

Defect Density Extraction of high- κ Dielectric Gate Stack by Combining
Charge Pumping and Low Frequency Measurement

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Abstract

We demonstrate a technique to plot the depth distribution of defect density inside the gate dielectric stack of advanced high- κ CMOSFETs by combining analysis results of frequency-dependent charge pumping and low frequency noise measurement. It shows that with higher hafnium ratio in the HfSiON layer, SiO₂ interfacial layer suffered from hafnium diffusion during process, results in large amount of defect generated near HfSiON/SiO₂ interface.

Keyword : high- κ dielectric, HfSiON, charge pumping, low frequency noise