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

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**Semiconductor devices - Semiconductor interface for human
body communication - Part 1: General requirements**

半导体器件 人体通信半导体接口 第1部分：总则

(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 Part 1 of GB/T 47240 "Semiconductor Devices - Semiconductor Interfaces for Human Body Communication". GB/T 47240 has been published.

The following section.

---Part 1: General Provisions;

---Part 4: Capsule Endoscopy this document is equivalent to IEC 62779-1:2016 "Semiconductor devices - Semiconductor interfaces for human body communication - Part 1: General".

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

Human body communication technology is a transmission technology that uses the human body as a transmission medium to transmit signals. It features low signal leakage, high security, and low latency.

Signal attenuation - characterized by low transmission power and low carrier frequency, resulting in low interference, high security, suitable transmission range, and potential for further improvements.

High degree of miniaturization. Human body communication technology has already been used in several products for medical applications, such as using endoscopic capsules to monitor the digestive system and for testing.

Transmits heart rate and blood oxygen saturation, transmits electrocardiogram signals, monitors muscle contraction or relaxation, fluid hydration and dehydration, and assists in the diagnosis and treatment of fluid disorders.

Disorders, etc.

GB/T 47240 "Semiconductor Devices - Human Body Communication Semiconductor Interface" is proposed to consist of the following four parts.

---Part 1: General Provisions. The purpose is to specify the general requirements for semiconductor interfaces used in human body communication, including the functional requirements of the interface.

Find the limit value and the working condition requirements.

---Part 2: Performance Characteristics. The purpose is to specify the measurement methods for the electrical performance of electrodes used in human body communication (HBC) semiconductor interfaces.

The method includes the general requirements and functional requirements of the measurement method.

---Part 3: Functional Classification and Operating Conditions. The purpose is to define the functional categories of semiconductor interfaces for Human Body Communication (HBC).

The classification of HBC interfaces includes categorizing them based on contact conditions and defining performance parameters for each type of interface.

---Part 4: Capsule Endoscopes. The purpose is to specify the semiconductor interface for capsule endoscopes using electrically coupled human body communication.

General requirements for electrical performance.

Semiconductor devices, human body communication, semiconductor interfaces Part 1:
General Provisions

1 Scope

This document specifies the general requirements for semiconductor interfaces used in Human Body Communication (HBC), including interface functional requirements and limits. and working conditions requirements.

Note: Supplementary information on HBC human body communication can be found in Appendix A.

2 Normative references

This document has no normative references.

3 Terms, Definitions and Symbols

The following terms, definitions and symbols apply to this document.

3.1 General Terminology

3.1.1

It handles the interface located between the human body and the human body communication modem, transmitting or receiving electrical signals to or from the human body.

Note: A human body communication semiconductor interface consists of an electrode and an analog front end. The human body communication modem converts data into electrical signals and transmits them to the electrical circuit.

It can either receive electrical signals from an analog front-end or convert them into data. Human body communication semiconductor interfaces are implemented externally or internally to the human body and connect with the surrounding environment.

Equipment integration.

3.1.2

Electrode

A physical structure that attaches to or near the human body to transmit electrical signals between the analog front end and the human body.

Note: The electrodes transmit electrical signals to the non-metallic transmission channel of the human body. Simultaneously, the electrodes transmit the electrical signals received by the human body to the analog front end.

3.1.3

Analog frontend

Semiconductor integrated circuits that recover original data from received signals transmitted from the human body.

Note: The analog front end includes a power line noise reduction filter, a signal amplifier, a high-pass filter, a comparator, and a clock and data recovery (CDR) circuitry for restoring signal strength.

The raw data is transmitted through a non-metallic transmission channel. Simultaneously, it generates control signals to control the operation of each component in the analog front-end.

3.1.4

Analog front-end circuit components that eliminate power line noise signals in the received signal caused by the human body's antenna function.

Note: See Appendix B for further information on power line noise signal generation.

3.1.5

comparator

Compare the voltage or current magnitudes of two signals and output a signal based on the comparison result, indicating which signal has a lower voltage or current.

Larger analog front-end circuitry components.