



GaN HEMT 50V, 350W, 2.3-2.7GHz RF Power Transistor

Description

The STBV27350BY4 is a dual path 350watt, Input matched GaN HEMT, ideal for applications from 2.3 to 2.7GHz especially for LTE/5G

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

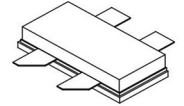
- Typical WCDMA 1 carrier performance on **2.5-2.7GHz** asymmetrical Doherty with device soldered
VDS= 50V, IDQ=300mA(Vgm=-3.02V, Vgp=-5.6V)

Freq (MHz)	Pout (dBm)	CCDF (dB)	ACPR (dBc)	Gain (dB)	Efficiency (%)
2500	47.5	7.26	-26.90	16.00	53.72
2600	47.5	7.59	-27.27	15.76	56.60
2700	47.5	7.38	-26.84	14.06	53.12

- Typical WCDMA 1 carrier performance on **2.3-2.4GHz** asymmetrical Doherty with device soldered
VDS= 50V, IDQ=100mA(Vgm=-3.18V, Vgp=-6.0V)

Freq (MHz)	Pout (dBm)	CCDF (dB)	ACPR (dBc)	Gain (dB)	Efficiency (%)
2300	47.5	7.46	-28.37	16.87	53.60
2350	47.5	7.69	-27.72	16.65	55.86
2400	47.5	7.48	-28.59	16.01	53.21

STBV27350BY4



Applications

- Asymmetrical Doherty amplifier within 2.5-2.7GHz, 2.3-2.4GHz
- Sub-3GHz S bandpower amplifier
- CW or pulsed Amplifier

Important Note: Proper Biasing Sequence for GaN HEMT Transistors

Turning the device ON

- Set VGS to the pinch-off (VP) voltage, typically -5 V
- Turn on VDS to nominal supply voltage
- Increase VGS until IDS current is attained
- Apply RF input power to desired level

Turning the device OFF

- Turn RF power off
- Reduce VGS down to VP, typically -5 V
- Reduce VDS down to 0 V
- Turn off VGS

Figure 2: Pin Connection definition

Transparent top view (Backside grounding for source)

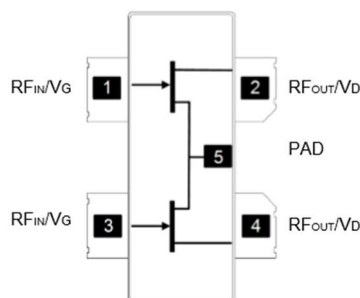




Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DS}	+200	Vdc
Gate--Source Voltage	V_{GS}	-8 to +0.5	Vdc
Operating Voltage	V_{DD}	55	Vdc
Maximum gate current	I_{gs}	46.8	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 $T_c = 85^\circ\text{C}$, at $P_d = 50\text{W}$, on Doherty application board	$R_{\theta JC}$	1.9	°C /W

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

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

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = -8\text{V}$; $I_{DS} = 17\text{mA}$	V_{DS}		200		V
Gate Threshold Voltage	$V_{DS} = 10\text{V}$, $I_D = 17\text{mA}$	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	$V_{DS} = 50\text{V}$, $I_{DS} = 500\text{mA}$, Measured in Functional Test	$V_{GS(Q)}$		-3.0		V

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

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = -8\text{V}$; $I_{DS} = 30\text{mA}$	V_{DS}		200		V
Gate Threshold Voltage	$V_{DS} = 10\text{V}$, $I_D = 30\text{mA}$	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	$V_{DS} = 50\text{V}$, $I_{DS} = 130\text{mA}$, Measured in Functional Test	$V_{GS(Q)}$		-3.4		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	2.6GHz, $P_{out} = 55\text{W}$ WCDMA 1 Carrier in Doherty circuit All phase, No device damages	VSWR		10:1		



2.5-2.7GHz

Figure 3: Efficiency and power gain as function of Pout

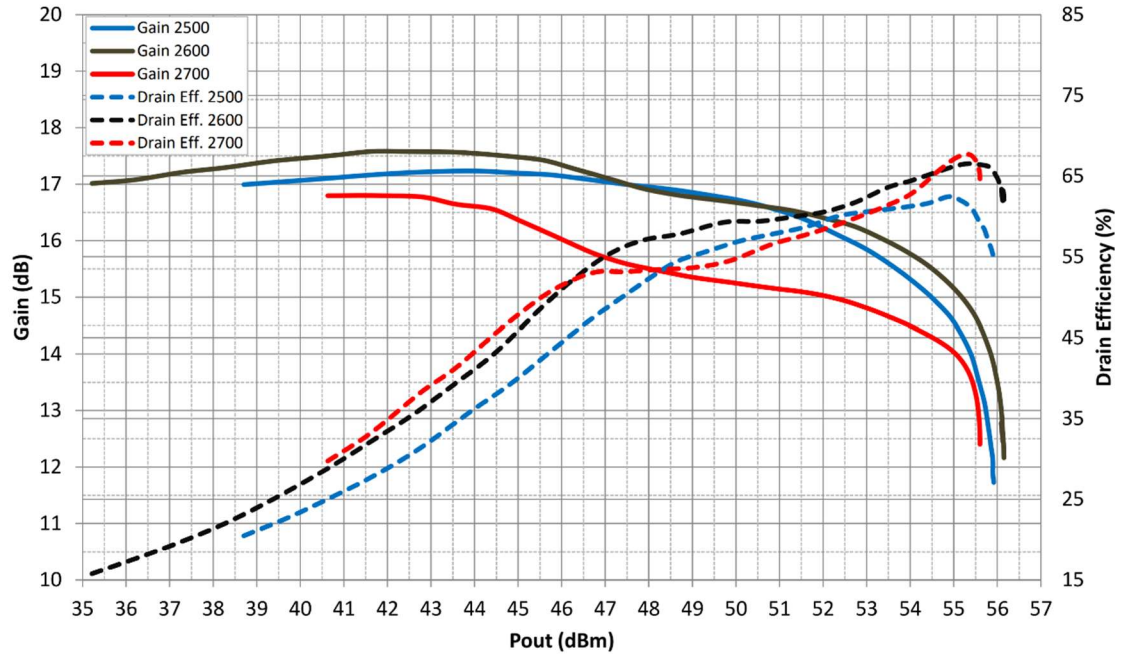


Figure 4: Network analyzer output, S11 and S21



Figure 5: Picture of application board Doherty circuit

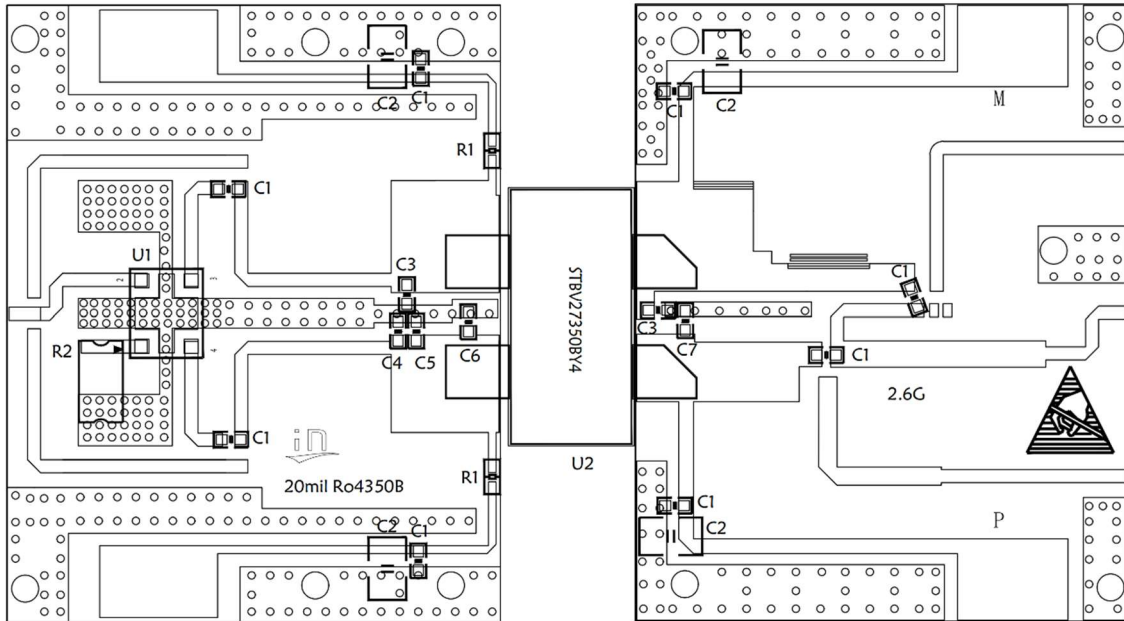


Table 4. Bill of materials of application board (PCB layout upon request, RO4350B 20mils)

Reference	Footprint	Value	Quantity
C1	0805	10pF/250V	8
C2	1210	10uF/100V	4
C3	0805	1.0pF/250V	1
C4	0805	0.5pF/250V	1
C5	0805	1pF/250V	1
C6	0805	1.5pF/250V	1
C7	0805	0.6pF/250V	1
R1	0603	10R	2
R2	2512	51R	1
U1	6.35*5.08mm	X3C26P1-03S	1
U2	BY4	STBV27350BY4	1



2.3-2.4GHz

Figure 6: Efficiency and power gain as function of Pout

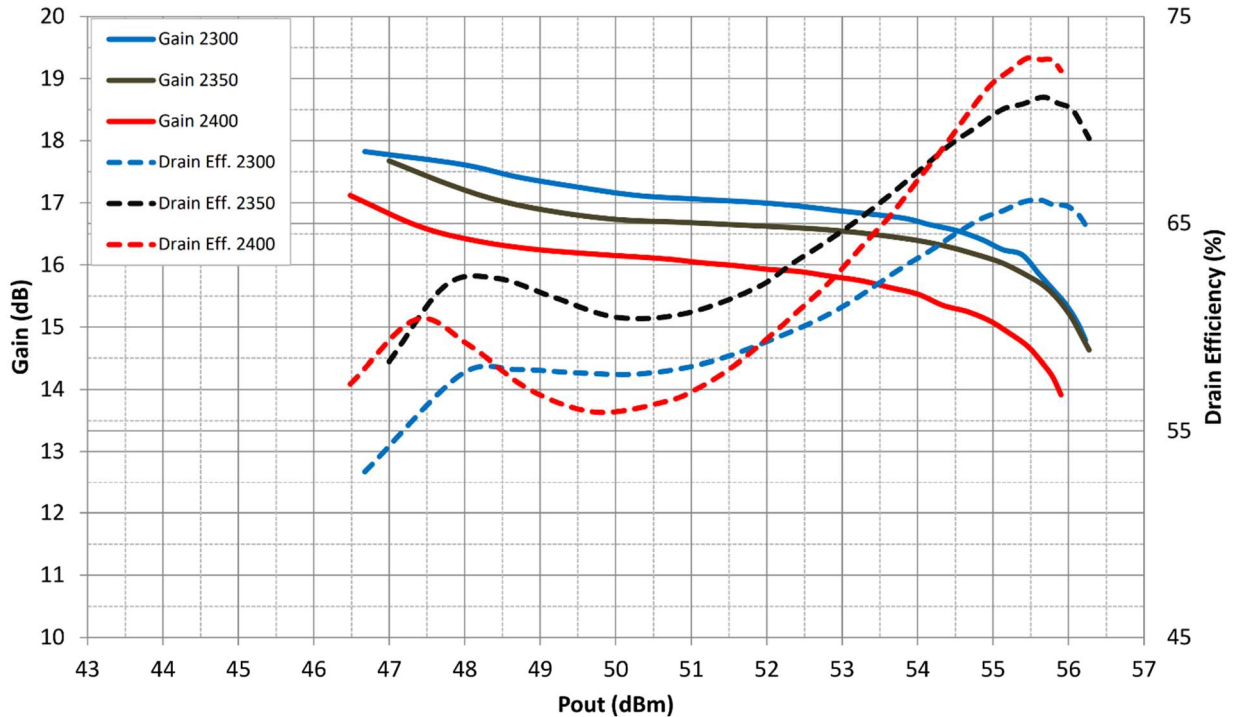


Figure 7: Network analyzer output, S11 and S21

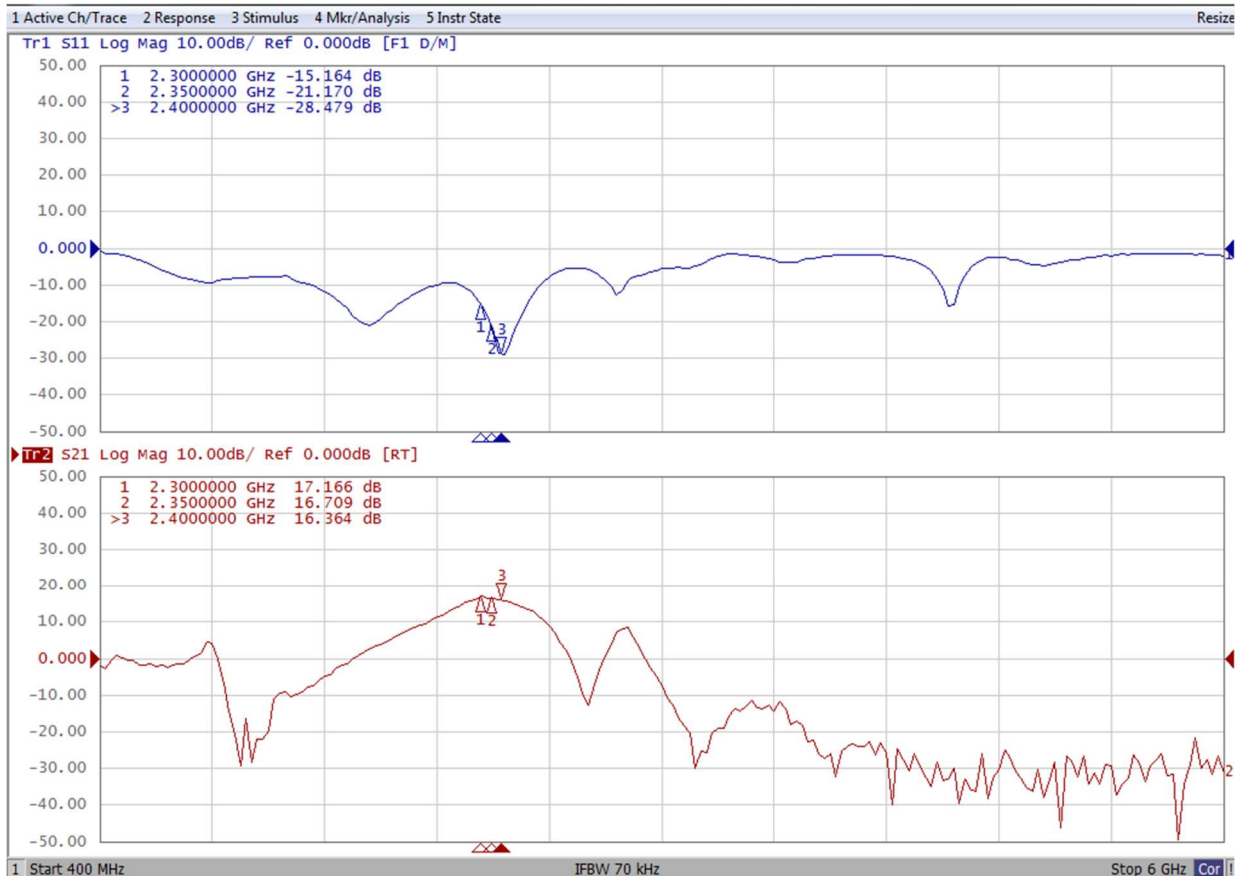


Figure 8: Picture of application board Doherty circuit for 2.3-2.4GHz

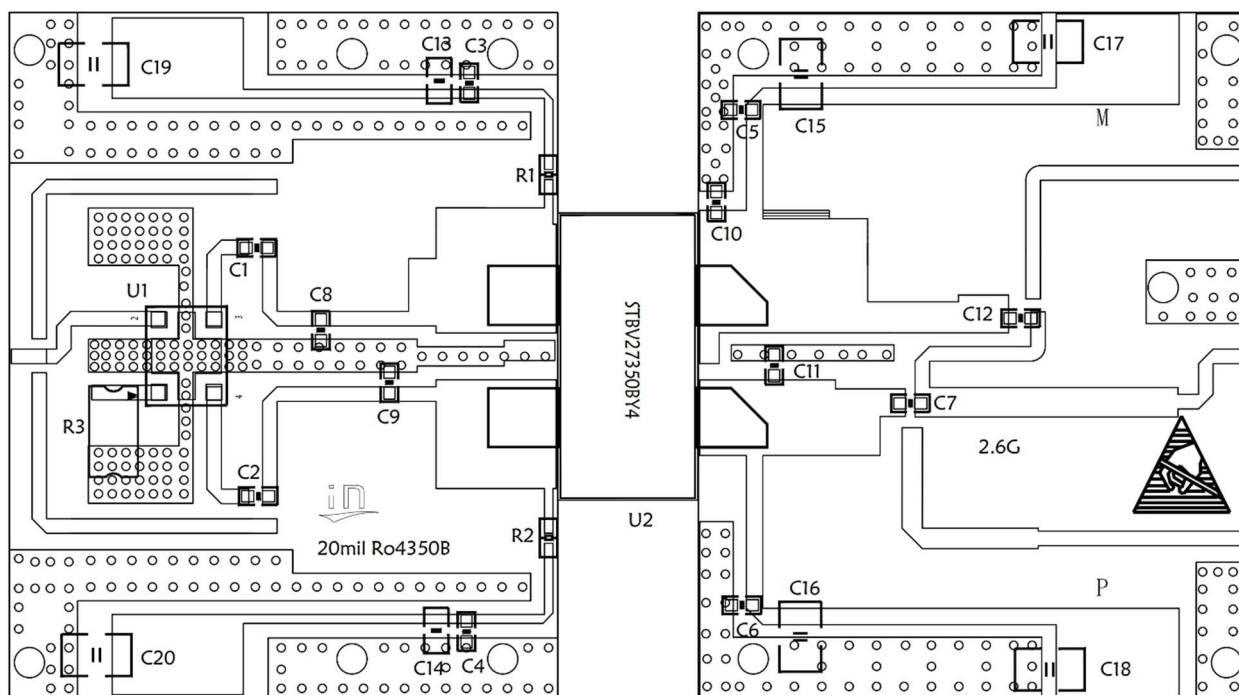
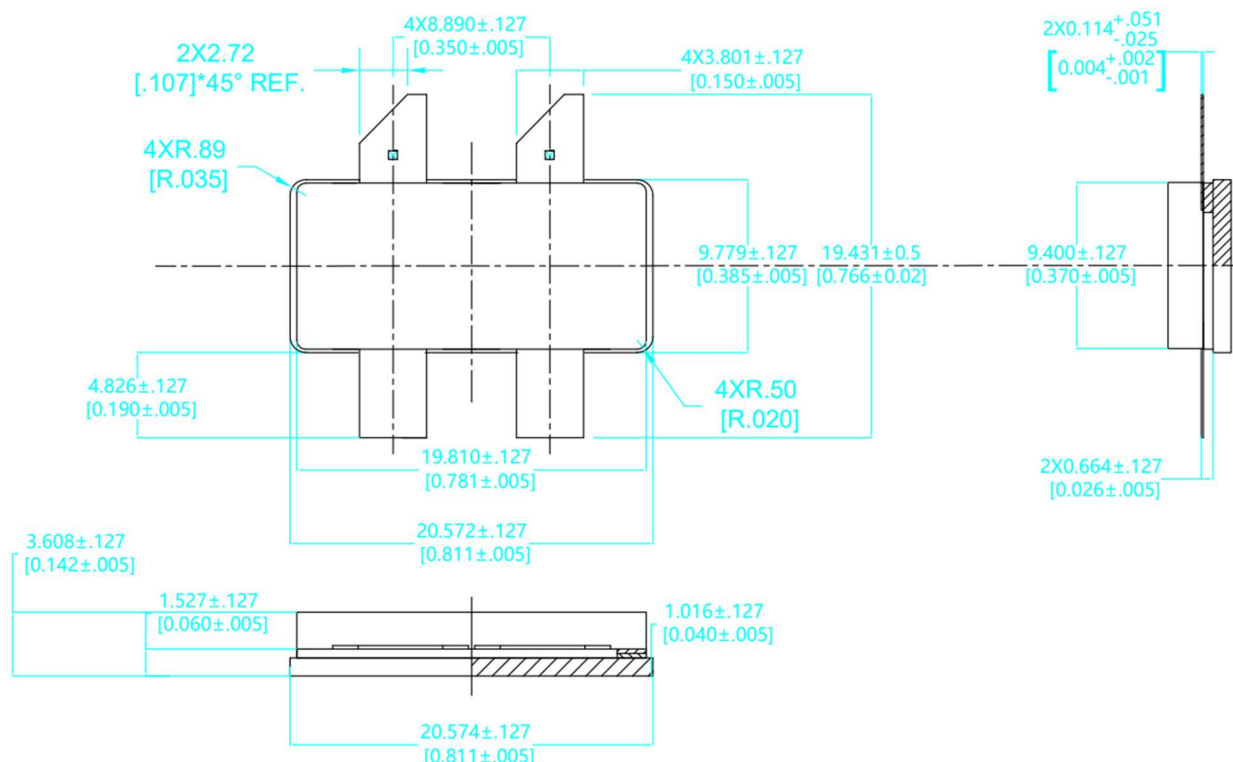


Table 5. Bill of materials of application board (PCB layout upon request, RO4350B 20mils)

Reference	Footprint	Value	Quantity
C1, C2, C3, C4, C5, C6, C7	0805	10pF/250V	7
C8	0805	1.0pF/250V	1
C9	0805	0.8pF/250V	1
C10, C11	0805	1.6pF/250V	2
C12	0805	8.2pF/250V	1
C13, C14	0805	10uF/16V	2
C15, C16, C17, C18, C19, C20	1210	10uF/100V	6
R1, R2	0603	10R	2
R2	2512	51R	1
U1	6.35*5.08mm	XC2500P03	1
U2	BY4	STBV27350BY4	1



Earless Flanged Ceramic Package; 4 leads



Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2021/12/15	V1.0	Preliminary Datasheet Creation
2022/3/24	V2.0	Device version fixed at V6
2022/10/21	V3.0	Device version updated to V10
2022/11/28	V3.1	Add application data of narrowed band within 2.62-2.69GHz at 45dBm
2024/1/26	V3.2	Add 2.3-2.4GHz application data and remove 2.62-2.69GHz data
2024/7/10	V3.3	Modify the mechanical drawing of BY4 with correct lead width

Application data based on: ZBB-22-12/15,24-03

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