HED

ESG - Columbia Design Center

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Enterprise server group

Input Buffer Modeling Characterization: The first steps Proving Feasibility 8/23/99

Behavioral Input Characterization

- **Problem:**
  - Improve timing simulation predication over the “time at threshold” technique
  - Create method to determine if characterization is feasible for a given receiver
- **Characterize input performance and determine predictable trends.**
  - Look for patterns in receiver behavior
  - Use 3D view to suggest trends
  - Use Monte Carlo to define multi-variant problem space
- **Start with simple characterization case**
  - Triangle wave stimulus - Randomly vary amplitude and slew, then measure time delay

Simple Characterization Circuit

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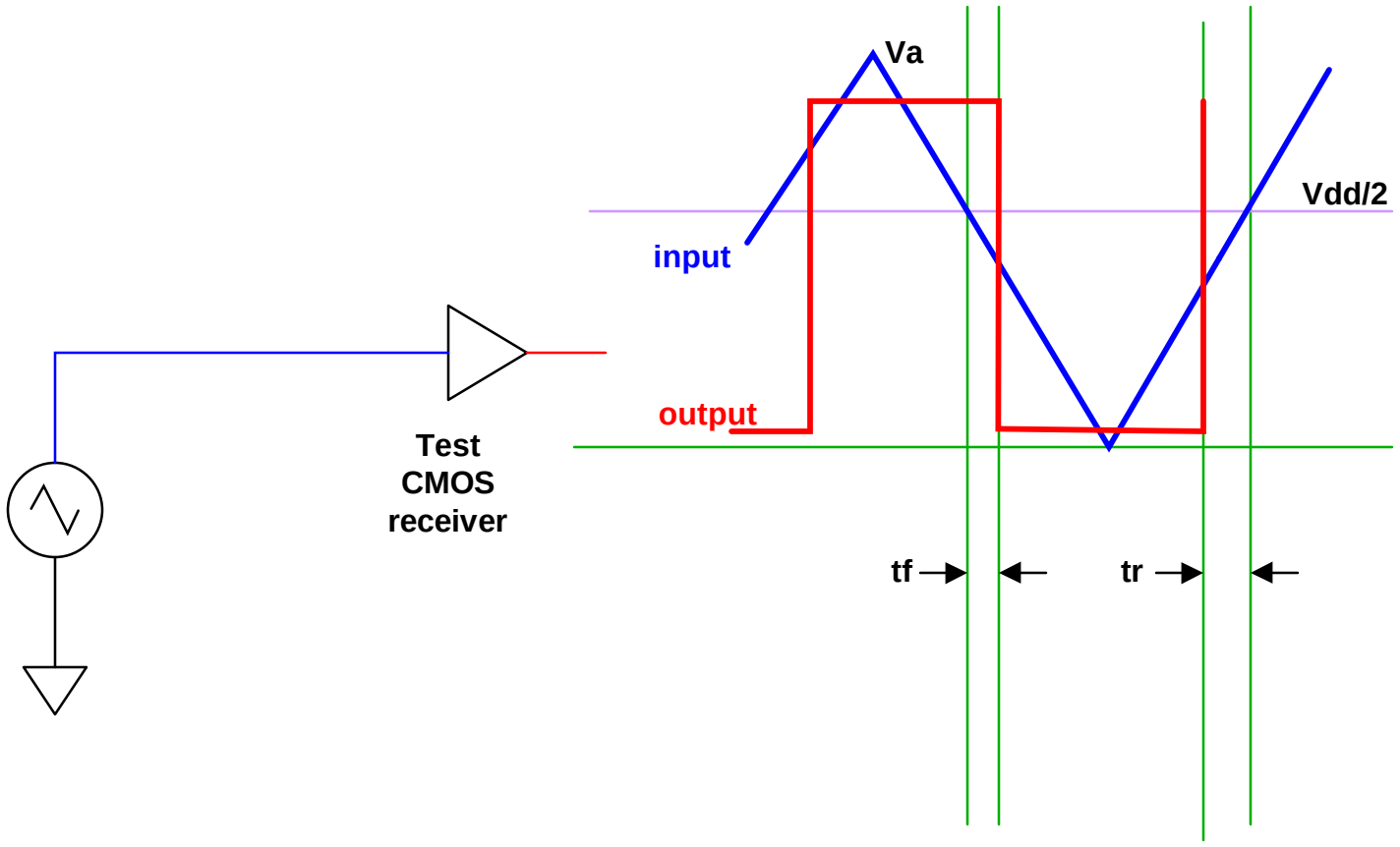
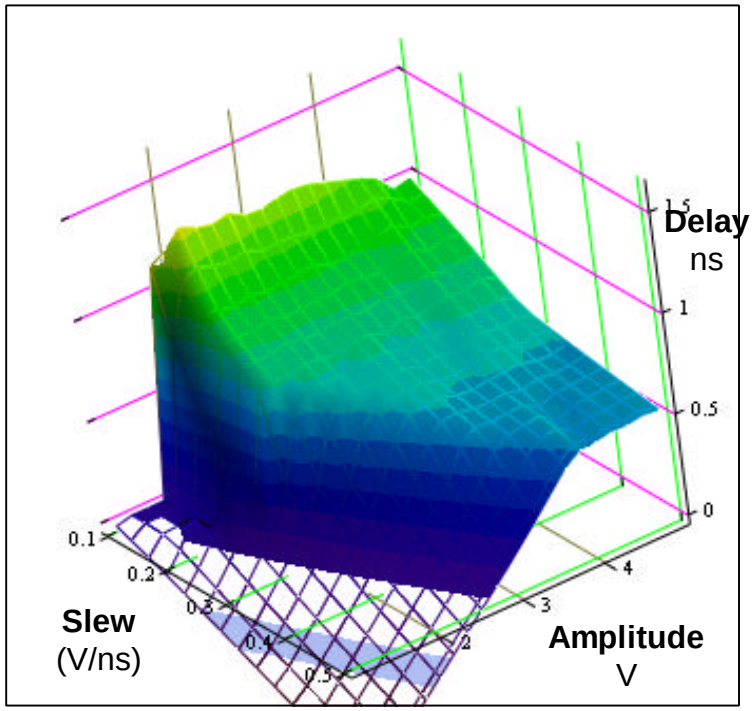


Monte Carlo Sweep: frequency and Va
Measure: tr, tf

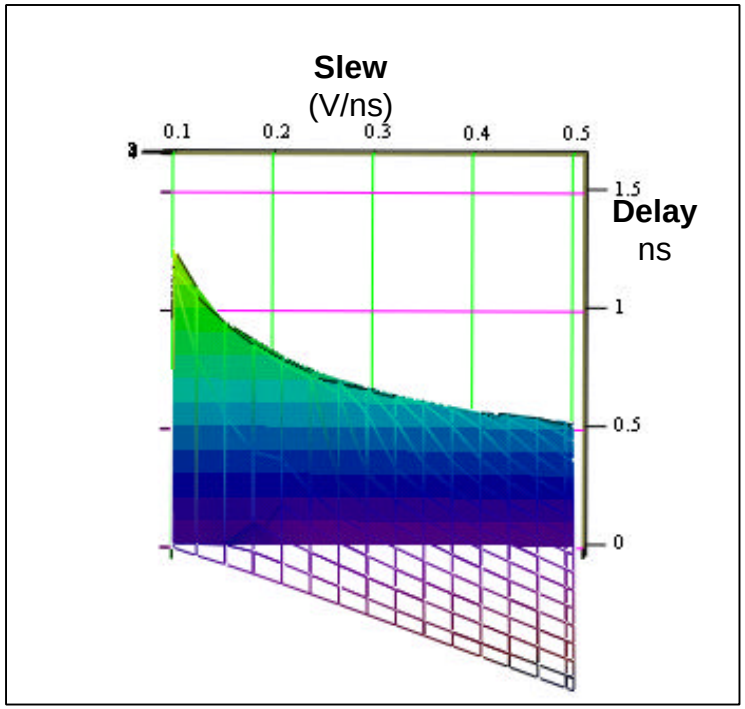
Example of Results for Triangle wave

delay vs.slew rate and max voltage for falling edge



(slew, ampl, time)

delay vs.slew rate and max voltage for falling edge



(slew, ampl, time)

Different angles of view

Conclusion: We can accurately map slew rate to time delay for at least some devices