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

GB/T 20521.5-2025

**Semiconductor devices - Part 14-5: Semiconductor sensors -
PN-junction semiconductor temperature sensor**

半导体器件 第14-5部分：半导体传感器 PN结半导体温度传感器

(English Translation)

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Table of Contents

Preface
Introduction
1 Scope
2 Normative References
3 Terms, Definitions, and Symbols
3.1 Terms and Definitions
3.2 Symbol
4 Basic ratings and characteristics
4.1 Overview
4.2 Rated values (limit values)
4.3 Electrical Characteristics
5 Test Methods
5.1 Overview
5.2 Circuit diagram of PN junction temperature sensor
5.3 Temperature Sensitivity
5.4 Bias Voltage and Operating Current
5.5 Output Voltage
5.6 Nonlinearity
5.7 Linear Adjustment Rate
5.8 Load regulation rate
5.9 Reliability Test
Appendix A (Informative) Characteristics of Semiconductor Temperature Sensors
References

Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document is Part 14-5 of GB/T 20521 "Semiconductor Devices". GB/T 20521 has already published the following parts.

---Part 14-1.General Principles and Classification of Semiconductor Sensors (GB/T

20521-2006);

---Part 14-2.Hall Elements in Semiconductor Sensors (GB/T 20521.2-2025);

---Part 14-3.Semiconductor Sensors - Pressure Sensors (GB/T 20522-2006);

This document is equivalent to IEC 60747-14-5:2010 "Semiconductor devices - Part 14-5.Semiconductor sensors - PN junction semiconductors".

Temperature sensor.

The following minimal editorial changes have been made to this document.

---Added some symbol descriptions;

---Added explanations of formulas and symbols in the formulas.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the Ministry of Industry and Information Technology of the People's Republic of China.

This document is under the jurisdiction of the National Semiconductor Device Standardization Technical Committee (SAC/TC78).

Introduction

Semiconductor sensors are fundamental products in the electronics industry chain, widely used in smart cars, industrial manufacturing, consumer electronics, and medical devices.

Applications include healthcare and other fields. GB/T 20521 "Semiconductor Devices" is proposed to consist of eight parts.

---Part 14-1.Semiconductor Sensors - General Specification. This section aims to define the basic requirements for various types of semiconductor sensors.

---Part 14-2.Semiconductor Sensor Hall Elements. The purpose is to specify the relevant requirements for semiconductor Hall elements.

---Part 14-3.Semiconductor Pressure Sensors. This section specifies the requirements for semiconductor pressure sensors.

---Part 14-4.Semiconductor Sensors - Semiconductor Accelerometers. The purpose is to specify the relevant requirements for semiconductor accelerometers.

---Part 14-5.Semiconductor Sensors PN Junction Semiconductor Temperature Sensors. The purpose is to specify the temperature transmission characteristics of semiconductor PN junctions.

Requirements related to sensors.

---Part 14-10.Performance Evaluation Methods for Wearable Glucose Sensors. The aim is to specify the performance evaluation methods for wearable glucose sensors.

Performance evaluation method for glucose sensors.

---Parts 14-11.Semiconductor Sensors for Measuring Ultraviolet Light, Light, and Temperature - Surface Acoustic Wave-Based Integrated Sensors Test methods. The aim is to specify the performance of integrated surface acoustic wave-based sensors used to measure ultraviolet light, ambient light, and temperature.

Test method.

---Parts 14-12.Performance testing methods for semiconductor sensors based on CMOS imaging gas sensors. The purpose is to regulate...

This document defines a performance testing method for CMOS imaging-based gas sensors, including terminology and definitions, test environment conditions, and test system.

Measurement methods and test reports.

semiconductor devices Part 14-5.Semiconductor Sensors PN junction semiconductor temperature sensor

1 Scope

This document specifies the markings, basic ratings, and characteristics of PN junction temperature sensors.

This document applies to semiconductor PN junction temperature sensors and describes the characteristics that can be used to determine various types of PN junction temperature sensors.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included.

For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies.

This document.

IEC 60747-14-1 Semiconductor devices - Part 14-1.General principles and classification of semiconductor sensors Note. GB/T 20521-2006 Semiconductor devices - Part 14-1.General principles and classification of semiconductor sensors (IEC 60747-14-1:2000, IDT)

3.1 Terms and Definitions

The terms and definitions defined in IEC 60747-14-1 and the following terms and definitions apply to this document.

3.1.1

voltage output style A voltage output type temperature sensor represents temperature changes by changing the output voltage.

3.1.2

Current output style A current-output type temperature sensor represents temperature changes by changing the output current.

3.1.3

Supply voltage range the voltage range in which the temperature sensor operates normally.

3.1.4

The temperature range within which the temperature sensor operates normally.

3.1.5

Linear adjustment rate the ratio of the change in output voltage to the change in power supply voltage.

Note: Linearity adjustment is generally expressed in millivolts per volt (mV/V).