



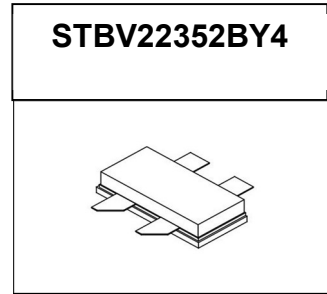
GaN HEMT 50V, 350W, 1.8-2.2GHz RF Power Transistor

Description

The STBV22352BY4 is a dual path 350watt , Input matched GaN HEMT, ideal for applications from 1.8 to 2.2GHz especially for LTE/5G

- Typical WCDMA 1C performance on 2.1GHz asymmetrical Doherty with device soldered
VDS= 50V, IDQ=50mA(Vgm=-3.3V, Vgp=-5.50V)

Freq (MHz)	Pout (dBm)	Psat (W)	ACPR (dBc)	Gain (dB)	Eff (%)
2110	47.60	383.40	-27.54	15.64	62.42
2140	47.60	382.69	-30.04	15.41	62.14
2170	47.60	367.91	-32.62	16.01	60.74



Applications

- Asymmetrical Doherty amplifier within 1.8-2.2GHz
- Sub-2GHz power amplifier
- CW or pulsed 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)

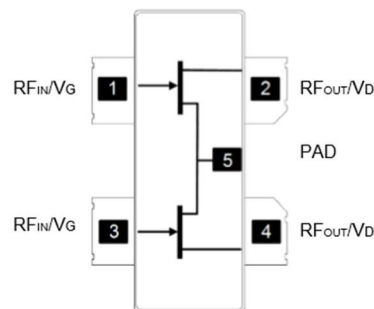


Table 1. Maximum Ratings

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	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°C, at Pd=50W, on Doherty application board	R _{θJC}	1.8	°C /W

Table 3. Electrical Characteristics (TA = 25°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	VGS=-8V; IDS=16.8mA	V _{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 16.8mA	V _{GS(th)}	-4		-2	V
Gate Quiescent Voltage	VDS =50V, IDS=130mA, Measured in Functional Test	V _{GS(Q)}		-3.23		V

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

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	VGS=-8V; IDS=30mA	V _{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 30mA	V _{GS(th)}	-4		-2	V
Gate Quiescent Voltage	VDS =50V, IDS=130mA, Measured in Functional Test	V _{GS(Q)}		-3.4		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	2.14GHz, Pout=55W WCDMA 1 Carrier in Doherty circuit All phase, No device damages	VSWR		10:1		

Figure 2: Median Lifetime vs. Channel Temperature

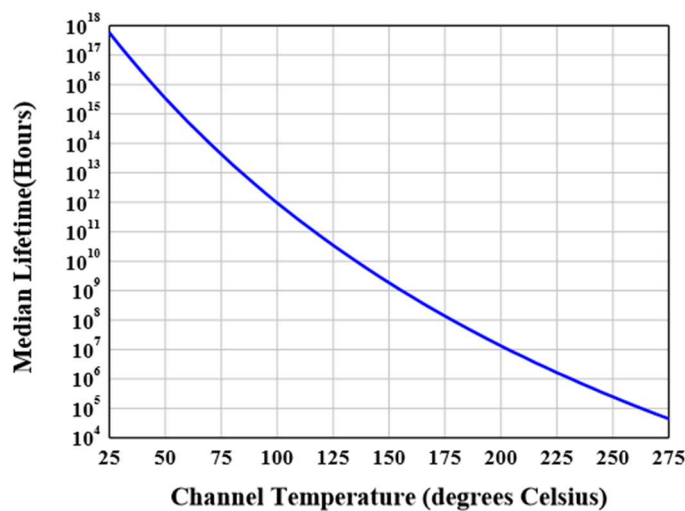




Figure 3: Efficiency and power gain as function of Pout (2.1-2.2GHz Doherty)

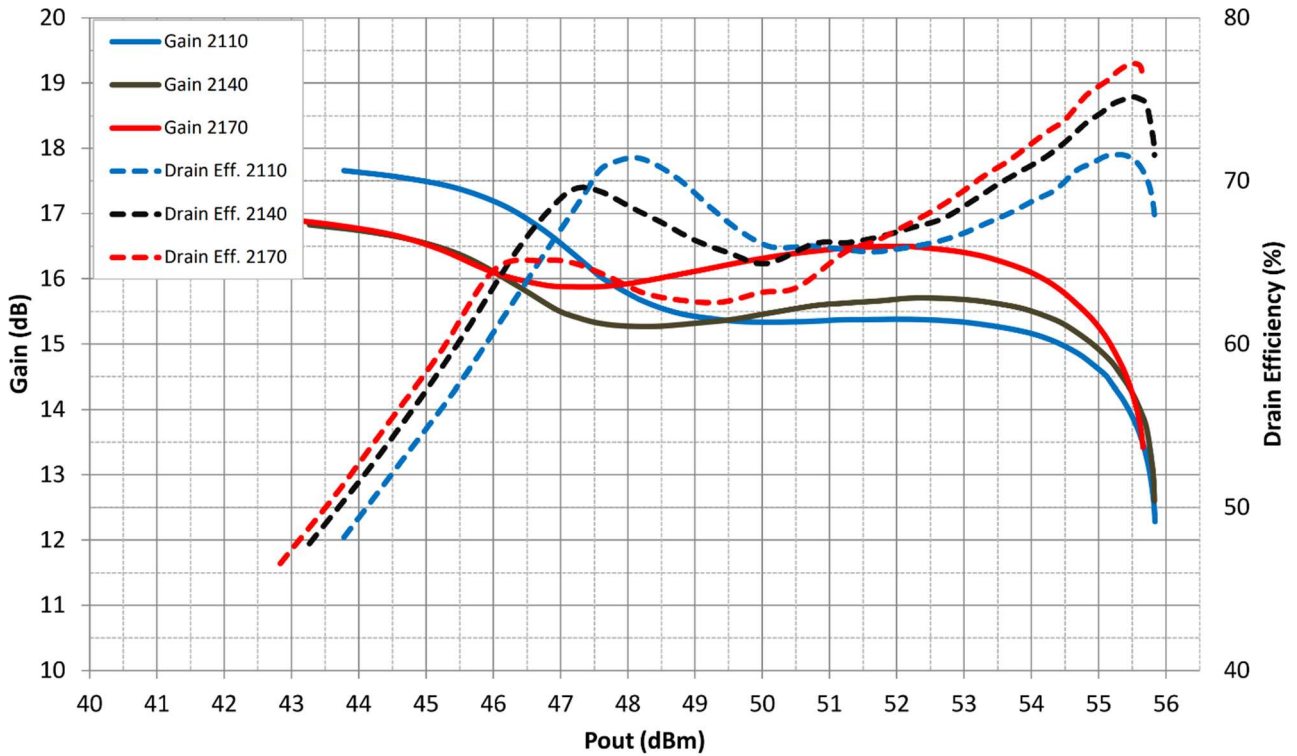


Figure 4: Network analyzer output, S11 and S21 (2.1-2.2GHz Doherty)

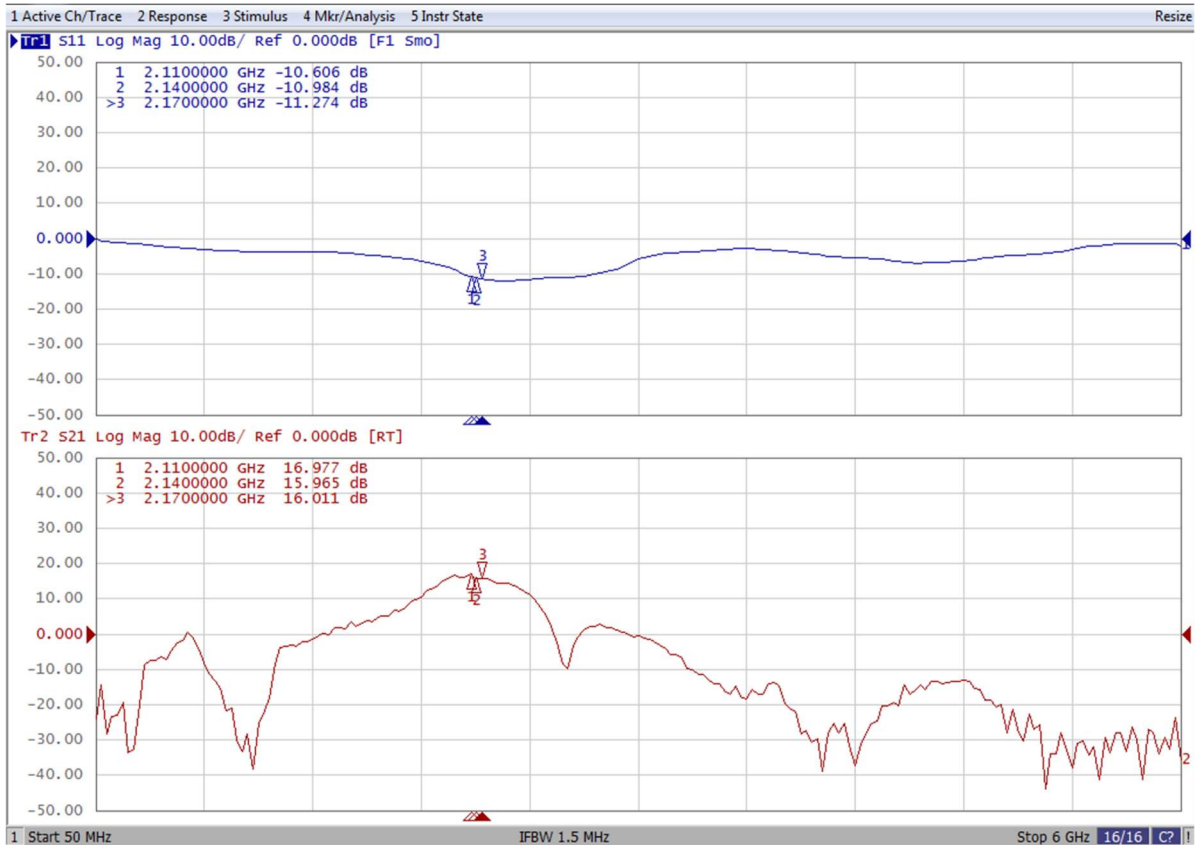


Figure 5: Picture of application board Doherty circuit for 2.1-2.2GHz

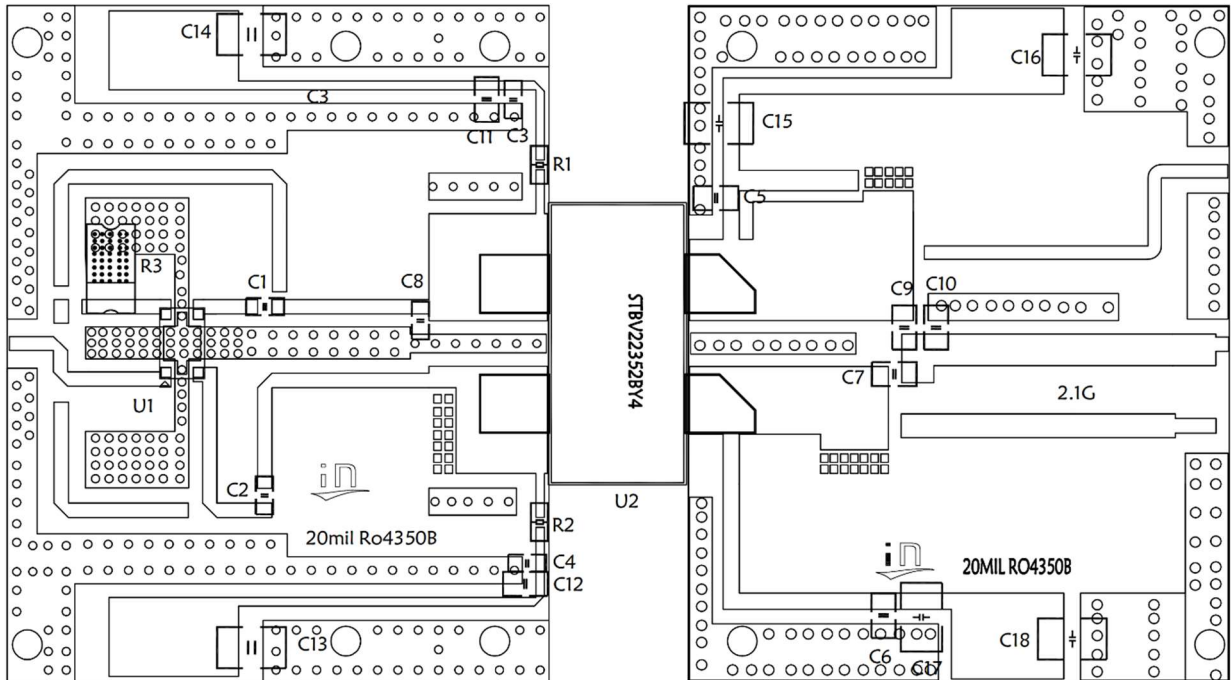
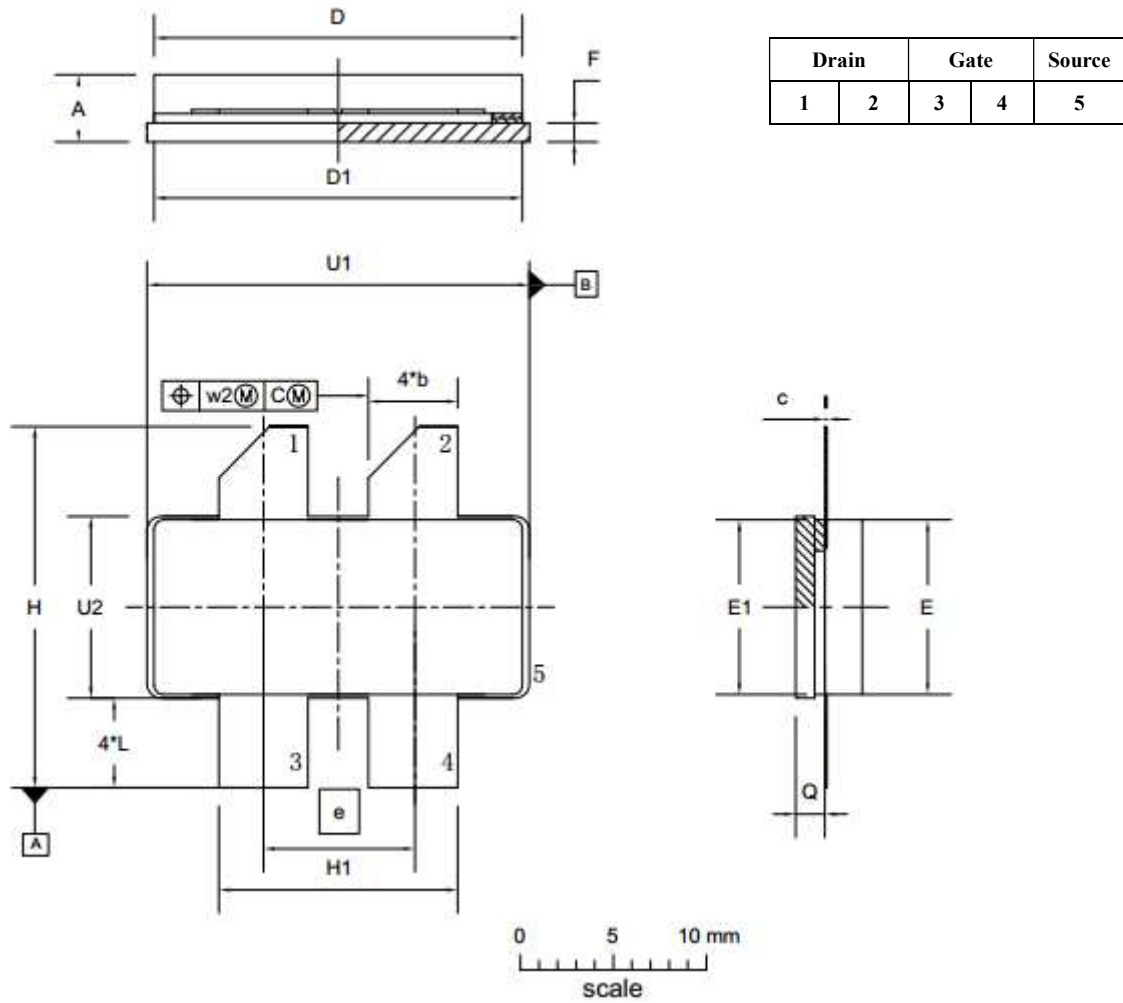


Table 4. Bill of materials of application board (PCB layout upon request, RO4350B 20mils)

Reference	Footprint	Value	Quantity
C1	0603	10pF/250V	1
C2, C3, C4, C5, C6, C7	0603	20pF/250V	6
C8	0603	1.0pF/250V	1
C9	0603	2.4pF/250V	1
C10	0603	0.2pF/250V	1
C11, C12	0805	1nF/50V	2
C13, C14, C15, C16, C17, C18	1210	10uF/100V	6
R1, R2	0603	10R	2
R3	2512	50R	1
U1	5.08*3.18mm	X3C20F1-02S	1
U2	BY4	STBV22352BY4 ^{v0}	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
2024/4/8	V1.0	Preliminary Datasheet Creation

Application data based on: LSM-23-17/ZBB-24-11

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