Tagore Technology

TA9110K

6W CW 0.03 – 4.0 GHz GaN Power Transistor

Application Note: TA9110K EVB E

Application Note

30MHz~800MHz

32V 30mA

Rev-1.1

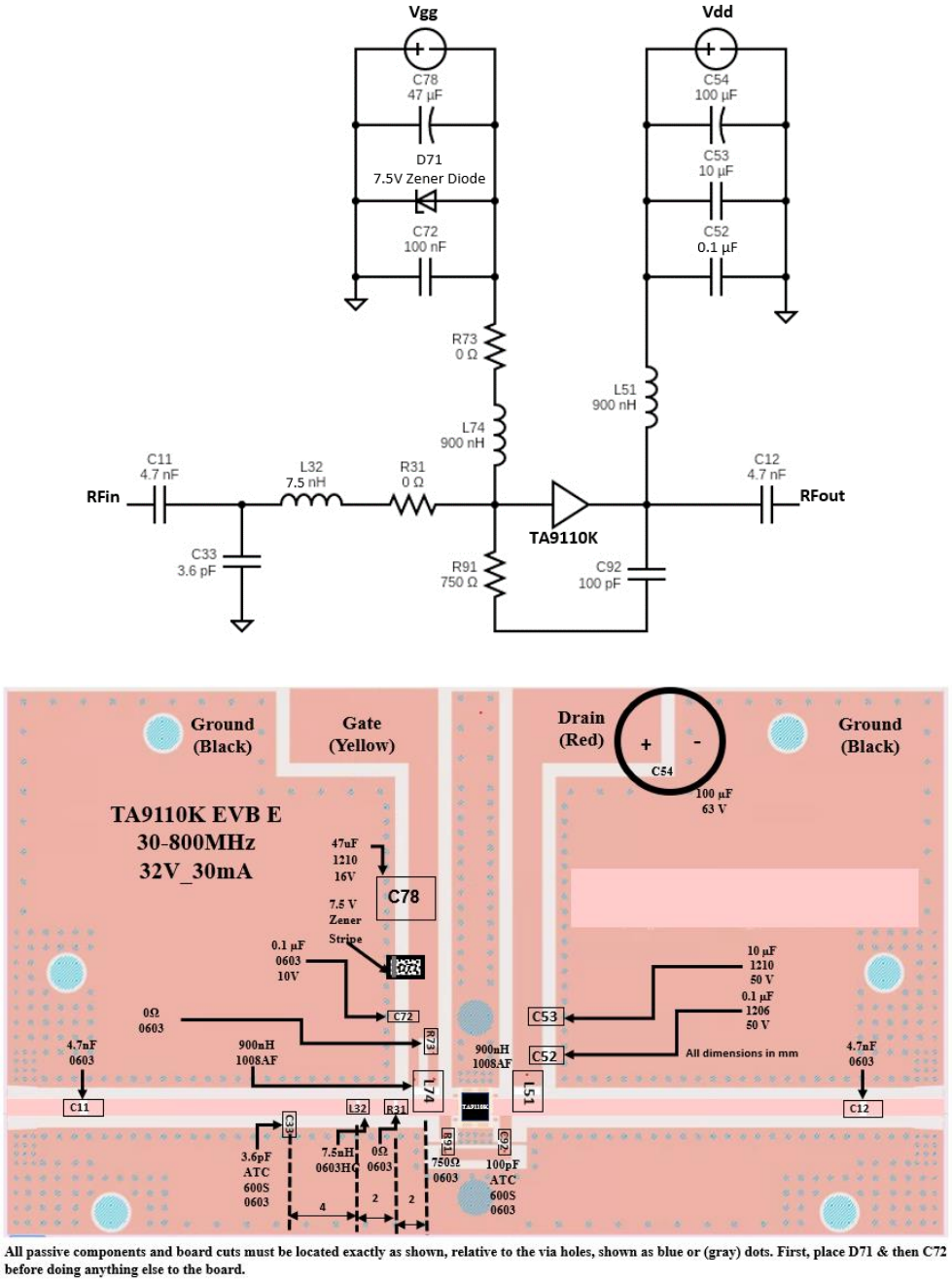
List of Contents

1. General Description

The TA9110K is a broadband GaN power transistor capable of delivering 6W CW from 30MHz to 4.0GHz 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) 3x3x0.8mm, 16 leads plastic package. TA9110K-EVB-E is tuned from 30MHz to 800MHz.

2. TA9110K-EVB-E Board Details



All passive components and board cuts must be located exactly as shown, relative to the via holes, shown as blue or (gray) dots. First, place D71 & then C72 before doing anything else to the board.

Figure 2.1 TA9110K-EVB-E 30MHz ~ 800MHz Schematic and EVB Layout

3. TA9110K-EVB-E Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
C11, C12	4.7nF, 50V	Murata	GRM1885C1H472JA01D
R31, R73	0Ω	Vishay	CRCW06030000Z0EAC
L32	7.5nH	Coil craft	0603HC-7N5XJLW
C33	3.6pF	AVX	600S3R6CT250XT
L51, L74	900nH	Coil craft	1008AF-901XKRC
C52	0.1µF, 10V	AVX	0603ZC104K4T2A
C53	10 µF, 50V	Murata	GRM32ER71H106KA12L
C54	100µF, 63V	Nichicon	UPW1J101MPD1TD
D71	7.5 V Zener	On Semiconductor	MMSZ5236BT1G
C72	0.1µF, 10V	AVX	0603ZC104K4T2A
C78	47µF, 16V	Murata	GRM32ER61C476ME15L
R91	750Ω	Vishay	CRCW0603750RFKEB
C92	100pF	AVX	600S101GT250XT
Q1	6W GaN transistor	Tagore Technology	TA9110K
PCB		Rogers RO4350B, 20 mils, 2 oz copper	

Table 3.1 TA9110K-EVB-E BOM

4. TA9110K-EVB-E Biasing Sequence

Turn ON Device	Turn OFF Device
1. Set V_G to -5V 2. Set V_D to +32V 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-E Bias and Sequencing

5. TA9110K-EVB-E Board Measurement Summary

Frequency (MHz)	S21 Gain(dB)	S11(dB)	S22(dB)	Noise Figure	Psat(dBm)	PAE (%) @Psat
30	20.7	-14	-22.1	1.59	40.2	67
100	20.8	-14.1	-24.0	0.76	40.5	68
200	20.6	-12.0	-20.6	0.66	40.4	67
400	20.0	-9.5	-20.0	0.85	40.3	62
600	19.9	-10.4	-19.9	0.89	40.5	56
800	19.8	-18.3	-19.8	0.85	40.7	56

Table 5.1 TA9110K-EVB-E 32V 30mA Electrical Characteristics Summary

6. TA9110K-EVB-E Test Results

All the tests are carried out at room temperature.

6.1. S parameters

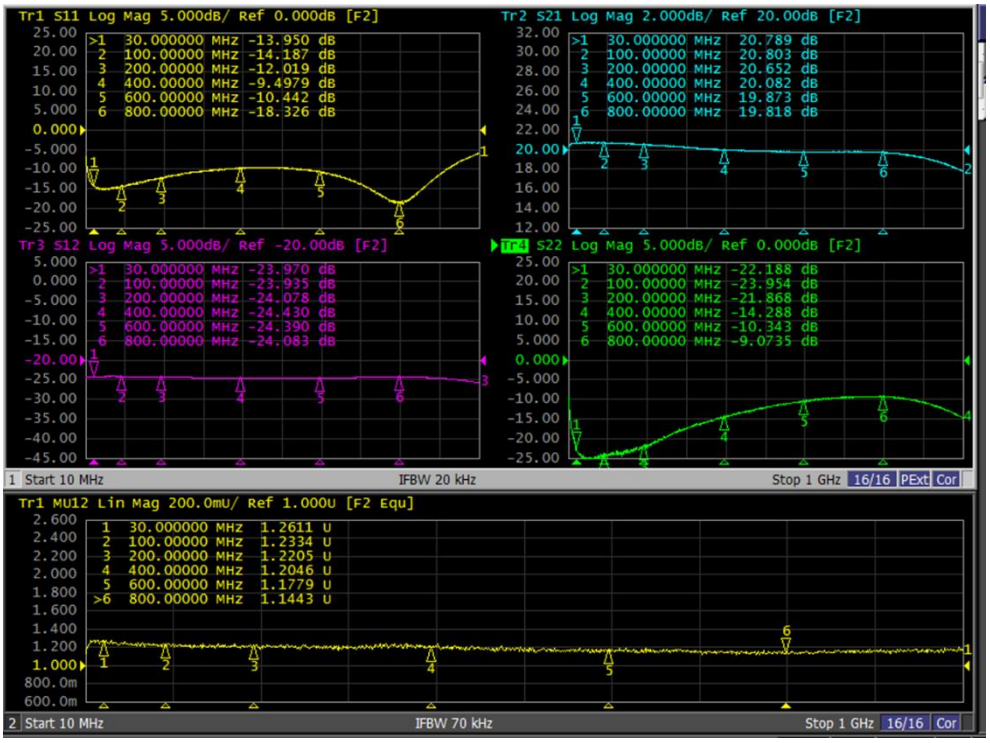


Figure 6.1.1. S parameters of TA9110K-EVB-E 32V 30mA

6.2. SMA to SMA Noise Figure

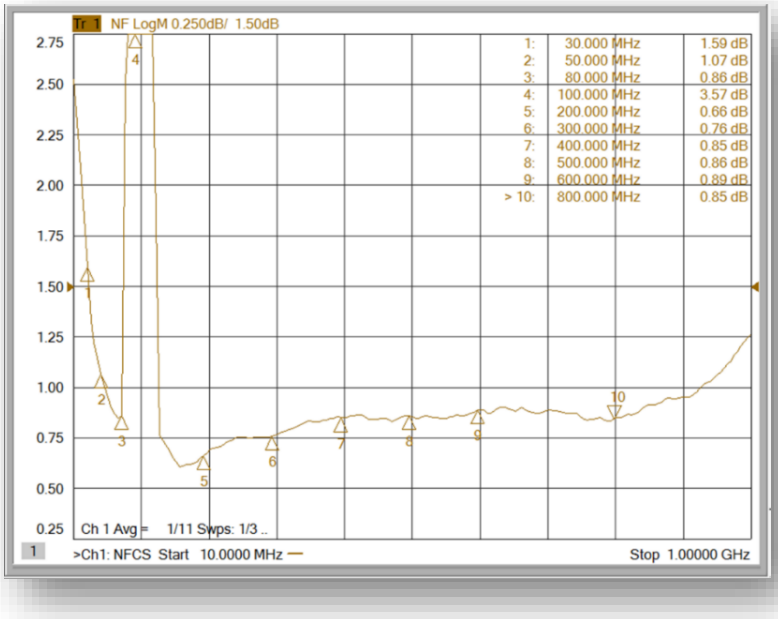


Figure 6.2.1. Noise Figure of TA9110K-EVB-E 32V 30mA

[Note: Measurement readings may exhibit spikes due to atmospheric signals, but please disregard them]

6.3. Large Signal Test Results

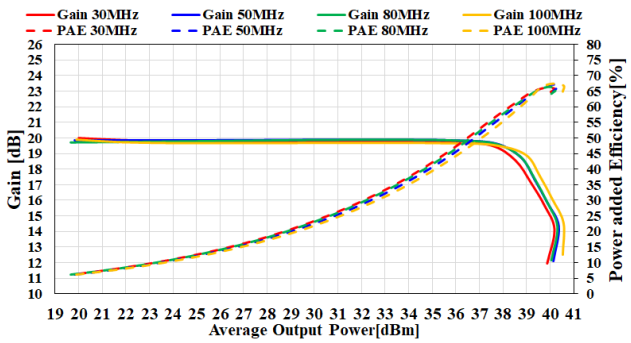


Figure 6.3.1. Gain and PAE vs P_{OUT} of TA9110K-EVB-E[30-100MHz]

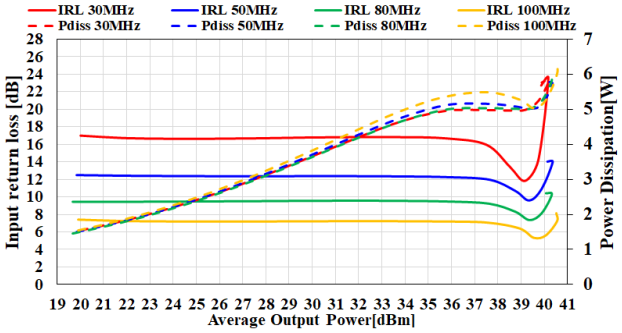


Figure 6.3.2. IRL and Pdiss vs P_{OUT} of TA9110K-EVB-E[30-100MHz]

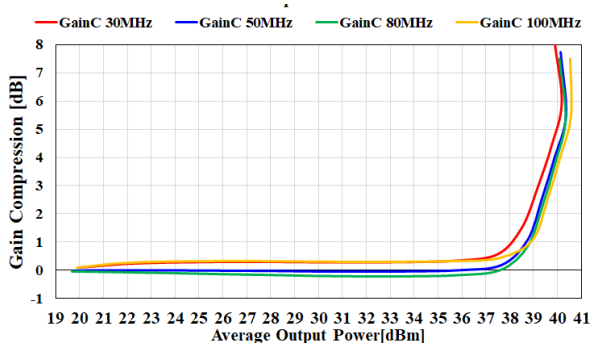


Figure 6.3.3. Gain Compression vs P_{OUT} of TA9110K-EVB-E[30-100MHz]

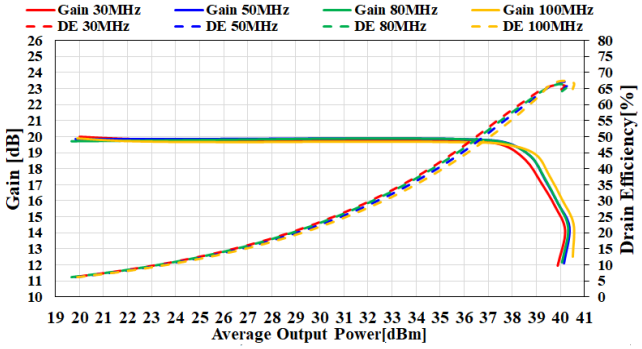


Figure 6.3.4. Gain and DE vs P_{OUT} of TA9110K-EVB-E[30-100MHz]

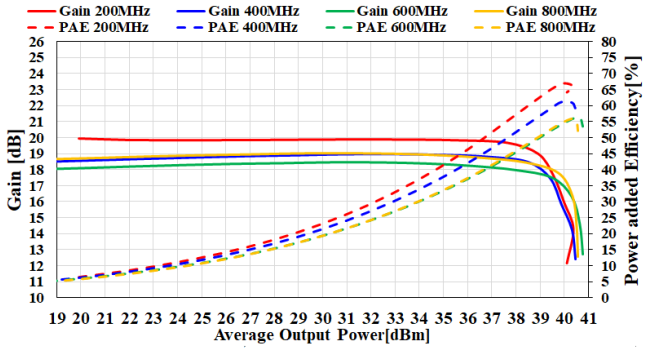


Figure 6.3.5. Gain and PAE vs P_{OUT} of TA9110K-EVB-E[200-800MHz]

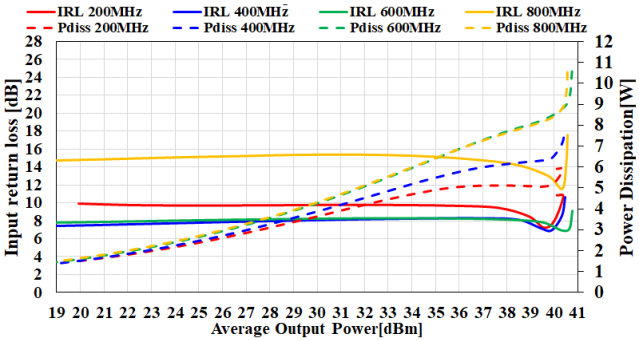


Figure 6.3.6. IRL and Pdiss vs P_{OUT} of TA9110K-EVB-E[200-800MHz]

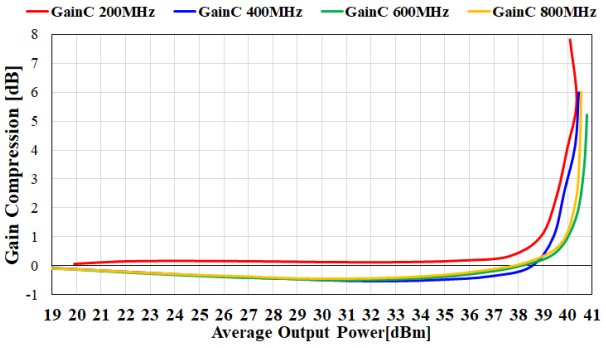


Figure 6.3.7. Gain Compression vs P_{OUT} of TA9110K-EVB-E[200-800MHz]

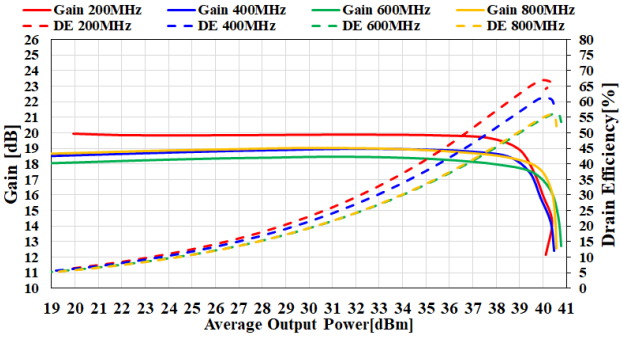


Figure 6.3.8. Gain and DE vs P_{OUT} of TA9110K-EVB-E[200-800MHz]

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