

Testing static single cell faults using static and dynamic data background

ABSTRACT

This work proposes a bit-adjacent Data Background (DB) management scheme to improve fault coverage of March algorithms while simultaneously maintaining the shortest test cycle. Both static and dynamic DB transitions are used in order to detect Deceptive Read Destructive Faults (DRDFs) and Write Disturb Faults (WDFs) that are not detected by previous algorithms. A conventional March Test Algorithm can be modified by using the DB management scheme to form a new March Test Algorithm (referred to as Mod March Test Algorithm), e.g., MATS++(6N) becoming Mod MATS++(6N). This paper shows that Mod March SR (14N) and Mod March CL (12N) can detect DRDFs and WDFs while the corresponding conventional algorithms cannot. It is also shown that Mod March CL(12N) and Mod March SR(14N) with DB management can detect all Static Single Cell Faults based on the Bit-Oriented-Memories (BOM) test method. Comparisons on test cycle time for Mod March SR, March SR, and March SS in the context of memory Built-In-Self-Test (BIST) are also presented. From the simulation result, it shows that by including Data Backgrounds (DBs) management in Bit-Oriented Memories (BOM), the cycle test time is the same after a given multiple of DBs in the test algorithm.

Keyword: Deceptive read destructive faults; Write disturb faults; Data background