

DERIVATION OF EQ. (3-3):

The basic equation

$$P = VI$$

was derived in your dc-ac course. When we apply it to a diode, we add the subscripts to get

$$P_D = V_D I_D$$

DERIVATION OF EQ. (3-5):

Refer to Fig. 3-10 on page 72. The voltage across the resistor is given by

$$V_R = I_D R_B$$

Add the knee voltage of the diode and you get

$$V_D = 0.7 \text{ V} + I_D R_B$$

DERIVATION OF EQ. (3-7):

Refer to Fig. 3-10a on page 72. The slope of the line above the knee voltage is

$$\frac{\Delta I}{\Delta V} = \frac{I_2 - I_1}{V_2 - V_1}$$

The reciprocal of this is the bulk resistance:

$$R_B = \frac{V_2 - V_1}{I_2 - I_1}$$