

## **C-SFF8644-QSFP-AOC5M**

5m SFF-8644 HD Male to QSFP+ Male Active Optical Storage Cable

### **Features**

- Support SAS 3.0 application
- Compliant to Electrical MSA SFF-8436
- Multi rate of up to 12Gb/s
- +3.3V single power supply
- Low power consumption
- Commercial Temperature 0 to 70 Celsius
- RoHS Compliant

### **Applications**

- SAS 3.0 at 12Gb/s per lane
- SAS 2.1 at 6Gb/s per lane
- Other optical links

### **Product Description**

This is a 5.0m (16.4ft) SFF-8644 external mini-SAS HD male to QSFP+ male aqua active optical storage cable that is used for high speed data transfer. This part is made to industry standard specifications and can be used in many different applications. This storage cable features SFF-8644 to QSFP+ connectors for connectivity between network appliances. These cables are application tested and guaranteed to work 100% of the time.

ProLabs' cables are RoHS compliant and lead free.

## Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power Supply Voltage	Vcc	-0.5		3.6	V
Storage Temperature	Tstg	-10		85	°C
Case Operating Temperature	Tc	0		70	°C
Operating Humidity (Non-Condensing)	RH	5		85	%
Bit Rate	BR	2.5	12.0		Gbps

## Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	Vcc	3.14	3.3	3.46	V	
Power Dissipation	P <sub>DISS</sub>			1.5	W	1
Transmit Turn-On Time	T <sub>ON</sub>	2000			ms	
Input Logic Level - High	V <sub>IH</sub>	2.5		Vcc+0.3	V	
Input Logic Level - Low	V <sub>IL</sub>	0		0.8	V	
Output Logic Level - High	V <sub>OH</sub>	2.4		Vcc	V	
Output Logic Level - Low	V <sub>OL</sub>	0		0.4	V	
<b>Transmitter</b>						
Differential Data Input Swing	V <sub>IN,pp</sub>	200		1200	mVp-p	
Input Differential Impedance	Z <sub>IN</sub>	90	100	110	Ω	
Average Launch Power Tx_Off	P <sub>off</sub>			-30	dBm	
<b>Receiver</b>						
Differential Data Output	V <sub>OUT</sub>	200		1100	mV	
Output Differential Impedance	Z <sub>D</sub>	90	100	110	Ω	
Bit Error Ratio	BER			10 <sup>-12</sup>		2

### Notes:

1. Per terminal.
2. PRBS2<sup>31</sup>-1 @12.0Gbps.

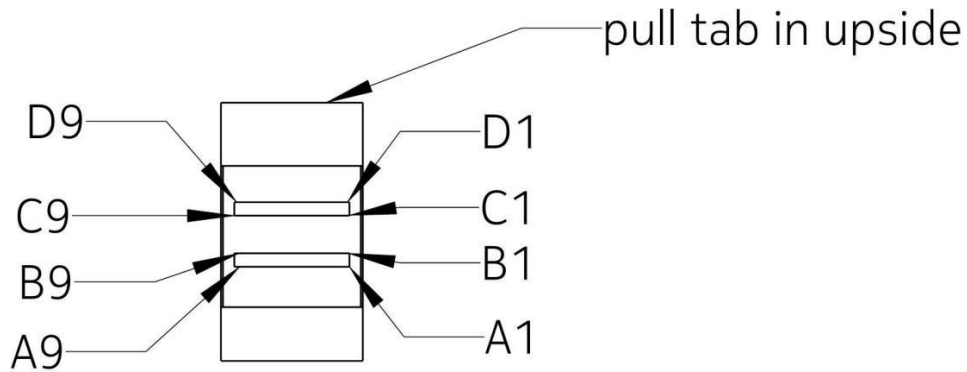
## Mini-SAS HD Pin Descriptions

Pin	Name	Function/Description	Notes
A1	Reserved	Must Be Disconnected.	
A2	IntL	Interrupt.	
A3	GND	Module Ground.	1
A4	Rx1+	Receiver Non-Inverted Data Input.	
A5	Rx1-	Receiver Inverted Data Input.	
A6	GND	Module Ground.	1
A7	Rx3+	Receiver Non-Inverted Data Input.	
A8	Rx3-	Receiver Inverted Data Input.	
A9	GND	Module Ground.	1
B1	Vact	+3.3V Power Supply.	
B2	ModPrsL	Module Present.	
B3	GND	Module Ground.	1
B4	Rx0+	Receiver Non-Inverted Data Input.	
B5	Rx0-	Receiver Inverted Data Input.	
B6	GND	Module Ground.	1
B7	Rx2+	Receiver Non-Inverted Data Input.	
B8	Rx2-	Receiver Inverted Data Input.	
B9	GND	Module Ground.	1
C1	SCL	2-Wire Serial Interface Clock.	
C2	SDA	2-Wire Serial Interface Data.	
C3	GND	Module Ground.	1
C4	Tx1+	Transmitter Non-Inverted Data Input.	
C5	Tx1-	Transmitter Inverted Data Input.	
C6	GND	Module Ground.	1
C7	Tx3+	Transmitter Non-Inverted Data Input.	
C8	Tx3-	Transmitter Inverted Data Input.	
C9	GND	Module Ground.	1
D1	Vact	+3.3V Power Supply.	
D2	Vman	Management Interface Power.	
D3	GND	Module Ground.	1
D4	Tx0+	Transmitter Non-Inverted Data Input.	
D5	Tx0-	Transmitter Inverted Data Input.	
D6	GND	Module Ground.	1
D7	Tx2+	Transmitter Non-Inverted Data Input.	
D8	Tx2-	Transmitter Inverted Data Input.	
D9	GND	Module Ground.	1

### Notes:

1. Circuit ground is internally isolated from the chassis ground.

### Mini-SAS HD Terminal Pin-Out Details



### QSFP+ Pin Descriptions

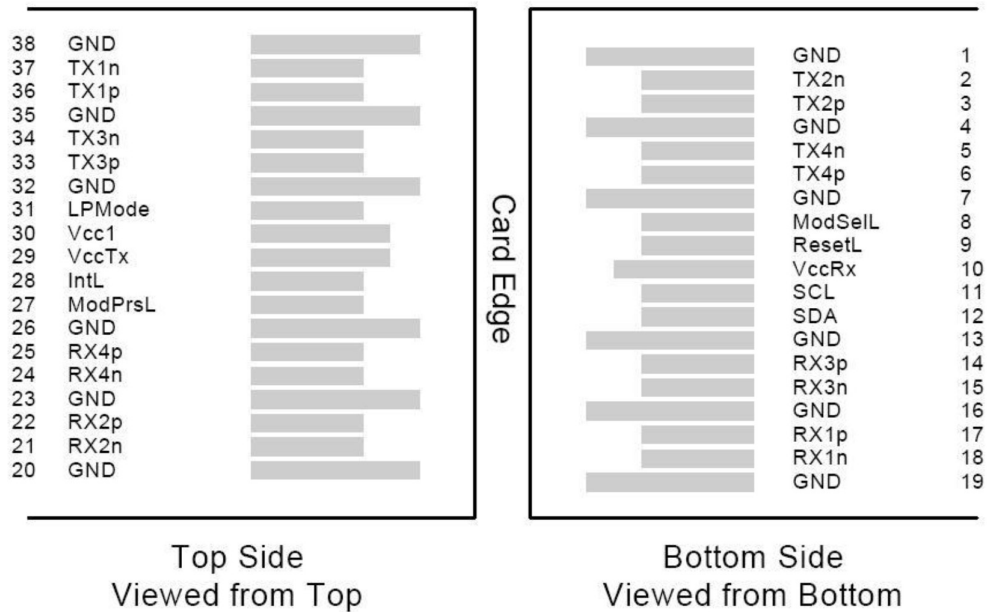
Pin	Name	Function/Description	Notes
1	GND	Transmitter Ground (Common with Receiver Ground).	1
2	Tx2-	Transmitter Inverted Data Input.	
3	Tx2+	Transmitter Non-Inverted Data Output.	
4	GND	Transmitter Ground (Common with Receiver Ground).	1
5	Tx4-	Transmitter Inverted Data Input.	
6	Tx4+	Transmitter Non-Inverted Data Output.	
7	GND	Transmitter Ground (Common with Receiver Ground).	1
8	ModSelL	Module Select.	2
9	ResetL	Module Reset.	2
10	VccRx	+3.3V Receiver Power Supply.	
11	SCL	2-Wire Serial Interface Clock.	2
12	SDA	2-Wire Serial Interface Data.	2
13	GND	Transmitter Ground (Common with Receiver Ground).	1
14	Rx3+	Receiver Non-Inverted Data Output.	
15	Rx3-	Receiver Inverted Data Output.	
16	GND	Transmitter Ground (Common with Receiver Ground).	1
17	Rx1+	Receiver Non-Inverted Data Output.	
18	Rx1-	Receiver Inverted Data Output.	
19	GND	Transmitter Ground (Common with Receiver Ground).	1
20	GND	Transmitter Ground (Common with Receiver Ground).	1
21	Rx2-	Receiver Inverted Data Output.	
22	Rx2+	Receiver Non-Inverted Data Output.	
23	GND	Transmitter Ground (Common with Receiver Ground).	1
24	Rx4-	Receiver Inverted Data Output.	1
25	Rx4+	Receiver Non-Inverted Data Output.	
26	GND	Transmitter Ground (Common with Receiver Ground).	1
27	ModPrsl	Module Present.	

28	IntL	Interrupt.	2
29	VccTx	+3.3V Transmitter Power Supply.	
30	Vcc1	+3.3V Power Supply.	
31	LPMMode	Low-Power Mode.	2
32	GND	Transmitter Ground (Common with Receiver Ground).	1
33	Tx3+	Transmitter Non-Inverted Data Input.	
34	Tx3-	Transmitter Inverted Data Output.	
35	GND	Transmitter Ground (Common with Receiver Ground).	1
36	Tx1+	Transmitter Non-Inverted Data Input.	
37	Tx1-	Transmitter Inverted Data Output.	
38	GND	Transmitter Ground (Common with Receiver Ground).	1

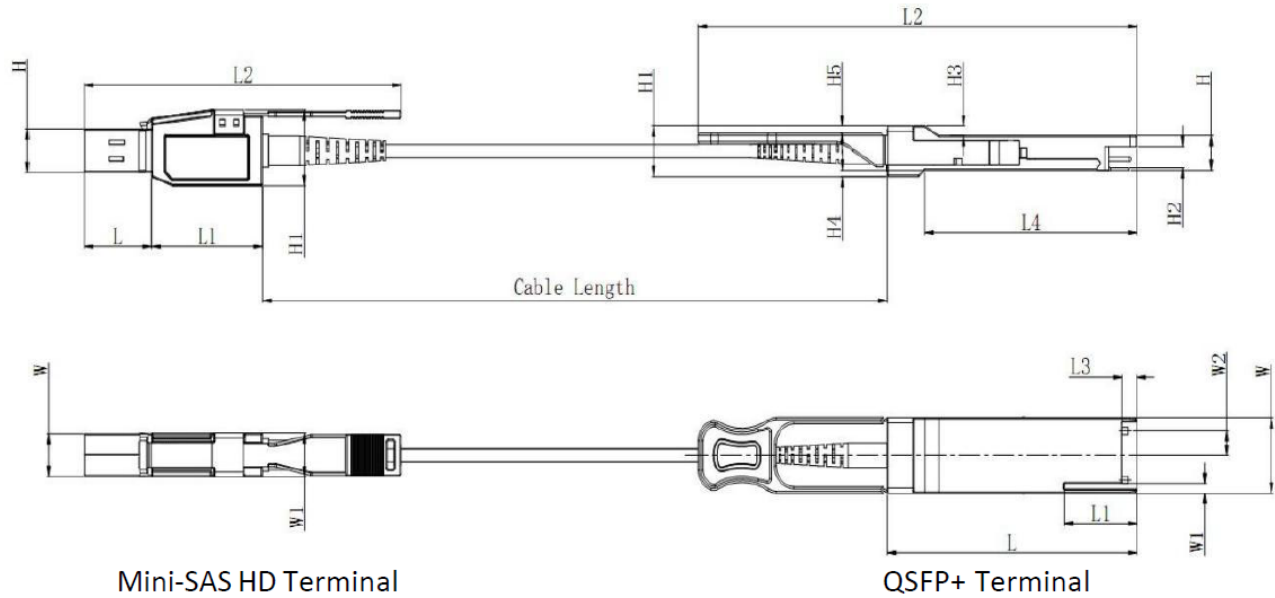
**Notes:**

1. The module signal grounds are isolated from the module case.
2. This is an open collector/drain output that on the host board requires a 4.7kΩ to 10kΩ pull-up resistor to the Host\_Vcc.

**QSFP+ Electrical Pin-Out Details**



## Mechanical Specifications



Mini-SAS HD	L	L1	L2	W	W1	H	H
Maximum	19.66	32.0	91.91	10.60	10.85	10.60	18.62
Typical	19.56	31.9	91.41	10.45	10.7	10.45	18.42
Minimum	19.46	31.8	90.91	10.55	10.55	10.30	18.22

### Notes:

- Unit: mm.

QSFP+	L	L1	L2	L3	L4	W	W1	W2	H	H1	H2	H3	H4	H5
Maximum	72.2	—	128	4.35	61.4	18.45	—	6.2	8.6	12.4	5.35	2.5	1.6	2.0
Typical	72.0	—	—	4.20	61.2	18.35	—	—	8.5	12.2	5.2	2.3	1.5	1.8
Minimum	68.8	16.5	124	4.05	61.0	18.25	2.2	5.8	8.4	12.0	5.05	2.1	1.3	1.6

### Notes:

- Unit: mm.

## Cable Tolerance

Fiber Cable Length (Unit: m)	Tolerance (Unit: cm)
5.0~14.5	+30/-0

## About ProLabs

Our experience comes as standard; for over 15 years ProLabs has delivered optical connectivity solutions that give our customers freedom and choice through our ability to provide seamless interoperability. At the heart of our company is the ability to provide state-of-the-art optical transport and connectivity solutions that are compatible with over 90 optical switching and transport platforms.

## Complete Portfolio of Network Solutions

ProLabs is focused on innovations in optical transport and connectivity. The combination of our knowledge of optics and networking equipment enables ProLabs to be your single source for optical transport and connectivity solutions from 100Mb to 400G while providing innovative solutions that increase network efficiency. We provide the optical connectivity expertise that is compatible with and enhances your switching and transport equipment.

## Trusted Partner

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure that you get immediate answers to your questions and compatible product when needed. With Engineering and Manufacturing offices in the U.K. and U.S. augmented by field offices throughout the U.S., U.K. and Asia, ProLabs is able to be our customers best advocate 24 hours a day.



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