GHSX0ACXX

10Gb/s SFP+ Active Optical Cable

Features

- Electrical interface compliant to SFF-8431
- Lane bit rate 10.3 Gb/s
- 850nm VCSEL laser and PIN photo-detector
- I2C interface with integrated Digital Diagnostic monitoring
- Single +3.3V power supply
- Hot Plug-gable
- Maximum link length of 300m on OM3 MMF
- Operating case temperature : 0°C to +70 °C
- RoHS compliant

Application

- 10G Gigabit Ethernet
- InfiniBand QDR, DDR, SDR
- High-performance computing clusters
- 4G and 8G Fibre Channel Applications
- Servers, switches, storage and host card adapters;

General Description

The GearLink's SFP+ Active Optical Cables are direct-attach fiber assemblies with SFP+ connectors. They have very good power consumption performance. They are suitable for very short distances and offer a cost-effective way to connect within racks and across adjacent racks. The length of GearLink's SFP+ Active Optical Cables is up to 300 meters on OM3 MMF.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Storage Temperature	T_S	-40	-	+85	°C	
Supply Voltage	V_{CC}	-0.3	-	+3.6	V	
Operating Relative Humidity	RH	0	-	+85	%	no condensation

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	TC	0	-	+70	℃	GHSX0ACXX
		-40		+85	℃	GHSX0AIXX
Power Supply Voltage	VCC	3.13	3.3	3.47	V	
Power Supply Current	ICC	-	-	250	MA	
Maximum Power Dissipation	PD	-	-	0.87	W	
Data Rate	DRAVE	-	10.312	-	Gb/s	
Transmission Distance	TD		-	300	m	Over MMF

General Specifications

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Bit Rate	BR		10.3		Gb/s	
Bit Error Ratio	BER			10-12		1

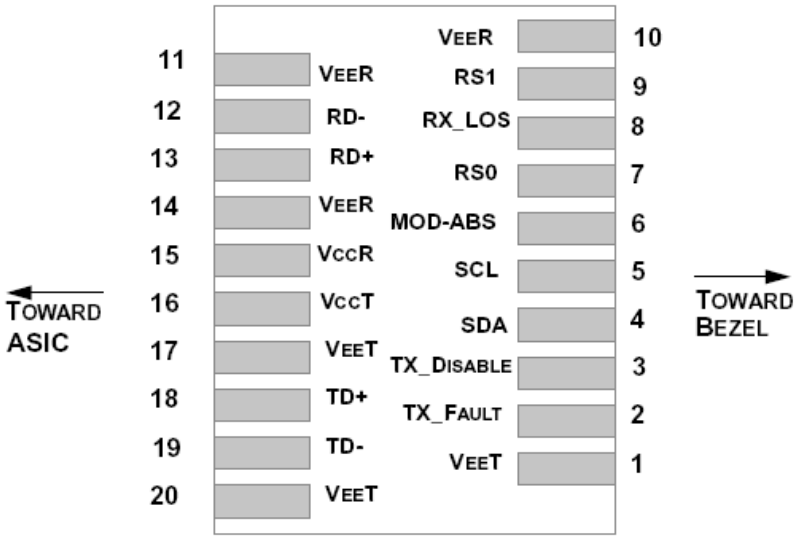
Notes:

1. Measured with a PRBS 2^{31}-1 test pattern @10.3125Gbps,BER≤10-12.

Electrical Characteristics

Parameter		Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter (Module Input)							
Differential Data Input Amplitude		VIN,P-P	300	-	1100	mVpp	
Differential Termination Mismatch			-	-	10	%	
Tx_Disable	Normal Operation	VIL	-0.3	-	0.8	V	
	Laser Disable	VIH	2.0	-	VCC+0.3	V	
Receiver (Module Output)							
Differential Data Output Amplitude		VOUT,P-P	370	-	950	mVpp	
Differential Termination Mismatch（1MHZ）			-	-	10	%	
Output Rise/Fall Time, 20%~80%		TR	12	-	-	ps	
Rx_LOS	Normal Operation	VOL	-	-	0.4	V	
	Lose Signal	VOH	VCC-0.5	-	-	V	

Pin Assignment



Pin Description

Pin	Name	Function	Plug Seq.	Notes
1	VeeT	Transmitter Ground	1	Note 5
2	TX Fault	Transmitter Fault Indication	3	Note 1
3	TX Disable	Transmitter Disable	3	Note 2, Module disables on high or open
4	SDA	Module Definition 2	3	2-wire Serial Interface Data Line.
5	SCL	Module Definition 1	3	2-wire Serial Interface Clock.
6	MOD_ABS	Module Definition 0	3	Note 3
7	RS0	RX Rate Select (LVTTL).	3	Rate Select 0, optionally controls SFP+ module receiver. This pin is pulled low to VeeT with a >30K resistor..
8	LOS	Loss of Signal	3	Note 4
9	RS1	TX Rate Select (LVTTL).	1	Rate Select 1, optionally controls SFP+ module transmitter. This pin is pulled low to VeeT with a >30K resistor.
10	VeeR	Receiver Ground	1	Note 5
11	VeeR	Receiver Ground	1	Note 5
12	RD-	Inv. Received Data Out	3	Note 6
13	RD+	Received Data Out	3	Note 6
14	VeeR	Receiver Ground	1	Note 5
15	VccR	Receiver Power	2	3.3 ± 5%, Note 7
16	VccT	Transmitter Power	2	3.3 ± 5%, Note 7
17	VeeT	Transmitter Ground	1	Note 5
18	TD+	Transmit Data In	3	Note 8
19	TD-	Inv. Transmit Data In	3	Note 8
20	VeeT	Transmitter Ground	1	Note 5

Note:

1.TX Fault is an open collector/drain output, which should be pulled up with a 4.7K – 10KΩ resistoron the host board. Pull up voltage between 2.0V

and VccT/R+0.3V. When high, output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.

2.TX disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7K – 10 KΩ resistor. Its states are: Low (0 – 0.8V): Transmitter on (>0.8, < 2.0V): Undefined High (2.0 – 3.465V): Transmitter Disabled Open: Transmitter Disabled

3.Module Absent, connected to VeeT or VeeR in the module.

4.LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7K – 10KΩ resistor. Pull up voltage between 2.0V and VccT/ R+0.3V. When high, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.

5.The module signal ground contacts, VeeR and VeeT, should be isolated from the module case.

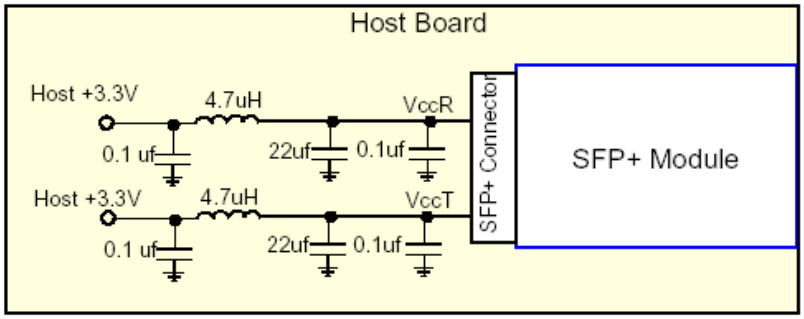
6.RD-/+: These are the differential receiver outputs. They are AC coupled 100Ω differential lines

7.which should be terminated with 100Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board. The voltage swing on these lines will be between 350 and 700 mV differential (175 –350 mV single ended) when properly terminated.

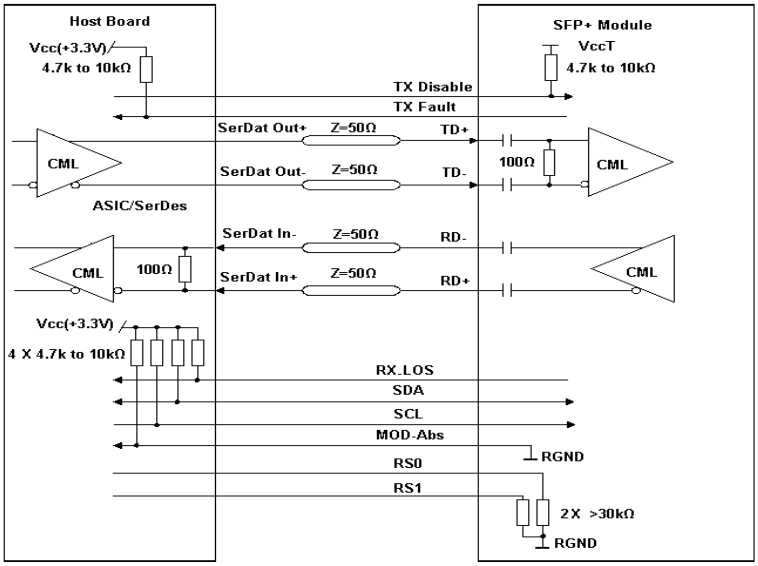
8.VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V ±5% at the SFP+ connector pin. Maximum supply current is 725mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than 1 ohm should be used in order to maintain the required voltage at the SFP+ input pin with 3.3V supply voltage. When the recommended supply-filtering network is used, hot plugging of the SFP+ transceiver module will result in an inrush current of no more than 30mA greater than the steady state value. VccR and VccT may be internally connected within the SFP+ transceiver module.

9.TD-/+: These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board. The inputs will accept differential swings of 150 – 1200 mV (75 – 600mV single-ended).

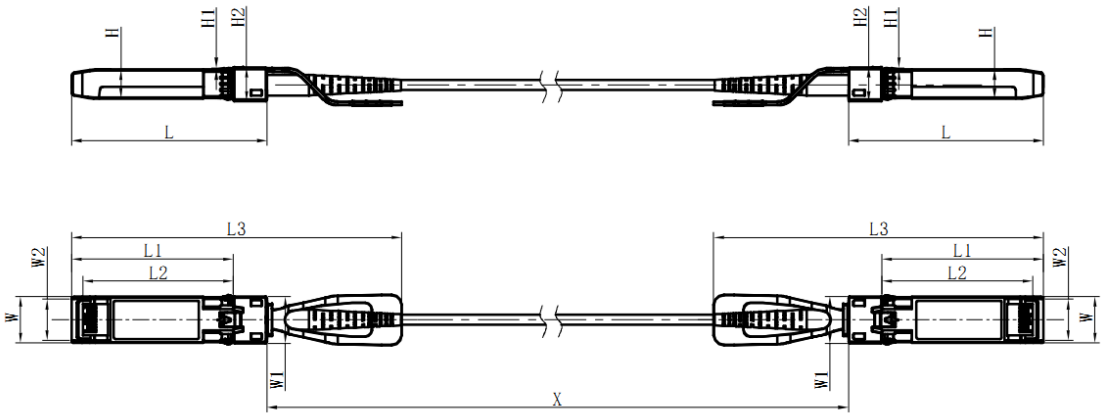
Recommended Host Board Power Supply Circuit



Recommended interface Circuit



Mechanical Dimension



Unit: mm

	L	L1	L2	L3	W	W1	W2	H	H1	H2
MAX	57.75	48.0	44.65	102.5	13.75	14.0	12.25	8.65	0.55	10.4
Typical	57.55	47.8	44.45	101.5	13.65	13.9	12.15	8.55	0.5	10.2
MIN	57.35	47.6	44.25	100.5	13.55	13.8	12.05	8.45	0.45	10.0

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.

Ordering Information

GHSX0ACXX	SFP+ Active Optical Cable with operate temperature 0℃~70℃
GHSX0AIXX	SFP+ Active Optical Cable with operate temperature -40℃~85℃