TL0375J

2.0 – 5.0 GHz GaAs Ultra Low Noise Amplifier

Application Note: TL0375J EVB E

Application Note

4700 MHz~6000 MHz

5.0 V, 70 mA

Rev-2.0

List of Contents

1. General Description

The TL0375J 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 > 3 GHz frequency band, TL0375J can be considered. The TL0375J is packaged in a compact, low-cost Dual Flat No Lead (DFN) 2 x 2 x 0.75 mm, 8 pin plastic package.
TL0375J-EVB-E is an evaluation board specially tuned for frequency range of 4700 MHz~6000 MHz applications. Its high gain, low noise performance makes it suitable for application of public safety, radar, tactical radio, IoT, Cellular infrastructure, LTE etc.

2. TL0375J-EVB-E Board Details

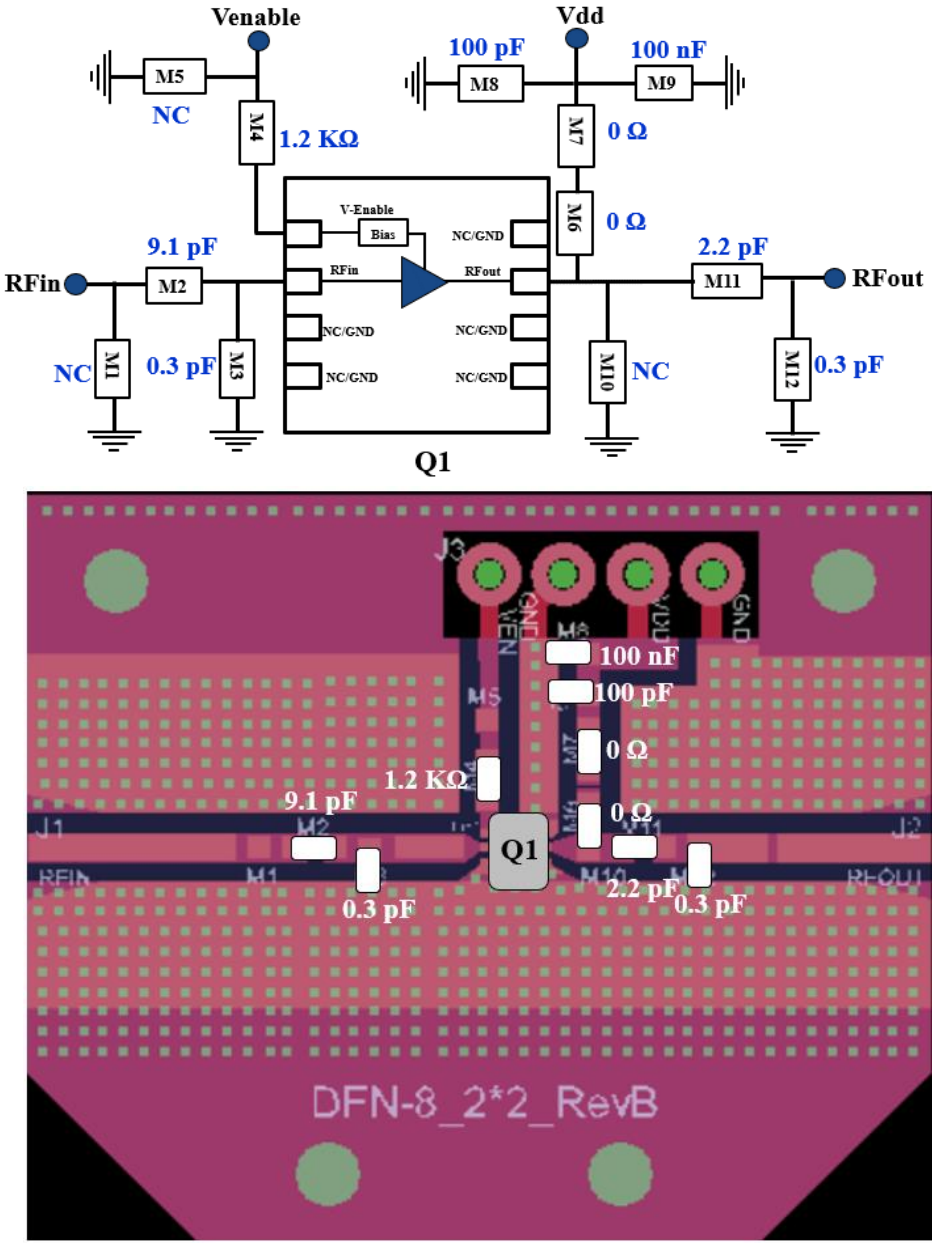


Figure 2.1 TL0375J-EVB-E 4700 MHz ~ 6000 MHz Schematic and EVB Layout

3. TL0375J-EVB-E Bill of Material

Component ID	Value	Manufacturer	Recommended Part Number
M2	9.1 pF	Murata	GJM1555C1H9R1BB01
M4	1.2 KΩ	Panasonic	ERJ-2RKF1201X
M3	0.3 pF	Murata	GJM1555C1HR30BB01
M8	100 pF	AVX	04025A101JAT4A
M9	100 nF	TDK	C1005X7R1H104K050BE
M6, M7	0 Ω	Panasonic	ERJ-2GE0R00X
M11	2.2pF	Murata	GJM1555C1H2R2BB01
M12	0.3 pF	Murata	GJM1555C1HR30BB01
Q1	GaAs LNA	Tagore Tech	TL0375J
PCB		Rogers RO4350B, 20 mils, 1 oz copper	

Table 3.1 TL0375J-EVB-E BOM

4. TL0375J-EVB-E Biasing Sequence

Turn ON Device	Turn OFF Device
1. Set Venable to +5 V 2. Set V_{DD} to +5 V 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 TL0375J-EVB-E Bias and Sequencing

5. TL0375J-EVB-E Board Measurement Summary

Frequency (MHz)	De-embedded Noise Figure (dB)	Gain (dB)	OP1 (dBm)	OIP3(dBm) Fspacing:1 MHz 0dBm Pout/tone	S11 (dB)	S22 (dB)	Mu1
4700	0.7	14.9	19-20	31.5	-12.4	-4.5	1.1
5000	0.7	14.8		32.0	-12.4	-5.4	
5200	0.8	14.8		32.0	-13.3	-5.7	
5400	0.8	14.8		32.0	-15.1	-5.8	
5600	0.9	14.6		33.0	-17.6	-5.9	
5800	0.8	14.4		31.6	-20.7	-6.0	
6000	1.0	14.2		31.6	-20.5	-6.0	

**** Note:** Trace loss is around 0.15-0.35 dB. So EVB NF will lie between 0.8 dB to 1.2 dB.

Table 5.1 TL0375J-EVB-E Electrical Characteristics Summary

6. TL0375J-EVB-E Test Results

All the tests are carried out at room temperature.

6.1. S parameters

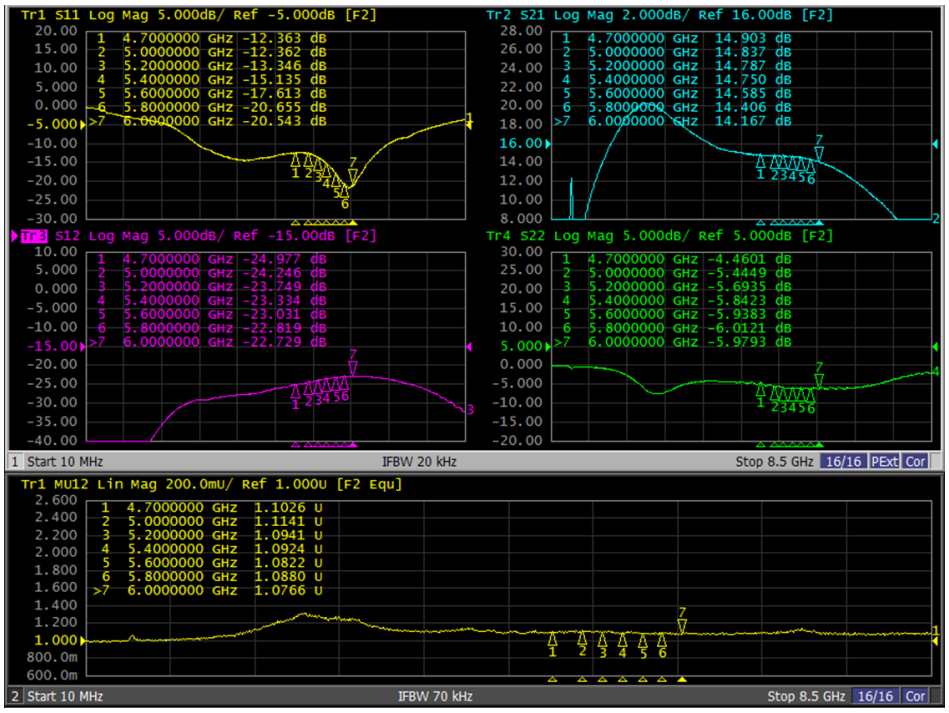
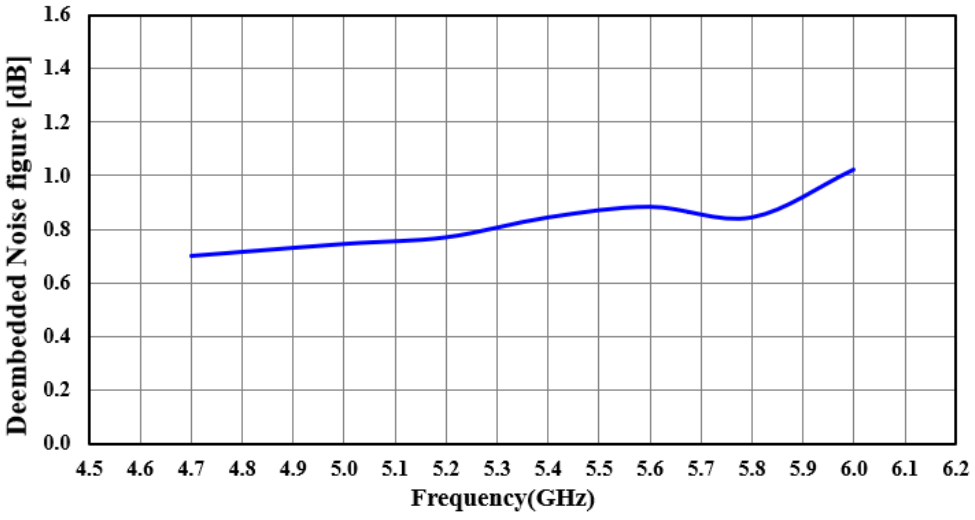


Figure 6.1.1. S parameters of TL0375J-EVB-E

6.2. De-embedded Noise Figure



**** Note:** Trace loss is around 0.15-0.35 dB. So EVB NF will lie between 0.8 dB to 1.2 dB.

Figure 6.2.1. De-embedded Noise Figure mode of TL0375J-EVB-E

6.3. Large Signal Test Results

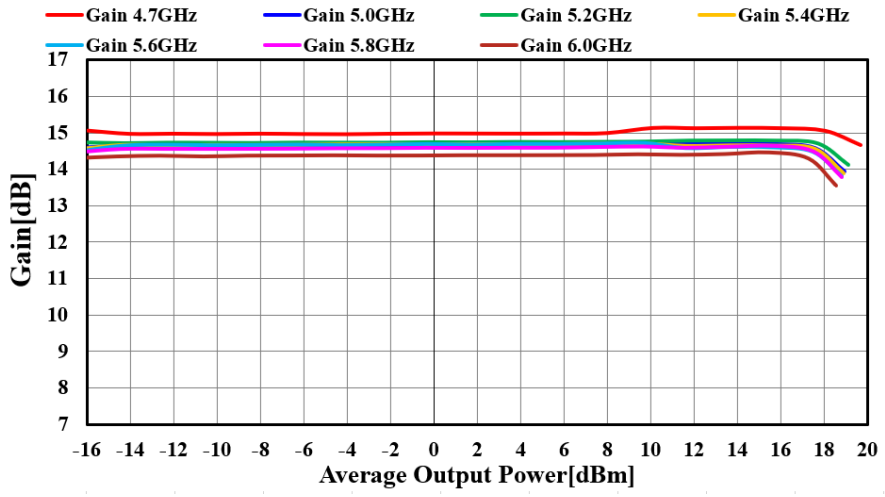


Figure 6.3.1. Gain Vs Pout of TL0375J-EVB-E

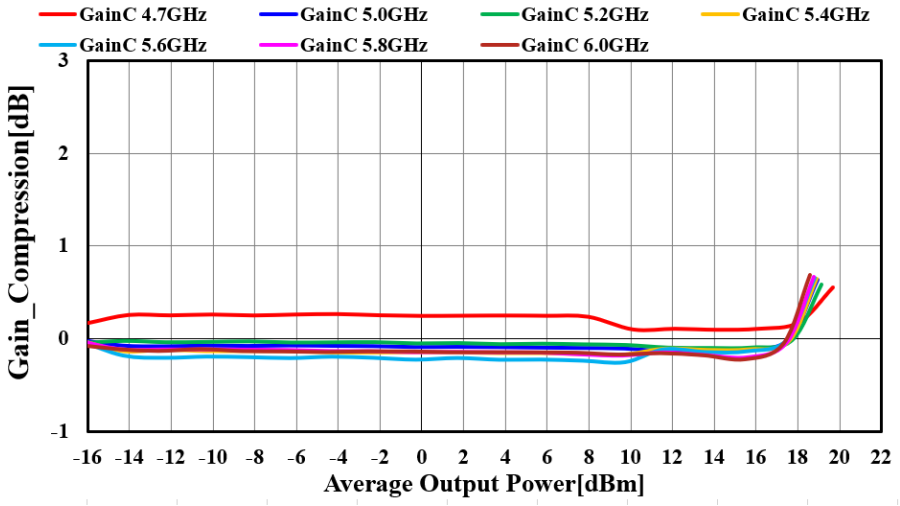


Figure 6.3.2. Gain compression Vs Pout of TL0375J-EVB-E

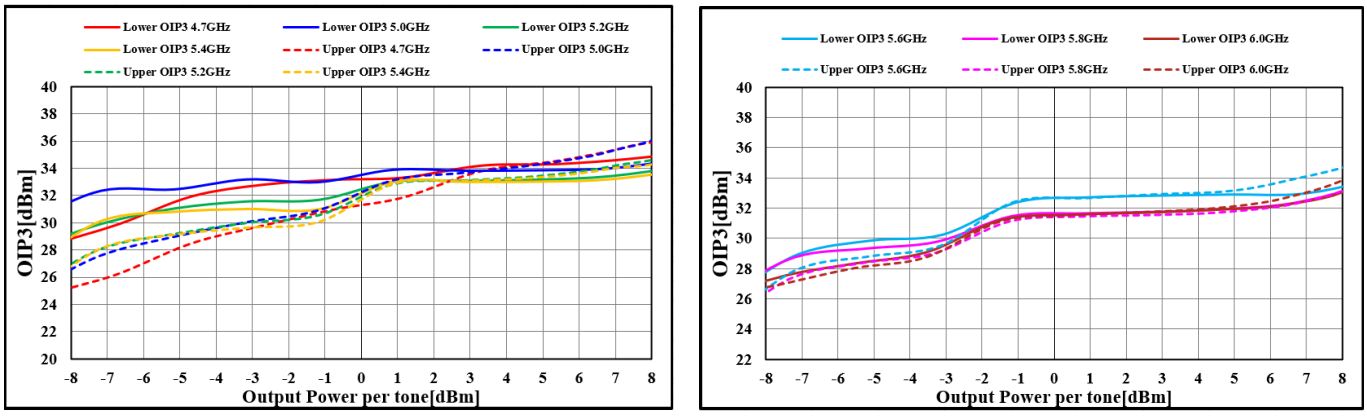


Figure 6.3.3. Output 3rd Order Intercept Point of TL0375J-EVB-E

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