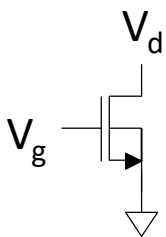
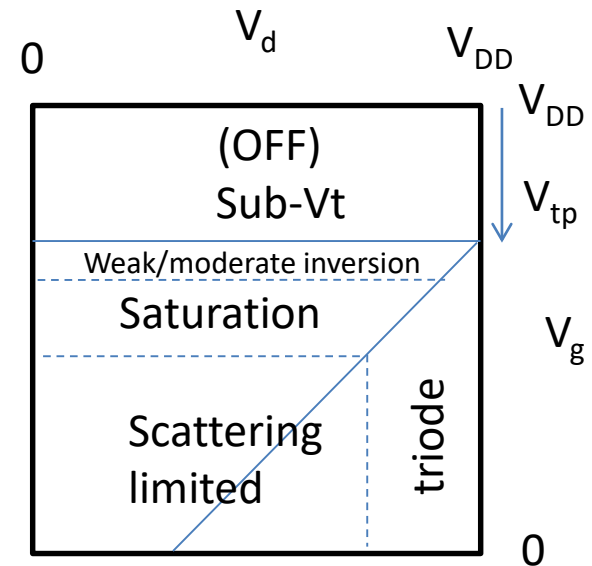
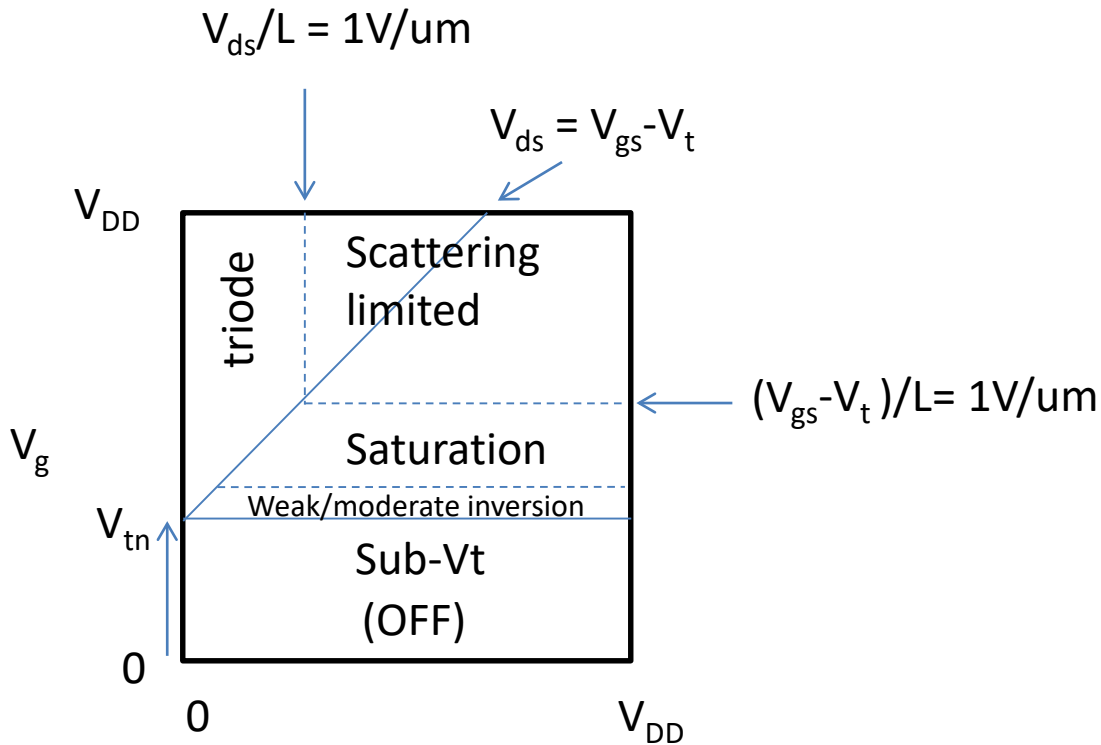
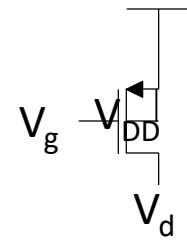


Regions of Operation



V_d

$I_d = (\mu_n C_{ox})(W/L)(V_{gs} - V_t - V_{ds}/2) V_{ds}(1 + \lambda V_{ds})$	triode
$I_d = (\mu_n C_{ox}/2)(W/L)(V_{gs} - V_t)^2(1 + \lambda V_{ds})$	saturation
$I_d = (C_{ox} W/2)(V_{gs} - V_t)^{\alpha_{scl}}(1 + \lambda V_{ds})$	scattering limited
$I_d = I_s e^{(V_{gs} - V_t)/(nV_T)}(1 + V_{ds}/V_A)$	sub-threshold

None of these regions has a hard boundary, and the current varies smoothly from region to region.

Note the symmetry between the NMOS and PMOS devices.