

25Gbps SFP28 Active Optical Cable

1. Applications

- 25GBASE-SR Ethernet
- Servers, switches, storage and host card adapters

2. Features

- Electrical interface compliant to SFF-8431
- 850nm VCSEL laser and PIN photo-detector
- Digital diagnostics functions are available via the I2C interface
- Operating case temperature Commercial: 0°C to +70 °C
- +3.3V single power supply
- Power consumption less than 1W
- RoHS compliant
- Password protection for A0h and A2h



3. Description

SFP28 Active Optical Cable (AOC) is a 25Gbps solution to 25G Ethernet, and datacenter. The AOC is SFP+ MSA compliance, low power consumption and lightweight.

4. Standard

- Compliant with SFF-8431 and SFF-8432
- Compliant with SFF-8472 Rev 10.2
- RoHS Compliant

5. Performance Specifications

5.1. Absolute Maximum Ratings

These values represent the damage threshold of the module. Stress in excess of any of the individual Absolute Maximum Ratings can cause immediate catastrophic damage to the module even if all other parameters are within Recommended Operating Conditions.

Table.1 Absolute maximum ratings

Parameter	Symbol	Min	Max	Units
Storage temperature	Ts	-40	85	°C
Relative Humidity	RH	5	85	%
Supply Voltage	Vc	-0.3	3.6	V
Supply Current	Icc		450	mA

5.2. Recommended Operating Conditions

Table.2 Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	Standard Tc	0	25	70	°C
Power Supply Voltage	Vcc	3.13	3.3	3.47	V
Power Supply Current	Icc		-	300	mA
Power Dissipation	PD		-	1000	mW
Data Rate	DR	8.5	25.78125		Gbps
Transmission Distance	TD			100	m

5.3. Transmitter Specification

Table.3 Transmitter Specification (Optical)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Average Output Power	Po	-6		2.4	dBm	
Disable Power	Poff			-40	dBm	
Extinction Ratio	ER	3.5			dB	

Output Centre Wavelength	λ_c	840		860	nm	
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Table.4 Transmitter Specification (Electrical)

Parameter	Symbol	Min	Typical	Max	Unit	
Data Input Swing Differential	V_{IN}	200		1600	mV	
Input Differential Impedance	Z_{IN}	90	100	110	Ω	
Transmit Disable Input	High	V_{IH}	2.0		$V_{CC}+0.3$	V
	Low	V_{IL}	0		0.8	V

5.4. Receiver Specification

Table.5 Receiver Specification (Optical)

Parameter	Symbol	Min	Typical	Max	Unit	note
Centre Wavelength	λ_c	840	850	860	nm	
Receiver Sensitivity	Sen			-8.2	dBm	1
Receiver Overload	Psat	2.4			dBm	1
LOS De-Assert	LOSD			-13	dBm	
LOS Assert	LOSA	-30			dBm	
LOS Hysteresis		0.5		4	dB	
Receiver Reflectance	Rrx			-12	dB	

Note : 1. Measured at BER 10⁻¹², 25Gbps, PRBS2³¹-1, NRZ

Table.6 Receiver Specification (Electrical)

Parameter	Symbol	Min	Typical	Max	Unit	note
Data Output Swing Differential	V_{out}	400		800	mV	
Rx-Los Fault	V_{lf}	2.0		$V_{CC}HOST$	V	
Rx-Los Normal	V_{ln}	0		0+0.8	V	
Output rise and fall time	T_r, T_f	28			ps	

5.5. Diagnostics Specification

Table.7 Diagnostics Specification

Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to 70	°C	±3°C	Internal / External
Voltage	3.0 to 3.6	V	±3%	Internal / External
Bias Current	0 to 100	mA	±10%	Internal / External
TX Power	-5 to -1	dBm	±3dB	Internal / External
RX Power	-30 to 0	dBm	±3dB	Internal / External

5.6. Pin Definitions

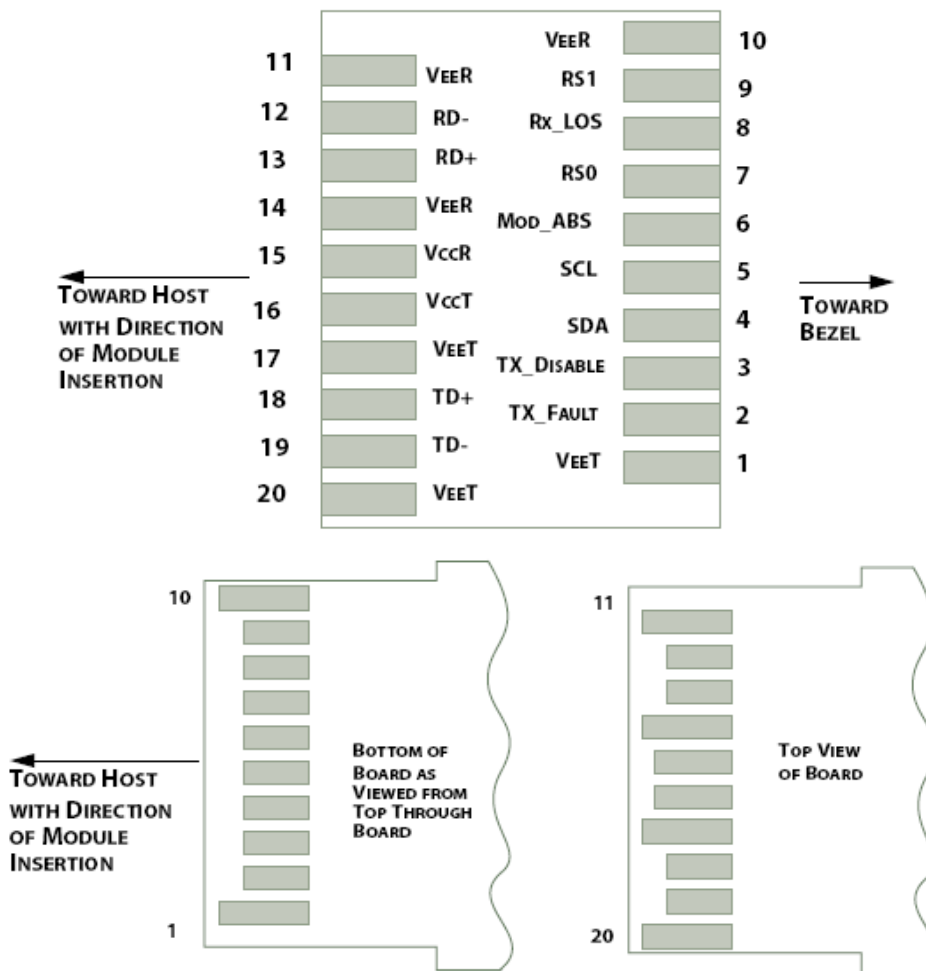


Table.8 Pin Definitions

PIN	Symbol	Description	Remarks
1	V _{EE} T	Transmitter ground (common with receiver ground)	Circuit ground is isolated from chassis ground
2	Tx_Fault	Transmitter Fault. Not supported	
3	Tx_Disable	Transmitter Disable. Laser output disable on high or open	Disabled: TDIS>2V or open Enabled: TDIS<0.8V
4	SDA	2-wire Serial Interface Data Line	Should Be pulled up with 4.7k – 10k ohm on host board to a voltage between 2V and 3.6V
5	SCL	2-wire Serial Interface Clock Line	
6	M _{OD} _ABS	Module Absent. Grounded within the module.	
7	RS0	No connection required	
8	RX_LOS	Loss of Signal indication. Logic 0 indicates normal operation	LOS is open collector output
9	RS1	No connection required	
10	V _{EE} R	Receiver ground (common with transmitter ground)	Circuit ground is isolated from chassis ground
11	V _{EE} R	Receiver ground (common with transmitter ground)	
12	RD-	Receiver Inverted DATA out. AC coupled	
13	RD+	Receiver Non-inverted DATA out. AC coupled	
14	V _{EE} R	Receiver ground (common with transmitter ground)	Circuit ground is isolated from chassis ground
15	V _{CC} R	Receiver power supply	
16	V _{CC} T	Transmitter power supply	
17	V _{EE} T	Transmitter ground (common with receiver ground)	Circuit ground is isolated from chassis ground
18	TD+	Transmitter Non-Inverted DATA in. AC coupled	
19	TD-	Transmitter Inverted DATA in. AC coupled	
20	V _{EE} T	Transmitter ground (common with receiver ground)	Circuit ground is isolated from chassis ground

5.9. Mechanical Dimensions

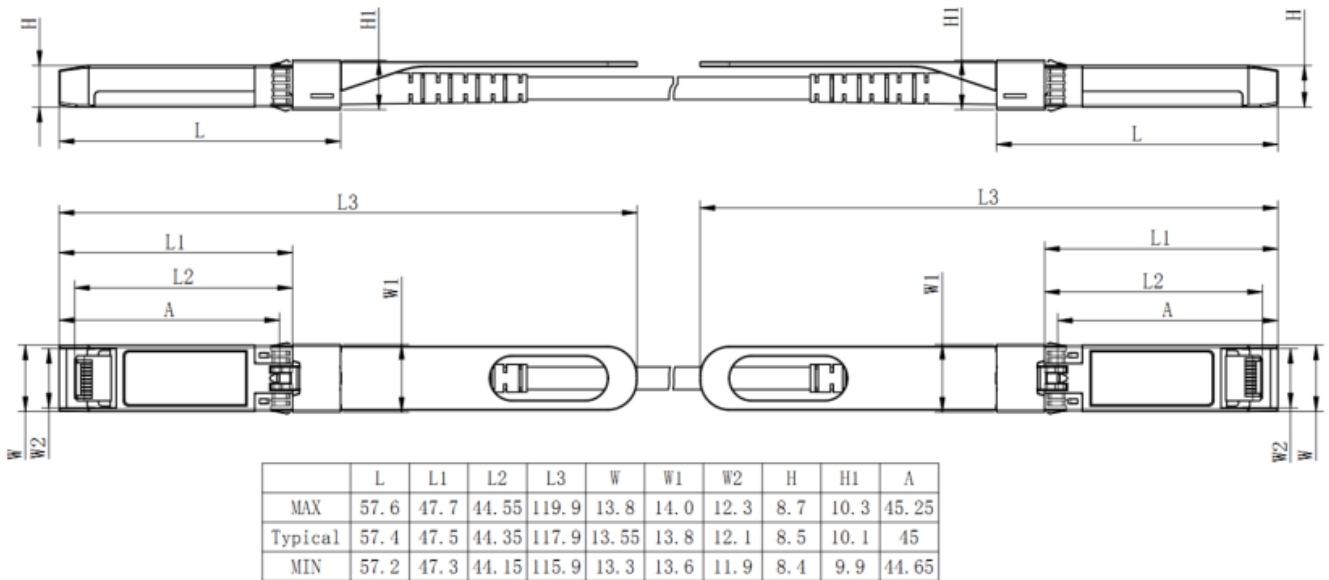


Diagram of Mechanical Dimensions

6. Application Cautions

6.1. ESD

This transceiver is specified as ESD threshold 1kV for high speed pins and 2kV for all other electrical input pins, tested per MIL-STD-883, Method 3015.4 /JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.

6.2. LASER SAFETY

This is a Class 1 Laser Product according to IEC 60825-1:1993:+A1:1997+A2:2001. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (July 26, 2001)