Tagore Technology

TA9210D

12.5W CW 0.03 – 4.0 GHz GaN Power Transistor

Application Note: TA9210D EVB F

Application Note

200MHz~2700MHz

20V 50mA

Rev-1.3

List of Contents

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-F is tuned from 200MHz to 2700MHz.

2. TA9210D-EVB-F Board Details

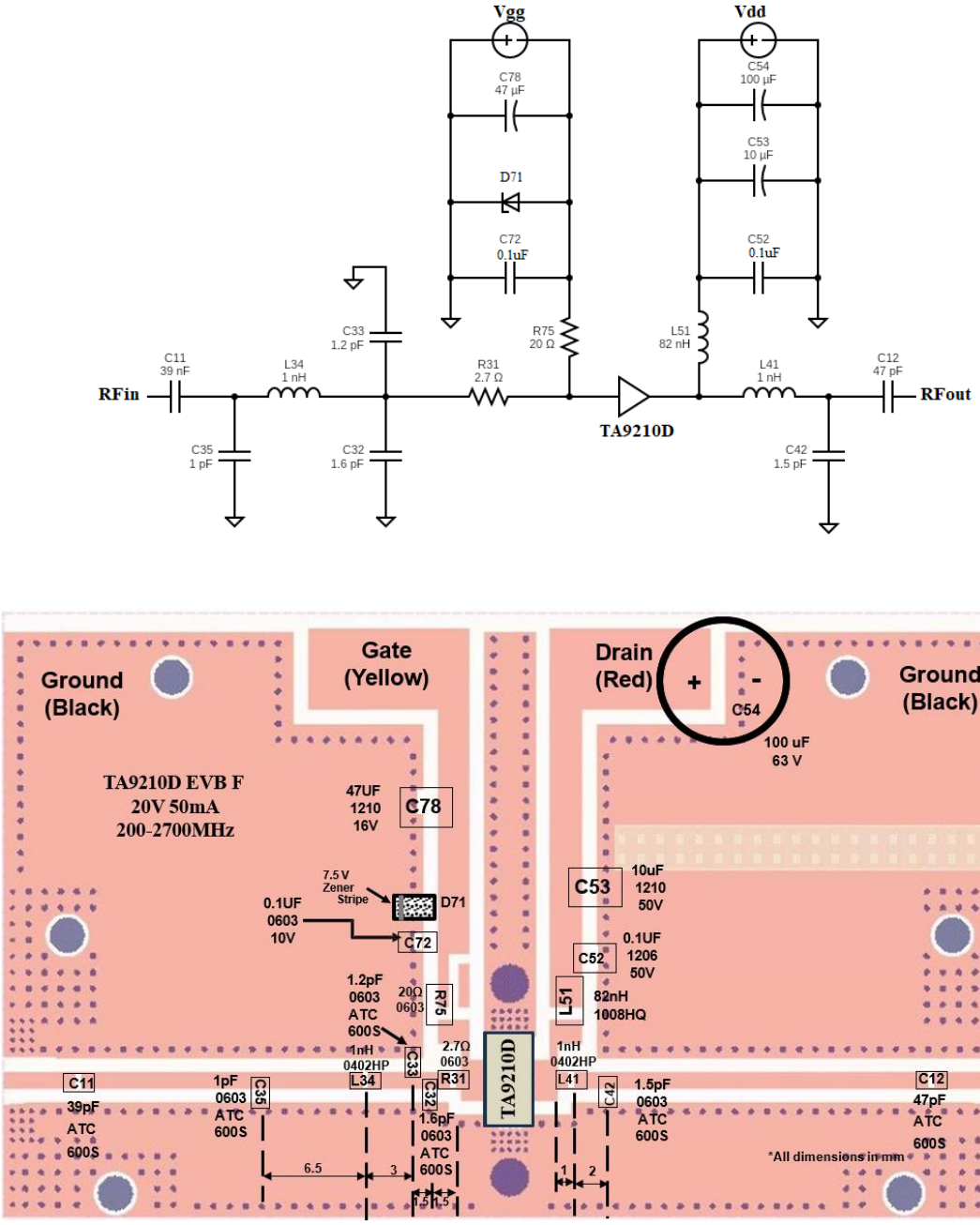

Figure 2.1 TA9210D-EVB-F 200MHz ~ 2700MHz Schematic and EVB Layout

3. TA9210D-EVB-F Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
C11	39 pF	AVX	600S390FT250XT
C12	47 pF	AVX	600S470FT250XT
R31	2.7 Ω	Vishay	CRCW06032R70FKEAHP
C32	1.6 pF	AVX	600S1R6BW250XT
C33	1.2 pF	AVX	600S1R2BW250XT
L34,L41	1 nH	Coil craft	0402HP-1N0XJRW
C35	1 pF	AVX	600S1R0BW250XT
C42	1.5 pF	AVX	600S1R5BW250XT
L51	82 nH	Coil craft	1008HQ-82NXGLC
C52	0.1 uF, 50V	Murata	GRM31C5C1H104JA01L
C53	10uF,50V	Murata	GRM32ER71H106KA12L
C54	100 uF, 63V	Nichicon	UPW1J101MPD1TD
D71	7.5 V Zener	On Semiconductor	SZMMSZ5236BT1G
C72	0.1 uF, 10V	AVX	0603ZC104K4T2A
R75	20 Ω	Vishay	CRCW060320R0FKEAHP
C78	47 uF, 16V	Murata	GRM32ER61C476ME15L
Q1	12.5Watt power transistor	Tagore Technology	TA9210D
PCB	Rogers RO4350B, 20mils, 2oz copper		

Table 3.1 TA9210D-EVB-F BOM

4. TA9210D-EVB-F Biasing Sequence

Turn ON Device	Turn OFF Device
1. Set V_G to -5V 2. Set V_D to +20V 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-F Bias and Sequencing

5. TA9210D-EVB-F Board Measurement Summary

Frequency (MHz)	S21 Gain(dB)	S11 (dB)	S22 (dB)	Psat (dBm)	PAE (%) @Psat
200	18.9	-6.9	-7.4	37.2	75
500	18.1	-6.8	-4.6	37.8	66
1000	16.6	-5.9	-3.7	38.5	58
1500	15.8	-6.7	-3.7	38.2	45
2000	14.4	-5.9	-6.3	39.5	40
2700	13.5	-9.9	-15.6	38.2	50

Table 5.1 TA9210D-EVB-F 20V 50mA Electrical Characteristics Summary

6. TA9210D-EVB-F Test Results

All the tests are carried out at room temperature.

6.1. S parameters

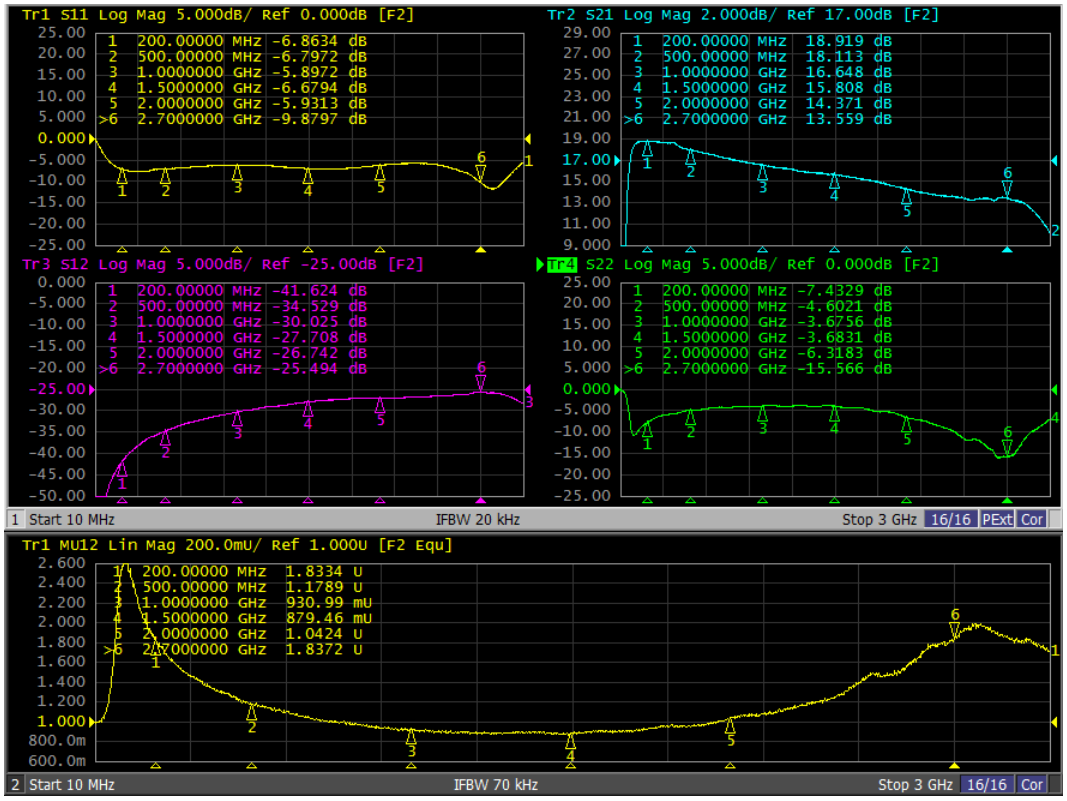

Figure 6.1.1. S parameters of TA9210D-EVB-F 20V 50mA

6.2. Large Signal Test Results

Gain and PAE Vs P_{OUT} data [Vd=20V, I_{DQ}=50mA, CW]

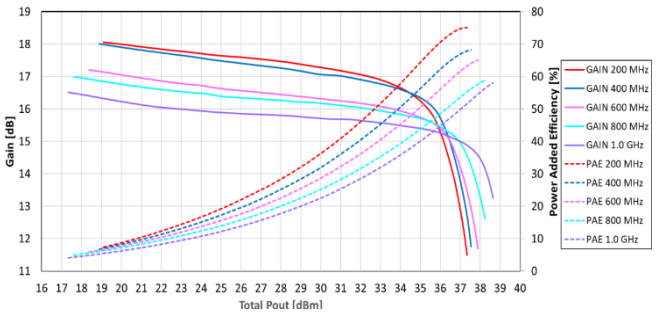

Figure 6.2.1. Gain and PAE vs P_{OUT} of TA9210D-EVB-F for 20V 50mA 200M-1GHz

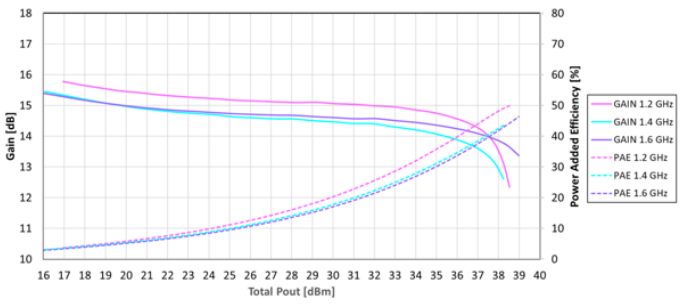

Figure 6.2.2. Gain and PAE vs P_{OUT} of TA9210D-EVB-F for 20V 50mA 1.2G-1.6GHz

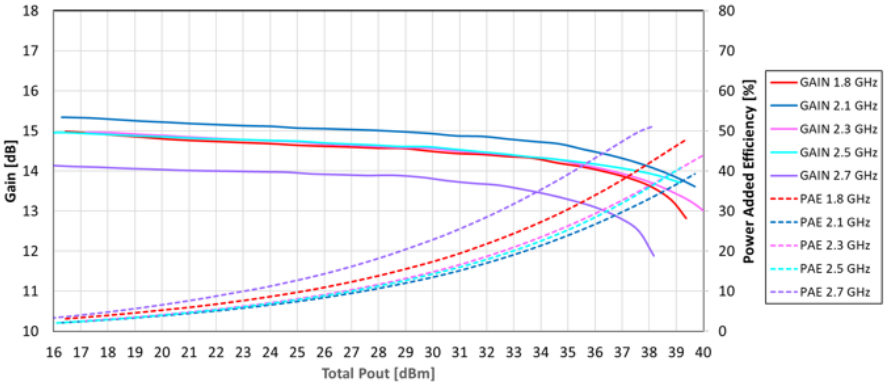

Figure 6.2.3. Gain and PAE vs P_{OUT} of TA9210D-EVB-F for 20V 50mA 1.8G-2.7GHz

6.3. ACPR and AACPR Test Results

Bias :20V 50mA

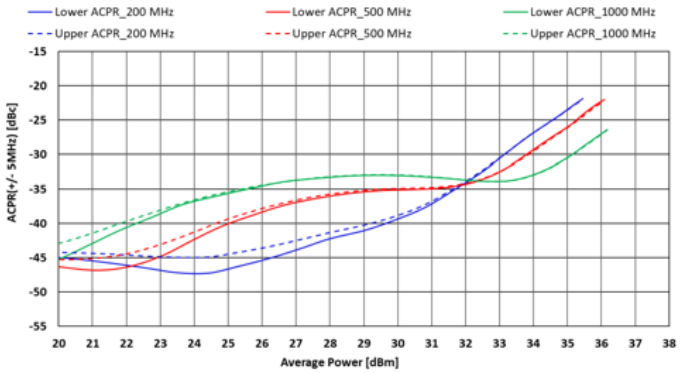

Figure 6.3.1. ACPR vs P_{OUT} of TA9210D-EVB-F for 20V 50mA 200M-1GHz

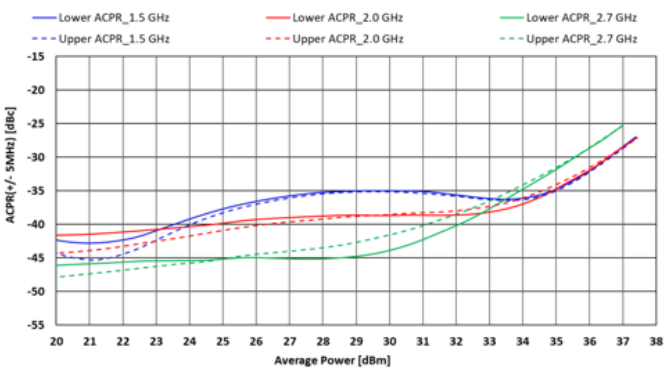

Figure 6.3.2. ACPR vs P_{OUT} of TA9210D-EVB-F for 20V 50mA 1.5G-2.7GHz

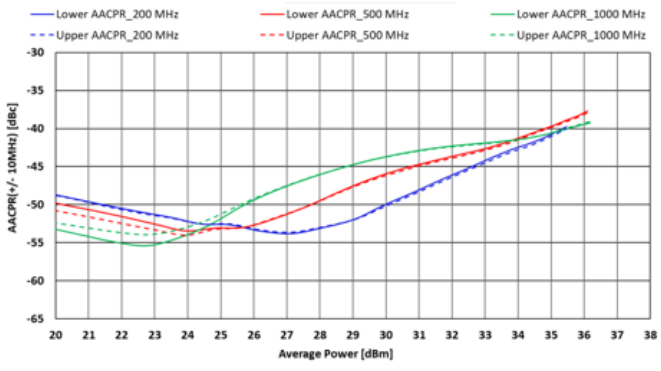

Figure 6.3.3. AACPR vs P_{OUT} of TA9210D-EVB-F for 20V 50mA 200M-1GHz

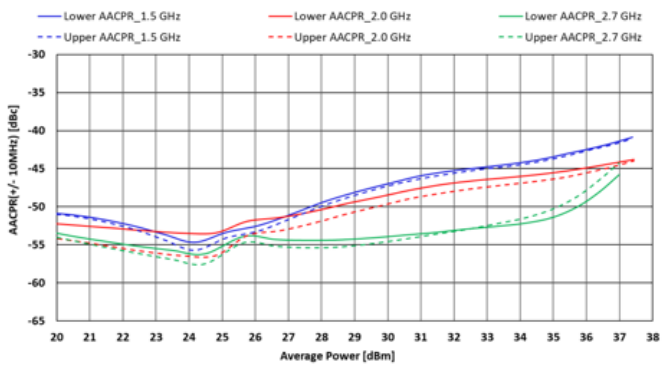

Figure 6.3.4. AACPR vs P_{OUT} of TA9210D-EVB-F for 20V 50mA 1.5G-2.7GHz

Bias :20V 600mA

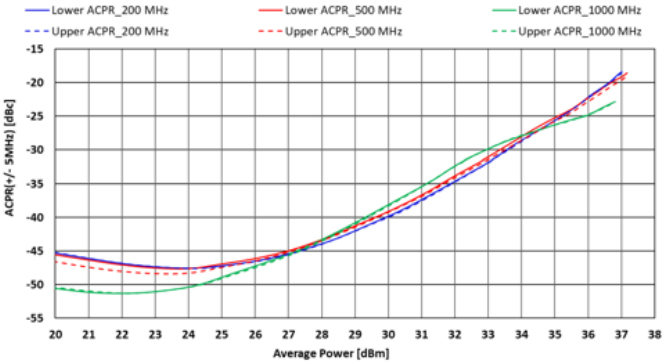

Figure 6.3.5. ACPR vs P_{OUT} of TA9210D-EVB-F for 20V 50mA 200M-1GHz

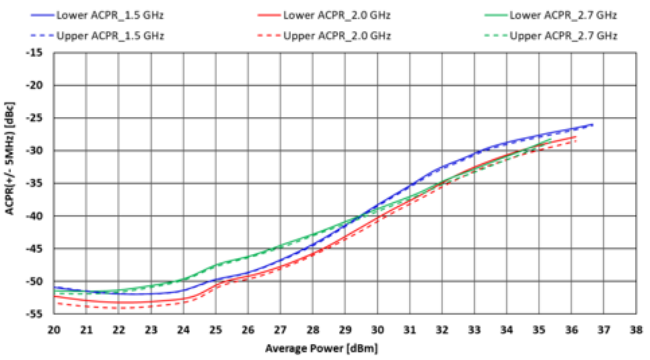

Figure 6.3.6. ACPR vs P_{OUT} of TA9210D-EVB-F for 20V 50mA 1.5G-2.7GHz

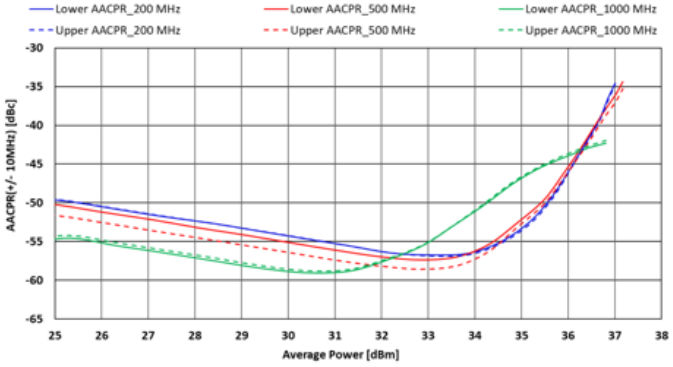

Figure 6.3.7. AACPR vs P_{OUT} of TA9210D-EVB-F for 20V 50mA 200M-1GHz

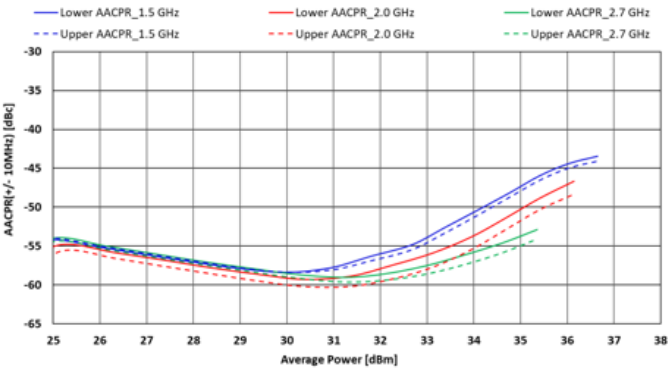

Figure 6.3.8. AACPR vs P_{OUT} of TA9210D-EVB-F for 20V 50mA 1.5G-2.7GHz

Edition Revision 1.3 - 2023-10-12

Published by

Tagore Technology Inc.

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Arlington Heights, IL 60004, USA

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