

Static FRAM: A Novel Ferroelectric Memory Approach

Joe T. Evans, Jr.

Radiant Technologies, Inc. 2021 Girard SE Albuquerque, NM 87106

Tel: 505-842-8007 E-mail: radiant@ferrodevices.com

Abstract—Nonvolatile memory based on thin ferroelectric film capacitors has become available commercially in increasing density now reaching 256Kb. Reseachers have begun to examine new memory elements consisting of transistors using the ferroelectric material in the gate to control current flow in the transistor channel. While most published research has concentrated on building ferroelectric gates on CMOS transistors, Radiant has explored thin ferroelectric film transistors similar to those used in TFT-LCDs. The devices are fabricated as a ferroelectric capacitor with an oxide semiconductor, not silicon, as one of the electrodes. If the semiconducting electrode is thin enough, the ferroelectric polarization will modulate its conductivity. While it is not possible to use these devices as logic gates, they can produce ON/OFF ratios up to 100 in conductivity while being read with voltages as low as 10mV. Write times less than 100ns in cell areas rivaling SRAM are possible. An attractive application for the SFRAM transistor is in ultra-low power non-volatile memories.