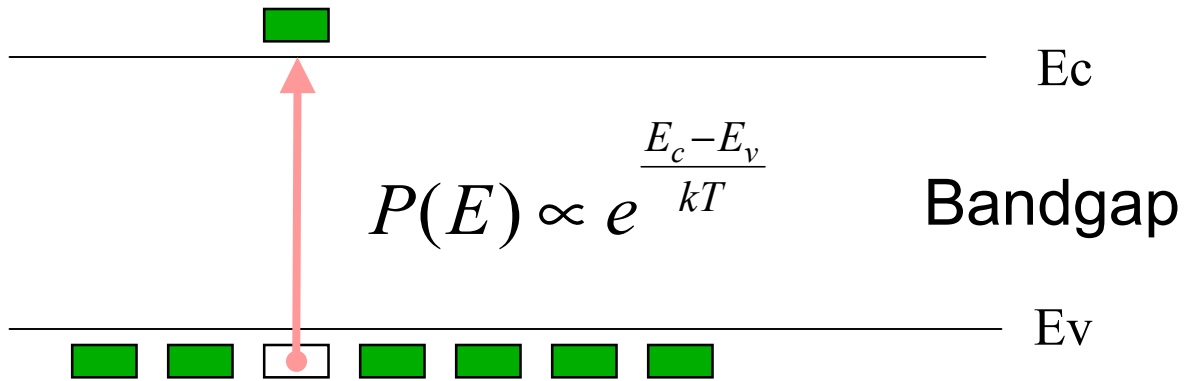


Silicon Photoreceptors

From Photons to Electrons



Energy: $h\nu = hc / \lambda = 1.24 / \lambda(\mu)$ in eV

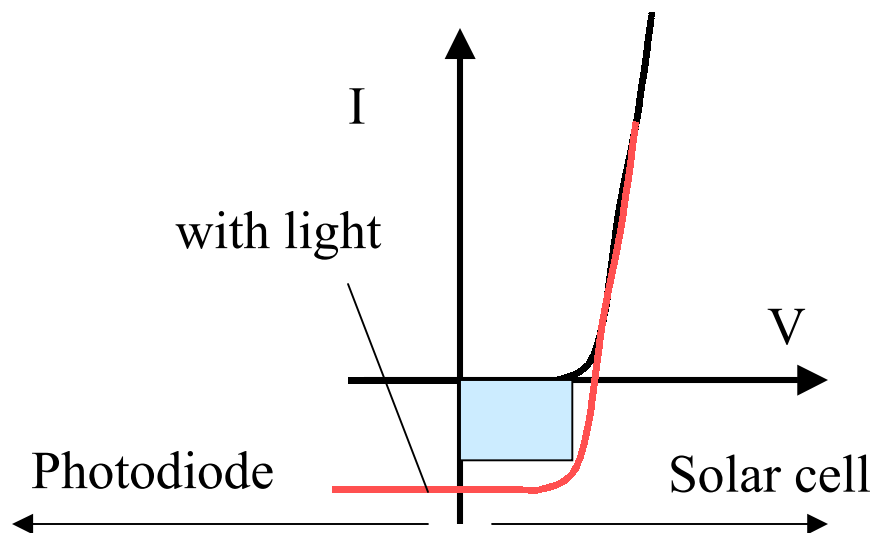
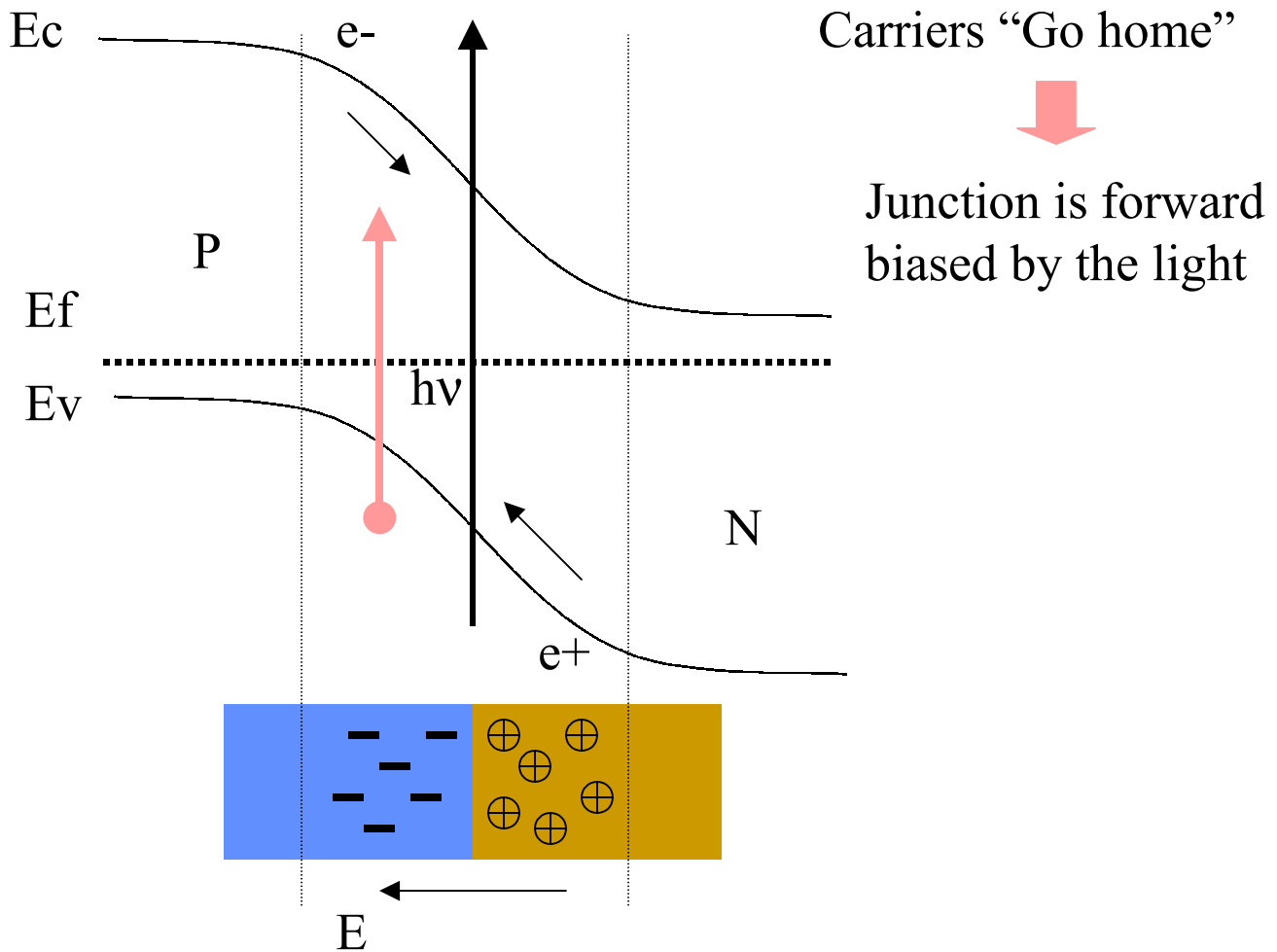
$h\nu = E_g = 1.1 \text{ eV}$ for Si

Green $0.55 \mu \sim 2.5 \text{ eV}$

Red $0.7 - 0.8 \mu \sim 1.7 \text{ eV}$

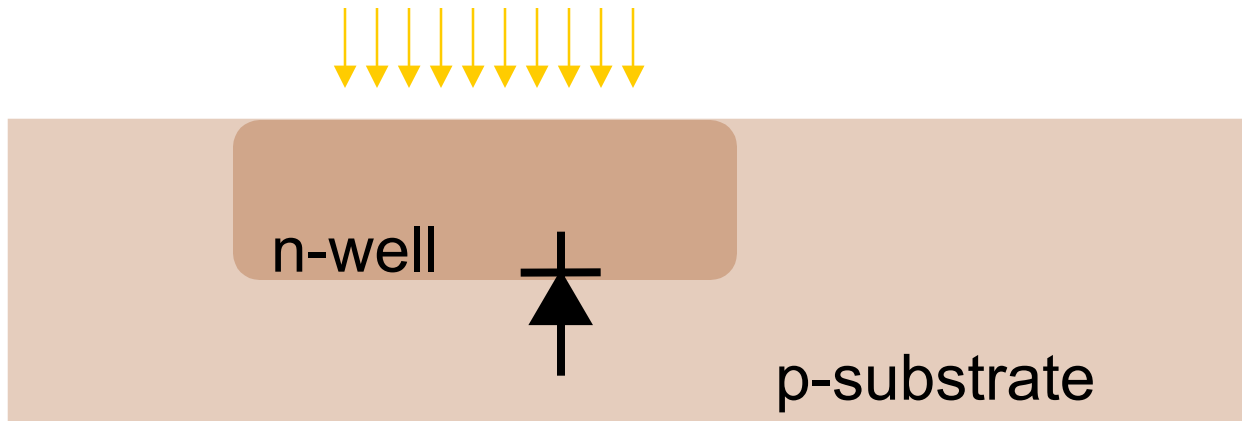
GaAs LEDs $0.86 \mu \sim 1.3$

PN junction under illumination

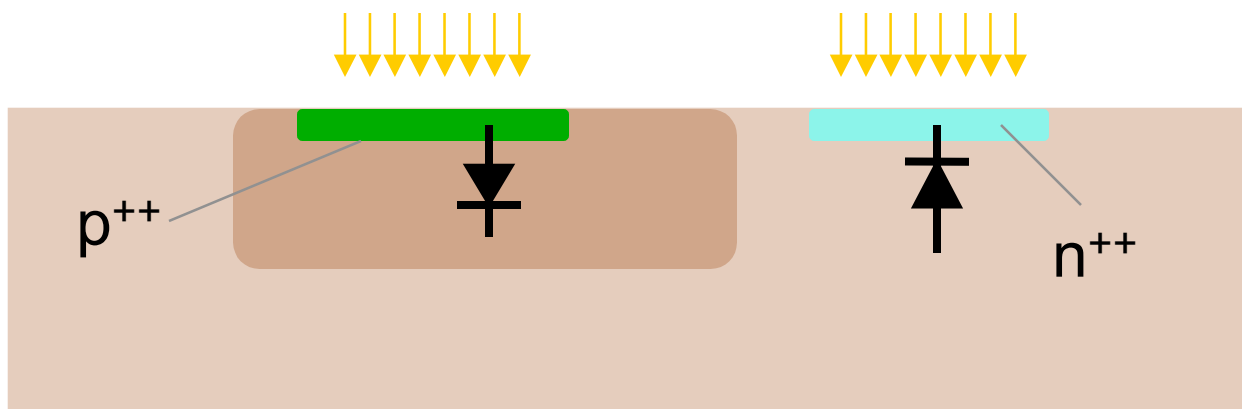


Photosensitive structures (I)

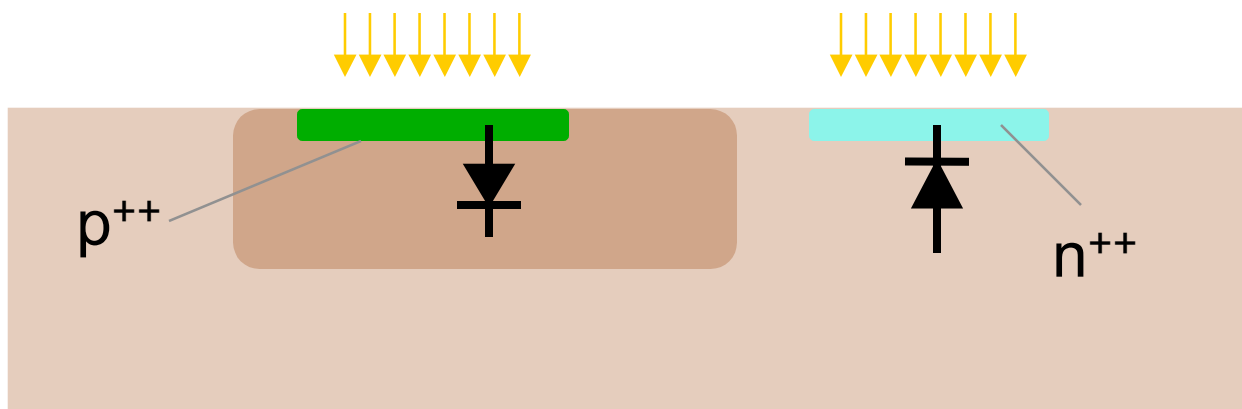
n-well / p-sub diode



n-well / p-diff diode

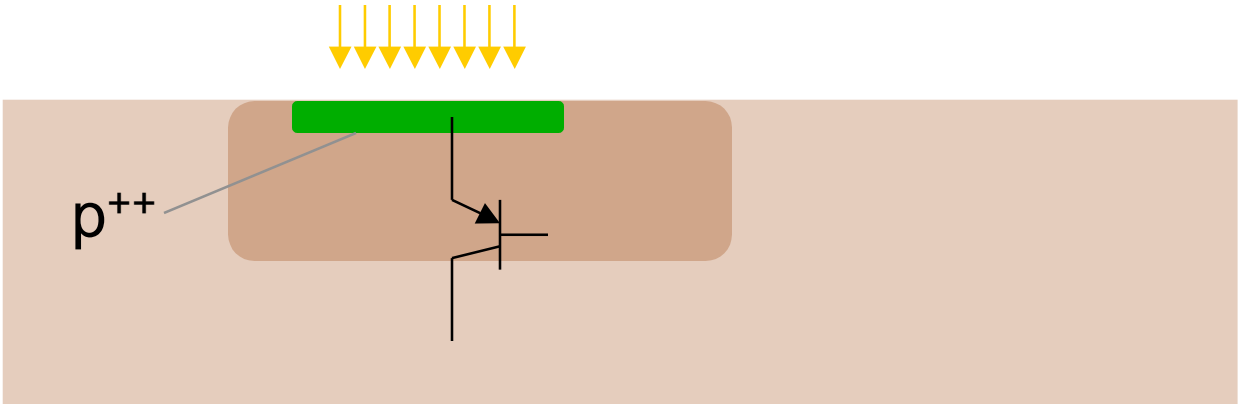


n-diff / p-sub diode

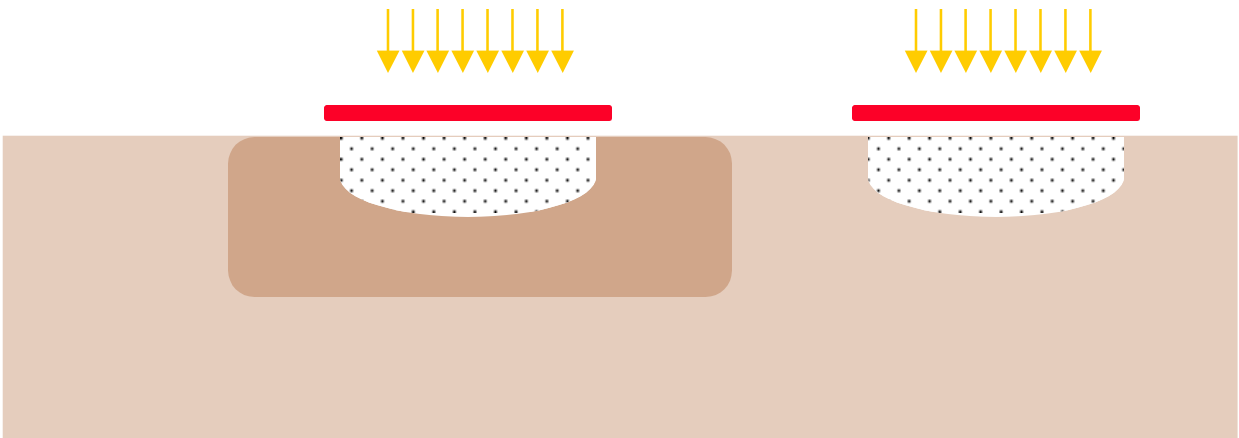


Photosensitive structures (II)

p-diff / n-well / p-sub bipolar

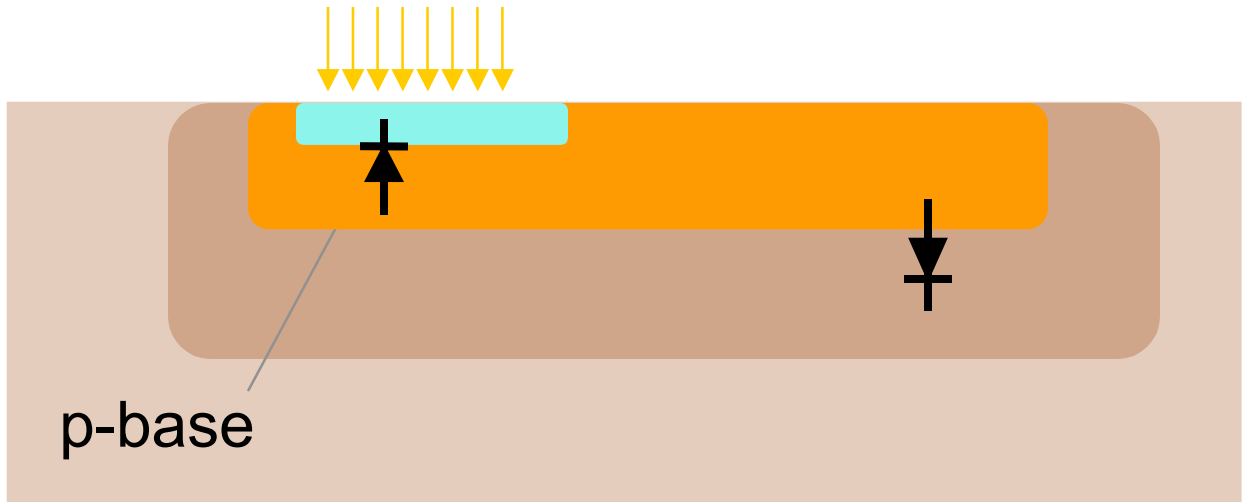


photogate

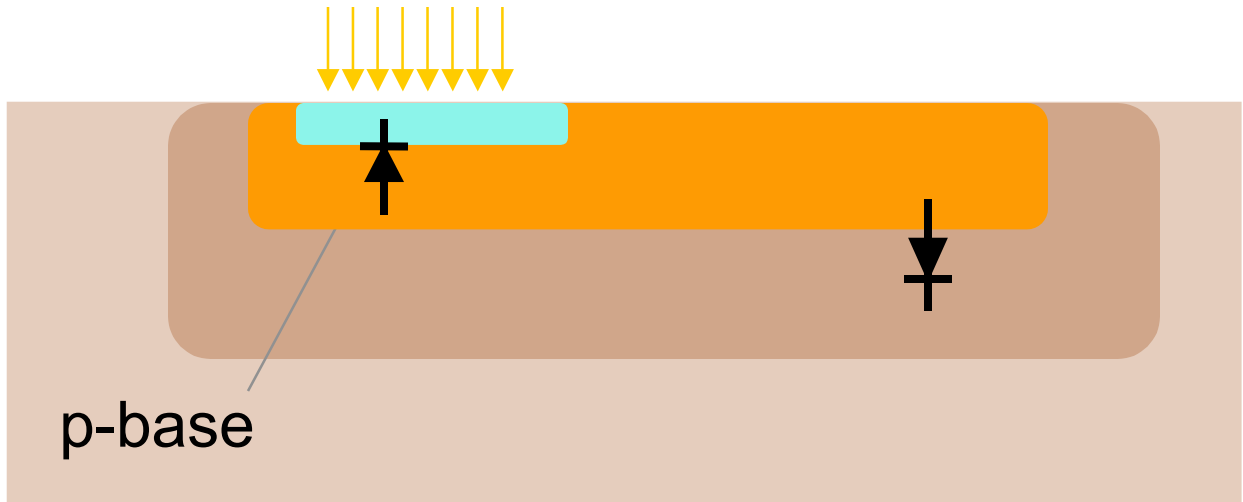


Photosensitive structures (III)

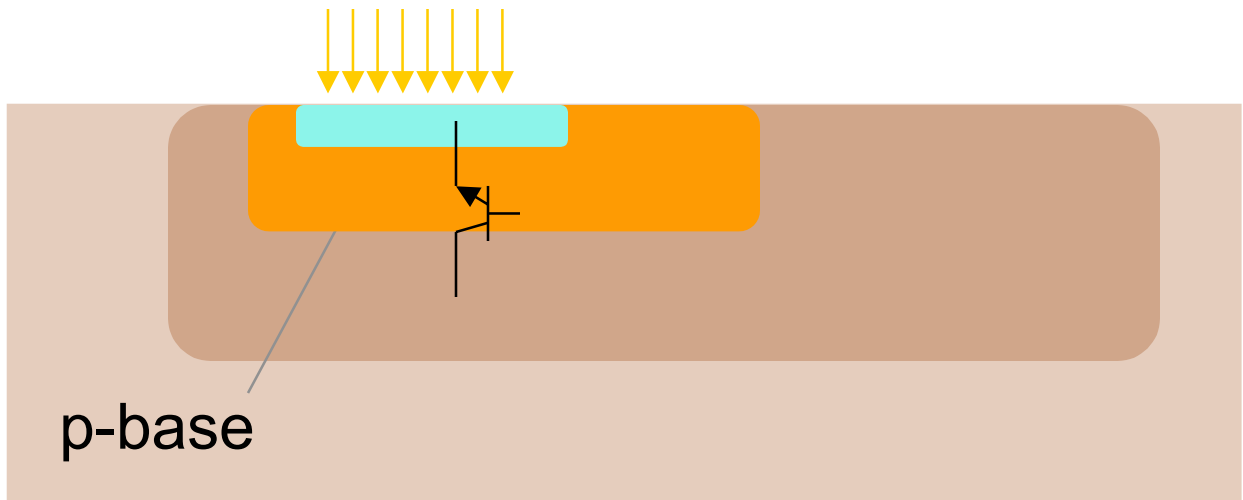
n-diff / p-base diode



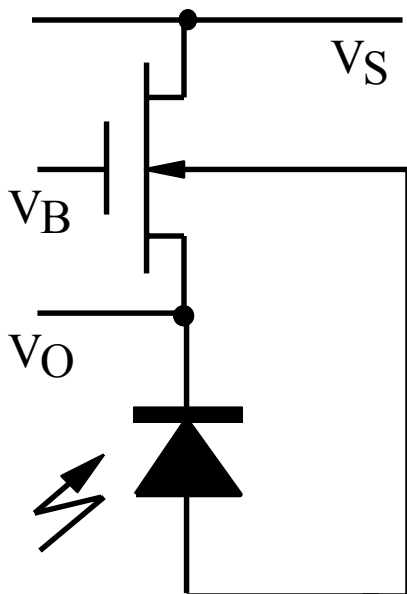
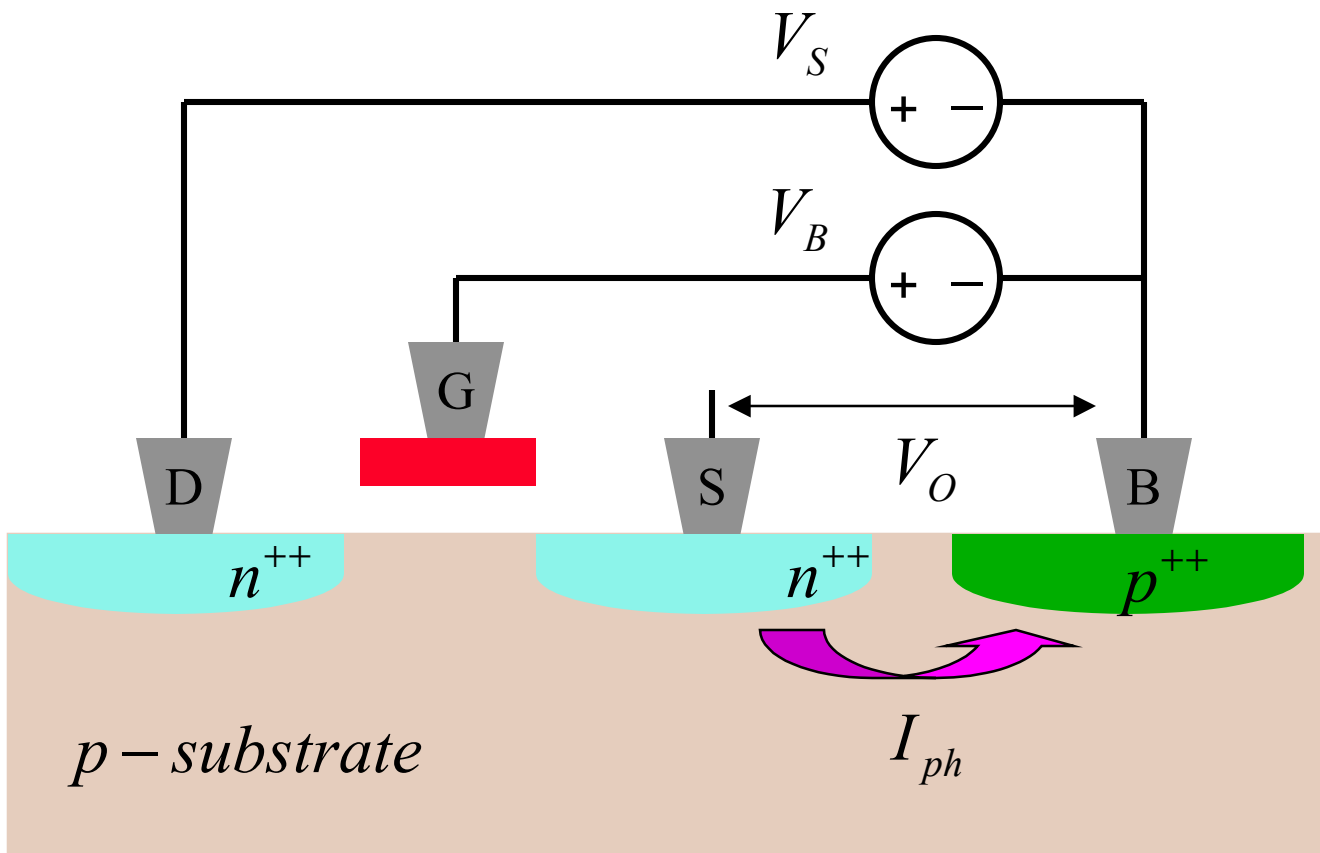
n-well / p-base diode



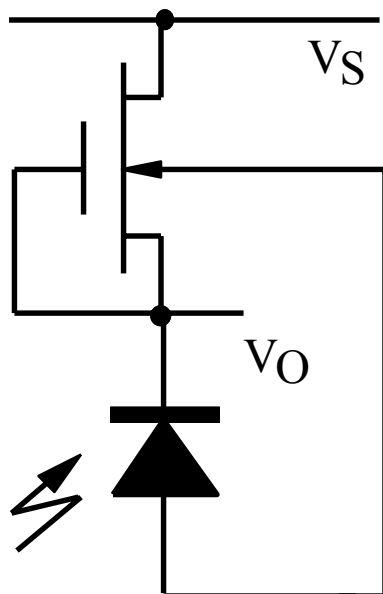
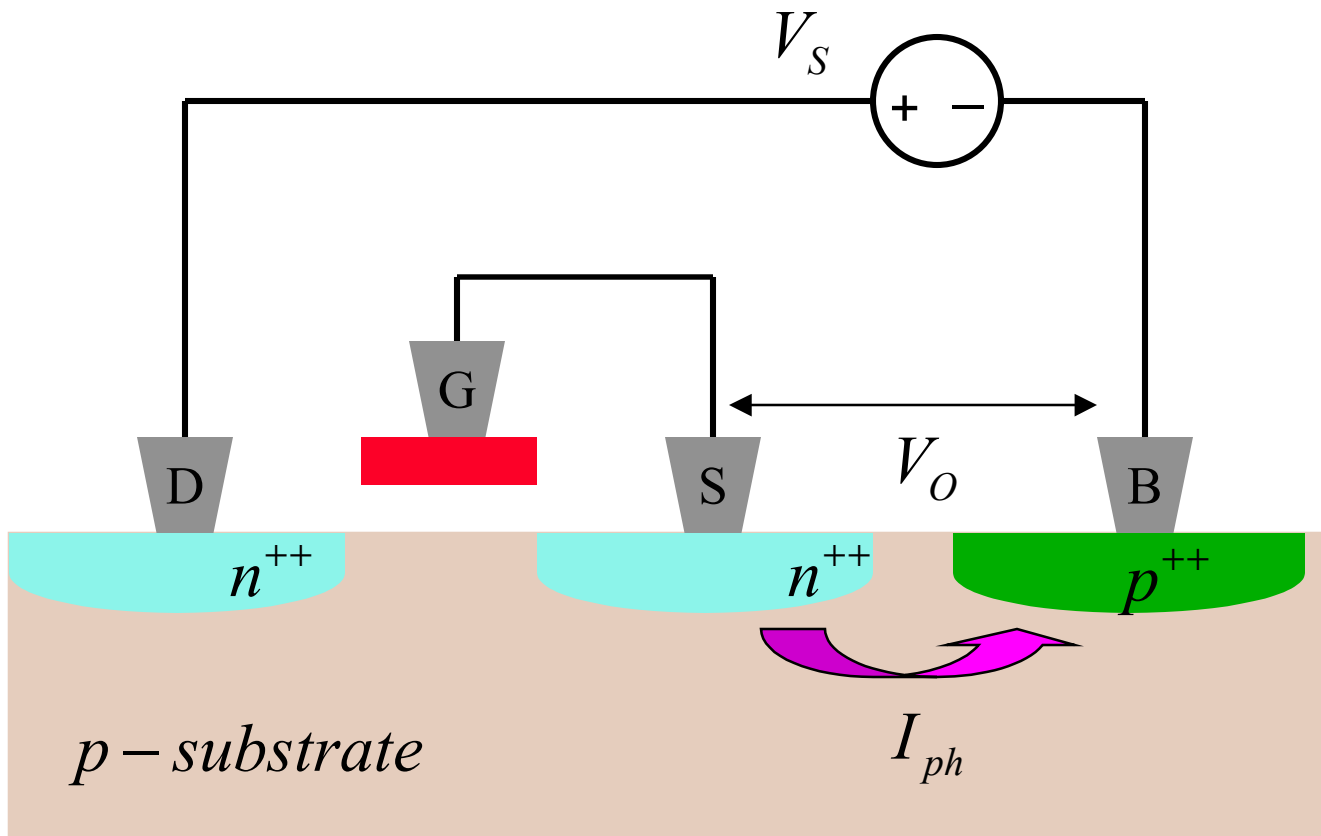
n-diff / p-base / n-well bipolar



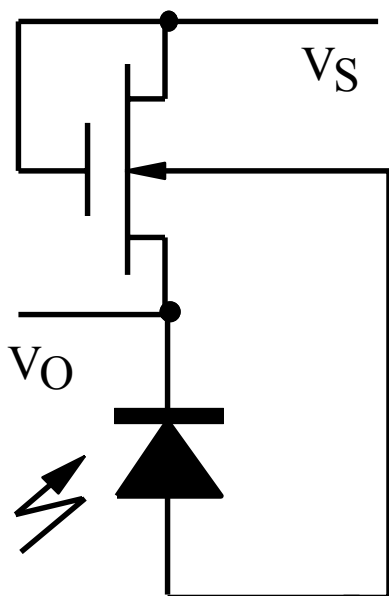
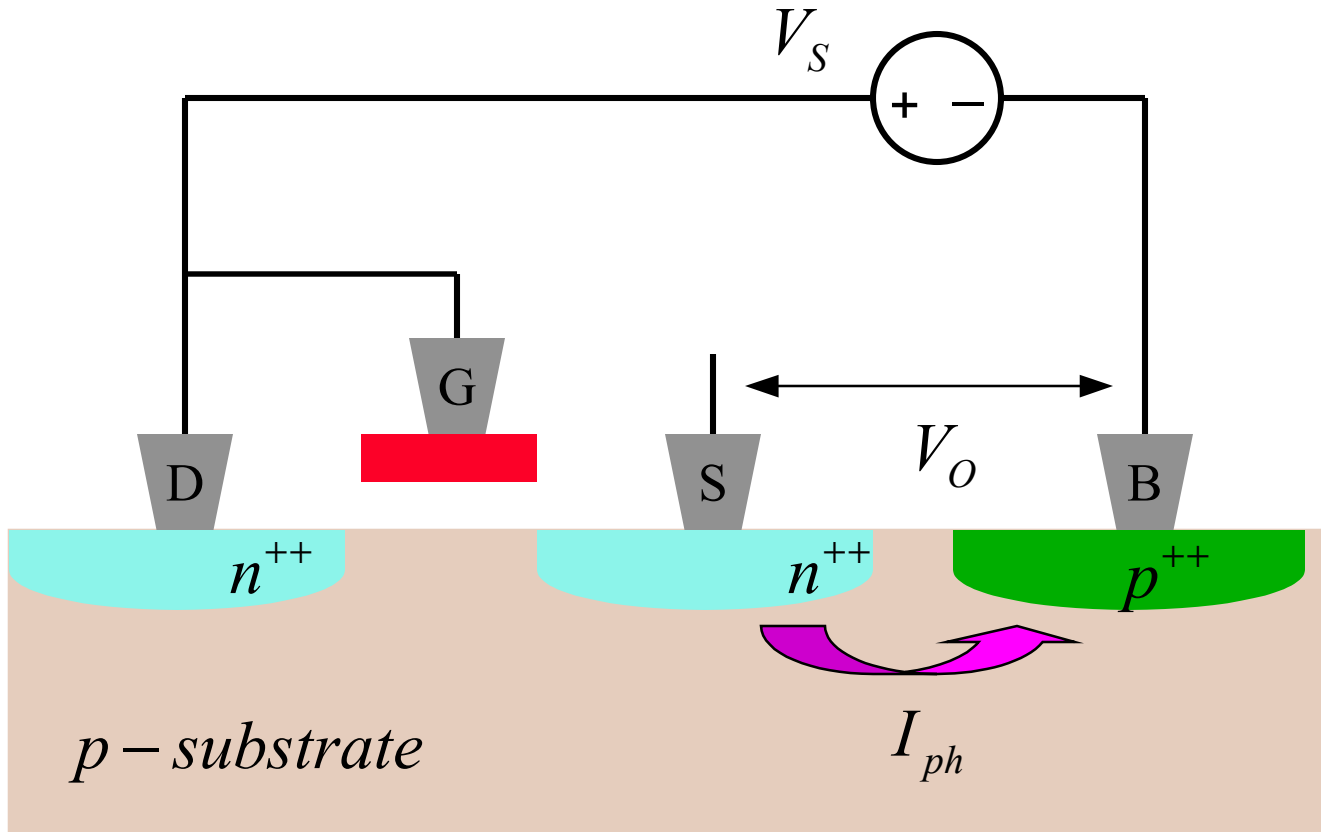
CMOS Logarithmic Photoreceptor (I): Source Follower



CMOS Logarithmic Photoreceptor (II): Zero-threshold MOS Load



CMOS Logarithmic Photoreceptor (III): Diode Connected Load



Adaptive Logarithmic Photoreceptor: Tobi Photoreceptor

