Disclaimer

This summary is part of the lecture "ETH Semiconductor Devices" by Prof. Dr. Colombo Bolognesi (FS19). It is based on the lecture.

Please report errors to huettern@student.ethz.ch such that others can benefit as well.

The upstream repository can be found at https://github.com/noah95/formulasheets

ETH Semiconductor Devices

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1 Introduction

1.1 Electric Field

- Electrical current is the movement of electrical charge Q.
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1.2 Electric resistivity/conductivity

Conductivity σ is a material property describing how easily certain material can conduct electrical current. Resistivity $\rho = 1/\sigma$ describes how much a material opposes the current flow. The resistance of a square/round piece of metal is:

$$R = \rho\frac{l}{A} = \rho\frac{l}{r^2\pi}$$

1.3 Current flow

1.4 Moore's Law

Gordon Moore predicted that the number of transistors on an integrated circuit doubles about every two years. This is described using exponential growth:

$$p(t) = p_0 \cdot b^{t/\tau}$$

Where

$p(t)$ = population at given time
p_0 = initial population
b = growth rate per time constant
τ = time constant