

SPP-SR



SFP+ Multi-Mode, Dual Fiber transceiver, with Digital Diagnostics for 10G BASE-SW/SR, 0.6~10Gb/s



Product description

The SPP-SR series multi-mode transceiver is SFP+ module for duplex optical data communications such as 10GBASE-SR and 10GBASE-SW. It is with the SFP+ 20-pin connector to allow hot plug capability. Digital diagnostic functions are available via an I2C. This module is designed for multi-mode fiber and operates at a nominal wavelength of 850 nm.

The transmitter section uses a Vertical Cavity Surface Emitted Laser (VCSEL) and is a Class 1 laser compliant according to International Safety Standard IEC 60825. The receiver section uses an integrated GaAs detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC.

Features

- Data rate up to 10.3Gbps
- 850nm VCSEL transmitter
- Distance up to 300m @50 / 125 um MMF
- Single 3.3V power supply and TTL logic interface
- Duplex LC connector interface, hot plug-gable
- Compliant with MSA SFP+ specification SFF-8431
- Compliant with IEEE 802.3ae 10GBASE-SR/SW
- Power dissipation < 1.0W
- Dispersion tolerance up to 40ps/nm over G.651
- Operating case temperature:
Standard: 0 °C ~+70 °C
Extended: -10 °C ~+85 °C

Applications

- 10GBASE-SW at 9.953Gbps
- 10GBASE-SR at 10.3125Gbps
- Other optical link



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	Laser	Fiber type	Distance	Interface	Temp.	DDMI
SPP-SR	9.95Gbps to 10.3Gbps	850nm VCSEL	MMF	300m	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 MHz to 6 GHz. Good system EMI design practice required to achieve Class B margins. System margins depend 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 80 MHz to 1 GHz. 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 meets 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 ^{*note2}

Parameter	Symbol	Min.	Max.	Unit
Storage temperature	T _s	-40	+85	°C
Supply voltage	V _{CC}	-0.5	3.6	V
Input voltage	V _{in}	-0.5	V _{CC}	V
Output current	I _o	-	50	mA

Note2: exceeding any one of these values may destroy the device permanently

Recommended operating conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating case temperature	T _c	SPP-SR	0	70	°C
		SPP-SR-I	-10	85	
Power supply voltage	V _{CC}	3.15	3.3	3.45	V
Power supply current	I _{CC}			300	mA
Surge current	I _{Surge}			+30	mA
Baud rate	10GBASE-SR		10.31		Gbps
	10GBASE-SW		9.95		

Performance specifications – Electrical

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Transmitter						
CML inputs (differential)	V _{in}	150		1200	mVpp	AC coupled inputs
Input impedance (differential)	Z _{in}	85	100	115	ohms	R _{in} > 100 kohms @ DC
Tx_DISABLE input voltage – high		2		V _{CC} +0.3	V	
Tx_DISABLE input voltage – low		0		0.8	V	
Tx_FAULT output voltage – high		2		V _{CC} +0.3	V	I _o = 400µA; Host V _{CC}
Tx_FAULT output voltage – low		0		0.8	V	I _o = -4.0mA
Receiver						
CML outputs (differential)	V _{out}	350		700	mVpp	AC coupled outputs
Output impedance (differential)	Z _{out}	85	100	115	ohms	
Rx_LOS output voltage – high		2		V _{CC} +0.3	V	I _o = 400µA; Host V _{CC}
Rx_LOS output voltage – low		0		0.8	V	I _o = -4.0mA
MOD_DEF (2:0)	VoH	2.5			V	With Serial ID
	VoL	0		0.5	V	

Optical and electrical characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit
50 / 125 um MMF			300		m
Data rate			10.3125		Gbps
Transmitter					
Centre wavelength	λ_c	840	850	860	nm
Spectral width (RMS)	$\Delta\lambda$			0.45	nm
Average output power	P_{out}	-6		-1	dBm
Extinction ratio	ER	3.0	5.0		dB
Output optical eye		IEEE 802.3-2005 Compliant			
Transmitter dispersion penalty	TDP			3.9	dB
Input differential impedance	Z_{IN}	90	100	110	Ω
TX_Disable assert time	t_{off}			10	μs
TX_DISABLE negate time	t_{on}	-	-	1	ms
TX_BISABLE time to start reset	t_{reset}	10	-	-	μs
Time to initialize, include reset of TX_FAULT	t_{init}	-	-	300	ms
TX_FAULT from fault to assertion	t_{fault}	-	-	100	μs
Total jitter	TJ	-	-	0.28	UI(p-p)
Data dependant jitter	DDJ	-	-	0.1	UI(p-p)
Uncorrelated jitter	UJ	-	-	0.023	RMS
Receiver					
Centre wavelength	λ_c	840	850	860	nm
Receiver sensitivity	P_{min}			-11.1	dBm
Output differential impedance	R_{IN}	90	100	110	Ω
Receiver overload ^{*note3}	P_{max}	-1			dBm
Optical return loss	ORL			-12	dB
LOS De-Assert	LOS_D			-12.5	dBm
LOS assert	LOS_A	-25			dBm
LOS hysteresis		0.5			dB
LOS	High		2.0	$V_{cc}+0.3$	V
	Low		0	0.8	

Note3: Measured with a PRBS 2³¹ -1 test pattern @ 10.3125Gbps, BER ≤ 10⁻¹²