# Introduction to Simulation Model

TLE4971-A120N5-U-E0001

## Targeted simulator: SIMetrix

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# TLE4971-A120N5-U-E0001 current sensor model specifications

## 1. General considerations

The TLE4971-A120N5-U-E0001 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) |
| IPN | Negative current terminal pin (current-out) |
| IPP | Positive current terminal pin (current-in) |

## 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_THRSH** | Threshold level of OCD1 | 19 | **150 A** overcurrent threshold for OCD1. **This is the standard setting** |
| | | 22 | **166.8 A** overcurrent threshold for OCD1 |
| | | 25 | **184.8 A** overcurrent threshold for OCD1 |
| | | 27 | **201.6 A** overcurrent threshold for OCD1 |
| | | 30 | **218.4 A** overcurrent threshold for OCD1 |
| | | 33 | **235.2 A** overcurrent threshold for OCD1 |
| | | 36 | **253.2 A** overcurrent threshold for OCD1 |
| | | 39 | **270 A** overcurrent threshold for OCD1 |
| | | | |
| **OCD2_THRSH** | Threshold level of OCD2 | 15 | **60 A** overcurrent threshold for OCD2 |
| | | 19 | **73.2 A** overcurrent threshold for OCD2 |
| | | 23 | **85.2 A** overcurrent threshold for OCD2 |
| | | 27 | **98.4 A** overcurrent threshold for OCD2. **This is the standard setting** |
| | | 32 | **111.6 A** overcurrent threshold for OCD2 |
| | | 36 | **124.8 A** overcurrent threshold for OCD2 |
| | | 40 | **136.8 A** overcurrent threshold for OCD2 |
| | | 44 | **150 A** overcurrent threshold for OCD2 |
| | | | |
| **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 | 7.5 V hysteresis cycle |
| | | 2 | 15 V hysteresis cycle |
| | | 3 | 30 V hysteresis cycle. **This is the standard setting** |