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Forbes

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- [54] MULTI-STATE FLASH MEMORY CELL AND METHOD FOR PROGRAMMING SINGLE ELECTRON DIFFERENCES
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- [58] Field of Search 365/45, 185.33, 365/185.01, 184, 185.03, 185.28

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[57] ABSTRACT

A flash memory cell. The cell includes a transistor with a floating gate that is formed from a number of crystals of semiconductor material. The crystals are disposed in the gate oxide of the transistor. The size of the crystals and their distance from a surface of a semiconductor layer of the transistor are chosen such that the crystals can trap a single electron by hot electron injection. Each trapped electron causes a measurable change in the drain current of the transistor. Thus, multiple data bits can be stored and retrieved by counting the changes in the drain current.

14 Claims, 2 Drawing Sheets

