

10 Gb/s 1310 nm SFP+ 20 km Transceiver

SFP+ Series

- Up to 11.3 Gbps Data Links
- Up to 20 km transmission on SMF
- DFB Laser and PIN/TIA receiver
- Metal enclosure, for lower EMI
- 2-wire interface with integrated Digital Diagnostic monitoring
- Hot-pluggable SFP+ footprint
- Specifications compliant with SFF 8472
- Compliant with SFP+ MSA with LC connector
- Single 3.3 V power supply
- Power dissipation < 1.2 W



ASCENT's SFPP-ATLP-31-20 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 20 km using 9/125 μ m single-mode fiber.

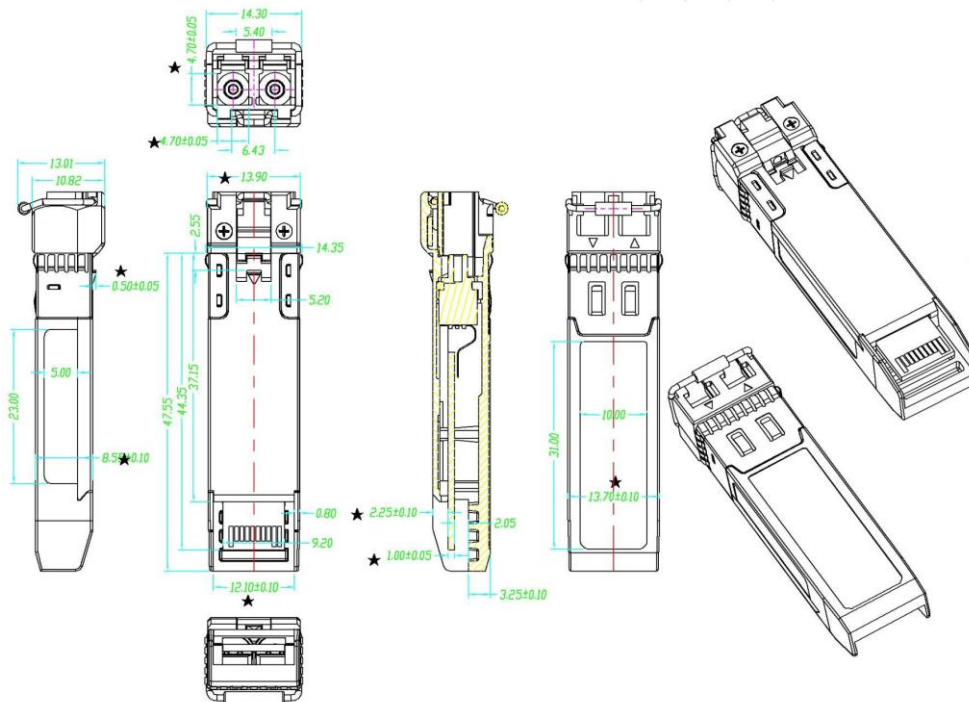
The optical output can be disabled by a TTL logic high-level input of Tx Disable, and the system also can disable the module via I2C. Tx Fault is provided to indicate that degradation of the laser. Loss Of signal (LOS) output is provided to indicate the loss of an input optical signal of receiver or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

The system can also get the LOS (or Link)/Disable/Fault information via I2C register access.

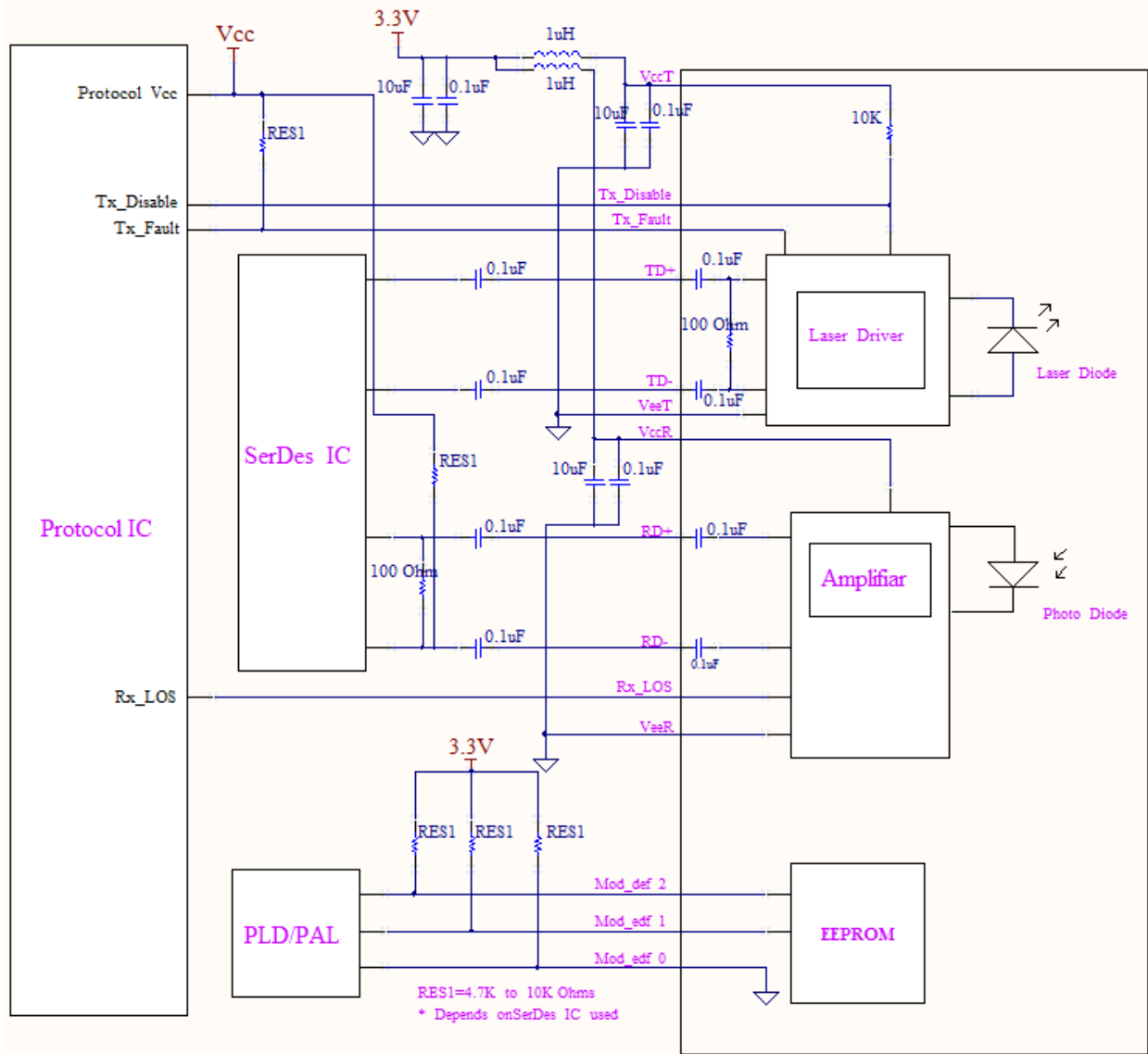
Key Features

- Up to 11.3 Gbps Data Links
- Up to 20 km transmission on SMF
- 1310 nm DFB Laser and PIN/TIA receiver
- Metal enclosure, for lower EMI
- 2-wire interface with integrated Digital Diagnostic monitoring
- Hot-pluggable SFP+ footprint
- Compliant with SFP+ MSA with LC connector
- Single 3.3 V power supply
- Case operating temperature range: 0°C to 70°C
- Power dissipation < 1.2 W
- 10GBASE-LR/LW & 10G Ethernet
- Compliant with SFF-8431
- Compliant with SFF 8472
- RoHS compliant

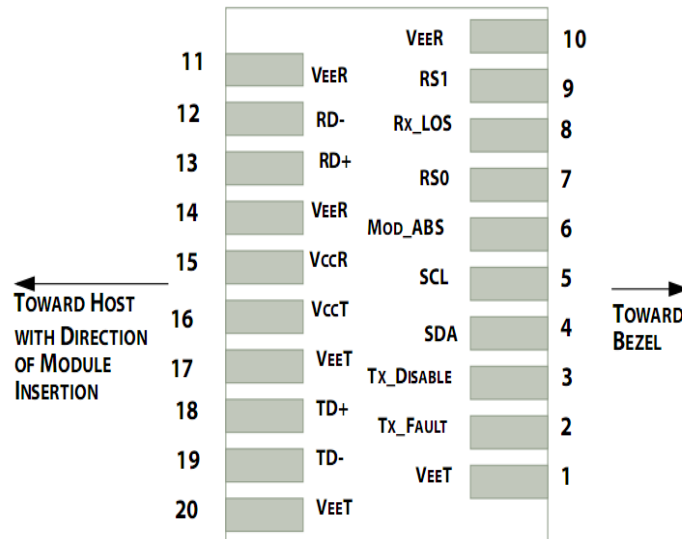
Outline Diagram



Transceiver Interface Block Diagram



Pin Assignment



Pin out of Connector Block on Host Board

Pin	Symbol	Name/Description	Note
1	V _{EET}	Transmitter Ground (Common with Receiver Ground)	1
2	T _{FAULT}	Transmitter Fault.	2
3	T _{DIS}	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 _{EE R}	Receiver Ground (Common with Transmitter Ground)	1
11	V _{EE R}	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 _{EE R}	Receiver Ground (Common with Transmitter Ground)	1
15	V _{CCR}	Receiver Power Supply	
16	V _{CCT}	Transmitter Power Supply	
17	V _{EET}	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 _{EET}	Transmitter Ground (Common with Receiver Ground)	1

Notes:

1. Circuit ground is internally isolated from chassis ground.

2. T_{FAULT} is an open collector/drain output, which should be pulled up with a 4.7 k Ω to 10 k Ω resistor on the host board if intended for use. Pull up voltage should be between 2.0 V to $V_{CC} + 0.3$ V. A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm threshold. A low output indicates normal operation. In the low state, the output is pulled to <0.8 V.
3. Laser output disabled on $T_{DIS} > 2.0$ V or open, enabled on $T_{DIS} < 0.8$ V.
4. Should be pulled up with 4.7 k Ω to 10 k Ω 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 4.7 k Ω to 10 k Ω on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

Specifications

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	T_S	-40		85	°C	
Storage Ambient Relative Humidity	H_A	0		85	%	
Power Supply Voltage	V_{CC}	-0.5		4	V	
Signal Input Voltage		-0.3		$V_{CC}+0.3$	V	
Receiver Damage Threshold		+3			dBm	
Lead Soldering Temperature/Time	T_{SOLD}			260/10	°C/sec	1
Lead Soldering Temperature/Time	T_{SOLD}			360/10	°C/sec	2

Notes

1. Suitable for wave soldering.
2. Only for soldering by iron.

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Case Operating Temperature	T_{case}	0	-	+70	°C	Commercial
		-40	-	+85	°C	Industrial
Ambient Humidity	H_A	5		70	%	Non-condensing
Data Rate		10.3125/10.3125			Gbps	TX Rate/RX Rate
Transmission Distance				20	km	
Coupled Fiber		Single-mode fiber				9/125 μ m G.652

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Average Output Power	P_{OUT}	-8.2		+0.5	dBm	
Extinction Ratio	ER	3			dB	

Center Wavelength	λ_c	1290	1310	1330	nm	DFB Laser
Side Mode Suppression Ratio	SMSR	30			dBm	DFB Laser
Spectrum Width (RMS)	σ			1	nm	
Transmitter OFF Output Power	P_{off}			-30	dBm	
Output Eye Mask	Compatible with IEEE 802.3ae					

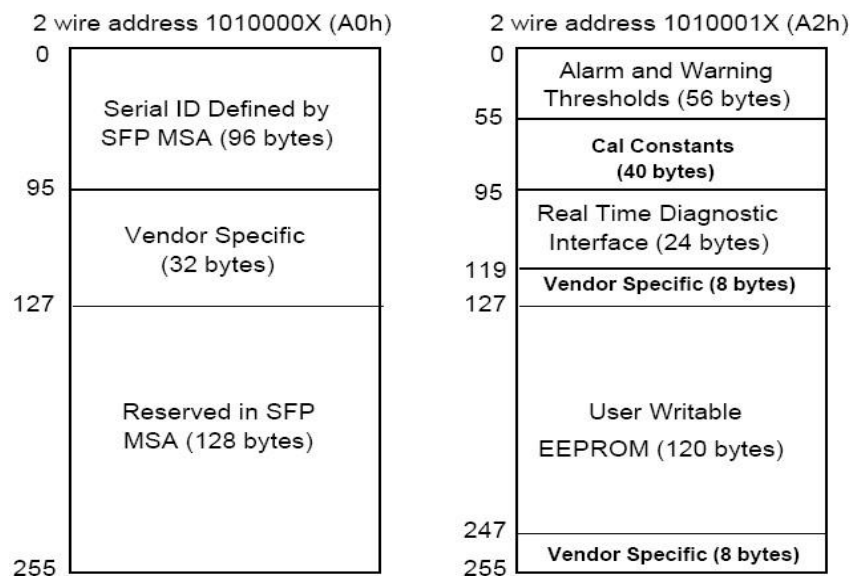
Receiver

Input Optical Wavelength	λ_{in}	1260		1600	nm	
Rx Sensitivity	R_{SENS1}			-14.4	dBm	1
Rx Sensitivity (OMA)	R_{SENS2}			-10.3	dBm	2
Input Saturation Power (Overload)	PSAT	-3			dBm	
Loss of Signal Assert	P_A	-30			dBm	
Loss of Signal De-assert	P_D			-15.4	dBm	
LOS Hysteresis	$P_D - P_A$	0.5		6	dB	

Notes:

1. With worst-case extinction ratio. Measured with a PRBS $2^{31}-1$ test pattern, @10.3125 Gb/s, BER < 10^{-12} .
2. Valid between 1260 nm and 1355 nm. Per IEEE 802.3ae.

Digital Diagnostic Memory Map



Digital Diagnostic Monitoring Information

Parameter	Unit	Accuracy
Case Temperature	°C	±3
Supply Voltage	V	±3%
Tx Bias Current	mA	±10%
Tx Optical Power	dB	±3
Rx Optical Power	dB	±3

Electrical Interface Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage	V _{CC}	3.13	3.30	3.47	V	
Supply Current	I _{CC}		200	285	mA	
Transmitter						
Input Different Impedance	R _{in}	90	100	110	Ω	1
Single-Ended Data Input Swing	V _{in, pp}	180		700	mV	
Transmitter Disable Voltage	V _{DIS}	2		V _{CC}	V	
Transmitter Enable Voltage	V _{EN}	0		0.8	V	
Receiver						
Output Difference Impedance	R _{out}	90	100	110	Ω	1
Single-Ended Data Output Swing	V _{out, pp}	300		850	mV	2
LOS Asserted	V _{LOSA}	2		V _{CCHOST}	V	3
LOS De-Asserted	V _{LOSD}	0		0.8	V	3

Notes:

1. Connected directly to TX data input pins. AC coupled thereafter.
2. Into 100 Ω differential termination.
3. Loss Of Signal is LVTTTL. Logic "0" indicates normal operation; logic "1" indicates no signal detected.

Ordering Information

Product Name	Product Description
SFPP-ATLP-31-20	SFP+ plug-in, 10 Gbps, 20 km, TX=1310/RX wide, on two single-mode fibers, LC/PC Blue
SFPP-ATLP-31-20A	SFP+ plug-in, 10 Gbps, 20 km, TX=1310/RX wide, on two single-mode fibers, LC/PC Blue, Industrial Temp

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