



Gallium Nitride 50V, 150W, 0.1-3.5GHz RF Power Transistor

Description

The STBV35150C6 is a 150watt, GaN HEMT, ideal for general applications from 0.1 to 3.5GHz.

It features high gain, wide band and low cost, in 10*6mm plastic open cavity package, enabling surface mounted on PCB through grounding vias or soldered on heatsink directly.

It is a highly cost effective option for pulsed power amplifier within L/S band.

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

- Typical Class AB pulse CW performance for multiple bands on different boards

Pulse width=20us, duty cycle=10%

STBV35150C6



$V_{DS} = 50V, I_{DQ} = 100mA, V_{GS} = -3.2V$

FREQ (MHZ)	P1dB (dBm)	P1dB (W)	P1dB Eff (%)	P1dB Gain (dB)	P3dB (dBm)	P3dB (W)	P3dB Eff (%)
1200-1400	51	120	68	20	51.8	150	72
2700-3100	50.5	115	54	17	52	160	59
3100-3500	50.5	115	52	18	52	160	58

Applications

- 5G, 4G wireless infrastructure
- Wideband or narrowband power amplifier
- S band pulsed power amplifier
- L band pulsed 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

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}	10	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
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Thermal Resistance, Junction to Case by FEA T _C = 85°C, at Psat=150W Pulsed output at 3.5GHz	R _{θJC}	1.6	°C /W
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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} =-8V; I _{DS} =20mA	V _{DSS}		200		V
Gate Threshold Voltage	V _{DS} =10V, I _D = 20mA	V _{GS(th)}	-4	-3	-2	V
Gate Quiescent Voltage	V _{DS} =50V, I _{DS} =100mA, Measured in Functional Test	V _{GS(Q)}		-3.2		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	3.5GHz, P _{out} =150W pulse CW All phase, No device damages	VSWR		10:1		

Figure 1:Pin Definition(Top View)



Pin No.	Symbol	Description
8,9,10,11,14,15,16,17	V _{gs} /RF In	V _{gs} and RF input
26,27,28,29,32,33,34,35	V _{ds} /RF out	V _{ds} and RF output
2,5,7,12,13,18,20,23,25,30,31,36	GND	DC/RF Ground
Others	NC	No connection
Package Base	GND	DC/RF Ground.



1200-1400MHz

Figure 2: Efficiency and power gain as function of Pout

VDD = 50 Vdc, IDQ = 100 mA,

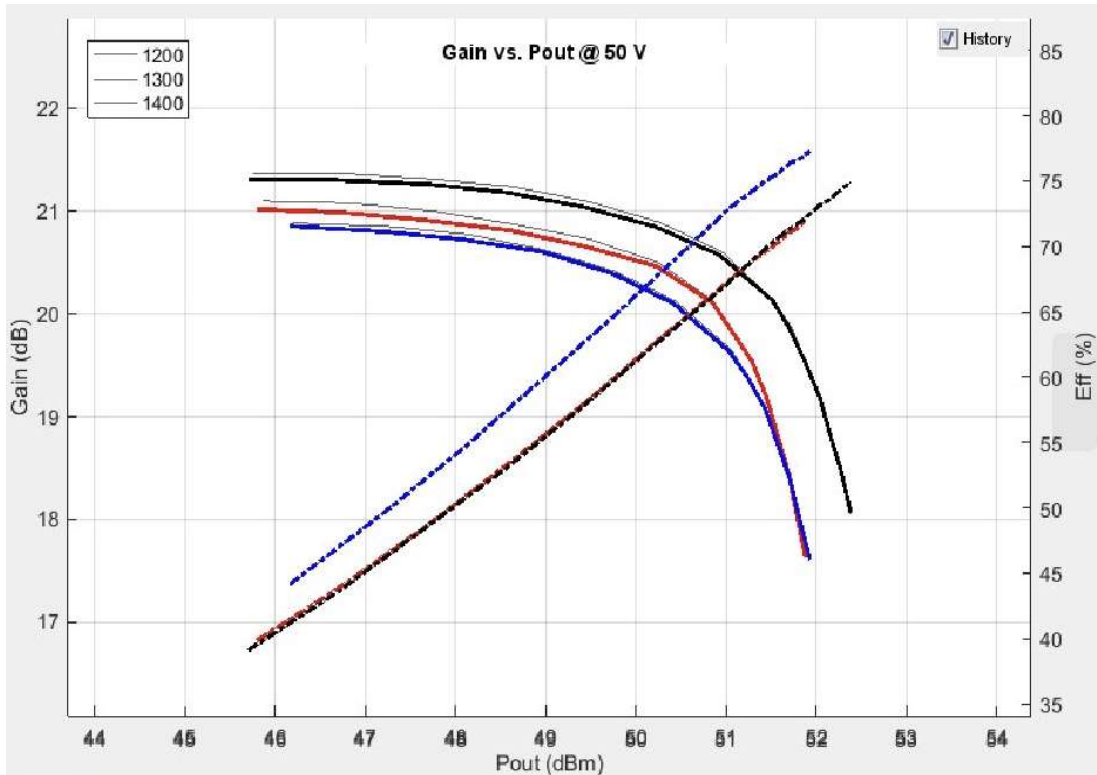


Figure 3: Network plot for S11/S21



Figure 4: Picture of application board of 1.2-1.4GHz

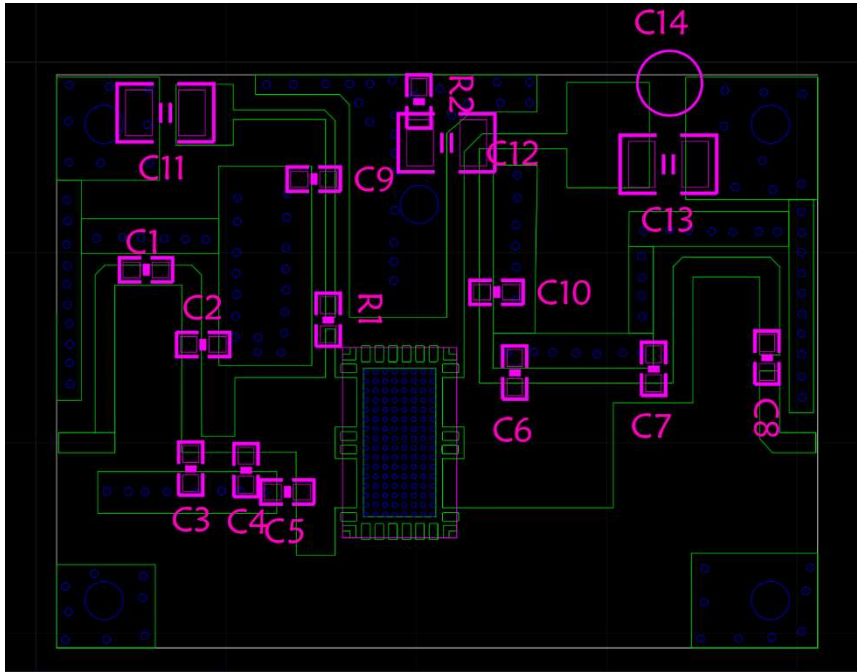


Table 4. Bill of materials of application board (PCB layout upon request)

Component	Value	Quantity
U1	STBV35150C6	1
C1、C8、C9、C10	20pF	4
C2	3pF	1
C3	3.9pF	1
C4	5.6pF	1
C5	8.2pF	1
C6	0.3pF	1
C7	3.9pF	1
C11、C12、C13	10uF/63V	3
R1、R2	10 Ω	2
C14	470uF/63V	1



2700-3100MHz

Figure 5: Efficiency and power gain as function of Pout

VDD = 50 Vdc, IdQ = 100 mA,

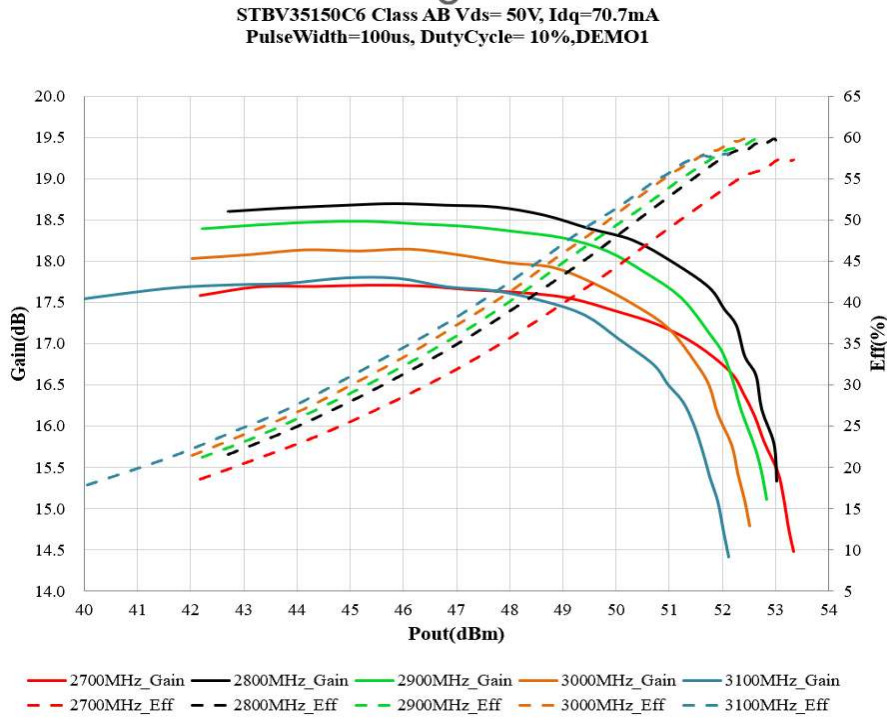


Figure 6: Network plot for S11/S21



Figure 7: Picture of application board of 2.7-3.1GHz

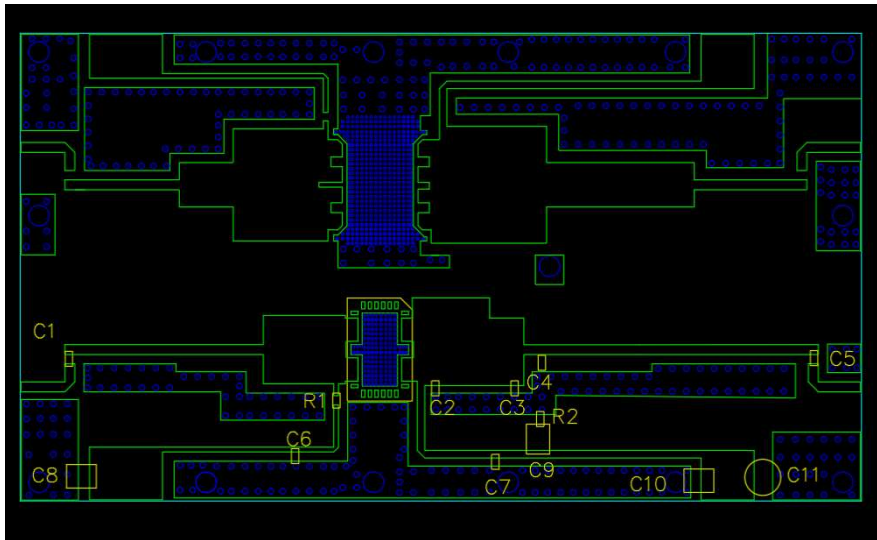


Table 5. Bill of materials of application board (PCB layout upon request)

Component	Value	Quantity
U1	STBV35150C6	1
C1、C5、C6、C7	12pF	4
C2	0.8pF	1
C3	0.3pF	1
C4	0.5pF	1
C8、C9、C10	10uF/63V	3
R1、R2	10 Ω	2
C11	470uF/63V	1



3100-3500MHz

Figure 8: Efficiency and power gain as function of Pout

VDD = 50 Vdc, IdQ = 100 mA,

STBV35150C6 Class AB Vds= 50V, Idq=67.5mA
PulseWidth=100us, DutyCycle= 10%, DEMO1

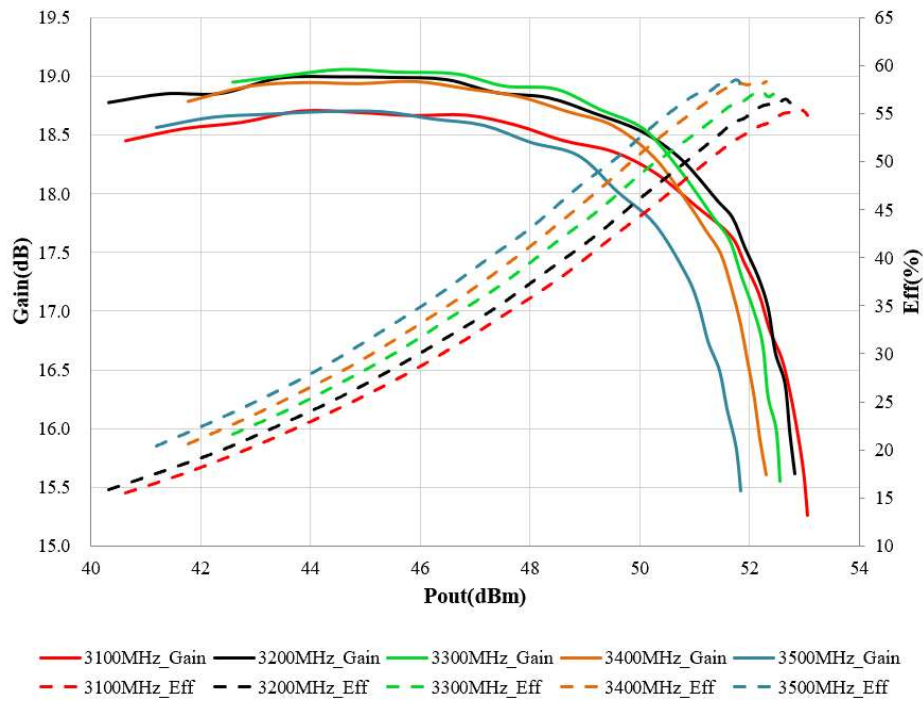


Figure 9: Network plot for S11/S21

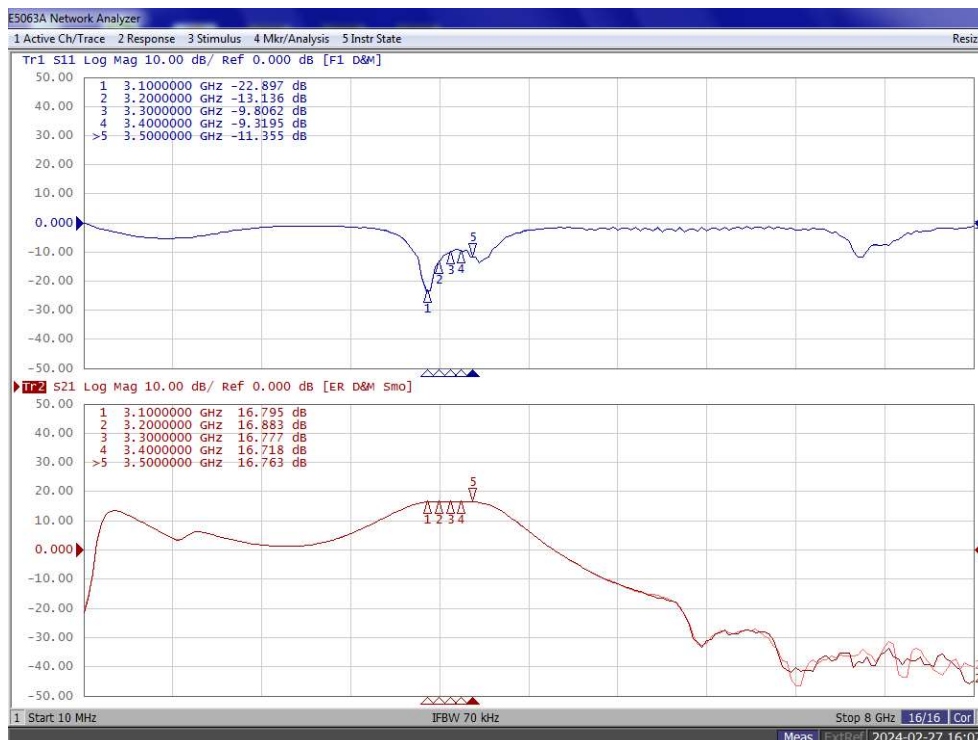


Figure 10: Picture of application board of 3.1-3.5GHz

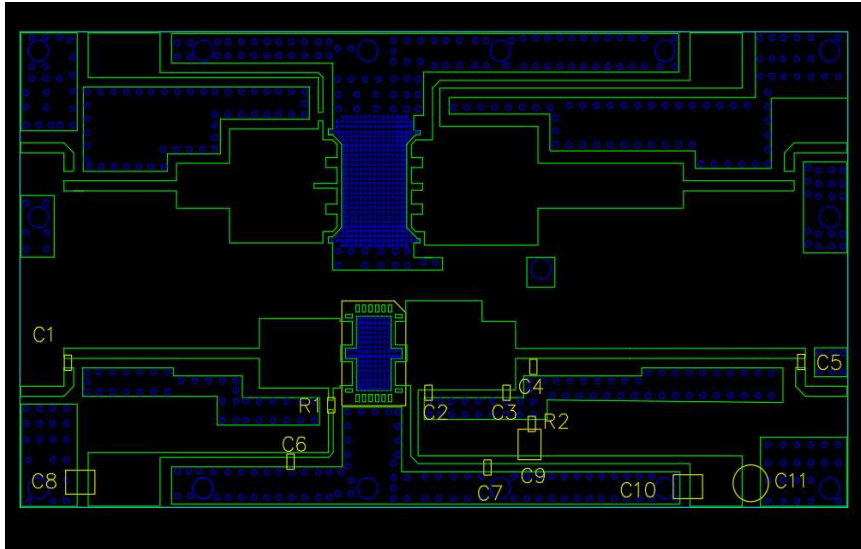


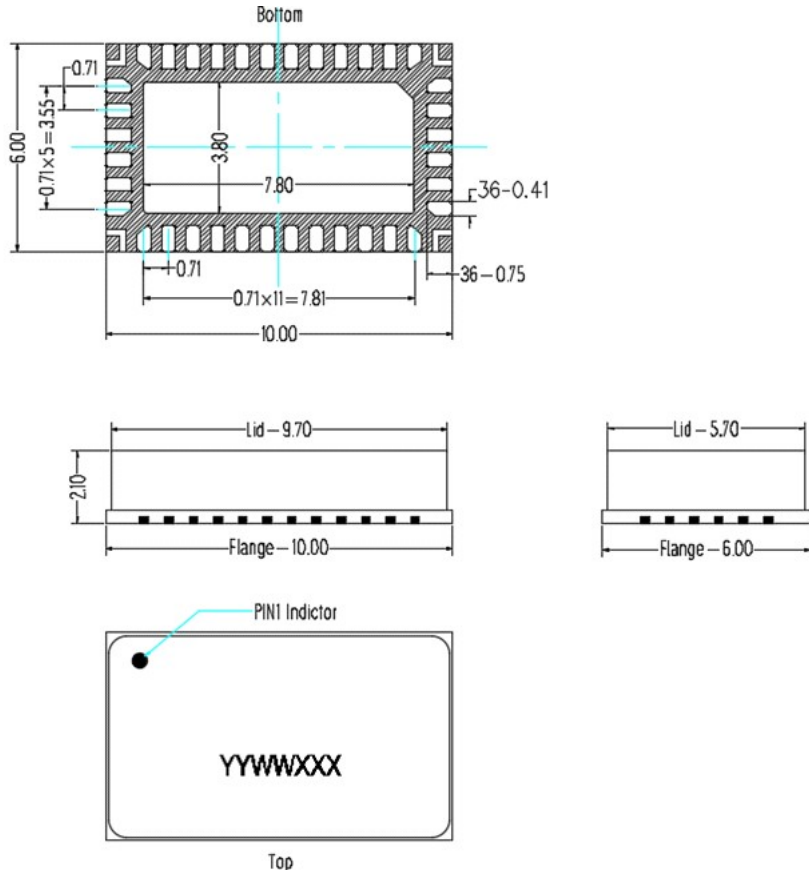
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C2	0.8pF	1
C3	0.3pF	1
C4	0.5pF	1
C8、C9、C10	10uF/63V	3
R1、R2	10 Ω	2
C11	470uF/63V	1



Package Dimensions

10*6 Plastic Package



Notes:

1. All dimensions are in mm;
2. The tolerances unless specified are ±0.2mm.

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2024/3/1	V1.0	Preliminary Datasheet Creation

Application data based on: ZYX-24-03

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