

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

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

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



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**FIBRE OPTIC ACTIVE COMPONENTS AND DEVICES –  
PACKAGE AND INTERFACE STANDARDS –****Part 15: Discrete vertical cavity surface emitting laser packages**

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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.

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## 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.

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# 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*

<https://standards.iteh.ai/catalog/standards/sist/0781f200-6bf5-4af0-9bbb->

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.)

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## 5 Specification of the optical interface

[IEC 62148-15:2014](https://standards.iteh.ai/catalog/standards/sist/0781f200-6bf5-4af0-9bbb-8e4e4b9aab8c/iec-62148-15-2014)

### 5.1 General <https://standards.iteh.ai/catalog/standards/sist/0781f200-6bf5-4af0-9bbb-8e4e4b9aab8c/iec-62148-15-2014>

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.

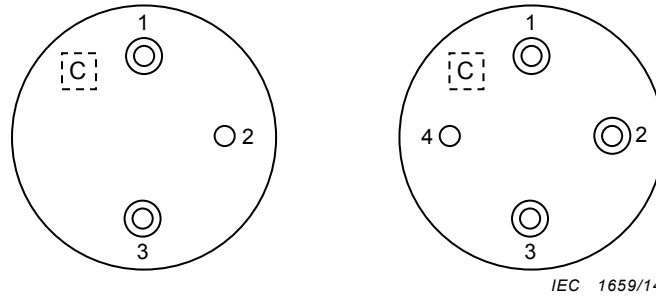
**6.2 Electrical interface specifications for VCSEL TO CAN packages**

**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

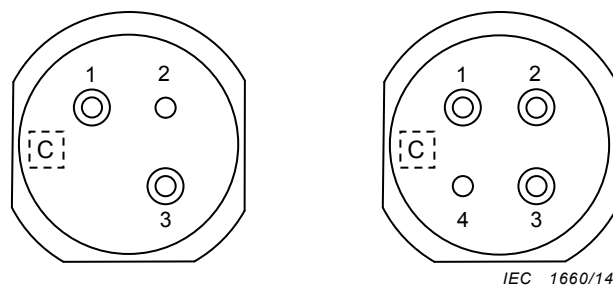
**6.3 Electrical interface specifications for VCSEL TOSA package with a LC connector**

**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

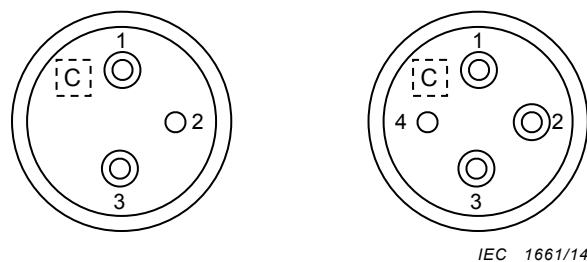
### 6.4.1 General

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

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### 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.