IEC 62148-22

Edition 1.0 2023-02

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Fibre optic active components and devices – Package and interface standards – Part 22: 25 Gbit/s directly modulated laser packages with temperature control unit

Composants et dispositifs actifs fibroniques – Normes de boîtier et d'interface – Partie 22: Boîtiers pour laser à modulation directe 25 Gbit/s équipés d'une unité de régulation de température

IEC 62148-22:2023-02(en-fr)

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

Tel.: +41 22 919 02 11
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 corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform
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 It also gives information on projects, replaced and withdrawn publications.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 once a month by email.

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: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch
Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org
The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

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.

Recherche de publications IEC - webstore.iec.ch/advsearchform
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 une fois par mois par email.

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

IEC Products & Services Portal - products.iec.ch
Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org
Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 300 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 19 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

IEC 62148-22

Edition 1.0 2023-02

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Fibre optic active components and devices – Package and interface standards – Part 22: 25 Gbit/s directly modulated laser packages with temperature control unit

Composants et dispositifs actifs fibroniques – Normes de boîtier et d'interface – Partie 22: Boîtiers pour laser à modulation directe 25 Gbit/s équipés d'une unité de régulation de température

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 33.180.20

ISBN 978-2-8322-6528-4

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

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

Part 22: 25 Gbit/s directly modulated laser packages with temperature control unit

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.

IEC 62148-22 has been prepared by subcommittee 86C: Fibre optic systems and active devices, of IEC technical committee 86: Fibre optics. It is an International Standard.

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

Draft	Report on voting
86C/1851/FDIS	86C/1859/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.

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 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 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 laser devices are used to convert electrical signals into optical signals. This document covers the physical dimensions and interfaces for directly modulated laser (DML) packages which are intended to be applied to 25 Gbit/s transceivers.

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

Part 22: 25 Gbit/s directly modulated laser packages with temperature control unit

1 Scope

This part of IEC 62148 defines the physical dimensions and interface specifications for directly modulated laser (DML) devices used in optical telecommunication and optical data transmission applications.

The intent of this document is to adequately specify the physical requirements for DML devices so as to enable mechanical interchangeability of laser devices or transmitters complying with this document both at the printed circuit board and for any panel-mounting requirements.

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*

IEC 61753 (all parts), *Fibre optic interconnecting devices and passive components – Performance standard*

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

IEC 61755 (all parts), *Fibre optic interconnecting devices and passive components – Fibre optic connector optical 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*

3 Terms, definitions and abbreviated terms

For the purposes of this document, the terms and definitions given in IEC 62148-1 and the following apply.

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

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://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

[SOURCE: IEC 62148-15:2021, 3.1.1]

3.1.2
TOSA module
optical module that converts electrical signals into optical signals and that is connected to an optical fibre

[SOURCE: IEC 62148-18:2014 , 3.1.1]

3.2 Abbreviated terms

CAN	airtight sealed metal container (see IEC 60747-1)
DML	directly modulated laser
LD	laser diode
MPD	monitor photodiode
NC	not connected
PD	photodiode
RH	heat resistor
RTH	thermistor resistor
TEC	thermo-electric cooler
TO	transistor outline
TOSA	transmitter optical subassembly

4 Specification of the optical interface

4.1 Optical connector interface

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

4.2 Pigtail interface

All single-mode optical fibres defined in IEC 60793-2-50 shall apply.

All optical connectors defined in the IEC 61753 series, IEC 61754 series, and IEC 61755 series are applicable when a pigtail shall be terminated with an optical connector.

5 Specification of electrical interface

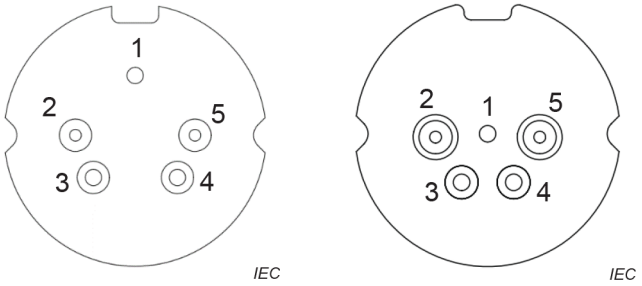
5.1 General

The specifications for the electrical interfaces of DML TO-can packages are described in 5.2. The specifications for the electrical interfaces of DML for TOSA module and DML pigtail packages are described in 5.3. The electrical interface specifications define only the basic functionality of each pin.

5.2 Electrical interface specifications for DML TO-can package

5.2.1 5-pin

The electrical terminal numbering assignments for 5-pin type TO-can packages with temperature control unit are shown in Figure 1. There are two different configurations. Figure 1 a) shows the first configuration, where pin 1 is offset from the centre of the TO-can, and Figure 1 b) shows the second configuration with a centred pin 1. The pin function definitions for the two 5-pin TO-can packages are specified in Table 1.



a) With offset ground pin 1 b) With centred ground pin 1

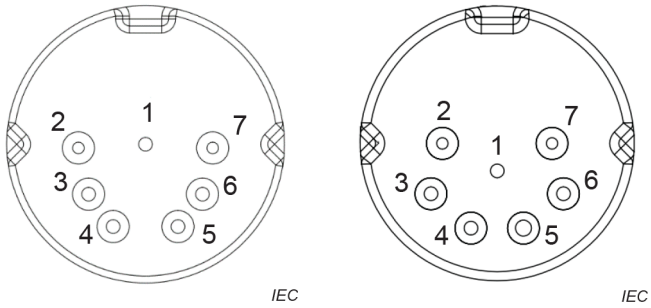
Figure 1 – Electrical terminal numbering assignments for 5-pin type TO-can packages with temperature control unit

Table 1 – Pin function definitions for 5-pin type DML TO-can packages

Pin number	Function	
	Option 1	Option 2
1	Ground, MPD anode, and RH cathode	Ground and RH cathode
2	LD anode	LD anode
3	RH anode	RH anode and MPD anode
4	MPD cathode	MPD cathode
5	LD cathode	LD cathode

5.2.2 7-pin

The electrical terminal numbering assignments for 7-pin type TO-can packages with temperature control unit are shown in Figure 2. There are two different configurations. Figure 2 a) shows the configuration with a centred pin 1, and Figure 2 b) shows the configuration where pin 1 is offset from the centre. The pin function definitions for the two 7-pin TO-can packages are specified in Table 2.



a) With centred ground pin 1 b) With offset ground pin 1

Figure 2 – Electrical terminal numbering assignments for 7-pin type TO-can packages with temperature control unit

Table 2 – Pin function definitions for 7-pin type DML TO-can packages

Pin number	Function		
	Option 1	Option 2	Option 3
1	Ground, RTH cathode, and MPD cathode	Ground	Ground, RTH cathode, and MPD anode
2	LD anode	LD anode	LD anode
3	RTH anode	MPD cathode	RTH anode
4	TEC anode	TEC anode	TEC cathode
5	TEC cathode	TEC cathode	TEC anode
6	MPD anode	MPD anode	MPD cathode
7	LD cathode	LD cathode	LD cathode

5.2.3 8-pin

The electrical terminal numbering assignments for 8-pin type TO-can packages with temperature control unit are shown in Figure 3. The pin function definitions for 8-pin TO-can packages are specified in Table 3.

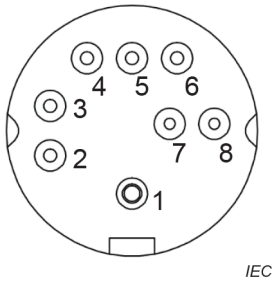


Figure 3 – Electrical terminal numbering assignments for 8-pin type TO-can packages with temperature control unit

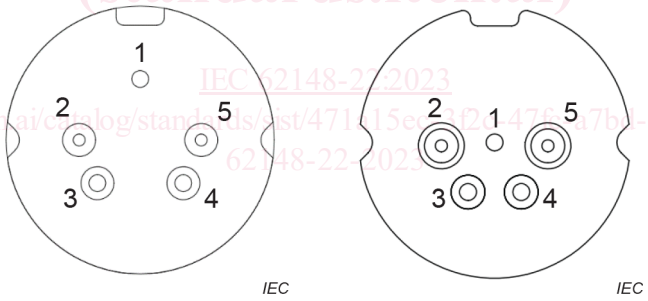
Table 3 – Pin function definitions for 8-pin type DML TO-can packages

Pin number	Function		
	Option 1	Option 2	Option 3
1	Ground and RTH cathode	Ground, RTH cathode, and MPD anode	Ground, RTH cathode, and MPD anode
2	RTH anode	RTH anode	RTH anode
3	MPD cathode	MPD cathode	MPD cathode
4	TEC cathode	TEC cathode	TEC cathode
5	TEC anode	TEC anode	TEC anode
6	MPD anode	Ground, RTH cathode, and MPD anode	NC
7	LD cathode	LD cathode	LD cathode
8	LD anode	LD anode	LD anode

5.3 Electrical interface specifications for DML TOSA module packages

5.3.1 5-pin

The pin number assignments for 5-pin TOSA module packages are shown in Figure 4. Figure 4 a) shows the configuration where pin 1 is offset from the centre, and Figure 4 b) shows the configuration with pin 1 centred. The pin function definitions for DML TOSA module packages are the same as specified in Table 1 for DML TO-can packages.



a) With offset ground pin 1 b) With centred ground pin 1

Figure 4 – Electrical terminal numbering assignments for 5-pin TOSA module packages with temperature control unit

5.3.2 7-pin

The pin number assignments for 7-pin TOSA module packages are shown in Figure 5. Figure 5 a) shows the configuration with pin 1 centred, and Figure 5 b) shows the configuration with pin 1 offset from the centre. The pin function definitions for DML TOSA module packages are the same as specified in Table 2 for DML TO-can packages.