TA9110K

6 W CW 0.03 – 4.0 GHz GaN Power Transistor

Application Note: TA9110K EVB D

Application Note

1500 MHz~1800 MHz

30 V, 30 mA

Rev-2.1

List of Contents

1. General Description

The TA9110K is a broadband GaN power transistor capable of delivering 6 W CW from 30 MHz to 4.0 GHz frequency band. The transistor can be used at lower frequencies with reduced output power. The input and output can be matched for best power and efficiency for the desired band.

The TA9110K is packaged in a compact, low-cost Quad Flat No lead (QFN) 3 x 3 x 0.75 mm, 16 leads plastic package. TA9110K-EVB-D is tuned from 1.5 GHz to 1.8 GHz.

2. TA9110K-EVB-D Board Details

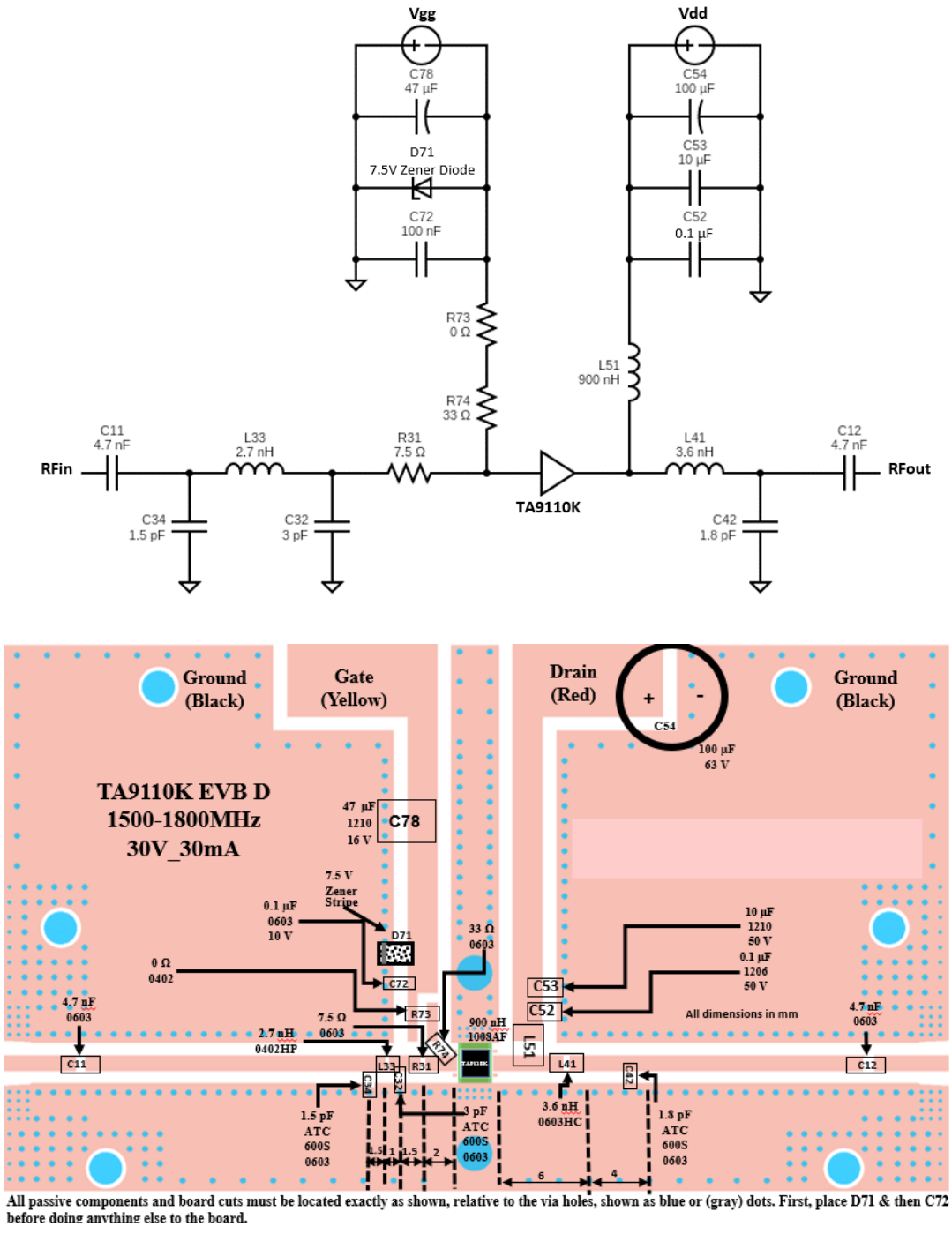

Figure 2.1 TA9110K-EVB-D 1500 MHz ~ 1800 MHz Schematic and EVB Layout

3. TA9110K-EVB-D Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
C11, C12	4.7 nF, 50 V	Murata	GRM1885C1H472JA01
R31	7.5 Ω	Panasonic	ERJ-3RQF7R5V
C32	3 pF	AVX	600S3R0BT250XT
L33	2.7 nH	Coil craft	0402HP-2N7XGE
C34	1.5 pF	AVX	600S1R5BT250XT
L41	3.6 nH	Coil craft	0603HC-3N6XJLW
C42	1.8 pF	AVX	600S1R8BT250XT
L51	900 nH	Coil craft	1008AF-901XJLC
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	SZMMSZ5236BT 1G
C72	0.1 µF, 10 V	AVX	0603ZC104K4T2A
R73	0 Ω	Panasonic	ERJ-2GE0R00X
R74	33 Ω	ROHM Semiconductor	ESR03EZPJ330
C78	47 µF, 16 V	Murata	GRM32ER61C476ME15L
Q1	6 W GaN transistor	Tagore Tech	TA9110K
PCB	Rogers RO4350B, 20 mils, 2 oz copper		

Table 3.1 TA9110K-EVB-D BOM

4. TA9110K-EVB-D Biasing Sequence

Turn ON Device	Turn OFF Device
1. Set V_G to -5 V 2. Set V_D to +30 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 TA9110K-EVB-D Bias and Sequencing

5. TA9110K-EVB-D Board Measurement Summary

Frequency (MHz)	S21 Gain(dB)	S11(dB)	S22(dB)	Psat(dBm)	PAE (%) @Psat
1500	18.2	-7.0	-6.7	40.2	70.2
1600	18.2	-9.0	-8.0	39.6	75.0
1700	18.0	-11.6	-9.0	39.2	70.0
1800	17.3	-14.2	-9.0	38.1	60.3

Table 5.1 TA9110K-EVB-D 30 V, 30 mA Electrical Characteristics Summary

6. TA9110K-EVB-D Test Results

All the tests are carried out at room temperature.

6.1. S parameters

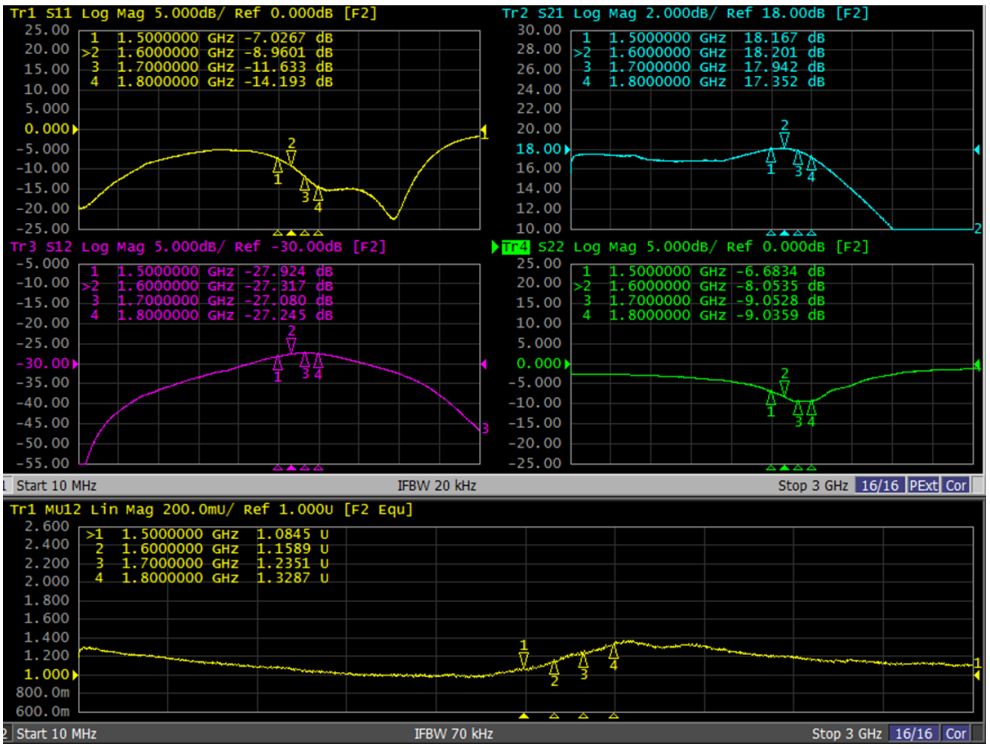

Figure 6.1.1. S parameters of TA9110K-EVB-D 30 V, 30 mA

6.2. Large Signal Test Results

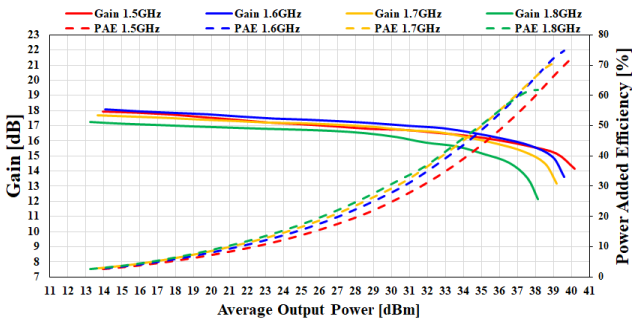

Figure 6.2.1. Gain and PAE vs P_{OUT} of TA9110K-EVB-D For 30 V, 30 mA

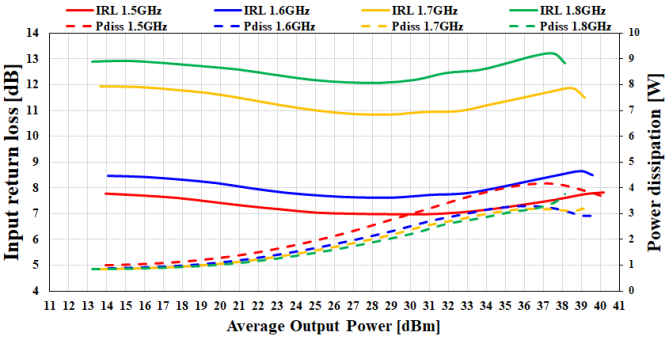

Figure 6.2.2. IRL and Pdiss vs P_{OUT} of TA9110K-EVB-D For 30 V, 30 mA

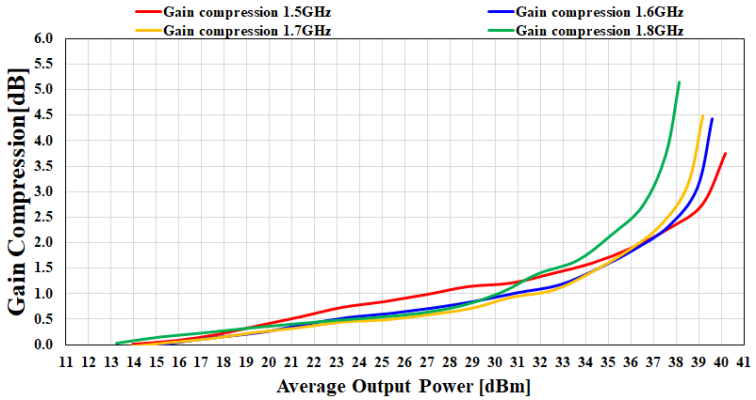

Figure 6.2.3. Gain Compression vs P_{OUT} of TA9110K-EVB-D For 30 V, 30 mA

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