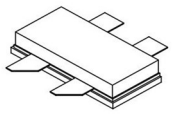
Gallium Nitride 50V, 200W,1.3-1.8GHz RF Power Transistor

STBV18200BY4



Description

The STBV18200BY4 is a 200watt Doherty pair capable, GaN HEMT, ideal for for 4G/5G cellular applications from 1.3 to 1.8GHz..

It can be configured as asymmetrical Doherty delivering 80W average power, according to normal 8dB back off.

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

- Typical WCDMA 1 carrier performance on 1320-1750MHz Doherty

V_{DD} = 50 Vdc, I_{DQ_main} = 200mA, Vgs_peak=-5.0V, Tc=25°C

Freq (MHz)	Pout (dBm)	CCDF (dB)	ACPR (dBc)	Gain (dB)	Efficiency (%)
1320	44.50	7.95	-28.7	14.5	51.5
1400	44.49	7.95	-32.3	15.2	56.1
1500	44.49	7.88	-32.6	15.4	55.0
1600	44.50	8.34	-35.5	15.1	50.3
1700	44.49	8.69	-37.8	15.6	50.7
1750	44.50	7.98	-34.0	15.7	53.5

Applications

- Asymmetrical Doherty amplifier
- L band 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)

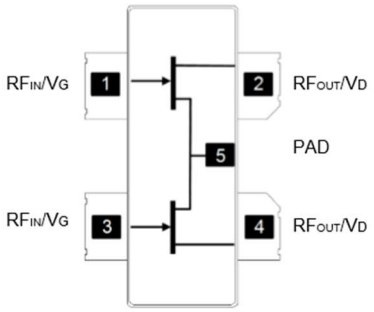


Table 1. Maximum Ratings

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	Igs	27	mA
Storage Temperature Range	Tstg	-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=25W, on Doherty application board	$R_{\theta JC}$	3.3	°C /W

Table 3. Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	1400MHz, Pout=25W pulse CW for All phase, No device damages	VSWR		10:1		

Figure 2: Median Lifetime vs. Channel Temperature

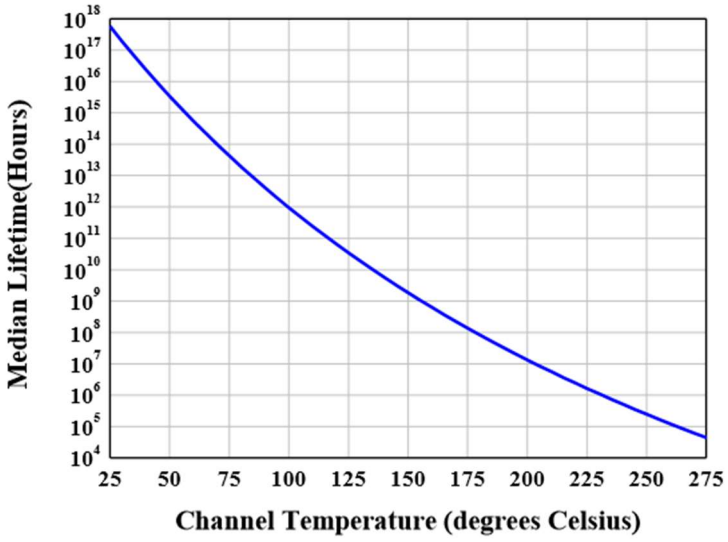


Figure 3: Efficiency and power gain as function of Pout (1320-1750MHz Doherty)

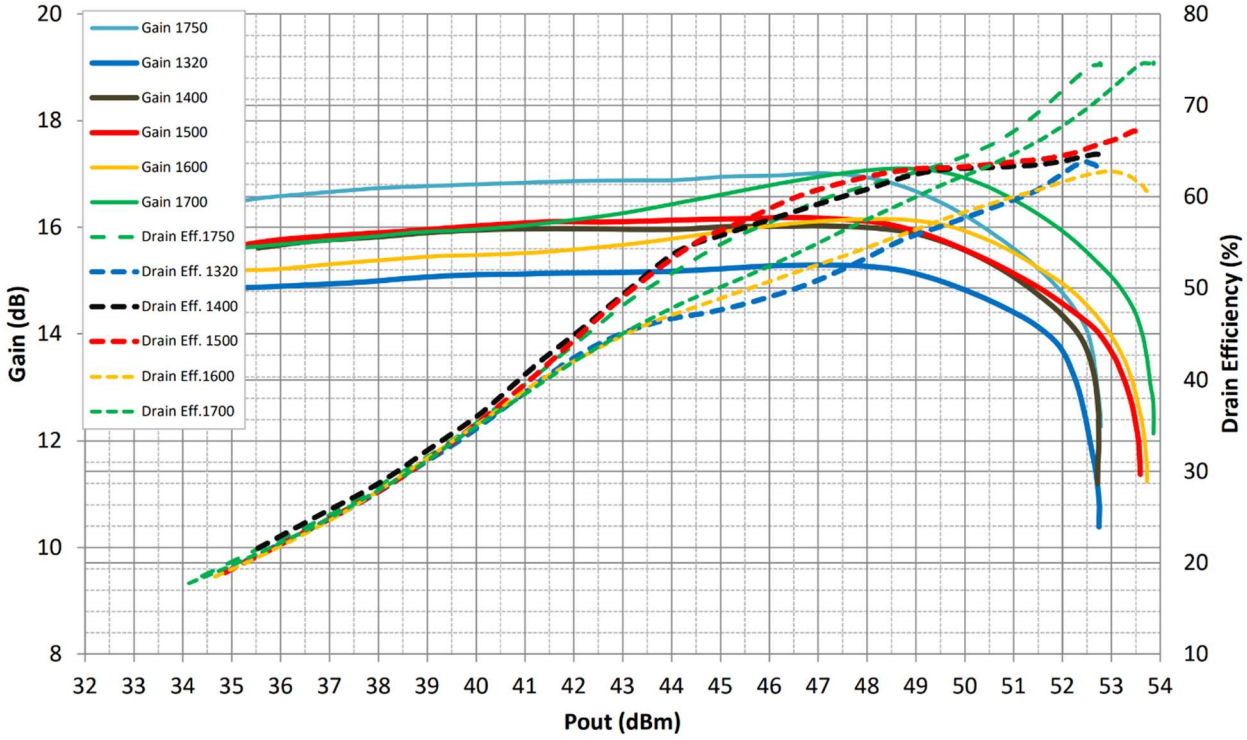


Figure 4: Network analyzer output, S11 and S21 (1320-1750MHz Doherty)

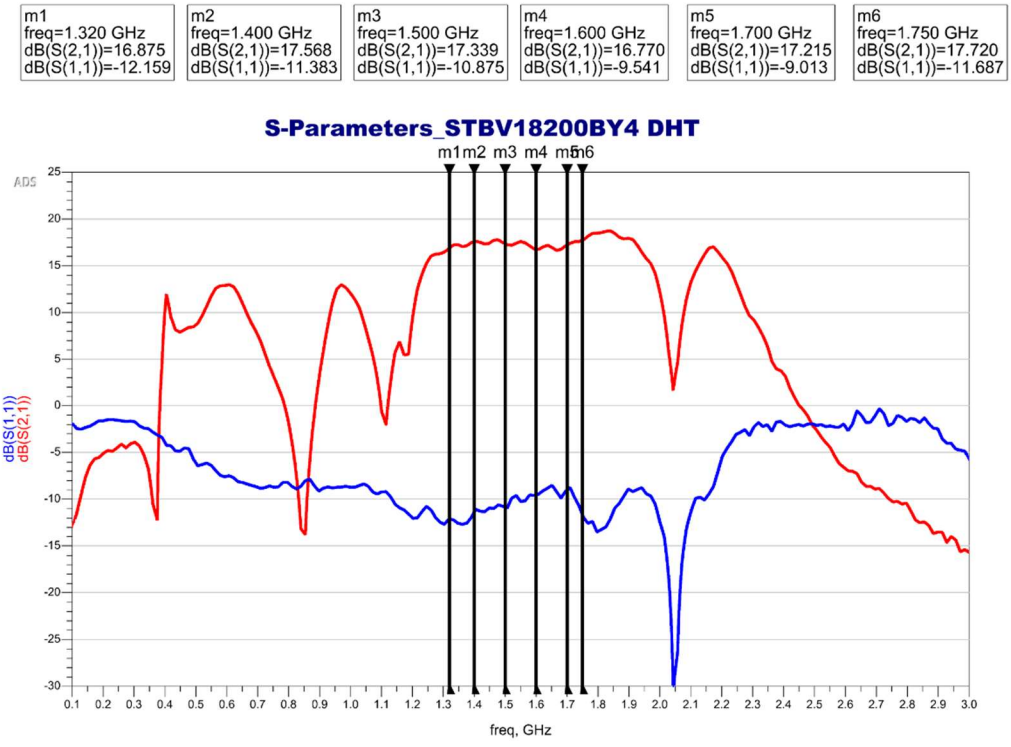


Figure 5: Picture of application board Doherty circuit for 1320-1750MHz

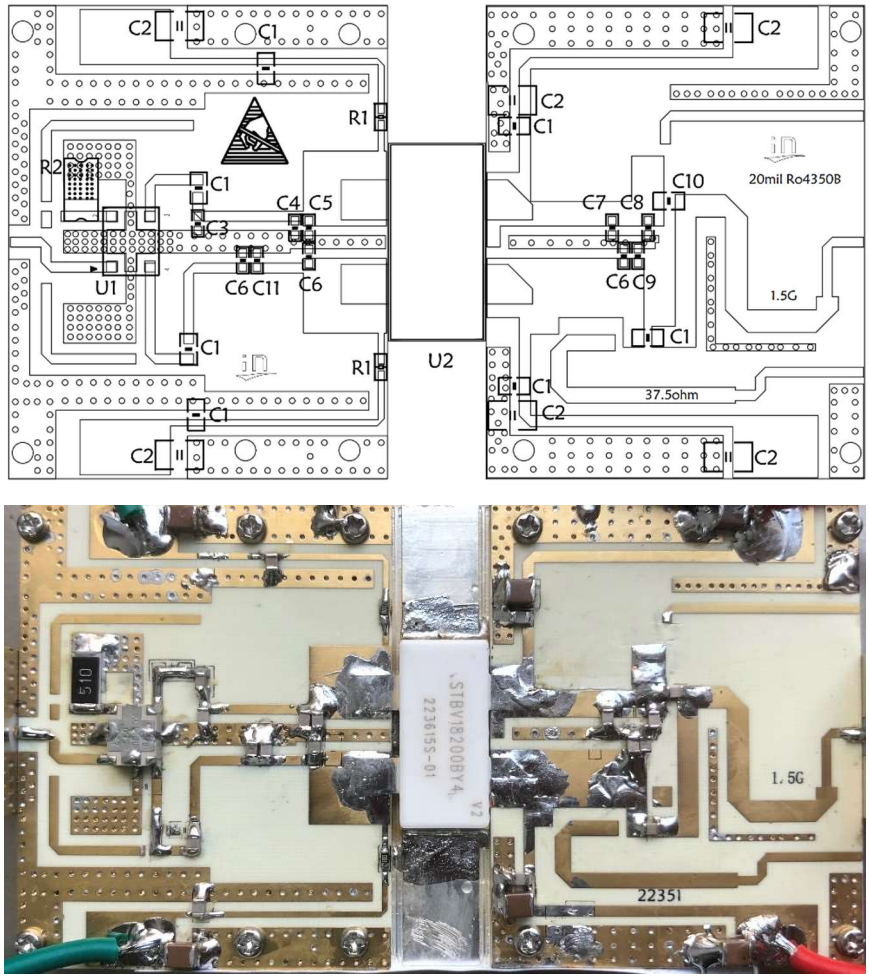
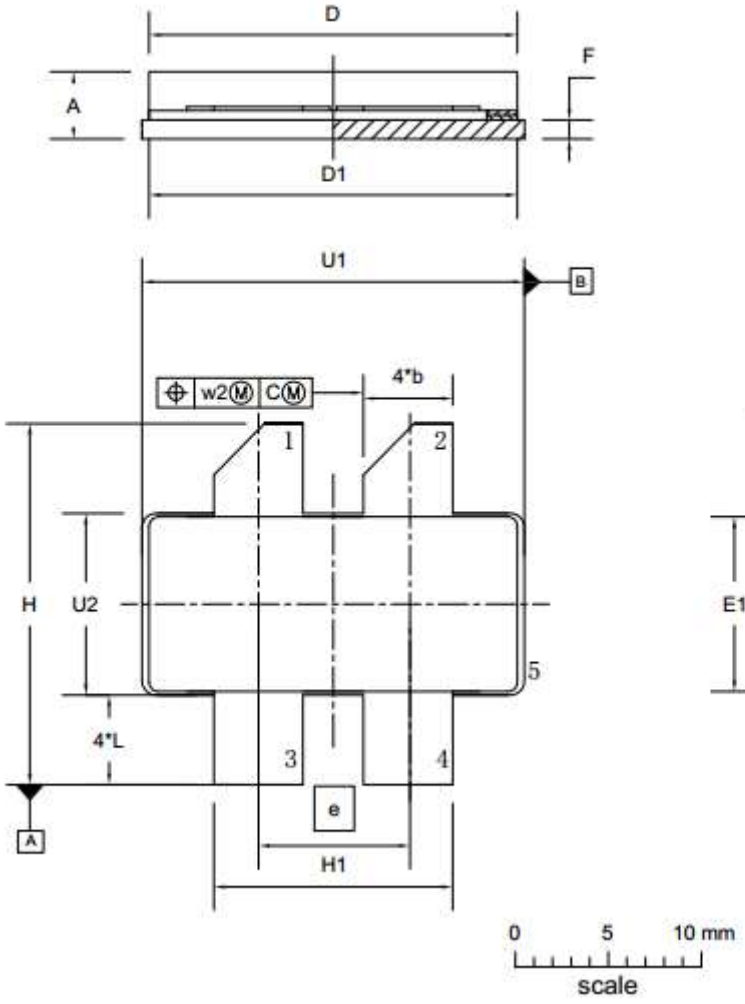


Table 4. Bill of materials of application board (PCB layout upon request, RO4350B 30mils)

Quantity	Reference	Value	PCB Footprint	Part number
2	R1	10ohm	R0603	
1	R2	51ohm	R2512	
7	C1	20pF	C0805	GQM1875G2E200GB12
6	C2	10uF/100V	C1210	
2	C3,C11	0.8pF	C0603	GQM1875G2E0R8BB12
1	C4	0.5pF	C0603	GQM1875G2E0R5BB12
1	C5	2.7pF	C0603	GQM1875C2E2R7BB12
3	C6	1pF	C0603	GQM1875G2E1R0BB12
1	C7	1.3pF	C0603	GQM1875G2E1R3BB12
1	C8	1.2pF	C0603	GQM1875G2E1R2BB12
1	C9	2.4pF	C0603	GQM1875C2E2R4BB12
1	C10	18pF	C0603	GQM1875G2E180GB12
1	U1	XC1400P-03S	250X200	XC1400P-03S
1	U2	STBV18200BY4	BY4	STBV18200BY4

Earless Flanged Ceramic Package; 4 leads



Drain		Gate		Source
1	2	3	4	5

UNIT	A	b	c	D	D_1	e	E	E_1	F	H	H1	L	Q	U_1	U_2	W_1	W_2
mm	4.72 3.43	4.67 4.93	0.15 0.08	20.02 19.61	19.96 19.66	7.90	9.50 9.30	9.53 9.25	1.14 0.89	19.94 18.92	12.98 12.73	5.33 4.32	1.70 1.45	20.70 20.45	9.91 9.65	0.25	0.51
inches	0.186 0.135	0.194 0.184	0.006 0.003	0.788 0.772	0.786 0.774	0.311	0.374 0.366	0.375 0.364	0.045 0.035	0.785 0.745	0.511 0.501	0.210 0.170	0.067 0.057	0.815 0.805	0.390 0.380	0.01	0.02

OUTLINE VERSION	REFERENCE			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
PKG-B4					03/12/2013

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2022/9/7	**V1.0**	**Preliminary Datasheet Creation**

Application data based on: ZBB-22-09

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