

# SBHxUB10L62D – SFP+ Single Fibre CWDM Low SW-SF CWDM / 10dB / 6.1Gbps

For your product safety, please read the following information carefully before any manipulation of the transceiver:



**ESD**

This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all others electrical input pins, tested per MIL-STD-883G, Method 3015.4 / JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module.



**LASER SAFETY**

This is a Class 1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

The optical ports of the module need to be terminated with an optical connector or with a dust plug in order to avoid contamination.

## 1. Overview

SBHxUB10L62D is a high performance transceiver module for up to 6.144Gbps bidirectional data links over one single mode fibre within one single CWDM channel, which is split into two sub bands called CWDM High and CWDM Low.

The power budget is minimum 10dB end of life (EOL). The transmitter is a cooled CWDM Low DFB laser, the receiver is a PIN photodiode operating in the CWDM High sub band. Consequently, a module with a CWDM High transmitter and a CWDM Low receiver is required at the opposite side of the link. The recommended counterpart is SBHxDB10L62D.

This transceiver module is compliant with the Small Form-factor Pluggable (SFP) Multisource Agreement (MSA) and hot pluggable. Always contact Skylane Optics® commercial agents for compatibility with different equipment platforms.

## 2. Features

- SFP+ Multi-Source Agreement compliant (SFF-8431)
- Hot pluggable SFP+ footprint
- Serial ID functionality supported according to (SFF-8472)
- Class 1 laser safety standard IEC 60825 compliant
- Supports bit rates up to 6.144Gbps
- Single LC connector
- Cooled CWDM DFB transmitter
- Power budget >10dB
- Operating temperature range -40 to 85°C
- Power consumption <1.8W
- Digital Diagnostics Monitoring (DDM)

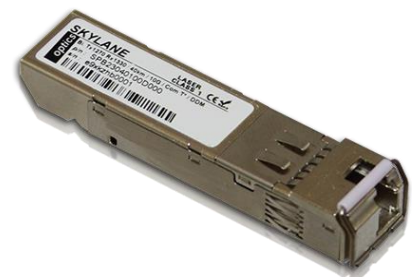


Figure 1. SFP+ Single Fibre (non-binding illustration)

## 3. Applications

- CPRI 6.144Gbps
- CPRI 4.9152Gbps

## 4. Optical Interface

P/N	Wavelength [nm]	Output Optical Power <sup>1</sup> [dBm]	Optical Receiver Sensitivity <sup>2</sup> [dBm]	Dispersion Penalty [dB]	Optical Receiver Overload <sup>3</sup> [dBm]	Power Budget <sup>1</sup> [dB]
SBHxUB10L62D	ITU CWDM Low	-4 to 2	≤ -14	≤ 2.5	2	≥ 10

1. EOL, over operating temperature range

2. Measured with 6.144Gbps PRBS 2<sup>7</sup>-1, ER=4.5dB, BER≤10<sup>-12</sup>

3. The optical input to the receiver should not exceed this value. Transmitters must never be directly connected to receivers (optical loop back) before ensuring that proper optical attenuation is used

5. Technical Parameters

5.1. Recommended Operating Conditions

Parameter	Min	Typ	Max	Unit	Notes
Storage temperature	-40		85	°C	
Operating Case Temperature	-40		85	°C	
Relative Humidity	5		95	%	Non condensing
Power Supply Voltage	3.135		3.465	V	
Power Supply Current		280	550	mA	

5.2. Transmitter Optical Specifications

Parameter	Min	Typ	Max	Unit	Notes
Average Output Power	-4		2	dBm	4
Centre Wavelength Range	1270		1610	nm	
Wavelength (CWDM Low)	$\lambda_T - 6.5$		$\lambda_T - 1.5$	nm	5
Spectral Width (-20dB)			1	nm	
Extinction Ratio	4.5			dB	
Dispersion Penalty			2.5	dB	6

4. Output power coupled into a 9/125µm µm single mode fibre

5.  $\lambda_T$  according to the ITU-T G.694.2 CWDM grid, see section 10 for details

6. @200ps/nm (10km SMF)

5.3. Receiver Optical Specifications

Parameter	Min	Typ	Max	Unit	Notes
Receiver Sensitivity			-14	dBm	7
Receiver Overload	2			dBm	7
Receiver Operating Range (CWDM High)	$\lambda_T + 2.0$		$\lambda_T + 6.5$	nm	5

7. Measured with 6.144Gbps PRBS 27-1, ER=4.5dB, BER≤10<sup>-12</sup>

6. Transceiver Electrical Pad Layout

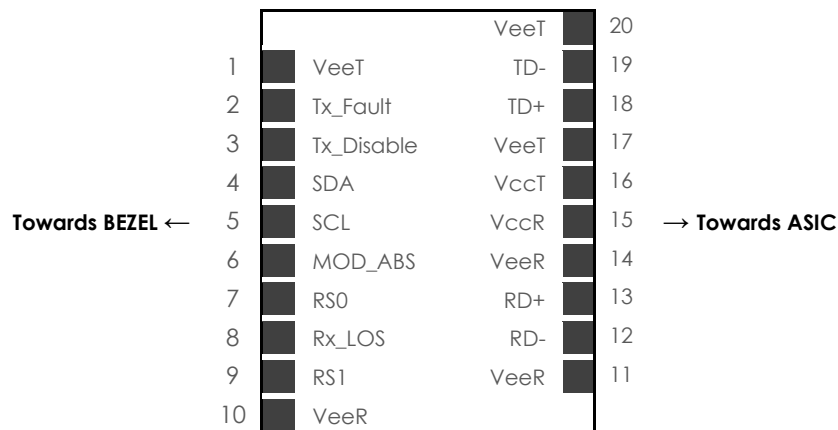


Figure 2. Transceiver Electrical Pad Layout

7. Module Electrical Pin Definition

SFP MSA (SFF-8431)

Pin Number	Name	Function
1	VeeT	Module Transmitter Ground
2	Tx_Fault	Module Transmitter Fault
3	Tx_Disable	Transmitter Disable
4	SDA	2-Wire Serial Interface Data
5	SCL	2-Wire Serial Interface Clock
6	Mod_ABS	Module Absent
7	RS0	Not Used
8	Rx_LOS	Receiver Loss of Signal
9	RS1	Not Used
10	VeeR	Module Receiver Ground
11	VeeR	Module Receiver Ground
12	RD-	Receiver Inverted Data Output
13	RD+	Receiver Non-Inverted Data Output
14	VeeR	Module Receiver Ground
15	VccR	Module Receiver 3.3V Supply
16	VccT	Module Transmitter 3.3V Supply
17	VeeT	Module Transmitter Ground
18	TD+	Transmitter Non-Inverted Data Input
19	TD-	Transmitter Inverted Data Input
20	VeeT	Module Transmitter Ground

8. EEPROM

SFP+ MSA (SFF-8431)

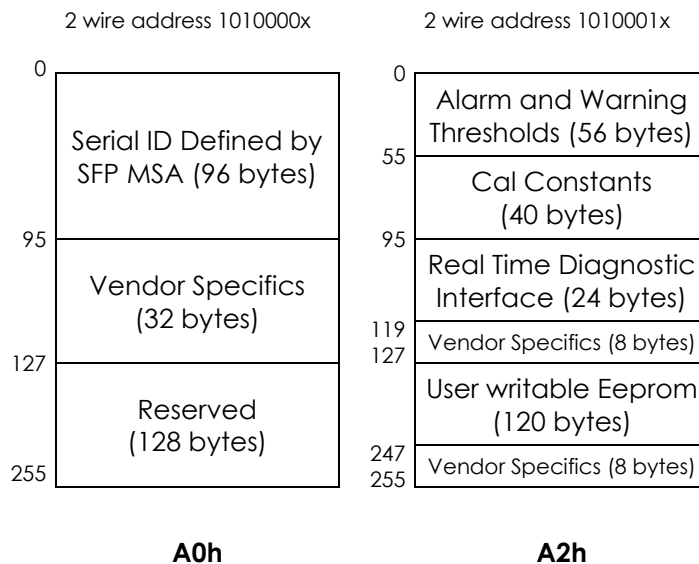


Figure 3. EEPROM of a SFP+

**9. Transmission Reach**

The actual transmission reach is depending on the CWDM channel used, due to the wavelength dependent dispersion in the fibre path. The table below shows the *estimated* transmission reach for CWDM channels 27 to 61.

**NB:** Distances are purely indicative and only valid for G.652 fibre. Only the optical power budget is guaranteed. Additional optical insertion loss from CWDM filters, splices, optical connectors etc. is not included.

CWDM Channel	Nominal Wavelength [nm]	Estimated Reach [km]
27	1270	15
29	1290	15
31	1310	15
33	1330	15
35	1350	15
37	1370	15
39	1390	15
41	1410	15
43	1430	15
45	1450	15
47	1470	15
49	1490	15
51	1510	14
53	1530	13
55	1550	12
57	1570	11
59	1590	10
61	1610	10

10. Ordering Information

Part Number	Description
SBHIUB10L62D	SFP CWDM Single Fibre, <b>Tx 1270nm</b> , Low (CWDM DFB), <b>Rx 1270nm</b> , High (PIN), power budget 10dB, 6.1Gbps, LC connector, -40°C to 85°C, DDM
SBHJUB10L62D	SFP CWDM Single Fibre, <b>Tx 1290nm</b> , Low (CWDM DFB), <b>Rx 1290nm</b> , High (PIN), power budget 10dB, 6.1Gbps, LC connector, -40°C to 85°C, DDM
SBHKUB10L62D	SFP CWDM Single Fibre, <b>Tx 1310nm</b> , Low (CWDM DFB), <b>Rx 1310nm</b> , High (PIN), power budget 10dB, 6.1Gbps, LC connector, -40°C to 85°C, DDM
SBHLUB10L62D	SFP CWDM Single Fibre, <b>Tx 1330nm</b> , Low (CWDM DFB), <b>Rx 1330nm</b> , High (PIN), power budget 10dB, 6.1Gbps, LC connector, -40°C to 85°C, DDM
SBHMUB10L62D	SFP CWDM Single Fibre, <b>Tx 1350nm</b> , Low (CWDM DFB), <b>Rx 1350nm</b> , High (PIN), power budget 10dB, 6.1Gbps, LC connector, -40°C to 85°C, DDM
SBHNUB10L62D	SFP CWDM Single Fibre, <b>Tx 1370nm</b> , Low (CWDM DFB), <b>Rx 1370nm</b> , High (PIN), power budget 10dB, 6.1Gbps, LC connector, -40°C to 85°C, DDM
SBHOUB10L62D	SFP CWDM Single Fibre, <b>Tx 1390nm</b> , Low (CWDM DFB), <b>Rx 1390nm</b> , High (PIN), power budget 10dB, 6.1Gbps, LC connector, -40°C to 85°C, DDM
SBHPUB10L62D	SFP CWDM Single Fibre, <b>Tx 1410nm</b> , Low (CWDM DFB), <b>Rx 1410nm</b> , High (PIN), power budget 10dB, 6.1Gbps, LC connector, -40°C to 85°C, DDM
SBHQUB10L62D	SFP CWDM Single Fibre, <b>Tx 1430nm</b> , Low (CWDM DFB), <b>Rx 1430nm</b> , High (PIN), power budget 10dB, 6.1Gbps, LC connector, -40°C to 85°C, DDM
SBHRUB10L62D	SFP CWDM Single Fibre, <b>Tx 1450nm</b> , Low (CWDM DFB), <b>Rx 1450nm</b> , High (PIN), power budget 10dB, 6.1Gbps, LC connector, -40°C to 85°C, DDM
SBHAUB10L62D	SFP CWDM Single Fibre, <b>Tx 1470nm</b> , Low (CWDM DFB), <b>Rx 1470nm</b> , High (PIN), power budget 10dB, 6.1Gbps, LC connector, -40°C to 85°C, DDM
SBHBUB10L62D	SFP CWDM Single Fibre, <b>Tx 1490nm</b> , Low (CWDM DFB), <b>Rx 1490nm</b> , High (PIN), power budget 10dB, 6.1Gbps, LC connector, -40°C to 85°C, DDM
SBHCUB10L62D	SFP CWDM Single Fibre, <b>Tx 1510nm</b> , Low (CWDM DFB), <b>Rx 1510nm</b> , High (PIN), power budget 10dB, 6.1Gbps, LC connector, -40°C to 85°C, DDM
SBHDUB10L62D	SFP CWDM Single Fibre, <b>Tx 1530nm</b> , Low (CWDM DFB), <b>Rx 1530nm</b> , High (PIN), power budget 10dB, 6.1Gbps, LC connector, -40°C to 85°C, DDM
SBHEUB10L62D	SFP CWDM Single Fibre, <b>Tx 1550nm</b> , Low (CWDM DFB), <b>Rx 1550nm</b> , High (PIN), power budget 10dB, 6.1Gbps, LC connector, -40°C to 85°C, DDM
SBHFUB10L62D	SFP CWDM Single Fibre, <b>Tx 1570nm</b> , Low (CWDM DFB), <b>Rx 1570nm</b> , High (PIN), power budget 10dB, 6.1Gbps, LC connector, -40°C to 85°C, DDM
SBHGUB10L62D	SFP CWDM Single Fibre, <b>Tx 1590nm</b> , Low (CWDM DFB), <b>Rx 1590nm</b> , High (PIN), power budget 10dB, 6.1Gbps, LC connector, -40°C to 85°C, DDM
SBHHUB10L62D	SFP CWDM Single Fibre, <b>Tx 1610nm</b> , Low (CWDM DFB), <b>Rx 1610nm</b> , High (PIN), power budget 10dB, 6.1Gbps, LC connector, -40°C to 85°C, DDM

Skylane Optics® supplies a broad range of optical transceivers. Our engineers work closely with our customers to find the best solutions for every application. We are committed to provide high quality products and services to our customers.

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