

# SPDxx040100D – SFP+ Dual Fibre DWDM 100GHz DWDM / 40 km / 10× Gigabit Ethernet

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 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

SPDxx040100D is a high performance transceiver module for up to 10× Gigabit Ethernet data links over a single mode fibre pair. The maximum reach<sup>1</sup> is 40km, with 14dB end of life (EOL) power budget. The transmitter is a DWDM EML laser, the receiver is a PIN photodiode.

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
- Dual LC connector
- DWDM EML transmitter
- 40km point-to-point transmission on single mode fibre
- Operating temperature range 0°C to 70°C
- Low power dissipation (<1.5W)
- Digital Diagnostics monitoring (DDM)



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

## 3. Applications

- 10× Gigabit Ethernet
- 8× Fiber Channel
- 4× Fiber Channel
- 2× Fiber Channel

## 4. Optical Interface

P/N	Wavelength [nm]	Optical Output Power <sup>2</sup> [dBm]	Receiver Sensitivity <sup>3</sup> [dBm]	Dispersion Penalty [dB]	Receiver Overload <sup>4</sup> [dBm]	Power Budget <sup>2</sup> [dB]
SPDxx040100D	ITU DWDM 100GHz	0 to 4	≤ -14	2	-1	≥ 14

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

3. Measured with 10.3Gbps PRBS 2<sup>31</sup>-1, BER≤10<sup>-12</sup>

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	
Relative Humidity	5		95	%	Non condensing
Power Supply Voltage	3.15	3.3	3.45	V	
Power Supply Current			455	mA	

5.2. Transmitter Optical Specifications

Parameter	Min	Typ	Max	Unit	Notes
Optical Output Power	0		4	dBm	5
Centre Wavelength Range	1528.77		1563.86	nm	
Wavelength	$\lambda_T - 100$	$\lambda_T$	$\lambda_T + 100$	pm	6
Spectral Width (-20dB)		0.25		nm	
Extinction Ratio	9.0	10		dB	
Dispersion Penalty			2	dB	

5. Output power coupled into a 9/125  $\mu$ m single-mode fibre  
 6. ITU-T G.694.1 DWDM. For available wavelengths, see section 9

5.3. Receiver Optical Specifications

Parameter	Min	Typ	Max	Unit	Notes
Receiver Sensitivity			-14	dBm	7
Receiver Overload	-1			dBm	7
Receiver Operating Range	1250		1620	nm	

7. Measured with 10.3Gbps PRBS 2<sup>31</sup>-1, BER $\leq$ 10<sup>-12</sup>

6. Transceiver Electrical Pad Layout

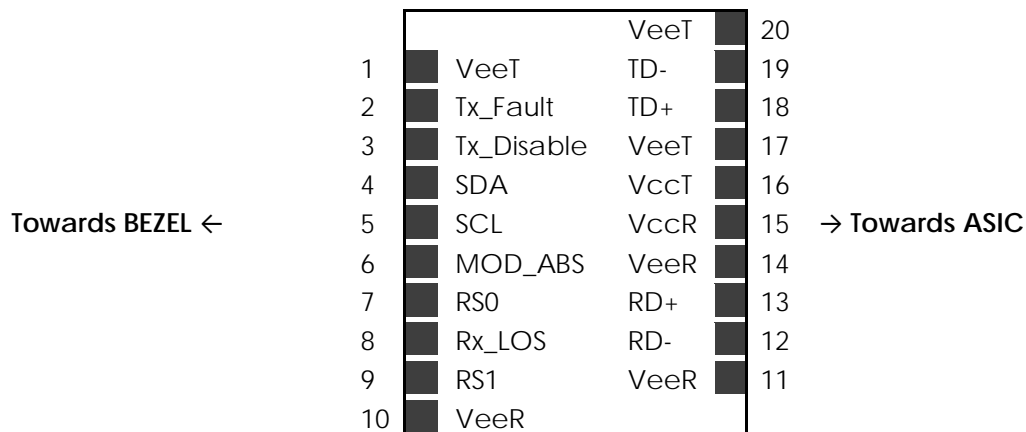


Figure 2. Transceiver Electrical Pad Layout

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-8472)

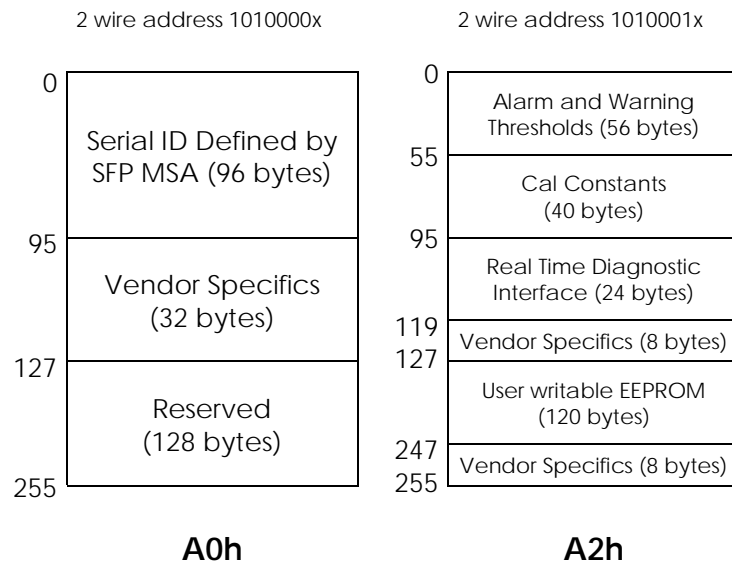


Figure 3. EEPROM of a SFP+



SPD50040100D	SFP+ DWDM Dual Fibre, <b>Tx 1537.4nm</b> (DWDM EML) , Rx (PIN), maximum distance 40km, power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM
SPD51040100D	SFP+ DWDM Dual Fibre, <b>Tx 1536.61nm</b> (DWDM EML) , Rx (PIN), maximum distance 40km, power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM
SPD52040100D	SFP+ DWDM Dual Fibre, <b>Tx 1535.82nm</b> (DWDM EML) , Rx (PIN), maximum distance 40km, power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM
SPD53040100D	SFP+ DWDM Dual Fibre, <b>Tx 1535.04nm</b> (DWDM EML) , Rx (PIN), maximum distance 40km, power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM
SPD54040100D	SFP+ DWDM Dual Fibre, <b>Tx 1534.25nm</b> (DWDM EML) , Rx (PIN), maximum distance 40km, power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM
SPD55040100D	SFP+ DWDM Dual Fibre, <b>Tx 1533.47nm</b> (DWDM EML) , Rx (PIN), maximum distance 40km, power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM
SPD56040100D	SFP+ DWDM Dual Fibre, <b>Tx 1532.68nm</b> (DWDM EML) , Rx (PIN), maximum distance 40km, power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM
SPD57040100D	SFP+ DWDM Dual Fibre, <b>Tx 1531.9nm</b> (DWDM EML) , Rx (PIN), maximum distance 40km, power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM
SPD58040100D	SFP+ DWDM Dual Fibre, <b>Tx 1531.12nm</b> (DWDM EML) , Rx (PIN), maximum distance 40km, power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM
SPD59040100D	SFP+ DWDM Dual Fibre, <b>Tx 1530.33nm</b> (DWDM EML) , Rx (PIN), maximum distance 40km, power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM
SPD60040100D	SFP+ DWDM Dual Fibre, <b>Tx 1529.55nm</b> (DWDM EML) , Rx (PIN), maximum distance 40km, power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM
SPD61040100D	SFP+ DWDM Dual Fibre, <b>Tx 1528.77nm</b> (DWDM EML) , Rx (PIN), maximum distance 40km, power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM

10. Document Revision Information

Revision	Description
A	Initial release
B	Specification updated to include 8x Fiber Channel compatibility

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](mailto:support@skylaneoptics.com)

