



Gallium Nitride 50V, 100W, 4.4-5GHz RF Power Transistor

STBV50100G2

Description

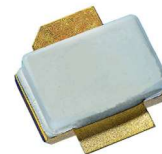
The STBV50100G2 is a single ended 100watt, GaN HEMT, ideal for 5G NR applications from 4.4-5GHz

It is an internally matched transistor capable of supporting CW, pulse or any modulated signal.

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

- Typical performance across **4.6-5GHz** (On innegration application board with device soldered)

Pulse CW: Pulse width=100us, duty cycle=10%,



$V_{DS} = 50V$, $I_{DQ} = 100mA$, $V_{GS} = -3.1V$

FREQ (MHZ)	P1dB (dBm)	P1dB (W)	P1dB Eff (%)	P1dB Gain (dB)	P3dB (dBm)	P3dB (W)	P3dB Eff (%)
4600	49.08	81.0	58.4	16	50.21	104.9	61.9
4700	49.08	81.0	57.8	16.29	50.22	105.2	61.3
4800	49.03	80.1	56.4	16.46	50.31	107.4	60.7
4900	49.01	79.6	54.3	16.53	50.4	109.6	59.2
5000	48.91	77.9	52.5	16.62	50.33	107.9	57.7

WCDMA

$V_{DS} = 50V$, $I_{DQ} = 270mA$, $V_{GS} = -2.98V$

Freq (MHz)	Pout (dBm)	CCDF (dB)	ACPR (dBc)	Gain (dB)	Efficiency (%)
4600	39	9.48	-40.8	17.1	21.6
4800		9.42	-41.3	17.5	20.5
5000		9.44	-39.6	17.3	19.2
4600	38	9.83	-41.5	17.3	20.2
4800		9.81	-41.3	17.5	19.3
5000		9.69	-40.3	17.2	18.5

Applications

- Sub-6GHz C band pulse or CW amplifier
- 5G or LTE-U Class AB amplifier within N79

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



Figure 1: Pin Connection definition

Transparent top view (Backside grounding for source)

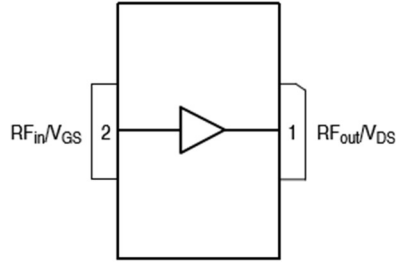


Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DS}	+200	Vdc
Gate--Source Voltage	V_{GS}	-8 to +0.5	Vdc
Operating Voltage	V_{DD}	55	Vdc
Maximum gate current	I_{gs}	16	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 $T_C = 85^\circ\text{C}$, at $P_{out}=100\text{W}$, Pulsed CW	$R_{\theta JC}$	1.3	°C /W

Table 3. Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

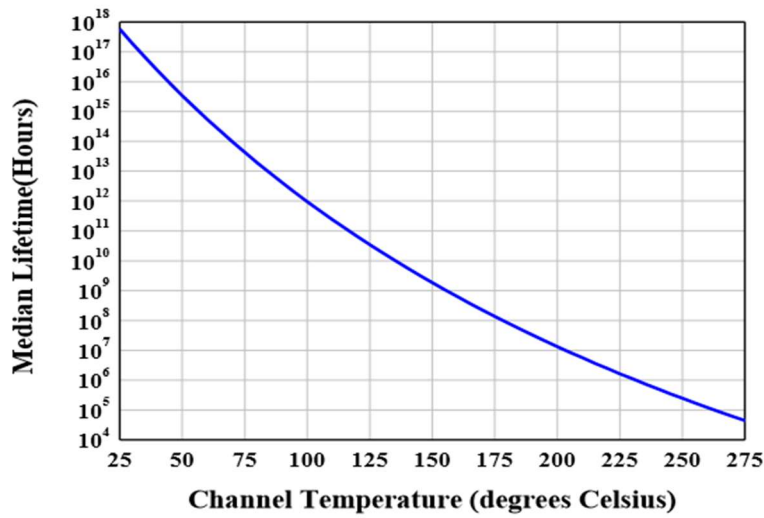
DC Characteristics (measured on wafer prior to packaging)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=-8\text{V}$; $I_{DS}=16\text{mA}$	V_{DSS}		200		V
Gate Threshold Voltage	$V_{DS}=10\text{V}$, $I_D=16\text{mA}$	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	$V_{DS}=50\text{V}$, $I_{DS}=100\text{mA}$, Measured in Functional Test	$V_{GS(Q)}$		-3.1		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	5.0GHz, $P_{out}=100\text{W}$ pulse CW All phase, No device damages	VSWR		10:1		

Figure 2: Median Lifetime vs. Channel Temperature



Typical performance

4.6-5GHz

Figure 3: Efficiency and power gain as function of Pout

STBV50100G2 Class AB Vds= 50V, Idq=105.3mA
PulseWidth= 20us, DutyCycle= 10%, DEMO1

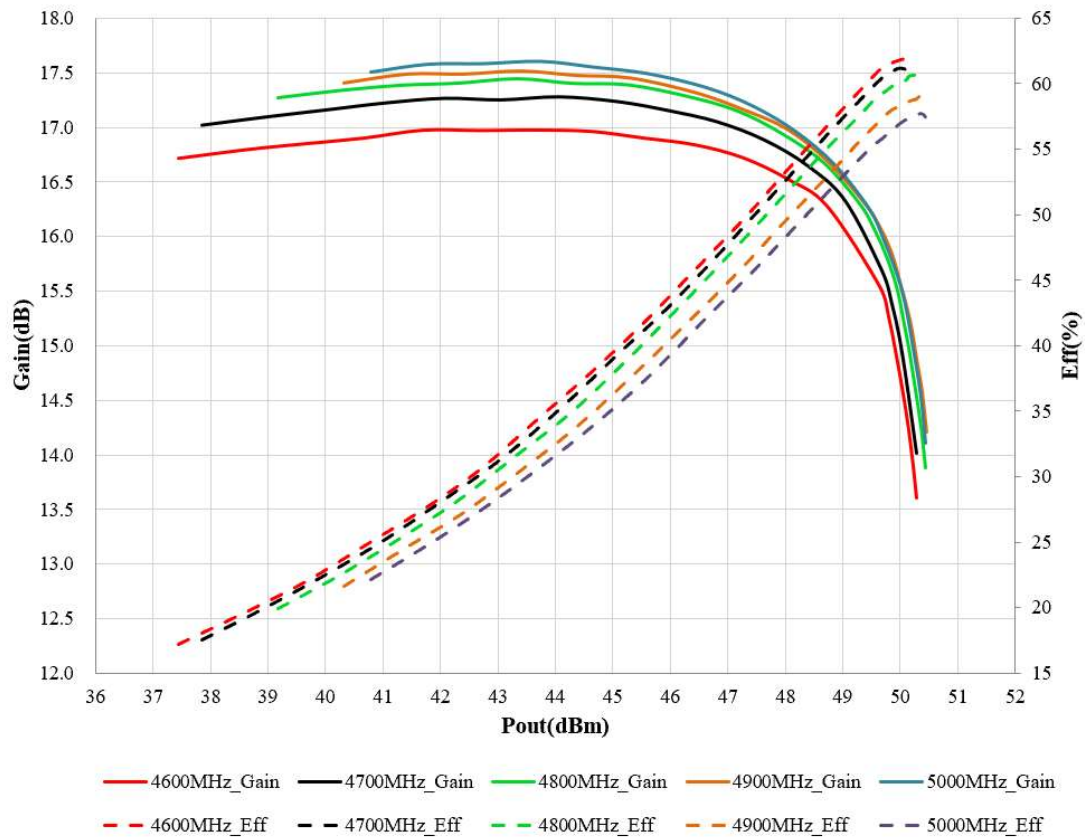


Figure 4: S11 / S21 output from network analyzer on 4.6-5GHz application board

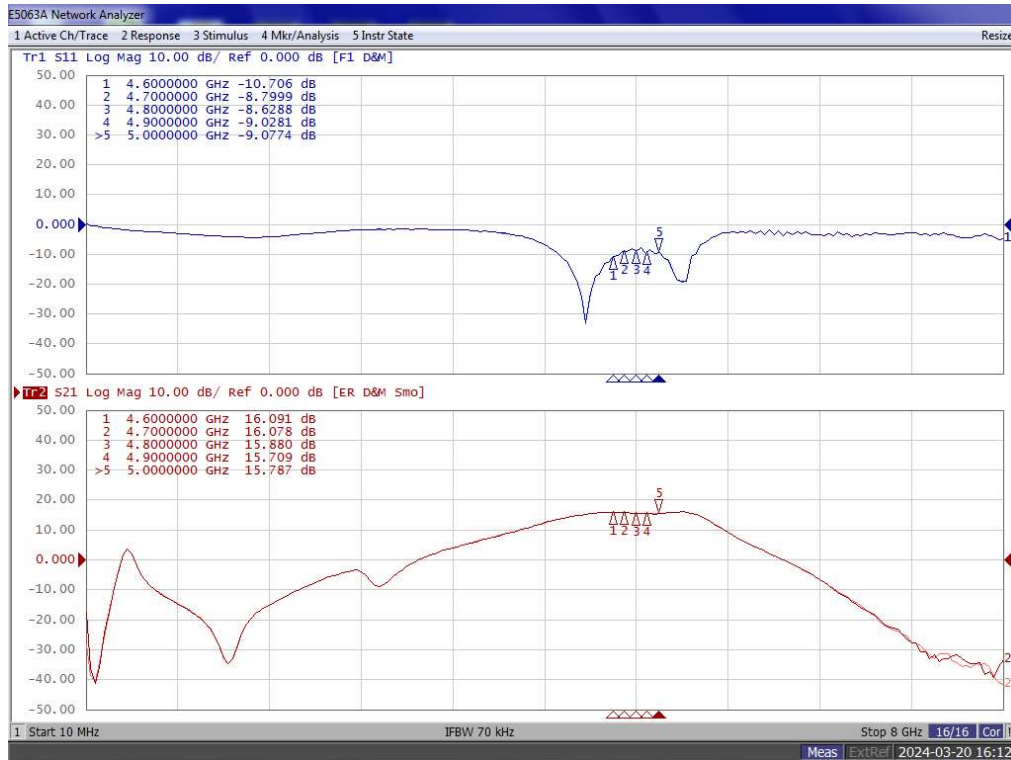
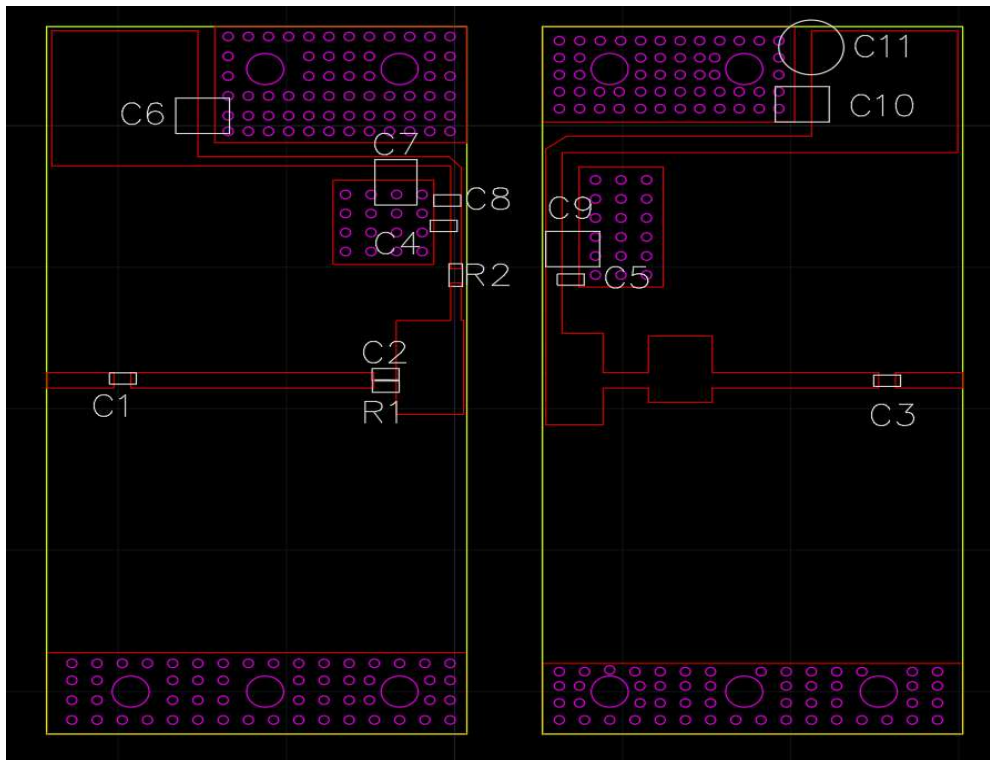


Figure 5: Picture of application board of 4.6-5GHz and bill of materials

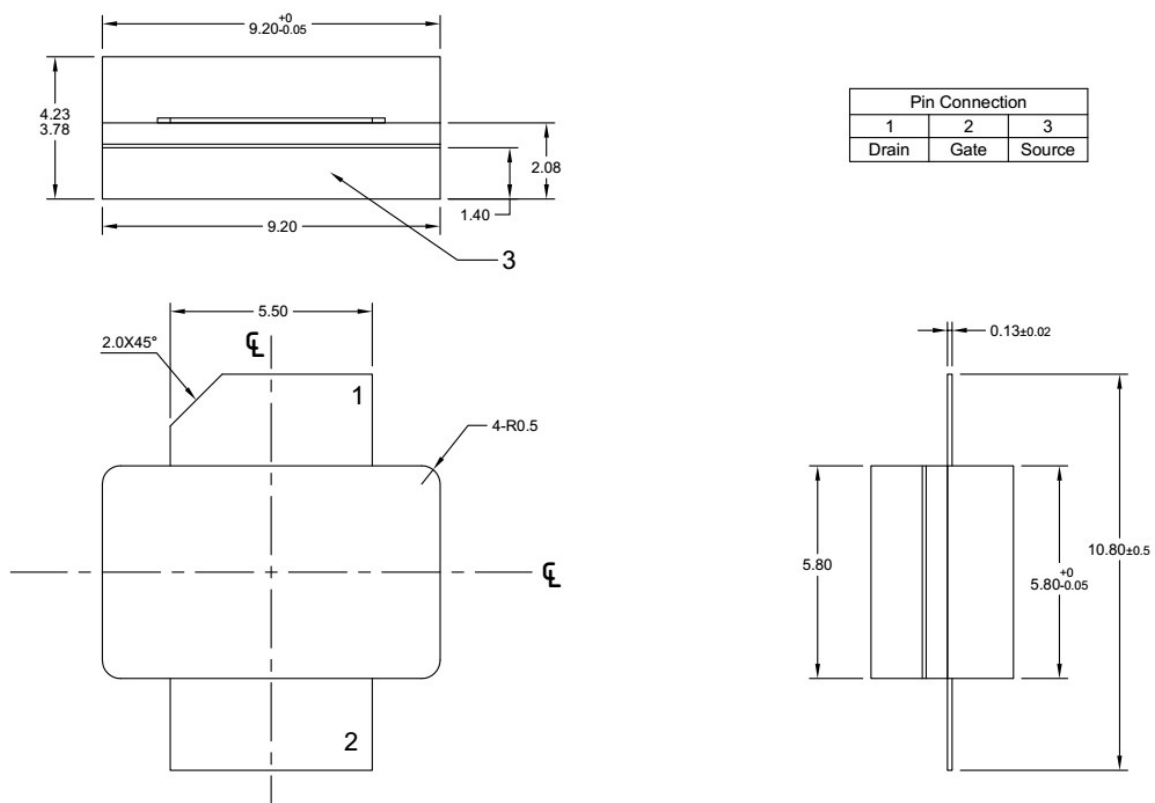




Component	Value	Quantity
U1	STBV50100G2	1
C1、C2、C3、C4、C5	3.9pF	5
C6、C7、C9、C10	10uF/63V	4
C8	1nF	1
C11	470uF/63V	1
R1	50 Ω	1
R2	10 Ω	1

Package Outline

Flanged ceramic package; 2 leads



Unit: mm

Tolerances(unless specified): x.x ±0.25

x.xx ±0.13

OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-GXB-2EL- 9.2					2018.1.31

Figure 2. Package Outline PKG-G2



Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2024/3/21	V1.0	Preliminary Datasheet Creation

Application data based on:ZYX-24-03

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