

10G SFP+ Active Optical Cables

AOC-S1S1-xxx

Features

- Support 10GBASE-SR/10G Fiber Channel application
- Compliant to SFP+ Electrical MSA SFF-8431
- Compliant to SFP+ Mechanical MSA SFF-8432
- Multi rate of up to 11.3Gbps
- Transmission distance up to 100m (OM3)
- +3.3V single power supply
- Low power consumption
- Operating case temp Commercial: 0°C to +70 °C
- RoHS compliant
- Password protection for A0h and A2h



Applications

- 10GBASE-SR at 10.31Gbps
- InfiniBand QDR, SDR, DDR
- Other optical links

Absolute Maximum Ratings

Table1- Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Supply Voltage	Vcc3	-0.5	-	+3.6	V	
Storage Temperature	Ts	-40	-	+85	°C	
Operating Humidity	R _H	+5	-	+85	%	1
Receiver Damage Threshold	P Rdmg	+3.4	-	-	dBm	

Note1: No condensation

Recommended Operating Conditions

Table 2- Recommended operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	Tc	0	-	+70	°C	
Power Supply Voltage	Vcc	3.14	3.3	3.47	V	
Power Supply Current	Icc	-	-	150	mA	
Power Dissipation	Pd	-	-	0.6	W	
Bit Rate	BR	-	10.3125	-	Gbps	
Fiber Bend Radius	Rb	3	-	-	cm	

Electrical Characteristics

Table 3- Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units	Notes	
Transmitter							
Differential Data Input Swing	V _{in,P-P}	200	-	1600	mVPP		
Input Differential Impedance	Z _{IN}	90	100	110	Ω		
Tx_Fault	Normal Operation	V _{OL}	0	-	0.8	V	
	Transmitter Fault	V _{OH}	2.0	-	VCC	V	
Tx_Disable	Normal Operation	V _{IL}	0	-	0.8	V	
	Laser Disable	V _{IH}	2.0	-	VCC+0.3	V	
Receiver							
Differential Date Output	V _{out}	370	-	1600	mV		
Output Differential Impedance	Z _D	90	100	110	Ω		
Rx_LOS	Normal Operation	V _{OL}	0	-	0.8	V	
	Lose Signal	V _{oH}	2.0	-	Vcc	V	

Optical Characteristics

Table 4-Optical Characteristics

Parameter	Symbol	Unit	Min	Typ	Max	Notes
Optical transmitter Characteristics						
Data Rate	DR	Gbps	9.953	10.3125	11.3	
Center Wavelength Range	λc	nm	820	850	880	
Laser Off Power	Poff	dBm	-	-	-45	
Launch Optical Power	P0	dBm	-6.0			1
Extinction Ratio	ER	dB	3	-	-	
Spectral Width(RMS)	RMS	nm	-		0.45	

Optical Receiver Characteristics						
Data Rate	DR	Gbps	9.953	10.3125	11.3	
Bit Error Rate	BER	dBm	-	-	E-12	2
Overload Input Optical Power	PIN	dBm	2.4	-	-	2
Center Wavelength Range	λ_c	nm	820	-	880	
Receiver Sensitivity in Average Power	Sen	dBm	-	-	-9.9	3
Los Assert	LosA	dBm	-26	-	-	
Los De-Assert	LosD	dBm	-	-	-12	
Los Hysteresis	LosH	dB	0.5	-	-	

Note:

1. Coupled into 50/125 MMF.
2. Measured with PRBS 2³¹-1 test pattern @10.3125Gbps.BER=10E-12

Recommended Host Board Power Supply Circuit

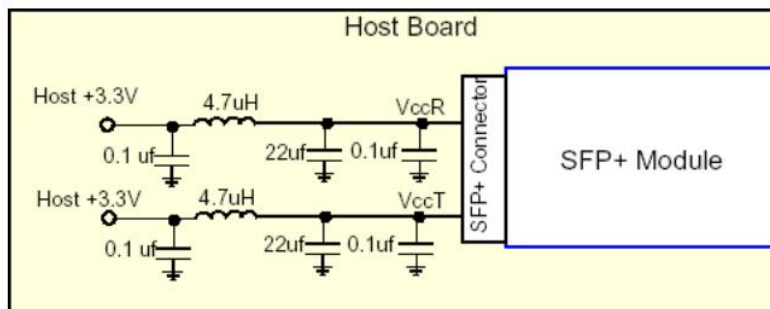


Figure 1, Recommended Host Board Power Supply Circuit

Recommended Interface Circuit

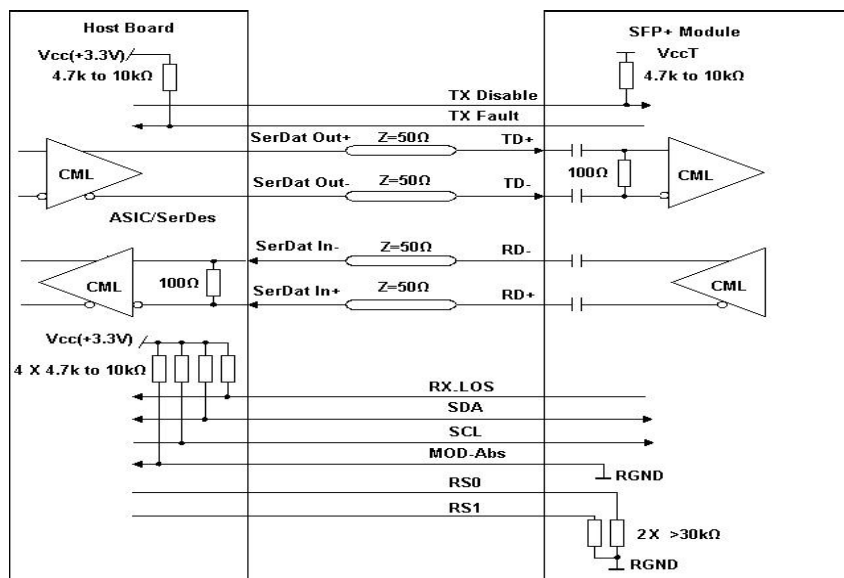


Figure 2, Recommended Interface Circuit

Pin arrangement

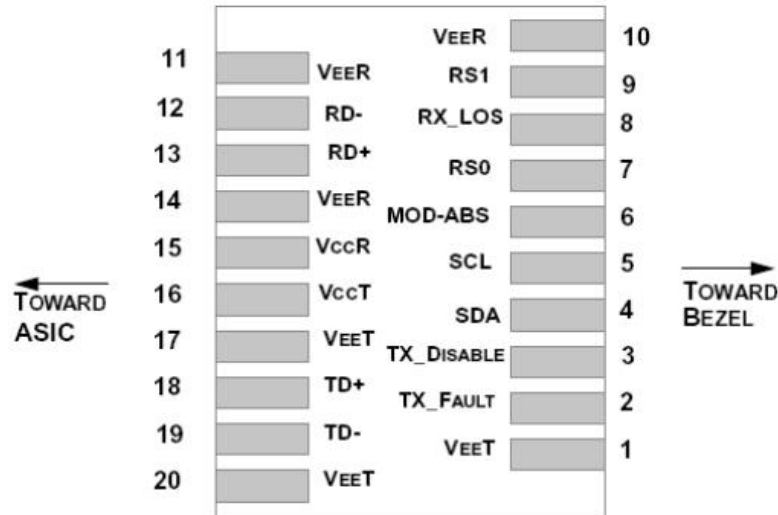


Figure 3, Pin View

Table 5-Pin Function Definitions

Pin	Symbol	Name/Description	Notes
1	VEET	Module Transmitter Ground	1
2	TX_FAULT	Module Transmitter Fault	2
3	TX_DISABLE	Transmitter Disable; Turns off transmitter laser output	3
4	SDA	2-Wire Serial Interface Data Line (MOD-DEF2)	
5	SCL	2-Wire Serial Interface Clock (MOD-DEF1)	
6	MOD_ABS	Module Absent, connected to VEET or VEER in the module	2
7	RS0	Rate Select 0, optionally controls SFP+ module receiver	
8	RX_LOS	Receiver Loss of Signal Indication (In FC designated as Rx_LOS and in Ethernet designated as NOT Signal Detect)	2
9	RS1	Rate Select 1, optionally controls SFP+ module transmitter	
10	VEER	Module Receiver Ground	1
11	VEER	Module Receiver Ground	1
12	RD-	Receiver Inverted Data Output	
13	RD+	Receiver Non-Inverted Data Output	
14	VEER	Module Receiver Ground	1
15	VCCR	Module Receiver 3.3 V Supply	
16	VCCT	Module Transmitter 3.3 V Supply	
17	VEET	Module Transmitter Ground	1
18	TD+	Transmitter Non-Inverted Data Input	
19	TD-	Transmitter Inverted Data Input	
20	VEET	Module Transmitter Ground	1

Note:

1. The module ground pins are isolated from the module case.
2. The pins shall be pulled up with 4.7K-10Kohms to a voltage between 3.14V and 3.46V on host board.
3. The pin is pulled up to VCCT with a 4.7K-10KΩ resistor in the module.

Monitoring Specification

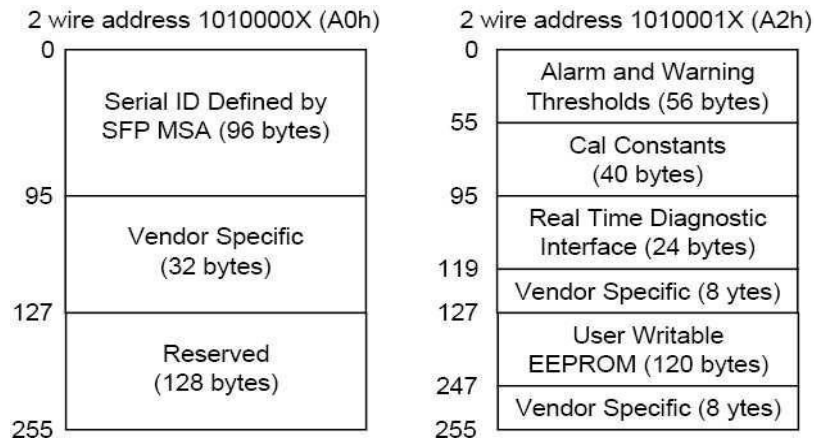


Figure 4, Memory Map

Mechanical

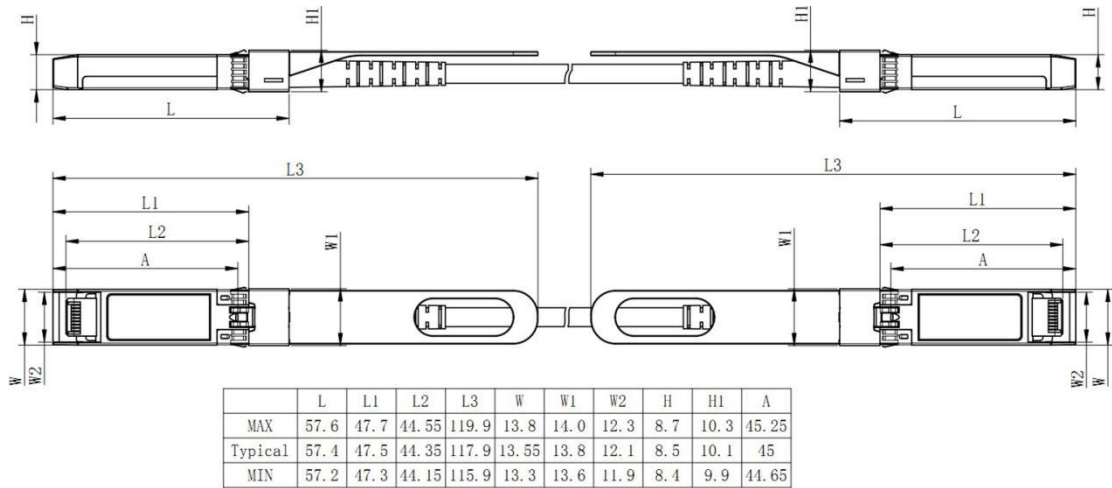


Figure 5, Mechanical Diagram

Table 6-Cable Mechanical Specifications

Parameter	Value	Units
Diameter	3	mm
Minimum bend radius	30	mm
Length tolerance	Length < 5 m: +300 /-0 5 m ≤ length ≤ 50 m: +500 / -0 50 m < length: +1000 /-0	mm
Cable color	Aqua(OM3)	

Warnings

Handling Precautions

This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

Laser Safety

Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

Order Information

Part No.	Bit Rate (Gbps)	Laser (nm)	Distance	Fiber Type	DDMI	Connector	Temp
AOC-S1S1-xxx	10.3125	850	0.5~150m	MMF	YES	LC	0°C~+70°C

Note:

1. Case Temperature

Revision History

Revision	Initiated	Approved	content	Revision History	Release Date
Ver1.0	HT.Huang	Nicky.Wen	Released	The latest version	Apr/2019

Further Information
