SKYLANE OPTICS®

SPB2304010xx – SFP+ Single Fibre

Tx 1270nm Rx 1330nm / 40km / 10x Gigabit Ethernet

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

CE   RoHS   TÜVRheinland

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 Class1 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

SPB2304010xx is a high-performance transceiver module for up to 10× Gigabit Ethernet data links over a single mode fibre. The maximum reach[1] is 40km, with 16dB end of life (EOL) power budget. The transmitter is a 1270nm DFB laser, the receiver a 1330nm PIN photodiode. Consequently, a module with a 1330nm transmitter and a 1270nm receiver is required at the opposite side of the link. The recommended counterpart is SPB3204010xx.

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
- Single LC connector
- 1270nm DFB transmitter, 1330nm PIN receiver
- 40km point-to-point transmission on single mode fibre
- Operating temperature range 0℃ to 70℃ or -40℃ to 85℃
- Low power dissipation (<1.5W)
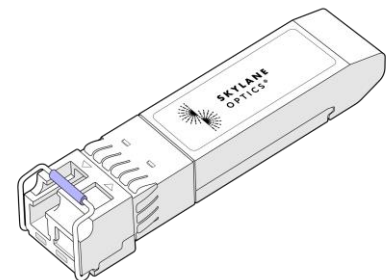- Digital diagnostics monitoring (DDM)

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

3. Applications

- 10× Gigabit Ethernet
- 9.83 Gbps CPRI
- 8× Fiber Channel
- 4× Fiber Channel
- 2× Fiber Channel

4. Optical Interface

P/N	Wavelength [nm]	Optical Output Power[2] [dBm]	Receiver Sensitivity[3] [dBm]	Dispersion Penalty [dB]	Receiver Overload[4] [dBm]	Power Budget[2] [dB]
SPB2304010xx	Tx 1270 Rx 1330	1 to 5	≤ -15	2	0	≥ 16

1. Distance is estimated assuming typical optical losses after decent quality fibre deployment; Only optical budget value is guaranteed.
2. EOL, over operating temperature range, together with SPB3204010xx
3. Measured with 10.3125Gbps PRBS 2^{31}-1, BER≤10^{-12}
4. 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	0		70	°C	SPB23040100D, SPB23040100B, SPB2304010GD, SPB2304010AD
	-40		85		SPB23040102D, SPB23040102B
Relative Humidity	5		95	%	
Power Supply Voltage	3.15	3.3	3.45	V	
Power Supply Current			430	mA	

5.2.   Transmitter Optical Specifications

Parameter	Min	Typ	Max	Unit	Notes
Average Output Power	1		5	dBm	5
Centre Wavelength	1260	1270	1280	nm	
Spectral Width (-20dB)			1	nm	
Extinction Ratio	3.5			dB	
Dispersion Penalty			2	dB	

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

5.3.   Receiver Optical Specifications

Parameter	Min	Typ	Max	Unit	Notes
Receiver Sensitivity			-15	dBm	6
Receiver Overload	0			dBm	6
Receiver Operating Range	1320		1340	nm	

6. Measured with 10.3125Gbps PRBS $2^{31}-1$, BER$\leq 10^{-12}$

6.   Transceiver Electrical Pad Layout

Figure 2. Transceiver Electrical Pad Layout

7. Module Electrical Pin Definition

SFP+ MSA (SFF-8431)

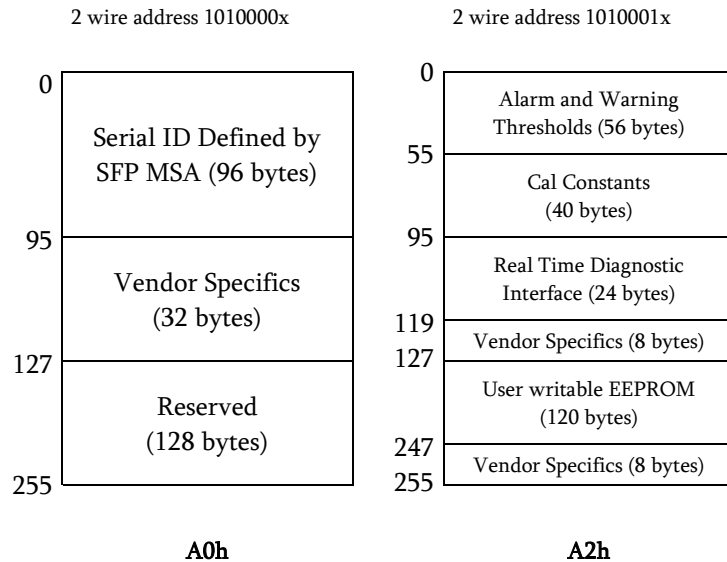| Pin Number	Name	Function
1	VeeT	Module Transmitter Ground
2	Tx_Fault	Module Transmitter Fault
3	Tx_ Disable	Transmitter Disable
4	SDA	2-Wire Serial Interface Data
5	SCL	2-Wire Serial Interface Clock
6	Mod_ABS	Module Absent
7	RS0	Not Used
8	Rx_LOS	Receiver Loss of Signal
9	RS1	Not Used
10	VeeR	Module 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-8472)

2 wire address 1010000x

0

Serial ID Defined by SFP MSA (96 bytes)

95

Vendor Specifics (32 bytes)

127

Reserved (128 bytes)

255

A0h

2 wire address 1010001x

0

Alarm and Warning Thresholds (56 bytes)

55

Cal Constants (40 bytes)

95

Real Time Diagnostic Interface (24 bytes)

119

Vendor Specifics (8 bytes)

127

User writable EEPROM (120 bytes)

247

Vendor Specifics (8 bytes)

255

A2h

Figure 3. EEPROM of a SFP+

9. Ordering Information

Part Number	Description
SPB23040100D	SFP+ Single Fibre, Tx 1270nm (DFB), Rx 1330nm (PIN), maximum distance 40km, power budget 16dB, 10x Gigabit Ethernet, LC connector, **0°C to 70°C**, DDM
SPB23040100B	SFP+ Single Fibre, Tx 1270nm (DFB), Rx 1330nm (PIN), maximum distance 40km, power budget 16dB, 10x Gigabit Ethernet, LC connector, **Gen B, 0°C to 70°C**, DDM
SPB23040102D	SFP+ Single Fibre, Tx 1270nm (DFB), Rx 1330nm (PIN), maximum distance 40km, power budget 16dB, 10x Gigabit Ethernet, LC connector, **-40°C to 85°C**, DDM
SPB23040102B	SFP+ Single Fibre, Tx 1270nm (DFB), Rx 1330nm (PIN), maximum distance 40km, power budget 16dB, 10x Gigabit Ethernet, LC connector, **Gen B, -40°C to 85°C**, DDM
SPB2304010GD	SFP+ Single Fibre, Tx 1270nm (DFB), Rx 1330nm (PIN), maximum distance 40km, power budget 16dB, 10x Gigabit Ethernet, LC connector, **0°C to 70°C**, DDM, **Specific Firmware**
SPB2304010AD	SFP+ Single Fibre, Tx 1270nm (DFB), Rx 1330nm (PIN), maximum distance 40km, power budget 16dB, 10x Gigabit Ethernet, LC connector, **0°C to 70°C**, DDM, **Specific Firmware**

10. Document Revision Information

Revision	Description
A	Initial release
B	Specification updated to include 8x Fiber Channel compatibility
C	Ordering information table updated with the "G" and "A" versions
D	Specification updated to include CPRI compatibility
E	Gen B variants added. Extended temperature variant removed

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.

For questions on this product please contact:
support@skylaneoptics.com

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