

ModelLib

Release Notes

12/16/11

BIPOLAR

BJT

Version 1.8.14

ALTERATIONS AND ENHANCEMENTS

- Spectre compatibility mode: parasitic resistances smaller than MINR model parameter are removed and corresponding nodes collapsed

Version 1.8.13

ALTERATIONS AND ENHANCEMENTS

- Spectre compatibility mode: collapse or limit series parasitic resistances when local model parameter MINR or global option parameter MINR is used

Version 1.8.12

ALTERATIONS AND ENHANCEMENTS

- Bandwidth accounted for thermal noise

Version 1.8.9

ALTERATIONS AND ENHANCEMENTS

- Improve bypass algorithm for model evaluation, when using options bypass=1 or bypass=2

Version 1.8.7

ALTERATIONS AND ENHANCEMENTS

- TLEV=3 scaling implementation

Version 1.8.6

ALTERATIONS AND ENHANCEMENTS

- TLEV (TEMPLEV)=3 temperature scaling implementation

Version 1.8.5

ALTERATIONS AND ENHANCEMENTS

- HSPICE compatibility mode: JCAP (DCAP) option dependent default parameter value

Version 1.8.4

ALTERATIONS AND ENHANCEMENTS

- HSPICE compatibility mode: Modify the initial setup and clipping of IBE and IBC parameters

Version 1.8.3

ALTERATIONS AND ENHANCEMENTS

- HSPICE compatibility mode: Default values of TLEV and TLEVC parameters to 1 if ASPEC option parameter is used

Version 1.8.1

ALTERATIONS AND ENHANCEMENTS

- SOA check enhancement, new model parameter VCS_MAX introduced

PBJT

Version 1.8.5

ALTERATIONS AND ENHANCEMENTS

- Parameter EXSUB controls evaluation of reverse base currents I_{sub} and X_{sub} . When EXSUB=1 V_{sc4} dependant component of main current of parasitic transistor is included.

Version 1.8.1

NEW FEATURES

- Release Mextram504 version 9 (v504.9)
 - Lower clip value added for parameter TVGEB
 - External voltages V_{se} , V_{bs} and V_{sc} added to operating point information
 - Parameters for collector substrate current description (ICSS and ASUB)

ALTERATIONS AND ENHANCEMENTS

- Correct order and evaluation for noise sources

CAPACITANCE

CAP

Version 1.8.13

ALTERATIONS AND ENHANCEMENTS

- Revert functionality to Charge-based model to version 1.8.10.R
- Remove EXPBYPASS functionality
- Revert back CAP_MNA_FORMULA functionality

Version 1.8.10

ALTERATIONS AND ENHANCEMENTS

- Charge-based model improved
- Use ctype device parameter to select charge computation model:
 - ctype=0 depends on voltage across the capacitor
 - ctype=1 depends on voltage of other circuit nodes.

Version 1.8.8

ALTERATIONS AND ENHANCEMENTS

- Spectre compatibility mode: Parameter cjsw can be used as an alias to capsw

Version 1.8.6

ALTERATIONS AND ENHANCEMENTS

- Correct EXPBYPASS feature if expression contains temperature dependent parameter while voltages do not change

Version 1.8.5

- SmartSpiceRF: Improve Non-linear Capacitances over Periodic Steady-State for Small-Signal analyses

Version 1.8.4

ALTERATIONS AND ENHANCEMENTS

- New threading scheme applies to the following capacitors:
 - Constant, having no run-time expression
 - No voltage dependence
 - No SOA check

Version 1.8.2

ALTERATIONS AND ENHANCEMENTS

- Nonlinear capacitor performance improvement
- Performance improvements in nonlinear capacitor evaluation
- CAP_MNA_FORMULA scheme has been removed

Version 1.8.1

ALTERATIONS AND ENHANCEMENTS

- HSPICE compatibility mode: CEFF parameter takes into account device multiplier

CONTROLLED VOLTAGE

ASRC

Version 1.8.9

ALTERATIONS AND ENHANCEMENTS

- Parameter f_{min} behavior for VCR in G-device

Version 1.8.8

ALTERATIONS AND ENHANCEMENTS

- Improve evaluation in Laplace transform function

Version 1.8.7

ALTERATIONS AND ENHANCEMENTS

- Correct time step too small in VCCS Table

Version 1.8.6

ALTERATIONS AND ENHANCEMENTS

- SmartSpiceRF: Improve Harmonic Balance analyses

Version 1.8.5

ALTERATIONS AND ENHANCEMENTS

- Enhance syntax for VCCAP to support behavior and multi-input table model

Version 1.8.4

ALTERATIONS AND ENHANCEMENTS

- Fix derivative calculation of table with two expressions

Version 1.8.3

ALTERATIONS AND ENHANCEMENTS

- Improve table with two expressions to support derivatives on a surface

Version 1.8.2

ALTERATIONS AND ENHANCEMENTS

- Enhance the table to support multi-input

Version 1.8.1

ALTERATIONS AND ENHANCEMENTS

- Correct functionality of VCVS in the AC domain

CCCS

Version 1.8.1

ALTERATIONS AND ENHANCEMENTS

- Correct functionality of VCVS in the AC domain

VCVS

Version 1.8.5

NEW FEATURES

- Support runtime expression for voltage gain

ALTERATIONS AND ENHANCEMENTS

- Revert back to 1.8.4.R for AC behaviour for min/max parameters

Version 1.8.4

ALTERATIONS AND ENHANCEMENTS

- Fix AC behaviour if min/max parameters

Version 1.8.1

ALTERATIONS AND ENHANCEMENTS

- Fix dissipated power computation so negative values are no longer reported

DIODE

DIODEL500

Version 1.8.1

NEW FEATURES

- HSPICE compatibility mode: Add level=5

DIODELEVELS13

Version 1.8.21

NEW FEATURES

- Implicit elimination of internal nodes connected to series resistances RS and RSW. Activate by option parameter hsimpspeed=3.

Version 1.8.20

ALTERATIONS AND ENHANCEMENTS

- Spectre compatibility mode: Use MINR option parameter instead of RESMIN to control collapsing of the parasitic resistors

Version 1.8.19

ALTERATIONS AND ENHANCEMENTS

- Spectre compatibility mode: Collapse series resistances based on local model parameter MINR and global option parameter RESMIN. All parasitic resistors inside devices less than global option parameter RESMIN are removed.
- Bandwidth is accounted for thermal noise

Version 1.8.17

NEW FEATURES

- Parameter RESMIN controls the minimum diode series resistance

Version 1.8.16

ALTERATIONS AND ENHANCEMENTS

- Spectre compatibility mode: Correct effective area and perimeter

Version 1.8.14

NEW FEATURES

- New output variables for depletion and diffusion capacitances (CDEP, CDEPBOT, CDEPPER and CDIFF)

Version 1.8.12

ALTERATIONS AND ENHANCEMENTS

- Correct implementation of the limited currents for the sidewall breakdown current component.
- HSPICE compatibility mode: Set default value of EXPLI parameter to 0

Version 1.8.11

ALTERATIONS AND ENHANCEMENTS

- HSPICE compatibility mode: Correct temperature scaling of the reverse tunneling saturation currents
- Spectre compatibility mode: Involve the reverse tunneling current into knee current correction
- Add pnjlim control of the Newton correction step in the presence of reverse tunneling current

Version 1.8.10

ALTERATIONS AND ENHANCEMENTS

- COMPATIBLE parameter default set to SmartSpice mode

- HSPICE compatibility mode: Clip the low saturation current values after temperature scaling

Version 1.8.9

ALTERATIONS AND ENHANCEMENTS

- COMPATIBLE parameter default set to HSPICE mode

Version 1.8.8

ALTERATIONS AND ENHANCEMENTS

- HSPICE compatibility mode: Default values of TLEV and TLEVC parameters set to 1 if ASPEC option parameter

Version 1.8.7

ALTERATIONS AND ENHANCEMENTS

- HSPICE compatibility mode: Adapt the breakdown voltage correction scheme
- Report negative values of breakdown current parameter IBV and reset it to its absolute value

Version 1.8.6

ALTERATIONS AND ENHANCEMENTS

- Improve Ask() routine to output Diode current for AC and SmartSpiceRF Shooting method analyses

Version 1.8.5

ALTERATIONS AND ENHANCEMENTS

- Improve Bypass code

Version 1.8.4

ALTERATIONS AND ENHANCEMENTS

- SOA check enhancement

Version 1.8.3

ALTERATIONS AND ENHANCEMENTS

- HSPICE compatibility mode: Account for the GMIN (DCGMIN) contribution when total diode current is accessed as an output variable

Version 1.8.2

ALTERATIONS AND ENHANCEMENTS

- Spectre compatibility mode: Set the default value for the expli (imelt) model parameter to the corresponding netlist option
- HSPICE compatibility mode: Apply the area scaling of expli model parameter

Version 1.8.1

ALTERATIONS AND ENHANCEMENTS

- HSPICE compatibility mode: MINR parameter default changed to 0
- Spectre compatibility mode: MINR parameter default maintained as 0.1

INDEPENDANT VOLTAGE

ISRC

Version 1.8.7

ALTERATIONS AND ENHANCEMENTS

- Correct dcValue fill

Version 1.8.2

ALTERATIONS AND ENHANCEMENTS

- New syntax supported for ISRC device

Version 1.8.1

ALTERATIONS AND ENHANCEMENTS

- Pseudo random-bit generator (PRBS) current source

NOCS

Version 1.8.4

ALTERATIONS AND ENHANCEMENTS

- Account for Frequency bandwidth in white noise for timing jitter analysis

PORT

Version 1.8.8

ALTERATIONS AND ENHANCEMENTS

- Input parameter NumberTonesSpecified is updated if calculated frequency is out of bandwidth for SmartSpiceRF

Version 1.8.6

ALTERATIONS AND ENHANCEMENTS

- Correct parameter NumberTonesSpecified fill

Version 1.8.4

ALTERATIONS AND ENHANCEMENTS

- Improve processing of time-domain defined sources for HB analysis
- Improve dynamically allocated vectors from given number of harmonics

Version 1.8.1

ALTERATIONS AND ENHANCEMENTS

- Enhance device to support LFSR and PWL functions

VSRC

Version 1.8.15

ALTERATIONS AND ENHANCEMENTS

- Input parameter NumberTonesSpecified has to be updated if calculated frequency is out of bandwidth

Version 1.8.13

NEW FEATURES

- Enhance PULSE with runtime expressions (V1 and V2)

Version 1.8.12

ALTERATIONS AND ENHANCEMENTS

- Fix array bound read error during rise/fall time calculation for option "risetime"

Version 1.8.11

NEW FEATURES

- 'RISETIME'/'RISETI' option support

Version 1.8.10

NEW FEATURES

- Sine with runtime expressions

Version 1.8.9

ALTERATIONS AND ENHANCEMENTS

- Improve handling of the following parameters: SIN2, ZTRISE, ZTFALL, RNORM, RHIZ, SD, and TS

Version 1.8.7

ALTERATIONS AND ENHANCEMENTS

- Correct incorrect breakpoints setup under Rubberband

Version 1.8.6

ALTERATIONS AND ENHANCEMENTS

- SmartSpice RF: Processing of time-domain defined sources for HB analyses
- SmartSpice RF: Dynamically allocate vectors upon given number of Harmonics

Version 1.8.4

ALTERATIONS AND ENHANCEMENTS

- PWL voltage source uses the DC value instead of PWL at time 0 if pseudo-transient analysis is used inside DC

Version 1.8.3

ALTERATIONS AND ENHANCEMENTS

- Correct negative values in PWLZ

Version 1.8.2

NEW FEATURES

- Pseudo random-bit generator (PRBS) voltage source has been implemented

INDUCTANCE

IND

Version 1.8.4

ALTERATIONS AND ENHANCEMENTS

- Correct initial current condition for transient analysis

Version 1.8.3

KNOWN ISSUES AND WORKAROUNDS

- Fix EXPBYPASS feature if expression contained temperature dependent parameters while voltages did not change

Version 1.8.2

ALTERATIONS AND ENHANCEMENTS

- Improve calculation of non-linear Inductances over Periodic Steady-State for Small-Signal analyses

Version 1.8.1

ALTERATIONS AND ENHANCEMENTS

- Performance improvements in nonlinear inductor evaluation

MUT

Version 1.8.4

KNOWN ISSUES AND WORKAROUNDS

- Correct initial current condition for transient analysis

Version 1.8.3

KNOWN ISSUES AND WORKAROUNDS

- Fix EXPBYPASS feature if expression contained temperature dependent parameters while voltages did not change

Version 1.8.2

ALTERATIONS AND ENHANCEMENTS

- Improve calculation of non-linear Inductances over Periodic Steady-State for Small-Signal analyses

Version 1.8.1

ALTERATIONS AND ENHANCEMENTS

- Performance improvements in nonlinear inductor evaluation

MOSFET

BSIM3V3

Version 1.8.28

ALTERATIONS AND ENHANCEMENTS

- LINT parameter value is taken into account for the evaluation of the parasitic resistances in the model setup phase if the selected area calculation method (ACM) is 5 (Spectre compatible ACM)

Version 1.8.26

ALTERATIONS AND ENHANCEMENTS

- Adaptation of the implicit node elimination algorithm (selected by option parameter HSIMSPEED=3) to be used also in combination with the option parameter VZERO>0.
- Eliminating fatal errors if the parameters SA or SB are less or equal zero for STIMOD=1, and if any of the parameters SA1-SA10 as well as SB1-SB10 are less or equal zero for STIMOD=2. If any of the above STIMOD parameters are less or equal zero for STIMOD>0, the value of STIMOD is reset to 0

Version 1.8.25

ALTERATIONS AND ENHANCEMENTS

- HSPICE compatibility mode: LINT parameter replaces the parameter LD in ACM calculation of effective access resistances
- HSPICE compatibility mode: The default ACM value is used in parasitic resistance calculation if $ACM > 3$

Version 1.8.24

ALTERATIONS AND ENHANCEMENTS

- Spectre compatibility mode: Collapse series resistances based on local model parameter MINR and global option parameter MINR
- All parasitic resistors inside devices less than the local or the global option parameter MINR are removed. The order of checking inside devices are the follows:
 1. If resistors are smaller than the local MINR the resistor are collapsed and warning messages are issued
 2. All remaining parasitic resistors less than the global option parameter MINR are removed and warning messages are issued
 3. If a resistor is not removed and its value is smaller than 0.001, then a warning message is issued

Version 1.8.23

ALTERATIONS AND ENHANCEMENTS

- Handle round-off error for NPEAK and NGATE model parameters

Version 1.8.21

ALTERATIONS AND ENHANCEMENTS

- A hierarchical option `hsimspeed` allows to use a different transistor terminal RS/RD reduction techniques on different circuit hierarchy levels

Version 1.8.18

ALTERATIONS AND ENHANCEMENTS

- Correct math library functions to improve floating point calculations

Version 1.8.17

ALTERATIONS AND ENHANCEMENTS

- HSPICE compatibility mode: Default value of IMAX model parameter is 0
- Implementing TSMC Safe Operation Area (SOA) specification v0.4

Version 1.8.15

ALTERATIONS AND ENHANCEMENTS

- Code optimization for implicit series resistance elimination in `hsimspeed=3` mode.
- Default parameter `CJ=0` if `ASPEC` option parameter is given and `LEVEL=49`

Version 1.8.11

ALTERATIONS AND ENHANCEMENTS

- HSPICE compatibility mode: Default `TLEV` to 1, `TLEVC` to 1 and `ACM` to 1 when option `ASPEC` is used

Version 1.8.10

NEW FEATURES

- RSRD collapsing scheme. Activate by setting `.option hsimspeed=3` in the netlist

Version 1.8.9

ALTERATIONS AND ENHANCEMENTS

- HSPICE compatibility mode: Use MJ, MJSW and MJSWG parameters if their values are close to 1 to avoid singular depletion capacitance charges.

Version 1.8.8

ALTERATIONS AND ENHANCEMENTS

- Default value for MINR model parameter has been changed from 1.0e-9 to 1.0e-5 for levels 49 and 53
- Spectre compatibility mode: internal series resistance node collapsing scheme now uses RESMIN circuit parameter to determine if nodes are collapsed

Version 1.8.7

ALTERATIONS AND ENHANCEMENTS

- Improve scaling in multi-threading for model calculations

Version 1.8.6

ALTERATIONS AND ENHANCEMENTS

- Support hierarchical accuracy options

Version 1.8.5

ALTERATIONS AND ENHANCEMENTS

- Enhance SOA check feature. New model parameter VBS_MAX to check maximum Vbs terminal voltage:

Version 1.8.1

ALTERATIONS AND ENHANCEMENTS

- Improve first order extrapolation of the charge for bypass procedure.

BSIM4

Version 1.8.35

ALTERATIONS AND ENHANCEMENTS

- Default value of the RGEOMOD flag parameter to 0

Version 1.8.34

ALTERATIONS AND ENHANCEMENTS

- Improve convergence control to reverse bulk-source and bulk-drain voltages if IGBMOD>0

Version 1.8.33

ALTERATIONS AND ENHANCEMENTS

- HSPIICE compatibility mode: Evaluate series parasitic resistances. If the source (drain) contact resistance is 0 and the contribution of the corresponding diffusion source (drain) resistance for RGEOMOD=1 is also 0, than the diffusion source (drain) resistance is set to 1e-3 Ohm.

Version 1.8.31

ALTERATIONS AND ENHANCEMENTS

- Adaptation of the implicit node elimination algorithm (selected by option parameter HSIMSPEED=3) to be used also in combination with the option parameter VZERO>0.

Version 1.8.30

ALTERATIONS AND ENHANCEMENTS

- Spectre compatibility mode: Collapse series resistances, based on local model parameter MINR and global option parameter MINR

Version 1.8.29

ALTERATIONS AND ENHANCEMENTS

- Bandwidth is accounted for thermal noise.

Version 1.8.28

ALTERATIONS AND ENHANCEMENTS

- Handle round-off error for the following model parameters: NDEP, NSD, LNDEP, LNSD, LNGATE, WNDEP, WNSD, WNGATE, PNDEP, PNSD, and PNGATE

Version 1.8.27

ALTERATIONS AND ENHANCEMENTS

- Issue warnings on negative Gm, Gds and Gmbs conductances

Version 1.8.25

ALTERATIONS AND ENHANCEMENTS

- Handle round-off error for NGATE model parameter

Version 1.8.23

ALTERATIONS AND ENHANCEMENTS

- Prevent negative Gds in the model evaluation

Version 1.8.22

ALTERATIONS AND ENHANCEMENTS

- Prevent negative Gmbs in the model evaluation
- Spectre compatibility mode: Control internal source and drain resistances based on the model parameter MINR

Version 1.8.21

ALTERATIONS AND ENHANCEMENTS

- Prevent negative Gm in the model evaluation
- Create warning message for negative CIT model parameter

Version 1.8.20

ALTERATIONS AND ENHANCEMENTS

- Hierarchical option hsim speed' allows a different transistor terminal RS/RD reduction technique on different circuit hierarchy levels

Version 1.8.18

NEW FEATURES

- Improve DIBL/Rout model from BSIMSOI
- Improve GIDL/GISL model from BSIMSOI
- Improve sub-threshold temperature dependence
- Improve thermal noise model (tnoiMod=2)
- limiting of diode ideality factor (NJS,NJD) and new parameter "mtrlCompatMod" to ensure consistent results of mtrlMod=0 versus mtrlMod=1

ALTERATIONS AND ENHANCEMENTS

- Berkeley BSIM4.7 model of April 2011 now available

Version 1.8.16

ALTERATIONS AND ENHANCEMENTS

- SOA check enhancement
- Implementing TSMC Safe Operation Area (SOA) specification v0.4

Version 1.8.15

ALTERATIONS AND ENHANCEMENTS

- Code optimization for implicit series resistance elimination in hsimspeed=3 mode

Version 1.8.14

ALTERATIONS AND ENHANCEMENTS

- Set minimum value for series resistances in the implicit RsRd method

Version 1.8.12

ALTERATIONS AND ENHANCEMENTS

- HSPICE compatibility mode: TLEV model parameter default set to 1 if ASPEC option is given
- Internal charges are now computed and correctly displayed in TRANOP mode

Version 1.8.11

ALTERATIONS AND ENHANCEMENTS

- RSRD collapsing scheme. Activate by .option hsim speed=3 in the netlist

Version 1.8.9

ALTERATIONS AND ENHANCEMENTS

- Spectre compatibility mode: Internal series resistance node collapsing scheme has been implemented. If RS/RD values are less than RESMIN circuit parameter then corresponding internal nodes are collapsed
- limit NF in RSC/RDC scaling if nodes are collapsed

Version 1.8.8

ALTERATIONS AND ENHANCEMENTS

- New model feature that tradeoffs between accuracy and simulation efficiency.
- Setting the Hsim parameter value hsim speed=4, the external series resistances are analytically incorporated into the effective internal drain-source resistance used with the model selector RDSMOD=0 and the internal source and drain nodes are collapsed

Version 1.8.6

ALTERATIONS AND ENHANCEMENTS

- Hierarchical accuracy options. Can specify different accuracy options for different hierarchy levels of circuit

Version 1.8.4

ALTERATIONS AND ENHANCEMENTS

- SOA check enhancement. New model parameter VBS_MAX

BSIMMG104

Version 1.8.2

ALTERATIONS AND ENHANCEMENTS

- Expanded functionality for extrinsic source and drain contact resistance given by parameters RSC and RDC respectively. When $RSC > 0$ or $RDC > 0$ external contact resistances even when $RDSMOD = 0$. When $RDSMOD = 1$ contact resistance added to external resistance components

Version 1.8.1

ALTERATIONS AND ENHANCEMENTS

- Fix incorrect M scaling of external series resistance

HISIMHV

Version 1.8.12

ALTERATIONS AND ENHANCEMENTS

- Additional output for alias parameters
- Requires SmartSpice 4.3.2 or later

Version 1.8.11

ALTERATIONS AND ENHANCEMENTS

- Release HiSIM_HV 1.2.2 (June. 29 2011)

Version 1.8.7

ALTERATIONS AND ENHANCEMENTS

- Correct output of internal model warnings

Version 1.8.6

ALTERATIONS AND ENHANCEMENTS

- Implemented TSMC SOA specification v0.4

Version 1.8.5

ALTERATIONS AND ENHANCEMENTS

- Release HiSIM_HV 1.2.1 (Nov. 2 2010)

Version 1.8.4

ALTERATIONS AND ENHANCEMENTS

- Implement Geometry binning, all geometry scaling factors for binning set to unity

Version 1.8.3

ALTERATIONS AND ENHANCEMENTS

- Output variable for 1/f is changed to .loverf

Version 1.8.2

ALTERATIONS AND ENHANCEMENTS

- Enhance SOA check feature with parameter VBS_MAX for $|V_{bs}| > V_{bs_max}$

Version 1.8.1

ALTERATIONS AND ENHANCEMENTS

- Add alias parameters for UTMOST III cosubnod : cosubnode, lcvdsovr : lcvdsover, wcvdsovr : wcvdsover, pcvdsovr : pcvdsover

HISIMHVREF

Version 1.8.7

ALTERATIONS AND ENHANCEMENTS

- Release HiSIM_HV 1.2.2 (June 29 2011)

Version 1.8.3

ALTERATIONS AND ENHANCEMENTS

- Fix uninitialised model variables
- Correct output of internal model warnings

Version 1.8.2

ALTERATIONS AND ENHANCEMENTS

- Release HiSIM_HV 1.2.1

Version 1.8.1

ALTERATIONS AND ENHANCEMENTS

- Add alias parameters for UTMOST III cosubnod : cosubnode, lcvdsovr : lcvdsover, wcvdsovr : wcvdsover, pcvdsovr : pcvdsover

HISIMREF

Version 1.8.6

ALTERATIONS AND ENHANCEMENTS

- Release HiSIM 2.6.0 (December 13 2011)

Version 1.8.2

ALTERATIONS AND ENHANCEMENTS

- Release HiSIM 2.5.1 (April 11 2011)

HVMOS

Version 1.8.2

ALTERATIONS AND ENHANCEMENTS

- Fix rounding issue for Ngate parameter

Version 1.8.1

ALTERATIONS AND ENHANCEMENTS

- Limiting parameters MJ, MJSW and MJSWG when close to 1 to avoid singular depletion capacitance charge evaluation

MOSLEVELS123

Version 1.8.10

ALTERATIONS AND ENHANCEMENTS

- Spectre compatibility mode: Collapse or limit series parasitic resistances, based on local model parameter MINR and global option parameter MINR

Version 1.8.9

ALTERATIONS AND ENHANCEMENTS

- HSPICE compatibility mode: Evaluate the default value of the surface mobility parameter U0 (if U0 not given and the transconductance parameter KP is given) from KP

Version 1.8.8

ALTERATIONS AND ENHANCEMENTS

- HSPICE compatibility mode: Set correct default values of surface mobility (U0) and transconductance (KP) parameters

Version 1.8.7

ALTERATIONS AND ENHANCEMENTS

- HSPICE compatibility mode: Correct usage of capacitance and charge models

Version 1.8.4

ALTERATIONS AND ENHANCEMENTS

- Use Berkeley code for vdsat derivatives

Version 1.8.3

ALTERATIONS AND ENHANCEMENTS

- Correct evaluation of the MOS level 3 drain current derivatives in saturation operation region

Version 1.8.1

ALTERATIONS AND ENHANCEMENTS

- Calculate default value (if it is not specified) for parameter KP from parameters UO and TOX(COX).
- HSPICE compatibility mode: Default value of parameter UO for PMOS devices is modified

PSP

Version 1.8.2

ALTERATIONS AND ENHANCEMENTS

- Enhanced SOA functionality to meet TSMC specification v0.4

Version 1.8.1

ALTERATIONS AND ENHANCEMENTS

- Enhanced SOA check feature by adding parameter VBS_MAX

NPORT

NPORT

Version 1.8.27

ALTERATIONS AND ENHANCEMENTS

- S element support:
2 new model/instance parameters - DELAYHANDLE=0|1|on|off and DELAYFREQ=val

Version 1.8.26

ALTERATIONS AND ENHANCEMENTS

- Default value for the HIFGPASSFILTERTYPE model parameter is changed from QUADRATIC to TUKEY.

Version 1.8.25

NEW FEATURES

- New model parameter HIFGPASSFILTERTYPE has been added to specify the high pass filter type.

Version 1.8.23

ALTERATIONS AND ENHANCEMENTS

- Default value for the model parameter LOSSY is 1.
- Default value for the model parameter SCALECONV is 1.
- Add HIFGPASSFILTER model parameter. It specifies the percentage of the spectrum which will be filtered by high pass filter.

Version 1.8.22

ALTERATIONS AND ENHANCEMENTS

- Passivity check (in S-element)

Version 1.8.21

NEW FEATURES

- New model parameter CURR has been added. When CURR=1 new currents contributions formula will be used during convolution. Default is 1.

Version 1.8.20

NEW FEATURES

- New model parameter SCALECONV has been added. Activate scaling currents in convolution

Version 1.8.19

MEW FEATURES

- Model parameter LOSSY=1 removes positive resistor

Version 1.8.18

NEW FEATURES

- Model parameter LOSSY blocked for RF analyses

Version 1.8.17

ALTERATIONS AND ENHANCEMENTS

- Fix incorrect behaviour with pseudo-transient analysis

Version 1.8.16

ALTERATIONS AND ENHANCEMENTS

- New model parameter ZC has been added to specify resistor values for lossy algorithm.

Syntax:

```
.model smodel s tstonefile=touchstone.s4p lossy=1 zc=10
```

- Spline interpolation is used to calculate Y-parameters for 0 point frequency if it is not specified in the touchstone file and the transient analysis is performed.

Version 1.8.13

ALTERATIONS AND ENHANCEMENTS

- New implementation of S-element.

Version 1.8.7

ALTERATIONS AND ENHANCEMENTS

- Fix DCOP calculation for AC analysis in case if the first frequency point is non zero.

Version 1.8.5

ALTERATIONS AND ENHANCEMENTS

- New impulse response and convolution calculation algorithms has been implemented under .option NPORTALG=0
- Fix DCOP calculation in case if the first frequency point is not zero
- Fix linear interpolation when two angles both are close to the 180 degrees
- Do not force the linear interpolation in the transient analysis

Version 1.8.3

ALTERATIONS AND ENHANCEMENTS

- Incorrect synthesis of S-element equivalent scheme

Version 1.8.1

ALTERATIONS AND ENHANCEMENTS

- Correct formation of a Foster"s network

RESISTANCE

RES

Version 1.8.16

ALTERATIONS AND ENHANCEMENTS

- Bandwidth is accounted for thermal noise.

Version 1.8.15

ALTERATIONS AND ENHANCEMENTS

- Spectre compatibility mode: Add Tran Noise Produce (Timing Jitter)

Version 1.8.9

ALTERATIONS AND ENHANCEMENTS

- Fix EXPBYPASS feature if expression contains temperature dependent parameters while voltages are constant

Version 1.8.8

ALTERATIONS AND ENHANCEMENTS

- Improve evaluation of non-linear Resistances over Periodic Steady-State for Small-Signal analyses

Version 1.8.7

ALTERATIONS AND ENHANCEMENTS

- Correct Timing Jitter Analysis

Version 1.8.2

ALTERATIONS AND ENHANCEMENTS

- Spectre compatibility mode: Add instance parameters KF, AF, EF (FEXP), LDEXP, WDEXP

Version 1.8.1

ALTERATIONS AND ENHANCEMENTS

- HSICE compatibility mode: REFF parameter now takes into account device multiplier

SOI

BSIM3SOIV3

Version 1.8.4

ALTERATIONS AND ENHANCEMENTS

- Warning for too small effective drain and source perimeters ($P_{\text{deff}} < W_{\text{eff}}$ or $P_{\text{seff}} < W_{\text{eff}}$) only if corresponding instance parameters PS and PD given. Small P_{deff} or P_{seff} values are clipped independantly of parameters PS or PD given.

BSIMSOI4

Version 1.8.6

ALTERATIONS AND ENHANCEMENTS

- Fix issue in loading of charge thermal derivatives

Version 1.8.2

NEW FEATURES

- BSIMSOI4.4 now available

Version 1.8.1

NEW FEATURES

- BSIMSOI4.1 now available

SWITCHES

SW

Version 1.8.2

ALTERATIONS AND ENHANCEMENTS

- Correct calculation of interval control voltages. Boundaries included in conditions to determine if relay is open or closed. Boundaries are not used when determining transition phase. calculation of a 4 terminal relay (spectre style).

Version 1.8.1

ALTERATIONS AND ENHANCEMENTS

- When the switch element is used as a four terminal relay (Spectre style) the resistance of the element depends on control voltage. Resistance was not calculated when control voltage was equal to the parameters VT1 and VT2

TFT

RPIASI

Version 1.8.5

ALTERATIONS AND ENHANCEMENTS

- Improve bypass method for latent devices when option BYPASS has value 1 or 2
- Improve implicit elimination of internal nodes connected to source/drain ports by parasitic resistance. Activated by option parameter hsimspeed=3.

RPIPSI

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TRANSMISSION LINE

TRA

Version 1.8.1

ALTERATIONS AND ENHANCEMENTS

- When parameters NL, F and TD are given in a device statement NL and F now take precedence over TD. Effective time delay is computed as NL/F

WTRA

Version 1.8.7

ALTERATIONS AND ENHANCEMENTS

- Improve SCALE parameter value dependant on a given G value