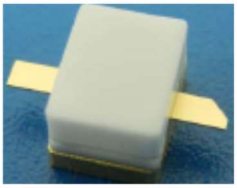
GaN HEMT 50V, 50W,5.0-6.0GHz RF Power Transistor

STAV58050J2



Description

The STAV58050J2 is a single ended 50watt, GaN HEMT, ideal for 5G NR applications within 5.0-6.0GHz

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

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

- Typical performance across **5.7-5.9GHz** (On innogration application board with device soldered)

V_{DD} = 50 Vdc, I_{DQ} = 70mA, Tc=25°C Pulse CW: Pulse width=100us, duty cycle=10%,

FREQ (MHZ)	P1dB(dBm)	P1dB(W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
5700	46.71	46.9	46.6	15.76	48.51	70.9	53.1
5800	46.42	43.9	46.7	15.59	48.24	66.7	53.3
5900	45.95	39.4	46.2	15.15	47.76	59.8	52.6

Applications

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

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)

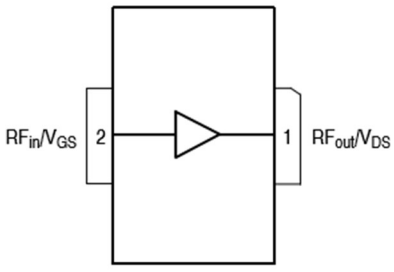


Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{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 Pout=50W, Pulsed CW	$R_{\theta JC}$	3.2	°C /W

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

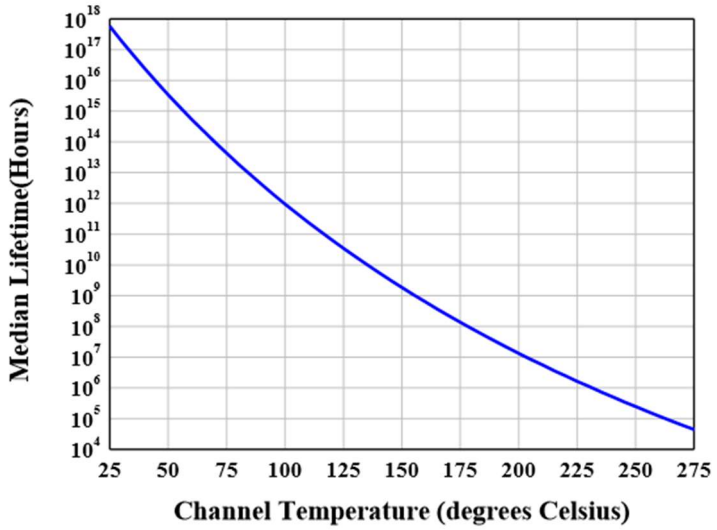
DC Characteristics (measured on wafer prior to packaging)

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=70mA, Measured in Functional Test	$V_{GS(Q)}$		-3.1		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	5.9GHz, Pout=50W pulse CW All phase, No device damages	VSWR		10:1		

Figure 2: Median Lifetime vs. Channel Temperature



Typical performance

5.7-5.9GHz

Figure 3: Efficiency and power gain as function of Pout

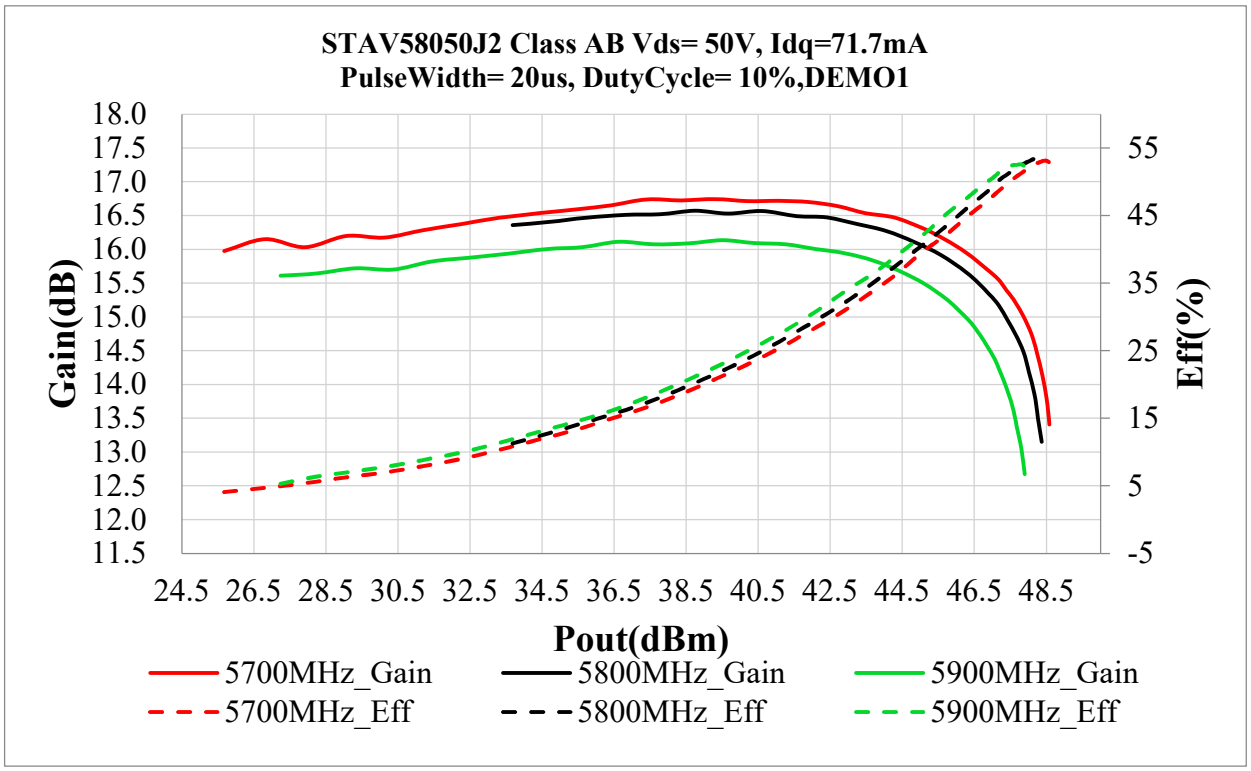
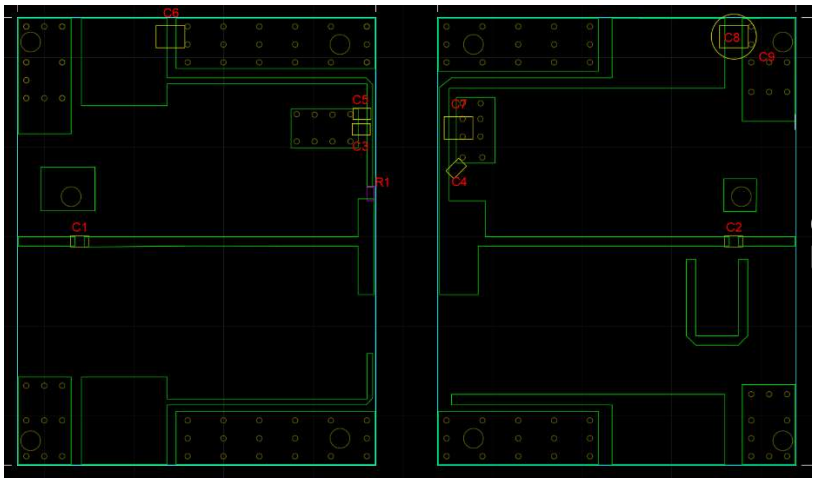


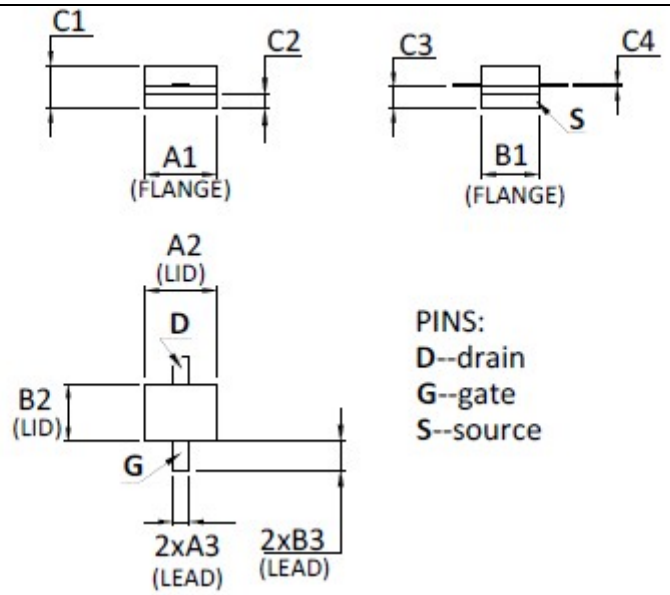
Figure 4: Picture of application board and bill of materials



Component	Value	Quantity
U1	STAV58050J2	1
C1	1.8pF	1
C2、C3、C4	3.3pF	3
C5	100pF	1
C6、C7、C8	10uF/63V	3
R1	10Ω	1
C9	470uF/63V	1

Package Outline

Earless ceramic package; 2 leads



DIM	INCH		MILLIMETER	
	MIN	MAX	MIN	MAX
A1	0.195	0.205	4.953	5.207
A2	0.195	0.205	4.953	5.207
A3	0.042	0.052	1.070	1.330
B1	0.155	0.165	3.937	4.191
B2	0.155	0.165	3.937	4.191
B3	0.060	0.100	1.524	2.540
C1	0.110	0.130	2.794	3.302
C2	0.034	0.044	0.870	1.130
C3	0.057	0.067	1.447	1.700
C4	0.004	0.006	0.101	0.150

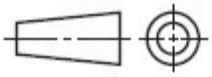
OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-MMS					12/13/2017

Figure 1. Package Outline PKG-MMS

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2023/8/7	**V1.0**	**Preliminary Datasheet Creation**

Application data based on:ZYX-23-08

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