

Study of wafer orientation dependence on performance and reliability of CMOS with direct-tunneling gate oxide

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Wafer orientation dependences on the properties of direct-tunneling gate oxides and characteristics of the related CMOS transistors were investigated for the first time. It has been found that the most of the properties of oxides and MOSFETs for (100)-, (100) 4°off-, and (111)-orientations become almost the identical when the oxide thickness reduces into direct-tunneling regime. These are good news for future new structures of MOSFETs which have different orientation Si surfaces.