

TA9210D

12.5 W CW .03 – 4.0 GHz GaN Power Transistor

Application Note: TA9210D EVB K

Application Note

2100 MHz~2500 MHz

28 V, 300 mA

Rev-2.1

List of Contents

- 1 General Description
- 2 TA9210D-EVB-K Board Details
- 3 TA9210D-EVB-K Bill of material
- 4 TA9210D-EVB-K Biasing sequence
- 5 TA9210D-EVB-K Board Measurement Summary
- 6 TA9210D-EVB-K Board Measurement Results

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-K is tuned from 2100 MHz to 2500 MHz.

2. TA9210D-EVB-K Board Details

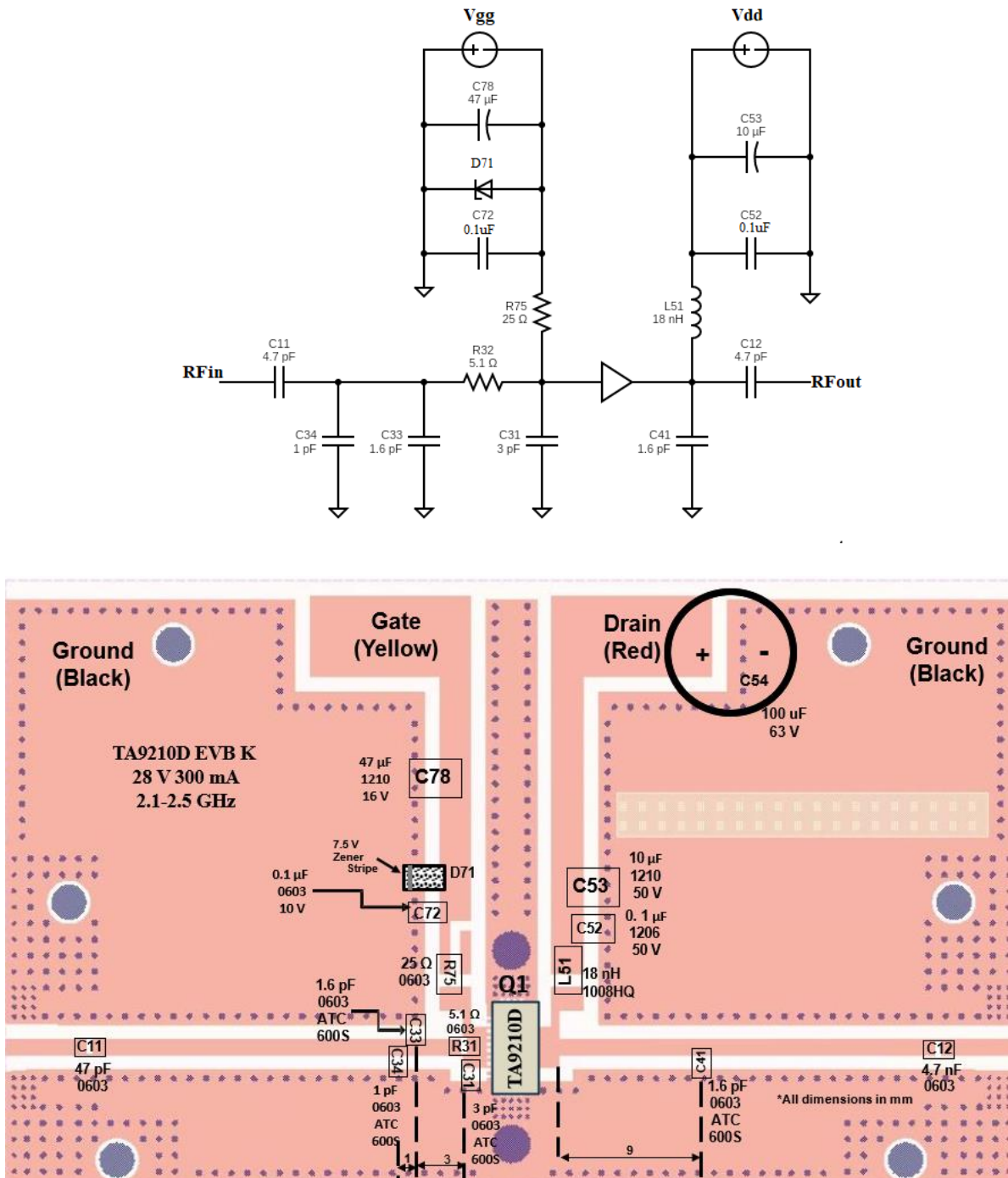


Figure 2.1 TA9210D-EVB-K 2100 MHz ~ 2500 MHz Schematic and EVB Layout

3. TA9210D-EVB-K Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
C11, C12	4.7 pF	AVX	600S4R7BT250XT
C31	3 pF	AVX	600S3R0AT250XT
R32	5.1 Ω	Vishay	CRCW06035R10FKEAHP
C33, C41	1.6 pF	AVX	600S1R6AT250XT
C34	1 pF	AVX	600S1R0BW250XT
L51	18 nH	Coil craft	1008HQ-18NXGLB
C52	0.1 μ F, 50 V	Murata	GRM31C5C1H104JA01L
C53	10 μ F, 50 V	Murata	GRM32ER71H106KA12L
D71	7.5 V Zener	On Semiconductor	MMSZ5236BT 1G
C72	0.1 μ F, 10 V	AVX	0603ZC104K4T2A
R75	25 Ω	Vishay	CRCW060324R9FKEAHP
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-K BOM

4. TA9210D-EVB-K Biasing Sequence

Turn ON Device	Turn OFF Device
1. Set V_G to -5 V 2. Set V_D to +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-K Bias and Sequencing

5. TA9210D-EVB-K Board Measurement Summary

Frequency (GHz)	S21 Gain(dB)	S11 (dB)	S22 (dB)	S12 (dB)	Psat (dBm)	PAE% @Psat	ACPR and AACPR
2.1	16.8	-10.9	-12.6	-30.5	40.1-40.8	47-55%	ACPR less than -28 dBc and AACPR less than -46 dBc for Average power up to 38.9 dBm With LTE 8 dB PAPR, 9.1 MHz BW
2.2	16.8	-14.6	-12.8	-30.1			
2.3	16.9	-21.3	-13.2	-29.7			
2.4	16.8	-18.2	-12.8	-29.4			
2.5	16.6	-11.5	-11.6	-29.4			

Table 5.1 TA9210D-EVB-K 28 V, 300 mA Electrical Characteristics Summary

6. TA9210D-EVB-K Test Results

All the tests are carried out at room temperature.

6.1. S parameters

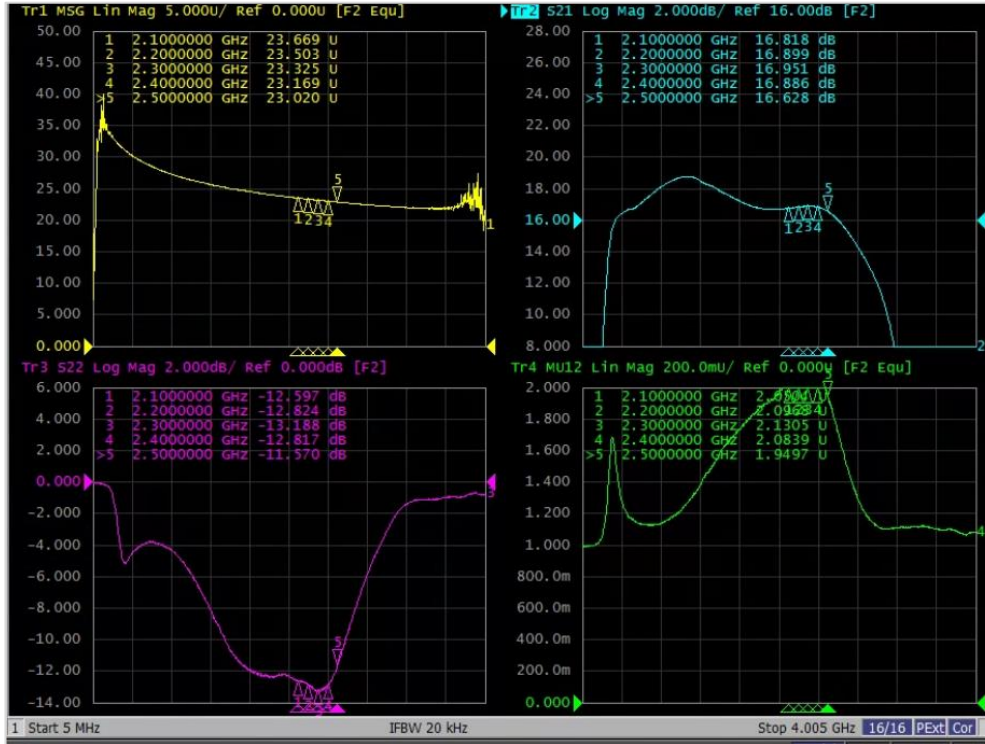


Figure 6.1.1. S parameters of TA9210D-EVB-K 28 V, 300 mA

6.2. Gain, PAE vs Pout @ 28 V Vdd, 300 mA Idq

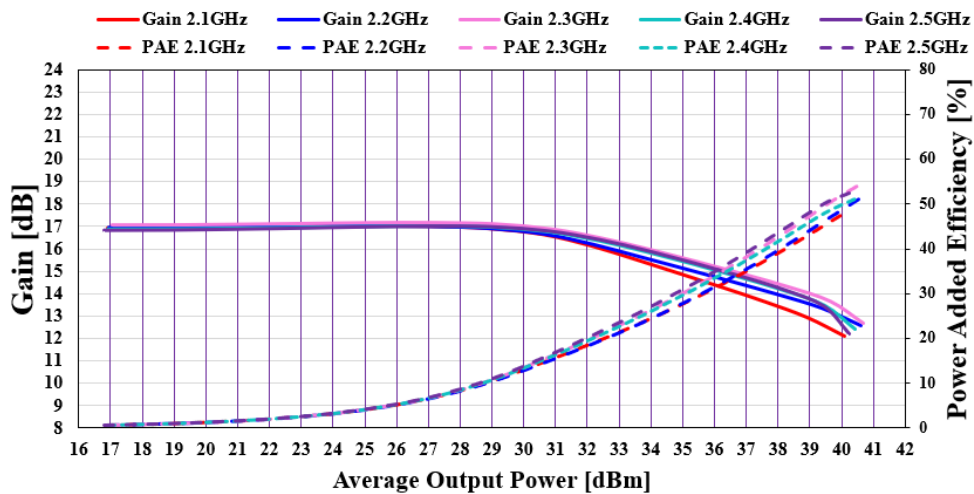


Figure 6.2.1 Gain, PAE v/s Pout of TA9210D-EVB-K, VD=28 V, IDQ=300 mA

6.3. TA9210D-EVB-K 2.1-2.5 GHz: ACPR Measurements

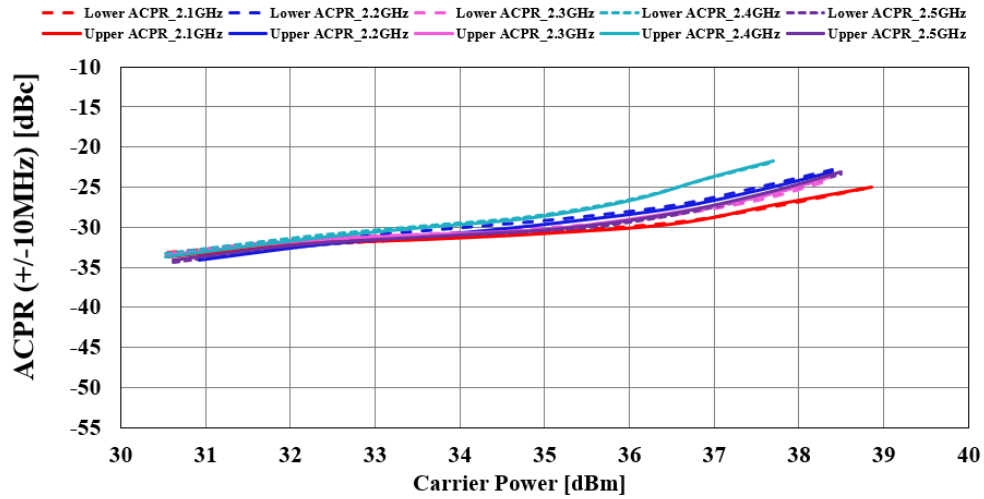


Figure 6.3.1 TA9210D-EVB-K 2.1-2.5 GHz_Design_Vdd:28 V, Id:300 mA
8 dB PAPR, 9.1 MHz BW

6.4. TA9210D 2.1-2.5GHz: AACPR Measurements

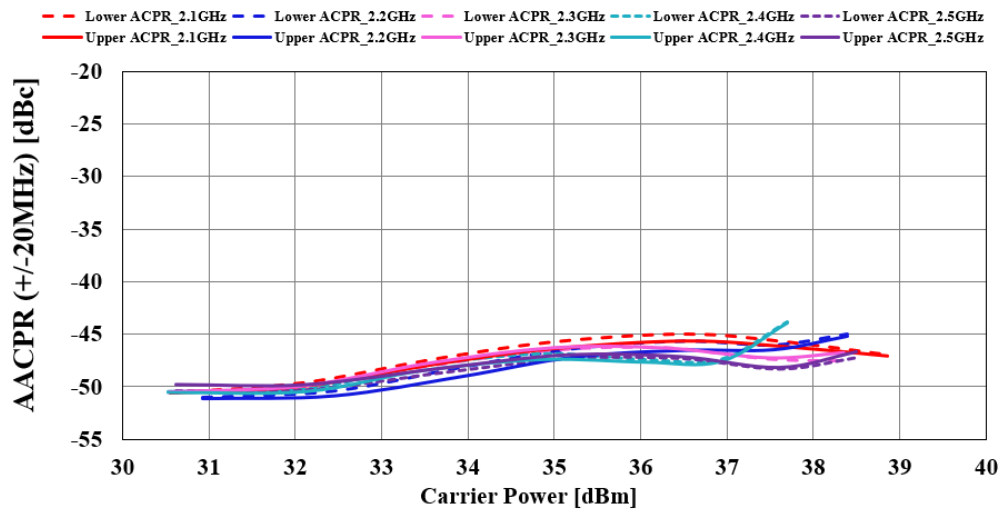


Figure 6.4.1 TA9210D-EVB-K 2.1-2.5 GHz_Design_Vdd:28 V, Id:300 mA
8 dB PAPR, 9.1 MHz BW

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601 W Campus Dr. Ste C1

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