TL0374J

0.03 – 3.0 GHz GaAs Ultra Low Noise Amplifier

Tagore Technology

Application Note: TL0374J EVB E

Application Note

1000MHz~2000MHz

3.3V 50mA

Rev-1.1

List of Contents

1. General Description

The TL0374J is a broadband, ultra-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 LTE (small cells and infrastructure) and any other applications requiring low noise, high gain, and linearity. For >3GHz frequency band, TL0375J can be considered. The TL0374J is packaged in a compact, low-cost Dual Flat No Lead (DFN) 2x2x0.75mm, 8 pin plastic package.

TL0374J-EVB-E is an evaluation board specially tuned for 3.3V 50mA for frequency range of 1000MHz~2000MHz applications. Its high gain, low noise performance makes it suitable.
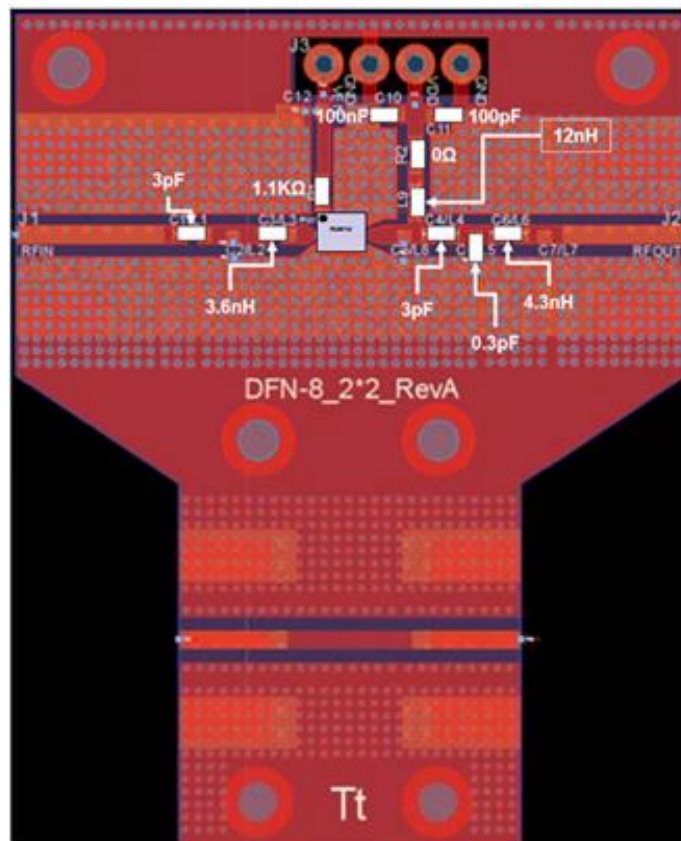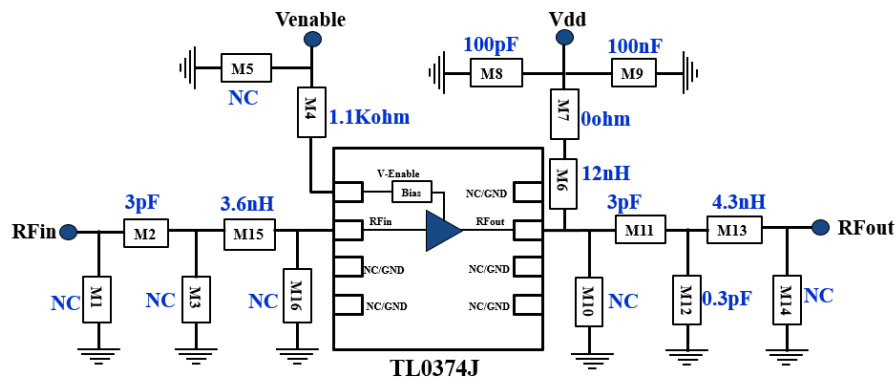
2. TL0374J-EVB-E Board Details

Figure 2.1 TL0374J-EVB-E 1000MHz ~ 2000MHz Schematic and EVB Layout

3. TL0374J-EVB-E Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
M2, M11	3.0pF	Murata	GJM1555C1H3R0BB01
M12	0.3pF	Murata	GJM1555C1HR30BB01
M8	100pF	AVX	04025A101JAT4A
M9	100nF	TDK	C1005X7R1H104K050BE
M7	0Ω	Panasonic	ERJ-2GE0R00X
M6	12nH	Coil craft	0402HP-12NXE
M15	3.6nH	Coil craft/Wurth Electronics	0402HP-3N6XGE/744916036
M14	1.1 KΩ	Panasonic	ERJ-2RKF1101X
M13	4.3 nH	Coil craft	0402HP-4N3XGE
Q1	GaAs LNA	Tagore Technology	TL0374J
PCB		Rogers RO4350B, 20 mils, 1 oz copper	

Table 3.1 TL0374J-EVB-E BOM

4. TL0374J-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 TL0374J-EVB-E Bias and Sequencing

5. TL0374J-EVB-E Board Measurement Summary

Frequency (MHz)	EVB Noise figure (dB)	Gain(dB)	OP1 (dBm)	OIP3(dBm) Fspacing:1MHz 0dBm Pout/tone	S11(dB)	S22(dB)	Mu1
1000	0.4	23.6	15.8	30.7	-5.1	-5.4	1.1
1200	0.4	22.8	16.7	32.2	-7.6	-5.2	1.1
1400	0.4	22.1	16.8	32.9	-12.3	-5.8	1.1
1500	0.4	21.8	16.4	32.3	-15.8	-6.4	1.1
1600	0.4	21.3	16.6	33.4	-21.5	-6.7	1.1
1800	0.4	20.1	15.9	32.8	-18.9	-6.7	1.2
2000	0.5	18.5	15.8	32.4	-13.9	-5.6	1.1

Table 5.1 TL0374J-EVB-E Electrical Characteristics Summary

6. TL0374J-EVB-E Test Results

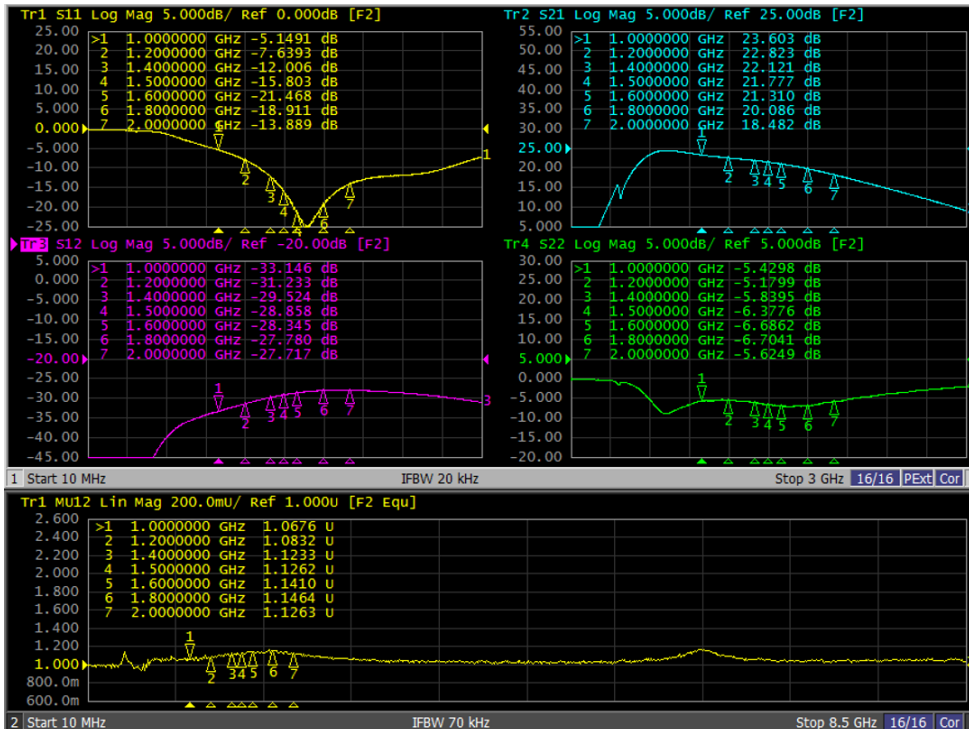All the tests are carried out at room temperature.

6.1. S parameters

Figure 6.1.1. S parameters of TL0374J-EVB-E
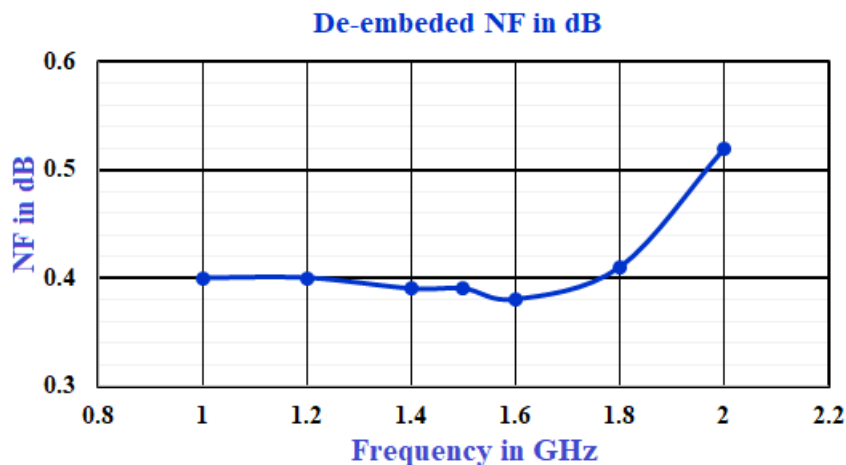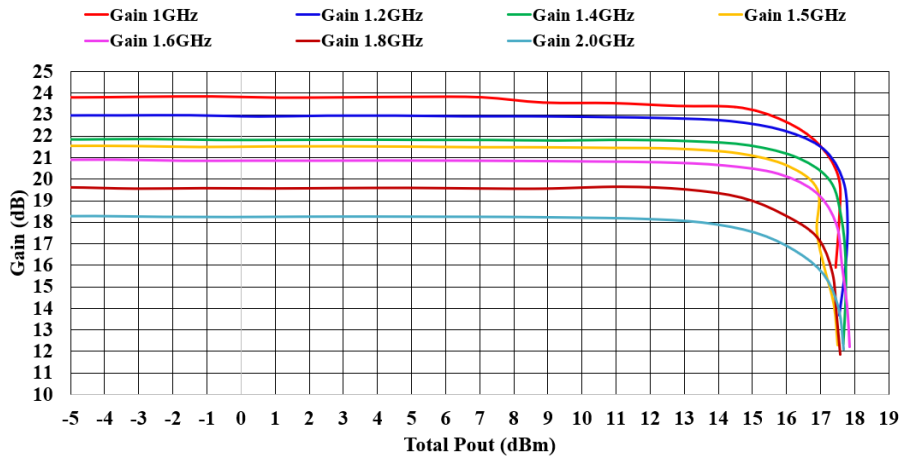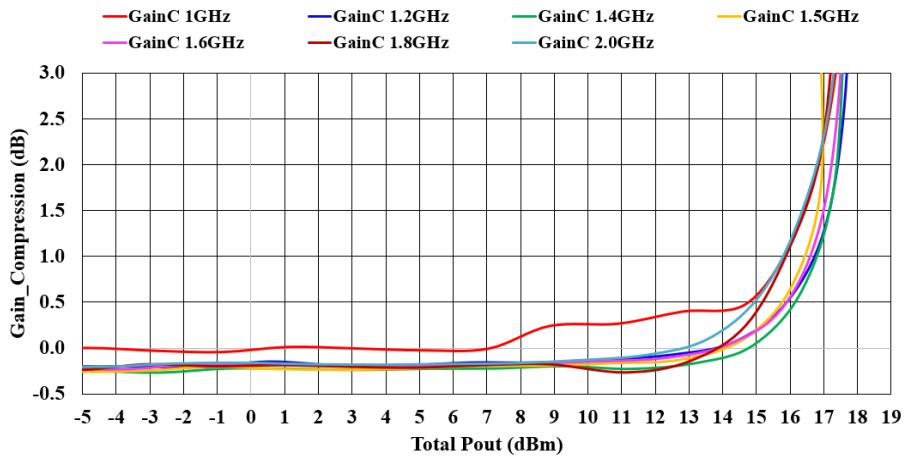
6.2. De-embedded Noise Figure

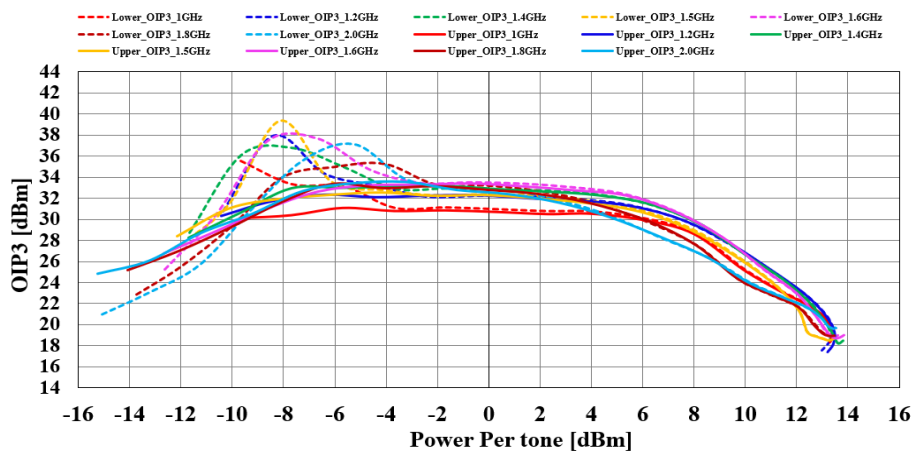
Figure 6.2.1. De-embedded Noise Figure of TL0374J-EVB-E

6.3. Large Signal Test Results

Gain 1GHz — Gain 1.2GHz — Gain 1.4GHz — Gain 1.5GHz
Gain 1.6GHz — Gain 1.8GHz — Gain 2.0GHz

Figure 6.3.1. Gain Vs Pout of TL0374J-EVB-E

GainC 1GHz — GainC 1.2GHz — GainC 1.4GHz — GainC 1.5GHz
GainC 1.6GHz — GainC 1.8GHz — GainC 2.0GHz

Figure 6.3.2. Gain compression Vs Pout of TL0374J-EVB-E

Lower_OIP3_1GHz — Lower_OIP3_1.2GHz — Lower_OIP3_1.4GHz — Lower_OIP3_1.5GHz — Lower_OIP3_1.6GHz
Lower_OIP3_1.8GHz — Lower_OIP3_2.0GHz — Upper_OIP3_1GHz — Upper_OIP3_1.2GHz — Upper_OIP3_1.4GHz
Upper_OIP3_1.5GHz — Upper_OIP3_1.6GHz — Upper_OIP3_1.8GHz — Upper_OIP3_2.0GHz

Figure 6.3.3. Output 3rd Order Intercept Point of TL0374J-EVB-E

Legal Disclaimer

The information provided in this document shall in no event be regarded as a guarantee of conditions or characteristics. Tagore Technology assumes no responsibility for the consequences of the use of this information, nor for any infringement of patents or of other rights of third parties which may result from the use of this information. No license is granted by implication or otherwise under any patent or patent rights of Tagore Technology. The specifications mentioned in this document are subject to change without notice.

Information

For further information on technology, delivery terms and conditions and prices, please contact Tagore Technology: support@tagoretech.com.