

TA9210D

12.5W CW 0.03 – 4.0 GHz GaN Power Transistor

Application Note: TA9210D EVB A2

Application Note

30MHz~1000MHz

32V/28V 50mA

Rev-1.1

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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-A2 is tuned from 30MHz to 1GHz.

2. TA9210D-EVB-A2 Board Details

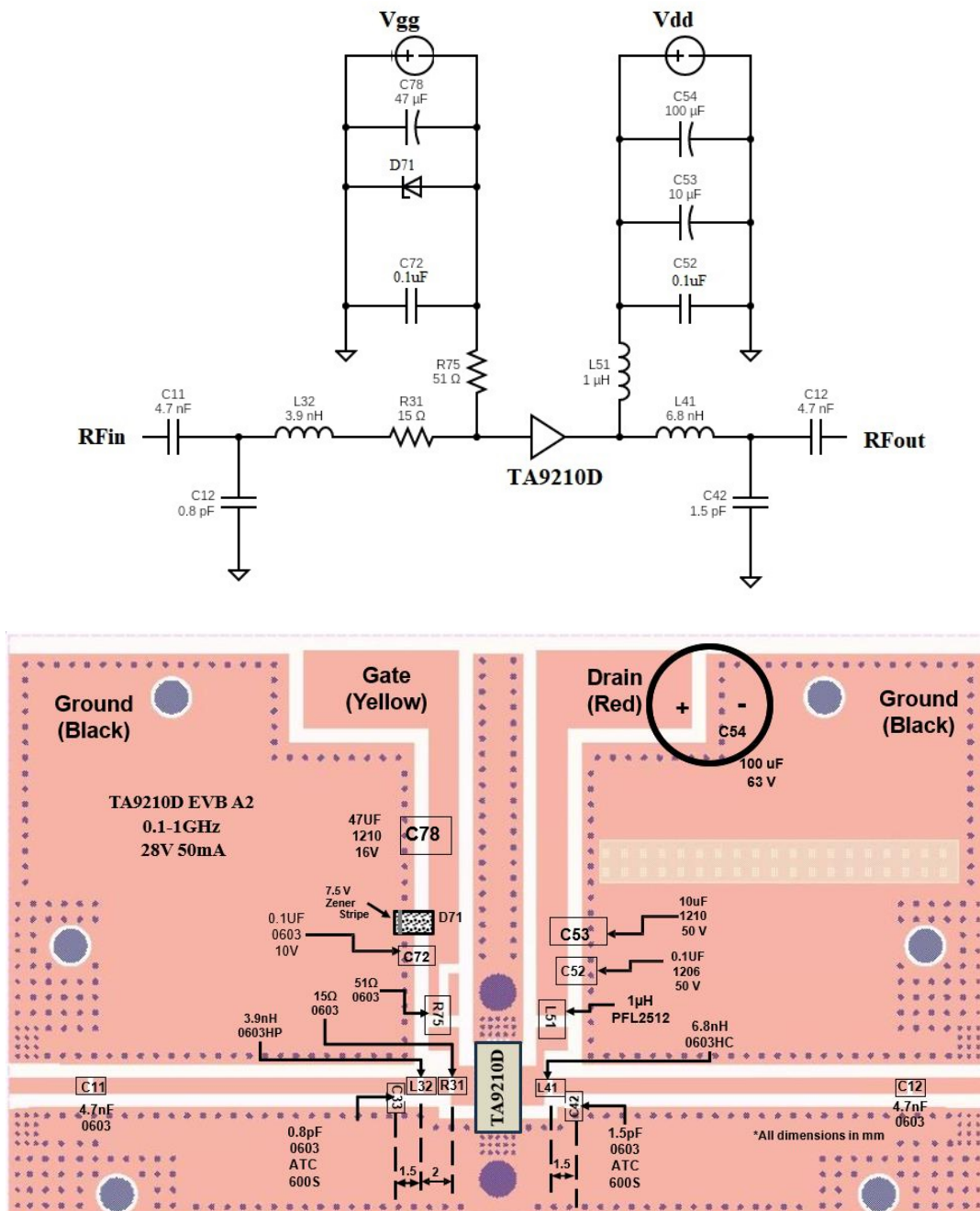


Figure 2.1 TA9210D-EVB-A2 30MHz ~ 1000MHz Schematic and EVB Layout

3. TA9210D-EVB-A2 Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
C11,C12	4.7nF, 50V	Murata	GRM1885C1H472JA01
R31	15Ω	Vishay/Dale	CRCW060315R0FKEAHP
L32	3.9nH	Coil craft	0603HP-3N9XGLW
C33	0.8pF	AVX	600S0R8AT250XT
L41	6.8nH	Coil craft	0603HC-6N8XJLW
C42	1.5pF	AVX	600S1R5BT250XT
L51	1μH	Coil craft	PFL2512-102MEB
C52	0.1μF, 50V	Murata	GRM31C5C1H104JA01L
C53	10μF, 50V	Murata	GRM32ER71H106KA12L
C54	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
TA9210D	12.5Watt GaN transistor	Tagore Technology	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 -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-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 32V 50mA Electrical Characteristics Summary

6. TA9210D-EVB-A2 Test Results

All the tests are carried out at room temperature.

6.1. S parameters

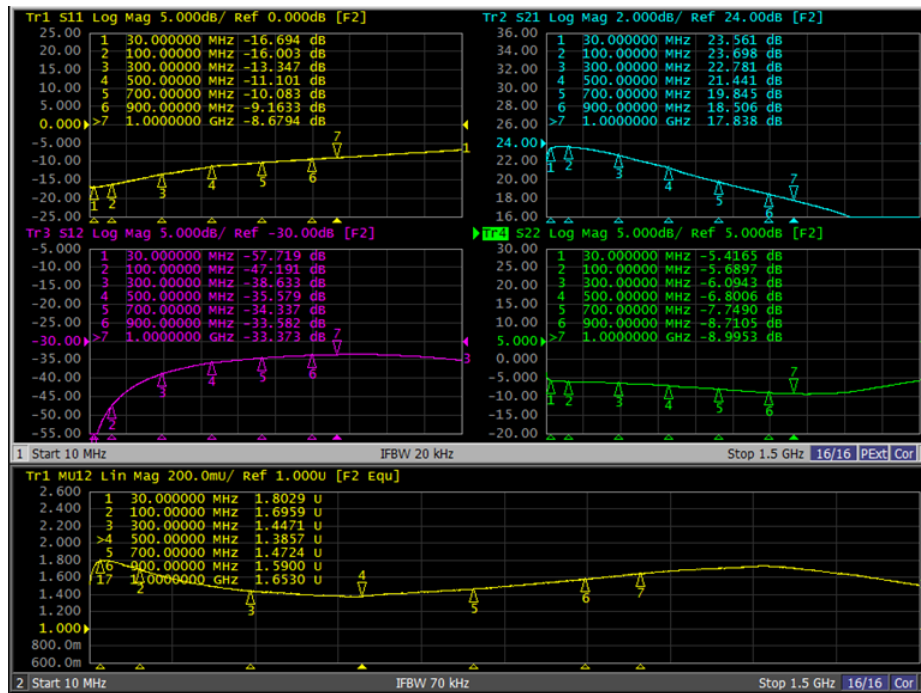


Figure 6.1.1. S parameters of TA9210D-EVB-A2 32V 50mA

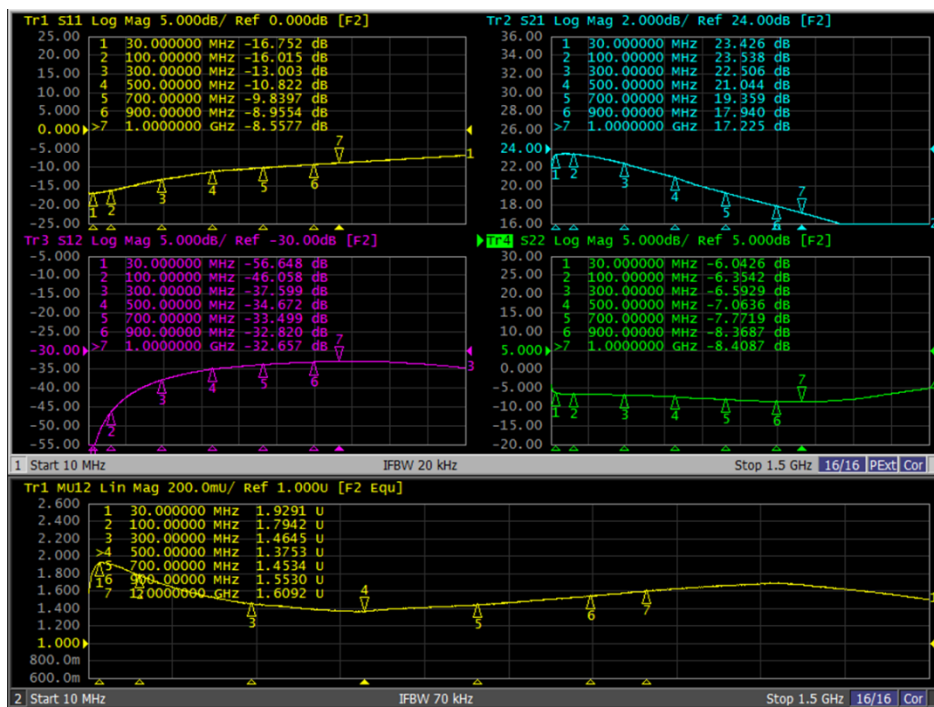


Figure 6.1.2. S parameters of TA9210D-EVB-A2 28V 50mA

6.2. Large Signal Test Results

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

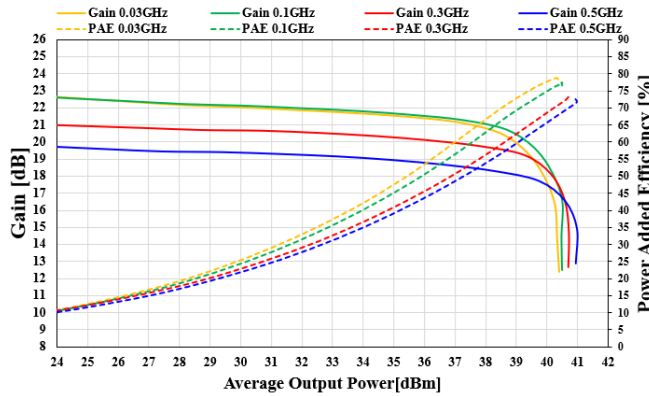


Figure 6.2.1. Gain and PAE vs P_{OUT} of TA9210D-EVB-A2 for 32V 50mA for freq:30-500MHz

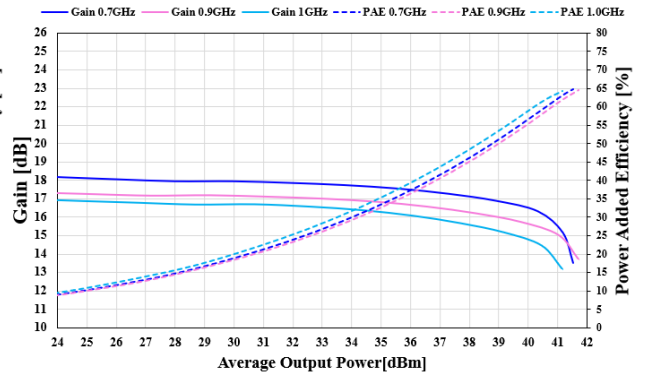


Figure 6.2.2. Gain and PAE vs P_{OUT} of TA9210D-EVB-A2 for 32V 50mA for freq:700-1000MHz

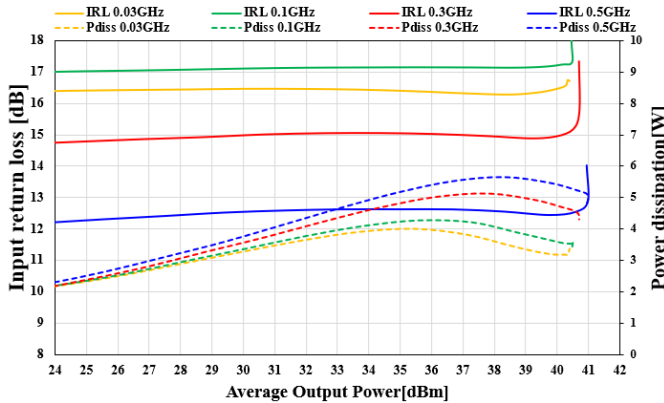


Figure 6.2.3. IRL and Pdiss vs P_{OUT} of TA9210D-EVB-A2 for 32V 50mA for freq:30-500MHz

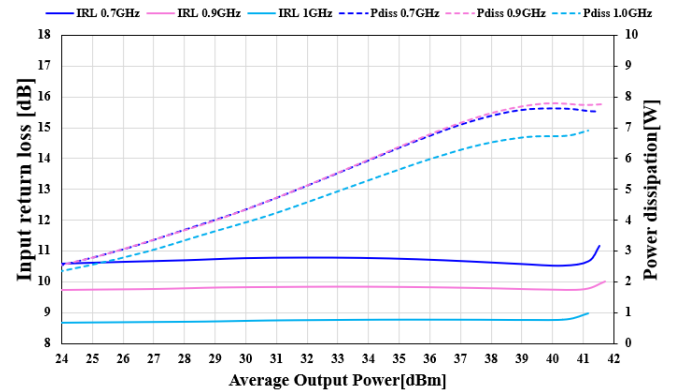


Figure 6.2.4. IRL and Pdiss vs P_{OUT} of TA9210D-EVB-A2 for 32V 50mA for freq:700-1000MHz

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

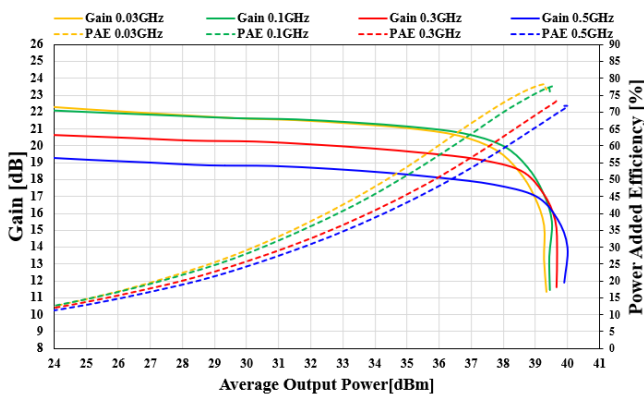


Figure 6.2.5. Gain and PAE vs P_{OUT} of TA9210D-EVB-A2 for 28V 50mA for freq:30-500MHz

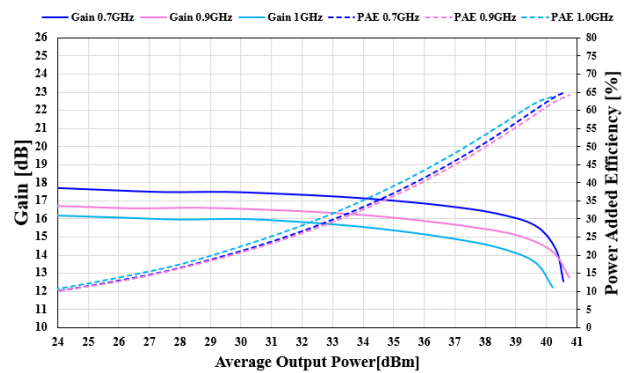


Figure 6.2.6. Gain and PAE vs P_{OUT} of TA9210D-EVB-A2 for 28V 50mA for freq:700-1000MHz

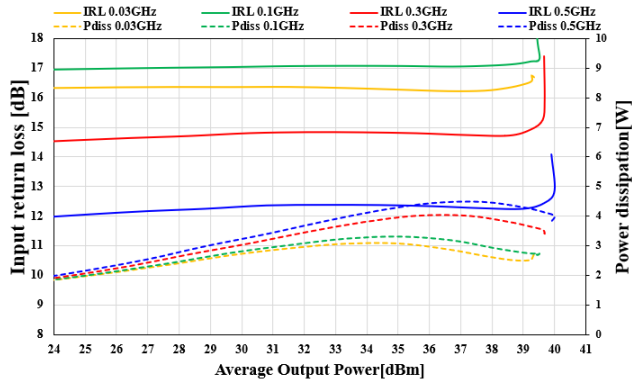


Figure 6.2.7. IRL and Pdiss vs P_{OUT} of TA9210D-EVB-A2 for 28V 50mA for freq:30-500MHz

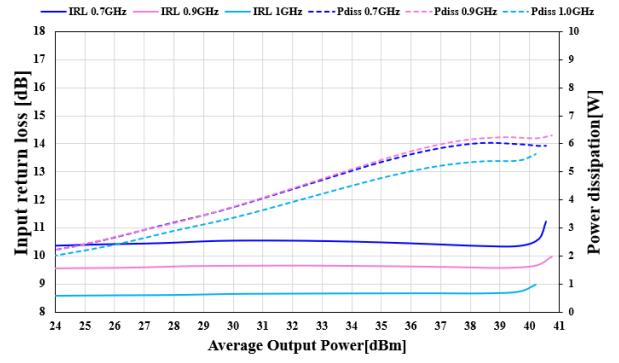


Figure 6.2.8. IRL and Pdiss vs P_{OUT} of TA9210D-EVB-A2 for 28V 50mA for freq:700-1000MHz

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