

The upgrade of the Large Hadron Collider into the High Luminosity Large Hadron Collider requires a complete replacement of the ATLAS Inner Detector by a new all-silicon Inner Tracker. For this reason a new micro-strip sensor type n^+ -in-p was developed. These sensors are expected to have many advantages, such as higher radiation resistance, the ability to operate even if not fully depleted and faster response. The main purpose of this thesis is to study and evaluate the detection performance and radiation hardness of the n^+ -in-p sensor type with the help of electrical characteristics performed on the delivered sensors. The obtained results are compared to the Market Survey Step-2 requirements and in the case of the sensors designed for the ATLAS Inner Tracker also to the corresponding Technical Specification document.