

## DAC39RF10 Output S-parameter model

The DAC39RF10 output s-parameter model is a 34 port (s34p) model representing die routing, internal termination resistor and package routing. There are 6 total \*.s34p s-parameter files, corresponding to PG1 and PG2 and weak, typical and strong corners. The corners affect the termination resistance, with weak having the highest termination resistance.

Ports 1-32 are for 16 differential current sources representing 16 MSB current segments (the device has 15 MSB segments, the mid segments and binary segments are represented by the 16<sup>th</sup>).

To use the model directly, 16 differential current sources with a maximum output current of 1.28125mA each should be connected to ports 1-32 (odd and even ports forming a differential pair). Ports 33 and 34 correspond the DAC39RF10 DACOUT.

In the ADS workspace DAC39RF10\_dacout\_wrk the schematic 32xCurrentSources show how to connect the s-parameter model (Figure 1). Each current source pair consists of two sinewaves swinging between 0 and 1.28125mA, 180 degrees out of phase. The frequency is a swept parameter to allow the output frequency response to be generated.

The output is connected to an ideal transformer and 50Ohm load. Two inductors are added to provide a path to sink the output current.

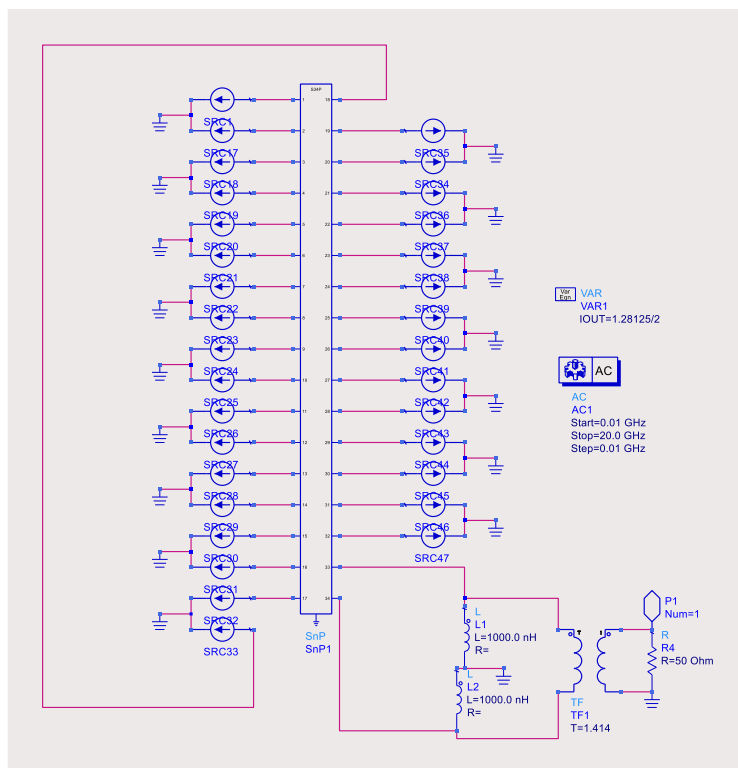


Figure 1: 34 port s-parameter model connection in ADS

To simplify the use of the s-parameter model in ADS, a component with differential voltage input and DAC output was created (DACmodel4 and DIFFVCCS). When each input swings from 0 to 1V (2\*VOUT variable) 180degrees out of phase (2Vppdiff), the proper current per input port is generated.

The schematic Voltage source allows sweeping over corner and/or PG# by setting spname to spsweepname. To use a single s-parameter file, change spname to sp\_pg#\_typ/weak/strong and disable the parameter sweep. An example output sweeping corners is shown in Figure 3 for PG2.

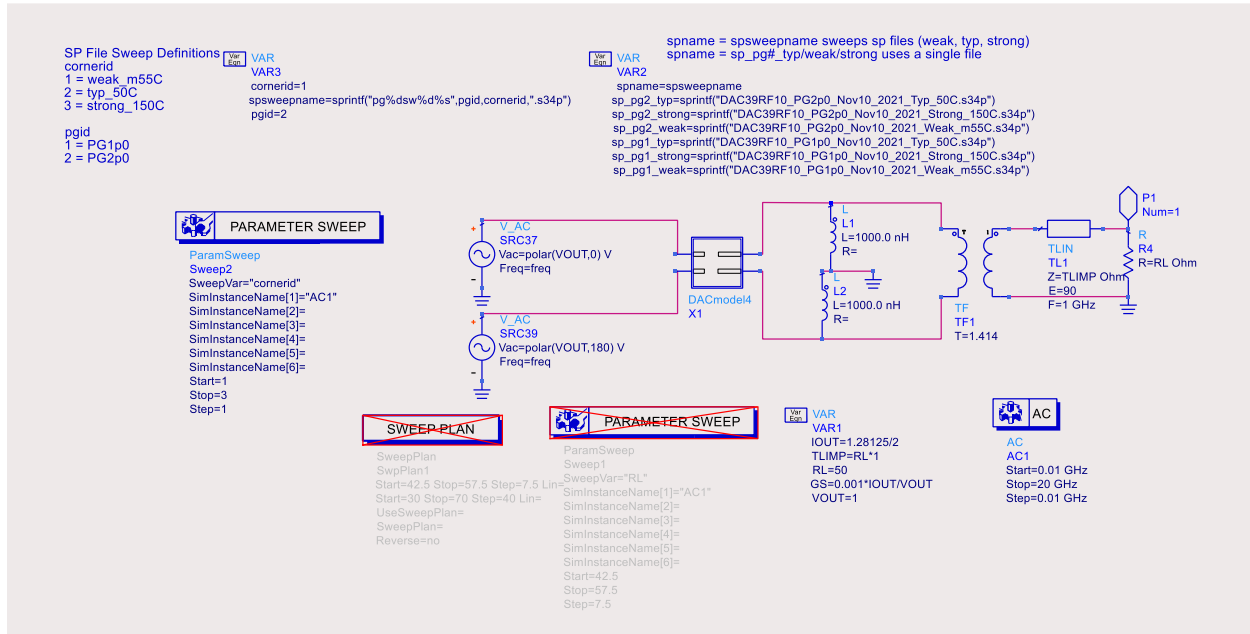


Figure 2: Schematic VoltageSource

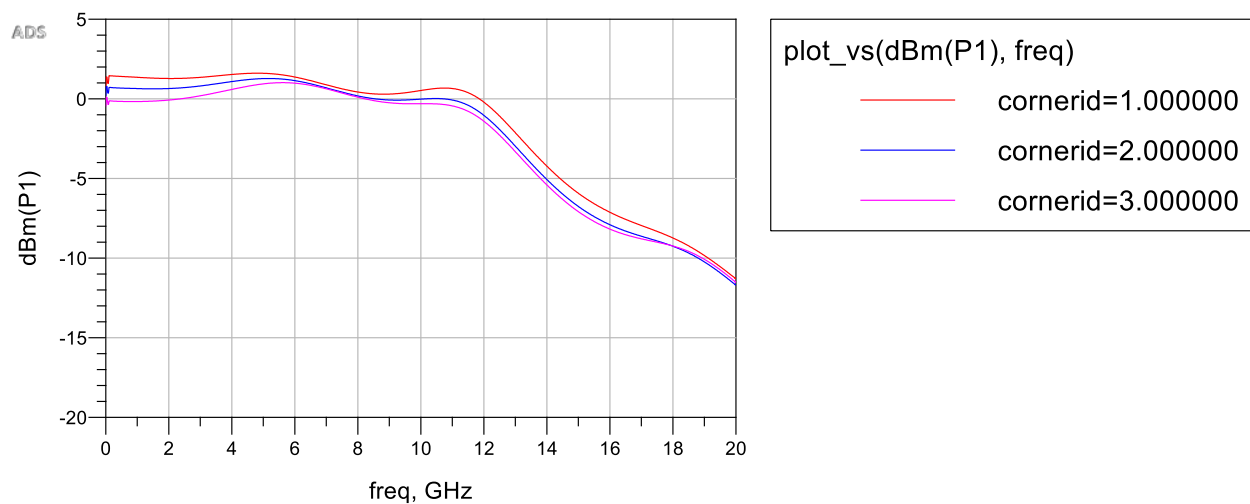


Figure 3: PG2 output over corners