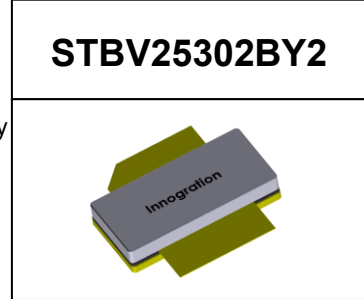




# GaN 50V, 300W, 2.45GHz RF Power Transistor



## Description

The STBV25302BY2 is a single ended 300watt capable, GaN HEMT, ideal for ISM and RF Energy Applications within full band of 2.4-2.5GHz

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

- Typical CW performance at 2.4-2.5GHz applications

V<sub>DD</sub> = 50 Vdc, V<sub>GS</sub> = -4.5V, with device soldered, CW:

Freq (MHz)	Pin (dBm)	Psat (dBm)	Psat (W)	IDS (A)	Gain (dB)	Eff (%)	2rd (dBc)	3rd (dBc)
2400	41.2	56.23	419.76	11.42	15.03	73.87	-23.22	-28.56
2420	40.98	56.1	407.38	10.92	15.12	74.61	-23.7	-29.07
2440	40.22	55.85	384.59	10.26	15.63	74.97	-23.95	-31.2
2450	39.93	55.75	375.84	9.91	15.82	75.85	-24.18	-32.26
2475	39.43	55.42	348.34	9.15	15.99	76.14	-25.37	-34.59
2500	39.17	55	316.23	8.25	15.83	76.66	-25.34	-32.08

Recommended driver: STAV58016P2

## Applications

- 2.45GHz RF Energy
- S band power amplifier

### 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>	54	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> = 25°C, at Pd = 160W	R <sub>θJC</sub>	0.62	°C /W

Table 3. Electrical Characteristics (T<sub>A</sub> = 25°C unless otherwise noted)

DC Characteristics (Each path, measured on wafer prior to packaging)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
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Drain-Source Breakdown Voltage	VGS=-8V, IDS=54mA	V <sub>DSS</sub>		200		V
Gate Threshold Voltage	VDS =10V, ID = 54mA	V <sub>GS(th)</sub>	-4	-	-2	V
Gate Quiescent Voltage	VDS =50V, IDS=100mA, Measured in Functional Test	V <sub>GS(Q)</sub>		--3.2		V

**Ruggedness Characteristics**

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	2.45GHz, Pout=300W pulse CW All phase, No device damages	VSWR		10:1		

**TYPICAL CHARACTERISTICS**

Figure 1: S11/S21 output from Network analyser (VDS= 50V, Idq=500 mA)

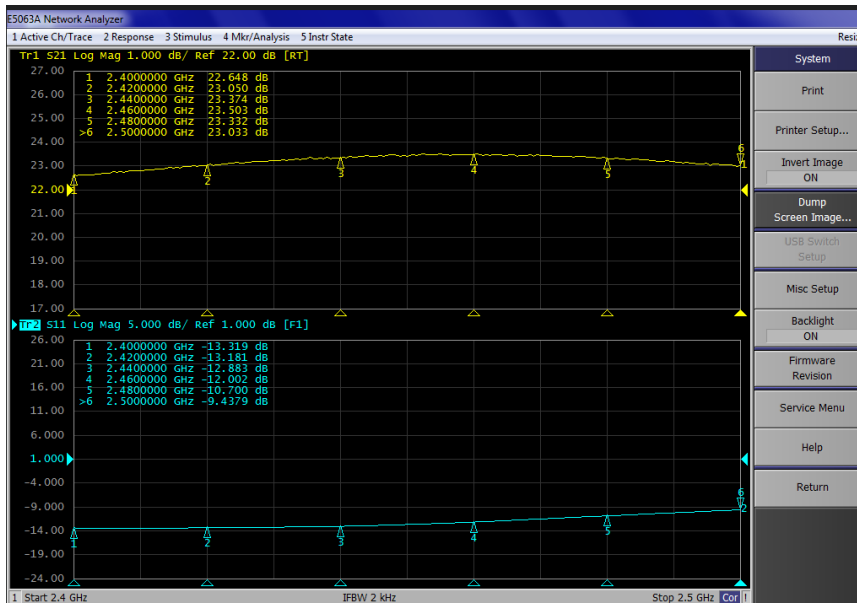


Figure 1: Efficiency and power gain as function of Pout (VDD = 50Vdc, Vgs=-4.5V, Pulse width=20us, duty cycle=20%)

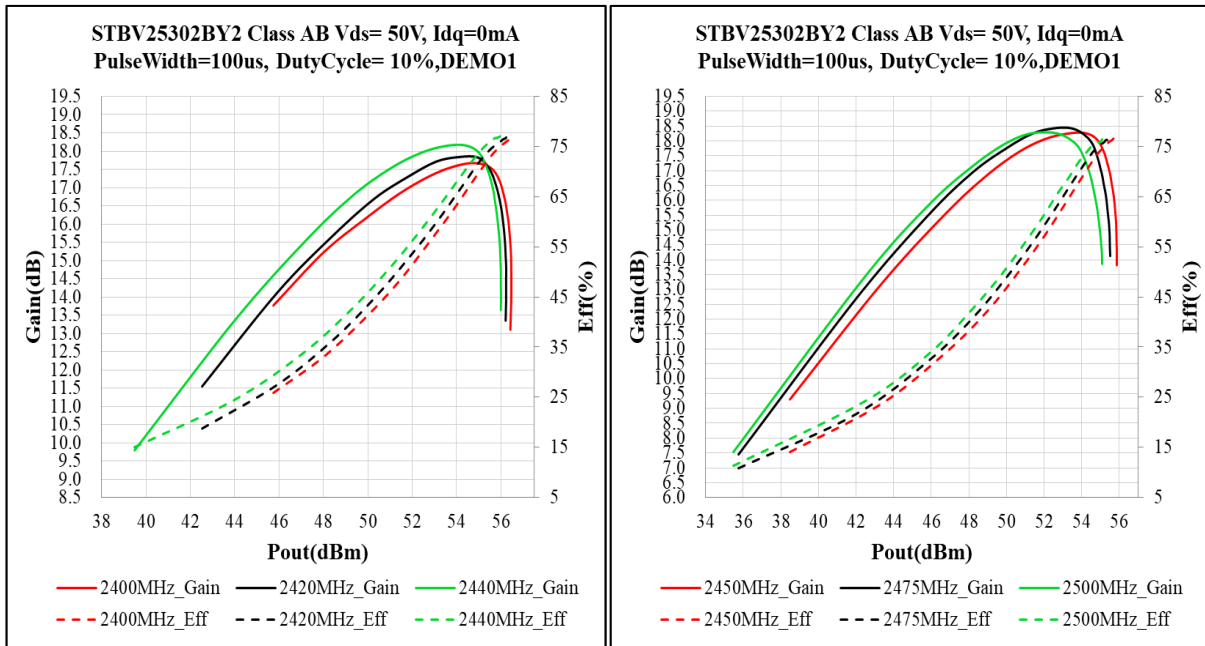
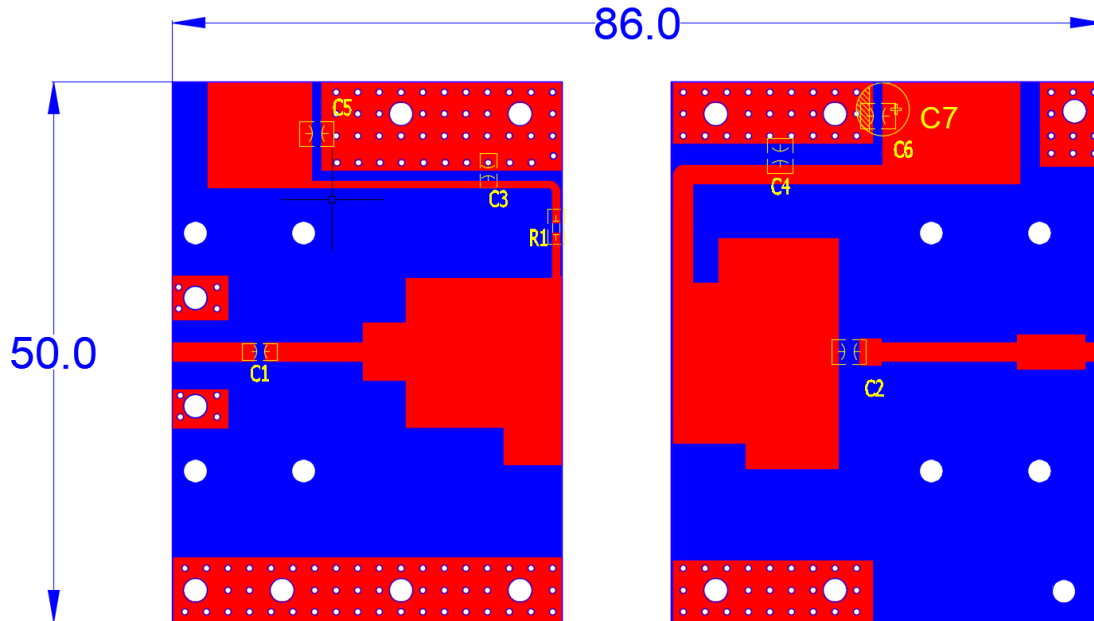


Figure 3: Reference design circuit (PCB DWG file upon request,)

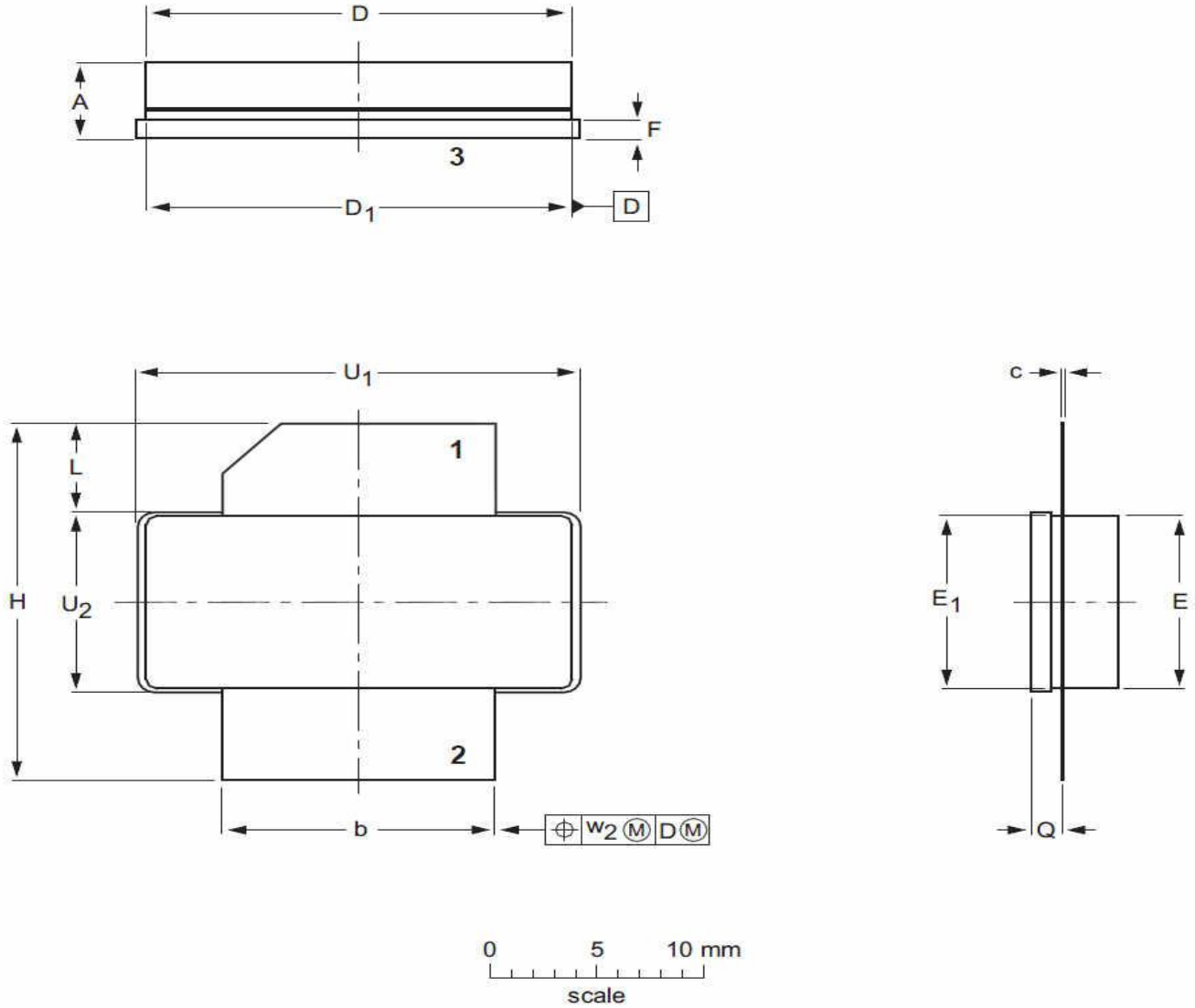


Component	Description	Suggestion
C5,C6	10uF/100V	-
C4,	15pF	MQ101111
C1, C3,	15pF	MQ300805
C7	4700uF/63V	-
R1	10Ω(0805)	-
C2	15pF	MCM-1-300V-150J
PCB	Rogers TC350, thickness 30 mils, 1oz copper	



### Package Outline

Earless flanged ceramic package; 2 leads (1—DRAIN、2—GATE、3—SOURCE)



UNIT	A	b	c	D	D <sub>1</sub>	E	E <sub>1</sub>	F	H	L	Q	U <sub>1</sub>	U <sub>2</sub>	W <sub>2</sub>
mm	4.72	12.83	0.15	20.02	19.96	9.50	9.53	1.14	19.94	5.33	1.70	20.70	9.91	0.25
	3.43	12.57	0.08	19.61	19.66	9.30	9.25	0.89	18.92	4.32	1.45	20.45	9.65	
inches	0.186	0.505	0.006	0.788	0.786	0.374	0.375	0.045	0.785	0.210	0.067	0.815	0.390	0.010
	0.135	0.495	0.003	0.772	0.774	0.366	0.364	0.035	0.745	0.170	0.057	0.805	0.380	

OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-B2					03/12/2013



## Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2023/12/5	V1.0	Preliminary Datasheet Creation
2025/10/30	V1.1	Change PCB material to only TC350

Application data based on: YHG-23-31/25-36

## Notice

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