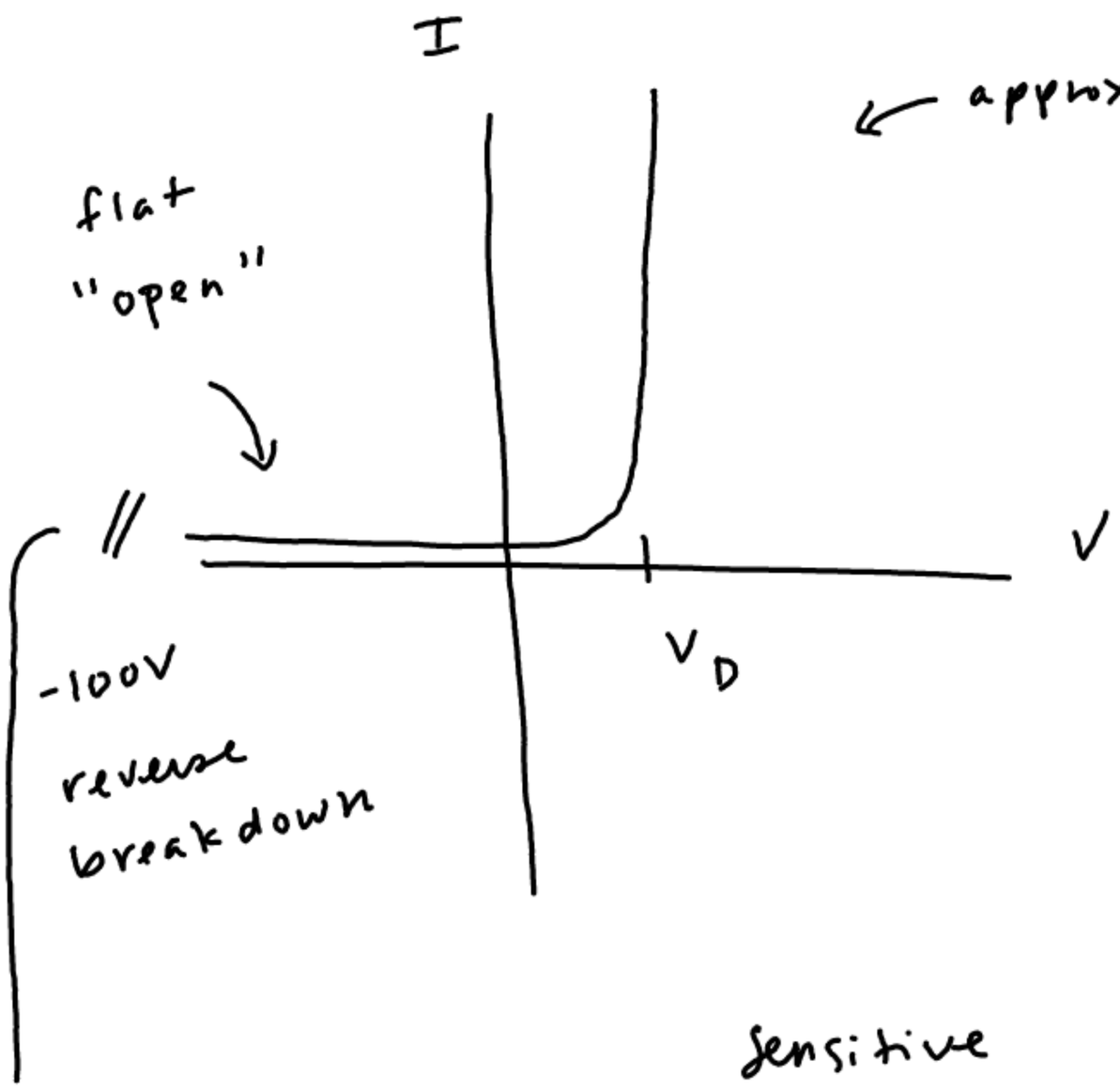
Diodes are nonlinear and asymmetric



← approximately vertical

"on" at $V > V_D$

"off" at $V << V_D$

(like $V < 0$)

narrow turn on region

$0 < V < V_D$

sensitive to temp.

- $V_D \sim 0.6V$ Si diodes
- 1.5 - 3 V LED



$$I(V) = I_0 \left(e^{eV/k_B T} - 1 \right)$$

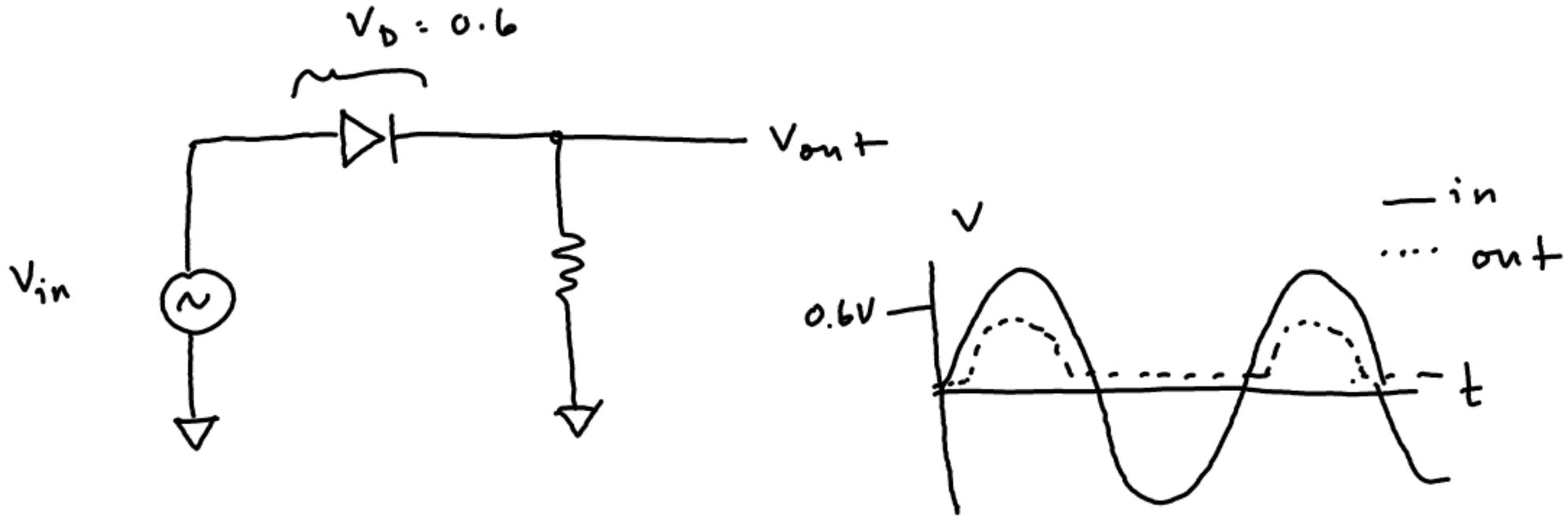
(v. small)

But mostly, we use diodes as an on/off switch where $\Delta V_D = 0.6$ for any non-zero current.

The diode is either open (no current)
or a "wire" w/ 0.6 V drop

Rectifier

makes the voltage always positive



no current :

$V_{in} < 0.6\,V$

$V_{out} = 0$

current flows :

$V_{in} > 0.6\,V$

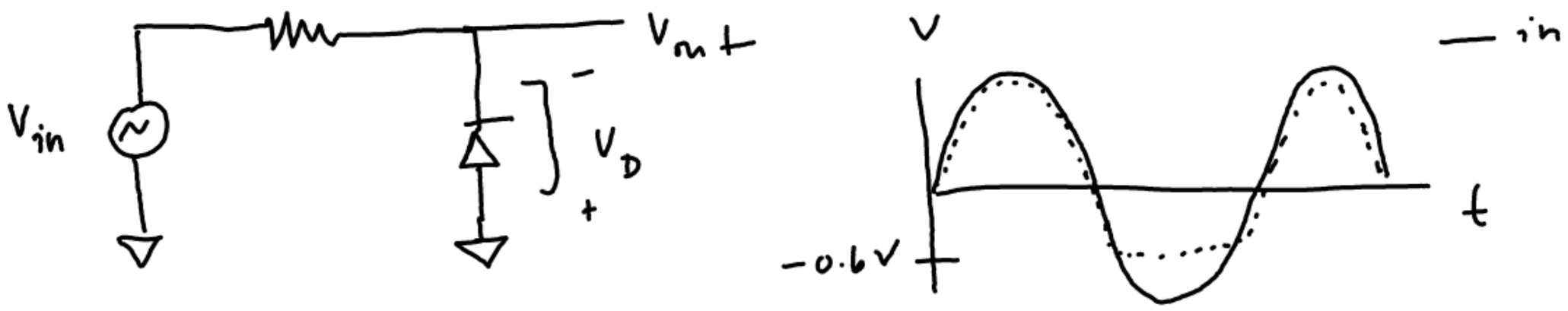
$V_{out} = \Delta V_R$

$V_{in} = 0.6V + \Delta V_R$

$V_R = V_{out} = V_{in} - 0.6V$

Clamp / Clipper

circuit protection
(avoid component limits)



No current :

$V_{out} > -0.6\,V$

current flows :

$V_{out} \leq -0.6\,V$