TA9210D

12.5 W CW 0.03 – 4.0 GHz GaN Power Transistor

Application Note: TA9210D EVB M

Application Note

200 MHz~2000 MHz

28 V, 30 mA

Rev-2.1

List of Contents

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 0.75mm, 32 leads plastic package. TA9210D-EVB-M is tuned from 200 MHz to 2000 MHz.

2. TA9210D-EVB-M Board Details

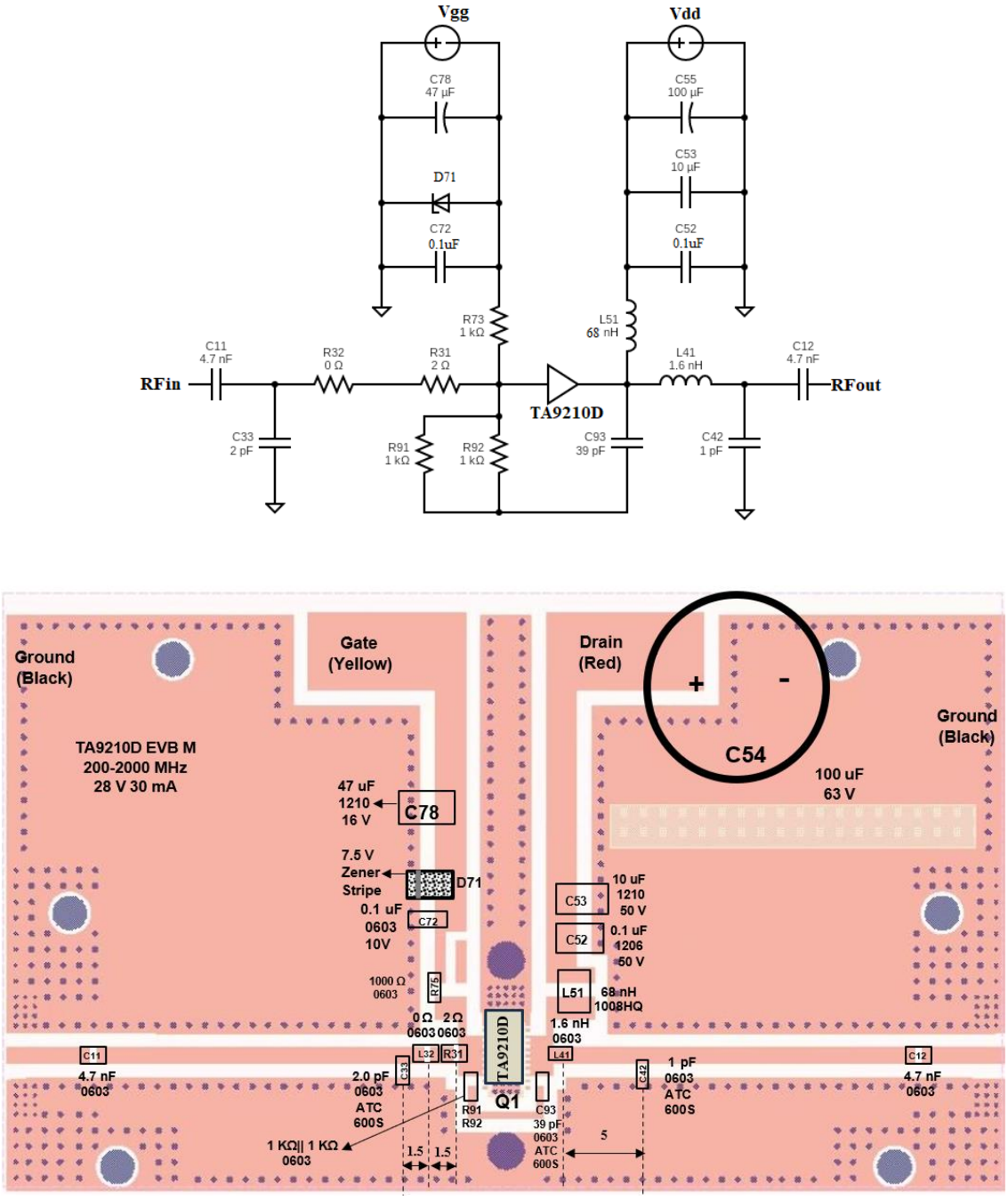

Figure 2.1 TA9210D-EVB-M 200 MHz ~ 2000 MHz Schematic and EVB Layout

3. TA9210D-EVB-M Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
C11, C12	4.7 nF, 50 V	Murata	GRM1885C1H472JA01D
R31	2 Ω	Vishay	CRCW06032R00FKEAHP
C33	2 pF	AVX	600S2R0AT250XT
L41	1.6 nH	Coil craft	0603HC-1N6XGLW
R32	0 Ω	Panasonic	ERJ-2GE0R00X
C42	1 pF	AVX	600S1R0AT250XT
L51	68 nH	Coil craft	1008HQ-68NXGLC
C52	0.1 µF, 50 V	Murata	GRM31C5C1H104JA01L
C53	10 µF, 50 V	Murata	GRM32ER71H106KA12L
C54	100 µF, 63 V	Nichicon	UPW1J101MPD1TD
D71	7.5 V Zener	On Semiconductor	MMSZ5236BT 1G
C72	0.1 µF, 10 V	AVX	0603ZC104K4T2A
C78	47 µF, 16 V	Murata	GRM32ER61C476ME15L
R73	1 KΩ	Panasonic	ERJ-3EKF1001V
R91, R92	1 KΩ, 1.5 W	Vishay	RCP0603W1K00GEB
C93	39 pF	AVX	600S390JT250XT
Q1	12.5 W Power transistor	Tagore Tech	TA9210D
PCB	Rogers RO4350B, 20 mils, 2 oz copper		

Table 3.1 TA9210D-EVB-M BOM

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

5. TA9210D-EVB-M Board Measurement Summary

Frequency (GHz)	S21 Gain(dB)	S11 (dB)	S22 (dB)	Noise Figure (dB)	Psat (dBm)	PAE% @Psat
0.2	19.7	-7.3	-9.9	1.1	39	65
0.5	18.3	-6.4	-16.9	1.4	39.5	60
1.0	15.3	-4.4	-10.3	1.6	39.5	45
1.5	14.0	-4.6	-7.2	2.0	37.0	25
2.0	14.4	-9.0	-7.4	2.0	39.2	42

Table 5.1 TA9210D-EVB-M 28 V, 30 mA Electrical Characteristics Summary

6. TA9210D-EVB-M Test Results

All the tests are carried out at room temperature.

6.1. S parameters

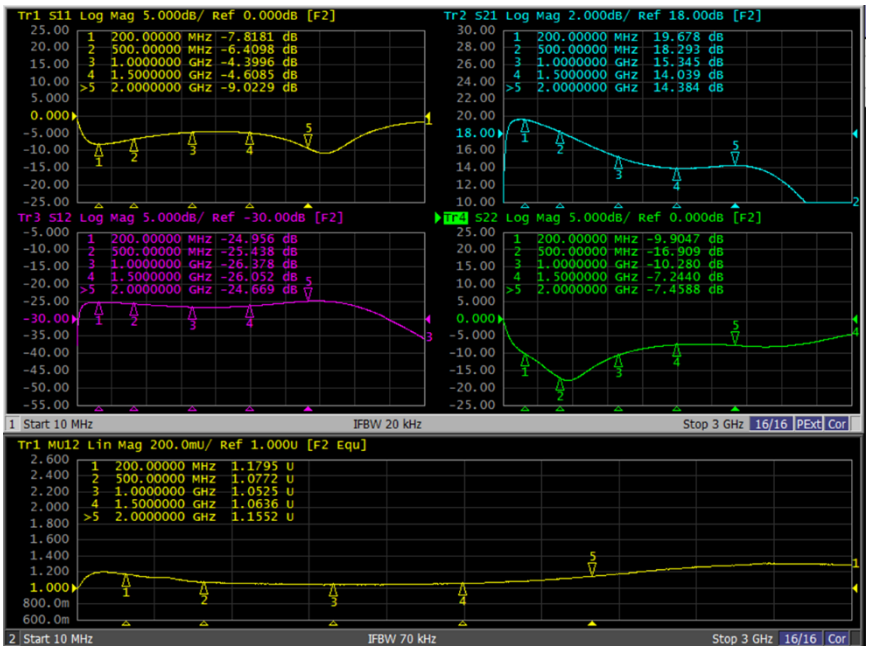

Figure 6.1.1. S parameters of TA9210D-EVB-M 28 V, 30 mA

6.2. Noise Figure

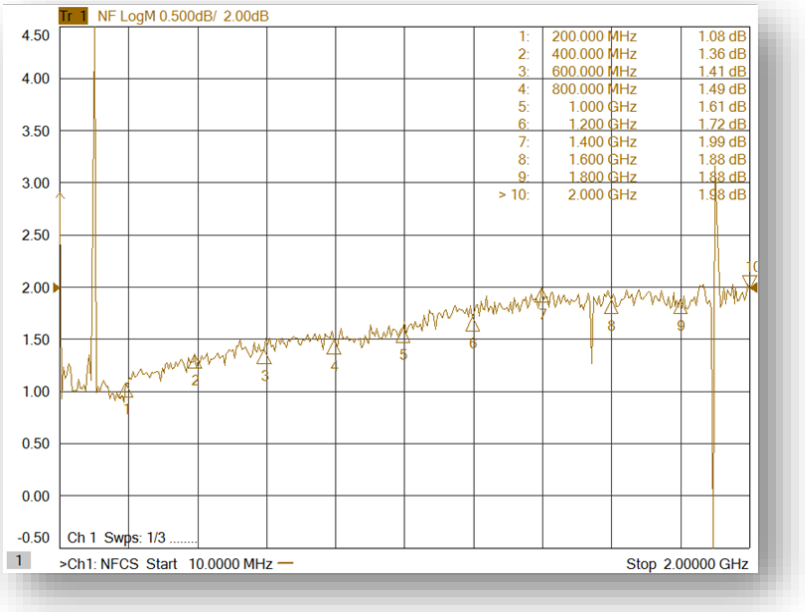

Figure 6.2.1. Noise Figure of TA9210D-EVB-M 28 V, 30 mA

6.3. Gain & PAE vs Pout, Gain compression Vs Pout and IRL & Pdiss Vs Pout @ 28 V, 30 mA

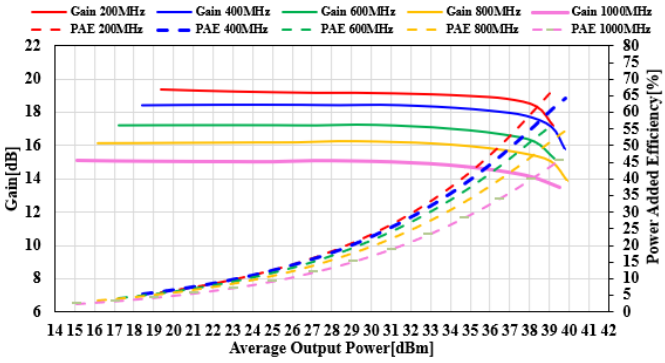

Figure 6.3.1 Gain, PAE v/s Pout Of TA9210D-EVB-M, VD=28 V, IDQ=30 mA 200-1000 MHz

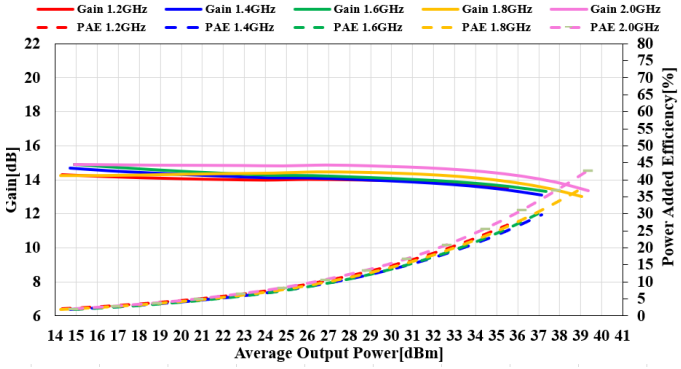

Figure 6.3.2 Gain, PAE v/s Pout Of TA9210D-EVB-M, VD=28 V, IDQ=30 mA 1.2-2 GHz

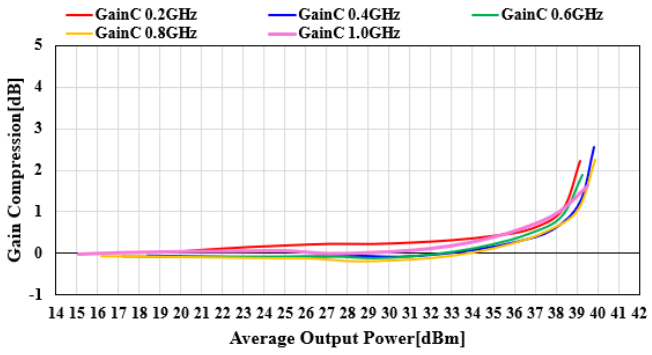

Figure 6.3.3 Gain compression Vs Pout Of TA9210D-EVB-M, VD=28 V, IDQ=30 mA 200-1000 MHz

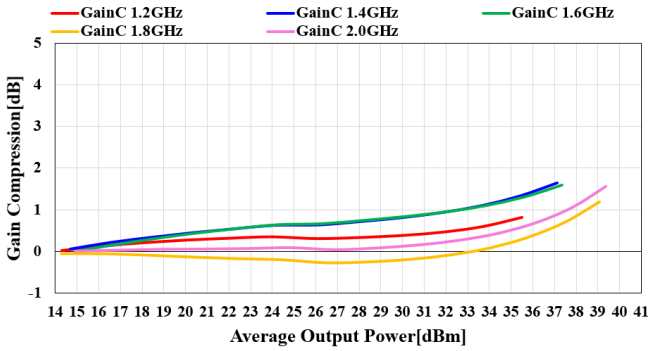

Figure 6.3.4 Gain compression Vs Pout Of TA9210D-EVB-M, VD=28 V, IDQ=30 mA 1.2-2 GHz

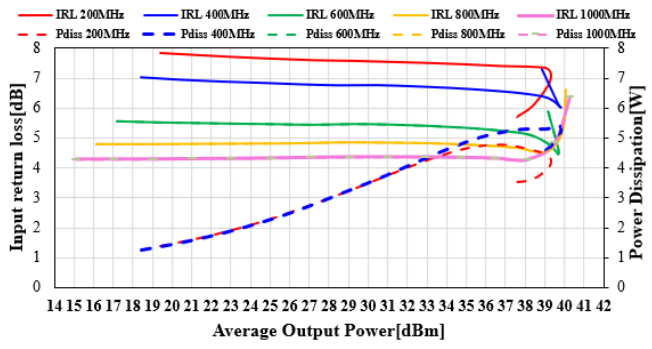

Figure 6.3.5 IRL & Pdiss Vs Pout Of TA9210D-EVB-M, VD=28 V, IDQ=30 mA 200-1000 MHz

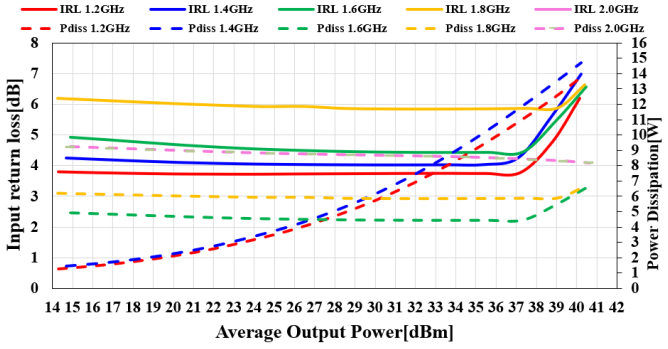

Figure 6.3.6 IRL & Pdiss Vs Pout Of TA9210D-EVB-M, VD=28V, IDQ=30 mA 1.2-2 GHz

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