Tagore Technology

TA9310E

20W CW 0.5 – 4.0 GHz GaN Power Transistor

Application Note: TA9310E EVB D

Application Note

2100MHz~2500MHz

32V 100mA

Rev-1.1

List of Contents

1. General Description

The TA9310E is a broadband GaN power transistor capable of delivering 20W CW from 500MHz to 4.0GHz 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 Quad Flat No lead (QFN) 5x6x0.8mm, 8 leads plastic package.

TA9310E-EVB-D is tuned from 2100MHz to 2500MHz.

2. TA9310E-EVB-D Board Details

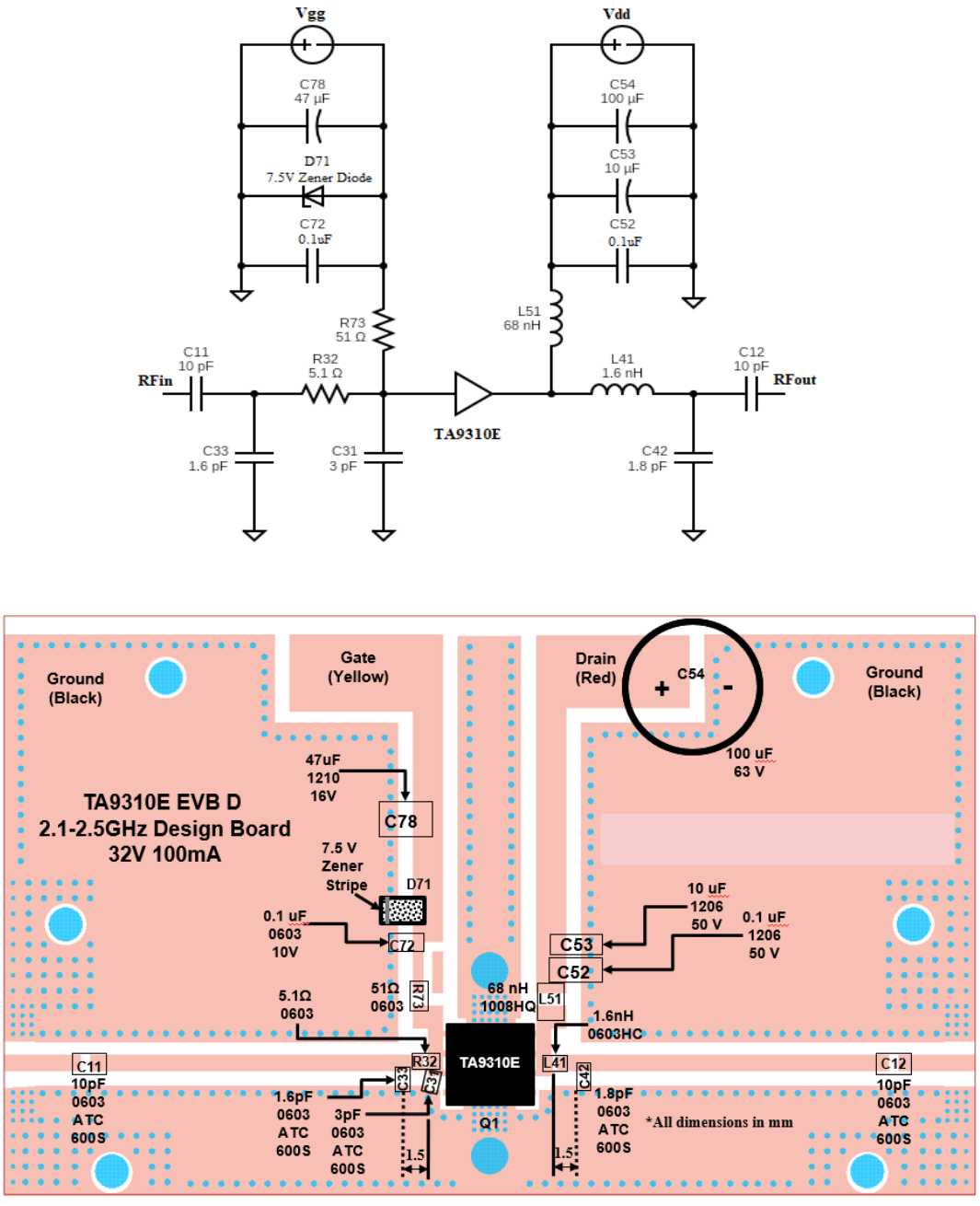

Figure 2.1 TA9310E-EVB-D 2100MHz ~ 2500MHz Schematic and EVB Layout

3. TA9310E-EVB-D Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
C11, C12	10pF	AVX	600S100AT250XT
C31	3pF	AVX	600S3R0AT250XT
R32	5.1Ω	Vishay	CRCW06035R10FKEAHP
C33	1.6pF	AVX	600S1R6AT250XT
L41	1.6nH	Coil craft	0603HC-1N6XJLW
C42	1.8pF	AVX	600S1R8AT250XT
L51	68nH	Coil craft	1008HQ-68NXGLB
C52	0.1µF, 50V	Murata	GRM31C5C1H104JA01L
C53	10µF, 50V	Murata	GRM32ER71H106KA12L
D71	7.5 V Zener	On Semiconductor	MMSZ5236BT1G
C72	0.1µF, 10V	AVX	0603ZC104K4T2A
R75	51Ω	Vishay	CRCW060351R0FKEAHP
C78	47µF, 16V	Murata	GRM32ER61C476ME15L
C55	100µF, 63V	Nichicon	UPW1J101MPD1TD
Q1	20Watt GaN Transistor	Tagore Technology	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 -5V 2. Set V_D to +32V 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 -35dBc and AACPR less than -54dBc for Average power up to 36dBm With LTE 6.98dB PAPR 3MHz 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 32V 100mA Electrical Characteristics Summary

6. TA9310E-EVB-D Test Results

All the tests are carried out at room temperature.

6.1. S parameters

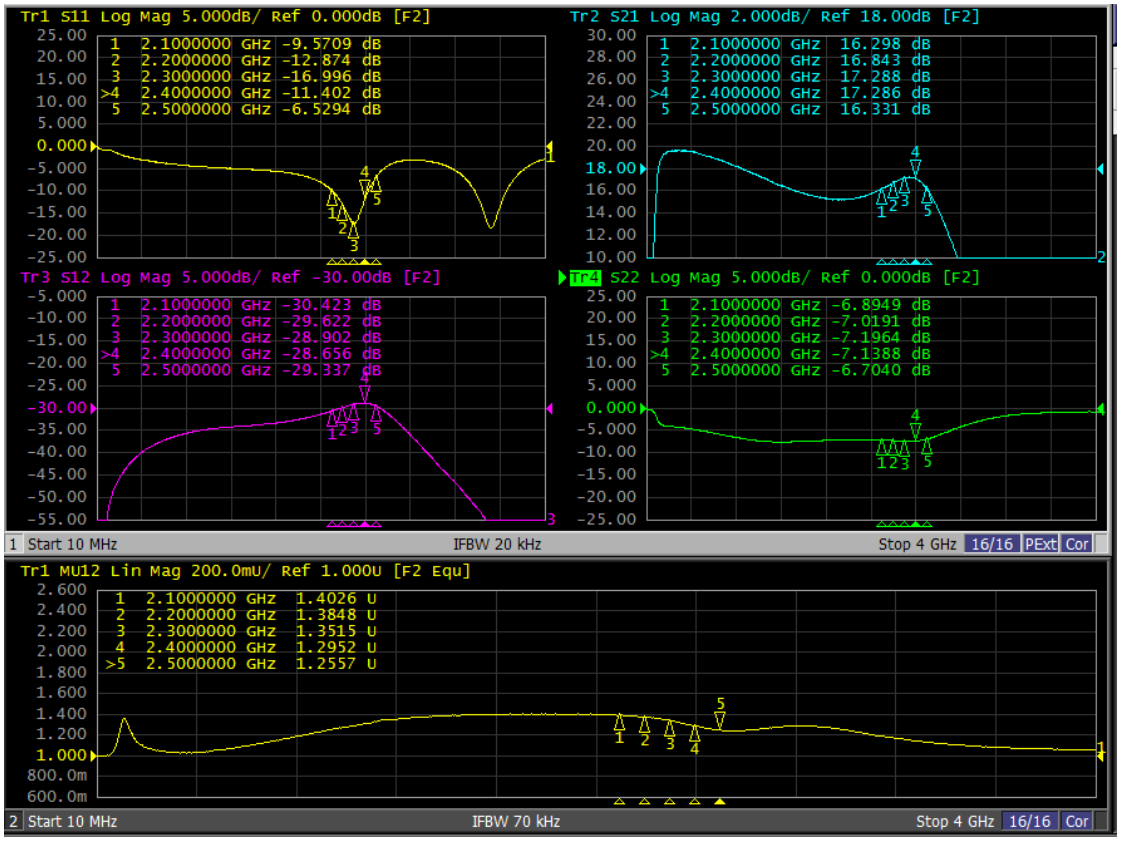

Figure 6.1.1. S parameters of TA9310E-EVB-D 32V 100mA

6.2. Large Signal Test Results

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

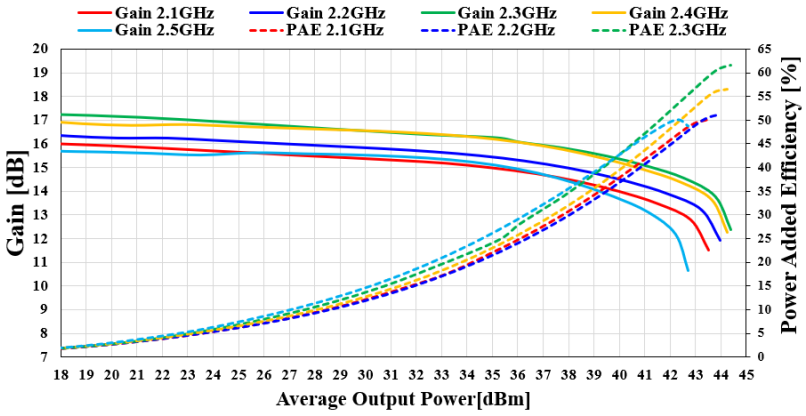

Figure 6.2.1. Gain and PAE vs P_{OUT} of TA9310E-EVB-D for 32V 100mA for freq:2100-2500MHz

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

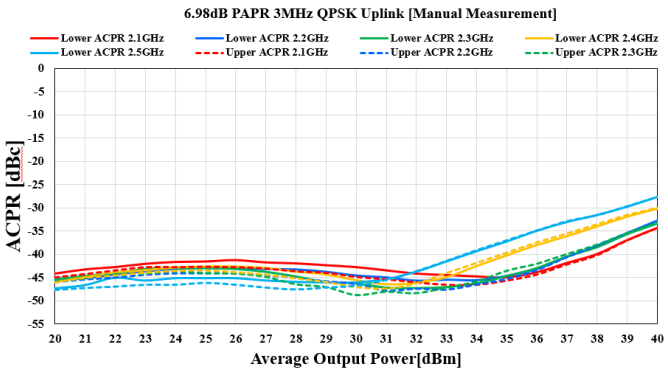

Figure 6.2.2. ACPR vs P_{OUT} of TA9310E-EVB-D for 32V 100mA for freq:2100-2500MHz

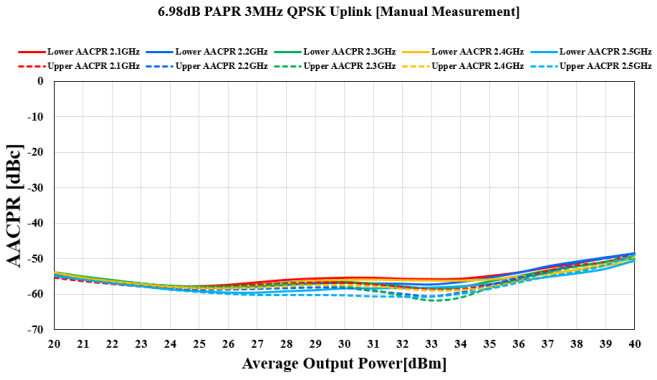

Figure 6.2.3. AACPR vs P_{OUT} of TA9310E-EVB-D for 32V 100mA for freq:2100-2500MHz

6.3. EVM Test Results

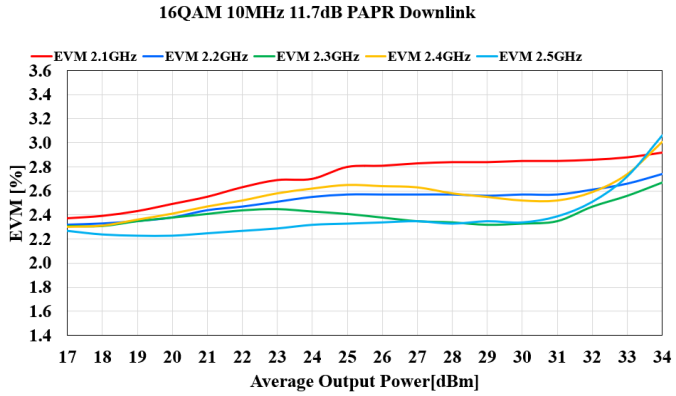

Figure 6.3.1 EVM Vs P_{OUT} V_D=32V, I_{DQ}=100mA, Vgg= -2.50V 16QAM 10MHz 11.7dB PAPR Downlink

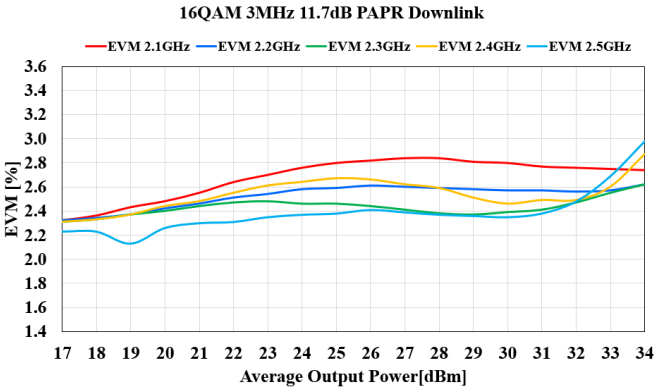

Figure 6.3.2 EVM Vs P_{OUT} V_D=32V, I_{DQ}=100mA, Vgg= -2.50V 16QAM 3MHz 11.7dB PAPR Downlink

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