

SPP-LR



1310nm SFP+ single-Mode Transceiver, With Diagnostic Monitoring
10G BASE-LW/LR, 0.6~10Gb/s CPRI/OBSAI
Duplex SFP+ Transceiver, RoHS 6 Compliant



Product Description

The SPP-LR series single mode transceiver is small form factor pluggable module for serial optical data communications such as IEEE 802.3ae 10GBASE-LR/LW. 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 1310 nm. The transmitter section uses a 1310nm multiple quantum well 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.

Features

- Operating data rate up to 11.1Gbps
- 1310nm DFB-LD Transmitter
- Distance up to 10km
- Single 3.3V Power supply and TTL Logic Interface
- Duplex LC Connector Interface
- Hot Pluggable
- Power Dissipation < 1.0W
- Compliant with MSA SFP+ Specification SFF-8431
- Compliant with IEEE 802.3ae 10GBASE-LR/LW
- Operating Case Temperature Standard: -5 °C ~+70 °C

Applications

- 10GBASE-LR at 10.31Gbps
- 10GBASE-LW at 9.95Gbps
- OBSAI rates 6.144 Gb/s, 3.072 Gb/s, 1.536 Gb/s, 0.768Gb/s
- CPRI rates 9.830 Gb/s, 7.373Gb/s, 6.144 Gb/s, 4.915 Gb/s, 2.458 Gb/s, 1.229 Gb/s, 0.614Gb/s
- 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	Laser	Fiber Type	Distance	Inter- face	Temp.	DDMI
SPP-LR	0.614Gbps to 11.1Gbps	1310nm DFB	SMF	10km	LC	Standard	YES

Regulatory Compliance

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 50135430 0001	EN 55022:2006
		EN 55024:1998+A1+A2
CB	JPTUV-024038-M1	IEC 60825-2
		IEC 60950-1
FCC	WTF13F0503735E	47 CFR PART 15 OCT., 2010
	WTF13F0503732E	47 CFR PART 15 OCT., 2010
FDA	1230816-000	CDRH 1040.10
ROHS	RLSZF00163462	2011/65/EU

Absolute Maximum Ratings ^{*note1}

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

Note1: 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-LR	-5		+70	°C
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			0.6		11.1	Gbps

Performance Specifications – Electrical

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Transmitter						
CML Inputs(Differential)	Vin	150		1200	mVpp	AC coupled inputs
Input AC Common Mode Voltage		0		25	mV	RMS
Input Impedance (Differential)	Zin	85	100	115	ohm	Rin > 100 kohms @ DC
Differential Input S-parameter	S _{DD} 11	-	-	-10	dB	
Differential to Common Mode Conversion	S _{CD} 11	-	-	-10	dB	
Tx_DISABLE Input Voltage – High		2		3.45	V	
Tx_DISABLE Input Voltage – Low		0		0.8	V	
Tx_FAULT Output Voltage – High		2			V	Io = 400µA; Host Vcc
Tx_FAULT Output Voltage – Low		0		0.5	V	Io = -4.0mA
Receiver						
CML Outputs (Differential)	Vout	350		700	mVpp	AC coupled outputs
Output AC Common Mode Voltage		0		15	mV	RMS
Output Impedance (Differential)	Zout	90	100	110	ohm	
Differential Output S-parameter	S _D 22	-	-	-10	dB	
Rx_LOS Output Voltage – High		2			V	Io = 400µA; Host Vcc
Rx_LOS Output Voltage – Low		0		0.8	V	Io = -4.0mA
MOD_DEF (0:2)	VoH	2.5			V	With Serial ID
	VoL	0		0.5	V	

Performance Specifications – Optical

Parameter	Symbol	Min.	Typical	Max.	Unit
9µm Core Diameter SMF			10		Km
Data Rate		0.6		11.1	Gbps
Transmitter					
Centre Wavelength	λ _C	1270	1310	1355	nm
Spectral Width (-20dB)	Δλ			1	nm
Average Output Power ^{*note2}	P _{out}	-6		0	dBm

Extinction Ratio	ER	3.5			dB
Average Power of OFF Transmitter	P_{off}			-30	dBm
Side Mode Suppression Ratio	SMSR	30			dB
Transmitter Dispersion Penalty	TDP			3.2	dB
Input Differential Impedance	Z_{IN}	90	100	110	Ω
TX Disable Assert Time	t_{off}	-	-	10	us
TX_DISABLE Negate Time	t_{on}	-	-	1	ms
TX_BISABLE time to start reset	t_{reset}	10	-	-	us
Time to initialize, include reset of TX_FAULT	t_{init}	-	-	300	ms
TX_FAULT from fault to assertion	t_{fault}	-	-	100	us
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	1260		1565	nm
Sensitivity ^{*note3}	P_{min}			-14.4	dBm
Receiver Overload	P_{max}	0.5			dBm
Optical Return Loss	ORL			-12	dB
LOS De-Assert	LOS_D			-16	dBm
LOS Assert	LOS_A	-28			dBm
LOS	High		2.0		$V_{CC}+0.3$
	Low		0		0.8

Note3: Output is coupled into a 9/125um SMF. The -4.7dBm is reference IEEE 802.3ae, the typical value is -1dBm.

Note4: Minimum average optical power measured at the BER less than 1E-12, back to back. The measure pattern is PRBS 231-1.