Direct Measurement of the Inversion Charge in MOSFETs: Application to Mobility Extraction in Alternative Gate Dielectrics

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Abstract

It is shown that the inversion charge in MOSFETs can be directly measured by a variant of the charge pumping (C-P) technique in long channel devices (inversion-charge pumping (ICP)). This new technique is used to demonstrate that charge trapping and net-fixed charge in n-channel MOSFETs with SiO_2 / HfO_2 dual layer gate dielectrics are not the primary cause for the strong mobility degradation.