Tagore Technology

TA9210D

12.5W CW 0.03 – 4.0 GHz GaN Power Transistor

Application Note: TA9210D EVB E

Application Note

30MHz~512MHz

32V/28V 50mA

Rev-1.3

List of Contents

1. General Description

The TA9210D is a broadband capable 12.5W GaN power transistor covering 30MHz to 2.7GHz 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) 3x6x0.75mm, 32 leads plastic package. TA9210D-EVB-E is tuned from 30MHz to 512MHz.

2. TA9210D-EVB-E Board Details

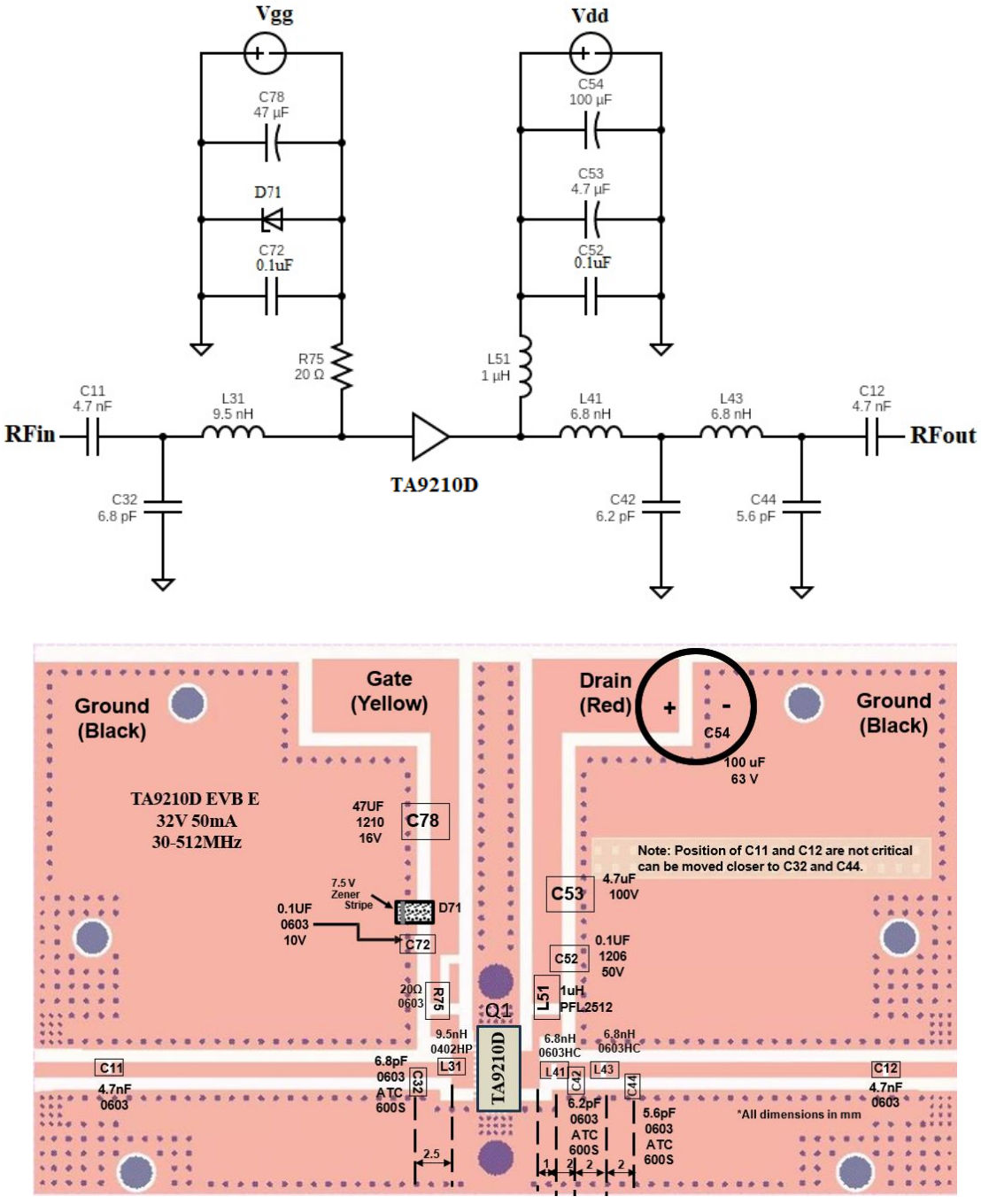

Figure 2.1 TA9210D-EVB-E 30MHz ~ 512MHz Schematic and EVB Layout

3. TA9210D-EVB-E Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
C11, C12	4.7 nF, 50V	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 uH	Coil craft	PFL2512-102MEC
C52	0.1 uF, 50V	Murata	GRM31C5C1H104JA01L
C53	4.7 uF,100V	Murata	GCM32DC72A475KE02L
C54	100uF,63V	Nichicon	UPW1J101MPD1TD
D71	7.5V Zener	On Semiconductor	SZMMSZ5236BT1G
C72	0.1 uF, 10V	AVX	0603ZC104K4T2A
R75	20 ohms	Panasonic	ERJ-PA3F20R0V
C78	47µF, 16V	Murata	GRM32ER61C476ME15L
Q1	12.5Watt power transistor	Tagore Technology	TA9210D
PCB	Rogers RO4350B, 20mils, 2oz 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 -5V 2. Set V_D to +32V/28V 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	72
300	18.9	-11.4	-3.1	41	61
400	19.1	-17.2	-2.9	42	62
512	19.6	-31.4	-3.1	42	56

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

6. TA9210D-EVB-E Test Results

All the tests are carried out at room temperature.

6.1. S parameters

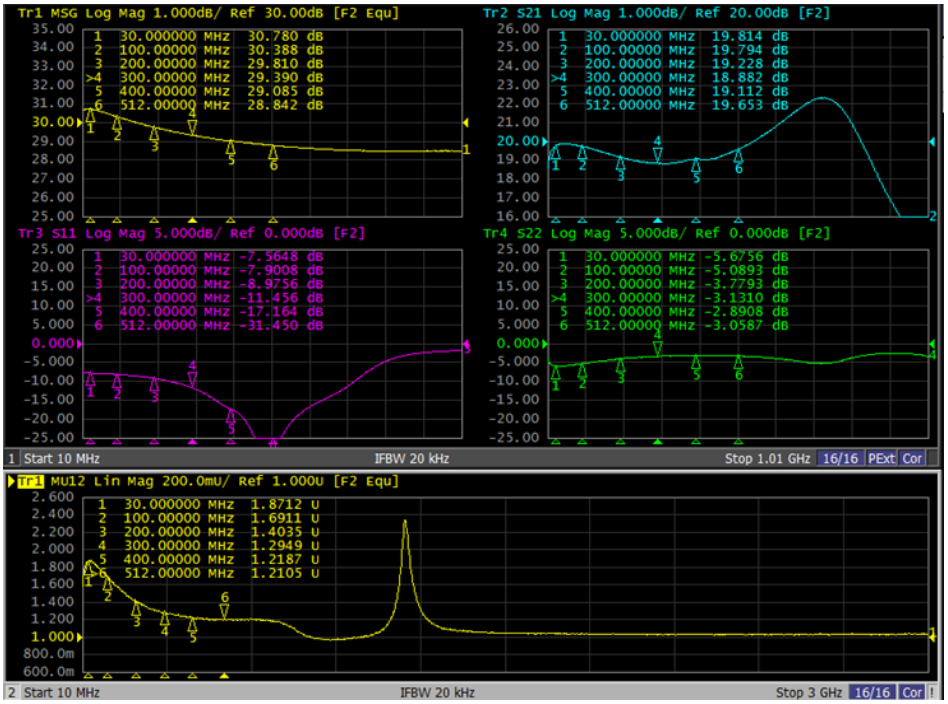

Figure 6.1.1. S parameters of TA9210D-EVB-E 32V 50mA

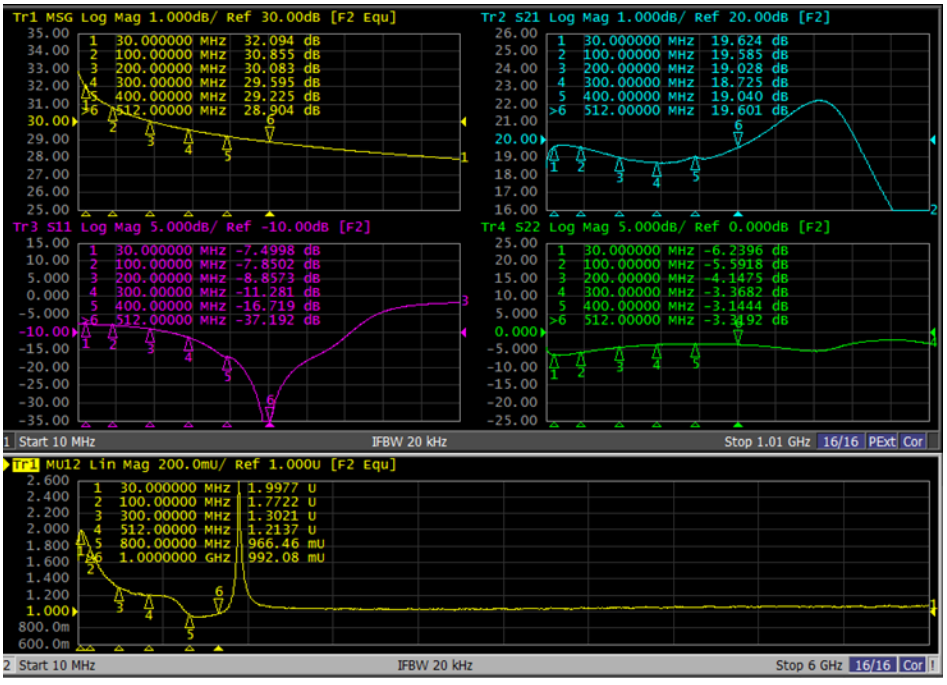

Figure 6.1.2. S parameters of TA9210D-EVB-E 28V 50mA

6.2. Large Signal Test Results

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

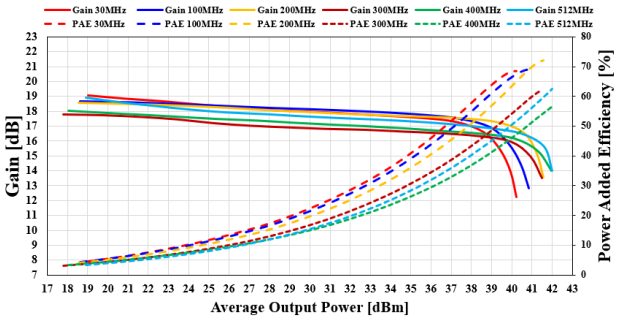

Figure 6.2.1. Gain and PAE vs P_{OUT} of TA9210D-EVB-E for 32V 50mA

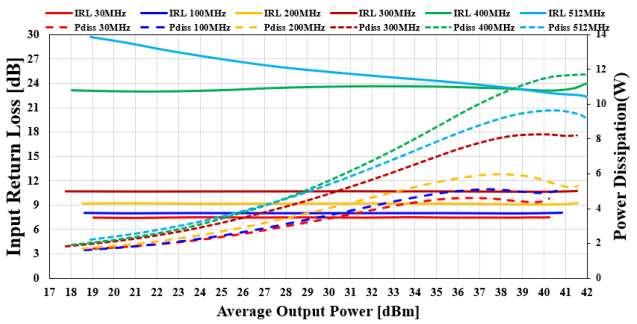

Figure 6.2.2. IRL and Pdiss vs P_{OUT} of TA9210D-EVB-E for 32V 50mA

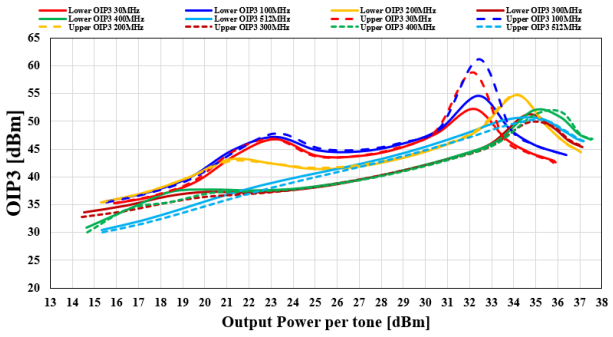

Figure 6.2.3. OIP3 vs P_{OUT} of TA9210D-EVB-E for 32V 50mA

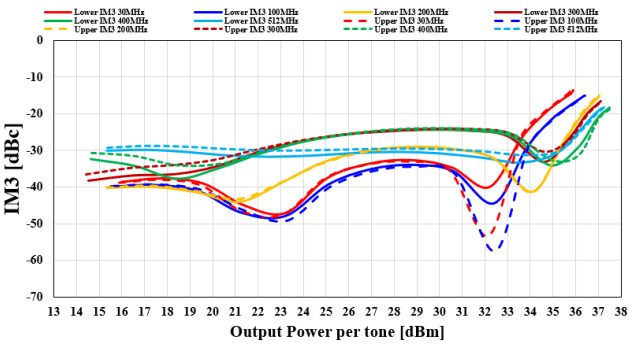

Figure 6.2.4. IM3 Vs P_{OUT} of TA9210D-EVB-E for 32V 50mA

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

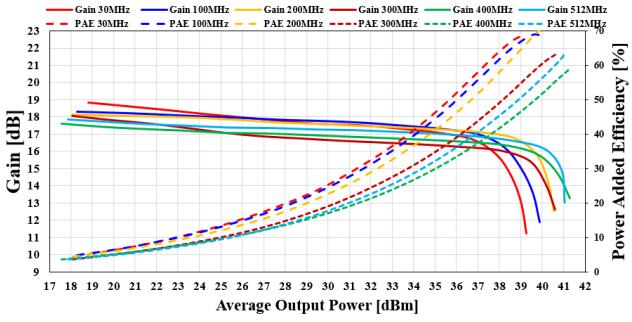

Figure 6.2.5. Gain and PAE vs P_{OUT} of TA9210D-EVB-E for 28V 50mA

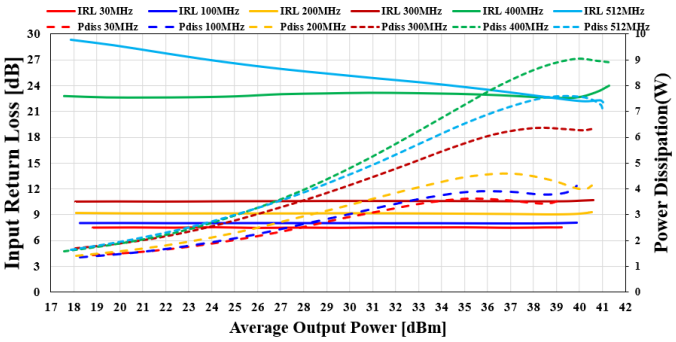

Figure 6.2.6. IRL and Pdiss vs P_{OUT} of TA9210D-EVB-E for 28V 50mA

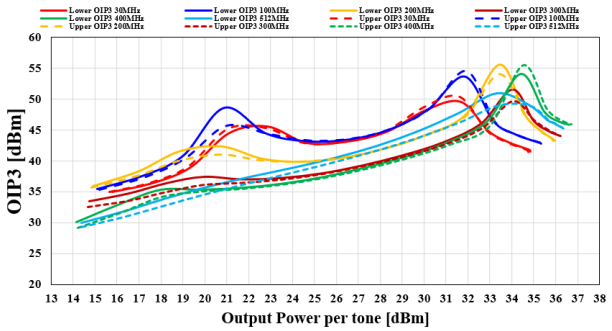

Figure 6.2.7. OIP3 vs P_{OUT} of TA9210D-EVB-E for 28V 50mA

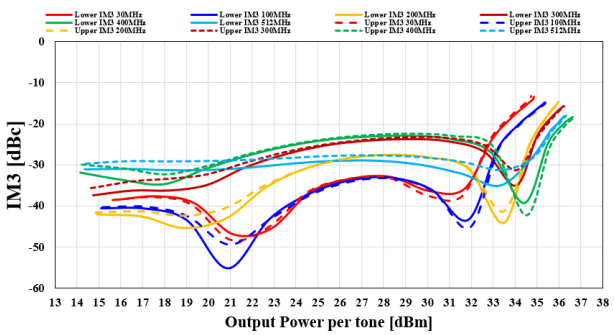

Figure 6.2.8. IM3 vs P_{OUT} of TA9210D-EVB-E for 28V 50mA

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