US 20230231399A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2023/0231399 A1**

ZHAO et al. (43) **Pub. Date: Jul. 20, 2023**

(54) **NITRIDE-BASED BIDIRECTIONAL SWITCHING DEVICE FOR BATTERY MANAGEMENT AND METHOD FOR MANUFACTURING THE SAME**

(71) Applicant: **INNOSCIENCE (SUZHOU) SEMICONDUCTOR CO., LTD.**, Suzhou City (CN)

(72) Inventors: **Qiyue ZHAO**, Suzhou City (CN); **Wuhao GAO**, Suzhou City (CN); **Baoli WEI**, Suzhou City (CN)

(21) Appl. No.: **18/072,633**

(22) Filed: **Nov. 30, 2022**

Related U.S. Application Data

(62) Division of application No. 17/777,058, filed on Jan. 1, 1, filed as application No. PCT/CN2022/072558 on Jan. 18, 2022.

Publication Classification

(51) **Int. Cl.**

H02J 7/00 (2006.01)

H01M 10/42 (2006.01)

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

CPC ***H02J 7/0068*** (2013.01); ***H01M 10/425*** (2013.01); *H01M 2010/4271* (2013.01)

(57) **ABSTRACT**

A nitride-based bidirectional switching device is provided for working with a battery protection controller having a power input terminal, a discharge over-current protection (DO) terminal, a charge over-current protection (CO) terminal, a voltage monitoring (VM) terminal and a ground terminal. The nitride-based bidirectional switching device comprises a nitride-based bidirectional switching element and an adaption module configured for receiving a DO signal and a CO signal from the battery protection controller and generating a main control signal for controlling the bidirectional switching element. By implementing the adaption circuit, the nitride-based bidirectional switching element can work with conventional battery protection controller for battery charging and discharging management. Therefore, a nitride-based battery management system can be realized with higher operation frequency as well as a more compact size.