RAJ2930004AGM

PSPICE Model Readme

Targeted simulator: Cadence OrCAD

Gate Driver IC for IGBTs and SiC MOSFETs

This document discusses the PSPICE model for the RAJ2930004AGM including the features support and not supported by the model. To download the model, see the RAJ2930004AGM product page.

Contents

1. Model Features

This PSPICE model is intended to give typical DC performance characteristics under external circuit configurations using compatible simulation platforms – such as Cadence OrCAD. Also, can use other software which can load PSPICE model, but in this file used Cadence OrCAD for simulation.

1.1 Device Performance Features Supported

The following are the device performance features that are supported by this model:

- Typical static behavior
- Over current detection by Desaturation Protection (DESAT)
- On-chip under voltage lockout circuit (UVLO)
- Fault Alarm outputs on FOB pin and the latched fault status can be reset by RSTB pin
- On-chip active miller clamp
- Soft turn-off function

1.2 Device Performance Features Limited

The following are the device performance features that are not supported by this model:

- Temperature Characteristics
- Thermal behavior

2. Downloading and Running on Cadence OrCAD

Download the RAJ2930004AGM PSPICE model first and save the file to a local directory for your simulations. PSPICE model at least include the library file (xxx.lib) and Symbol file (xxx.OLB)

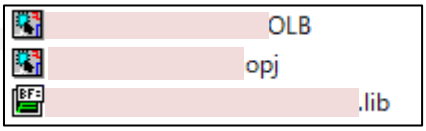

Figure.1 An example of PSPICE model package

If use exist bench simulation click [Open Project] on start page and chose the [xxx.opj] file from PSPICE model package. Or can also build a new project use own setting.

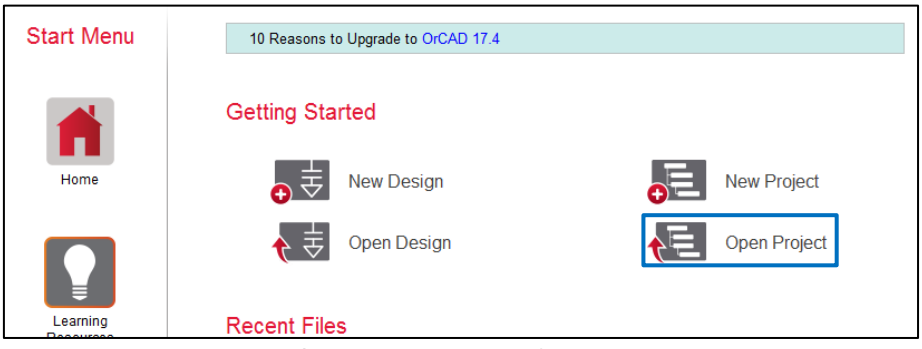

Figure.2 Start page of OrCAD

Load project successfully, chose a schematic of simulation bench under [xxx.dsn] by double click.
And will move to the schematic page.
If build a new project need to build a new schematic page for simulation.
For example, double click Figure.3 [PAGE1]

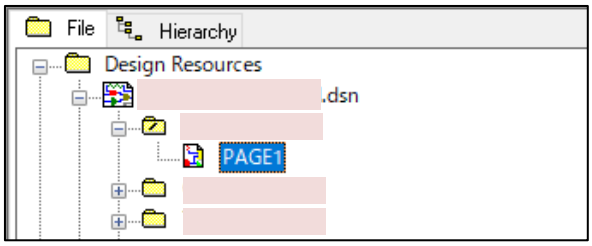

Figure.3 Design Resources list

First time need to build simulation and add PSPICE model library. Click New Simulation Profile button [ ]
New Simulation window will open. Input simulation name and click [Create]

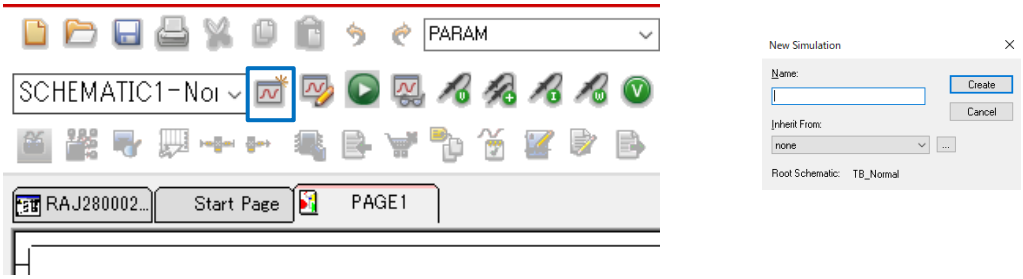

Figure.4 New simulation button and window

Simulation Setting window will open. Select tab [Configuration Files]=> Category [Library]=> [Browse…]

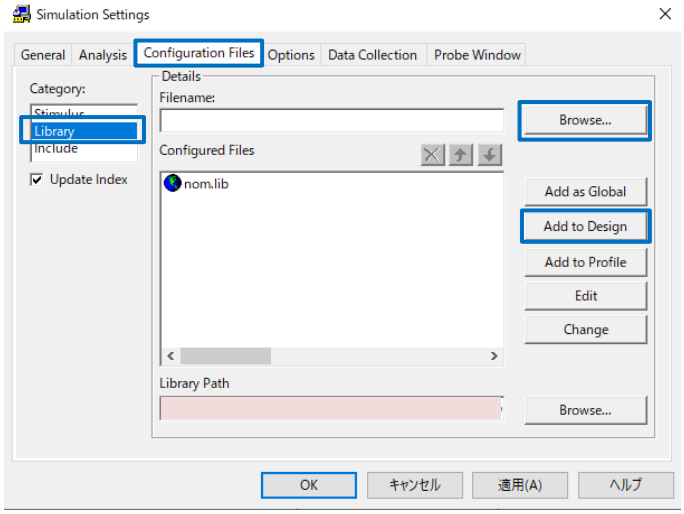

Figure.5 Simulation Setting

Select the PSPICE model file [xxx.lib] from the directory where release the model package. Then return to Figure.5 window and click [Add to design] => [OK]

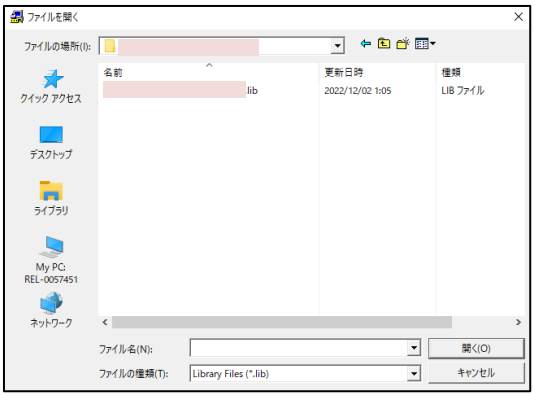

Figure.6 select PSPICE model file

After Library setting, exist simulation bench can run simulation normally.
If build a new schematic need to complete the simulation circuit. Below shows a basic simulation circuit as an example.

3. Simulation Circuit example

Figure 7 shows a reference circuit to check the basic characteristics of RAJ2930004AGM.
Apply supply voltage to each of Pin.5, Pin.8, and Pin.15. A negative voltage should be applied to Pin.8 with respect to GND2. Also, connect GND1 and GND2 to ground respectively, as this device is isolated on the primary and secondary.
Furthermore, when pulse waveforms are applied to Pin.10 and Pin.11, the corresponding output waveforms can be observed.

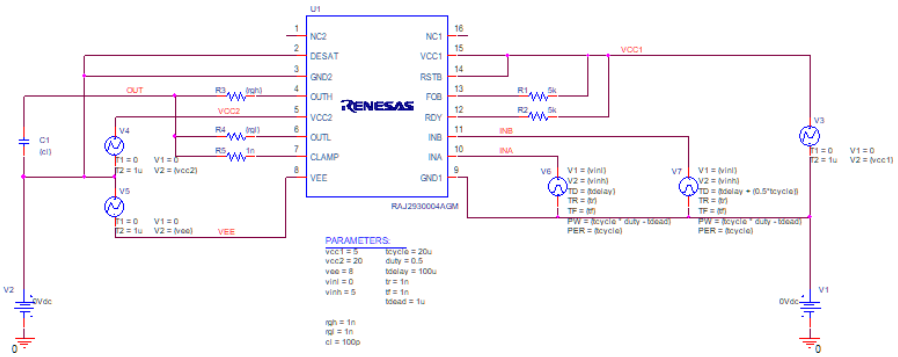

Figure.7 Simulation Circuit (Basic characteristics)

Figure.8 shows the simulation result of Figure.7 circuit.

Figure.8 Simulation result (Basic characteristics)

As shown in Figure 9, two RAJ2930004AGMs can also be used to check half-bridge operation.

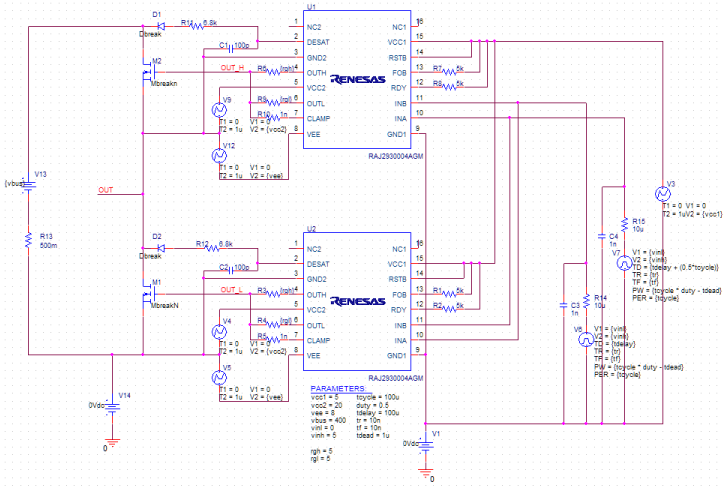

Figure.9 Simulation Circuit (Half-bridge operation)

Figure.10 shows the simulation result of Figure.9 circuit.

Figure.10 Simulation result (Half-bridge operation)

If the simulation does not converge and waveforms cannot be obtained, click “Edit Simulation Profile” shown in Figure 11 to open the Simulation settings screen.

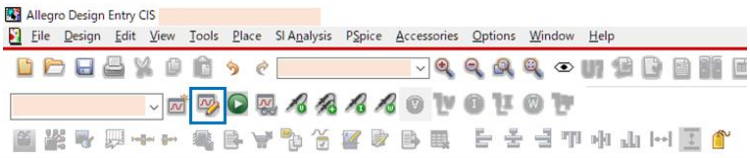

Figure. 11 Location of Edit Simulation Profile

You should check SKIPBP on the Analysis tab. (Figure. 12)
Furthermore, go to the Options tab, click the AutoConverge button, and check AutoConverge. (Figure. 13)
And adjust the value of “Relative accuracy of V's and I's” to 1u. (Figure. 14)
Then click the OK button on the Simulation settings screen to apply the settings and run the simulation again.

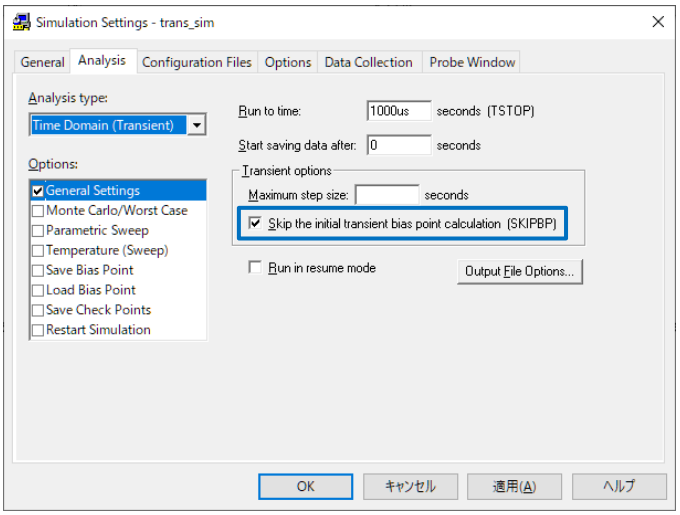

Figure. 12 Simulation settings screen (Location of “SKIPBP”)

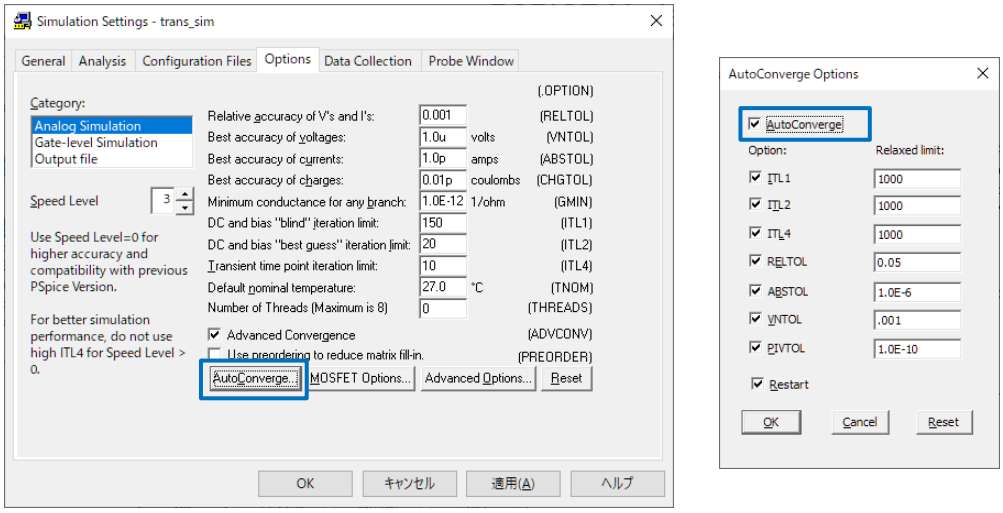

Figure. 13 Simulation settings screen (Location of “AutoConverge”)

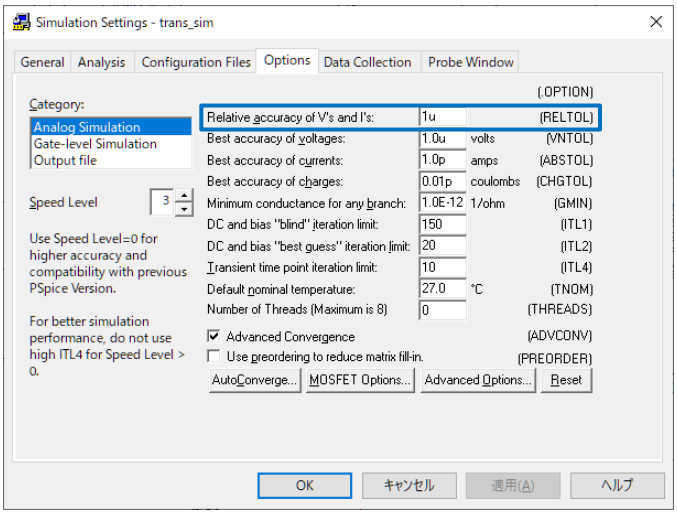

Figure. 14 Simulation settings screen (Where to adjust accuracy)

Revision History

Rev.	Date	Description	
		Page	Summary
1.0	2024/06/05	-	Initial release

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