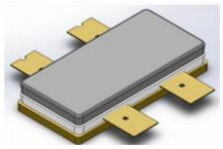
GaN HEMT 50V, 1000W,0.6-1GHz RF Power Transistor

STBV101K0RB4C



Description

The STBV101K0RB4C is a 1000watt Doherty pair capable, GaN HEMT, ideal for for 4G/5G cellular applications up to 1GHz.

It can be configured as asymmetrical Doherty delivering 125-160W 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, Vgs_peak=-5.8V, 1 carrier WCDMA signal PAR=10.5dB

Freq (MHz)	P3dB (dBm)	P3dB (W)	P3dB Eff(%)	P3dB Gain(dB)	P5dB (dBm)	P5dB (W)	P5dB Eff(%)
758	58.13	650.0	70.4	14.65	60.08	1019.2	71.2
780	58.47	703.6	72.3	14.65	60.3	1071.7	73.6
803	58.68	738.5	74.2	13.87	60.09	1021.3	77.5

Freq (MHz)	Pout (dBm)	CCDF (dB)	Ppeak (dBm)	Ppeak (W)	ACPR (dBc)	Gain (dB)	Efficiency (%)
758	51.00	8.21	59.21	832.8	-32.0	16.4	61.9
780	51.00	8.16	59.14	820.8	-30.8	16.7	63.0
803	51.00	8.47	59.45	880.3	-32.6	15.8	62.6

Applications

- Asymmetrical Doherty amplifier within <1GHz
- UHF TV
- P band communication

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)

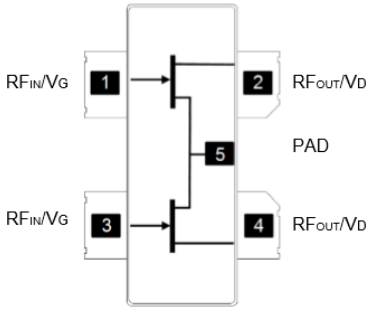


Table 1. Maximum Ratings

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	127	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=80W, on Doherty application board	$R_{\theta JC}$	1.1	°C /W

Table 3. Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	700MHz, Pout=120W pulse CW for All phase, No device damages	VSWR		10:1		

Figure 2: Median Lifetime vs. Channel Temperature

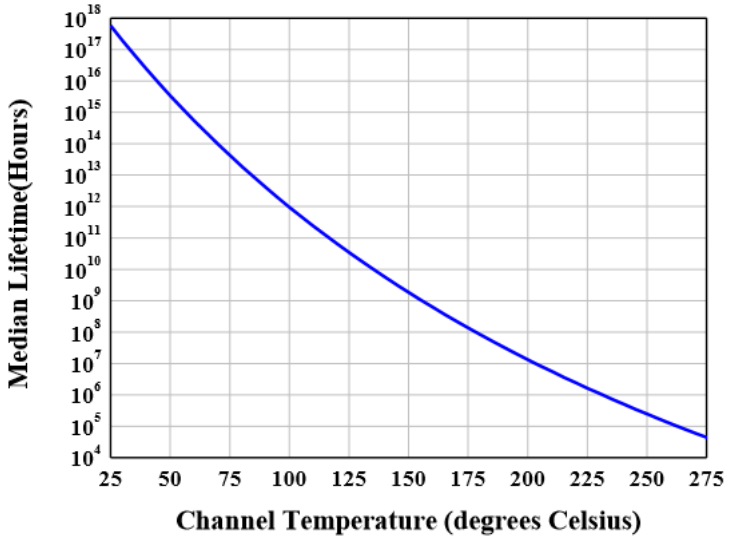


Figure 3: Efficiency and power gain as function of Pout (758-803MHz Doherty)

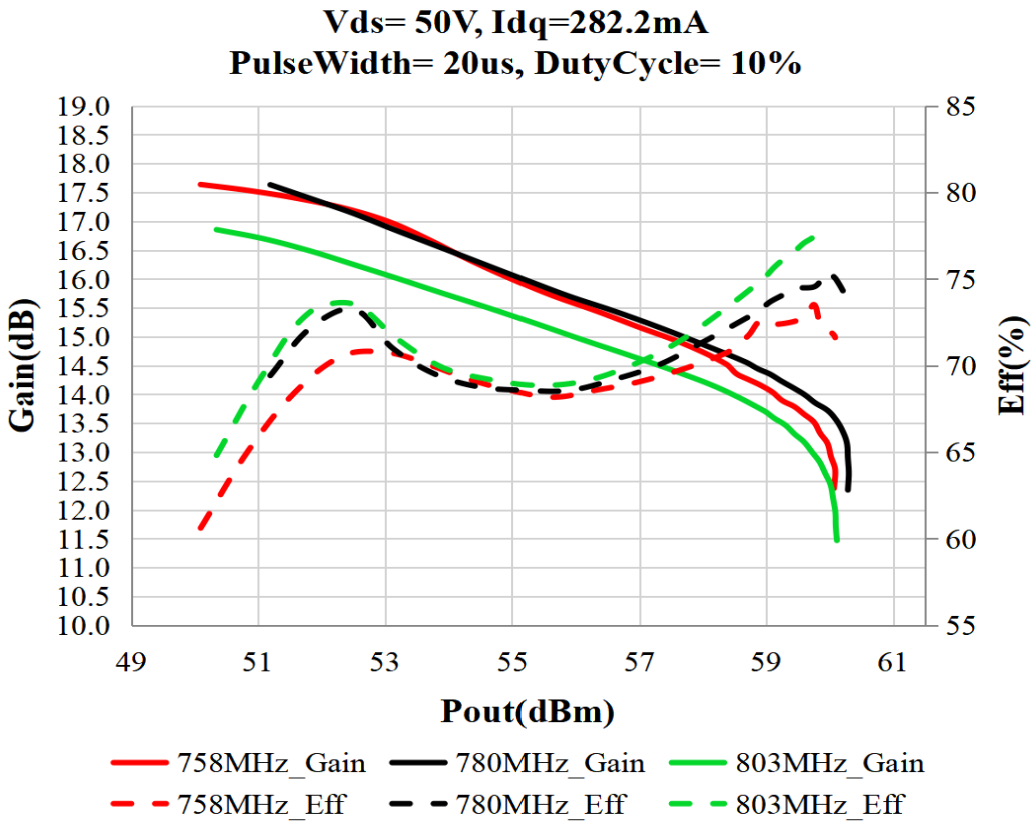


Figure 4: Network analyzer output, S11 and S21 (758-803MHz Doherty)

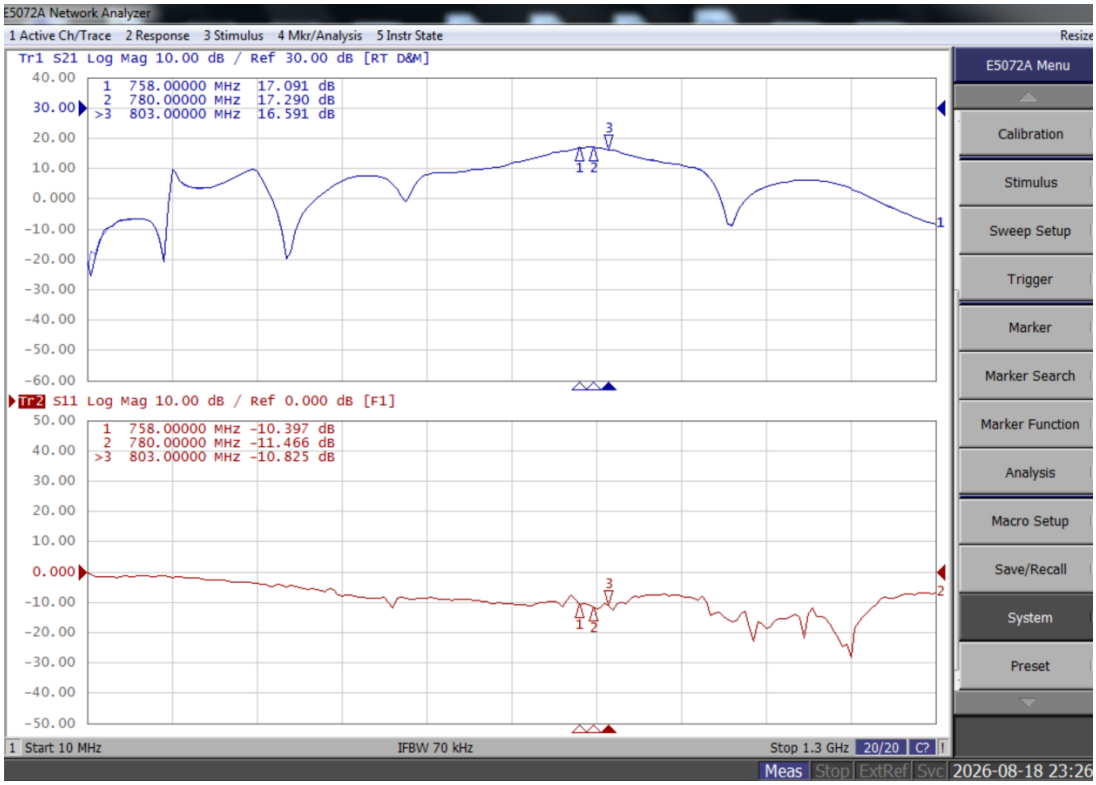


Figure 5: Picture of application board Doherty circuit for 758-803MHz

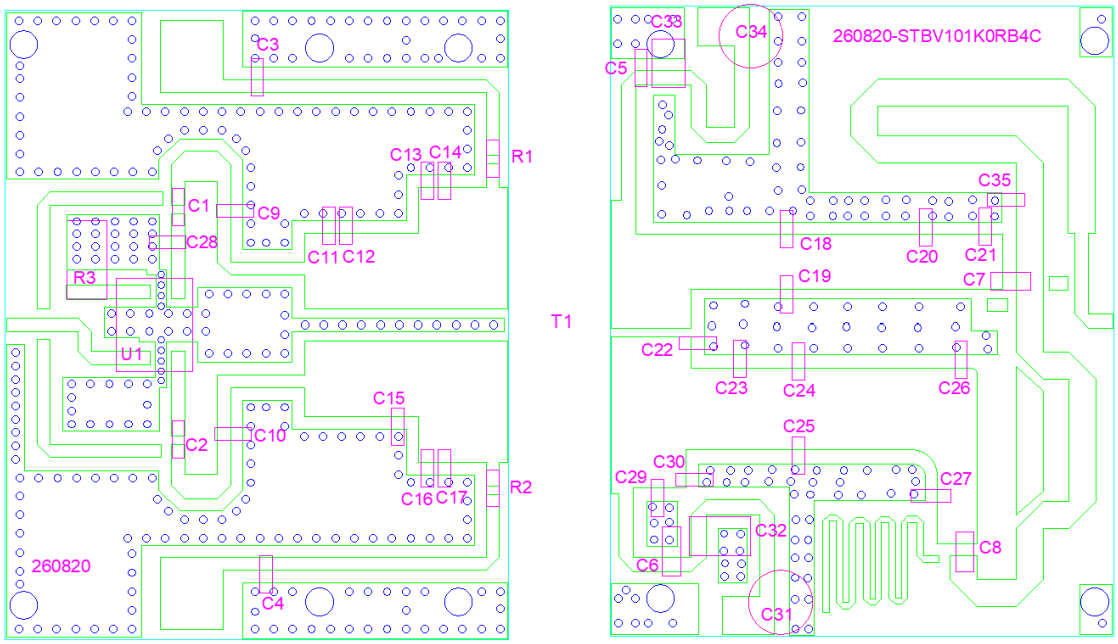
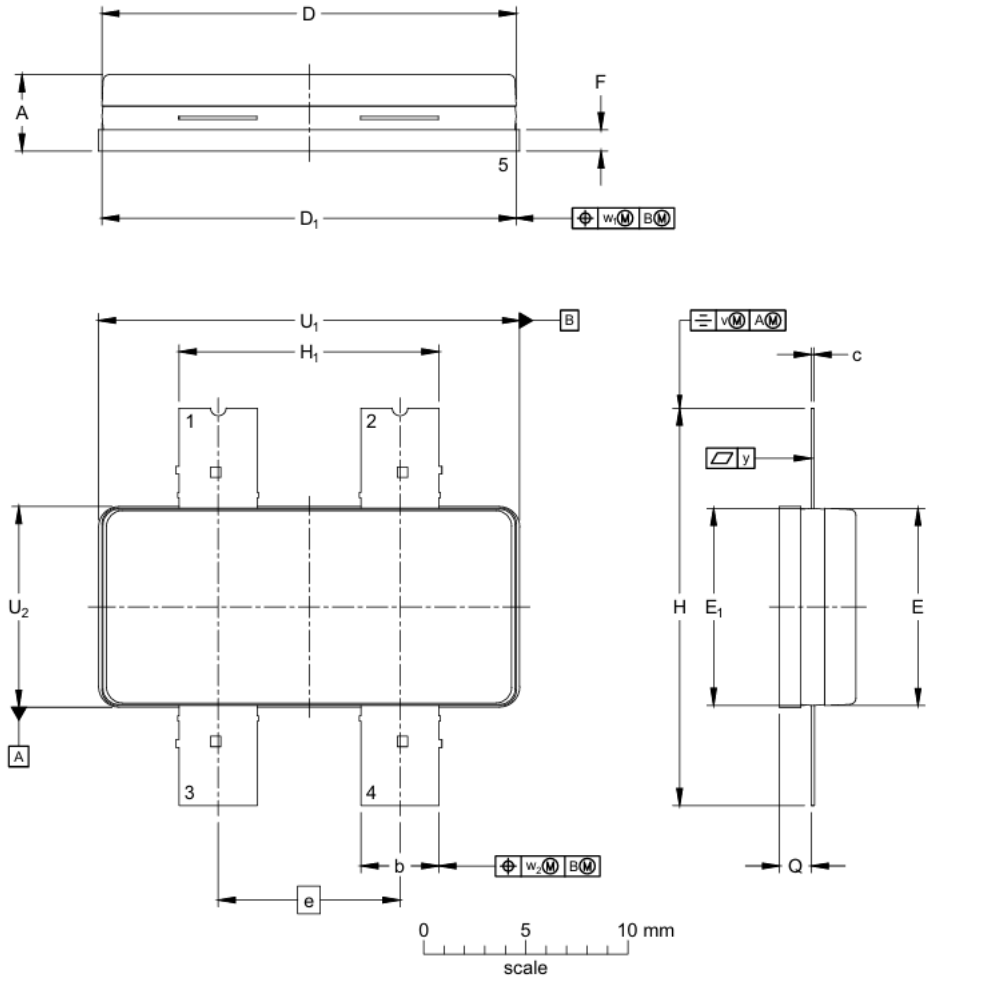


Table 4. Bill of materials of application board (PCB layout upon request, RO4350B 30mils)

Part	Quantity	Description	Part Number	Manufacture
C1,C2,C3,C4, C5,C6,C7,C8	8	100pFHigh Q Capacitor	251SHF101BSE	TEMEX
C9	1	0.8pFHigh Q Capacitor	251SHS0R8BSE	TEMEX
C10	1	1.0pFHigh Q Capacitor	251SHS1R0BSE	TEMEX
C11,C16,C17,C20,C27	5	5.6pFHigh Q Capacitor	251SHS5R6BSE	TEMEX
C12,C15	2	15pFHigh Q Capacitor	251SHS150BSE	TEMEX
C13,C14,C21,C26	4	3.9pFHigh Q Capacitor	251SHS3R9BSE	TEMEX
C18,C19，C35	3	0.4pFHigh Q Capacitor	251SHS0R4BSE	TEMEX
C22,C30	2	6.8pFHigh Q Capacitor	251SHS6R8BSE	TEMEX
C23	1	10pFHigh Q Capacitor	251SHS100BSE	TEMEX
C24,C25	2	1.2pFHigh Q Capacitor	251SHS1R2BSE	TEMEX
C28	1	0.9pFHigh Q Capacitor	251SHS0R9BSE	TEMEX
C29	1	12pFHigh Q Capacitor	251SHS120BSE	TEMEX
C31,C34	2	470uF		
C32,C33	2	10uF MLCC	RS80R2A106M	MARUWA
C11	1	5.6pFHigh Q Capacitor	251SHS5R6BSE	TEMEX
R1,R2	2	10Ω Power Resistor	ESR03EZPF10R0	ROHM
R3	1	50Ω Power Resistor	RFR50-20CT0421B	YT
U1	1	3 dB Bridge	HC07F03	YT
T1	1	1000W GaN Dual Transistor	STBV101K0RB4C	Innogration

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
2026/8/20	**V1.0**	**Preliminary Datasheet Creation**

Application data based on:LWH-26-22

Notice

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