3D TFT-SONOS Memory Cell for Ultra-High Density File Storage Applications

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Abstract

For the first time, a scalable, low power, deep-submicron TFT-SONOS (Thin-Film Transistor Silicon-Oxide-Nitride-Oxide-Silicon) memory cell is described with characteristics rivaling those of single crystal devices ($>10^6$ cycles, ~1.6V threshold window after 10 years on cycled cell at 85C) showing the promise of 3D integration and ultra-small cell footprints. The ability to vertically stack device layers enables the current memory density record of ~200Mbyte/cm^2, set by 90nm NAND, to be surpassed.