



US 20240215260A1

(19) **United States**

(12) **Patent Application Publication**
Lin et al.

(10) **Pub. No.: US 2024/0215260 A1**

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

(54) **SEMICONDUCTOR DEVICE AND METHOD FOR FABRICATING THE SAME**

(30) **Foreign Application Priority Data**
Jun. 2, 2021 (CN) 202110613576.5

(71) Applicant: **UNITED MICROELECTRONICS CORP.**, Hsin-Chu City (TW)

(72) Inventors: **Hung-Chan Lin**, Tainan City (TW); **Yu-Ping Wang**, Hsinchu City (TW)

(73) Assignee: **UNITED MICROELECTRONICS CORP.**, Hsin-Chu City (TW)

(21) Appl. No.: **18/595,376**

(22) Filed: **Mar. 4, 2024**

Related U.S. Application Data
(63) Continuation of application No. 17/369,917, filed on Jul. 7, 2021, now Pat. No. 11,956,973.

Publication Classification
(51) **Int. Cl.**
H10B 61/00 (2006.01)
H10N 50/01 (2006.01)
H10N 50/80 (2006.01)
(52) **U.S. Cl.**
CPC *H10B 61/22* (2023.02); *H10N 50/01* (2023.02); *H10N 50/80* (2023.02)

(57) **ABSTRACT**
A semiconductor device includes a magnetic tunneling junction (MTJ) on a substrate, a first spin orbit torque (SOT) layer on the MTJ, a passivation layer around the MTJ, and a second SOT layer on the first SOT layer and the passivation layer. Preferably, a top surface of the passivation layer is lower than a top surface of the first SOT layer.

