

## SFPP-ATLP-31-02 10Gb/s 1310nm SFP+ 2km Transceiver

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### SFP Series

- Up to 11.1Gbps Data Links
- Up to 2km transmission on SMF
- FP Laser and PIN receiver
- Metal enclosure, for lower EMI
- 2-wire interface with integrated Digital Diagnostic monitoring
- Specifications compliant with SFF 8472
- Compliant with SFP+ MSA with LC connector
- Single 3.3V power supply
- Power dissipation < 1.2W

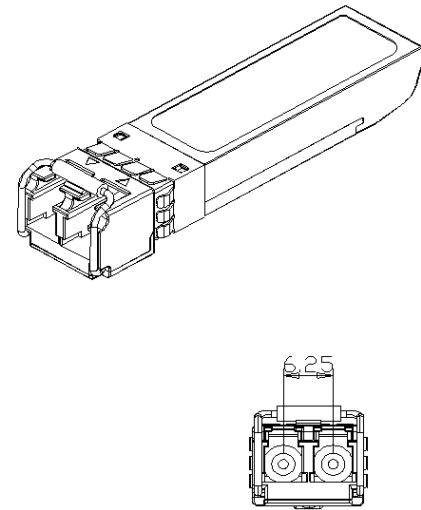
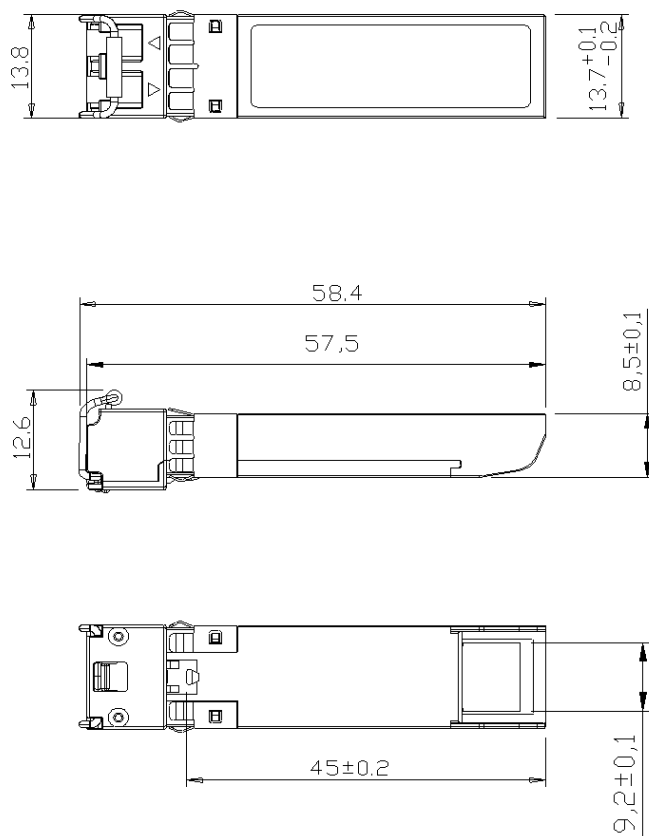
ASCENT's SFPP-ATLP-31-02 Small Form Factor Pluggable (SFP) transceivers are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA). The transceiver consists of five sections: the LD driver, the limiting amplifier, the digital diagnostic monitor, the 1310nm FP laser and the PIN photo-detector. The module data link up to 2KM in 9/125um single mode fiber.

The optical output can be disabled by a TTL logic high-level input of Tx Disable, and the system also can disable the module via I2C. Tx Fault is provided to indicate that degradation of the laser. Loss of signal (LOS) output is provided to indicate the loss of an input optical signal of receiver or the link status with partner. The system can also get the LOS (or Link)/Disable/Fault information via I2C register access.

## Key Features

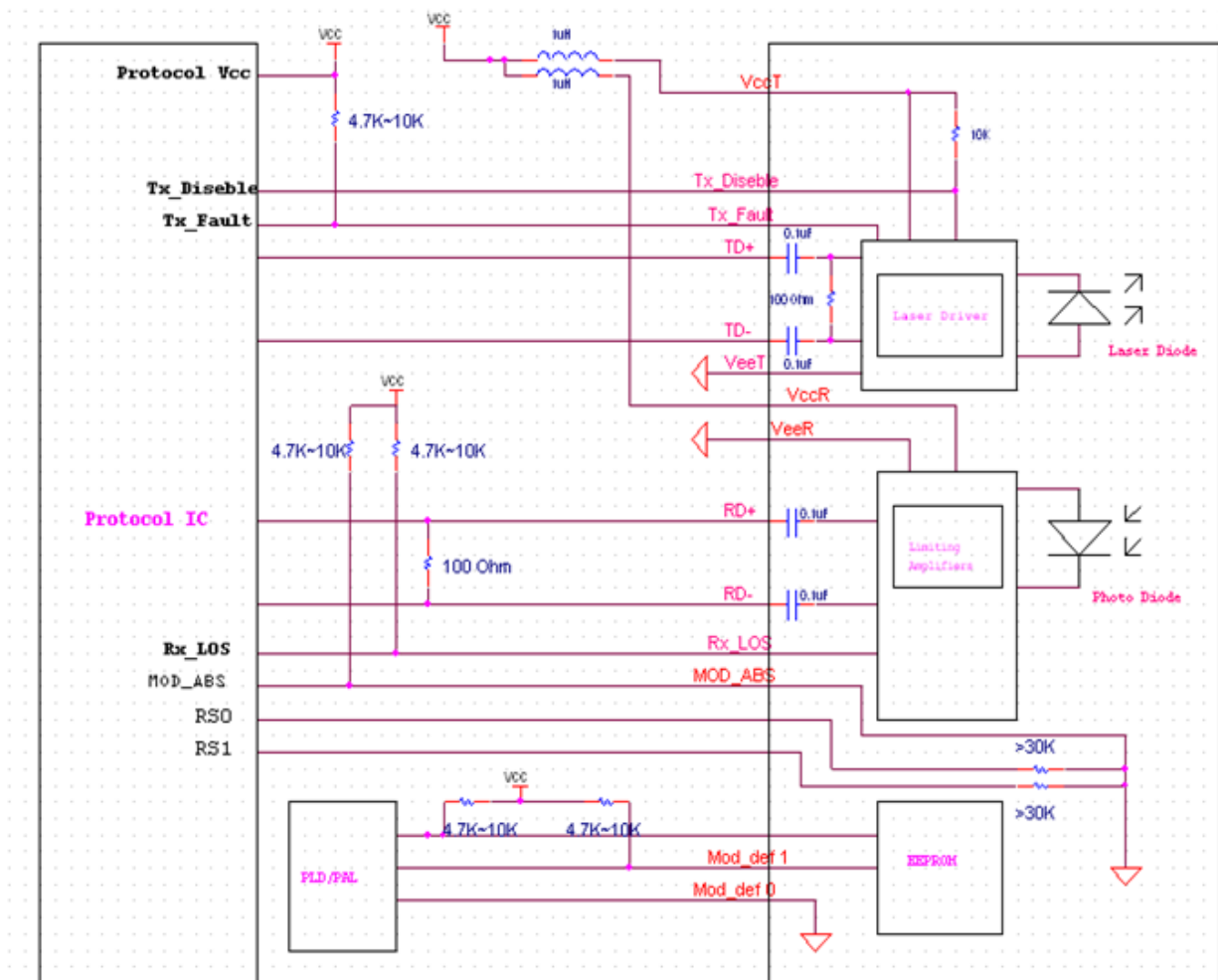
- 10GBASE-LR/LW & 10G Ethernet
- Compliant to 802.3ae 10GBASE-LR/LW
- Compliant to SFF-8431
- RoHS Compliant.

## Outline Dimensions

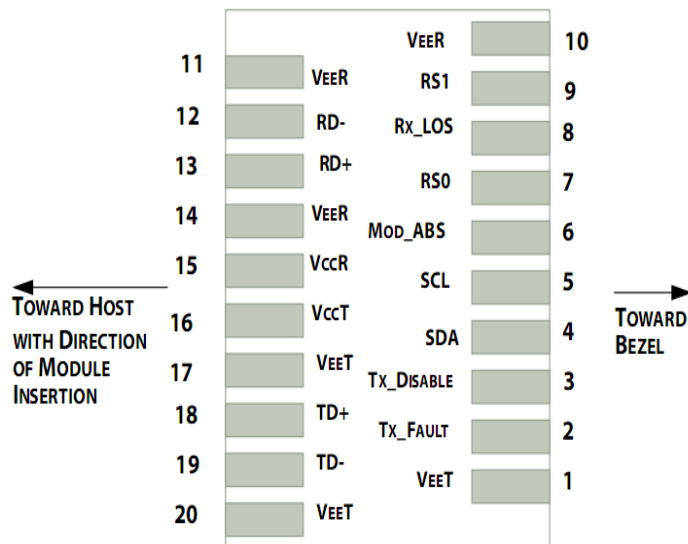


Units in mm

## Host - Transceiver Interface Block Diagram



## Pin Assignments



Pin out of Connector Block on Host Board

Pin	Symbol	Name/Description	NOTE
1	V <sub>EET</sub>	Transmitter Ground (Common with Receiver Ground)	1
2	T <sub>FAULT</sub>	Transmitter Fault.	2
3	T <sub>DIS</sub>	Transmitter Disable. Laser output disabled on high or open.	3
4	SDA	2-wire Serial Interface Data Line	4
5	SCL	2-wire Serial Interface Clock Line	4
6	MOD_ABS	Module Absent. Grounded within the module	4
7	RS0	Rate Select 0	5
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	6
9	RS1	No connection required	1
10	V <sub>EER</sub>	Receiver Ground (Common with Transmitter Ground)	1
11	V <sub>EER</sub>	Receiver Ground (Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out. AC Coupled	
13	RD+	Receiver Non-inverted DATA out. AC Coupled	
14	V <sub>EER</sub>	Receiver Ground (Common with Transmitter Ground)	1
15	V <sub>CCR</sub>	Receiver Power Supply	
16	V <sub>CCT</sub>	Transmitter Power Supply	
17	V <sub>EET</sub>	Transmitter Ground (Common with Receiver Ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	V <sub>EET</sub>	Transmitter Ground (Common with Receiver Ground)	1

### Notes:

1. Circuit ground is internally isolated from chassis ground.
2. T<sub>FAULT</sub> is an open collector/drain output, which should be pulled up with a 4.7k – 10k Ohms resistor on

the host board if intended for use. Pull up voltage should be between 2.0V to  $V_{cc} + 0.3V$ . 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  $T_{DIS} > 2.0V$  or open, enabled on  $T_{DIS} < 0.8V$ .
4. Should be pulled up with 4.7kΩ- 10kΩ 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 SFF-8431 Rev 4.1.
6. LOS is open collector output. It should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

## Specifications

### SFPP-ATLP-31-02 SFPP Transceiver

Parameter	Symbol	Value	Notes
<b>Absolute Maximum Ratings</b>			
Storage Temperature	Ts	-40 °C to +85 °C	
Relative Humidity	RH	5 % to 95 %	
Power Supply Voltage	Vcc	-0.3 V to +4 V	
<b>Recommended Operating Conditions</b>			
Case Operating Temperature	Tcase	0 °C to +70 °C -40 °C to 85 °C	Commercial Industrial
Power Supply Voltage	Vcc	3.14 V to 3.47 V, 3.3 V typical	
Power Supply Current	Icc	360 mA maximum	
Data Rate	BR	10.3125 Gbps	
Transmission Distance	TD	2 km	
Coupled Fiber		Single-mode fiber	9/125 μm SMF

### Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Note
<b>Transmitter</b>						
Output Opt. Power	POUT	-6		-0.5	dBm	1
Optical Wavelength	λ	1260	1310	1355	nm	
Spectral Width (RMS)	σ			3	nm	
Optical Extinction Ratio	ER	3.5			dB	
Output Eye Mask	Compliant with IEEE 802.3ae					
<b>Receiver</b>						
Rx Sensitivity	PSEN			-14.4	dBm	2
Input Saturation Power (Overload)	Psat	0.5			dBm	
Wavelength Range	λC	1270		1610	nm	
LOS De -Assert	LOSD			-17	dBm	
LOS Assert	LOSA	-30			dBm	
LOS Hysteresis		0.5	1.0		dB	

#### Notes:

1. Class 1 Laser Safety per FDA/CDRH and IEC-825-1 regulations.
2. Measured with a PRBS 2<sup>31</sup>-1 test pattern, @10.3125Gb/s, BER<10<sup>-12</sup>.

## Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Note
Supply Voltage	Vcc	3.14	3.3	3.46	V	
Supply Current	Icc			360	mA	
<b>Transmitter</b>						
Input differential impedance	Rin		100		$\Omega$	1
Differential data input swing	Vin,pp	180		1200	mV	
Transmit Disable Voltage	VD	Vcc-1.3		Vcc	V	
Transmit Enable Voltage	VEN	Vee		Vee+ 0.8	V	2
Transmit Disable Assert Time				10	us	
<b>Receiver</b>						
Differential data output swing	Vout,pp	300		850	mV	3
Data output rise time	tr	30			ps	4
Data output fall time	tf	30			ps	4
LOS Fault	VLOS fault	Vcc-1.3		VccHOST	V	5
LOS Normal	VLOS norm	Vee		Vee+0.8	V	5
Power Supply Rejection	PSR	100			mVpp	6

### Notes:

1. Connected directly to TX data input pins. AC coupled thereafter.
2. Or open circuit.
3. Input 100 ohms differential termination.
4. These are unfiltered 20-80% values
5. Loss of Signal is LVTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.
6. Receiver sensitivity is compliant with power supply sinusoidal modulation of 20 Hz to 1.5 MHz up to specified value applied through the recommended power supply filtering network.

## Digital Diagnostic Functions

ASCENT's SFPP-ATLP-31-02 transceivers support the 2-wire serial communication protocol as defined in the SFP+ MSA. The standard SFP serial ID provides access to identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information.

Additionally, ASCENT SFP+ transceivers provide a unique enhanced digital diagnostic monitoring interface, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, receiver optical power and transceiver supply voltage. It also defines a sophisticated system of alarm and warning flags, which alerts end-users when particular operating parameters are outside of a factory set normal range.

The SFP MSA defines a 256-byte memory map in EEPROM that is accessible over a 2-wire serial interface at the 8 bit address 1010000X (A0h). The digital diagnostic monitoring interface makes use of the 8 bit address 1010001X (A2h), so the originally defined serial ID memory map remains unchanged.

The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through a 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL, Mod Def 1) is generated by the host. The positive edge clocks data into the SFP transceiver into those segments of the E2PROM that are not write-protected. The negative edge clocks data from the SFP transceiver. The serial data signal (SDA, Mod Def 2) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially.

## Regulatory Compliance

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Feature	Reference	Performance
Electrostatic discharge (ESD)	IEC/EN 61000-4-2	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN 55022 Class B (CISPR 22A)	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10, 1040.11 IEC/EN 60825-1, 2	Class 1 laser product
Component Recognition	IEC/EN 60950, UL	Compatible with standards
ROHS	2002/95/EC	Compatible with standards
EMC	EN61000-3	Compatible with standards

## Ordering Information

### Part Number

SFPP-ATLP-31-02

SFPP-ATLP-31-02A

### Product Description

SFP+ Plug-in, 10Gbps, 2km, TX=1310/RX wide, on two single-mode fibers, LC/PC Blue

SFP+ Plug-in, 10Gbps, 2km, TX=1310/RX wide, on two multimode fibers, LC/PC Blue,  
Industrial Temp

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Ver. ACT\_SFPP-ATLP-31-02\_Datasheet\_V1b\_Aug\_2016