

# TP0310K

27dBm CW 0.1-3.8GHz GaAs Power LNA

Application Note: TP0310K EVB D

## Application Note

130MHz~950MHz

5.0V 140mA

Rev-1.1

## List of Contents

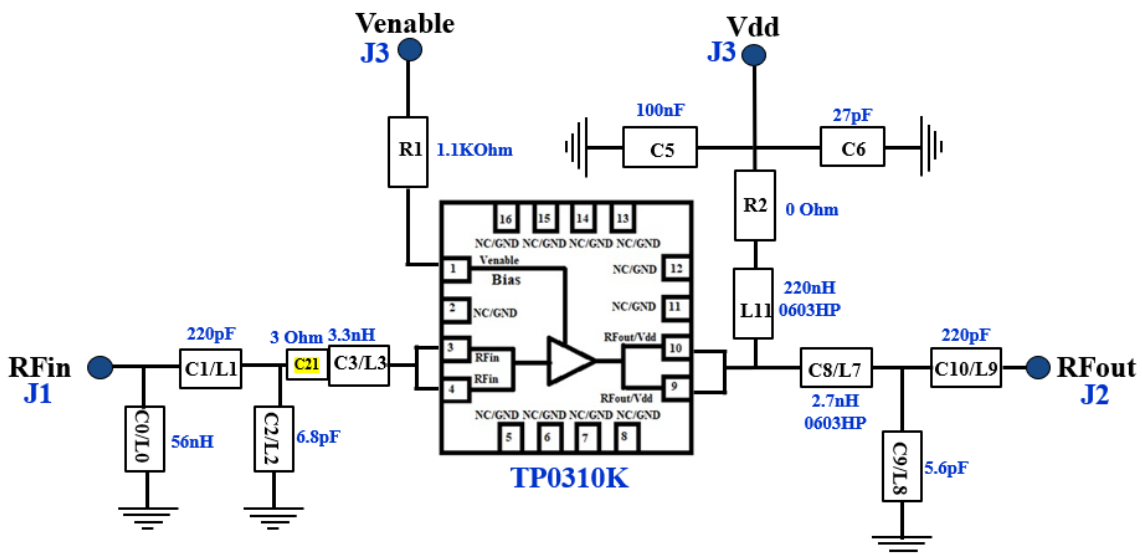
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## 1. General Description

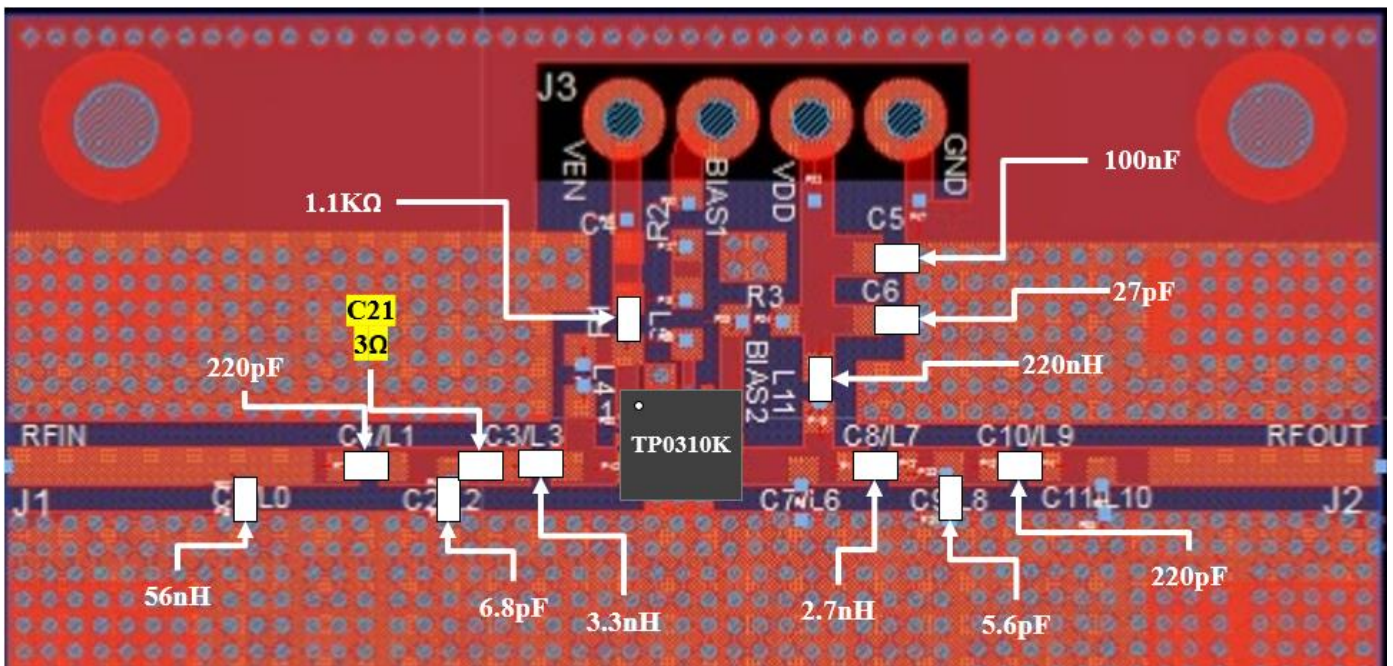
The TP0310K is a power Low Noise Amplifier (LNA) providing high gain and linearity. With a simple input and output match, this LNA can be tuned for different frequency bands targeting low noise, high power, and high linearity over 0.1-3.8GHz frequency band. At 1.85 GHz, the amplifier typically provides 16.5 dB gain, 27.5dBm OP1, +39 dBm OIP3, and a 1.0 dB noise figure, while drawing 140-160 mA current from a +5 V supply.

TP0310K-EVB-D is an evaluation board specially tuned for frequency range of 130MHz~950MHz 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) 3x3x0.8mm, 16 pin plastic package.

## 2. TP0310K-EVB-D Board Details



An external series cut has been made between M2 and M3 in the EVB board to incorporate an extra series resistance (named as C21) at the input side match..



**Figure 2.1 TP0310K-EVB-D 130MHz ~ 950MHz Schematic and EVB Layout**

### 3. TP0310K-EVB-D Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
C0/L0	56nH	Coil craft	0402HPH-56NXGLU
C1/L1, C10/L9	220pF	Murata	GRM0335C1H221FA01D
C2	6.8pF	Murata	GJM1555C1H6R8BB01D
R14	3Ω	Panasonic	ERJ-U02F3R00X
C3/L3	3.3nH	Coil craft	0402HP-3N3XGLU
R1	1.1kΩ	Panasonic	ERJ-2RKF1101X
C5	100nF	TDK	C1005X7R1H104K050BE
C6	27pF	Murata	GJM1555C1H270JB01D
L11	220nH	Coil craft	0402HPH-R22XGLU
C8/L7	2.7nH	Coil craft	0402HP-2N7XGLU
C9/L8	5.6pF	Murata	GJM1555C1H5R6BB01D
Q1	GaAs Power LNA	Tagore Technology	TP0310K
PCB		Rogers RO4350B, 20 mils, 1 oz copper	

**Table 3.1 TP0310K-EVB-D BOM**

### 4. TP0310K-EVB-D Biasing Sequence

Turn ON Device	Turn OFF Device
1. Set Venable to +5V 2. Set V <sub>DD</sub> to +5V 3. Device will draw required I <sub>DQ</sub> current 4. Apply RF power	1. Turn RF power off 2. Turn off V <sub>DD</sub> 3. Turn off Venable

**Table 4.1 TP0310K-EVB-D Bias and Sequencing**

### 5. TP0310K-EVB-D Board Measurement Summary

Frequency (MHz)	EVB Noise figure (dB)	Gain(dB)	OP1 (dBm)	OIP3(dBm) 1MHz tone spacing & 8dBm power per tone	S11(dB)	S22(dB)	Mu1
130	1.9	27.6	24.7	34.0	-25.3	-7.5	1.4
200	1.8	26.5	24.9	35.8	-9.8	-7.0	1.2
300	1.6	24.6	24.7	37.1	-6.2	-7.7	1.2
500	1.6	22.5	25.3	37.0	-6.0	-11.1	1.2
700	1.6	21.6	26.4	36.2	-8.4	-13.5	1.2
950	2.5	20.8	27.1	34.8	-22	-16.9	1.7

**Table 5.1 TP0310K-EVB-D Electrical Characteristics Summary**

## 6. TP0310K-EVB-D Test Results

All the tests are carried out at room temperature.

### 6.1. S parameters

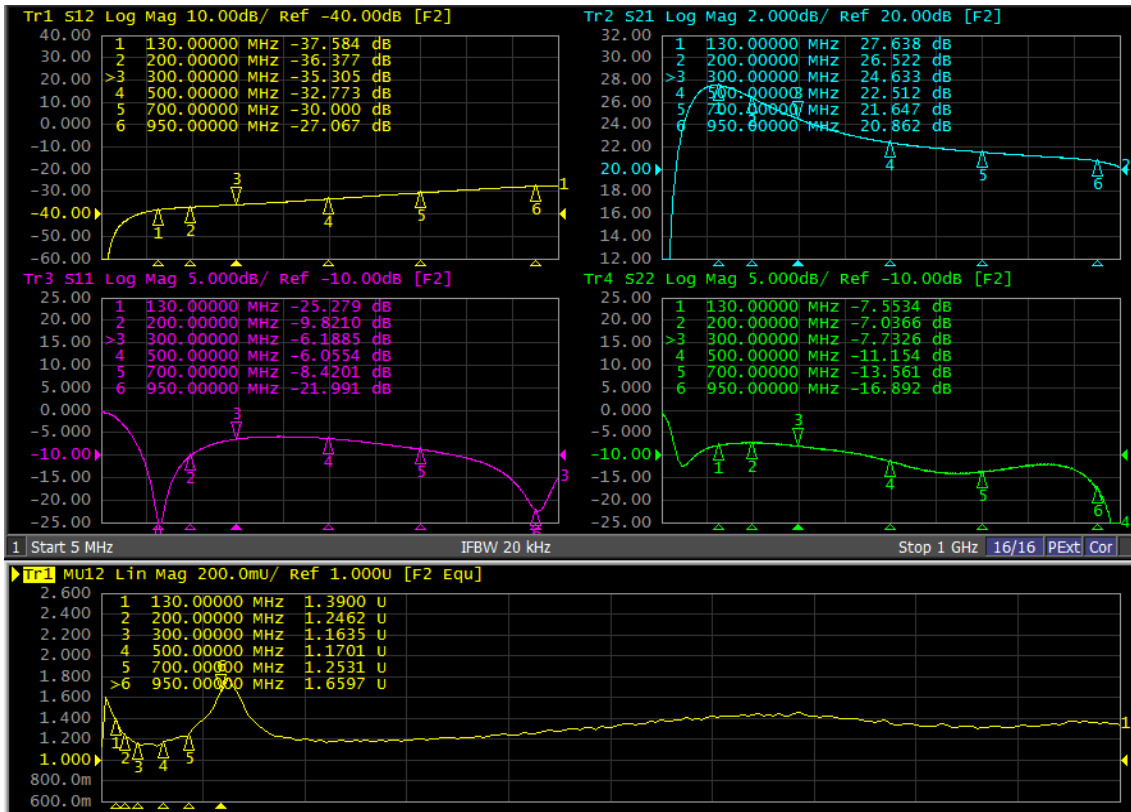


Figure 6.1.1. S parameters of TP0310K-EVB-D

### 6.2. Large Signal Test Results

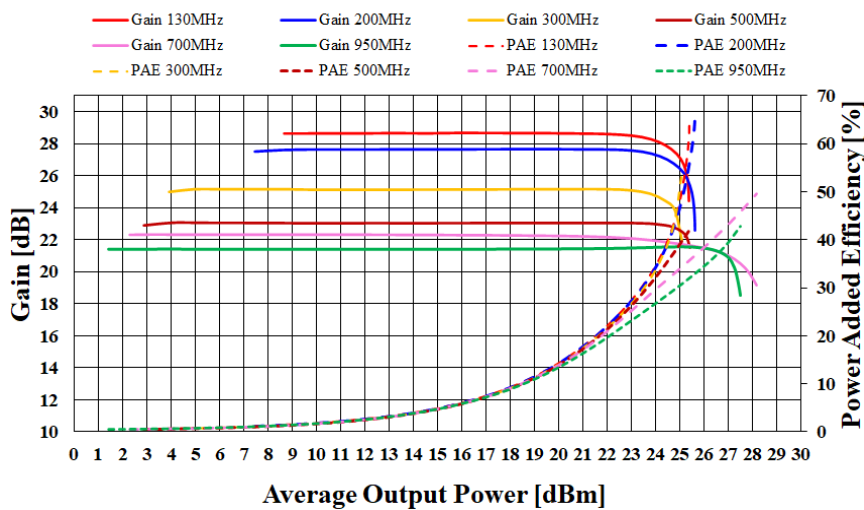
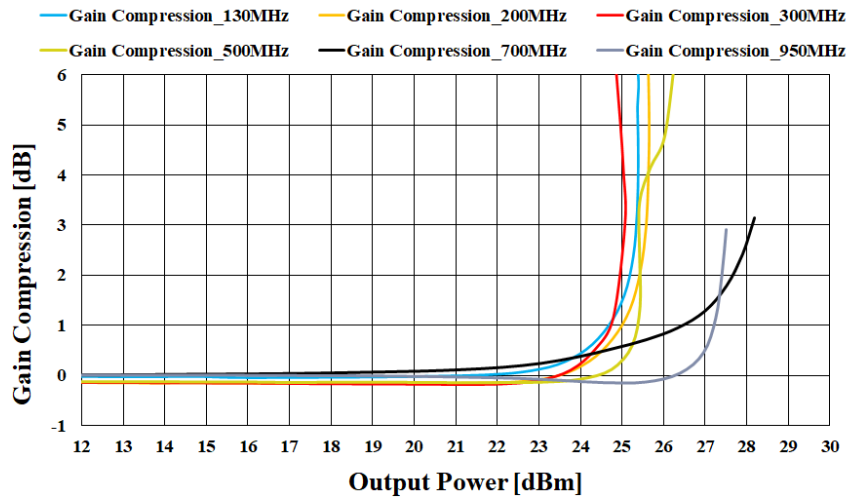
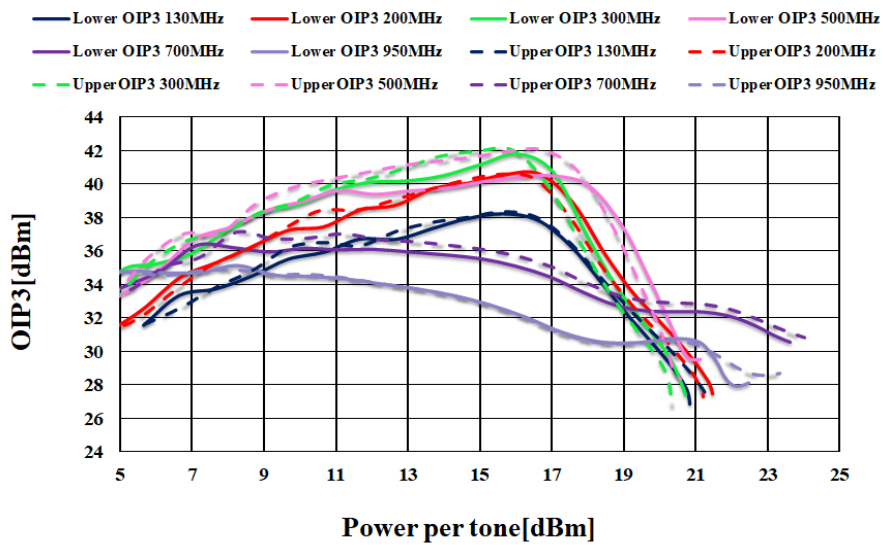


Figure 6.2.1. Gain Vs Pout of TP0310K-EVB-D



**Figure 6.2.2. Gain compression Vs Pout of TP0310K-EVB-D**



**Figure 6.2.3. OIP3 Vs Pout per tone of TP0310K-EVB-D**

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601 W Campus Dr. Ste C1

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