



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_{DD} = 50 Vdc, V_{GS} = -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_{GS} to the pinch-off (V_P) voltage, typically -5 V
2. Turn on V_{DS} to nominal supply voltage
3. Increase V_{GS} until I_{DS} current is attained
4. Apply RF input power to desired level

Turning the device OFF

1. Turn RF power off
2. Reduce V_{GS} down to V_P, typically -5 V
3. Reduce V_{DS} down to 0 V
4. Turn off V_{GS}

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}	54	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°C, at Pd = 160W	R _{θJC}	0.62	°C /W

Table 3. Electrical Characteristics (T_A = 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 _{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 54mA	V _{GS(th)}	-4	-	-2	V
Gate Quiescent Voltage	VDS =50V, IDS=100mA, Measured in Functional Test	V _{GS(Q)}		--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=550 mA)

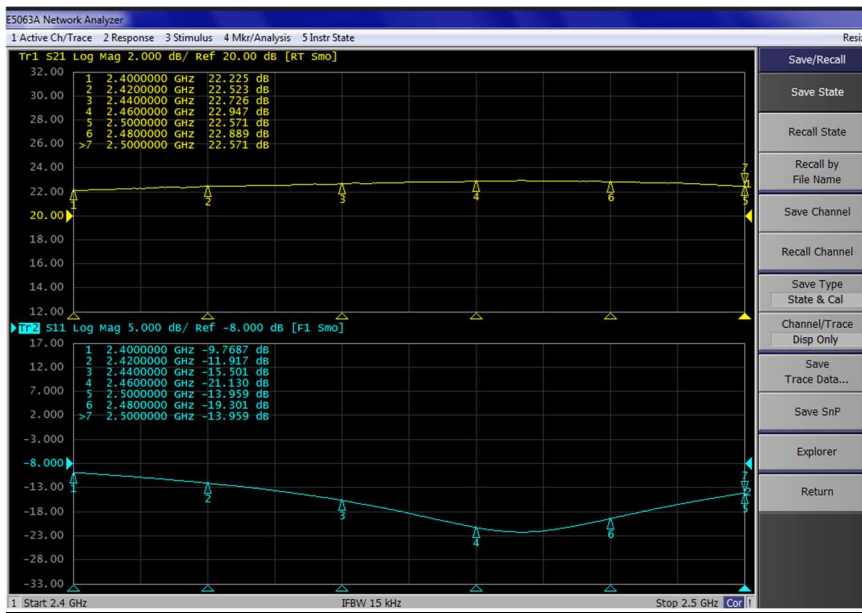


Figure 1: Efficiency and power gain as function of Pout (VDD = 50Vdc, Vgs=-4.5V, Pulse width=20us, duty cycle=20%)

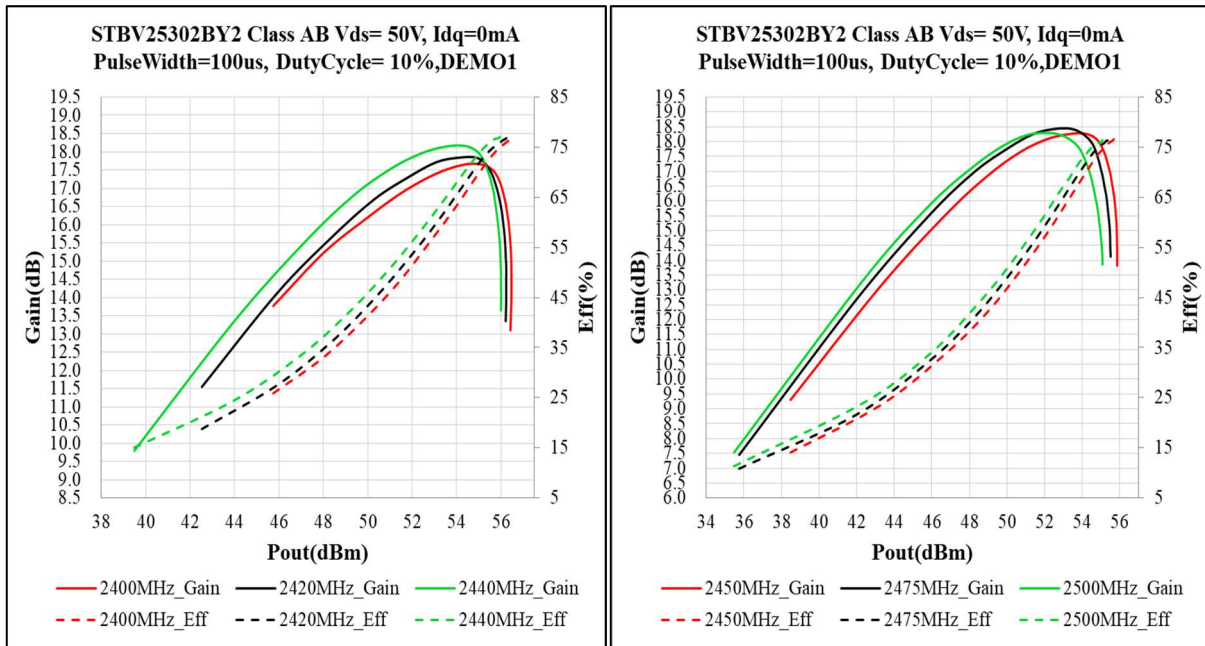
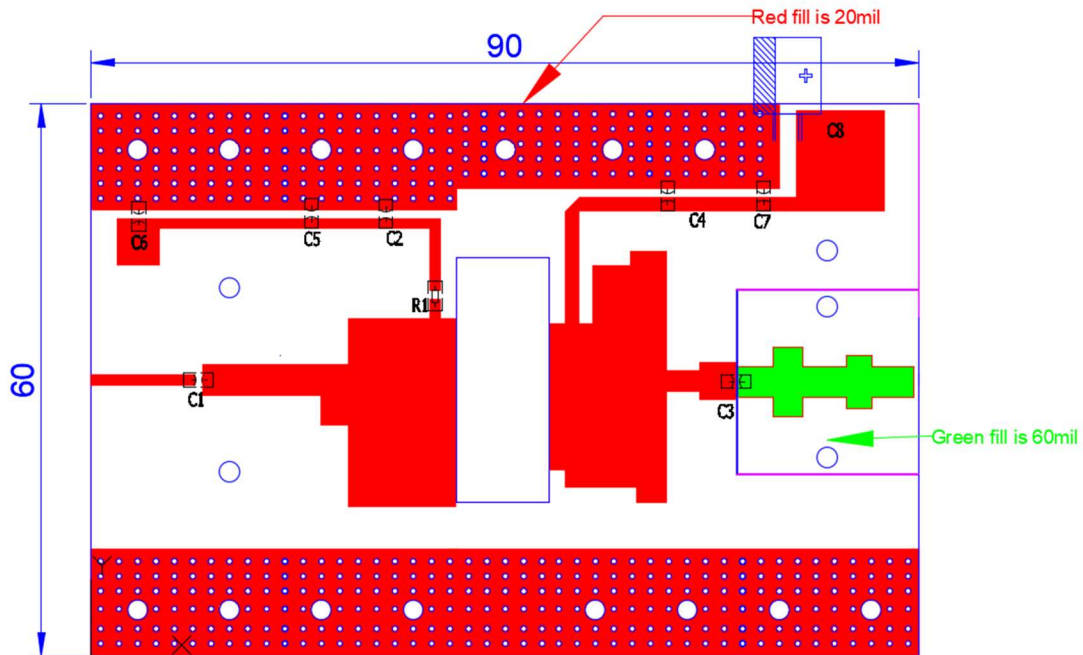


Figure 3: Reference design circuit (PCB DWG file upon request,)

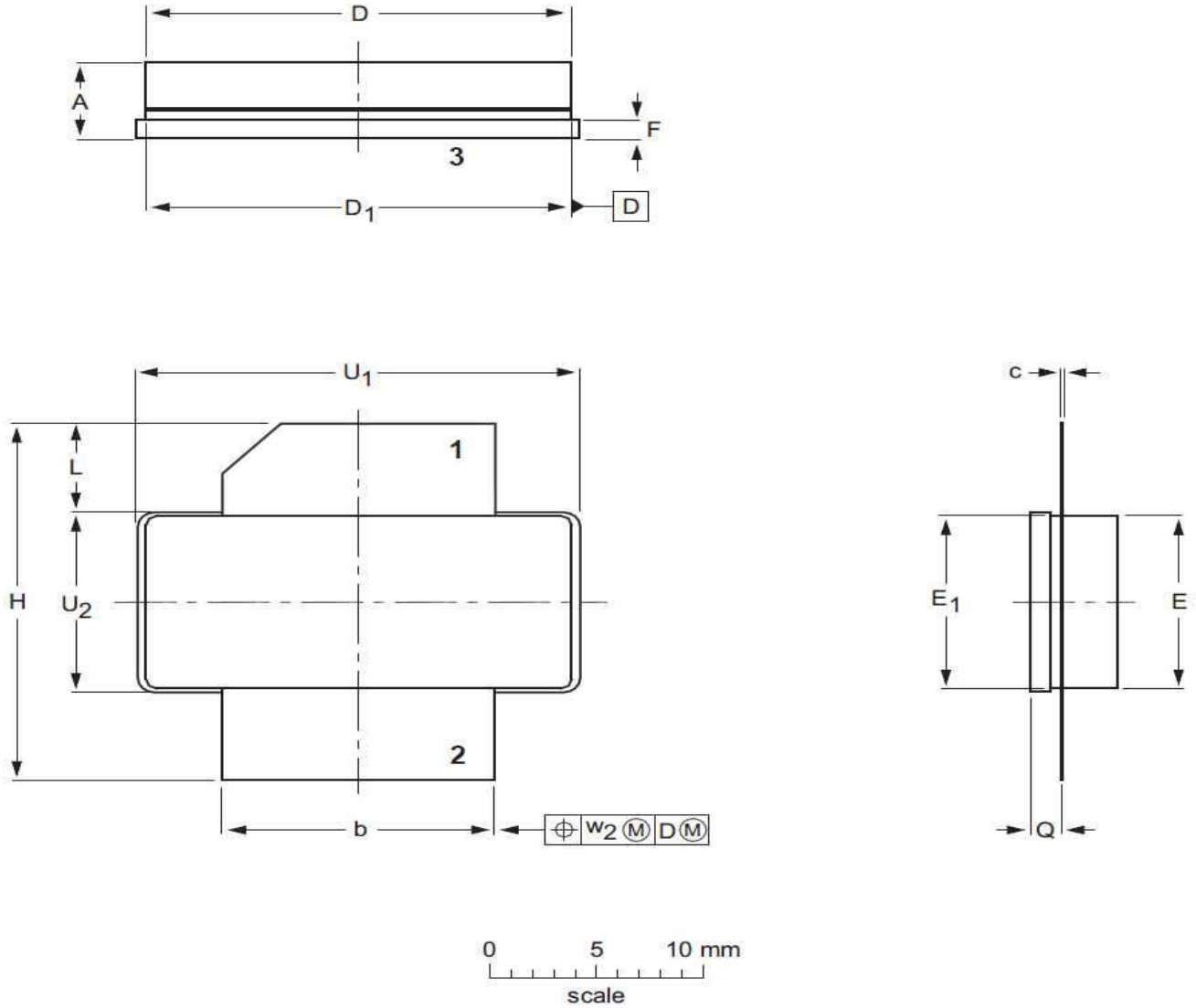


Component	Description	Suggestion
C5,C6,C7	10uF	10uF/100V
C4,	15pF	BJYN:MQ101111
C1, C2,	15pF	BJYN:MQ300805
C8	4700uF/63V	Electrolytic Capacitor
R1	10Ω	Chip Resistor
C3	6.8pF	Huamao:MCM-1-300V-6R8D
PCB	Rogers TC350, thickness 20 mils, 1oz copper. //Taconic RF-35TC-0600-A, thickness 60 mils, 1oz copper	



Package Outline

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



UNIT	A	b	c	D	D ₁	E	E ₁	F	H	L	Q	U ₁	U ₂	W ₂
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

Application data based on: YHG-23-31

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