硅通孔电阻开路故障模型研究

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摘　要：硅通孔（Through Silicon Via）技术是三维集成电路发展的关键技术，因此对于TSV的缺陷故障检测具有十分重要的意义.讨论了TSV的物理模型和延时模型，同时在先进设计系统（ADS）中建立了TSV的电阻开路故障的等效电路模型，提取了RLC参数. 然后通过给等效电路模型施加信号源，将开路故障的输出延时与无故障时的输出进行对比,对不同程度故障的TSV的传输延时进行分析,并用最小二乘法拟合出利用延时来判断故障的大小的曲线.

关键词：三维集成电路；硅通孔；电阻开路故障

Analysis of Through Silicon Via Resistance-Open Fault Model

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Abstract: Through Silicon Via technology is a key technology for the development of three-dimensional integrated circuits, so it is very important to detect the defects in TSVs. In this paper, we discussed the physical model and delay model of the TSV, a resistance-open fault equivalent circuit model is also established in the Advanced simulation system(ADS) and extracted RLC parameters of the TSV. Then through applying signal source to the equivalent circuit model, we compare the output of the fault TSV with fault-free TSV and analyze the propagation delay of different degree of the fault TSV. We draw a curve judging the size of the crack with the method of the least squares.

Key words: 3D integrated circuit; through-silicon-via; resistance-open fault

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