

## MTM 非晶硅反熔丝导通电阻

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**摘要:** 分析了现场可编程门阵列 (FPGA) 和可编程存储器 (PROM) 中广泛使用的 MTM (metal-to-metal) 反熔丝结构, 测量了决定 FPGA 和 PROM 传输延迟的反熔丝编程后导通电阻, 给出了编程电流对导通电阻的决定规律. 结合 MTM 非晶硅反熔丝的特征电压模型, 确定了 TiN/ $\alpha$ -Si/TiN 结构反熔丝的特征电压值. 对大量样品的实际测量结果, 并且对实验数据进行拟合, 实验结果表明, 实验特征电压值接近模型理论值, 可通过控制编程电流对编程后电阻的进行调控.

**关键词:** 电流编程; 导通电阻; MTM; 非晶硅; 反熔丝

## On-state Resistance of MTM Amorphous Silicon Antifuse

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**Abstract:** The structure of MTM (metal-to-metal) amorphous silicon antifuse which has been extensively used in FPGA and PROM product is introduced. On-state resistances which determine the delay of FPGA and PROM have been measured, and the fact that the on-state resistance is inversely proportional to the programming current has been present. The electro thermal model used to predict programmed resistance of TiN/ $\alpha$ -Si/TiN MTM antifuse was derived, and the characteristic voltage of MTM antifuse was measured. The experimental results show that the experimental fitting value is in accordance with the theoretical value, and their on-state resistance can be controlled by choosing a programming current level.

**Key words:** current programming; on-state resistance; MTM; amorphous silicon; antifuse

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