IEC 62148-15

Edition 2.0 2014-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Fibre optic active components and devices – Package and interface standards – Part 15: Discrete vertical cavity surface emitting laser packages

Composants et dispositifs actifs à fibres optiques – Normes de boîtier et d'interface – Partie 15: Boîtiers individuels pour laser à cavité verticale émettant par la surface

IEC 62148-15:2014-05(en-fr)

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC
The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications
The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue
The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,…). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org
The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in 14 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary
More than 55 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

A propos de l'IEC
La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC
Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Catalogue IEC - webstore.iec.ch/catalogue
Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

Recherche de publications IEC - www.iec.ch/searchpub
La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,…). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished
Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org
Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient plus de 30 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 14 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary
Plus de 55 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

Service Clients - webstore.iec.ch/csc
Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.

IEC 62148-15

Edition 2.0 2014-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Fibre optic active components and devices – Package and interface standards – Part 15: Discrete vertical cavity surface emitting laser packages

Composants et dispositifs actifs à fibres optiques – Normes de boîtier et d'interface – Partie 15: Boîtiers individuels pour laser à cavité verticale émettant par la surface

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

PRICE CODE
CODE PRIX S

ICS 33.180.20

ISBN 978-2-8322-1602-6

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIBRE OPTIC ACTIVE COMPONENTS AND DEVICES – PACKAGE AND INTERFACE STANDARDS –

Part 15: Discrete vertical cavity surface emitting laser packages

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 62148-15 has been prepared by subcommittee 86C: Fibre optic systems and active devices, of IEC technical committee 86: Fibre optics.

This second edition cancels and replaces the first edition published in 2009 and constitutes a technical revision.

The significant technical changes with respect to the previous edition are as follows:

– to include a type-A pin configuration in the 4-pin type VCSEL TO CAN packages;
– to introduce new package standards for high-speed (8 Gbps and 10 Gbps) VCSEL TOSA packages with LC and SC connectors;
– to suggest optional colour codes for various pin configurations; and
– to delete the requirement of the minimum dimension for the outer diameters of the TO CAN packages in order to accommodate recent mini-TO CAN packages.

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

CDV	Report on voting
86C/1131/CDV	86C/1228/RVC

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

A list of all parts of the IEC 62148 series, published under the general title *Fibre optic active components and devices – Package and interface standards,* can be found on the IEC website.

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

A list of all parts of the IEC 62148 series, published under the general title *Fibre optic active components and devices – Package and interface standards,* 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.

INTRODUCTION

Fibre optic laser devices are used to convert electrical signals into optical signals. This standard covers the physical dimension and interface for the discrete vertical cavity surface emitting laser (VCSEL) packages.

FIBRE OPTIC ACTIVE COMPONENTS AND DEVICES – PACKAGE AND INTERFACE STANDARDS –

Part 15: Discrete vertical cavity surface emitting laser packages

1 Scope

This part of IEC 62148 covers the physical dimension and interface specifications for the discrete vertical cavity surface emitting laser (VCSEL) devices in optical telecommunication and optical data transmission applications.

The intent of this standard is to adequately specify the physical requirements of VCSEL devices that will enable mechanical interchangeability of laser devices or transmitters complying with this standard both at the printed circuit wiring board and for any panel-mounting requirement.

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.

IEC 60793-2 (all parts), *Optical fibres – Part 2: Product specifications*

IEC 60874 (all parts), *Fibre optic interconnecting devices and passive components – Connectors for optical fibres and cables*

IEC 61754-4-1, *Fibre optic connector interfaces – Part 4-1: Type SC connector family – Simplified receptacle SC-PC connector interfaces*

IEC 61754-20, *Fibre optic interconnecting devices and passive components – Fibre optic connector interfaces – Part 20: Type LC connector family*

IEC 62148-1, *Fibre optic active components and devices – Package and interface standards – Part 1: General and guidance*

ITU-T Recommendation G.652, *Characteristics of a single-mode optical fibre and cable*

3 Terms, definitions and abbreviations

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

3.1 Terms and definitions

3.1.1
pigtail package
package type of photonic devices which has a length of fibre attachment for both optical input and output ports

3.2 Abbreviations

VCSEL vertical cavity surface emitting laser

PD photodiode

TOSA transmitter optical subassembly

TO transistor outline

CAN airtight sealed metal container (IEC 60747-1)

4 Classification

This part of IEC 62148, which gives the physical dimension and interface specifications for the discrete vertical cavity surface emitting laser devices, specifies the interface of types 1 and 3 modules with direct solderable type electrical terminals.

Fibre optic transceiver modules are classified into five types of forms according to the combination of mating types of electrical and optical interfaces. Details are described in IEC 62148-1. The five types are as follows:

Type 1: fibre optic connector interface with direct solderable type electrical terminals.

Type 2: fibre optic connector interface with plug-in type electrical terminals.

Type 3: fibre optic pigtail interface with direct solderable type electrical terminals.

Type 4: fibre optic pigtail interface with plug-in type electrical terminals.

Type 5: modules are not classified into type 1 – type 4. (A typical example is a module that has both electrical connectors and non-connector type terminals as an electrical interface, such as a coaxial connector for signal and lead terminals for the power supply.)

5 Specification of the optical interface

5.1 General

The intent of this standard is to adequately specify the physical requirements of a VCSEL device that will enable mechanical interchangeability of laser devices or transmitters to this specification both at the printed circuit board and for any panel mounting requirement.

5.2 Optical connector interface (type 1)

This standard applies to the LC and SC optical connector interfaces. Detailed dimensions of the optical receptacle are specified in IEC 61754-20 and IEC 61754-4-1.

5.3 Pigtail interface (type 3)

All optical fibres defined in the IEC 60793-2 series and ITU-T Recommendation G.652 are applicable.

All optical connectors defined in the IEC 60874 series are applicable, if a pigtail has to be terminated with an optical connector.

6 Specifications of electrical interfaces

6.1 General

Specifications for the electrical interface of VCSEL TO CAN, TOSA and VCSEL pigtail packages are described as follows.

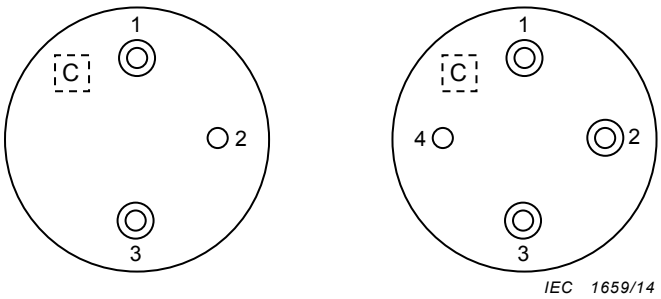
6.2 Electrical interface specifications for VCSEL TO CAN packages

6.2.1 General

The electrical interface in this standard defines only the basic functionality of each pin.

6.2.2 Numbering of electrical terminals

Pin numbering assignments are shown in Figure 1.



NOTE The electrical terminals as viewed from the bottom of the package module with pins underneath

Figure 1 – Electrical terminal numbering assignments of 3-pin and 4-pin type TO CAN packages with optional colour code C for pin configuration

6.2.3 Electrical terminal assignment

Table 1 – Pin-function definitions of 4-pin type VCSEL TO CAN packages

Pin number	Function (VCSEL with a monitor photodiode)			
	Common cathode	Common anode	Float (type K)	Float (type A)
1	VCSEL anode	VCSEL cathode	VCSEL anode	VCSEL cathode
2	VCSEL cathode/PD anode	VCSEL anode/PD cathode	VCSEL cathode	VCSEL anode
3	PD cathode	PD anode	PD cathode	PD cathode
4	Ground/case (option)	Ground/case (option)	PD anode/case	PD anode/case
Optional colour code (C)	Blue	Red	Green	Black

Table 2 – Pin-function definitions of 3-pin type VCSEL TO CAN packages

Pin number	Function (VCSEL with a monitor photodiode)	
	Common anode	Common cathode
1	VCSEL cathode	VCSEL anode
2	VCSEL anode/PD cathode	VCSEL cathode/PD anode
3	PD anode	PD cathode
Optional colour code (C)	Red	Blue

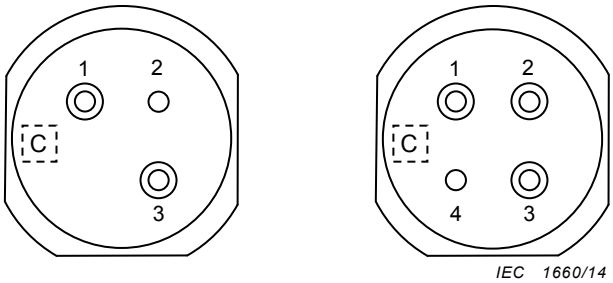
6.3 Electrical interface specifications for VCSEL TOSA package with a LC connector

6.3.1 General

The electrical interface in this standard defines only the basic functionality of each pin.

6.3.2 Numbering of electrical terminals

Pin numbering assignments are shown in Figure 2.



NOTE The electrical terminals as viewed from the bottom of the package module with pins underneath

Figure 2 – Electrical terminal numbering assignments of 3-pin and 4-pin type TOSA packages with LC connector and with optional colour code C

6.3.3 Electrical terminal assignment

The pin-function definitions of the 3-pin and 4-pin type VCSEL TOSA packages with a LC connector are the same as those of the VCSEL TO CAN packages as specified in Tables 1 and 2.

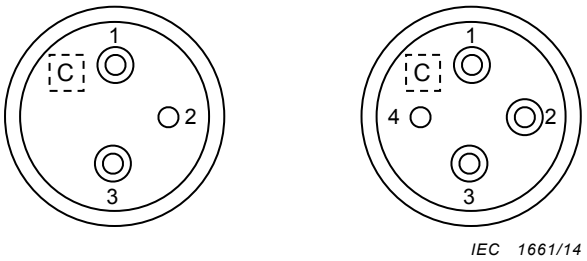
6.4 Electrical interface specifications for VCSEL TOSA package with a SC connector

6.4.1 General

The electrical interface in this standard defines only the basic functionality of each pin.

6.4.2 Numbering of electrical terminals

Pin numbering assignments are shown in Figure 3.



NOTE The electrical terminals as viewed from the bottom of the package module with pins underneath

Figure 3 – Electrical terminal numbering assignments of 3-pin and 4-pin type TOSA packages with SC connector and with optional colour code C

6.4.3 Electrical terminal assignment

The pin-function definitions of the 3-pin and 4-pin type VCSEL TOSA packages with a SC connector are the same as those of the VCSEL TO CAN packages as specified in Tables 1 and 2.