

Optical Module

WS-PII110L-SD (10G SFP+ 850nm 300m)



Performance Characteristics

- Hot Pluggable
- Uncooled 850nm VCSEL transmitter, PIN photo-detector
- Power dissipation < 1W</p>
- Applicable for 300m MMF connection
- All-metal housing for superior EMI performance
- Advanced firmware allow customer system encryption
- Information to be stored in transceiver
- Cost effective SFP+ solution, enables higher port densities and greater bandwidth
- RoHS compliant (lead free)
- Operating case temperature:Commercial: 0°C ~ 70°C

Applications

- 10GBASE-SR at 10.3125Gbps & 10GBASE-SW at 9.95328Gbps
- FC-10GFC (8G/10G)
- Other optical links

Standards

- IEEE 802.3ae 10G BASE-SR/SW
- SFF-8083 Rev 3.1
- SFF-8071 Rev 1.8
- SFF-8418 Rev 1.4
- SFF-8419 Rev 1.3
- SFF-8431 Rev 4.1
- SFF-8432 Rev 5.1
 SFF-8433 Rev 0.7
- SFF-8472 Rev 10.2

Description

This 850nm VCSEL 10Gbps SFP+ transceiver is designed to transmit and receive optical data over multimode optical fiber for link length 300m.

The SFP+ 300m module electrical interface is compliant to SFI electrical specifications. The transmitter input and receiver output impedance is 100 Ohms differential. Data lines are internally AC coupled. The module provides differential termination and reduce differential to common mode conversion for quality signal termination and low EMI. SFI typically operates over 200 mm of improved FR4 material or up to about 150mm of standard FR4 with one connector.



Module Block Diagram



SFP+SR Transceiver

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit
Power Supply Voltage	Vcc	-0.5		4	V
Storage Temperature Range	Ts	-40		85	C
Relative Humidity	RH	5		95	C

Parameter	Symbol	Min.	Typical	Max.	Unit
Case Operating Temperature Range	TC	0		70	C
Power Supply Voltage	VCC	3.14	3.3	3.47	V
Supply Current	ITX+RX			300	mA
Differential Input Voltage	VIN	180		700	mV
Differential output Voltage	VOUT	300		850	mV
Data Rate		9.95	10.3125		Gbps



Optical and Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
	Trans	mitte Character	istics			
Center Wavelength Range	λς	840	850	860	nm	
Spectral Width	Δλ			0.45	nm	
Launch Optical Power	Pout	-7.3		-1	dBm	1
Extinction Ratio	EX	3			dB	
Relative intensity noise	RIN120MA			-128	dB/Hz	
Eye Diagram		Complies wit	h IEEE802.3ae	eye masks whe	en filtered	
	Rece	iver Characteris	stics			
Receiver Sensitivity	S			-12	dBm	2
Receiver Overload	PIN	-1			dBm	
Signal Detect- Deasserted	LOS-A	-30			dBm	
Signal Detect-Asserted	LOS-D			-12	dBm	
Signal Detect-Hysteresis		0.5	3	5	dB	

Notes:

1. Average power figures are informative only, per IEEE 802.3ae.

2. Measured with worst ER; BER<10-12; 231-1 PRBS.

Pin Definitions





Pin Descriptions

Pin	Signal Name	Description	
1	VeeT	Transmitter Ground	1
2	Tx_Fault	Transmitter Fault	2
3	Tx_Disable	Transmitter Disable; Turns off transmitter laser output	3
4	SDA	2-wire Serial Interface Data Line	4
5	SCL	2-wire Serial Interface Clock Line	4
6	Mod_ABS	Module Absent, connected to VeeT or VeeR in the module	4
7	RS0	Rate Select 0, optionally controls SFP+ module receiver	5
8	Rx_LOS	Receiver Loss of Signal Indication (In FC designated as Rx_LOS and in Ethernet designated as Signal Detect)	6
9	RS1	Rate Select 1, optionally controls SFP+ module transmitter	
10	VeeR	Receiver Ground	1
11	VeeR	Receiver Ground	1
12	RD-	Receiver Inverted Data Output. AC Coupled.	
13	RD+	Receiver Non-Inverted Data Output. AC Coupled.	
14	VeeR	Receiver Ground	1
15	VccR	Receiver Power Supply 3.3V	
16	VccT	Transmitter Power Supply 3.3V	
17	VeeT	Transmitter Ground	1
18	TD+	Transmitter Non-Inverted Data Input. AC Coupled.	
19	TD-	Transmitter Inverted Data Input. AC Coupled.	
20	VeeT	Transmitter Ground	1

Notes:

1. Circuit ground is internally isolated from chassis ground.

2. Tx_Fault is an open collector/drain output, which should be pulled up with a $4.7k\Omega \sim 10 k\Omega$ resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3V. A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.

3. Laser output disabled on Tx_Disable >2.0V or open, enabled on Tx_Disable <0.8V.

4. Should be pulled up with $4.7k\Omega \sim 10k\Omega$ host board to a voltage between 2.0V and 3.6V. Mod_ABS pulls line low to indicate module is plugged in.

5. Internally pulled down per 4.1.3 and 4.2 of SFF-8419 Rev 1.3.

6. LOS is open collector output. Should be pulled up with $4.7k\Omega \sim 10k\Omega$ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.



Recommended Host Board Supply Filtering Circuit

The Transceiver includes internal circuit components to filter power supply noise. Under some conditions of EMI and power supply noise, external power supply filtering may be necessary. If receiver sensitivity is found to be degraded by power supply noise, the filter network illustrated in the following figure may be used to improve performance. The values of the filter components are general recommendations and may be changed to suit a particular system environment. Shielded inductors are recommended.



Typical Application Circuit





Digital Diagnostic Memory Map



I²C Read/Write Memory Contents (A0h) Information

Accessing Serial ID Memory use the 2 wire address 1010000x (A0). Memory contents of Serial ID are shown in the below table.

Address	Size (Bytes)	Name of Field	Contents (Hex)	Description
0	1	Identifier	03	SFP+
1	1	Ext.Identifier	04	SFP function is defined by two-wire interface ID only
2	1	Connector	07	LC Connector
3-10	8	Transceiver	10 00 00 00 44 00 04 00	Transceiver Codes
11	1	Encoding	06	64B/66B
12	1	BR, nominal	67	10.3Gbps
13	1	Reserved	00	
14	1	Length (9um)-km	00	
15	1	Length (9um)-100m	00	
16	1	Length (50um)	08	OM2
17	1	Length (62.5um)	03	OM1
18	1	Length (50um and copper)	00	50um OM4 and Length (Active Cable or Copper)
19	1	Lenggth (50um)	1E	Transmit distance is 300m
20-35	16	Vendor name	43 63 6C 6F 75 64 20 20 20 20 20 20 20 20 20 20 20 20	Company Name (ASC II) "Ccloud"
36	1	Reserved	00	



37-39	3	Vendor OUI	00 00 00	
40-55	16	Vendor PN	43 43 2D 50 49 49 31 31 30 4C 2D 53 44 00 00 00	Transceiver product number (ASC II)
56-59	4	Vendor rev	31 2E 30 20	ASC II(Rev 1.0)
60-61	2	Wavelength	03 52	850nm
62	1	Reserved	00	
63	1	CC BASE	Check Sum (variable)	Check code for base ID fields from byte 0 to byte 62
64-65	2	Options	00 1A	Tx_Disable, Tx_Fault and Loss of Signal implemented
66	1	BR, max	00	
67	1	BR, min	00	
68-83	16	Vendor SN		Serial Number (ASC II)
84-91	8	Vendor date code	xx xx yy yy zz zz 20 20	In ASCII;xx=Year (2 bytes), yy=Month (2 bytes), zz=Day (2 bytes)
92	1	Diagnostic type	68	Internal Calibrated
93	1	Enhanced option	во	Diagnostics (Optional alarm/ warning flags, Soft TX_FAULT and Soft TX_LOS monitoring)
94	1	SFF-8472	03	Diagnostics (SFF-8472 Rev 10.2)
95	1	CC EXT	Check Sum (variable)	Check sum of bytes 64-94 for extended ID fields
96-255	160	Vendor specific		

■ I²C Read/Write Memory Contents (A2h) Monitoring Interface

Diagnostic Monitor Functions interface use the 2 wire address 1010001x (A2).

Data Address	Parameter	Range	Accuracy
96-97	DMI_Temp	0 to 70°C	±3°C
98-99	DMI_TX	-7.3 to -1 dBm	±3dB
100-101	DMI_RX	-12 to -1 dBm	±3dB
102-103	DMI_VCC	+3 to +3.6 V	±3%
104-105	DMI_Ibias	0 to 80 mA	±10%



Mechanical Dimensions



Ordering information

Part Number	Product Description
WS-PII110L-SD	SFP+ 850nm 10.3Gbps 300m 0°C~70°C With DDM

Package Dimension



Carton (400pcs) 10.5kg Note: The specific packing box size is determined according to the quantity ordered by the customer.

