

TL0374J

0.03 – 3.0 GHz GaAs Ultra Low Noise Amplifier

Application Note: TL0374J EVB F

Application Note

4400MHz~5000MHz

5V 55mA

Rev-1.0

List of Contents

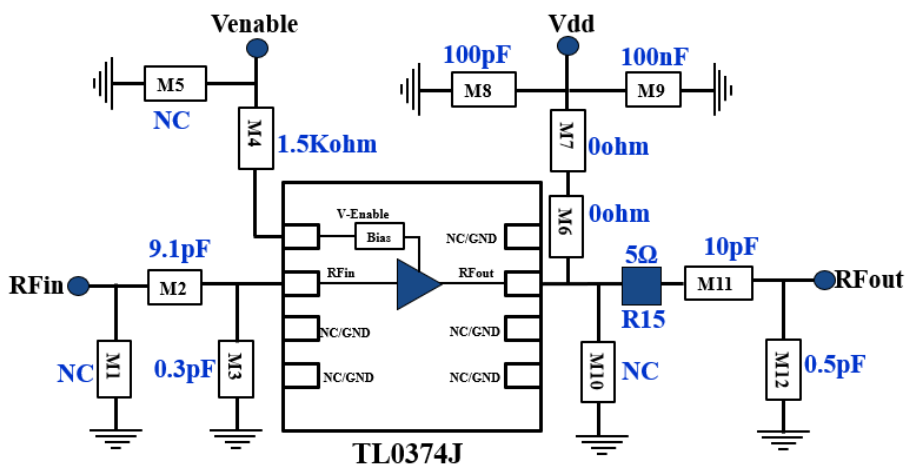
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1. General Description

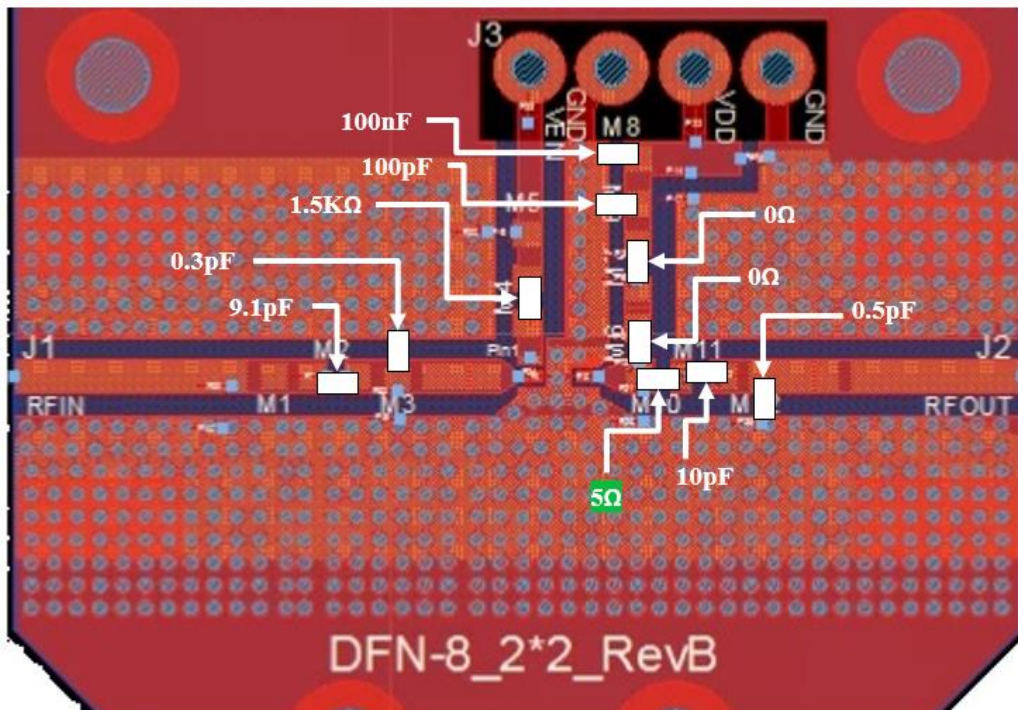
The TL0374J is a broadband, ultra-low Noise Amplifier (LNA) providing high gain and linearity. With a simple input and output match, this LNA can be tuned for different frequency bands targeting LTE (small cells and infrastructure) and any other applications requiring low noise, high gain, and linearity. 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-F is an evaluation board specially tuned for 5V 55mA for frequency range of 4400MHz~5000MHz applications. Its high gain, low noise performance makes it suitable.

2. TL0374J-EVB-F Board Details



R15 is the extra series cut that we made at output side RF line between M10 and M11 to accommodate 5Ω resistor



R15 is the extra series cut that we made at output side RF line between M10 and M11 to accommodate 5Ω resistor. Please note that we have used TL0375 EVB REV B for this application and device used is TL0374.

Figure 2.1 TL0374J-EVB-F 4400MHz ~ 5000MHz Schematic and EVB Layout

3. TL0374J-EVB-F Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
M2	9.1pF	Murata	GJM1555C1H3R0BB01
M3	0.3pF	Murata	GJM1555C1HR30BB01
M4	1.5K Ω	Panasonic	ERJ-2RKF1501X
M6, M7	0 Ω	Panasonic	ERJ-2GE0R00X
M8	100nF	TDK	C1005X7R1H104K050BE
M9	100pF	AVX	04025A101JAT4A
M10	10pF	Murata	GJM1555C1H100JB01
M12	0.5pF	Murata	GJM1555C1HR50BB01
R15	5 Ω	KOA Speer	RK73H1ETTP4R99F
Q1	GaAs LNA	Tagore Technology	TL0374J
PCB		Rogers RO4350B, 20 mils, 1 oz copper	

Table 3.1 TL0374J-EVB-F BOM

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

5. TL0374J-EVB-F 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
4400	0.8	14.2	16.8	35.0	-12.7	-11.6	1.5
4600	0.9	14.0	18.2	32.0	-14.0	-18.5	1.9
4800	0.8	13.7	15.8	33.8	-17.3	-23.3	1.9
5000	0.9	13.0	15.8	35.0	-24.3	-12.3	1.6

Table 5.1 TL0374J-EVB-F Electrical Characteristics Summary

6. TL0374J-EVB-F Test Results

All the tests are carried out at room temperature.

6.1. S parameters

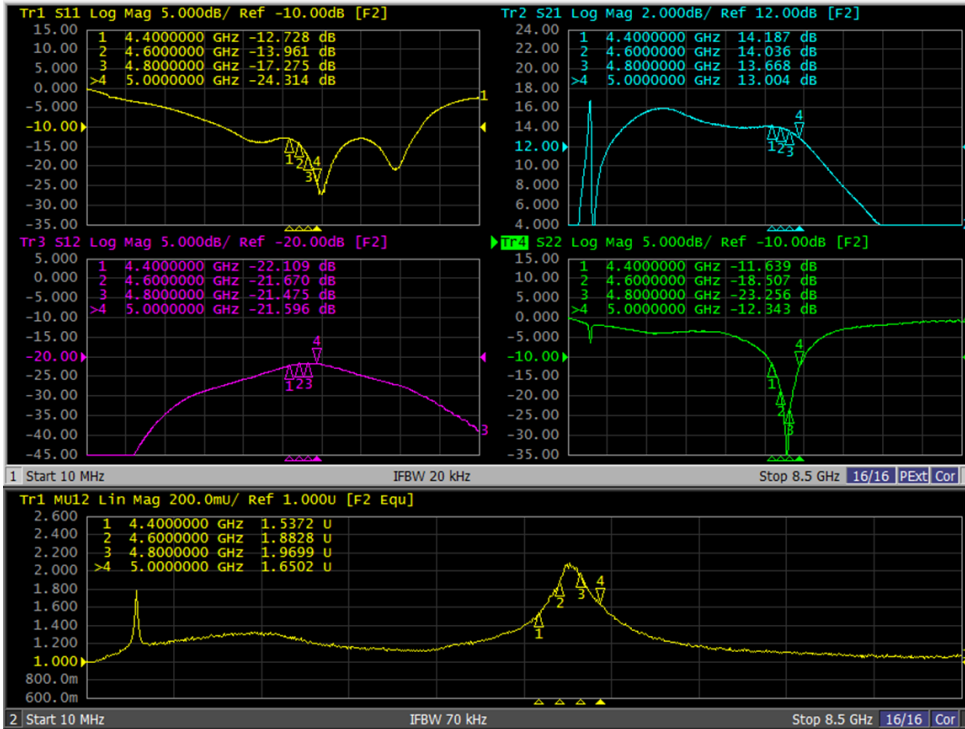


Figure 6.1.1. S parameters of TL0374J-EVB-F

6.2. SMA-SMA Noise Figure

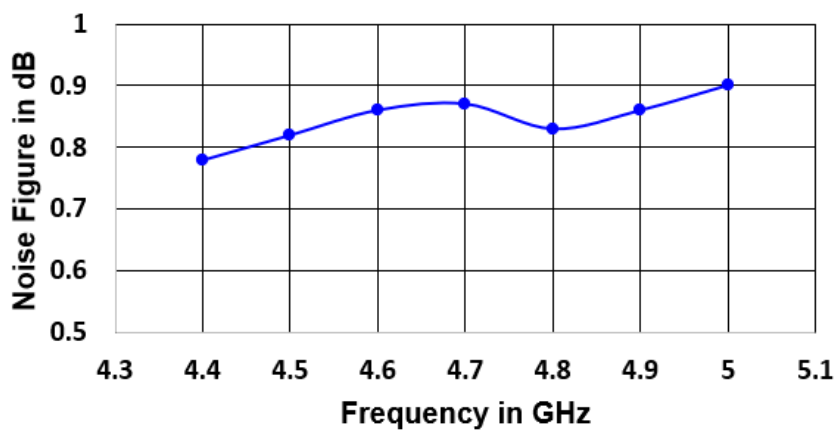


Figure 6.2.1. SMA-SMA Noise Figure of TL0374J-EVB-F

Note: The trace loss is within the range of 0.1 to 0.15dB, resulting in a de-embedded NF of 0.7 to 0.8dB.

6.3. Large Signal Test Results

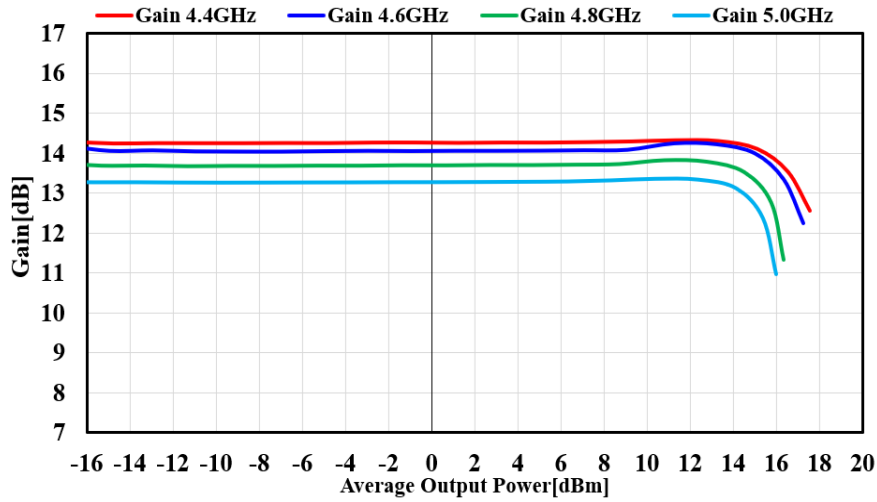


Figure 6.3.1. Gain Vs Pout of TL0374J-EVB-F

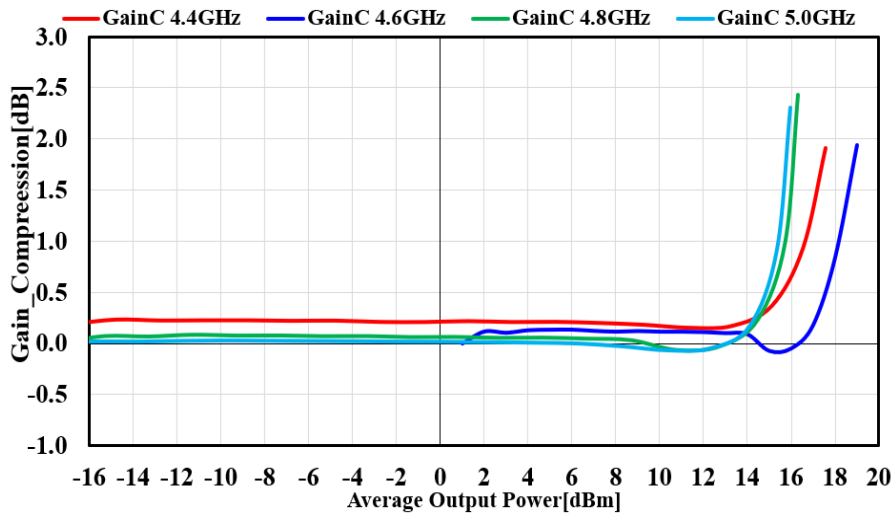


Figure 6.3.2. Gain compression Vs Pout of TL0374J-EVB-F

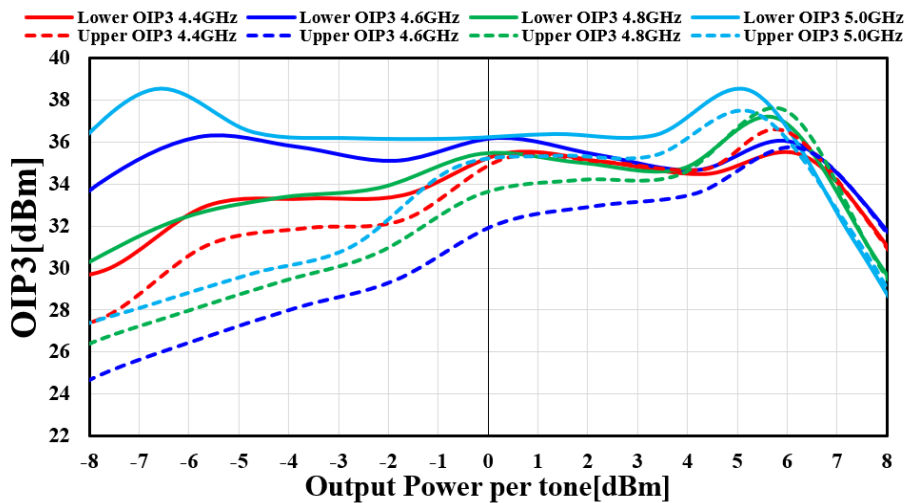


Figure 6.3.3. Output 3rd Order Intercept Point of TL0374J-EVB-F

Edition Revision 1.0 - 2023-11-15

Published by

Tagore Technology Inc.

601 W Campus Dr. Ste C1

Arlington Heights, IL 60004, USA

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