Essentials of MOSFETs

Lecture 5.1: Limits of MOSFETs

Short Problem

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Consider an $L = 10$ nm MOSFET with $W/L = 2$, $CET = 0.7$ nm, and a parasitic gate capacitance equal to the intrinsic device capacitance. Assume a power supply voltage of $V_{DD} = 0.7$ V, and answer the following question.

1a) How much energy does it take to switch this device from zero to one or vice versa? (Note that we are not considering any wiring capacitance.)

1b) Compare the device switching energy to $k_B T \ln(2)$ at room temperature.