

TL0374J

0.03 – 3.0 GHz GaAs Ultra Low Noise Amplifier

Application Note: TL0374J EVB C

Application Note

30MHz~1000MHz

3.3V 30mA

Rev-1.2

List of Contents

- 1 General Description
- 2 TL0374J-EVB-C Board Details
- 3 TL0374J -EVB-C Bill of Material
- 4 TL0374J -EVB-C Biasing sequence
- 5 TL0374J -EVB-C Board Measurement Summary
- 6 TL0374J -EVB-C Board Measurement Results

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-C is an evaluation board specially tuned for frequency range of 30MHz~1000MHz applications. Its high gain, low noise performance makes it suitable.

2. TL0374J-EVB-C Board Details

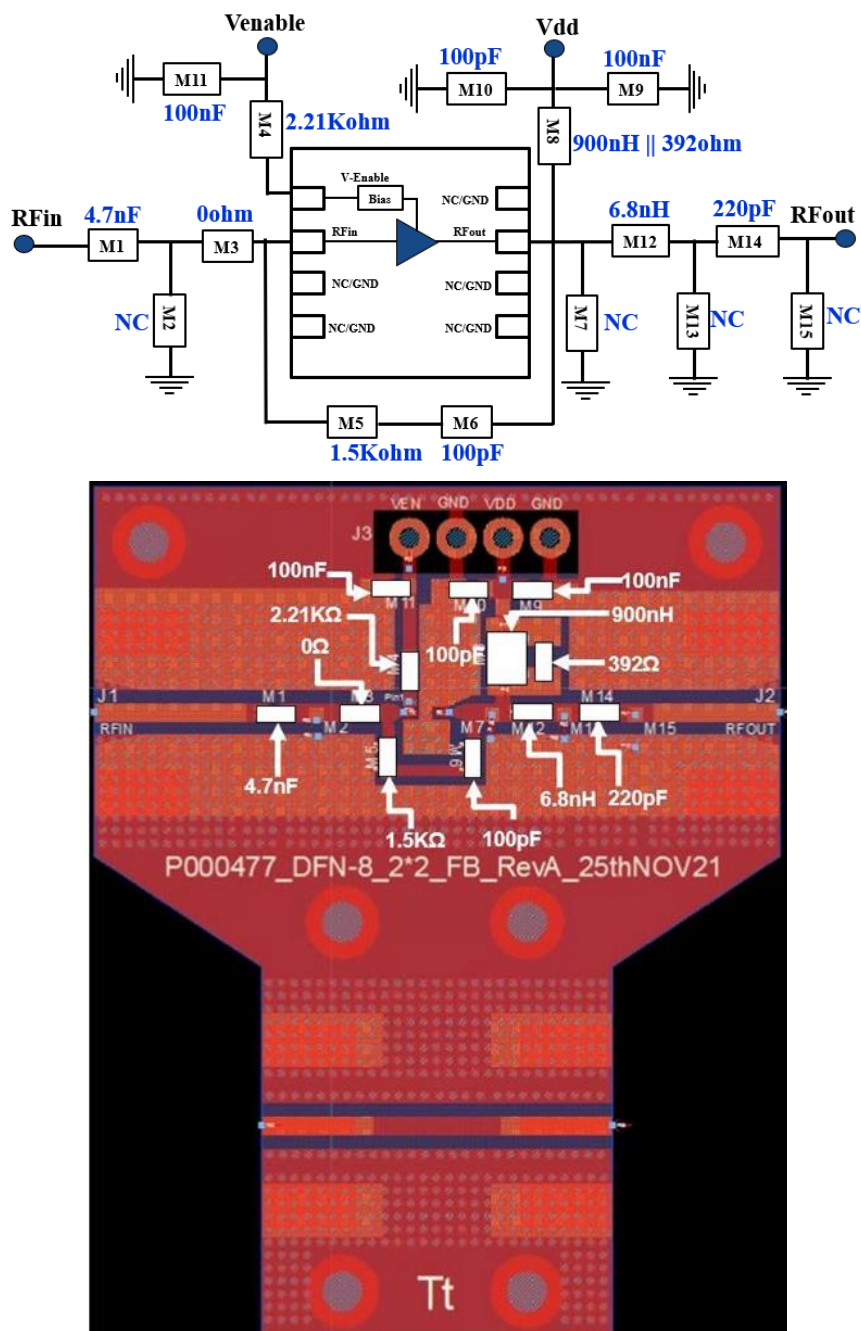


Figure 2.1 TL0374J-EVB-C 30MHz ~ 1000MHz Schematic and EVB Layout

3. TL0374J-EVB-C Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
M1	4.7nF, 50V	Murata	GRM1885C1H472JA01D
M3	0Ω	Panasonic	ERJ-2GE0R00X
M4	2.21KΩ	Panasonic	ERJ-2RKF2211X
M5	1.5KΩ	Panasonic	ERJ-2RKF1501X
M6, M10	100pF	AVX	04025A101JAT4A
M8	900nH	Coil craft	1008AF-901XJLC
M8	392Ω	Panasonic	ERJ-UP3F3920V
M9, M11	100nF	TDK	C1005X7R1H104K050BE
M12	6.8nH	Coil craft	0402HP-6N8XJRW
M14	220pF	Kemet	C0402C221K5GCAUTO
Q1	GaAs LNA	Tagore Technology	TL0374J
PCB		Rogers RO4350B, 20 mils, 1 oz copper	

Table 3.1 TL0374J-EVB-C BOM

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

5. TL0374J-EVB-C Board Measurement Summary

Frequency (MHz)	De-embedded Noise figure (dB)	Gain(dB)	OP1 (dBm)	OIP3(dBm) Fspacing:1MHz 0dBm Pout/tone	S11(dB)	S22(dB)	Mu1
30	1.1	25.6	14.4	28.4	-13.83	-22.7	1.1
100	0.7	25.7	14.3	27.5	-12.55	-23.8	1.2
250	0.6	25.2	14.6	28.1	-12.92	-17.2	1.3
500	0.6	23.9	14.7	28.7	-14.82	-14.6	1.5
750	0.5	22.6	15.2	29.1	-18.07	-18.4	1.7
1000	0.5	21.3	14.9	29.3	-26.34	-28.4	1.7

Table 5.1 TL0374J-EVB-C Electrical Characteristics Summary

6. TL0374J-EVB-C Test Results

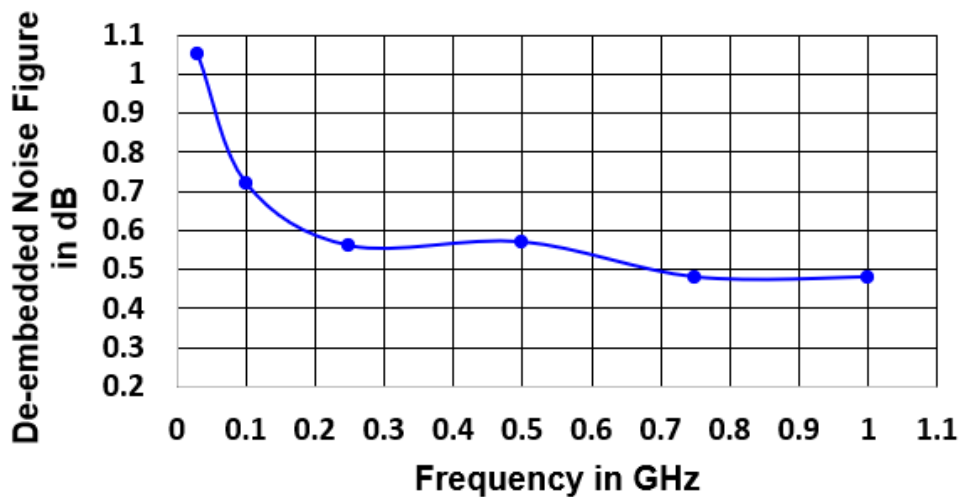
All the tests are carried out at room temperature.

6.1. S parameters



Figure 6.1.1. S parameters of TL0374J-EVB-C

6.2. De-embedded Noise Figure



** Note: Trace loss is around 0.01-0.03dB. So SMA to SMA NF will lie between 1.05dB to 0.5dB.

Figure 6.2.1. De-embedded Noise Figure mode of TL0374J-EVB-C

6.3. Large Signal Test Results

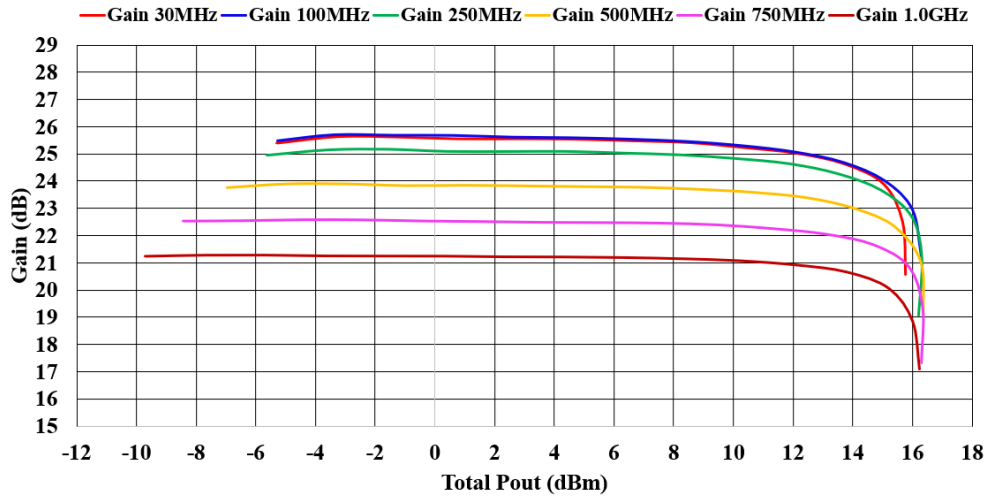


Figure 6.3.1. Gain Vs Pout of TL0374J-EVB-C

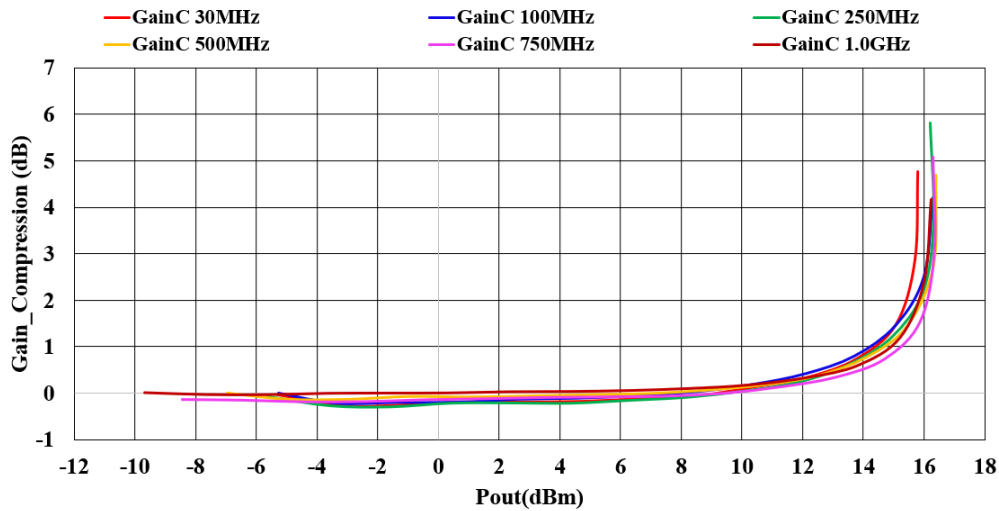


Figure 6.3.2. Gain compression Vs Pout of TL0374J-EVB-C

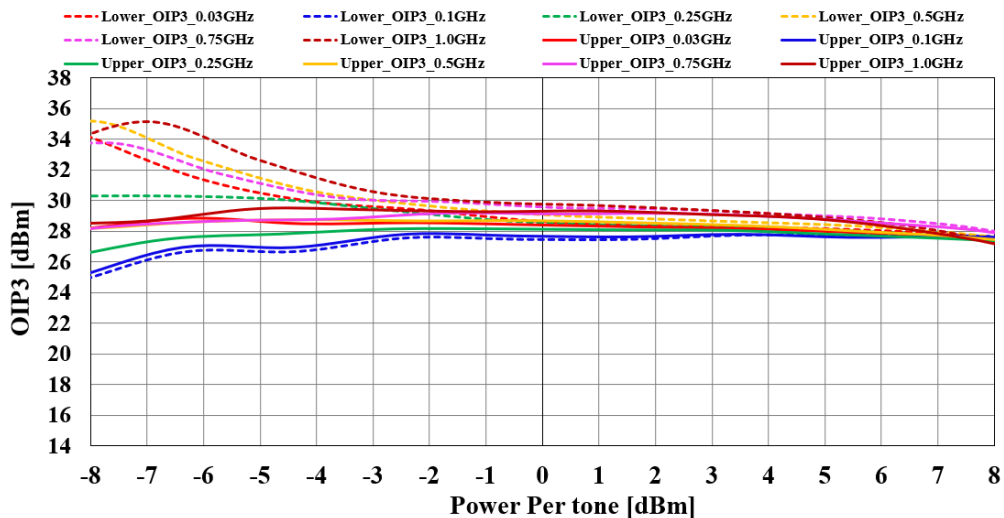


Figure 6.3.3. Output 3rd Order Intercept Point of TL0374J-EVB-C

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