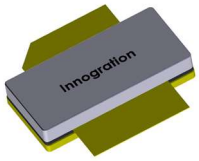
GaN 50V, 400W,2.45GHz RF Power Transistor

STBV25401BY2



Description

The STBV25401BY2 is a single ended 400watt capable, GaN HEMT, ideal for ISM applications at the narrower sub-band within 2.4-2.5GHz

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

- Typical CW performance at 2.45-2.55GHz applications

V_{DD} = 50 Vdc, Vgs=-4.3V, with device soldered，CW:

Freq(MHz)	Pin(dBm)	Psat(dBm)	Psat(W)	IDS(A)	Gain(dB)	Eff(%)
2445	40.3	56.2	414	11.2	15.9	74
2450	40.4	56.12	410	11.0	15.7	74
2455	40.5	56.12	410	10.8	15.6	75

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 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	Igs	54	mA
Storage Temperature Range	Tstg	-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=140W	$R_{\theta JC}$	0.65	°C /W

Table 3. Electrical Characteristics (TA = 25℃ unless otherwise noted)

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

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
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=400W pulse CW All phase,No device damages	VSWR		10:1		

TYPICAL CHARACTERISTICS

Figure 1: S11/S21 output from Network analyser (VDS= 50V, IDQ=300 mA)

Figure 1: Efficiency and power gain as function of Pout

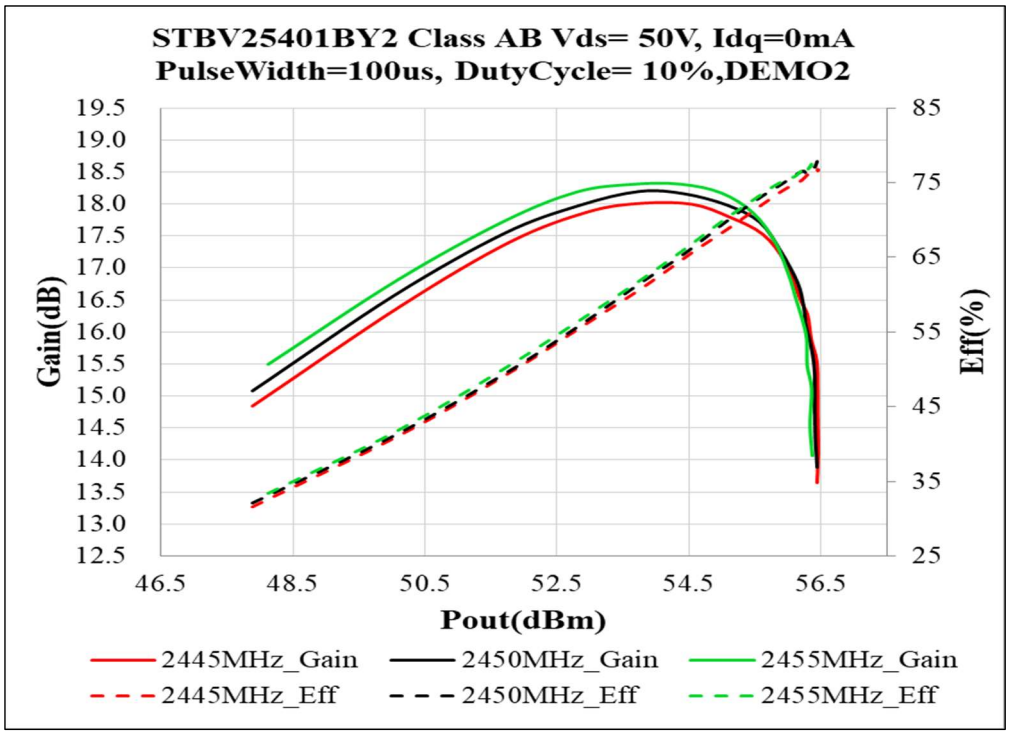
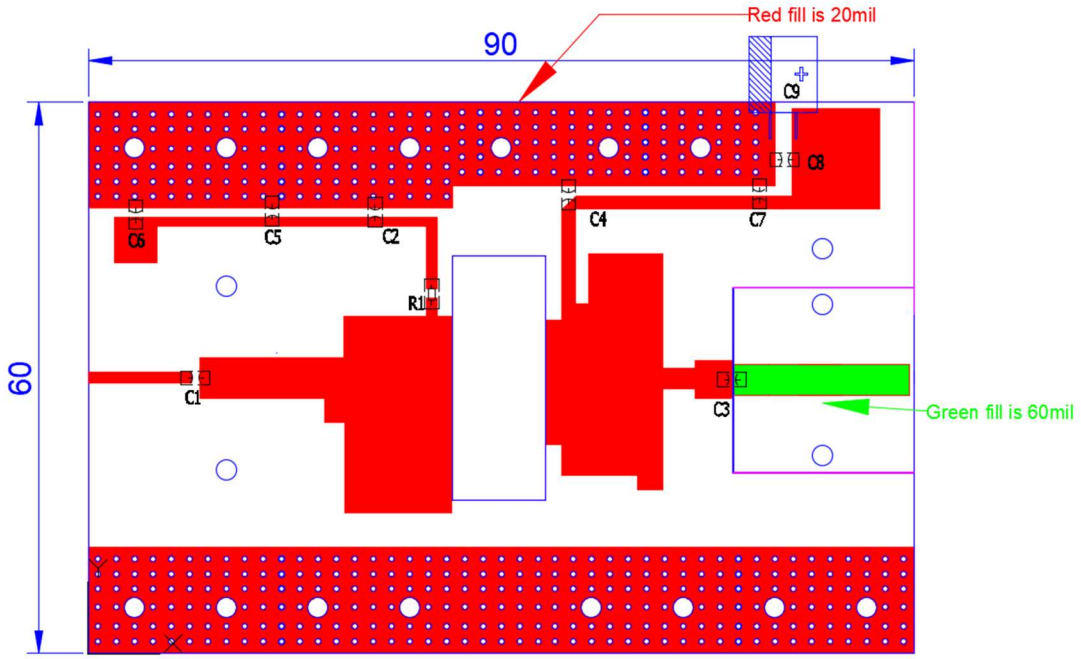


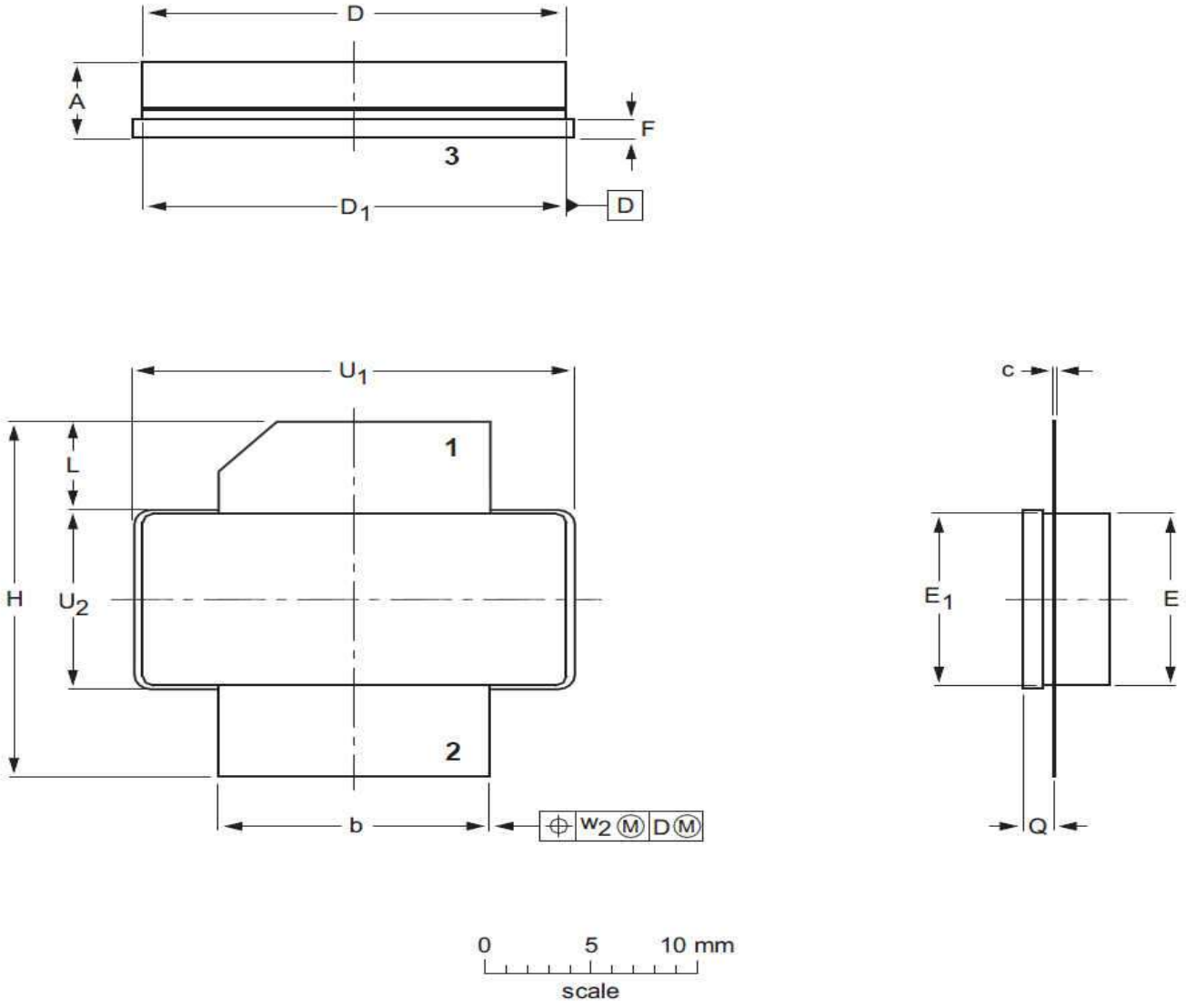
Figure 3: Reference design circuit (PCB DWG file upon request,)



Component	Description	Suggestion
C5,C6,C7,C8	10uF	10uF/100V
C4,	18pF	MQ101111
C1, C2,	15pF	MQ300805
C9	4700uF/63V	Electrolyic Capacitor
R1	10Ω	Chip Resistor
C3	12pF	MIN02-002CC120J-F, Dubilier - CDE
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
2023/12/13	**V1.0**	**Preliminary Datasheet Creation**

Application data based on: YHG-23-32

Notice