



US 20230403856A1

(19) **United States**(12) **Patent Application Publication**
LEE(10) **Pub. No.: US 2023/0403856 A1**(43) **Pub. Date: Dec. 14, 2023**(54) **SEMICONDUCTOR DEVICE AND
MANUFACTURING METHOD OF THE
SEMICONDUCTOR DEVICE****Publication Classification**(51) **Int. Cl.***H10B 43/27* (2006.01)*H10B 43/10* (2006.01)*H10B 43/35* (2006.01)(52) **U.S. Cl.**CPC *H10B 43/27* (2023.02); *H10B 43/10*
(2023.02); *H10B 43/35* (2023.02)(71) Applicant: **SK hynix Inc.**, Icheon-si Gyeonggi-do
(KR)(72) Inventor: **Nam Jae LEE**, Icheon-si Gyeonggi-do
(KR)(73) Assignee: **SK hynix Inc.**, Icheon-si Gyeonggi-do
(KR)(21) Appl. No.: **18/450,865**(22) Filed: **Aug. 16, 2023****Related U.S. Application Data**(63) Continuation of application No. 16/933,440, filed on
Jul. 20, 2020, now Pat. No. 11,765,896.**Foreign Application Priority Data**

(30) Jan. 30, 2020 (KR) 10-2020-0011397

(57) **ABSTRACT**

There are provided a semiconductor device and a manufacturing method thereof. The semiconductor device includes: a stack structure; a source structure; a channel structure penetrating the stack structure, the channel structure being connected to the source structure; and a first memory layer interposed between the channel structure and the stack structure. The source structure includes a first protrusion part protruding between the first memory layer and the channel structure.

