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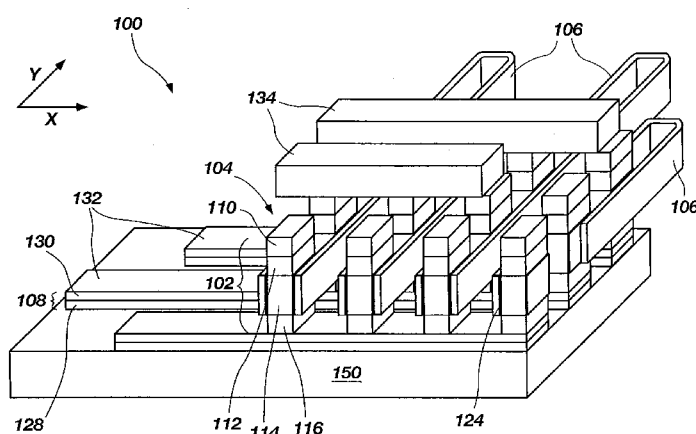
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(54) **Title:** THYRISTOR-BASED MEMORY CELLS, DEVICES AND SYSTEMS INCLUDING THE SAME AND METHODS FOR FORMING THE SAME



**FIG. 2A**

(57) **Abstract:** Semiconductor devices including a plurality of thyristor-based memory cells, each having a cell size of  $4F^2$ , and methods for forming the same are provided. The thyristor-based memory cells each include a thyristor having vertically superposed regions of alternating dopant types, and a control gate. The control gate may be electrically coupled with one or more of the thyristors and may be operably coupled to a voltage source. The thyristor-based memory cells may be formed in an array on a conductive strap, which may function as a cathode or a data line. A system may be formed by integrating the semiconductor devices with one or more memory access devices or conventional logic devices, such as a complementary metal-oxide-semiconductor (CMOS) device.