



SLOVENSKI STANDARD
SIST EN 62779-1:2016
01-september-2016

Polprevodniški elementi - Polprevodniški vmesnik za komuniciranje človeškega telesa - 1. del: Splošne zahteve (IEC 62779-1:2016)

Semiconductor devices - Semiconductor interface for human body communication - Part 1: General requirements (IEC 62779-1:2016)

iTeh STANDARD PREVIEW

Dispositifs à semi-conducteurs - Interface à semi-conducteurs pour les communications via le corps humain - Partie 1: Exigences générales (IEC 62779-1:2016)

[SIST EN 62779-1:2016](https://standards.iteh.ai/catalog/standards/sist/759bb11f-9a15-48a8-8acc-674327d4e2e9/sist-en-62779-1-2016)

Ta slovenski standard je istoveten z: EN 62779-1:2016

ICS:

31.080.01	Polprevodniški elementi (naprave) na splošno	Semiconductor devices in general
-----------	--	----------------------------------

SIST EN 62779-1:2016

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 62779-1:2016

<https://standards.iteh.ai/catalog/standards/sist/759bb11f-9a15-48a8-8acc-b74327d4e2e9/sist-en-62779-1-2016>

EUROPEAN STANDARD

EN 62779-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2016

ICS 31.080.01

English Version

Semiconductor devices - Semiconductor interface for human body communication - Part 1: General requirements (IEC 62779-1:2016)

Dispositifs à semiconducteurs - Interface à semiconducteurs pour les communications via le corps humain - Partie 1: Exigences générales
(IEC 62779-1:2016)

Halbleiterbauelemente - Halbleiterschnittstelle zur Kommunikation über den menschlichen Körper - Teil 1: Allgemeine Anforderungen
(IEC 62779-1:2016)

This European Standard was approved by CENELEC on 2016-03-24. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

SIST EN 62779-1:2016

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

EN 62779-1:2016**European foreword**

The text of document 47/2267/FDIS, future edition 1 of IEC 62779-1, prepared by IEC/TC 47 "Semiconductor devices" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62779-1:2016.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2016-12-24
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2019-03-24

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

iTeh STANDARD PREVIEW
Endorsement notice
(standards.iteh.ai)

The text of the International Standard IEC 62779-1:2016 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated :

IEC 62779 NOTE Harmonized in EN 62779 series.



IEC 62779-1

Edition 1.0 2016-02

INTERNATIONAL STANDARD

NORME INTERNATIONALE



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

**Dispositifs à semiconducteurs – Interface à semiconducteurs pour les communications via le corps humain –
Partie 1: Exigences générales**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 31.080.01

ISBN 978-2-8322-3176-0

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope.....	6
2 Normative references.....	6
3 Terms, definitions and letter symbols	6
3.1 General terms	6
3.2 Rating and characteristics	7
3.2.1 Input characteristics	7
3.2.2 Transfer characteristics	7
3.3 Letter symbols	9
4 General requirements for HBC semiconductor interface.....	9
4.1 General specifications	9
4.1.1 General	9
4.1.2 Function	9
4.1.3 Implementation types	10
4.2 Constructional specifications	10
4.3 Electrical specifications	11
4.3.1 General	11
4.3.2 Power supply characteristics	11
4.3.3 Power supply type.....	11
4.3.4 Dynamic characteristics of analog front end.....	11
4.3.5 CDR circuit interface	11
4.3.6 Modem interface	12
4.3.7 Limiting values.....	12
4.3.8 Temperatures	12
4.4 Operating specifications	12
4.4.1 Application.....	12
4.4.2 Grounding condition	13
4.4.3 Contact condition	13
Annex A (informative) General description of HBC.....	14
Annex B (informative) Generation of powerline noise signal in HBC	15
Annex C (informative) Calculation of sensitivity level	16
Bibliography	17
Figure 1 – Definition of cut-off frequency and bandwidth.....	8
Figure 2 – Block diagram (example).....	10
Figure A.1 – HBC applications	14
Figure B.1 – Coupling of electromagnetic fields and the human body	15
Table 1 – Letter symbols.....	9

INTERNATIONAL ELECTROTECHNICAL COMMISSION

SEMICONDUCTOR DEVICES –
SEMICONDUCTOR INTERFACE FOR HUMAN BODY COMMUNICATION –

Part 1: General requirements

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62779-1 has been prepared by IEC technical committee 47:Semiconductor devices.

The text of this standard is based on the following documents:

FDIS	Report on voting
47/2267/FDIS	47/2277/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62779 series, published under the general title *Semiconductor devices – Semiconductor interface for human body communication*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

iTeh STANDARD PREVIEW **(standards.iteh.ai)**

SIST EN 62779-1:2016

<https://standards.iteh.ai/catalog/standards/sist/759bb11f-9a15-48a8-8aec-b74327d4e2e9/sist-en-62779-1-2016>

INTRODUCTION

The IEC 62779 series is composed of three parts as follow:

- IEC 62779-1 defines general requirements of a semiconductor interface for human body communication. It includes general and functional specifications of the interface.
- IEC 62779-2 defines a measurement method on electrical performances of an electrode that constructs a semiconductor interface for human body communication.
- IEC 62779-3¹ defines functional type of a semiconductor interface for human body communication, and operational conditions of the interface.

IEC 60748-4 gives requirements on interface integrated circuits for semiconductor devices. Especially, Chapter III, Section 7 in this standard is applied to interface circuits for a communication network using a general channel, such as wire or wireless. However, a channel for HBC is the human body whose channel properties, such as signal loss and delay profile, are different from the general channel, so Chapter III, Section 7 can't be applied to an interface for HBC. Furthermore, a standard on a communication protocol for body area network (BAN) – IEEE 802.15.6, which includes a communication protocol for HBC was published in 2012. A common interface for HBC should be defined to secure communication compatibility between various devices that are implemented on/inside the human body or embedded in peripheral equipments.

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 62779-1:2016

<https://standards.iteh.ai/catalog/standards/sist/759bb11f-9a15-48a8-8aec-b74327d4e2e9/sist-en-62779-1-2016>

¹ To be published.

SEMICONDUCTOR DEVICES – SEMICONDUCTOR INTERFACE FOR HUMAN BODY COMMUNICATION –

Part 1: General requirements

1 Scope

This part of IEC 62779 defines general requirements for a semiconductor interface used in human body communication (HBC). It includes general and functional specifications of the interface, as well as limiting values and its operating conditions.

NOTE Additional information on HBC is provided in Annex A.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

None.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

3 Terms, definitions and letter symbols

SIST EN 62779-1:2016

For the purposes of this document, the following terms and definitions apply.

<https://standards.iteh.ai/catalog/standards/sist/759b11f9-1548-8a9c-b74327d4e2e9/sist-en-62779-1-2016>

3.1 General terms

3.1.1

HBC semiconductor interface

semiconductor interface to process an electrical signal that is transmitted to the human body or received from the human body while located between the human body and HBC modem; implemented on/inside the human body and embedded in peripheral equipment

Note 1 to entry: HBC semiconductor interface consists of an electrode and analog front end. The HBC modem converts data into an electrical signal and sends it to the electrode, or receives an electrical signal from the analog front end and converts it into data.

Note 2 to entry: This note applies to the French language only.

3.1.2

electrode

physical structure to transmit an electrical signal between an analog front end and the human body while attached to or located near the human body

Note 1 to entry: An electrode transfers an electrical signal to be transmitted to a non-metallic transmission channel, the human body. It also transfers an electrical signal received from the human body to the analog front end.

3.1.3

analog front end

semiconductor integrated circuit to recover original data from a receiving signal transmitted through the human body

Note 1 to entry: Analog front end includes a powerline noise reduction filter, a signal amplifier, a high-pass filter, a comparator and a clock and data recovery (CDR) circuit to recover original data transmitted through a non-

metallic transmission channel. Also, it generates control signals to control operations of each component in the analog front end.

3.1.4

powerline noise reduction filter

circuit component in an analog front end to remove a powerline noise signal included in a receiving signal by an antenna function of the human body

Note 1 to entry: Additional information on generation of a powerline noise signal is provided in Annex B.

3.1.5

comparator

circuit component in an analog front end to compare two signals and switch its output signal to indicate which is larger

3.1.6

CDR circuit

circuit component in an analog front end to generate a clock from a receiving signal and align phase of the receiving signal to the generated clock

3.2 Rating and characteristics

3.2.1 Input characteristics

3.2.1.1

supply voltage

V_S

supply voltage to operate a HBC semiconductor interface

iTeh STANDARD PREVIEW
(standards.iteh.ai)

3.2.1.2

normal mode supply current

I_S

total supply current during normal mode of a HBC semiconductor interface

SIST EN 62779-1:2016
<https://standards.iteh.ai/catalog/standards/sist/759bb11f-9a15-48a8-8aec-b74327d4e2e9/sist-en-62779-1-2016>

3.2.1.3

disabled mode supply current

I_{DISABLED}

total supply current during disabled mode of a HBC semiconductor interface

3.2.1.4

input impedance

Z_I

impedance seen by the human body into a HBC semiconductor interface

Note 1 to entry: Input impedance depends on input impedances of a powerline noise reduction filter, signal amplifier and high-pass filter.

Note 2 to entry: A powerline noise reduction filter removes a high-power noise signal which can saturate the active components in the interface.

3.2.2 Transfer characteristics

3.2.2.1

sensitivity level

SL

signal's minimum voltage at an input of a HBC semiconductor interface that is required to produce a signal having a specified signal-to-noise ratio at an output

Note 1 to entry: Additional information on the sensitivity level is provided in Annex C.

Note 2 to entry: This note applies to the French language only.