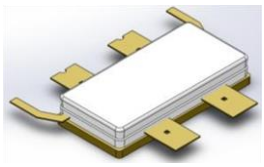
Gallium Nitride 50V, 200W,3.4-3.8GHz RF Power Transistor

Description

STBV38200B4VC



The STBV38200B4VC is a 200-watt, internally matched GaN HEMT, designed for 5G cellular applications with frequencies from 3.4-3.8GHz, **enabled by wide band VBW capability to support IBW up to 200MHz.**.

It can be configured as asymmetrical Doherty for 5G application, delivering 25W average power, according to normal 9dB back off.

There is no guarantee of performance when this part is used in applications designed Outside of these frequencies.

- Typical Doherty Pulsed CW and 1C W--CDMA Characterization Performance :

VDS= 50V, IDQ-main=140 mA Vgs-main=-3.27V. Vgs-peak=-4.9V

Freq (GHz)	Pulse CW Signal(1)				P_{avg}=44.5dBm WCDMA Signal(2)		
	P3 (dBm)	P3 (W)	P3.5 (dBm)	P3.5 (W)	Gp (dB)	η_D (%)	$ACPR_{5M}$ (dBc)
3.4	50.62	13.40	53.24	211	13.60	50.10	-28.50
3.5	49.55	13.78	53.16	207	13.77	50.30	-30.25
3.6	49.88	19.99	53.15	206	13.99	49.50	-32.57
3.7	51.86	13.96	53.27	212	13.96	48.60	-33.46
3.8	52.62	13.55	53.01	200	14.18	48.68	-30.05

Applications

- Asymmetrical Doherty amplifier within N78 5G band
- S 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

Pin Connection definition

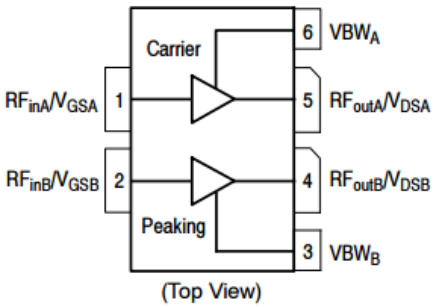


Table 1. Maximum Ratings

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, Pout=30W,	$R_{\theta JC}$	2.2	°C /W

Table 3. Electrical Characteristics (TA = 25℃ 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=10mA	V_{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 10mA	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	VDS =50V, IDS=75mA, Measured in Functional Test	$V_{GS(Q)}$		-3		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=17mA	V_{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 17mA	$V_{GS(th)}$	-4		-2	V
Gate Quiescent Voltage	VDS =50V, IDS=100mA, Measured in Functional Test	$V_{GS(Q)}$		-3		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	3.6GHz, Pout=25W WCDMA 1 Carrier in Doherty circuit All phase, No device damages	VSWR		10:1		

Typical RF performance

Figure 1：Gain，Eff as function of Pout under Pulsed CW condition

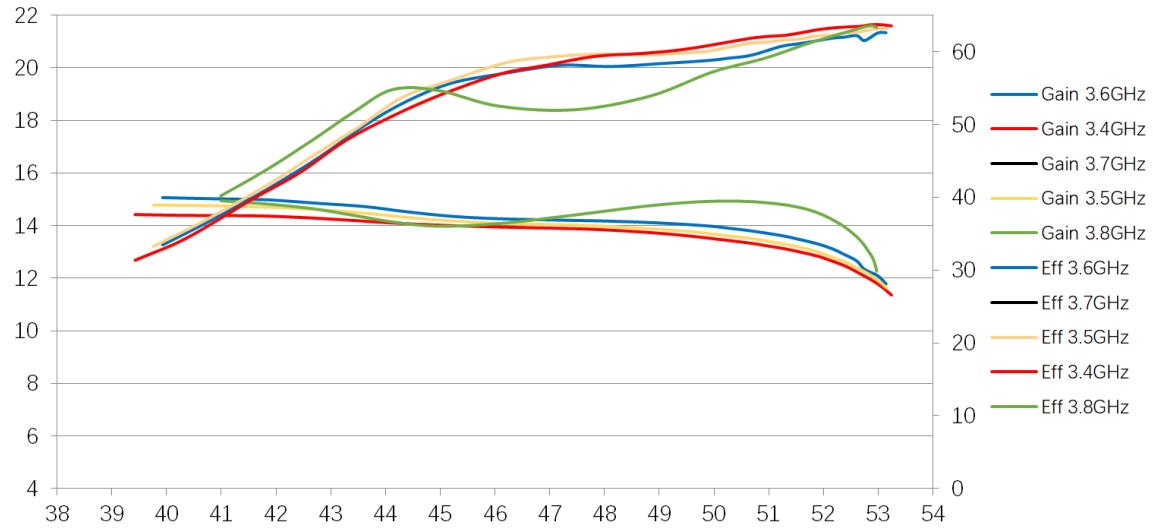


Figure 2: Network analyzer output, S11 S21 Curve Picture

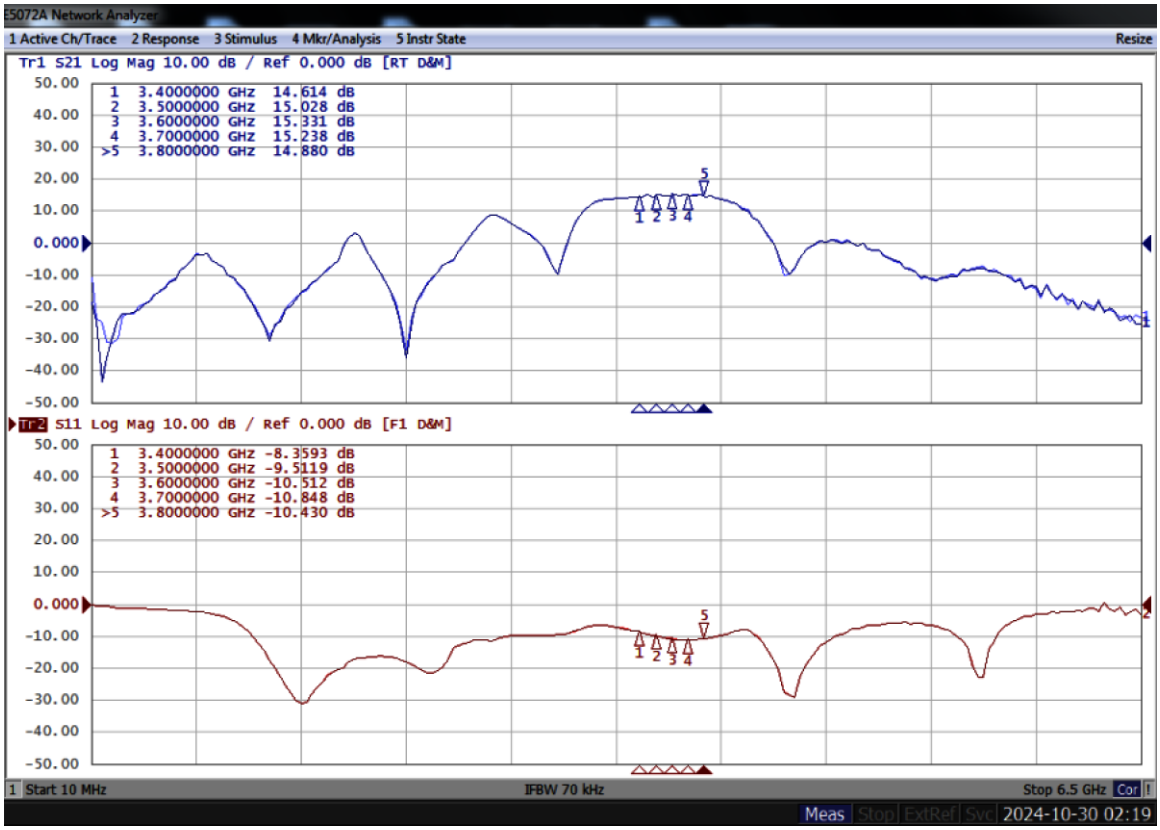
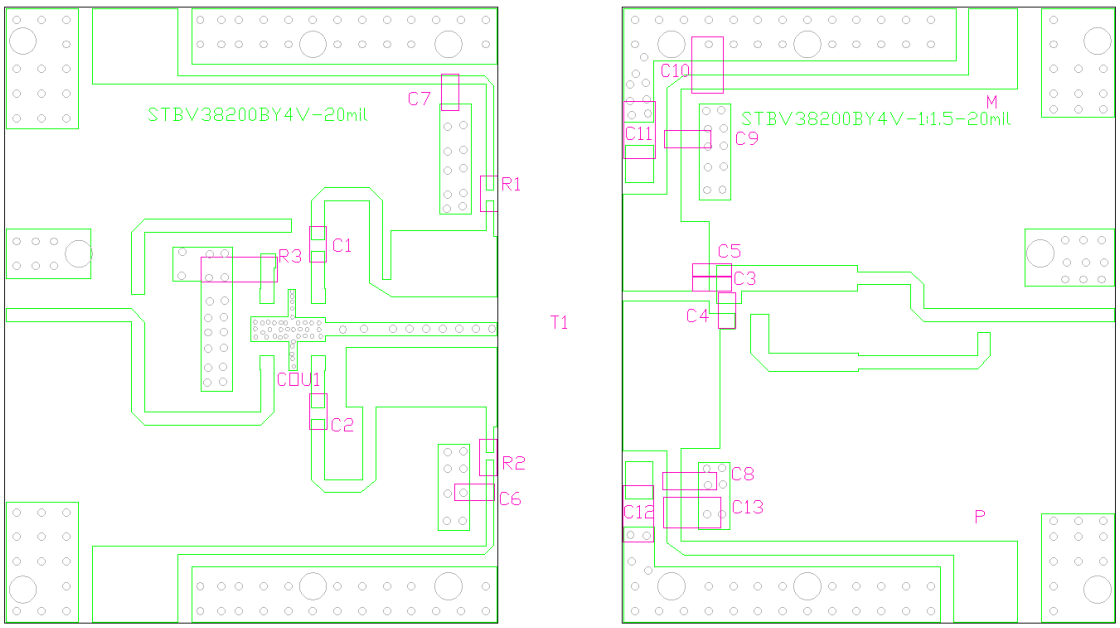
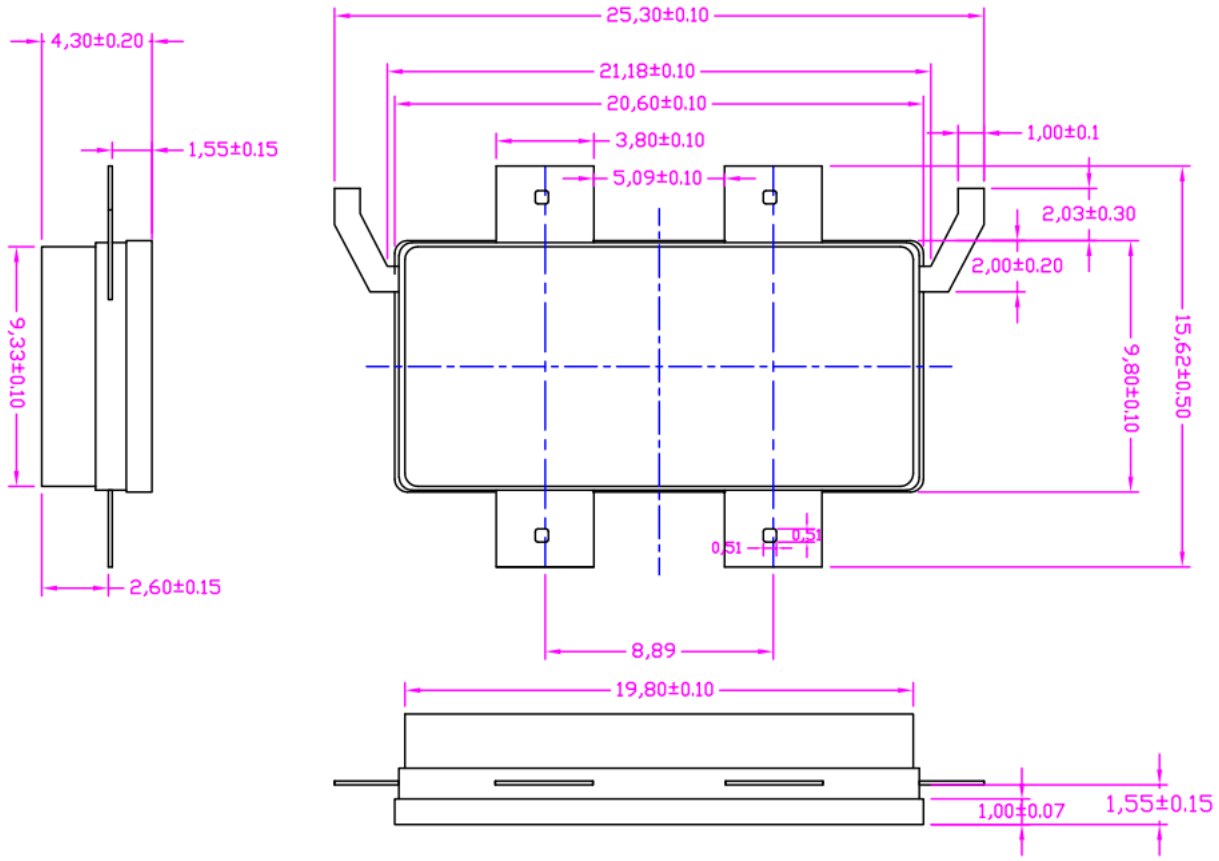


Figure 3: Picture of application board Doherty circuit



Test Board Bom				
Part	**Quantity**	**Description**	**Part Number**	**Manufacture**
C1,C2,C6, C7,C8,C9	6	8.2pFHigh Q Capacitor	251SHS8R2BSE	TEMEX
C3,C5	2	1.2pFHigh Q Capacitor	ATC600S1R8	ATC
C10,C11,C12,C13	4	10uF MLCC	GRM32EC72A106ME05	Murata
C4	1	2.4pFHigh Q Capacitor	251SHS2R4BSE	TEMEX
R1,R2	2	10Ω Power Resistor	ESR03EZPF10R0	ROHM
R3	1	51Ω Power Resistor	RFR50-20CT0421B	YT
COUT1	1	2 dB Bridge	X3C35F1-02S	ANAREN
T1	1	200W GaN Dual Transistor	STBV38200B4VC	Innogration

Earless Flanged Ceramic Package; 6 leads- B4VC



Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2024/8/30	V1.0	Objective Datasheet Creation
2024/10/24	V1.0	Preliminary datasheet creation

Application data based on LWH-24-36

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