



Gallium Nitride 50V, 135W, 3.3-3.8GHz RF Power Transistor

Description

The STBV36135AY2 is a single ended 135watt, GaN HEMT, ideal for applications from 3.3 to 3.8GHz.

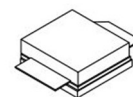
It is an input matched transistor capable to support CW, pulse or any modulated signal.

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

- Typical pulse CW and CW performance across **3.3-3.8GHz** with device soldered

$V_{DD} = 50$ Vdc, $I_{DQ} = 200$ mA, Pulse width=20us, **CW Psat defined as no gate leakage current**

Signal	Psat(W)	Power gain (dB)	Eff(%)@P3dB
Pulsed CW	142-185	11.5-12.5	57-62
CW	140-170	11-12	55-58

STBV36135AY2

Applications

- Sub-4GHz pulse or CW amplifier
- 5G base station amplifier
- S band Jammer

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}	-8 to +0.5	Vdc
Operating Voltage	V_{DD}	55	Vdc
Maximum gate current	I_{gs}	20	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 $T_C = 25^\circ\text{C}$, at $P_d = 100\text{W}$	$R_{\theta JC}$	1.1	°C /W

Table 3. Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

DC Characteristics (measured on wafer prior to packaging)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = -8\text{V}$; $I_{DS} = 20\text{mA}$	V_{DSS}		200		V



Gate Threshold Voltage	VDS =10V, ID = 20mA	V _{GS(th)}	-4	-3	-2	V
Gate Quiescent Voltage	VDS =50V, IDS=200mA, Measured in Functional Test	V _{GS(Q)}		-3.3		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	3.45GHz, Pout=135W pulse CW for each path All phase, No device damages	VSWR		10:1		

Figure 2: Median Lifetime vs. Channel Temperature

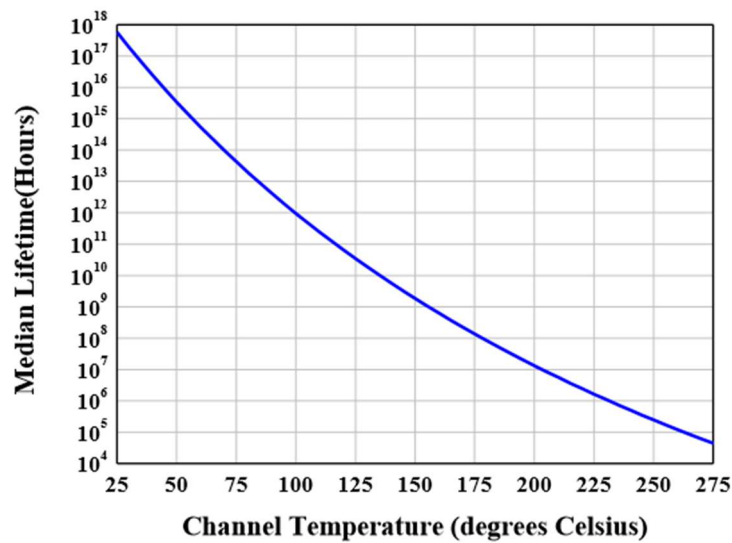


Figure 3: S11 / S21 output from network analyzer on 3.3-3.6GHz application board

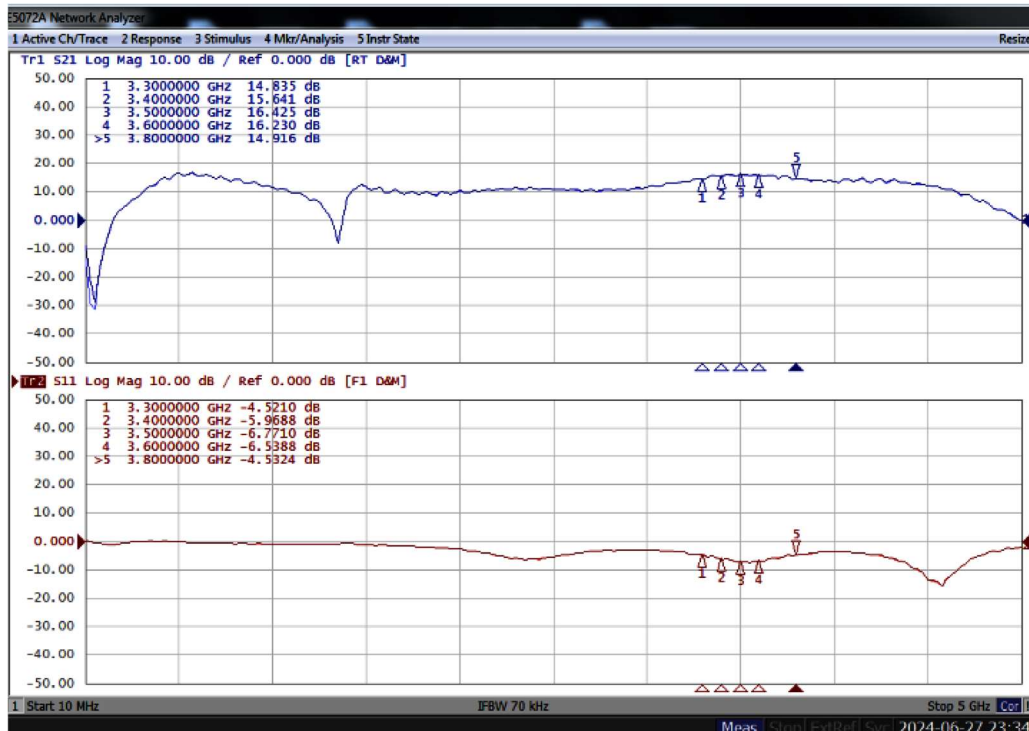




Figure 4: Picture of application board of 3.3-3.8GHz

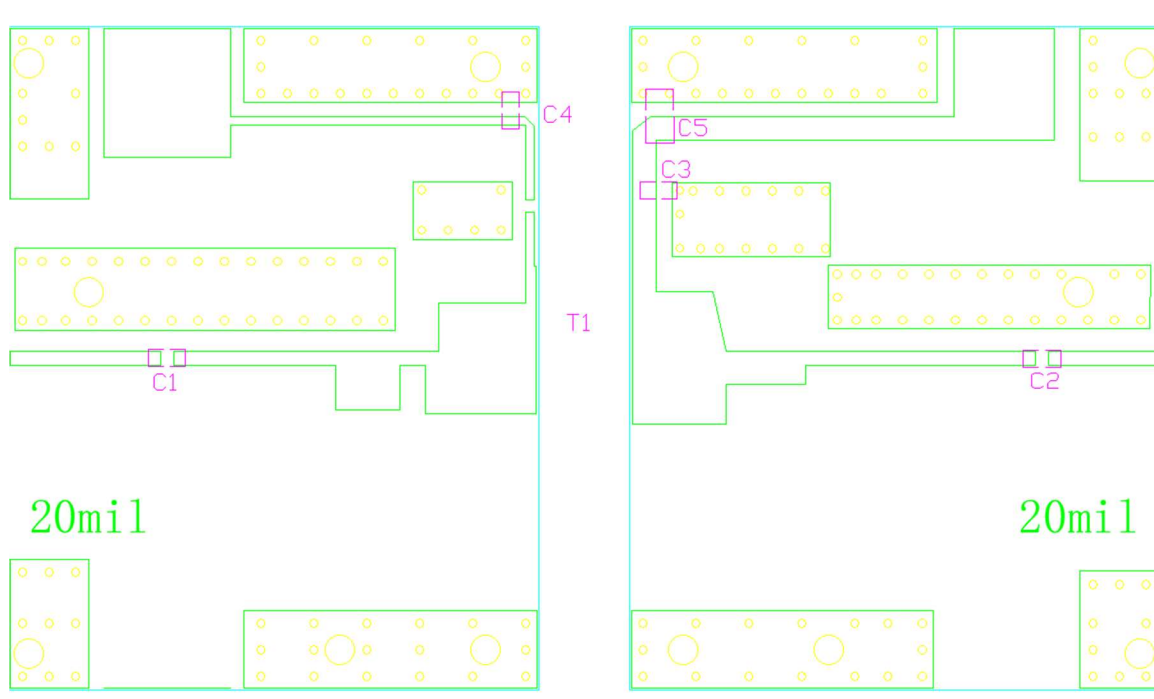
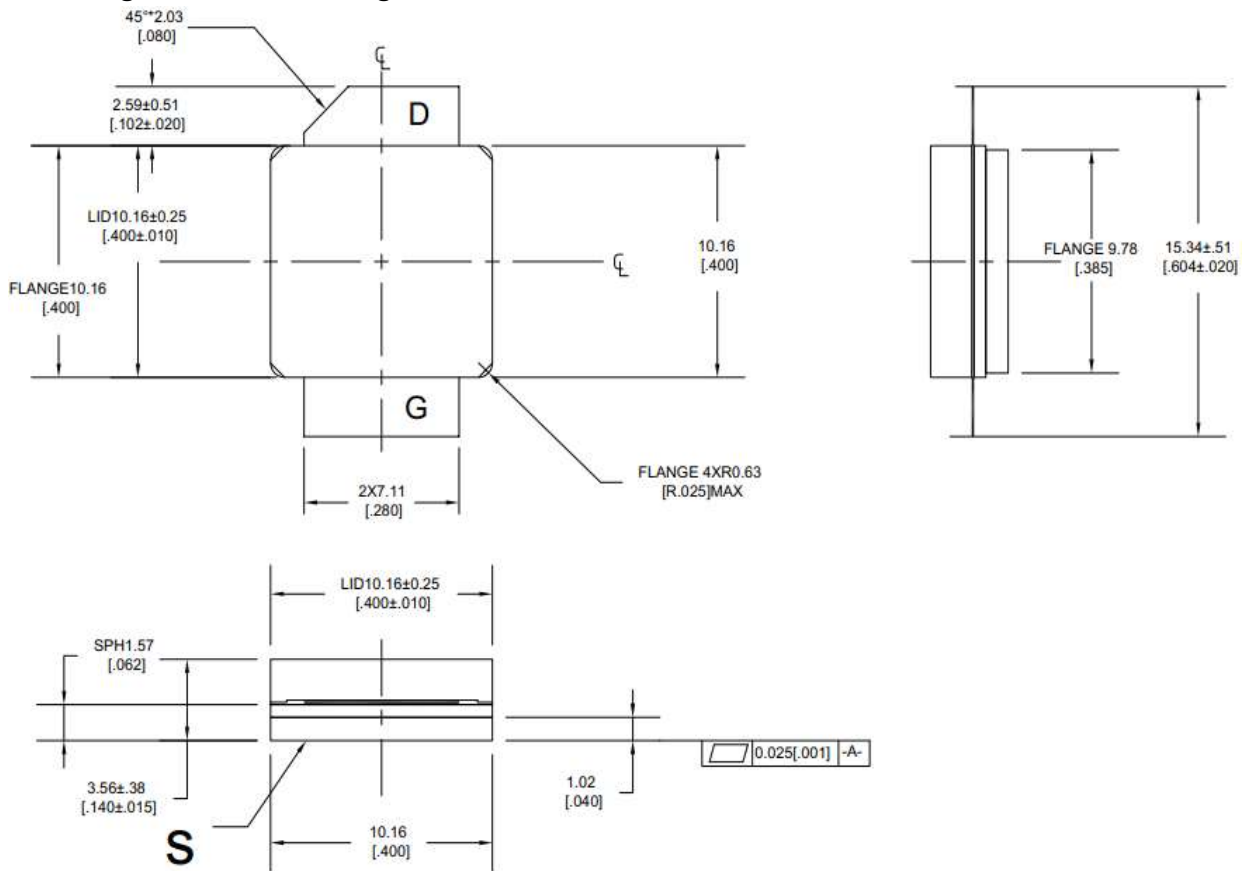


Table 4. Bill of materials of application board (PCB layout upon request, RO4350B 20mils)

Part	Quantity	Description	Part Number	Manufacture
C1,C2,C3,C4	4	8.2pF High Q Capacitor	251SHS8R2BSE	TEMEX
C5	1	10uF MLCC	GRM32EC72A106ME0 5	Murata
T1	1	135W GaN Dual Transistor	STBV36135AY2	Innegration



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
2024/7/2	V1.0	Preliminary datasheet creation

Application data based on: LWH-24-23

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