

## **Preliminary DATA SHEET**

### **CFORTH-SFP28-H25G-AOCxM**

25.78Gb/s SFP28 Active Optical Cable

### **CFORTH-SFP28-H25G-AOCxM Overview**

CFORTH-SFP28-H25G-AOCxM SFP28 active optical cables are based on 25G Ethernet IEEE 802.3 standard. They are compliant with FC-PI-6, SFF-8402, SFF-8419, SFF-8432 and SFF-8472, providing a fast and reliable interface for 25G Ethernet applications.

### **Product Features**

- Operating data rate support 25.2Gbps to 28.1Gbps
- Compliant with IEEE 802.3
- Compliant with FC-PI-6
- Compliant with SFF-8402
- Compliant with SFF-8419
- Compliant with SFF-8432
- Compliant with SFF-8472
- Hot-pluggable SFP+ footprint
- 850nm VCSEL laser transmitter and PIN receiver
- Up to 100m in length
- RoHS6 Compliant
- Single power supply 3.3V
- Low power consumption (module working power <0.5W@Single-end)
- Operating temperature range: 0°C to70°C(case temperature)

### **Applications**

- 25G Ethernet Data Center Intra-Rack and Inter-Rack links

## Ordering Information

Part Number	Description	Color on Clasp
CFORTH-SFP28-H25G-AOCxM	25G SFP28 Active Optical Cable, Length 0.5~100 meters	Blue

## General Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Data Rate	DR		25.78		Gb/s	1
Bit Error Rate	BER			$5 \times 10^{-5}$		2
Operating Temperature	$T_C$	0		70	°C	3
Storage Temperature	$T_{STO}$	-40		85	°C	4
Supply Current	$I_{CC}$		145	290	mA	5
Input Voltage	$V_{CC}$	3.15	3.3	3.46	V	
Maximum Voltage	$V_{MAX}$	-0.5		4	V	5
Product Weight	G		54.0		g/PCS	6
Fiber Optical Cable Weight	G		7.5		g/M	7

### Notes:

1. IEEE 802.3
2. Measured with data rate at 25.78Gbps, PRBS  $2^{31}-1$
3. Case temperature
4. Ambient temperature
5. For electrical power interface
6. The weight of 1M
7. The weight of fiber optical cable per unit length

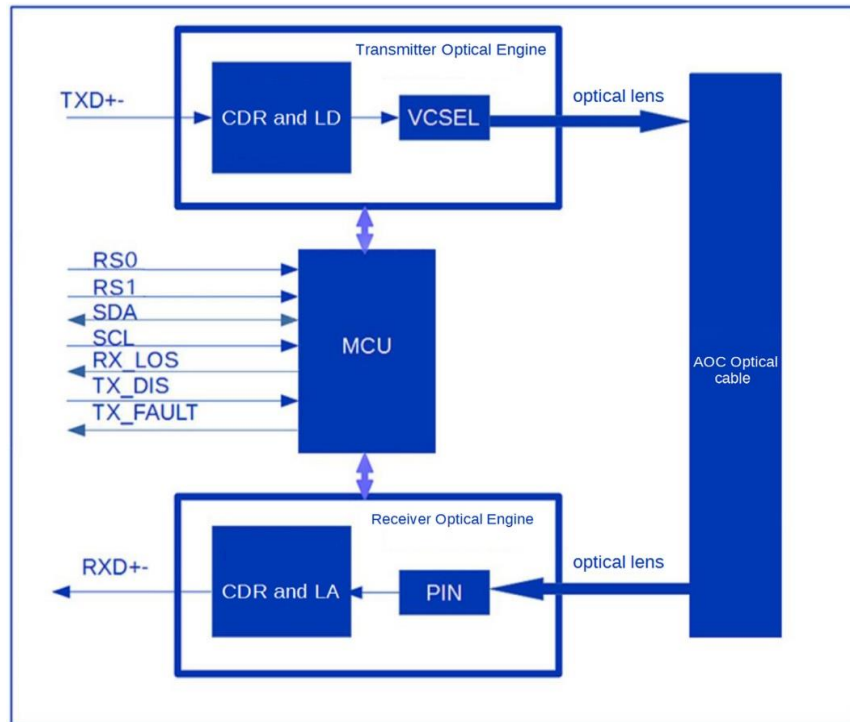
**Electrical – Characteristics – Transmitter** **$V_{CC}=3.15V$  to  $3.46V$ ,  $T_C=0^{\circ}C$  to  $70^{\circ}C$** 

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Input differential impedance	$R_{IN}$		100		$\Omega$	
Differential data input swing	$V_{IN\_PP}$	180		1600	mV	
Transmit Disable Voltage	$V_D$	2		$V_{CC}$	V	
Transmit Enable Voltage	$V_{EN}$	$V_{EE}$		$V_{EE}+0.8$	V	

**Electrical – Characteristics – Receiver** **$V_{CC}=3.15V$  to  $3.46V$ ,  $T_C=0^{\circ}C$  to  $70^{\circ}C$** 

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Differential data output swing	$V_{OUT\_PP}$	370	600	850	mV	
LOS Fault	$V_{LOS\_A}$	2		$V_{CC\_HOST}$	V	
LOS Normal	$V_{LOS\_D}$	$V_{EE}$		$V_{EE}+0.8$	V	

## Block-Diagram-of-Transceiver



## Functions Description

CFORTH-SFP28-H25G-AOCxM module is manufactured using the advanced COB (Chip on Board) process, which consists of a microcontroller, a transmitter optical engine and a receiver optical engine. The module has built-in clock and data recovery functions. The default fixed operation is in the 25.2Gbps-28.1Gbps rate range. If you need other speed range versions or dual rate range versions, you can contact us for special customization.

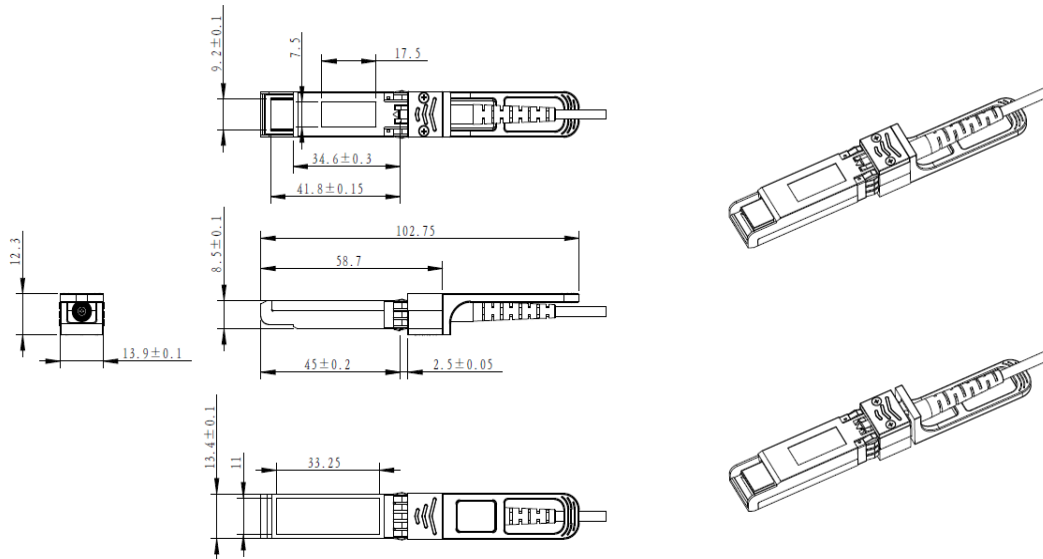
The transmitter optical engine includes a transmitter clock data recovery circuit (CDR) and a laser driver circuit (LD), a VCSEL laser, and a detection photodiode (MPD). The high-speed differential electrical signal output by the host is sent to the laser driver for amplification by CDR recovery shaping, driving the VCSEL laser to generate an optical signal, and the optical signal is coupled to the optical fiber through the optical lens. The light engine integrates a photodiode for detection for output optical power detection, and the laser driver uses an automatic optical power control loop to ensure the stability of the transmitted optical power.

The receiving end light engine includes a photodiode (PIN), a signal amplifier (TIA/LA) and a receiving end clock data recovery circuit (CDR). The optical signal in the optical fiber is coupled to the receiving photodiode (PIN) through the optical lens to be converted into The photo-generated current, the photo-generated current signal is amplified by the amplifier, sent to the CDR circuit and recovered from the clock and data signals, and finally output to the host as a high-speed differential signal.

## Optical Cable Details

Parameter	Min	Typ	Max	Unit	Remarks
Jacket Material		LSZH			
Jacket Color		Aqua Green			We can provide according to the needs of customers
Flammability Rating		OFN			We can provide according to the needs of customers
Outer Diameter	2.8	3.0	3.2	mm	
Tensile Load(Short Term)			200	N	
Tensile Load(Long Term)			100	N	
Crush Resistance	10			N/mm	IEC 60794-1-21
Impact Resistance	0.5			N.m	IEC 60794-1-21
Flexing	300			Cycles	IEC 60794-1-21
Twist Bend					IEC 60794-1-21
Cable to SFP+ Plug Connection			90	N	
Bend Radius(Short Term)	25			mm	
Bend Radius(Long Term)	30			mm	

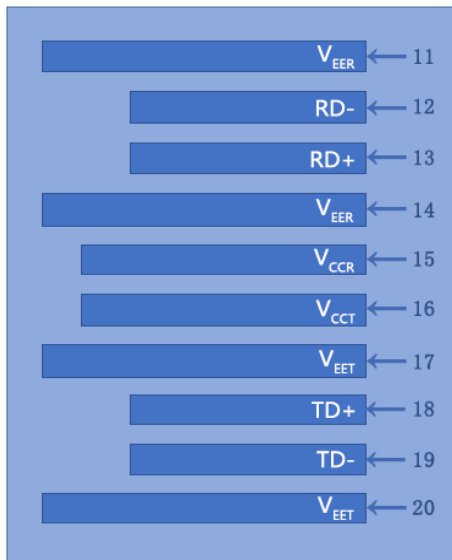
## Dimensions



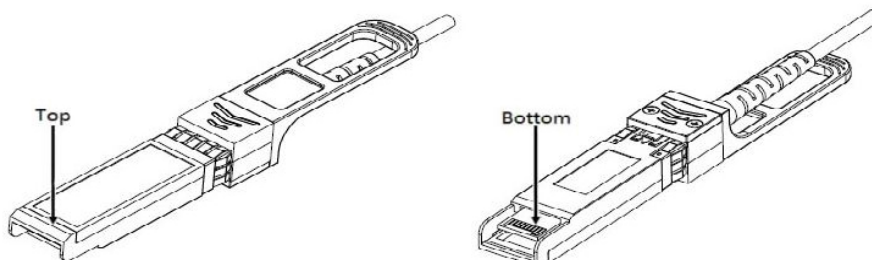
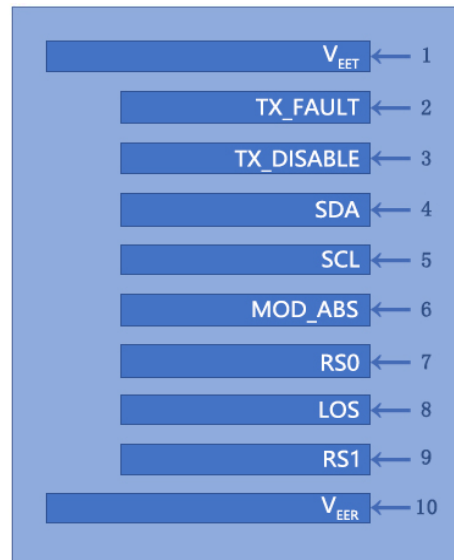
ALL DIMENSIONS ARE ±0.2mm UNLESS OTHERWISE SPECIFIED  
UNIT: mm

## Electrical Pad Layout

Top View Of Board



Bottom View Of Board



## Pin Assignment

PIN #	Symbol	Description	Remarks
1	V <sub>EET</sub>	Transmitter ground (common with receiver ground)	1
2	TX_FAULT	Transmitter Fault	
3	TX_DISABLE	Transmitter Disable. Laser output disabled on high or open	2
4	SDA	2-wire Serial Interface Data Line	3
5	SCL	2-wire Serial Interface Clock Line	3
6	MOD_ABS	Module Absent. Grounded within the module	3
7	RS0	No connection required	
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation	4
9	RS1	No connection required	1
10	V <sub>EER</sub>	Receiver ground (common with transmitter ground)	1
11	V <sub>EER</sub>	Receiver ground (common with transmitter ground)	1
12	RD-	Receiver Inverted DATA out. AC coupled	
13	RD+	Receiver Non-inverted DATA out. AC coupled	
14	V <sub>EER</sub>	Receiver ground (common with transmitter ground)	1
15	V <sub>CCR</sub>	Receiver power supply	
16	V <sub>CCT</sub>	Transmitter power supply	
17	V <sub>EET</sub>	Transmitter ground (common with receiver ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC coupled	
19	TD-	Transmitter Inverted DATA in. AC coupled	
20	V <sub>EET</sub>	Transmitter ground (common with receiver ground)	1

### Notes:

1. Circuit ground is isolated from chassis ground
2. Disabled: T<sub>DIS</sub>>2V or open, Enabled: T<sub>DIS</sub><0.8V
3. Should Be pulled up with 4.7k –10k ohm on host board to a voltage between 2V and 3.6V
4. LOS is open collector output