



Gallium Nitride 50V, 320W, RF Power Transistor

Description

The STAV15320AY2 is a single ended 320-watt, unmatched GaN HEMT, designed for multiple applications with frequencies up to 1.5GHz, mainly for RF energy application at ISM band like 915MHz and 1300MHz etc.

The performance is guaranteed for applications operating in the mentioned frequencies. There is no guarantee of performance when this part is used in applications designed Outside of these frequencies.

- Typical Performance (On Innogrations fixture with device soldered):

$V_{DD} = 50$ Volts, $I_{DQ} = 145$ mA, CW.

Freq (MHz)	Pin (W)	G_P (dB)	Pout(W)	η_D (%)
1300	6	17	320	78



Applications and Features

- Suitable for 1.3GHz/915MHz ISM application
- Suitable for L band radar and avionics application
- Suitable for wideband power amplifier
- High Efficiency and Linear Gain Operations
- Thermally Enhanced Industry Standard Package
- High Reliability Metallization Process
- Excellent thermal Stability and Excellent Ruggedness
- Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

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}	-10 to +0.5	Vdc
Operating Voltage	V_{DD}	39.6	Vdc
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 $T_C = 85^\circ\text{C}$, $T_J = 200^\circ\text{C}$, Power dissipation 160W	$R_{\theta JC}$	0.85	°C /W



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

DC Characteristics

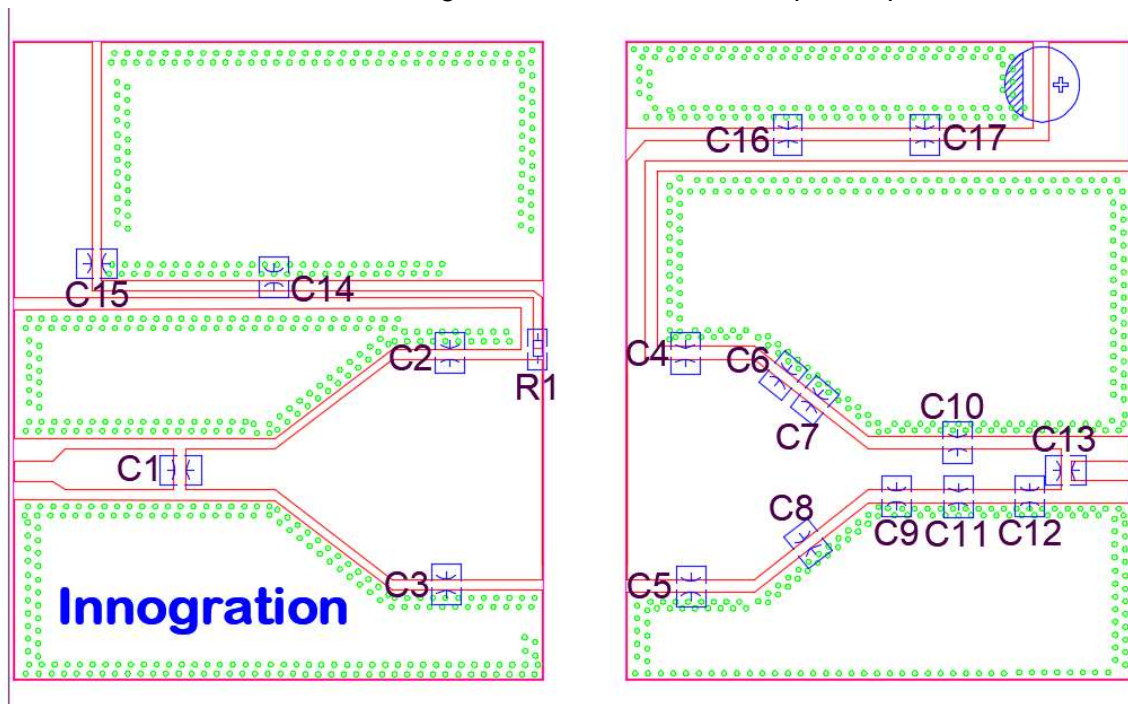
Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	VGS=-8V; IDS=39.6mA	V _{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 39.6 mA	V _{GS(th)}	-4		-2	V
Gate Quiescent Voltage	VDS =50V, IDS=145mA, Measured in Functional Test	V _{GS(Q)}		-3.31		V

Functional Tests (In Innegration Test Fixture, 50 ohm system) :V_{DD} = 50 Vdc, I_{DQ}=145mA, f =1.3GHz, Pulsed CW 20us/10%

Characteristic	Symbol	Min	Typ	Max	Unit
Power Gain @ P3dB	Gp	17	17.5		dB
3dB Compression Point	P3dB	300	320		W
Drain Efficiency@P3dB	η_D	75	78		%
Input Return Loss	IRL		-10		dB

Reference Circuit of Test Fixture Assembly Diagram

PCB materials: Roger 4350,30mils, DXF file upon request



Part	description	Model
C1,C13,C14,C16	47pF	ATC800B
C2,C3	3.9pF	DLC70B
C4,C5	2pF	DLC70B
C6,C7,C8,C10	1.2pF	DLC70B
C9	1pF	DLC70B
C11	0.3pF	DLC70B
C12	0.5pF	DLC70B
C15,C17	10uF	10uF/50V
R1	12Ω	0805



TYPICAL CHARACTERISTICS

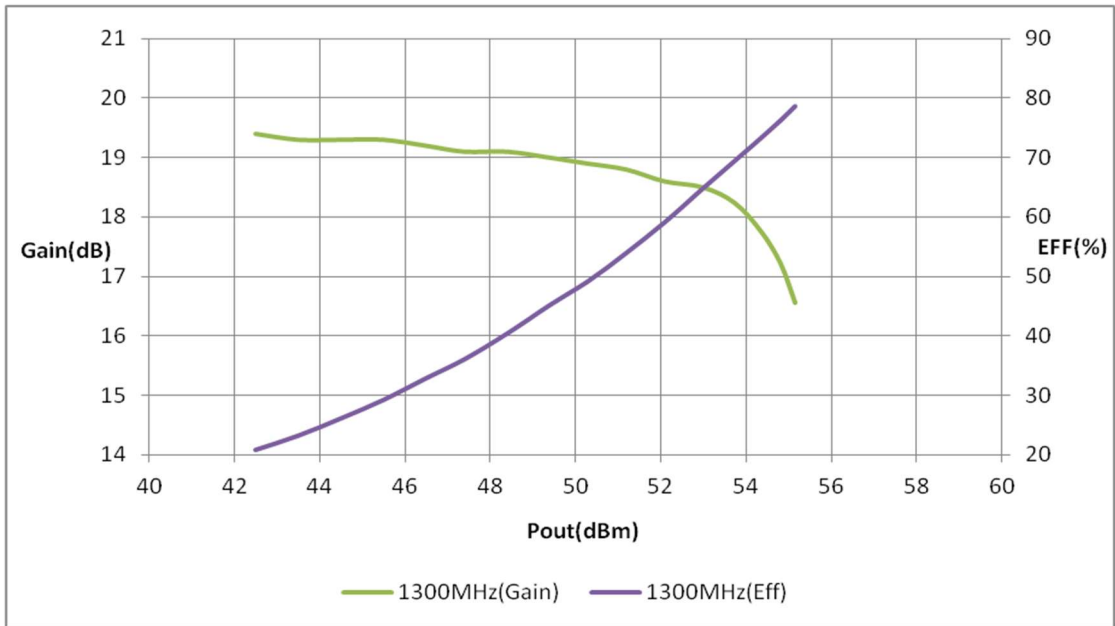


Figure 1. Power gain and drain efficiency as function of CW output power

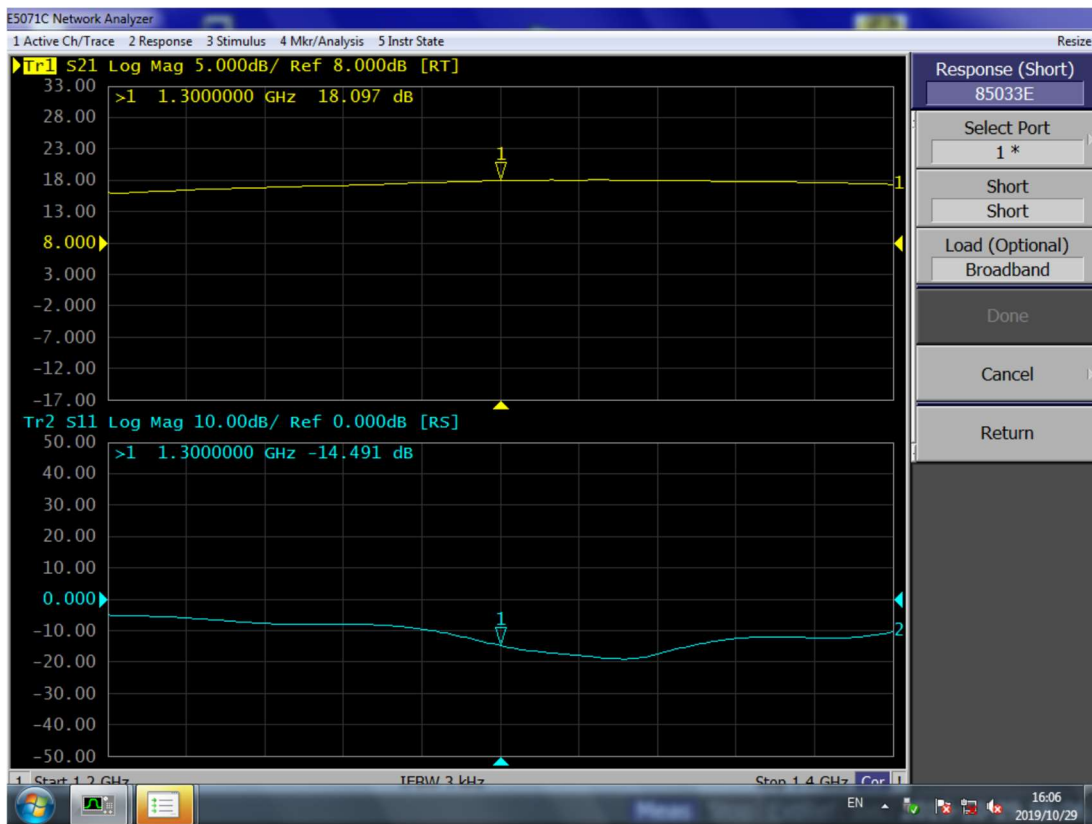
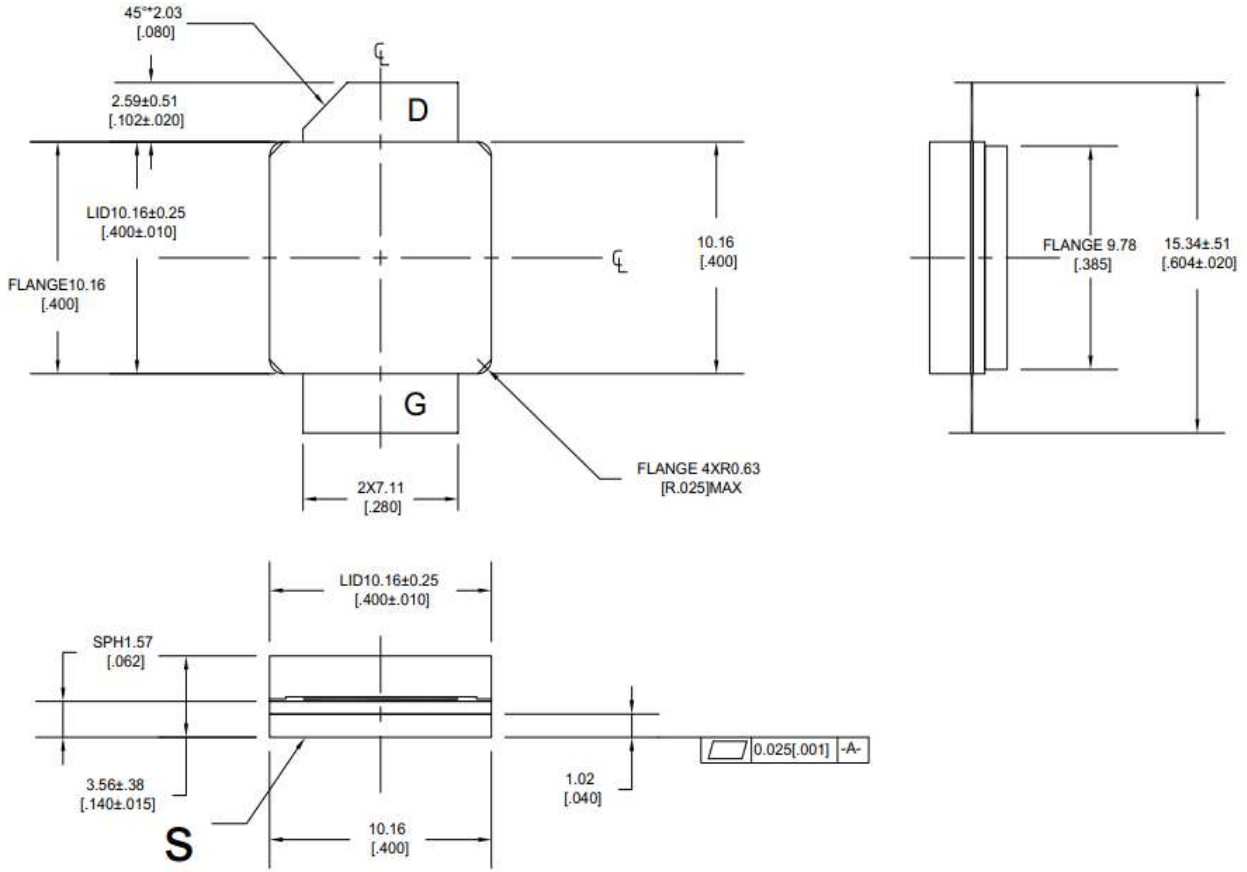


Figure 2. Network analyzer output, S11/S21



Package Outline

Earless Flanged Ceramic Package; 2 leads



Unit: mm [inch]

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



Revision history

Table 5. Document revision history

Date	Revision	Datasheet Status
2020/4/1	V1.0	Preliminary Datasheet Creation

Application data based on ZL-19-35

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