LVDS Driver Design for High Speed Application

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***Abstract*—This paper proposes the implementation of Low Voltage Differential Signaling (LVDS) based driver design using CMOS technology with 0.8 µm Technology. LVDS is a technique used for High Speed Digital data transmission over a communication channel such as copper cable. It also helps to reduce the no. of ports in multiport operation as multiport parallel data can be multiplexed, serialized and transmitted over a cable with LVDS Driver. This Driver circuit operates at 5V/3.3V of supply voltage. It consists of switched current sources and common mode feedback (CMFB) circuit to stabilize the output common mode voltage level. The reference circuit gives the output data rate of 450Mbps with R_L = 100Ω transmission line and C_L = 5pF. This circuit will be redesigned and simulated with 28nm process node using ipdk given by Synopsys Tool.**

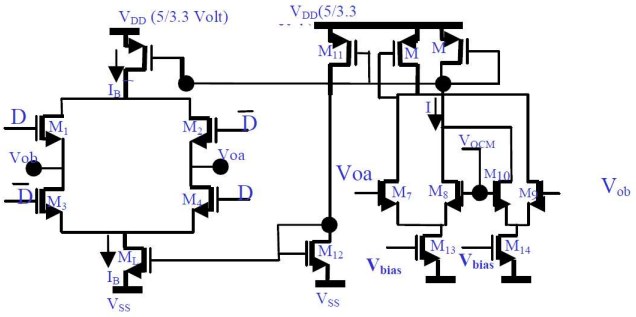
Keywords*— *Synopsys tool; 28nm Technology; LVDS; CMFB.

I. REFERENCE CIRCUIT DETAILS

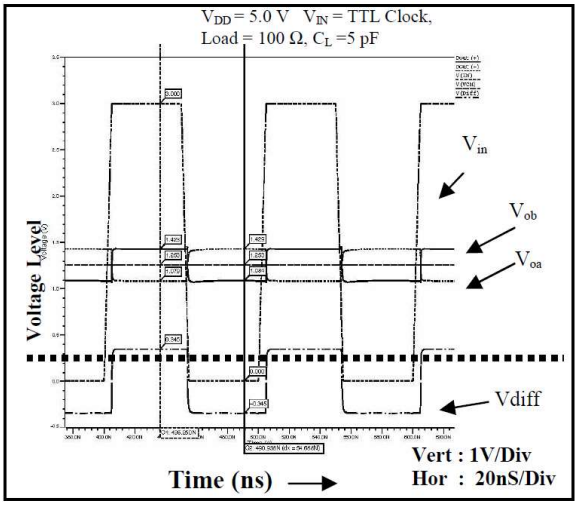
LVDS i.e. Low Voltage Differential Signaling is the interface used for high speed data transfer over transmission media such as coaxial cable or over PCB traces. It basically comprised of switched current sources which drives the transmission lines with differential signals. Salient features of this interface are low power operation, Noise rejection capability and reliable clock recovery at the receiver.

Reference LVDS Driver circuit diagram is shown in section II. Here transistors M1, M2, M3 and M4 are acting as a current source which are switched ON or OFF based on the input signal polarity D and ~D. The LVDS Driver output is obtained in the form of differential output signals as Voa and Vob which are coupled to 100 ohm transmission line. When D = 1, M1 and M4 will be conducting while M2 and M3 will act as open circuit. This will result into Vob = High and Voa = Low. When D = 0, M1 and M4 will be non-conducting and M2, M3 will be ON connecting Voa to VDD and Vob to VSS. In order to stabilize the Output Common mode voltage (VOCM) CMFB technique is used and implemented using M7-M10. The required VOCM is derived from reference voltage and it has to be stable at average of Voa and Vob. If Voa and Vob reduces causing reduction in VOCM then current in M8 and M10 reduces causing reduction in source current of driver which results into increase in VOCM to original value.

II. REFERENCE CIRCUIT DESIGN



III. REFERENCE CIRCUIT WAVEFORMS



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