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

GB/T 20521.12-2026

**Semiconductor devices - Part 14-12: Semiconductor sensors -
Performance test methods for CMOS imager-based gas sensors**

半导体器件 第14-12部分：半导体传感器 基于CMOS成像的气体传感器的性能测试方法

(English Translation)

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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 Parts 14-12 of GB/T 20521 "Semiconductor Devices - Part 14: Semiconductor Sensors".

The following sections have been released.

---Part 14-1.Semiconductor Sensors - General Specification (GB/T 20521.1-2026);

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

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

---Part 14-4.Semiconductor Sensors - Semiconductor Accelerometers (GB/T 20521.4-2025);

---Part 14-5.Semiconductor Sensors - PN Junction Semiconductor Temperature Sensors (20521.5-2025);

---Parts 14-12.Performance Testing Methods for Semiconductor Sensors Based on CMOS Imaging for Gas Sensors 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 - Part 14: Semiconductor Sensors" is proposed to consist of 8 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 Sensors - Pressure Sensors. The purpose is to specify the relevant 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...

Determine a performance testing method for gas sensors based on CMOS imaging.

Semiconductor sensors based on CMOS imaging Performance testing methods for gas sensors

1 Scope

This document describes a performance testing method for a gas sensor based on complementary metal-oxide-semiconductor (CMOS) imaging.

This document applies to the performance testing of gas sensors based on CMOS lensless imaging and CMOS lens imaging.

2 Normative references

This document has no normative references.

3 Terms and Definitions

The following terms and definitions apply to this document.

3.1 General Terminology

3.1.1

Zerogas

The target component is present in a sufficiently low concentration of a gas or mixture to

produce a zero response from a given gas sensor within a given concentration range.
gas.

[Source. GB/T 14850-2020, 5.6, with modifications] 3.1.2 target gas A gas or mixture of gases containing a certain concentration of a sensitive component is used to test the performance of a gas sensor.

Note: All gas concentrations in this document refer to volume concentrations, expressed as volume fractions.

Sensing unit

The sensing area is formed by covering a material that reacts when it comes into contact with a specific gas.

3.1.4

pixel value

The red channel value, green channel value, blue channel value, or grayscale value of a pixel.

3.1.5

Sensing unit value

The average value of the pixels covered by a gas-sensitive unit in an image.

3.1.6

The average value of the sensitive cell values (3.1.5) of a specified number of images.