

Ferroelectric-Based Functional Pass-Gate for Low-Power VLSI

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A ferroelectric-based functional pass-gate is proposed for low-power logic-in-memory VLSI which makes communication bottleneck free. Since non-destructive storage and switching functions are merged into a ferroelectric capacitor, active-device counts become small, which reduces the dynamic power dissipation. The use of ferroelectric-based non-volatile storage makes leakage currents cut off. Applying the ferroelectric-based circuitry to binary CAM implementation results in about half dynamic power reduction and 1/22000 static power reduction, compared to a CMOS implementation under 0.6 μ m ferroelectric/CMOS.