

# TA9310E

20 W CW 0.5 – 4.0 GHz GaN Power Transistor

**Application Note: TA9310E EVB B**

## Application Note

950 MHz~1250 MHz

28 V, 100 mA

Rev-2.3

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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-B is tuned from 950 MHz to 1200 MHz.

## 2. TA9310E-EVB-B Board Details

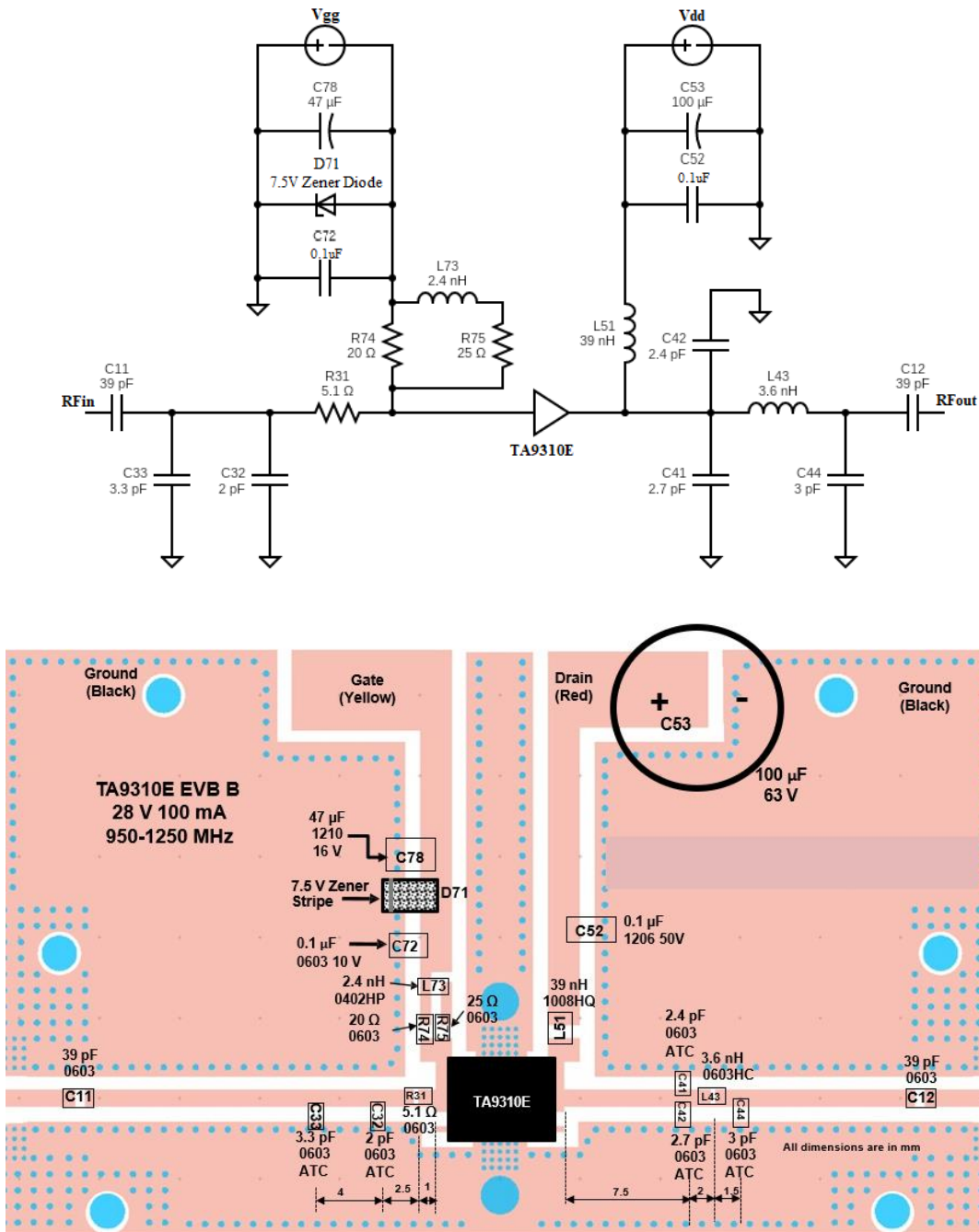


Figure 2.1 TA9310E-EVB-B 950 MHz ~ 1250 MHz Schematic and EVB Layout

### 3. TA9310E-EVB-B Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
C11, C12	39 pF	AVX	600S390FT250XT
R31	5.1 $\Omega$ , 250 mW	Panasonic	ERJ-PA3J5R1V
C32	2 pF	AVX	600S2R0CT250XT
C33	3.3 pF	AVX	600S3R3CT250XT
C41	2.7 pF	AVX	600S2R7CT250XT
C42	2.4 pF	AVX	600S2R4CT250XT
L43	3.6 nH	Coil craft	0603HC-3N6XJLW
C44	3 pF	AVX	600S3R0CT250XT
L51	39 nH	Coil craft	1008HQ-39NXGLC
C52	0.1 $\mu$ F, 50 V	Murata	GRM31C5C1H104JA01L
C53	100 $\mu$ F, 63 V	Nichicon	UPW1J101MPD1TD
D71	7.5 V, 0.5 W Zener	On Semiconductor	SZMMSZ5236BT1G
C72	0.1 $\mu$ F, 10 V	AVX	0603ZC104K4T2A
L73	2.4 nH	Coil craft	0402HP-2N4XGRW
R74	20 $\Omega$ , 250 mW	Panasonic	ERJ-PA3F20R0V
R75	24.9 $\Omega$ , 250 mW	Vishay/Dale	CRCW060324R9FKEAHP
C78	47 $\mu$ F, 16 V	Murata	GRM32ER61C476ME15L
Q1	20 W GaN transistor	Tagore Tech	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
1. Set $V_G$ to -5 V 2. Set $V_D$ to +28 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-B Bias and Sequencing

### 5. TA9310E-EVB-B Board Measurement Summary

Frequency (MHz)	S21 Gain(dB)	S11(dB)	S22(dB)	Psat(dBm) Pulse width:10 $\mu$ S DC:15%	PAE (%) @Psat Pulse width:10 $\mu$ S DC:15%
950	19.7	-5.1	-8.5	45.5	64
1050	19.4	-6.5	-9.5	45.0	74
1100	19.1	-7.8	-9.4	44.5	76
1150	18.8	-9.9	-8.3	44.0	75
1250	17.9	-17.4	-6.9	43.5	71

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

## 6. TA9310E-EVB-B Test Results

All the tests are carried out at room temperature.

### 6.1. S parameters

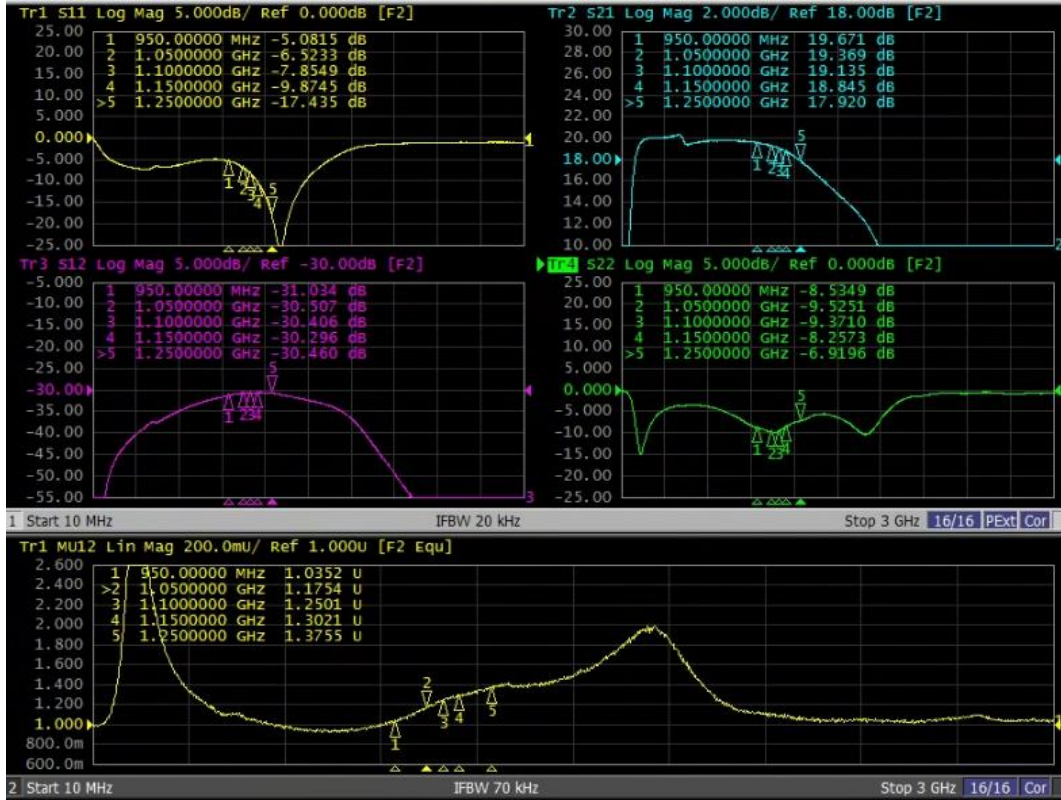


Figure 6.1.1. S parameters of TA9310E-EVB-B 28 V, 100 mA

### 6.2. Large Signal Test Results

#### Gain and PAE Vs P<sub>OUT</sub> data [ V<sub>d</sub>=28 V, I<sub>DQ</sub>=100 mA]

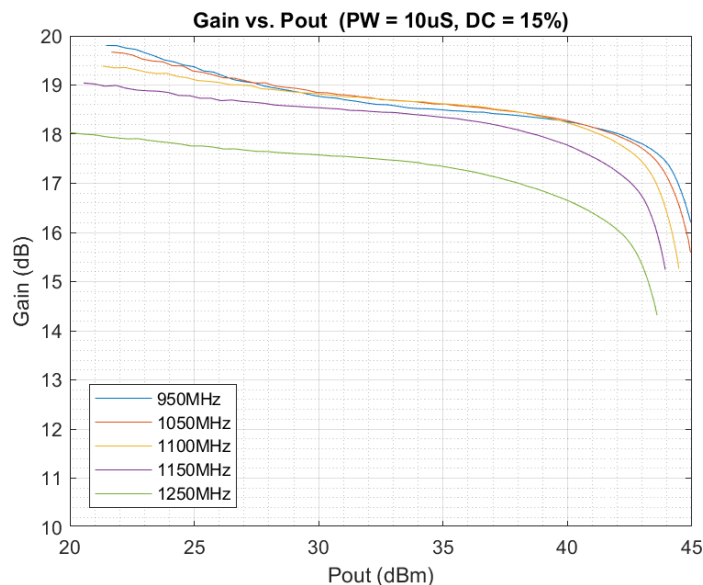
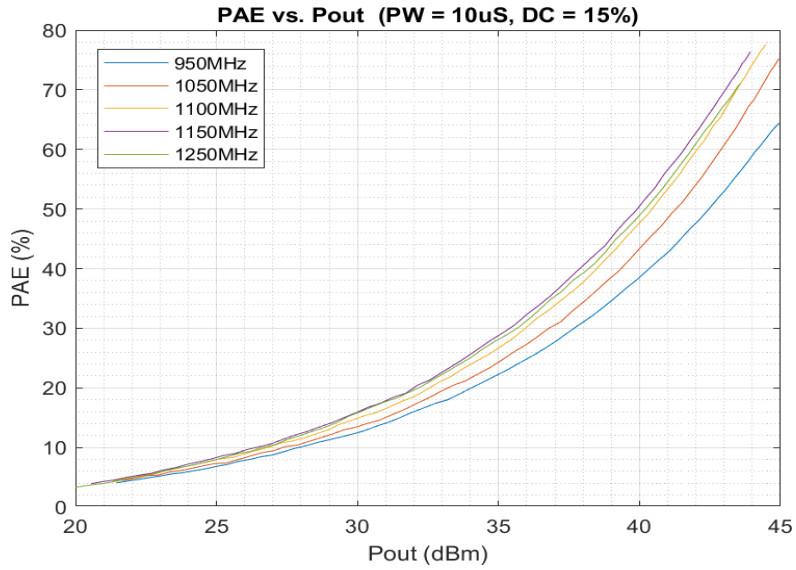


Figure 6.2.1. Gain vs P<sub>OUT</sub> of TA9310E-EVB-B for 28 V 100 mA for freq: 950-1200 MHz



**Figure 6.2.2. PAE vs P<sub>OUT</sub> of TA9310E-EVB-B for 28 V, 100 mA for freq: 950-1200 MHz**

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