



# GaN 50V, 500W, 2.4-2.5GHz RF Power Transistor

**STBV25500BY2**

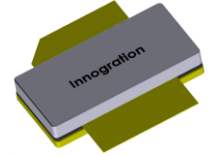
## Description

The STBV25500BY2 is a single ended 500watt capable, GaN HEMT, ideal for ISM applications within 2.4-2.5GHz full band

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,  $V_{GS} = -4.8$ V, with device soldered, CW:



Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
2400	57.05	507.5	70.8	14.82	57.52	565.0	72.6
2450	56.83	481.8	72.2	15.67	57.4	549.1	73.7
2500	56.79	477.9	71.2	15.42	57.46	557.4	72.7

Recommended driver: STAV58035C6

## Applications

- 2.45GHz RF Energy
- S band 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

**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	$I_{GS}$	75.6	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 $P_d = 180$ W	$R_{\theta JC}$	0.5	°C /W

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

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

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = -8$ V; $I_{DS} = 75.6$ mA	$V_{DSS}$		200		V
Gate Threshold Voltage	$V_{DS} = 10$ V, $I_D = 75.6$ mA	$V_{GS(th)}$	-4	-	-2	V
Gate Quiescent Voltage	$V_{DS} = 50$ V, $I_{DS} = 300$ mA, 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=500W pulse CW All phase, No device damages	VSWR		10:1		

**TYPICAL CHARACTERISTICS**

Figure 1: Efficiency and power gain as function of Pout

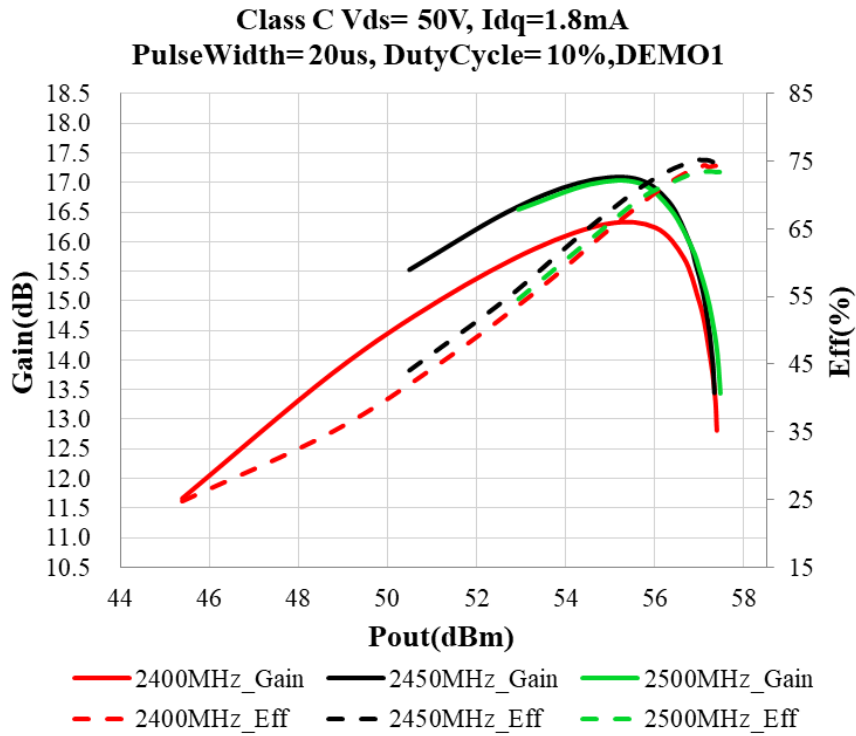
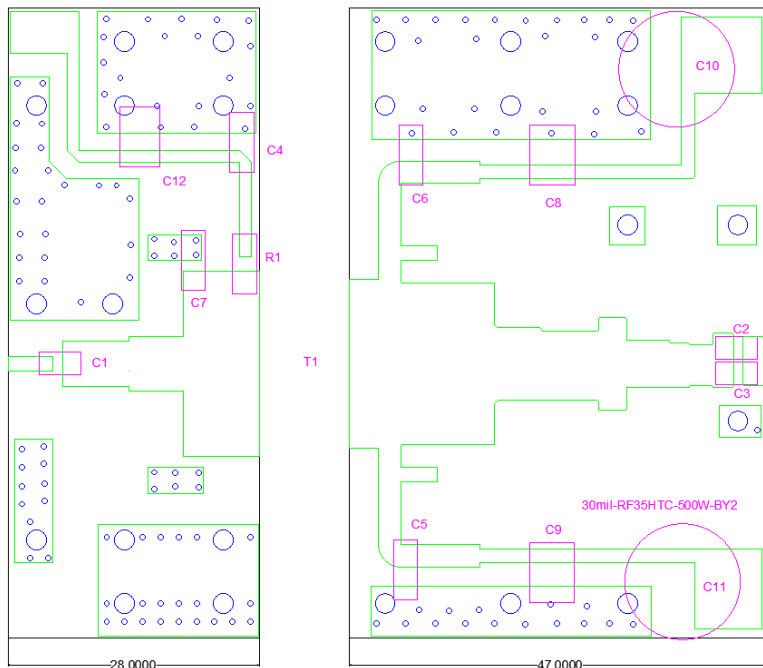


Figure 3: Reference design circuit (PCB DWG file upon request,)



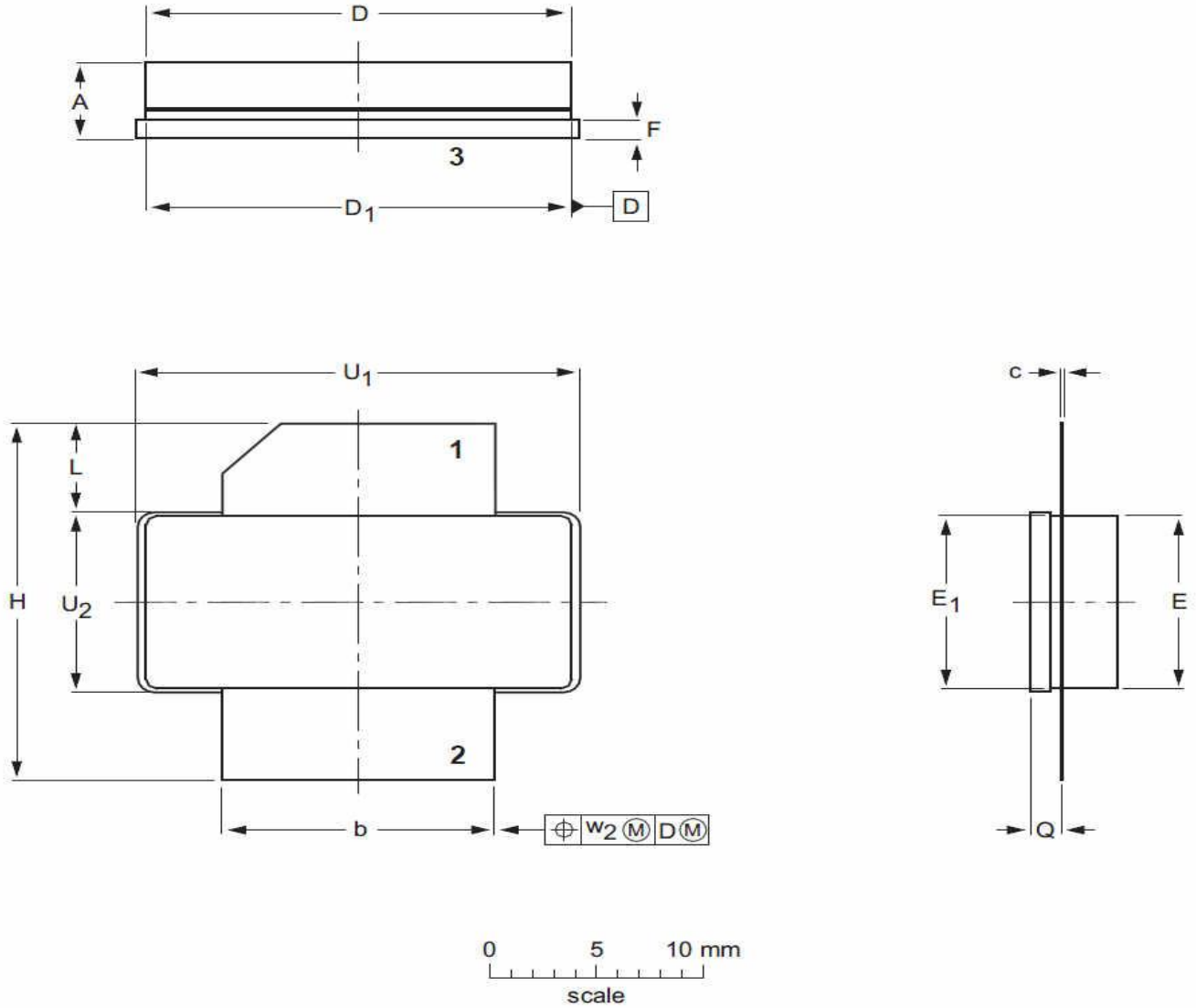


Part	Quantity	Description	Part Number	Manufacture
C1, C4,C5,C6	4	12pFHigh Q Capacitor	251SHF120BSE	TEMEX
C2,C3	2	6.8pFHigh Q Capacitor	MQ301111COG2H6 R8CNHB	元六
C10,C11	2	1000uF/63V		
C8,C9, C12	3	10uF MLCC	RS80R2A106M	MARUWA
C7	1	0.8pFHigh Q Capacitor	251SHFOR8BSE	TEMEX
R1	1	10 $\Omega$ Power Resistor	ESR03EZPF100	ROHM
T1	1	500W GaN Dual Transistor	STBV25500BY2	Innogrations



### 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
2025/12/18	V1.0	Preliminary Datasheet Creation

Application data based on: YHG-25-43

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