SPPS-ER

SFP+ Single-Mode, Single Fiber Transceiver,
With Digital Diagnostics

Features

- Up to 10 Gbit/s Data Rate
- Power Budget 16dB at least
- Compliant with MSA SFP+ Specification SFF-8431
- Compliant with IEEE 802.3ae 10GBASE-ER/EW

Applications

- 10GBASE-BX at 10.3125 Gb/s
- 10GBASE-BX at 9.953 Gb/s
- 8XFC at 8.5Gbps
- 4XFC at 4.25Gpbs
- 2XFC at 2.125Gpbs
- 1XFC at 1.0625Gbps

Product Description

The SPPS-ER single mode transceiver is small form factor pluggable module for serial optical data communications such as IEEE 802.3ae 10GBASE-ER/EW and 8.5 Gbps Fibre Channel over a single fiber. It is with the SFP+ 20-pin connector to allow hot plug capability.

The SPPS-ER-2733 module is designed for single mode fiber and operates at a nominal wavelength of 1270nm; SPPS-ER-3327 module is designed for single mode fiber and operates at a nominal wavelength of 1330nm The transmitter section uses a 1330nm or 1270nm 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.

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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	Temp.	Power budget	Interface	DDMI
SPPS-ER-2733	10.3Gbps	1270nm DFB	Standard	16dB	LC	YES
SPPS-ER-3327	10.3Gbps	1330nm DFB	Standard	16dB	LC	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

Note1: 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, Item 13: 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, isolators, and other electronic components.

Absolute Maximum Ratings*

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	TS	-40	+85	°C
Operating Case Temperature	SPPS-ER-2733/3327	0	70	°C
Supply Voltage	VCC	-0.5	3.6	V

*Note2: Exceeding any one of these values may destroy the device permanently.

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Power Supply Voltage	V_{CC}	3.15	3.3	3.45	V
Power Supply Current	I_{CC}			430	mA
Surge Current	I_{Surge}			+30	mA
Operating Case Temperature	SPPS-ER-2733		0	70	°C
Baud Rate					GBaud

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Transmitter						
CML Inputs(Differential)	Vin	150		1200	mVpp	AC coupled inputs
Input Impedance (Differential)	Zin	85	100	115	ohms	Rin > 100 kohms @ DC
Tx_DISABLE Input Voltage - High		2		Vcc+0.3	V	
Tx_DISABLE Input Voltage - Low		0		0.8	V	
Tx_FAULT Output Voltage - High		2		Vcc+0.3	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 Impedance (Differential)	Zout	85	100	115	ohms	
Rx_LOS Output Voltage - High		2		Vcc+0.3	V	Io = 400µA; Host Vcc
Rx_LOS Output Voltage - Low		0		0.8	V	Io = -4.0mA
MOD_DEF (2:0)	VoH	2.5			V	With Serial ID
	VoL	0		0.5	V	

Optical and Electrical Characteristics - SPPS-ER-3327

Parameter	Symbol	Min.	Typical	Max.	Unit
Power budget		16			dB
Data Rate			9.953/10.3125		Gbps
Transmitter					
Centre Wavelength	λ_C	1260	1270	1280	nm
Spectral Width (-20dB)	$\Delta\lambda$			1	nm
Average Output Power*note3	$P_{out, AVG}$	1		5	dBm
Extinction Ratio	ER	3.5			dB
Side Mode Suppression Ratio	SMSR	30			dB
Transmitter and Dispersion Penalty	TDP			2	dB
Average Power of OFF Transmitter				-30	dBm
Relative Intensity Noise	RIN			-128	dB/Hz

Input Differential Impedance		ZIN	90	100	110	Ω
TX Disable	Disable		2.0		Vcc+0.3	V
	Enable		0		0.8	
TX Fault	Fault		2.0			V
	Normal		0		0.8	
TX Disable Assert Time		t_off			10	us
Receiver						
Centre Wavelength		λC	1320		1340	nm
Sensitivity*note4		PIN			-15	dBm
Receiver Overload		PMAX	0.5			dBm
Output Differential Impedance		PIN	90	100	110	Ω
LOS De-Assert		LOSD			-18	dBm
LOS Assert		LOSA	-30			dBm
LOS	High		2.0			V
	Low		0		0.8	

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Parameter		Symbol	Min.	Typical	Max.	Unit
Power budget			16			dB
Data Rate				9.953/10.3125		Gbps
Transmitter						
Centre Wavelength		λ_C	1320	1330	1340	nm
Spectral Width (-20dB)		Δλ			1	nm
Average Output Power*note3		$P_{out, AVG}$	1		5	dBm
Extinction Ratio		ER	3.5			dB
Side Mode Suppression Ratio		SMSR	30			dB
Transmitter and Dispersion Penalty		TDP			2	dB
Average Power of OFF Transmitter					-30	dBm
Relative Intensity Noise		RIN			-128	dB/Hz
Input Differential Impedance		Z_{IN}	90	100	110	Ω
TX Disable	Disable		2.0		Vcc+0.3	V
	Enable		0		0.8	
TX Fault	Fault		2.0		V_{CC}+0.3	V
	Normal		0		0.8	
TX Disable Assert Time		t_off			10	us
Receiver						
Centre Wavelength		λ_C	1260		1280	nm
Sensitivity*note4		PIN			-15	dBm
Receiver Overload		P_{MAX}			0.5	dBm
Output Differential Impedance		P_{IN}	90	100	110	Ω
LOS De-Assert		LOS_D			-18	dBm
LOS Assert		LOS_A	-30			dBm
LOS	High		2.0		V_{CC}+0.3	V
	Low		0		0.8	

*Note3: Output is coupled into a 9/125um SMF.
*Note4: Measured with worst ER, BER less than 1E-12 and PRBS 2^{31}-1 at 10.3125Gbps.