



Kompetenzzentrum für Automobil-
und Industrieelektronik



Institut für Mikroelektronik

Gallium Nitride (GaN) is considered as a promising material for the next generation of semiconductor technology. Its wide band gap, high breakdown field and high electron sheet density makes it ideal for power applications. GaN based electronic chip production is yet to reach the required degree of reliability. This is at the cutting edge research in semiconductor technologies with outstanding prospects. In addition, opportunity to use advanced computational methods make this field attractive for young scientists and engineers.

Infineon Technologies Austria aims to improve its technologies, i.e. the choice and the integration of materials for these advanced semiconductor technologies to withstand ever higher thermo-mechanical loads induced during application. For this purpose, KAI, a competence centre was founded in Villach. One of the major focuses of KAI is to understand these thermo-mechanical interactions during processing and application by modelling and simulation.

PhD in Residual Stress Modelling

Thermo-mechanical stress generated during chip fabrication and application is responsible for the majority of reliability based failures. As new materials and fabrication techniques are employed in manufacturing GaN-on-Si chips, it becomes vital to understand the nature of stress evolution. Modelling and simulation are advantageous, as they avoid several design cycles and help gain more insight on the fundamental behaviour of the system. Also, various design for different materials and structures can be easily evaluated using simulations. This will be the primary focus of the PhD. In addition, advanced and novel interconnect and packaging techniques will be studied for this new GaN-on-Si device technology.

Job Description

- Mechanical stress modelling using FEM for GaN-on-Si chips
- Structural, material and process assessment for stress evolution
- Advanced Interconnect technology: Diffusion soldering
- Innovative package evaluation
- Model development to relate mechanical stress and output electrical parameters.

The duration of the PhD is 3 years. The student will be placed at TU-Vienna, IµE, and will work closely with the process and technology development teams in Infineon and the simulation group at KAI. This project will be supervised by Dr Hajdin Cerić at the Institute of Microelectronics, TU Wien.

PhD Student Profile:

Must have a university degree in mechanics, material science or physics. CAD/FEM experience and knowledge on semiconductor or MEMS processing technologies are desired. Some industry experience preferred.

If interested, please contact:

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