TA9210D

12.5 W CW 0.03 – 4.0 GHz GaN Power Transistor

Application Note: TA9210D EVB J

Application Note

3000 MHz~3500 MHz

24 V/ 28 V, 30 mA

Rev-2.3

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 0.75 mm, 32 leads plastic package. TA9210D-EVB- J is tuned from 3000 MHz to 3500 MHz.

2. TA9210D-EVB-J Board Details

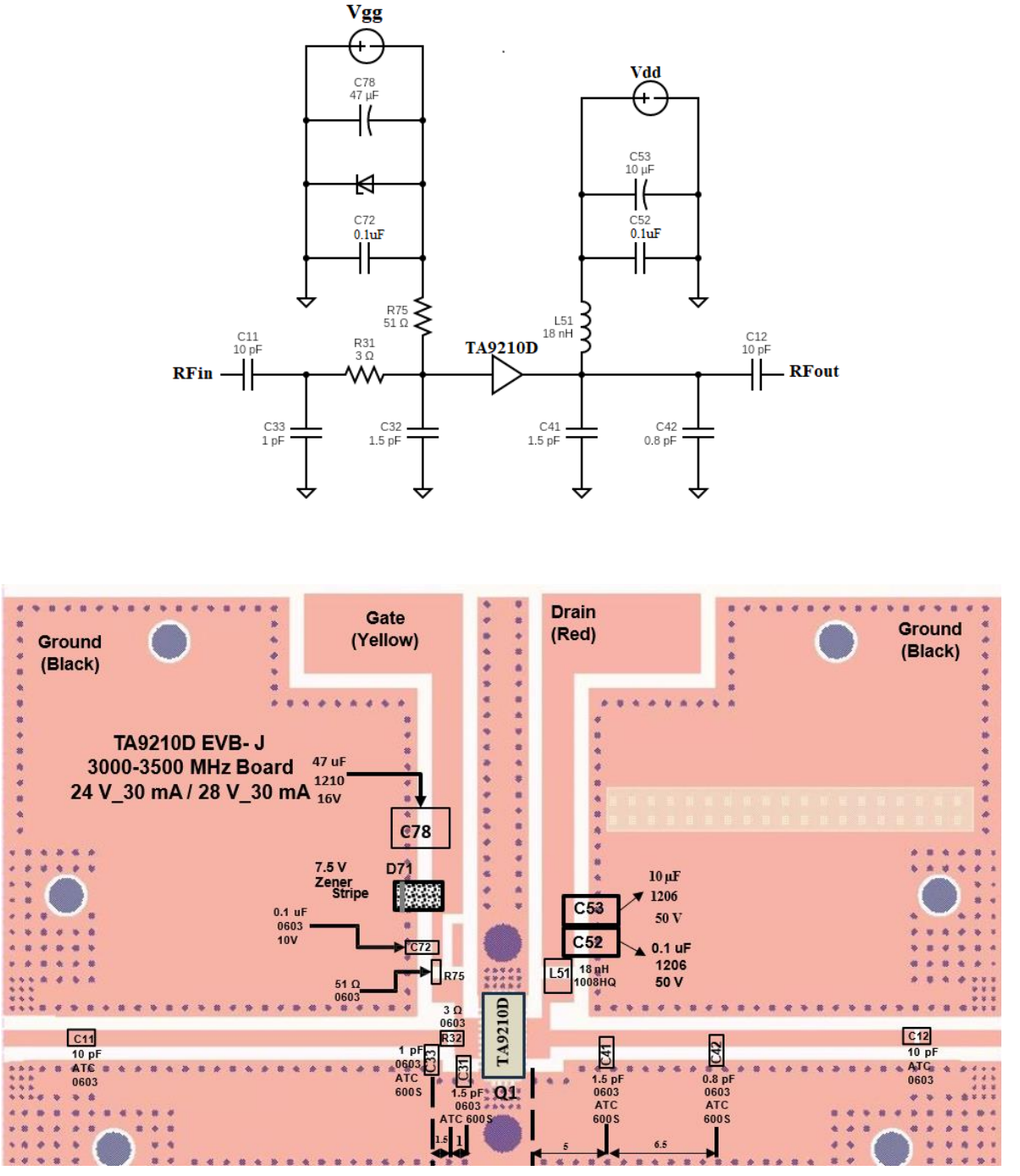

Figure 2.1 TA9210D-EVB-J 3000 MHz ~ 3500 MHz Schematic and EVB Layout

3. TA9210D-EVB-J Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
C11, C12	10 pF	AVX	600S100JT250XT
R32	3Ω	Vishay	CRCW06033R00FKEAHP
C31, C41	1.5 pF	AVX	600S1R5BT250XT
C33	1 pF	AVX	600S1R0BT250XT
C42	0.8 pF	AVX	600S0R8AT250XT
L51	18 nH	Coil craft	1008HQ-18NXGLB
C52	0.1 µF, 50 V	Murata	GRM31C5C1H104JA01L
C53	10 µF, 50 V	Murata	GRM32ER71H106KA12L
D71	7.5 V Zener	On Semiconductor	MMSZ5236BT 1G
C72	0.1 µF, 10 V	AVX	0603ZC104K4T2A
R75	51 Ω	Vishay	CRCW060351R0FKEAHP
C78	47 µF, 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-J BOM

4. TA9210D-EVB-J Biasing Sequence

Turn ON Device	Turn OFF Device
1. Set V_G to -5 V 2. Set V_D to +24 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-J Bias and Sequencing

5. TA9210D-EVB-J Board Measurement Summary

Frequency (GHz)	S21 Gain(dB)	S11 (dB)	S22 (dB)	Psat (dBm)	PAE% @Psat
3.0	13.1	-6.7	-7.5	40-40.2	49-50%
3.1	13.3	-7.9	-7.5		
3.2	13.4	-9.3	-7.5		
3.3	13.4	-10.5	-7.4		
3.4	13.4	-10.5	-7.6		
3.5	13.2	-9.4	-7.8		

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

6. TA9210D-EVB-J Test Results

All the tests are carried out at room temperature.

6.1. S parameters

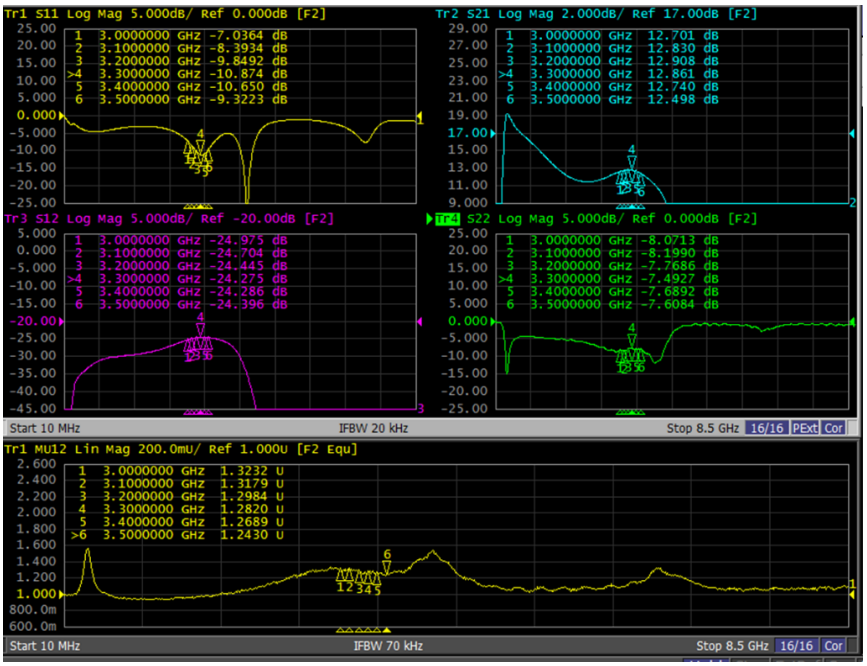

Figure 6.1.1. S parameters of TA9210D-EVB-J 24 V, 30 mA

Figure 6.1.2. S parameters of TA9210D-EVB-J 28 V, 30 mA

6.2. Gain, PAE Vs Pout & IRL, Pdiss Vs Pout @ 28 V Vdd, 30 mA Idq

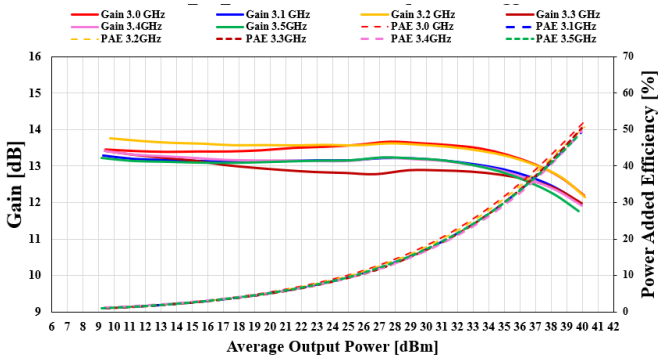

Figure 6.2.1 Gain, PAE v/s Pout
Of TA9210D-EVB-J, VD=28 V, IDQ=30 mA

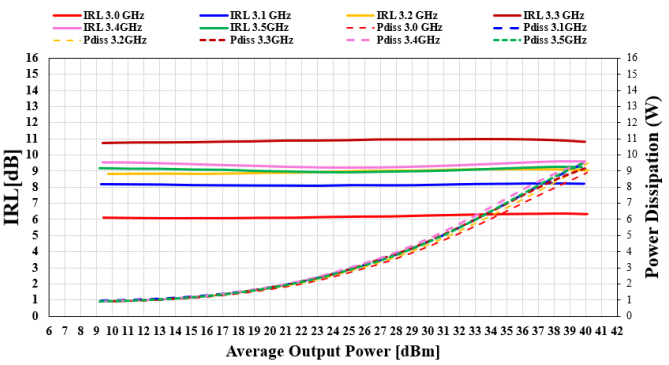

Figure 6.2.1 IRL, Pdiss v/s Pout
Of TA9210D-EVB-J, VD=28 V, IDQ=30 mA

6.3. OIP3dBm and IM3dBc @ 28 V Vdd, 30 mA Idq

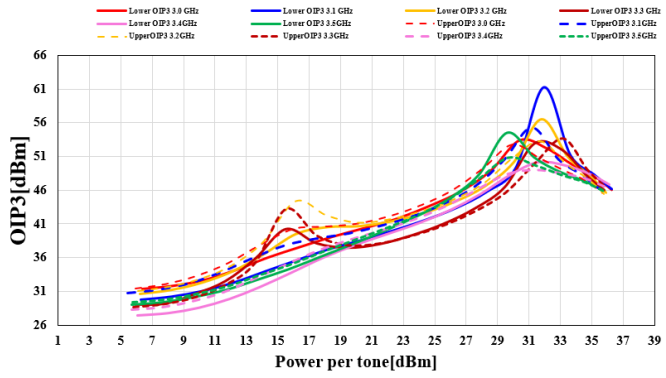

Figure 6.3.1 OIP3dBm
Of TA9210D-EVB-J, VD=24 V, IDQ=30 mA

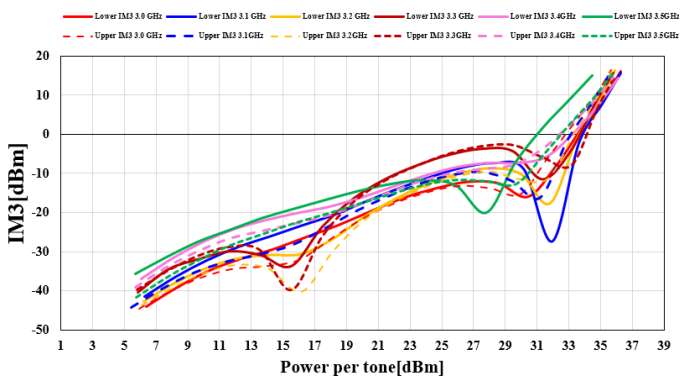

Figure 6.3.1 IM3dBc
Of TA9210D-EVB-J, VD=28 V, IDQ=30 mA

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