

DCMCS: Highly Robust Low-Power Differential Current-Mode Clocking and Synthesis

ABSTRACT

In this paper, we present a new differential current-mode pulsed flip-flop (DCMPFF) for low-power clock distribution using a representative 45-nm CMOS technology. Experimental results show that the DCMPFF has a 47% faster clock-to-output (CLK-Q) delay than a traditional voltage-mode (VM)-pulsed FF. When the DCMPFF is integrated with a DCM H-tree clock distribution, the differential technique saves 53% and 26% power compared to conventional VM and previous current-mode (CM) clock networks, respectively. In addition, we propose the first DCM clocking and synthesis (DCMCS) methodology to improve the robustness and overall clock power of a network. The proposed DCMCS-based electromigration-aware clocking saves 79% and 51% average power with 7.7 and 11.3 ps lower clock skew when the DCM scheme is applied to ISPD 2009 and 2010 test benches, respectively.

EXISTING SYSTEM

- An alternative signaling scheme such as CM, however, can eliminate transmission line repeaters, while, in addition, decreasing necessary voltage swing to significantly reduce power.
- Differential CM (DCM) signaling has better noise immunity compared to a single-ended CM scheme.
- However, this comes at the cost of double wiring resources and increased wiring complexity.
- As a result, the traditional clock routing techniques are limited to single-ended clocking.

PROPOSED SYSTEM

- We propose the first DCM-pulsed FF (DCMPFF), the delay and power increase linearly with the increase of load and ensure the scalability of the proposed design..
- The DCMPFF extends the previous single input current CM pulsed FF (CMPFF) to have two complementary input currents.
- These inputs can be either positive or negative depending on the hn, the DCMPFF is sensitive only when has a push current and a pull current to mimic an edge triggered behavior.

SYSTEM REQUIREMENTS

HARDWARE REQUIREMENTS:

- Processor - intel core i3
- RAM - 2GB
- Hard Disk - 20 GB

SOFTWARE REQUIREMENTS:

- Tool - Tanner/Microwind

REFERENCE

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