

10 Gb/s 850nm Multi-mode SFP+ Transceiver 400m

SFP+ Series



- Multi-protocol from 8.5Gb/s to 11.3Gb/s
- Hot-Pluggable SFP+ footprint
- 850nm VCSEL Toca laser transmitter
- Duplex LC connector
- Up to 300m links on MMF OM3, 400m on MMF OM4
- Single +3.3V power supply
- Power consumption < 1W
- Compliant with SFF-8431 SFF-8432 and IEEE802.3ae
- RoHS compliant

ASCENT SFPP-ATLP-85-04 transceivers support the 2-wire serial communication protocol as defined in the SFP+ MSA, 400m on MMF OM4.

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.

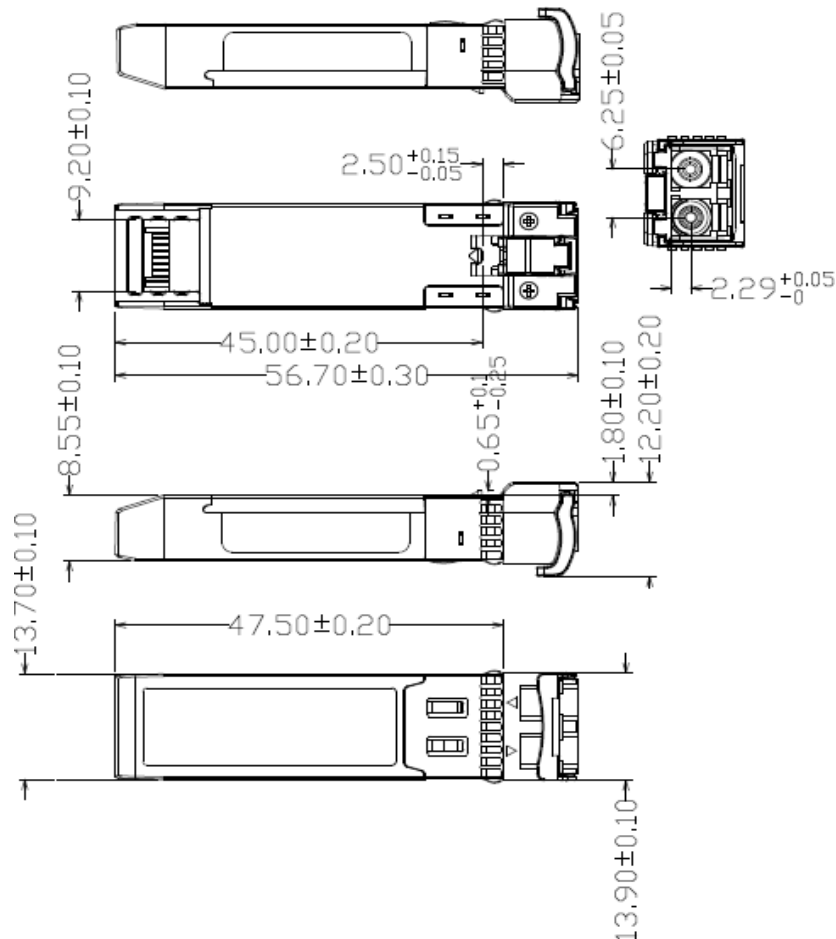
The SFP+ MSA defines a 256-byte memory map in EEPROM that is accessible over a 2-wire serial interface at the 8-bit address 1010000X (A0h). The digital diagnostic monitoring interface makes use of the 8-bit address 1010001X (A2h), so the originally defined serial ID memory map remains unchanged.

The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDM) inside the transceiver, which is accessed through a 2-wire serial interface.

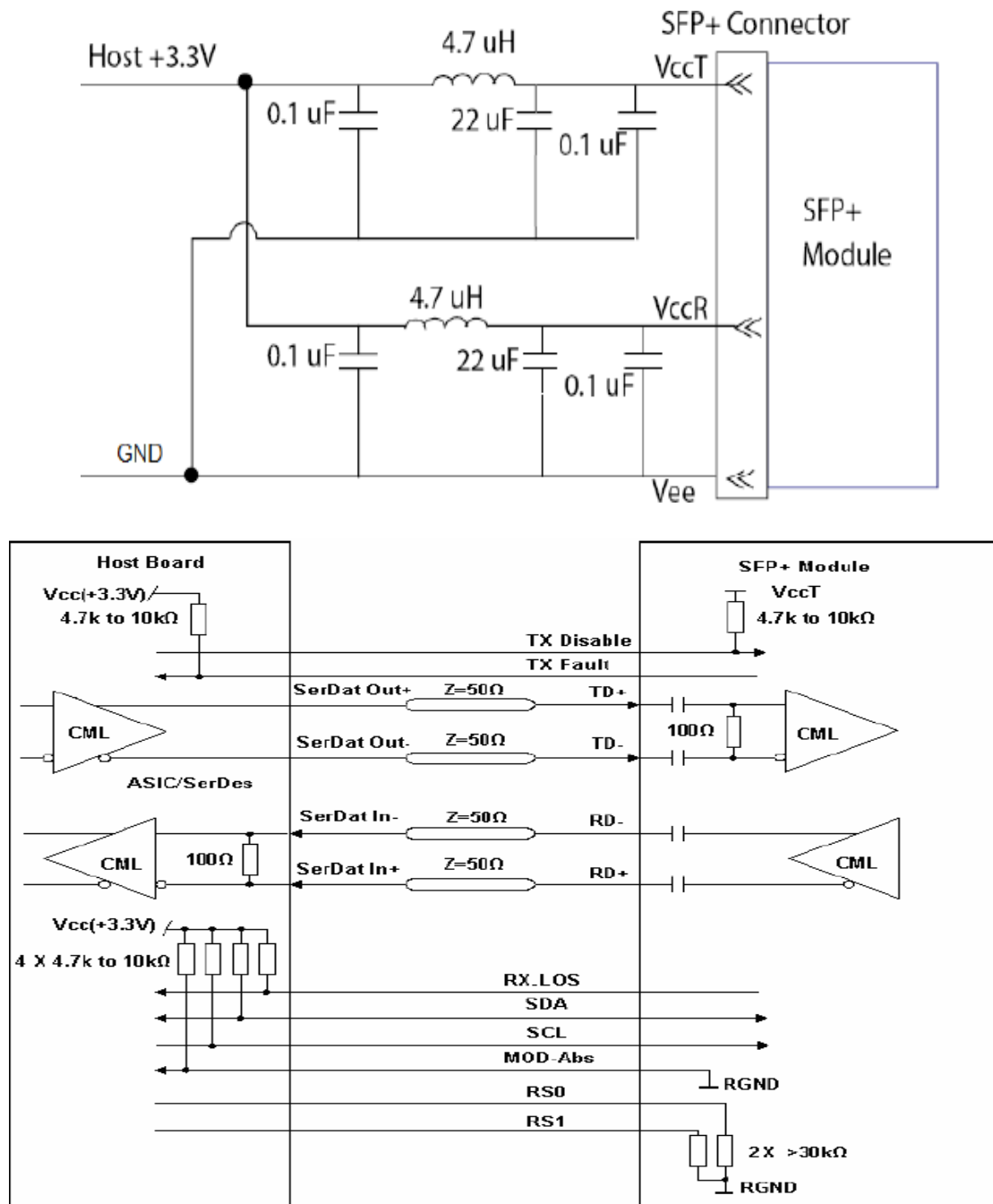
Key Features

- Support multi-protocol from 8.5Gb/s to 11.3Gb/s
- Hot-Pluggable SFP+ footprint
- 850nm VCSEL Tocan laser transmitter
- Duplex LC connector
- Up to 300m links on MMF OM3, 400m on MMF OM4
- Single +3.3V Power Supply
- Power consumption<1W
- Compliant with SFF-8431 SFF-8432 and IEE802.3ae
- Operating temperature range:
Commercial: 0°C to +70°C
Industrial: -40°C to +85°C
- RoHS compliant (lead-free)

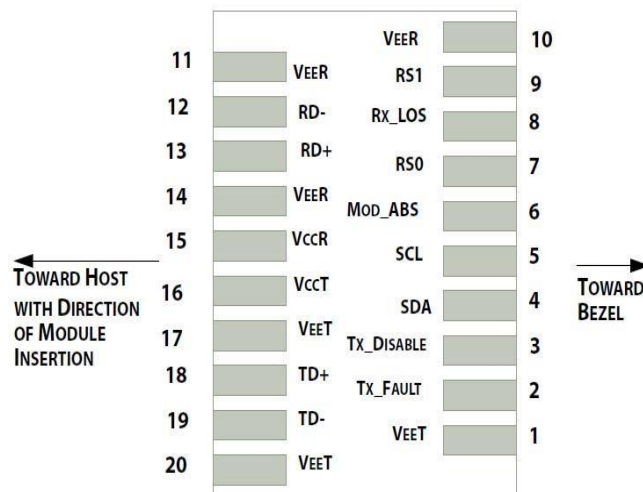
Mechanical Dimensions



Recommended Circuit



Pin Descriptions



Pin	Symbol	Name/Description	Note
1	V _{EET}	Module transmitter ground	1
2	T _{FAULT}	Module transmitter fault	2
3	T _{DIS}	Transmitter Disable; Turns off transmitter laser output	3
4	MOD_DEF(2)	2 wire serial interface data input/output (SDA)	
5	MOD_DEF(1)	2 wire serial interface clock input (SCL)	
6	MOD_DEF(0)	Module Absent, connect to VeeR or VeeT in the module	2
7	Rate Select	Rate select0, optionally control SFP+ receiver. When high, input data rate >4.5Gb/s; when low, input data rate <=4.5Gb/s	
8	LOS	Receiver Loss of Signal Indication	4
9	V _{EER}	Rate select0, optionally control SFP+ transmitter. When high, input data rate >4.5Gb/s; when low, input data rate <=4.5Gb/s	
10	V _{EER}	Module receiver ground	1
11	V _{EER}	Module receiver ground	1
12	R _{D-}	Receiver inverted data out put	
13	R _{D+}	Receiver non-inverted data out put	
14	V _{EER}	Module receiver ground	1
15	V _{CCR}	Module receiver 3.3V supply	
16	V _{CCT}	Module transmitter 3.3V supply	
17	V _{EET}	Module transmitter ground	1
18	TD+	Transmitter inverted data input	
19	TD-	Transmitter non-inverted data input	
20	V _{EET}	Module transmitter ground	1

Notes:

1. The module ground pins shall be isolated from the module case.
2. This pin is an open collector/drain output pin and shall be pulled up with 4.7K-10Kohms to Host_V_{cc} on the host board.
3. This pin shall be pulled up with 4.7K-10Kohms to V_{cct} in the module.
4. This pin is an open collector/drain output pin and shall be pulled up with 4.7K-10Kohms to Host_V_{cc} on the host board.

Specifications

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	T _s	-40		+85	°C	
Case Operating Temperature	T _A	0		70	°C	
Supply Voltage	V _{CC}	-0.5		3.6	V	
Industrial	T _c	-40		+85	°C	
Commercial	T _c	0		70	°C	

General

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Bit Rate	BR	9.95	10.3125	11.3	Gb/s	Bit Rate
Bit Error Ratio	BER	0		10 ⁻¹²		Bit Error Ratio
Supply Voltage	V _{CC}	-0.5		3.6	V	Supply Voltage
Maximum Supported Distances(OM4)				400	m	Maximum Supported Distances(OM4)

Timing Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
TX_Disable Assert Time	t _{off}			10	us	
TX_Disable Negate Time	t _{on}			1	ms	
Time to Initialize Include Reset of TX_FAULT				300	ms	
TX_FAULT from Fault to Assertion	t _{fault}			100	us	
TX_Disable Time to Start Reset	t _{reset}	10			us	
Receiver Loss of Signal Assert Time	T _A ,RX_LOS			100	us	
Receiver Loss of Signal Deassert Time	T _d ,RX_LOS			100	us	
Rate-Select Charge Time	t _{ratesel}			10	us	

Electrical Characteristics (Condition: TOP =25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage	V _{CC}	3.14		3.47	V	
Supply Current	I _{CC}			300	mA	
Transmitter						
Input Differential Impedance	R _{in}		100		Ω	1
Tx Input Single Ended DC Voltage Tolerance (RefV _{eeT})	V	-0.3		4	V	
Differential Input Voltage Swing	V _{in,pp}	100		1000	mV	2
Transmit Disable Voltage	V _D	2		V _{CC}	V	3
Transmit Enable Voltage	V _{EN}	V _{ee}		+0.8	V	
Receiver						
Single Ended Output Voltage Tolerance	V	-0.3		4	V	
Rx Output Diff Voltage	V _O	300		1000	mV	
Rx Output Rise and Fall Time	Tr/Tf	30			ps	4
LOS Fault	V _{LOS fault}	2		V _{CCHOST}	V	5
LOS Normal	V _{LOS norm}	V _{ee}		+0.8	V	5

Notes:

1. Connected directly to TX data input pins. AC coupling from pins into laser driver IC.
2. Per SFF-8431 Rev 3.0
3. Into 100 ohms differential termination.
4. 20% to 80%
5. LOS is an open collector output. Should be pulled up with 4.7k – 10kΩ on the host board. Normal operation is logic 0; loss of signal is logic 1. Maximum pull-up voltage is 5.5V.

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Center Wavelength	λ_t	830	850	870	nm	
RMS Spectral Width	$\Delta\lambda_{rms}$			0.45	nm	
Average Optical Power	P_{avg}	-6		-1	dBm	1
Optical Power OMA	P_{oma}		-1.5		dBm	
Laser Off Power	P_{off}			-30	dBm	
Extinction Ratio	ER	3.5			dB	
Transmitter Dispersion Penalty	TDP			3.9	dB	2
Relative Intensity Noise	R_{in}			-128	dB/Hz	3
Optical Return Loss Tolerance		20			dB	
Receiver						
Center Wavelength	λ_r	830		870	nm	
Receiver Sensitivity (OMA) @ 10.3Gb/s	S_{en}			-10.5	dBm	4
Stressed Sensitivity (OMA)	S_{enST}				dBm	4
Los Assert	LOS_A	-25			dBm	
Los De-Assert	LOS_D			-12	dBm	
Los Hysteresis	LOS_H	0.5			dB	
Overload	Sat	-1			dBm	5

Notes:

1. Average power figures are informative only, per IEEE802.3ae.
2. TWDP figure requires the host board to be SFF-8431compliant. TWDP is calculated using the Matlab code provided in clause 68.6.6.2 of IEEE802.3ae.
3. 12dB reflection.
4. Conditions of stressed receiver tests per IEEE802.3ae. CSRS testing requires the host board to be SFF-8431 compliant.
5. Receiver overload specified in OMA and under the worst comprehensive stressed condition.

Ordering Information

Product Name	Product Description
SFPP-ATLP-85-04	SFP+ plug-in, 10 Gbps, 400m on OM4, TX/RX 850nm, on two multimode fiber, LC duplex
SFPP-ATLP-85-04A	SFP+ plug-in, 10 Gbps, 400m on OM4, TX/RX 850nm, on two multimode fiber, LC duplex, Industrial Temp -40 to 85°C
JSPP-ATLP-85-04	SFP+ plug-in, 10 Gbps, 400m on OM4, TX/RX 850nm, on two multimode fiber, LC duplex, Juniper Compatible
JSPP-ATLP-85-04A	SFP+ plug-in, 10 Gbps, 400m on OM4, TX/RX 850nm, on two multimode fiber, LC duplex, Industrial Temp -40 to 85°C, Juniper Compatible

Contact Information



Ascent Communication Technology Ltd

AUSTRALIA

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

Hong Kong SAR

Room 1210, 12th Floor, Wing Tuck Commercial Centre
181 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

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