



US005852306A

United States Patent [19] Forbes

[11] **Patent Number:** **5,852,306**
[45] **Date of Patent:** **Dec. 22, 1998**

- [54] **FLASH MEMORY WITH NANOCRYSTALLINE SILICON FILM FLOATING GATE**
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- [21] Appl. No.: **790,500**
- [22] Filed: **Jan. 29, 1997**
- [51] **Int. Cl.**⁶ **H01L 29/788**
- [52] **U.S. Cl.** **257/315; 257/316; 257/321**
- [58] **Field of Search** **257/315, 316, 257/314, 321, 325, 322, 324**

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[57] **ABSTRACT**

A memory is described which has memory cells that store data using hot electron injection. The data is erased through electron tunneling. The memory cells are described as floating gate transistors wherein the floating gate is fabricated using a conductive layer of nanocrystalline silicon particles. Each nanocrystalline silicon particle has a diameter of about 10 Å to 100 Å. The nanocrystalline silicon particles are in contact such that a charge stored on the floating gate is shared between the particles. The floating gate has a reduced electron affinity to allow for data erase operations using lower voltages.

7 Claims, 3 Drawing Sheets

