

TA9210D

12.5 W CW 0.03 – 4.0 GHz GaN Power Transistor

Application Note: TA9210D EVB D

Application Note

30 MHz~1000 MHz

28 V, 50 mA

Rev-2.4

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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-D is tuned from 30 MHz to 1000 MHz.

2. TA9210D-EVB-D Board Details

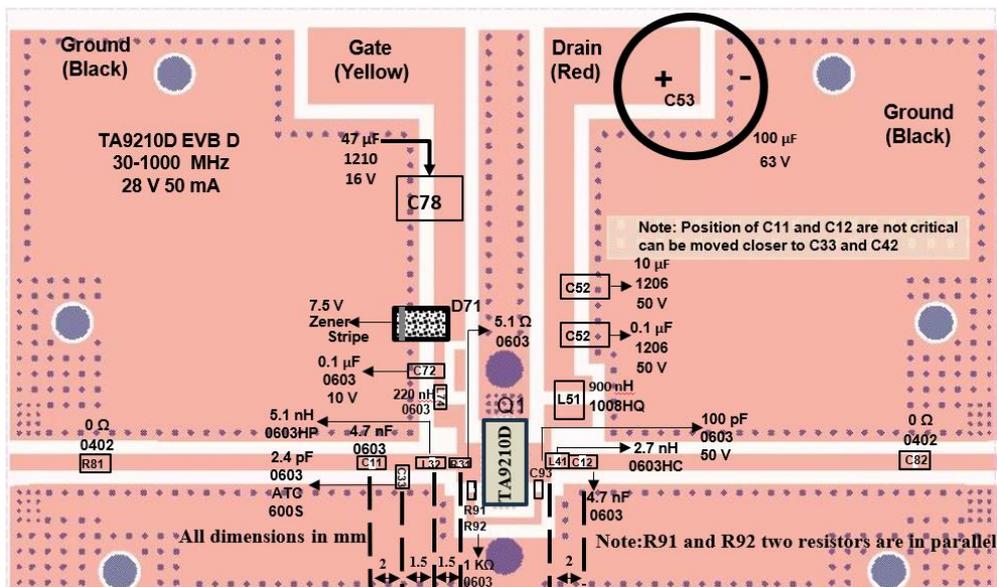
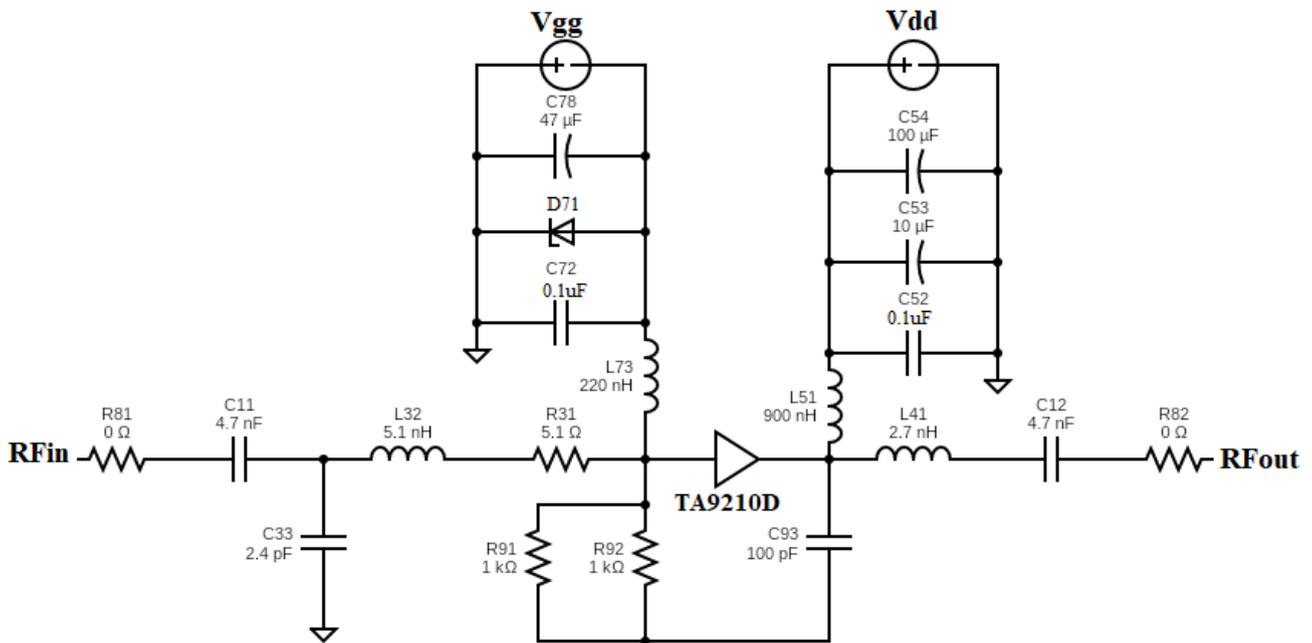


Figure 2.1 TA9210D-EVB-D 30 MHz ~ 1000 MHz Schematic and EVB Layout

3. TA9210D-EVB-D Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
C11, C12	4.7 nF, 50 V	Murata	GRM1885C1H472JA01D
R31	5.1 Ω	Vishay	CRCW06035R10FKEAHP
L32	5.1 nH	Coil craft	0603HP-5N1XGRW
C33	2.4 pF	AVX	600S2R4CT250XT
L41	2.7 nH	Coil craft	0402HP-2N7XGRW
L51	900 nH	Coil craft	1008AF-901XJRC
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 Zener	On Semiconductor	SZMMSZ5236BT1G
C72	0.1 μ F, 10 V	AVX	0603ZC104K4T2A
L73	220 nH	Coil craft	0603CS-R22XGRW
C78	47 μ F, 16 V	Murata	GRM32ER61C476ME15L
R81, R82	0 Ω	Panasonic	ERJ-2GE0R00X
R91, R92	1 k Ω , 1.5 W	Vishay	RCP0603W1K00GEB
C93	100 pF	AVX	600S300JT250XT
Q1	12.5 W power transistor	Tagore Tech	TA9210D
PCB	Rogers RO4350B, 20 mils, 2 oz copper		

Table 3.1 TA9210D-EVB-D BOM

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

5. TA9210D-EVB-D Board Measurement Summary

Frequency (MHz)	S21 Gain(dB)	S11 (dB)	S22 (dB)	Noise Figure(dB)	Pout (dBm)	ACPR & AACPR
30	20.9	-12.46	-8.2	2.1	40.0	ACPR less than -30 dBc & AACPR less than -45 dBc for Average power up to 36 dBm With LTE 8 dB PAPR 4.515 MHz BW
100	21.0	-14.58	-6.7	1.2	40.7	
250	20.7	-12.23	-7.3	1.2	40.2	
500	19.6	-9.86	-8.8	1.4	40.3	
750	18.7	-9.71	-9.1	1.4	40.5	
1000	17.3	-9.61	-7.7	1.5	40.0	

Table 5.1 TA9210D-EVB-D 28 V, 50 mA Electrical Characteristics Summary

6. TA9210D-EVB-D Test Results

All the tests are carried out at room temperature.

6.1. S parameters



Figure 6.1.1. S parameters of TA9210D-EVB-D 28 V, 50 mA

6.2. Large Signal Test Results

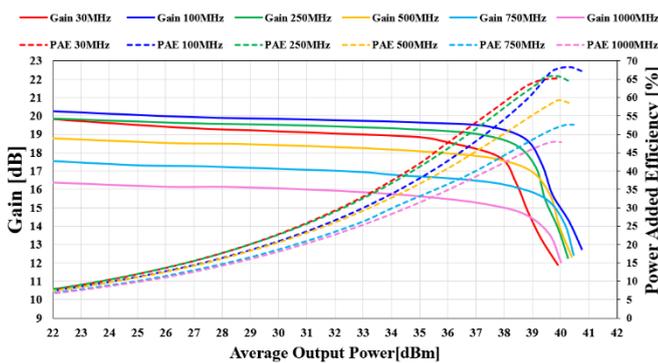


Figure 6.2.1. Gain and PAE vs P_{OUT} over temperature of TA9210D-EVB-D for 28 V, 50 mA For 30-1000 MHz

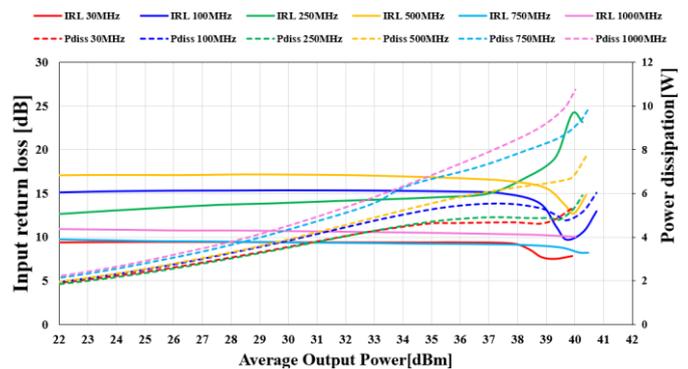


Figure 6.2.2. IRL and Pdiss vs P_{OUT} over temperature of TA9210D-EVB-D for 28 V, 50 mA For 30-1000 MHz

6.3. ACPR & AACPR Test Results

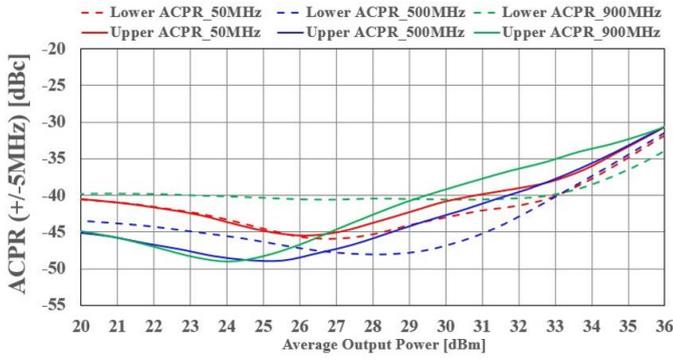


Figure 6.3.1 ACPR Vs P_{OUT} of TA9210D-EVB-D, VD=28 V, IDQ=50 mA, LTE, PAPR = 8 dB, 4.515 MHz BW, TA=+25°C

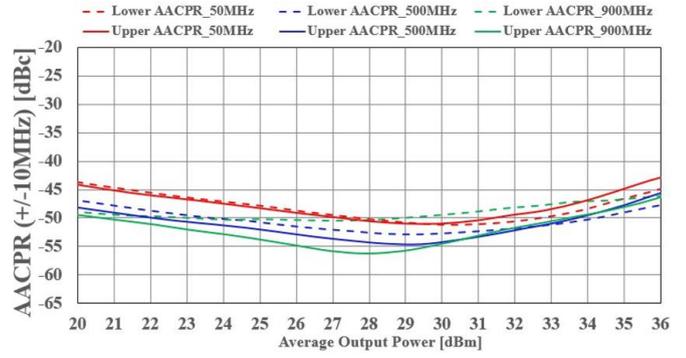


Figure 6.3.2 AACPR Vs P_{OUT} of TA9210D-EVB-D, VD=28 V, IDQ=50 mA, LTE, PAPR = 8 dB, 4.515 MHz BW, TA=+25°C

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