

TA9110K

6 W CW 0.03 – 4.0 GHz GaN Power Transistor

Application Note: TA9110K EVB C

Application Note

3300 MHz~3800 MHz

15 V, 400 mA

Rev-2.3

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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-C is tuned from 3300 MHz to 3800 MHz.

2. TA9110K-EVB-C Board Details

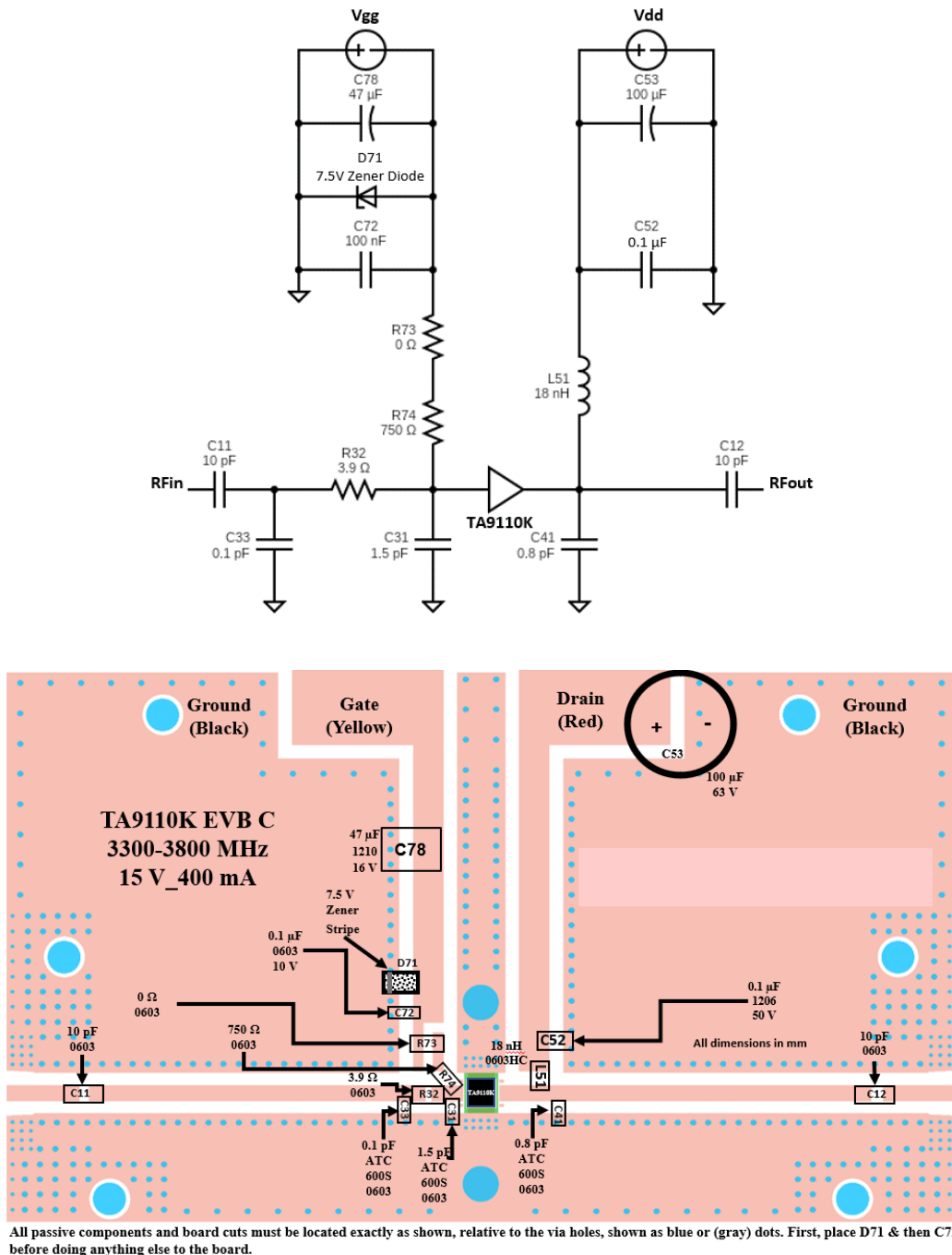


Figure 2.1 TA9110K-EVB-C 3300 MHz ~ 3800 MHz Schematic and EVB Layout

3. TA9110K-EVB-C Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
C11,12	10 pF	AVX	600S100JT250XT
C31	1.5 pF	AVX	600S1R5BT250XT
R32	3.9Ω	Vishay	CRCW06033R90FKEAHP
C33	0.1 pF	AVX	600S0R1BT250XT
C41	0.8 pF	AVX	600S0R8AT250XT
L51	18 nH	Coil craft	0603HC-18NXGLW
C52	0.1 μF, 50 V	Murata	GRM31C5C1H104JA01L
C53	100 μF, 63 V	Nichicon	UPW1J101MPD1TD
D71	7.5 V Zener	On Semiconductor	MMSZ5236BT1G
C72	0.1 μF, 10 V	AVX	0603ZC104K4T2A
R73	0Ω	Vishay	CRCW06030000Z0EAC
R74	750Ω	Vishay	CRCW0603750RFKEB
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-C BOM

4. TA9110K-EVB-C Biasing Sequence

Turn ON Device	Turn OFF Device
1. Set V_G to -5 V 2. Set V_D to +15 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-C Bias and Sequencing

5. TA9110K-EVB-C Board Measurement Summary

Frequency (MHz)	S21 Gain(dB)	S11(dB)	S22(dB)	Psat(dBm)	PAE (%) @Psat
3300	12.3	-8.6	-9.3	36.5-37.0	48
3500	13.0	-14.4	-8.6		50
3700	12.9	-16.6	-7.6		51
3800	12.2	-9.9	-6.8		53

Table 5.1 TA9110K-EVB-C 15 V, 400 mA Electrical Characteristics Summary

6. TA9110K-EVB-C Test Results

All the tests are carried out at room temperature.

6.1. S parameters

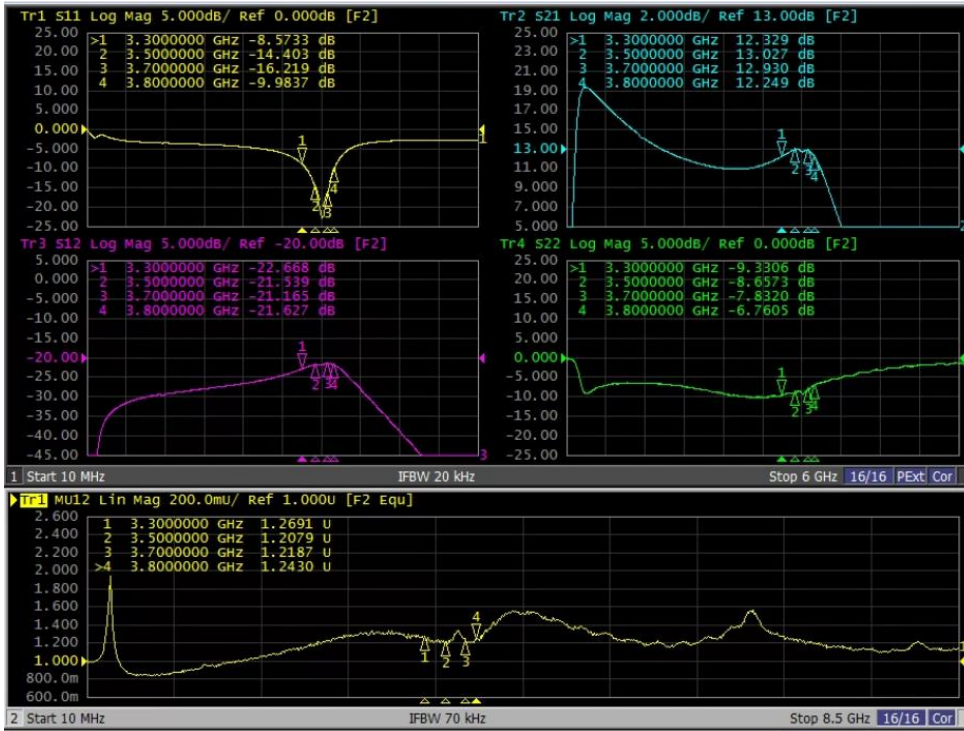


Figure 6.1.1. S parameters of TA9110K-EVB-C 15 V, 400 mA

6.2. Large Signal Test Results

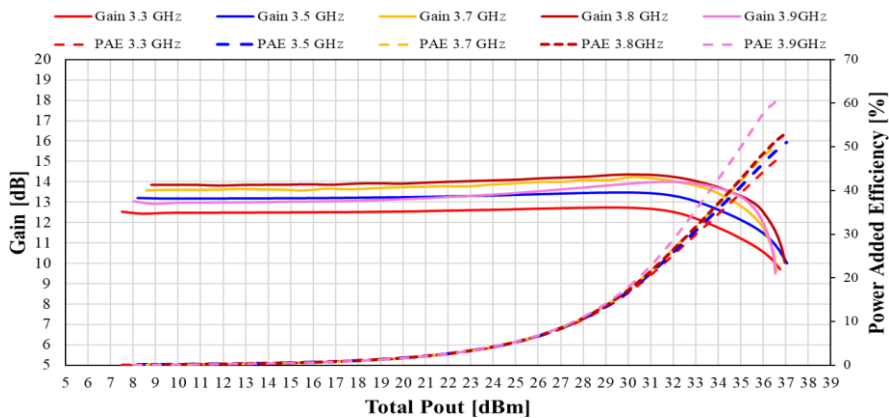


Figure 6.2.1. Gain and PAE vs P_{OUT} of TA9110K-EVB-C

6.3. Spectrum Mask Plots

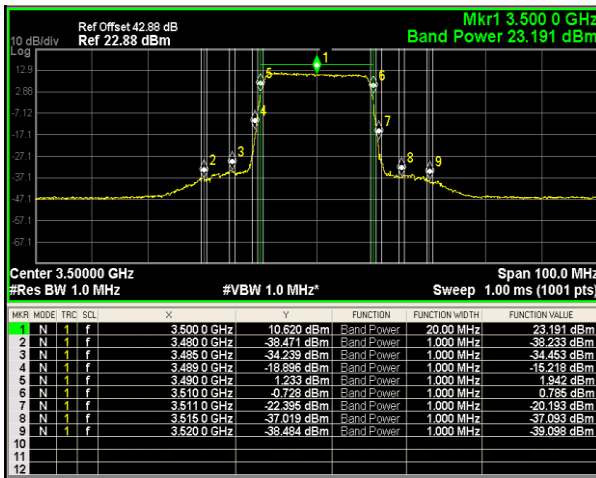


Figure 6.3.1. Spectrum Mask Plot of TA9110K-EVB-C for Pout=23 dBm

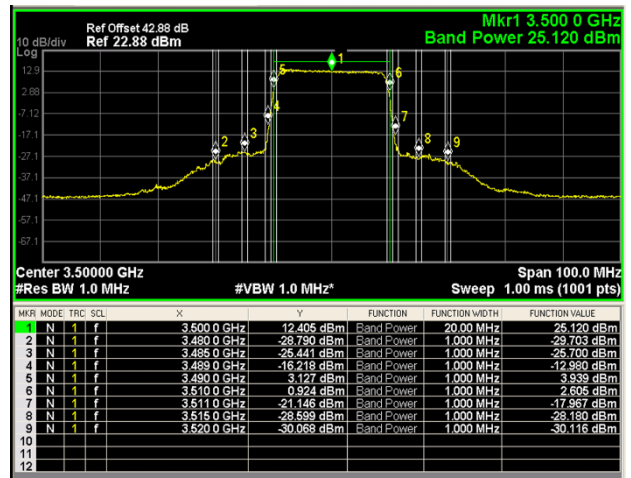


Figure 6.3.2. Spectrum Mask Plot of TA9110K-EVB-C for Pout=25 dBm

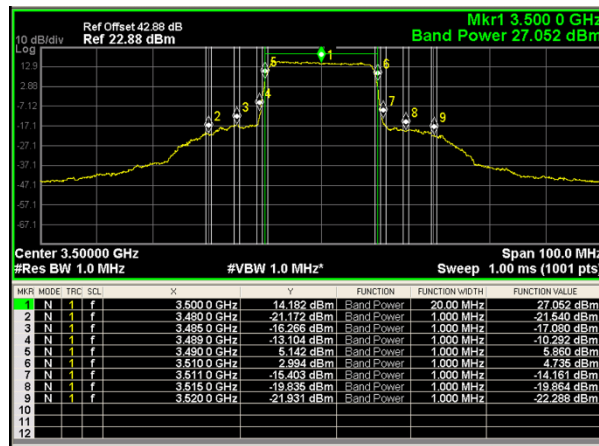


Figure 6.3.3. Spectrum Mask Plot of TA9110K-EVB-C for Pout=27 dBm

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