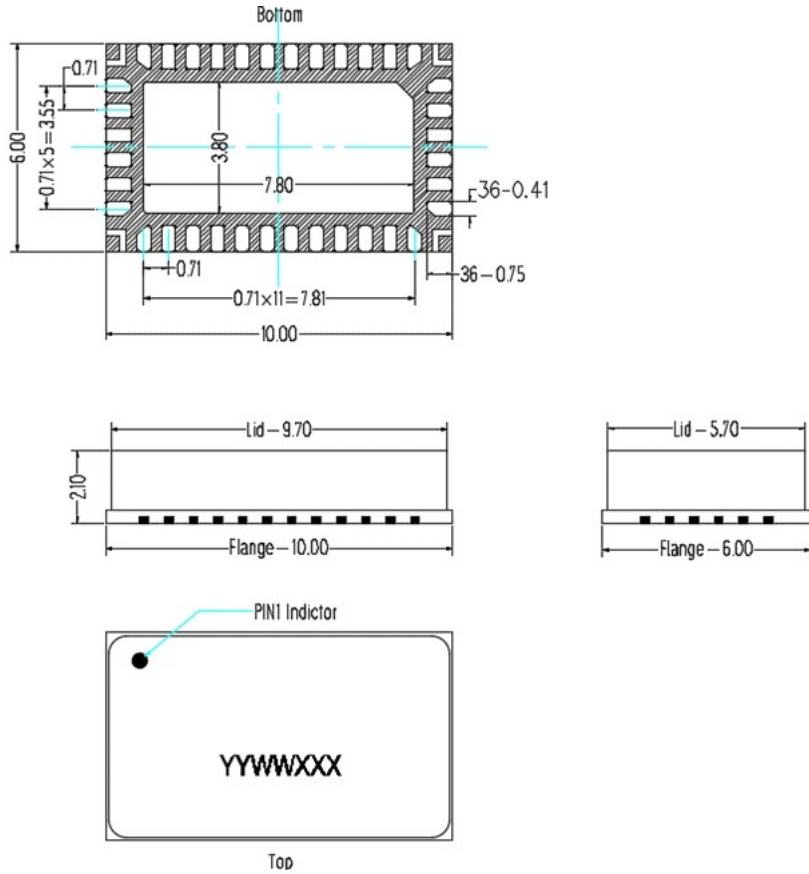


Component	Value	Quantity
C1	8.2pF	3
C4	10uF	3
R1	10 ohm	1
C2	3.9pF	1
R2	50 ohm	1
C7	470uF	1
C3	3.9pF	1
C5	0.5pF	1
C6	0.1 pF	1



### 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
2024/4/12	V1.0	Preliminary Datasheet Creation from STBV42081C6 due to thermal optimization

Application data based on: ZXY-22-07/24-09

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