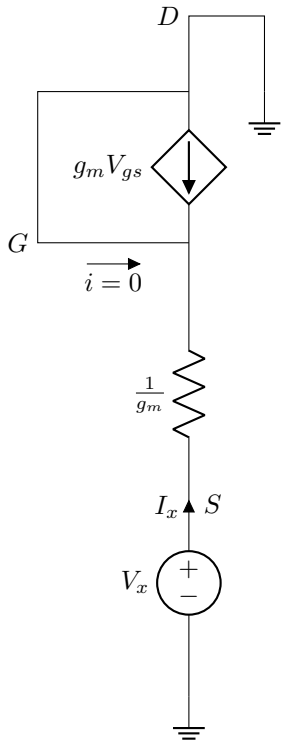
Output Resistance(R_{out}) of Diode Connected NMOS

With channel length modulation ($\lambda = 0$)

$R_{out} = \frac{1}{gm}$

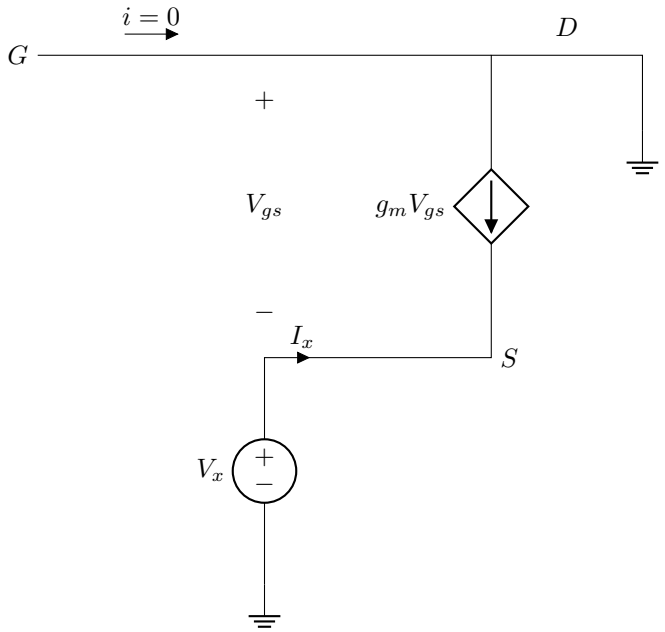
Using T Model



$$V_x = V_{sg}$$
$$I_x = g_m V_{gs}$$
$$\frac{V_x}{I_x} = R_{out} = \frac{V_{sg}}{-g_m V_{gs}} = \frac{1}{g_m}$$

When looking for output resistance, ground the input and apply test source at the output with I_x going into the circuit under test. Gate is ground, and remember that there is no current flowing into gate!! this is really important reality.
Useful Youtube video

Using Hybrid π Model



$$V_x = V_{sd} = V_{sg}$$
$$I_x = g_m V_{gs}$$
$$\frac{V_x}{I_x} = R_{out} = \frac{V_{sg}}{-g_m V_{gs}} = \frac{1}{g_m}$$

Again remember there is not current coming from the gate node (into the gate oxide).

With channel length modulation ($\lambda \neq 0$)

I won't draw it out but should be able to work it out with both T and hybrid π model and get the result $R_{out} = \frac{1}{r_o || \frac{1}{g_m}}$.