Tagore Technology

TA9310E

20W CW 0.5 – 4.0 GHz GaN Power Transistor

Application Note: TA9310E EVB F

Application Note

950MHz~1800MHz

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

2. TA9310E-EVB-F Board Details

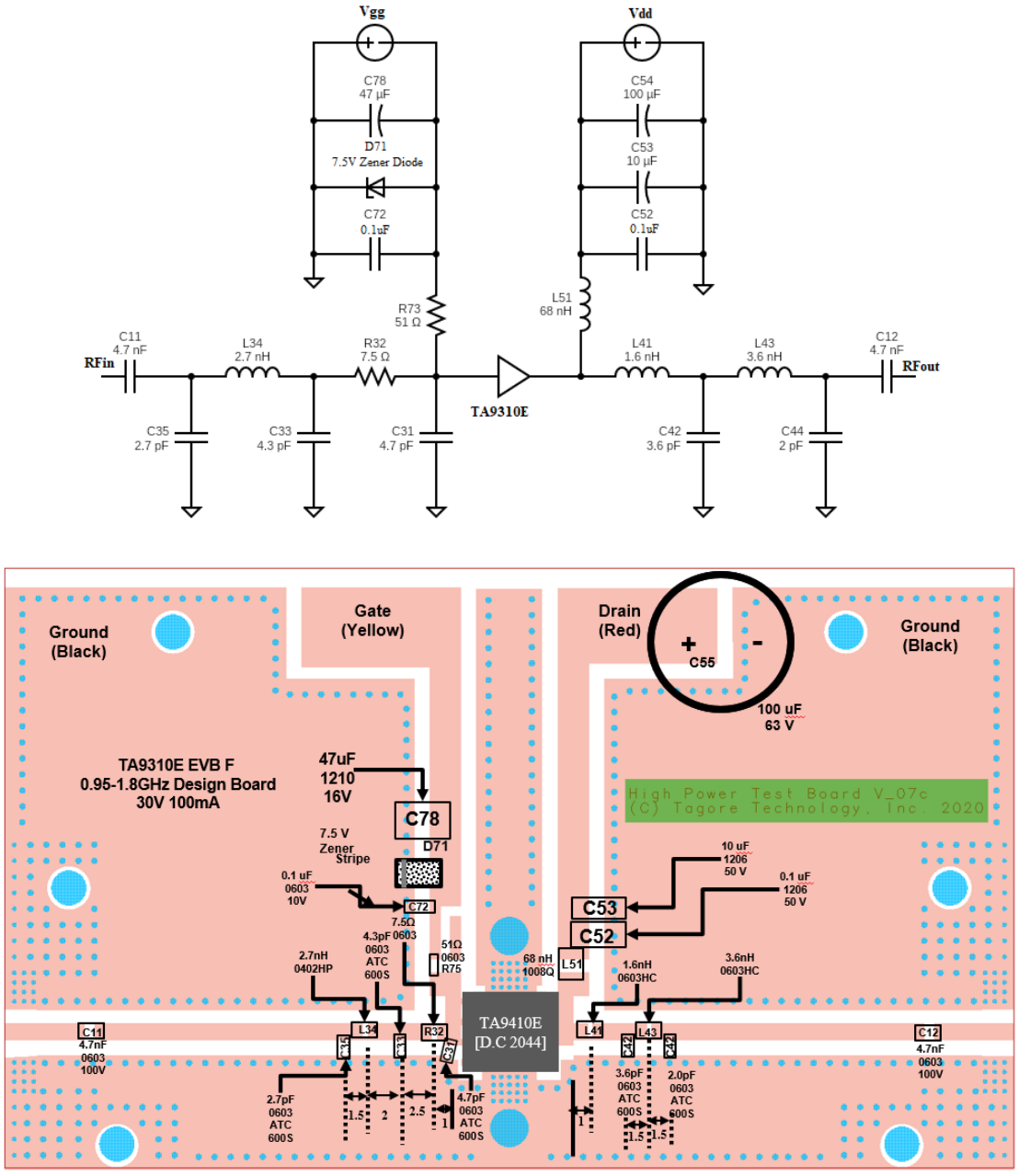

Figure 2.1 TA9310E-EVB-F 950MHz ~ 1800MHz Schematic and EVB Layout

3. TA9310E-EVB-F Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
C11, C12	4.7nF, 50V	Murata	GRM1885C1H472JA01
C31	4.7pF	AVX	600S4R7AT250XT
R32	7.5Ω	Vishay/Dale	CRCW06037R50FKEAHP
C33	4.3pF	AVX	600S4R3AT250XT
L34	2.7nH	Coil craft	0603HP-2N7XGLW
C35	2.7pF	AVX	600S2R7AT250XT
L41	1.6nH	Coil craft	0603HC-1N6XJLW
C42	3.6pF	AVX	600S3R6AT250XT
L43	3.6nH	AVX	0603HC-3N6XJLW
C44	2.0pF	AVX	600S2R0AT250XT
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, 0.5W Zener	On Semiconductor	SZMMSZ5236BT1G
C72	0.1µF, 10V	AVX	0603ZC104K4T2A
R75	51Ω	Vishay/Dale	CRCW060351R0FKEAHP
C78	47µF, 16V	Murata	GRM32ER61C476ME15L
Q1	20Watt GaN Transistor	Tagore Technology	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 30V 100mA Electrical Characteristics Summary

6. TA9310E-EVB-F Test Results

All the tests are carried out at room temperature.

6.1. S parameters

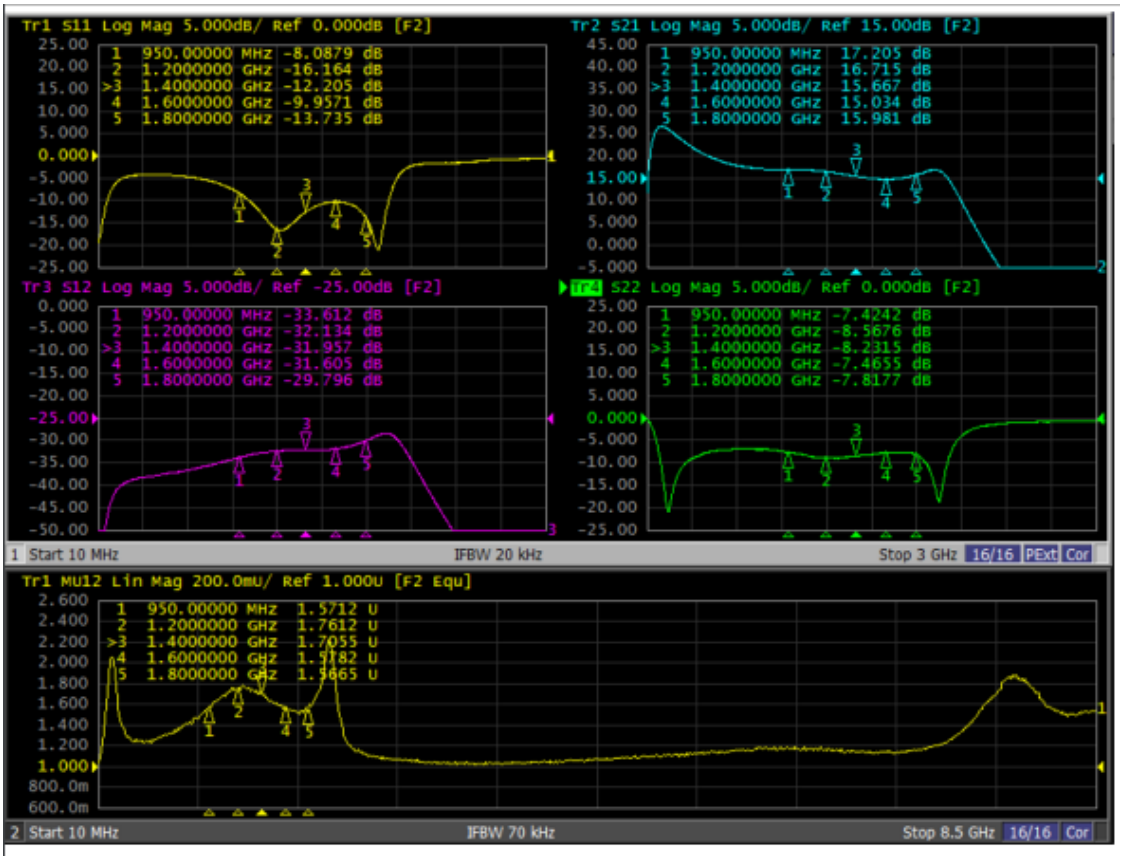

Figure 6.1.1. S parameters of TA9310E-EVB-F 30V 100mA

6.2. Large Signal Test Results

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

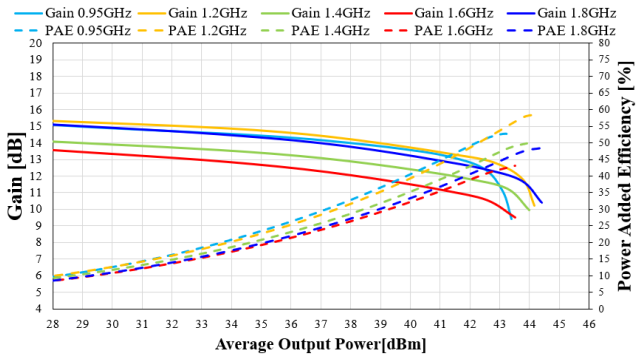

Figure 6.2.1. Gain and PAE vs P_{OUT} of TA9310E-EVB-F for 30V 100mA for freq:950-1800MHz

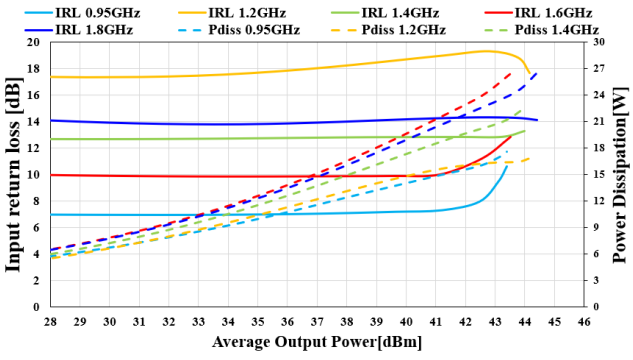

Figure 6.2.2. IRL and Pdiss vs P_{OUT} of TA9310E-EVB-F for 30V 100mA for freq:950-1800MHz

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