

TSVs 串扰故障分组测试和诊断策略

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摘 要: TSVs 串扰故障的测试和诊断对提高集成电路成品率有重要影响。为了减少 TSVs 测试和诊断时间, 并且减少测试电路的面积开销, 提出在信号接收端重用扫描单元的测试架构对 TSVs 串扰故障进行分组测试和诊断的新方案。该方案首先使用提出的 TSVs 分组算法, 根据 TSVs 之间串扰影响距离, 应用邻接矩阵求极大独立集对 TSVs 进行快速分组, 使得每组内的 TSVs 不会发生串扰故障, 并且最大化同组中 TSVs 的数量。分组完成后, 使用提出的测试架构对同组内的 TSVs 进行并行测试, 并且根据 TSVs 的测试响应, 可以进一步诊断故障 TSVs。实验结果表明, 所提测试方案有效地减少了测试和诊断时间, 并且减少了面积开销。

关键词: TSVs; 串扰; 集成电路; 成品率; 扫描链

TSVs crosstalk fault grouping test and diagnostic strategy

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Abstract: Testing and diagnosis of TSVs crosstalk faults has an important impact on improving the yield of integrated circuits. In order to reduce TSVs testing and diagnostic time, and reduce the area overhead of the test circuit, a new scheme for group testing and diagnosis of TSVs crosstalk faults using a test architecture of the unilateral scan chain is proposed. The scheme firstly divides the TSVs into several groups according to the crosstalk influence distance between TSVs by the algorithm for finding the largest independent set in an adjacency matrix, so that the TSVs in each group do not have crosstalk faults and maximize TSVs in the same group. After grouping, the TSVs in the same group are tested and diagnosed in parallel using the proposed test architecture, and the faulty TSVs can be further diagnosed according to the test response of the TSVs. The experimental results show that the proposed test scheme effectively reduces the test and diagnosis time, and reduces the area overhead.

Key words: TSVs; crosstalk; integrated circuits; yield; scan chain

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