



GaN 50V, 1000W, 2.45GHz RF Power Transistor

STCV251K0BY2

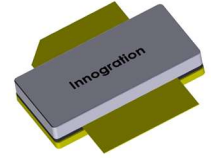
Description

The STCV251K0BY2 is a single ended 1000watt capable, GaN HEMT, ideal for ISM and RF Energy applications within full band of 2.4-2.5GHz . **It can only support pulsed CW signal, NOT CW.**

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, **Pulsed CW: 10% 100us**



Freq(MHz)	Pin(dBm)	Psat(dBm)	Psat(W)	IDS(A)	Gain(dB)	Eff(%)
2400	45.72	60.54	1132.40	3.47	14.82	65.27
2425	46.16	60.48	1116.86	3.4	14.32	65.70
2450	46.17	60.36	1086.43	3.32	14.19	65.45
2475	46.23	60.25	1059.25	3.22	14.02	65.79
2500	46.47	60.1	1023.29	3.12	13.63	65.60

Recommended driver: STAV25050G2

Applications

- 2.45GHz RF Energy Pulsed amplifier
- 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}	140	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 P _{out} = 1000W Pulsed CW	R _{θJC}	0.25	°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} = -8V; I _{DS} = 140mA	V _{DSS}		200		V
Gate Threshold Voltage	V _{DS} = 10V, I _D = 140mA	V _{GS(th)}	-4	-	-2	V



Gate Quiescent Voltage	VDS =50V, IDS=140mA, Measured in Functional Test	V _{GS(Q)}		--3.2		V
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Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	2.45GHz, Pout=1000W 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)

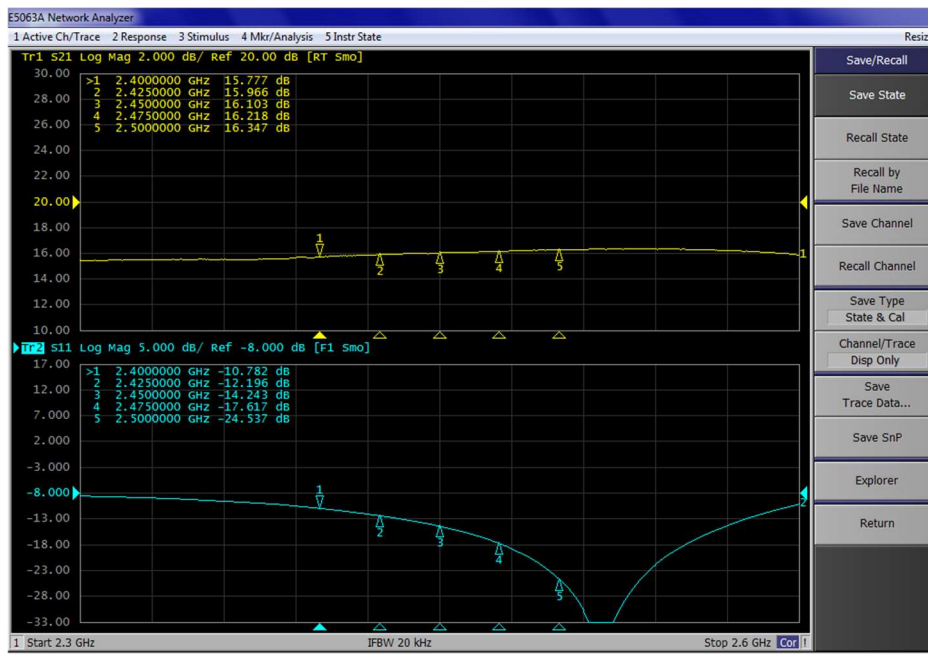
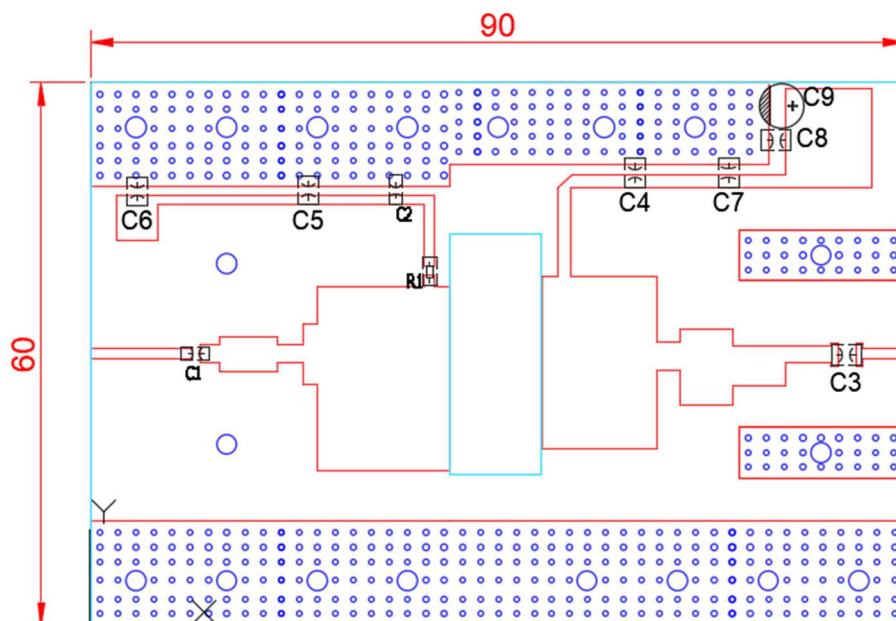


Figure 2: Reference design circuit (PCB DWG file upon request,)



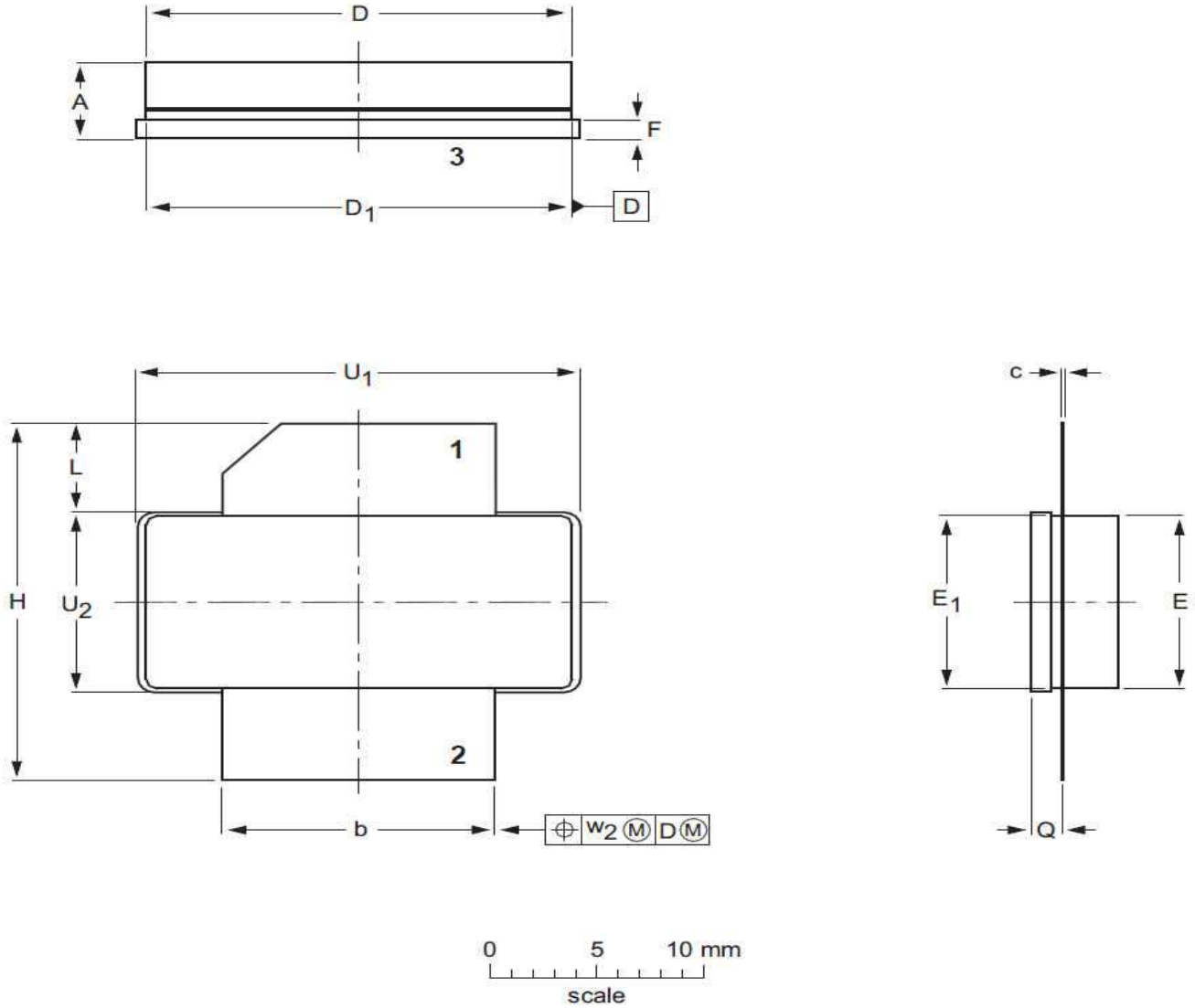


Component	Description	Suggestion
C5,C6,C7, C8	10uF	10uF/100V
C3,C4,	15pF	MQ101111
C1, C2,	15pF	MQ300805
C9	4700uF/63V	Electrolyic Capacitor
R1	10Ω	Chip Resistor
PCB	Rogers TC350, thickness 20 mils, 1oz copper.	



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
2024/3/11	V1.0	Preliminary Datasheet Creation

Application data based on: YHG-24-04

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