

# MODELING OF MONOCRYSTALLINE, AMORPHOUS AND MICROMORPHOUS SILICON PHOTOVOLTAIC MODULES

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**ABSTRACT.** Photovoltaic Solar energy, with a steady growth of around 40% in recent years, is spearheading and the bulk silicon that remains these days the main material of photovoltaic due to its good performance has seen, for the imperatives of cost reduction, the emergence of cheaper thin film silicon whose performance is constantly improving. In this work, we present models for predicting the performance of different type of silicon photovoltaic (PV) modules (monocrystalline (c-Si), amorphous (a-Si) and micromorphous ( $\mu$ -Si)) operating in outdoor conditions. The models are based on the seven-parameter model which is adapted for each technological type considered. The simulations conducted for each type of module for different conditions of irradiation and temperature were validated with the experimental data got from a commercialized PV module installed on a PV outdoor test platform at UDES. Good agreements were found between the simulated results and the measurements. However, some discrepancies are noticed which we think are due mainly to the effects of the temperature.

**KEYWORDS:** *Photovoltaic modules, Silicon, Mono-crystalline, thin films, modeling.*