Chapter 3

3.1 0.0373 μm, 0.0339 μm, 3.39 x 10^{-3} μm, 0.979 V, 5.24 x 10^{5} V/cm

3.3 10^{18}/cm^3, 10^{2}/cm^3, 10^{18}/cm^3, 10^{2}/cm^3, 0.921 V, 0.0488 μm

3.6 2.55 V, 1.05 μm

3.10 6400 A/cm^2

3.13 1.00 x 10^{21}/cm^4

3.17 290 K

3.20 312K

3.21 1.39, 3.17 pA

3.22 0.837 V; 0.768 V; 0 A; 9.43 x 10^{-19} A, -1.00 x 10^{-18} A

3.25 1.34 V; 1.38 V

3.28 0.518 V; 0.633 V

3.31 0.757 V; 0.721 V

3.34 −1.96 mV/K

3.37 0.633 V, 0.949 μm, 3.89 μm, 12.0 μm

3.39 374 V

3.41 4 V, 0 Ω

3.43 9.80 nF/cm^2; 188 pF

3.45 400 fF, 10 fC; 100 pF, 0.5 pC

3.49 9.97 MHz; 15.7 MHz

3.51 0.495 V, 0.668 V

3.53 0.708 V, 0.718 V

3.56 (a) Load line: (450 μA, 0.500 V); SPICE: (443 μA, 0.575 V)
(b) Load line: (-667 μA, -4 V);
(c) Load line: (0 μA, -3 V);

3.59 (0.600 mA, -4 V) , (0.950 mA, 0.5 V) , (-2.00 mA, -4 V)

3.65 Load line: (50 μA, 0.5 V); Mathematical model: (49.9 μA, 0.501 V); Ideal diode model: (100 μA, 0 V); CVD model: (40.0μA, 0.6 V)

3.69 (a) 0.625 mA, 3 V; 0.625 mA, -5 V; 0 A, -5 V; 0 A, 7 V

3.71 (a) (409 μA, 0 V), (270 μA, 0 V); (c) (0 A -3.92 V), (230 μA, 0 V)

3.73 (a) (0.990 mA, 0 V) (0 mA, -1.73 V) (1.09 mA, 0)
(d) (0 A, -0.452 V) (0 A, -0.948 V) (1.16 mA, 0.600 V)

3.76 (1.50 mA, 0 V) (0 A, -5.00 V) (1.00 mA, 0)

3.78 (I_Z, V_Z) = (792 μA, 4.00 V)

3.81 10.8 mW

3.83 2.25 W, 4.50 W

3.88 17.6 V

3.91 −7.91 V; 1.05 F; 17.8 V; 3530 A; 841 A (ΔT = 0.628 ms)

3.94 -7.91V, 0.158 F, 17.8 V, 3540 A, 839 A

3.97 6.06 F; 8.6 V; 3.04 V; 1920 A; 9280 A

3.100 -20.2 V; 1.35 F; 42.4 V; 10800 A; 1650 A

3.103 3.03 F, 8.6 V, 3.04 V, 962 A, 4910 A

3.107 278 μF; 3000 V; 2120 V; 44.4 A; 314 A

3.115 5 mA, 4.4 mA, 3.6 mA, 5.59 ns

3.119 (0.969 A, 0.777 V); 0.753 W; 1 A, 0.864 V

3.121 1.11 μm, 0.875 μm; far infrared, near infrared