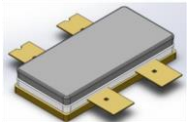
GaN HEMT 50V, 280W,791-960MHz full band Doherty Transistor

STBV10W280B4C



Description

The STBV10W280B4C is a 280 watt capable, GaN HEMT, ideal for for 4G/5G cellular applications from 791 to 960MHz full band Doherty operation.

It can be configured as symmetrical Doherty delivering 30-40W 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 **791-960MHz full band symmetrical Doherty** with device soldered

V_{DS}= 50V, I_{DQM}=100mA(VgsM=-3.32V), VgsP=-5.2V

Freq (MHz)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)	P1dB Gain(dB)	P5dB (dBm)	P5dB (W)	P5dB Eff(%)
791	53.73	235.9	60.3	20.77	54.4	275.2	60.9
833	54.17	261.0	64.6	22.16	54.94	312.0	64.9
875	54.17	261.4	69.0	21.75	54.41	275.8	65.6
918	54.65	291.8	72.9	21.98	54.58	286.9	68.8
960	53.75	237.0	75.7	20.17	54.53	283.5	79.0

46.5dBm_1C-WCDMA							
Freq (MHz)	Pout (dBm)	CCDF (dB)	Ppeak (dBm)	Ppeak (W)	ACPR (dBc)	Gain (dB)	Efficiency (%)
791	46.48	7.74	54.22	264.0	-29.1	20.4	51.3
833	46.50	8.37	54.87	307.2	-28.6	21.1	53.3
875	46.49	8.36	54.85	305.5	-30.8	21.3	53.8
915	46.47	8.70	55.17	329.2	-36.1	20.4	50.5
960	46.47	8.61	55.08	322.2	-36.1	19.8	50.3

Applications

- symmetrical wideband 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

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	33.6	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=35W, on Doherty application board	$R_{\theta JC}$	3	°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=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=100mA, Measured in Functional Test	$V_{GS(Q)}$		-3.2		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=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=100mA, Measured in Functional Test	$V_{GS(Q)}$		-3.2		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	960MHz, Pout=40W WCDMA 1 Carrier in Doherty circuit All phase, No device damages	VSWR		10:1		

Figure 2: Network analyzer output, S11 and S21

V_{DS}= 50V, I_{DQM}=100mA(VgsM=-3.32V), VgsP=-5.8V

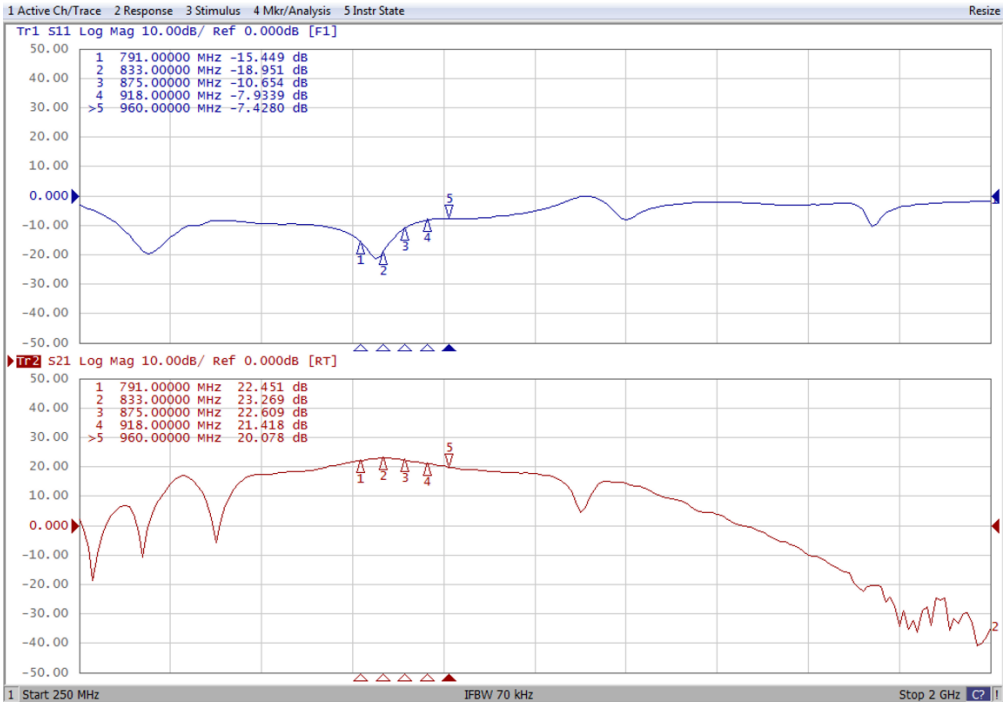


Figure 3: Efficiency and power gain as function of Pout

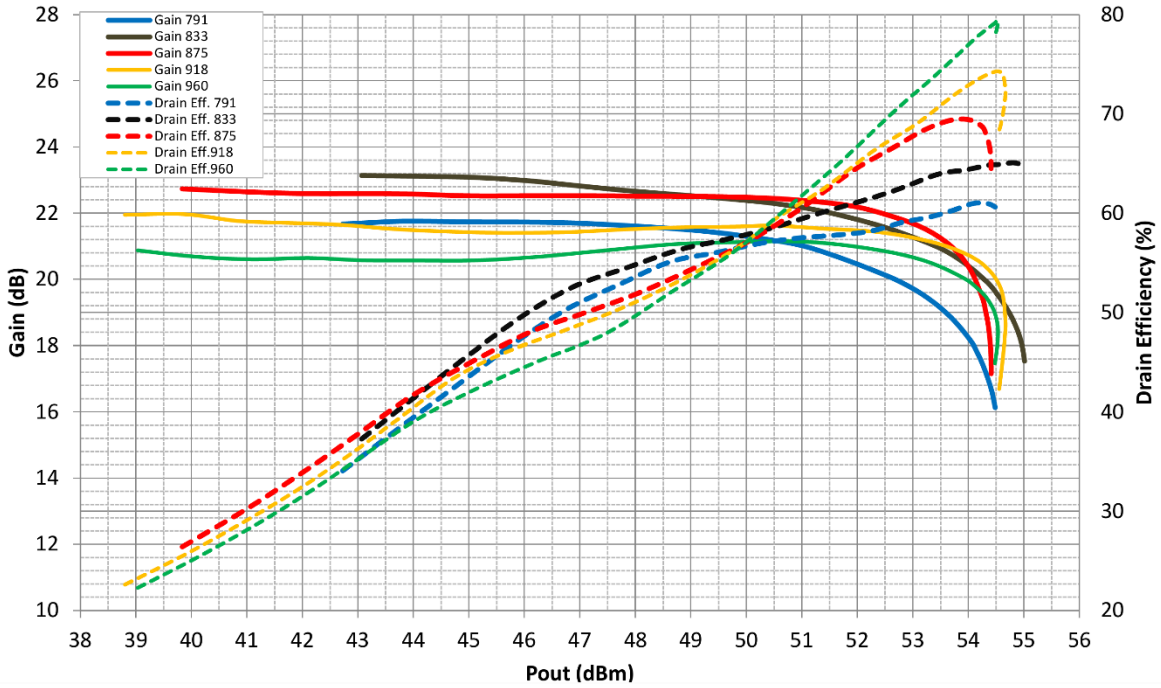
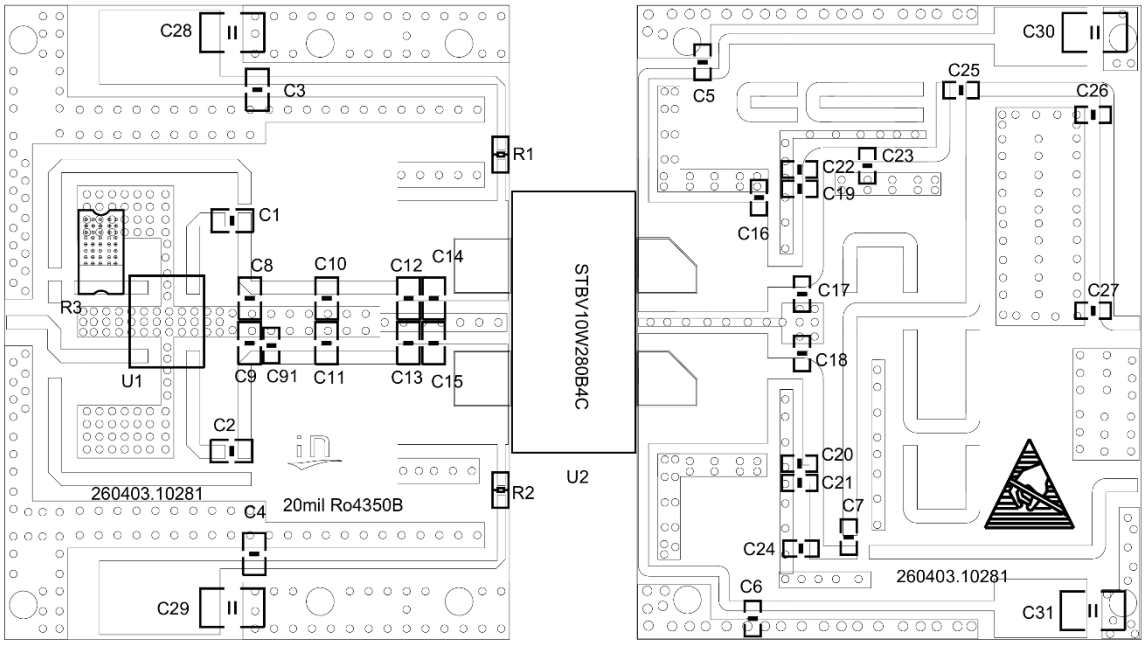


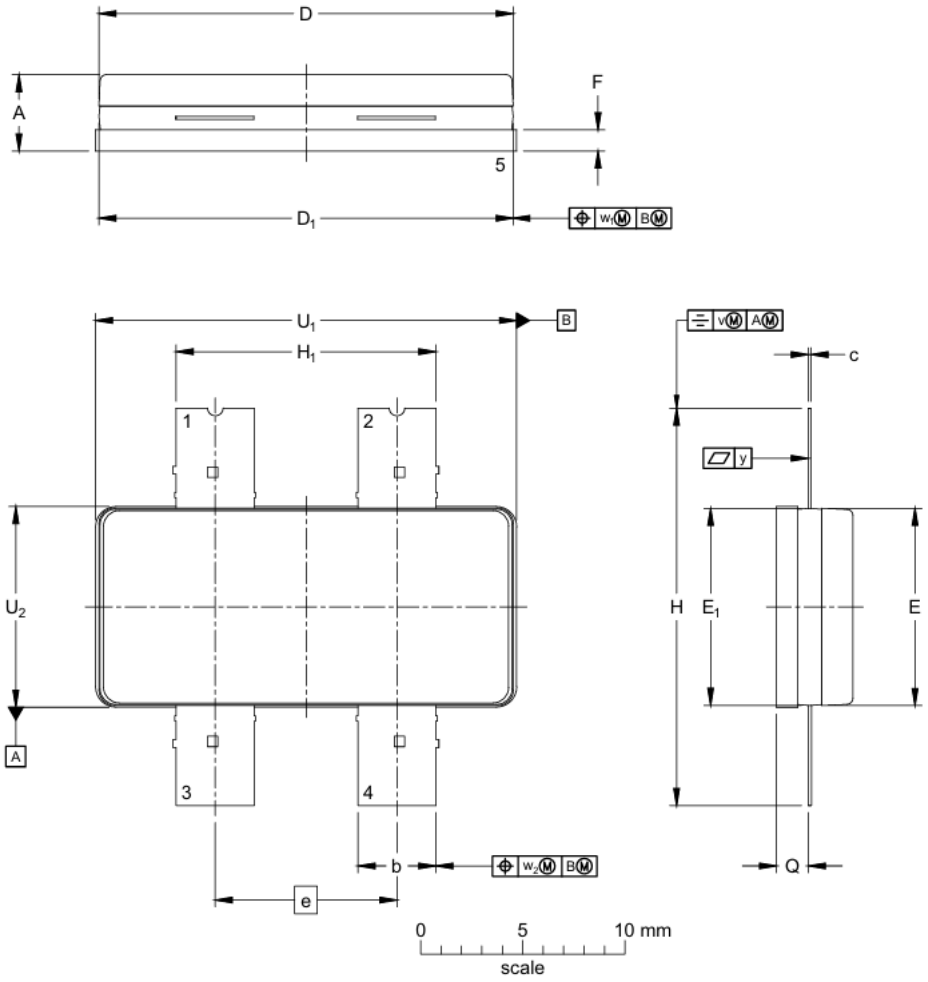
Figure 4: Picture of application board Doherty circuit



BOM of Test Circuit

Reference	Footprint	Value	Quantity
C1, C2, C3, C4, C5, C6, C7	0603	47pF/250V	7
C8, C9	0603	3.9pF/250V	2
C10, C11, C12, C13, C17, C18, C21, C23, C24	0603	2.0pF/250V	9
C14, C15	0603	12pF/250V	2
C16, C91	0603	1.5pF/250V	2
C19, C20	0603	3.0pF/250V	2
C22	0603	2.2pF/250V	1
C25	0603	9.1pF/250V	1
C26	0603	1.5pF/250V	1
C27	0603	1.8pF/250V	1
C28, C29, C30, C31	0603	10uF/100V	4
R1, R2	0603	10R	2
R3	2512	51R	1
U1	3.18*5.08mm	HC07F03	1
U2	B4C	STBV10W280B4C	1

Earless Flanged Plastic Air Cavity Package; 4 leads



Dimensions

Unit		A	b	c	D	D_1	E	E_1	e	F	H	H_1	$Q^{(1)}$	U_1	U_2	v	w_1	w_2	y
mm	max	4.01	3.91	0.18	20.42	20.37	9.80	9.75		1.14	19.53	12.83	1.68	20.70	9.91	0.50	0.50	0.50	0.10
	nom								8.89										
	min	3.40	3.71	0.13	20.12	20.17	9.50	9.55		0.94	19.33	12.57	1.45	20.50	9.70				

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2026/4/3	**V1.0**	**Preliminary datasheet creation**

Application data based on: ZBB-26-06

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