

## Importing a SPICE NetList into TINA9-TI

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### ABSTRACT

This application note describes the procedure for importing an unencrypted SPICE netlist into [TINA9-TI](#) (available at [www.ti.com/tina-ti](http://www.ti.com/tina-ti)), creating a new macromodel based on the netlist, and placing a symbol to instantiate the macromodel in a TINA9-TI circuit schematic. This procedure applies to TINA9-TI only.

If you have an earlier version of TINA-TI, see the app note *Importing a SPICE Netlist into TINA7-TI* (lit number [SLVA424](#)).

The behavior of the macromodel can depend on the compatibility of the netlist entries with TINA-TI. It is possible that some Spice-based netlists may contain syntax or executable statements that are not compatible with TINA. If the Spice netlist is encrypted and cannot be imported directly into TINA, contact the E2E and Simulation and Models Forum for support ([www.e2e.ti.com](http://www.e2e.ti.com)).

The next section provides an example of the step-by-step procedure for importing a Spice netlist to create a TINA-TI macromodel, and then creating an instance of the TINA macromodel on a circuit schematic. The example uses the netlist of an OPA830, a low-power, high-speed op amp with a rail-to-rail output. For additional TINA and/or simulation support, consult the Simulation and Models E2E forum at [www.e2e.ti.com](http://www.e2e.ti.com). For support on high speed amplifiers like the OPA830 consult the E2E High Speed Amplifier Forum at [www.e2e.ti.com](http://www.e2e.ti.com).

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# 1 Procedure

## 1. Importing a SPICE netlist file.

The netlist in question must be configured using a SPICE subcircuit statement, and the netlist file must have a .cir, .lib, or .mod extension. If the Spice netlist file has a different extension change the extension to .cir, .lib, or .mod before trying to import it into TINA-TI. To illustrate the procedure, an example is shown below using the netlist for the OPA830:

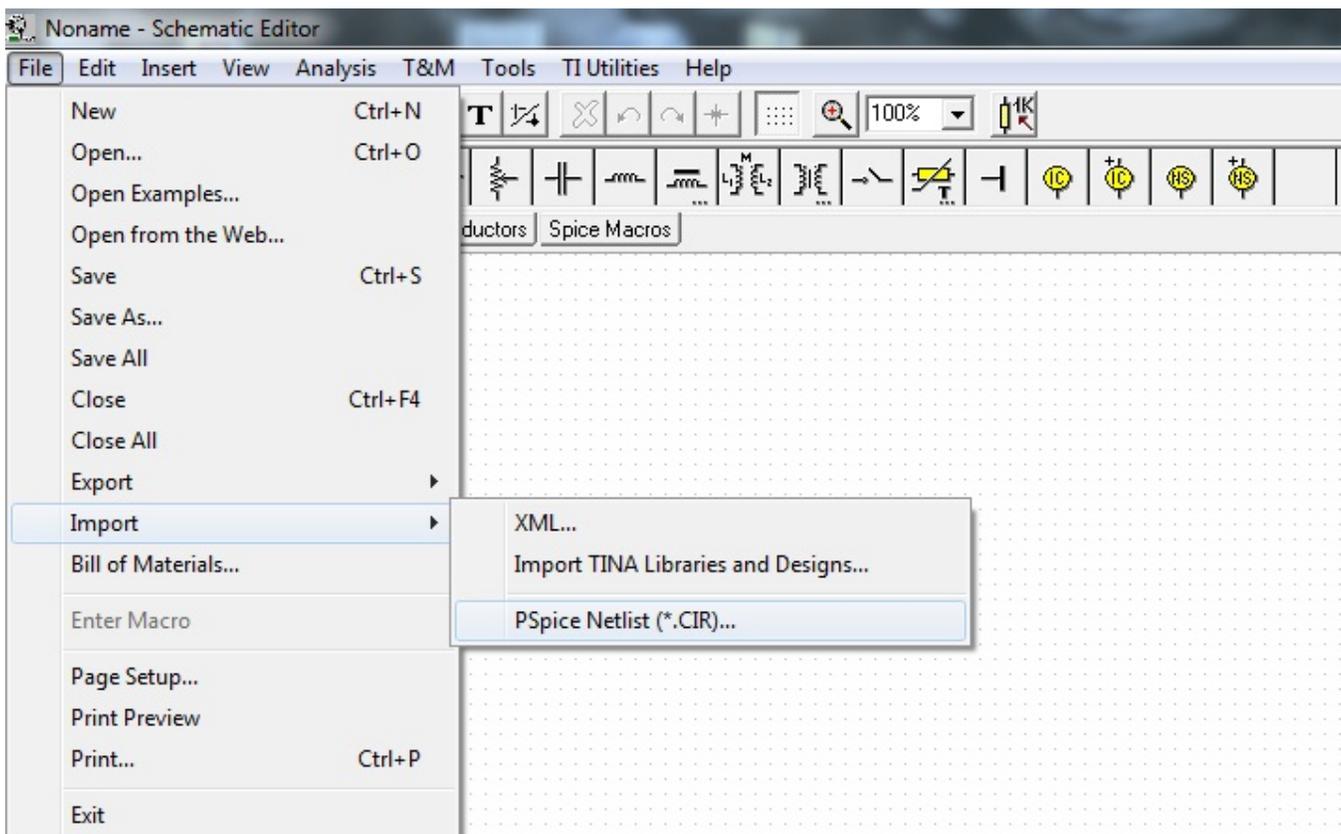
```
.SUBCKT OPA830 IN+ IN- VCC VEE VOUT
```

Note that this report does not address the details and best practices of generating Spice subcircuits. For more information on this topic, see the [References](#) section.

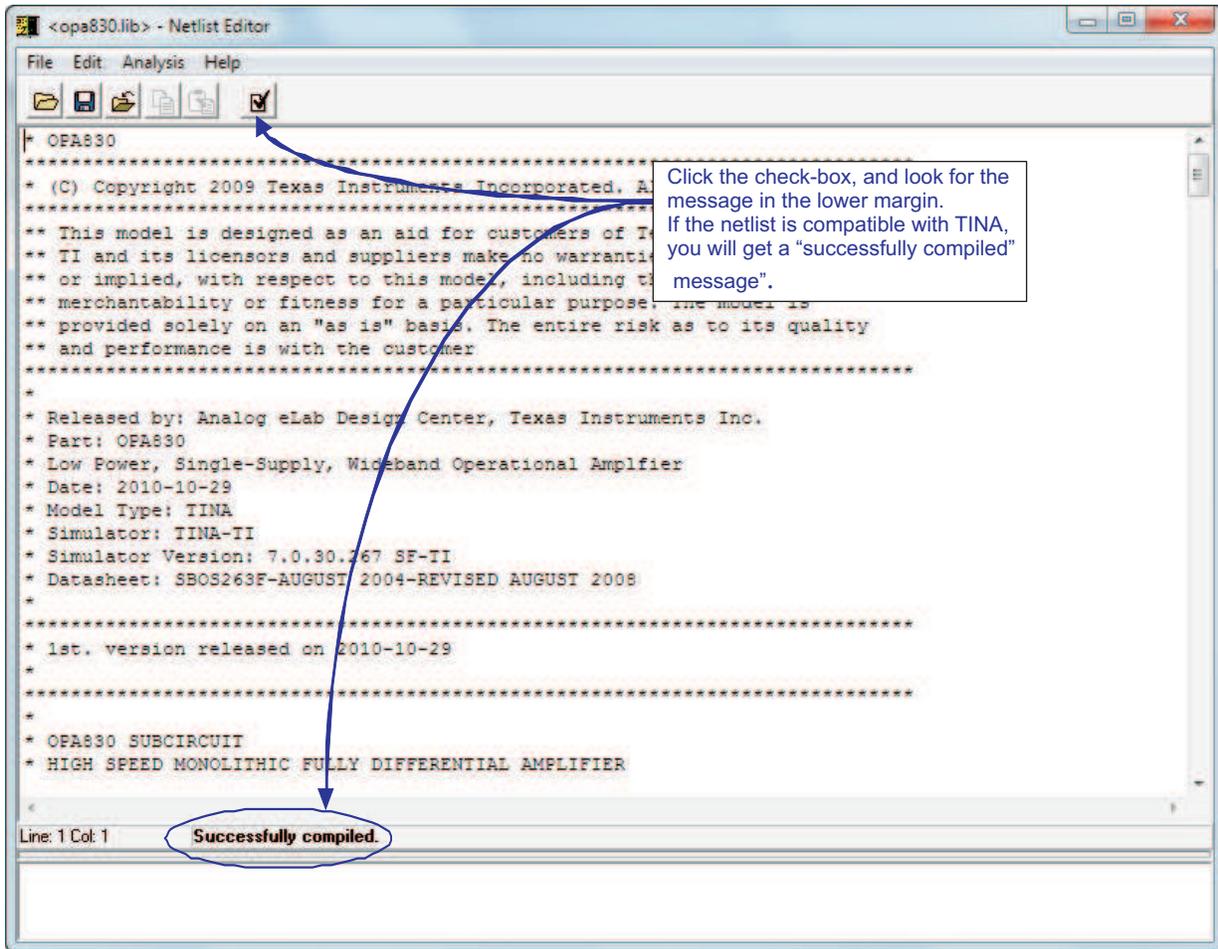
## 2. Confirming that the SPICE netlist will compile in TINA.

Some SPICE netlists may contain statements and/or formatting that is incompatible with TINA. To check for this, open TINA, and select the *File/Import/Pspice Netlist (\*.CIR)* menu tab as shown in [Figure 1](#).

Navigate to the desired file and select it using the open directory window. A netlist editor window opens as shown in [Figure 2](#). Select the check-box icon on the upper menu bar as indicated by the black arrow in [Figure 2](#). If the netlist format and syntax are compatible with TINA, then a message that says "Successfully completed" appears in the lower margin of the window as shown in [Figure 2](#).



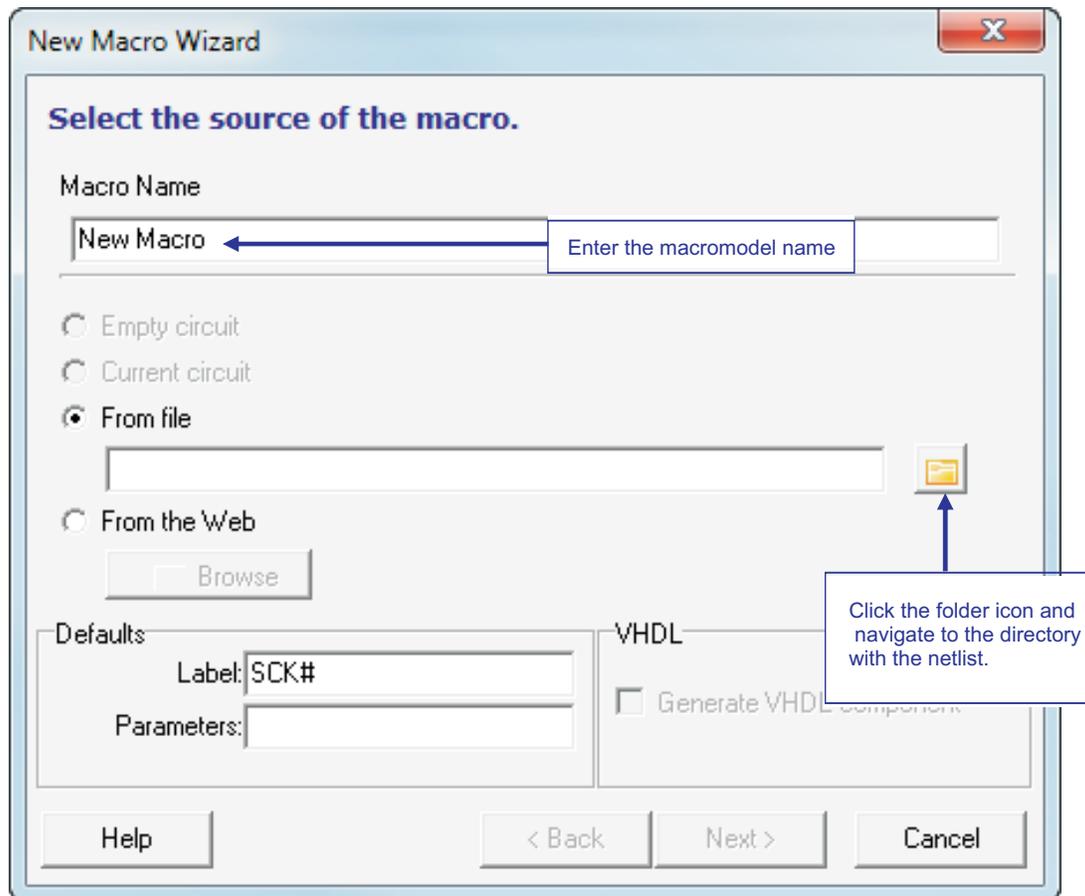
**Figure 1. Menu Tabs for Importing a Netlist as a \*.CIR or \*.LIB or .MOD File**



**Figure 2. Netlist Editor Window Used to Check Netlist Compatibility with TINA**

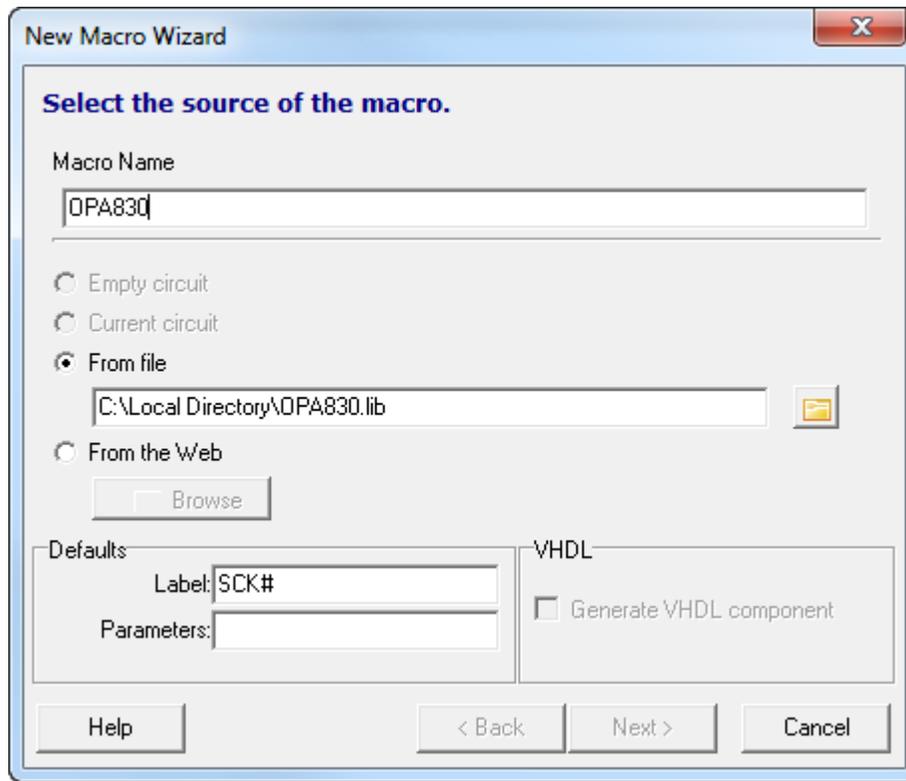
### 3. Creating the TINA-TI macromodel.

Open TINA9-TI and select the *Tools/New Macro Wizard* menu tab. A window should appear, as shown in [Figure 3](#).



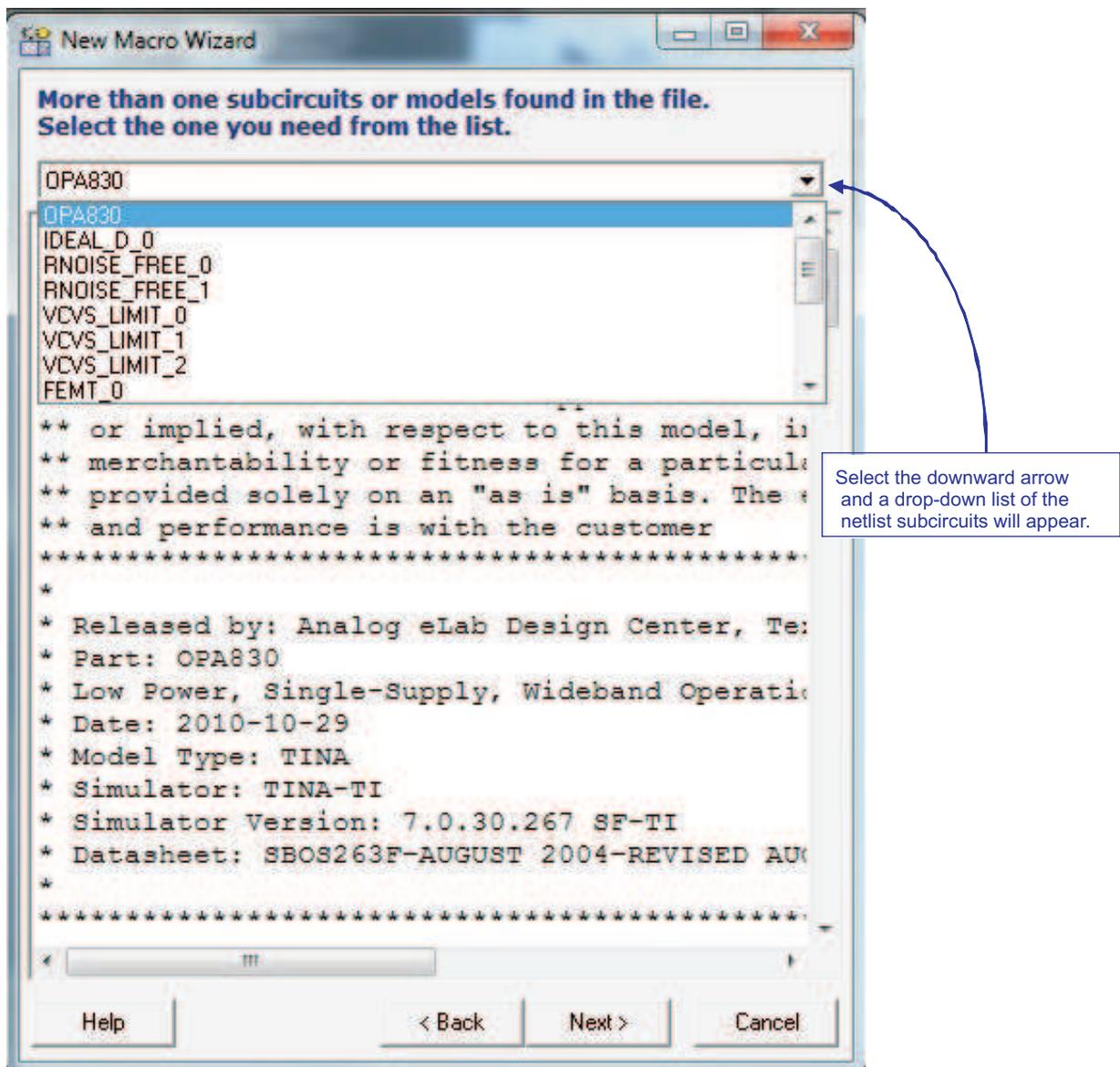
**Figure 3. New Macro Wizard Start Window**

Fill in an entry in the *Macro Name* field, and then click the folder icon to the right of the empty *From File* field. A pop-up directory window opens. Navigate to the folder containing the Spice netlist file and click on the file icon. For this example, the *New Macro Wizard* window should appear as shown in [Figure 4](#).



**Figure 4. New Macro Wizard Window with Entries**

Leave the other fields as they are shown here and click the Next button. The next pop-up window (Figure 5) shows the netlist. Click the arrow on the right side of the top text field, and a list of the netlist's subcircuits are displayed. Select the appropriate subcircuit that represents the macromodel and click the Next button.



**Figure 5. List of Subcircuits Found in the Macromodel Netlist**

Highlight the subcircuit that serves as the main call function for the macro.

## 2 Assigning a Symbol

The next step is to pick a symbol for the macromodel. There are two options for creating a macro symbol:

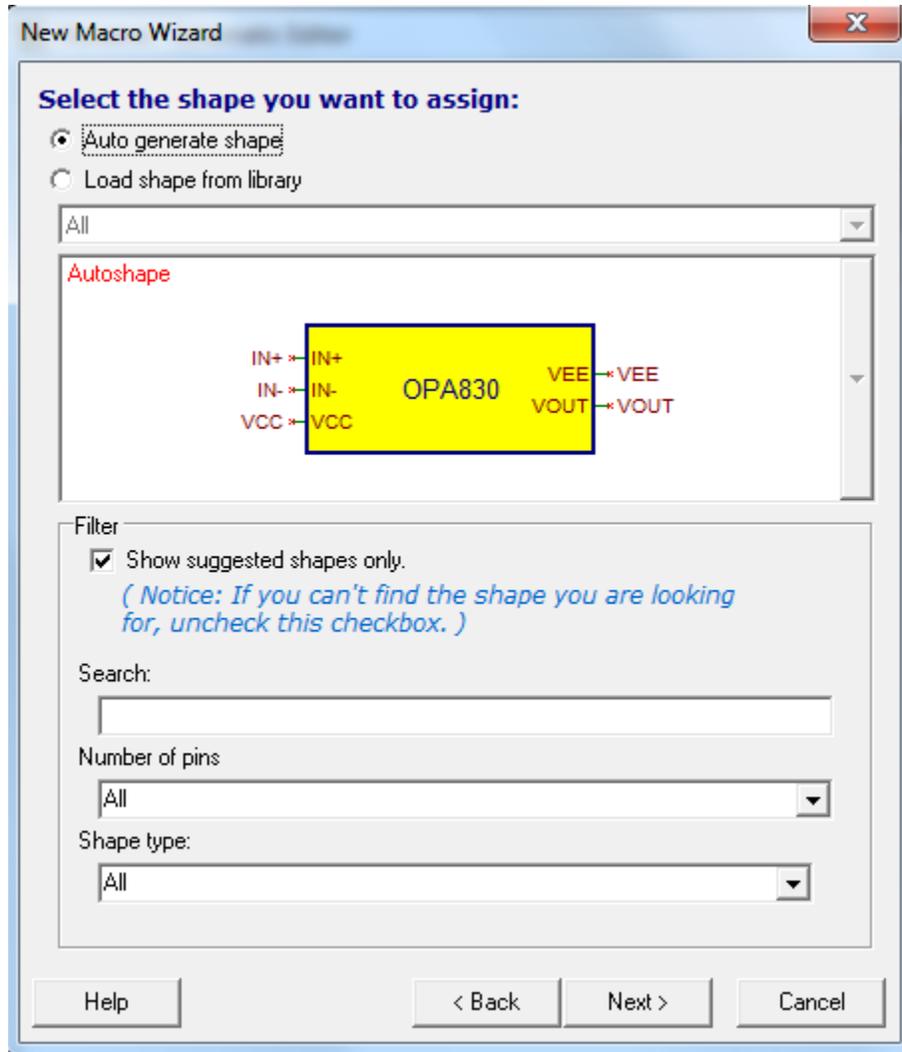
1. Let TINA auto generate a symbol – This option may be best for a unique model, or a model with a large number of I/Os.
2. Pick a suitable symbol from the existing TINA symbol library – This option may be preferred if the model is for a common device, such as a five-pin op amp.

In either case, the symbol may be modified later using the TINA9-TI symbol editor that is found in the Windows\TINA9-TI start menu.

Highlight the subcircuit that serves as the main description of the model, and click the *Next* button as shown in [Figure 5](#).

## 2.1 Auto Generate a Symbol

After selecting the main subcircuit in the previous step, the next pop-up window allows the choice of *Auto generate shape* or *Load shape from library* as shown in the upper left of [Figure 6](#). Select *Auto generate shape* and TINA generates a symbol with the model pins located on the left and right sides of the default rectangular shape.



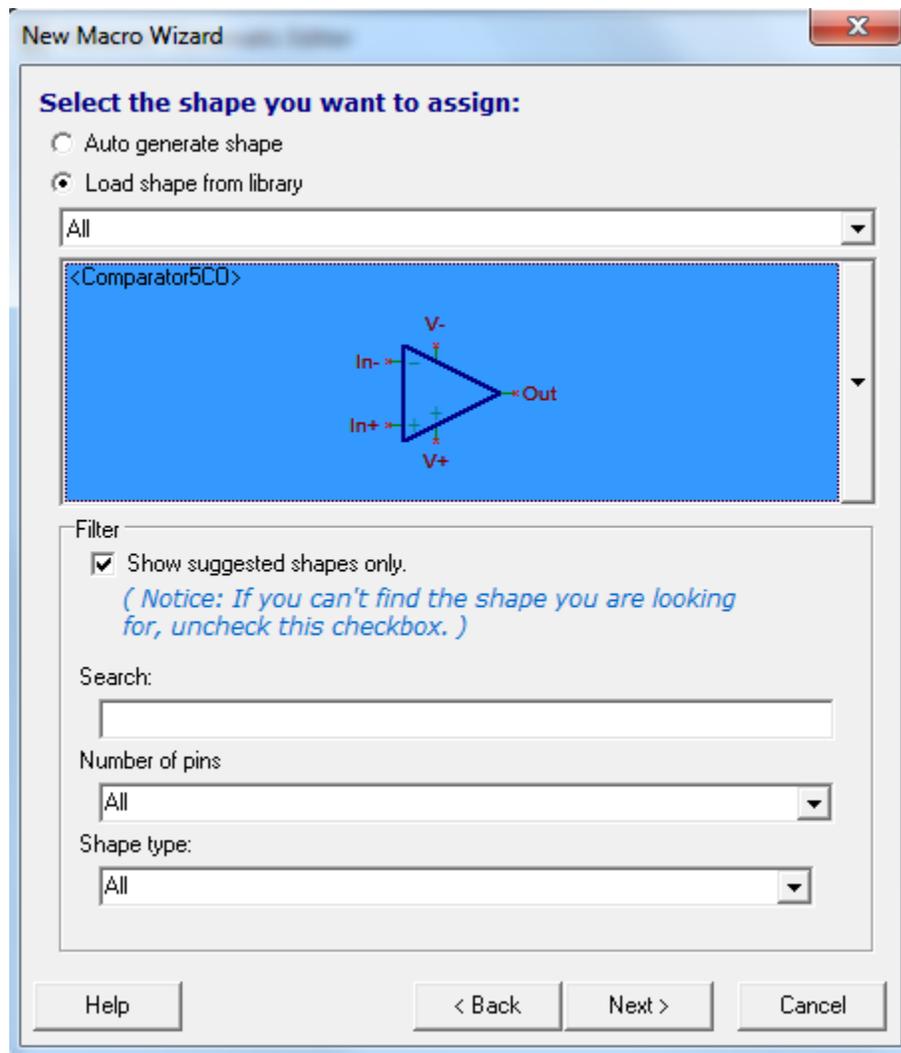
**Figure 6. Symbol Selection Using the Auto Generate Option**

Clicking the Next button allows the user to save the completed TINA9-TI macromodel to a local directory. In this example, the default name is OPA830.TSM

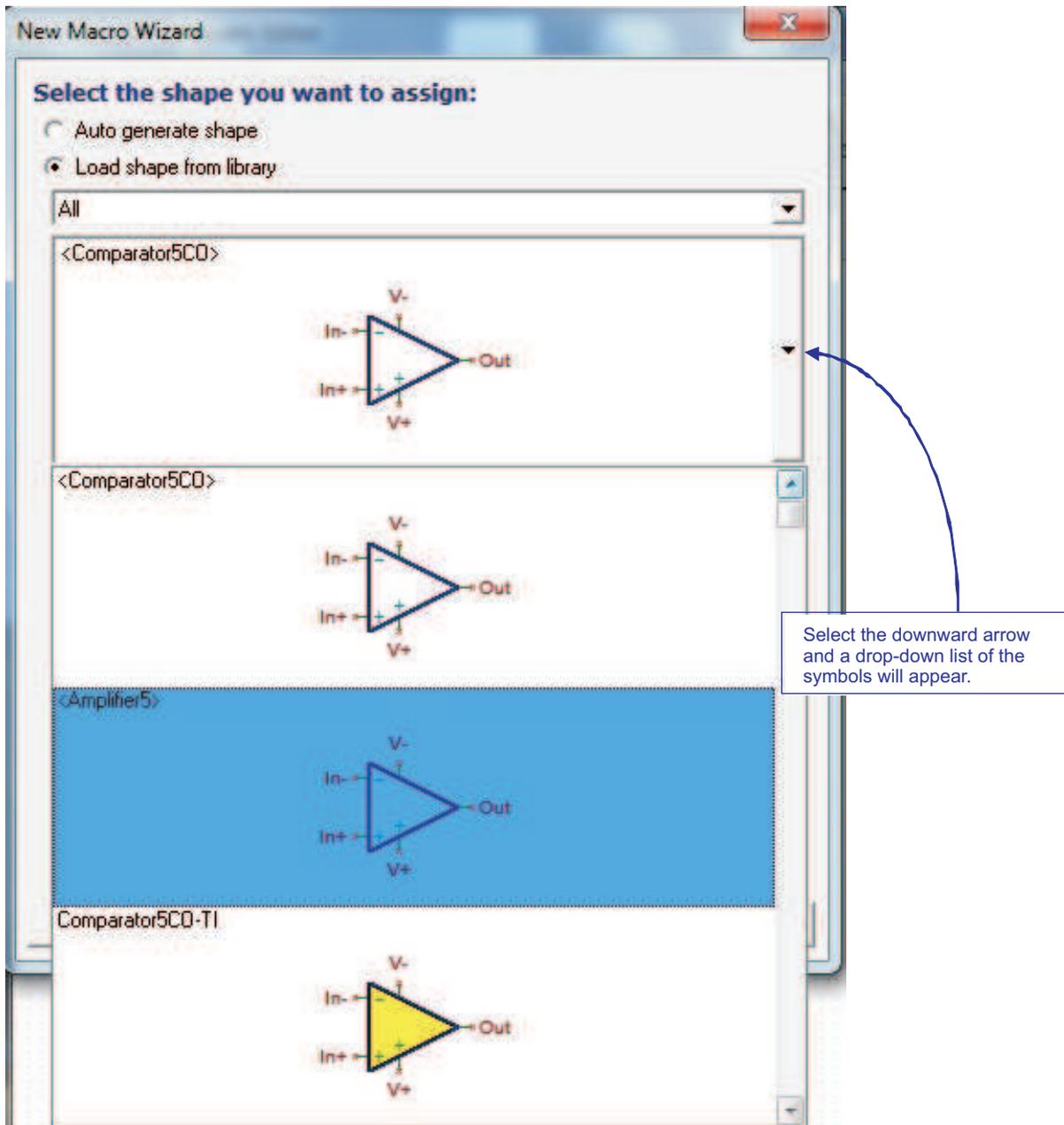
## 2.2 Load Shape From Library

If this option is selected, then a symbol may be chosen from the internal libraries of TINA symbols. This can be a convenient option for common macros with standard pin-outs such as 5-pin or 6-pin amplifiers. [Figure 7](#), [Figure 8](#), and [Figure 9](#) show the steps after selecting this option.

[Figure 7](#) shows the default pop-up window for this example. TINA has identified the macro as a five-pin device and has picked a list of candidate symbols from its internal libraries. The displayed symbol is associated with a five pin comparator. Clicking on the downward arrow on the right side of the symbol shows the other candidates, as shown in [Figure 8](#).



**Figure 7. Initial Pop-up Window for Shape Selection From Internal Libraries**



**Figure 8. List of Devices.**

**TINA has attempted to select likely candidates by cross-referencing the netlist I/Os with the internal symbol libraries.**

If a suitable symbol does not appear, try unselecting the check-mark field *Show suggested shapes only* as shown in [Figure 9](#). For this example it expanded the list of displayed symbols from about 50 to over 200.

If the list is too long to search easily, check the box *Show suggested shapes only* and select a single symbol library in the top-most field as shown in [Figure 10](#) and [Figure 11](#).

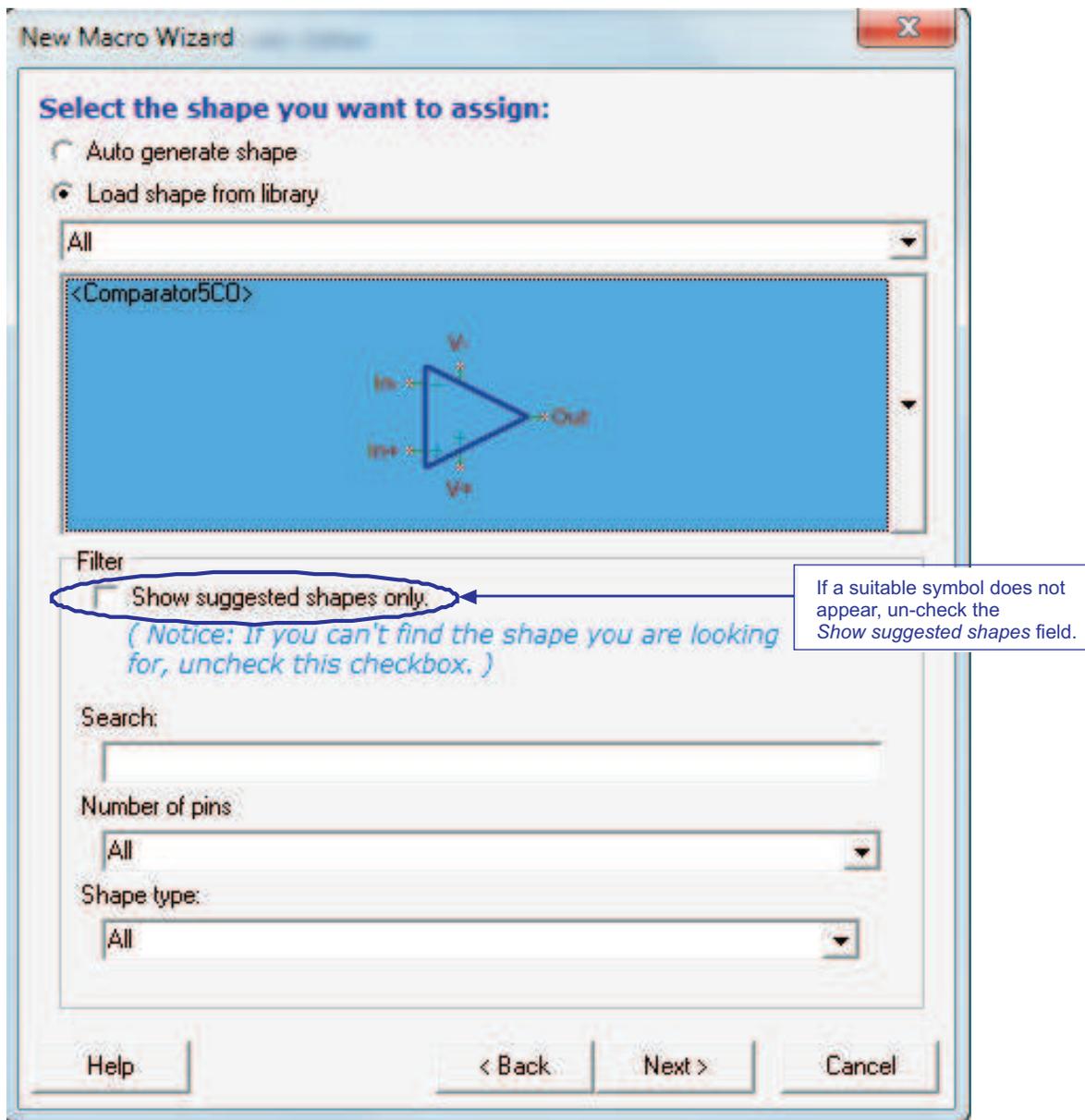


Figure 9. Uncheck the *Show Selected Shapes* Box to Expand the Search of Internal Libraries.

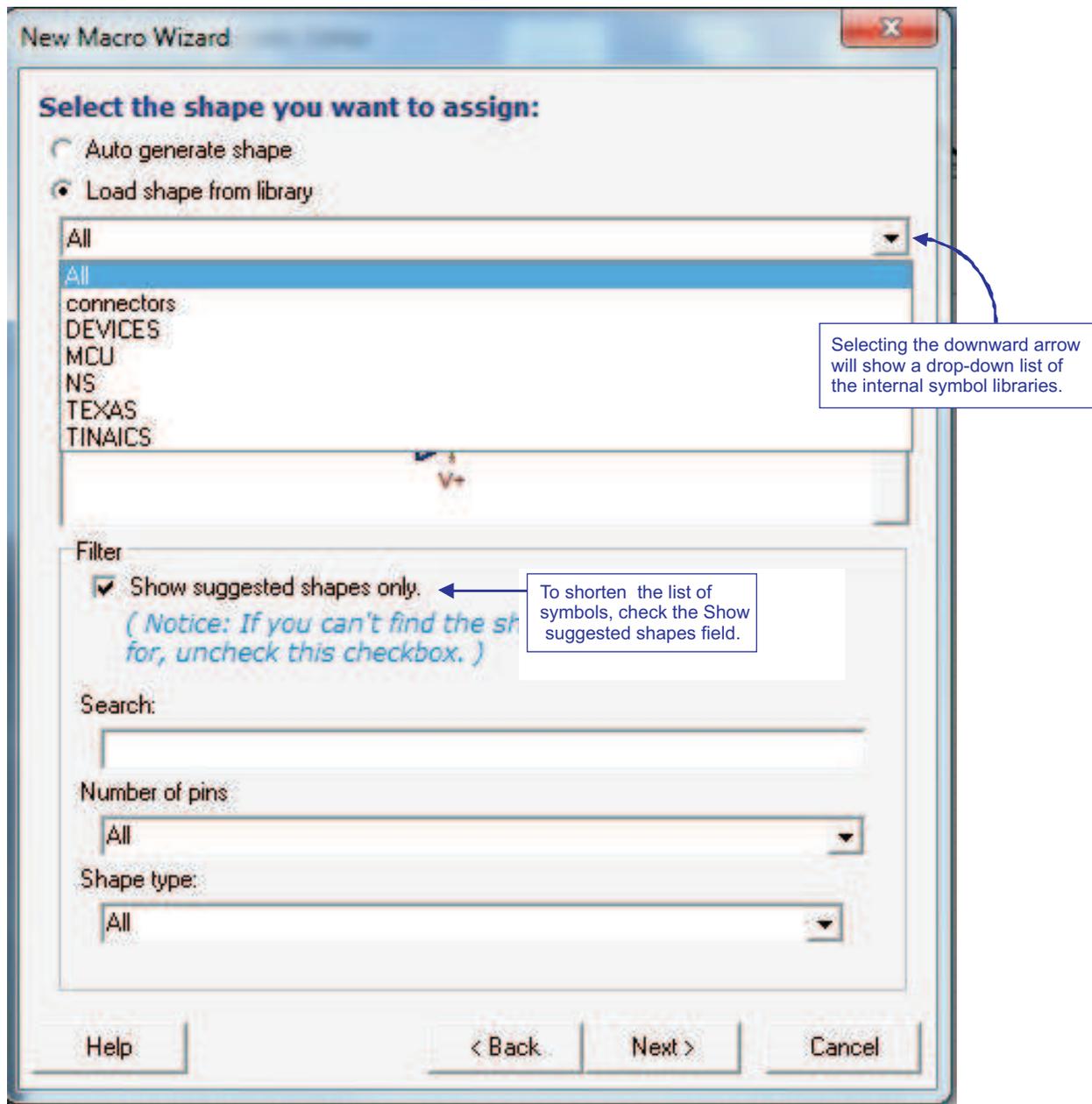
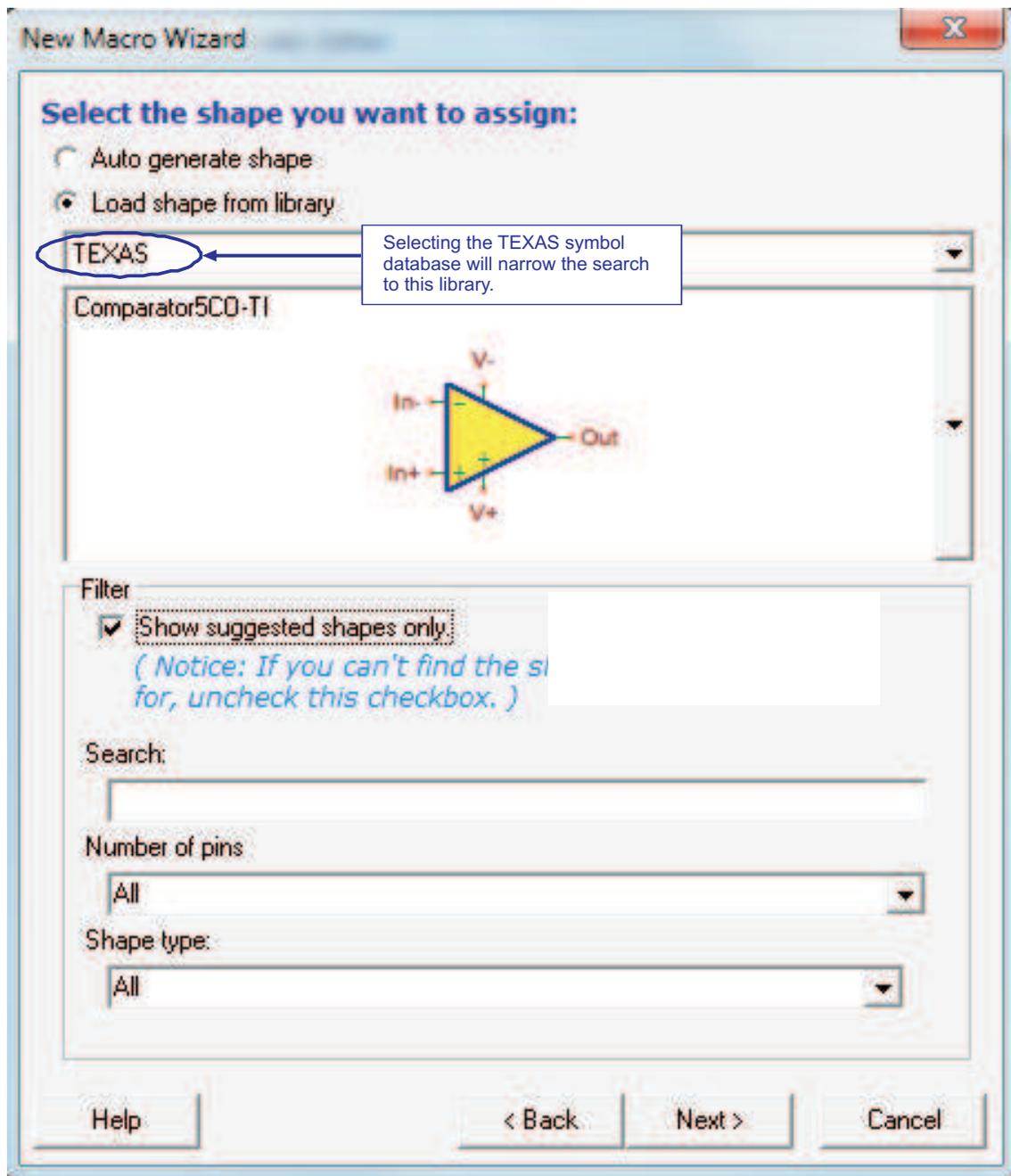


Figure 10. Narrow the Search of the Symbol Libraries from all to one of the internal libraries, if the symbol list is too long to be easily searched.



**Figure 11. Narrowed the Search of the Symbol Libraries from All to one (TEXAS).**

After selecting a default or library symbol, click the Next button. The next window allows you to cross-reference the symbol pins and the subcircuit pins (netlist) as shown in [Figure 12](#). The netlist is shown in the lower window with the netlist subcircuit pins appearing in blue font. The figure in the upper diagram shows the macro wizard's educated guess on the pin assignments between the symbol and the netlist's subcircuit (selected in [Figure 5](#)).

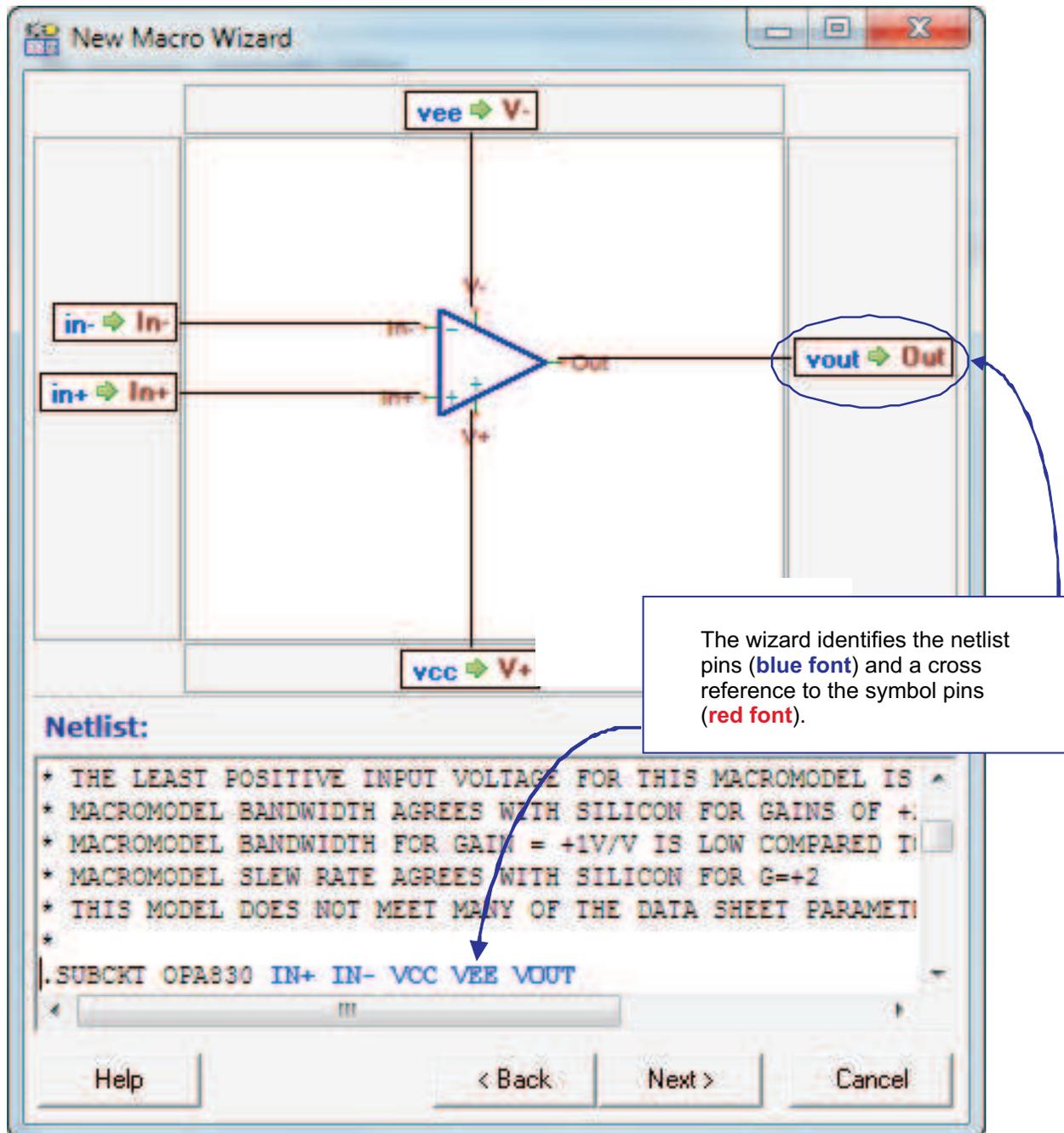


Figure 12. Default Cross-Reference Between Symbol Pins and Netlist I/Os

If any pin assignments need to be changed, this can be done by clicking and dragging the individual white boxes (showing the pin-to-pin translations) to new locations. Selecting the boxes often causes them to move to the margin at the bottom of the image as shown in Figure 13. From this location, the boxes can be dragged-and-dropped to the red contact points on the symbol pins, creating the new pin assignments.

After completing any changes, press the *Next* button and save the TSM file to a local directory to complete the macro.

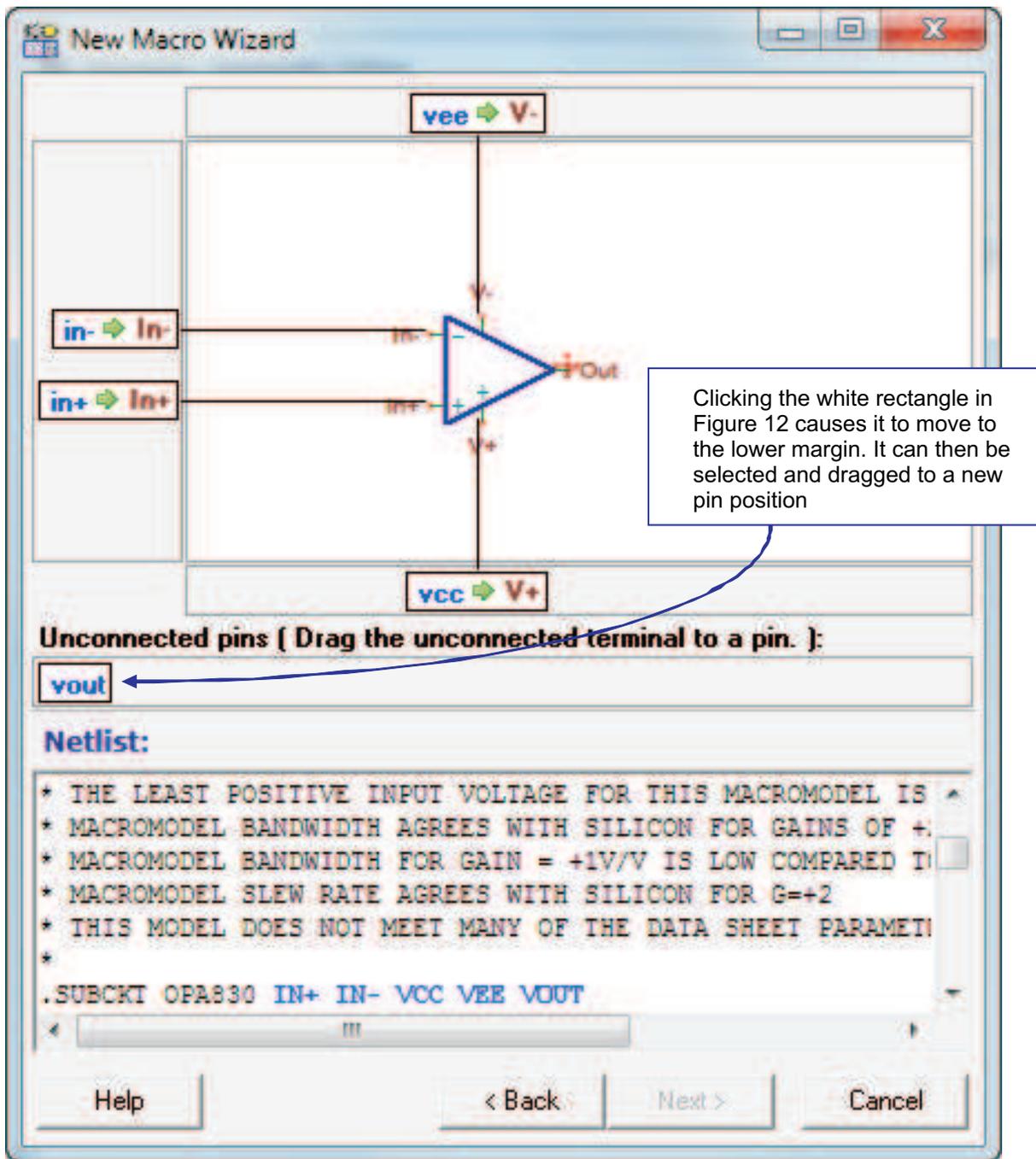


Figure 13. Clicking on the Netlist's  $V_{OUT}$  pin moves it to the gray strip so it can then be placed on a different symbol pin.

### 2.3 Placing an instance of the new macromodel in a TINA-TI circuit schematic

After the new macromodel file (\*.TSM) has been created and saved, the macromodel may be instantiated (placed) into a circuit schematic by first selecting the Insert or Macro menu tab (see Figure 14). Next, navigate to the directory containing the macromodel file, select the desired macromodel file (OPA830.TSM in this example) and select the Open button. The window closes, and the mouse cursor shows the outline of the auto-generated shape. Left-click the mouse once the cursor is in the desired position in the schematic window and the shape should appear as shown in Figure 15.

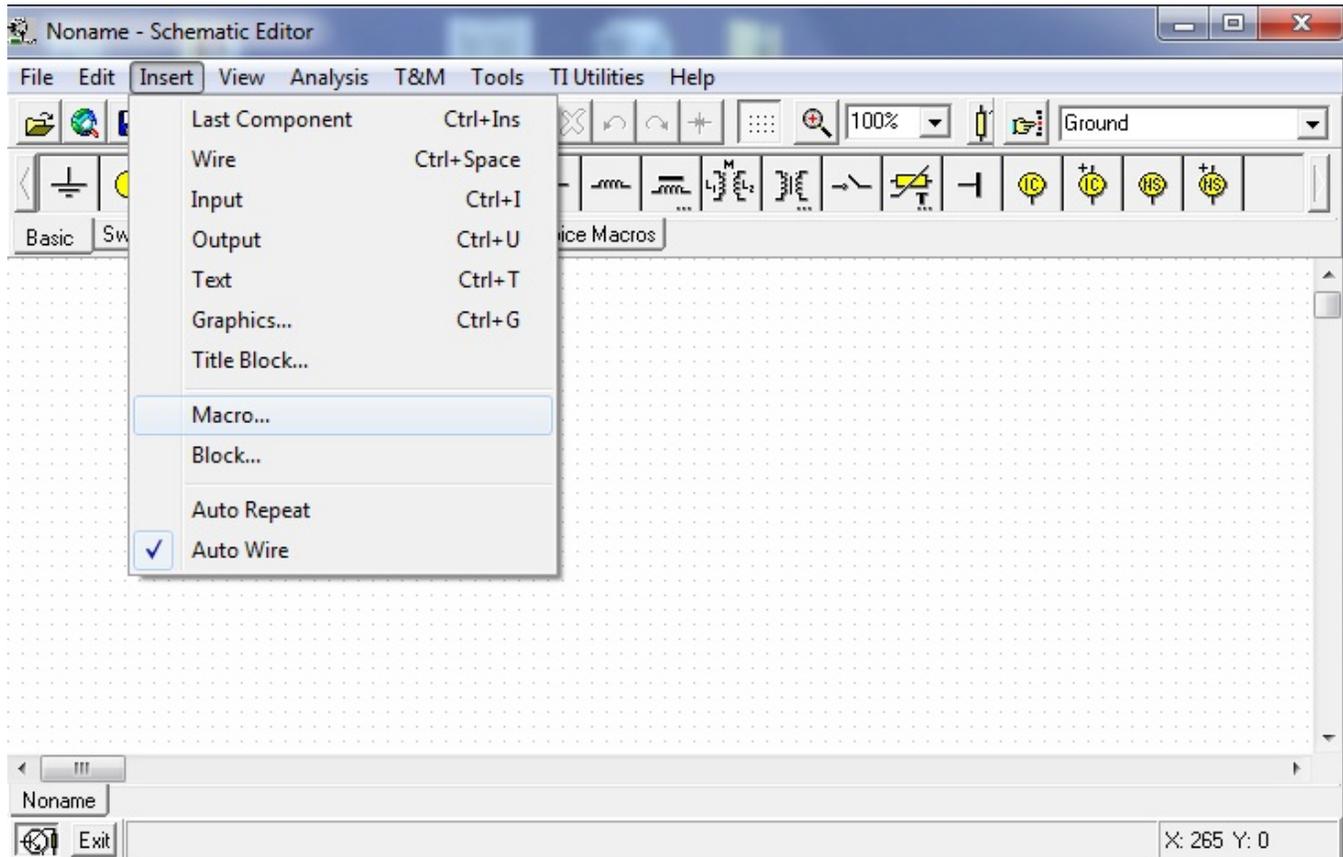
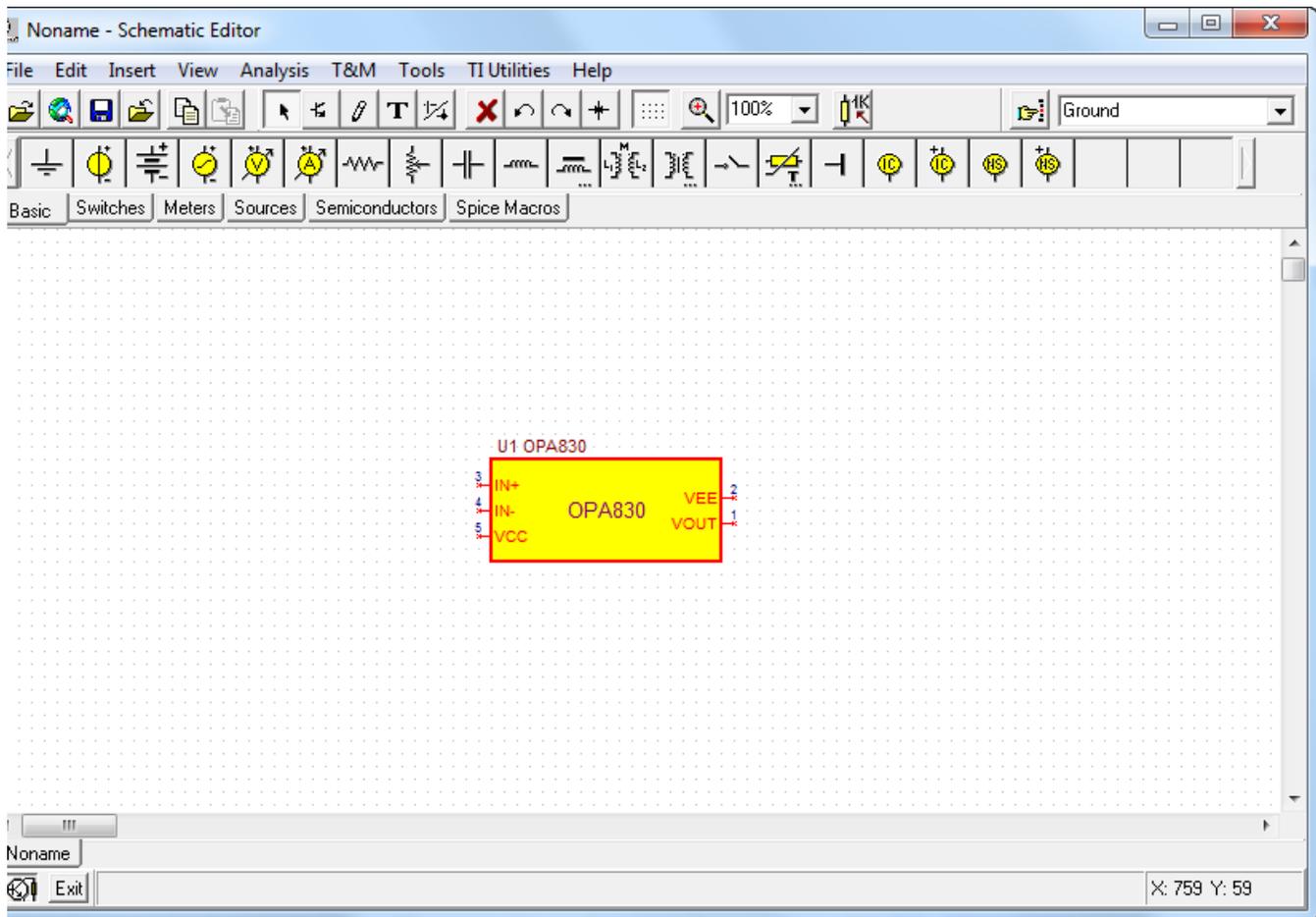


Figure 14. Initial Step to Add a Macro to a Schematic.



**Figure 15. Newly Created Macromodel Placed (Instantiated) in a Schematic Window.**

Complete the circuit by inserting and connecting additional components, and run the desired simulations. An example of a final schematic and the probe window showing the output waveform from a transient simulation appear below in [Figure 16](#).

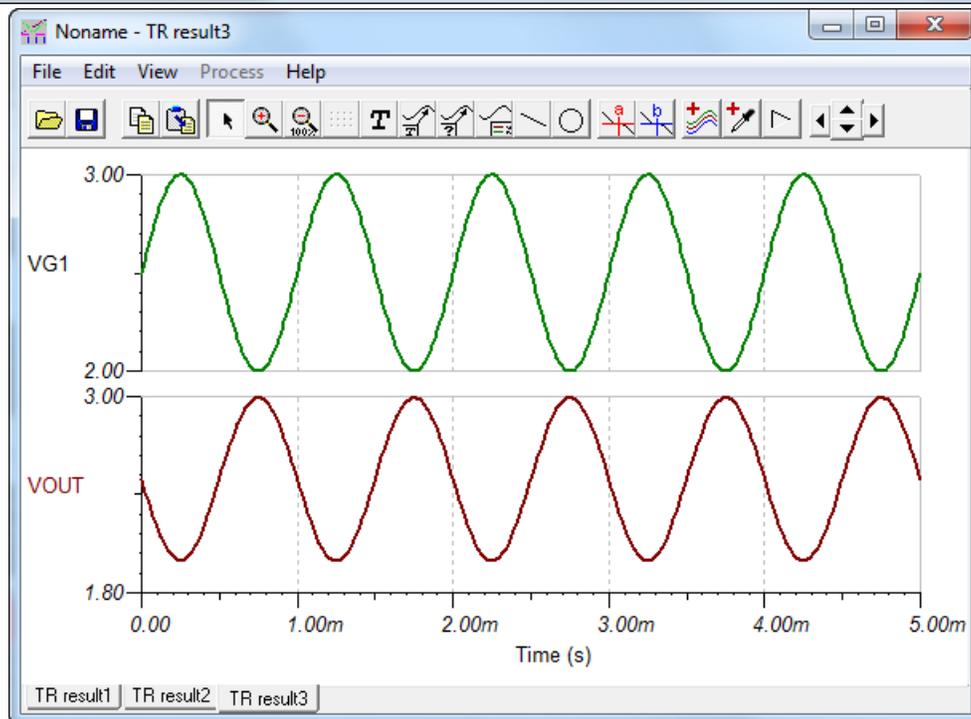
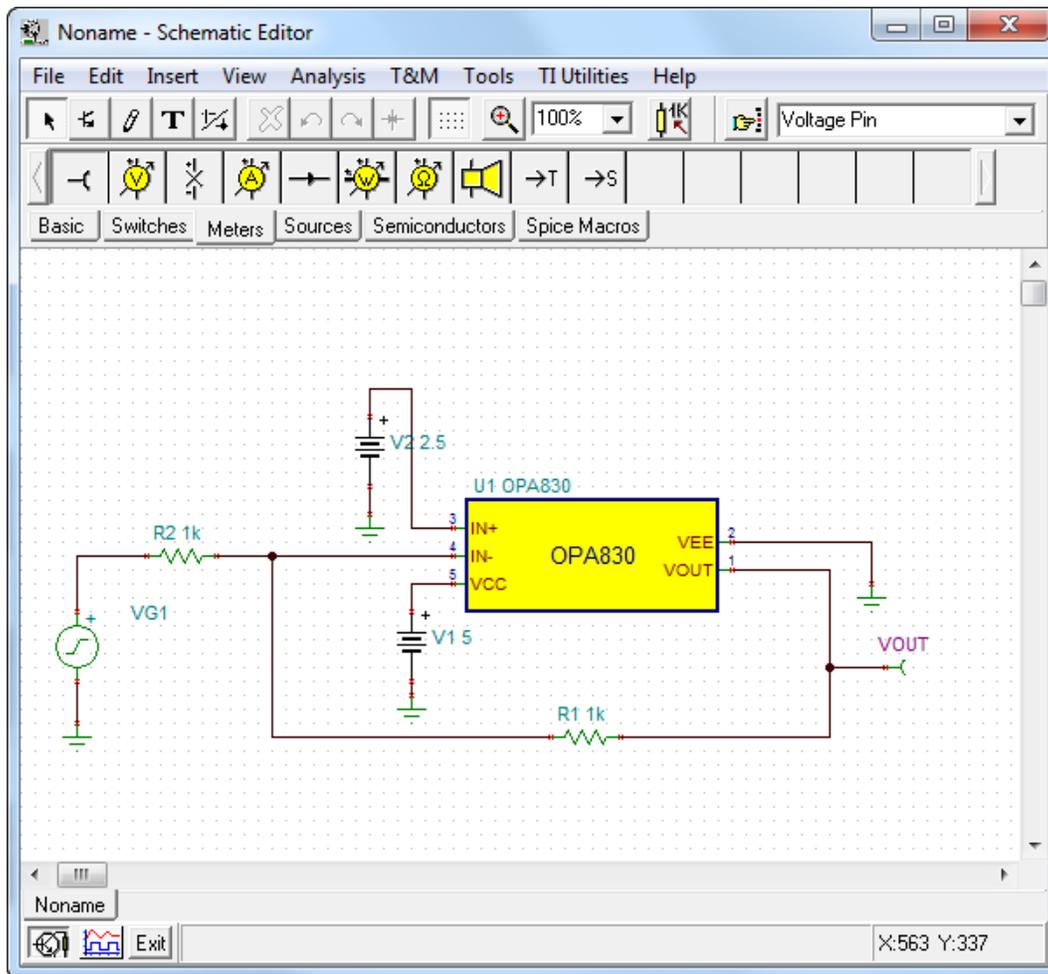
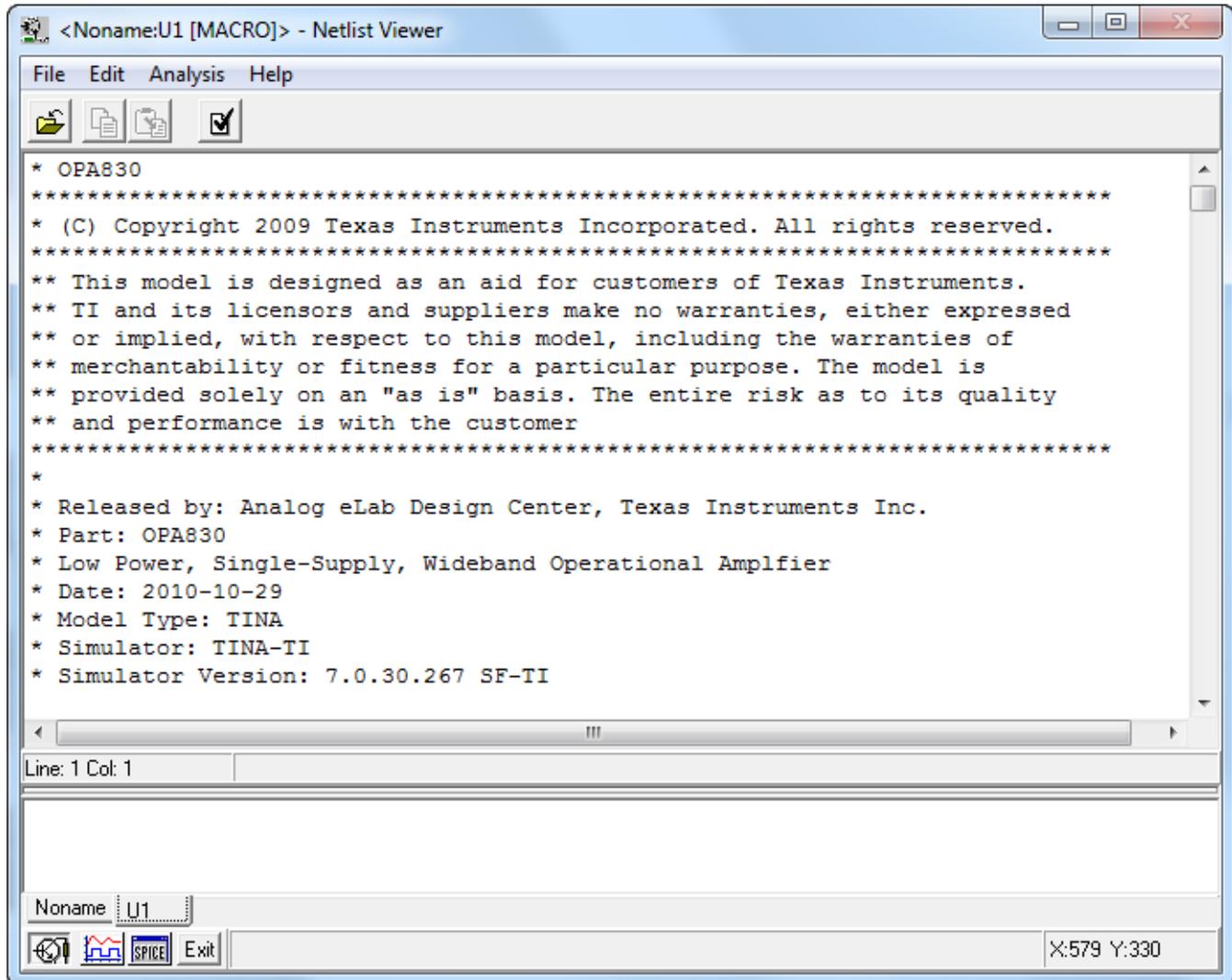


Figure 16. Final Schematic

Figure 16 Shows the macromodel shape and additional components, and probe windows showing the output waveform from a transient simulation.

**Viewing the Netlist** – If the netlist is unencrypted, it is possible to view the macromodel netlist in TINA. To do this, left-click the macromodel symbol and select *Enter Macro* in the pop-up menu. The netlist viewer window opens within the TINA application window as shown in Figure 17. The schematic can still be viewed by selecting the appropriate tab on the lower left corner of the TINA application window. To close the netlist viewer select the *File/Close* menu tab.



NOTE: The tabs for the schematic window and the viewer window (lower left).

**Figure 17. Netlist viewer window**

If the netlist is encrypted, it is not possible to view the netlist content from within TINA, or any other text viewer. As an example, Figure 18 shows the netlist view of the TPS6300 macromodel. If the Spice netlist is encrypted and cannot be imported directly into TINA, please contact the E2E/Simulation and Models Forum for support.

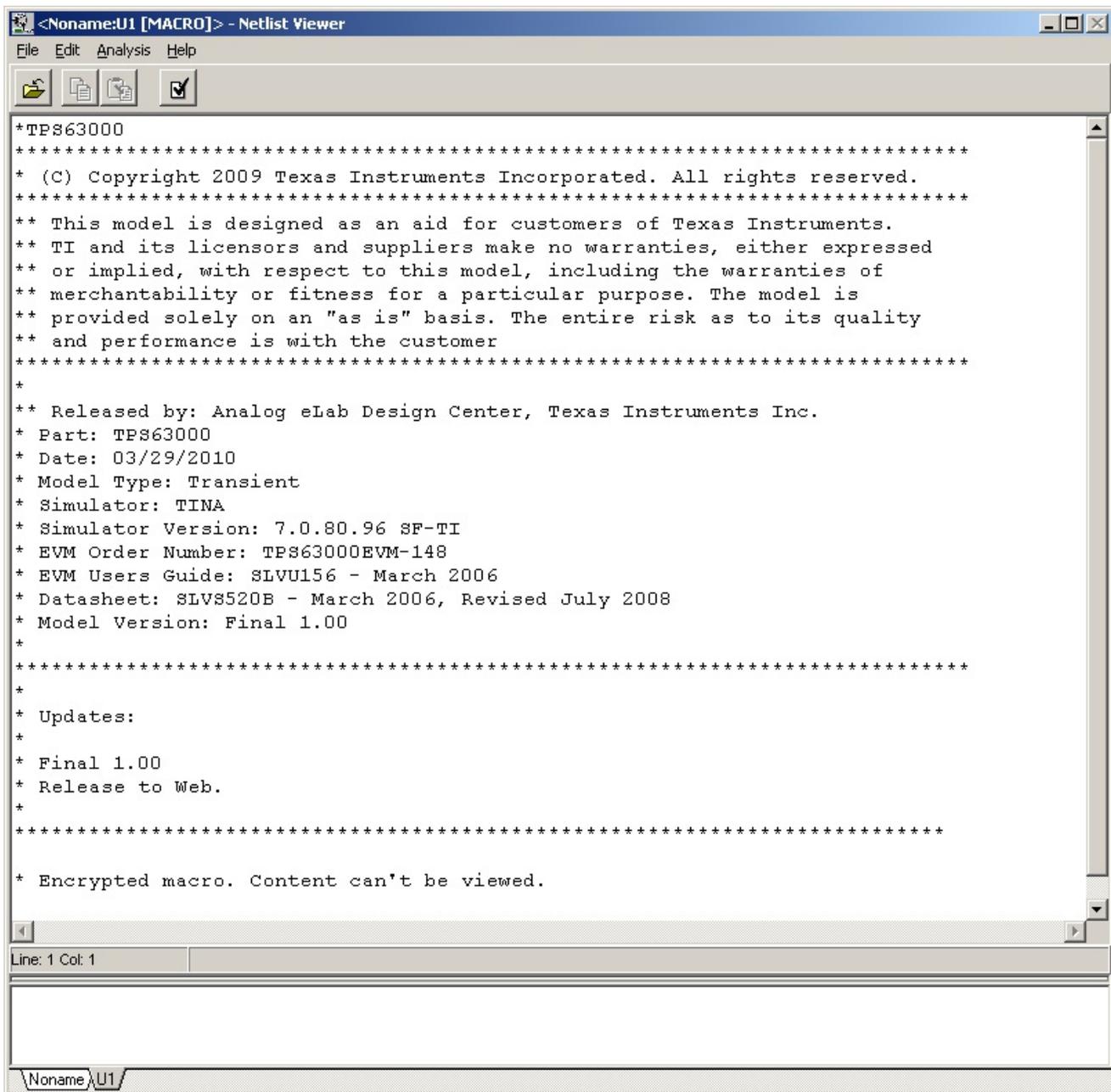


Figure 18. Netlist editor display for an encrypted netlist

### 3 References

1. Vladimirescu, V. (1994). *The Spice Book*. John Wiley and Sons, Inc. New York. ISBN 0-471-60926-9

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