We propose ANN–based models to analyze and extract the internal parameters of a Schottky photodiode (SPD) without presenting them with any knowledge of the highly nonlinear thermionic emission (TE) expression of the device current. We train, evaluate and demonstrate the ML models on thirty–six private datasets from three previously published devices, which denote current responses under illumination and ambient temperature of graphene oxide (GO) doped p–Si Schottky barrier diodes (SBDs). The GO doping levels are 0%, 1%, 3%, 5%, and 10%. The illumination ranged from dark (0 mW/cm2) to 30 mW/cm2. The predictions are then made completely at the intensity of 60 mW/cm2. For each diode, some values of the barrier height (