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Design and Implementation of Testable Reversible Sequential Circuits Optimized Power

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Abstract : The conservative reversible gates are used to designed reversible sequential circuits. The sequential circuits are flip-flops and latches. The conservative logic gates are Feynman, Toffoli, and Fredkin. The design of two vectors testable sequential circuits based on conservative logic gates. All sequential circuit based on conservative logic gates can be tested for classical unidirectional stuck-at faults using only two test vectors. The two test vectors are all 1s, and all 0s. The designs of two vectors testable latches, master-slave flip-flops and double edge triggered (DET) flip-flops are presented. We also showed the application of the proposed approach toward 100% fault coverage for single missing/additional cell defect in the quantum- dot cellular automata (QCA) layout of the Fredkin gate. The conservative logic gates are in terms of complexity, speed, and area.

Keywords : DET, QCA, reversible logic gates, POS, SOP, latches, flip flops
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