Tagore Technology

TP0310K

27dBm CW 0.1-3.8GHz GaAs Power LNA

Application Note: TP0310K EVB C

Application Note

3300MHz~3800MHz

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-C is an evaluation board specially tuned for frequency range of 3300MHz~3800MHz 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-C Board Details

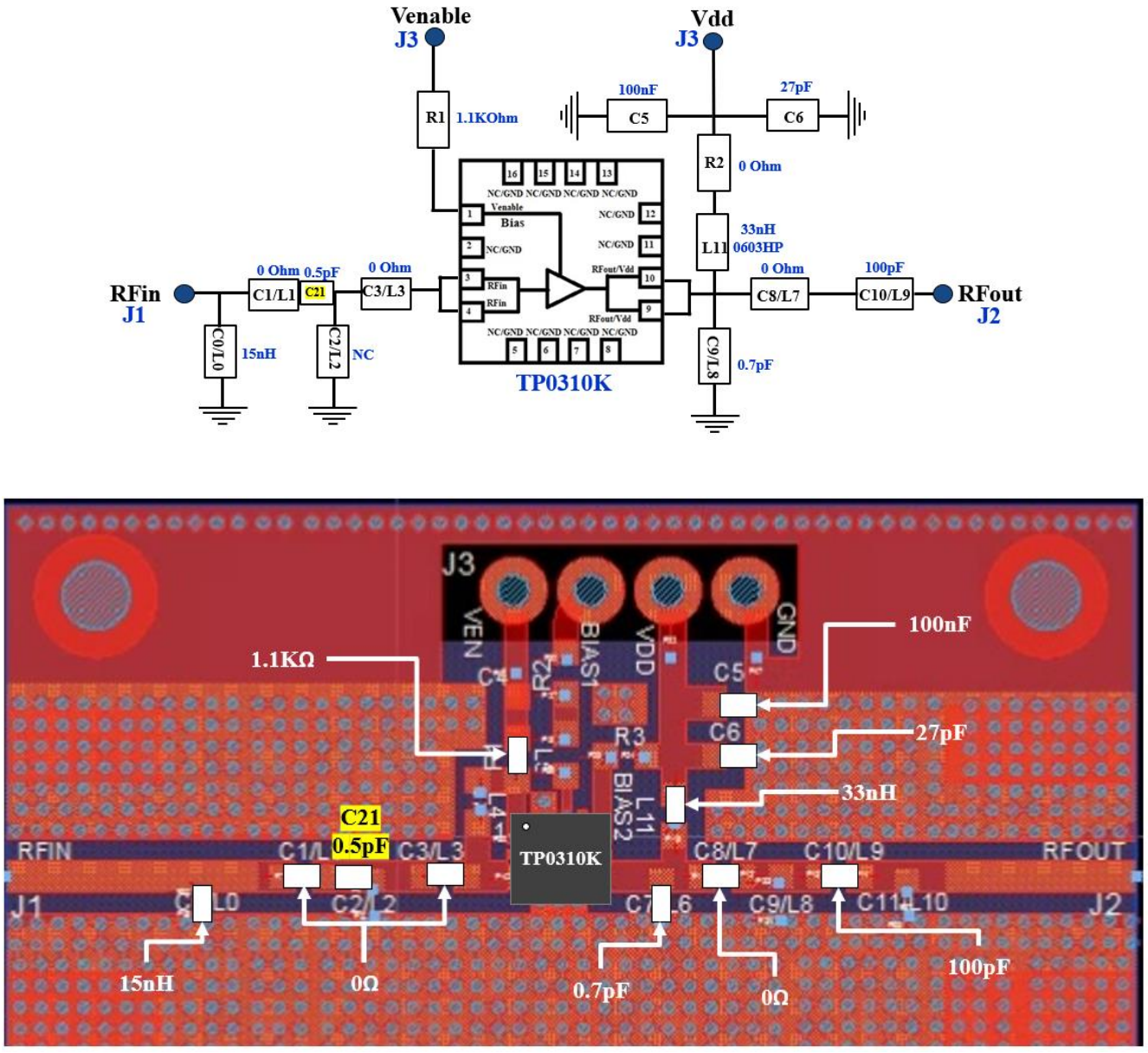

Figure 2.1 TP0310K-EVB-C 3300MHz ~ 3800MHz Schematic and EVB Layout

Note: An external series cut has been made between C1/L1 and C2/L2 in the EVB board to incorporate an extra series capacitance 0.5pF (named as C21) at the input side match.

3. TP0310K-EVB-C Bill of Materials

Component ID	Value	Manufacturer	Recommended Part Number
C0/L0	15nH	Coil craft	0402HP-15NXGRW
C21	0.5pF	Murata	GJM1555C1HR50BB01
C1/L1, C3/L3, C8/L7 & R2	0 ohm	Panasonic	ERJ-2GE0R00X
R1	1.1KΩ	Panasonic	ERJ-2RKF1101X
C7/L6	0.7pF	Murata	GJM1555C1HR70BB01
C10/L9	100pF	AVX	04025A101JAT4A
L11	33nH	Coil craft	0402HP-33NXGRW
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-C BOM

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

5. TP0310K-EVB-C 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
3300	1.3	11.4	27.4	41.2	-7.32	-24.1	1.2
3400	1.2	11.5	27.6	41.5	-8.81	-21.8	1.2
3600	1.0	11.3	27.8	41.0	-10.79	-18.9	1.3
3800	1.2	10.9	27.8	42.0	-9.60	-16.8	1.3

Table 5.1 TP0310K-EVB-C Electrical Characteristics Summary

6. TP0310K-EVB-C Test Results

All the tests are carried out at room temperature.

6.1. S parameters

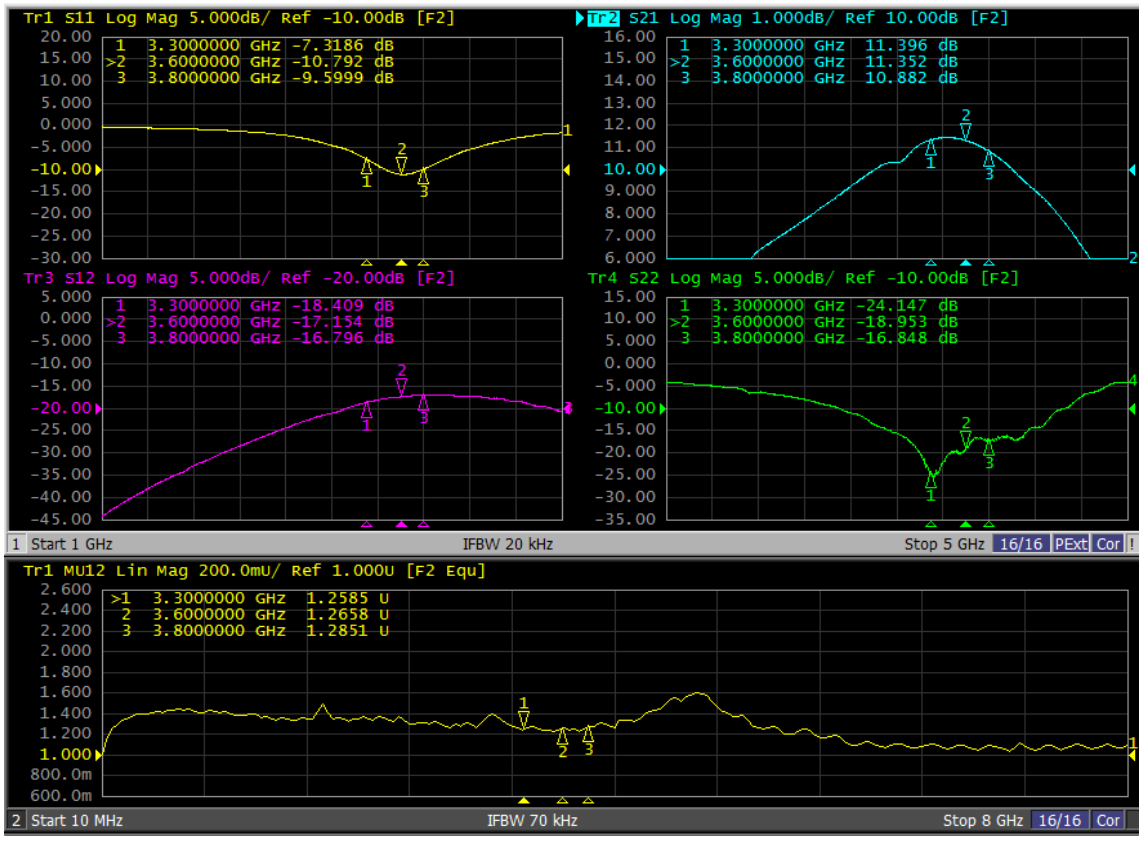

Figure 6.1.1. S parameters of TP0310K-EVB-C

6.2. SMA to SMA Noise Figure

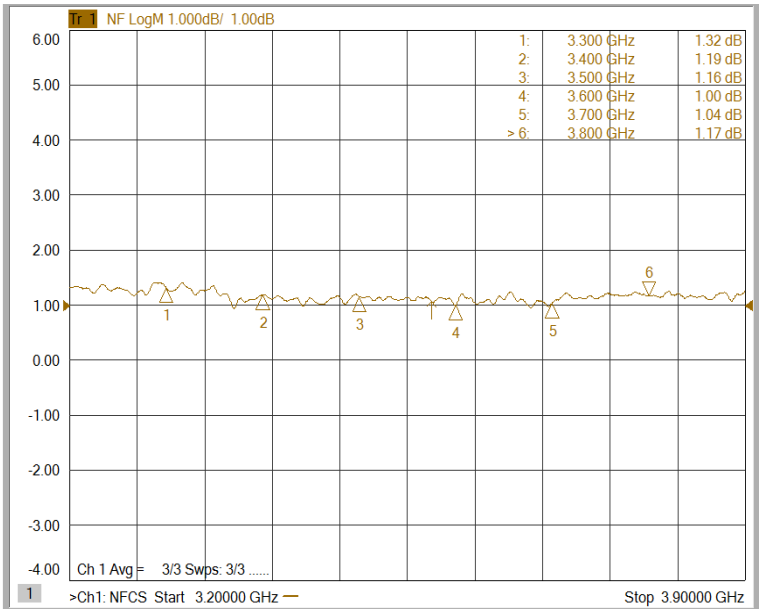

Figure 6.2.1 SMA to SMA NF of TP0310K-EVB-C

6.3. Large Signal Test Results

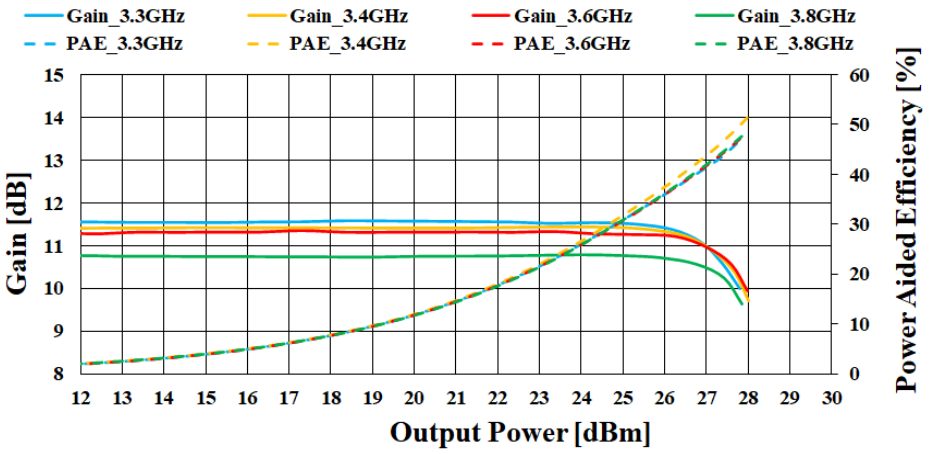

Figure 6.3.1. Gain Vs Pout of TP0310K-EVB-C

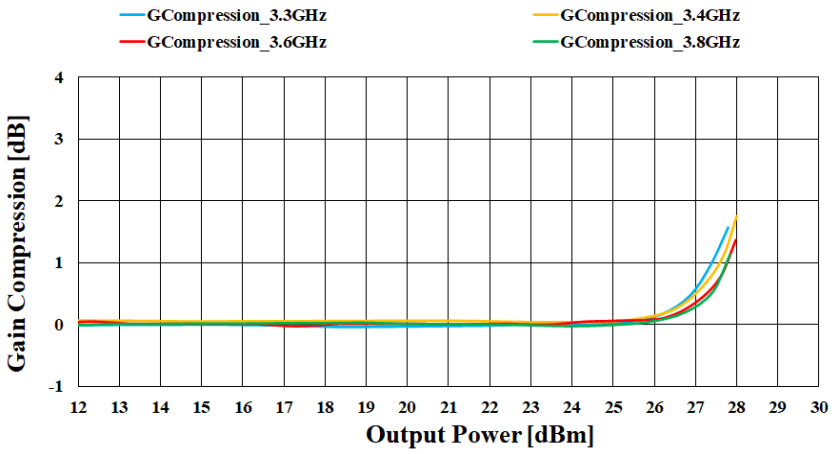

Figure 6.3.2. Gain compression Vs Pout of TP0310K-EVB-C

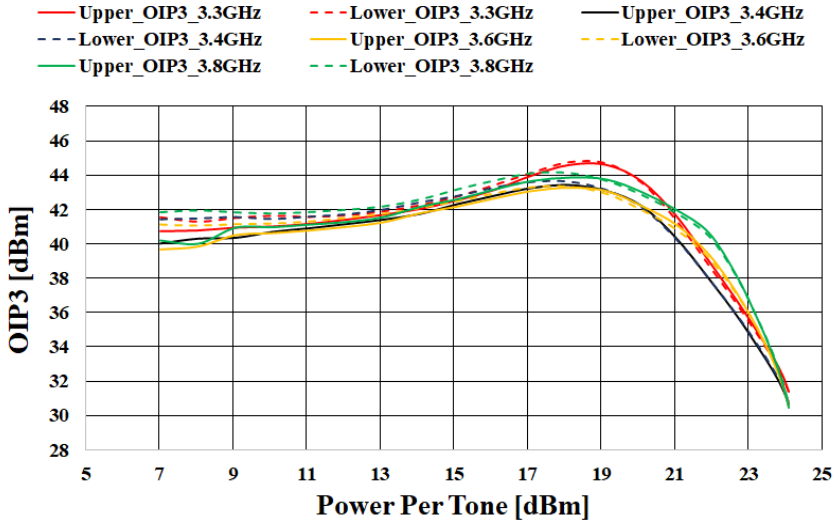

Figure 6.3.3. OIP3 Vs Pout per tone of TP0310K-EVB-C

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