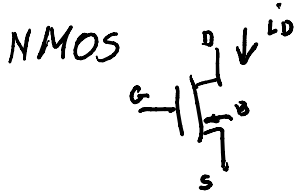


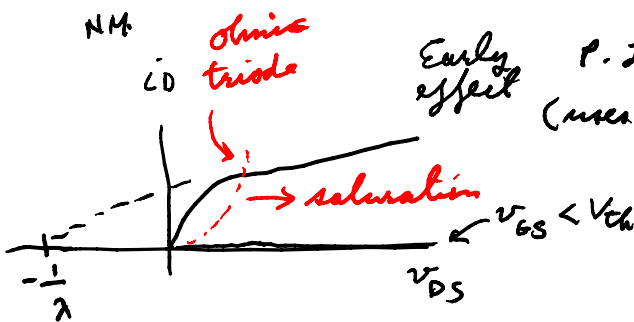
solid state diode 

p. 212
Fig. 3.51

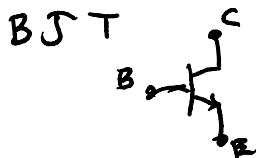


i_D eq. p. 245, eqs. (4.5a)(4.6a)
ohmic triode \uparrow
saturation \uparrow

V_{th} p. 258, eq. (4.33)
(use Spice $\gamma = \text{GAMMA}$)



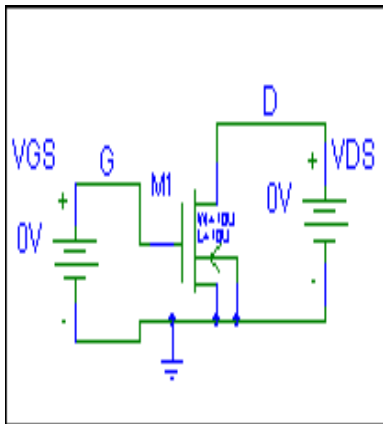
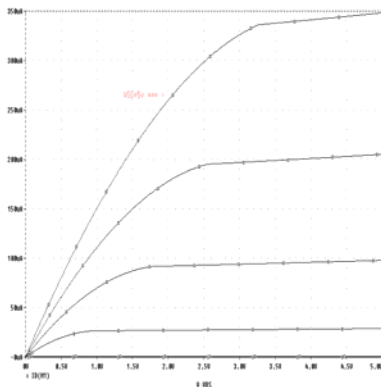
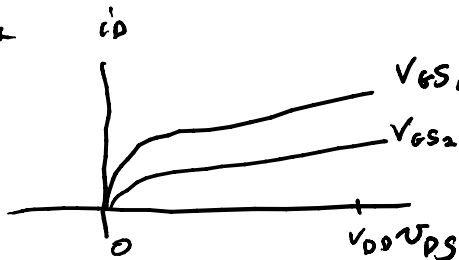
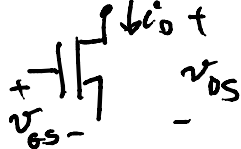
Early effect p. 254, eq. (4.22)
(use Spice $\lambda = \text{LAMBDA}$)



eqs. p. 387-88
Fig. 5.8 & eqs (5.26)-(5.30)

Ebers-Moll model

To get transistor curves

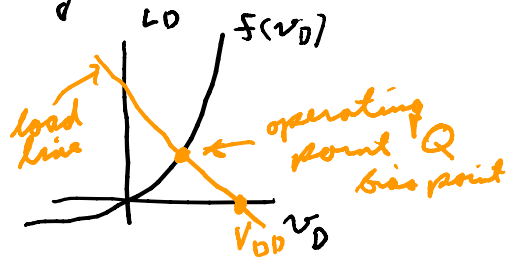
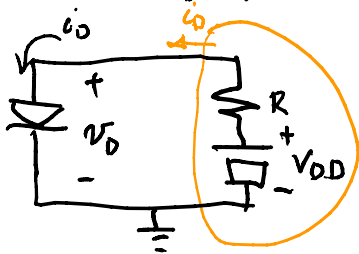


$$\dot{v} = \frac{dv}{dt} = 3v + \underbrace{\tanh(2v)}_{VCCS}$$

\parallel \parallel \parallel
 i_{in} i_{in} i_{in}
 acap. resistor VCCS

Σi 's by KCL

Bias, load lines, operating point



$$i_D = f(v_D) \text{ diode}$$

$$0 = -V_{DD} + R i_D \quad \& \quad v_D = 0 \Rightarrow i_D = \frac{-v_D + V_{DD}}{R}$$