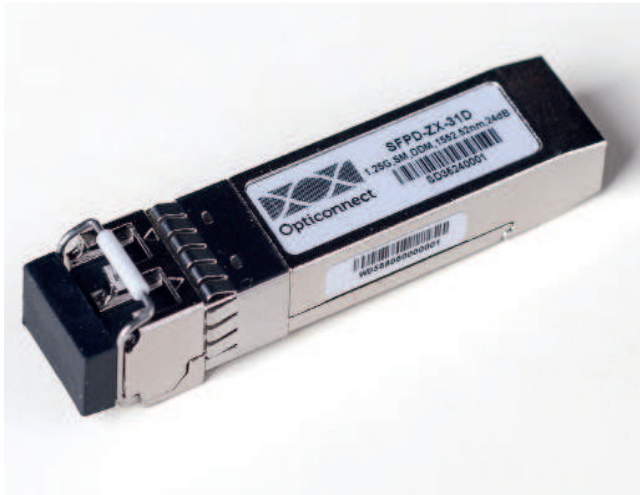


SFPD-ZX Series



SFP Single-Mode, Dual Fiber Transceiver for DWDM Applications



Product Description

The SFPD-ZX-xx series single mode transceiver is small form factor pluggable module for duplex optical data communications. This module is designed for single mode fiber and operates at a nominal DWDM wavelength from 1528.77nm to 1565.50nm as specified by the ITU-T. It is designed to deploy in the DWDM networking equipment in metropolitan access and core networks.

It is with the SFP 20-pin connector to allow hot plug capability. The transmitter section uses a DWDM multiple quantum well DFB laser and is a class 1 laser compliant according to International Safety Standard IEC-60825.

The SFPD-ZX series are designed to be compliant with SFF-8472 Multi-Source Agreement (MSA).

Features

- Up to 1.25. Gbps Data Rate
- 100GHz DWDM ITU Grid C-Band
- Budget up to 37dB
- Digital Diagnostics

Applications

- DWDM networks
- Fast Ethernet, Gigabit Ethernet
- Fiber Channel

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Opticonnect SYSTEMS B.V., an Optical Networking vendor with its headquarters in the Netherlands, provides Optical Transport solutions and Optical Transceivers at the best price performance ratio possible. Our goal is to simplify the planning, deployment and maintenance of

complex Optical Networks. This is achieved by our user friendly planning apps and information, sophisticated products and transparent support. Relying on our superior product quality, all items are supplied with life time warranty.

Ordering Information

Part No.	Data Rate	Laser	Budget	Interface	Temperature
SFPD-ZX-xx ^(note1)	1.25Gbps	DWDM DFB	24dB	LC	Standard
SFPD-EZX-xx ^(note1)	1.25Gbps	DWDM DFB	32dB	LC	Standard
SFPD-XZX-xx ^(note1)	1.25Gbps	DWDM DFB	37dB	LC	Standard

Note1: xx refers to DWDM Wavelength range as ITU-T specified

XX- Channel refers to the following table:

Channel (XX)	Part NO.	Frequency (THz)	Center Wavelength (nm)
15	SFPD-xxx-*15	191.5	1565.50
16	SFPD-xxx-*16	191.6	1564.68
17	SFPD-xxx-*17	191.7	1563.86
18	SFPD-xxx-*18	191.8	1563.05
19	SFPD-xxx-*19	191.9	1562.23
20	SFPD-xxx-*20	192.0	1561.42
21	SFPD-xxx-*21	192.1	1560.61
22	SFPD-xxx-*22	192.2	1559.79
23	SFPD-xxx-*23	192.3	1558.98
24	SFPD-xxx-*24	192.4	1558.17
25	SFPD-xxx-*25	192.5	1557.36
26	SFPD-xxx-*26	192.6	1556.55
27	SFPD-xxx-*27	192.7	1555.75
28	SFPD-xxx-*28	192.8	1554.94
29	SFPD-xxx-*29	192.9	1554.13
30	SFPD-xxx-*30	193.0	1553.33
31	SFPD-xxx-*31	193.1	1552.52
32	SFPD-xxx-*32	193.2	1551.72
33	SFPD-xxx-*33	193.3	1550.92
34	SFPD-xxx-*34	193.4	1550.12
35	SFPD-xxx-*35	193.5	1549.32
36	SFPD-xxx-*36	193.6	1548.51
37	SFPD-xxx-*37	193.7	1547.72
38	SFPD-xxx-*38	193.8	1546.92
39	SFPD-xxx-*39	193.9	1546.12
40	SFPD-xxx-*40	194.0	1545.32
41	SFPD-xxx-*41	194.1	1544.53
42	SFPD-xxx-*42	194.2	1543.73
43	SFPD-xxx-*43	194.3	1542.94
44	SFPD-xxx-*44	194.4	1542.14
45	SFPD-xxx-*45	194.5	1541.35
46	SFPD-xxx-*46	194.6	1540.56
47	SFPD-xxx-*47	194.7	1539.77
48	SFPD-xxx-*48	194.8	1538.98
49	SFPD-xxx-*49	194.9	1538.19
50	SFPD-xxx-*50	195.0	1537.40
51	SFPD-xxx-*51	195.1	1536.61
52	SFPD-xxx-*52	195.2	1535.82
53	SFPD-xxx-*53	195.3	1535.04
54	SFPD-xxx-*54	195.4	1534.25
55	SFPD-xxx-*55	195.5	1533.47
56	SFPD-xxx-*56	195.6	1532.68
57	SFPD-xxx-*57	195.7	1531.90
58	SFPD-xxx-*58	195.8	1531.12
59	SFPD-xxx-*59	195.9	1530.33

60	SFPD-xxx-*60	196.0	1529.55
61	SFPD-xxx-*61	196.1	1528.77

*xxx refers to the type: ZX, EZX or XZX.

Regulatory Compliance

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883G Method 3015.7	Class 1C (>1000V)
Electrostatic Discharge to the Enclosure	EN 55024:1998+A1+A2 IEC-61000-4-2 GR-1089-CORE	Compliant with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN55022:2006 CISPR 22B :2006 VCCI Class B	Compliant with standards Noise frequency range: 30MHz to 6GHz. Good system EMI design practice required to achieve Class B margins. System margins are dependent on customer host board and chassis design.
Immunity	EN 55024:1998+A1+A2 IEC 61000-4-3	Compliant with standards. 1KHz sine-wave, 80% AM, from 80MHz to 1GHz. No effect on transmitter/receiver performance is detectable between these limits.
Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN (IEC) 60825-1:2007 EN (IEC) 60825-2:2004+A1	CDRH compliant and Class I laser product. TüV Certificate No. 50135086
Component Recognition	UL and CUL EN60950-1:2006	UL file E317337 TüV Certificate No. 50135086 (CB scheme)
RoHS6	2002/95/EC 4.1&4.2 2005/747/EC 5&7&13	Compliant with standards*note2

Note 2: For update of the equipments and strict control of raw materials, Opticonnect has the ability to supply the customized products since Jan 1, 2007, which meet the requirements of RoHS6 (Restrictions on use of certain Hazardous Substances) of European Union. In light of item 5 in RoHS exemption list of RoHS Directive 2002/95/EC, Item 5: Lead in glass of cathode ray tubes, electronic components and fluorescent tubes.

In light of item 13 in RoHS exemption list of RoHS Directive 2005/747/EC, Item13: Lead and cadmium in optical and filter glass.

The three exemptions are being concerned for Opticonnect's transceivers, because Opticonnect's transceivers use glass, which may contain Pb, for components such as lenses, windows, isolators, and other electronic components.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T_s	-40	+85	°C
Operating Case Temperature	T_c	0	75	°C
Supply Voltage	V_{CC}	-0.5	3.6	V
Operating Relative Humidity		-	95	%

*Exceeding any one of these values may destroy the device permanently.

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	T_A	0	-	+70	°C
Power Supply Voltage	Vcc	3.15	3.3	3.45	V
Power Supply Current	Icc	-	-	300	mA
Date Rate				1.25G	bps

Performance Specifications - Electrical

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Transmitter						
LVPECL Inputs(Differential)	Vin	400		2000	mVpp	AC coupled inputs*(note4)
Input Impedance (Differential)	Zin	85	100	115	ohm	Rin > 100 kohm @ DC
TX_Dis	Disable	2		Vcc	V	
	Enable	0		0.8		
TX_FAULT	Fault	2		Vcc	V	
	Normal	0		0.8		
Receiver						
LVPECL Outputs (Differential)	Vout	370		2000	mVpp	AC coupled outputs*(note4)
Output Impedance (Differential)	Zout	85	100	115	ohm	
RX_LOS	LOS	2		Vcc	V	
	Normal	0		0.8	V	
MOD_DEF (0:2)	VoH	2.5			V	
	VoL	0		0.8	V	

Performance Specifications – Optical

SFPD-ZX-xx (TOP = -5 to 70 °C, VCC = 3.15 to 3.45V)

Parameter	Symbol	Min.	Typical	Max.	Unit
Data Rate			1.25G		bps
Transmitter					
Center Wavelength	λ	1528		1566	nm
Spectral Width (-20dB)	$\Delta\lambda$			0.3	nm
Channel Spacing	Δf		100		GHz
Deviation From Central Frequency@EOL		-12		12	GHz
Side Mode Suppression Ratio	SMSR	30			dB
Average Output Power*(note5)	Pout	0		5	dBm
Average Launch Power (Tx: OFF)	Poff			-45	dBm
Extinction Ratio*(note6)	ER	8.2			dB
Rise/Fall Time(20%~80%)	tr/tf			160	ps
Output Optical Eye*(note6)	Compatible with IEEE 802.3*(note8)				
TX_Disable Assert Time	t_off			10	us
Pout@TX Disable Asserted	Pout			-45	dBm

Relative Intensity Noise	RIN			-135	dB/Hz
Receiver					
Center Wavelength	λ	1528		1566	nm
Receiver Sensitivity ^{*(note7)}	Pmin			-24	dBm
Receiver Overload	Pmax	-3			dBm
LOS De-Assert	LOSD			-25	dBm
LOS Assert	LOSA	-42			dBm
LOS Hysteresis ^{*(note9)}		0.5			dB

SFPD-EZX-xx ($T_{OP} = -5$ to 70°C , $V_{CC} = 3.15$ to 3.45V)

Parameter	Symbol	Min.	Typical	Max.	Unit
Data Rate			1.25G		bps
Transmitter					
Center Wavelength	λ	1528		1566	nm
Spectral Width (-20dB)	$\Delta\lambda$			0.3	nm
Channel Spacing	Δf		100		GHz
Deviation From Central Frequency@EOL		-12		12	GHz
Side Mode Suppression Ratio	SMSR	30			dB
Average Output Power ^{*(note5)}	Pout	0		5	dBm
Average Launch Power (Tx: OFF)	Poff			-45	dBm
Extinction Ratio ^{*(note6)}	ER	8.2			dB
Rise/Fall Time(20%~80%)	tr/tf			160	ps
Output Optical Eye ^{*(note6)}	Compatible with IEEE 802.3 ^{*(note8)}				
TX_Disable Assert Time	t_off			10	us
P _{out} @TX Disable Asserted	Pout			-45	dBm
Relative Intensity Noise	RIN			-135	dB/Hz
Receiver					
Center Wavelength	λ	1528		1566	nm
Receiver Sensitivity ^{*(note7)}	Pmin			-32	dBm
Receiver Overload	Pmax	-10			dBm
LOS De-Assert	LOSD			-33	dBm
LOS Assert	LOSA	-45			dBm
LOS Hysteresis ^{*(note9)}		0.5			dB

SFPD-XZX-xx ($T_{OP} = -5$ to 70°C , $V_{CC} = 3.15$ to 3.45V)

Parameter	Symbol	Min.	Typical	Max.	Unit
Data Rate			1.25G		bps
Transmitter					
Center Wavelength	λ	1528		1566	nm
Spectral Width (-20dB)	$\Delta\lambda$			0.3	nm
Channel Spacing	Δf		100		GHz
Deviation From Central Frequency@EOL		-12		12	GHz
Side Mode Suppression Ratio	SMSR	30			dB
Average Output Power ^{*(note5)}	Pout	2		7	dBm
Average Launch Power (Tx: OFF)	Poff			-45	dBm
Extinction Ratio ^{*(note6)}	ER	8.2			dB
Rise/Fall Time(20%~80%)	tr/tf			160	ps
Output Optical Eye ^{*(note6)}	Compatible with IEEE 802.3 ^{*(note8)}				

TX_Disable Assert Time	t_off			10	us
P _{out} @TX Disable Asserted	P _{out}			-45	dBm
Relative Intensity Noise	RIN			-135	dB/Hz
Receiver					
Center Wavelength	λ	1528		1566	nm
Receiver Sensitivity ^{*(note7)}	P _{min}			-35	dBm
Receiver Overload	P _{max}	-10			dBm
LOS De-Assert	LOSD			-36	dBm
LOS Assert	LOSA	-45			dBm
LOS Hysteresis ^{*(note9)}		0.5			dB

Note3: Output is coupled into a 9/125 μ m single-mode fiber.

Note4: Filtered, measured with a PRBS 27-1 test pattern @1.25Gbps

Note5: LVPECL logic, internally AC coupled.

Note6: Minimum average optical power measured at BER less than 1E-12, with a 27-1 PRBS and ER=9dB.

Note7: Measured with a PRBS 27-1 test pattern @1.25Gbps, BER $\leq 1 \times 10^{-12}$.

Note8: Eye Pattern Mask

Note9: LOS Hysteresis