BS EN 62148-3:2011

BSI Standards Publication

Fibre optic active components and devices — Package and interface standards

Part 3: SFF 20-pin transceivers

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National foreword

This British Standard is the UK implementation of EN 62148-3:2011. It is identical to IEC 62148-3:2010. It supersedes BS EN 62148-10:2003, BS EN 62148-3:2003, and BS EN 62148-8:2003, which are withdrawn.

The UK participation in its preparation was entrusted by Technical Committee GEL/86, Fibre optics, to Subcommittee GEL/86/3, Fibre optic systems and active devices.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Amendments issued since publication

Amd. No.	Date	Text affected

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NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 62148-3

January 2011

ICS 33.180.20

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English version

Fibre optic active components and devices - Package and interface standards - Part 3: SFF 20-pin transceivers

(IEC 62148-3:2010)

Composants et dispositifs actifs en fibres optiques -
Normes de boîtier et d'interface -
Partie 3: Emetteurs-récepteurs SFF à 20 broches
(CEI 62148-3:2010)

Aktive Lichtwellenleiterbauelemente und -geräte -
Gehäuse- und Schnittstellennormen -
Teil 3: SFF-Sende- und Empfangsmodule mit 20 Anschlüssen
(IEC 62148-3:2010)

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Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Management Centre: Avenue Marnix 17, B - 1000 Brussels

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Foreword

The text of document 86C/970/FDIS, future edition 2 of IEC 62148-3, prepared by SC 86C, Fibre optic systems and active devices, of IEC TC 86, Fibre optics, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62148-3 on 2011-01-01.

This European Standard supersedes EN 62148-3:2003, EN 62148-8:2003 and EN 62148-10:2003.

The significant technical change with respect to EN 62148-3:2003 is that this edition includes 20-pin SFF MT-RJ/LC/MU devices.

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

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2011-10-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2014-01-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 62148-3:2010 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 60603-7	NOTE Harmonized as EN 60603-7.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 61754-6	-	Fibre optic connector interfaces - Part 6: Type MU connector family	EN 61754-6	-
IEC 61754-18	-	Fibre optic connector interfaces - Part 18: Type MT-RJ connector family	EN 61754-18	-
IEC 61754-20	-	Fibre optic interconnecting devices and passive components - Fibre optic connector interfaces - Part 20: Type LC connector family	EN 61754-20	-
IEC 62148-1	-	Fibre optic active components and devices - Package and interface standards - Part 1: General and guidance	EN 62148-1	-

CONTENTS

INTRODUCTION

Fibre optic transceivers are used to convert electrical signals into optical signals and vice versa. This standard covers the physical interface for a 20-pin small form factor (SFF) transceiver. This transceiver is designed for use with the SFF MT-RJ/LC/MU duplex optical connectors and with through-hole printed circuit-board applications.

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

Part 3: SFF 20-pin transceivers

1 Scope

This part of IEC 62148 covers the physical interface specifications for the SFF MT-RJ/LC/MU duplex 20-pin fibre optic transceiver module family.

The intent of this standard is to adequately specify the physical requirements of an optical transceiver that will enable mechanical interchangeability of transceivers complying with this standard both at the printed circuit wiring board and for any panel-mounting requirement.

2 Normative references

The following referenced documents are indispensable for the application 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 61754-6, *Fibre optic connector interfaces – Part 6: Type MU connector family*

IEC 61754-18, *Fibre optic connector interfaces – Part 18: Type MT-RJ connector family*

IEC 61754-20, *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 abbreviations

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

3.1 Terms and definitions

3.1.1
small form factor optical transceiver
compact optical digital signal transceiver whose package has the same cross sectional outline as the receptacle of an electrical connector compliant with the IEC 60603-7 series

3.2 Abbreviations

SFF small form factor

4 Classification

The transceiver described in this standard is classified as type 1 according to IEC 62148-1.

5 Specification of the optical connector interface

This standard applies to the MT-RJ/LC/MU duplex optical connector interface. Detailed dimensions of the optical receptacle are provided in Clause 7.

Assignment of the optical transmit and receive ports is aligned to the electrical pins. One-half of the module is the transmit side and the other is the receive side. Assignments are shown in Figure 1.

6 Electrical interface

6.1 General

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

6.2 Numbering of electrical terminals

Pin numbering assignments are shown in Figure 1 (viewed from the top of the module with pins underneath).

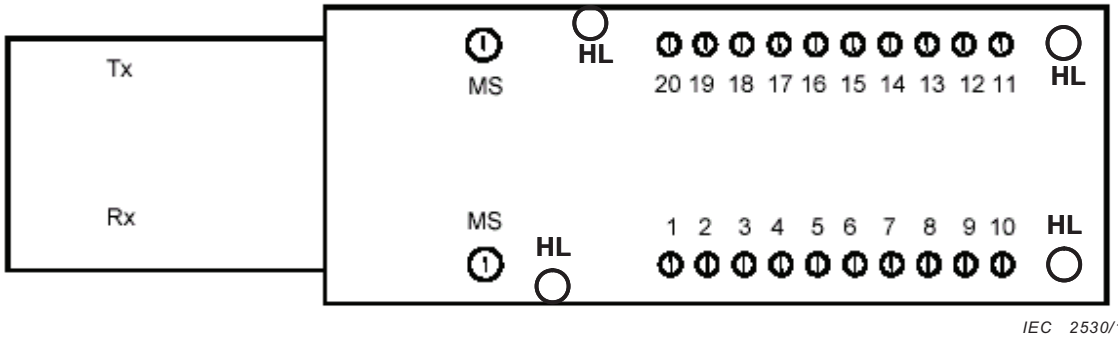


Figure 1 – Electrical terminal numbering assignments (viewed from above with pins underneath)

6.3 Electrical terminal assignment

See Tables 1 and 2.

Table 1 – Transceiver receiver pin-function definitions

20-pin part	Symbol	Functional description
MS [a]	MS	Mounting studs The mounting studs are provided for transceiver mechanical attachment to the circuit board. They may also provide an optional connection of the transceiver to the equipment chassis ground
HL	HL	Housing leads The optional transceiver housing leads may be provided for additional signal grounding. These additional grounds may improve signal integrity, EMC or EMI performance
1	Photo-detector bias	Photodetector bias: optional feature This lead supplies bias for the PIN photodetector diode when provided as a feature of a transceiver
2	Vee_r	Receiver signal ground
3	Vee_r	Receiver signal ground
4 [b]	Clk–	Received recovered clock-out bar: optional feature

20-pin part	Symbol	Functional description
5 [b]	Clk+	Received recovered clock-out: optional feature
6	Vee_r	Receiver signal ground
7	Vcc_r	Receiver power supply
8	SD	Signal detect
9	RD–	Received data-out bar
10	RD+	Received data out
[a] The holes in the circuit board must be tied to the chassis ground. [b] If the feature is not used, do not connect.		

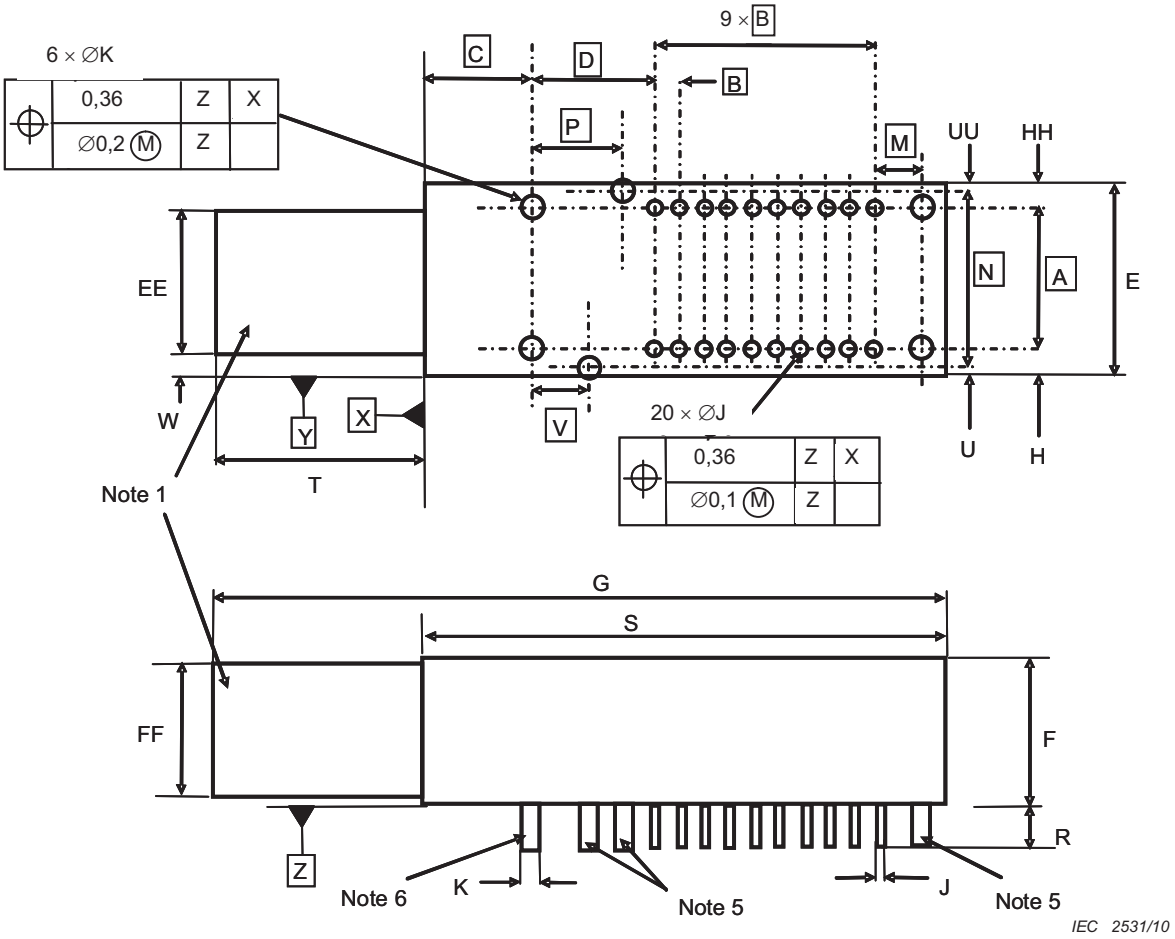
Table 2 – Transceiver transmitter pin-function definitions

20-pin part	Symbol	Functional description
MS [a]	MS	Mounting studs The mounting studs are provided for transceiver mechanical attachment to the circuit board. They may also provide an optional connection of the transceiver to the equipment chassis ground
HL	HL	Housing leads The optional transceiver housing leads may be provided for additional signal grounding. These additional grounds may improve signal integrity, EMC or EMI performance
11	Vcc_t	Transmitter power supply
12	Vee_t	Transmitter signal ground
13 [b]	TDis	Transmitter disable: optional feature
14	TD+	Transmitter data in
15	TD–	Transmitter data in bar
16	Vee_t	Transmitter signal ground
17 [c]	Bmon(–)	Laser diode bias current monitor – Negative end: optional feature
18 [c]	Bmon(+)	Laser diode bias current monitor – Positive end: optional feature
19 [c]	Pmon(–)	Laser diode optical power monitor – Negative end: optional feature
20 [c]	Pmon(+)	Laser diode optical power monitor – Positive end: optional feature
[a] The holes in the circuit board shall be tied to the chassis ground. [b] Option use for laser-based products only. [c] If the feature is not used, do not connect.		

7 Outline and footprint

7.1 Drawings of case outline

Drawings of the case outline as well as the dimensions are given in Figures 2, 3 and 4.


6 × ∅K
0,36 Z X
∅0,2 M Z
9 × B
C
D
B
P
M
UU
HH
EE
N
A
E
W
Y
X
V
T
20 × ∅J
0,36 Z X
∅0,1 M Z
U
H
Note 1
G
S
FF
F
R
Z
Note 6
K
Note 5
J
Note 5
IEC 2531/10

Reference	Dimensions mm		Remarks
	Minimum	Maximum	
A	10,16		Basic dimension
B	1,78		Basic dimension
C	7,59		Basic dimension
D	8,89		Basic dimension
E		13,59	
F		9,80	
G		49,56	Reference dimension
H		1,90	See Note 7
J	0,41	0,61	Diameter in case of rod pins (See Note 3)
K	0,97	1,07	Diameter in case of rod pins (See Note 4)
M	3,56		Basic dimension
N	13,34		Basic dimension
P	7,11		Basic dimension
R	2,92		
S		37,56	
T		12,00	
U		0,30	See Note 8
V	4,57		Basic dimension
W	1,70	2,30	
EE		9,60	
FF		9,30	
HH		1,90	See Note 7
UU		0,30	See Note 8

NOTE 1 Defines the space available for the MT-RJ optical receptacle.

NOTE 2 All 26 pins and posts are to be treated as a single pattern.

NOTE 3 Quadratic prism whose cross section is less than the quadrangle inscribed in the circle which diameter is “J”.

NOTE 4 Quadratic prism whose cross section is less than the quadrangle inscribed in the circle which diameter is “K”.

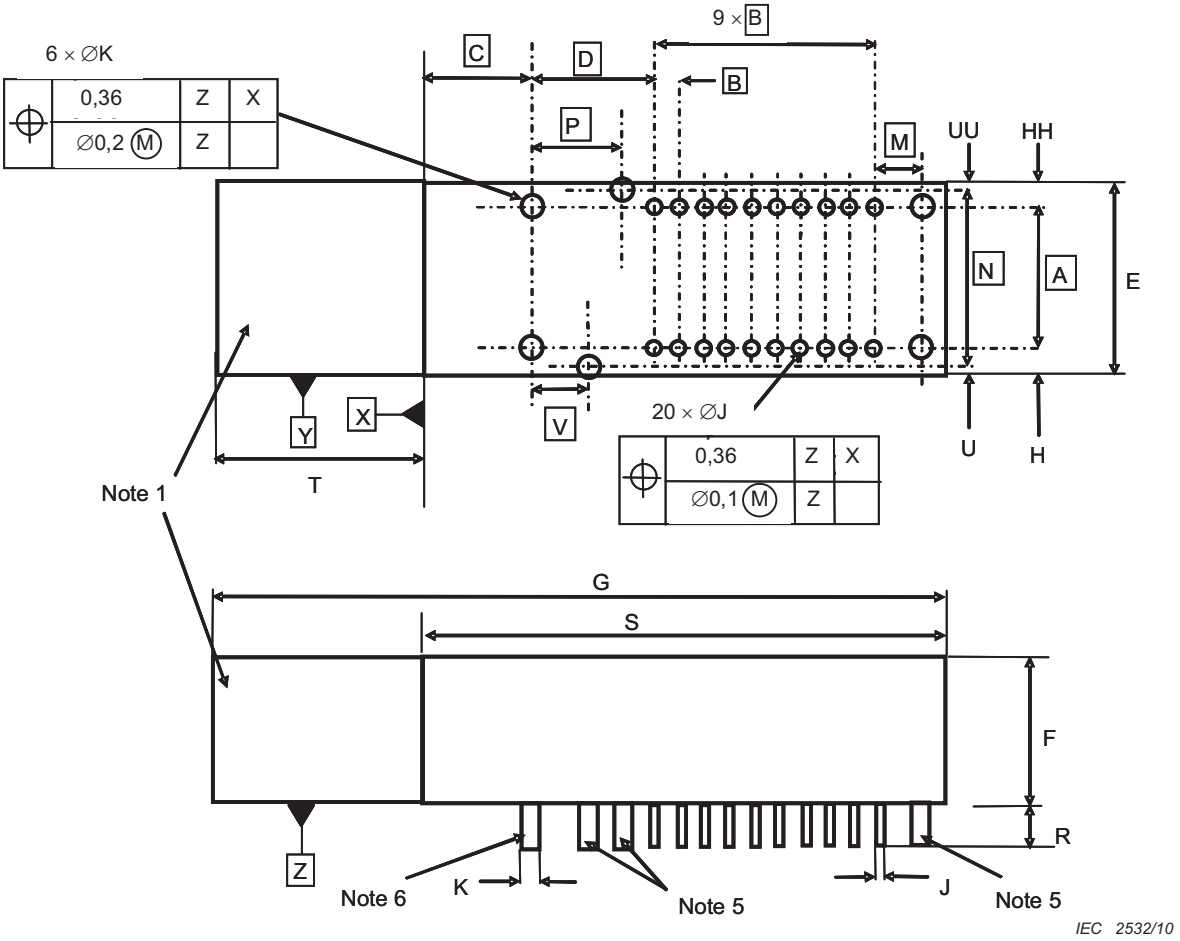
NOTE 5 Four housing leads are additional signal grounds to enhance the tolerance of Electromagnetic immunity and Electromagnetic compatibility.

NOTE 6 Two mounting studs are recommended to be tied to the chassis ground.

NOTE 7 H+HH is less than 3,63.

NOTE 8 U+UU is less than 0,45.

Figure 2 – Case outline of the SFF MT-RJ 20-pin transceiver


6 × ∅K
0,36 Z X
∅0,2 M Z
9 × B
C
D
B
P
M
UU
HH
N
A
E
U
H
20 × ∅J
0,36 Z X
∅0,1 M Z
V
X
Y
T
Note 1
G
S
F
R
Z
Note 6
K
Note 5
J
Note 5
IEC 2532/10

Reference	Dimensions mm		Remarks
	Minimum	Maximum	
A	10,16		Basic dimension
B	1,78		Basic dimension
C	7,59		Basic dimension
D	8,89		Basic dimension
E		13,59	
F		9,80	
G		49,56	Reference dimension
H		1,90	See Note 7
J	0,41	0,61	Diameter in case of rod pins (See Note 3)
K	0,97	1,07	Diameter in case of rod pins (See Note 4)
M	3,56		Basic dimension
N	13,34		Basic dimension
P	7,11		Basic dimension
R	2,92		
S		37,56	
T		12,00	
U		0,30	See Note 8
V	4,57		Basic dimension
HH		1,90	See Note 7
UU		0,30	See Note 8

NOTE 1 Defines the space available for the LC optical receptacle.

NOTE 2 All 26 pins and posts are to be treated as a single pattern.

NOTE 3 Quadratic prism whose cross section is less than the quadrangle inscribed in the circle which diameter is “J”.

NOTE 4 Quadratic prism whose cross section is less than the quadrangle inscribed in the circle which diameter is “K”.

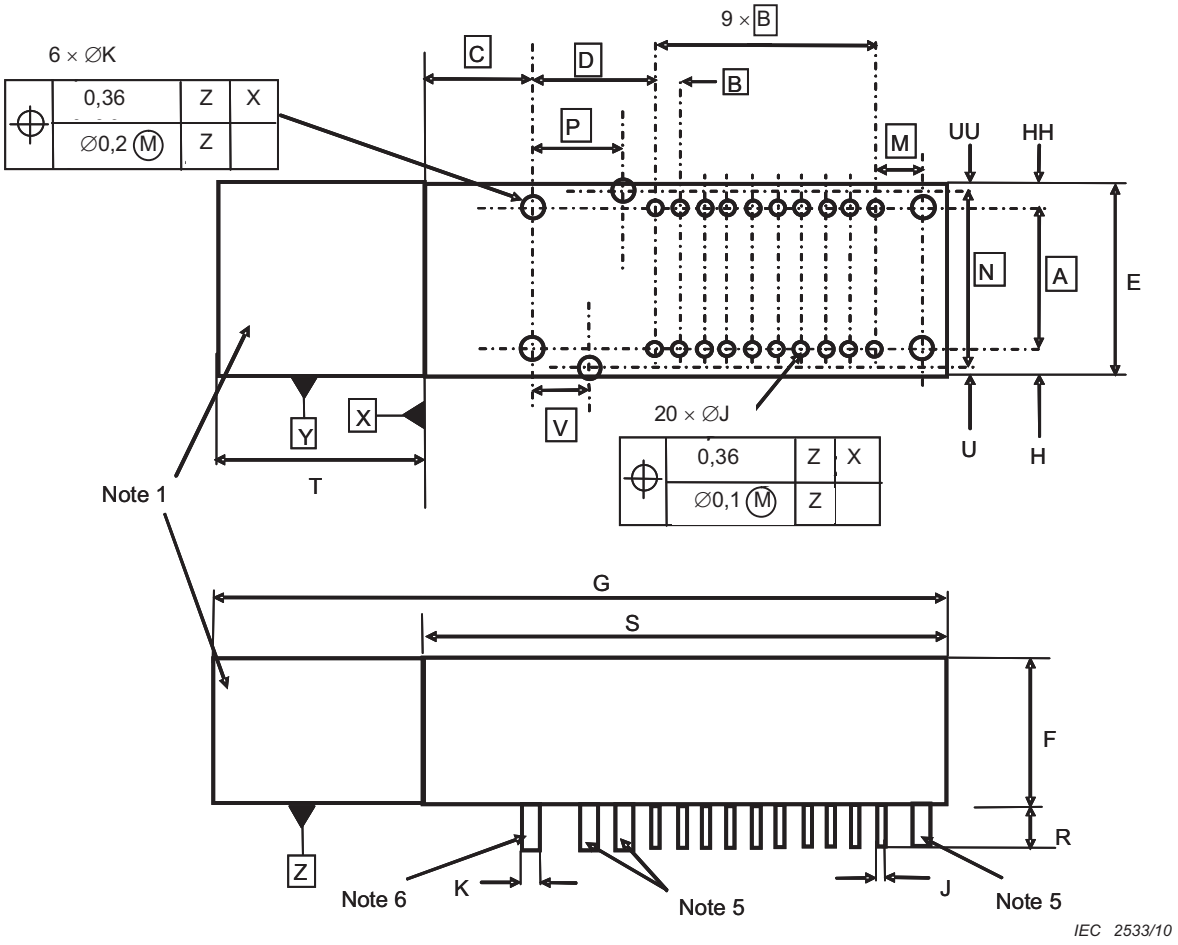
NOTE 5 Four housing leads are additional signal grounds to enhance the tolerance of Electromagnetic immunity and Electromagnetic compatibility.

NOTE 6 Two mounting studs are recommended to be tied to the chassis ground

NOTE 7 H+HH is less than 3,63.

NOTE 8 U+UU is less than 0,45.

Figure 3 – Case outline of the SFF LC 20-pin transceiver


6 × ∅K
0,36 Z X
∅0,2 M Z
9 × B
C
D
B
P
M
UU
HH
N
A
E
V
20 × ∅J
0,36 Z X
∅0,1 M Z
U
H
Y
X
T
Note 1
G
S
F
R
Z
Note 6
K
Note 5
J
Note 5
IEC 2533/10

Reference	Dimensions mm		Remarks
	Minimum	Maximum	
A	10,16		Basic dimension
B	1,78		Basic dimension
C	7,59		Basic dimension
D	8,89		Basic dimension
E		13,59	
F		9,80	
G		49,56	Reference dimension
H		1,90	See Note 7
J	0,41	0,61	Diameter in case of rod pins (See Note 3)
K	0,97	1,07	Diameter in case of rod pins (See Note 4)
M	3,56		Basic dimension
N	13,34		Basic dimension
P	7,11		Basic dimension
R	2,92		
S		37,56	
T		12,00	
U		0,30	See Note 8
V	4,57		Basic dimension
HH		1,90	See Note 7
UU		0,30	See Note 8

NOTE 1 Defines the space available for the MU duplex optical receptacle.

NOTE 2 All 26 pins and posts are to be treated as a single pattern.

NOTE 3 Quadratic prism whose cross section is less than the quadrangle inscribed in the circle which diameter is “J”.

NOTE 4 Quadratic prism whose cross section is less than the quadrangle inscribed in the circle which diameter is “K”.

NOTE 5 Four housing leads are additional signal grounds to enhance the tolerance of Electromagnetic immunity and Electromagnetic compatibility.

NOTE 6 Two mounting studs are recommended to be tied to the chassis ground.

NOTE 7 H+HH is less than 3,63.

NOTE 8 U+UU is less than 0,45.

Figure 4 – Case outline of the SFF MU duplex 20-pin transceiver

7.2 Optical receptacle

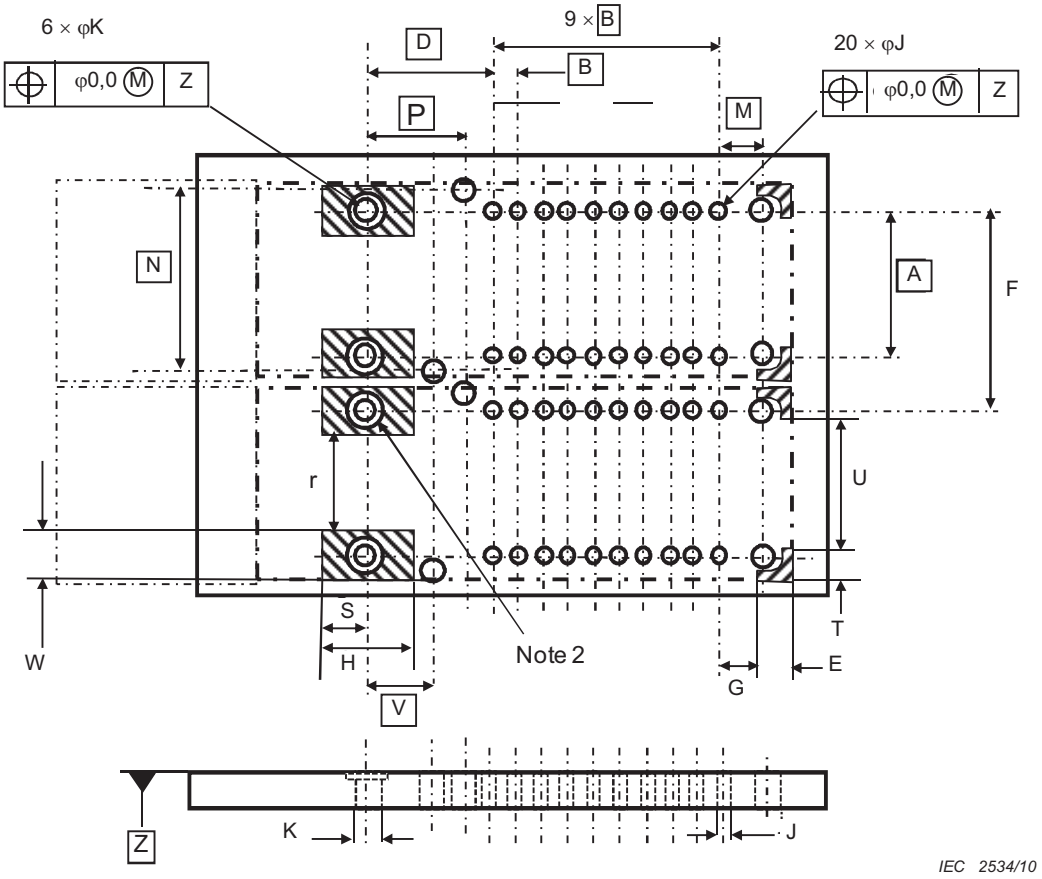
Refer to IEC 61754-18 for MT-RJ style.

Refer to IEC 61754-20 for LC style.

Refer to IEC 61754-6 for MU duplex style.

7.3 Drawings of case footprint

A drawing of the case footprint as well as the dimensions are given in Figure 5.



Reference	Dimensions mm		Notes
	Minimum	Maximum	
A	10,16		Basic dimension
B	1,78		Basic dimension
D	8,89		Basic dimension
E	1,90	2,10	
F	13,97		Minimum interval between two transceivers
G	3,08		
H	5,90	6,10	
J	0,71	0,91	
K	1,30	1,50	
M	3,56		Basic dimension
N	13,34		Basic dimension
P	7,11		Basic dimension
R	7,49	7,69	
S	2,90	3,10	
T	1,90	2,10	
U	9,49	9,96	
V	4,57		Basic dimension
W	2,90	3,10	

NOTE 1 The hatched areas are keep-out areas reserved for housing stand-offs. No metal traces or ground connection in keep-out areas.

NOTE 2 Maximum diameter area of 2 × 2,29 mm for mounting eyelets.

Figure 5 – Case footprint

Bibliography

IEC 60603-7, *Connectors for electronic equipment – Part 7: Detail specification for 8-way, unshielded, free and fixed connectors*

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