TA9210D

12.5 W CW 0.03 – 4.0 GHz GaN Power Transistor

Application Note: TA9210D EVB E

Application Note

30 MHz~512 MHz

32 V/ 28 V, 50 mA

Rev-2.3

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 4GHz. 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-E is tuned from 30 MHz to 512 MHz.

2. TA9210D-EVB-E Board Details

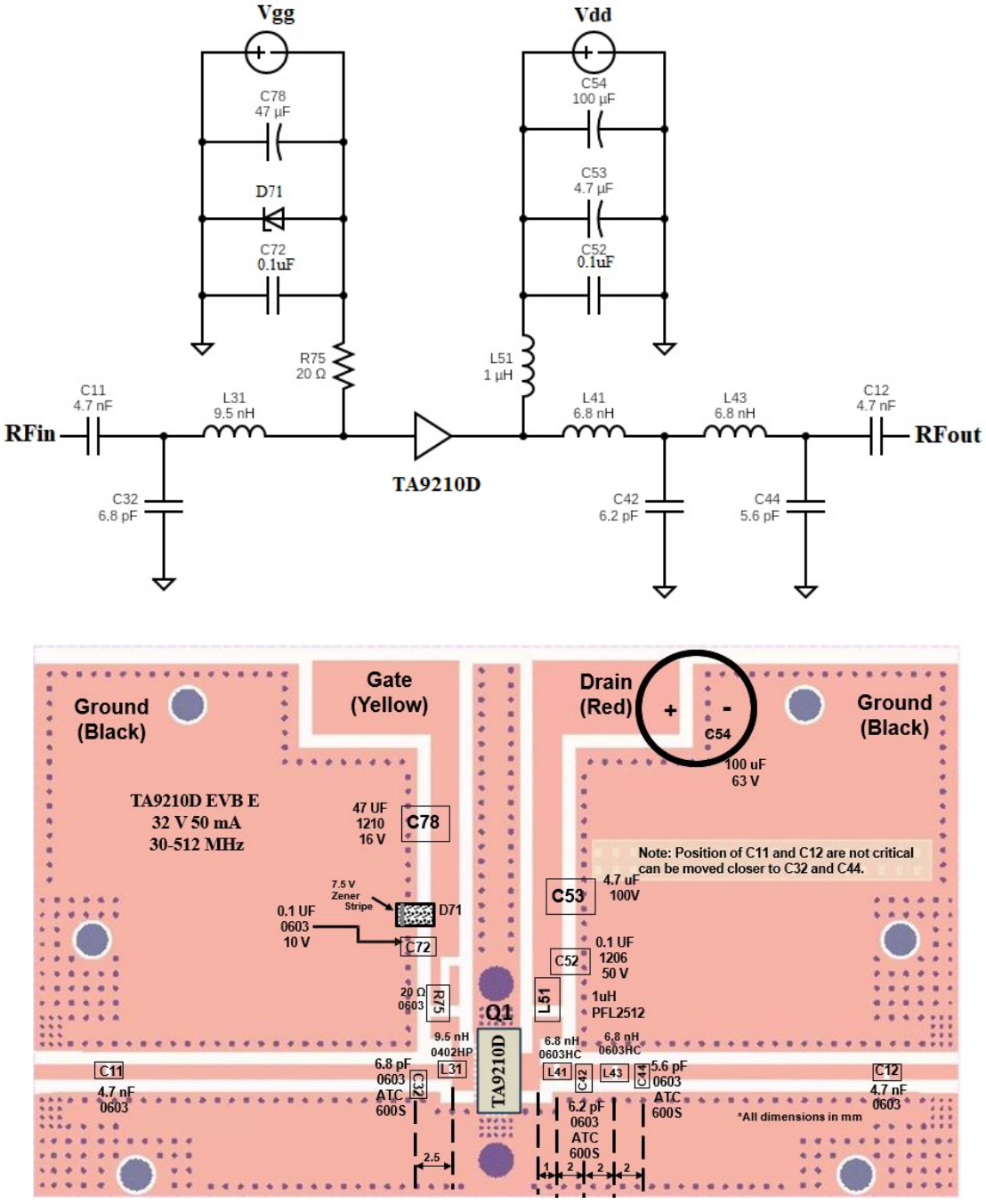

Figure 2.1 TA9210D-EVB-E 30 MHz ~ 512 MHz Schematic and EVB Layout

3. TA9210D-EVB-E Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
C11, C12	4.7 nF, 50 V	Murata	GRM1885C1H472JA01D
L31	9.5 nH	Coil craft	0402HP-9N5XJLU
C32	6.8 pF	AVX	600S6R8JT250XT
L41, L43	6.8 nH	Coil craft	0603HC-6N8XJLU
C42	6.2 pF	AVX	600S6R2BT250XT
C44	5.6 pF	AVX	600S5R6CT250XT
L51	1 µH	Coil craft	PFL2512-102MEC
C52	0.1 µF, 50V	Murata	GRM31C5C1H104JA01L
C53	4.7 µF, 100V	Murata	GCM32DC72A475KE02L
C54	100 µF, 63V	Nichicon	UPW1J101MPD1TD
D71	7.5 V Zener	On Semiconductor	SZMMSZ5236BT1G
C72	0.1 µF, 10V	AVX	0603ZC104K4T2A
R75	20 Ω	Panasonic	ERJ-PA3F20R0V
C78	47 µF, 16 V	Murata	GRM32ER61C476ME15L
Q1	12.5 W power transistor	Tagore Tech	TA9210D
PCB	Rogers RO4350B, 20 mils, 2 oz copper		

Table 3.1 TA9210D-EVB-E BOM

4. TA9210D-EVB-E 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-E Bias and Sequencing

5. TA9210D-EVB-E Board Measurement Summary

Frequency (MHz)	S21 Gain(dB)	S11 (dB)	S22 (dB)	Psat (dBm)	PAE (%) @Psat
30	19.8	-7.6	-5.7	40.1	69
100	19.8	-7.9	-5.1	40.8	69
200	19.2	-8.9	-3.8	41.0	72
300	18.9	-11.4	-3.1	41.0	61
400	19.1	-17.2	-2.9	42.0	62
512	19.6	-31.4	-3.1	42.0	56

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

6. TA9210D-EVB-E Test Results

All the tests are carried out at room temperature.

6.1. S parameters

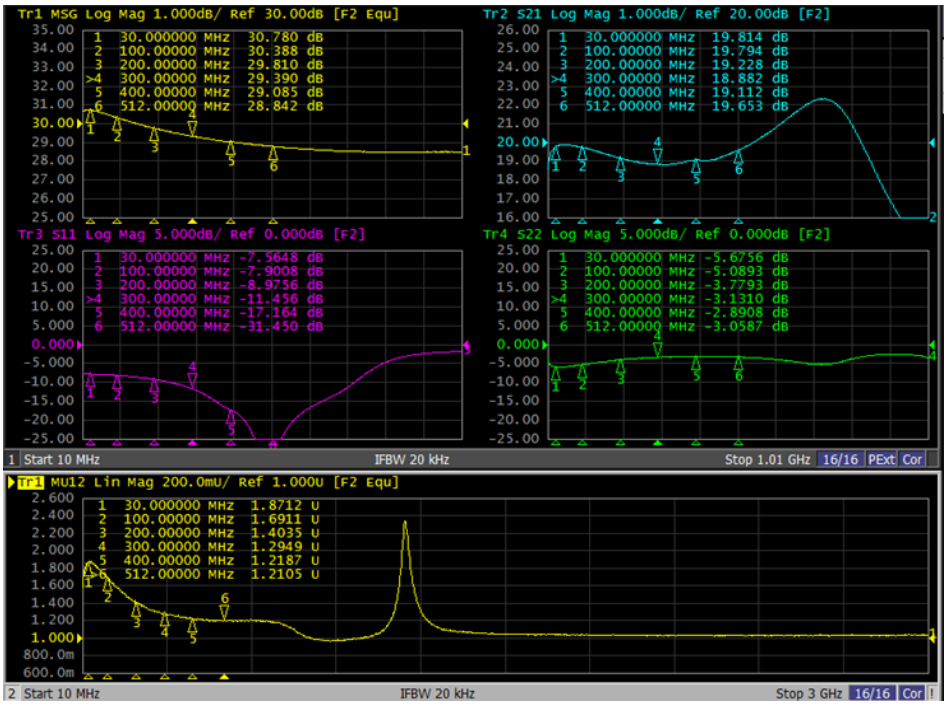

Figure 6.1.1. S parameters of TA9210D-EVB-E 32 V, 50 mA

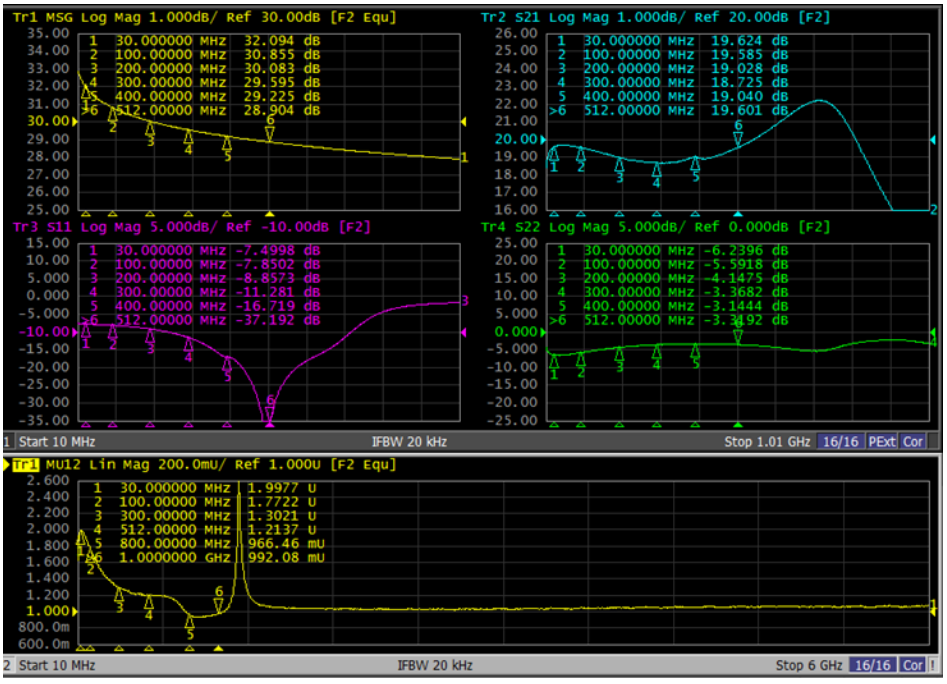

Figure 6.1.2. S parameters of TA9210D-EVB-E 28 V, 50 mA

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]

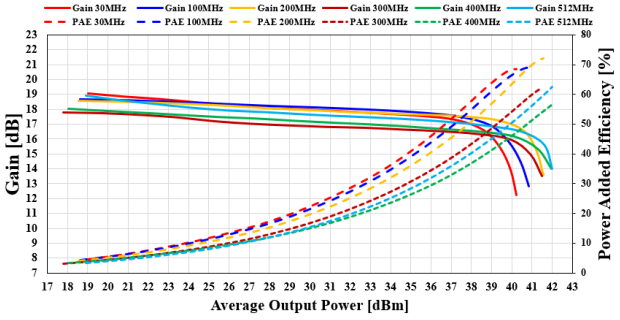

Figure 6.2.1. Gain and PAE vs P_{OUT} of TA9210D-EVB-E for 32 V, 50 mA

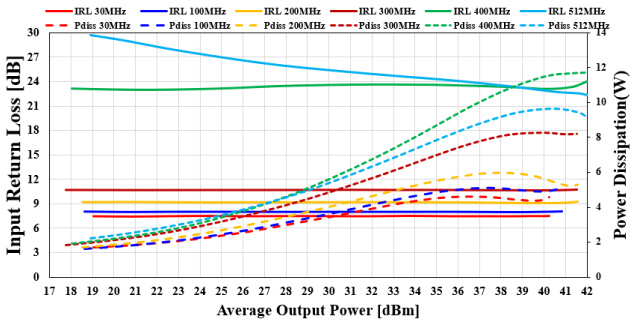

Figure 6.2.2. IRL and Pdiss vs P_{OUT} of TA9210D-EVB-E for 32 V, 50 mA

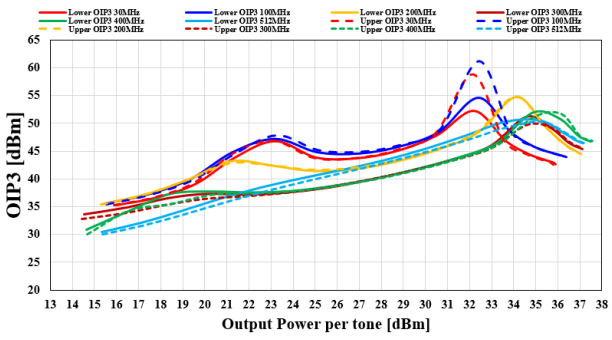

Figure 6.2.3. OIP3 vs P_{OUT} of TA9210D-EVB-E for 32 V, 50 mA

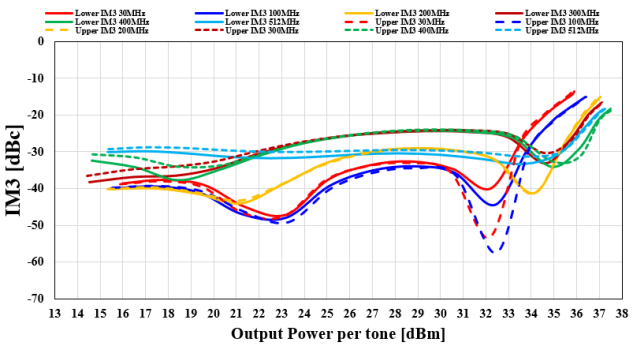

Figure 6.2.4. IM3 Vs P_{OUT} of TA9210D-EVB-E for 32 V, 50 mA

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

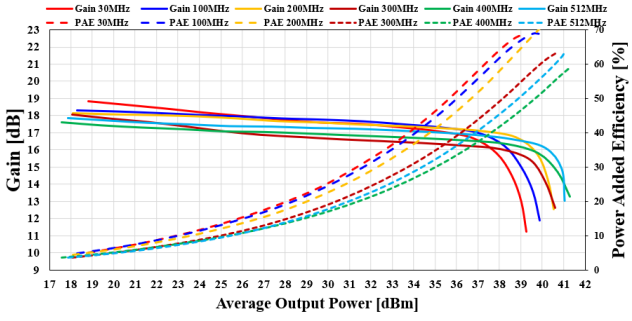

Figure 6.2.5. Gain and PAE vs P_{OUT} of TA9210D-EVB-E for 28 V, 50 mA

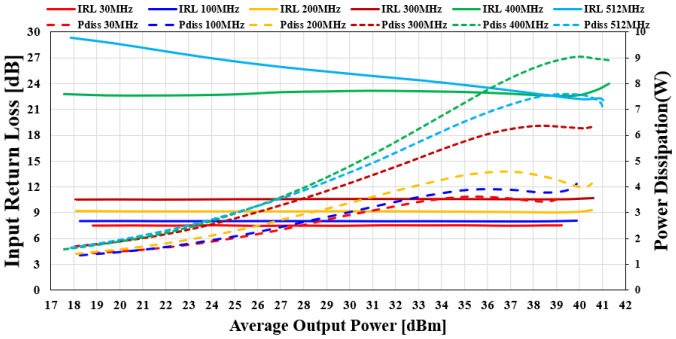

Figure 6.2.6. IRL and Pdiss vs P_{OUT} of TA9210D-EVB-E for 28 V, 50 mA

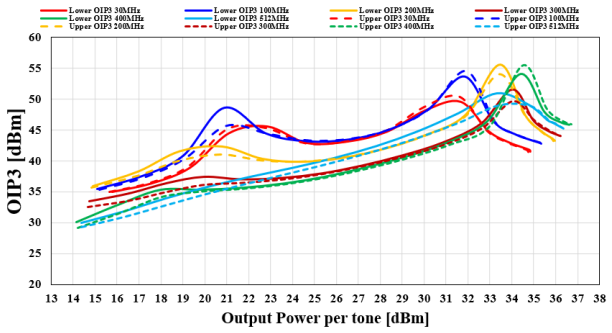

Figure 6.2.7. OIP3 vs P_{OUT} of TA9210D-EVB-E for 28 V, 50 mA

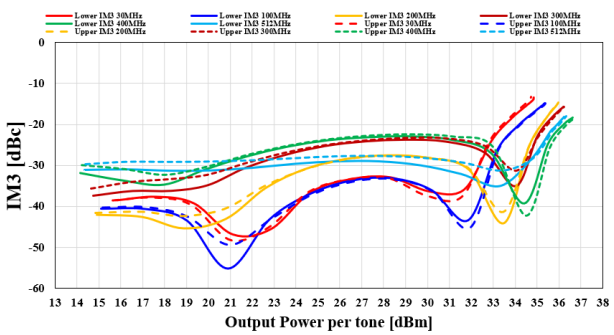

Figure 6.2.8. IM3 vs P_{OUT} of TA9210D-EVB-E for 28 V, 50 mA

Edition Revision 2.3 - 2024-07-30

Published by

Tagore Tech Inc.

601 W Campus Dr. Ste C1

Arlington Heights, IL 60004, USA

Legal Disclaimer

The information provided in this document shall in no event be regarded as a guarantee of conditions or characteristics. Tagore Tech assumes no responsibility for the consequences of the use of this information, nor for any infringement of patents or of other rights of third parties which may result from the use of this information. No license is granted by implication or otherwise under any patent or patent rights of Tagore Tech. The specifications mentioned in this document are subject to change without notice.

Information

For further information on technology, delivery terms and conditions and prices, please contact Tagore Tech: support@tagoretech.com.