



Gallium Nitride 50V, 100W, 0.1-4.2GHz RF Power Transistor

Description

The STBV38100G2 is a 100watt, GaN HEMT, ideal for general applications from 0.1 to 4.2GHz.

It can support CW, pulse or any modulated signal.

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

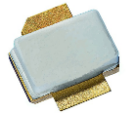
- Typical Class AB pulse CW performance at different bands

$V_{ds}=50V$, $I_{dq}=100mA$

Pulse width=50us, duty cycle=20% (On innegration wideband application board with device soldered)

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff (%)	P1dB Gain (dB)	P3dB (dBm)	P3dB (W)	P3dB Eff (%)
3900-4000	48.55	71.6	54.2	16.61	50.37	108.9	61.9
3400-3600	48.66	73.4	52.4	15.82	50.4	109.8	59.2
2110-2170	48.01	63.2	53.5	18.1	50.22	105.2	67.0
1805-1880	47.56	57.0	53.7	19.41	50.07	101.7	67.9
925-960	49.11	81.5	64.5	20.67	50.31	107.3	71.7

STBV38100G2



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	I_{gs}	12	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 $T_C=85^{\circ}C$, at $P_{avg}=8W$ WCDMA 1 carrier	$R_{\theta JC}$	2.2	°C /W



Table 3. Electrical Characteristics (TA = 25°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} =-8V; I _{DS} =12mA	V _{DSS}		200		V
Gate Threshold Voltage	V _{DS} =10V, I _D = 12mA	V _{GS(th)}	-4	-3	-2	V
Gate Quiescent Voltage	V _{DS} =50V, I _{DS} =120mA, Measured in Functional Test	V _{GS(Q)}		-3.04		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	3.8GHz, P _{out} =100W pulse CW All phase, No device damages	VSWR		10:1		

3.9-4.0GHz

Figure 1: Efficiency and power gain as function of P_{out} (Measured on application board)

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

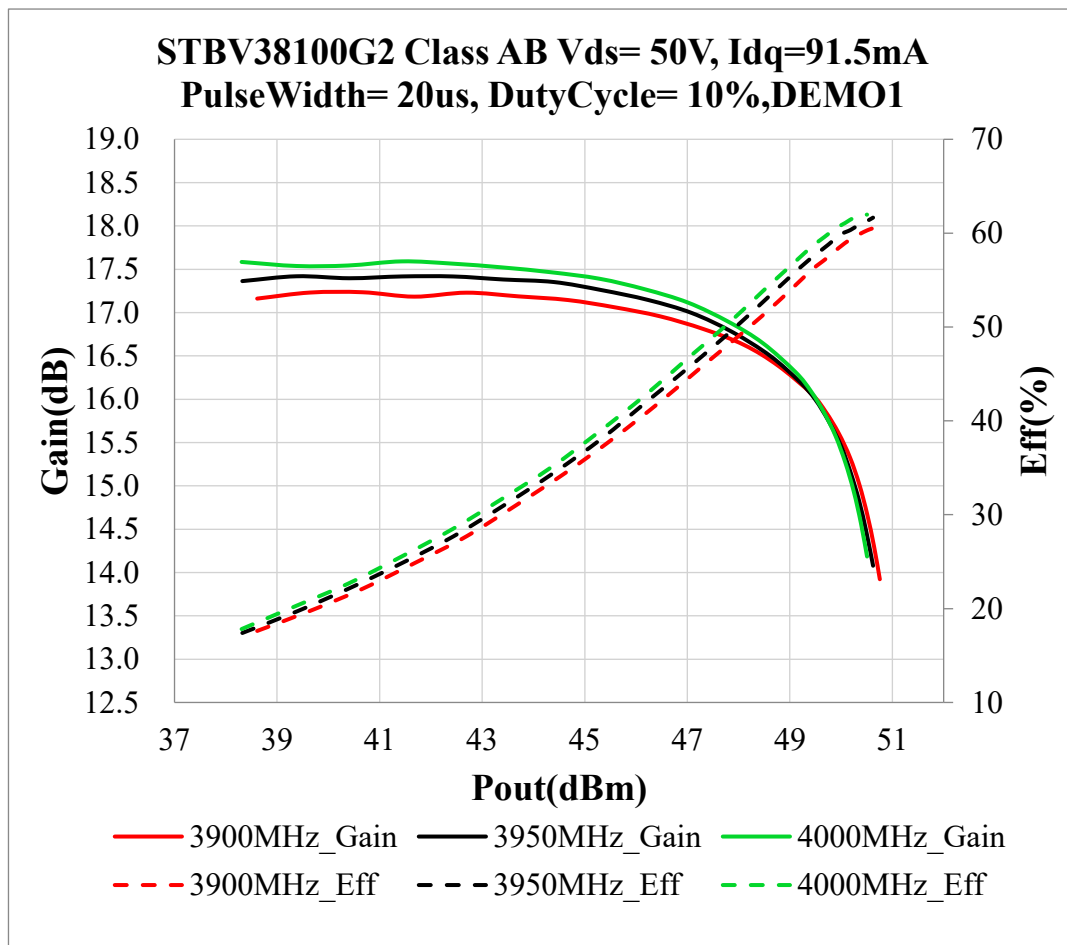




Figure 2: Network plot for S11/S21

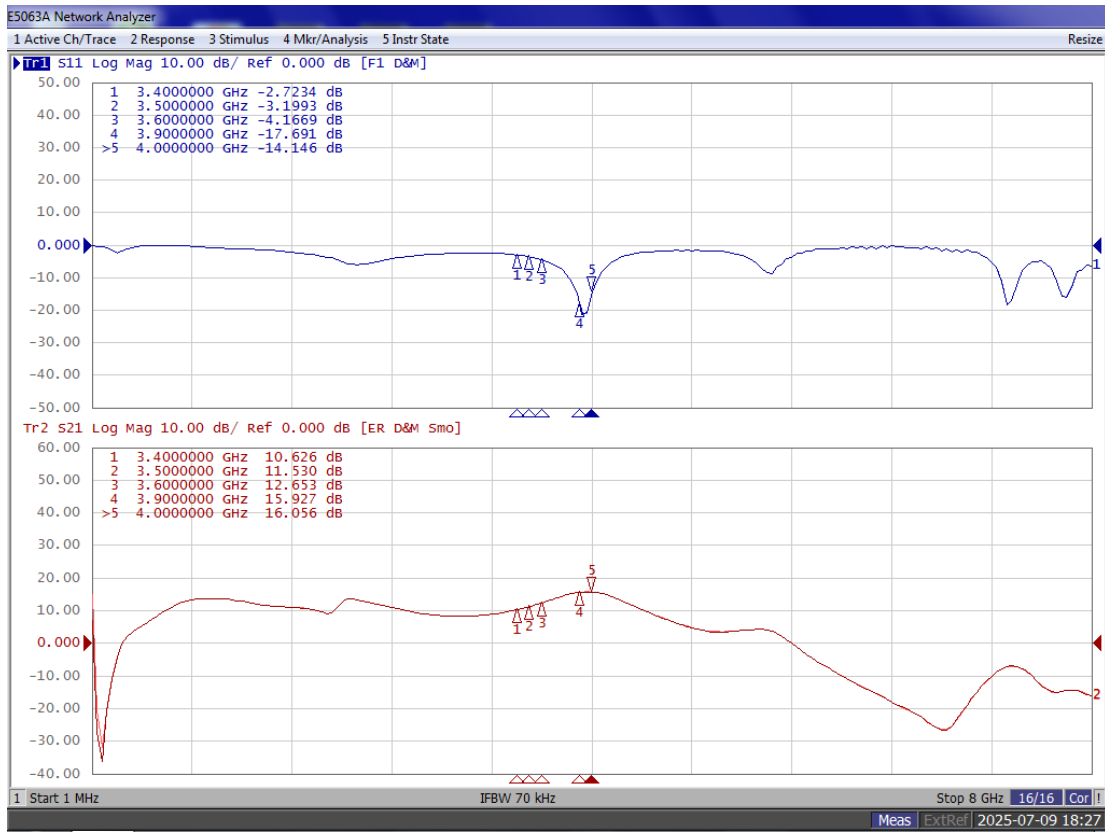


Figure 3: Picture of application board

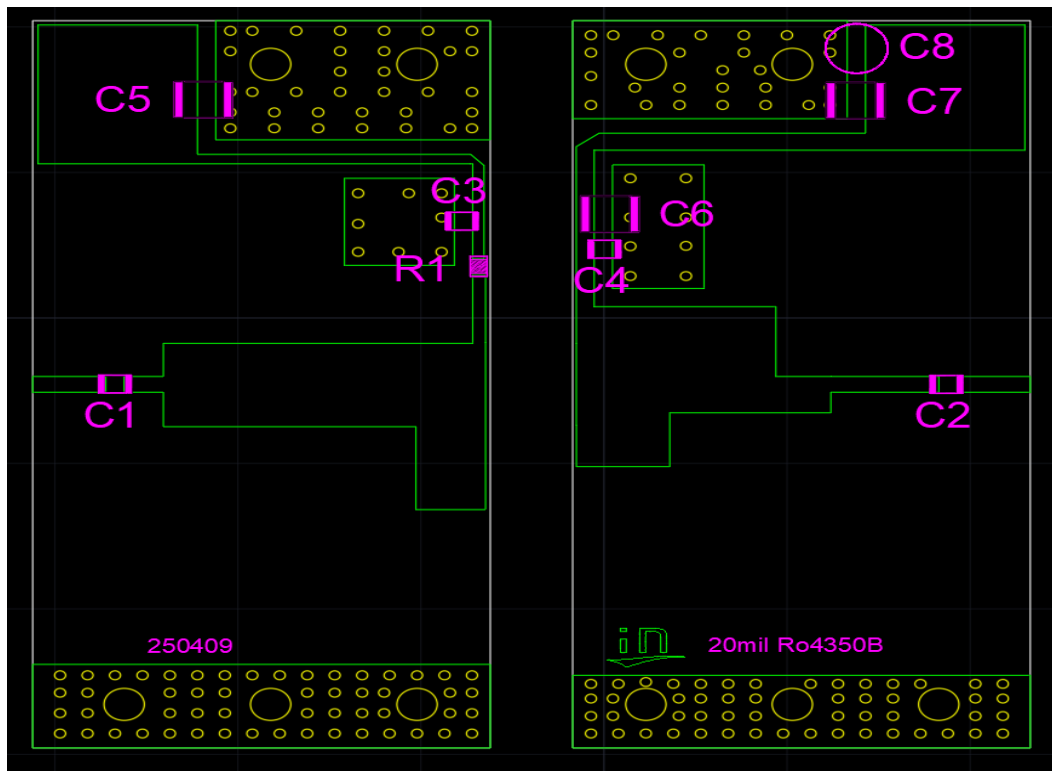


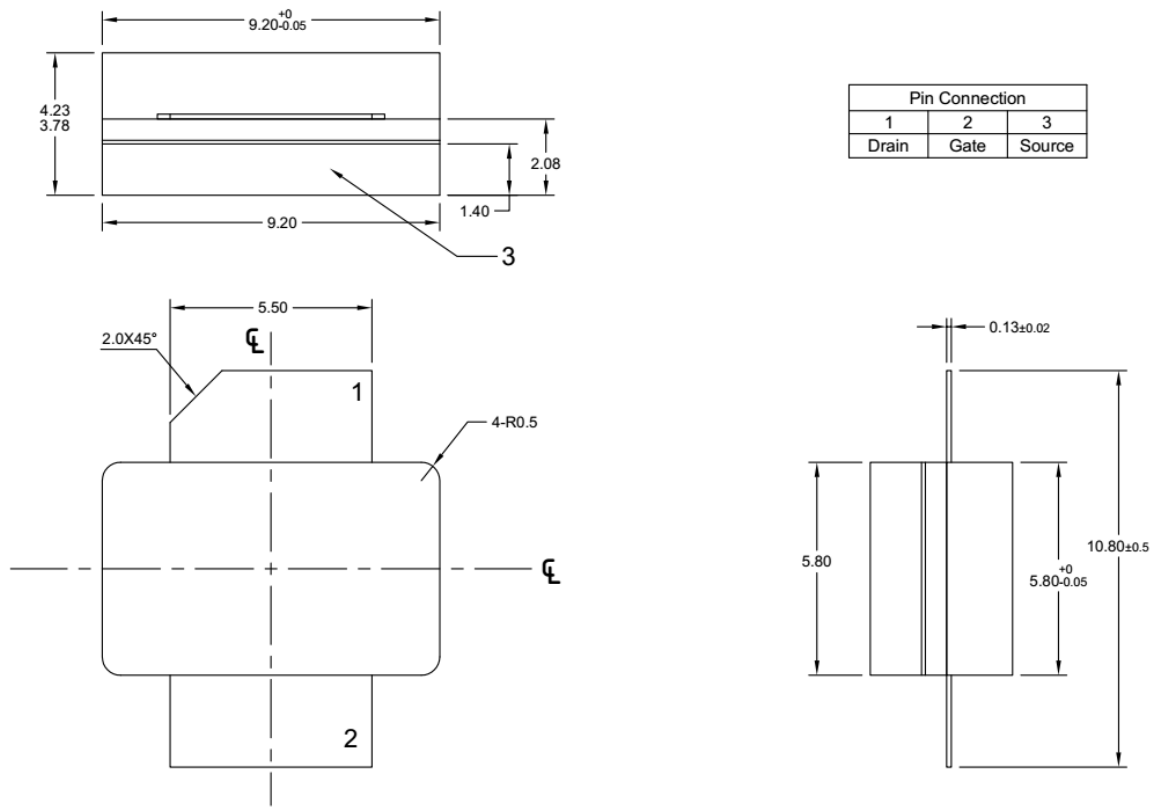


Table 4. Bill of materials of application board, RO4350B 20Mils (PCB layout upon request)

Component	Value	Quantity
U1	STBV38100G2	1
C1、 C2、 C3、 C4	8.2pF	4
C5、 C6、 C7	10uF/63V	3
C8	470uF/63V	1
R1	10 Ω	1



Flanged ceramic package; 2 leads



Unit: mm

Tolerances(unless specified): x.x ±0.25

x.xx ±0.13

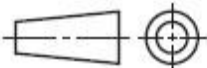
OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-GXB-2EL- 9.2					2018.1.31

Figure 2. Package Outline PKG-G2



Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2025/7/10	V1.0	Preliminary Datasheet Creation

Application data based on: ZYX-25-21/22/23/24/25

Notice

Specifications are subject to change without notice. Innogrations believes the information within the data sheet to be reliable. Innogrations makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose.

“Typical” parameter is the average values expected by Innogrations in quantities and are provided for information purposes only. It can and do vary in different applications and related performance can vary over time. All parameters should be validated by customer’s technical experts for each application.

Innogrations products are not designed, intended or authorized for use as components in applications intended for surgical implant into the body or to support or sustain life, in applications in which the failure of the Innogrations product could result in personal injury or death or in applications for planning, construction, maintenance or direct operation of a nuclear facility.

For any concerns or questions related to terms or conditions, please check with Innogrations and authorized distributors

Copyright © by Innogrations (Suzhou) Co.,Ltd.