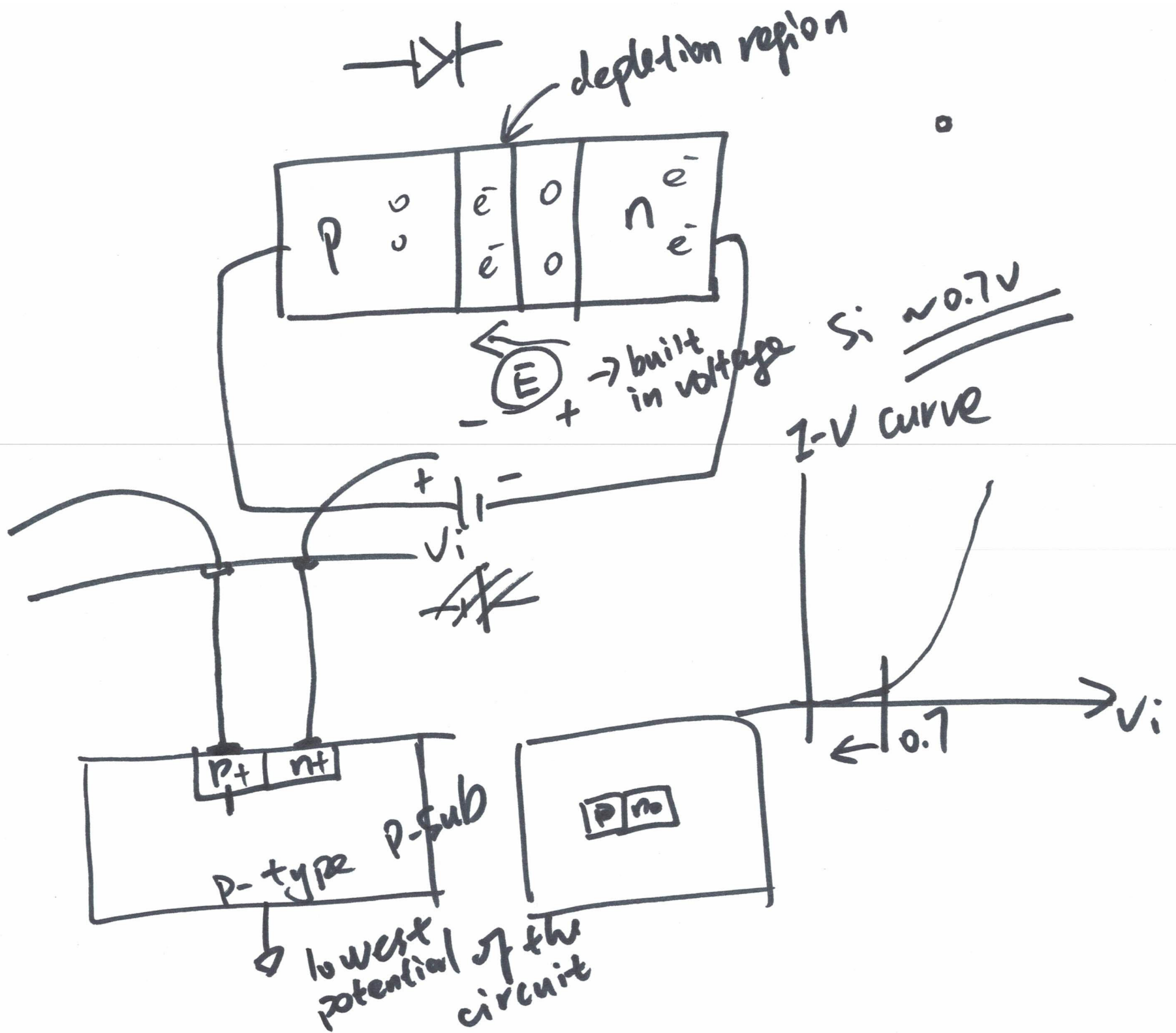
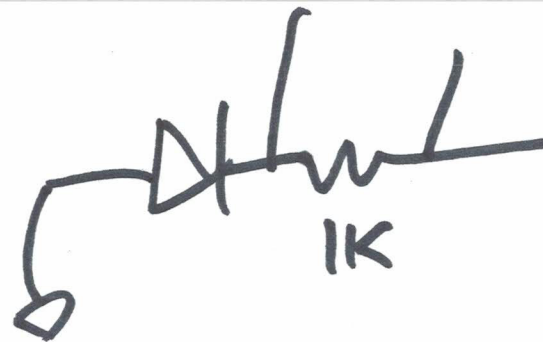
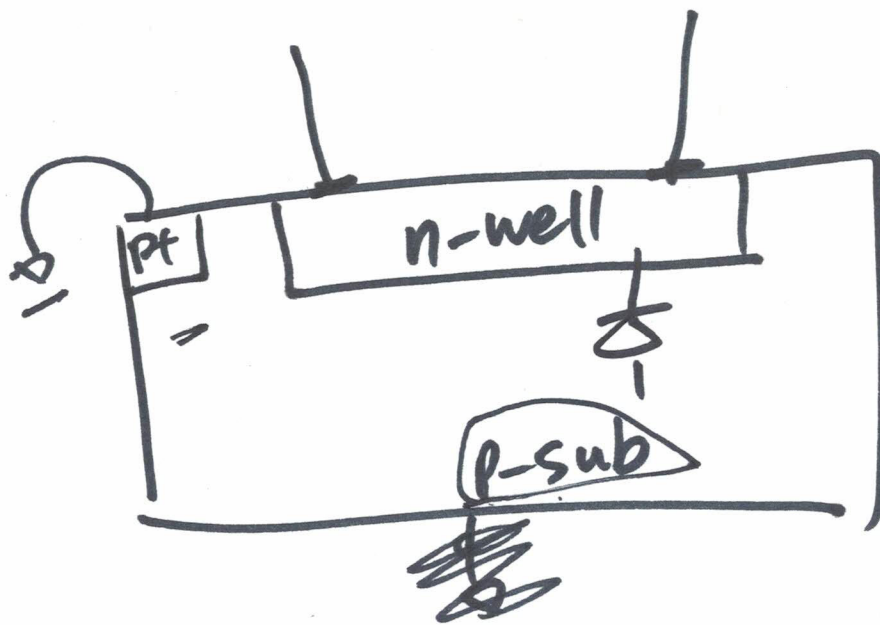
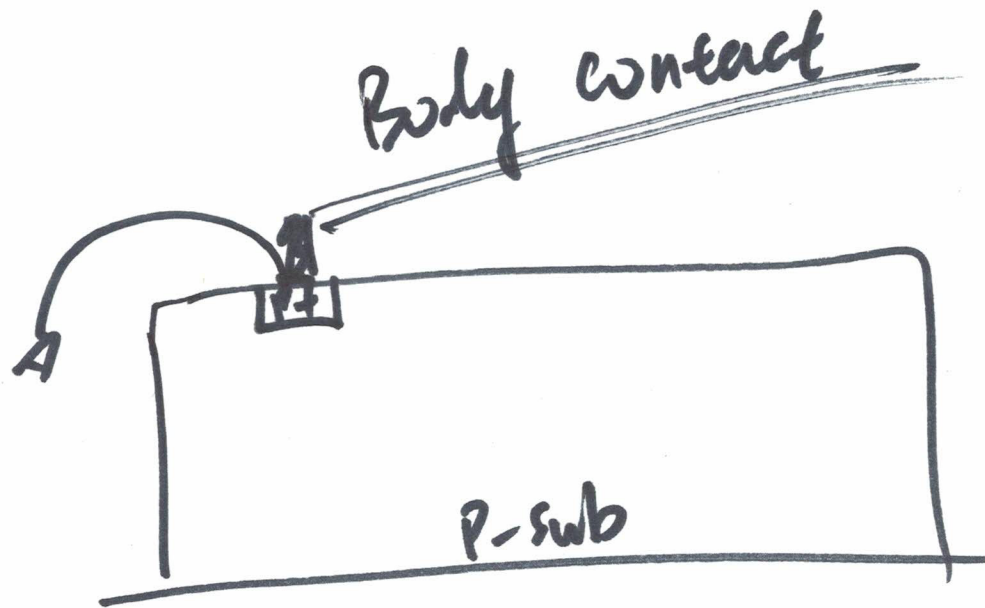
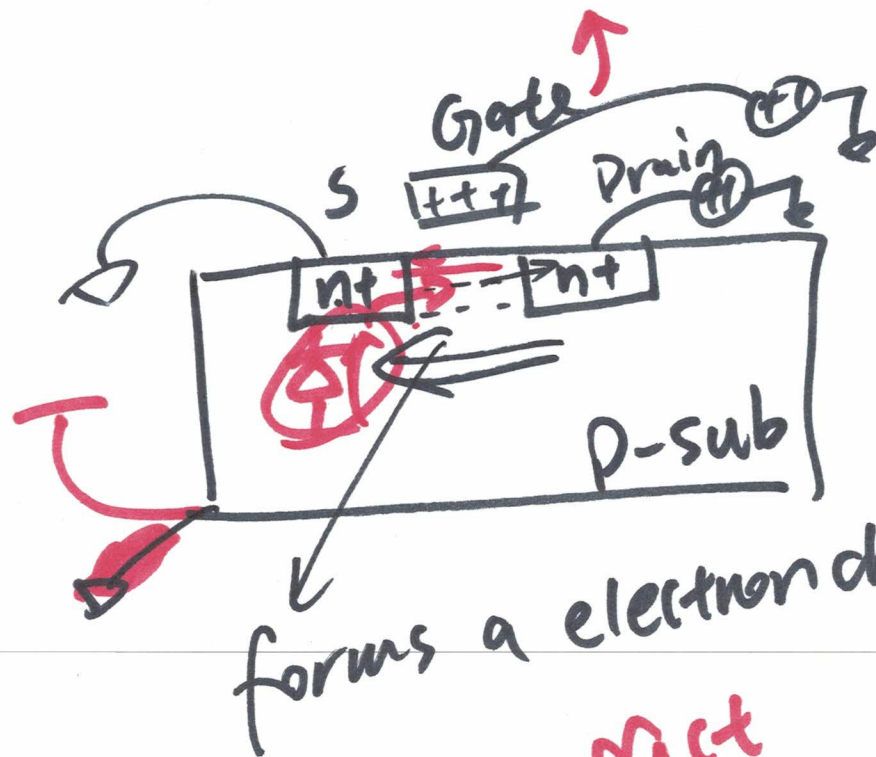




①



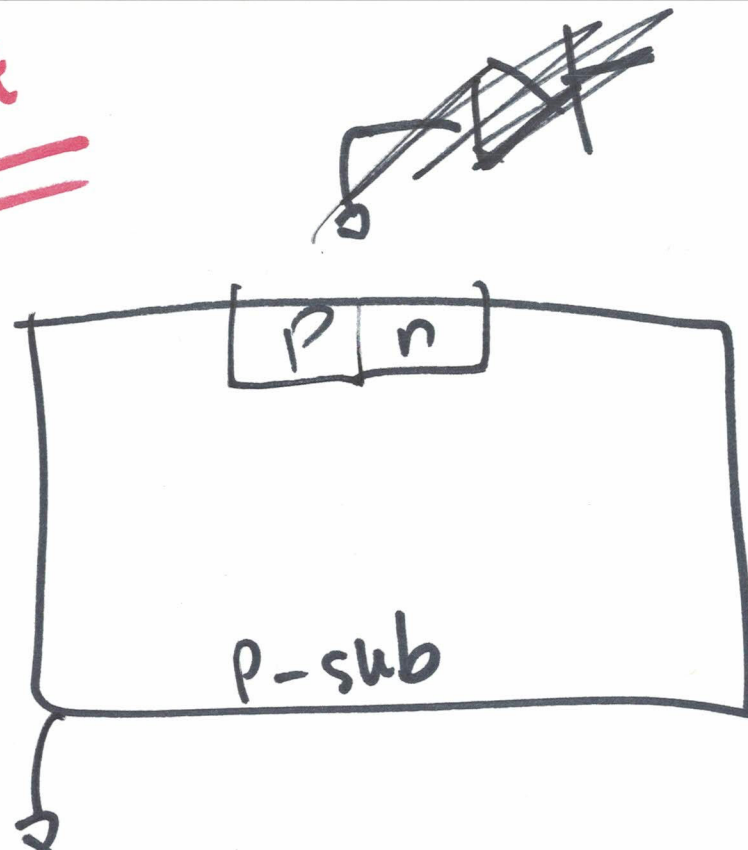
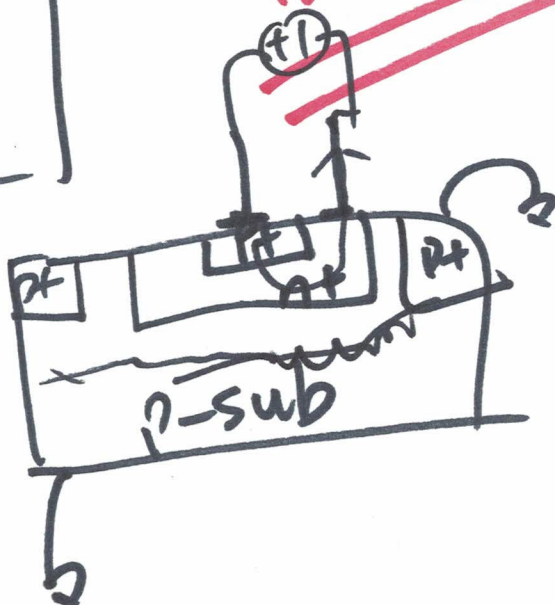
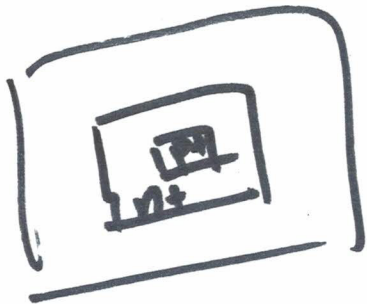
2



Threshold voltage to turn on the NMOS is 0.8V

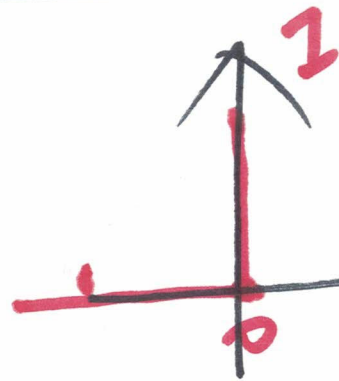
$$V_{GS} > \underline{V_{TH}} \uparrow 1.2V$$

Body effect



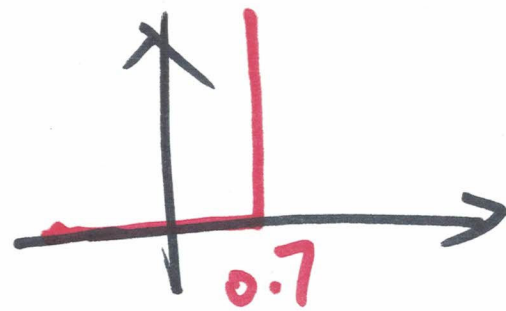
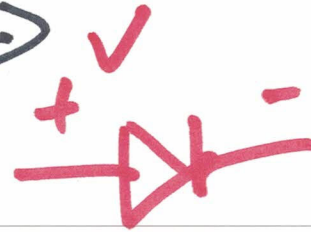
3)

Ideal Diode IV curve

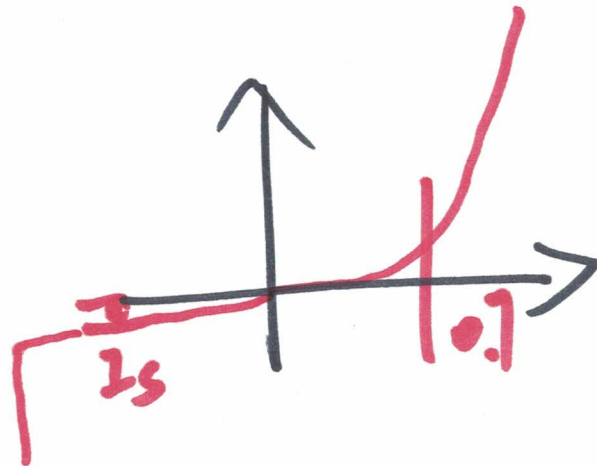


$$v_1 + V - v_2$$

$$v_1 - v_2 = V$$

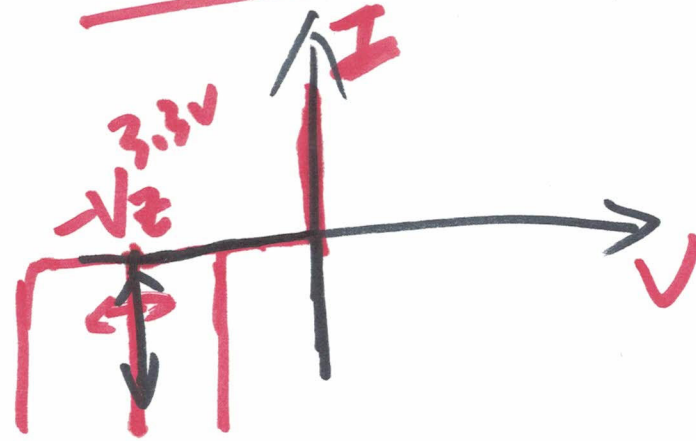


ideal diode with V_b
built in
voltage



regular
diode

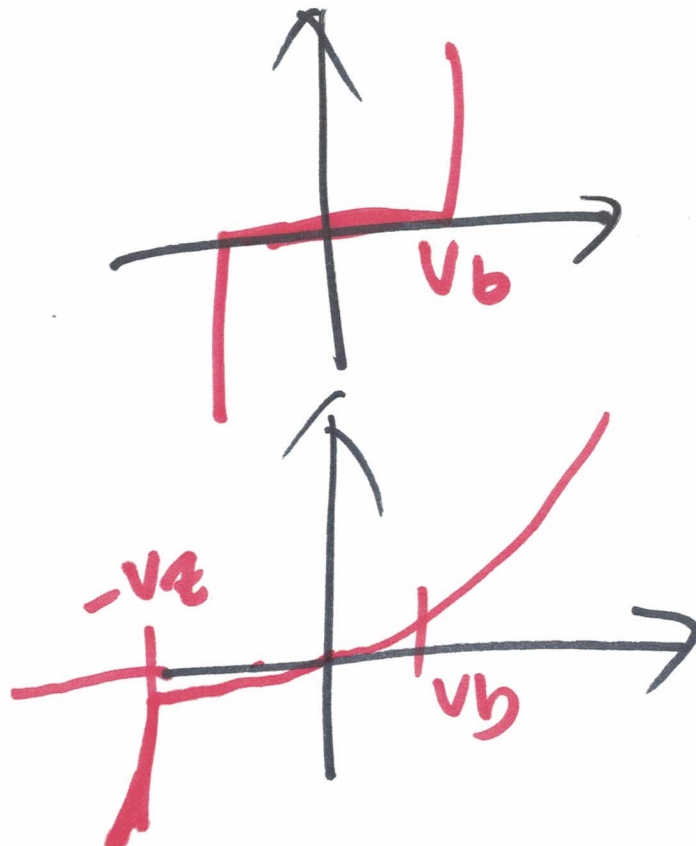
Zener Diode



Ideal Zener Diode

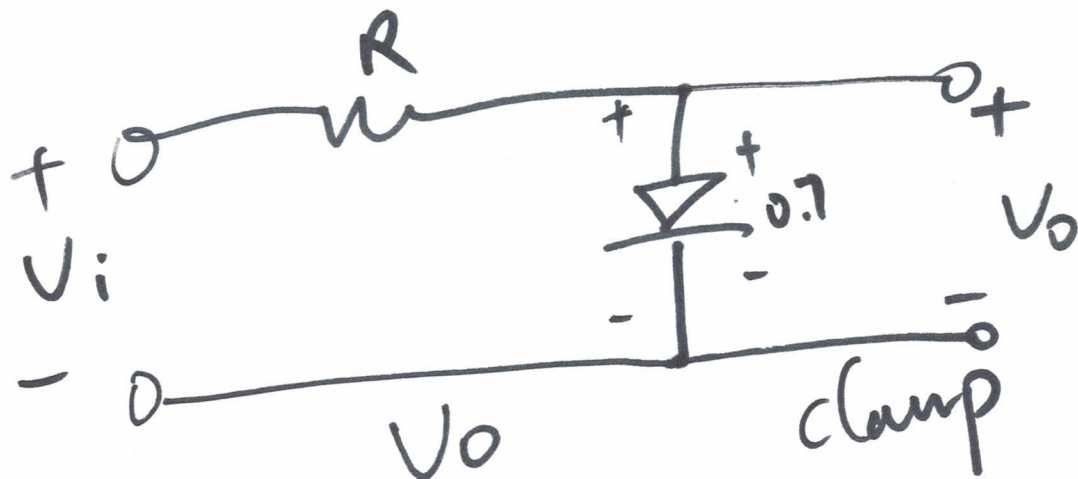


Ideal Zener Diode
with V_b

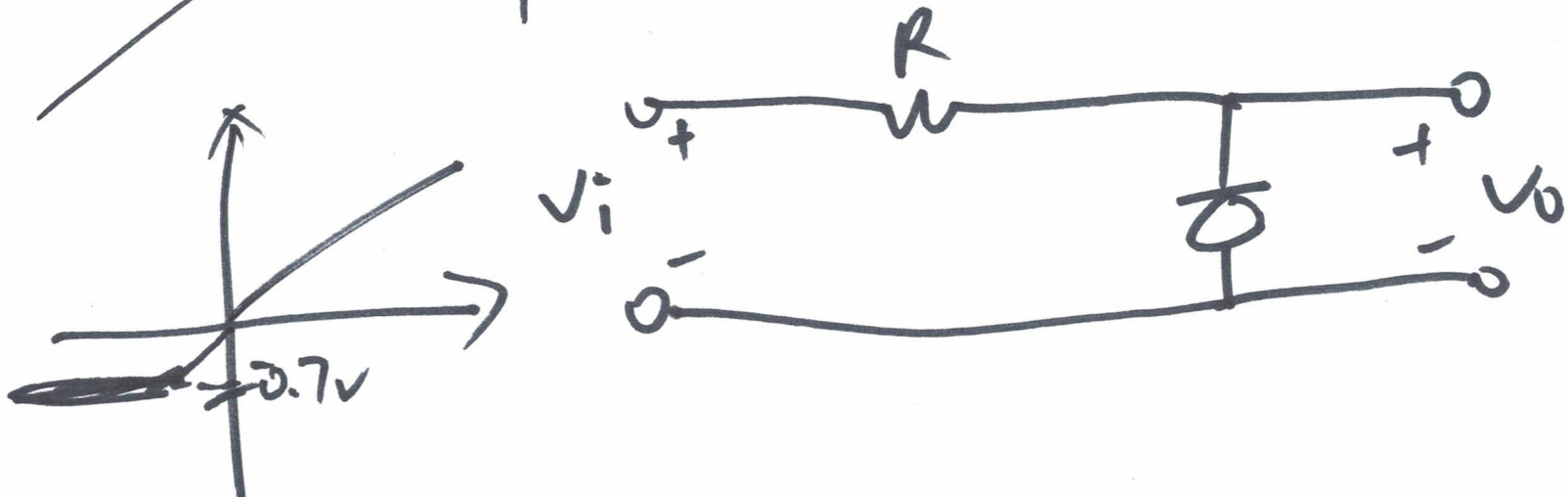
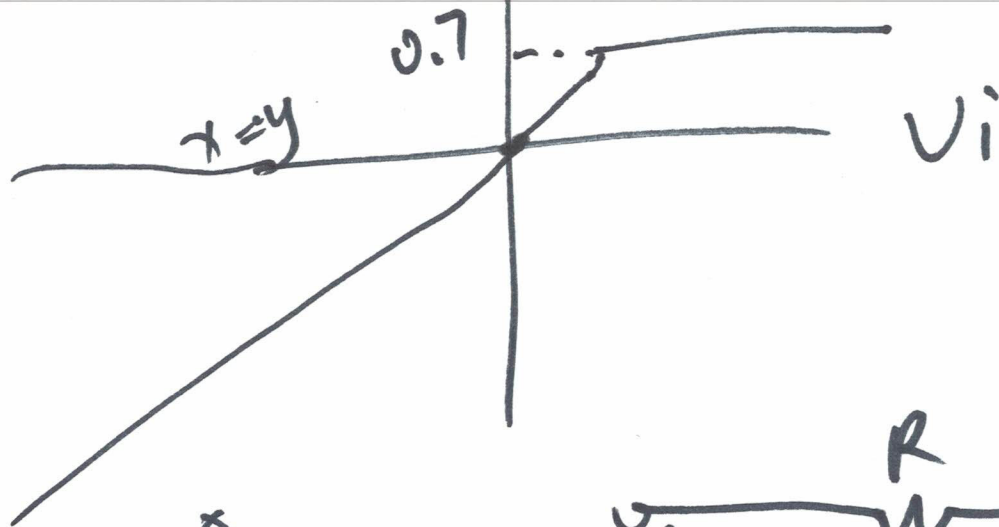
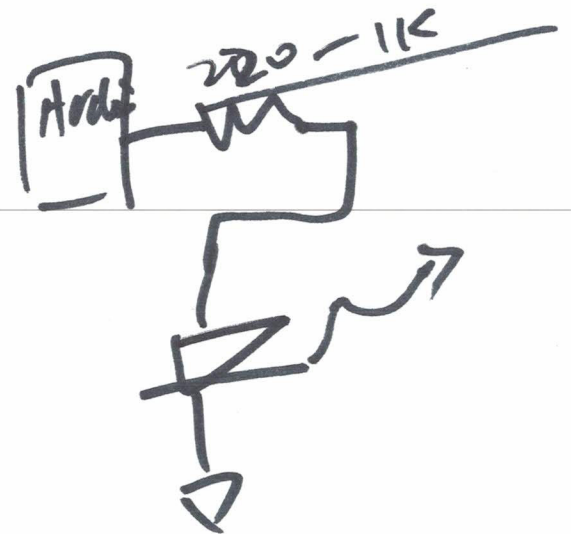


real Zener Diode

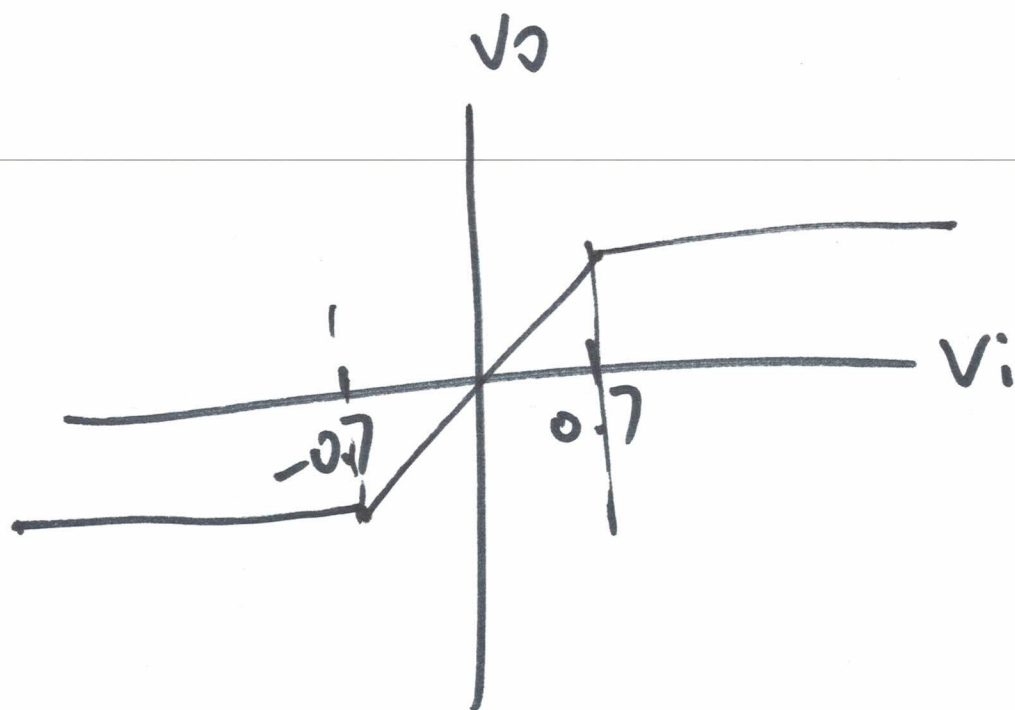
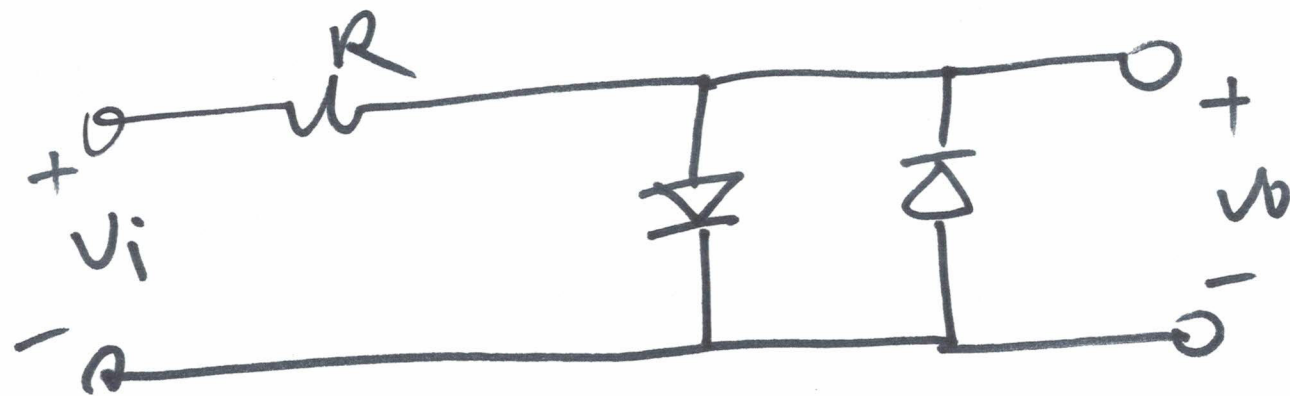
5



real diode
no reverse
breakdown

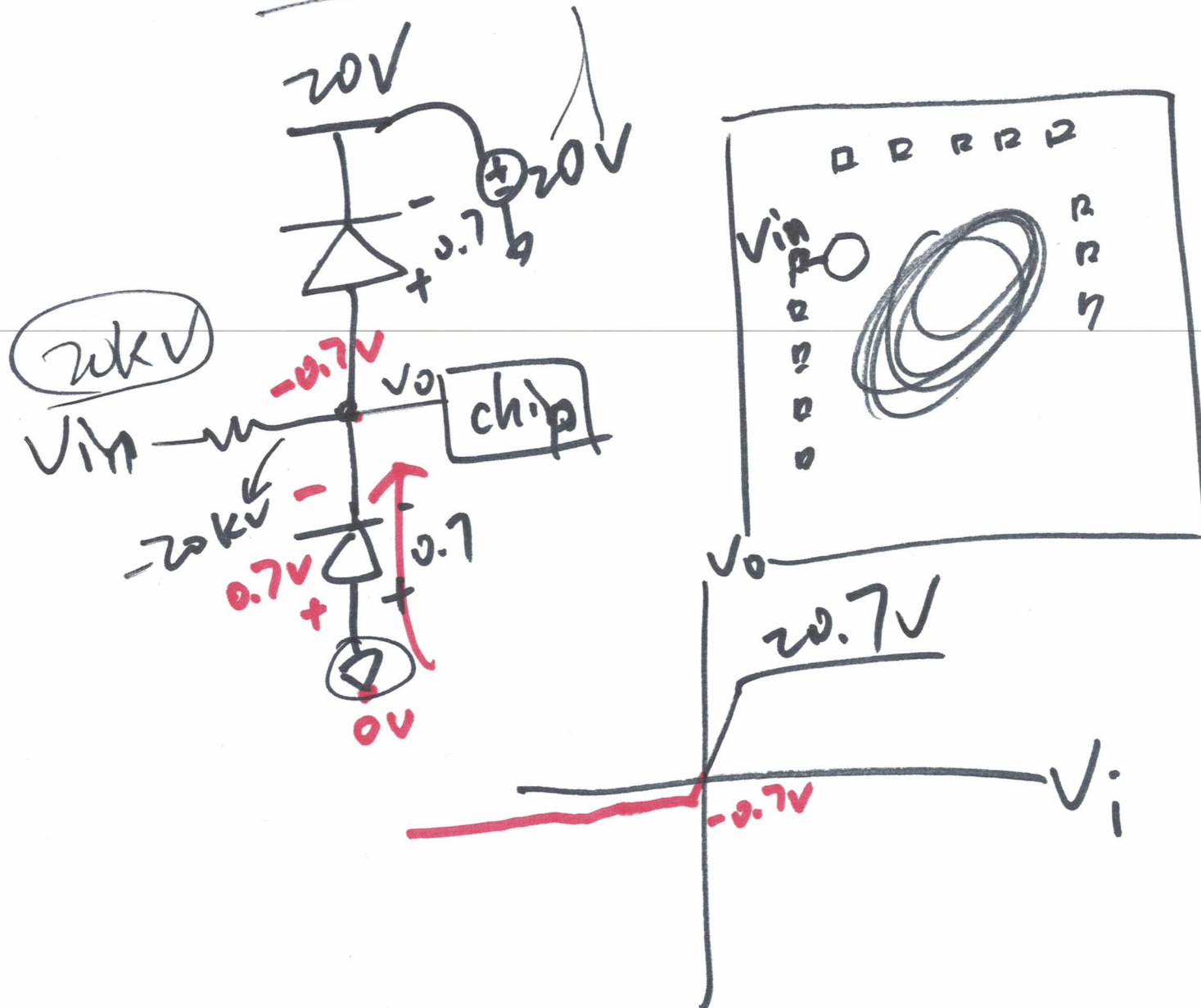


(b)



①

ESD Protection



①