TA9210D

12.5 W CW 0.03 – 4.0 GHz GaN Power Transistor

Application Note: TA9210D EVB A2

Application Note

30 MHz~1000 MHz

32 V/ 28 V, 50 mA

Rev-2.1

List of Contents

1. General Description

The TA9210D is a broadband capable 12.5 W GaN power transistor covering 30 MHz to 2.7 GHz frequency band with a single match. TA9210D is usable up to 4 GHz. The input and output can be matched for best power and efficiency for the desired band.

The TA9210D is packaged in a compact, low-cost Quad Flat No lead (QFN) 3 x 6 x 0.75 mm, 32 leads plastic package. TA9210D-EVB-A2 is tuned from 30 MHz to 1 GHz.

2. TA9210D-EVB-A2 Board Details

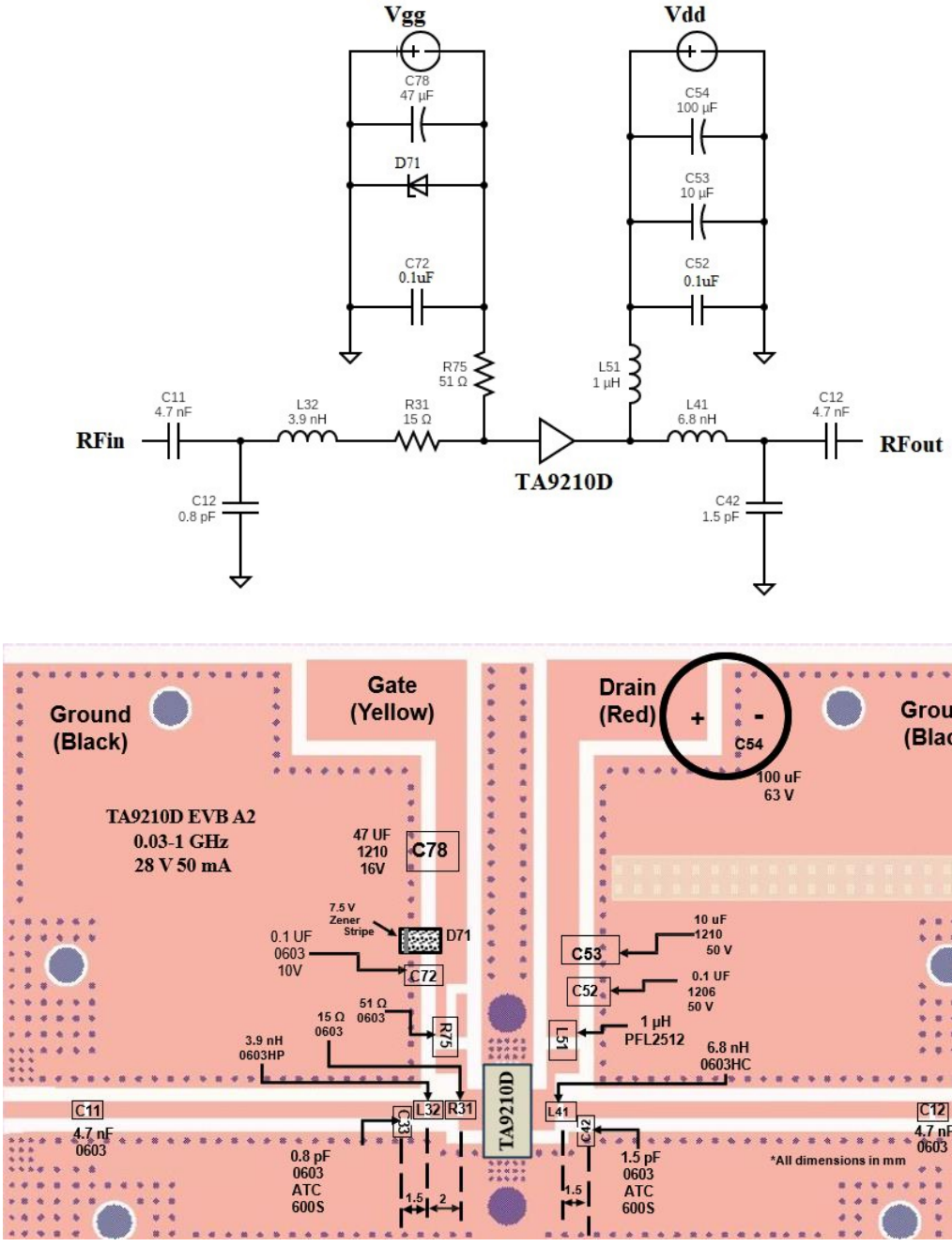

Figure 2.1 TA9210D-EVB-A2 30 MHz ~ 1000 MHz Schematic and EVB Layout

3. TA9210D-EVB-A2 Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
C11, C12	4.7 nF, 50 V	Murata	GRM1885C1H472JA01
R31	15 Ω	Vishay/Dale	CRCW060315R0FKEAHP
L32	3.9 nH	Coil craft	0603HP-3N9XGLW
C33	0.8 pF	AVX	600S0R8AT250XT
L41	6.8 nH	Coil craft	0603HC-6N8XJLW
C42	1.5 pF	AVX	600S1R5BT250XT
L51	1 µH	Coil craft	PFL2512-102MEB
C52	0.1 µF, 50 V	Murata	GRM31C5C1H104JA01L
C53	10 µF, 50 V	Murata	GRM32ER71H106KA12L
C54	100 µF, 63 V	Nichicon	UPW1J101MPD1TD
D71	7.5 V, 0.5 W Zener	On Semiconductor	SZMMSZ5236BT1G
C72	0.1 µF, 10 V	AVX	0603ZC104K4T2A
R75	51 Ω	Vishay/Dale	CRCW060351R0FKEAHP
C78	47 uF, 16 V	Murata	GRM32ER61C476ME15L
TA9210D	12.5 W GaN transistor	Tagore Tech	TA9210D
PCB	Rogers RO4350B, 20mils, 2oz copper		

Table 3.1 TA9210D-EVB-A2 BOM

4. TA9210D-EVB-A2 Biasing Sequence

Turn ON Device	Turn OFF Device
1. Set V_G to -5 V 2. Set V_D to +32 V/ 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 TA9210D-EVB-A2 Bias and Sequencing

5. TA9210D-EVB-A2 Board Measurement Summary

Frequency (MHz)	S21-Gain(dB)	S11(dB)	S22(dB)	Psat(dBm)	PAE (%) @Psat
30	23.6	-16.7	-5.4	40.4	79
100	23.7	-16	-5.7	40.5	78
300	22.8	-13.3	-6.1	40.7	74
500	21.4	-11.1	-6.8	40.9	72
700	19.8	-10.1	-7.7	41.5	64
900	18.5	-9.2	-8.7	41.7	64
1000	17.8	-8.7	-9.0	41.2	64

Table 5.1 TA9210D-EVB-A2 32 V, 50 mA Electrical Characteristics Summary

6. TA9210D-EVB-A2 Test Results

All the tests are carried out at room temperature.

6.1. S parameters

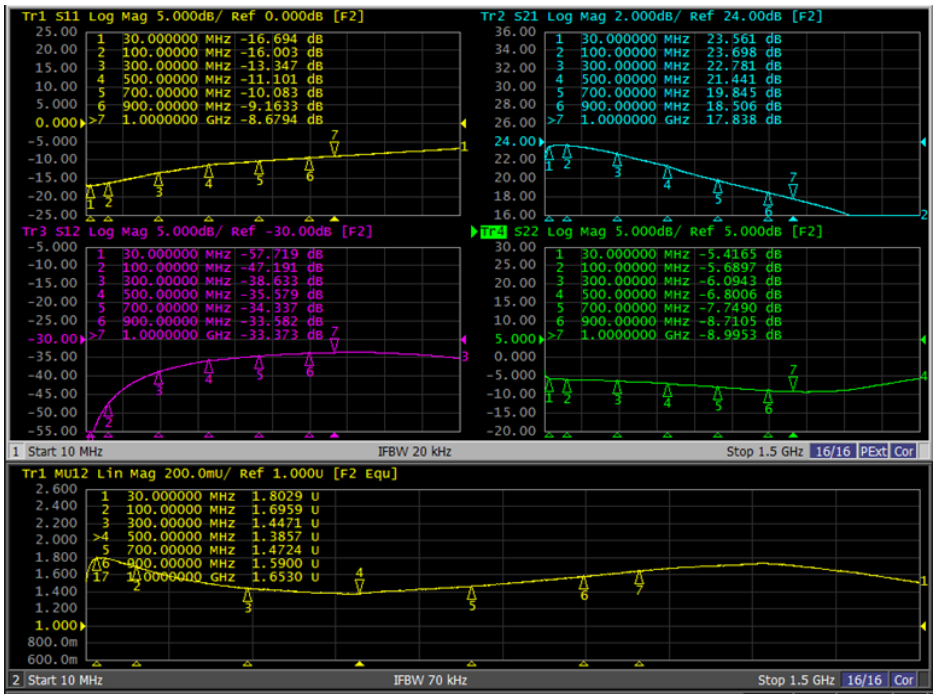

Figure 6.1.1. S parameters of TA9210D-EVB-A2 32 V, 50 mA

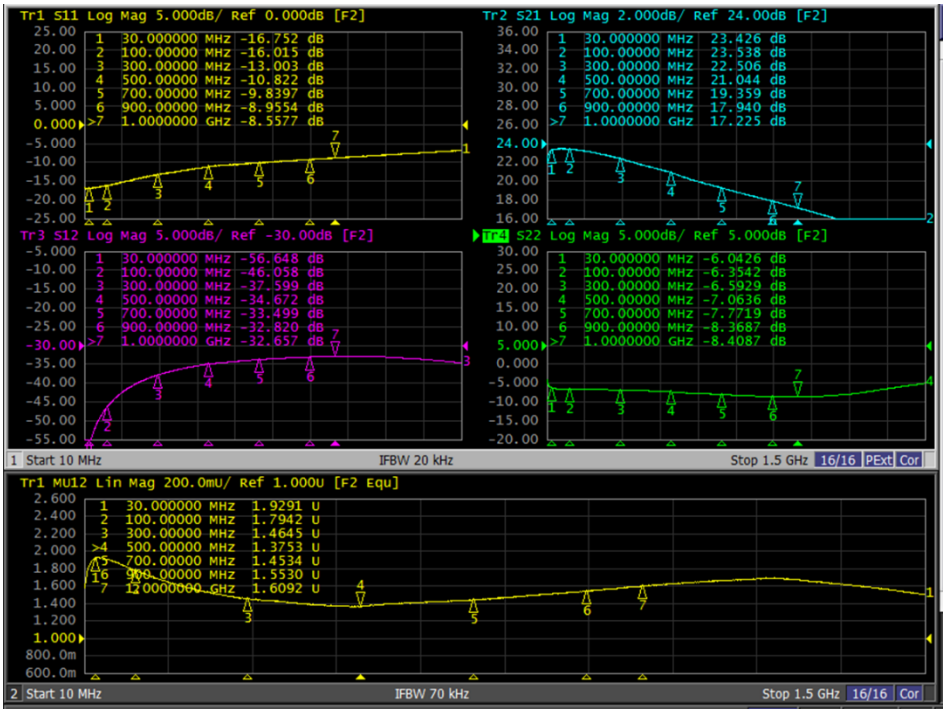

Figure 6.1.2. S parameters of TA9210D-EVB-A2 28 V, 50 mA

6.2. Large Signal Test Results

Gain and PAE Vs P_{OUT} data and IRL, Pdiss Vs P_{OUT} [Vd=32 V, I_{DQ}=50 mA, CW]

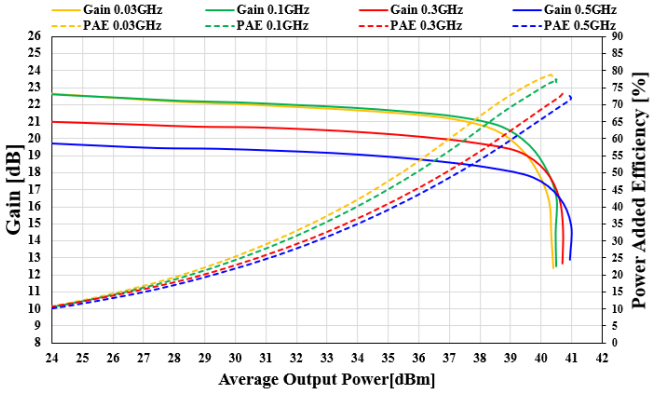

Figure 6.2.1. Gain and PAE vs P_{OUT} of TA9210D-EVB-A2 for 32 V, 50 mA for freq: 30-500 MHz

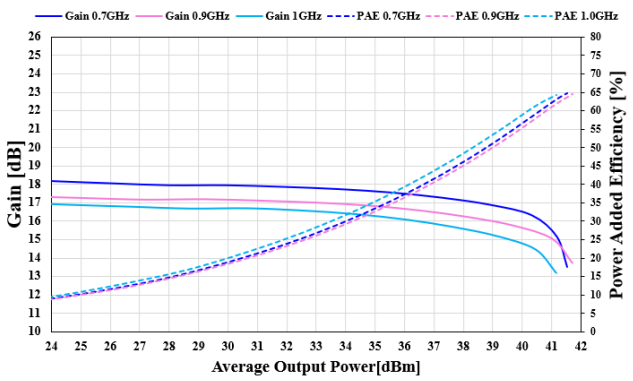

Figure 6.2.2. Gain and PAE vs P_{OUT} of TA9210D-EVB-A2 for 32 V, 50 mA for freq: 700-1000 MHz

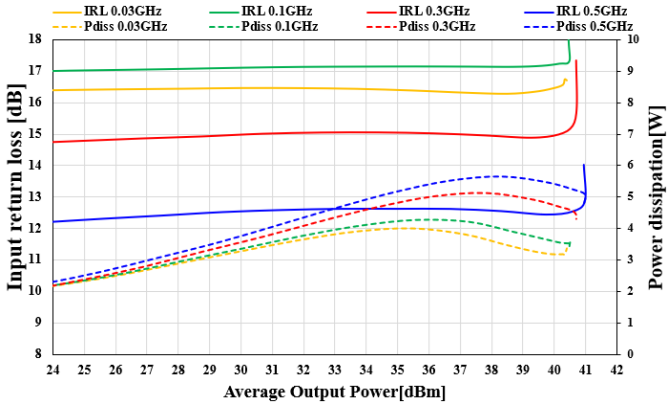

Figure 6.2.3. IRL and Pdiss vs P_{OUT} of TA9210D-EVB-A2 for 32 V, 50 mA for freq: 30-500 MHz

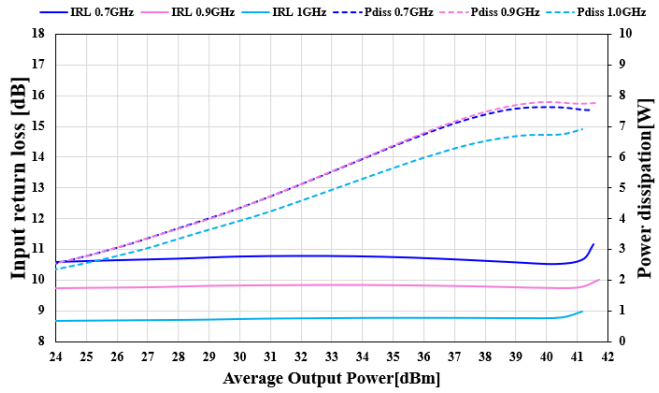

Figure 6.2.4. IRL and Pdiss vs P_{OUT} of TA9210D-EVB-A2 for 32 V, 50 mA for freq: 700-1000 MHz

Gain and PAE Vs P_{OUT} data and IRL, Pdiss Vs P_{OUT} [Vd=28 V, I_{DQ}=50 mA, CW]

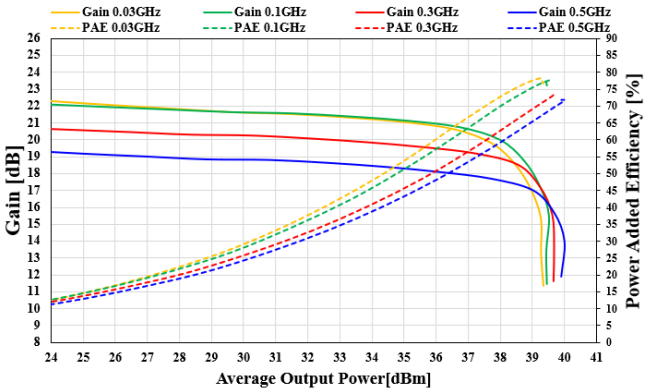

Figure 6.2.5. Gain and PAE vs P_{OUT} of TA9210D-EVB-A2 for 28 V, 50 mA for freq: 30-500 MHz

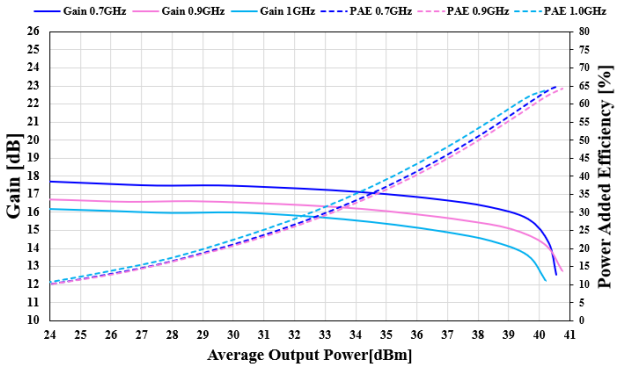

Figure 6.2.6. Gain and PAE vs P_{OUT} of TA9210D-EVB-A2 for 28 V, 50 mA for freq: 700-1000 MHz

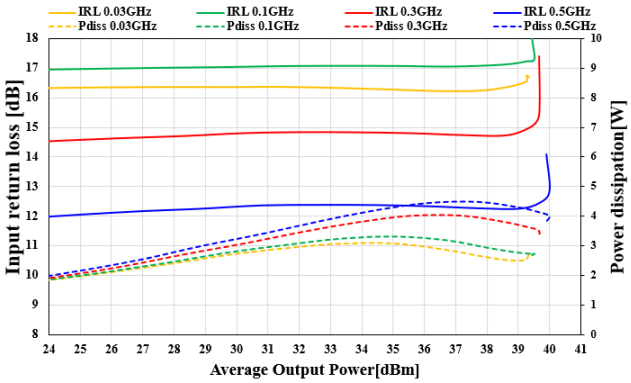

Figure 6.2.7. IRL and Pdiss vs P_{OUT} of TA9210D-EVB-A2 for 28 V, 50 mA for freq: 30-500 MHz

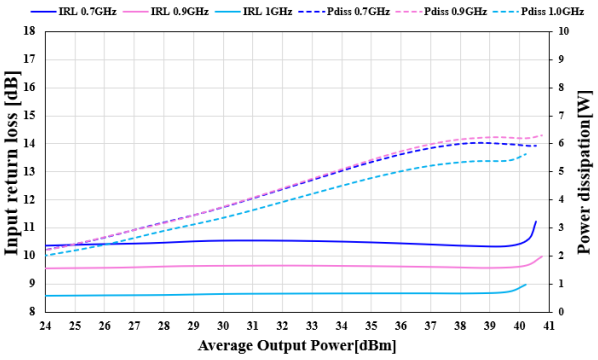

Figure 6.2.8. IRL and Pdiss vs P_{OUT} of TA9210D-EVB-A2 for 28 V, 50 mA for freq: 700-1000 MHz

Edition Revision 2.1 - 2024-07-30

Published by

Tagore Tech Inc.

601 W Campus Dr. Ste C1

Arlington Heights, IL 60004, USA

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