

TA9310E

20 W CW 0.5 – 4.0 GHz GaN Power Transistor

Application Note: TA9310E EVB D

Application Note

2100 MHz~2500 MHz

32 V, 100 mA

Rev-2.1

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1. General Description

The TA9310E is a broadband GaN power transistor capable of delivering 20 W CW from 500 MHz to 4.0 GHz frequency band. The transistor can be used at lower frequencies with reduced output power. The input and output can be matched for best power and efficiency for the desired band. The TA9310E is packaged in a compact, low-cost Dual Flat No lead (DFN) 5 x 6 x 0.75 mm, 8 leads plastic package. TA9310E-EVB-D is tuned from 2100 MHz to 2500 MHz.

2. TA9310E-EVB-D Board Details

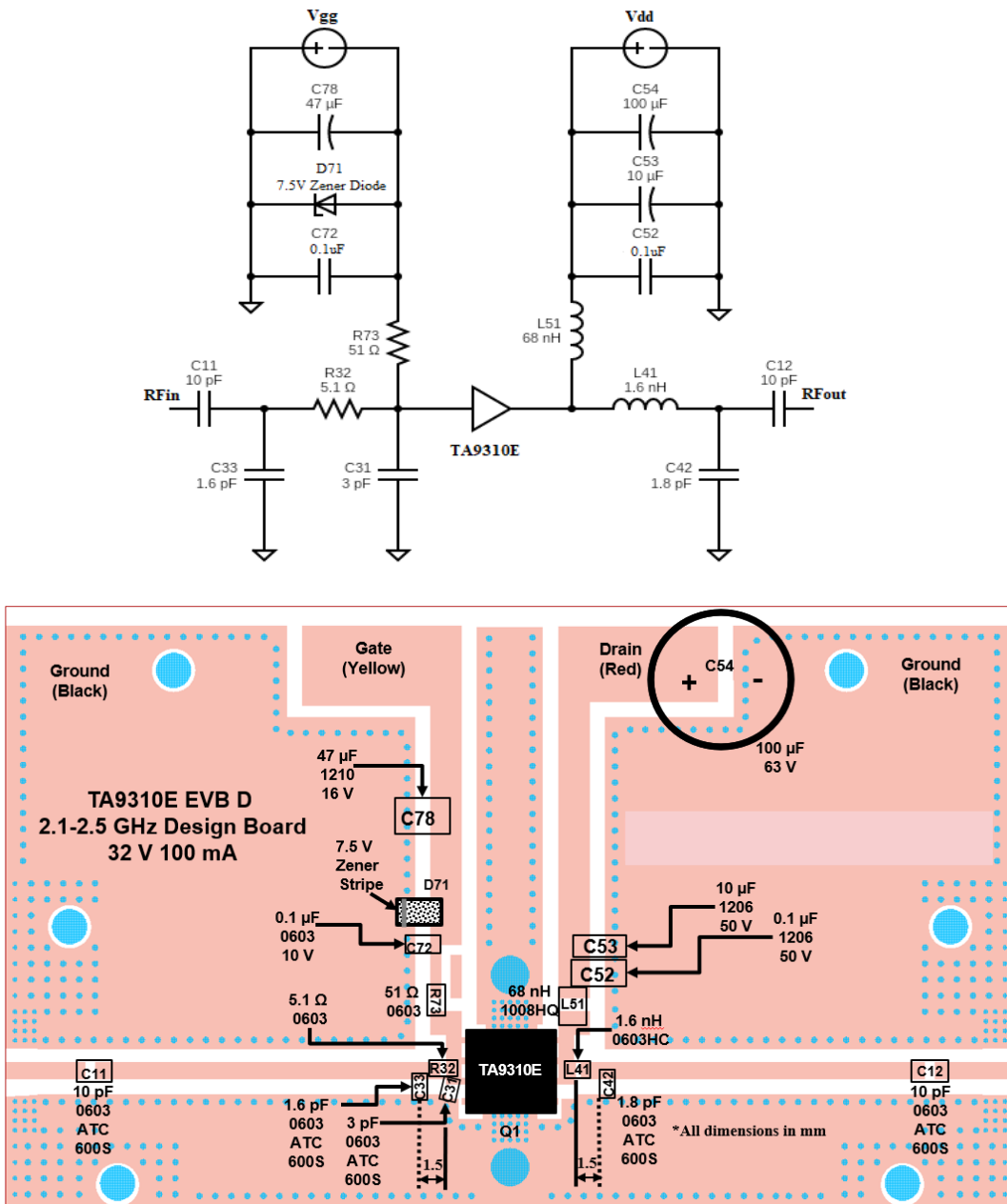


Figure 2.1 TA9310E-EVB-D 2100 MHz ~ 2500 MHz Schematic and EVB Layout

3. [TA9310E-EVB-D Bill of Material](#)

Component ID	Value	Manufacturer	Recommended Part Number
C11, C12	10 pF	AVX	600S100AT250XT
C31	3 pF	AVX	600S3R0AT250XT
R32	5.1 Ω	Vishay	CRCW06035R10FKEAHP
C33	1.6 pF	AVX	600S1R6AT250XT
L41	1.6 nH	Coil craft	0603HC-1N6XJLW
C42	1.8 pF	AVX	600S1R8AT250XT
L51	68 nH	Coil craft	1008HQ-68NXGLB
C52	0.1 μ F, 50 V	Murata	GRM31C5C1H104JA01L
C53	10 μ F, 50 V	Murata	GRM32ER71H106KA12L
D71	7.5 V Zener	On Semiconductor	MMSZ5236BT1G
C72	0.1 μ F, 10 V	AVX	0603ZC104K4T2A
R75	51 Ω	Vishay	CRCW060351R0FKEAHP
C78	47 μ F, 16 V	Murata	GRM32ER61C476ME15L
C55	100 μ F, 63 V	Nichicon	UPW1J101MPD1TD
Q1	20 W GaN Transistor	Tagore Tech	TA9310E
PCB	Rogers RO4350B, 20 mils, 2 oz copper		

Table 3.1 TA9310E-EVB-D BOM

4. [TA9310E-EVB-D Biasing Sequence](#)

Turn ON Device	Turn OFF Device
1. Set V_G to -5 V 2. Set V_D to +32 V 3. Adjust V_G to reach required I_{DQ} current 4. Apply RF power	1. Turn RF power off 2. Turn off V_D 3. Turn off V_G

Table 4.1 TA9310E-EVB-D Bias and Sequencing

5. [TA9310E-EVB-D Board Measurement Summary](#)

Frequency (MHz)	S21 Gain(dB)	S11 (dB)	S22 (dB)	Psat (dBm)	PAE (%) @Psat	ACPR & AACPR
2100	16.3	-9.5	-6.8	43.5	50	ACPR less than -35 dBc and AACPR less than -54 dBc for Average power up to 36 dBm With LTE 6.98 dB PAPR 3 MHz BW
2200	16.8	-12.8	-7.0	44.0	52	
2300	17.2	-17.0	-7.1	44.4	63	
2400	17.2	-11.4	-7.1	44.3	56	
2500	16.3	-6.5	-6.7	42.7	50	

Table 5.1 TA9310E-EVB-D 32 V, 100 mA Electrical Characteristics Summary

6. TA9310E-EVB-D Test Results

All the tests are carried out at room temperature.

6.1. S parameters

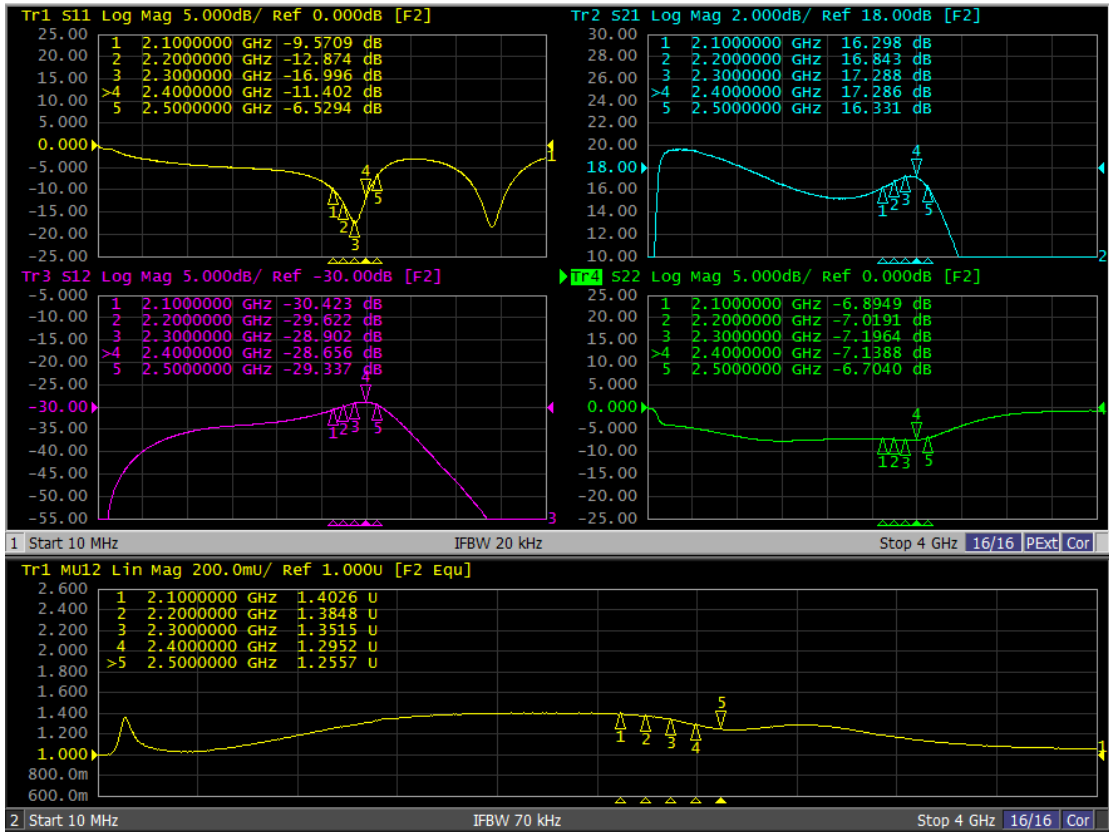


Figure 6.1.1. S parameters of TA9310E-EVB-D 32 V, 100 mA

6.2. Large Signal Test Results

Gain and PAE Vs P_{OUT} data [V_d=32 V, I_{DQ}=100 mA, CW]

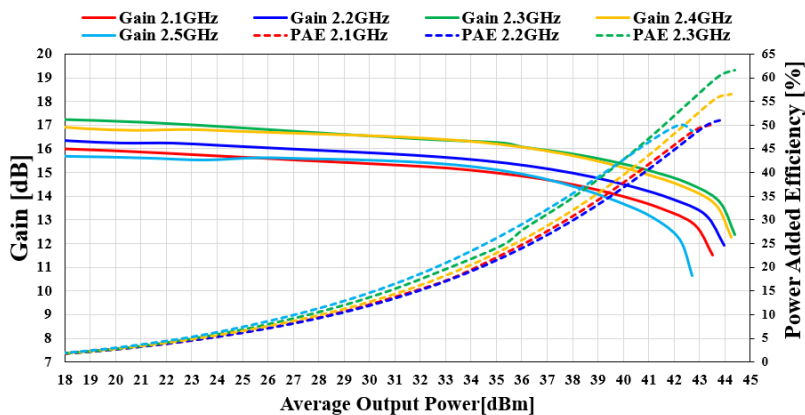


Figure 6.2.1. Gain and PAE vs P_{OUT} of TA9310E-EVB-D for 32 V, 100 mA for freq: 2100-2500 MHz

ACPR and AACPR Vs P_{OUT} data [V_D=32 V, I_{DQ}=100 mA]

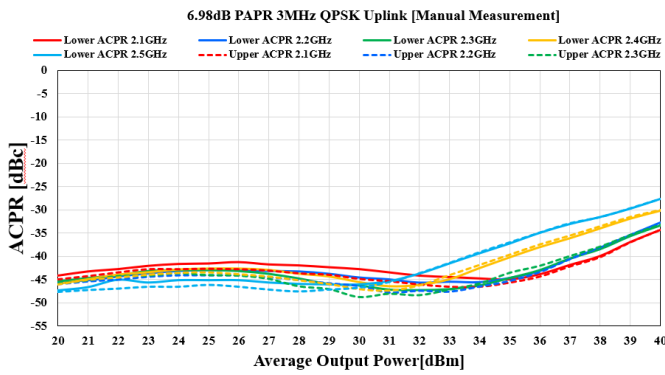


Figure 6.2.2. ACPR vs P_{OUT} of TA9310E-EVB-D for 32 V, 100 mA for freq: 2100-2500 MHz

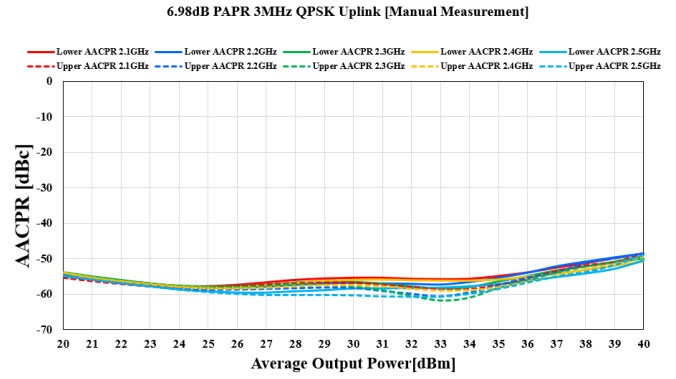


Figure 6.2.3. AACPR vs P_{OUT} of TA9310E-EVB-D for 32 V, 100 mA for freq: 2100-2500 MHz

6.3. EVM Test Results

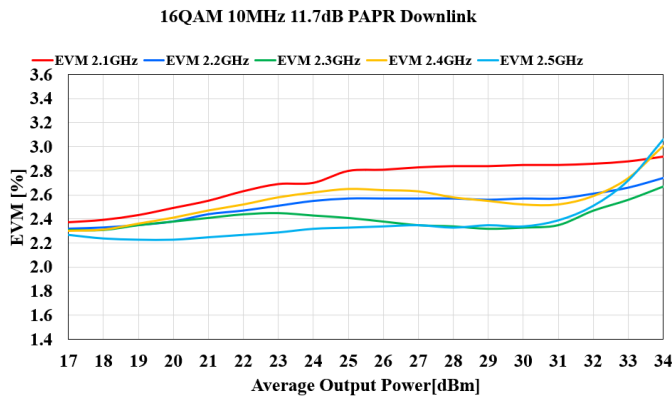


Figure 6.3.1 EVM Vs P_{OUT}
 V_D=32 V, I_{DQ}=100 mA, V_{gg}= -2.50 V
 16 QAM 10 MHz 11.7 dB PAPR Downlink

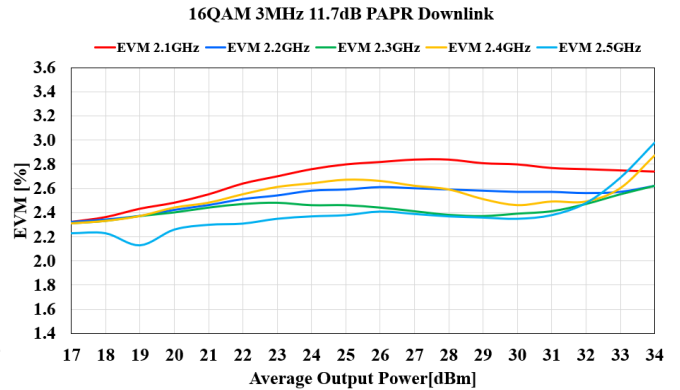


Figure 6.3.2 EVM Vs P_{OUT}
 V_D=32V, I_{DQ}=100 mA, V_{gg}= -2.50 V
 16 QAM 3 MHz 11.7 dB PAPR Downlink

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