

Differential_Gilbert_Cell

Where To Find This Example

Select **Help > Open Examples...** from the menus and type either the example name listed above or one of the keywords below.

Or in Version 13 or higher you can open the project directly from this page using this button. Make sure to select the **Enable Guided Help** before clicking this button.

Open Install Example

Design Notes

Differential Gilbert Cell Mixer

This project demonstrates the new differential probe measurement feature of the AWR Design Environment and the improved performance of the Harmonic Balance simulator.

To show the speed improvements and support for fairly complex circuits a differential Gilbert Cell mixer is used. This mixer design also includes driver stages, output stages and current sources.

Overview

The schematic, "Gilbert_Cell_Mixer" contains 22 transistors in a DC coupled design. Several of these transistors are set up to control the current through the differential stages. The use of annotation to display the device current helps the designer check that each stage is operating at the correct bias point.

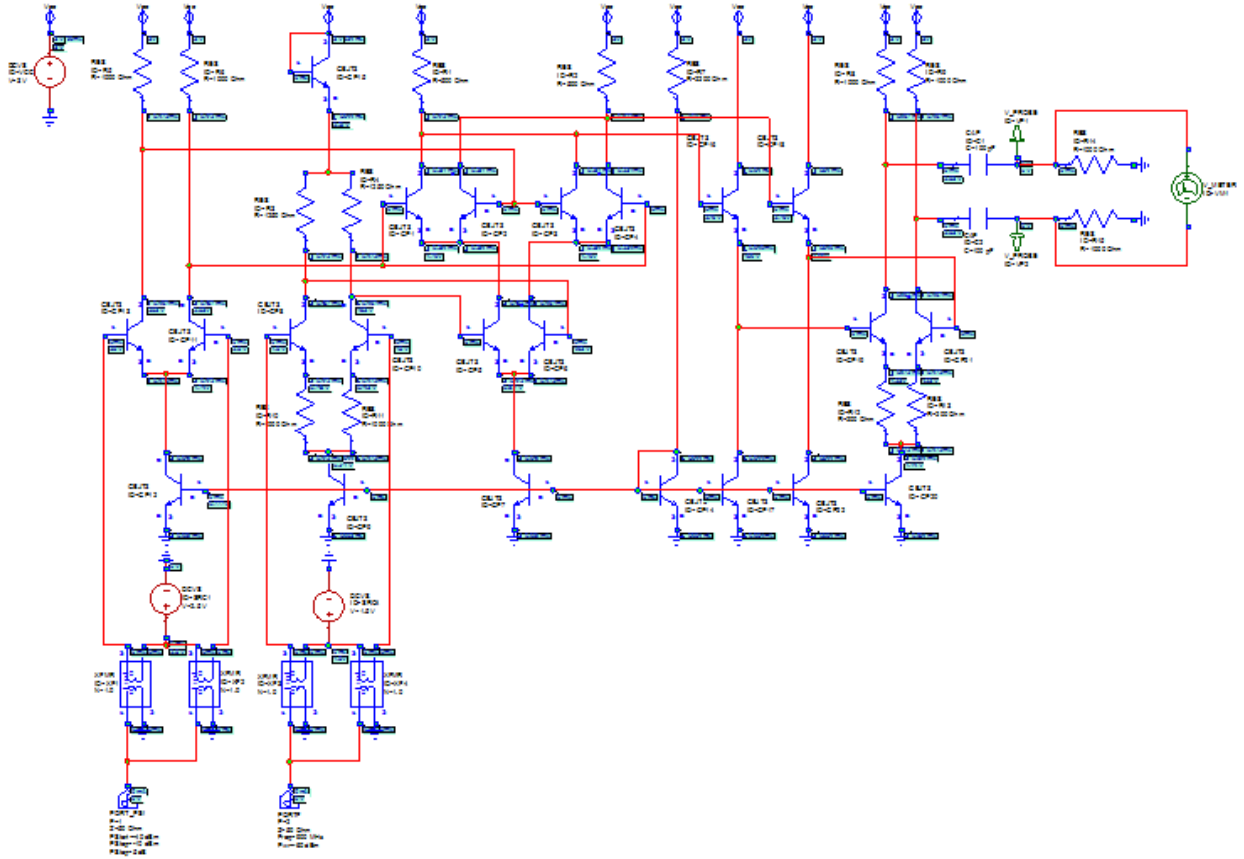
The LO signal is amplified and then applied to the upper quad set of switching transistors. The signal also undergoes some amplification and is applied to the lower differential amplifier. The mixer uses a differential output.

Gilbert Cell Mixer

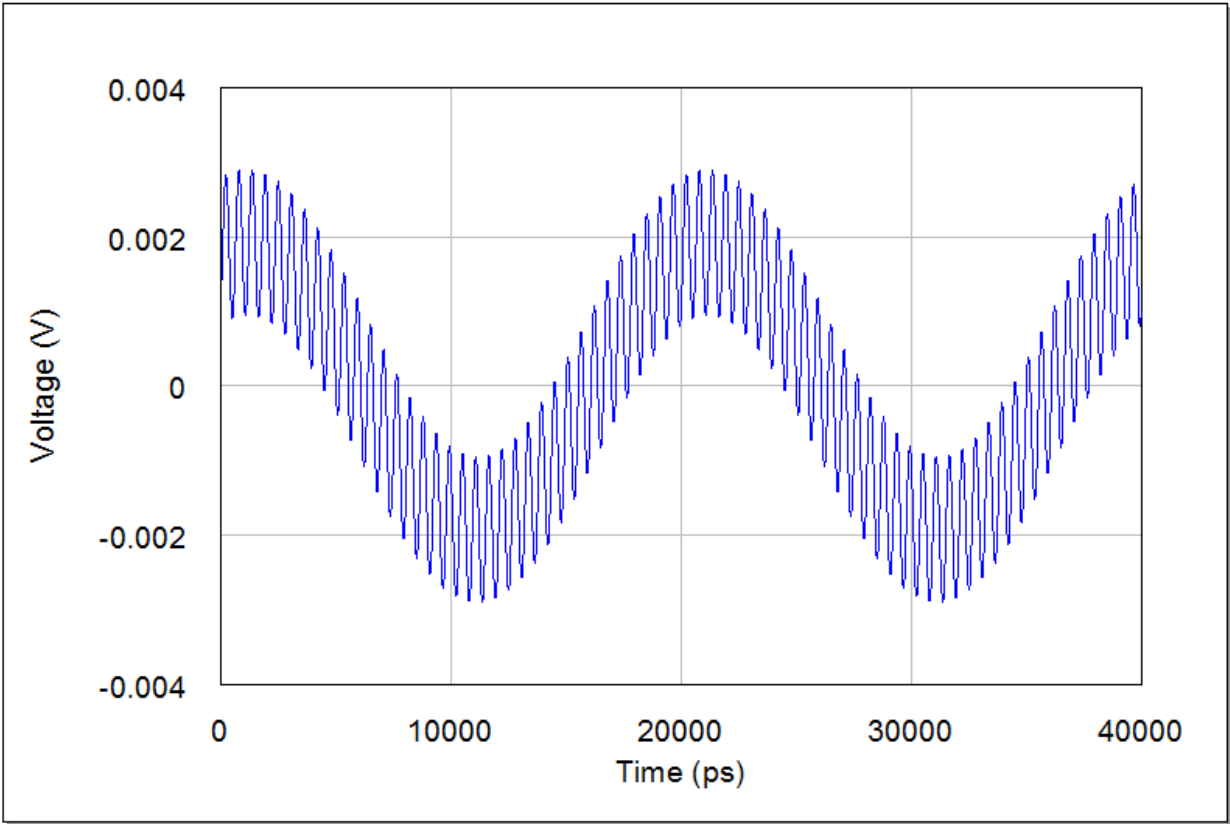
Two methods of making the differential measurement are demonstrated in the schematic, "Gilbert_Cell_Mixer". A simple voltage measurement is made using a **V_METER**. This element is found in the **MeasDevices** node in the element tree. A second method is also used as an alternative. Here we use two probes and make use of the differential probe measurement **VtimeD**. The use of probes simplifies the process of making differential measurements, a **V_METER** elements needs to have wires that join this element to the various circuit nodes.

Schematic - Gilbert_Cell_Mixer

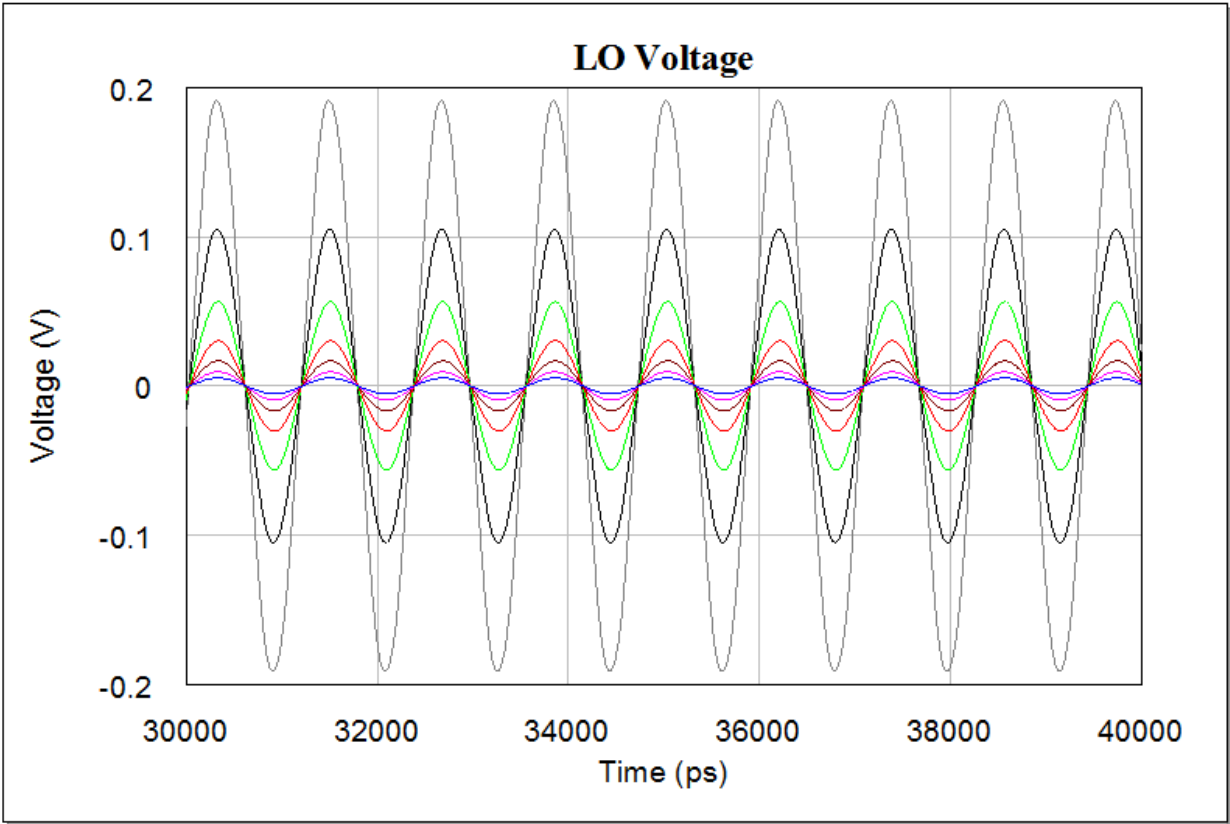
Gilbert Cell Mixer



Graph - IF Voltage



Graph - LO Voltage



Graph - Spectrum at Different Input Power Levels

