A highly manufacturable 110nm EDRAM process with Al_2O_3 stack MIM capacitor for cost effective high density, high speed, low voltage ASIC memory applications

Fred Fishburn, Ralph Kauffman, Richard Lane, Terry McDaniel, Kevin Schofield, Scott Southwick, Ray Turi, Hongmei Wang
Micron Technology, Process R & D Center, 8000 S. Federal Way Boise, ID. 83707-0006

ABSTRACT

A highly manufacturable 110nm Embedded DRAM technology with stack Al_2O_3 MIM capacitor has been demonstrated successfully for the first time. High-density DRAM core with $0.1\mu m^2$ cell size and high performance logic circuits have been realized at the same time by separation of the gate pattern at memory cell and peripheral logic region. Low temperature BDL process, highly reliable Al_2O_3 MIM capacitors have been developed to control process temperature. DRAM cell performance has been improved by introducing tungsten wordline, $CoSi_2$ plug and tungsten bitline. 7 levels Cu and CVD-OSG low-k material have been implemented to satisfy the requirement of high performance logic circuits design.