

TP0310K

27 dBm CW 0.03-3.8GHz GaAs Power LNA

Application Note: TP0310K EVB F

Application Note

2900 MHz~3500 MHz

5.0 V, 130 mA

Rev-2.0

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1. General Description

The TP0310K is a power Low Noise Amplifier (LNA) providing high gain and linearity. With a simple input and output match, this LNA can be tuned for different frequency bands targeting low noise, high power, and high linearity over 0.03-3.8 GHz frequency band. At 1.85 GHz, the amplifier typically provides 16.5 dB gain, 27.5 dBm OP1, +39 dBm OIP3, and a 1.0 dB noise figure, while drawing 140-160 mA current from a +5 V supply.

TP0310K-EVB-F is an evaluation board specially tuned for frequency range of 2900 MHz~3500 MHz applications. Its application in the areas of Wireless infrastructure, smart cells, cellular repeaters, SDARs Mil/comm radios etc. The TP0310K is packaged in a compact, low-cost Dual Flat No Lead (QFN) 3 x 3 x 0.8 mm, 16 pin plastic package.

2. TP0310K-EVB-F Board Details

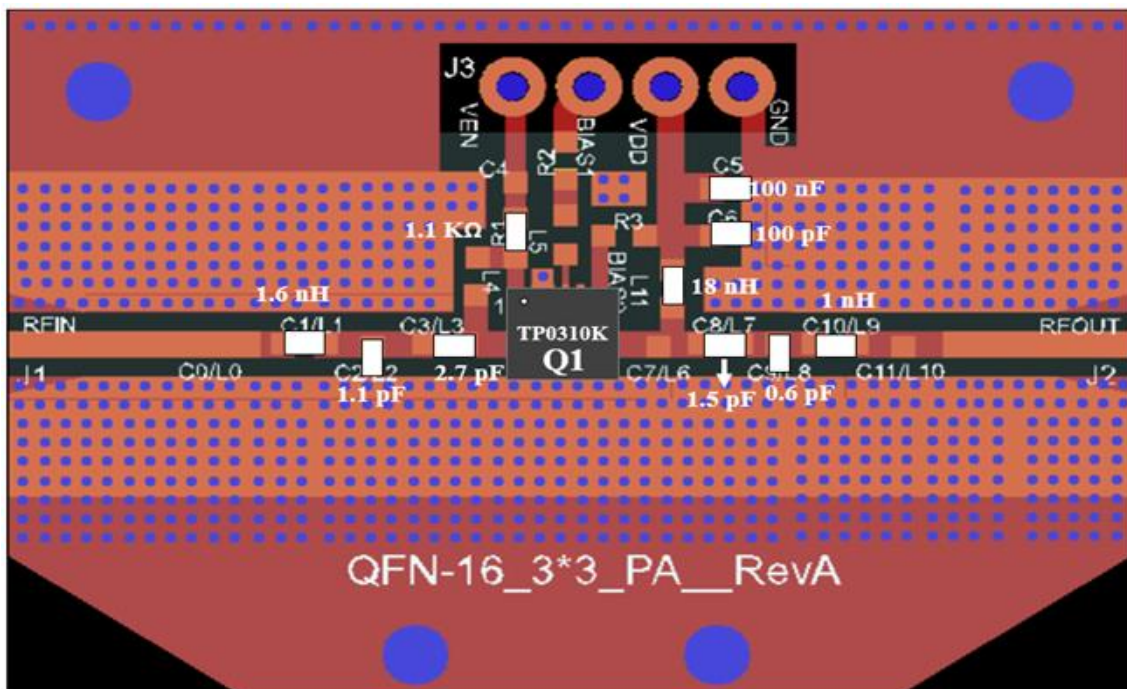
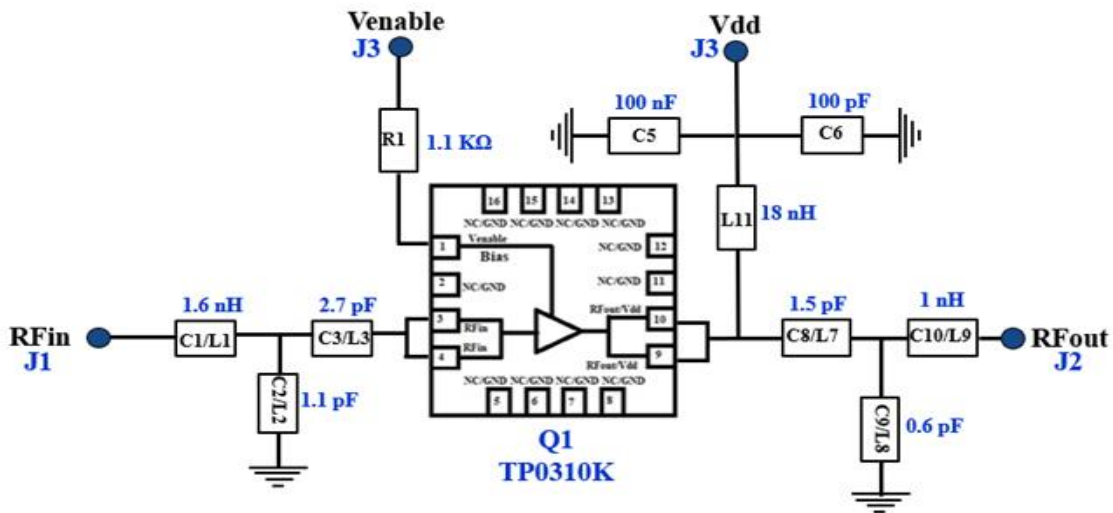


Figure 2.1 TP0310K-EVB-F 2900 MHz ~ 3500 MHz Schematic and EVB Layout

3. TP0310K-EVB-F Bill of Materials

Component ID	Value	Manufacturer	Recommended Part Number
L1	1.6 nH	Coil craft	0603HC-1N6XJRW
C2	1.1 pF	AVX	600S1R1BT250XT
C3	2.7 pF	AVX	600S2R7BT250XT
R1	1.1 K Ω	Panasonic	ERJ-2RKF1111X
C5	100 nF	TDK	C1005X7R1H104K050BE
C6	100 pF	AVX	04025A101JAT4A
C8	1.5 pF	AVX	600S1R5BT250XT
C9	0.6 pF	AVX	600S0R6BT250XT
L9	1 nH	Coil craft	0402HP-1N0XJRW
L11	18 nH	Coil craft	0402HP-18NXGRW
Q1	GaAs LNA	Tagore Tech	TP0310K
PCB		Rogers RO4350B, 20 mils, 1 oz copper	

Table 3.1 TP0310K-EVB-F BOM

4. TP0310K-EVB-F Biasing Sequence

Turn ON Device	Turn OFF Device
1. Set Venable to +5 V 2. Set V_{DD} to +5 V 3. Device will draw required I_{DQ} current 4. Apply RF power	1. Turn RF power off 2. Turn off V_{DD} 3. Turn off Venable

Table 4.1 TP0310K-EVB-F Bias and Sequencing

5. TP0310K-EVB-F Board Measurement Summary

Frequency (MHz)	EVB Noise figure (dB)	Gain(dB)	OP1 (dBm)	OIP3(dBm) 1 MHz tone spacing & 8 dBm power per tone	S11(dB)	S22(dB)	Mu1
2900	1.2	11.7	27.5	38.5	-8.3	-13.2	1.1
3100	0.9	11.8	27.6	37.5	-11.6	-11.8	1.2
3300	0.9	11.8	27.7	38.0	-19.5	-10.3	1.2
3500	1.0	11.4	27.7	38.8	-19.7	-9.8	1.2

Table 5.1 TP0310K-EVB-F Electrical Characteristics Summary

6. TP0310K-EVB-F Test Results

All the tests are carried out at room temperature.

6.1. S parameters

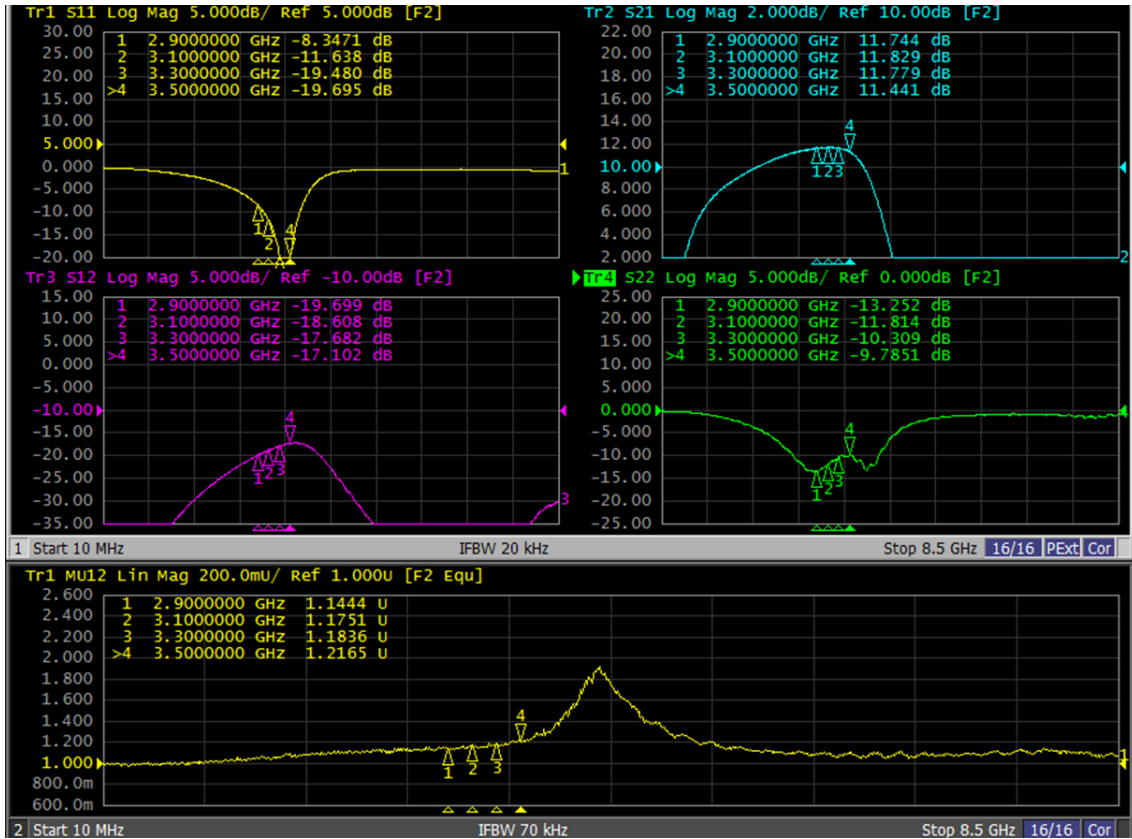


Figure 6.1.1. S parameters of TP0310K-EVB-F

6.2. SMA to SMA Noise Figure

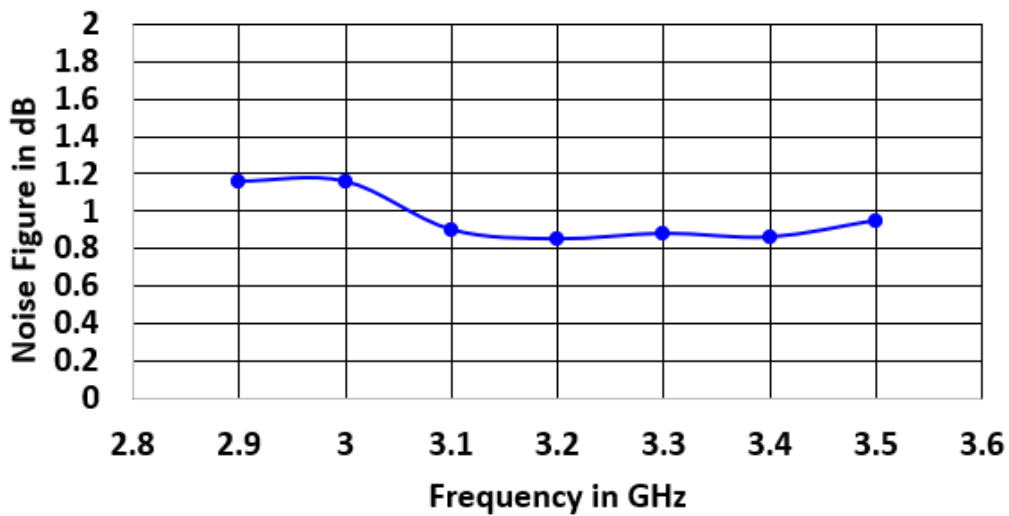


Figure 6.2.1 SMA to SMA NF of TP0310K-EVB-F

6.3. Large Signal Test Results

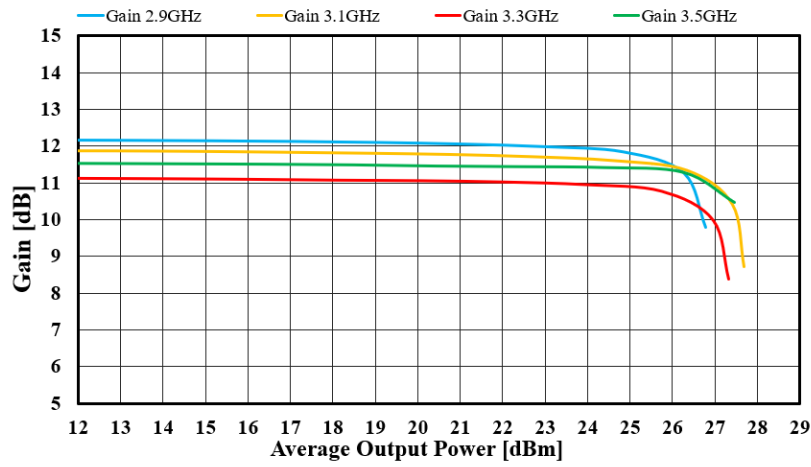


Figure 6.3.1. Gain Vs Pout of TP0310K-EVB-F

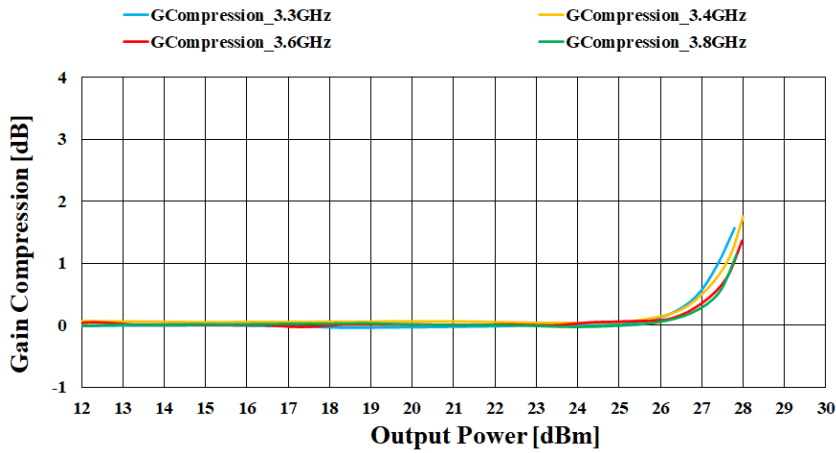


Figure 6.3.2. Gain compression Vs Pout of TP0310K-EVB-F

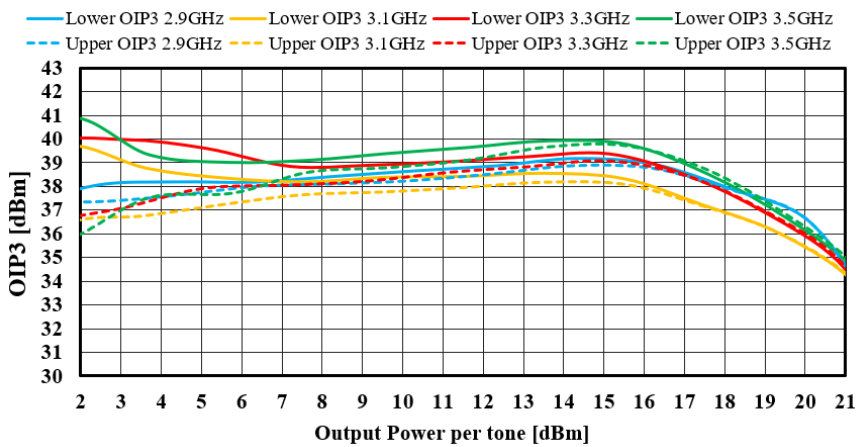


Figure 6.3.3. OIP3 Vs Pout per tone of TP0310K-EVB-F

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