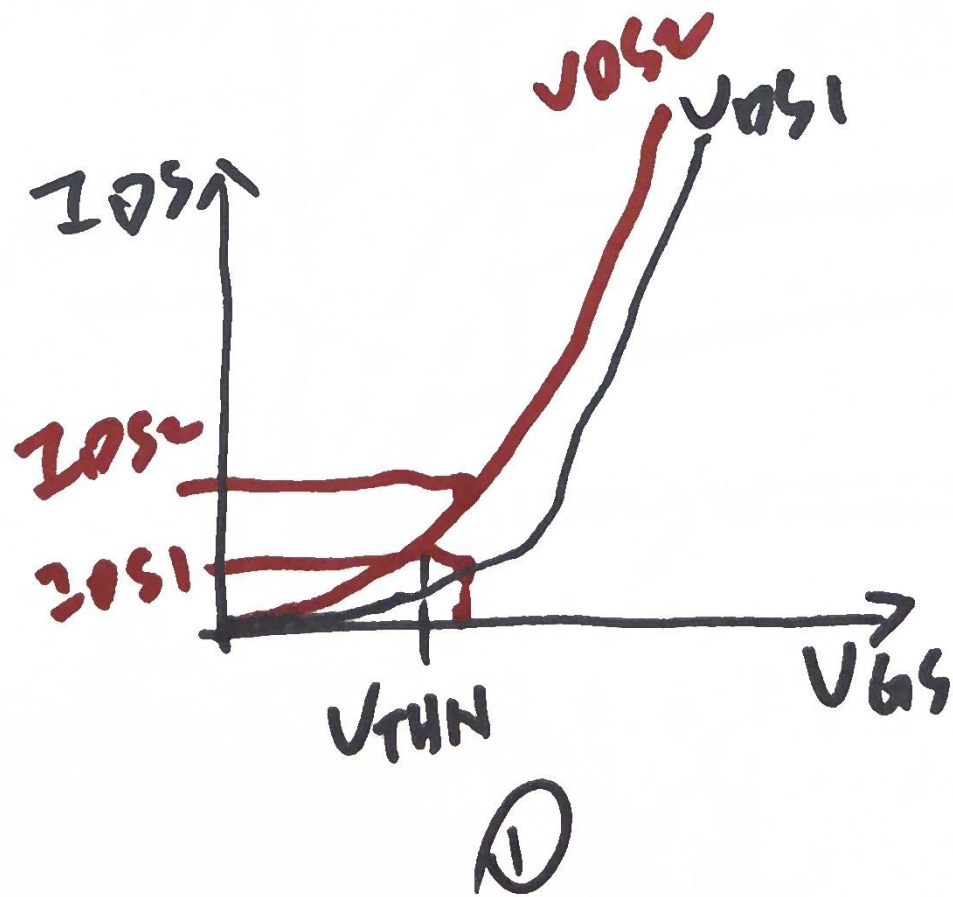
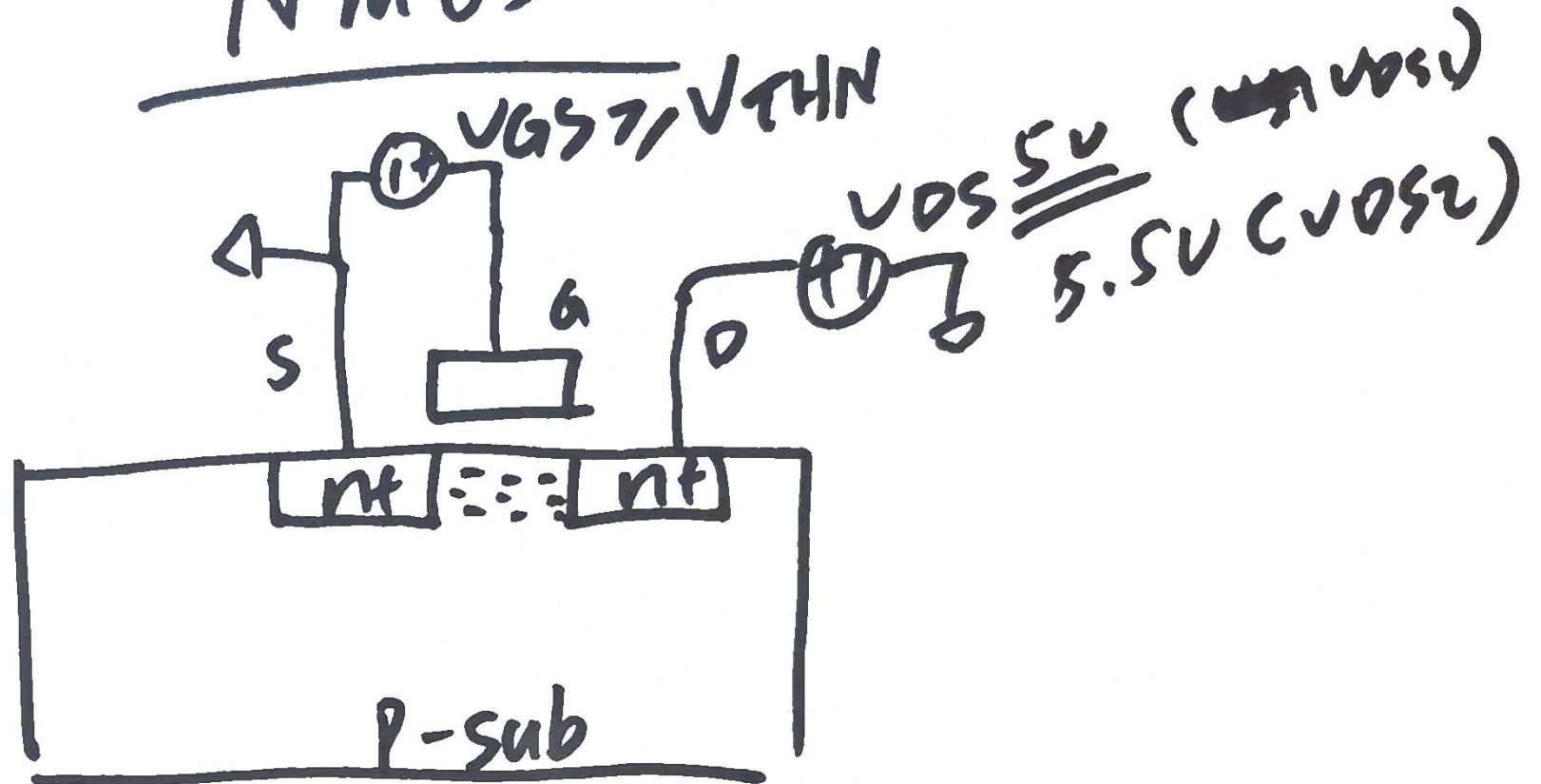
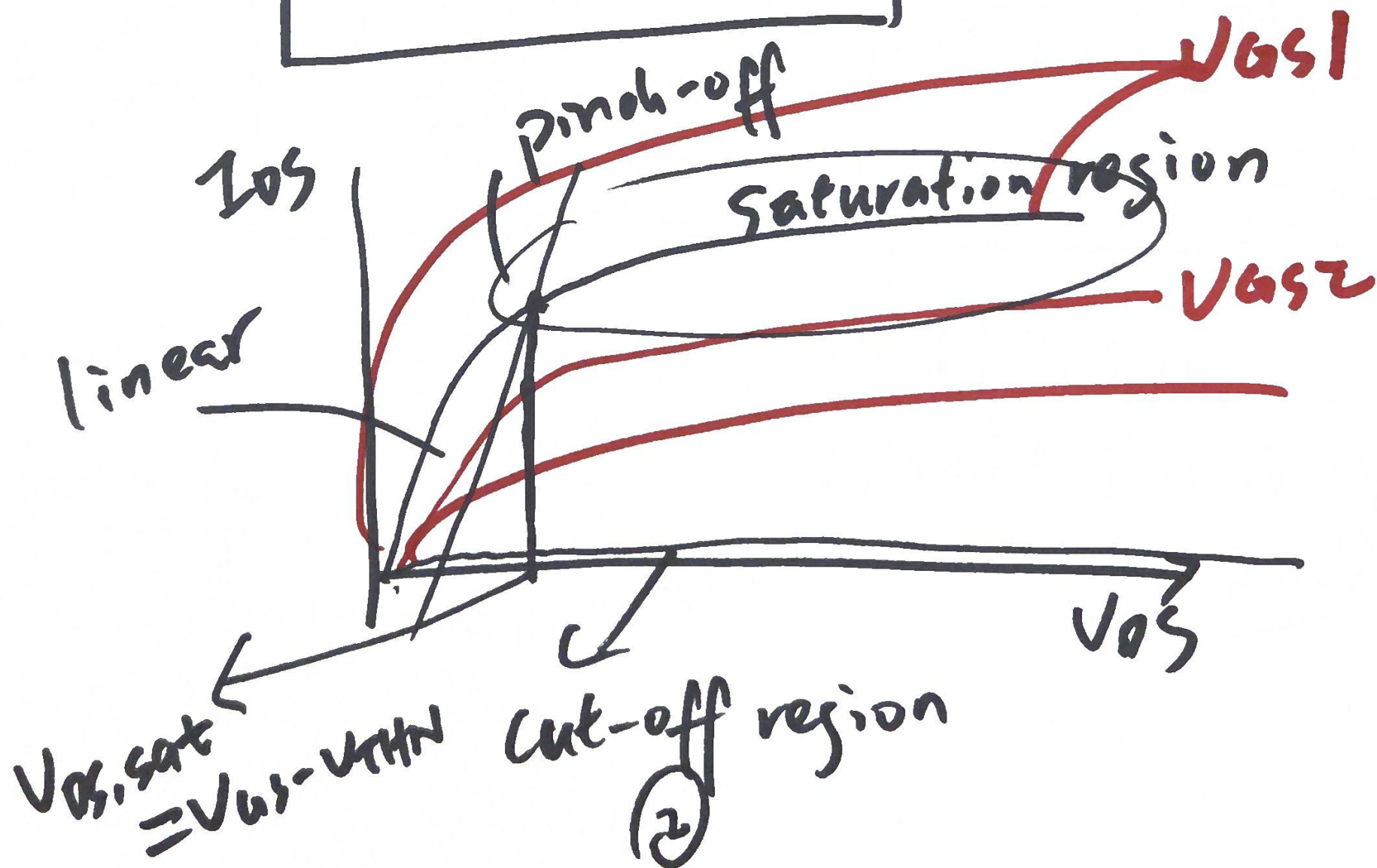
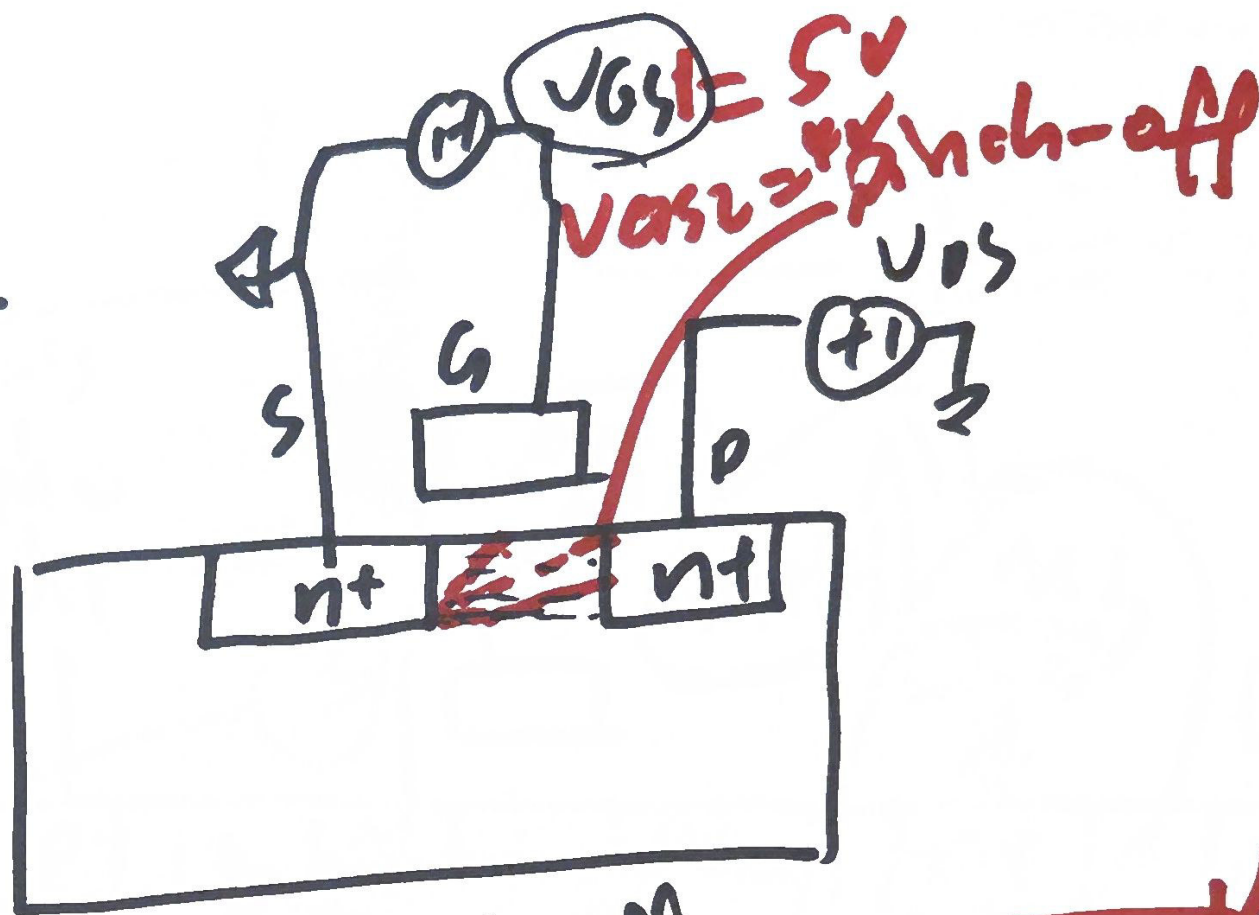


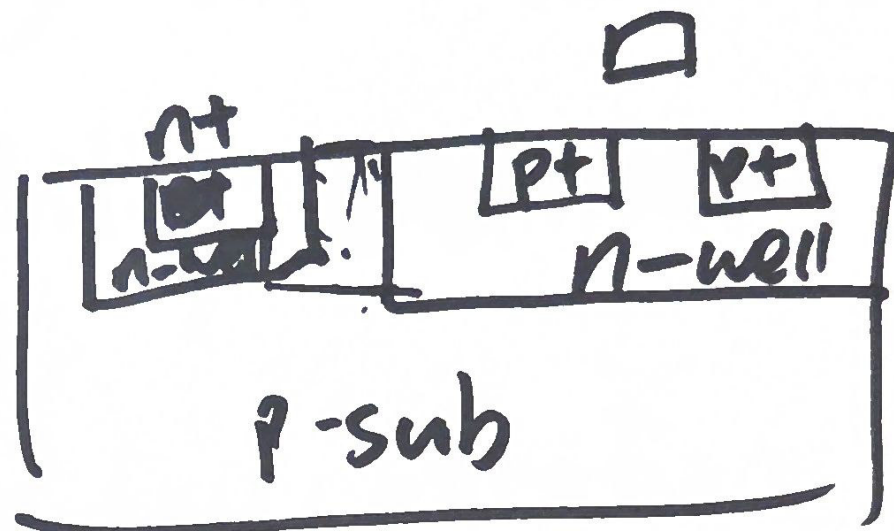
# NMOS



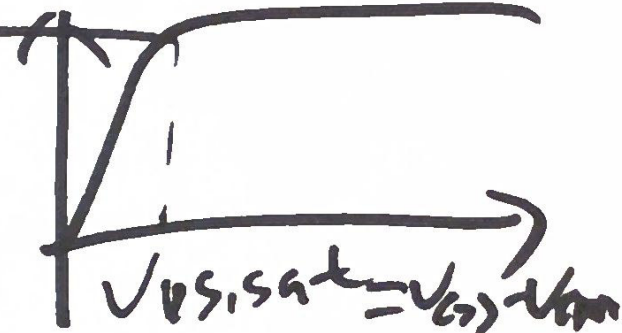
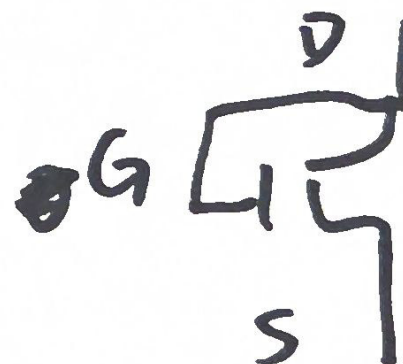
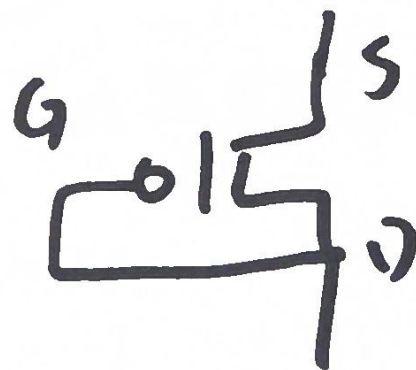
$I/V$  curve

DC sweep





## Diode Connections



Saturation  
region

$$V_{DS} \geq V_{DS,sat} = V_{GS} - V_{TH}$$

$V_{TH}$

0.7V

$$V_{DS} \geq V_{DS,sat} = V_{GS} - V_{TH}$$

$\downarrow$   $\swarrow$   $\downarrow$   
 $V_{GS}$   $0.8V$

(4)

Why  $V_{THP} > V_{THN}$

mobility of electrons > holes

△ Square Law Equation

$$I_{DS} = \frac{K_P n}{2} \frac{W}{L} (V_{GS} - V_{THN})^2 (1 + \lambda V_{DS})$$

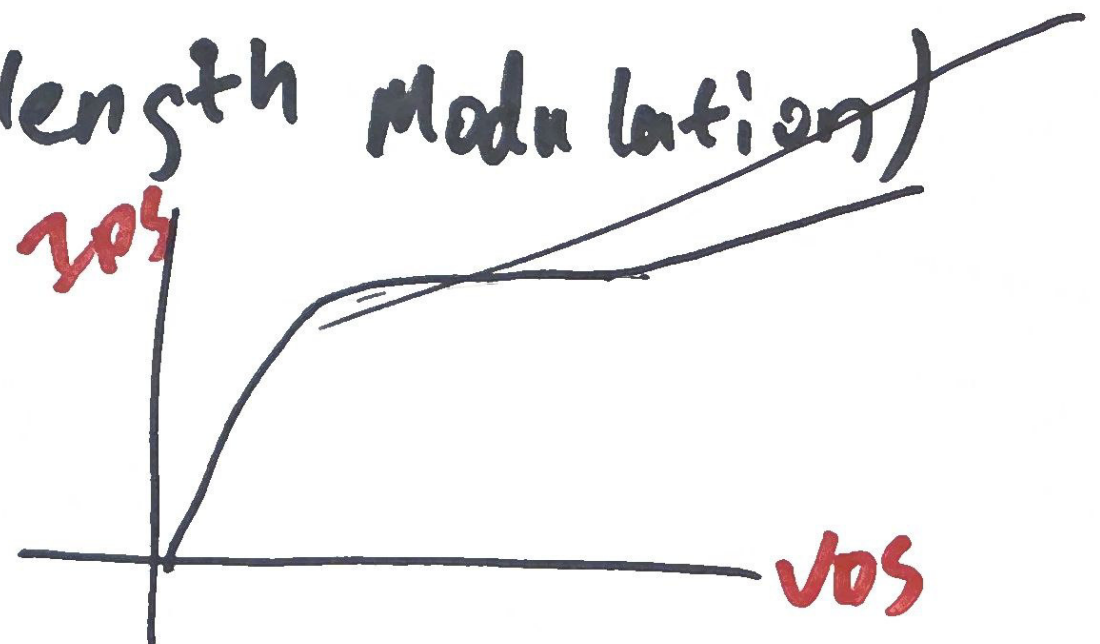
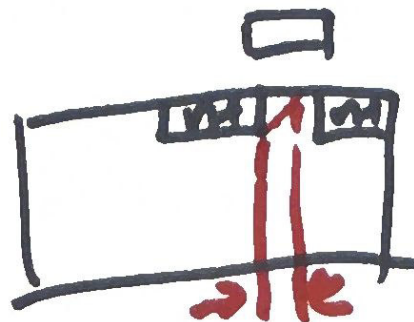
$$K_P n = 120 \mu A/V^2 \quad (K_P n = \mu_n C_{ox} n)$$

CLM parameter

1  $\mu m$  process  
(textbook)

△ CLM (channel length Modulation)

(5)



500nm    180nm.    2nm    28nm

