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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 1550-2018

Replacing GB/T 1550-1997

**Test methods for conductivity type of extrinsic semiconducting
materials**

非本征半导体材料导电类型测试方法

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009. This standard replaces GB/T 1550-1997 "Test method for conductivity type of extrinsic semiconductor materials", compared with GB/T 1550-1997 The main technical changes are as follows:

- The scope of application was changed to "This standard applies to the testing of conductivity types of silicon and germanium non-intrinsic semiconductor materials, and other extrinsic semiconductors. Materials can be tested with reference to this standard" (see Chapter 1, Chapter 1 of the.1997 edition);
- Added terms and definitions (see Chapter 3);
- Change the original standard 1.2~4.1 General" (see 4.1,.1997 version 1.2~1.9);
- Revised the scope of application of Method A, Method D1, Method D2 (see 4.1.2, 4.1.5, 4.1.6,.1997, 1.3, 1.6, 1.7);
- Added method E (surface photovoltage method) to test the conductivity type (see 4.1.7, 4.5, 5.5, 7.6, 9.5);
- Added "If you use 9.1 ~ 9.5 test steps to obtain stable readings and good sensitivity, then the sample table No stain or oxide layer on the surface. If the reading is unstable or the sensitivity is poor, it indicates that the surface of the sample has been stained or has an oxide layer. The surface of the sample was treated by the method of 8.2. " (see 9.6);
- Added analysis of test results (see Chapter 10). This standard is supported by the National Semiconductor Equipment and Materials Standardization Technical Committee (SAC/TC203) and National Semiconductor Equipment and Materials Standards. The Technical Subcommittee Materials Branch (SAC/TC203/SC2) jointly proposed and

managed. This standard was drafted. Leshan City Product Quality Supervision and Inspection Institute, China Institute of Metrology, Guangzhou Kunde Technology Co., Ltd. Milliper Trading (Shanghai) Co., Ltd., Zhejiang Haina Semiconductor Co., Ltd., Xinte Energy Co., Ltd., Jiangsu Zhongneng Silicon Technology Co., Ltd. Exhibition Co., Ltd., Silicon Semiconductor Materials Research Institute, Luoyang Zhongsi High-Tech Co., Ltd., Zhonghao Technology Co., Ltd., Yunnan Metallurgical Cloud Silicon Co., Ltd., Jiangxi Saiwei LDK Solar High-Tech Co., Ltd., Beijing Heineng Sunshine New Energy Technology Co., Ltd. The main drafters of this standard. Liang Hong, Wang Ying, Zhao Xiaobin, Gao Ying, Wang Wei, Wang Feiqi, Huang Li, Xu Hongyu, Qiu Yanmei, Liu Xiaoxia, Yang Xu, Zhang Yuanyuan, Liu Xinjun, Xu Yuanzhi, Cheng Xiaojuan, Pan Jinping, Xiao Zongjie. The previous versions of the standards replaced by this standard are.

---GB 1550-1979, GB/T 1550-1997;

---GB 5256-1985. Test method for conductivity type of extrinsic semiconductor materials

1 Scope

GB/T 1550-2018 is the Chinese national standard on test methods for conductivity type of extrinsic semiconducting materials, in the field of metallurgy. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 28 December 2018 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 November 2019. Classification: ICS 77.040, CCS H21. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This standard specifies the test method for the conductivity type of extrinsic semiconductor materials. This standard is applicable to the testing of conductivity types of silicon and germanium non-intrinsic semiconductor materials. Other extrinsic semiconductor materials may be tested with reference to this standard. test. This standard method can ensure reliable results for uniform materials of the same conductivity type; for materials with non-uniform conductivity types, Different conductive type regions are measured on the surface. This standard does not apply to the testing of conductive types of layered structural materials such as epitaxial wafers.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only dated versions apply to this article. Pieces. For undated references, the

latest edition (including all amendments) applies to this document.

GB/T 1551 silicon single crystal resistivity determination method

GB/T 4326 extrinsic semiconductor single crystal Hall mobility and Hall coefficient measurement method

GB/T 14264 semiconductor material terminology

3 Terms and definitions

The terms and definitions defined in GB/T 14264 apply to this document.

4.1 General

4.1.1 This standard includes five test methods. Method A

---Thermal probe method; Method B

---Cold probe method; Method C

---Point contact rectification Method; Method D

---All-type method, including method D1

---all types of rectification method, method D2

---all types of thermoelectric potential method; method E

---table Surface light voltage method.

4.1.2 Method A. Applicable to N-type and P-type tantalum materials with a resistivity of 20 $\Omega\cdot\text{cm}$ or less and N-type resistivity of 1000 $\Omega\cdot\text{cm}$ or less And P-type silicon material.

4.1.3 Method B. Applicable to N-type and P-type tantalum materials with a resistivity of 20 $\Omega\cdot\text{cm}$ or less and N-type resistivity of 1000 $\Omega\cdot\text{cm}$ or less And P-type silicon material.

4.1.4 Method C. Applicable to N-type and P-type silicon materials with a resistivity of 1 $\Omega\cdot\text{cm}$ to 1000 $\Omega\cdot\text{cm}$.

4.1.5 Method D1. Suitable for N-type and P-type tantalum materials with a resistivity of 1 $\Omega\cdot\text{cm}$ ~36 $\Omega\cdot\text{cm}$ and a resistivity of 0.1 $\Omega\cdot\text{cm}$ ~ N-type and P-type silicon materials of 3000 $\Omega\cdot\text{cm}$.

4.1.6 Method D2. Applicable to N-type and P-type silicon materials with a resistivity of 0.2 $\Omega\cdot\text{cm}$ to 1 $\Omega\cdot\text{cm}$.

4.1.7 Method E. Applicable to N-type and P-type silicon materials with a resistivity of 0.2 $\Omega\cdot\text{cm}$ to 3000 $\Omega\cdot\text{cm}$.