

TP0310K

27 dBm CW 0.03-3.8 GHz GaAs Power LNA

Application Note: TP0310K EVB D

Application Note

130 MHz~950 MHz

5.0 V, 140 mA

Rev-2.1

List of Contents

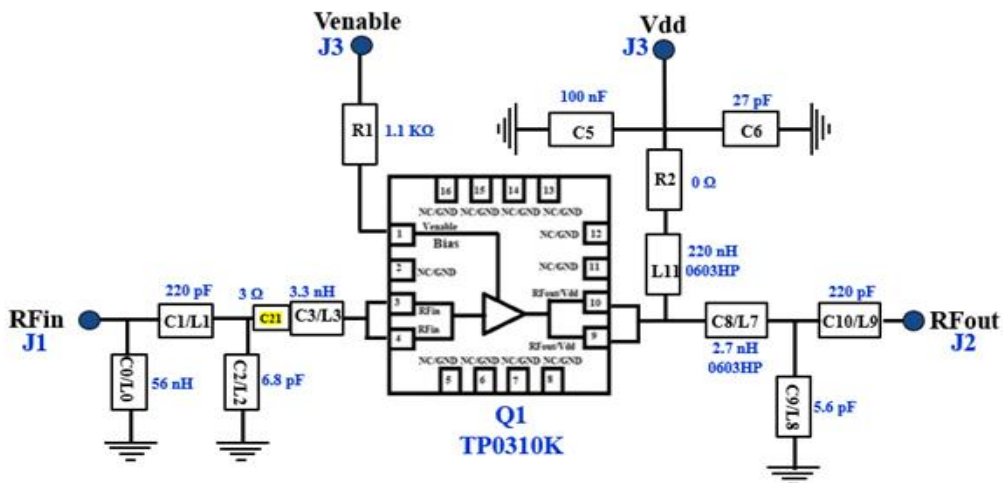
- 1 General Description
- 2 TP0310K-EVB-D Board Details
- 3 TP0310K-EVB-D Bill of Material
- 4 TP0310K-EVB-D Biasing sequence
- 5 TP0310K-EVB-D Board Measurement Summary
- 6 TP0310K-EVB-D Board Measurement Results

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-D is an evaluation board specially tuned for frequency range of 130 MHz~950 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-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.

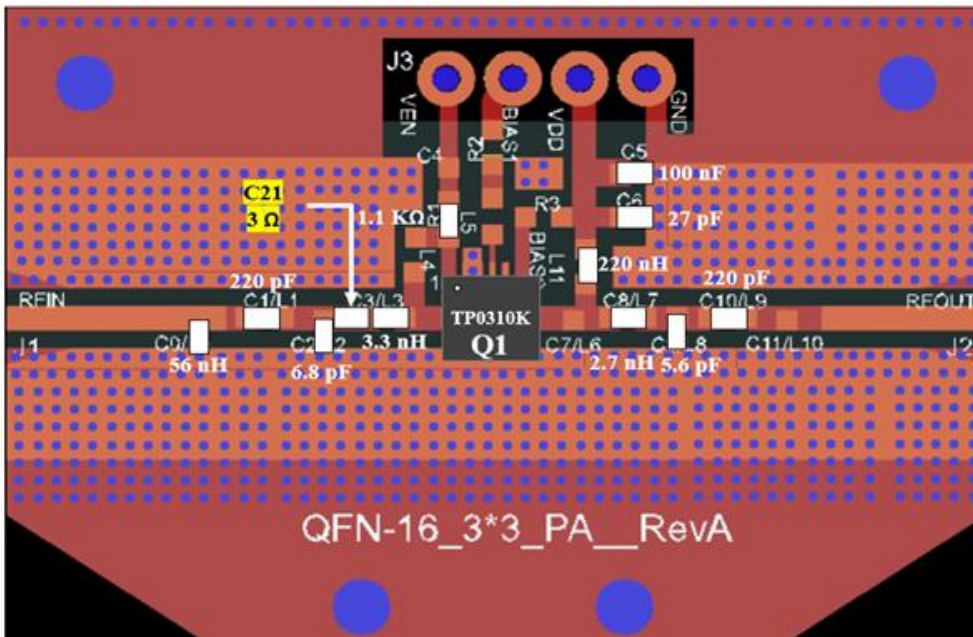


Figure 2.1 TP0310K-EVB-D 130 MHz ~ 950 MHz Schematic and EVB Layout

Note: An external series cut has been made between C3/L3 and C2/L2 in the EVB board to incorporate an extra series resistance 3 ohm (named as R14) at the input side match.

3. TP0310K-EVB-D Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
C0/L0	56 nH	Coil craft	0402HPH-56NXGLU
C1/L1, C10/L9	220 pF	Murata	GRM0335C1H221FA01D
C2	6.8 pF	Murata	GJM1555C1H6R8BB01D
R14	3 Ω	Panasonic	ERJ-U02F3R00X
C3/L3	3.3 nH	Coil craft	0402HP-3N3XGLU
R1	1.1 k Ω	Panasonic	ERJ-2RKF1101X
C5	100 nF	TDK	C1005X7R1H104K050BE
C6	27 pF	Murata	GJM1555C1H270JB01D
L11	220 nH	Coil craft	0402HPH-R22XGLU
C8/L7	2.7 nH	Coil craft	0402HP-2N7XGLU
C9/L8	5.6 pF	Murata	GJM1555C1H5R6BB01D
Q1	GaAs Power LNA	Tagore Tech	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 +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-D Bias and Sequencing

5. TP0310K-EVB-D 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
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

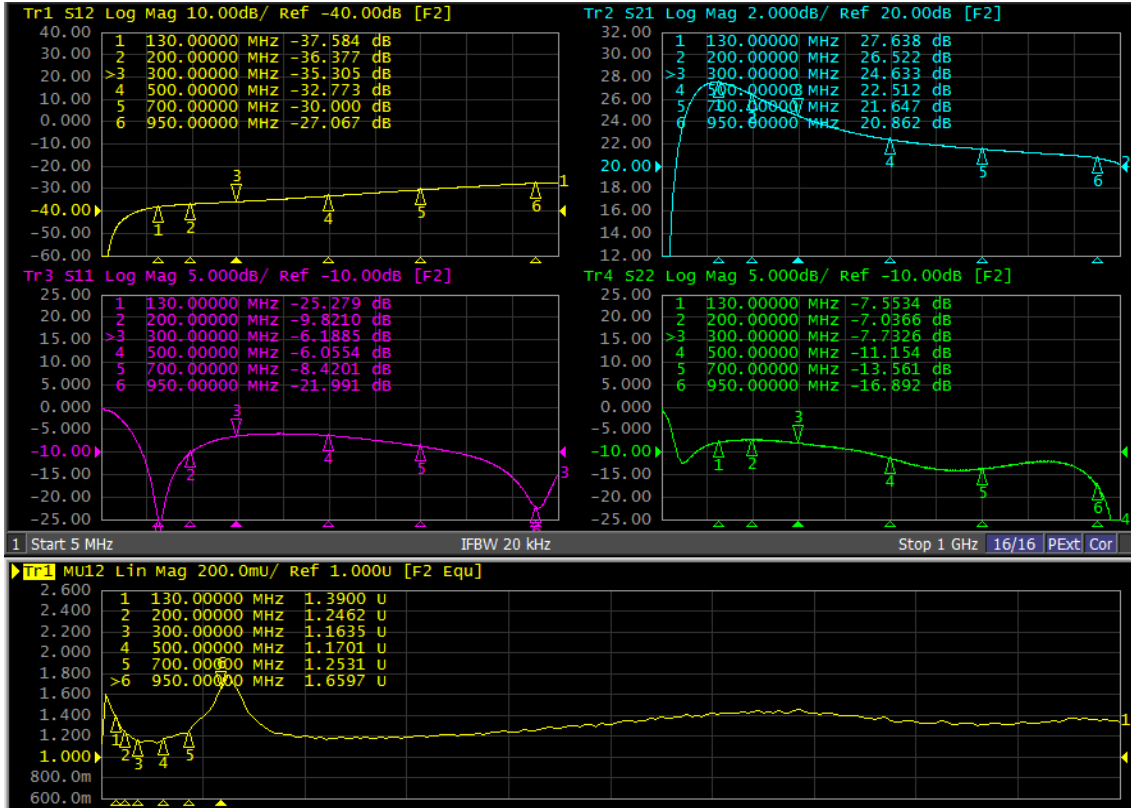


Figure 6.1.1. S parameters of TP0310K-EVB-D

6.2. Large Signal Test Results

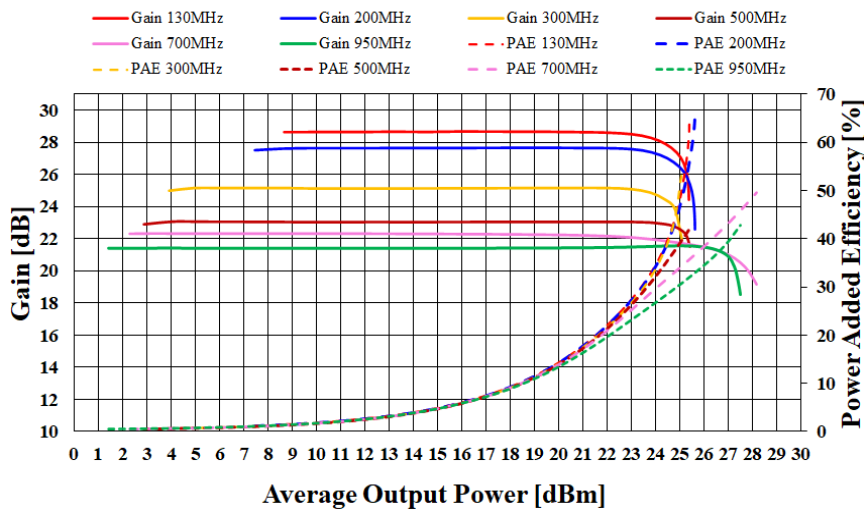


Figure 6.2.1. Gain Vs Pout of TP0310K-EVB-D

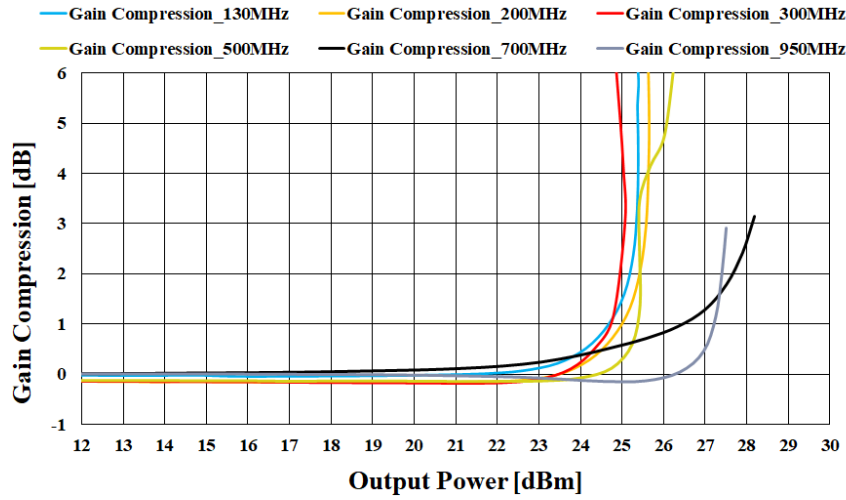


Figure 6.2.2. Gain compression Vs Pout of TP0310K-EVB-D

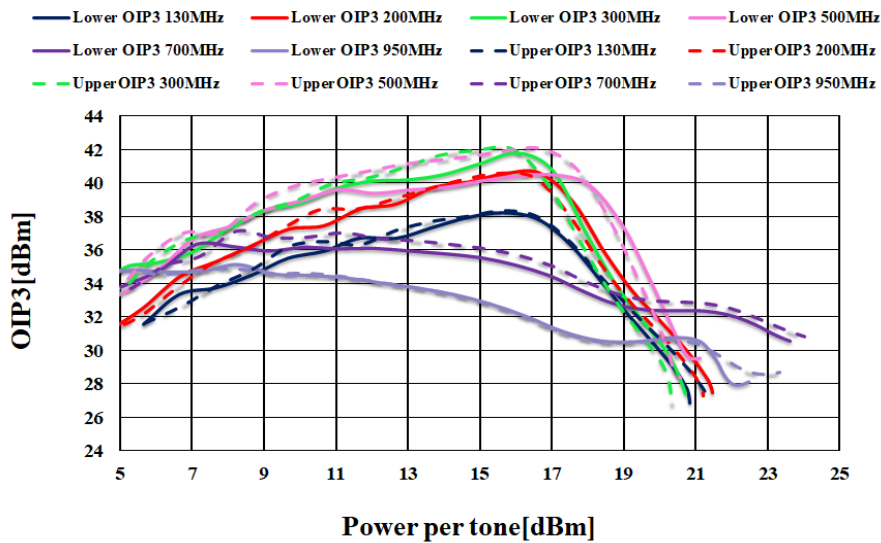


Figure 6.2.3. OIP3 Vs Pout per tone of TP0310K-EVB-D

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