Tagore Technology

TP0310K

27dBm CW 0.1-3.8GHz GaAs Power LNA

Application Note: TP0310K EVB B

Application Note

2500MHz~2700MHz

5.0V 140mA

Rev-1.1

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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-B is an evaluation board specially tuned for frequency range of 2500MHz~2700MHz 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-B Board Details

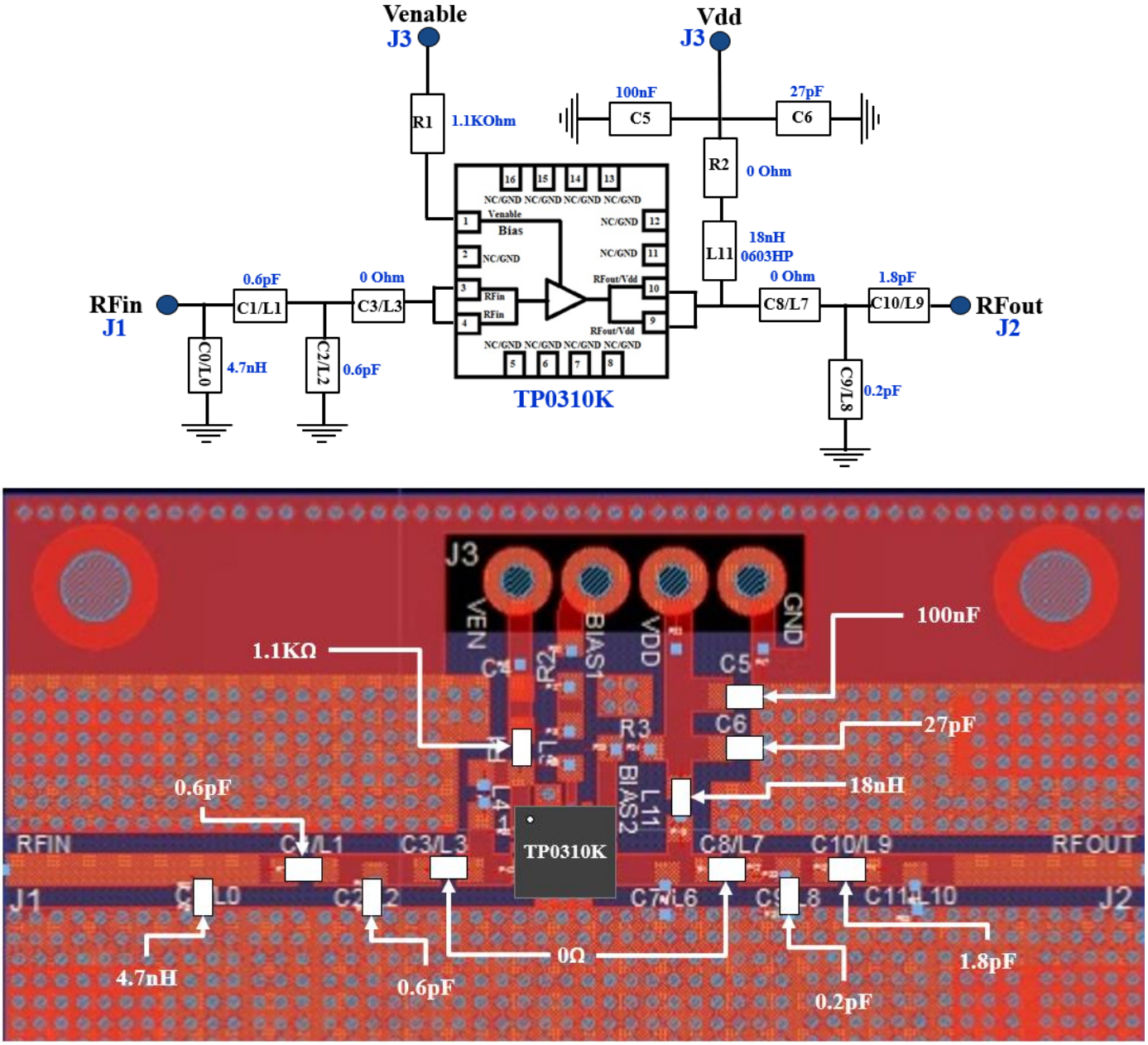

Figure 2.1 TP0310K-EVB-B 2500MHz ~ 2700MHz Schematic and EVB Layout

3. TP0310K-EVB-B Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
C0/L0	4.7nH	Coil craft	0402HP-4N7XGRW
C1/L1, C2/L2	0.6pF	Murata	GJM1555C1HR60BB01
C3/L3, C8/L7 & R2	0 ohm	Panasonic	ERJ-2GE0R00X
R1	1.1KΩ	Panasonic	ERJ-2RKF1101X
C9/L8	0.2pF	Murata	GJM1555C1HR20BB01
C10/L9	1.8pF	Murata	GJM1555C1H1R8BB01
L11	18nH	Coil craft	0402HP-18NXGRW
C5	100nF	TDK	C1005X7R1H104K050BE
C6	27pF	Murata	GJM1555C1H270JB01D
Q1	GaAs LNA	Tagore Technology	TP0310K
PCB		Rogers RO4350B, 20 mils, 1 oz copper	

Table 3.1 TP0310K-EVB-B BOM

4. TP0310K-EVB-B 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-B Bias and Sequencing

5. TP0310K-EVB-B 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
2500	1.2	14.9	27.1	38.0	-18.5	-18.3	1.2
2600	1.3	14.6	27.7	38.0	-17.0	-16.6	1.3
2700	1.3	14.0	26.4	37.5	-10.8	-12.8	1.3

Table 5.1 TP0310K-EVB-B Electrical Characteristics Summary

6. TP0310K-EVB-B Test Result

All the tests are carried out at room temperature.

6.1. S parameters

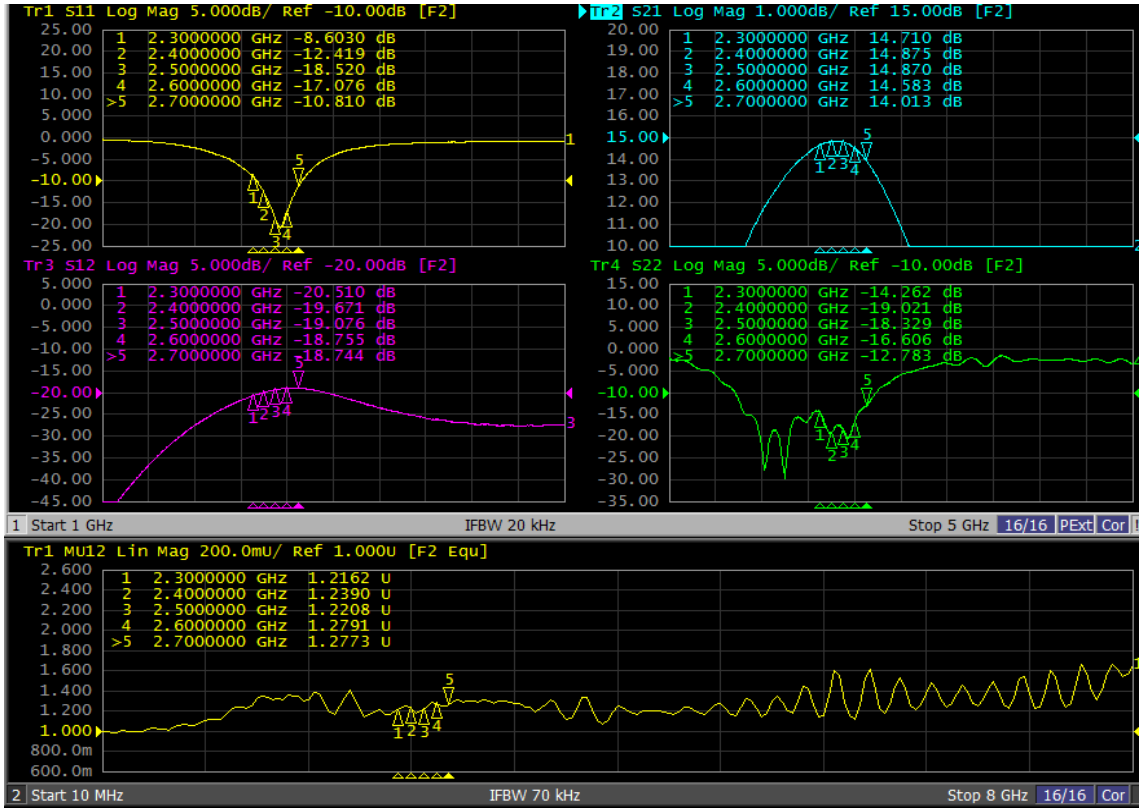

Figure 6.1.1. S parameters of TP0310K-EVB-B

6.2. SMA to SMA Noise Figure

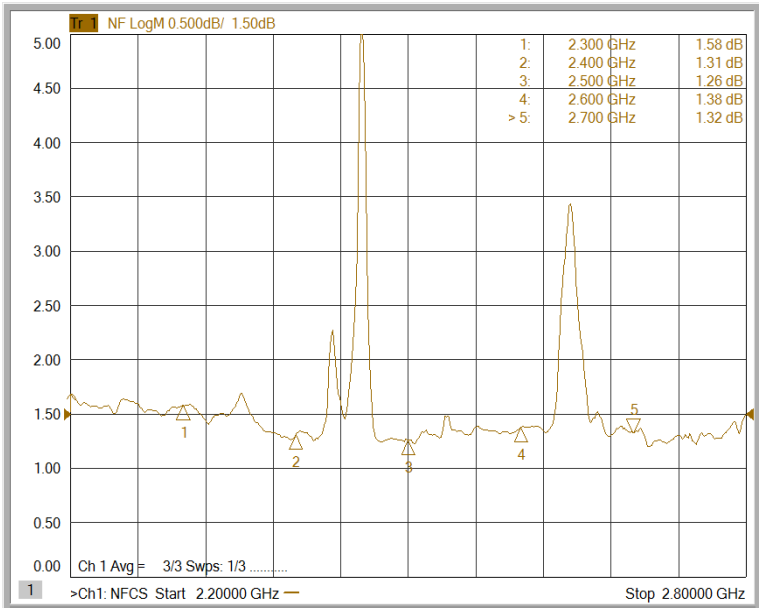

Figure 6.2.1 SMA to SMA NF of TP0310K-EVB-B

6.3. Large Signal Test Results

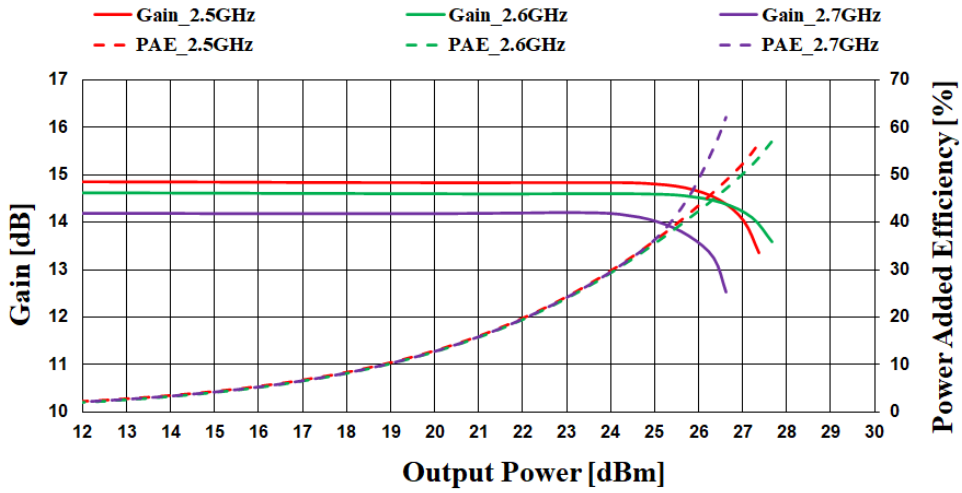

Figure 6.3.1. Gain Vs Pout of TP0310K-EVB-B

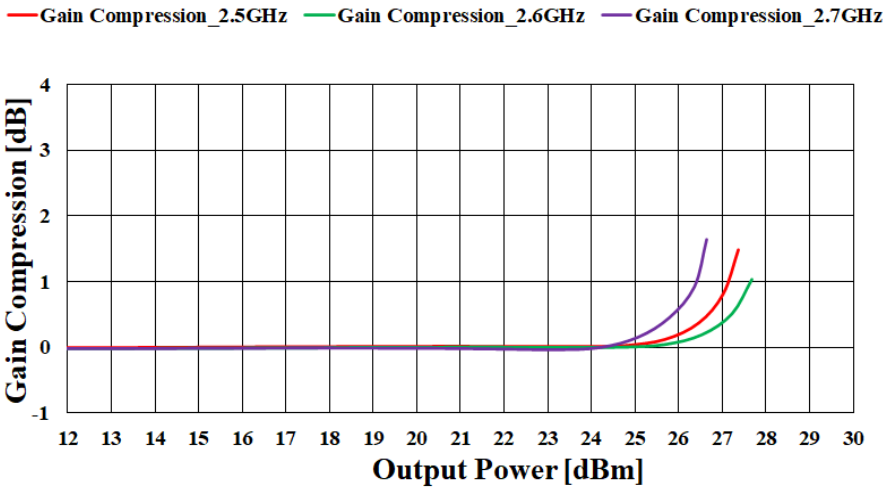

Figure 6.3.2. Gain compression Vs Pout of TP0310K-EVB-B

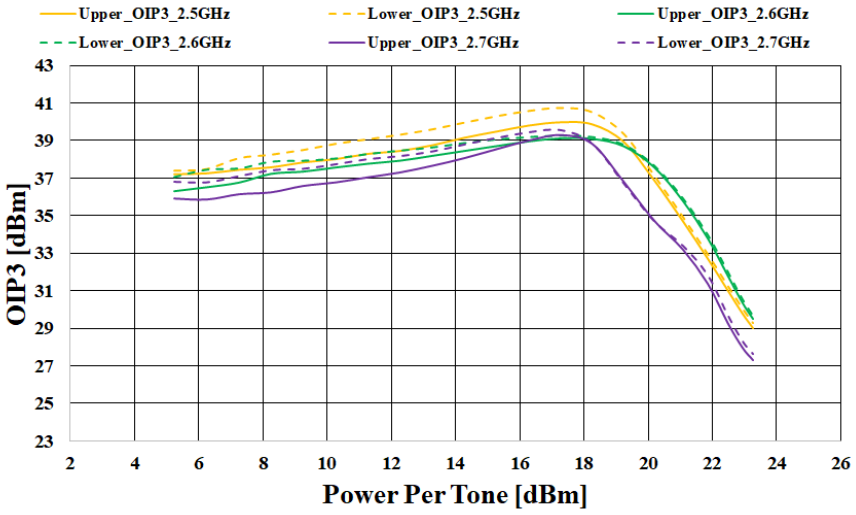

Figure 6.3.3. OIP3 Vs Pout per tone of TP0310K-EVB-B

6.4. ACPR Test Results

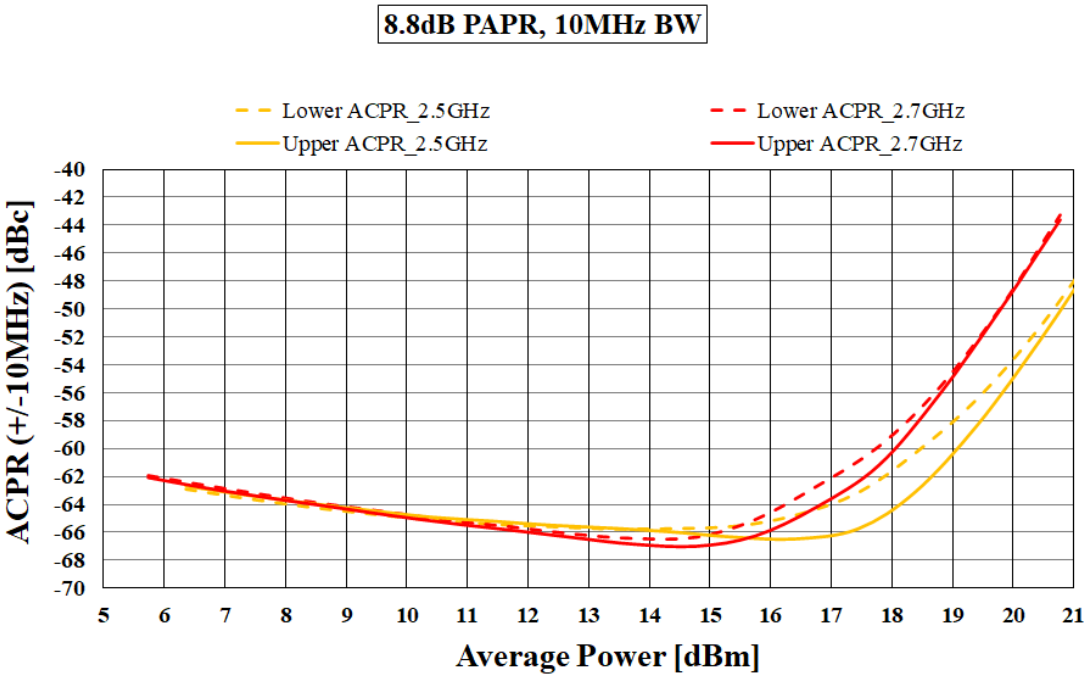

Figure 6.4.1. ACPR vs Average power of TP0310K-EVB-B

6.5. Switching time Test Results

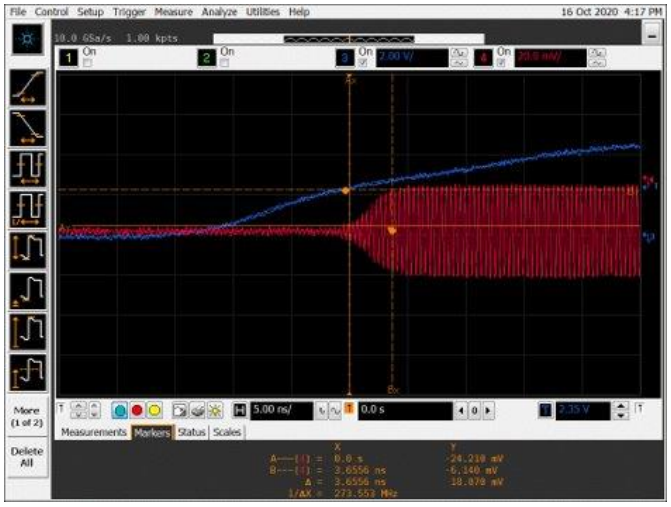

Figure 6.5.1. Rise Time of TP0310K-EVB-B

Figure 6.5.2. Fall Time of TP0310K-EVB-B

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