

ECE6420 Wireless IC Design Fall 2012

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Low Noise Amplifier Design Project

LNA Design Specifications

VDD	1.2 V
Center Frequency	5 GHz
Load (single-ended)	200 Ω // 100 fF
Q for all inductors	15
DC Current Budget	7.5 mA
$ S_{11} $	< -10 dB
Peak Voltage Gain	20 dB
Bandwidth ⁽¹⁾	200 MHz
Noise Figure	3.5 dB
P_{1dB} @ Input	-25 dBm
A_{1dB} @ Output	-13 dBV
P_{IIP3}	-15 dBm
A_{OIP3}	-3 dBV
Total Inductance Budget	20 nH
Total Capacitance Budget	Unlimited

- (1) Bandwidth is defined as the overlapping frequency range for the -3dB gain bandwidth and the S_{11} bandwidth ($|S_{11}| < -10\text{dB}$).
- (2) If you choose to design a differential LNA, you need to include an ideal $1:\sqrt{2}$ transformer (balun) at the input, which converts the 50Ω single-ended source impedance to the 100Ω differential source impedance.

The specification requirements for differential LNA designs are the same as the values listed above.

The load for differential LNA designs is shown in the figure below.

