

## XFP-SR

XFP Multi-Mode, Dual Fiber transceiver for 10GbE/10GFC/SDH/ SONET



### Product description

The XFP-SR is a multi-purpose optical transceiver module for 10Gbit/s data transmission applications at 850nm. It is ideally suited for 10 GbE datacom (belly-to-belly for high density applications) and storage area network(SAN/NAS) applications based on the IEEE 802.3ae and Fiber Channel standards designed for short range distances, the transceiver module comprises a transmitter with a vertical cavity surface emitting laser (VCSEL) and a receiver with a PIN photodiode. Transmitter and receiver are separate within a wide temperature range and offers optimum heat dissipation and excellent electromagnetic shielding thus enabling high port densities for 10 GbE systems.

### Features

- Data Rate 9.95 Gb/s to 11.3 Gb/s
- Distance 300 m
- Low power consumption 1.5W(typ.)
- LC duplex connector
- Laser Class 1M compliant
- Vertical Cavity Surface Emitting Laser at 850nm(VCSEL)
- XFI loopback supported
- Compliant with MSA
- Digital Diagnostics

### Applications

- OC192/ STM 64
- 10GBASE-ZR/ZW 10G Ethernet
- 1200-SM-LL-L 10G Fiber Channel



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

Product code	Product description
XFP-SR	XFP Module, 10Gbps 10 Gigabit ethernet, fiber channel 10 Gbps, 850 nm, LC connector, 300m distance/budget, with digital diagnostics

## Regulatory compliance\*<sup>Note2</sup>

Product Certificate	Certificate Number	Applicable Standard
TUV	R50135086	EN 60950-1:2006+A11+A1+A12 EN 60825-1:2007 EN 60825-2:2004+A1+A2
UL	E317337	UL 60950-1 CSA C22.2 No. 60950-1-07
EMC CE	AE 50285865 0001	EN 55022:2010 EN 55024:2010
CB	JPTUV-049251	IEC 60825-1 IEC 60950-1
FCC	WTF14F0514437E 47	CFR PART 15 OCT., 2013
FDA	1331340-000	CDRH 1040.10
ROHS	RHS01G006464	2011/65/EU

Note2: The above certificate number updated to June 2014, because some certificate will be updated every year, such as FCC, FDA and ROHS. For the latest certification information, please check with Opticonnect.

Standard	Description	Nominal Baud Rate	Unit
IEEE 802.3ae-2002	10 GBASE-SW	9.953	GBd
IEEE 802.3ae-2002	10 GBASE-SR	10.3125	GBd
1200-Mxx-SN-I	10G Fiber Channel	10.51875	GBd

## Absolute maximum ratings

Rating	Conditions	Symbol	Min	Max	Units
Storage ambient temperature range			-40	+85	°C
Operating relative humidity		RH	8	80	%
Supply voltage range @ 5.0V		$V_{C5}$	0.5	6.0	V
Supply voltage range @ 3.3V		$V_{C3}$	0.5	3.6	V
Open drain VCC level		$V_O$		4.0	V
Static discharge voltage on XFI high	HBM human body model per JEDEC JESD22-A114-B			500	V
Static discharge voltage excluding XFI high speed pins	HBM human body model			2,000	V
Static discharge voltage on XFP module	EN61000-4-2 Criterion B: Air discharge direct contact discharge			15,000 8,000	V V

\*Any stress beyond the maximum ratings can result in permanent damage. The device specifications are guaranteed only under the recommended operating conditions

## Recommend operating condition

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Operating case temperature range	XFP-SR	$T_C$	0		+70	°C
Transceiver total power consumption		$P_{TOT}$		1.5	2.3	W
Power supply voltage @ 3.3V		$V_{C3}$	3.135	3.300	3.465	V
Supply current	@ $V_{C3}$	$I_{VCC3}$		325	600	mA

## High speed line characteristics

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Baud rate nominal			9.95		11.3	Gbd
Baud rate tolerance			-100		+100	ppm

## High speed line output-DC characteristics

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Single ended output impedance		$Z_{SE}$	40	50	60	$\Omega$
Differential output impedance		$Z_O$	80	100	120	$\Omega$

## High speed line output-AC characteristics

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Differential output amplitude		$V_{OSPP}$	340		850	mV
Output common mode		$V_{CM}$	0		3.6	V
Transition time low to high		$t_r$	24			ps
Transition time high to low		$t_f$	24			ps
Differential output return loss	0.05 – 0.1GHz		20			dB
	0.1 – 5.5GHz		8			dB
	5.5 – 12GHz		See1			
Common mode output return loss See 2 Loss <sup>2</sup> )	0.1—15GHz	SCC 22	3			dB
Total Peak-to-peak Jitter		$D_j$			0.34	UI
Output AC Common Mode Voltage					15	mV (RMS)

1.  $SDD22(dB)=8-20.66 \log_{10}(f15.5)$  with fin GHz

2. Common mode reference impedance is 25 $\Omega$ . Common mode return loss helps absorb reflection and noise improving EMI.

## High speed line input-DC characteristics

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Differential output impedance		$R_{IND}$	80	100	120	$\Omega$
Input AC common mode input voltage			0		25	mV (RMS)
Source to sink DC potential difference		$V_{CM}$	0		3.6	V

## High speed line input-AC characteristics

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Differential input voltage swing		$V_D$	120 *Note2			mV
Differential return loss	0.05—0.1GHz 0.1—5.5GHz 5.5—12GHz	SDD11	20 8 *Note1			dB
Common mode return loss	0.1—15GHz	SCC11	3			dB
Total Jitter		$T_J$			TBD	UI

Note1:  $SDD11(dB)=8-20.66 \log_{10}(f/15.5)$  with f in GHz

Note2: Beneath this level the signal can't meet the specification

## Optical transmitter

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Nominal wavelength		$\lambda_{TRP}$	840	850	860	nm
Spectral width		$\lambda$		0.4	0.45	nm
Operating range	62.5/125 $\mu$ m MMF, 160 MHz*km				26	m
	50/125 $\mu$ m MMF, 400 MHz*km				66	
	62.5/125 $\mu$ m MMF, 200 MHz*km				33	
	50/125 $\mu$ m MMF, 500 MHz*km				82	
	50/125 $\mu$ m MMF, 2000MHz*km				300	
Nominal signalling speed		$f_{OPT}$	9.95		10.71	Gbps
Average launch power		$P_o$	-7.3	-2.6	-1	dBm
Extinction ratio		ER	3.5	5.5		dB
Transmitter and dispersion penalty		TDP			3.9	dB
Relative intensity noise		RIN			-128	dB/Hz



Optical receiver

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Center wavelength		$I_C$	840	850	860	nm
Receiver sensitivity	BER $10^{-12}$ @ $2^{31}-1^1$	$P_N$		-13.5	-11.1	dBm
Receiver sensitivity	in OMA				-11.1	
Stressed receiver sensitivity	in OMA	$P_N$			-7.5	dBm
Saturation input power		$P_{SAT}$	1			dBm

1. With ideal transmitter

Note: The specified characteristics are met within the recommended range of operating conditions and under the default settings of output power and modulation amplitude.. A change in setting of the optical output power influences especially the dynamic behavior of the output signal. Unless otherwise noted typical data are quoted at nominal voltages and +25°C ambient temperature.