



Gallium Nitride 50V, 200W, 1.8-2.2GHz RF Power Transistor

Description

The STAV22200AY2 is an input matched, single ended 200watt, GaN HEMT, ideal for 5G applications from 1.8 to 2.2GHz.

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

- WCDMA 3GPP TM1 64 DPCH 9.9 dB PAR @ 0.01% CCDF. VDS = 50 V, IDQ = 200 mA, (On innegration Class AB application board with device soldered)



Freq(MHz)	Pout(dBm)	CCDF(dB)	Ppeak(dBm)	Ppeak(W)	ACPR(dBc)	Gain(dB)	Efficiency(%)
2110.0	46.01	8.12	54.12	258.37	-33.51	18.72	35.32
2140.0	46.00	7.81	53.80	240.10	-32.91	18.84	36.66
2170.0	45.99	7.51	53.50	223.76	-32.50	18.93	38.46
Freq(MHz)	Pout(dBm)	CCDF(dB)	Ppeak(dBm)	Ppeak(W)	ACPR(dBc)	Gain(dB)	Efficiency(%)
2110.0	46.47	7.76	54.23	265.02	-32.54	18.68	36.92
2140.0	46.49	7.45	53.94	247.79	-31.87	18.80	38.47
2170.0	46.46	7.18	53.64	231.34	-31.39	18.89	40.31

Applications

- Sub-2GHz 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)

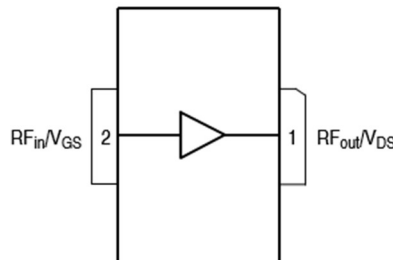


Table 1. Maximum Ratings

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	I _{gs}	25	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°C, at Pd=70W	R _{θJC}	TBD	°C /W

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

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

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V _{GS} =-8V; I _{DS} =25mA	V _{DSS}		200		V
Gate Threshold Voltage	V _{DS} =10V, I _D = 25mA	V _{GS(th)}	-4		-2	V
Gate Quiescent Voltage	V _{DS} =50V, I _{DS} =200mA, Measured in Functional Test	V _{GS(Q)}		-3.2		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	2.14GHz, P _{out} =200W pulse CW for each path All phase, No device damages	VSWR		10:1		

Figure 2: Median Lifetime vs. Channel Temperature

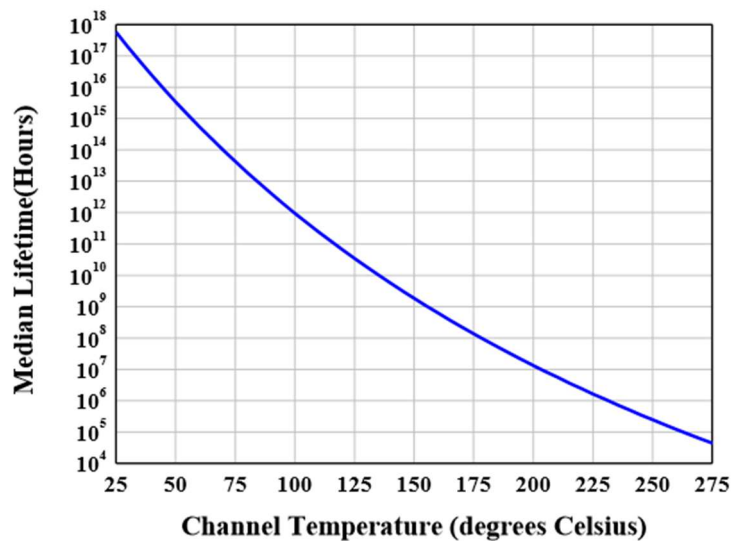




Figure 3: Efficiency and power gain as function of Pout

(VDD = 50Vdc, IDQ = 200 mA, Pulse width=20us, duty cycle=10%)

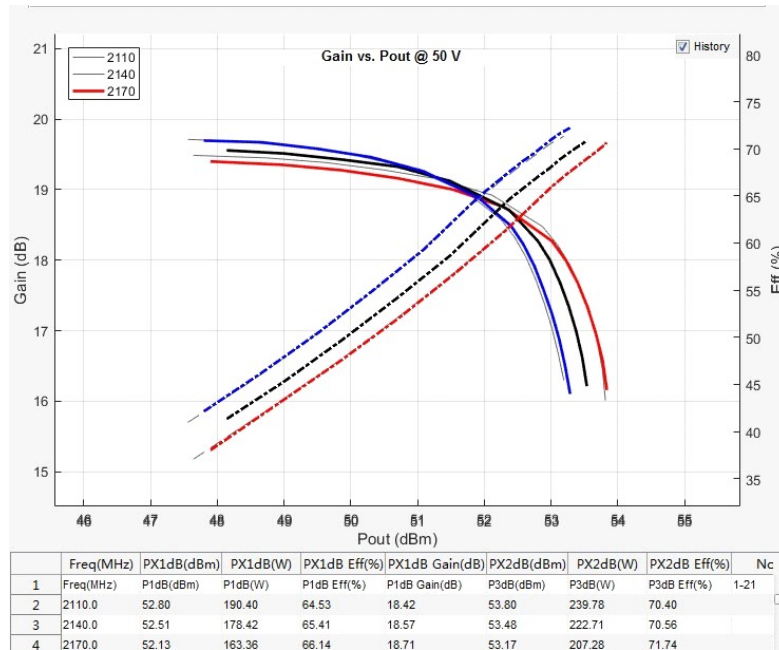


Figure 4: S11 / S21 output from network analyzer

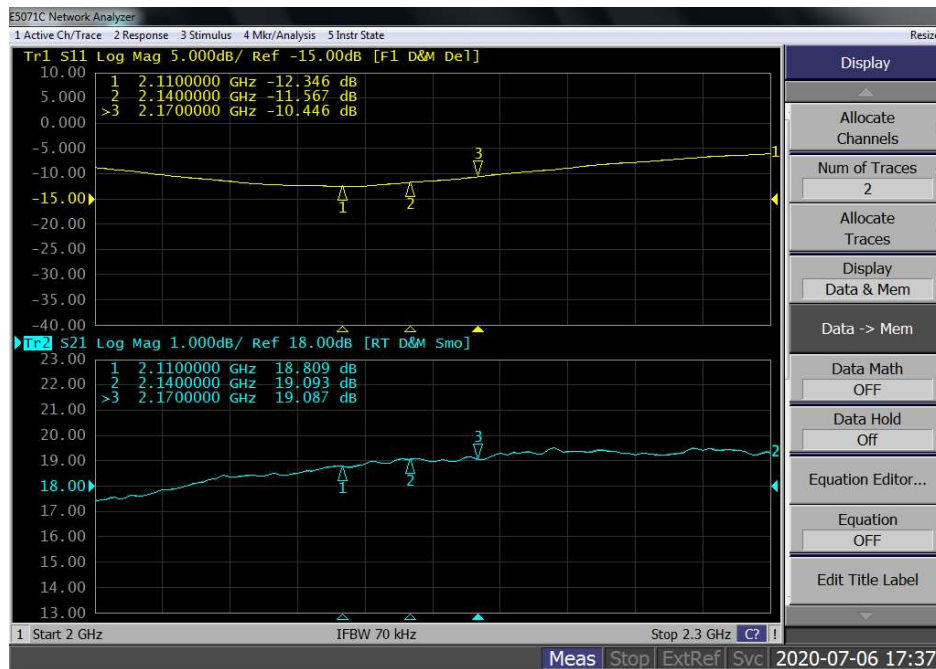
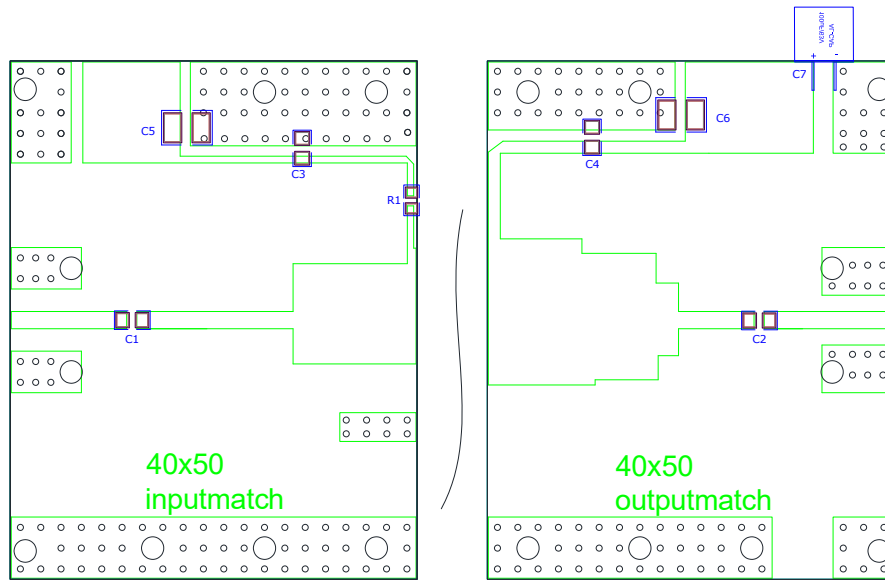


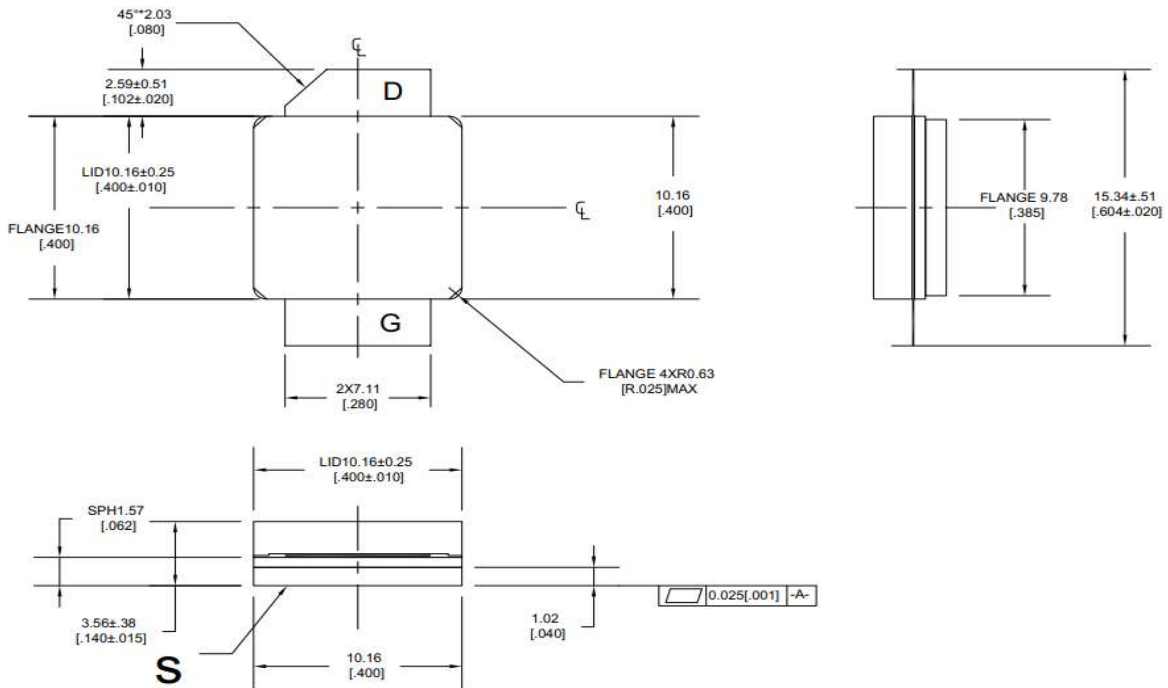


Figure 5: Layout and BOM of Application board 2.1-2.2GHz Class AB (RO4350B 30mils)



Designator	Comment	Footprint	Quantity
C1, C2, C3, C4	10pF	0805	4
C5, C6	10uF	1210	2
C7	100uF/63V		1
R1	51ohm	0603	1

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
2020/7/7	V1.0	Preliminary Datasheet Creation

Application data based on: LSM-20-09

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