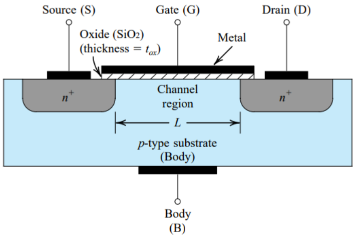


The size of the "process" indicates the minimum possible channel length.
Magnitude of the electron charge in the channel [Q]:

$$|Q| = C_{OX}(WL)v_{OV}$$

C_{OX} is the oxide capacitance, [F/m^2]

$$C_{OX} = \frac{\epsilon_{OX}}{t_{OX}}$$

ϵ_{OX} is the permittivity of the SiO_2.
t_{OX} is the oxide thickness.

$$i_D = \left[(\mu_n C_{OX})\left(\frac{W}{L}\right)(v_{GS} - V_t)\right] v_{DS}$$

$$i_D = [g_{DS}]\, v_{DS}$$

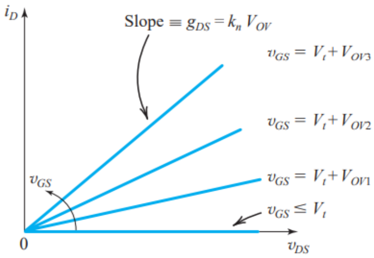
$$k_n' = \mu_n C_{OX}$$

$$k_n = k_n'(W/L)$$

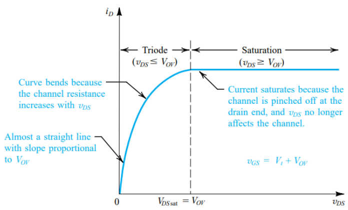
When V_{DS} is small, the MOSFET behaves as a linear resistance r_{DS} whose value is controlled b the gate voltage v_{GS}.

More text over here

$$r_{DS} = \frac{1}{g_{DS}}$$



Triode vs Saturation



Triode

$$i_D = k_n'\left(\frac{W}{L}\right)\left(V_{OV} - \frac{1}{2}v_{DS}\right)v_{DS}$$