

TA9210D

12.5W CW 0.03 – 4.0 GHz GaN Power Transistor

Application Note: TA9210D EVB J

Application Note

3000MHz~3500MHz

24V/28V 30mA

Rev-1.3

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1. General Description

The TA9210D is a broadband capable 12.5W GaN power transistor covering 30MHz to 2.7GHz frequency band with a single match. TA9210D is usable up to 4GHz. 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) 3x6x0.75mm, 32 leads plastic package. TA9210D-EVB-I is tuned from 3000MHz to 3500MHz.

2. TA9210D-EVB-J Board Details

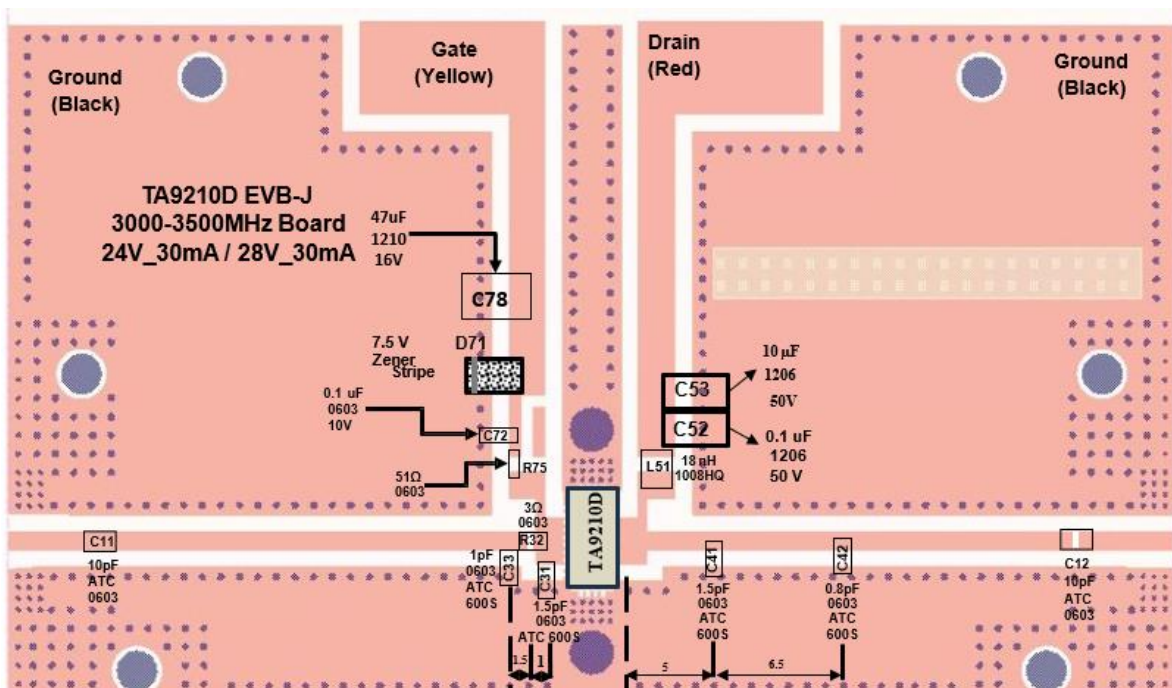
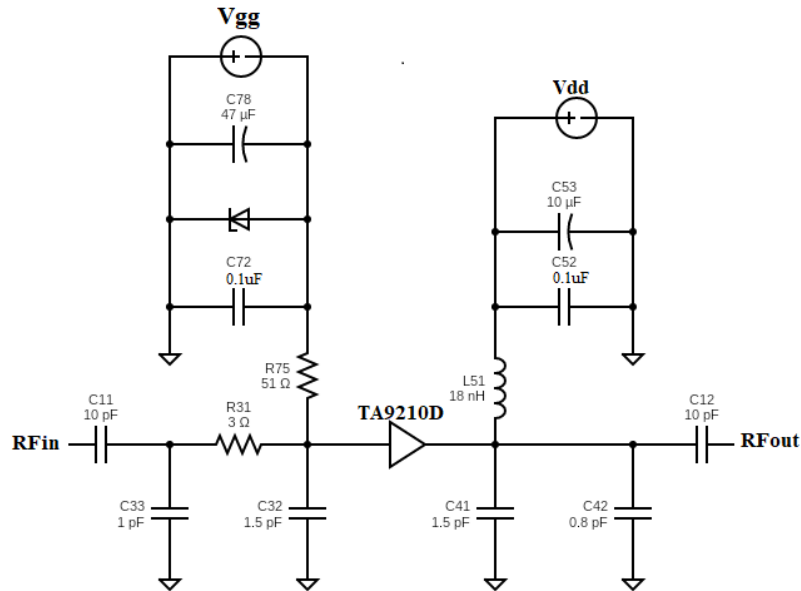


Figure 2.1 TA9210D-EVB-J 3000MHz ~ 3500MHz Schematic and EVB Layout

3. TA9210D-EVB-J Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
C11, C12	10pF	AVX	600S100JT250XT
R32	3Ω	Vishay	CRCW06033R00FKEAHP
C31, C41	1.5pF	AVX	600S1R5BT250XT
C33	1pF	AVX	600S1R0BT250XT
C42	0.8pF	AVX	600S0R8AT250XT
L51	18nH	Coil craft	1008HQ-18NXGLB
C52	0.1μF, 50V	Murata	GRM31C5C1H104JA01L
C53	10μF, 50V	Murata	GRM32ER71H106KA12L
D71	7.5 V Zener	On Semiconductor	MMSZ5236BT 1G
C72	0.1μF, 10V	AVX	0603ZC104K4T2A
R75	51Ω	Vishay	CRCW060351R0FKEAHP
C78	47μF, 16V	Murata	GRM32ER61C476ME15L
Q1	12.5W GaN Transistor	Tagore Technology	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 -5V 2. Set V_D to +24V/28V 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 28V 30mA Electrical Characteristics Summary

6. TA9210D-EVB-J Test Results

All the tests are carried out at room temperature.

6.1. S parameters

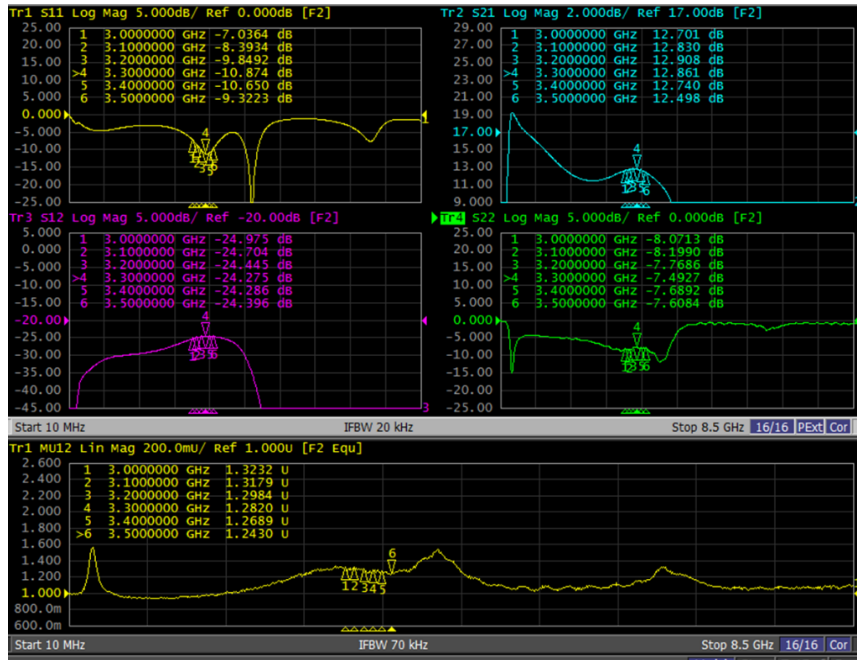


Figure 6.1.1. S parameters of TA9210D-EVB-J 24V 30mA



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

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

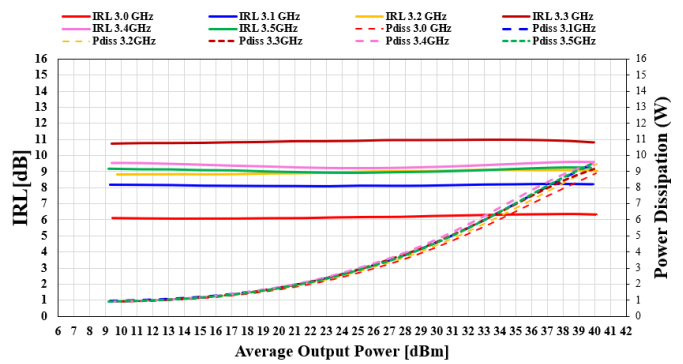
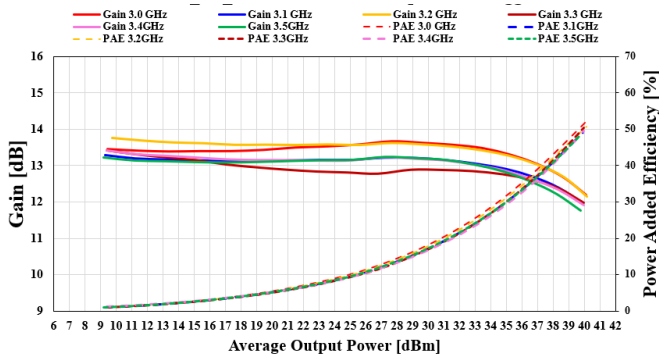


Figure 6.2.1 Gain, PAE v/s Pout Of TA9210D-EVB-J, VD=28V, IDQ=30mA

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

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

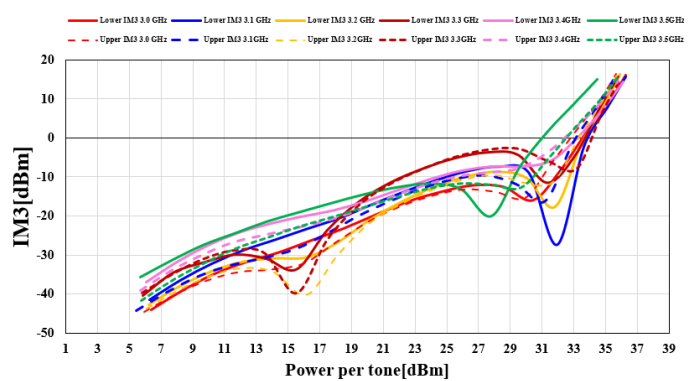
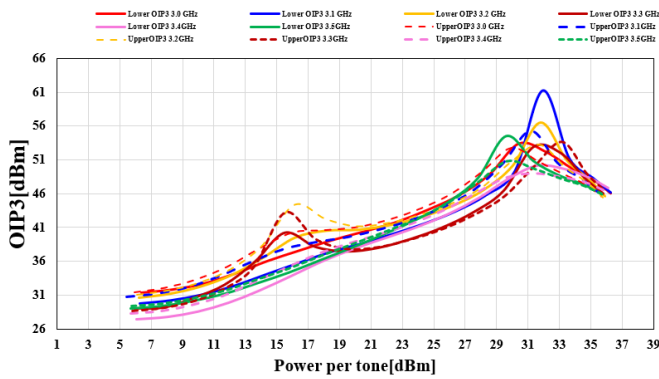


Figure 6.3.1 OIP3dBm Of TA9210D-EVB-J, VD=24V, IDQ=30mA

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

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