

TP0310K

27dBm CW 0.1-3.8GHz GaAs Power LNA

Application Note: TP0310K EVB E

Application Note

30MHz~525MHz

5.0V 140mA

Rev-1.0

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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 0.1-3.8GHz 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-E is an evaluation board specially tuned for frequency range of 30MHz~512MHz 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-E Board Details

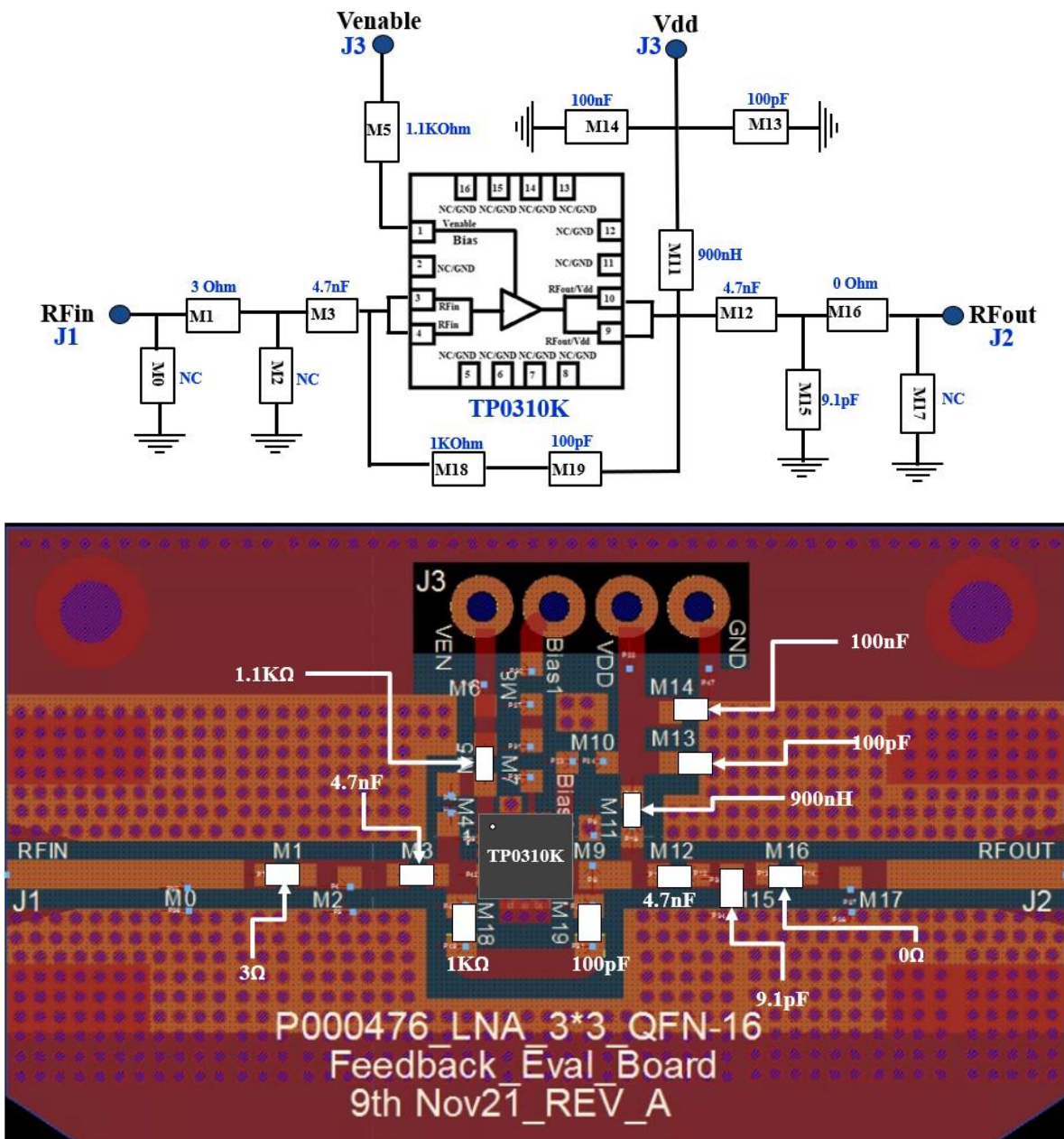


Figure 2.1 TP0310K-EVB-E 30MHz ~ 525MHz Schematic and EVB Layout

3. TP0310K-EVB-E Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
M1	3Ω	Panasonic	ERJ-U02F3R00X
M3,M12	4.7nF	Murata	GRM1885C1H472JA01D
M5	1.1KΩ	Panasonic	ERJ-2RKF1101X
M11	900nH	Coil craft	1008AF-901XJLC
M13, M19	100pF	AVX	04025A101JAT4A
M14	100nF	TDK	C1005X7R1H104K050BE
M15	9.1pF	Murata	GJM1555C1H9R1BB01
M16	0Ω	Panasonic	ERJ-2GE0R00X
M18	1.0KΩ	Panasonic	ERJ-2RKF1001X
Q1	GaAs Power LNA	Tagore Technology	TP0310K
PCB		Rogers RO4350B, 20 mils, 1 oz copper	

Table 3.1 TP0310K-EVB-E BOM

4. TP0310K-EVB-E Biasing Sequence

Turn ON Device	Turn OFF Device
1. Set Venable to +5V 2. Set V _{DD} to +5V 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-E Bias and Sequencing

5. TP0310K-EVB-E Board Measurement Summary

Frequency (MHz)	EVB Noise figure (dB)	Gain(dB)	OP1 (dBm)	OIP3(dBm) 1MHz tone spacing & 16dBm power per tone	S11(dB)	S22(dB)	Mu1
30	2.3	24.2	25.0	39.2	-8.1	-3.6	1.1
100	1.9	23.9	25.5	39.4	-8.0	-3.8	1.1
200	1.7	23.4	25.5	39.7	-7.6	-3.9	1.1
300	1.8	22.7	25.6	38.1	-7.3	-4.3	1.1
400	1.8	21.9	25.6	39.4	-7.3	-4.7	1.1
525	1.8	21.1	26.4	36.6	-7.8	-5.8	1.1

Table 5.1 TP0310K-EVB-E 5V 140mA Electrical Characteristics Summary

6. TP0310K-EVB-E Test Results

All the tests are carried out at room temperature.

6.1. S parameters

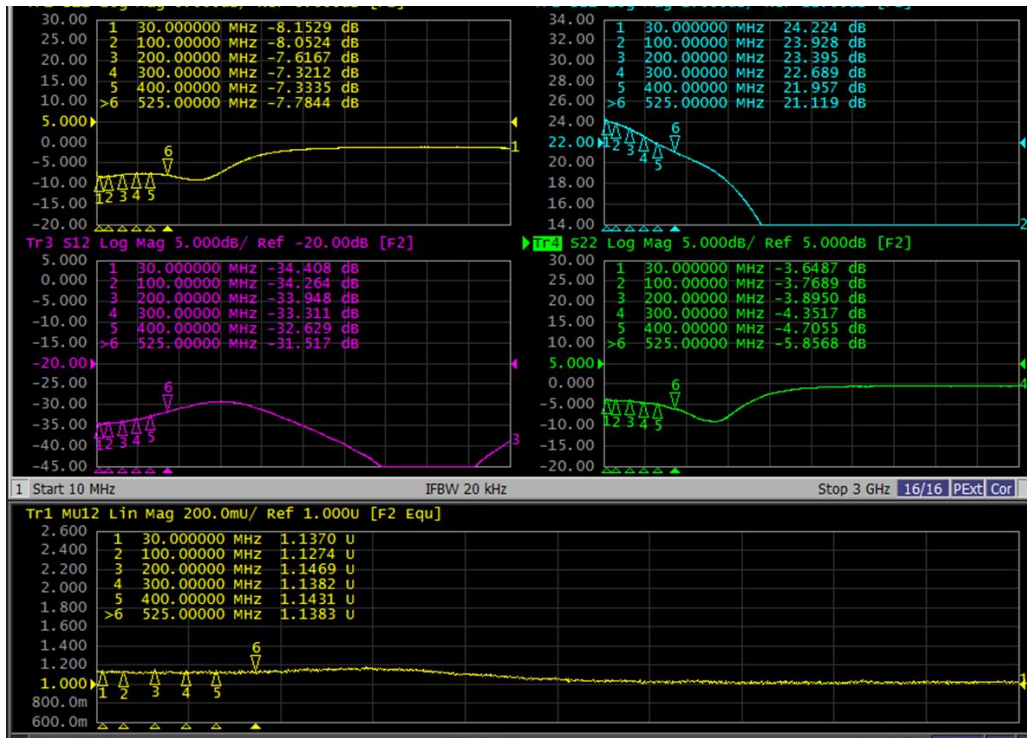


Figure 6.1.1. S parameters of TP0310K-EVB-E for 5V 140mA

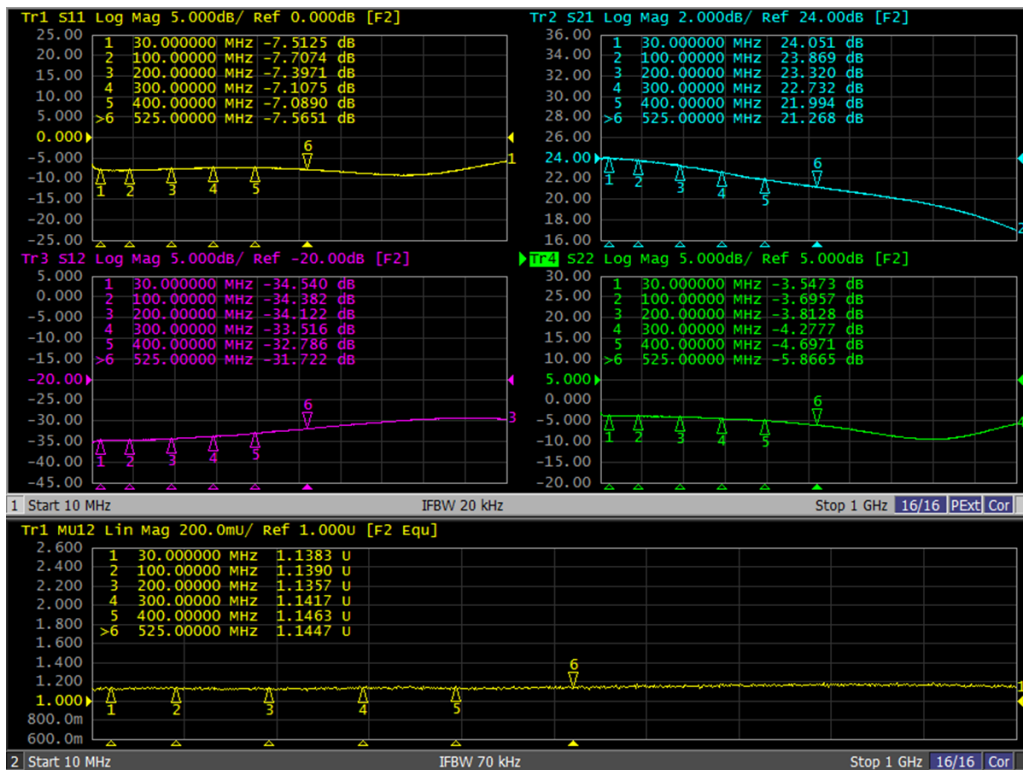


Figure 6.1.2. S parameters of TP0310K-EVB-E for 6V 155mA

6.2. Noise Figure [SMA-SMA]

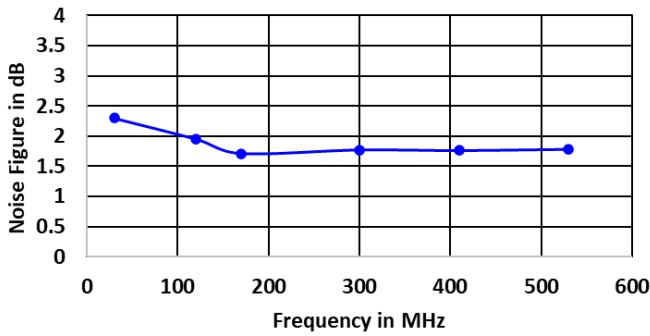


Figure 6.2.1. Noise Figure of TP0310K-EVB-E for 5V 140mA

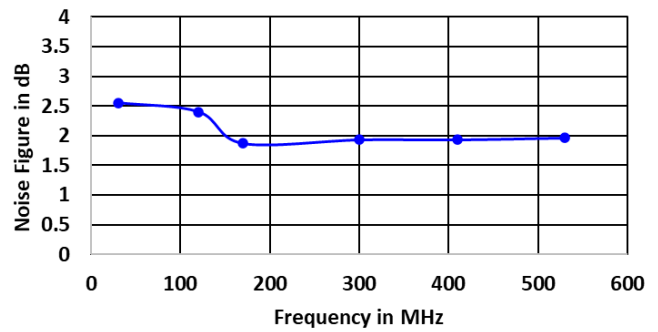


Figure 6.2.2. Noise Figure of TP0310K-EVB-E for 6V 155mA

6.3. Large Signal Test Results

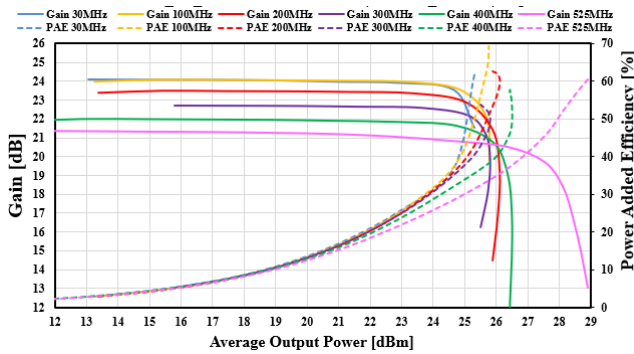


Figure 6.3.1. Gain Vs Pout of TP0310K-EVB-E for 5V 140mA

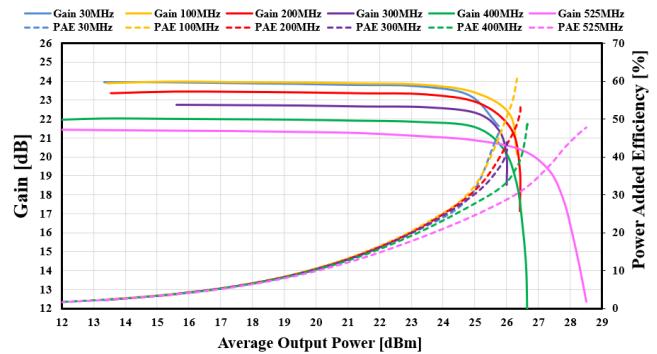


Figure 6.3.2. Gain Vs Pout of TP0310K-EVB-E for 6V 155mA

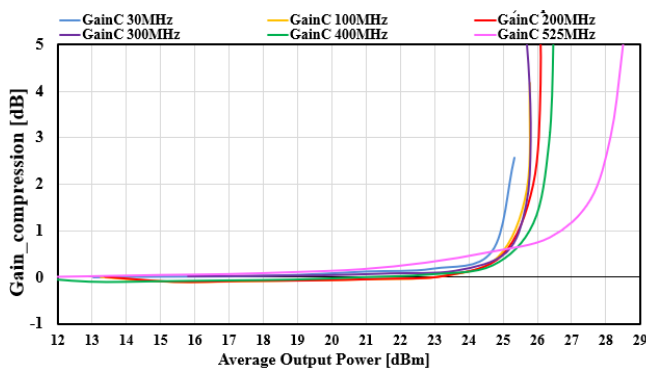


Figure 6.3.3. Gain compression Vs Pout of TP0310K-EVB-E for 5V 140mA

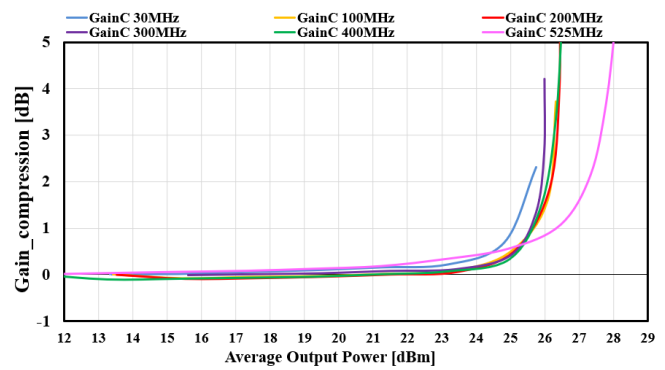


Figure 6.3.4. Gain compression Vs Pout of TP0310K-EVB-E for 6V 155mA

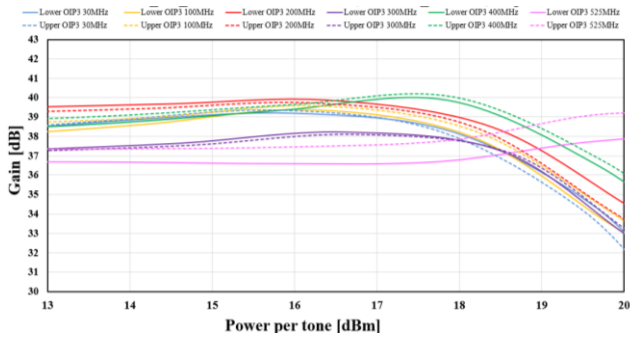


Figure 6.3.5. OIP3 Vs Pout per tone of TP0310K-EVB-E for 5V 140mA

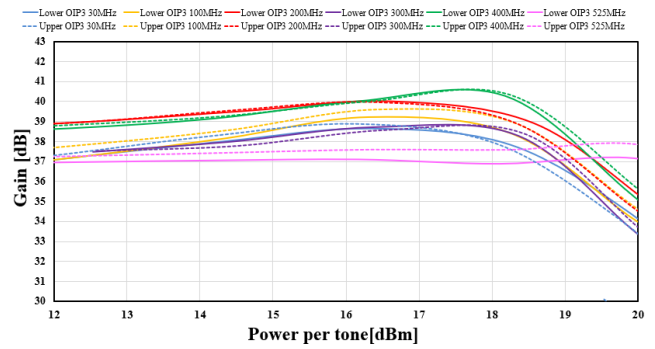


Figure 6.3.5. OIP3 Vs Pout per tone of TP0310K-EVB-E for 6V 155mA

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