

SPPD-ER



SFP+ Single-Mode, Dual Fiber DWDM transceiver for 10GbE/10GFC/SDH/SONET



Product description

The SPPD-ER-XX series single mode transceiver is small form factor pluggable module for duplex optical data communications. This module is designed for single mode fiber and operates at a nominal DWDM wavelength from 1528.77nm to 1563.86nm as specified by the ITU-T. It is designed to deploy in the DWDM networking equipment in metropolitan access and core networks.

It is with the SFP+ 20-pin connector to allow hot plug capability. The transmitter section uses a DWDM EML laser and is a class 1 laser compliant according to International Safety Standard IEC-60825. The receiver section uses a PIN detector and a limiting post-amplifier IC.

The SPPD-ER series are designed to be compliant with SFP+ Multi-Source Agreement (MSA) Specification SFF-8431.

Features

- Data Rate up to 10Gbit/s
- Available in all C-band wavelenghts on the 100GHz DWDM ITU Grid, C
- Distance 40 km
- Hot pluggable SFP footprint
- Duplex LC Connector
- Digital diagnostics

Applications

- 10GBASE-ER/EW 10G ethernet
- 1200-SM-LL-L 10G Fiber channel
- SDH STM S-64.2b



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	Power budget ^{*(note2)}	CDR	Case temperature
SPPD-ER-xx ^{*(note1)}	9.953~11.1 Gbps	DWDM EML	14dB	NO	0°C to 70°C

Note1: xx refers to DWDM Wavelength channel as ITU-T specified, please refer the following table for detailed center wavelength information.

Note 2: Over the G.652 SMF

xx - Channel refers to the following table:

*Channel (xx)	Part no.	Frequency (THz)	Center wavelength (nm)
15	SPPD-ER-15	191.5	1565.50
16	SPPD-ER-16	191.6	1564.68
17	SPPD-ER-17	191.7	1563.86
18	SPPD-ER-18	191.8	1563.05
19	SPPD-ER-19	191.9	1562.23
20	SPPD-ER-20	192.0	1561.42
21	SPPD-ER-21	192.1	1560.61
22	SPPD-ER-22	192.2	1559.79
23	SPPD-ER-23	192.3	1558.98
24	SPPD-ER-24	192.4	1558.17
25	SPPD-ER-25	192.5	1557.36
26	SPPD-ER-26	192.6	1556.55
27	SPPD-ER-27	192.7	1555.75
28	SPPD-ER-28	192.8	1554.94
29	SPPD-ER-29	192.9	1554.13
30	SPPD-ER-30	193.0	1553.33
31	SPPD-ER-31	193.1	1552.52
32	SPPD-ER-32	193.2	1551.72
33	SPPD-ER-33	193.3	1550.92
34	SPPD-ER-34	193.4	1550.12
35	SPPD-ER-35	193.5	1549.32
36	SPPD-ER-36	193.6	1548.51
37	SPPD-ER-37	193.7	1547.72
38	SPPD-ER-38	193.8	1546.92
39	SPPD-ER-39	193.9	1546.12
40	SPPD-ER-40	194.0	1545.32
41	SPPD-ER-41	194.1	1544.53
42	SPPD-ER-42	194.2	1543.73
43	SPPD-ER-43	194.3	1542.94

*Channel (xx)	Part no.	Frequency (THz)	Center wavelength (nm)
44	SPPD-ER-44	194.4	1542.14
45	SPPD-ER-45	194.5	1541.35
46	SPPD-ER-46	194.6	1540.56
47	SPPD-ER-47	194.7	1539.77
48	SPPD-ER-48	194.8	1538.98
49	SPPD-ER-49	194.9	1538.19
50	SPPD-ER-50	195.0	1537.40
51	SPPD-ER-51	195.1	1536.61
52	SPPD-ER-52	195.2	1535.82
53	SPPD-ER-53	195.3	1535.04
54	SPPD-ER-54	195.4	1534.25
55	SPPD-ER-55	195.5	1533.47
56	SPPD-ER-56	195.6	1532.68
57	SPPD-ER-57	195.7	1531.90
58	SPPD-ER-58	195.8	1531.12
59	SPPD-ER-59	195.9	1530.33
60	SPPD-ER-60	196.0	1529.55
61	SPPD-ER-61	196.1	1528.77

*:Please contact with Opticonnect the channel you need for the further detail.

Regulatory compliance

Feature	Standard	Performance
Electrostatic discharge (ESD) to the electrical pins	MIL-STD-883G Method 3015.7	Class 1C (>1000V)
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 10X.10 and 10X.11 EN (IEC) 60825-1: 2007 EN (IEC) 60825-2: 2004+A1	CDRH compliant and Class I laser product. TüV Certificate No. 50135086

Feature	Standard	Performance
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 ^{*note3}

Absolute maximum ratings*

Parameter	Symbol	Min.	Max.	Unit
Storage temperature	Ts	-40	+85	°C
Supply voltage	Vcc	-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 SPPD-ER-XX	0		+70	°C
Power supply voltage	V _{CC}	3.15	3.3	3.45	V
Power supply current	I _{CC}		350	435	mA
Data rate	SPPD-ER-XX	9.953		11.1	Gbps

Performance specifications – Electrical (T_{OP} = 0 to 70 °C, V_{CC} = 3.15 to 3.45V)

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Transmitter						
CML inputs (differential)	Vin	250		1000	mVpp	AC coupled input ^{*(note3)}
Input impedance (differential)	Zin	85	100	115	ohm	Rin > 100 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)	Vout	350		700	mVpp	AC coupled output ^{*(note3)}
Output impedance (differential)	Zout	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	

Performance specifications – Optical ($T_{OP} = 0$ to $70^{\circ}C$, $V_{CC} = 3.15$ to $3.45V$)

Parameter	Symbol	Min.	Typical	Max.	Unit
Data rate		9.953		11.1	Gbps
Transmitter					
Center wavelength spacing			100		GHz
			0.8		nm
Side mode suppression ratio	SMSR	30			dB
Average output power*(note4)	Pout	-1		4	dBm
Average launch power (Tx: OFF)	Poff			-30	dBm
Extinction ratio SPPD-ER	ER	3.5			dB
Transmitter dispersion penalty @800ps/nm	TDP			2	dB
Pout@TX Disable asserted	Pout			-45	dBm
Relative intensity noise	RIN			-128	dB/Hz
TX jitter	TXj	Per 802.3ae requirements			
Receiver					
Receiver sensitivity*(note5)	Pmin			-15	dBm
Receiver overload	Pmax	-1			dBm
LOS De-Assert	LOSD			-17	dBm
LOS assert	LOSA	-29			dBm
LOS hysteresis		1			dB

Note3: CML logic, internally AC coupled.

Note4: Output is coupled into a 9/125µm single-mode fiber.

Note5: Minimum average optical power measured at the BER less than 1E-12. The measure pattern is PRBS 2³¹-1.

SFP+ Transceiver Electrical Pad Layout

