Tagore Technology

TA9310E

20W CW 0.5 – 4.0 GHz GaN Power Transistor

Application Note: TA9310E EVB H

Application Note

300MHz~500MHz

32V 200mA

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-H is tuned from 300MHz to 500MHz.

2. TA9310E-EVB-H Board Details

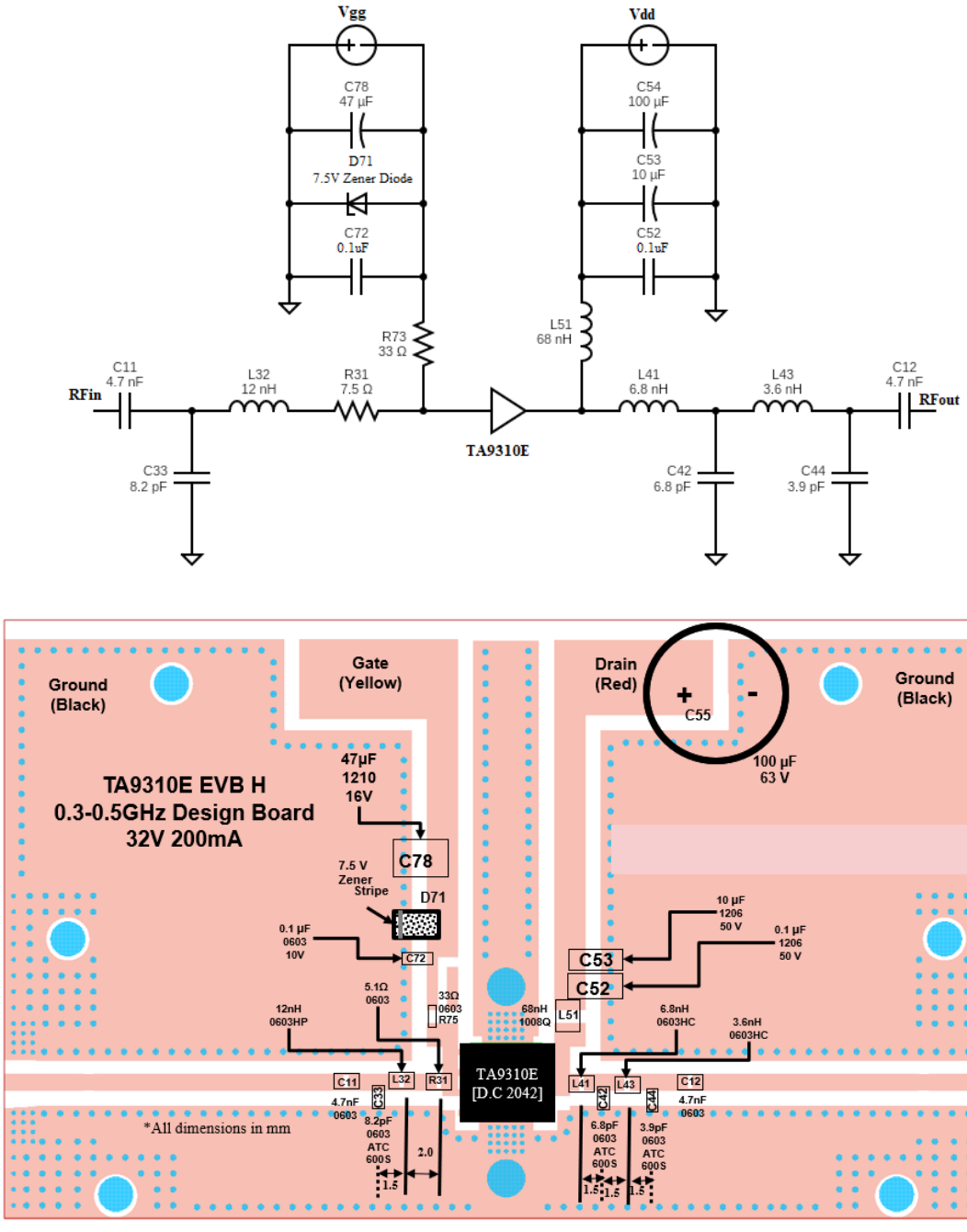

Figure 2.1 TA9310E-EVB-H 300MHz ~ 500MHz Schematic and EVB Layout

3. TA9310E-EVB-H Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
C11, C12	4.7nF, 50V	Murata	GRM1885C1H472JA01
R31	7.5Ω	Panasonic	ERJ-3RQF7R5V
L32	12nH	Coil craft	0603HC-12NXGLW
C33	8.2pF	AVX	600S8R2BT250XT
L41	6.8nH	Coil craft	0603HC-6N8XJLW
C42	6.8pF	AVX	600S6R8BT250XT
L43	3.6nH	Coil craft	0603HC-3N6XJLW
C44	3.9pF	AVX	600S3R9BT250XT
L51	68nH	Coil craft	1008HQ-68NXGLC
C52	0.1µF, 50V	Murata	GRM31C5C1H104JA01L
C53	10µF, 50V	Murata	GRM32ER71H106KA12L
C55	100µF, 63V	Nichicon	UPW1J101MPD1TD
D71	7.5 V Zener	On Semiconductor	SZMMSZ5236BT1G
C72	0.1µF, 10V	AVX	0603ZC104K4T2A
R75	33Ω	Vishay	CRCW060333R0FKEAHP
Q1	20Watt GaN Transistor	Tagore Technology	TA9310E
PCB	Rogers RO4350B, 20 mils, 2 oz copper		

Table 3.1 TA9310E-EVB-H BOM

4. TA9310E-EVB-H 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-H Bias and Sequencing

5. TA9310E-EVB-H Board Measurement Summary

Frequency (MHz)	S21 Gain(dB)	S11(dB)	S22(dB)	Psat(dBm)	PAE (%) @Psat
300	22.3	-8.8	-8.0	43.1	69
400	22.0	-12.7	-10.4	43.7	52
500	21.2	-7.3	-15.6	44.9	58

Table 5.1 TA9310E-EVB-H 32V 200mA Electrical Characteristics Summary

6. TA9310E-EVB-H Test Results

All the tests are carried out at room temperature.

6.1. S parameters

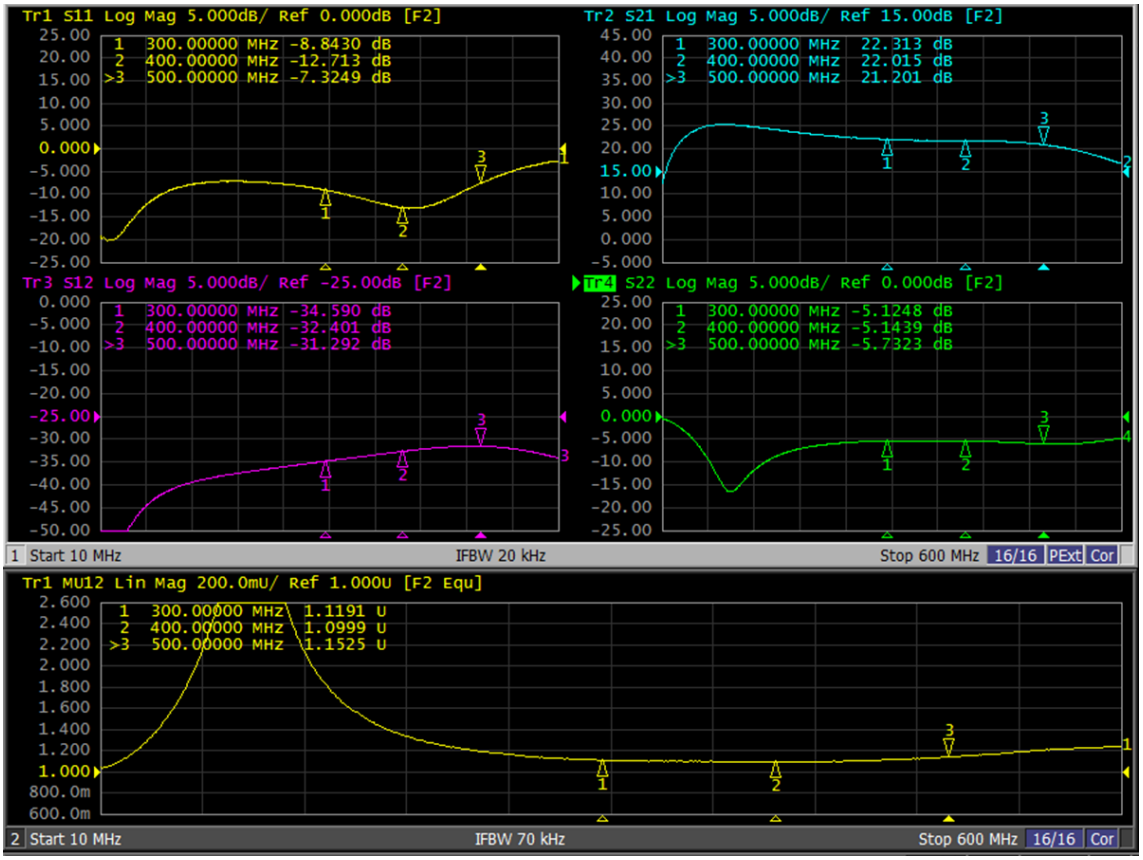

Figure 6.1.1. S parameters of TA9310E-EVB-H 32V 200mA

6.2. Large Signal Test Results

Gain and PAE Vs P_{OUT} data and IRL and Pdiss Vs P_{OUT} [Vd=32V, I_{DQ}=200mA, CW]

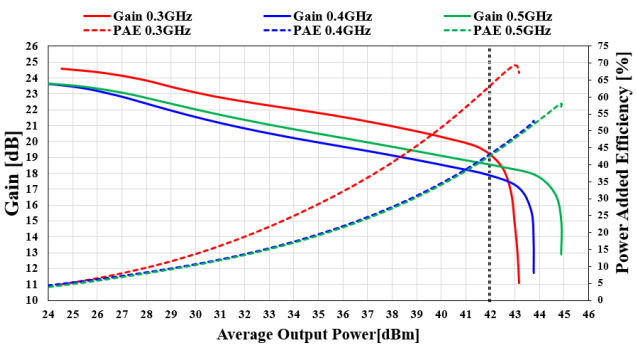

Figure 6.2.1. Gain and PAE vs P_{OUT} of TA9310E-EVB-H for 32V 200mA for freq:300-500MHz

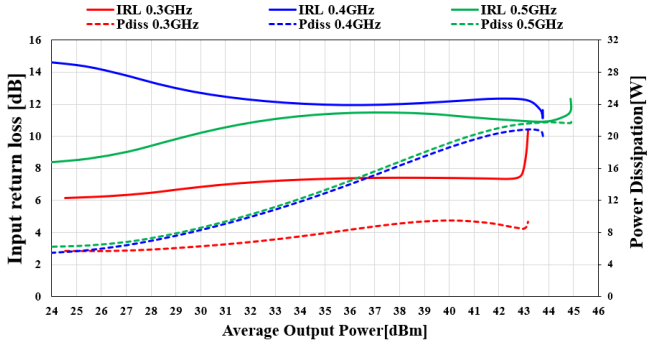

Figure 6.2.2. IRL and Pdiss vs P_{OUT} of TA9310E-EVB-H for 32V 200mA for freq:300-500MHz

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