Dipartimento Energia
Power Electronics Innovation Center (PEIC)
Politecnico di Torino

We are looking for a master student to work on

GaN Cascode Device Characterization

Background

The ongoing development of power electronics converters is pushing towards new semiconductor technologies. Currently, wide bandgap (WBG) semiconductors are quite promising, being able to greatly reduce the power losses of the converters. Among WBG, gallium nitride (GaN) devices are particularly promising for high switching frequency applications (> 100 kHz), leveraging their low switching losses.

Thesis goal

The goal of this thesis is the loss and behavioral characterization of 650V GaN transistors. This is done by SPICE simulations and experimentally using dedicated double pulse test equipment.

Your tasks

- Study of the GaN cascode structure
- Integration of the manufacturer SPICE models into a simulation environment and construction of PLECS loss and thermal models
- Experimental validation of the SPICE models using a double pulse test testbench
- Correction of the constructed model according to the experimental tests

Necessary skills

- Knowledge of power electronics devices: MOSFETs, GaN devices, double pulse test procedure
- Knowledge of PLECS software
- Knowledge of LTSPICE is a plus

What you will learn

- Deep knowledge of cascode GaN devices
- SPICE simulation skills
- Testing procedures for power devices
- Experimental skills in terms of i) testbench setup including power supplies and oscilloscopes, ii) use measurement systems, and iii) organization and execution of experimental tests involving power devices

Duration of the thesis: 6 months

Application

We are looking forward to receiving your application. Please include your CV and a short motivation letter about why you fit the position (Italian or English). Send your application to: radu.bojoi@polito.it, fabio.mandrile@polito.it, enrico.vico@polito.it.