BS EN IEC 62149-4:2023

BSI Standards Publication

# Fibre optic active components and devices — Performance standards

Part 4: 1 300 nm fibre optic transceivers for Gigabit Ethernet application

bsi.

# National foreword

This British Standard is the UK implementation of EN IEC 62149-4:2023. It is identical to IEC 62149-4:2022. It supersedes BS EN 62149-4:2010, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee GEL/86/3, Fibre optic systems and active devices.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN IEC 62149-4

February 2023

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Supersedes EN 62149-4:2010

English Version

# Fibre optic active components and devices - Performance standards - Part 4: 1 300 nm fibre optic transceivers for Gigabit Ethernet application (IEC 62149-4:2022)

Composants et dispositifs actifs fibroniques - Normes de performance - Partie 4: Émetteurs-récepteurs fibroniques de 1 300 nm pour application Gigabit Ethernet (IEC 62149-4:2022)

Aktive Lichtwellenleiterbauelemente und -geräte - Betriebsverhalten - Teil 4: 1 300-nm-Lichtwellenleiter-Sende- und Empfangsmodule für Gigabit-Ethernet-Anwendungen (IEC 62149-4:2022)



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

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

# European foreword

The text of document 86C/1800/CDV, future edition 3 of IEC 62149-4, prepared by SC 86C "Fibre optic systems and active devices" of IEC/TC 86 "Fibre optics" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62149-4:2023.

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) 2023-10-20 |
| • | latest date by which the national standards conflicting with the document have to be withdrawn | (dow) 2026-01-20 |

This document supersedes EN 62149-4:2010 and all of its amendments and corrigenda (if any).

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

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

## Endorsement notice

The text of the International Standard IEC 62149-4:2022 was approved by CENELEC as a European Standard without any modification.

# Annex A
(normative)

# Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| IEC 60068-2-6 | - | Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal) | EN 60068-2-6 | - |
| IEC 60068-2-20 | - | Environmental testing - Part 2-20: Tests - Test Ta and Tb: Test methods for solderability and resistance to soldering heat of devices with leads | EN IEC 60068-2-20 | - |
| IEC 60068-2-27 | - | Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock | EN 60068-2-27 | - |
| IEC 60068-2-38 | - | Environmental testing - Part 2-38: Tests - Test Z/AD: Composite temperature/humidity cyclic test | EN IEC 60068-2-38 | - |
| IEC 60068-2-78 | - | Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state | EN 60068-2-78 | - |
| IEC 60749-25 | - | Semiconductor devices - Mechanical and climatic test methods - Part 25: Temperature cycling | EN 60749-25 | - |
| IEC 60749-26 | - | Semiconductor devices - Mechanical and climatic test methods - Part 26: Electrostatic discharge (ESD) sensitivity testing - Human body model (HBM) | EN IEC 60749-26 | - |
| IEC 60825-1 | - | Safety of laser products - Part 1: Equipment classification and requirements | EN 60825-1 | - |
| IEC 60938-1 | - | Fixed inductors for electromagnetic interference suppression - Part 1: Generic specification | EN IEC 60938-1 | - |
| IEC 60950-1 | - | Information technology equipment - Safety - Part 1: General requirements | - | - |
| IEC 61300-2-47 | - | Fibre optic interconnecting devices and passive components - Basic test and measurement procedures - Part 2-47: Tests - Thermal shocks | EN 61300-2-47 | - |

| | | | |
|---|---|---|---|
| ISO/IEC/IEEE 8802-3 2021 | Telecommunications and exchange between information technology systems - Requirements for local and metropolitan area networks - Part 3: Standard for Ethernet | - | - |

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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# FIBRE OPTIC ACTIVE COMPONENTS AND DEVICES – PERFORMANCE STANDARDS –

## Part 4: 1 300 nm fibre optic transceivers for Gigabit Ethernet application

## 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.
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IEC 62149-4 has been prepared by subcommittee 86C: Fibre optic systems and active devices, of IEC technical committee 86: Fibre optics. It is an International Standard.

This third edition cancels and replaces the second edition published in 2010. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) the normative references are updated;
b) the condition "for short periods" in 4.1 is removed;
c) the absolute limiting rating for soldering temperature in Table 1 is modified;
d) the maximal optical output power (multimode fibre) in Table 4 is increased from −3,5 dBm to −3 dBm, to align value with the referenced document;

e) a note is added to Table 7 to clarify that out-of-specification products are not allowed to pass the performance tests.

The text of this International Standard is based on the following documents:

| Draft | Report on voting |
|---|---|
| 86C/1800/CDV | 86C/1826/RVC |

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts of the IEC 62149 series, published under the general title *Fibre optic active components and devices – Performance standards,* can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

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

# INTRODUCTION

Fibre optic transceivers are used to convert electrical signals into optical signals and vice versa. This document specifies performance standards for 1 300 nm fibre optic transceivers for Gigabit Ethernet application. The ISO/IEC/IEEE 8802-3 Gigabit Ethernet standard is used as the basis for determining the optical characteristics of the transceiver, which operates at a line rate of 1,25 Gbit/s.

# FIBRE OPTIC ACTIVE COMPONENTS AND DEVICES – PERFORMANCE STANDARDS –

## Part 4: 1 300 nm fibre optic transceivers for Gigabit Ethernet application

## 1 Scope

This part of IEC 62149 defines performance specifications for 1 300 nm fibre optic transceiver modules used for the ISO/IEC/IEEE 8802-3 Gigabit Ethernet application. This document contains definitions for product performance requirements as well as a series of tests and measurements, for which clearly defined conditions, severities and pass/fail criteria are provided. The tests are intended to be run on a "once-off" basis to prove any product's ability to satisfy the performance standard's requirements.

A product that has been shown to meet all the requirements of a performance standard can be declared as complying with the performance standard but will then be controlled by a quality assurance/quality conformance program.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60068-2-6, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-20, *Environmental testing – Part 2-20: Tests – Test Ta and Tb: Test methods for solderability and resistance to soldering heat of devices with leads*

IEC 60068-2-27, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*

IEC 60068-2-38, *Environmental testing – Part 2-38: Tests – Test Z/AD: Composite temperature/humidity cyclic test*

IEC 60068-2-78, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

IEC 60749-25, *Semiconductor devices – Mechanical and climatic test methods – Part 25: Temperature cycling*

IEC 60749-26, *Semiconductor devices – Mechanical and climatic test methods – Part 26: Electrostatic discharge (ESD) sensitivity testing – Human body model (HBM)*

IEC 60825-1, *Safety of laser products – Part 1: Equipment classification and requirements*

IEC 60938-1, *Fixed inductors for electromagnetic interference suppression – Part 1: Generic specification*

IEC 60950-1, *Information technology equipment – Safety – Part 1: General requirements*