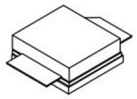
Gallium Nitride 50V, 300W,2.5-2.7GHz RF Power Transistor

Description

The STAV27300AY2 is an input matched, single ended 300watt, GaN HEMT, ideal for 5G applications from 2.5 to 2.7GHz.

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

STAV27300AY2



- Typical pulse CW performance across 2.5-2.7GHz

V_{DD} = 50 Vdc, I_{DQ} = 240mA, Pulse width=20us, duty cycle=10%, Tc=25°C

(On innogration application board with device soldered)

Freq(MHz)	P1(dBm)	P3(dBm)	P3(W)	EFF(%)@P3
2515	54.18	55.50	355	62.67
2600	53.71	55.24	334	66.15
2690	52.92	54.80	302	68.79

- WCMDA 3GPP TM1 64 DPCH 9.9 dB PAR @ 0.01% CCDF. VDS = 50 V, IDQ = 240 mA, POUT = 70W across 2.5-2.7G (On innogration Class AB application board with device soldered)

Freq(MHz)	Pout(dBm)	CCDF(dB	Ppeak(dBm)	Ppeak(W)	ACPR(dBc)	Gain(dB)	Efficiency(%)
2515	48.41	7.11	55.52	356.33	-35.60	15.07	32.48
2600	48.48	7.00	55.48	352.80	-34.91	15.36	35.88
2690	48.48	6.72	55.20	331.40	-33.42	15.57	39.38

Applications

- Sub-3GHz pulse or CW amplifier
- 5G base station amplifier
- Doherty power 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)

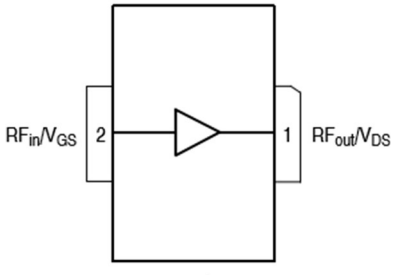


Table 1. Maximum Ratings

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	36	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=80W	$R_{\theta JC}$	TBD	°C /W

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

DC Characteristics (Each path, measured on wafer prior to packaging)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	VGS=-8V; IDS=36mA	V_{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 36mA	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	VDS =50V, IDS=240mA, Measured in Functional Test	$V_{GS(Q)}$		-3.23		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	2.6GHz, Pout=300W pulse CW for each path All phase, No device damages	VSWR		10:1		

Figure 2: Median Lifetime vs. Channel Temperature

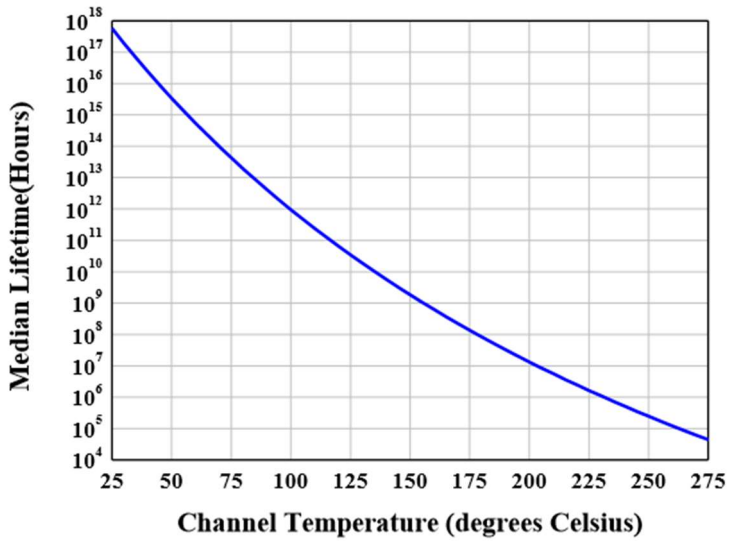
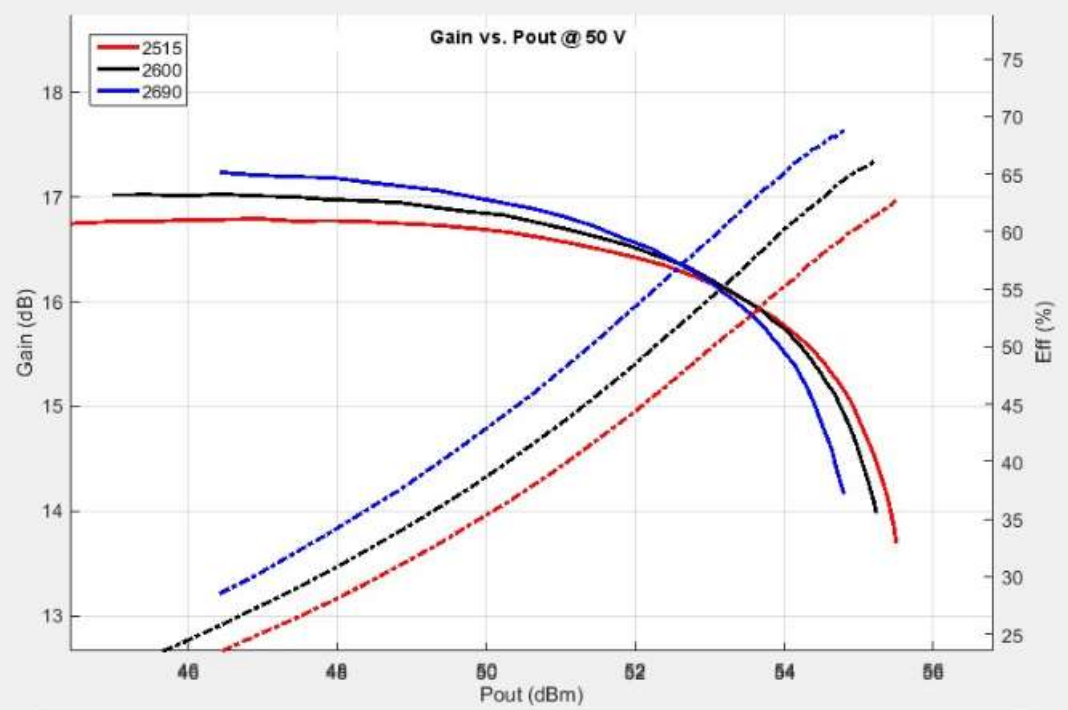


Figure 3: Efficiency and power gain as function of Pout

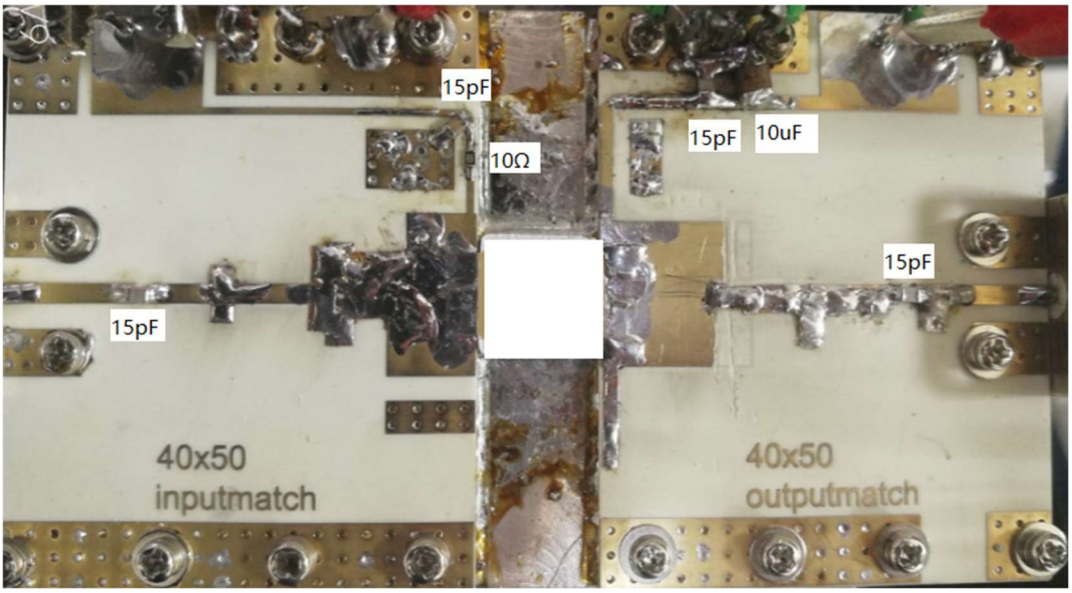
(VDD = 50Vdc, IDQ = 240 mA, Pulse width=20us, duty cycle=10%)



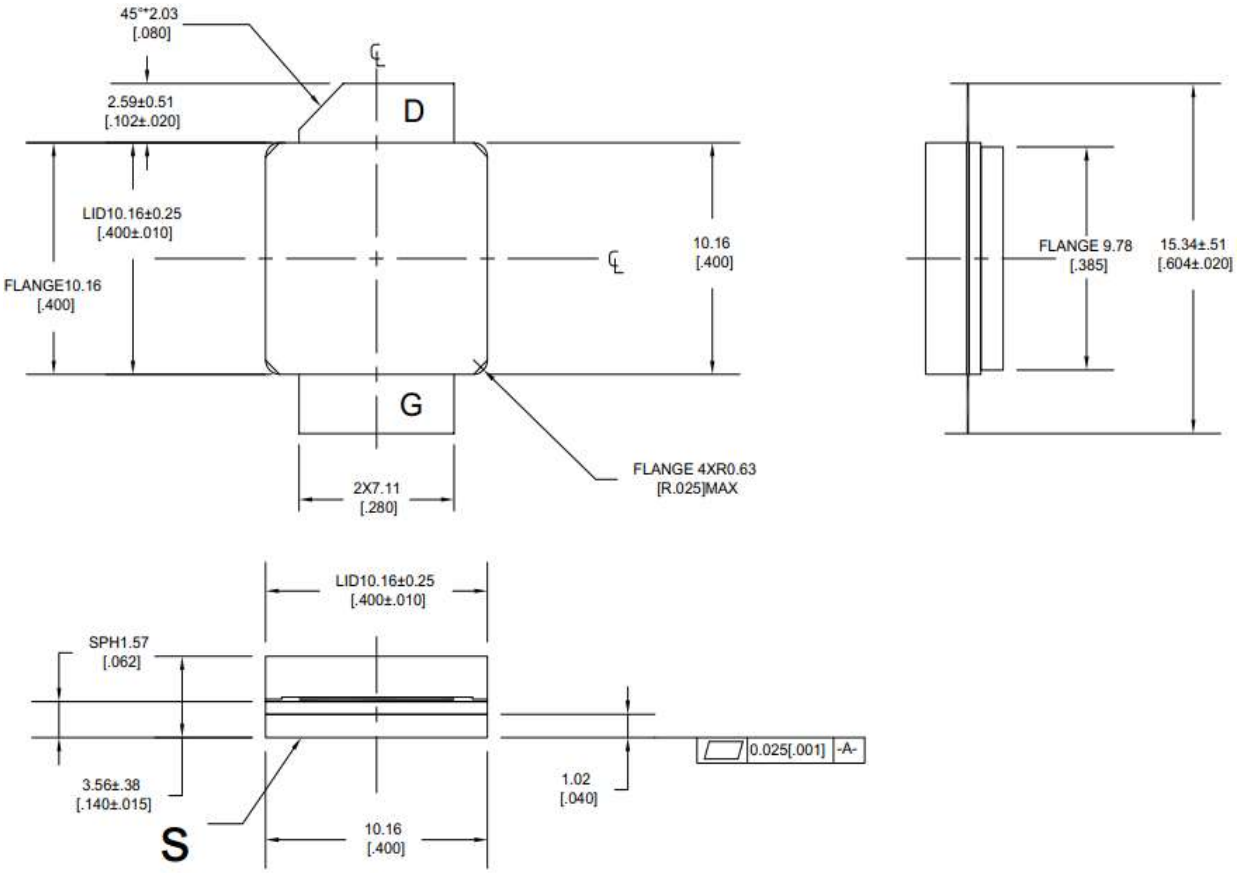
Freq(MHz)	P1dB (dBm)	P1dB (W)	P1dB Eff(%)	P1dB Gain(dB)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)
2515	54.18	261.92	56.13	15.67	55.50	355.06	62.67
2600	53.71	235.05	58.39	15.91	55.24	333.99	66.15
2690	52.92	195.90	58.84	16.23	54.80	302.34	68.79

Figure 4: S11 / S21 output from network analyzer

Figure 5: Picture of application board of 2.5-2.7GHz



Earless Flanged Ceramic Package; 2 leads



Unit: mm [inch]

Tolerance .xx +/- 0.01 .xxx +/- 0.005 inches

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2020/6/23	**V1.0**	**Preliminary Datasheet Creation**

Application data based on: LWH-20-18

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