

TA9310E

20W CW 0.5 – 4.0 GHz GaN Power Transistor

Application Note: TA9310E EVB B

Application Note

950MHz~1250MHz

28V 100mA

Rev-1.3

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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-B is tuned from 950MHz to 1200MHz.

2. TA9310E-EVB-B Board Details

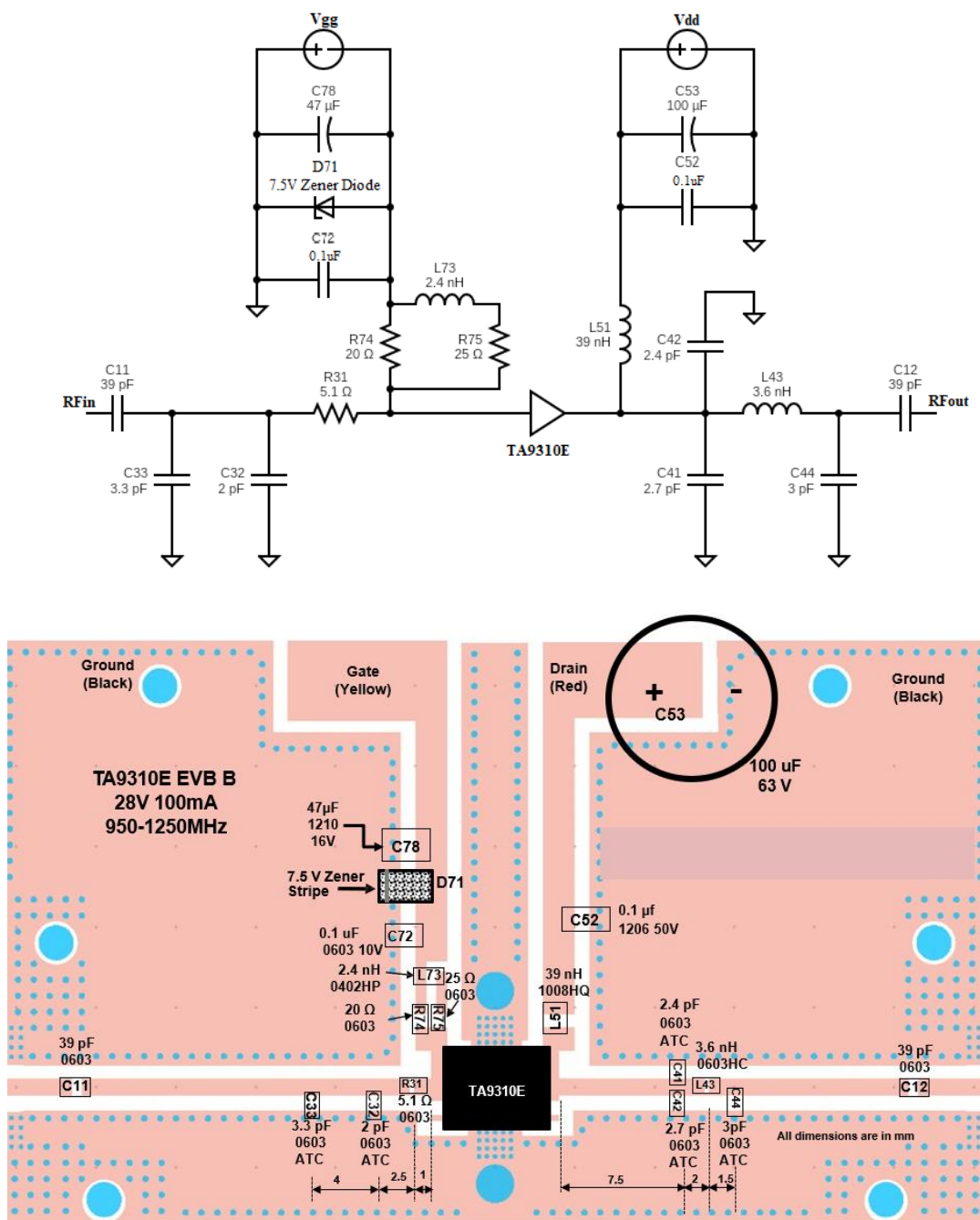


Figure 2.1 TA9310E-EVB-B 950MHz ~ 1250MHz Schematic and EVB Layout

3. TA9310E-EVB-B Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
C11, C12	39pF	AVX	600S390FT250XT
R31	5.1Ω, 250mW	Panasonic	ERJ-PA3J5R1V
C32	2pF	AVX	600S2R0CT250XT
C33	3.3pF	AVX	600S3R3CT250XT
C41	2.7pF	AVX	600S2R7CT250XT
C42	2.4pF	AVX	600S2R4CT250XT
L43	3.6nH	Coil craft	0603HC-3N6XJLW
C44	3pF	AVX	600S3R0CT250XT
L51	39nH	Coil craft	1008HQ-39NXGLC
C52	0.1uF, 50V	Murata	GRM31C5C1H104JA01L
C53	100uF, 63V	Nichicon	UPW1J101MPD1TD
D71	7.5 V, 0.5W Zener	On Semiconductor	SZMMSZ5236BT1G
C72	0.1uF, 10V	AVX	0603ZC104K4T2A
L73	2.4nH	Coil craft	0402HP-2N4XGRW
R74	20Ω, 250mW	Panasonic	ERJ-PA3F20R0V
R75	24.9Ω, 250mW	Vishay/Dale	CRCW060324R9FKEAHP
C78	47uF, 16V	Murata	GRM32ER61C476ME15L
Q1	20W GaN transistor	Tagore Technology	TA9310E
PCB	Rogers RO4350B, 20 mils, 2 oz copper		

Table 3.1 TA9310E-EVB-B BOM

4. TA9310E-EVB-B Biasing Sequence

Turn ON Device	Turn OFF Device
<ol style="list-style-type: none"> 1. Set V_G to -5V 2. Set V_D to +28V 3. Adjust V_G to reach required I_{DQ} current 4. Apply RF power 	<ol style="list-style-type: none"> 1. Turn RF power off 2. Turn off V_D 3. Turn off V_G

Table 4.1 TA9310E-EVB-B Bias and Sequencing

5. TA9310E-EVB-B Board Measurement Summary

Frequency (MHz)	S21 Gain(dB)	S11(dB)	S22(dB)	Psat(dBm) Pulse width:10uS DC:15%	PAE (%) @Psat Pulse width:10uS DC:15%
950	19.7	-5.1	-8.5	45.5	64
1050	19.4	-6.5	-9.5	45	74
1100	19.1	-7.8	-9.4	44.5	76
1150	18.8	-9.9	-8.3	44	75
1250	17.9	-17.4	-6.9	43.5	71

Table 5.1 TA9310E-EVB-B 28V 100mA Electrical Characteristics Summary

6. TA9310E-EVB-B Test Results

All the tests are carried out at room temperature.

6.1. S parameters

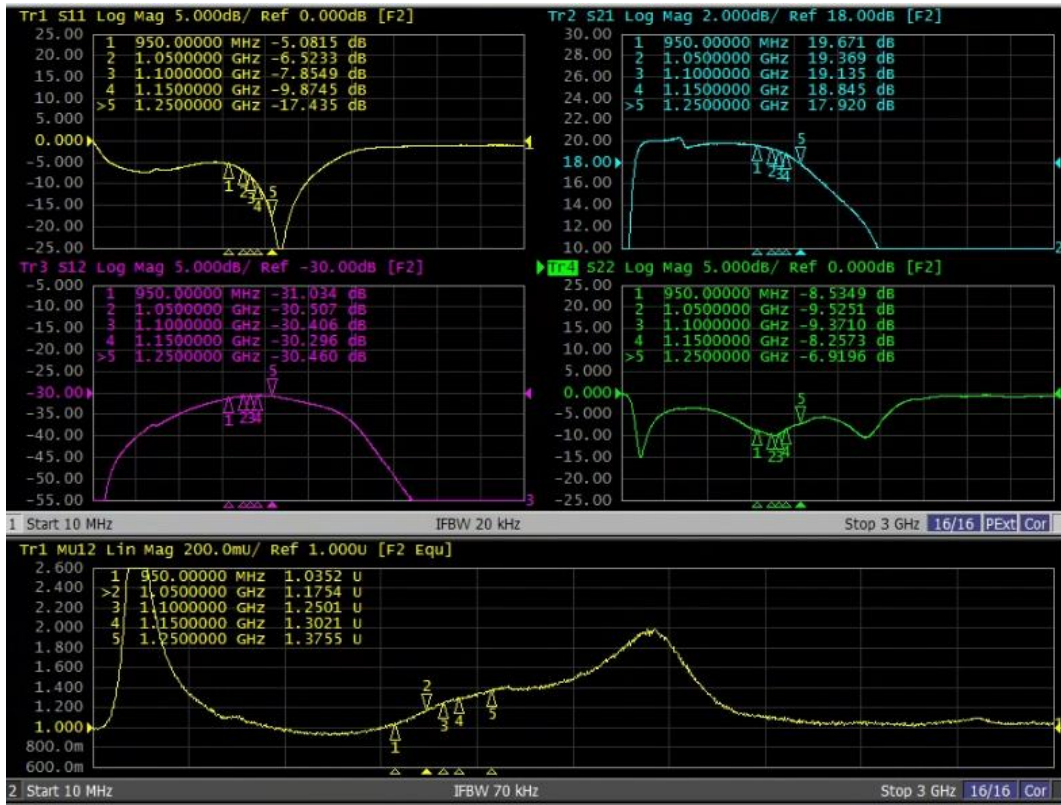


Figure 6.1.1. S parameters of TA9310E-EVB-B 28V 100mA

6.2. Large Signal Test Results

Gain and PAE Vs P_{OUT} data [V_d=28V, I_{DQ}=100mA]

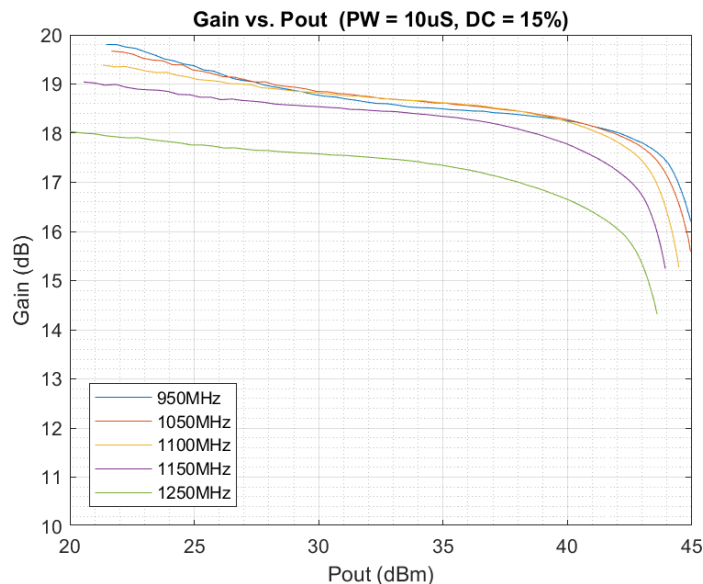


Figure 6.2.1. Gain vs P_{OUT} of TA9310E-EVB-B for 28V 100mA for freq:950-1200MHz

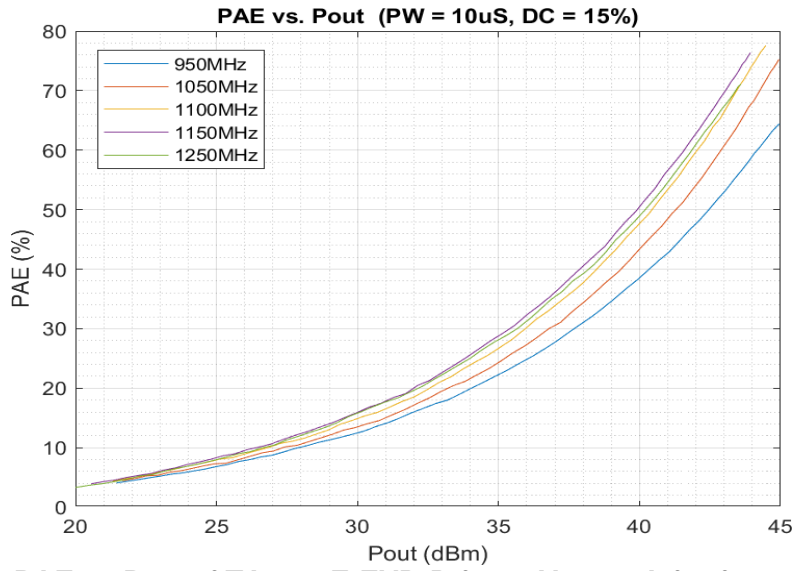


Figure 6.2.2. PAE vs P_{OUT} of TA9310E-EVB-B for 28V 100mA for freq:950-1200MHz

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