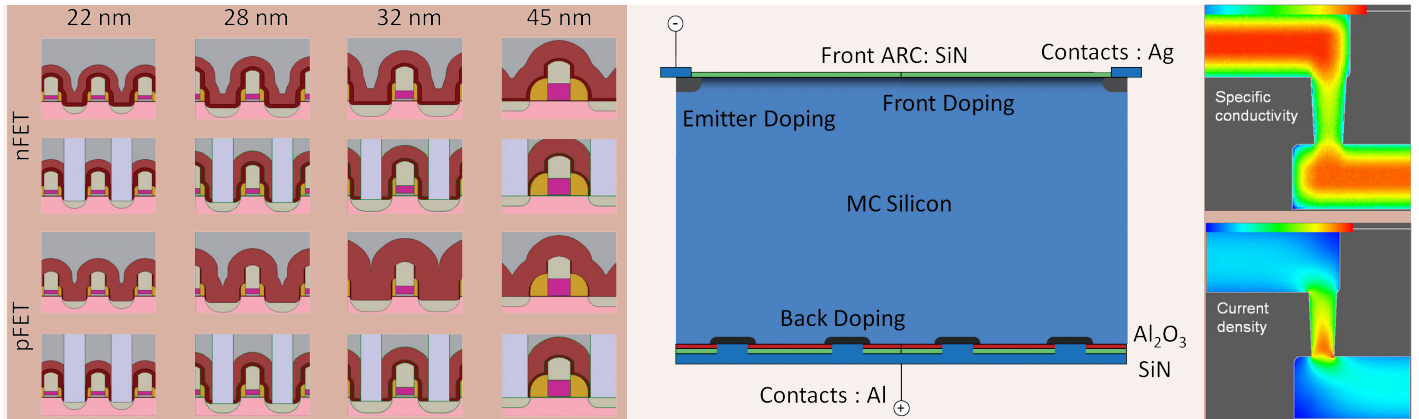


DEVICE SIMULATIONS FOR SEMICONDUCTOR INDUSTRY AND PHOTOVOLTAICS



Contact

Fraunhofer Institute for Electronic Nano Systems ENAS

Technologie-Campus 3
09126 Chemnitz | Germany

Contact persons

Prof. Dr. Stefan E. Schulz
Phone: +49 371 45001-232
E-mail: stefan.schulz@enas.fraunhofer.de

Dr. Jörg Schuster
Phone: +49 371 45001-286
E-mail: joerg.schuster@enas.fraunhofer.de

Figures: Transistor models for a scaling analysis (left); Schematic model of a solar cell (middle); Conductivity and current distribution in an on chip interconnect structure (right)

Photo acknowledgements: Fraunhofer ENAS
All information contained in this datasheet is preliminary and subject to change. Furthermore, the described systems, materials and processes are not commercial products.

Device simulation is a very efficient tool for test, design and optimization of any electronic device. Simulation tools are available for simulation of devices from the nano- to the macroscale. Available physical models include advanced transport models for electrons and holes as well as optoelectronic effects. On the nanoscale, quantum effects can be considered based on effective models.

Available Software

- Commercial TCAD-software including comprehensive material database
- Proprietary software solutions for transport in nanoscale interconnects
- Software development for special models on user demand
- Combination with process- and equipment simulation available
- Combination with atomistic methods for the analysis of unknown material parameters available

High performance computing hardware

- Efficient calculation of complex device models

- Highly parallel parameter scanning based on device models

TCAD based device simulation of ULSI transistors

- Generation of 2D/3D transistor models for thermo-mechanical simulation based on user defined process flows or TEM cross sections
- Development of mobility models
- Analysis of strained silicon technologies including strained contact metallization
- Scaling analysis

Device simulation of solar cells

- Cell models including front side selective emitter, emitter diffusion and local back side for various cell concepts (PERL, PERC, LOBACO ...)
- Optimization of cell efficiency for different technologies

Simulation of on chip interconnects

- Current and heat flow in 3D interconnect structures
- Scattering at grains and edges