



US 20240244851A1

(19) **United States**

(12) **Patent Application Publication**

**Kim et al.**

(10) **Pub. No.: US 2024/0244851 A1**

(43) **Pub. Date:**

**Jul. 18, 2024**

(54) **SEMICONDUCTOR DEVICE**

(52) **U.S. Cl.**

(71) Applicant: **SAMSUNG ELECTRONICS CO., LTD.**, SUWWON-SI (KR)

CPC ..... **H10B 63/845** (2023.02); **H10N 70/8822** (2023.02); **H10N 70/8825** (2023.02); **H10N 70/8828** (2023.02)

(72) Inventors: **Hodae Kim**, SUWON-SI (KR); **Hwan Kim**, SUWON-SI (KR); **Kyudong Park**, SUWON-SI (KR); **Seulji Song**, SUWON-SI (KR)

(57)

**ABSTRACT**

A semiconductor device includes a stack structure that includes horizontal conductive layers and interlayer insulating layers that are alternately stacked with each other in a first direction, vertical conductive layers that pass through the stack structure and extend in the first direction, where the vertical conductive layers have a pillar shape, selector layers that surround external surfaces of the vertical conductive layers, where the selector layers include a chalcogenide material, and first isolation layers that divide the horizontal conductive layers from each other and pass through the stack structure and between the vertical conductive layers adjacent to each other in a second direction that is perpendicular to the first direction. Ends of the first isolation layers in the second direction are in contact with external surfaces of the selector layers.

(21) Appl. No.: **18/535,198**

(22) Filed: **Dec. 11, 2023**

(30) **Foreign Application Priority Data**

Jan. 12, 2023 (KR) ..... 10-2023-0004822

**Publication Classification**

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

