

A Novel and Direct Determination of the Interface Traps in Sub-100nm CMOS Devices with Direct Tunneling Regime (12~16Å) Gate Oxide

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ABSTRACT

For the first time, an improved charge pumping (CP) method has been implemented for direct determination of the interface traps in ultra-short gate length CMOS devices with ultra-thin gate oxide in the direct tunneling regime. The leakage current in a 12-16Å gate oxide can be removed from the measured CP current, which enables accurate determination of the interface traps. This method has been demonstrated successfully for various RTNO grown and RPN treated oxide CMOS devices with very thin gate oxide. Moreover, it can be used as a good monitor of ultra-thin gate oxide process and the evaluations of device reliabilities in relating to the interface trap generation.