VICTORY Device

Release Notes

03/06/12

SILVACO

RELEASE NOTES

VERSION 1.4.1

NEW FEATURES

- Transient interface traps and interface defects

ALTERATIONS AND ENHANCEMENTS

- Better memory management when traps and defects include trap-assisted tunneling

VERSION 1.4.0

ALTERATIONS AND ENHANCEMENTS

- Improve linear solvers

VERSION 1.3.20

NEW FEATURES

- Optical ray tracing in 3D and 2D
- Transient bulk traps and bulk defects

ALTERATIONS AND ENHANCEMENTS

- Improve handling of optical beams

VERSION 1.3.19

NEW FEATURES

- Compositional heat-capacity data for GaN

ALTERATIONS AND ENHANCEMENTS

- Remove spurious warning message when loading optional material-specific data for alloys
- Better resolution of vector-based calculations in nearly-degenerate mesh geometries

VERSION 1.3.18

NEW FEATURES

- Material-specific doping specification
- FDTD electro-optical simulations
- Bulk traps and bulk defects
- Interface traps and interface defects
- Joule heating in non-contact conductor regions
- Small signal analysis with bulk traps, bulk defects, interface traps, and interface defects
- Albrecht, Farahmand, and Gansat mobility models
- Sellmeier and Adachi refractive index models
- Tabular GaN Selberherr impact ionization model
- Polarization charge model
- Material defaults for GaN, InN, AlN, AlGaN, InGaN and InAlN
- Material defaults for borosilicate glasses (BSG and BPSG)
- Material-specific specification of electron and hole tunneling masses

ALTERATIONS AND ENHANCEMENTS

- Improve conductor equations and conductor interfaces to prevent potential convergence issues
- Small signal log file output during frequency sweeps
- Improve heterojunction model to resolve band structure alignment issue
- Trap-assisted tunneling (TRAP.TUNNEL) model is now consistent over entire range of tunneling energies
- Change default values of electron and hole tunneling masses
- Improve edge-based impact ionization model to increase accuracy
- Improve semiconductor/insulator interfaces to prevent potential convergence issues

- Improved convergence when the current-density threshold (BBT.DJHURKX) is used in the Hurkx band-to-band tunneling model (BBT.HURKX).

VERSION 1.3.17

NEW FEATURES

- PAM.MPI parallel iterative solver
- Optional consistent RHS norms which are consistent for 2D and 3D
- Precision-dependent default settings for iterative solvers
- Hatakeyama anisotropic impact ionization model
- Orientation of crystallographic (optical) axis for 4H-SiC and other hexagonal materials can now be specified using ZETA and THETA on the MATERIAL statement
- Electrodes with several regions of different materials

ALTERATIONS AND ENHANCEMENTS

- Increase accuracy of extended-precision electric field and current vector calculations
- Improve bias projection scheme to prevent convergence issues

VERSION 1.3.16

ALTERATIONS AND ENHANCEMENTS

- Improve Gummel non-linear solution method to prevent convergence issues
- Improve cutback scheme for divergence to prevent convergence issues

VERSION 1.3.15

NEW FEATURES

- Hatakeyama bandgap parameters are now default for 4H-SiC
- Complex index of refraction and beam spectrum models

ALTERATIONS AND ENHANCEMENTS

- Improve the transient current and time step algorithms to prevent convergence issues

VERSION 1.3.14

NEW FEATURES

- Support for 80-bit,128-bit, 160-bit, and 320-bit extended-precision arithmetic
- Run-time material information output is now more consistent for extended-precision

ALTERATIONS AND ENHANCEMENTS

- Improve Gummel non-linear solution method to prevent convergence issues
- Improve recombination/generation heating model to resolve transient accuracy issues
- Improve floating ohmic contacts to prevent a potential crash
- Run-time material information output now displays Selberherr impact ionization parameters

VERSION 1.3.13

NEW FEATURES

- Additional convergence criteria for iterative linear solver to control accuracy
- Bank-Rose non-linear solution damping
- Optional dynamic rescaling of the linear solution matrix and solution vector to improve convergence
- Optional dynamic rescaling of the equations to improve convergence
- Support for SiGe, HfO2 and TiN materials

ALTERATIONS AND ENHANCEMENTS

- Improve convergence for solution bias projection routine
- Semiconductor regions used as electrical contacts are now supported
- Improve interface recombination model to prevent potential crash

VERSION 1.3.12

NEW FEATURES

- Multi-level parameter selection for AMP linear solver preconditioner
- RCS and RPS mobility models for high-K inversion channels
- High-K material workfunction parameters
- 256-bit extended-precision solvers
- Automatic increase solver precision on specified iteration
- Automatic increase solver precision within a specified range of convergence norms

VERSION 1.3.11

NEW FEATURES

- Automatic check and fix for structure files with face errors

ALTERATIONS AND ENHANCEMENTS

- Ensure conservation of discretization flags across load statements
- Solution will now be automatically initialized when solve initial is not specified
- Extra information in the run-time output for bias and time steps

VERSION 1.3.10

NEW FEATURES

- Support for Red Hat Enterprise 4 LINUX

VERSION 1.3.9

NEW FEATURES

- Optional selection of linear, quadratic or multiplicative bias projection of carrier concentration

- Improve accuracy of potential and carrier concentration bias projection

VERSION 1.3.8

NEW FEATURES

- Specification of the number of steps the solver may take in order to improve the solution beyond convergence
- 64-bit linear solvers are now available in 128-bit mode

ALTERATIONS AND ENHANCEMENTS

- Currently used bias projection method is now displayed in run-time output
- Improve accuracy of potential and carrier concentration bias projection to prevent potential convergence issues

VERSION 1.3.7

NEW FEATURES

- Optional disabling of bias projection limits
- Optional specification of multiplier and divisor limits used in solution update

ALTERATIONS AND ENHANCEMENTS

- Bias run-time output now displays number of cutback steps
- Increase accuracy for potential X norm calculation

VERSION 1.3.6

ALTERATIONS AND ENHANCEMENTS

- Improve calculation of charge neutrality during initial solves and at contacts to prevent loss of accuracy

VERSION 1.3.5

NEW FEATURES

- 128-bit and 256-bit extended-precision iterative solvers

VERSION 1.3.4

ALTERATIONS AND ENHANCEMENTS

- Improve 128-bit and 256-bit extended-precision floating-point arithmetic to prevent convergence issues

VERSION 1.3.3

ALTERATIONS AND ENHANCEMENTS

- Improve 128-bit and 256-bit extended-precision floating-point arithmetic to prevent potential crash

VERSION 1.3.2

NEW FEATURES

- Independent of selection of preconditioners and iterative solvers
- Improve bias projection and stepping algorithm to prevent potential convergence issues
- Additional control parameters for solution divergence check routine
- Optional specification for carrier concentration update limits
- Optional selection of logarithmic scaling for carrier concentration X norm

ALTERATIONS AND ENHANCEMENTS

- Improve bias projections following cutbacks to prevent potential convergence issues

VERSION 1.3.1

NEW FEATURES

- 128-bit and 256-bit extended-precision floating-point arithmetic
- Thermal power and power density parameters specification
- Convergence norms can now be adjusted using a single factor

ALTERATIONS AND ENHANCEMENTS

- Improve edge-based impact ionization model to prevent potential convergence issues

VERSION 1.3.0

NEW FEATURES

- Minimum intrinsic concentration specification
- Silicon carbide materials
- Anisotropic mobility model
- Anisotropic impact ionization model

ALTERATIONS AND ENHANCEMENTS

- Overlapping contacts are now joined together
- Bias run-time output now displays tunneling currents
- Improve convergence criteria to prevent potential convergence issues
- Improve parabolic and thermionic emission and tunneling models to prevent potential convergence issues