Characterization of Failure Modes in High-Voltage GaN HEMT Transistors

Record number : OPR-1414

Overview

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ADMINISTRATIVE UNIT(S)

Faculté de génie
Département de génie électrique et de génie informatique
Institut interdisciplinaire d'innovation technologique (3IT)

LEVEL(S)

3e cycle

LOCATION(S)

3IT - Institut interdisciplinaire d'innovation technologique
Campus de Sherbrooke

Project Description

This research project focuses on characterizing the failure mechanisms of GaN HEMT transistors operating under high-voltage conditions and predicting their aging behavior in order to mitigate the risks associated with integrating this emerging technology into the automotive industry. The proposed work includes a comprehensive review of the latest transistor technologies potentially suitable for automotive applications, the development of a highly accurate test bench capable of measuring critical parameters related to transistor degradation and failure, the creation of semi-empirical models to predict transistor failure mechanisms, and a comparison with SiC transistors, which are currently more mature and extensively studied. The objective of this project is to develop the knowledge required to guide the selection of transistor technologies for automotive inverters and future electric propulsion systems.

Work Environment: The student will be part of the Createk Innovation Group at the University of Sherbrooke. With 12 faculty members, 12 staff members, and more than 75 graduate students from a variety of disciplines, all passionate about technological innovation, Createk offers a work environment focused on technology development. Its mission is to support innovation by fostering strong connections between research and industry. The group also maintains a vibrant maker community, providing access to a wide range of prototyping equipment through its FabLab workshop. In addition, Createk promotes an entrepreneurial mindset through various events held throughout the year.On a day-to-day basis, the student will work with the Dana TM4 Research Chair team, which includes six other graduate students and two research professionals, while also benefiting from the support of Dana TM4’s Advanced Engineering team. The work will be conducted in the state-of-the-art facilities of the Interdisciplinary Institute for Technological Innovation (3IT). Université de Sherbrooke Createk Innovation Group Dana TM4 Research Chair Interdisciplinary Institute for Technological Innovation (3IT)

Discipline(s) by

Funding offered

Yes

$ 35 000 annual

Partner(s)

Dana TM4

sector

Sciences naturelles et génie

Génie électrique et génie électronique

The last update was on 22 June 2026. The University reserves the right to modify its projects without notice.