Essentials of MOSFETs

Lecture 2.4: The Square Law MOSFET

Short Problem

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Consider an N-channel MOSFET with the following parameters:

$V_{GS} = V_{DD} = 5\text{ V}$
$V_T = 1\text{ V}$
Electron mobility: $\mu_n = 500\text{ cm}^2/\text{V-s}$
MOSFET width: $W = 10.0\ \mu\text{m}$
Channel length: $L = 10\ \mu\text{m}$

1) What is the magnitude of the electric field at the beginning of the channel in V/cm. Assume the square law theory and compare you answer to the critical field for velocity saturation in silicon, $\approx 7\text{ kV/cm}$.