SPS-4341W-CXX0G **(RoHS Compliant)**

8.5 Gb/s / CWDM / 40 km Digital Diagnostic LC SFP+ SINGLE-MODE TRANSCEIVER

FEATURES

- Up to 8.5 Gbps Bi-directional Data Links
- Complaint to SFP+ MSA
- Compliance with Fibre Channel FC-PI-4 800-SM-LC-L
- Compliant with 4G and, 2G Fibre Channel
- 8 Wavelength (λ): 1470 nm to 1610 nm CWDM EML Transmitter
- Distance up to 40 km
- SFF-8472 Digital Diagnostic Function
- AC/AC Coupling according to MSA
- Single +3.3 V Power Supply
- RoHS 6/6 Compliant
- 0 to 70°C Operating
- Class 1 Laser International Safety Standard IEC-60825 Compliant

APPLICATIONS

- Multi-rate 8x / 4x / 2x Fibre Channel
- Gigabit Ethernet

DESCRIPTION

The SPS-4341W-CXX0G series single mode transceiver is small form factor pluggable module for bi-directional serial optical data communications such as 8x/4x/2x Fibre Channel. It is with the SFP 20-pin connector to allow hot plug capability. Digital diagnostic functions are available via an I^2C. This module is designed for single mode fiber and operates at a nominal wavelength of CWDM wavelength. There are eight center wavelengths available from 1470 nm to 1610 nm, with each step 20 nm. A guaranteed minimum optical link budget of 15 dB is offered. The transmitter section uses a CWDM 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.

LASER SAFETY

This single mode transceiver is a Class 1 laser product. It complies with IEC-60825 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated within the specified temperature and voltage limits. The optical ports of the module shall be terminated with an optical connector or with a dust plug.

ORDER INFORMATION

P/No.	Bit Rate (Gb/s)	FC-PI	Power Budget (dB)	Wavelength (nm)	Package	Temp. (°C)	RoHS Compliant
SPS-4341W-CXX0G	8 / 4 / 2	FC-PI-4	> 15	CWDM*	SFP+ with DMI	0 to 70	Yes

CWDM* Wavelength (0 to 70°C)

Central Wavelength	Min. (nm)	Typ. (nm)	Max. (nm)	Label	Central Wavelength	Min. (nm)	Typ. (nm)	Max. (nm)	Label
-C470	1464.5	1470	1477.5	C47	-C550	1544.5	1550	1557.5	C55
-C490	1484.5	1490	1497.5	C49	-C570	1564.5	1570	1577.5	C57
-C510	1504.5	1510	1517.5	C51	-C590	1584.5	1590	1597.5	C59
-C530	1524.5	1530	1537.5	C53	-C610	1604.5	1610	1617.5	C61

CWDM*: 8 Wavelengths from 1470 nm to 1610 nm, each step 20 nm.

OPTOWAY TECHNOLOGY INC. No.38, Kuang Fu S. Road, Hu Kou, Hsin Chu Industrial Park, Hsin Chu, Taiwan 303
Tel: 886-3-5979798 Fax: 886-3-5979737
E-mail: sales@optoway.com.tw http: // www.optoway.com.tw 1/1/2009 V1.0

Absolute Maximum Ratings					
Parameter	**Symbol**	**Min**	**Max**	**Units**	**Notes**
Storage Temperature	Tstg	-40	85	°C	
Operating Case Temperature	Topr	0	70	°C	
Power Supply Voltage	Vcc	-0.5	3.6	V	

Recommended Operating Conditions					
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units / Notes**
Power Supply Voltage	Vcc	3.13	3.3	3.47	V
Operating Case Temperature	Topr	0		70	°C
Power Supply Current	$I_{CC (TX+RX)}$		330	500	mA
Data Rate		2.125	8.5		Gb/s

Transmitter Optical Specifications (0°C < Topr < 70°C, 3.13V < Vcc < 3.47V)						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
Average Launch Power	$Po_{, AVG}$	-1		3	dBm	1
Output Center Wavelength	λ	λc –5.5	λc	λc +7.5	nm	2
Output Spectrum Width	Δλ	---		1	nm	-20 dB width
Side Mode Suppression Ratio	SMSR	30			dB	
Relative Intensity Noise	RIN			-128	dB/Hz	
Average Launch Power of OFF Transmitter				-30	dBm	

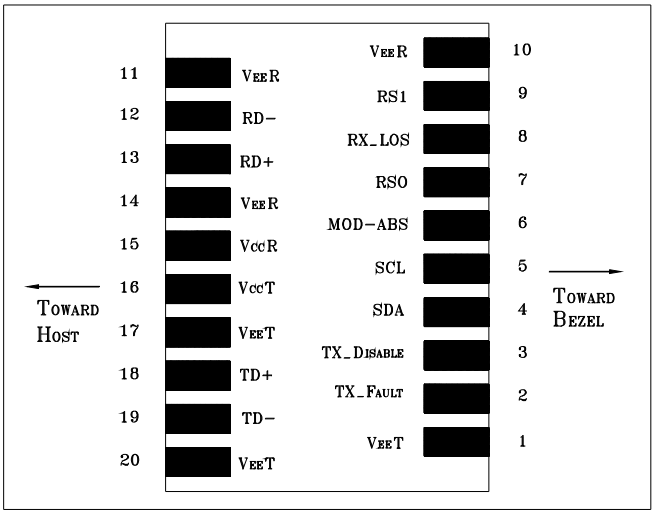
1. Output power is power coupled into a 9/125 μm single-mode fiber.
2. ITU-T G.694.2 CWDM wavelength from 1470 nm to 1610 nm, each step 20 nm.

Receiver Optical Specifications (0°C < Topr < 70°C, 3.13V < Vcc < 3.47V)						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
Sensitivity				-16	dBm	3
Receiver Overload	P_{MAX}	-1	---		dBm	
LOS -- Deasserted	LOS_D	---	---	-16	dBm	Transition: low to high
LOS -- Asserted	LOS_A	-28	---	---	dBm	Transition: high to low
Wavelength of Operation	λc	1260		1620	nm	

3. Measured with average power; BER < 10^{-12} and PRBS 2^7-1.

Electrical Characteristics						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
High-Speed Signal (CML) Interface Specification						
Input Data Rate		2.125	8.5		Gb/s	
Differential Input Impedance	Rin		100		Ω	
Differential Data Input Amplitude		150		1200	mVpp	Internally AC coupled
Output Data Rate		2.125	8.5		Gb/s	
Differential Output Impedance	Rout		100		Ω	
Differential Data Output Amplitude		350	600	700	mVpp	Internally AC coupled
Low-Speed Signal (LVTTL) Interface Specification						
Input High Voltage		2.0		Vcc+0.3	V	
Input Low Voltage		GND		0.8	V	
Output High Voltage		2.4		Vcc	V	
Output Low Voltage		GND		0.5	V	

CONNECTION DIAGRAM



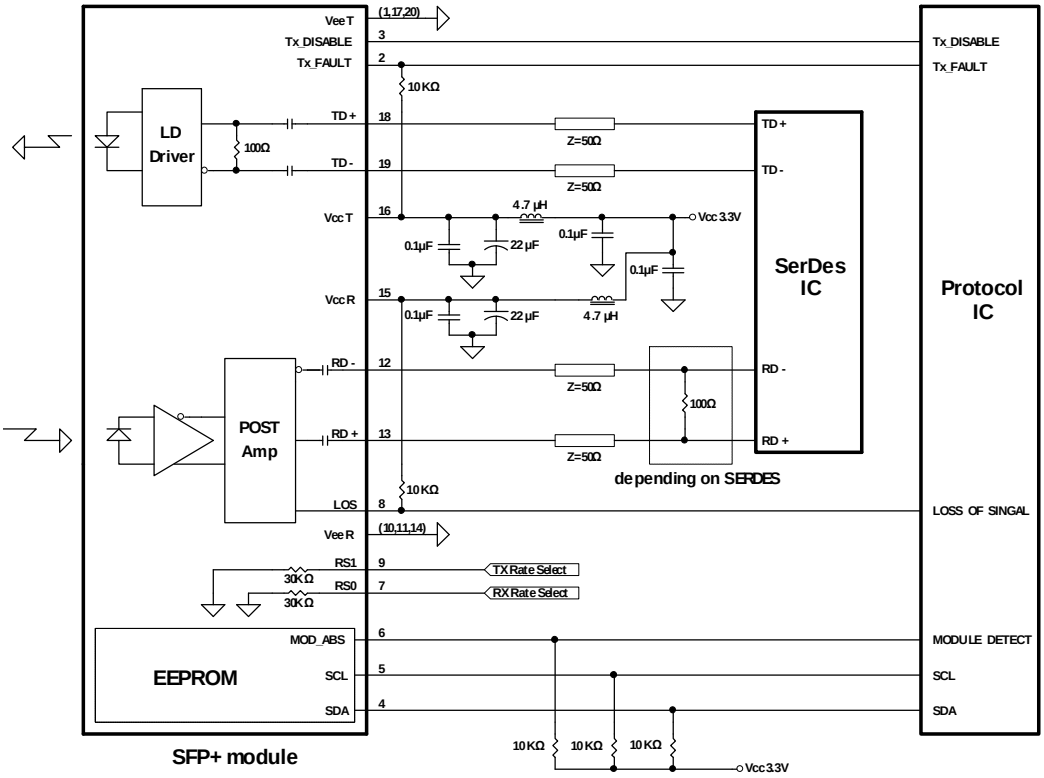
PIN	Signal Name	Description	PIN	Signal Name	Description
1	$V_{EE}T$	Transmitter Signal Ground	11	$V_{EE}R$	Receiver Signal Ground
2	TX_Fault	Transmitter Fault Indication. Logic "1" Output = Laser Fault. Logic "0" Output = Normal Operation	12	RD-	Inverse Receiver Data Out
3	TX_Disable	Logic "1" Input (or no connection) = Laser off, Logic "0" = Laser on.	13	RD+	Receiver Data Out
4	SDA	Modulation Definition 2 – Two wires serial ID Interface	14	$V_{EE}R$	Receiver Signal Ground
5	SDL	Modulation Definition 1 – Two wires serial ID Interface	15	$V_{CC}R$	Receiver Power – 3.3V±5%
6	MOD-ABS	Modulation Definition 0 – Ground in Module	16	$V_{CC}T$	Transmitter Power – 3.3V±5%
7	RS0	RX Rate Select (LVTTL). This pin has an internal 30k pulldown to ground. A signal on this pin will not affect module performance.	17	$V_{EE}T$	Transmitter Signal Ground
8	RX_LOS	Loss of Signal Out (OC).	18	TD+	Transmitter Data In
9	RS1	TX Rate Select (LVTTL). This pin has an internal 30k pulldown to ground. A signal on this pin will not affect module performance.	19	TD-	Inverse Transmitter Data In
10	$V_{EE}R$	Receiver Signal Ground	20	$V_{EE}T$	Transmitter Signal Ground

MODULE DEFINITION

Module Definition	PIN 4	PIN 5	PIN 6	Interpretation by Host
4	SDA	SCL	MOD-ABS	Serial module definition protocol

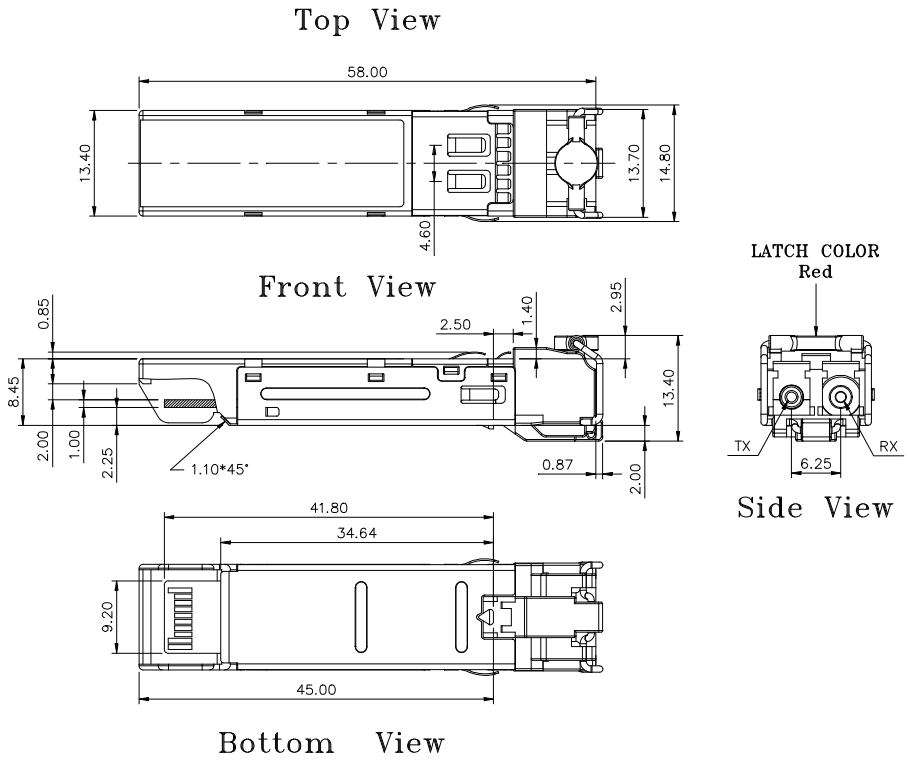
Module Definition 4 specifies a serial definition protocol. For this definition, upon power up, SDA and SDL appear as no connector (NC) and MOD-ABS is TTL LOW. When the host system detects this condition, it activates the serial protocol. The protocol uses the 2-wire serial CMOS E^2PROM protocol of the ATMEL AT24C01A/02/04 family of components.

RECOMMENDED CIRCUIT SCHEMATIC



PACKAGE DIAGRAM

Units in mm



REVISION HISTORY

Version	Subject	Release Date
1.0	Initial datasheet	2009/1/1

Note: Specifications subject to change without notice.