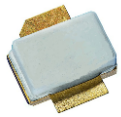
GaN 50V, 130W, 0.1-3.8GHz RF Power Transistor

STBV38130G2



Description

The STBV38130G2 is a 130watt, GaN HEMT, ideal for general applications from 0.1 to 3.8GHz. It can support CW, pulse or any modulated signal.There is no guarantee of performance when this part is used outside of stated frequencies.

- Typical Class AB performance 3.4-3.8GHz: (On application board with device soldered)

VdS= 50V，Idq=100mA，Vgs =-3.18V
WCDMA-1C-PAR10.8

Freq (MHz)	Pout (dBm)	CCDF (dB)	Ppeak (dBm)	Ppeak (W)	ACPR (dBc)	Gain (dB)	Efficiency (%)
3400	43	8.70	51.68	147.2	-38.8	13.8	23.8
3500		8.69	51.66	146.5	-39.1	14.5	24.1
3600		8.65	51.63	145.5	-38.4	14.8	25.0
3700		8.53	51.50	141.4	-37.8	14.9	26.5
3800		8.29	51.28	134.2	-37.1	14.6	28.3

Applications

- 5G, 4G wireless infrastructure
- S band power amplifier
- Test instruments
- Jammer

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	16.8	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	$R_{\theta JC}$	2	°C /W

T_C= 85°C, at Pavg=25W WCDMA 1 carrier			

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

DC Characteristics (measured on wafer prior to packaging)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	VGS=-8V; IDS=16.8mA	V_{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 16.8mA	$V_{GS(th)}$	-4	-3	-2	V
Gate Quiescent Voltage	VDS =50V, IDS=150mA, Measured in Functional Test	$V_{GS(Q)}$		-3.2		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	3.6GHz, Pout=130W pulse CW All phase, No device damages	VSWR		10:1		

3.4-3.8GHz

Typical performance

Figure 1: Efficiency and power gain as function of Pout (Measured on 3.4-3.8GHz application board)

V_{DD} = 50 Vdc, I_{DQ} = 100 mA, Pulse width=20us, duty cycle=20%

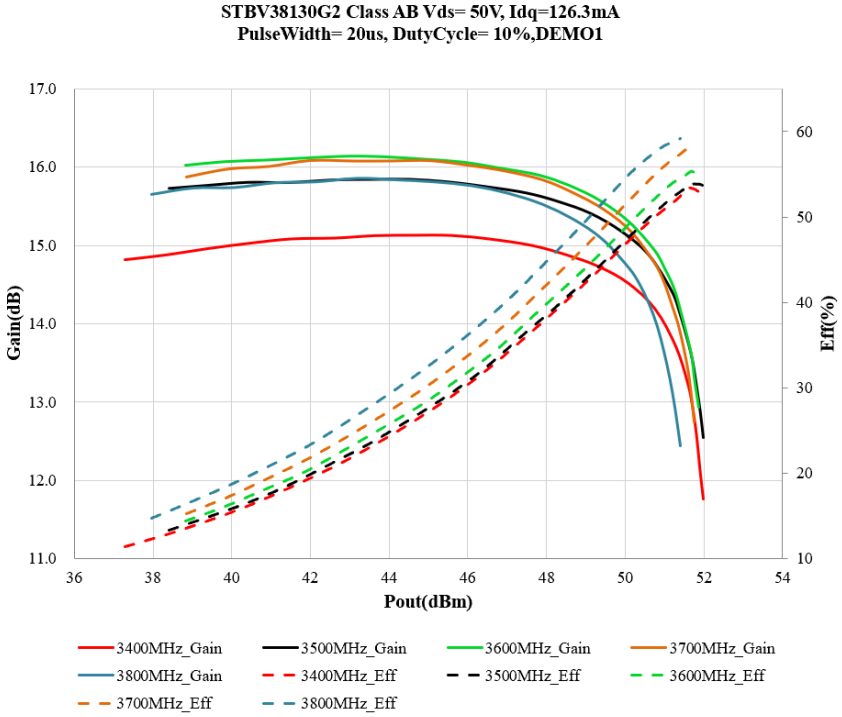


Figure 2: Network plot for S11/S21

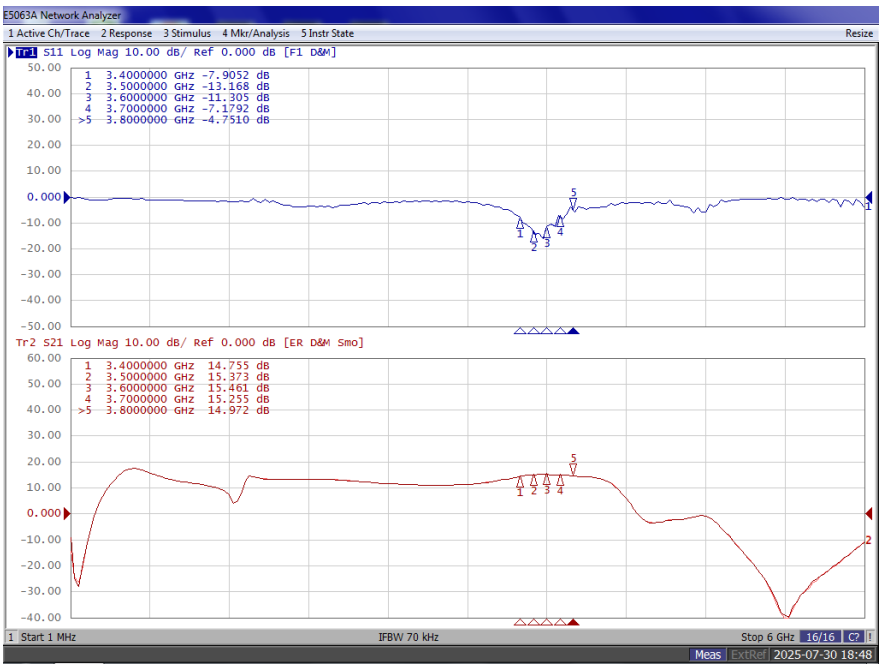


Figure 3: Picture of application board of 3.4-3.8GHz

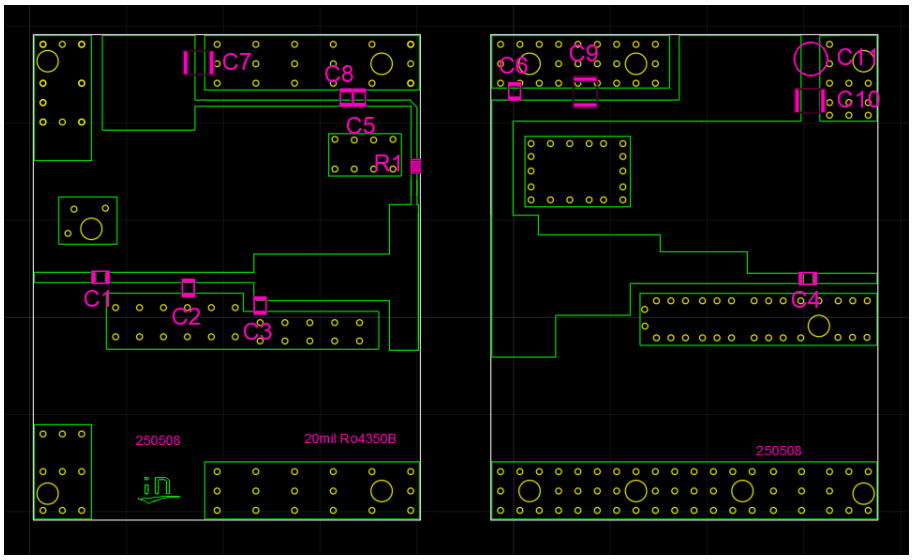
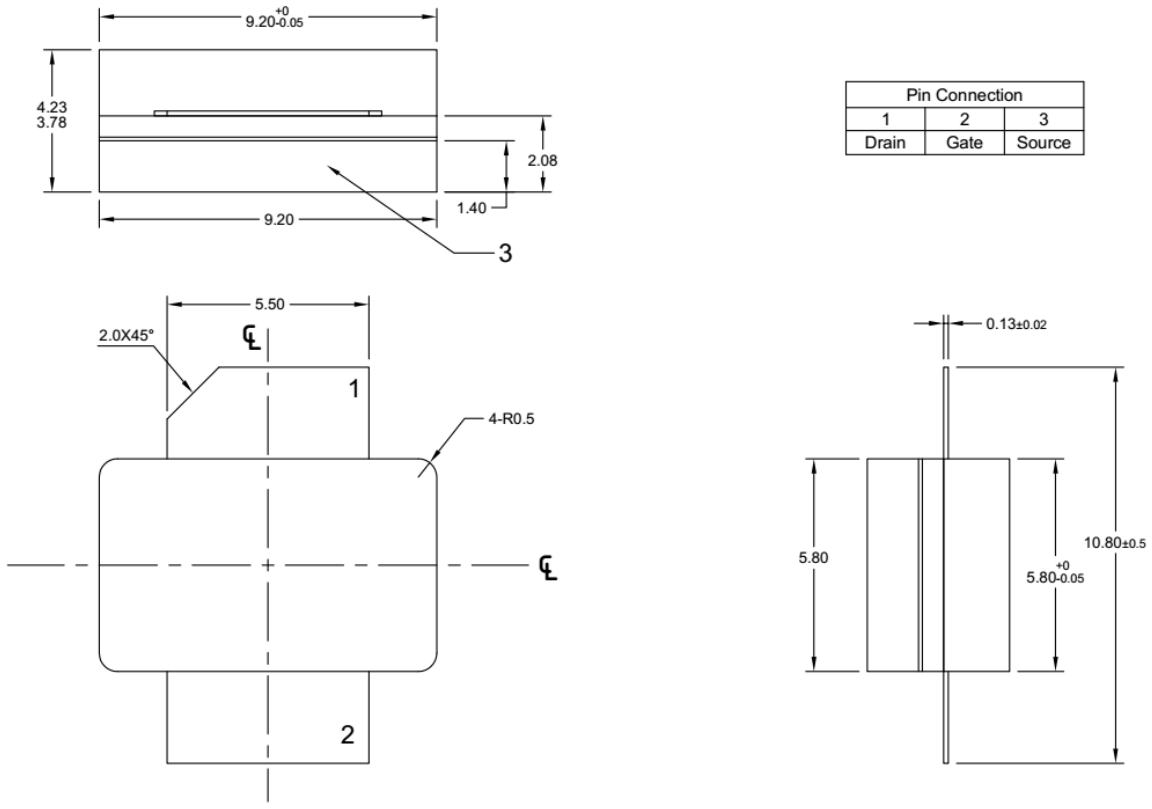


Table 4. Bill of materials of application board, RO4350B 20Mils (PCB layout upon request)

Component	Value	Quantity
U1	STBV38130G2	1
C1、 C4、C5、C6	8.2pF	4
C2	0.5pF	1
C3	1pF	1
C8	10nF	1
C7、C9、C10	10uF/63V	3
C11	470uF/63V	1
R1	10 Ω	1

Package Outline

Flanged ceramic package; 2 leads



Pin Connection		
1	2	3
Drain	Gate	Source

Unit: mm
Tolerances(unless specified): x.x ±0.25
x.xx ±0.13

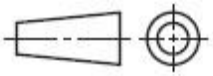
OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-GXB-2EL-9.2					2018.1.31

Figure 2. Package Outline PKG-G2

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2025/8/1	**V1.0**	**Preliminary Datasheet Creation**

Application data based on: ZYX-25-32

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