10G SFP+ Active Optical Cable Specification

1 Description

10G SFP active optical cable (AOC) components are supported by active circuits and have a longer distance than standard passive or active SFP+ copper cables. They are designed for high-speed, short-range data links via fiber optic lines. The SFP+AOC cable provides a high-performance enhanced small form factor pluggable (SFP+) interface, which is a cost-effective solution for data center/storage and all short-range data applications.

10G SFP active optical cable can be used as an alternative to SFP+ passive and active copper cables, while providing improved signal integrity, longer distances, superior electromagnetic immunity and better bit error rate performance.

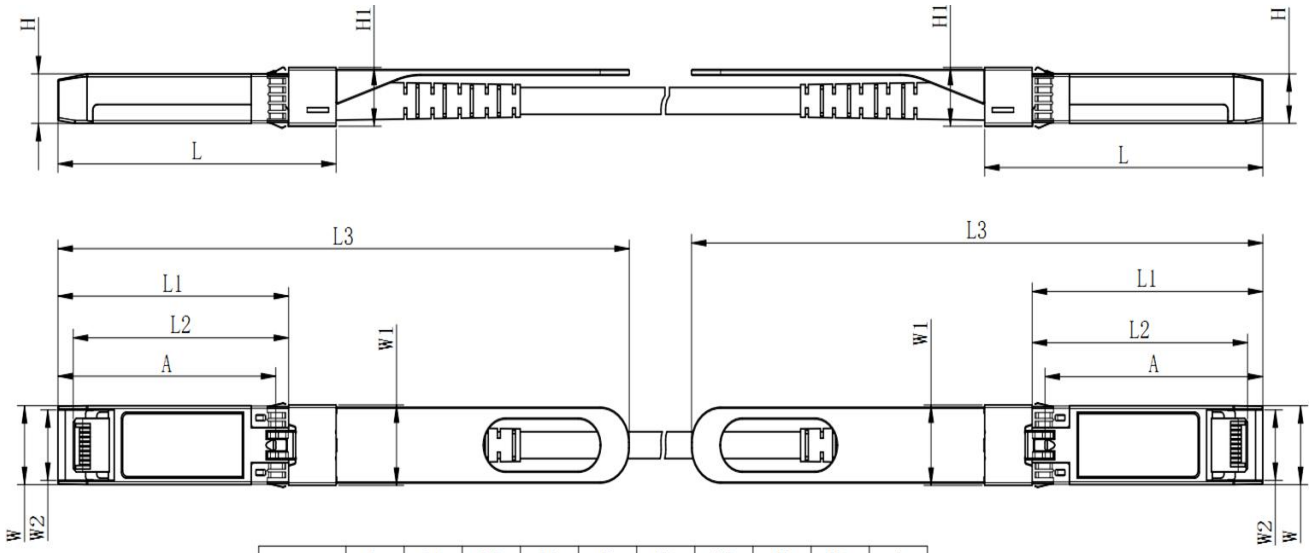
2 Product Features

- Electrical interface compliant to SFF-8431
- 850nm VCSEL laser and PIN photo-detector
- Digital diagnostics functions are available via the I2C interface
- RoHS compliant
- Hot Pluggable
- Temperature: 0°C to +70°C

3 Applications

- 10 Gigcabit Ethernet
- InfiniBand QDR, SDR, DDR
- Servers, switches, storage and host card adapters

4 Outline drawing

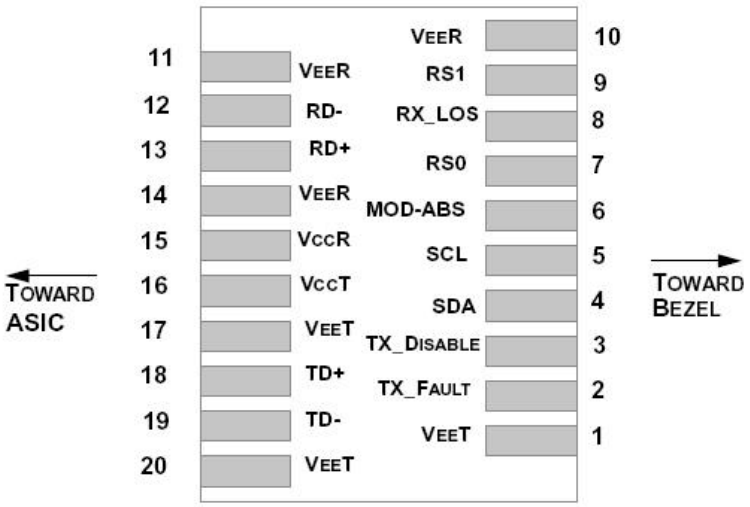


	L	L1	L2	L3	W	W1	W2	H	H1	A
MAX	57.6	47.7	44.55	119.9	13.8	14.0	12.3	8.7	10.3	45.25
Typical	57.4	47.5	44.35	117.9	13.55	13.8	12.1	8.5	10.1	45
MIN	57.2	47.3	44.15	115.9	13.3	13.6	11.9	8.4	9.9	44.65

Parameter	Value	Units
Diameter	3	mm
Minimum bend radius	30	mm
Length tolerance	Length < 1 m: +5 /-0	cm
	1 m ≤length ≤ 4.5 m: +15 / -0	cm
	5 m ≤length ≤ 14.5 m: +30 / -0	cm
	Length≥15.0 m +2% / -0	m
Cable color	Aqua(OM3);Orange(OM2)	

5 Wiring Diagram

5.1 pin



5.2 pin description

Pin	Symbol	Name/Description	Notes
1	$V_{EE}T$	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 $V_{EE}T$ or $V_{EE}R$ 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	$V_{EE}R$	Module Receiver Ground	1
11	$V_{EE}R$	Module Receiver Ground	1
12	RD-	Receiver Inverted Data Output	
13	RD+	Receiver Non-Inverted Data Output	
14	$V_{EE}R$	Module Receiver Ground	1
15	$V_{CC}R$	Module Receiver 3.3 V Supply	
16	$V_{CC}T$	Module Transmitter 3.3 V Supply	
17	$V_{EE}T$	Module Transmitter Ground	1
18	TD+	Transmitter Non-Inverted Data Input	
19	TD-	Transmitter Inverted Data Input	
20	$V_{EE}T$	Module Transmitter Ground	1

6. Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	T_C	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	

7. Electrical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Units	Notes
Transmitter							
Differential Data Input Swing		$V_{in,P-P}$	200	-	1600	mV_{PP}	
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	-	V_{CC}	V	
Tx_Disable	Normal Operation	V_{IL}	0	-	0.8	V	
	Laser Disable	V_{IH}	2.0	-	V_{CC}+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	-	V_{CC}	V	

8. 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	-	-	
（rms）	RMS	nm	-		0.45	

Spectral Width(RMS)						
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	P_{IN}	dBm	2.4	-	-	2
Center Wavelength Range	λc	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	-	-	

9. Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Supply Voltage	Vcc_3	-0.5	-	+3.6	V	
Storage Temperature	T_s	-40	-	+85	°C	
Operating Humidity	RH	+5	-	+85	%	1
Receiver Damage Threshold	P Rdmg	+3.4	-	-	dBm	