Cascode CS-LNA Design Report

EE 619 RF Microelectronics

by

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Cascode CS-LNA Design

1.1 Schematic

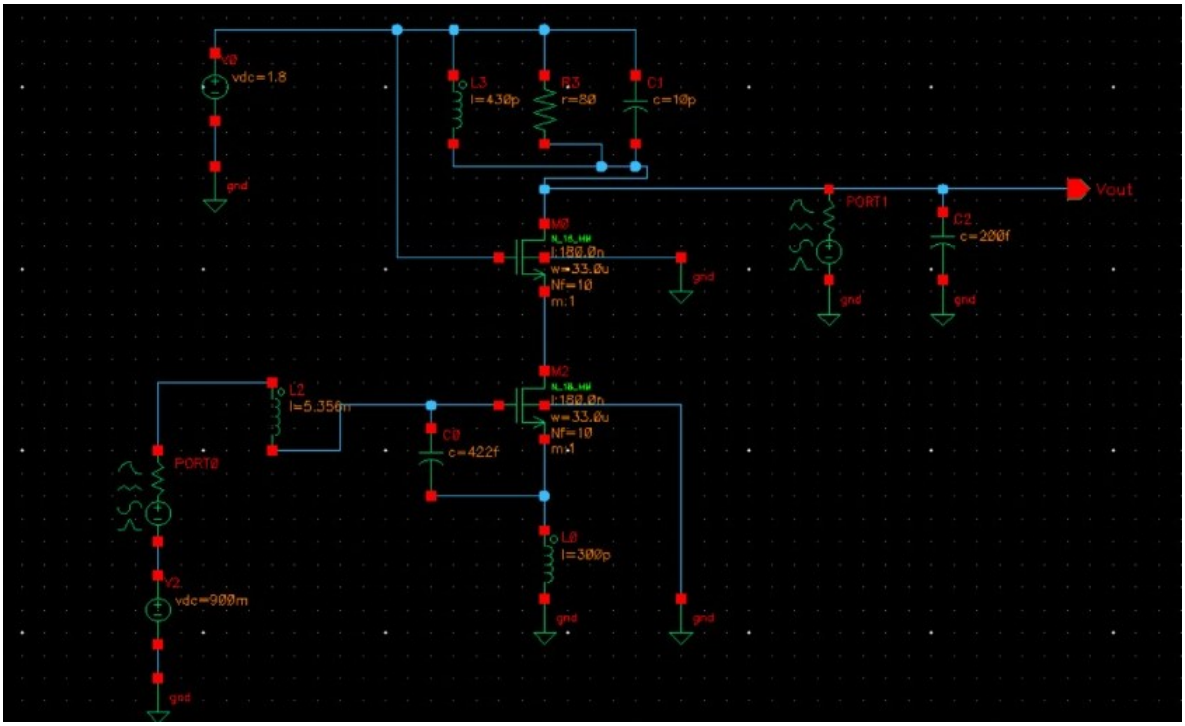

Figure 1.1: Schematic of cascode CS-LNA

The Schematic of the cascode CS-LNA is shown in Figure 1.1
The value of V_{in} is chosen to be 900mV .

1.2 Simulation Results

Design parameters	Required range	Simulation results
Noise Figure	$\leq 2dB$	$\leq 0.744dB$
S_{21}	$> 15dB$	$> 15.34dB$
S_{11}	$< -10dB$	$< -11.11dB$
S_{22}	$< -10dB$	$< -10.22dB$
IIP_3	$> -8dB$	1.1392dBm

1.3 Noise Figure

The Noise figure vs frequency plot is shown in Figure 1.2. For all frequencies in the range 2.3GHz to 2.4GHz, the noise figure is below 2dB.

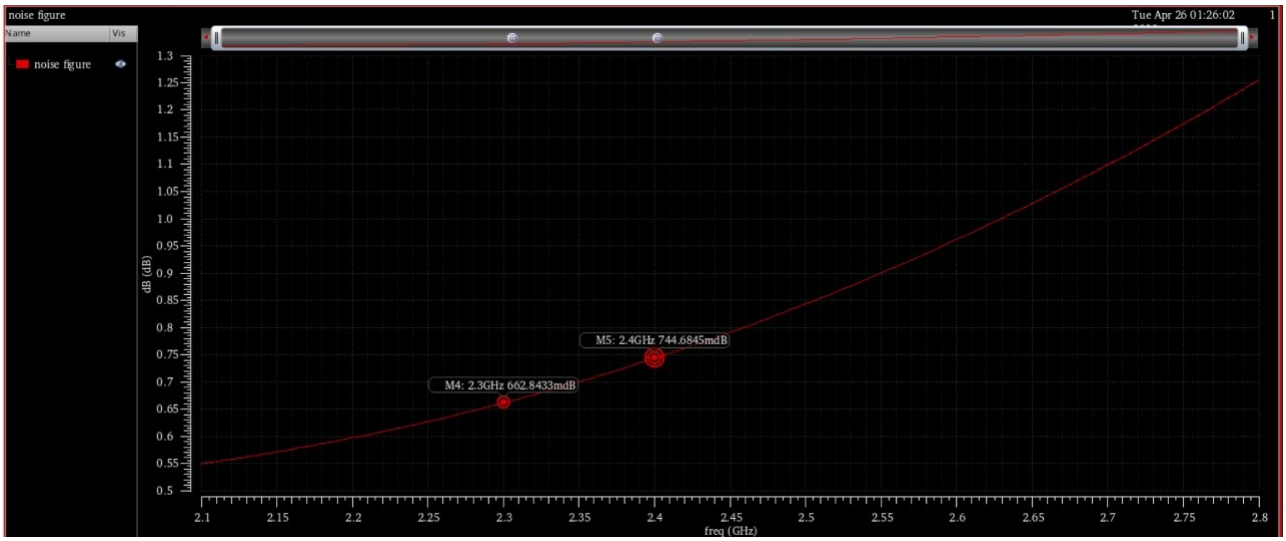

Figure 1.2: Noise Figure

1.4 S-parameters

The plot for S_{21}, S_{11} and S_{22} parameters is given in Figure 1.3. The forward voltage gain is above 15dB for all frequencies in the range 2.3GHz to 2.4GHz.
The Input port and Output port voltage reflection coefficients are also shown here. The value of these reflection coefficients is below -10dB for all frequencies in the range 2.3GHz to 2.4GHz.

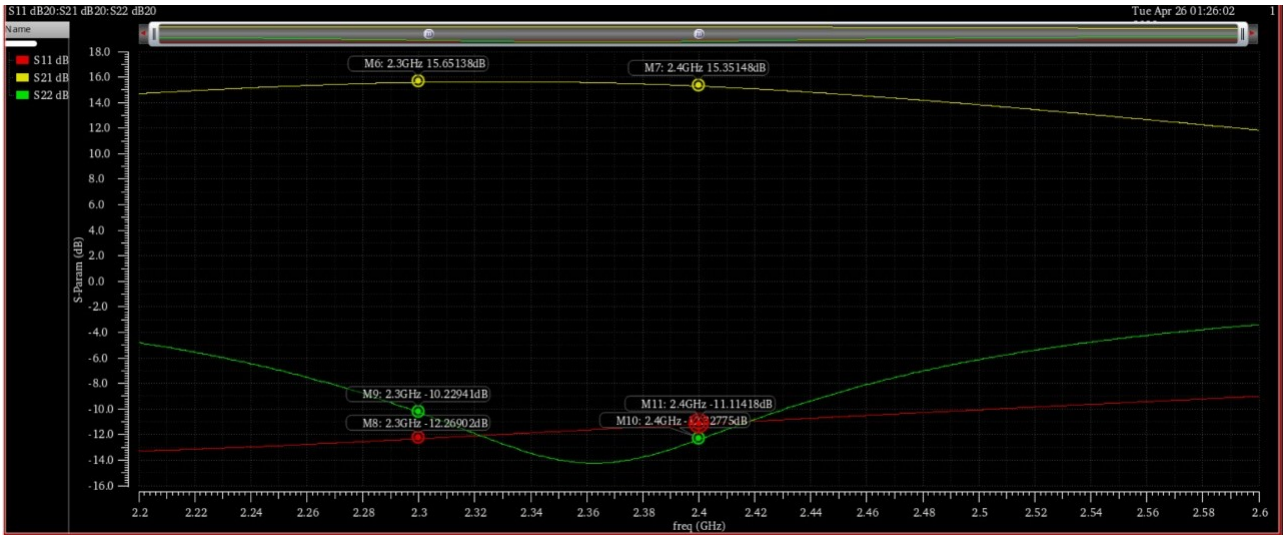

Figure 1.3: Forward voltage gain, Input & Ouput port voltage reflection coeffiecients

1.5 IIP3

The IIP3 for this LNA is shown in Figure 1.4. IIP3 is 1.1392dBm > -8dBm as seen in the figure.

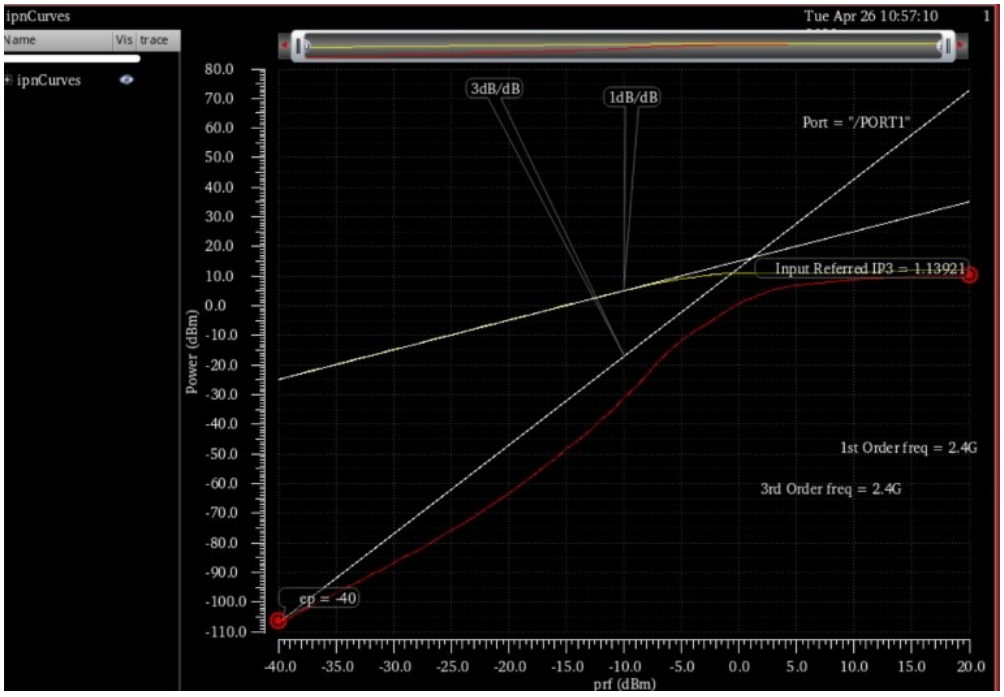

Figure 1.4: IIP3

The 1dB compression point is 2.6206dBm as shown in Figure 1.5

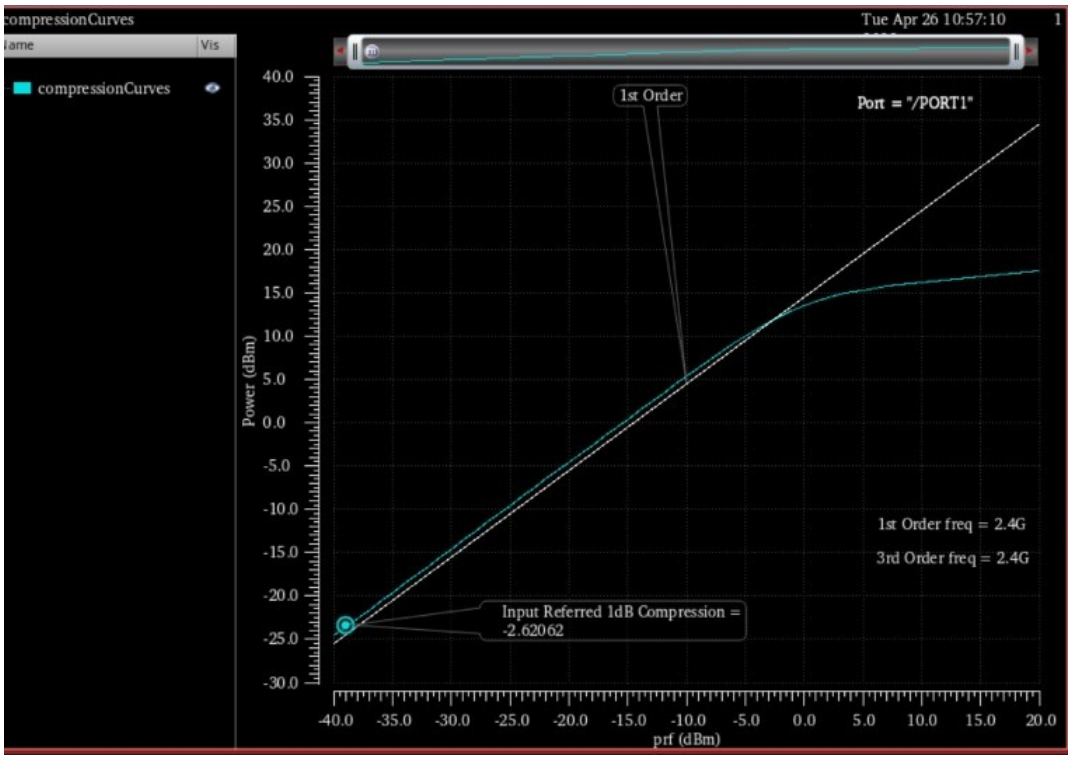

Figure 1.5: 1dB compression point