

# TA9310E

20 W CW 0.5 – 4.0 GHz GaN Power Transistor

**Application Note: TA9310E EVB F**

## Application Note

950 MHz~1800 MHz

30 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-F is tuned from 950 MHz to 1800 MHz.

## 2. TA9310E-EVB-F Board Details

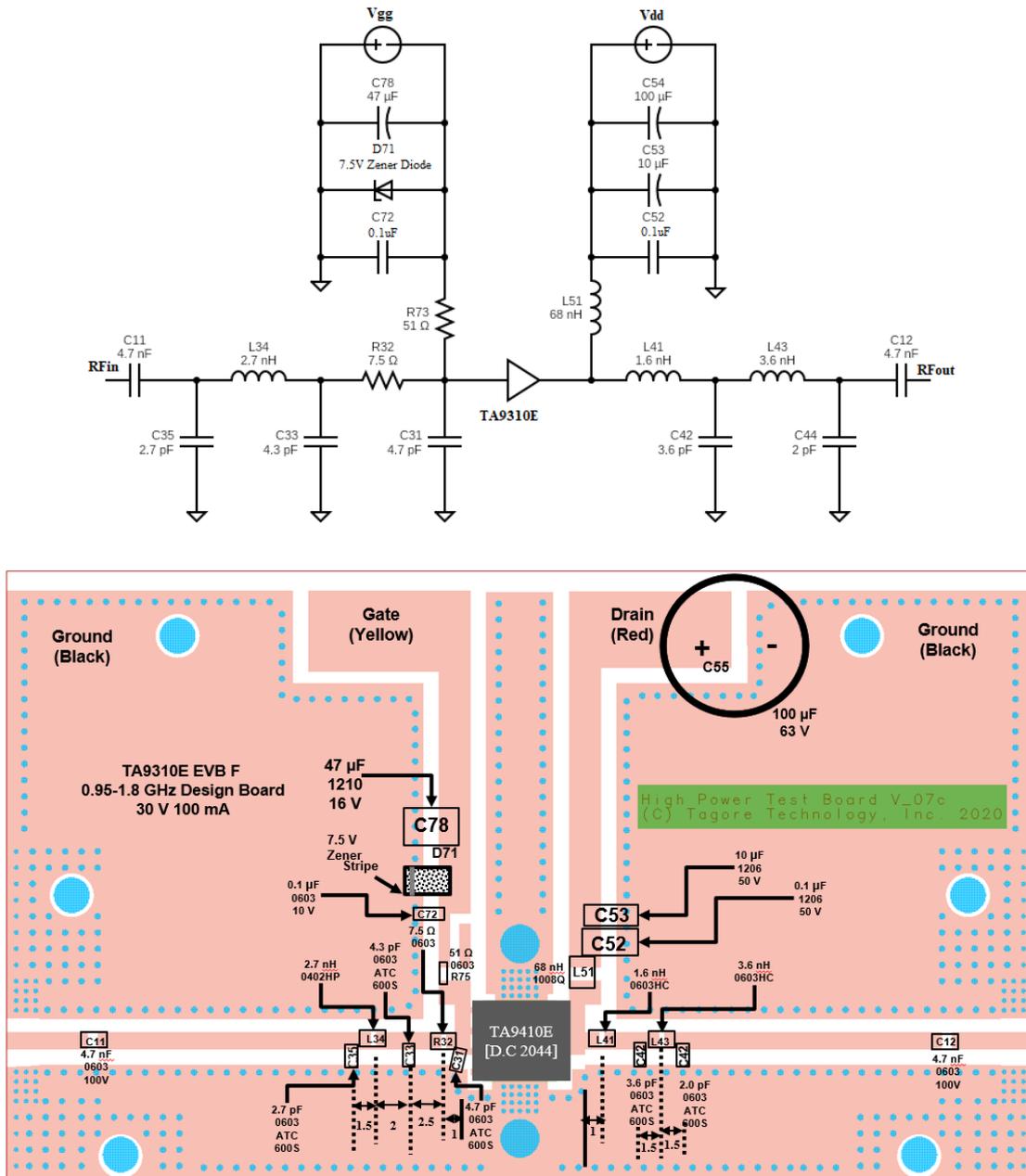


Figure 2.1 TA9310E-EVB-F 950 MHz ~ 1800 MHz Schematic and EVB Layout

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

Component ID	Value	Manufacturer	Recommended Part Number
C11, C12	4.7 nF, 50 V	Murata	GRM1885C1H472JA01
C31	4.7 pF	AVX	600S4R7AT250XT
R32	7.5 $\Omega$	Vishay/Dale	CRCW06037R50FKEAHP
C33	4.3 pF	AVX	600S4R3AT250XT
L34	2.7 nH	Coil craft	0603HP-2N7XGLW
C35	2.7 pF	AVX	600S2R7AT250XT
L41	1.6 nH	Coil craft	0603HC-1N6XJLW
C42	3.6 pF	AVX	600S3R6AT250XT
L43	3.6 nH	AVX	0603HC-3N6XJLW
C44	2.0 pF	AVX	600S2R0AT250XT
L51	68 nH	Coil craft	1008HQ-68NXGLC
C52	0.1 $\mu$ F, 50 V	Murata	GRM31C5C1H104JA01L
C53	10 $\mu$ F, 50 V	Murata	GRM32ER71H106KA12L
C55	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
R75	51 $\Omega$	Vishay/Dale	CRCW060351R0FKEAHP
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-F BOM**

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

Turn ON Device	Turn OFF Device
1. Set $V_G$ to -5V 2. Set $V_D$ to +30V 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-F Bias and Sequencing**

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

Frequency (MHz)	S21 Gain(dB)	S11(dB)	S22(dB)	Psat(dBm)	PAE (%) @Psat
950	17.2	-8.0	-7.4	43.4	53
1200	16.7	-16.1	-8.5	44.2	58
1400	15.6	-12.2	-8.2	44.0	50
1600	15.0	-9.9	-7.4	43.6	43
1800	16.0	-13.7	-7.8	44.4	48

**Table 5.1 TA9310E-EVB-F 30 V, 100 mA Electrical Characteristics Summary**

## 6. TA9310E-EVB-F Test Results

All the tests are carried out at room temperature.

### 6.1. S parameters

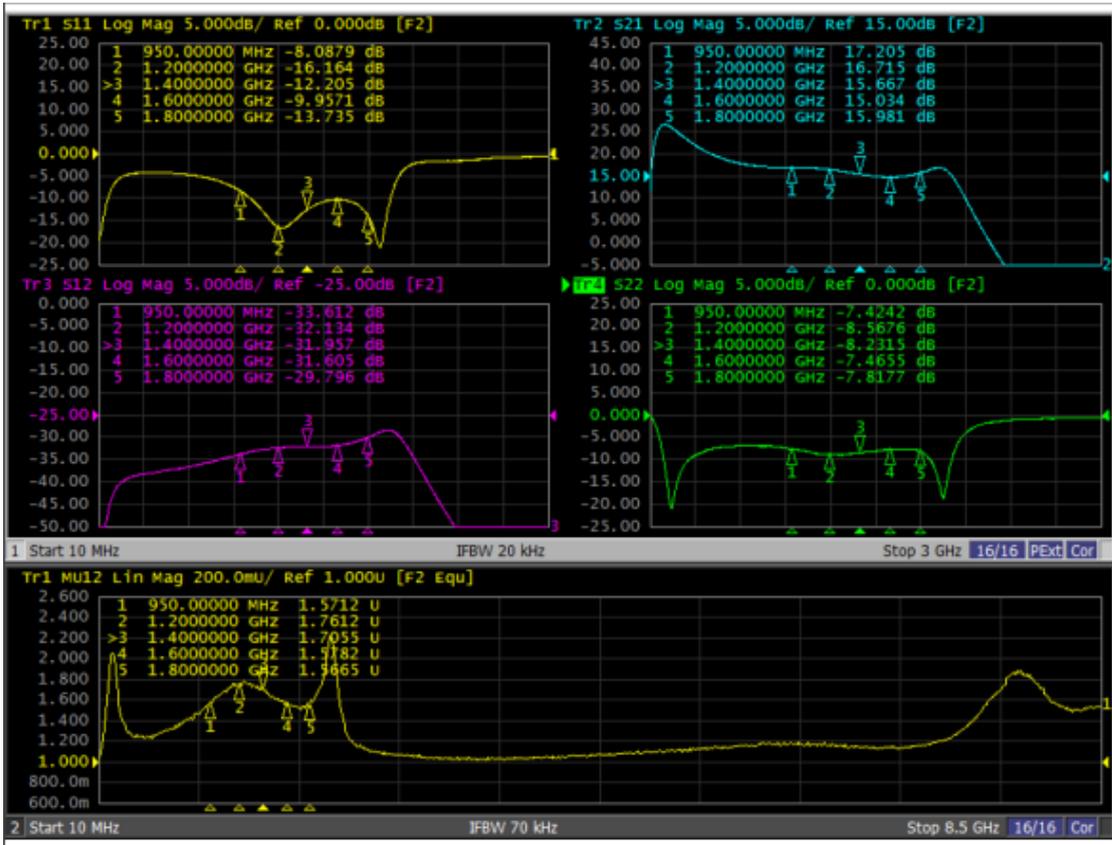


Figure 6.1.1. S parameters of TA9310E-EVB-F 30 V, 100 mA

### 6.2. Large Signal Test Results

**Gain and PAE Vs  $P_{OUT}$  data and IRL and Pdiss Vs  $P_{OUT}$  [ Vd=30 V, IDQ=100 mA, CW]**

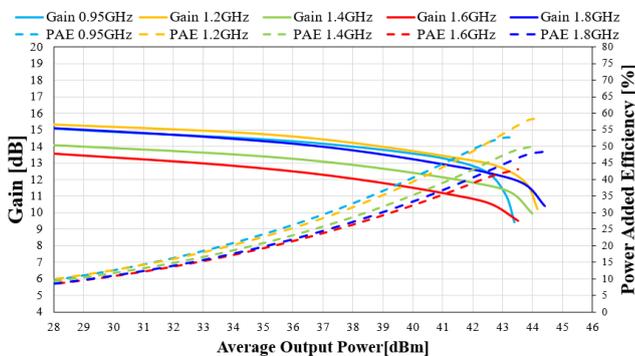


Figure 6.2.1. Gain and PAE vs  $P_{OUT}$  of TA9310E-EVB-F for 30 V, 100 mA for freq: 950-1800 MHz

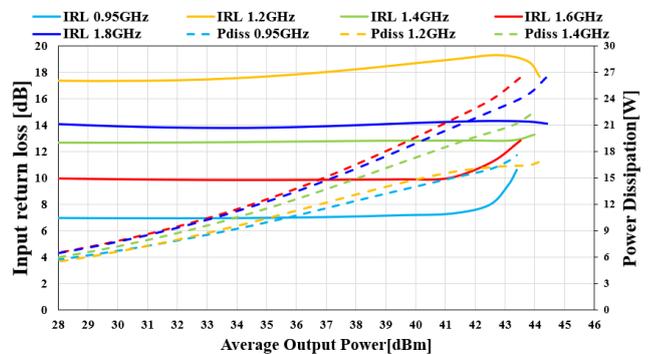


Figure 6.2.2. IRL and Pdiss vs  $P_{OUT}$  of TA9310E-EVB-F for 30 V, 100 mA for freq: 950-1800 MHz

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