

# TL0374J

0.03 – 3.0 GHz GaAs Ultra Low Noise Amplifier

Application Note: TL0374J EVB A

## Application Note

1800MHz~2100MHz

5.0V 60mA

Rev-1.1

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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-A is an evaluation board specially tuned for frequency range of 1800MHz~2100MHz applications. Its high gain, low noise performance makes it suitable.

## 2. TL0374J-EVB-A Board Details

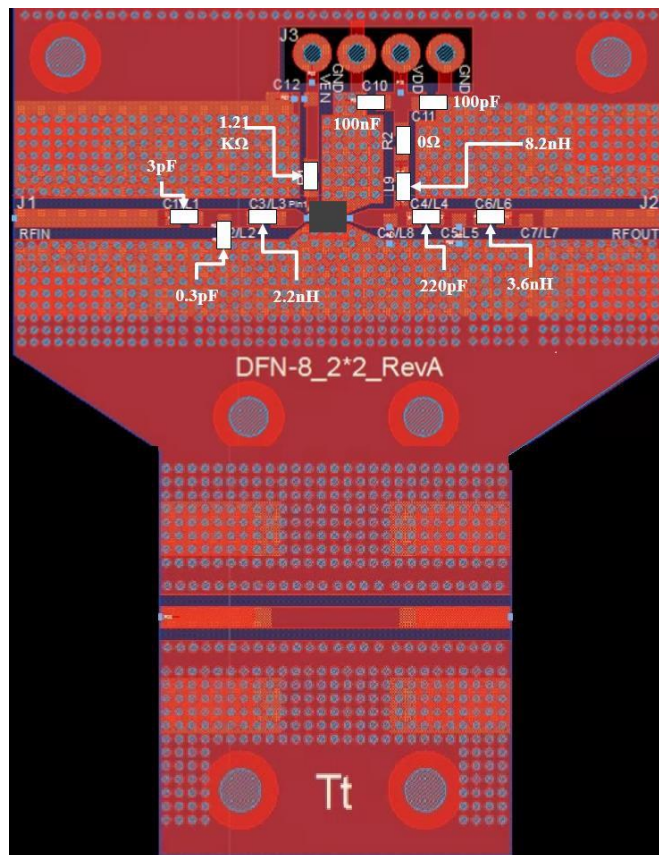
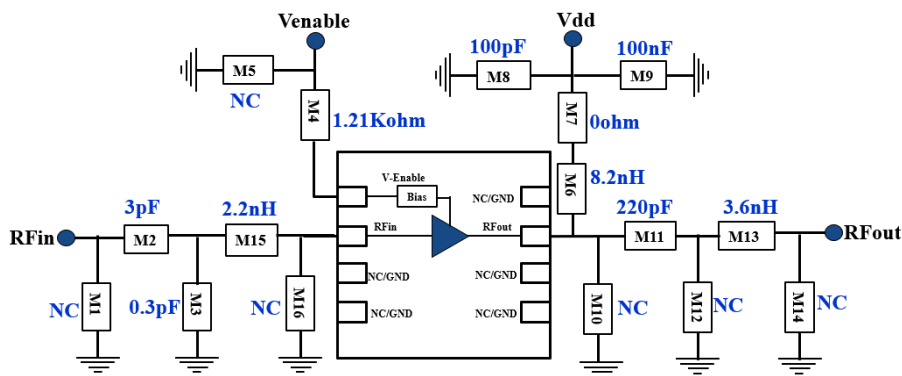


Figure 2.1 TL0374J-EVB-A 1800MHz ~ 2100MHz Schematic and EVB Layout

### 3. TL0374J-EVB-A Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
M2	3.0pF	Murata	GJM1555C1H3R0BB01
M3	0.3pF	Murata	GJM1555C1HR30BB01
M15	2.2nH	Coil craft / Wurth Elektronik	0402HP-2N2XJE /744765022A
M4	1.21K $\Omega$	Panasonic	ERJ-2RKF1211X
M8	100pF	AVX	04025A101JAT4A
M9	100nF	TDK	C1005X7R1H104K050BE
M7	0 $\Omega$	Panasonic	ERJ-2GE0R00X
M6	8.2nH	Coil craft / Wurth Elektronik	0402HP-8N2XGE /744765082GA
M11	220pF	Kemet	C0402C221K5GACAUTO
M13	3.6nH	Coil Craft / Wurth Elektronik	0402HP-3N6XGE /744765036A
Q1	GaAs LNA	Tagore Technology	TL0374J
PCB		Rogers RO4350B, 20 mils, 1 oz copper	

**Table 3.1 TL0374J-EVB-A BOM**

### 4. TL0374J-EVB-A 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-A Bias and Sequencing**

### 5. TL0374J-EVB-A 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
1800	0.4	21.9	18.7	35.0	-17	-8.9	1.2
1900	0.5	21.5	19.5	35.5	-27	-9.9	1.2
2000	0.5	21.0	18.3	35.8	-26.5	-9.6	1.2
2100	0.5	20.4	18.8	37.3	-18	-8.6	1.2

**Table 5.1 TL0374J-EVB-A Electrical Characteristics Summary**

## 6. TL0374J-EVB-A Test Results

All the tests are carried out at room temperature.

### 6.1. S parameters

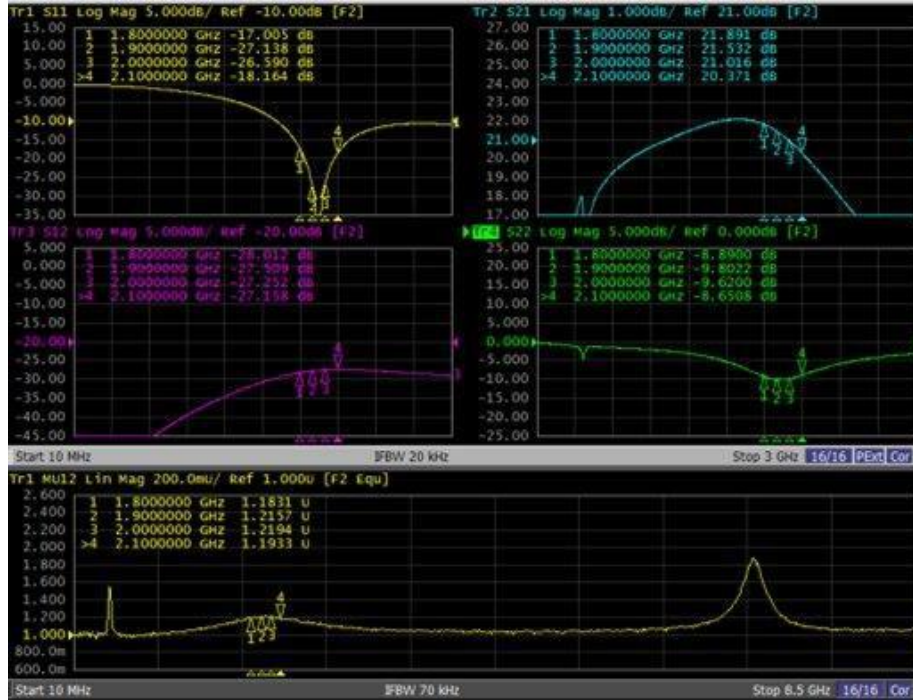


Figure 6.1.1. S parameters of TL0374J-EVB-A

### 6.2. SMA to SMA Noise Figure

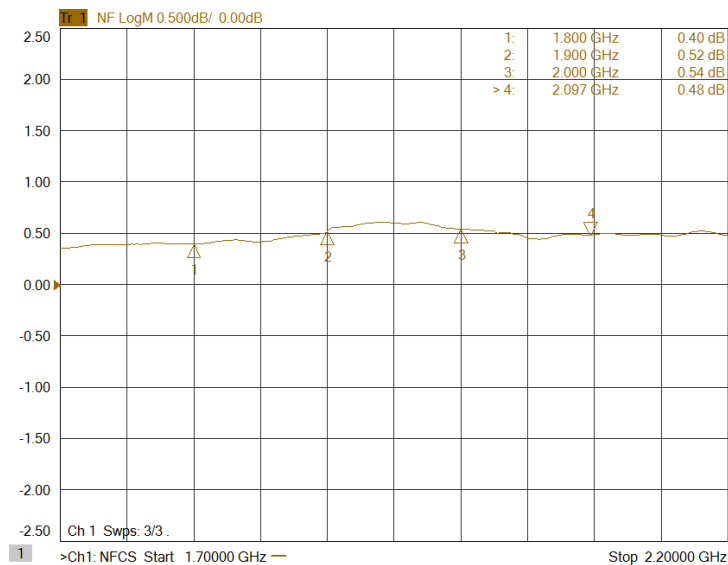


Figure 6.2.1 SMA to SMA NF of TL0374J-EVB-A

### 6.3. Large Signal Test Results

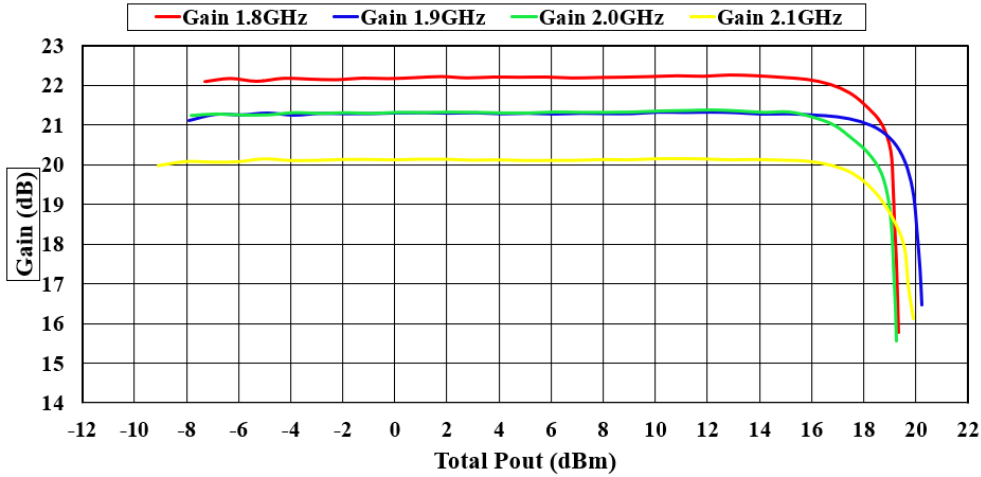


Figure 6.3.1. Gain Vs Pout of TL0374J-EVB-A

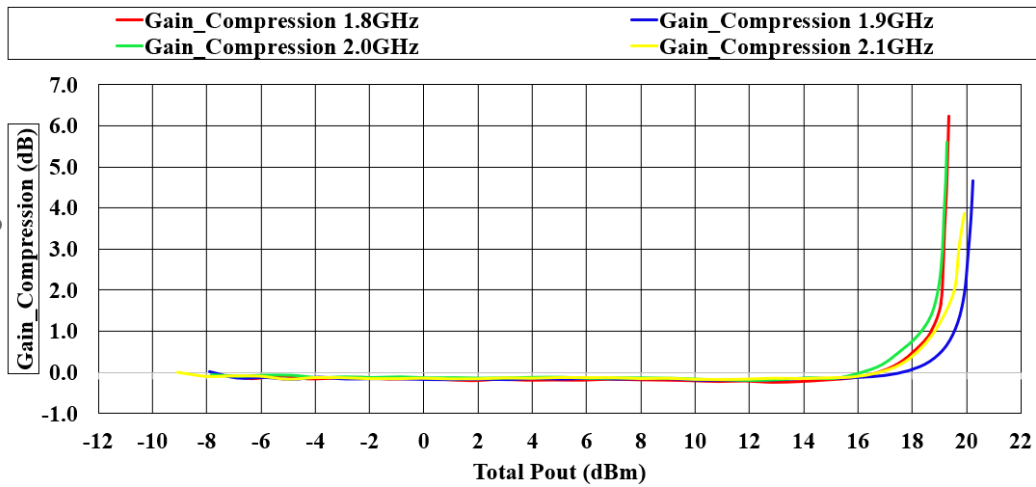


Figure 6.3.2. Gain compression Vs Pout of TL0374J-EVB-A

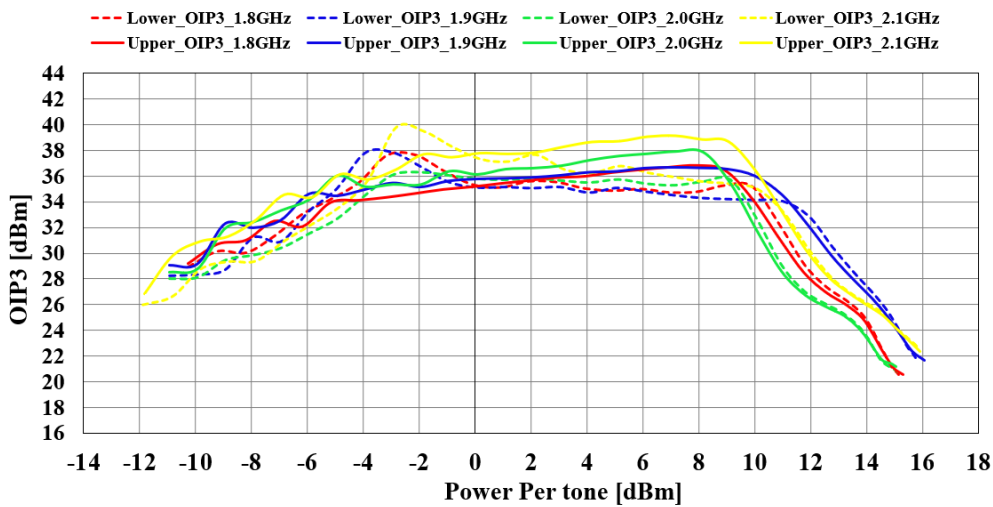


Figure 6.3.3. Output 3<sup>rd</sup> Order Intercept Point of TL0374J-EVB-A

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