

ABSTRACT

A memory device includes a memory cell array including a plurality of memory cells, each of the plurality of memory cells having a switch element, and a data storage element connected to the switch element and containing a phase-change material; and a
5 memory controller for obtaining first read voltages from the plurality of memory cells, inputting a first write current to the plurality of memory cells, and then, obtaining second read voltages from the plurality of memory cells, wherein the memory controller compares the first read voltage of a first memory cell of the plurality of memory cells to the second read voltage of the first memory cell to determine a state of the first memory
10 cell.

FIG. 1