

"Physics of Semiconductor Devices"

S.M.Sze

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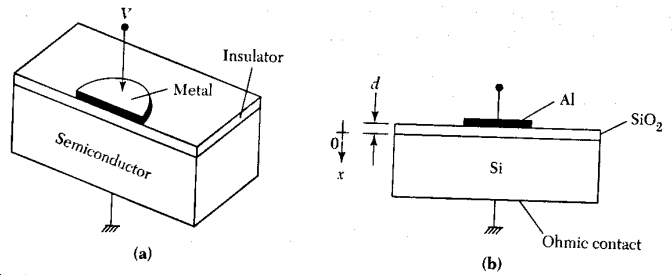


Fig. 1 (a) Perspective view of a metal-oxide-semiconductor (MOS) diode. (b) Cross-section of an MOS diode.

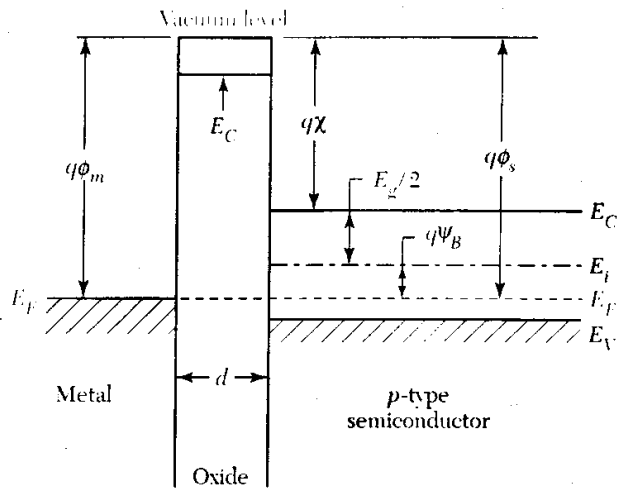


Fig. 2 Energy band diagram of an ideal MOS diode at  $V = 0$ .

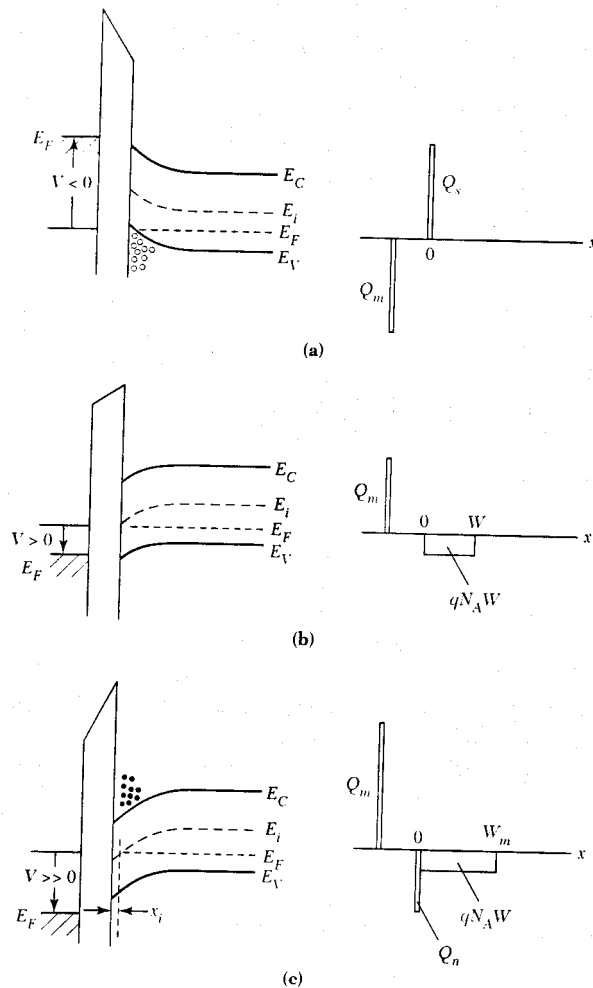
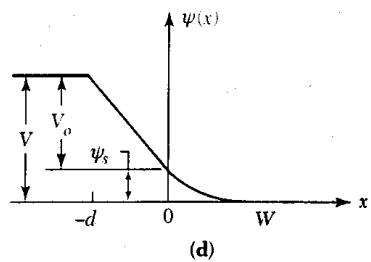
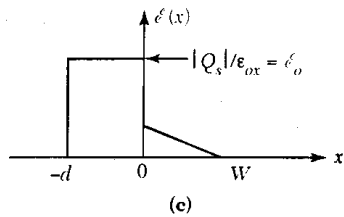
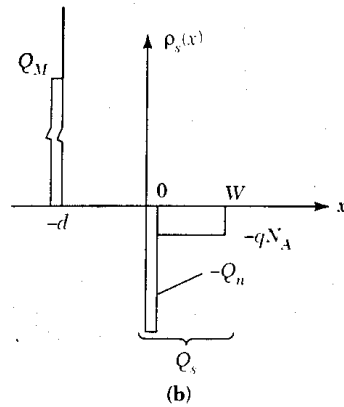
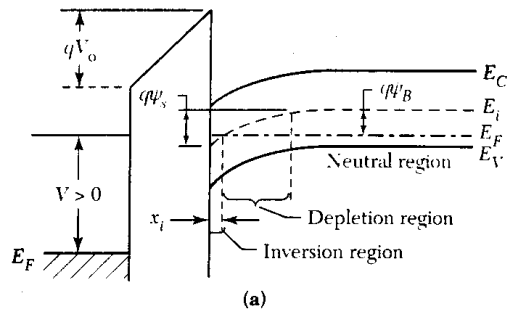
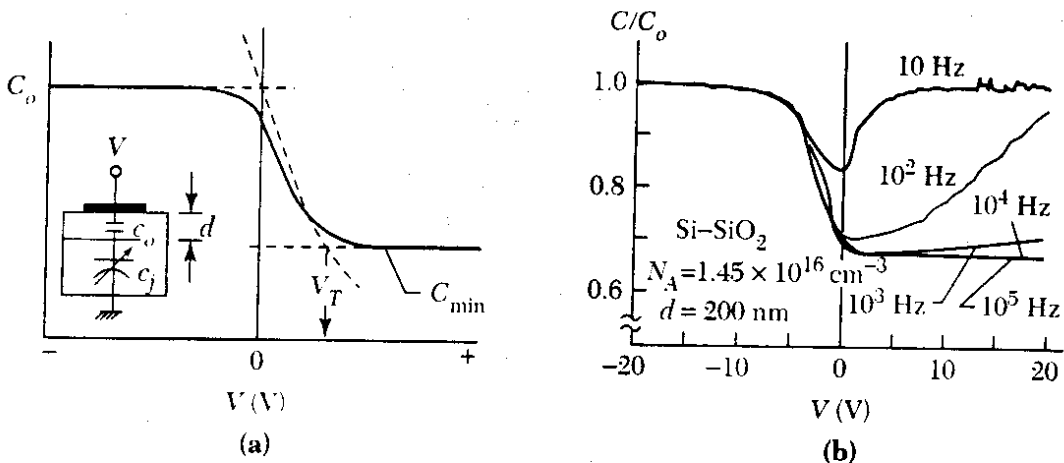


Fig. 3 Energy band diagrams and charge distributions of an ideal MOS diode in (a) accumulation, (b) depletion, and (c) inversion cases.



**Fig. 6** (a) Band diagram of an ideal MOS diode. (b) Charge distributions under inversion condition. (c) Electric-field distribution. (d) Potential distribution.



**Fig. 7** (a) High-frequency MOS C-V curve showing its approximated segments (dashed lines). Inset shows the series connection of the capacitors. (b) Effect of frequency on the C-V curve.<sup>2</sup>

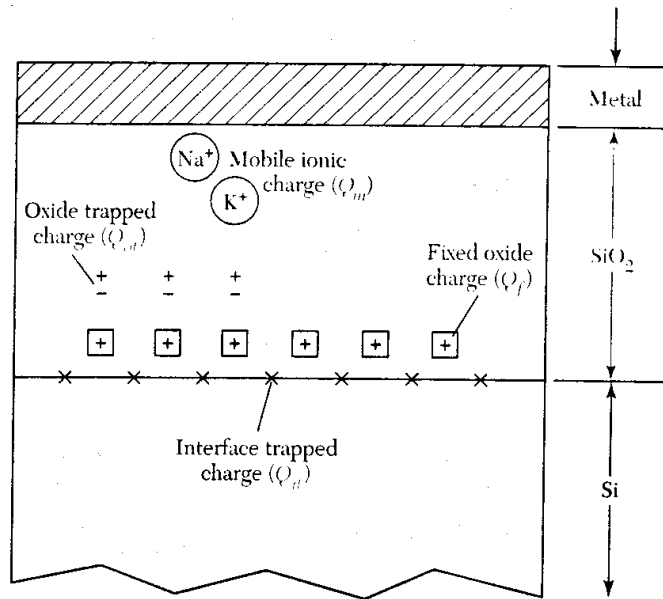


Fig. 10 Terminology for the charges associated with thermally oxidized silicon.<sup>3</sup>

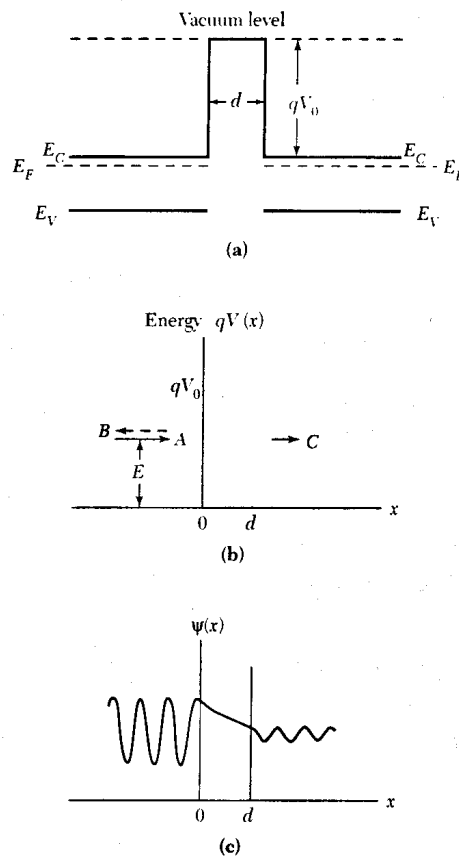
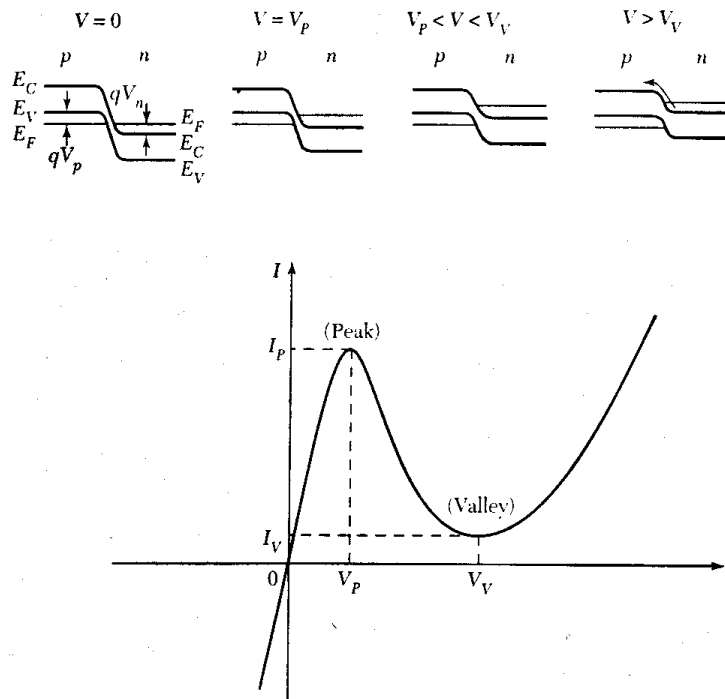


Fig. 20 (a) The band diagram of two isolated semiconductors with a distance  $d$ . (b) One-dimensional potential barrier. (c) Schematic representation of the wave function across the potential barrier.



**Fig. 4** Static current-voltage characteristics of a typical tunnel diode.  $I_p$  and  $V_p$  are the peak current and peak voltage, respectively.  $I_v$  and  $V_v$  are the valley current and valley voltage, respectively. The upper figures show the band diagrams of the device at different bias voltages.