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Use of MC33161 Pspice Model

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APPLICATION NOTE

Overview

The MC33161 is a universal voltage monitor intended for use in a wide variety of voltage sensing applications. This device offers the circuit designer an economical solution for positive and negative voltage detection. The circuit consists of two comparator channels each with hysteresis, a unique Mode Select Input for channel programming, a pinned out 2.54 V reference, and two open collector outputs capable of sinking in excess of 10 mA. Each comparator channel can be configured as either inverting or non-inverting by the Mode Select Input. This allows over, under, and window detection

of positive and negative voltages. The minimum supply voltage needed for these devices to be fully functional is 2.0 V for positive voltage sensing and 4.0 V for negative voltage sensing.

To provide simulation results and initial design of system parameters before a real board design in applications, a simulation model of the MC33161 in Pspice has been developed. Figure 1 shows a typical simulation circuit with the MC33161 model. This simulation note is to illustrate a simulation procedure with the MC33161 Pspice model.

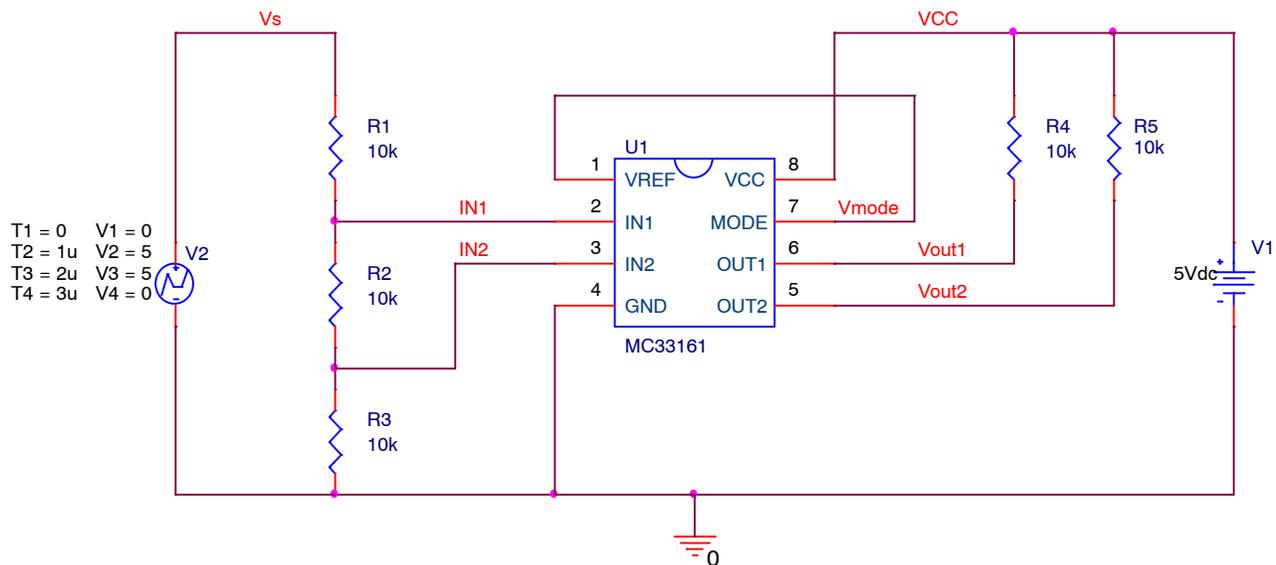


Figure 1. Typical Simulation Circuit with MC33161 Pspice Model

DETAILED DESCRIPTION

Download Pspice Model

Users can download the Pspice model of the MC33161 from ON Semiconductor website, which is a zipped file “MC33161_Pspice.ZIP” including one Pspice model lib file “MC33161_Pspice.LIB”, one schematic symbol olb file “MC33161_Pspice.OLB”, and one design dsn file “MC33161_Pspice.DSN”. Save all the extracted files in a folder.

Model Installation

1. Create New Project

Users need to run ORCAD Capture or Allegro Design Entry CIS first, and then create a new blank project in Capture as shown in Figure 2.

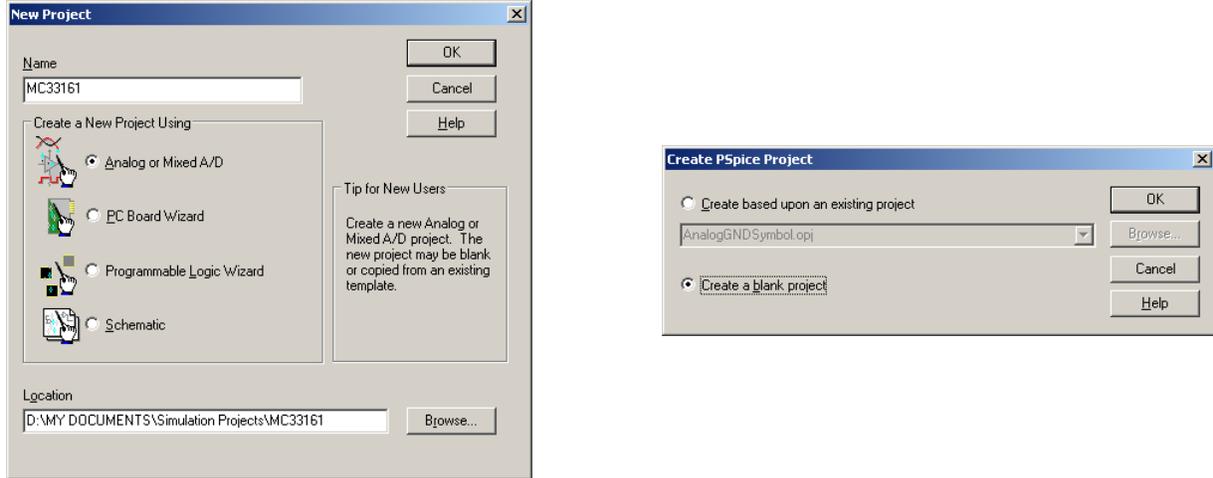


Figure 2. Create New Blank Simulation Project

2. Import Design File

Add the design file “MC33161_ABM.DSN” into the Design Resources to replace the blank design.

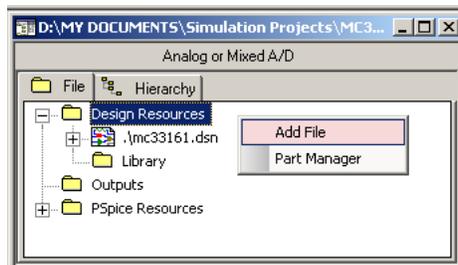


Figure 3. Import Design File into Design Resources

3. Import Symbol File

Add the symbol file “MC33161_ABM.OLB” into the Design Resources as shown in Figure 4.

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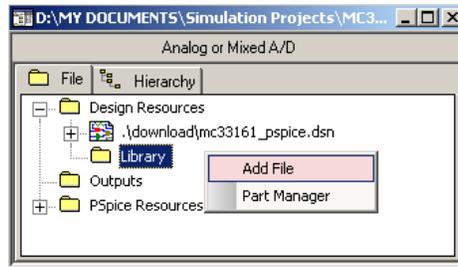


Figure 4. Import Symbol File into Design Resources

4. Open Schematic

Open the schematic “Page 1” in the “Schematic1” under the design file as shown in Figure 5. Users can edit the schematic according to real applications. A DC source “V2” is employed to simulate the monitored power rail.

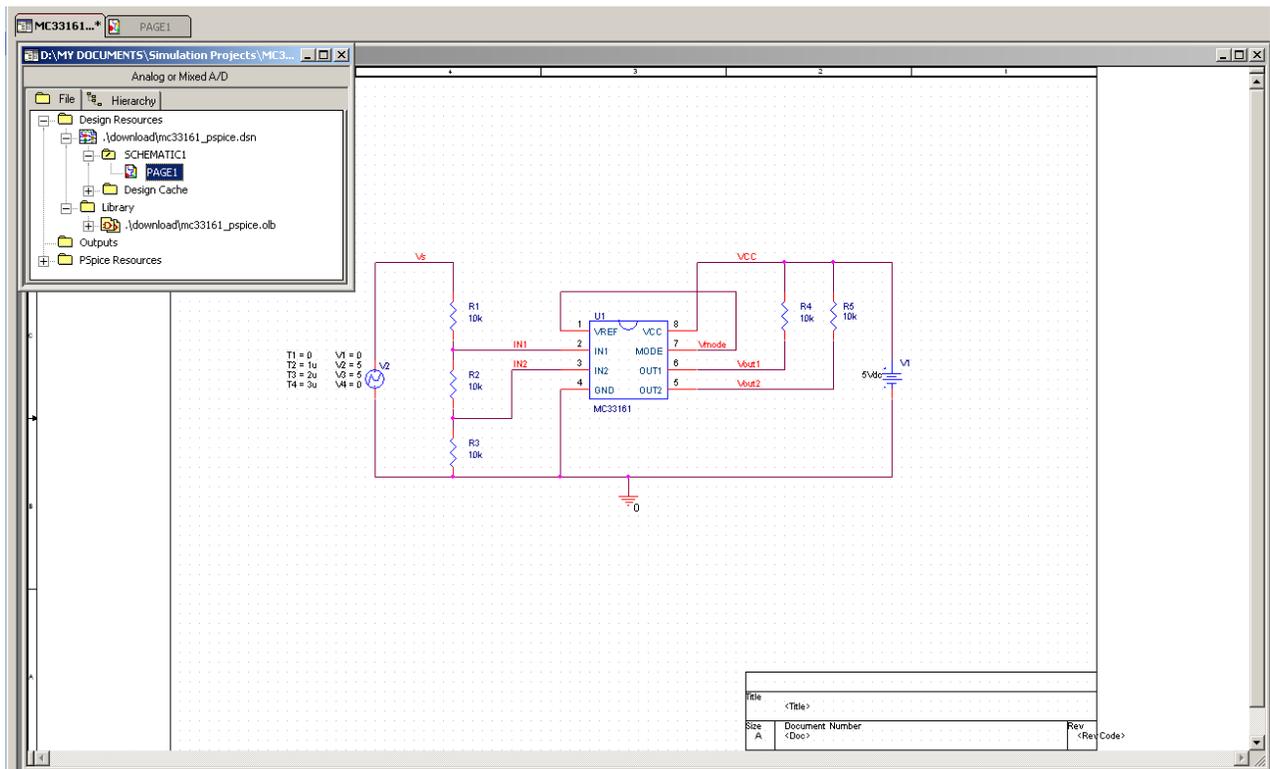


Figure 5. Open Schematic in Design File

5. Create Simulation Profile and Run Simulations

In order to run simulations, a new simulation profile has to be created. In the simulation setting of the simulation profile, users need to use browser to add the Pspice lib file “MC33161_ABMLIB” into the design library of the simulation configuration files, as shown in Figure 7.

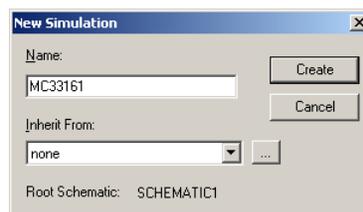


Figure 6. Create a New Simulation Profile

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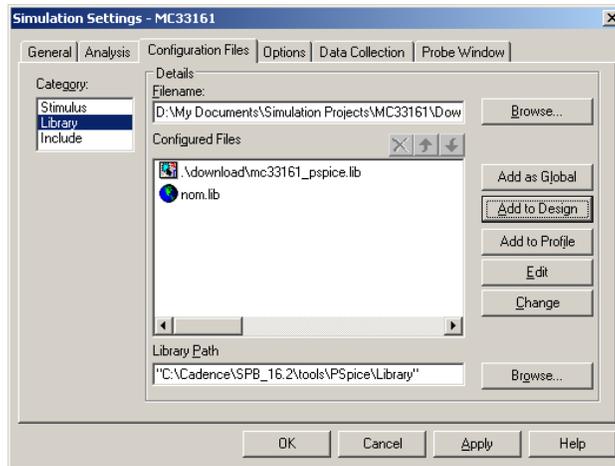


Figure 7. Add Pspice LIB File into Library of Configuration Files

A typical time-domain simulation profile setting is shown in Figure 8. Users can review simulation waveforms in Pspice A/D after running a simulation. Figure 9 shows an example of the simulation results.

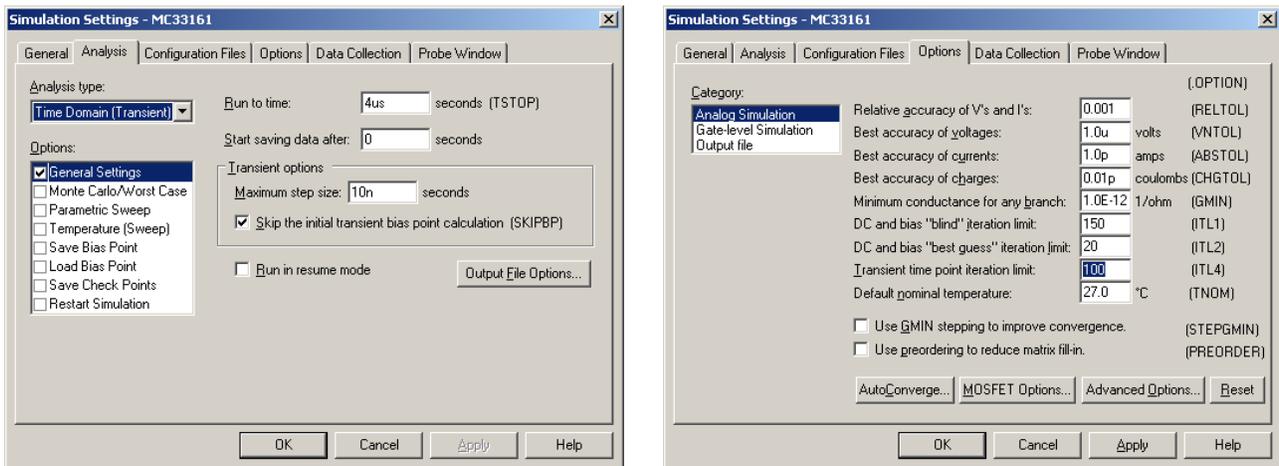


Figure 8. Simulation Setting for Time Domain Simulation

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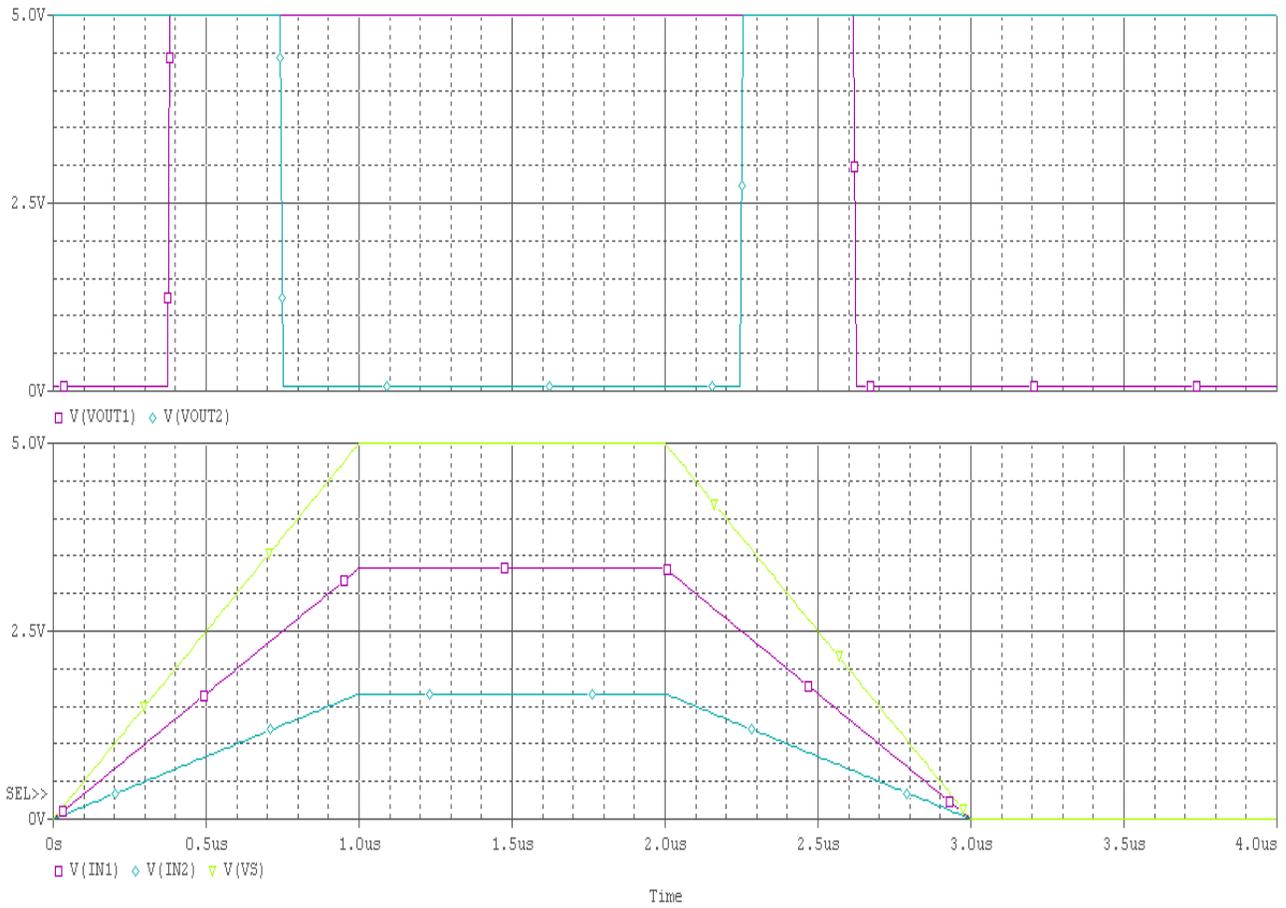


Figure 9. Typical Simulation Results of Time Domain Transient Simulation

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