# TA9210D

12.5 W CW 0.03 – 4.0 GHz GaN Power Transistor

**Application Note: TA9210D EVB H**

# Application Note

1200 MHz~2600 MHz

28 V/ 20 V, 50 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-H is tuned from 1200 MHz to 2600 MHz.

## 2. TA9210D-EVB-H Board Details

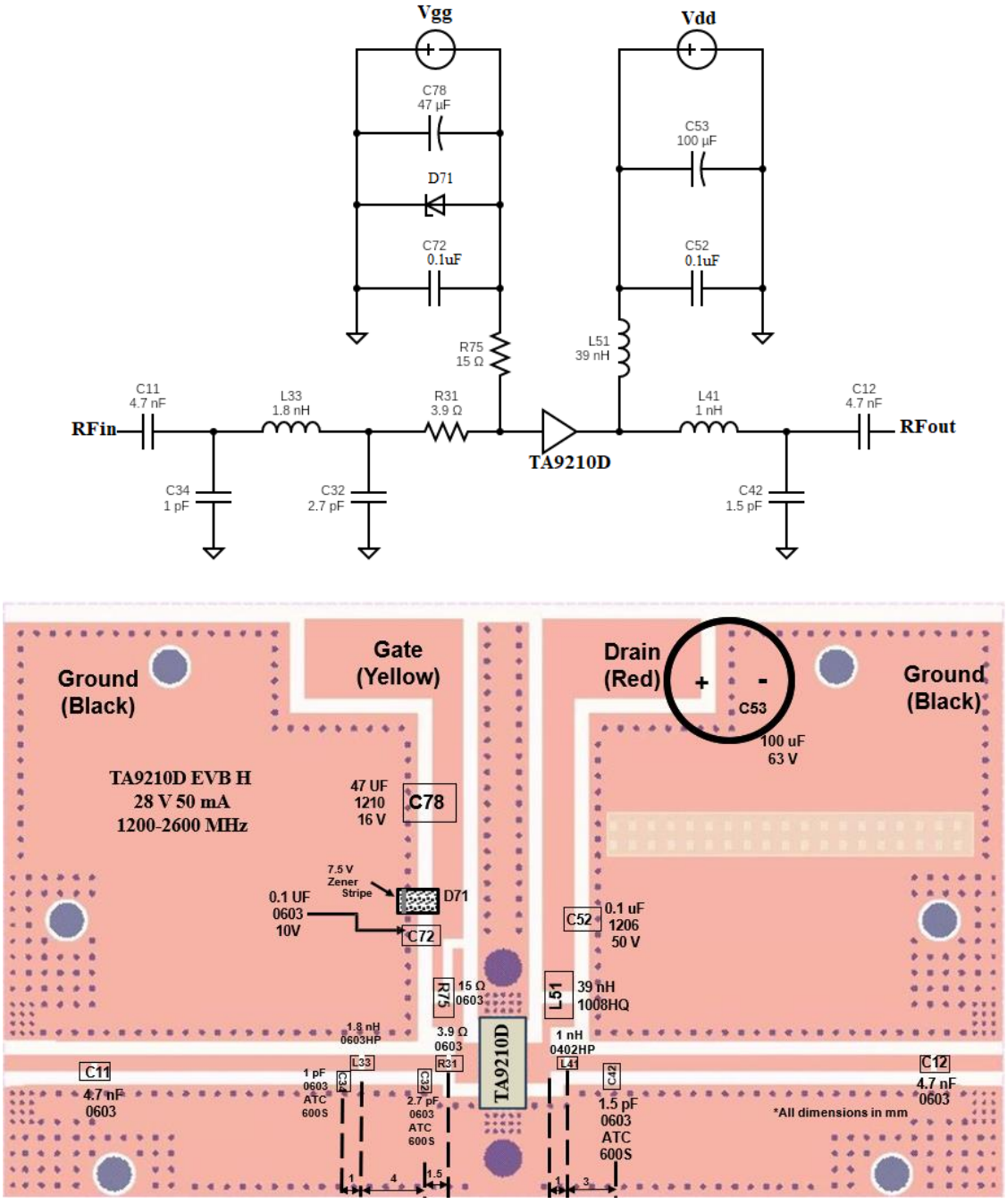


**Figure 2.1 TA9210D-EVB-H 1200 MHz ~ 2600 MHz Schematic and EVB Layout**

## 3. TA9210D-EVB-H Bill of Material

| Component ID | Value | Manufacturer | Recommended Part Number |
|---|---|---|---|
| C11, C12 | 4.7 nF, 50 V | Murata | GRM1885C1H472JA01D |
| R31 | 3.9 Ω | Vishay | CRCW06033R90FKEAHP |
| C32 | 2.7 pF | AVX | 600S2R7CT250XT |
| L33 | 1.8 nH | Coil craft | 0603HP-1N8XJLW |
| C34 | 1 pF | AVX | 600S1R0BW250XT |
| L41 | 1 nH | Coil craft | 0402HP-1N0XJRW |
| C42 | 1.5 pF | AVX | 600S1R5CT250XT |
| L51 | 39 nH | Coil craft | 1008HQ-39NXGLC |
| C52 | 0.1 µF, 50 V | Murata | GRM31C5C1H104JA01L |
| C53 | 100 µF, 63 V | Nichicon | UPW1J101MPD1TD |
| D71 | 7.5 V Zener Diode | On Semiconductor | MMSZ5236BT1G |
| C72 | 0.1 uF, 10 V | AVX | 0603ZC104K4T2A |
| R75 | 15 Ω | Vishay/Dale | CRCW060315R0FKEAHP |
| 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-H BOM**

## 4. TA9210D-EVB-H Biasing Sequence

| Turn ON Device | Turn OFF Device |
|---|---|
| 1. Set $V_G$ to -5 V<br>2. Set $V_D$ to +28 V/ 20 V<br>3. Adjust $V_G$ to reach required $I_{DQ}$ current<br>4. Apply RF power | 1. Turn RF power off<br>2. Turn off $V_D$<br>3. Turn off $V_G$ |

**Table 4.1 TA9210D-EVB-H Bias and Sequencing**

## 5. TA9210D-EVB-H Board Measurement Summary

| Frequency (GHz) | S21 Gain(dB) | S11 (dB) | S22 (dB) | Psat (dBm) | PAE [%] @Psat |
|---|---|---|---|---|---|
| 1.2 | 16.8 | -5.1 | -3.7 | 40.9 | 50 |
| 1.6 | 16.0 | -4.9 | -4.4 | 40.9 | 38 |
| 2 | 15.7 | -6.3 | -5.8 | 41.2 | 42 |
| 2.4 | 15.6 | -11.0 | -10.2 | 41.4 | 55 |
| 2.6 | 15.3 | -28.8 | -14.4 | 41.0 | 60 |

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

# 6. TA9210D-EVB-H Test Results

All the tests are carried out at room temperature.

## 6.1. S parameters

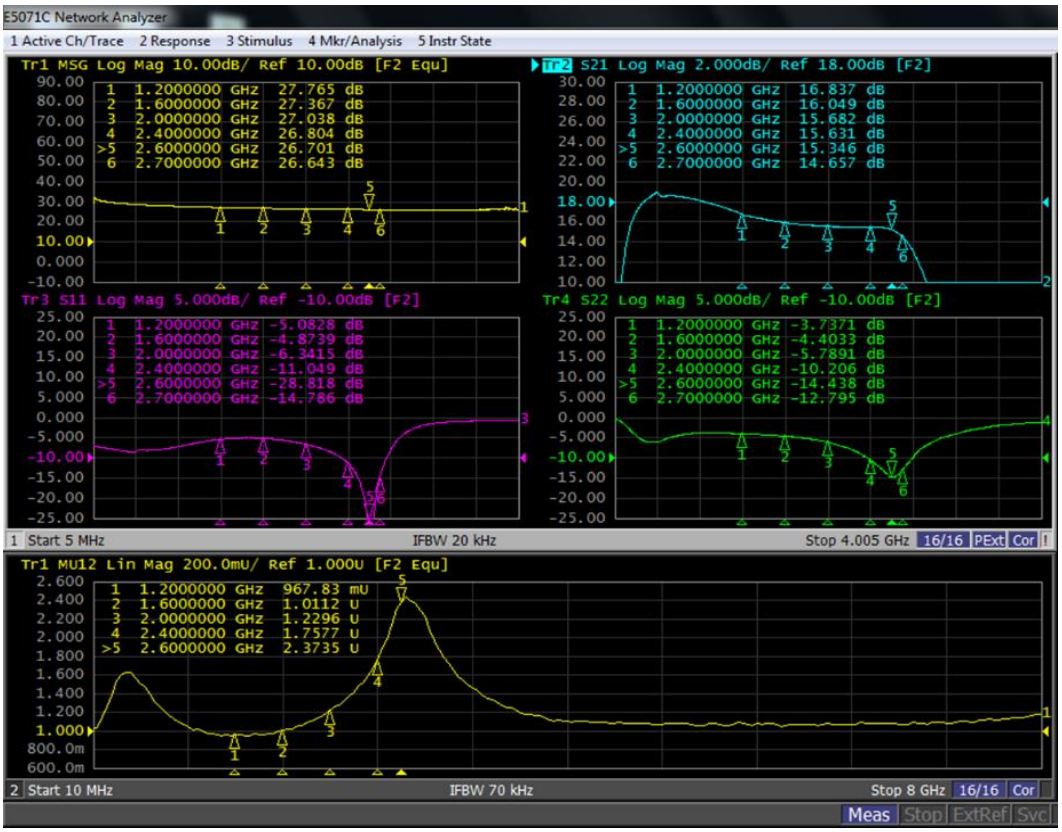


**Figure 6.1.1. S parameters of TA9210D-EVB-H 28 V, 50 mA**

## 6.2. Gain, PAE v/s Pout (CW) @ 20 V and 28 V Vdd

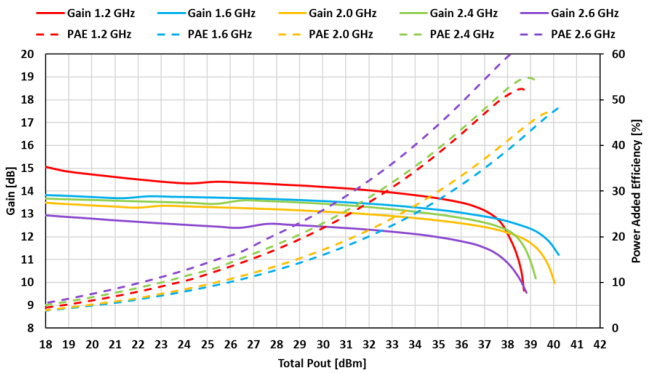


**Figure 6.2.1 Gain, PAE v/s Pout Of TA9210D-EVB-H, VD=20 V, IDQ=50 mA**

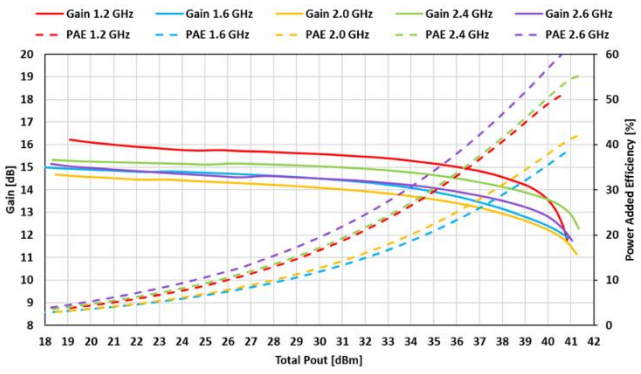


**Figure 6.2.2 Gain, PAE v/s Pout Of TA9210D-EVB-H, VD=28 V, IDQ=50 mA**

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