



GaN HEMT 50V, 30W,4.0-6.0GHz RF Power Transistor



Description

The STAV58030J2 is a single ended 30watt, GaN HEMT, ideal for 5G NR applications within 4.0-6.0GHz. It is an internally matched transistor capable of supporting CW, pulse or any modulated signal. There is no guarantee of performance when this part is used outside of stated frequencies.

- Typical performance across **5.1-5.9GHz** (On innegration application board with device soldered)

$V_{DD} = 50\text{ Vdc}$, $I_{DQ} = 40\text{ mA}$, $T_c = 25^\circ\text{C}$ 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(%)
5100	44.22	26.4	47.0	13.65	45.71	37.3	50.7
5200	44.08	25.6	47.5	14.6	45.67	36.9	52.3
5300	44.04	25.3	49.1	14.99	45.62	36.5	54.1
5400	43.84	24.2	49.4	15.48	45.55	35.9	55.4
5500	43.52	22.5	48.2	15.39	45.38	34.5	55.0
5600	43.3	21.4	47.5	15.32	45.22	33.2	54.7
5700	43.24	21.1	47.0	15.01	45.14	32.7	53.8
5800	43.2	20.9	46.3	14.7	45.11	32.4	53.7
5900	42.6	18.2	45.3	14.76	44.84	30.5	54.7

Applications

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

Important Note: Proper Biasing Sequence for GaN HEMT Transistors

Turning the device ON

1. Set V_{GS} to the pinch-off (V_P) voltage, typically -5 V
2. Turn on V_{DS} to nominal supply voltage
3. Increase V_{GS} until I_{DS} current is attained
4. Apply RF input power to desired level

Turning the device OFF

1. Turn RF power off
2. Reduce V_{GS} down to V_P , typically -5 V
3. Reduce V_{DS} down to 0 V
4. Turn off V_{GS}

Figure 1: Pin Connection definition

Transparent top view (Backside grounding for source)

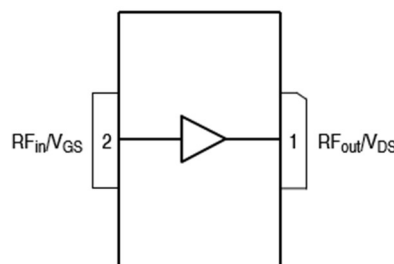




Table 1. Maximum Ratings

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	I_{gs}	4	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 $T_c = 85^\circ\text{C}$, at $P_{out} = 30\text{W}$, Pulsed CW	$R_{\theta JC}$	4.5	°C /W

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

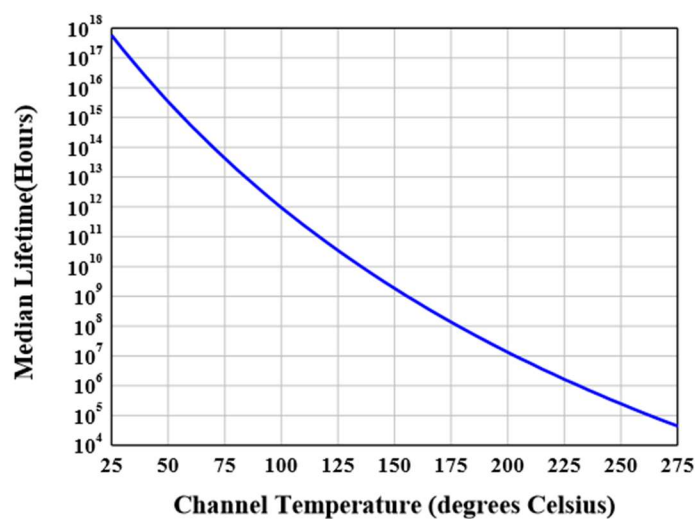
DC Characteristics (measured on wafer prior to packaging)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = -8\text{V}$; $I_{DS} = 4\text{mA}$	V_{DSS}		200		V
Gate Threshold Voltage	$V_{DS} = 10\text{V}$, $I_D = 4\text{mA}$	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	$V_{DS} = 50\text{V}$, $I_{DS} = 40\text{mA}$, Measured in Functional Test	$V_{GS(Q)}$		-3.1		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	5.9GHz, $P_{out} = 30\text{W}$ pulse CW All phase, No device damages	VSWR		10:1		

Figure 2: Median Lifetime vs. Channel Temperature

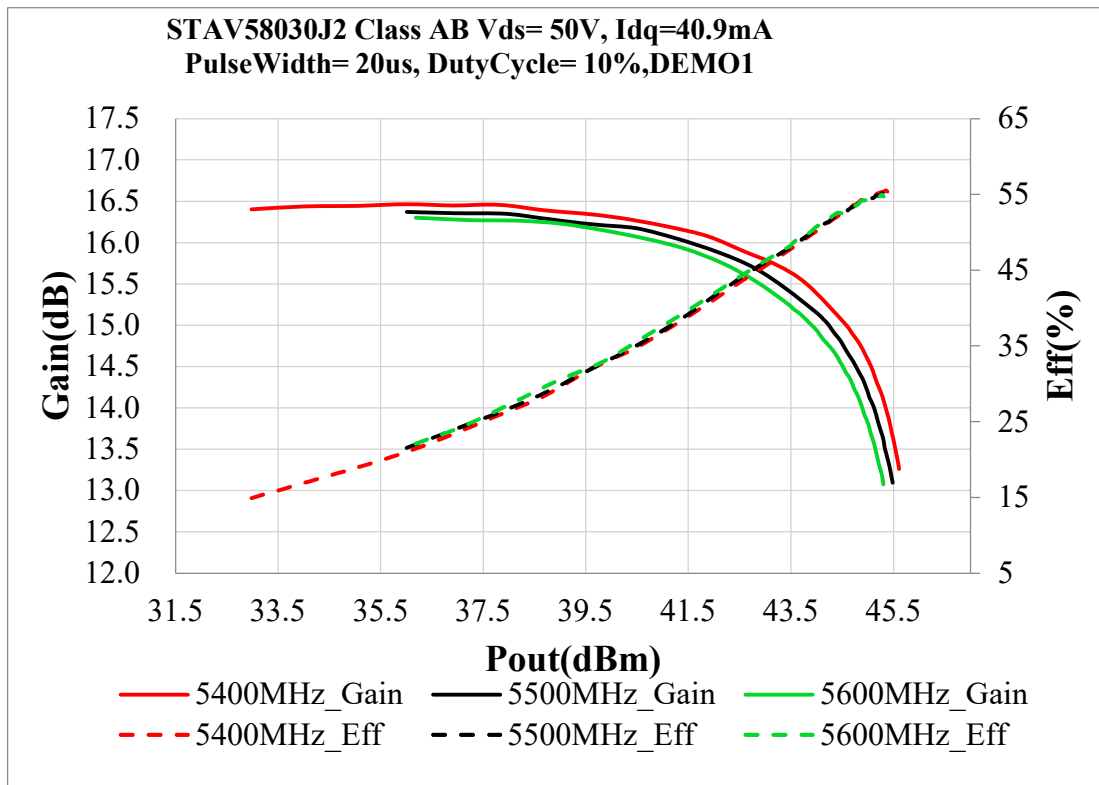
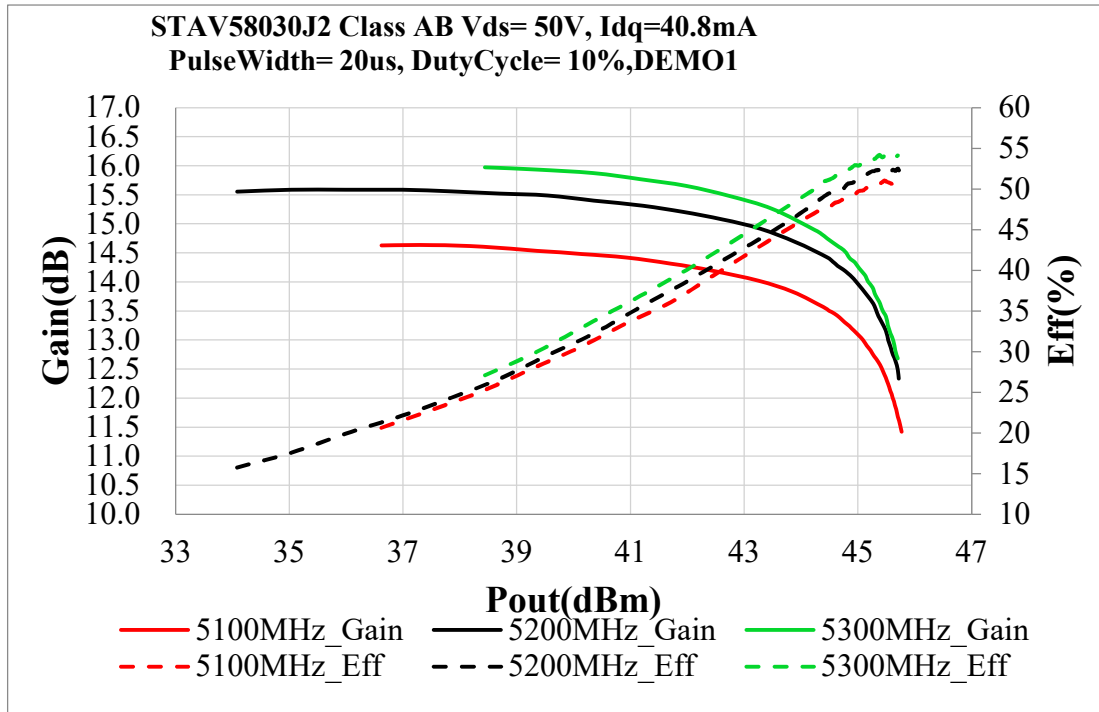




Typical performance

5.1-5.9GHz

Figure 3: Efficiency and power gain as function of Pout



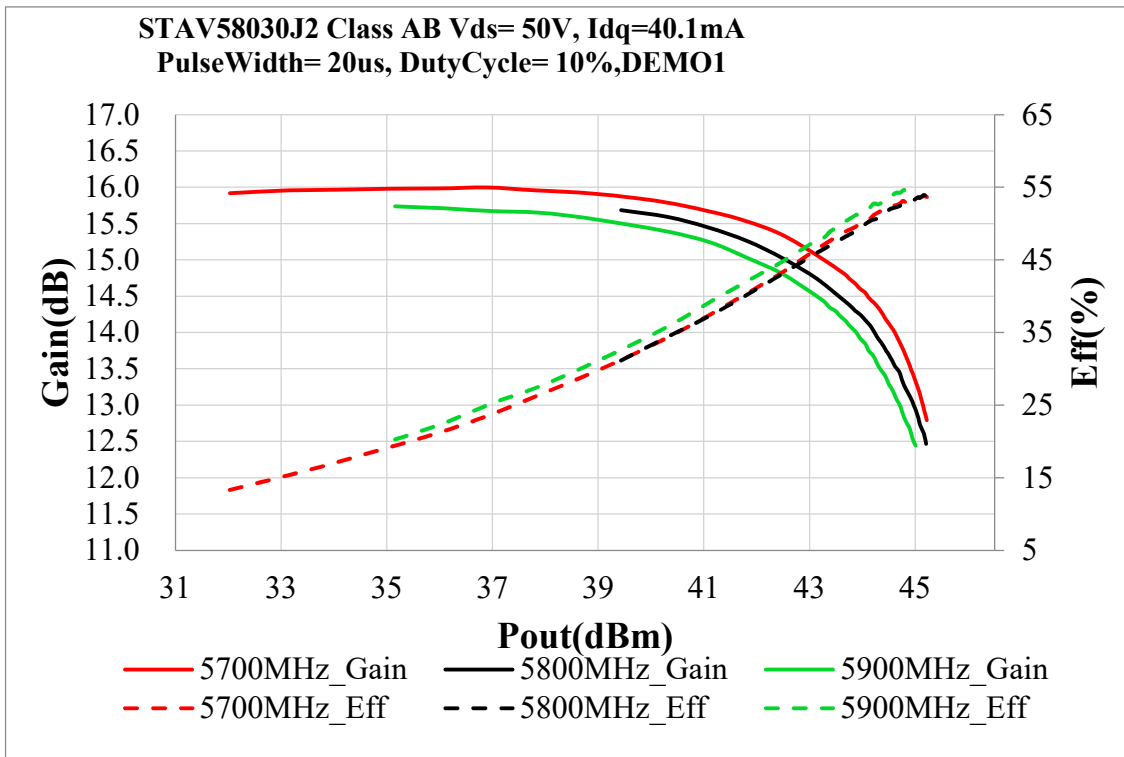
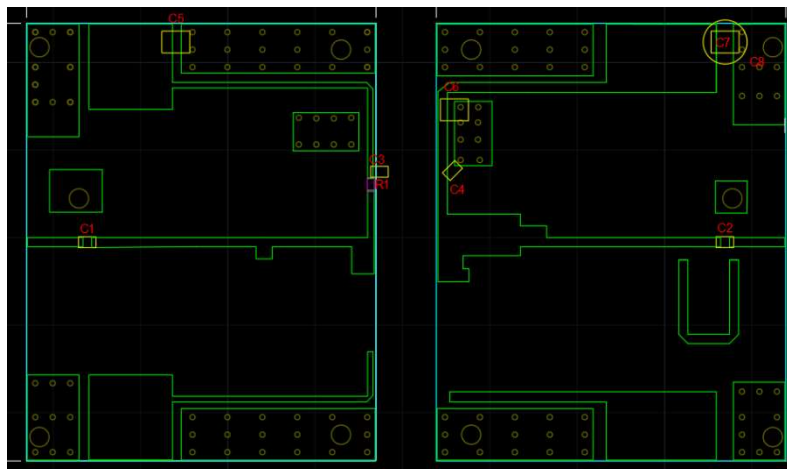


Figure 4: Picture of application board and bill of materials



Component	Value	Quantity
U1	STAV58030J2	1
C1、C2、C3、C4	3.3pF	4
C5、C6、C7	10uF/63V	3
R1	10 Ω	1
C8	470uF/63V	1

Package Outline

Earless ceramic package; 2 leads

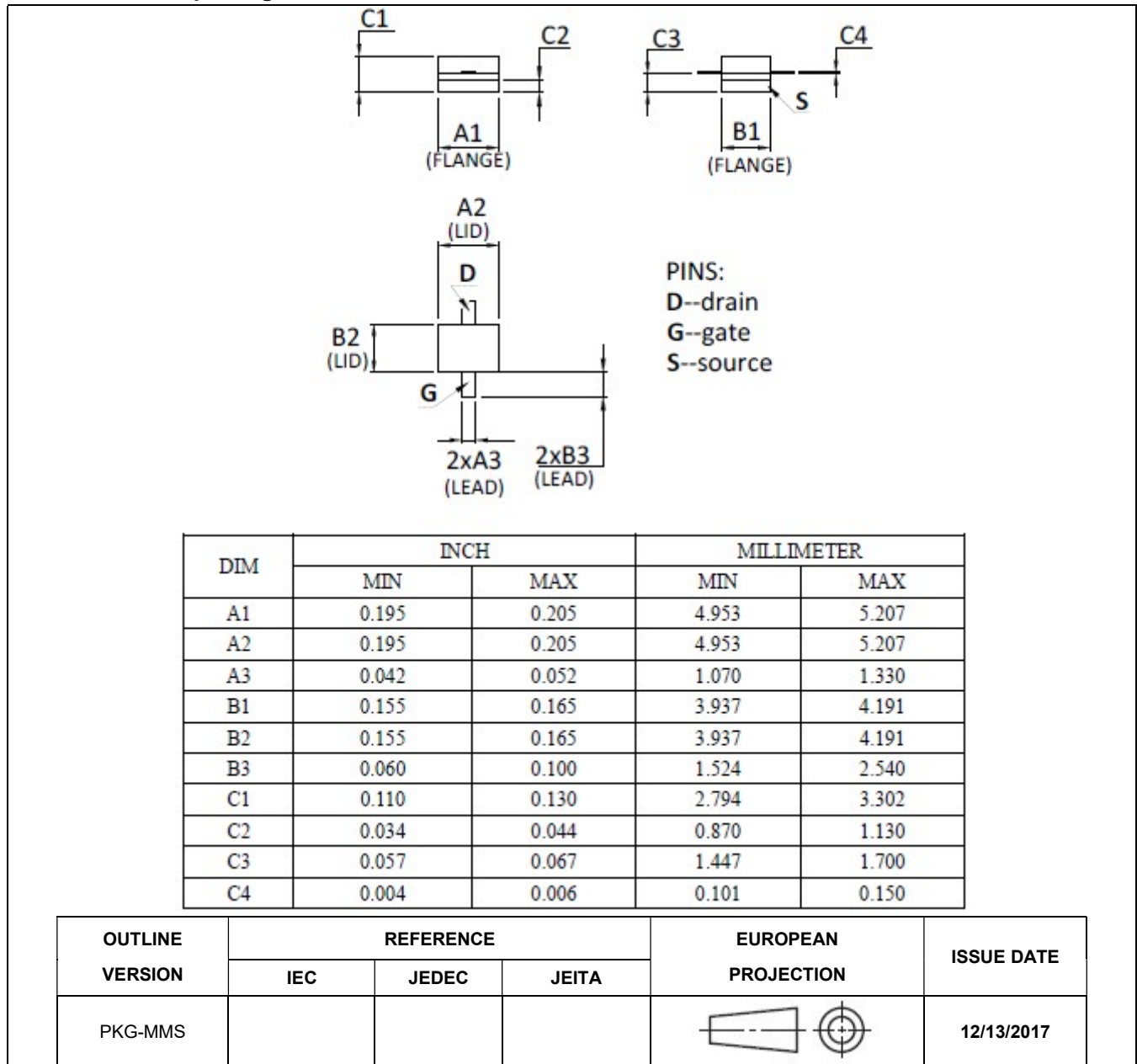


Figure 1. Package Outline PKG-MMS



Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2023/8/1	V1.0	Preliminary Datasheet Creation

Application data based on:ZYX-23-08

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