

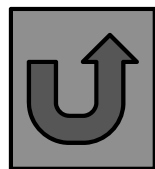
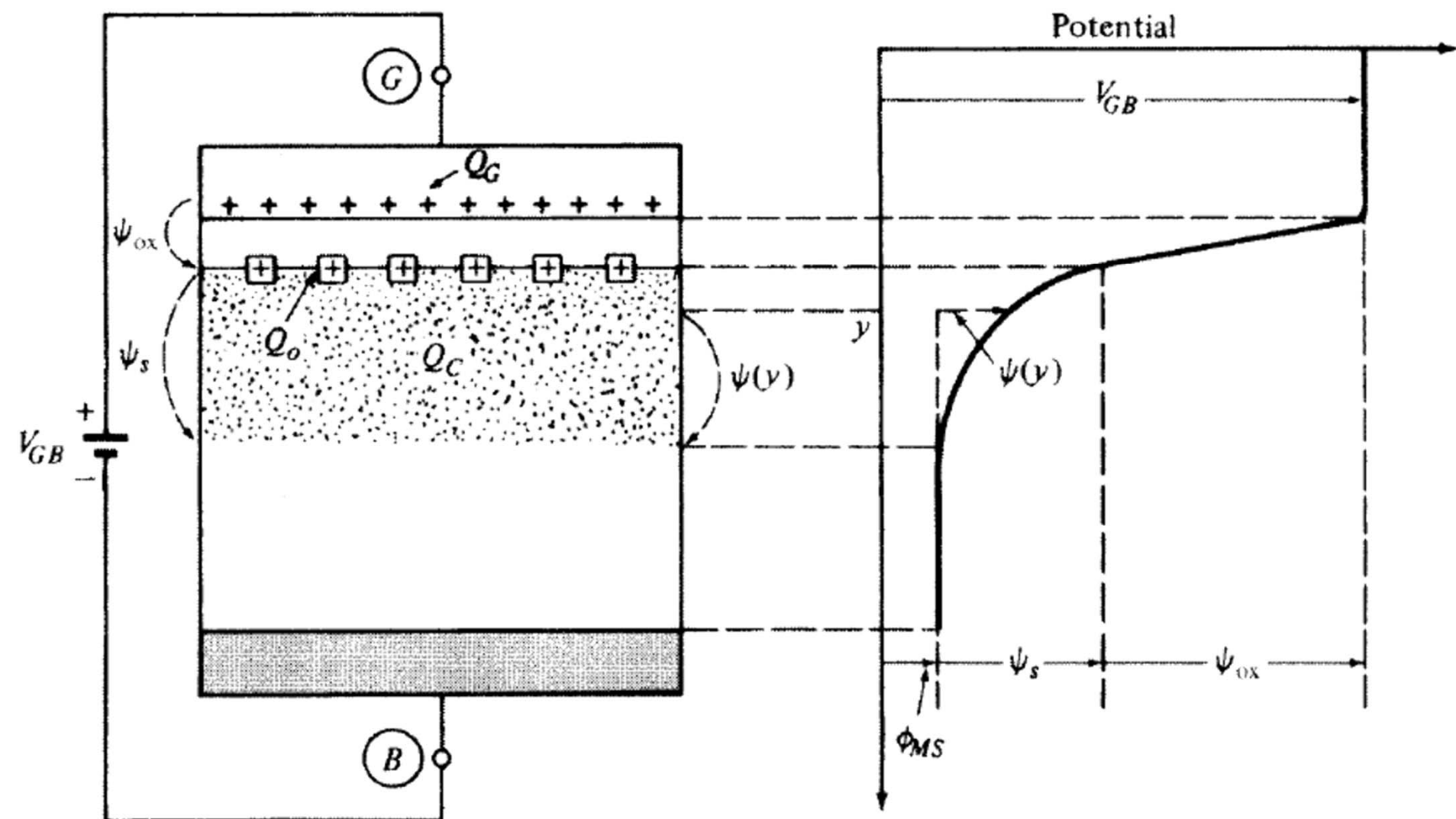
Potential Balance and Charge Balance



Potential Balance and Charge Balance

- What happened if $V_{GB} \neq V_{FB}$
- Four type of voltage drop:
 - The voltage of the external source V_{GB}
 - The potential drop across the oxide ψ_{ox}
 - The surface potential ψ_s
 - Several contact potentials. Their sum, when going clockwise, is Φ_{MS}

$$V_{GB} = \psi_{ox} + \psi_s + \Phi_{MS}$$



Potential Balance and Charge Balance...

- If there is a change in V_{GB}

$$\Delta V_{GB} = \Delta \psi_{ox} + \Delta \psi_s$$

- Charge in the system

- The charge on the gate, Q_G
- The effective interface charge, Q_o
- The charge in the semiconductor under the oxide, Q_C
- Charge neutrality $\rightarrow Q_G + Q_o + Q_C = 0$
- If there is charge variation due to V_{GB} variation as Q_o is constant we have:

$$\Delta Q'_G + \Delta Q'_C = 0$$

