
Discrete semiconductor devices and integrated circuits - Part 5-1: Optoelectronic devices - General (IEC 60747-5-1:1997)

Discrete semiconductor devices and integrated circuits -- Part 5-1: Optoelectronic devices - General

Einzel-Halbleiterbauelemente und integrierte Schaltungen -- Teil 5-1: Optoelektronische Bauelemente - Allgemeines

Dispositifs discrets à semiconducteurs et circuits intégrés -- Partie 5-1: Dispositifs optoélectroniques - Généralités

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EUROPÄISCHE NORM

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Discrete semiconductor devices and integrated circuits
Part 5-1: Optoelectronic devices -
General
(IEC 60747-5-1:1997)

Dispositifs discrets à semiconducteurs et
circuits intégrés
Partie 5-1: Dispositifs optoélectroniques -
Généralités
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Allgemeines
(IEC 60747-5-1:1997)

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat 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 Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of the International Standard IEC 60747-5-1:1997, prepared by SC 47C, Flat panel display devices, of IEC TC 47, Semiconductor devices, was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 60747-5-1 on 2000-12-01 without any modification.

This standard should be read jointly with IEC 60747-1, EN 62007-1 and EN 62007-2.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2002-01-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2004-01-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annex ZA is normative and annex A is informative.
Annex ZA has been added by CENELEC.

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The text of the International Standard IEC 60747-5-1:1997 was approved by CENELEC as a European Standard without any modification.

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Annex ZA (normative)

Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-731	1991	International Electrotechnical Vocabulary (IEV) Chapter 731: Optical fibre communication	-	-
IEC 60050-845	1987	Chapter 845: Lighting	-	-
IEC 60664-1 (mod)	1992	Insulation coordination for equipment within low-voltage systems Part 1: Principles, requirements and tests	HD 625.1 S1 + corr. November	1996 1996

[SIST EN 60747-5-1:2002](https://standards.iteh.ai/catalog/standards/sist/20995322-5533-48eb-ac7a-b9bf0b07f5af/sist-en-60747-5-1-2002)

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**Dispositifs discrets à semiconducteurs
et circuits intégrés –**

**Partie 5-1:
Dispositifs optoélectroniques –
Généralités**

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**Discrete semiconductor devices
and integrated circuits –**

**Part 5-1:
Optoelectronic devices –
General**

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Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

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For price, see current catalogue*

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

DISCRETE SEMICONDUCTOR DEVICES
AND INTEGRATED CIRCUITS –Part 5-1: Optoelectronic devices –
General

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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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- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
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- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60747-5-1 has been prepared by subcommittee 47C: Optoelectronic, display and imaging devices, of IEC technical committee 47: Semiconductor devices.

This first edition replaces partially the second edition of IEC 60747-5 (1992) and constitutes a technical revision (see also annex A: Cross references index).

It should be read jointly with IEC 60747-1 and IEC 62007-1 and IEC 62007-2.

The text of this standard is based partially on IEC 60747-5 (1992) and partially on the following documents:

FDIS	Report on voting
47C/173/FDIS	47C/186/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.

Annex A is for information only.

DISCRETE SEMICONDUCTOR DEVICES AND INTEGRATED CIRCUITS –

Part 5-1: Optoelectronic devices – General

1 Scope

This part of IEC 60747 deals with the terminology relating to the semiconductor optoelectronic devices.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60747. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 747 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60050(731),1991, *International Electrotechnical Vocabulary (IEV) – Chapter 731: Optical fibre communication*

IEC 60050(845):1987, *International Electrotechnical Vocabulary (IEV) – Chapter 845: Lighting*
<https://standards.iteh.ai/catalog/standards/sist/20995322-5533-48eb-ac7a-1987/iec-60050-845-1987>

IEC 60664-1:1992, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

3 Physical concepts

3.1 (Electromagnetic) radiation (IEV 845-01-01)

- 1) Emission or transfer of energy in the form of electromagnetic waves with the associated photons.
- 2) These electromagnetic waves or these photons.

3.2 Optical radiation (IEV 845-01-02)

Electromagnetic radiation of wavelengths lying between the region of transition to X-rays (≈ 1 nm) and the region of transition to radio waves (≈ 1 nm).

3.3 Visible radiation (IEV 845-01-03)

Any optical radiation capable of causing a visual sensation directly.

NOTE – There are no precise limits for the spectral range of visible radiation since they depend upon the amount of radiant power available and the responsivity of the observer. The lower limit is generally taken between 360 nm and 400 nm and the upper limit between 760 nm and 830 nm.

3.4 Infrared radiation (IEV 845-01-04, specialized)

Optical radiation for which the wavelengths are longer than those for visible radiation.

3.5 Ultraviolet radiation (IEV 845-01-05, specialized)

Optical radiation for which the wavelengths are shorter than those for visible radiation.

3.6 Light (IEV 845-01-06, without note 2 which is not relevant)**3.6.1 Perceived light** (see IEV 845-02-17)**3.6.2 Visible radiation** (see IEV 845-01-03)

NOTE – Concept 2 is sometimes used for optical radiation extending outside the visible range, but this usage is not recommended.

3.7 Photoelectric effect (from IEV 845-05-33: photoelectric detector)

Interaction between optical radiation and matter resulting in the absorption of photons and the consequent generation of mobile charge carriers, thereby generating an electric potential or current, or a change in electrical resistance, excluding electrical phenomena caused by temperature changes.

4 Types of devices**4.1 Semiconductor optoelectronic device**

- 1) A semiconductor device that emits or detects or that is responsive to coherent or non-coherent optical radiation.
- 2) A semiconductor device that utilizes such radiation for its internal purposes.

4.2 Semiconductor photoemitter

A semiconductor optoelectronic device that directly converts electric energy into optical radiant energy.

4.3 Semiconductor laser**4.3.1 (Semiconductor) laser diode**

A semiconductor diode that emits coherent optical radiation through stimulated emission resulting from the recombination of free electrons and holes when excited by an electric current that exceeds the threshold current of the diode.

NOTE – The laser diode is mounted on a submount or in a package with or without coupling means (e.g. lens, pigtail).

4.3.2 Laser-diode module

A module containing, together with the laser diode, means for an automatic optical and/or thermal stabilization of the radiant output power.

4.4 Light-emitting diode (LED)

A semiconductor diode, other than a semiconductor laser, capable of emitting visible radiation when excited by an electric current.

4.5 Infrared-emitting diode (IRED)

A semiconductor diode other than a semiconductor laser capable of emitting infrared radiation when excited by an electric current.

4.6 (Semiconductor) photosensitive device

A semiconductor device that utilizes the photoelectric effect for detection of optical radiation.

4.7 (Semiconductor) photoelectric detector

A semiconductor device that utilizes the photoelectric effect for detection of optical radiation.

4.8 (Semiconductor) photoresistor, photoconductive cell (IEV 845-05-37, specialized)

A semiconductor photoelectric detector that utilizes the change of electric conductivity produced by the absorption of optical radiation.

4.9 Photoelement, photovoltaic cell (IEV 845-05-38)

A photoelectric detector that utilizes the electromotive force produced by the absorption of optical radiation.

4.10 Photodiode (IEV 845-05-39)

A photoelectric detector in which a photocurrent is generated by absorption of optical radiation in the neighbourhood of a PN junction between the semiconductors, or of a junction between a semiconductor and a metal.

4.11 Phototransistor

A transistor in which the current produced by the photoelectric effect in the neighbourhood of the emitter-base junction acts as base current, which is amplified.

4.12 Photothyristor

A thyristor that is designed to be triggered by optical radiation.

4.13 Photocoupler, optocoupler

A semiconductor optoelectronic device designed for the transfer of electrical signals by utilizing optical radiation to provide coupling with electrical isolation between the input and the output.

5 General terms**5.1 Optical axis**

A line about which the principal radiation or sensitivity pattern is centered.

NOTE – Unless otherwise stated, the optical axis coincides with the direction of maximum radiation or sensitivity.