

INTERNATIONAL STANDARD

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

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



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PACKAGE AND INTERFACE STANDARDS –****Part 15: Discrete vertical cavity surface emitting laser packages****FOREWORD**

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IEC 62148-15 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 2014. This edition constitutes a technical revision.

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

- a) the classification of optical/electrical interface types is generalized and referred to IEC 62148-1;
- b) a new pin mode is added to Table 1;
- c) several dimensions of the VCSEL TO CAN package are changed in Table 3 to reflect the current state of technology;
- d) Figure 7 is updated to show the complete details of the VCSEL TOSA package.

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

FDIS	Report on voting
86C/1709/FDIS	86C/1712/RVD

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.

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 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/standardsdev/publications.

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- replaced by a revised edition, or
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INTRODUCTION

Fibre optic laser devices are used to convert electrical signals into optical signals. This document covers the physical dimension and interface for 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 discrete vertical cavity surface emitting laser (VCSEL) devices in optical telecommunication and optical data transmission applications.

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

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 60793-2-50, *Optical fibres – Part 2-50: Product specifications – Sectional specification for class B single-mode fibres*
<https://standards.iteh.ai/catalog/standards/sist/e426d3f8-6b7f-4a23-9e98-bd12e7aa71c0/iec-62148-15-2021>

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

IEC 61754 (all parts), *Fibre optic interconnecting devices and passive components – Fibre optic connector interfaces*

IEC 61754-4-100, *Fibre optic interconnecting devices and passive components – Fibre optic connector interfaces – Part 4-100: 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*

ASTM B-652.B, *Standard Specification for Niobium-Hafnium Alloy Ingots*

3 Terms, definitions and abbreviated terms

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

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 Abbreviated terms

CAN	airtight sealed metal container (see IEC 60747-1)
PD	photodiode
TO	transistor outline
TOSA	transmitter optical subassembly
VCSEL	vertical cavity surface emitting laser

4 Classification

Fibre optic transceiver modules are classified into several types of forms according to the combination of mating types of electrical and optical interfaces. The classifications provided in IEC 62148-1 apply.

5 Specification of the optical interface

5.1 General

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

5.2 Optical connector interface

This document applies to the LC and SC optical connector interfaces. Detailed dimensions of the optical receptacle are specified in IEC 61754-20 and IEC 61754-4-100.

5.3 Pigtail interface

All optical fibres defined in IEC 60793-2-50, ASTM B-652.B and ITU-T Recommendation G.652 are applicable.

All optical connectors defined in IEC 60874 (all parts) and IEC 61754 (all parts) are applicable, if a pigtail is 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 in 6.2.

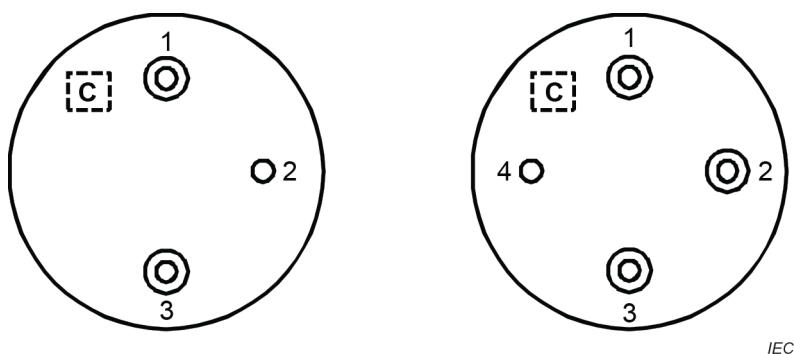
6.2 Electrical interface specifications for VCSEL TO CAN packages

6.2.1 General

The electrical interface in this document 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

Electrical terminal assignments are defined in Table 1 and Table 2.

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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)	Float (type D)
1	VCSEL anode	VCSEL cathode	VCSEL anode	VCSEL cathode	VCSEL cathode
2	VCSEL cathode/PD anode	VCSEL anode/PD cathode	VCSEL cathode	VCSEL anode	PD anode
3	PD cathode	PD anode	PD cathode	PD cathode	VCSEL anode/PD cathode
4	Ground/case (option)	Ground/case (option)	PD anode/case	PD anode/case	case
Optional colour code (C)	Blue	Red	Green	Black	Yellow

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 an LC connector

6.3.1 General

The electrical interface in this document 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 an LC connector are the same as those of the VCSEL TO CAN packages as specified in Table 1 and Table 2.

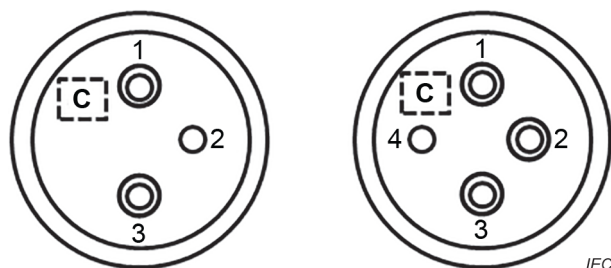
6.4 Electrical interface specifications for VCSEL TOSA package with an SC connector

6.4.1 General

The electrical interface in this document 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 an SC connector are the same as those of the VCSEL TO CAN packages as specified in Table 1 and Table 2.

7 Outline

7.1 General

The outline, dimensions and electrical interface of VCSEL TO CAN, TOSA and VCSEL pigtail packages are described in 7.2 to 7.8.

7.2 Outline of VCSEL TO CAN packages

7.2.1 Drawings of case outline

Drawings of case outlines for various VCSEL TO CAN packages are shown in Figure 4 a) to Figure 4 e).

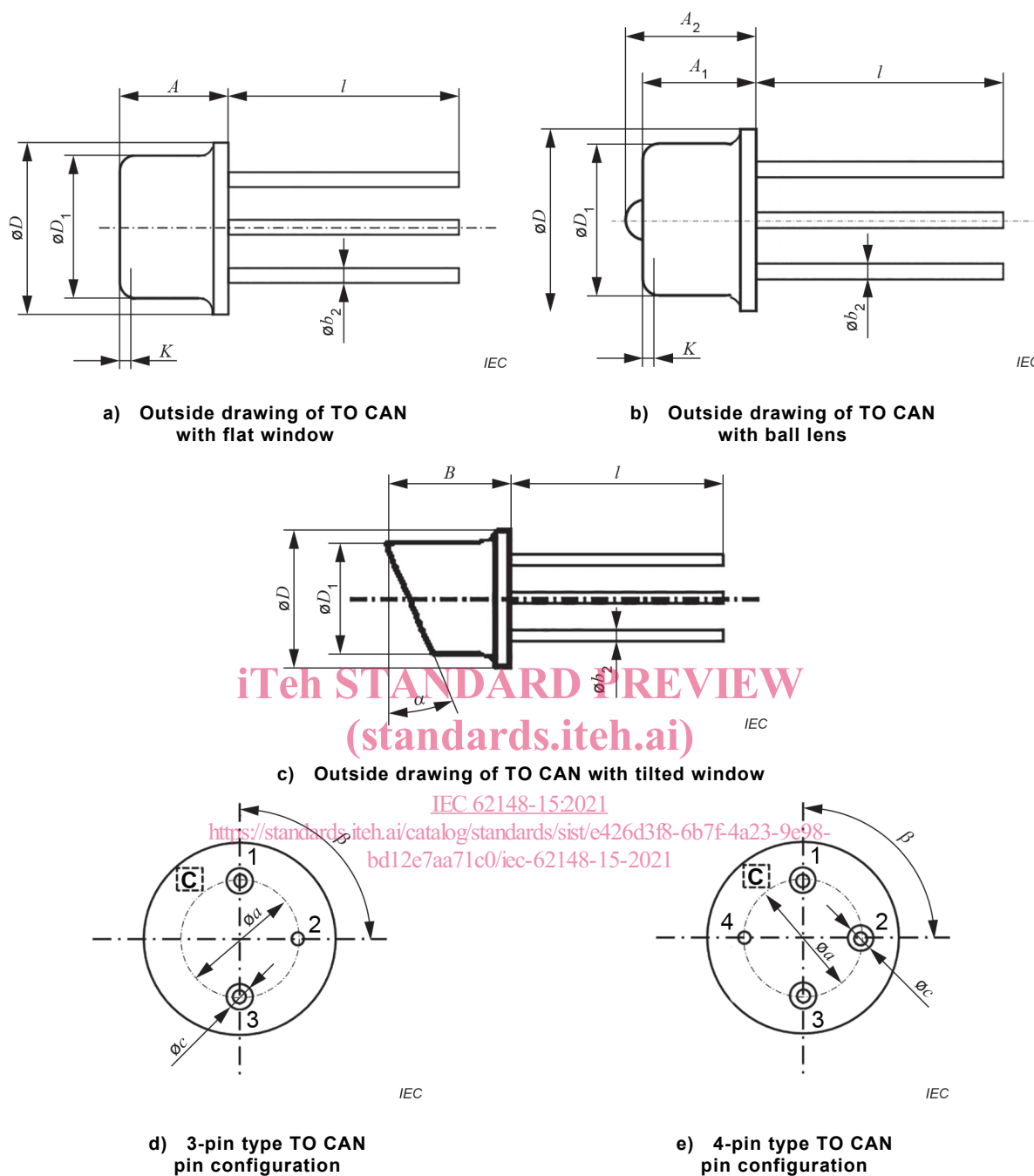


Figure 4 – Schematic diagrams and pin-out of VCSEL TO CANs with flat window, with ball lens, and with tilted window with optional colour code C on the bottom

7.2.2 Dimensions of VCSEL TO CAN packages

Dimensions of VCSEL TO CANs are specified in Table 3.