

Practical Next Generation Solution for Stand-alone and Embedded DRAM Capacitor

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For the first time, MIS capacitor with $\text{HfO}_2\text{-Al}_2\text{O}_3$ laminate is successfully demonstrated. The effective oxide thickness (EOT) of 21 Å with acceptable low leakage current has been achieved at cylinder-type MIS capacitor. The EOT of 21 Å is the smallest value reported for MIS capacitor with TiN electrode regardless of dielectric material. $\text{HfO}_2\text{-Al}_2\text{O}_3$ laminate is also useful for SIS capacitor and can satisfy the needs of MIM capacitor for the next generation without changing electrode material. Therefore, this technology is not far away from present but a practical approach adequate for chip-making industry.