

Problem Set

Problem #1

Consider the circuits in figure 2.32. If we assume the transistors are well described by the Schokley model and their respective S and B terminals are tied together, the two circuits are equivalent (i.e. $I_{DS1} = I_{DS2}$).

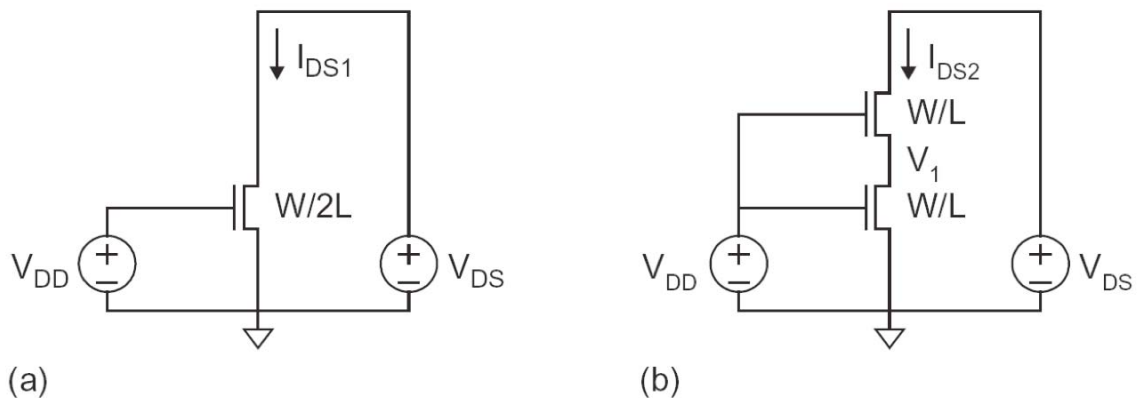


FIGURE 2.32 Current in series transistors

1. If the body effect is considered, will I_{DS2} be equal to, greater than, or less than I_{DS1} ? Consider only body effect: assume velocity saturation and mobility degradation effects are negligible.
2. Explain.

Problem #2

1. As temperature rises, does the current through an ON transistor increase or decrease? Explain.
2. Does current through an OFF transistor increase or decrease? Explain.
3. Will a chip operate faster at higher temperature or low temperature? Explain.