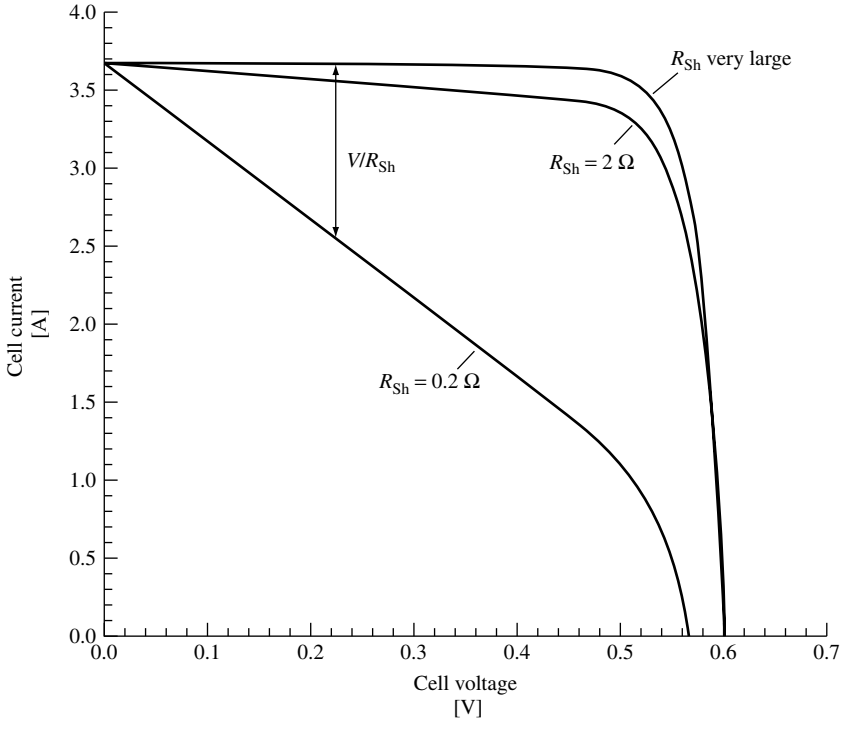

Figure 3.23 Effect of shunt resistance on the current–voltage characteristic of a solar cell ($R_S = 0$)

and a plot of I_{SC} versus $\log[I_o e^{qV_{OC}/A_o kT} - I_{SC}]$ will then permit R_S to be extracted from the slope of this line. Similarly, in the regime where only R_{Sh} is important, equations (3.151) and (3.152) can be combined to give

$$\frac{V_{OC}}{R_{Sh}} = I_{SC} - I_o e^{qV_{OC}/A_o kT} \tag{3.154}$$

and R_{Sh} can be determined from the slope of the line given by plotting V_{OC} versus $[I_{SC} - I_o e^{qV_{OC}/A_o kT}]$. If the series and shunt resistances are such that there is no regime where they can be neglected, the parameters can, with patience, be extracted through the process of trial and error.

3.5.4 Temperature Effects

From equations (3.127) and (3.128), it is apparent that

$$I_{o1,n},\ I_{o1,p} \propto n_i^2 \tag{3.155}$$

and from equation (3.129) that

$$I_{o2} \propto n_i. \tag{3.156}$$