IEC 62148-17

Edition 2.0 2023-09

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Fibre optic active components and devices – Package and interface standards – Part 17: Transmitter and receiver components with dual coaxial RF connectors

Composants et dispositifs actifs fibroniques – Normes de boîtiers et d'interface – Partie 17: Composants émetteurs et récepteurs avec deux connecteurs RF coaxiaux

IEC 62148-17:2023-09(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

ICS 33.180.99

ISBN 978-2-8322-7504-7

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 17: Transmitter and receiver components with dual coaxial RF connectors

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IEC 62148-17 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 second edition cancels and replaces the first edition published in 2013. This edition constitutes a technical revision.

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

a) IEC 61169-60 was added as a normative reference for SMPM connectors;
b) normative reference IEC 60874-1 (withdrawn) was replaced by IEC 61754 (all parts);
c) a reference to the terms and definitions of IEC 62007-1 was added in Clause 3;
d) a new column "Typical" was added to the tables in Figure 2 and Figure 3 to clarify the meaning of all listed values.

This standard is to be read in conjunction with IEC 62148-1.

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

Draft	Report on voting
86C/1880/FDIS	86C/1886/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, or
- revised.

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

Part 17: Transmitter and receiver components with dual coaxial RF connectors

1 Scope

This part of IEC 62148 defines physical interface specifications for transmitter and receiver components with dual coaxial RF connectors.

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 61169-60, *Radio-frequency connectors – Part 60: Sectional specification for RF coaxial connectors with push on mating – Characteristic impedance 50 Ohm (type SMPM)*

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

IEC 62007-1, *Semiconductor optoelectronic devices for fibre optic system applications – Part 1: Specification template for essential ratings and characteristics*

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

3 Terms, definitions, and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62007-1 apply.

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

- IEC Electropedia: available at https://www.electropedia.org/
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3.2 Abbreviated terms

EMC	electromagnetic compatibility
EMwL	external modulator with laser diode
IC	integrated circuit
LD	laser diode
PCB	printed circuit board
PD	photo diode
PIN	positive intrinsic negative
RF	radio frequency
SMPM	sub-miniature push-on miniature
TEC	thermo-electric cooler
TIA	trans-impedance amplifier

4 Electromagnetic compatibility (EMC) requirements

The components specified in this document shall comply with suitable requirements for electromagnetic compatibility (in terms of both emission and immunity), depending on the particular usage and environment in which they are intended to be installed or integrated.

Guidance to the drafting of such EMC requirements is provided in the IEC 61000 series.

5 Classification

The transmitter and receiver components with dual coaxial RF connectors described in this standard are classified as type 7 according to the definitions of IEC 62148-1.

6 Specification of transmitter component with dual coaxial RF connectors

6.1 General

The intention of this clause is to specify adequately the physical requirements of an optical transmitter component with an EMwL, a modulator driver IC, a TEC and dual coaxial RF input connectors. It will enable mechanical interchangeability of components complying with this specification both for the PCB and for any panel mounting requirement.

6.2 Pigtail interface

The optical fibre used in the pigtail shall be one of the fibre types specified in IEC 60793-2-50.

If a pigtail is to be terminated with an optical connector, the connector shall be one of the optical connectors specified in the IEC 61754 series.

6.3 Electrical interface

6.3.1 General

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

6.3.2 Numbering of electrical terminals

Terminal numbering assignments are shown in Figure 1.

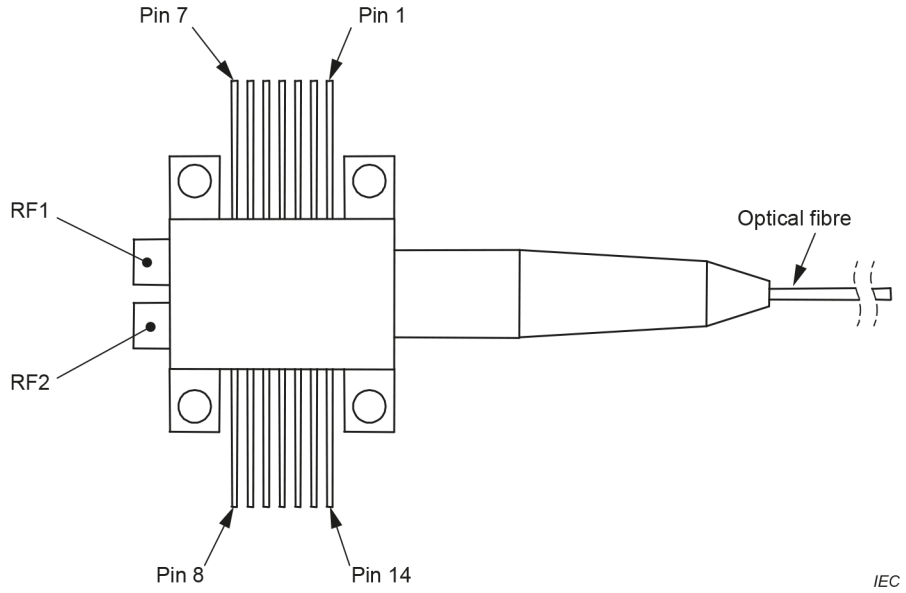


Figure 1 – Electrical terminal numbering assignments for transmitter component with dual coaxial RF connectors

6.3.3 Coaxial connector

The transmitter component has male type coaxial connectors as RF1 and RF2 terminals. These connectors handle RF electrical signals and shall be compatible with the SMPM connector defined in IEC 61169-60 having pin-centre contact full detent.

6.3.4 Electrical terminal assignment

The basic functionalities of each electrical terminal for transmitter components are defined in Table 1.

Table 1 – Function definitions of transmitter terminals

Terminal number	Symbol	Function
1	LDA	LD anode
2	PDA	PD anode
3	V_b	Modulator bias
4	V_m	Modulator modulation
5	V_{ss}	Driver IC supply voltage
6	V_x	Cross point control voltage
7	–	Vendor option
8	–	Vendor option
9	–	Vendor option
10	GND	Case ground
11	–	Vendor option (reserved for thermistor)
12	R_{TH}	Thermistor
13	TEC (–)	TEC cathode [a]
14	TEC (+)	TEC anode [a]
RF1	IN or INB	RF input [b]
RF2	INB or IN	RF input [b]

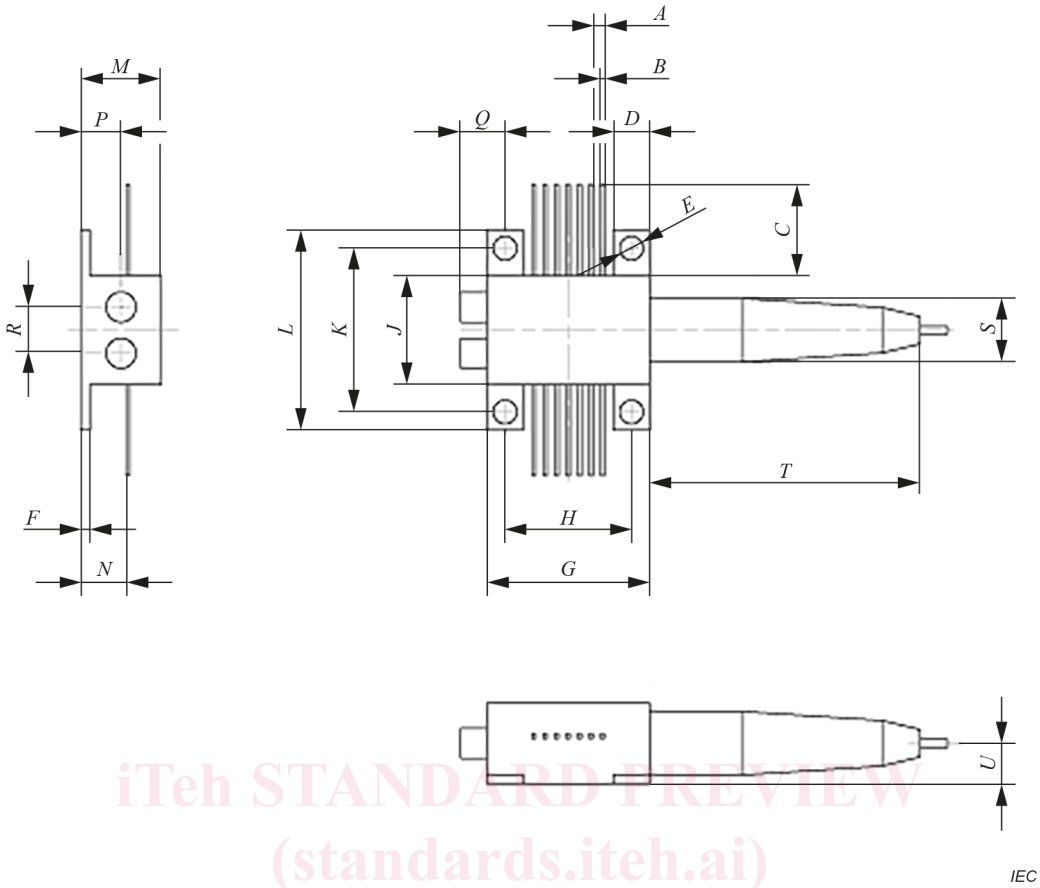
[a] TEC acts as an EMwL chip-cooler in the bias direction described here. When it is biased reversely, its function is changed into heating.

[b] Polarity of RF inputs shall be defined by each vendor.

6.4 Package outline and footprint

6.4.1 Drawing of package outline

A drawing of the package outline as well as the dimensions is given in Figure 2.

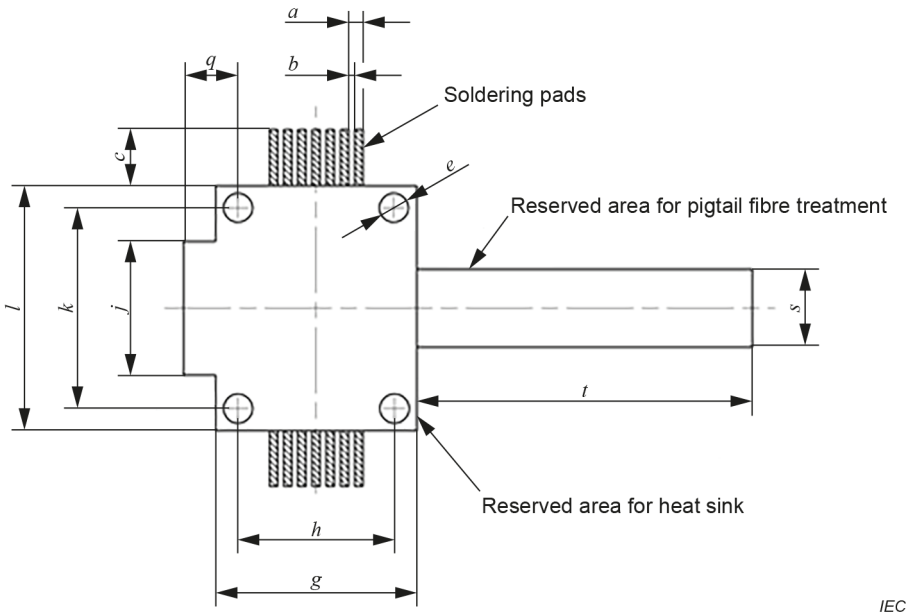


Reference	Dimensions mm			Notes
	Minimum	Typical	Maximum	
A	–	1,27	–	Basic dimension
B	–	–	0,45	
C	10,0	–	–	
D	3,75	–	4,25	
E	–	2,6	–	Diameter, basic dimension
F	–	–	1,0	
G	17,75	–	18,25	
H	13,9	–	14,1	
J	11,75	–	12,25	
K	17,9	–	18,1	
L	21,75	–	22,25	
M	–	–	8,9	
N	4,6	–	5,0	
P	–	4,45	–	Basic dimension
Q	4,65	4,90	5,15	
R	–	5,08	–	Basic dimension
S	–	–	7,0	Diameter
T	–	–	30	
U	–	4,45	–	Basic dimension

Figure 2 – Package outline drawing

6.4.2 Drawing of footprint

A drawing of the case footprint as well as the dimensions is given in Figure 3.



Reference	Dimensions mm			Notes
	Minimum	Typical	Maximum	
a	–	1,27	–	Basic dimension
b	0,45	–	–	
c	–	–	–	Specified by each vendor
e	–	2,6	–	Hole diameter, basic dimension
g	18,25	–	–	
h	–	14	–	Basic dimension
j	12,25	–	–	
k	–	18	–	Basic dimension
l	22,25	–	–	
q	5,15	–	–	
s	7,0	–	–	
t	30	–	–	

Figure 3 – Recommended pattern layout for the PCB

7 Specification of receiver component with dual coaxial RF connectors

7.1 General

The intention of this clause is to specify adequately the physical requirements of an optical receiver component with a PIN PD, TIA IC and dual coaxial RF output connectors. It will enable mechanical interchangeability of components complying with this specification both for the PCB and for any panel mounting requirement.

7.2 Pigtail interface

The optical fibre used in the pigtail shall be one of the fibre types specified in IEC 60793-2-50.

If a pigtail is to be terminated with an optical connector, the connector shall be one of the optical connectors specified in the IEC 61754 series.