

IBIS Modeling for Load Dependent Current Mode Differential Drivers

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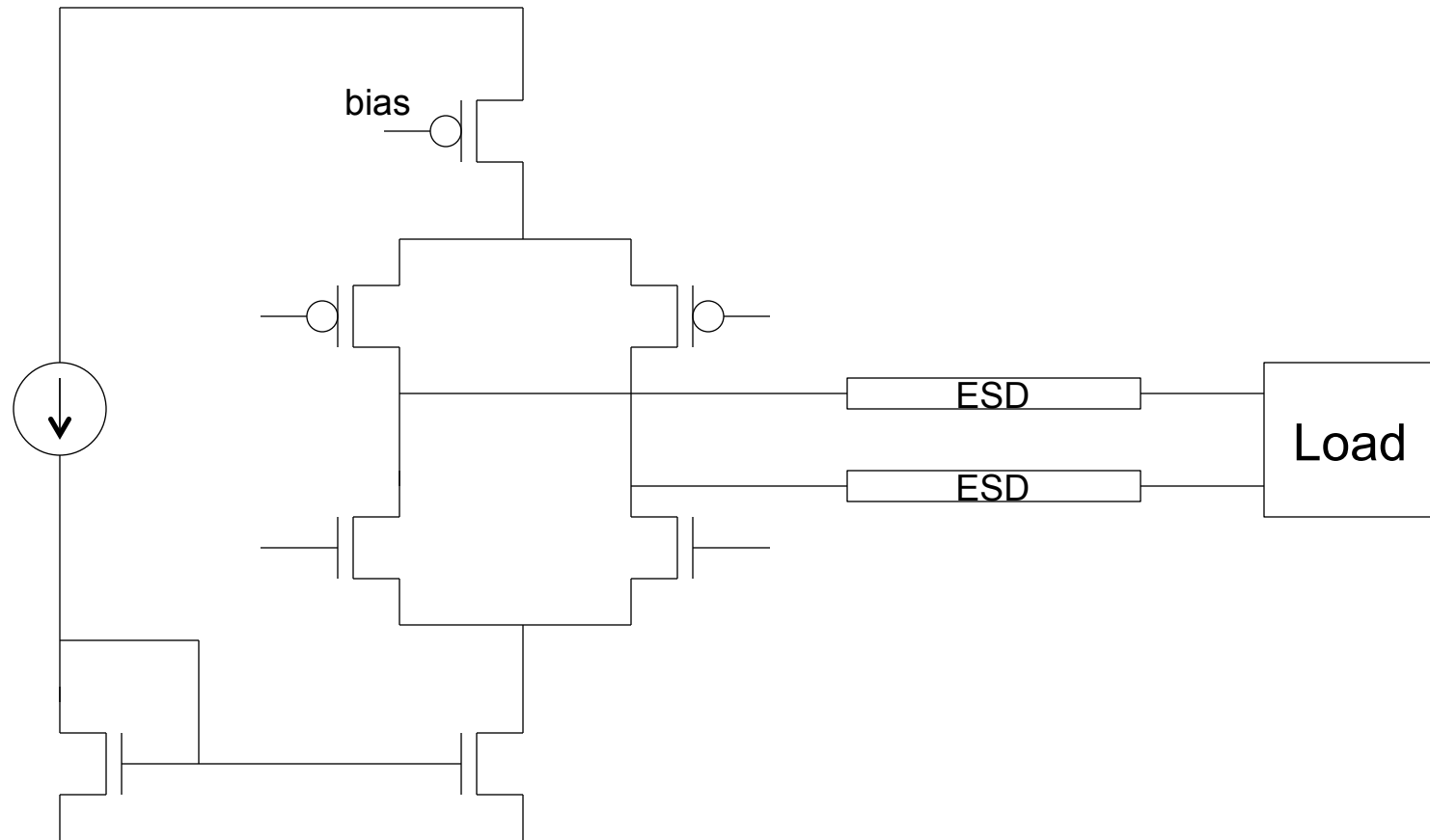
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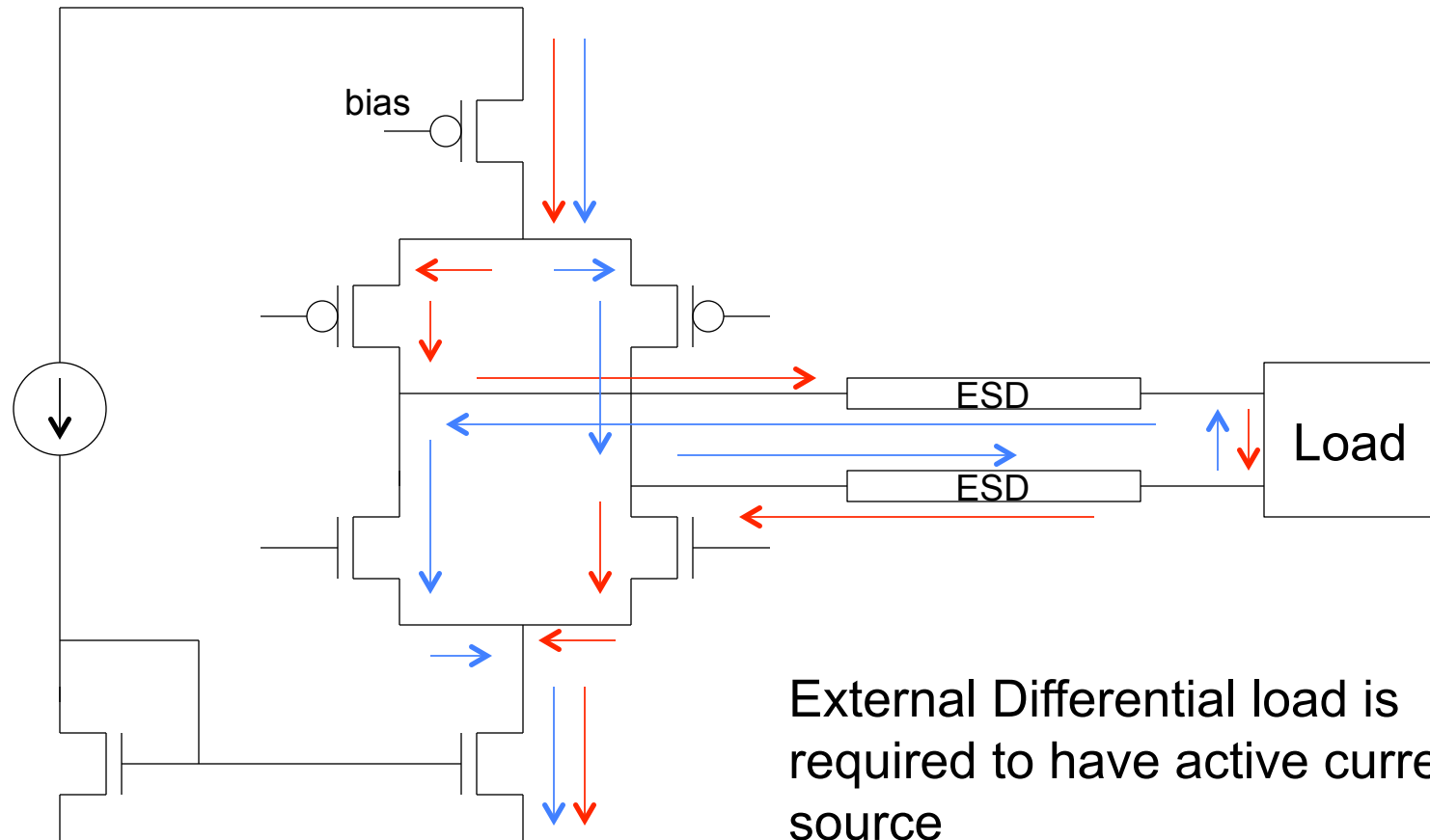
Outlines

- Load Dependent Current Mode Differential Driver
- IBIS Extraction Method
- What IBIS is missing
- Summary

Load Dependent Current Mode Differential Driver



Load Dependent Current Mode Differential Driver (Current Flow)



IBIS Extraction Method (Modeling as 2 individual pins)

No load to be used for I-V curve extraction

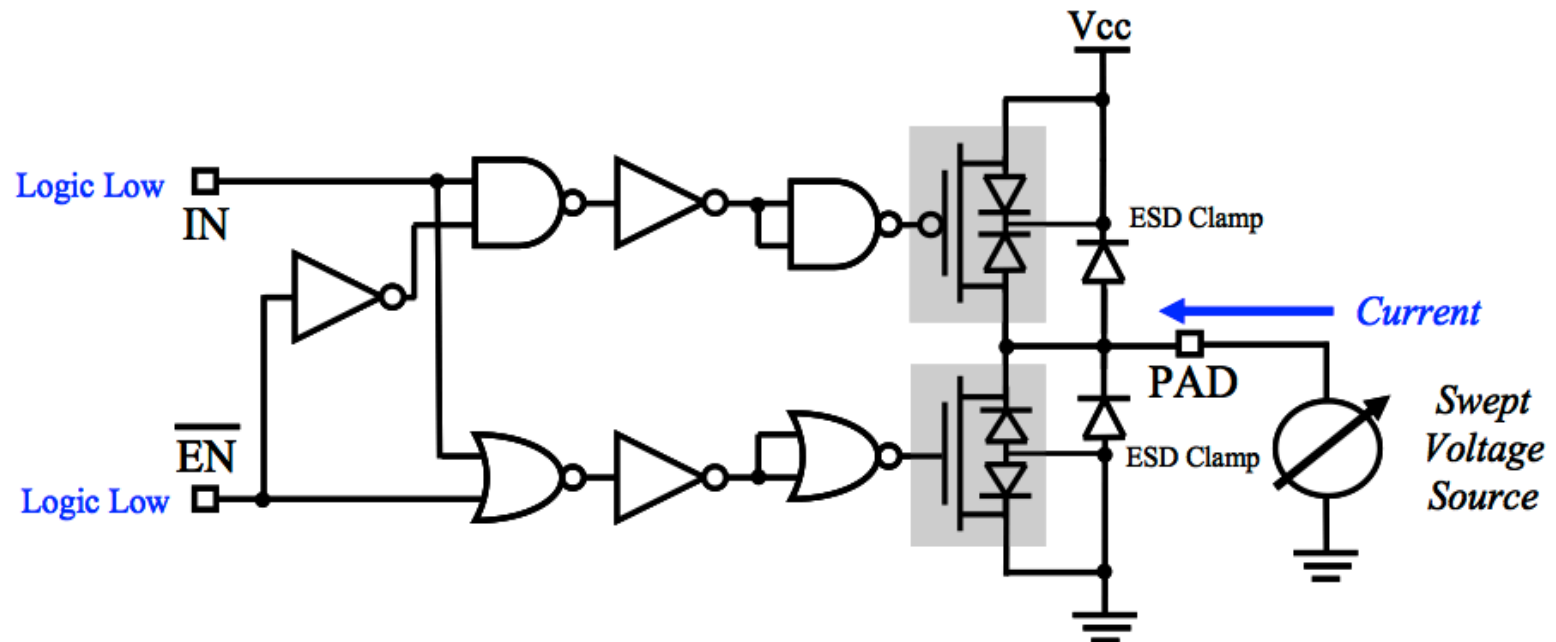


Figure 3.1 – Standard 3-state Buffer (Pulldown I-V Table Extraction Shown)

Pictures from IBIS cookbook

IBIS Extraction Method (Modeling as 2 individual pins)

Load connected to GND or VCC to be used for V-T curve extraction

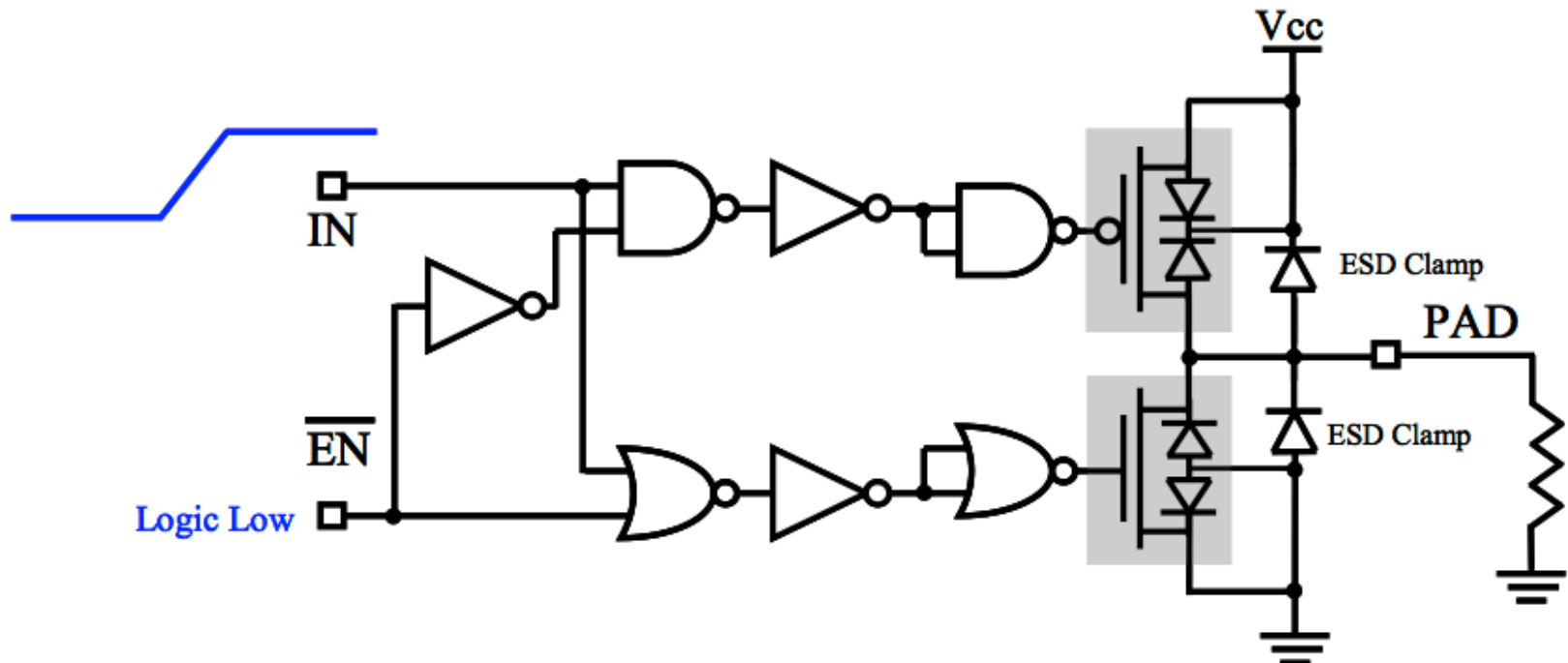
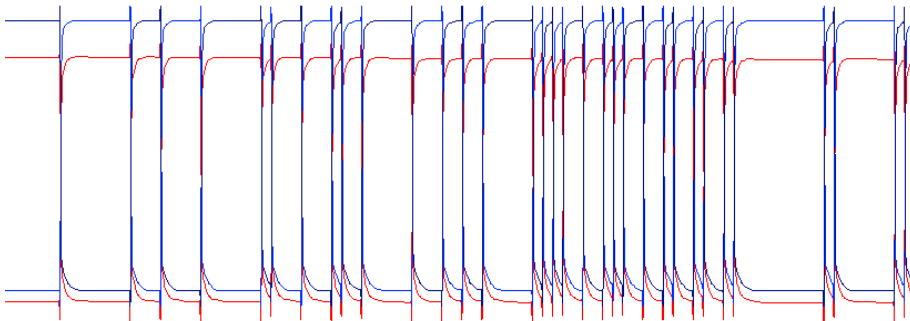
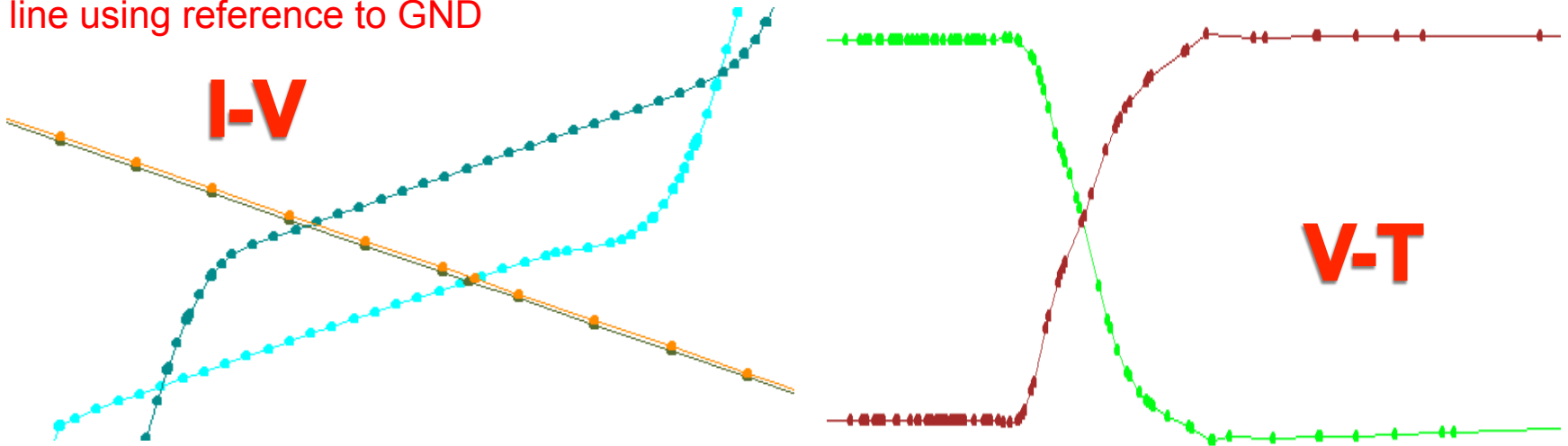


Figure 3.2 – Simulation Setup for Extracting Ramp Rate Information (Rising Edge Shown)

Pictures from IBIS cookbook

Using normal extraction methods for I-V and V-T curves

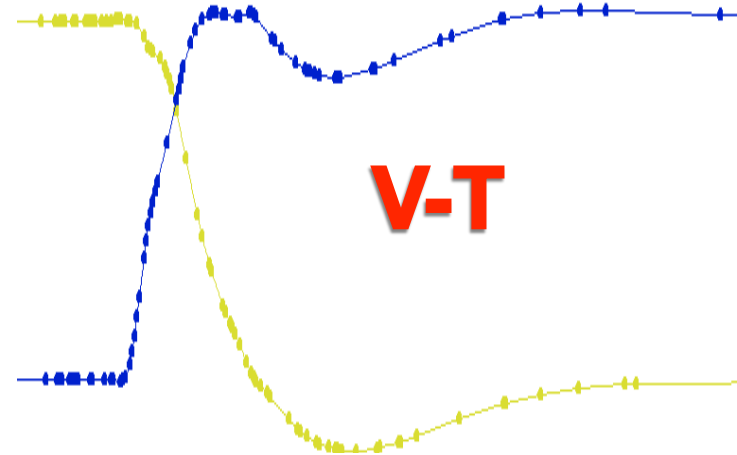
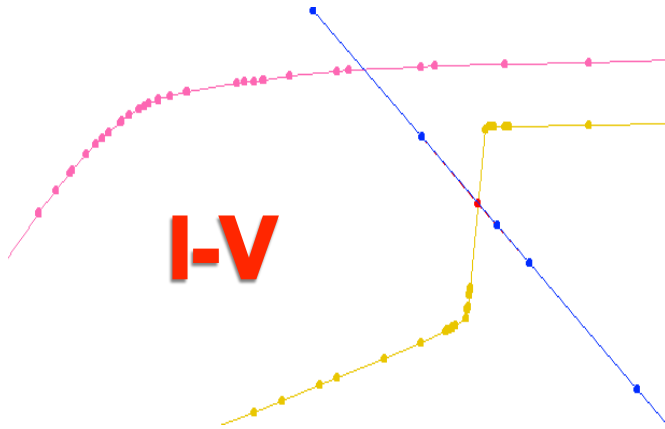
* I-V curves shown are combined curves and load line using reference to GND



Correlation shown they are way off from the Spice result
RED – Spice, BLUE - IBIS

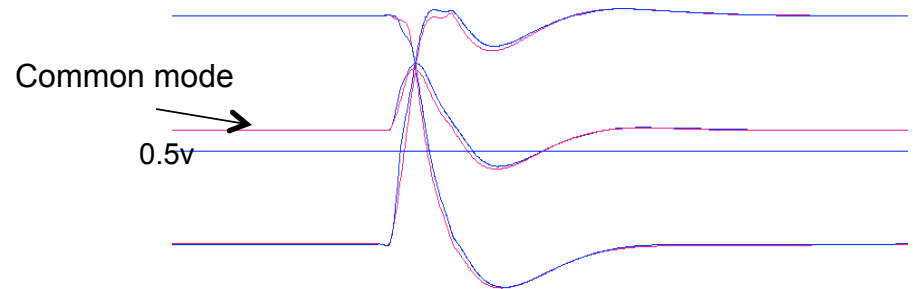
Using enhanced extraction method with differential load

* I-V curves shown are combined curves and load line using reference to GND



Correlation shown matched result with Spice

RED – SPICE, BLUE - IBIS



Summary

- Differential load dependent current mode differential pair buffer can not use normal extraction method to model IBIS
- Enhanced method considered differential load can solve this issue. It gives the matched results when correlating with Spice simulation results
- It would be better to have IBIS Spec accepts “Rref_diff/Cref_diff” kind of differential loads for regular IBIS differential pair models
 - Rref_diff/Cref_diff is limited for External model use now
- IBIS Spec needs to be enhanced when modeling dynamic PLL current mode buffer
 - Various I-V tables for different diff_loads
 - Current dependent C-comp value table



The Modeling Experts