



Gallium Nitride 50V, 350W,0.6-1GHz RF Power Transistor

Description

The STBV10350BY4 is a 350watt Doherty pair capable, GaN HEMT, ideal for for 4G/5G cellular applications from 0.6 to 1GHz..

It can be configured as asymmetrical Doherty delivering 45-55W average power, according to normal 8-9dB back off.

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

- Typical RF performance on 758-803MHz Doherty

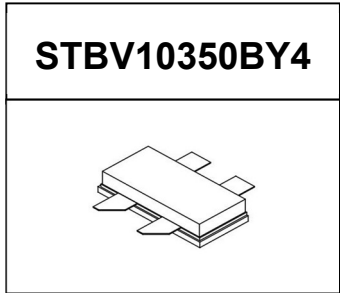
V_{DD} = 50 Vdc, I_{DQ_main} = 300mA, V_{gs_peak}=-6V,

Pulse condition: 100us 10%

Freq (MHz)	P5dB (dBm)	P5dB (W)	P5dB Eff(%)	P1dB Gain(dB)
758	55.88	387.23	82.04	18.08
781	55.62	364.71	82.13	18.33
803	55.60	362.94	85.15	17.86

Typical WCDMA 1 carrier performance

Freq (MHz)	Pout (dBm)	CCDF (dB)	ACPR (dBc)	Gain (dB)	Efficiency (%)
758	47.44	7.64	-26.74	16.43	70.2
781	47.48	8.02	-28.12	17.07	69.2
803	47.48	8.08	-30.70	16.57	68.3



Applications

- Asymmetrical Doherty amplifier within 0.6-1GHz
- UHF TV
- P 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)

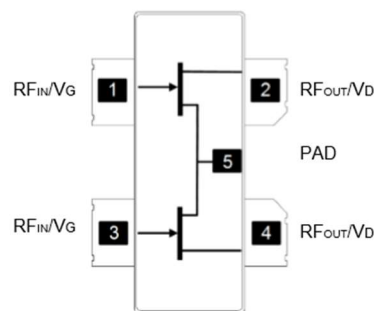




Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{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 $P_d = 25\text{W}$, on Doherty application board	$R_{\theta JC}$	2	°C /W

Table 3. Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	800MHz, $P_{out} = 55\text{W}$ pulse CW for All phase, No device damages	VSWR		10:1		

Figure 2: Median Lifetime vs. Channel Temperature

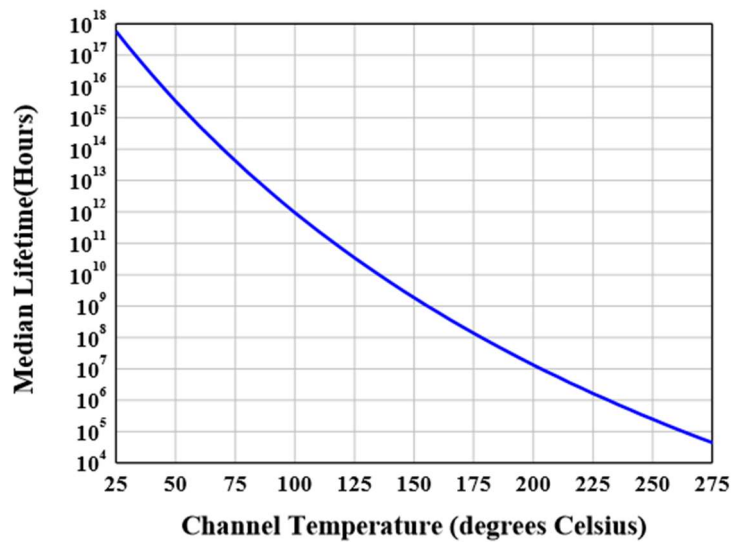




Figure 3: Efficiency and power gain as function of Pout (758-803MHz Doherty)

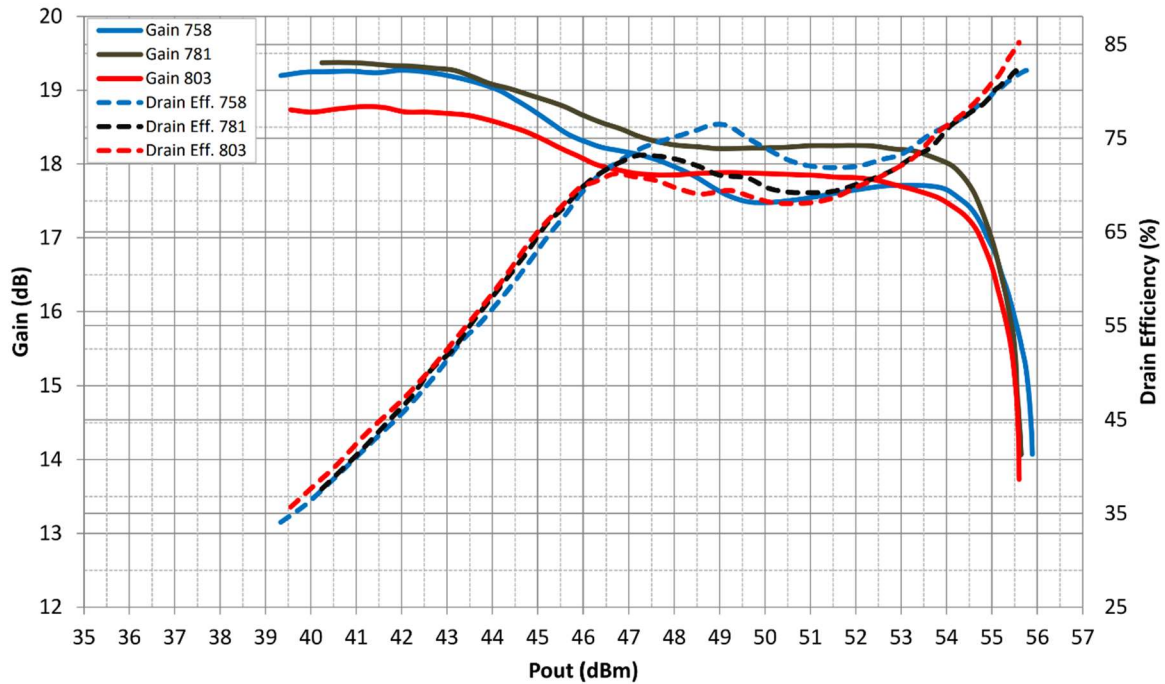


Figure 4: Network analyzer output, S11 and S21 (758-821MHz Doherty)

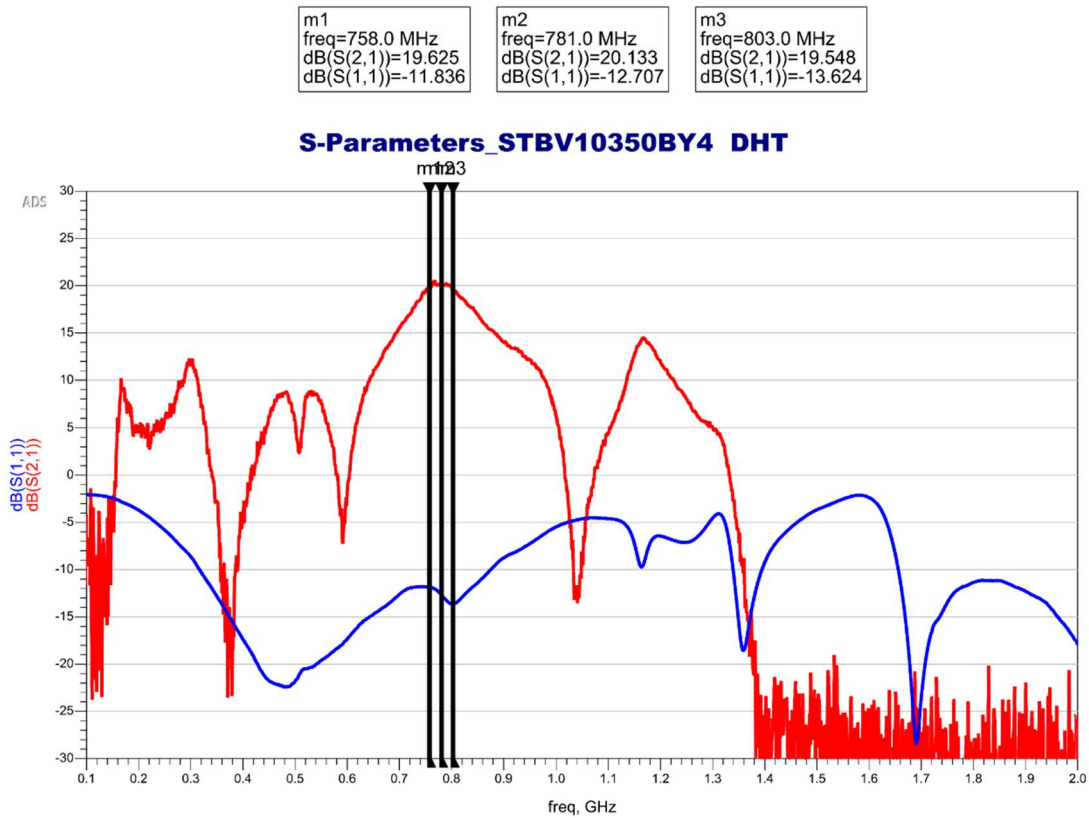


Figure 5: Picture of application board Doherty circuit for 758-803MHz

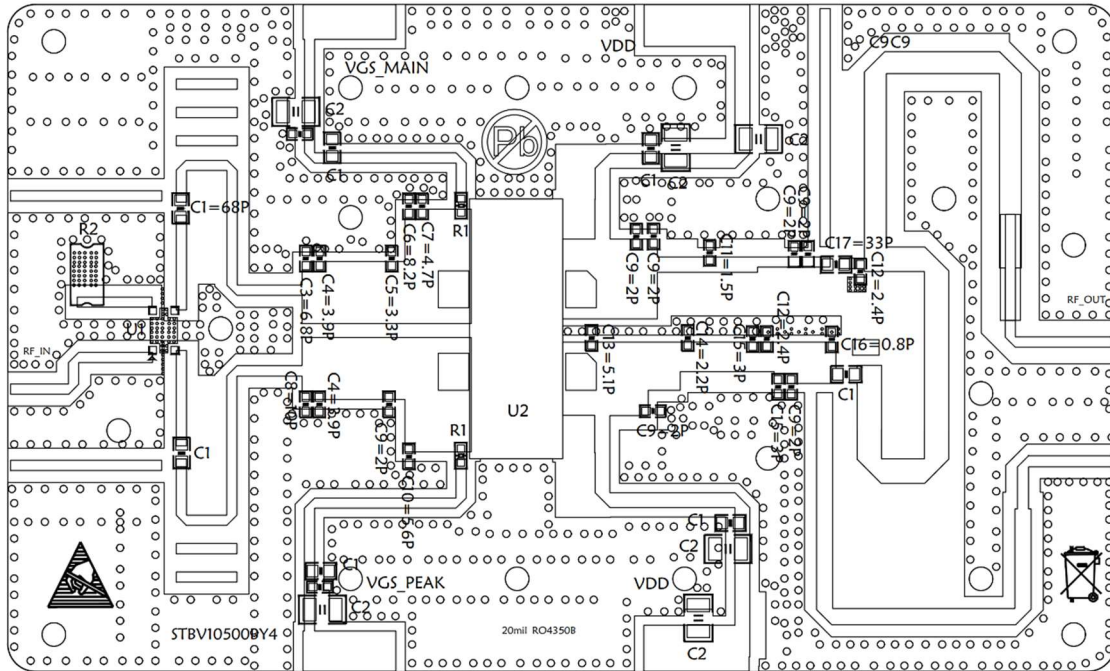
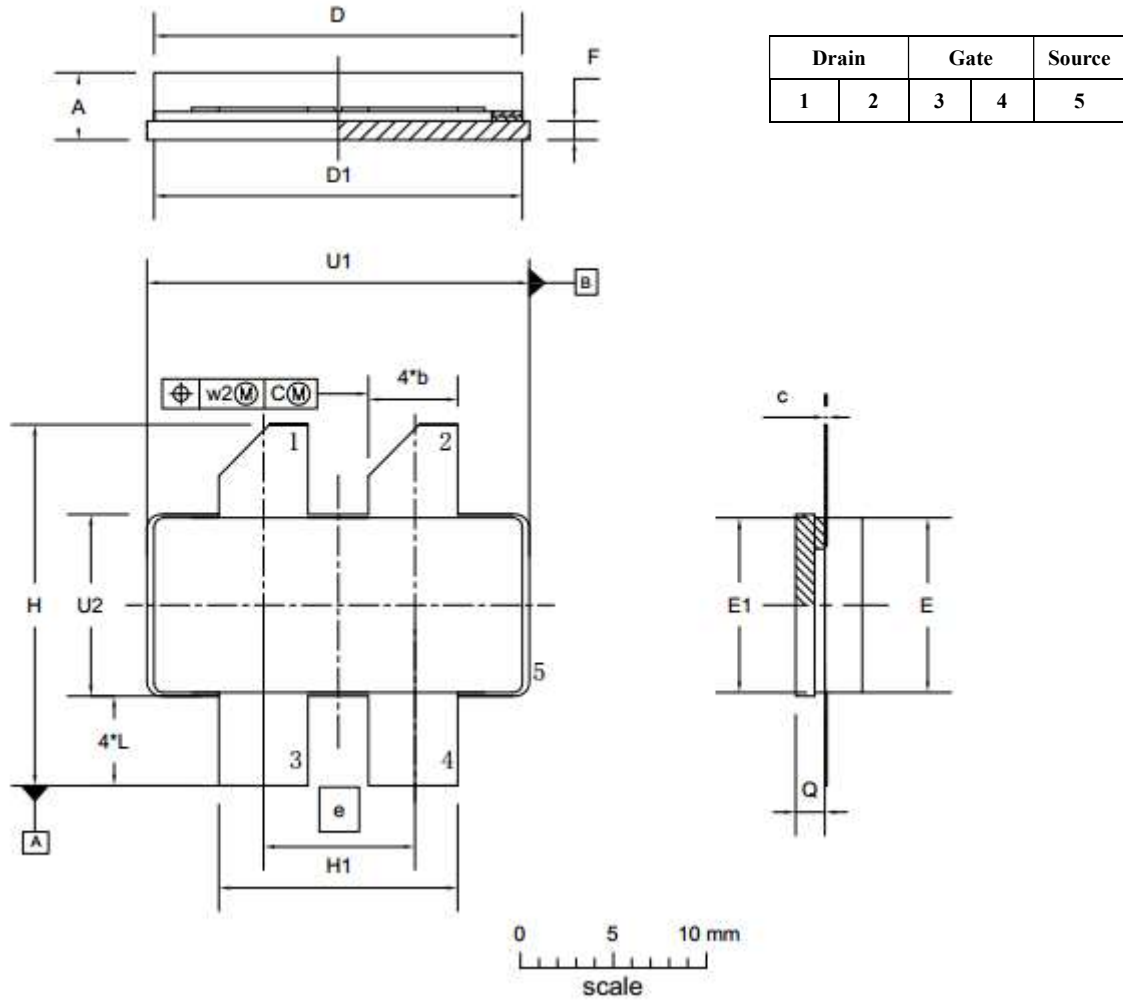


Table 4. Bill of materials of application board (PCB layout upon request, RO4350B 20mils)

Reference	Footprint	Value	Quantity
C1	0805	68pF/250V	7
C2	1210	10uF/100V	6
C3	0805	6.8pF/250V	1
C4	0805	3.9pF/250V	2
C5	0805	3.3pF/250V	1
C6	0805	8.2pF/250V	1
C7	0805	4.7pF/250V	1
C8	0805	10pF/250V	1
C9	0805	2.0pF/250V	7
C10	0805	5.6pF/250V	1
C11	0805	1.5pF/250V	1
C12	0805	2.4pF/250V	1
C13	0805	5.1pF/250V	1
C14	0805	2.2pF/250V	1
C15	0805	3.0pF/250V	2
C16	0805	0.8pF/250V	1
C17	0805	33pF/250V	1
R1	0603	10R	2
R2	2512	51R	1
U1	3.18*5.08mm	X3C07F1-02S	1
U2	BY4	STBV10350BY4	1



Earless Flanged Ceramic Package; 4 leads



UNIT	A	b	c	D	D ₁	e	E	E ₁	F	H	H ₁	L	Q	U ₁	U ₂	W ₁	W ₂
mm	4.72	4.67	0.15	20.02	19.96	7.90	9.50	9.53	1.14	19.94	12.98	5.33	1.70	20.70	9.91	0.25	0.51
	3.43	4.93	0.08	19.61	19.66		9.30	9.25	0.89	18.92	12.73	4.32	1.45	20.45	9.65		
inches	0.186	0.194	0.006	0.788	0.786	0.311	0.374	0.375	0.045	0.785	0.511	0.210	0.067	0.815	0.390	0.01	0.02
	0.135	0.184	0.003	0.772	0.774		0.366	0.364	0.035	0.745	0.501	0.170	0.057	0.805	0.380		

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
2022/10/11	V1.0	Preliminary Datasheet Creation

Application data based on:ZBB-22-13

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