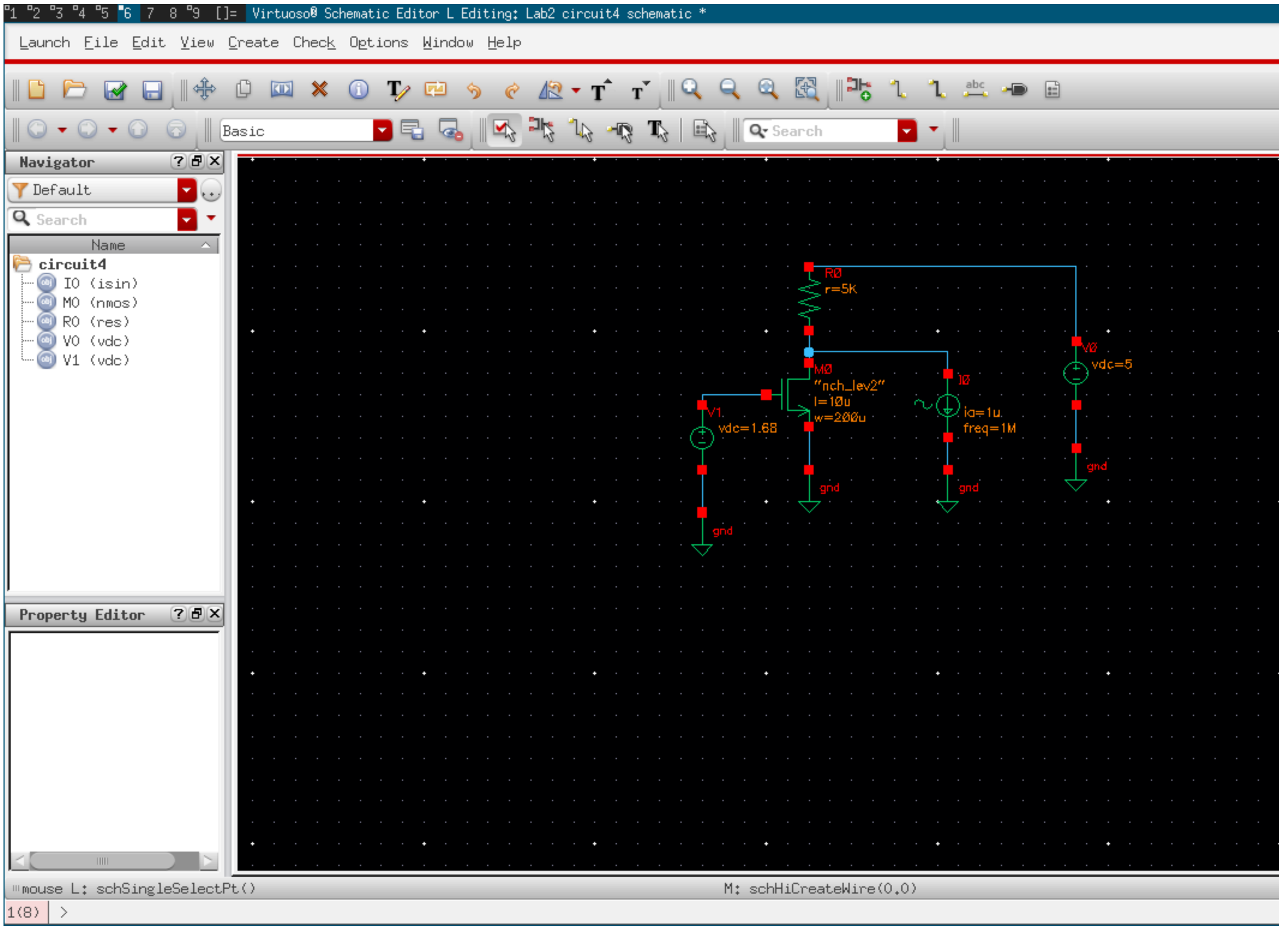

Figure 1: Circuit 3

The amplitude V_x can be acquired by analyzing the results of a transient simulation.

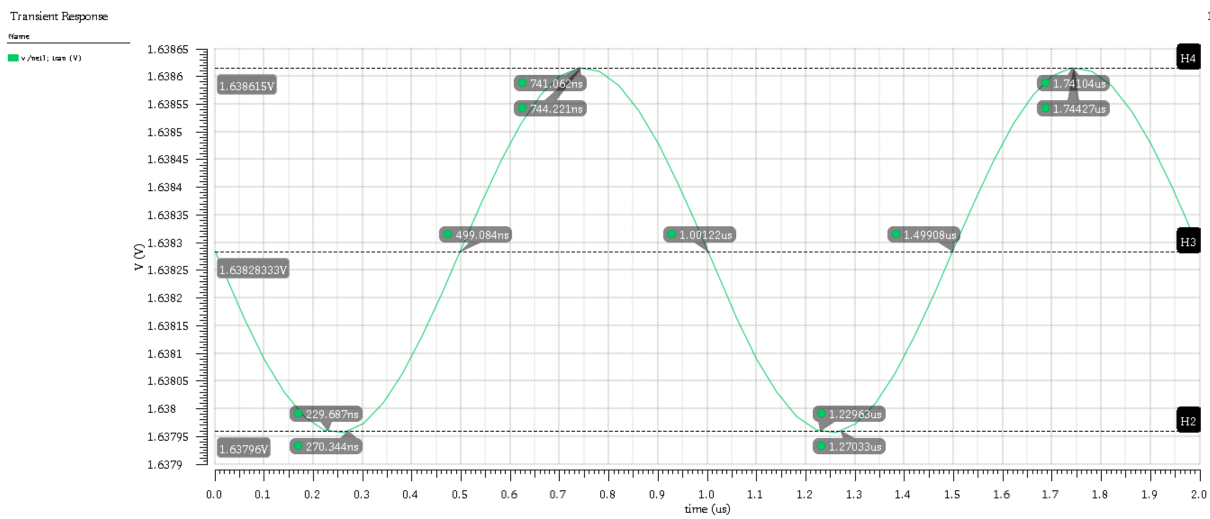

Figure 2: V_x Plot for Circuit in Figure (1)

The output resistance can be calculated simply by observing the amplitude of the waveform in figure (2), also known as V_x, and dividing it by the input current amplitude, which is 1µA in this case. The output resistance can be theoretically calculated for a common-drain amplifier using $r_{out} = R_s || \frac{1}{g_m} || r_o$. Here, assume r_o to be rather large. Thus, the simplified expression $r_{out} = R_s || \frac{1}{g_m}$ is used for a theoretical comparison instead. Clearly, the experimental result is consistent with theory.

Table 1: r_{out} for the Common Drain Amplifier

rout from Simulation [Ohms]	rout from Theory [Ohms]	Error from Theory
327.50	330.40	0.88%

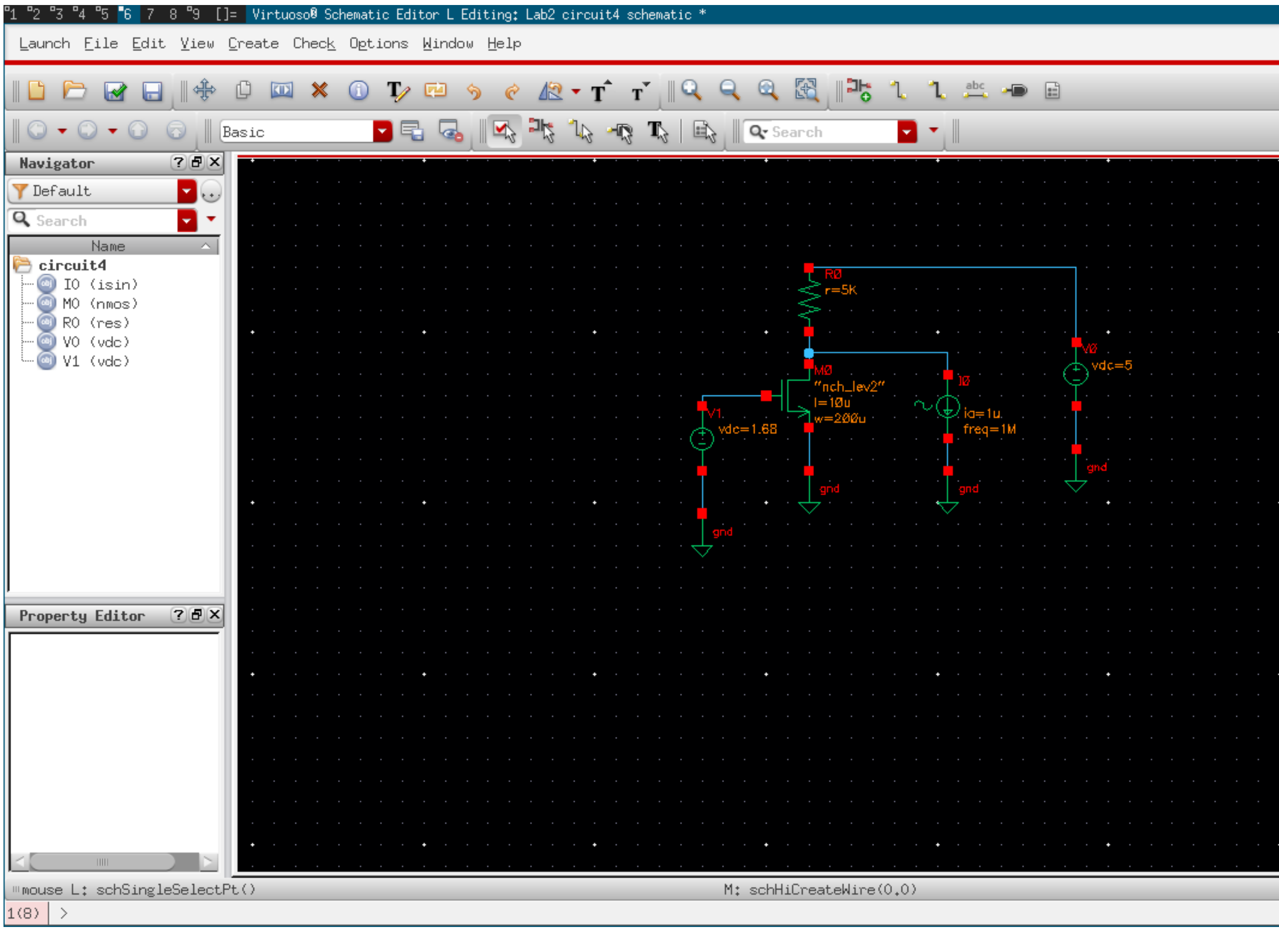

Figure 3: Circuit 4

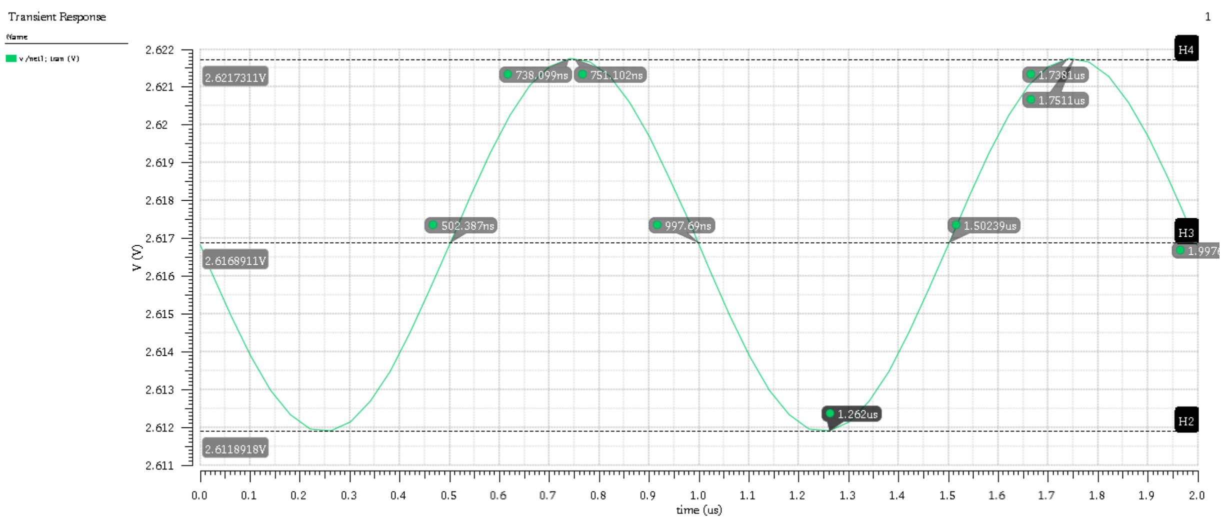

Figure 4: V_x Plot for Circuit in Figure (1)

Table 2: r_{out} for the Common Drain Amplifier

rout from Simulation [Ohms]	rout from Theory [Ohms]	Error from Theory
4919.65	4941.13	0.43%

From these results, it is clear that the common-drain amplifier has a much lower output resistance.