USE OF A TRANSFORMED DIODE EQUATION FOR CHARACTERIZATION OF THE IDEALITY FACTOR AND SERIES RESISTANCE OF CRYSTALLINE SILICON SOLAR CELLS BASED ON LIGHT I-V CURVES

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With the increase in installed solar system capacity, comparison and analysis of the physical property values of solar cells are becoming increasingly important for the production. Therefore, research on determining the physical characteristic values of solar cells is being actively pursued. In this study, a diode equation, which is commonly used to describe the I—V behavior and determine the electrical characteristic values of solar cells, was applied. Using this method, it is possible to determine the diode ideality factor (n) and series resistance (Rs) based on light I—V measurements. Thus, we determined the ideality factor (n) and series resistance (Rs) using a modified diode equation method for the light I—V curves from a commercial screen-printed solar cell and an interdigitated back-contact solar cell. We also used the sun-shade method to determine the ideality factor (n) and series resistance (Rs) of the samples. The values determined using the two methods were similar. However, given the error in the sun-shade method, the diode equation is considered more useful than the sun-shade method for analyzing the electrical characteristics by determining the ideality factor (n) and series resistance (Rs) based on the light I—V curves.

Figure 1 (a) Light I—V graph of industrial screen-printed solar cell (b) dV/dJ and 1/(J-J_L) graph calculated from measured Light I—V data.