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p type metal-oxide-semiconductor (MOS) at threshold voltage

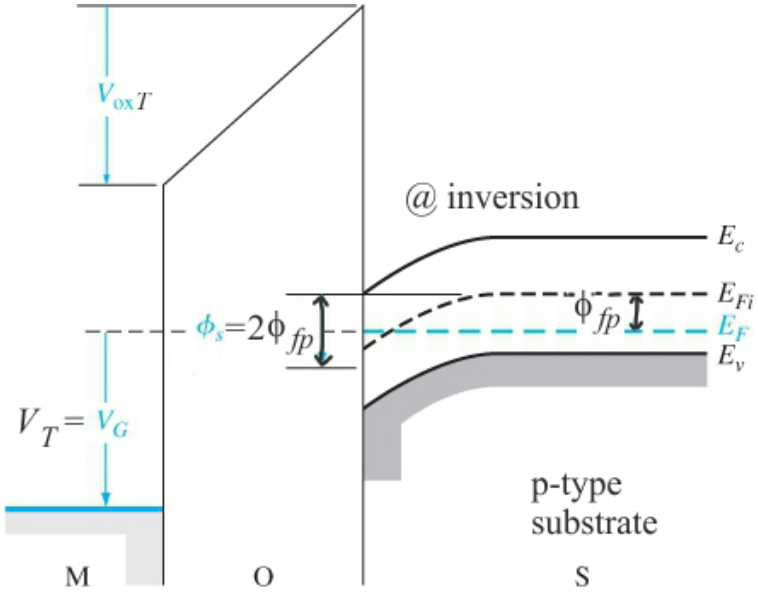

Figure 10.20 | Energy-band diagram through the MOS structure with a positive applied gate bias.

- Set gate voltage to achieve inversion of substrate, i.e., $V_G = V_T$.
- Note, E_{Fi} in substrate is bent so that surface potential is $\phi_s = 2\phi_{fp}$.

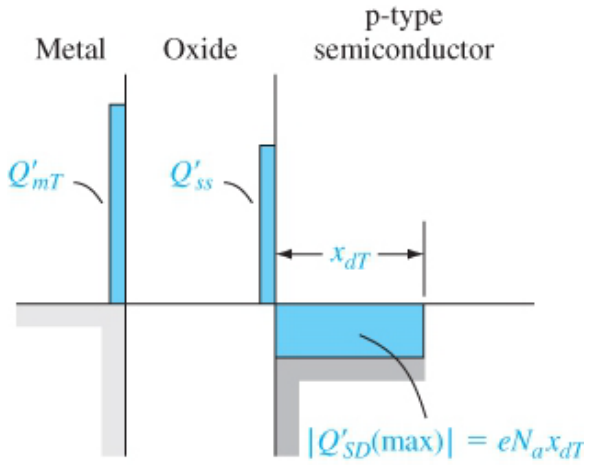

Figure 10.19 | Charge distribution in a MOS capacitor with a p-type substrate at the threshold inversion point.

- $Q'_{mT} \equiv$ charge density (C/m^2) build-up on the metal gate at threshold.
- Note, in addition to Q'_{ss}, we now have the charge density in the depletion layer at threshold $|\, Q'_{SD}(\max)\,|$