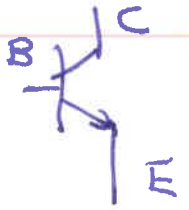
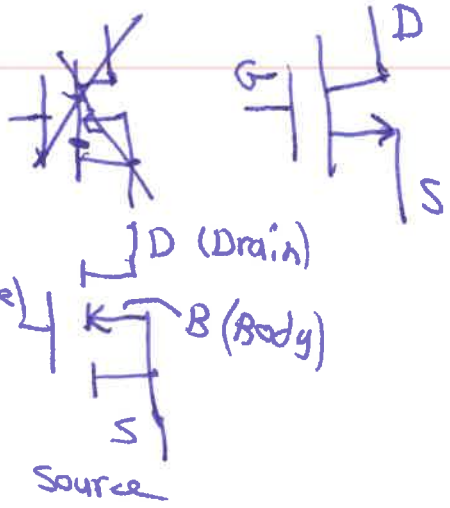
7 Nov 2016

FET vs BJT

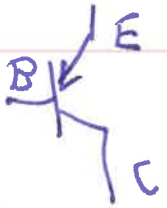
NPN BJT



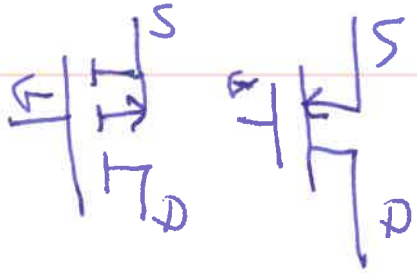
N-channel FET

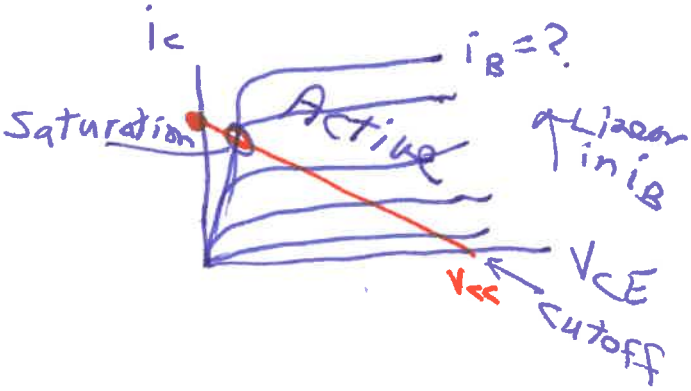


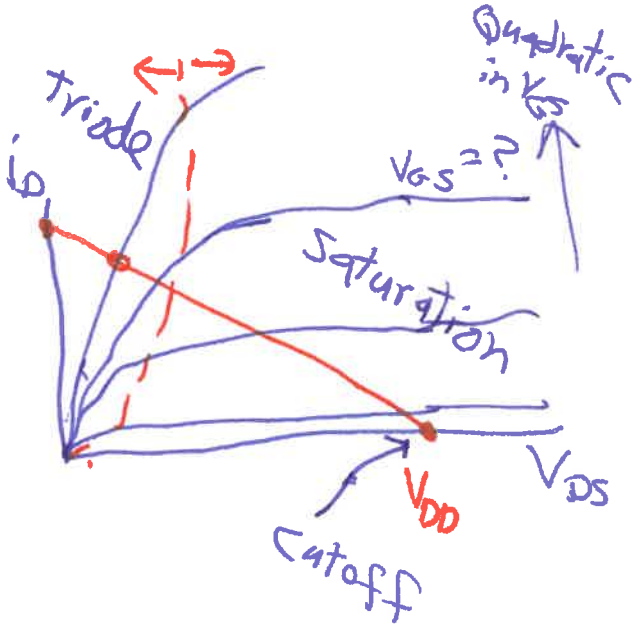
PNP BJT



P-channel FET







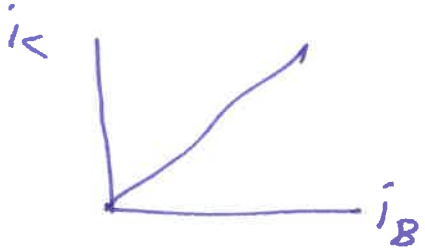
Active mode → amps

i_B is the parameter

linear

$i_C = \beta i_B$

$i_E = (\beta + 1) i_B$

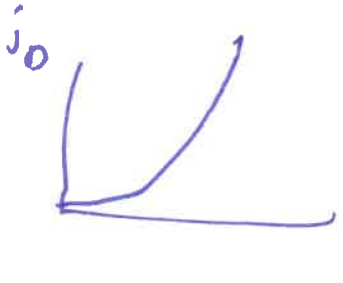


Saturation → amps

V_{GS} is the parameter

quadratic

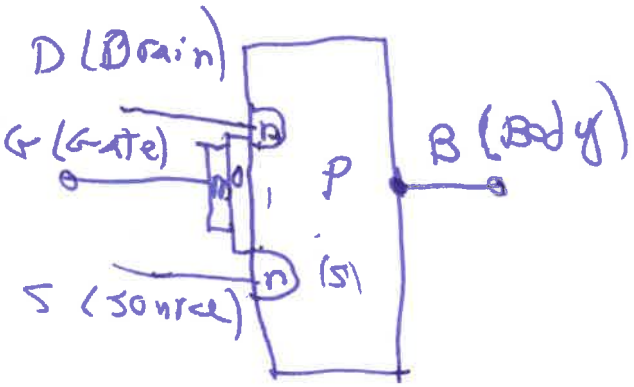
$i_D \propto (V_{GS} - V_{TO})^2$



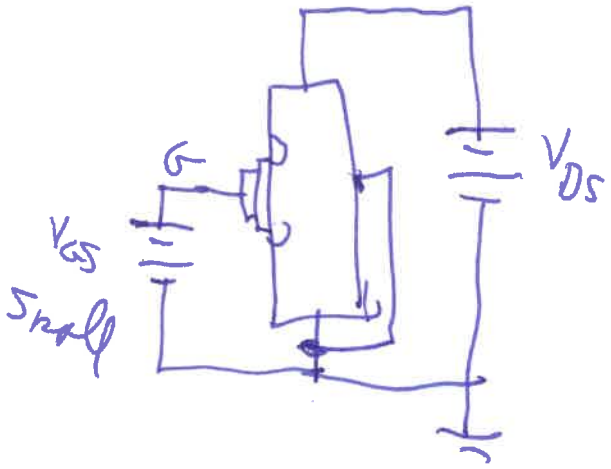
Common Emitter or Common Source Power Amp.

Collector Drain $A_V \simeq 1$

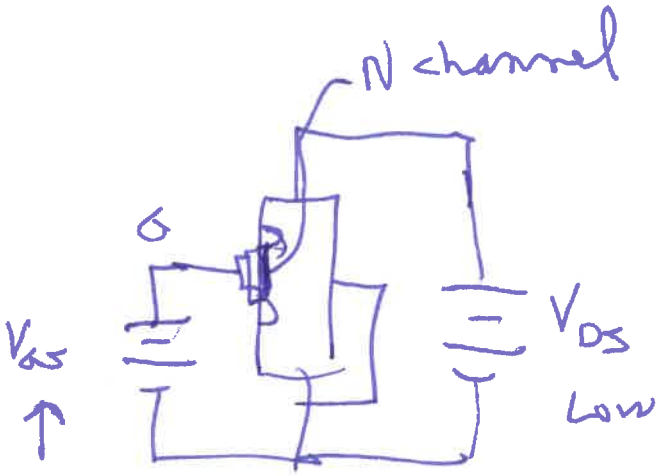
Base Gate $A_i = 1$



N- m (metal) o (Oxide) s (semiconductor)



Cutoff

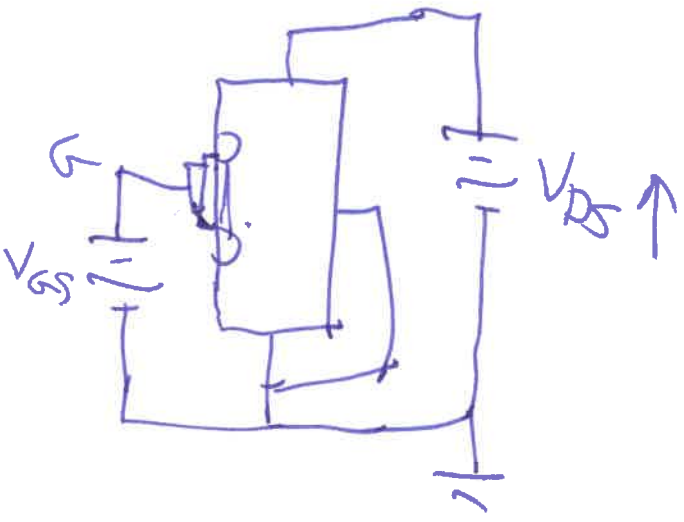


$i_D \propto (V_{GS} - V_{TO})$

$i_D \propto V_{DS}$

$i_D = K\left[2(V_{GS} - V_{TO})V_{DS} - V_{DS}^2\right]$

(Triode)



$i_D = K(V_{GS} - V_{TO})^2$

Saturation

Triode $i_D = K[2(V_{GS} - V_{TO})V_{DS} - V_{DS}^2]$

Saturation $i_D = K(V_{GS} - V_{TO})^2$

Boundary $i_D = K V_{DS}^2$