

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2024/0237357 A1 JIANG et al.

Jul. 11, 2024 (43) Pub. Date:

(54) NOVEL RESISTIVE RANDOM ACCESS MEMORY DEVICE

(71) Applicant: Taiwan Semiconductor

Manufacturing Co., Ltd., Hsinchu City

(72) Inventors: Jheng-Hong JIANG, Hsinchu City

(TW); Cheung CHENG, Hsinchu City

(TW); Chia-Wei LIU, Zhubei City

(21) Appl. No.: 18/615,936

(22) Filed: Mar. 25, 2024

Related U.S. Application Data

- (63) Continuation of application No. 17/884,014, filed on Aug. 9, 2022, now Pat. No. 11,950,433, which is a continuation of application No. 17/242,068, filed on Apr. 27, 2021, now Pat. No. 11,489,011, which is a continuation of application No. 16/419,324, filed on May 22, 2019, now Pat. No. 11,011,576.
- Provisional application No. 62/691,292, filed on Jun. 28, 2018.

Publication Classification

(51) Int. Cl. H10B 63/00 (2006.01)G11C 13/00 (2006.01)H10N 70/00 (2006.01)

U.S. Cl. H10B 63/20 (2023.02); G11C 13/0026 CPC

(2013.01); G11C 13/0028 (2013.01); H10B 63/84 (2023.02); H10N 70/021 (2023.02); H10N 70/023 (2023.02); H10N 70/063 (2023.02); H10N 70/066 (2023.02); H10N 70/826 (2023.02); H10N 70/841 (2023.02); H10N 70/881 (2023.02); H10N 70/8833

(2023.02)

(57)**ABSTRACT**

A memory device includes: a first conductor extending in parallel with a first axis; a first selector material comprising a first portion that extends along a first sidewall of the first conductor; a second selector material comprising a first portion that extends along the first sidewall of the first conductor; a first variable resistive material comprising a portion that extends along the first sidewall of the first conductor; and a second conductor extending in parallel with a second axis substantially perpendicular to the first axis, wherein the first portion of the first selector material, the first potion of the second selector material, and the portion of the first variable resistive material are arranged along a first direction in parallel with a third axis substantially perpendicular to the first axis and second axis.

