

TA9210D

12.5 W CW 0.03 – 4.0 GHz GaN Power Transistor

Application Note: TA9210D EVB B

Application Note

1800 MHz~2600 MHz

32 V/ 28 V, 50 mA

Rev-2.2

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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-B is tuned from 1.8 GHz to 2.6 GHz.

2. TA9210D-EVB-B Board Details

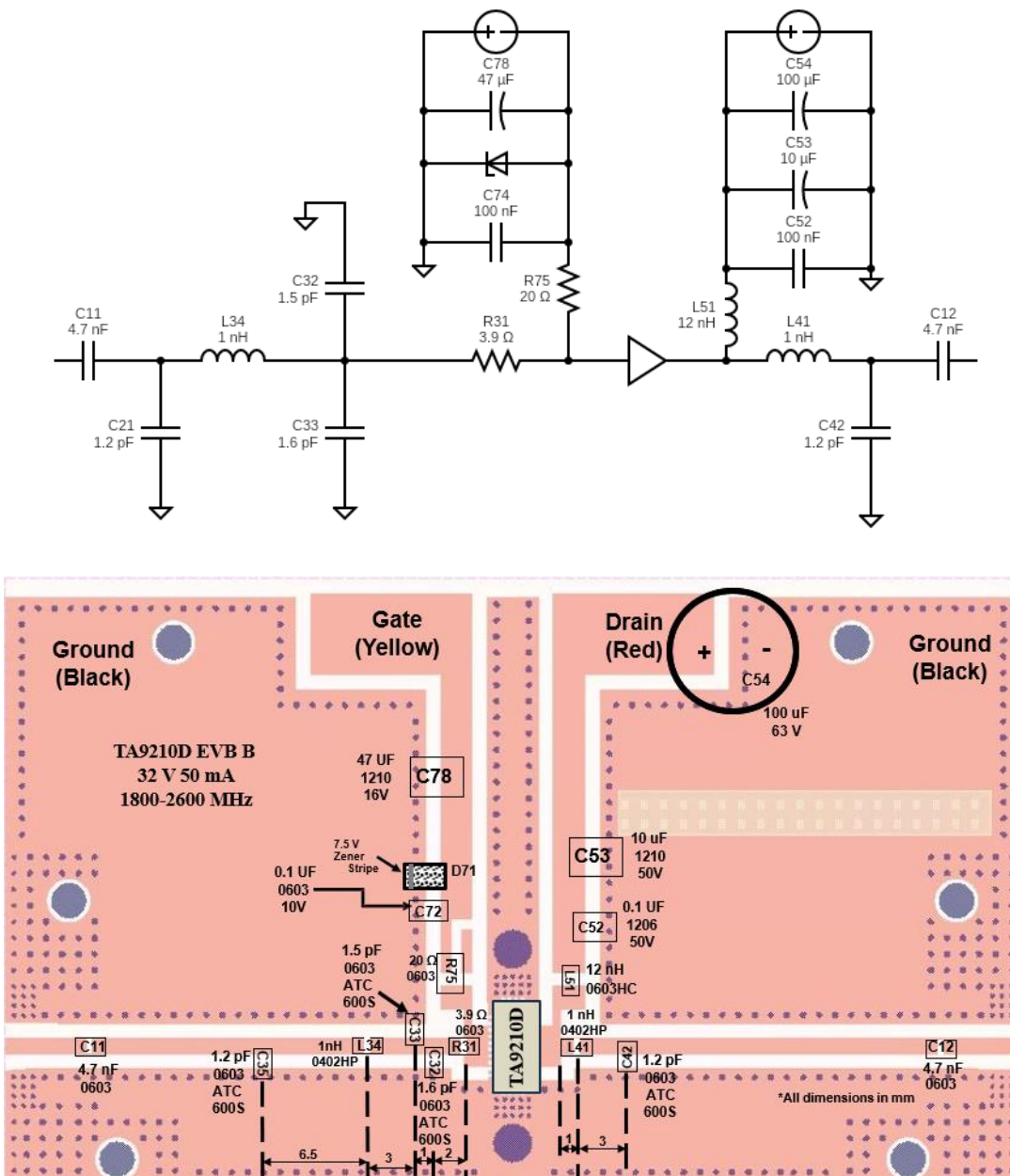


Figure 2.1 TA9210D-EVB-B 1800 MHz ~ 2600 MHz Schematic and EVB Layout

3. TA9210D-EVB-B Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
C11, C12	4.7 nF, 50 V	Murata	GRM1885C1H472JA01
R31	3.9 Ω , 250 mW	Panasonic	ERJ-PA3J3R9V
C32	1.6 pF	AVX	600S1R6CT250XT
C33	1.5 pF	AVX	600S1R5CT250XT
L34, L41	1.0 nH	Coil craft	0402HP-1N0XJL
C35, L42	1.2 pF	AVX	600S1R2CT250XT
L51	12 nH	Coil craft	0603HC-12NXJLW
C52	0.1 μ F, 50 V	Murata	GRM31C5C1H104JA01L
C53	10 μ F, 50 V	Murata	GRM32ER71H106KA12L
C54	100 μ F, 63 V	Nichicon	UPW1J101MPD1TD
D71	7.5 V, 0.5 W Zener	On Semiconductor	SZMMSZ5236BT 1G
C72	0.1 μ F, 10 V	AVX	0603ZC104K4T2A
R75	20 Ω , 250 mW	Panasonic	ERJ-PA3F20R0V
C78	47 μ F, 16 V	Murata	GRM32ER61C476ME15L
Q1	12.5 W GaN transistor	Tagore Tech	TA9210D
PCB	Rogers RO4350B, 20 mils, 2 oz copper		

Table 3.1 TA9210D-EVB-B BOM

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

5. TA9210D-EVB-B Board Measurement Summary

Frequency (MHz)	S21 Gain(dB)	S11 (dB)	S22 (dB)	Psat (dBm)	PAE (%) @Psat	ACPR & AACPR
1800	17	-8.1	-5.2	36.5	35	ACPR less than -35 dBc and AACPR less than -50 dBc for Average power up to 36 dBm With LTE 9.5 dB PAPR 10 MHz BW
2300	15.7	-7.4	-8.7	35.8	34	
2700	15	-15.5	-12.2	35.3	44	

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

6. TA9210D-EVB-B Test Results

All the tests are carried out at room temperature.

6.1. S parameters

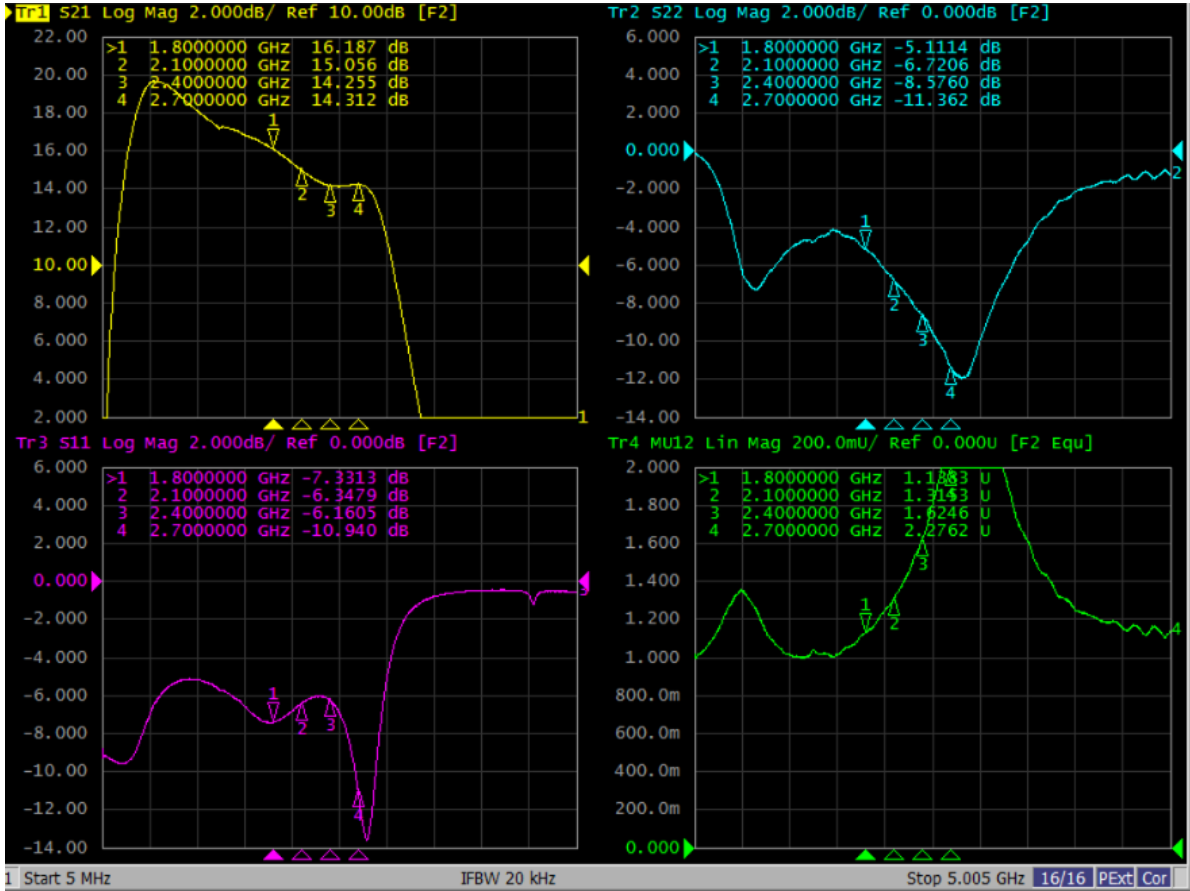


Figure 6.1.1. S parameters of TA9210D-EVB-B 32 V, 50 mA

6.2. Large Signal Test Results

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

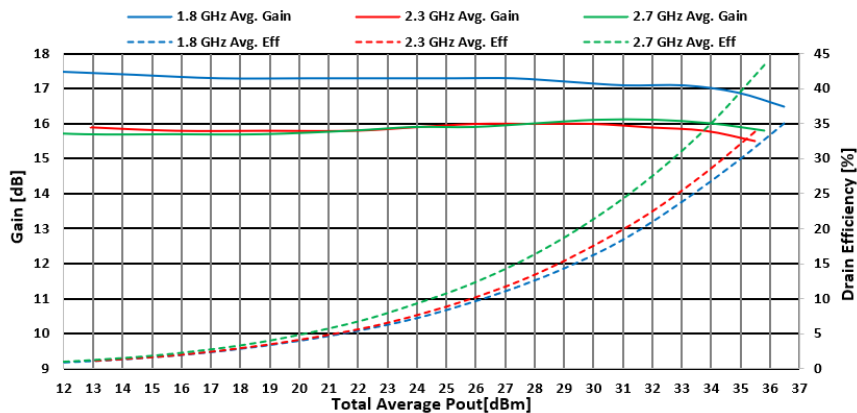


Figure 6.2.1. Gain and PAE vs P_{OUT} of TA9210D-EVB-B for 32 V, 50 mA for freq:1800-2600 MHz

Gain and PAE Vs P_{OUT} data over temperature [VD=32 V, I_{DQ}=50 mA, CW]

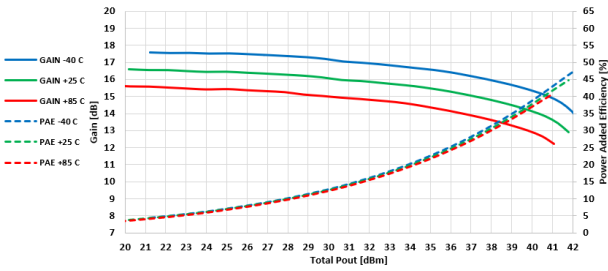


Figure 6.2.2. Gain and PAE vs P_{OUT} over temperature of TA9210D-EVB-B for 32 V, 50 mA For 1800 MHz

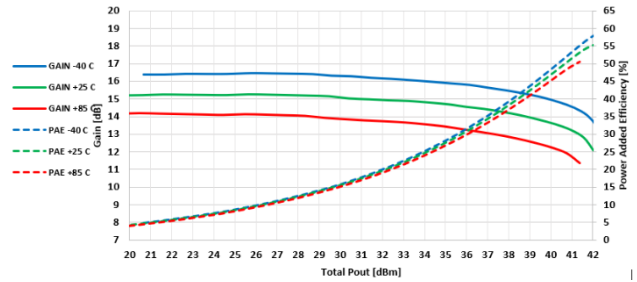


Figure 6.2.3. Gain and PAE vs P_{OUT} over temperature of TA9210D-EVB-B for 32 V, 50 mA For 2700 MHz

6.3. ACPR & AACPR Test Results

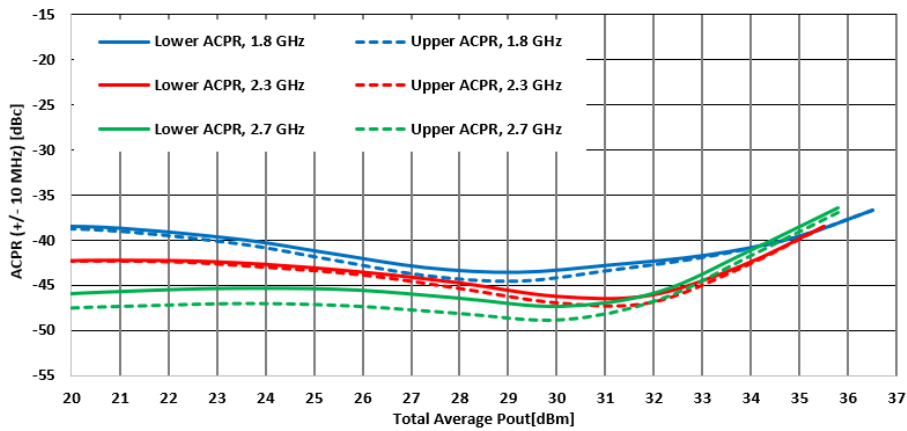


Figure 6.3.1 ACPR Vs P_{OUT} of TA9210D-EVB-B, VD=32 V, IDQ=50 mA, LTE, PAPR = 9.5 dB, 10 MHz BW, TA=+25°C

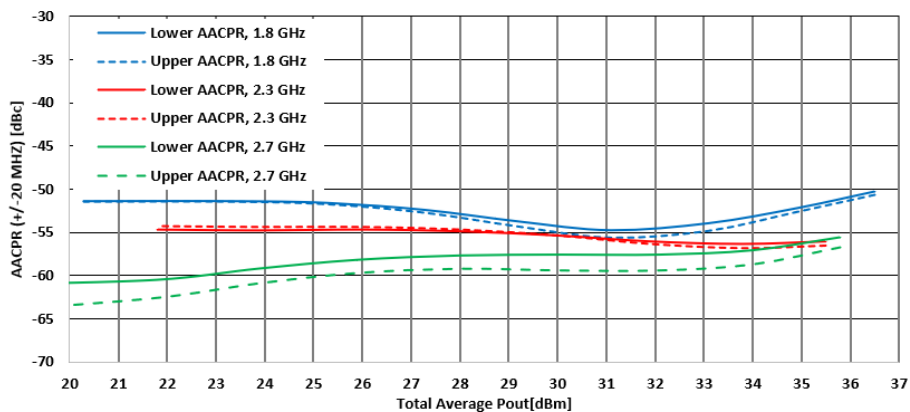


Figure 6.3.2 AACPR Vs P_{OUT} of TA9210D-EVB-B, VD=32 V, IDQ=50 mA, LTE, PAPR = 9.5 dB, 10 MHz BW, TA=+25°C

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