

TA9210D

12.5 W CW 0.03 – 4.0 GHz GaN Power Transistor

Application Note: TA9210D EVB C

Application Note

30 MHz~512 MHz

32 V/ 28 V, 50 mA

Rev-2.3

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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-C is tuned from 30 MHz to 512 MHz.

2. TA9210D-EVB-C Board Details

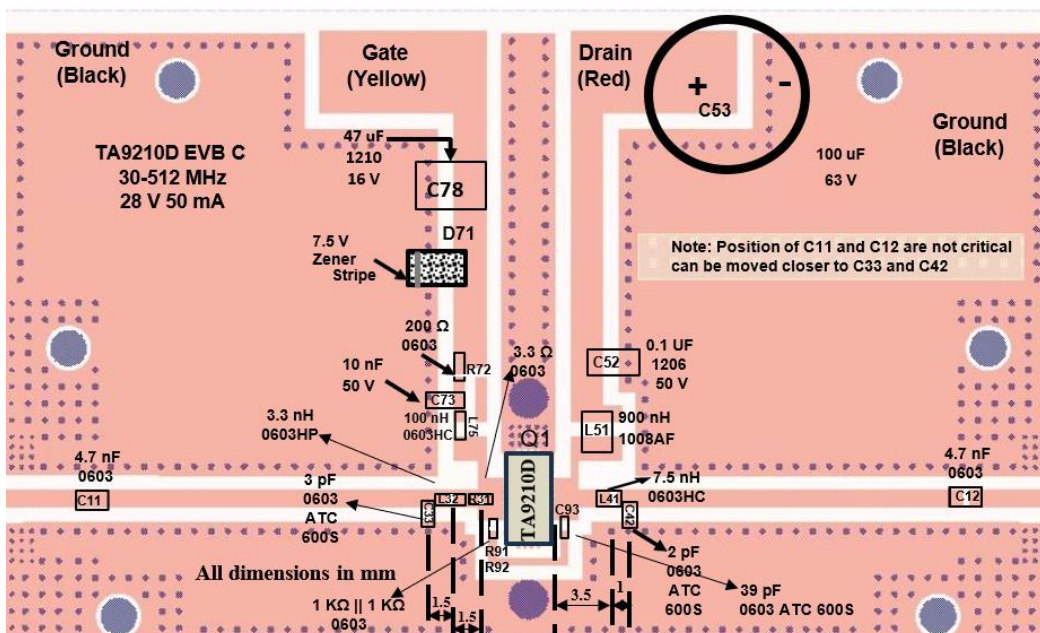
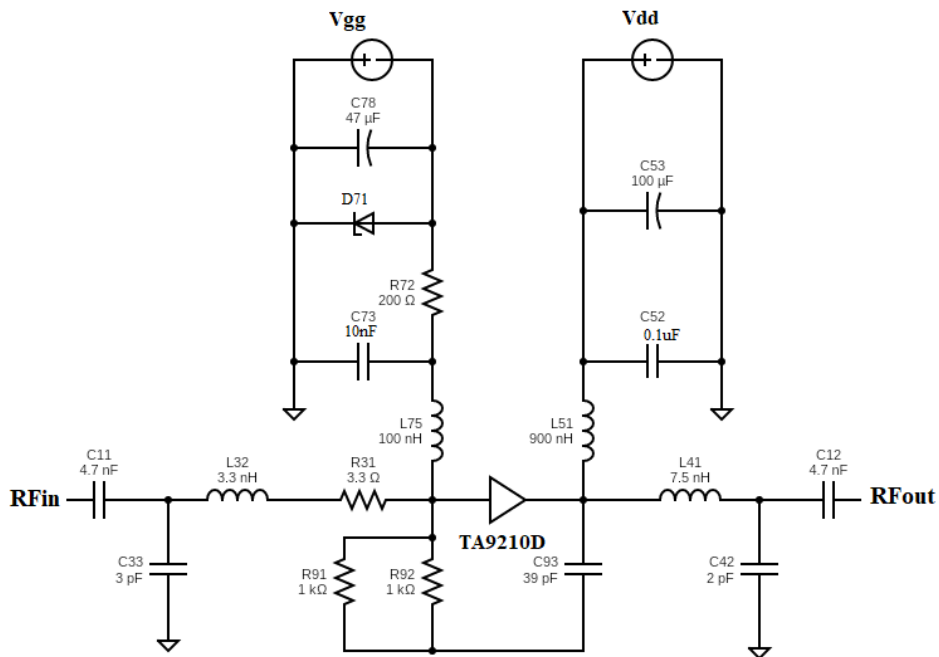


Figure 2.1 TA9210D-EVB-C 30 MHz ~ 512 MHz Schematic and EVB Layout

3. TA9210D-EVB-C Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
C11, C12	4.7 nF, 50 V	Murata	GRM1885C1H472JA01D
C33	3 pF	AVX	ATC600S3R0BT
L32	3.3 nH	Coil craft	0603HP-3N3XGEU
R31	3.3 Ω	Vishay	RCS08053R30FKEA
L41	7.5 nH	Coil craft	0603HC-7N5XJLU
C42	2 pF	AVX	ATC600S2R0BT
C53	100 μ F	Nichicon	UPW1J101MPD1TD
C52	0.1 μ F, 50 V	Murata	GRM31C5C1H104JA01L
L51	900 nH	Coil craft	1008AF-901XJLC
D71	7.5 V Zener	On Semiconductor	MMSZ5236BT 1G
R72	200 Ω	Vishay/Dale	CRCW0603200RFKEAHP
C73	10 nF, 50 V	Murata	GRM155R71H103KA88D
L75	100 nH	Coil craft	0603HP-R10XJE
R91, R92	1 K Ω 1K Ω	Vishay	RCP0603W1K00GEB
C93	39 pF	AVX	600S390FT250XT
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-C BOM

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

5. TA9210D-EVB-C Board Measurement Summary

Frequency (MHz)	S21 Gain(dB)	S11 (dB)	S22 (dB)	Noise Figure(dB)	ACPR and AACPR
30	19.7	-5.7	-7.3	3.6	ACPR less than -28 dBc and AACPR less than -40 dBc for Average power up to 36 dBm With LTE 8 dB PAPR 4.515 MHz BW
80	21.1	-11.8	-6.8	1.6	
100	21.1	-12.8	-6.7	1.4	
200	21.1	-13.1	-7.2	1.2	
300	20.7	-11.6	-7.9	1.4	
400	20.6	-10.2	-9.3	1.5	
512	20.2	-9.0	-10.5	1.5	

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

6. TA9210D-EVB-C Test Results

All the tests are carried out at room temperature.

6.1. S parameters

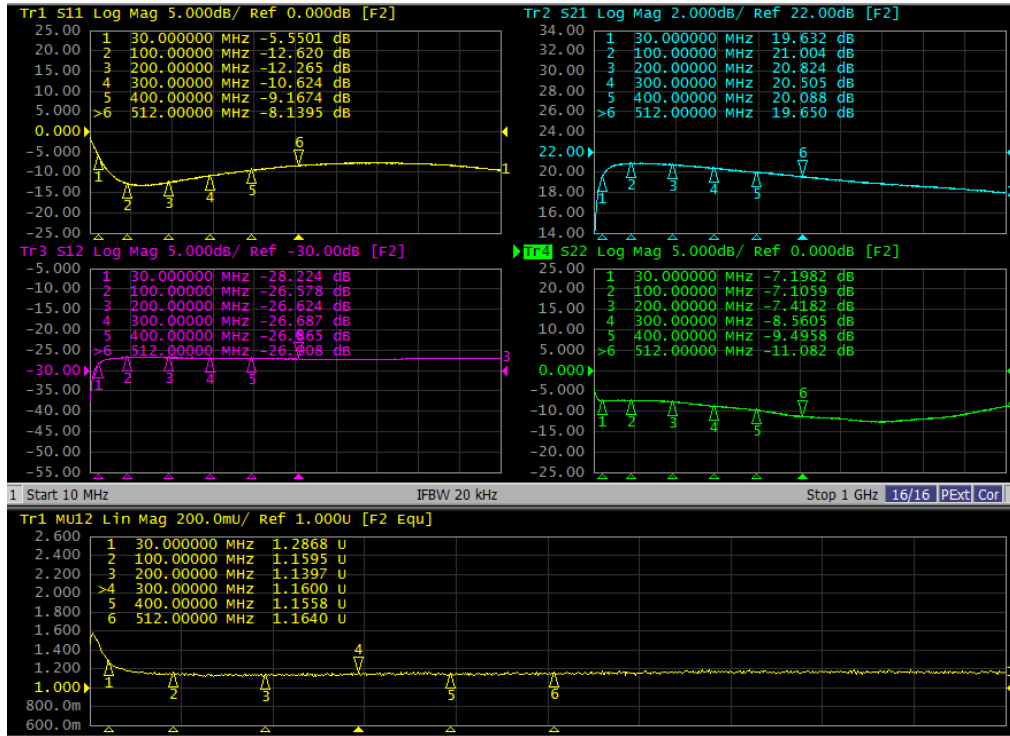


Figure 6.1.1. S parameters of TA9210D-EVB-C 32 V, 50 mA

6.2. ACPR & AACPR Test Results

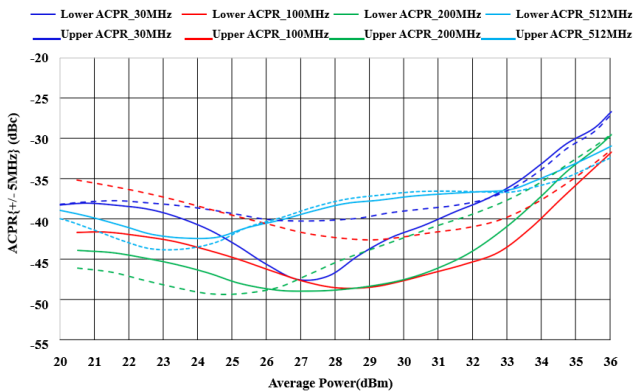


Figure 6.2.1 ACPR Vs P_{OUT} Of TA9210D-EVB-C, VD=32 V, IDQ=50 mA, LTE, PAPR = 8 dB, 4.515 MHz BW, TA=+25°C

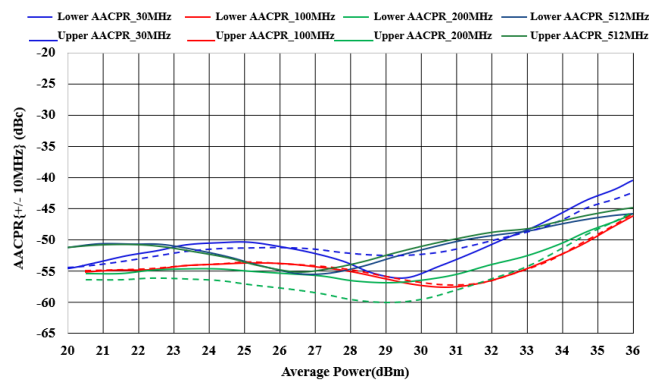


Figure 6.2.2 AACPR Vs P_{OUT} Of TA9210D-EVB-C, VD=32 V, IDQ=50 mA, LTE, PAPR = 8 dB, 4.515 MHz BW, TA=+25°C

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