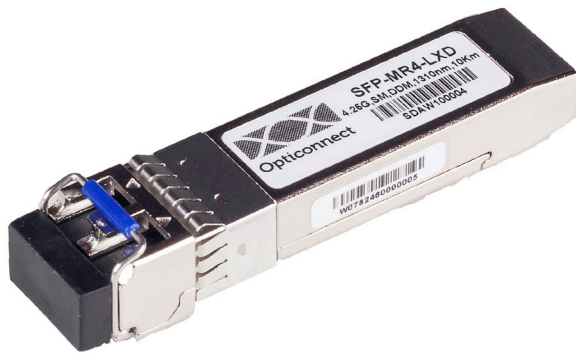


SFP-MR4-LXD and ELXD

SFP Single-Mode, Dual Fiber transceiver for 1GFC/2GFC/4GFC



Product description

The SFP-MR4-LXD series single mode transceiver is small form factor pluggable module for duplex optical data communications such as 4x/2x/1x Fiber Channel and 1000BASE-LX Ethernet. 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 1310nm.

The transmitter section uses a 1310nm multiple quantum well 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-MR4-LXD series are designed to be compliant with SFF-8472 Multi-source Agreement (MSA).

Features

- Data rate up to 4.25Gbps
- 1310nm DFB transmitter
- 10km with 9/125 μ m SMF
- 20km with 9/125 μ m SMF
- Single 3.3V Power supply and TTL Logic Interface
- Hot-Pluggable SFP Footprint
- Duplex LC Connector Interface
- Class 1 FDA and IEC60825-1 laser safety compliant
- Compliant with SFP MSA Specification
- Compliant with SFF-8472
- Digital diagnostics

Applications

- Fiber channel links
- Gigabit ethernet links
- Fast ethernet links
- Other optical links



All product specifications are subject to change without notice to improve reliability, function or design or otherwise.

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	Interface	Temperature	DDMI
SFP-MR4-LXD	4.25Gbps	SMF	10km	LC	Standard	YES
SFP-MR4-ELXD	4.25Gbps	SMF	20km	LC	Standard	YES

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: 30 Hz 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 ^{*note1}

Note 1: 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, 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*note 2

Parameter	Symbol	Min.	Max.	Unit
Storage temperature	T_s	-40	+85	°C
Supply voltage	V_{CC}	-0.5	3.6	V
Operating relative humidity		-	95	%

Note 2: 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 SFP-MR4-LXD	0		+70	°C
Power supply voltage	V_{CC}	3.15	3.3	3.45	V
Power supply current	I_{CC}			300	mA
Data rate			4.25		Gbps

Performance specifications - Electrical

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Transmitter						
CML inputs (differential)	V_{in}	400		1600	mVpp	AC coupled inputs*(note3)
Input impedance (differential)	Z_{in}	85	100	115	ohm	$R_{in} > 100 \text{ kohm}$ @ DC
TX_Dis	Disable	2		$V_{CC} + 0.3$	V	
	Enable	0		0.8		
TX_FAULT	Fault	2		$V_{CC} + 0.3$	V	
	Normal	0		0.5		
Receiver						
CML outputs (differential)	V_{out}	400	800	1200	mVpp	AC coupled output*(note4)
Output impedance (differential)	Z_{out}	85	100	115	ohm	
RX_LOS	LOS	2		$V_{CC} + 0.3$	V	
	Normal	0		0.8	V	
MOD_DEF (0:2)	VoH	2.5			V	With Serial ID
	VoL	0		0.5	V	

Optical and electrical characteristics - SFP-MR4-LXD, 10km

Parameter	Symbol	Min.	Typical	Max.	Unit
9µm Core diameter SMF	L		10		km
Data rate				4.25	Gbps
Transmitter					
Center wavelength	λ_c	1260	1310	1360	nm
Spectral width (-20dB)	$\Delta\lambda$			1	nm
Side mode suppression ratio	SMSR	30			dB

Parameter	Symbol	Min.	Typical	Max.	Unit
Average output power ^{*(note5)}	P _{out}	-8		-3	dBm
Rise/Fall time(20%~80%)	tr/tf			90	ps
Output optical eye ^{*(note6)}	Complies with ANSI FC-PI specification ^{*(note8)}				
TX_Disable assert time	t _{off}			10	μs
P _{out} @TX Disable asserted	P _{out}			-45	dBm
Receiver					
Center wavelength	λ _c	1260		1600	nm
Receiver sensitivity ^{*(note7)}	4GFC	P _{min}		-18	dBm
	2GFC			-21	
	1GFC			-22	
Receiver overload	P _{max}	-3			dBm
Reflection				-27	dB
LOS De-Assert	LOSD			-19	dBm
LOS assert	LOSA	-35			dBm
LOS hysteresis ^{*(note9)}		0.5			dB

SFP-MR4-ELXD, 20km

Parameter	Symbol	Min.	Typical	Max.	Unit
9μm Core diameter SMF	L		20		km
Data rate				4.25	Gbps
Transmitter					
Center wavelength	λ _c	1260	1310	1360	nm
Spectral width (RMS)	Δλ			1	nm
Side mode suppression ratio	SMSR	30			dB
Average output power ^{*(note5)}	P _{out}	-5		0	dBm
Rise/Fall time(20%~80%)	tr/tf			90	ps
Output optical eye ^{*(note6)}	Complies with ANSI FC-PI specification ^{*(note8)}				
TX_Disable assert time	t _{off}			10	μs
P _{out} @TX Disable asserted	P _{out}			-45	dBm
Receiver					
Center wavelength	λ _c	1260		1600	nm
Receiver sensitivity ^{*(note7)}	4GFC	P _{min}		-18	dBm
	2GFC			-21	
	1GFC			-22	
Receiver overload	P _{max}	-3			dBm
Reflection				-27	dB
LOS De-Assert	LOSD			-19	dBm

Parameter	Symbol	Min.	Typical	Max.	Unit
LOS assert	LOSA	-35			dBm
LOS hysteresis*(note9)		0.5			dB

Note3: LVPECL logic, internally AC coupled and terminated to 100 differential loads.

Note4: CML logic, internally AC coupled.

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

Note6: Filtered, measured with a PRBS 2⁷-1 test pattern @4.25Gbps

Note7: Minimum average optical power at BER less than 1E-12, with a 2⁷-1 NRZ PRBS.

Note8: Eye pattern mask

Note9: LOS hysteresis

