

Title:**A Multi-gate Dielectric Technology using Hydrogen Pre-treatment for 100nm generation System-on-a-Chip****Authors:**

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Abstract:

A multi-gate dielectric technology using hydrogen pre-treatment is developed for 100-nm generation CMOS technologies. This process can remove an only chemical oxide layer and smoothes the Si surface before a gate-oxidation to improve interface of 1.3 nm ultra-thin gate dielectric. In multi-oxide process, the hydrogen pre-treatment causes no degradation of performance or yield in thick gate region. Using this technology, we have achieved I_D^{SAT} of 780 $\mu\text{A}/\mu\text{m}$ ($I_{OFF} = 25 \text{ nA}/\mu\text{m}$) and 305 $\mu\text{A}/\mu\text{m}$ ($I_{OFF} = 30 \text{ nA}/\mu\text{m}$) for 70-nm nMOS and pMOS, respectively, at 1.0 V operation, and reliability in terms of TDDB and NBTI are also improved.