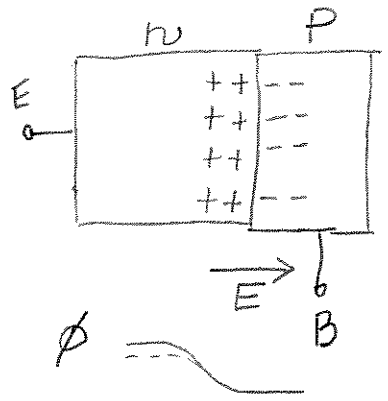
Bipolar Transistor

Emitter-Base jnt.



potential for electron

diffusion els. →

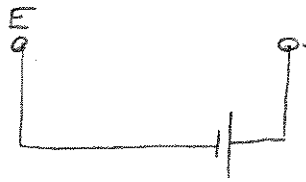
← drift els.

current ←

Current →

$j \propto e^{-\beta \Delta \phi}$

$j \propto$ const.



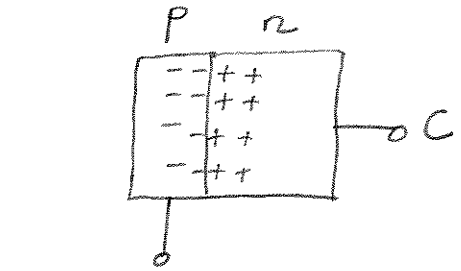
forward bias

dashed line above

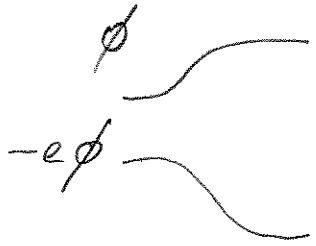
"diffusion" increases

current increases ← high to low $V_{applied}$ ✓

Base - Collector jnt.



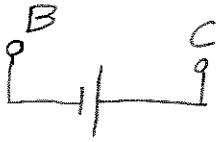
← E



← diffusion → current

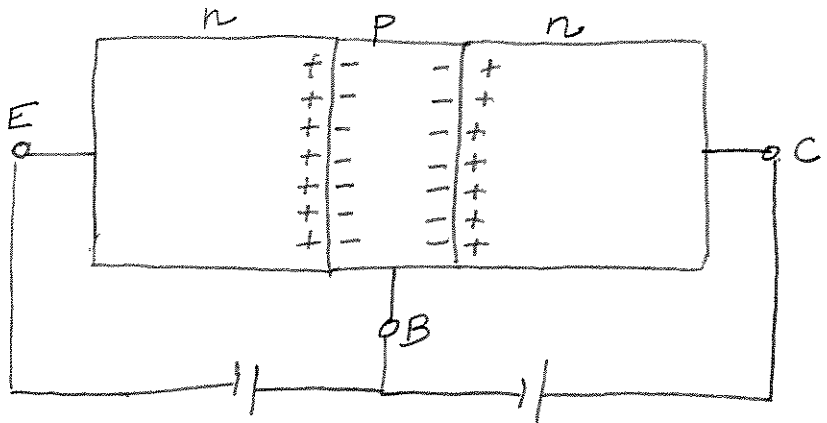
→ drift ← current

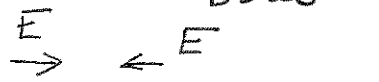
any els. in p depletion region will be swept away to collector by $\vec{E}$ field

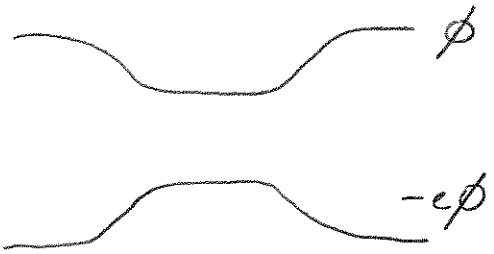


reverse bias suppresses drift current

Full picture:





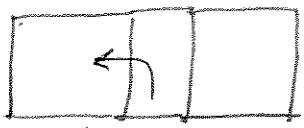


diffusion → drift

← current

$j_{diffusion} \propto e^{\beta V_{BC}}$

Also,



holes, but n of emitter more heavily doped also re combination of e^- & holes in base → make base thin.