Gallium Nitride 50V, 50W, RF Power Transistor

Description

The STAV25050G2 is a 50-watt, unmatched GaN HEMT, designed for multiple applications with frequencies under 3.0GHz.

The performance is guaranteed for applications operating in the mentioned frequencies There is no guarantee of performance when this part is used in applications designed Outside of these frequencies.

STAV25050G2

• Typical Performance (On Innogration fixture with device soldered):
V_{DD} = 48 V, I_{DQ} = 100 mA, Pulse Width =20us, Duty Cycle =10%.

Freq (MHz)	Gain@P1dB (dB)	P1dB (dBm)	η_D (%)	P3dB (dBm)	η_D (%)
2400	17.1	48.2	71.3	48.8	74.9
2450	17.5	47.7	71.1	48.6	75.2
2500	17.5	47.3	70.1	48.3	74.4

• Typical Performance (On Innogration fixture with device soldered):
V_{DD} = 48 Volts, I_{DQ} = 100 mA, CW.

Freq (MHz)	G_P (dB)	P3dB (dBm)	η_D (%)
2400	16.0	48.6	73.2
2450	15.7	48.4	73.8
2500	15.5	48.2	73.5

Applications and Features

- Suitable for 2.4GHz RF heating, Microwave cooking, industry heating application.
- Suitable for wideband power amplifier
- High Efficiency and Linear Gain Operations
- Thermally Enhanced Industry Standard Package
- High Reliability Metallization Process
- Excellent thermal Stability and Excellent Ruggedness
- Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

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}	-10 to +0.5	Vdc
Operating Voltage	V_{DD}	55	Vdc
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 T_C= 85°C, T_J=200°C, DC test	RθJC	2.8	°C /W

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

DC Characteristics

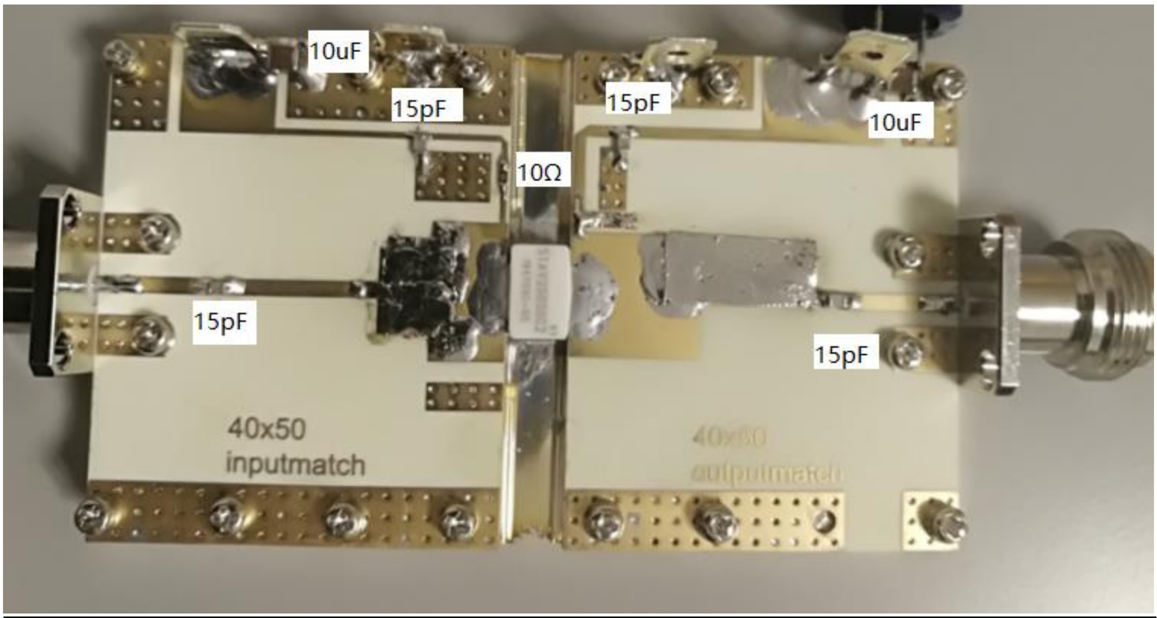
Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	VGS=-8V; IDS=8mA	V_{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 8 mA	$V_{GS(th)}$		-3.8		V
Gate Quiescent Voltage	VDS =50V, IDS=100mA, Measured in Functional Test	$V_{GS(Q)}$		-3.0		V

Functional Tests (In Innogration Test Fixture, 50 ohm system) :V_{DD} = 50 Vdc, I_{DQ}=100mA, f = 2.45GHz, Pulsed CW 20us/10%

Characteristic	Symbol	Min	Typ	Max	Unit
Power Gain @ P1dB	Gp		17.5		dB
3dB Compression Point	P3dB		48.6		dBm
Drain Efficiency@P3dB	η_D		75.2		%
Input Return Loss	IRL		-7		dB

Reference Circuit of Test Fixture Assembly Diagram

PCB materials: Roger 4350,30mils, DXF file upon request



TYPICAL CHARACTERISTICS

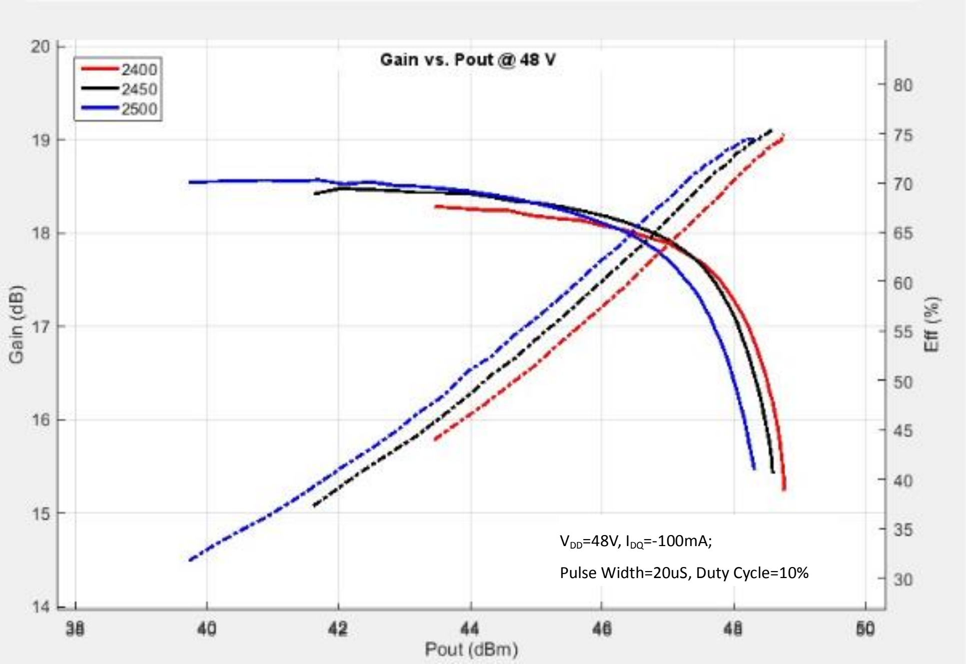


Figure 1. Power gain and drain efficiency as function of Pulse output power

Table 4. Load-Pull Performance：

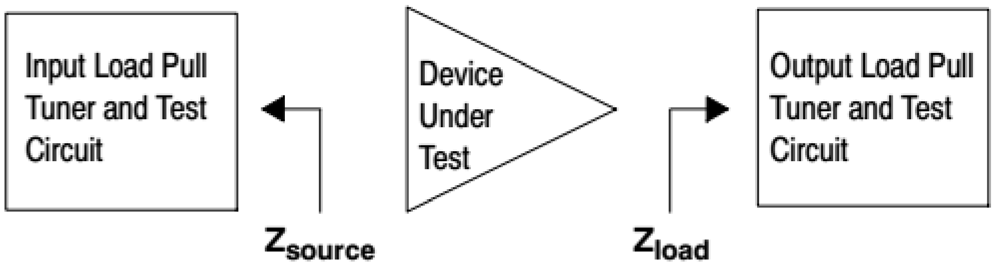
V_{DD} = 50 Vdc, I_{DQ} = 100 mA**,** Pulsed CW, Pulse Width=100 us, Duty cycle=10% .

f (MHz)	Tuning Type	Z_{source} (Ω)	P3dB			
			Z_{load} (Ω)	P3dB (dBm)	Gain (dB)	η_D (%)
2400	Max Output Power	1.5-j*3.4	7.8-j*1.2	49.9	15.2	68.8
	Max Drain Efficiency	1.5-j*3.4	4.3+j*3.7	48.0	16.9	77.5
	Trade Off	1.5-j*3.4	6.7+j*2.5	49.4	16.5	75.8
2450	Max Output Power	1.3-j*3.4	7.8-j*1.4	49.8	15.1	68.4
	Max Drain Efficiency	1.3-j*3.4	4.1+j*3.3	47.9	16.9	76.3
	Trade Off	1.3-j*3.4	6.5+j*2.0	49.3	16.3	75.2
2500	Max Output Power	1.0-j*3.5	7.9-j*1.9	49.8	15.1	65.0
	Max Drain Efficiency	1.0-j*3.5	4.1+j*3.0	47.8	17.1	74.8
	Trade Off	1.0-j*3.5	6.5+j*1.6	49.3	16.4	73.4

Note：

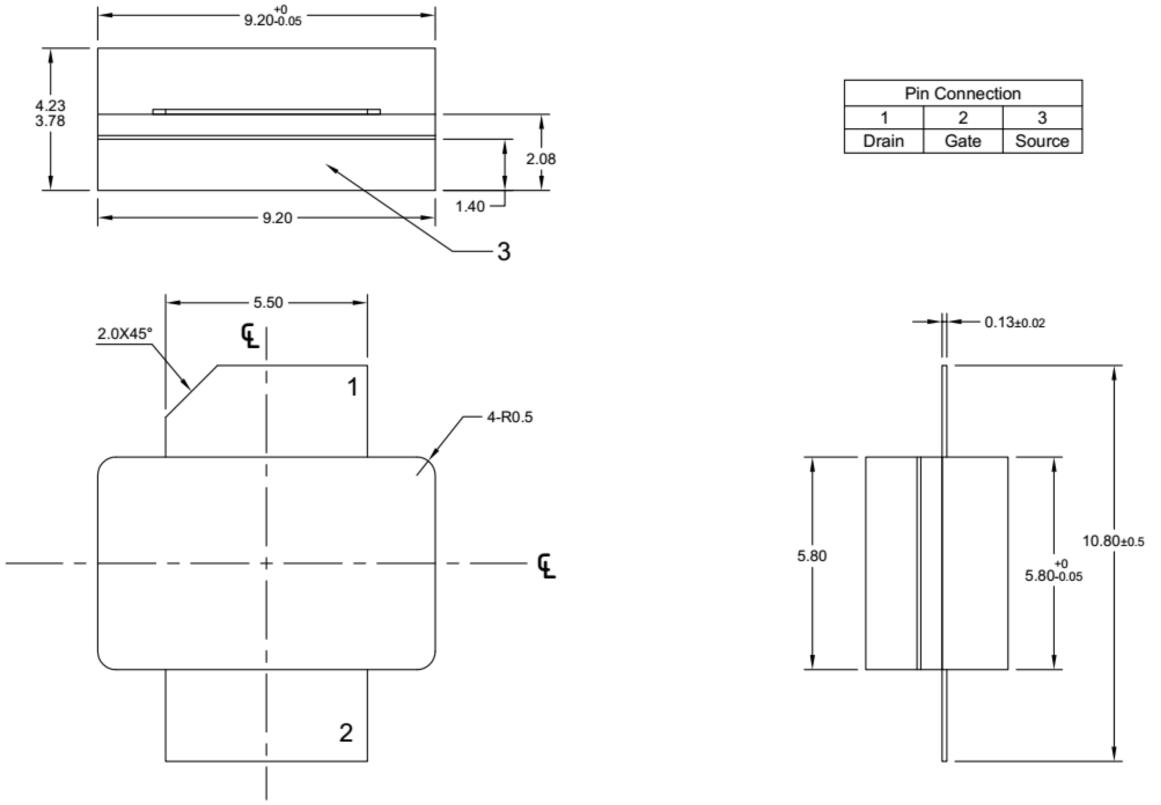
Zsource = Measured impedance presented to the input of the device at the package reference plane.

Zload = Measured impedance presented to the output of the device at the package reference plane.



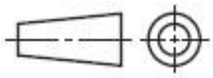
Package Outline

Earless 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

Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2019/12/25	V1.0	Preliminary Datasheet Creation
2019/12/30	V1.1	Modification on few parameters, and add PCB photo

Notice

Specifications are subject to change without notice. Innogration believes the information within the data sheet to be reliable. Innogration makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose.
"Typical" parameter is the average values expected by Innogration 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.
Innogration 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 Innogration 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 Innogration and authorized distributors