# SimElectronics® Release Notes

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*SimElectronics® Release Notes*



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# Contents

# Summary by Version

This table provides quick access to what's new in each version. For clarification, see "Using Release Notes" on page 2.

| Version (Release) | New Features and Changes | Version Compatibility Considerations | Fixed Bugs and Known Problems |
|---|---|---|---|
| **Latest Version V2.1 (R2012a)** | Yes<br>Details | No | Bug Reports |
| V2.0 (R2011b) | Yes<br>Details | Yes<br>Summary | Bug Reports |
| V1.6 (R2011a) | Yes<br>Details | Yes<br>Summary | Bug Reports |
| V1.5 (R2010b) | Yes<br>Details | No | Bug Reports |
| V1.4 (R2010a) | Yes<br>Details | Yes<br>Summary | Bug Reports<br>Includes fixes |
| V1.3 (R2009b) | Yes<br>Details | Yes<br>Summary | Bug Reports |
| V1.2 (R2009a) | Yes<br>Details | No | Bug Reports |
| V1.1 (R2008b) | Yes<br>Details | No | Bug Reports<br>Includes fixes |
| V1.0 (R2008a+) | Yes<br>Details | Not applicable | Bug Reports |

## Using Release Notes

Use release notes when upgrading to a newer version to learn about:

- New features
- Changes
- Potential impact on your existing files and practices

Review the release notes for other MathWorks® products required for this product (for example, MATLAB® or Simulink®). Determine if enhancements, bugs, or compatibility considerations in other products impact you.

If you are upgrading from a software version other than the most recent one, review the current release notes and all interim versions. For example, when you upgrade from V1.0 to V1.2, review the release notes for V1.1 and V1.2.

## What Is in the Release Notes

### New Features and Changes

- New functionality
- Changes to existing functionality

### Version Compatibility Considerations

When a new feature or change introduces a reported incompatibility between versions, the **Compatibility Considerations** subsection explains the impact.

Compatibility issues reported after the product release appear under Bug Reports at the MathWorks Web site. Bug fixes can sometimes result in incompatibilities, so review the fixed bugs in Bug Reports for any compatibility impact.

### Fixed Bugs and Known Problems

MathWorks offers a user-searchable Bug Reports database so you can view Bug Reports. The development team updates this database at release time

and as more information becomes available. Bug Reports include provisions for any known workarounds or file replacements. Information is available for bugs existing in or fixed in Release 14SP2 or later. Information is not available for all bugs in earlier releases.

Access Bug Reports using your MathWorks Account.

## Documentation on the MathWorks Web Site

Related documentation is available on `mathworks.com` for the latest release and for previous releases:

- Latest product documentation
- Archived documentation

# Version 2.1 (R2012a) SimElectronics Software

| New Features and Changes | Version Compatibility Considerations | Fixed Bugs and Known Problems |
|---|---|---|
| Yes<br>Details below | No | Bug Reports |

New features and changes introduced in this version are:



## Thermal Ports Available for Actuator Blocks and for Solar Cell Block

All the blocks in the Rotational Actuators and Translational Actuators libraries, as well as the Solar Cell block in the Sources library, can now have optional thermal ports. By default, the thermal ports are not displayed. To expose the thermal port, right-click on the relevant block in your model, and from the context menu select **Simscape block choices > Show thermal port**. This action displays the thermal port H on the block icon, and adds the **Thermal port** tab to the block dialog box.

This functionality is not always available for blocks in existing models, depending on when the model was last saved. If you right-click on a block in a model saved in a previous version, and the context menu item **Simscape**

**block choices** does not appear, make a new copy of the block from the SimElectronics® library.

## Fully Differential Op-Amp Block

The new Fully Differential Op-Amp block in the Integrated Circuits library models an operational amplifier with fully differential output, that is, not referenced to ground. The output common-mode voltage is controlled by the common-mode port `cm`. Internal resistors set the nominal output common-mode voltage to be midway between the values you provide for the positive and negative supply voltages. Applications include data acquisition where inputs are differential, for example, sigma-delta converters.

The block provides a behavioral model of a fully differential operational amplifier. It does not represent nonlinear effects, such as variation in gain with output voltage amplitude, and the nonlinear nature of the output voltage-current relationship for large load currents.

## Transmission Line Block

The new Transmission Line block in the Passive Devices library lets you model a transmission line either by using delays, or by a lumped parameter model. Use the delay-based models for better simulation performance at system level. The lossless delay-based model represents an ideal transmission line.

## Power Sensor Block

The new Power Sensor block in the Sensors library calculates the power taken by the load connected across the + and - terminals under the assumption that only the load is connected to the + terminal.

The sensor can return either instantaneous power, or power averaged over a fixed time period. The latter option is useful when working with periodic current and voltage waveforms, such as those associated with PWM control.

For an example of using this block, see the Flyback Converter demo.

## Induction Motor Block Usability Enhancement

The usability of the Induction Motor block has been improved. In previous versions, when setting **Model parameterization** to `By motor ratings`, you had to provide a value for either the motor starting current or maximum torque. This group of parameters has been removed, and instead the **Rated RMS line current** parameter value is used to determine the total motor inductance. In existing models, if you used consistent values for **RMS starting (or locked rotor) line current** and **Rated RMS line current**, simulation results are the same as in previous versions.

## Controlled PWM Voltage Block Enhancement

The Controlled PWM Voltage block has two new parameters, **Pulse delay time** and **Pulse width offset**. Use these parameters to add a small turn-on delay and a small turn-off advance. This can be helpful when fine-tuning switching times, to minimize switching losses.

## Exponential Diode Block Now Models Charge Dynamics

The Diode block now lets you model charge dynamics. The Exponential diode model contains an additional set of parameters that let you either specify values for the transit time and carrier lifetime directly, or calculate them using the peak reverse current and reverse recovery time. This functionality is especially useful for applications such as commutation diodes.

## New Demos

Demos introduced in this version are:

- Controllable Phase Shifter
- Low-Pass Filter Using Operational Transconductance Amplifiers
- Fourth-Order Sallen-Key Lowpass Filter
- Flyback Converter

# Version 2.0 (R2011b) SimElectronics Software

| New Features and Changes | Version Compatibility Considerations | Fixed Bugs and Known Problems |
|---|---|---|
| Yes<br>Details below | Yes<br>Summary | Bug Reports |

New features and changes introduced in this version are:



## Thermal Ports Available for Semiconductor Blocks

All the blocks in the Semiconductors library, as well as the Photodiode and Light-Emitting Diode blocks in the Sensors library, can now have optional thermal ports. By default, the thermal ports are not displayed. To expose the thermal port, right-click on the relevant block in your model, and from the context menu select **Simscape block choices > Show thermal port**. This action displays the thermal port H on the block icon, and adds the **Thermal port** tab to the block dialog box.

### Compatibility Considerations

In the N-Channel IGBT block, several new parameters on the **Advanced** tab have been added, to better match the typical device datasheets. The **Forward Early voltage, VAF** parameter, with the default value of 200 V, specifies the Forward Early voltage for the PNP transistor. Previously the effect was not modeled. This means that existing models will show small differences in the current-voltage relationship associated with the PNP

bipolar transistor, compared to the previous version. Additionally, the new **Collector resistance, RC** and **Emitter resistance, RE** parameters have nonzero default values, to improve the numeric efficiency of computations. If you want to preserve the simulation results for the existing models, set **Forward Early voltage, VAF** to `1e10`, **Collector resistance, RC** to `0`, and **Emitter resistance, RE** to `0`.

## New Operational Transconductance Amplifier Block

The Operational Transconductance Amplifier block, added to the Integrated Circuits library, provides a behavioral representation of an operational transconductance amplifier. A transconductance amplifier converts an input voltage into an output current. Applications include variable frequency oscillators, variable gain amplifiers, and current-controlled filters. These applications are based on the fact that the transconductance gain is a function of current flowing into the control current pin.

The block does not model the detailed transistor implementation. This results in faster simulation, but the model is only valid when operating in the linear region, that is, where the device input resistance, output resistance, and transconductance gain all depend linearly on the control current, and are independent of input signal amplitude.

## New Push-Pull Output Block

The Push-Pull Output block, added to the Integrated Circuits library, provides a behavioral representation of a CMOS complementary output stage. To improve simulation speed, the block does not model all the internal individual MOSFET devices that make up the gate You can use this block to create a representative output current-voltage relationship when defining an integrated circuit model behavior with Physical Signal blocks from the Simscape™ Foundation library. For an example, see the Modeling an Integrated Circuit demo.

## H-Bridge Block Enhancements

The following enhancements have been implemented for the H-Bridge block:

- In Averaged mode, a new **Load current characteristics** parameter is available with two options, `Smoothed` and `Unsmoothed or discontinuous`.

The first option assumes that the current is practically continuous due to load inductance, and corresponds to the old block behavior. For cases where the current is not smooth, or goes to zero between PWM cycles, use the `Unsmoothed or discontinuous` option, and provide values for the new **Total load series resistance**, **Total load series inductance**, and **PWM frequency** parameters. During simulation, the block uses these values to calculate a more accurate value for H-bridge output voltage that achieves the same average current as would be present if simulating in PWM mode.

- The **Freewheeling mode** parameter is now available not only in PWM mode, but also in Averaged mode in cases where you select `Unsmoothed or discontinuous` for the **Load current characteristics** parameter.
- An additional **Freewheeling mode** option, `Via two semiconductor switches and one freewheeling diode`, controls the load by maintaining one high-side bridge arm permanently on and using the PWM signal to toggle between enabling the corresponding low-side bridge arm and the opposite high-side bridge arm. This means that the block uses a freewheeling diode in parallel with a bridge arm, plus another series bridge arm, to complete the dissipation circuit when the bridge turns off.
- The block dialog box has been reorganized using tabs, to improve usability.

## DC Motor Block Supports No-Load Current Data for Rotor Damping

The DC Motor block has an additional option that lets you use no-load current data to calculate a value for rotor damping. This is helpful when the manufacturer datasheet does not provide an explicit rotor damping value.

The **Rotor damping parameterization** drop-down has been added to the **Electrical Torque** tab of the block dialog box, with the following values:

- `By damping value` — Specify a value for rotor damping directly, by using the **Rotor damping** parameter on the **Mechanical** tab. This is the default.
- `By no-load current` — The block calculates rotor damping based on the values that you specify for the **No-load current** and **DC supply voltage when measuring no-load current** parameters. If you select this option, the **Rotor damping** parameter is not available on the **Mechanical** tab.

### Compatibility Considerations

Previously, if the **Model parameterization** parameter was set to `By stall torque & no-load speed` or `By rated power, rated speed & no-load speed`, the block did not take rotor damping into account. The new block equations always include rotor damping, because it is now tied to no-load current. Therefore, rated speed and no-load speed results for existing models using these options will be slightly different than in previous versions if the model has a nonzero damping value.

If you wish to retain the original behavior, set the rotor damping to zero, and add an external Rotational Damper block (from Simscape Foundation library) across the motor R and C ports.

## New Demos

Demos introduced in this version are:

- IGBT Thermal Characteristics
- Low-Cost Voltage Regulator
- Synchronous Buck Converter With Thermal Dynamics
- Thermal Characteristics of a Synchronous Buck Converter

# Version 1.6 (R2011a) SimElectronics Software

| New Features and Changes | Version Compatibility Considerations | Fixed Bugs and Known Problems |
|---|---|---|
| Yes<br>Details below | Yes<br>Summary | Bug Reports |

New features and changes introduced in this version are:


- "Thermal Dependency Added to Semiconductor Blocks" on page 11
- "New Demos" on page 12


## Thermal Dependency Added to Semiconductor Blocks

Dialog boxes of most of the blocks in the Semiconductors library, and some related blocks, now have a new tab, **Temperature Dependence**, which lets you specify additional parameters to model the temperature dependence during simulation. For details, see reference pages of the following blocks:

- Diode
- Light-Emitting Diode
- N-Channel IGBT
- N-Channel JFET
- N-Channel MOSFET
- NPN Bipolar Transistor
- Optocoupler
- Photodiode
- P-Channel JFET
- P-Channel MOSFET
- PNP Bipolar Transistor

### Compatibility Considerations

In NPN and PNP Bipolar Transistor blocks, a new parameter, **Collector-emitter voltage at which h-parameters are defined**, has been added. It serves to increase the accuracy with which equation parameters are calculated from h-parameters, to better capture current gain dependence on temperature. As a result, when you use `Specify from a datasheet` for the **Parameterization** parameter, there is a small change in the resulting transistor gain BF (calculated from the **Forward current transfer ratio h_fe** parameter value), compared to the previous version of the block.

## New Demos

Demos introduced in this version are:

- Torque Motor
- Schottky Barrier Diode Characteristics
- IGBT Characteristics
- Master-Slave J-K Flip-Flop

Change to an existing demo:

- The Finite Element Parameterized Solenoid demo now includes comparison with the Simscape solenoid demo `ssc_solenoid.mdl`, to illustrate the effects of flux saturation.

# Version 1.5 (R2010b) SimElectronics Software

| New Features and Changes | Version Compatibility Considerations | Fixed Bugs and Known Problems |
|---|---|---|
| Yes<br>Details below | No | Bug Reports |

New features and changes introduced in this version are:



## New Thyristor Block

The new Thyristor block, located in the Semiconductor Devices library, represents a thyristor modeled using an NPN and a PNP transistor. The collector of each device is connected to the base of the other device so as to give the P-N-P-N junction structure of a thyristor.

## New Multiplier Block

The new Multiplier block, located in the Integrated Circuits library, represents an integrated circuit multiplier for physical signals. It allows you to multiply and divide signals without switching to Simulink signals and back.

## Additional Exponential Diode Parameterization Options

When using the Diode block, with the **Diode model** parameter set to `Exponential`, you now have two additional options under **Parameterization**:

- `Use an I-V data point and IS` — Specify measured data at a single point on the diode I-V curve in combination with the saturation current.
- `Use an I-V data point and N` — Specify measured data at a single point on the diode I-V curve in combination with the emission coefficient.

See the block reference page for details.

## Channel Modulation Parameter Added for MOSFET Blocks

The N-Channel MOSFET and P-Channel MOSFET blocks now have an additional parameter, **Channel modulation, L**. The default value is 0 1/V. See the respective block reference pages for details.

## Changes to the Bipolar Transistor Blocks

The following changes have been implemented in the NPN Bipolar Transistor and PNP Bipolar Transistor blocks:

- The **Junction Capacitance** tab has been renamed to **Capacitance**, and the two existing parameters on it have been renamed:
  - **Base-emitter capacitance** to **Base-emitter junction capacitance**
  - **Base-collector capacitance** to **Base-collector junction capacitance**
- Two new parameters have been added to the **Capacitance** tab:
  - **Total forward transit time**, representing the mean time for the minority carriers to cross the base region from the emitter to the collector
  - **Total reverse transit time**, representing the mean time for the minority carriers to cross the base region from the collector to the emitter
- Default values for ohmic resistances have been changed to RB = 1 Ω, RC = 0.01 Ω, and RE = 1e-4 Ω, to be consistent with the SPICE-compatible library.

## New Demos

Demos introduced in this version are:

- Thyristor Static Behavior Validation

- Thyristor Dynamic Behavior Validation
- IC Multiplier Circuits
- Synchronous Buck Converter

# Version 1.4 (R2010a) SimElectronics Software

| New Features and Changes | Version Compatibility Considerations | Fixed Bugs and Known Problems |
|---|---|---|
| Yes<br>Details below | Yes—Details labeled as **Compatibility Considerations**, below. See also Summary | Bug Reports |

New features and changes introduced in this version are:



## New Linear and Rotary Motors Defined in Terms of Flux

Two new blocks represent models of a motor or actuator defined in terms of magnetic flux:

- FEM-Parameterized Linear Actuator block, located in the Translational Actuators library
- FEM-Parameterized Rotary Actuator block, located in the Rotational Actuators library

## New Potentiometer Block

The new Potentiometer block, located in the Passive Devices library, represents a potentiometer, where the wiper position is controlled by the input physical signal.

## Initial Conditions Tab Added for Logic Blocks

The dialog boxes of blocks in the Logic library now have an additional tab, Initial Conditions, which lets you specify the output initial state (low or high). See the respective block reference pages for details.

## Changes in Block Parameterization

The ability to parameterize SimElectronics blocks by importing circuit data from a SPICE netlist is no longer supported. As a result, using the `netlist2sl` function is no longer recommended. See "Parameterizing Blocks from Datasheets" in the *SimElectronics User's Guide* for alternative ways of block parameterization. Additional related changes introduced in this version are:


- "Changes to the SPICE-Compatible Blocks" on page 17
- "Changes to the Solar Cell Block" on page 18
- "Compatibility Considerations" on page 18


### Changes to the SPICE-Compatible Blocks

The SPICE-compatible blocks have been moved to the Additional Components library. They are organized in sublibraries according to function, for example, the SPICE-Compatible Sources library is now the Sources sublibrary of the Additional Components/SPICE-Compatible Components library. The Resistor block, renamed SPICE Resistor, and the Current-Controlled Switch and Voltage-Controlled Switch blocks have been moved to the Passive Devices sublibrary of the Additional Components/SPICE-Compatible Components library.

Some of the blocks have been renamed so that their names start with the "SPICE" prefix. The following table lists the old and new block names.

| Old Name | New Name |
|---|---|
| Diode (SPICE) | SPICE Diode |
| NJFET | SPICE NJFET |
| NMOS | SPICE NMOS |
| NPN | SPICE NPN |

| Old Name | New Name |
|---|---|
| PJFET | SPICE PJFET |
| PMOS | SPICE PMOS |
| PNP | SPICE PNP |
| Resistor | SPICE Resistor |

There are no compatibility considerations as a result of renaming the SPICE-compatible blocks and moving them to the Additional Components library. Your existing models will be updated automatically when you open and save them in the new version.

### Changes to the Solar Cell Block

In previous versions, the Solar Cell block had the option of using the SPICE Environment Parameters block to set temperature. This is removed in R2010a to eliminate dependency on the SPICE sublibrary. Also, the Solar Cell model now uses the regular Diode block (exponential diode) rather than the SPICE Diode block.

### Compatibility Considerations

There is an insignificant change in results, of the order of 1e-12, in the Solar Cell block because of the diode replacement.

## New Demos

Demos introduced in this version are:

- Finite Element Parameterized Solenoid
- Circuit Level Switched Capacitor ADC
- Switching Audio Power Amplifier
- Bridge Configuration Switching Audio Power Amplifier
- Differential Pair Amplifier
- Low-Noise Bipolar Transistor Voltage Amplifier
- Triangle Wave Generator

- LC Transistor Oscillator
- Voltage-Controlled Oscillator with PI Control
- Voltage Regulator
- Band-Pass Filter Using Three Mutually-Coupled Inductors
- Class-E RF Amplifier
- Diode Ring Demodulator
- LC Transmission Line and Test Bridge

## Functions and Function Elements Being Removed

| Function or Function Element Name | What Happens When you use the Function or Element? | Use This Instead | Compatibility Considerations |
|---|---|---|---|
| `netlist2sl` | Issues a warning that it is not supported and may be removed in future releases | See "Parameterizing Blocks from Datasheets" in the *SimElectronics User's Guide* for alternative ways of block parameterization | See "Changes in Block Parameterization" on page 17 |

# Version 1.3 (R2009b) SimElectronics Software

| New Features and Changes | Version Compatibility Considerations | Fixed Bugs and Known Problems |
|---|---|---|
| Yes<br>Details below | Yes—Details labeled as **Compatibility Considerations**, below. See also Summary | Bug Reports |

New features and changes introduced in this version are organized by these topics:



## Actuators & Drivers Library Blocks

New features and changes introduced in this version are:



### New Generic Rotary Actuator Block

The Generic Rotary Actuator block models the torque-speed characteristics of a generalized rotary actuator.

### New Generic Linear Actuator Block

The Generic Linear Actuator block models the force-speed characteristics of a generalized linear actuator.

### Improved Servomotor Block

The Servomotor block now allows for the specification of additional parameters from within the Block Parameters dialog box.

### Compatibility Considerations

During simulation, the updated Servomotor block is backwards-compatible with models defined in earlier versions of the software. However, the model generates a warning in this version because the block dialog box supports additional unit options for torque and speed data. To remove the warnings, open the block dialog box and select appropriate units for the torque and speed data.

## New Abstracted Timer Block

The new Timer block, located in the Integrated Circuits library, is an abstracted behavioral model of a timer integrated circuit, such as the NE555.

## New Demos

Demos introduced in this version are:

- Brushless DC Motor
- ARINC 429 Communications Link
- PNP Bipolar Transistor Characteristics

# Version 1.2 (R2009a) SimElectronics Software

This table summarizes what's new in V1.2 (R2009a):

| New Features and Changes | Version Compatibility Considerations | Fixed Bugs and Known Problems |
|---|---|---|
| Yes<br>Details below | No | Bug Reports |

New features and changes introduced in this version are organized by these topics:



## Actuators & Drivers Library

New features and changes introduced in this version are:



### New Piezo Motor Blocks

The Actuators & Drivers library now contains blocks for modeling piezoelectric travelling wave motors. The library contains these new blocks:

- The Piezo Rotary Motor models the torque-speed characteristics of a rotary piezoelectric motor.
- The Piezo Linear Motor models the force-speed characteristics of a linear piezoelectric motor.

### Enhanced H-Bridge Block

The H-Bridge block now provides the option to dissipate current via two freewheeling diodes when the signal at the PWM port is low. To use this new option, select `Via two freewheeling diodes` for the `Freewheeling mode` parameter.

## Passive Devices Library

New features and changes introduced in this version are:



### New Switch Blocks

The Passive Devices library now contains Current-Controlled Switch and Voltage-Controlled Switch blocks to model electrical switches with hysteresis.

### New Resistor Block

The Passive Devices library now contains a Resistor block to model a resistor as a function of temperature and process data.

### New Crystal Block

The Passive Devices library now contains a Crystal block to model the electrical characteristics of a crystal resonator.

### Enhanced Variable Inductor and Variable Capacitor Blocks

The Variable Inductor and Variable Capacitor blocks have the following enhancements:

- The Variable Inductor block now provides two options for the relationship between the voltage across the device and the current through the inductor. The new **Equation** parameter lets you select the voltage-current equation that you want.

- The Variable Capacitor block now provides two options for the relationship between the current through the device and the voltage across the capacitor. The new **Equation** parameter lets you select the current-voltage equation that you want.

## Sources Library

New features and changes introduced in this version are:


- "Enhanced Solar Cell Block" on page 24
- "New Two-Input Dependent Source Blocks" on page 24


### Enhanced Solar Cell Block

The Solar Cell block has the following enhancements:

- The block now provides the option to use an 8-parameter model that includes an additional diode and a parallel resistor.
- The block now models temperature dependence.

### New Two-Input Dependent Source Blocks

The SPICE-Compatible Sources library (in the Sources library) contains blocks for modeling dependent sources with two controlling inputs. The library contains these new blocks:

- PCCCS2 — Model polynomial current-controlled current source with two controlling inputs
- PCCVS2 — Model polynomial current-controlled voltage source with two controlling inputs
- PVCCS2 — Model polynomial voltage-controlled current source with two controlling inputs
- PVCVS2 — Model polynomial voltage-controlled voltage source with two controlling inputs

## SPICE-Compatible Semiconductors Library

New features and changes introduced in this version are:

## Enhanced NMOS and PMOS Blocks

The NMOS and PMOS blocks now provide the option to model the electrical characteristics of SPICE Level-3 MOSFET devices.

# Version 1.1 (R2008b) SimElectronics Software

This table summarizes what's new in V1.1 (R2008b):

| New Features and Changes | Version Compatibility Considerations | Fixed Bugs and Known Problems |
|---|---|---|
| Yes<br>Details below | No | Bug Reports |

New features and changes introduced in this version are:



## New CMOS Logic Gate Blocks

The Logic library (in the Integrated Circuits library) contains blocks for modeling CMOS logic gates behaviorally. The library contains these new blocks:

- CMOS AND
- CMOS Buffer
- CMOS NAND
- CMOS NOR
- CMOS NOT
- CMOS OR
- CMOS XOR

## New Piezo Stack Block

The Actuators & Drivers library now contains a Piezo Stack block to model the electrical and force characteristics of a piezoelectric stacked actuator.

## New Relay Block

The Passive Devices library now contains a Relay block to model the resistive and delay characteristics of a relay controlled by an external physical signal.

## New Fuse Block

The Passive Devices library now contains a Fuse block to model the following fuse characteristics:

- Resistance.
- Rated current at which the fuse blows when exceeded for a specified amount of time.

## New NMOS and PMOS Blocks

The SPICE-Compatible Semiconductors library (in the Semiconductor Devices library) now contains NMOS and PMOS blocks to model the electrical characteristics of SPICE Level-1 MOSFET devices.

# Version 1.0 (R2008a+) SimElectronics Software

This table summarizes what's new in V1.0 (R2008a+):

| New Features and Changes | Version Compatibility Considerations | Fixed Bugs and Known Problems |
|---|---|---|
| Yes<br>Details below | Not applicable | Bug Reports |

## Product Introduction

SimElectronics software is a modeling environment for the engineering design and simulation of electronic and electromechanical systems within the Simulink environment.

Version 1.0 includes these features:

- A library of electronic and electromechanical blocks that model components such as:
  - Sensors
  - Semiconductors
  - Actuators

  For these blocks, you enter key parameter values directly from industry datasheets.

  For more information about the available blocks, see "SimElectronics Block Libraries".
- A function, `netlist2sl`, for creating library blocks that represent circuit data in a SPICE netlist.
- Ability to convert SimElectronics models to C code.

  For more information about code generation, see "Code Generation " in the Simscape documentation.
- Access to linearization and steady-state solve capabilities in Simscape.

For more information about linearization, see “Linearizing at an Operating Point” in the Simscape documentation.

For more information about how Simscape solves models, see “How Simscape Simulation Works” in the Simscape documentation.

# Compatibility Summary for SimElectronics Software

This table summarizes new features and changes that might cause incompatibilities when you upgrade from an earlier version, or when you use files on multiple versions. Details are provided in the description of the new feature or change.

| Version (Release) | New Features and Changes with Version Compatibility Impact |
|---|---|
| **Latest Version V2.1 (R2012a)** | None |
| V2.0 (R2011b) | See the **Compatibility Considerations** subheading for these new features or changes:<br>• "Thermal Ports Available for Semiconductor Blocks" on page 7<br>• "DC Motor Block Supports No-Load Current Data for Rotor Damping" on page 9 |
| V1.6 (R2011a) | See the **Compatibility Considerations** subheading for this new feature or change:<br>• "Thermal Dependency Added to Semiconductor Blocks" on page 11 |
| V1.5 (R2010b) | None |
| V1.4 (R2010a) | See the **Compatibility Considerations** subheading for this new feature or change:<br>• "Changes in Block Parameterization" on page 17 |

| Version (Release) | New Features and Changes with Version Compatibility Impact |
|---|---|
| V1.3 (R2009b) | See the **Compatibility Considerations** subheading for this new feature or change:<br><br>• "Actuators & Drivers Library Blocks" on page 20 |
| V1.2 (R2009a) | None |
| V1.1 (R2008b) | None |
| V1.0 (R2008a+) | None |