Contribution ID: **261** Type: **Talk**

Exploring the Design and Measurements of Next-Generation 4H-SiC LGADs

Thursday 20 February 2025 17:20 (20 minutes)

This contribution presents the design, production, and initial testing of newly developed 4H-SiC Low Gain Avalanche Detectors (LGADs). The evaluation includes performance metrics such as the internal gain layer' s efficiency in enhancing signal generation. Initial laboratory and Transient Current Technique (TCT) measurements provide insight into the device's stability and response to the signal.

Due to the increase of availability provided by the industry, 4H-SiC is emerging as a strong candidate for the next-generation of semiconductor detectors. These new sensors are promising due to the inherent radiation tolerance of 4H-SiC and its stable operation across a wide temperature range. However, due to the materials wider-bandgap compared to standard silicon, and difficulty to produce layers thicker than 50 \textmu m, an internal charge multiplication layer needs to be introduced.

The presented 4H-SiC LGADs, fabricated by OnSemi, are optimized for an N-type substrate/epi wafer. The initial TCT and laboratory test results demonstrate fast charge collection and uniform multiplication across multiple samples produced on a single wafer, aligning well with the performed TCAD simulations.

Primary experiment

Authors: KLIMSZA, Adam (OnSemi); KOZELSKY, Adam (OnSemi); NOVAK, David (OnSemi); CHOCHOL, Jan (OnSemi); KROLL, Jiri (Czech Academy of Sciences (CZ)); MIKESTIKOVA, Marcela (Czech Academy of Sciences (CZ)); MARCISOVSKA, Maria (Czech Technical University in Prague (CZ)); MARCISOVSKY, Michal (Czech Academy of Sciences (CZ)); WIEHE, Moritz (CERN); SLOVAK, Peter (OnSemi); SVIHRA, Peter (Czech Academy of Sciences (CZ)); NOVOTNY, Radek (University of New Mexico (US)); SPETIK, Radim (OnSemi); MALOUSEK, Roman (OnSemi); KAFKA, Vladimir (Czech Technical University in Prague)

Presenter: SVIHRA, Peter (Czech Academy of Sciences (CZ))

Session Classification: Semiconductor LGAD 2

Track Classification: LGAD