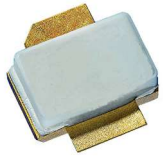
GaN HEMT 50V, 50W,5.8GHz RF Power Transistor

STAV58050G2



Description

The STAV58050G2 is a single ended 50watt, GaN HEMT, ideal for ISM applications at 5.8GHz.

It can support CW, pulse and linear applications.

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

- Typical pulse CW performance across the band with device soldered

V_{DD} = 50 Vdc, Vgs=-2.9V, Idq=100mA Tc=25°C, air cooling

Pulsed CW:

Freq (MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
5800	46.47	44.3	50.7	15.57	47.81	60.4	54.5

CW:

Freq(MHz)	Pin(dBm)	Psat(dBm)	Psat(W)	IDS(A)	Gain(dB)	Eff(%)
5800	34.7	47.5	56	2.15	12.7	52.

Applications

- C band Class AB power amplifier
- 5.8GHz RF Energy

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	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 T_C= 85°C, at Pd=50W CW	$R_{\theta JC}$	TBD	°C /W

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

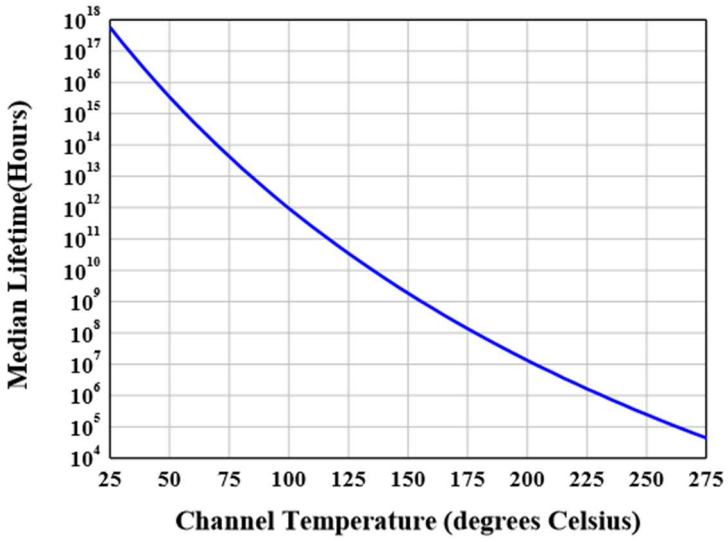
DC Characteristics (measured on wafer prior to packaging)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	VGS=-8V; IDS=8mA	V_{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 8mA	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	VDS =50V, IDS=100mA, Measured in Functional Test	$V_{GS(Q)}$		-2.9		V

Ruggedness Characteristics

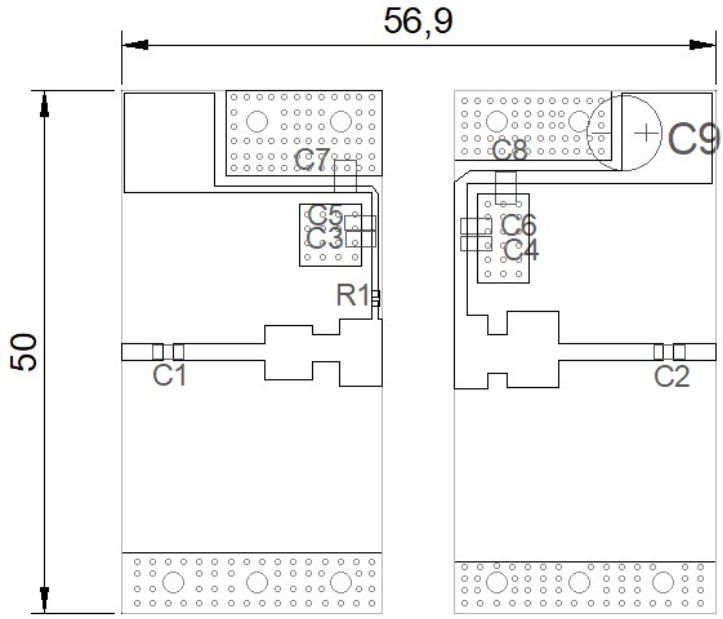
Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	5.8GHz, Pout=50W pulse CW All phase, No device damages	VSWR		10:1		

Figure 2: Median Lifetime vs. Channel Temperature



Reference Circuit of Test Fixture Assembly Diagram

DXF file upon request



Component	Description	Suggested Manufacturer
C1、C2、C3、C4	3.9pF	ATC600F
C5、C6	100pF	ATC600F
C7、C8	Ceramic multilayer capacitor, 10uF, 100V	10uF/100V
C9	470UF	63V/470UF
R1	Chip Resistor,16Ω,0603	
PCB	PC-board material: Rogers 4350B, ε_r = 3.48, thickness 30 mils, 1oz copper on each side	

Figure 3: Efficiency and power gain as function of Pout

(VDD = 50 Vdc, IDQ = 100mA, Pulse width=20us, duty cycle=10%，5.8GHz)

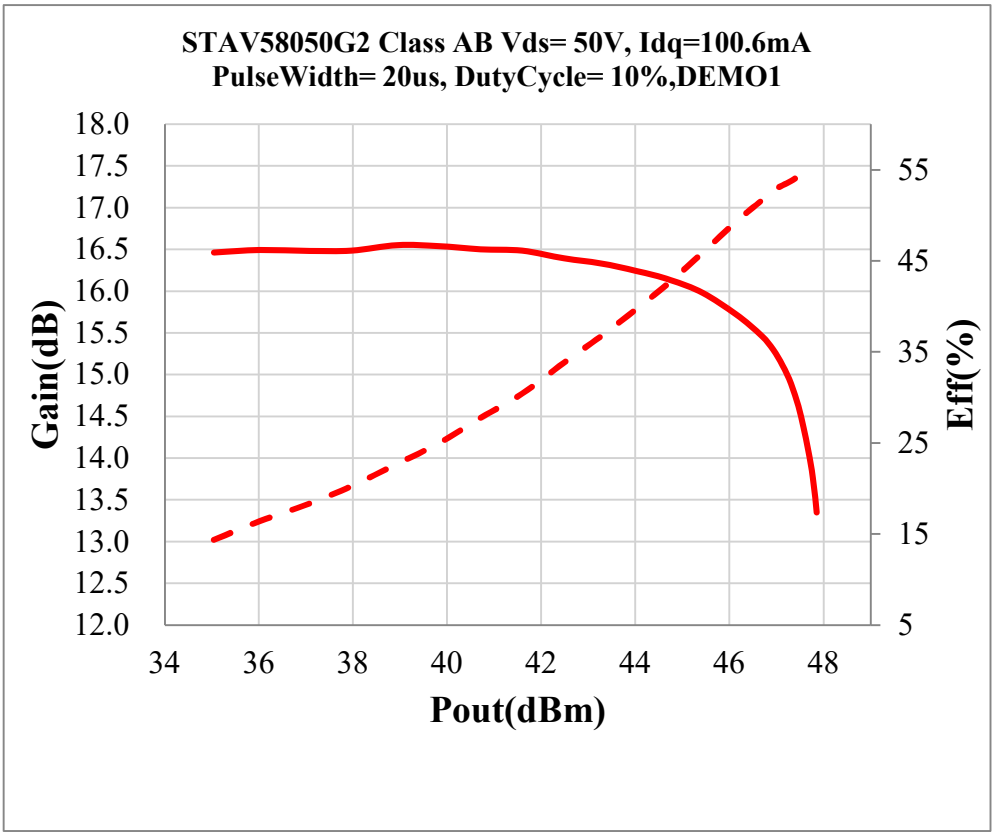
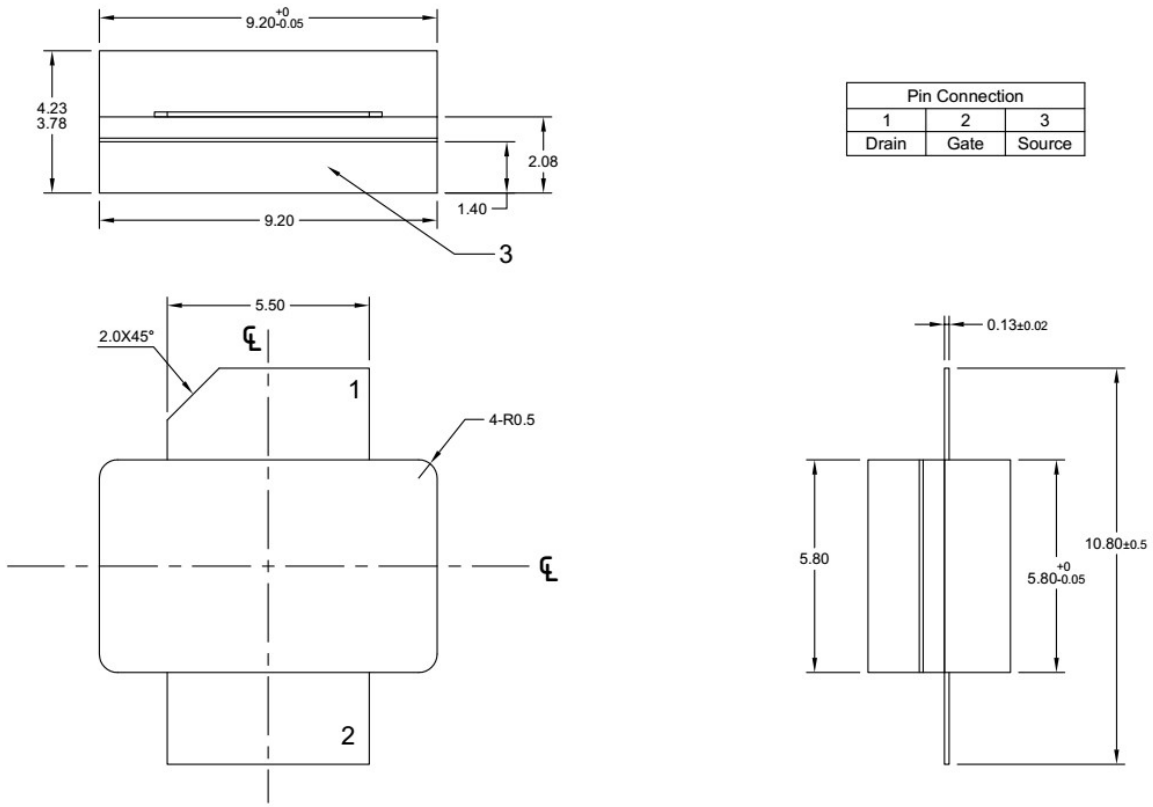


Figure 4: S11/S21 output from Network analyser (VDS= 50V, IDQ=100 mA Vgs =-3.08V)

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

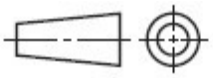
OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-GXB-2EL-9.2					2018.1.31

Figure 2. Package Outline PKG-G2

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2022/3/4	**V1.0**	**Preliminary Datasheet Creation**

Application data based on: YHG-22-05

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