



Figure 3.18 Effect of the back-surface field recombination velocity on solar cell performance. All other parameters are from Table 3.2

Table 3.3 Special cases of $S_{F,\text{eff}}$

No grid ($s = 0$)	$S_{F,\text{eff}} = S_F$
Full grid ($s = 1$)	$S_{F,\text{eff}} \rightarrow \infty$
Dark ($\bar{G} = 0$)	$S_{F,\text{eff}} = \frac{S_F + sD_p/W_N}{1 - s}$
Short circuit ($V = 0$)	$S_{F,\text{eff}} = S_F$
V large ($\approx V_{OC}$)	$S_{F,\text{eff}} = \frac{S_F + sD_p/W_N}{1 - s}$

3.4.8 An Analogy for Understanding Solar Cell Operation: A Partial Summary

The following analogy illustrates the importance of minimizing all sources of recombination in the solar cell.⁴ Imagine a funnel that has a variety of holes of different shapes and sizes in it. It also has a stopcock at the bottom for controlling the flow of liquid

⁴ This analogy was developed on the basis of discussions with Professor Richard J. Schwartz of Purdue University, West Lafayette, Indiana.