

1.  $V_{dd}$  Anomaly #1 is a sudden drop in  $V_{dd}$  supplied to the driver.

This is due to the  $L_{V_{dd}}$  inductor limiting the current available to the driver. When the driver is current limited by the inductor, it cannot launch as big of an incident wave.

As time goes on, the current through the inductor begins to increase allowing the edge to eventually reach  $V_{dd}$ . The edge of the incident wave however, follows  $V_{dd-pin}$  almost exactly as the inductor current increases.

Voltage at  $V_{dd-pin}$  droops because of the direction of current flow through the inductor.  $V_{dd}-V_{dd-pin}$  is a positive value which subtracts directly from the voltage supplied to the driver.

$V_{dd}$  Anomaly #2 is a result of the "inductive kick back" of the  $L_{V_{DD}}$  inductor. Near the end of the first pulse, the current has reached a steady state value through the inductor. The current stays steady because of the parallel termination.

When the output buffer switches its output to a logic low state, almost no current is needed from  $V_{dd}$ . In a short period of time, the  $L_{V_{DD}}$  inductor sees a current change and produces a reverse polarity voltage in an attempt to maintain the previously flowing current. Remember that the inductor's nature is to oppose changes in current. We thus see a large positive spike in  $V_{DD-pin}$ .

(Note: Ringing is evident in the simulation on  $V_{dd}$ . This is most likely due to resonant behavior between capacitance at  $V_{dd-pin}$  and the 100nH inductor.)