

# (19) United States

## (12) Patent Application Publication (10) Pub. No.: US 2024/0215459 A1 IWASAKI et al.

## Jun. 27, 2024 (43) **Pub. Date:**

### (54) **MEMORY DEVICE**

(71) Applicant: Kioxia Corporation, Tokyo (JP)

(72) Inventors: **Takeshi IWASAKI**, Kuwana (JP);

Yosuke MATSUSHIMA, Yokkaichi (JP); Makoto ONIZAKI, Tokyo (JP); Katsuyoshi KOMATSU, Yokkaichi (JP); Masakazu GOTO, Moriya (JP); Hiroki KAWAI, Inazawa (JP); Rina NOMOTO, Tokyo (JP); Kenta

CHOKAWA, Yokkaichi (JP); Zhu QI, Yokkaichi (JP); Tadaomi DAIBOU,

Yokkaichi (JP)

(73) Assignee: Kioxia Corporation, Tokyo (JP)

(21) Appl. No.: 18/476,628

(22) Filed: Sep. 28, 2023

#### (30)Foreign Application Priority Data

Dec. 21, 2022 (JP) ...... 2022-204150 Jul. 14, 2023 (JP) ...... 2023-116214

### **Publication Classification**

(51) Int. Cl. H10N 50/85 (2006.01)H10B 61/00 (2006.01)H10N 50/20 (2006.01)

(52) U.S. Cl. CPC ...... H10N 50/85 (2023.02); H10B 61/00 (2023.02); H10N 50/20 (2023.02)

#### (57)ABSTRACT

A memory device of embodiments includes a memory cell including: a first conductive layer; a second conductive layer; a third conductive layer provided between the first conductive layer and the second conductive layer; a variable resistance layer provided between the first conductive layer and the third conductive layer; and a switching layer provided between the third conductive layer and the second conductive layer. The switching layer contains an oxide of a first element, which is at least one element selected from a group consisting of zirconium, yttrium, tantalum, lanthanum, cerium, titanium, hafnium, and magnesium, and a compound of a second element that is at least one element selected from a group consisting of zinc, tin, gallium, indium, and bismuth and a third element that is at least one element selected from a group consisting of tellurium, sulfur, and selenium.

