10 Gb/s 850nm Multi-mode SFP+ Transceiver

SFP+ Series

- **Up to 11.1Gbps data links**
- **Up to 300m transmission on MMF**
- **Power dissipation < 1W**
- **VSCEL laser and PIN 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 3.3V power supply**

ASCENT SFPP-ATLP-85-03 transceivers support the 2-wire serial communication protocol as defined in the SFP+ MSA.

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.

Key Features

- Applicable for 10GBASE-SR/SW and 10G Ethernet networks

- Compliant to SFP+ SFF-8431

- Compliant to 802.3ae-2002 10GBASE-SR standards

- Support Digital Diagnostics Monitoring (DDM)

- Support Digital Optical Monitoring (DOM)

- RoHS, FCC Compliant

- Compatible with Cisco, HP, Juniper, Arista...

- Case operating temperature range: Commercial: 0 to 70°C

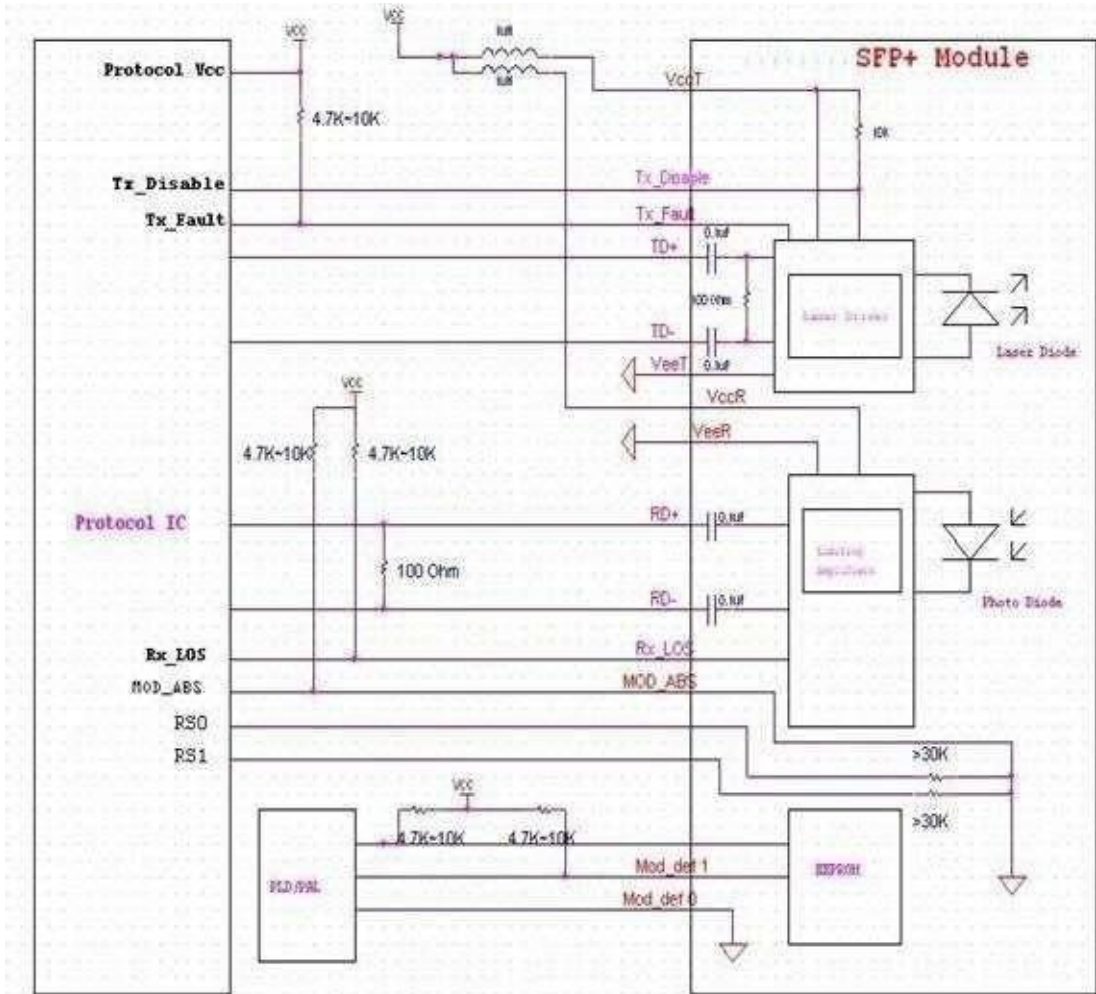   Industrial: -40 to 85°C

Outline Dimensions

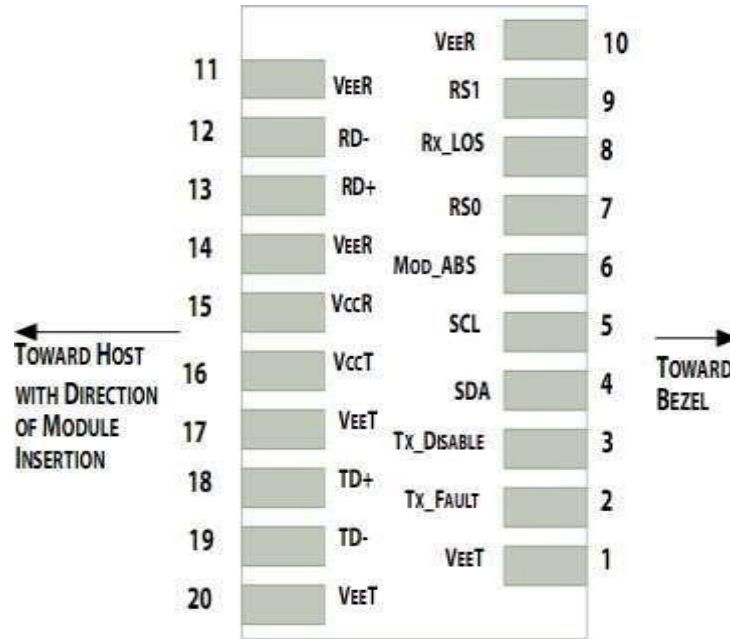Compliant with SFF-8432 rev 5.0, the improved pluggable form factor specification.
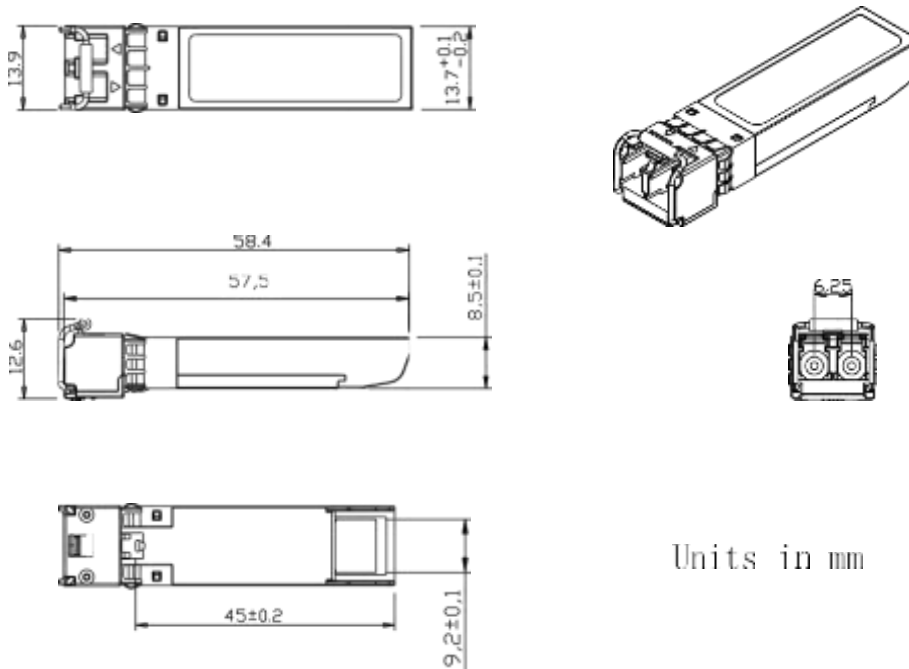
Host - Transceiver Interface Block Diagram

Pin Descriptions

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_{EER}	Receiver Ground (Common with Transmitter Ground)	1
11	V_{EER}	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_{EER}	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. TFAULT is an open collector/drain output, which should be pulled up with a 4.7kΩ – 10 kΩ 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 TDIS >2.0V or open, enabled on TDIS <0.8V.

4. Should be pulled up with 4.7kΩ- 10kΩ on 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.

Digital Diagnostic Function

ASCENT SFPP-ATLP-85-03 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 SFPP transceivers provide a unique enhanced digital diagnostic monitoring interface which allows real-time access to device operating parameters such as media type, vendor name, part number, serial number, wavelength, transceiver temperature, laser bias current, transmitted optical power , received 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.

Specifications

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	Ts	-40	-	85	°C	
Relative Humidity	RH	5	-	95	%	
Power Supply Voltage	VCC	-0.3	-	4	V	
Signal Input Voltage		Vcc - 0.3	-	Vcc + 0.3	V	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Case Operating Temperature	Tcase	0	-	70	°C	Commercial
	Tcase	-40	-	85	°C	Industrial
Power Supply Voltage	VCC	3.14	3.3	3.47	V	
Power Supply Current	ICC	-		300	mA	
Data Rate	BR		10.3125		Gbps	
Transmission Distance	TD		-	300	m	
Coupled Fiber	Multi-mode fiber				50/125 µm	MMF

Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Transmitter						
Output Optical Power	P$_{OUT}$	-7.3		-1	dBm	1
Optical Wavelength	λ	840	850	860	nm	
Optical Extinction Ratio	ER	3.0			dB	
RIN	RIN			-128	dB/Hz	
Output Eye Mask	Compliant with IEEE 802.3ae					
Receiver						
Rx Sensitivity	R$_{SENS}$			-11.1	dBm	2
Input Saturation Power (Overload)	Psat	0.5			dBm	

Wavelength Range	λ_C	770	850	860	nm
LOS De-Assert	LOSD			-12	dBm
LOS Assert	LOSA	-30			dBm
LOS Hysteresis		0.5			dB

Notes:

1. Class 1 Laser Safety per FDA/CDRH and IEC-825-1 regulations.

2. Measured with a PRBS 2^{31}-1 test pattern, @ 10.325 Gb/s, BER<10^{-12}.

Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	NOTE
Supply Voltage	Vcc	3.14	3.3	3.46	V	
Supply Current	Icc			300	mA	
Transmitter						
Input Differential Impedance	Rin		100		Ω	1
Single-ended Data Input Swing	Vin, pp	180		700	mV	
Transmit Disable Voltage	VD	Vcc–1.3		Vcc	V	
Transmit Enable Voltage	VEN	Vee		Vee + 0.8	V	2
Receiver						
Differential Data Output Swing	Vout, pp	300		850	mV	3
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. Into 100 Ω 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.

Regulatory Compliance

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

Product Part Number	Data Rate (Gbps)	Media	Wavelength	Transmission Distance	Temperature	Range (T$_{case}$)
SFPP-ATLP-85-03	10.3125	Multi-mode fiber	850 nm	300 m	0 to 70°C	Commercial
SFPP-ATLP-85-03A	10.3125	Multi-mode fiber	850 nm	300 m	-40 to 85°C	Industrial
HSPP-ATLP-85-03	10.3125	Multi-mode fiber	850 nm	300 m	0 to 70°C	Commercial HPE Compatible
JSPP-ATLP-85-03	10.3125	Multi-mode fiber	850 nm	300 m	0 to 70°C	Commercial Juniper Compatible
JSPP-ATLP-85-03A	10.3125	Multi-mode fiber	850 nm	300 m	-40 to 85°C	Industrial Juniper Compatible

Contact Information

Ascent Communication Technology Ltd

AUSTRALIA
140 William Street, Melbourne
Victoria 3000, AUSTRALIA
Phone: +61-3-8691 2902

Hong Kong SAR
Unit 9, 12th Floor, Wing Tuck Commercial Centre
177 Wing Lok Street, Sheung Wan, Hong Kong SAR
Phone: +852-2851 4722

CHINA
Unit 1933, 600 Luban Road
200023, Shanghai, CHINA
Phone: +86-21-60232616

USA
2710 Thomes Ave
Cheyenne, WY 82001, USA
Phone: + 1 203 350 9822

EUROPE
Pfarrer-Bensheimer-Strasse 7a
55129 Mainz, GERMANY
Phone: +49 (0) 6136 926 3246

VIETNAM
11th Floor, Hoa Binh Office Tower
106 Hoang Quoc Viet Street, Nghia Do Ward
Cau Giay District, Hanoi 10649, VIETNAM
Phone: +84-24-37955917

WEB: www.ascentcomtec.com **EMAIL:** sales@ascentcomtec.com