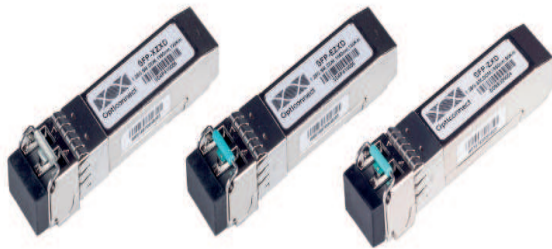


## SFP-ZX, EZX and XZX series



SFP Single-Mode, Dual Fiber Transceiver  
for 1.25Gbps FC/GBE



### Product Description

The SFP-ZX, -EZX AND -XZX series single-mode transceiver is small form factor pluggable module for serial optical data communications such as Gigabit Ethernet 1000BASE-ZX and Fiber Channel 1x SM-LC-L FC-PI. It is with the SFP 20-pin connector to allow hot plug capability. This module is designed for single mode fiber and operates at a nominal wavelength of 1550nm.

The transmitter section uses a multiple quantum well 1550nm DFB laser and is a class 1 laser compliant according to International Safety Standard IEC-60825. The receiver section uses an integrated InGaAs detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC.

The SFP-ZX, -EZX AND -XZX-D series are designed to be compliant with SFF-8472 SFP Multi-Source Multi-Source Agreement (MSA).

### Features

- Up to 4.25Gbps Data Rate
- 1550nm DFB Transmitter
- 80km with 9/125  $\mu$ m SMF
- 120km with 9/125  $\mu$ m SMF
- 160km with 9/125  $\mu$ m SMF
- Digital Diagnostics

### Applications

- Fiber Channel Links
- Gigabit Ethernet Links
- Fast Ethernet Links
- Other Optical Links

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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	Fiber	Distance <sup>*(note2)</sup>	Interface	Temperature	DDMI
SFP-ZX <sup>*(note1)</sup>	1.25Gbps	SMF	80km	LC	0°C~+70°C	NO
SFP-ZXD	1.25Gbps	SMF	80km	LC	0°C~+70°C	YES
SFP-EZX	1.25Gbps	SMF	120km	LC	0°C~+70°C	NO
SFP-EZXD	1.25Gbps	SMF	120km	LC	0°C~+70°C	YES
SFP-XZX	1.25Gbps	SMF	160km	LC	0°C~+70°C	NO
SFP-XZXD	1.25Gbps	SMF	160km	LC	0°C~+70°C	YES

Note1: Standard version

Note2: 80km/120Km with 9/125 μm SMF

## Regulatory Compliance

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883G Method 3015.7	Class 1C (>1000 V)
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 <sup>*(note3)</sup>

Note3: For update of the equipments and strict control of raw materials, Opticonnect has the ability to supply the customized products since Jan 1st, 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, Item 13: 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, isolators and other components.

## Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T <sub>s</sub>	-40	+85	°C
Supply Voltage	V <sub>CC</sub>	-0.5	3.6	V
Operating Relative Humidity		-	95	%

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

## Recommended Operating Conditions

Parameter		Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature		$T_A$	0		+70	°C
Power Supply Voltage		$V_{CC}$	3.15	3.3	3.45	V
Power Supply Current		$I_{CC}$			300	mA
Data Rate	GBE			1.25		Gbps
	FC			1.063		

## Performance Specifications - Electrical

Parameter		Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter							
LVPECL Inputs(Differential)		$V_{in}$	500		2400	mVpp	AC Coupled Inputs*(note4)
Input Impedance (Differential)		$Z_{in}$	85	100	115	ohm	$R_{in} > 100 \text{ kohm @ DC}$
TX Disable	Disable		2		$V_{CC}$	V	
	Enable		0		0.8		
TX FAULT	Fault		2		$V_{CC}+0.3$	V	
	Normal		0		0.5		
Receiver							
LVPECL Outputs (Differential)		$V_{out}$	370		2000	mVpp	AC Coupled Outputs*(note4)
Output Impedance (Differential)		$Z_{out}$	85	100	115	ohms	
RX_LOS	LOS		2		$V_{CC}+0.3$	V	
	Normal		0		0.8	V	
MOD_DEF ( 2:0 )		VoH	2.5			V	With Serial ID
		VoL	0		0.5	V	

## Optical and Electrical Characteristics

### SFP-ZX(D), 80km

Parameter		Symbol	Min.	Typical	Max.	Unit
9µm Core Diameter SMF		L		80		km
Data Rate				1.063/1.25		Gbps
Transmitter						
Center Wavelength		$\lambda_c$	1500	1550	1580	nm
Spectral Width (-20dB)		$\Delta\lambda$			1	nm
Average Output Power*(note5)		$P_{out}$	0		5	dBm
Side Mode Suppression Ratio		SMSR	30			dB
Extinction Ratio*(note6)		ER	9			dB
Rise/Fall Time(20%~80%)		tr/tf			0.26	ns
Total Jitter		TJ			0.43	UI

Output Optical Eye <sup>*(note6)</sup>	Compliant with IEEE 802.3ah-2004 <sup>*(note10)</sup>				
TX Disable Assert Time	t_off			10	□us
P <sub>out</sub> @TX Disable Asserted	P <sub>out</sub>			-45	dBm
Receiver					
Center Wavelength	λ <sub>C</sub>	1260		1600	nm
Receiver Sensitivity <sup>*(note7)</sup>	P <sub>min</sub>			-24	dBm
Receiver Overload	P <sub>max</sub>	-3			dBm
Return Loss		12			dB
Optical Path Penalty <sup>*(note8)</sup>				1	dB
LOS De-Assert	LOSD			-25	dBm
LOS Assert	LOSA	-42			dBm
LOS Hysteresis <sup>*(note9)</sup>		0.5			dB

## SFP-EZX(D), 120km

Parameter	Symbol	Min.	Typical	Max.	Unit
9μm Core Diameter SMF	L		120		km
Data Rate			1.063/1.25		Gbps
Transmitter					
Center Wavelength	λ <sub>C</sub>	1500	1550	1580	nm
Spectral Width (-20dB)	Δλ			1	nm
Average Output Power <sup>*(note5)</sup>	P <sub>out</sub>	0		5	dBm
Side Mode Suppression Ratio	SMSR	30			dB
Extinction Ratio <sup>*(note6)</sup>	ER	9			dB
Rise/Fall Time(20%~80%)	tr/tf			0.26	ns
Total Jitter	TJ			0.43	UI
Output Optical Eye <sup>*(note6)</sup>	Compliant with IEEE 802.3ah-2004 <sup>*(note10)</sup>				
TX Disable Assert Time	t_off			10	□us
P <sub>out</sub> @TX Disable Asserted	P <sub>out</sub>			-45	dBm
Receiver					
Center Wavelength	λ <sub>C</sub>	1260		1600	nm
Receiver Sensitivity <sup>*(note7)</sup>	P <sub>min</sub>			-32	dBm
Receiver Overload	P <sub>max</sub>	-10			dBm
Return Loss		12			dB
Optical Path Penalty <sup>*(note8)</sup>				1	dB
LOS De-Assert	LOSD			-33	dBm
LOS Assert	LOSA	-42			dBm
LOS Hysteresis <sup>*(note9)</sup>		0.5			dB

## SFP-XZX(D), 160km

Parameter	Symbol	Min.	Typical	Max.	Unit
9µm Core Diameter SMF	L		160		km
Data Rate			1.063/1.25		Gbps
Transmitter					
Center Wavelength	$\lambda_c$	1500	1550	1580	nm
Spectral Width (-20dB)	$\Delta\lambda$			1	nm
Average Output Power*(note5)	P <sub>out</sub>	0		5	dBm
Side Mode Suppression Ratio	SMSR	30			dB
Extinction Ratio*(note6)	ER	9			dB
Rise/Fall Time(20%~80%)	tr/tf			0.26	ns
Total Jitter	TJ			0.43	UI
Output Optical Eye*(note6)	Compliant with IEEE 802.3ah-2004*(note10)				
TX Disable Assert Time	t <sub>off</sub>			10	µs
P <sub>out</sub> @TX Disable Asserted	P <sub>out</sub>			-45	dBm
Receiver					
Center Wavelength	$\lambda_c$	1260		1600	nm
Receiver Sensitivity*(note7)	P <sub>min</sub>			-37	dBm
Receiver Overload	P <sub>max</sub>	-10			dBm
Return Loss		12			dB
Optical Path Penalty*(note8)				1	dB
LOS De-Assert	LOSD			-38	dBm
LOS Assert	LOSA	-42			dBm
LOS Hysteresis*(note9)		0.5			dB

Note4: LVPECL logic, internally AC coupled.

Note5: Output is coupled into a 9/125µm single-mode fiber.

Note6: Filtered, measured with a PRBS 27-1 test pattern @1.25Gbps

Note7: Minimum average optical power measured at BER less than 1E-12, with a 27-1 NRZ PRBS and ER=9dB.

Note8: Measured with a PRBS 27-1 test pattern @1.25Gbps, G.652 SMF, BER ≤1×10<sup>-10</sup>.

Note9: LOS Hysteresis

Note10: Eye Pattern Mask