Introduction to Simulation Model

TLE4972-AE35D5

Targeted simulator: SIMetrix

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TLE4972-AE35D5 current sensor model specifications

1. General considerations

The TLE4972-AE35D5 simulation model is written in PSpice and is compatible with OrCAD PSpice, Tina Industrial and SIMetrix. The model development has been performed according to the datasheet.

2. Functionality

Model performances:

- Static Electrical Characteristics and Dynamic Electrical Characteristics are modelled with the typical values from the datasheet.

Implemented features:

- Power-on delay time
- Overcurrent detection
- Undervoltage
- Output saturation voltage

3. Descriptions of ports/pins

Port name	Port function
VDD	Supply voltage
GND	Ground
VREF	Reference voltage input or output
AOUT	Analog signal output
OCD1	Over-current detection output 1 (open drain output)
OCD2	Over-current detection output 2 (open drain output)
VBFIELD	Magnetic field value generated by the sensing element

4. Model parameters

The configuration registers are **modeled** through **parameters**. Below you can find the list of model parameters and the values that could be used.

Parameter name	Description	Parameter Value	Comments
OP_MODE	Device operation mode	0	Semi-differential bidirectional mode. **This is the standard setting**
		1	Fully-differential mode
		3	Single-ended mode
VREF_ext	External voltage reference source value	0	**1.65 V** voltage source value. **This is the standard setting**
		1	**1.2 V** voltage source value
		2	**1.5 V** voltage source value
		3	**1.8 V** voltage source value
OCD1_deglitch	Deglitch time for OCD1	0	0 s deglitch time. **This is the standard setting**
		1	**500 ns** deglitch time
		2	**1000 ns** deglitch time
		3	**1500 ns** deglitch time
		4	**2000 ns** deglitch time
		5	**2500 ns** deglitch time
		6	**3000 ns** deglitch time
		7	**3500 ns** deglitch time
OCD2_deglitch	Deglitch time for OCD2	0	**0 s** deglitch time. **This is the standard setting**
		1	**500 ns** deglitch time
		2	**1000 ns** deglitch time
		3	**1500 ns** deglitch time
		4	**2000 ns** deglitch time
		5	**2500 ns** deglitch time
		6	**3000 ns** deglitch time
		7	**3500 ns** deglitch time
		8	**4000 ns** deglitch time
		9	**4500 ns** deglitch time
		10	**5000 ns** deglitch time
		11	**5500 ns** deglitch time
		12	**6000 ns** deglitch time
		13	**6500 ns** deglitch time
		14	**7000 ns** deglitch time
		15	**7500 ns** deglitch time
OCD1_EN	The over-current detection enable of channel 1	0	The OCD pin 1 will not indicate an internal failure or an over-current event
		1	The OCD pin 1 will indicate an internal failure or an over-current event. **This is the standard setting**

OCD2_EN	The over-current detection enable of channel 2	0	The OCD pin 2 will not indicate an internal failure or an over-current event
		1	The OCD pin 2 will indicate an internal failure or an over-current event. **This is the standard setting**
OCD1_THRLVL	Threshold level of OCD1	0 - 63	**OCD1_THRLVL** is used to calculate OCD1 $\mathbf{B_{field}}$ threshold according to the formula specified in the datasheet. The default value is **12.**
OCD2_THRLVL	Threshold level of OCD2	0 - 63	**OCD2_THRLVL** is used to calculate OCD2 $\mathbf{B_{field}}$ threshold according to the formula specified in the datasheet. The default value is **15.**
OCD1_HYS	OCD1 hysteresis cycle value	0	0 V hysteresis cycle
		1	1.5625 V hysteresis cycle
		2	3.125 V hysteresis cycle
		3	6.25 V hysteresis cycle. **This is the standard setting**
OCD2_HYS	OCD2 hysteresis cycle value	0	0 V hysteresis cycle
		1	1.5625 V hysteresis cycle
		2	3.125 V hysteresis cycle
		3	6.25 V hysteresis cycle. **This is the standard setting**
SENSITIVITY	Current sensor sensitivity range	1	Sensitivity range 1 (**38.75 mT/mV**) corresponding to **30.97 mT** Full Scale
		2	Sensitivity range 2 (**46.5 mT/mV**) corresponding to **25.81 mT** Full Scale
		3	Sensitivity range 3 (**62 mT/mV**) corresponding to **19.35 mT** Full Scale
		4	Sensitivity range 4 (**93 mT/mV**) corresponding to **12.9 mT** Full Scale
		5	Sensitivity range 5 (**124 mT/mV**) corresponding to **9.68 mT** Full Scale
		6	Sensitivity range 6 (**186 mT/mV**) corresponding to **6.45 mT** Full Scale