Corrections for

Basic Electronic Devices and Circuits

Author: Mahesh B. Patil

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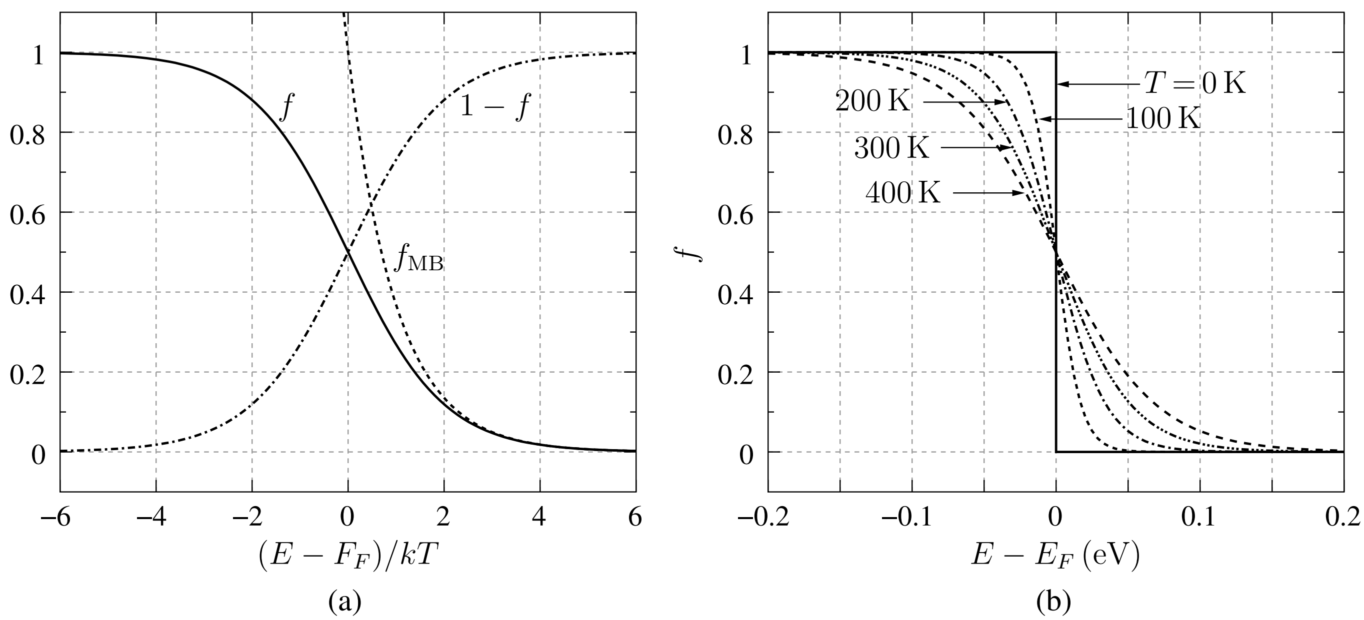
1. Page 14, second line from bottom:
   5×10^{22} atoms per cubic metre.
   should be replaced with
   5×10^{22} atoms per cm^3.

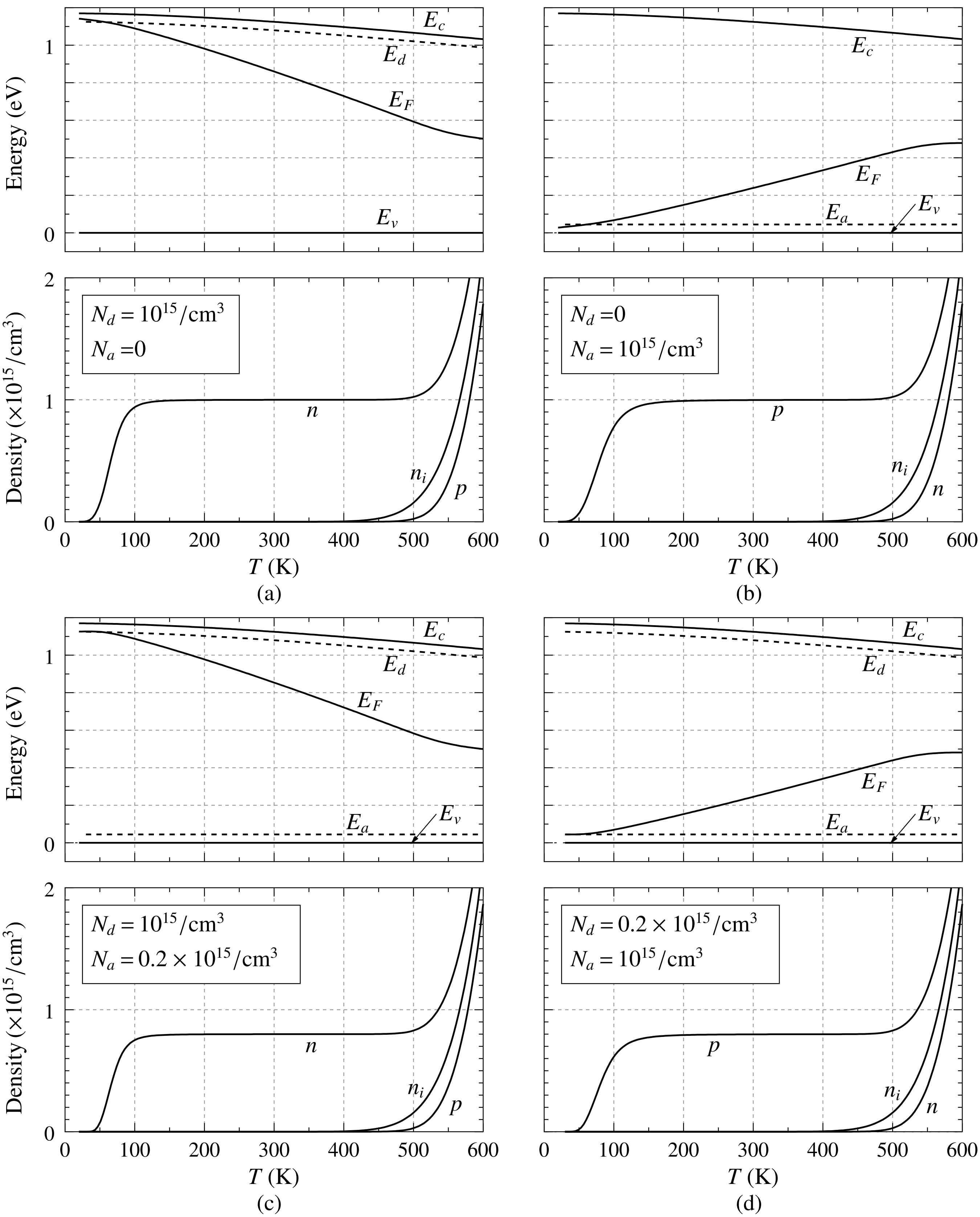
2. Page 23, Fig. 2.9: The correct figure is given below. (The x-axis label for plot (b) was not correct in the original figure.)



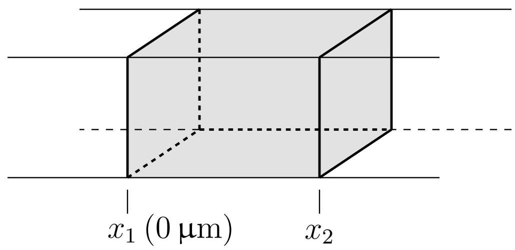
3. Page 25, Eq. 2.15 should be

$$p = \frac{(m_p^*)^{3/2}}{\pi^2 \hbar^3} \int_{-\infty}^{E_v} \frac{\sqrt{2(E_v - E)}}{1 + e^{-(E-E_F)/kT}}\, dE.$$

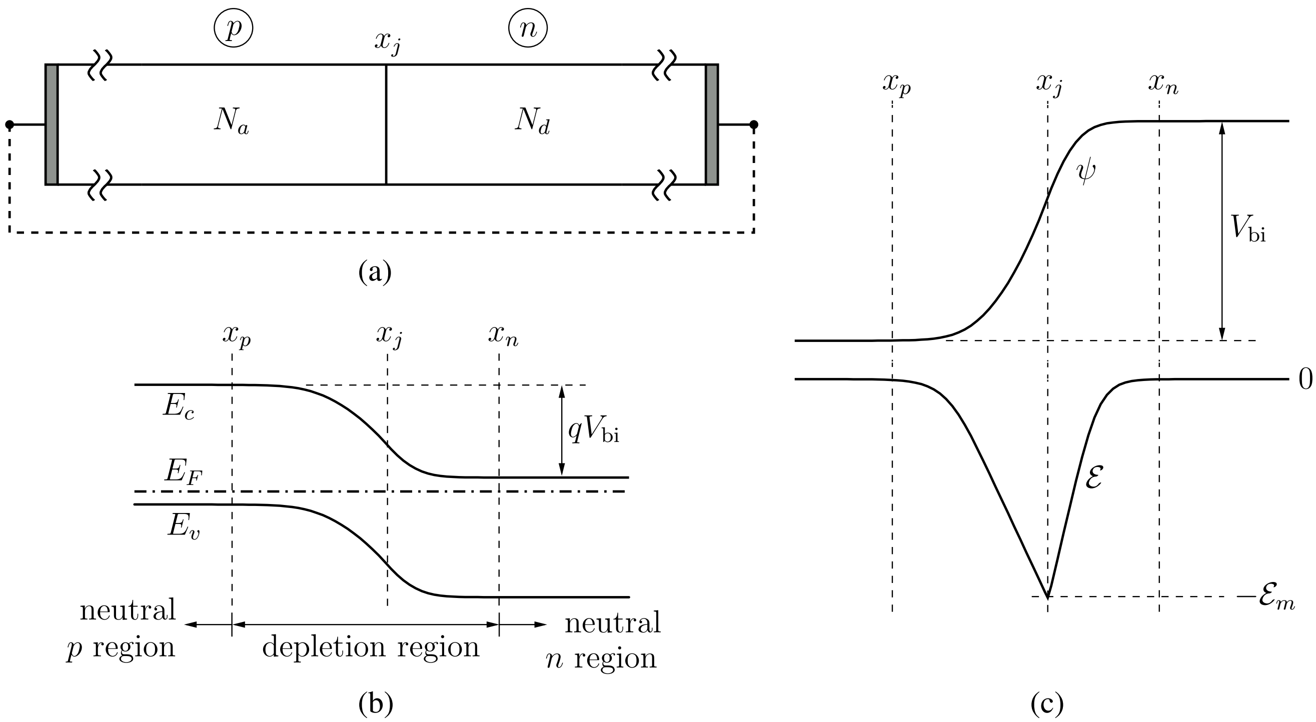
4. Page 33, Fig. 2.17: The correct figure is given below.



5. Page 60, Fig. 2.33: The correct figure is given below.



6. Page 65, Fig. 3.4: The correct figure is given below.



7. Page 81, just before Eq. 3.31:
$\psi(x_n) - \psi(x_p) = q\,V_j$
should be replaced with
$\psi(x_n) - \psi(x_p) = V_j$

8. Page 82, the equations,

$$n(x_p) = n_{p0}\ \exp\left(\frac{V_{\mathrm{bi}} - V_a}{V_T}\right) = 4.83 \times 10^8.$$

$$p(x_n) = p_{n0}\ \exp\left(\frac{V_{\mathrm{bi}} - V_a}{V_T}\right) = 2.41 \times 10^7.$$

should be replaced with

$$n(x_p) = n_{p0}\ \exp\left(\frac{V_a}{V_T}\right) = 4.83 \times 10^8\ \mathrm{cm}^{-3}.$$

$$p(x_n) = p_{n0}\,\exp\left(\frac{V_a}{V_T}\right) = 2.41\times 10^{7}\,\mathrm{cm}^{-3}.$$

9. Page 84:
   $L_p = \sqrt{12.0\times(1\times 10^{-9})} = 1.14\,\mu\mathrm{m}.$
   should be replaced with
   $L_p = \sqrt{12.9\times(1\times 10^{-9})} = 1.14\,\mu\mathrm{m}.$

10. Page 93:

$$\begin{aligned} L_p &= \sqrt{D_p\tau_p} = \sqrt{12.9\times 5\times 10^{-6}}\,\mathrm{cm} = 80.3\,\mu\mathrm{m}, \\ L_n &= \sqrt{D_p\tau_p} = \sqrt{38.7\times 2\times 10^{-6}}\,\mathrm{cm} = 88\,\mu\mathrm{m}. \end{aligned}$$

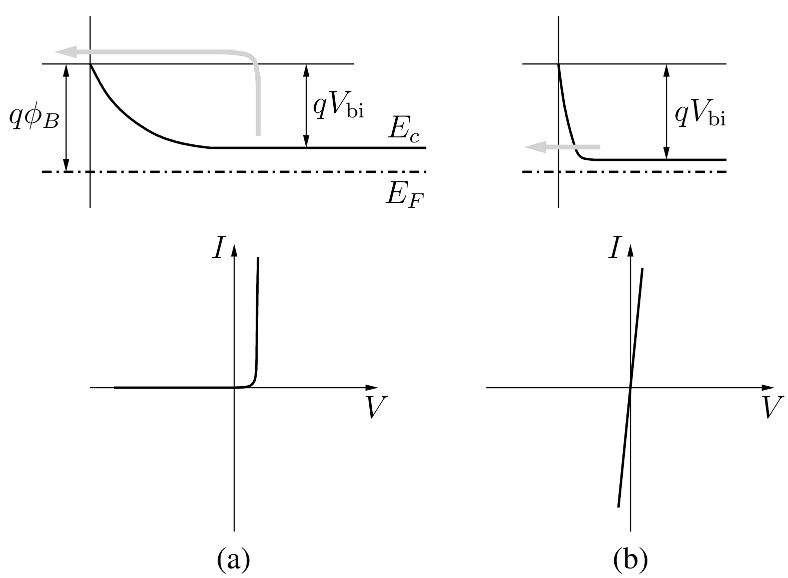
   should be replaced with

$$\begin{aligned} L_p &= \sqrt{D_p\tau_p} = \sqrt{12.9\times 5\times 10^{-6}}\,\mathrm{cm} = 80.3\,\mu\mathrm{m}, \\ L_n &= \sqrt{D_n\tau_n} = \sqrt{38.7\times 2\times 10^{-6}}\,\mathrm{cm} = 88\,\mu\mathrm{m}. \end{aligned}$$

11. Page 106:
    The electric field must be continuous ...
    should be replaced with
    The electric displacement $D = \epsilon\,\mathcal{E}$ must be continuous ...

12. Page 111:
    As we have seen, turn-off of a *pn* junction ...
    should be replaced with
    As we will see, turn-off of a *pn* junction ...

13. Page 112, Fig. 3.40: The correct figure is given below.



14. Page 126, Eq. 4.15 should be

$$i(t) = I_s \left[\exp\left(\frac{V_a(t)}{V_T} \right) - 1 \right] \approx I_s \exp\left(\frac{V_a(t)}{V_T} \right).$$

15. Page 138:
... enters the forward bias regime (sometimes between ...
should be replaced with
... enters the forward bias regime (at some time between ...

16. Page 205:
(b) With $E \leftrightarrow C$, we have

$$\frac{D_{nE}}{D_{pB}} \frac{W}{L_{nE}} \frac{N_{dB}}{N_{aE}} \rightarrow \frac{D_{nC}}{D_{pB}} \frac{W}{L_{nC}} \frac{N_{dB}}{N_{aC}} = \frac{1500}{500} \frac{2 \times 10^{-4}}{6.22 \times 10^{-3}} \frac{5 \times 10^{16}}{10^{15}} = 4.823,$$

$$\gamma = \frac{1}{1 + 4.823} = 0.1717,$$

$$\alpha_T = \frac{1}{1 + \frac{1}{2}(2/62.2)^2} = 0.99948, \quad \alpha = 0.1716, \quad \beta = 0.2,$$

should be replaced with
(b) With $E \leftrightarrow C$, we have

$$\frac{D_{nE}}{D_{pB}} \frac{W}{L_{nE}} \frac{N_{dB}}{N_{aE}} \rightarrow \frac{D_{nC}}{D_{pB}} \frac{W}{L_{nC}} \frac{N_{dB}}{N_{aC}} = \frac{1500}{500} \frac{2 \times 10^{-4}}{6.22 \times 10^{-3}} \frac{5 \times 10^{16}}{10^{15}} = 4.823,$$

$$\gamma = \frac{1}{1 + 4.823} = 0.1717,$$

$$\alpha_T = \frac{1}{1 + \frac{1}{2}(2/35.9)^2} = 0.9985, \quad \alpha = 0.1714, \quad \beta = 0.2,$$

17. Page 210, line 3:
... as long as $V_{CB} < 0\,\mathrm{V}$ (i.e., a reverse bias across the C-B junction), since the C-B diode current is negligibly small in that case.
should be replaced with
... as long as $V_{CB} > 0\,\mathrm{V}$ (i.e., a reverse bias across the C-B junction), since the C-B diode current is negligibly small in that case.

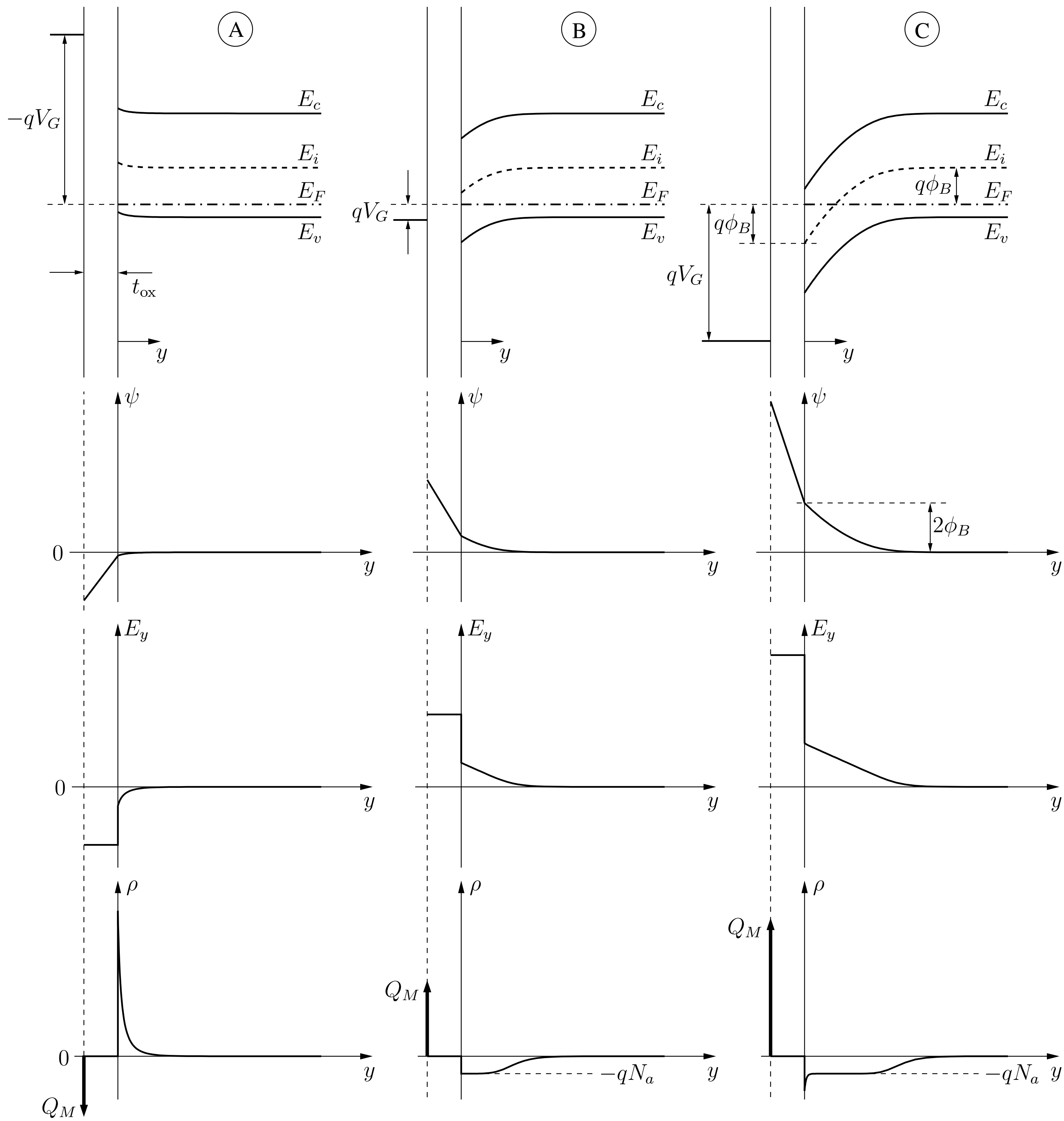
18. Page 280:
where $h = a - W = \sqrt{\frac{2\epsilon}{qN_d}(V_{\mathrm{bi}} - V_G)}$.
should be replaced with
where $h = a - W = a - \sqrt{\frac{2\epsilon}{qN_d}(V_{\mathrm{bi}} - V_G)}$.

19. Page 280: Eq. 9.3 should be

$$R_{\mathrm{ch}} = \frac{1}{\sigma} \frac{L}{A} = \frac{1}{qN_d\mu_n} \frac{L}{2hZ}$$

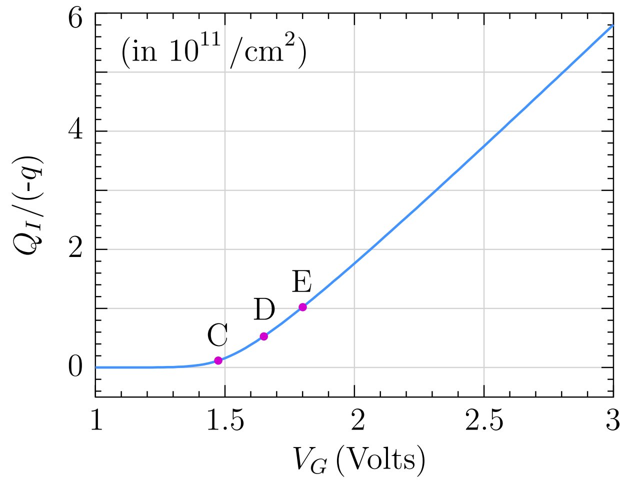
20. Page 289:
    The caption of Fig. 9.10 should include:
    The gate voltage is $V_G = -1\,\mathrm{V}$.

21. Page 308, Fig. 10.7: the correct figure is given below.

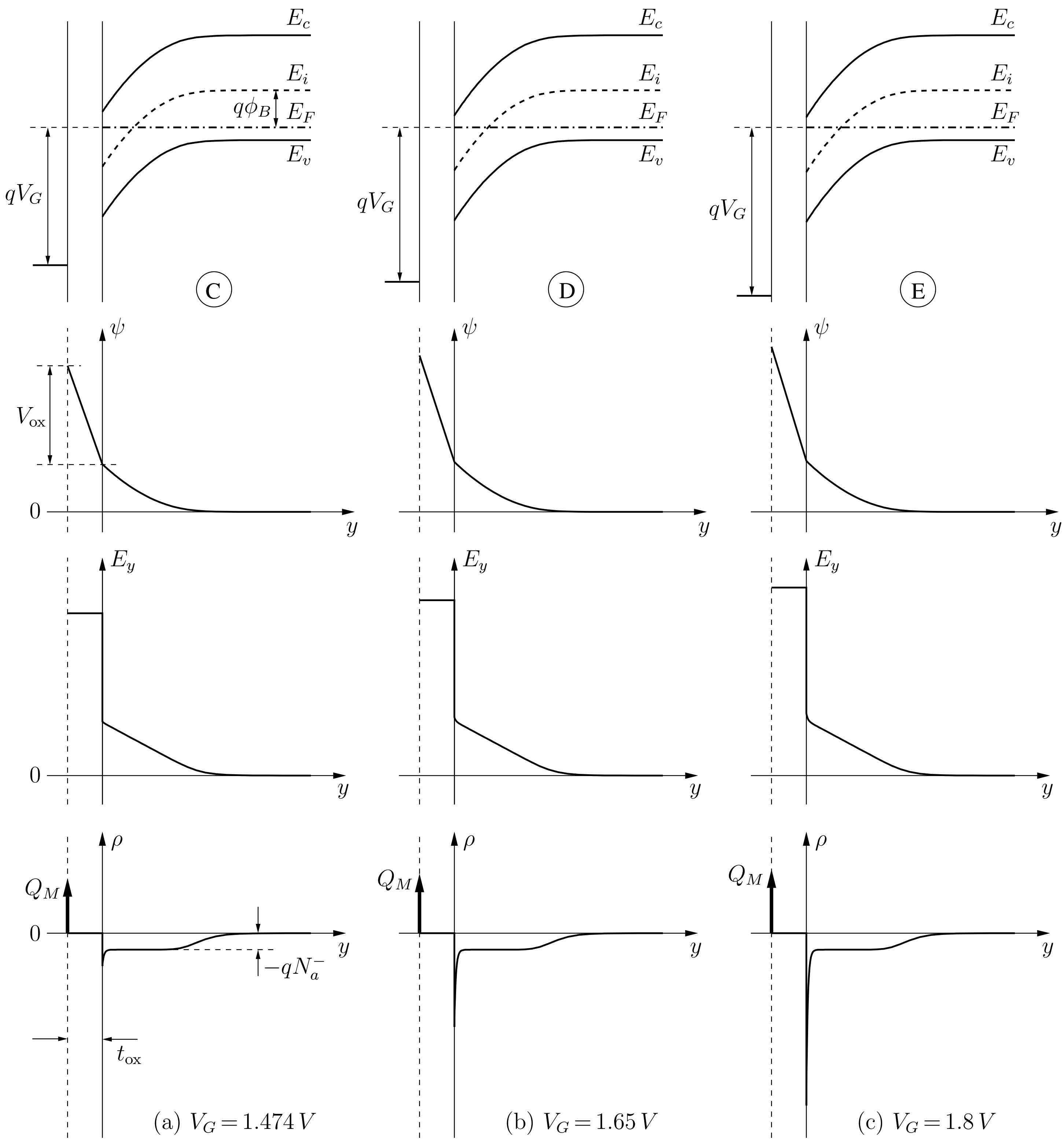


(a) accumulation (b) depletion (c) inversion

22. Page 310, Fig. 10.9 (b): the correct figure is given below.



23. Page 312, Fig. 10.10: the correct figure is given below.

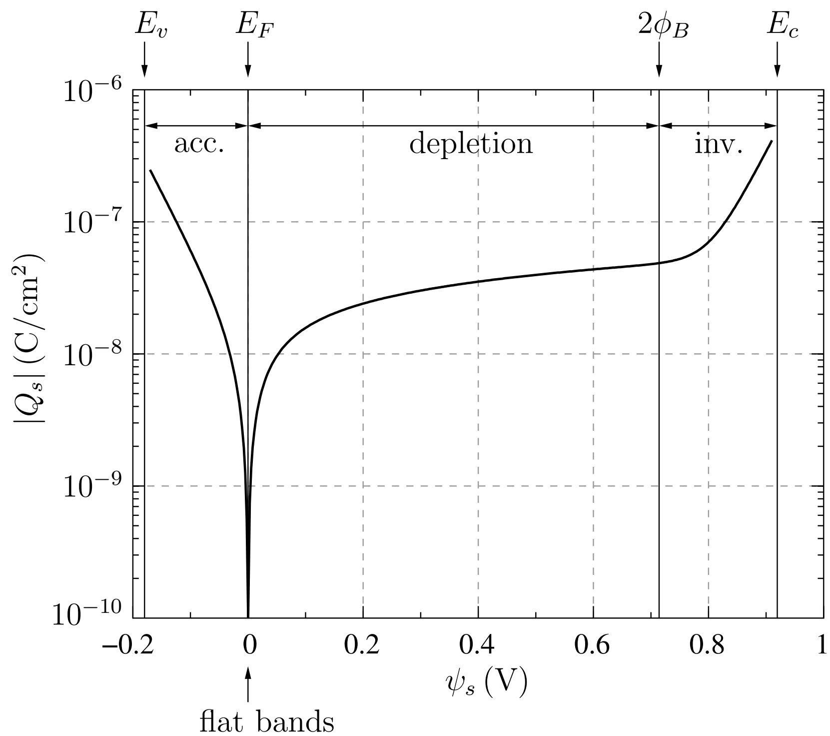


(a) $V_G = 1.474\,V$ (b) $V_G = 1.65\,V$ (c) $V_G = 1.8\,V$

24. Page 311: Eq. 10.11 should be

$$\frac{d\mathcal{E}_y}{dy} = \frac{\rho}{\epsilon} \rightarrow \int_{0^+}^{Y_{\rm dep}} d\mathcal{E}_y = \frac{1}{\epsilon_{\rm Si}} \int_{0^+}^{Y_{\rm dep}} \rho\, dy \rightarrow \mathcal{E}_y(0^+) = \frac{qN_a Y_{\rm dep}}{\epsilon_{\rm Si}}\,.$$

25. Page 317, Fig. 10.14: the correct figure is given below.



26. Page 326: Eq. 10.30 should be

$$\oint_{AA'B'B} \mathbf{D}\cdot d\mathbf{A} = -\oint_{AA'B'B} \epsilon\, \mathcal{E}_x(x,y)\, dA,$$
$$\oint_{DD'C'C} \mathbf{D}\cdot d\mathbf{A} = +\oint_{DD'C'C} \epsilon\, \mathcal{E}_x(x,y)\, dA.$$

27. Page 327: Eq. 10.31 should be

$$\Delta x \Delta z \int_0^{\infty} q\,(p - n - N_a^-)\, dy = -\,\Delta x \Delta z\, \epsilon_{\rm ox}\mathcal{E}_{\rm ox}^y(x).$$

28. Page 329: Eq. 10.39 should be

$$I_D = \iint q\, n(x_1, y, z)\, \mu_n \frac{dV_c}{dx}\, dydz$$
$$= \mu_n\, W \frac{dV_c}{dx} \int q\, n(x_1, y)\, dy = -\mu_n\, W \frac{dV_c}{dx}\, Q_I(x_1).$$

29. Page 334: Eq. 10.45 should have $\dfrac{\lambda I_D}{1+\lambda V_{DS}}$ instead of $\dfrac{\lambda I_D}{1+\lambda I_D}$.