



University of Stuttgart



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Power Electronics

Evaluation of the Standard Compact Model for Vertical Power MOSFETs

Study Thesis / Master Thesis

Introduction:

Power MOSFETs are one of the most commonly used power devices due to their low gate drive power, small device size, fast switching speed and superior paralleling capability. Therefore, there is a continuously increasing need for accurate and compact models for power MOSFETs which can be used for CAD tools for circuit designers.

However, there is a lack of accurate and robust models for power transistors. Device structure of vertical power MOSFETs is typically very different from standard CMOS type transistors (lateral) for logic/signal processing. Standard models exist for CMOS logic technologies (EKV, HiSIM, BSIM etc.), but not for power devices.

The aim of this research is to evaluate the applicability of the HiSIM model (HiSIM HV model), which is one of the CMC standard models for MOSFETs, to describe power devices working in high voltage and high current condition.

Tasks:

- Understand the definitions in the standard model describing the characteristics of a MOSFET.
- Evaluate the specific model requirements for power devices as opposed to standard technologies.
- Contribute to the improvement and development of modeling in the field of power transistors based on the standard model.

