

400G OSFP to 2x 200G QSFP56 Active Optical Breakout Cable

Features

- OSFP to two QSFP56 cable end
- Supports 53.125Gb/s per channel
- Low Power Dissipation, Max. 8W on OSFP end,
- Max. 4W on QSFP56 end
- 8x50G PAM4 VCSEL/PIN photo detector
- Operating Case Temperature: 0°C~70°C
- Compliant to Class 1M Laser Safety
- OSFP form factor compliance to:
- Compliant to OSFP Rev. 5.0 SFF-8679 electrical interface SFF-8661 Pluggable Module
- CMIS Rev. 4.0 Management Interface
- IEEE 802.3cd: Physical Layer Specifications and Management Parameters
- QSFP form factor compliance to:
- SFF-8636 Management Interface
- IEEE 802.3cd: Physical Layer Specifications and Management Parameters

Application

- InfiniBand for 4x 100G
- Data Center Interconnect

Description

The 400G OSFP to 2x 200G QSFP56 breakout AOC is an 4-channel, full-duplex, pluggable active optical cable. It is high-performance, ideal for short-range multi-lane data communication and interconnect applications, offering a low-cost, high-density solution for system providers and customers . This breakout cable is compliant with IEEE 802.3cd, OSFP Rev.5.0, SFF-8679, SFF-8661, SFF-8636, and CMIS Rev.4.0.

Product Specifications

I. General Product Characteristics

Parameter	Value	Unit	Comments
Module Form Factor	OSFP and QSFP		Module Form Factor
Number of Lanes	8TXand8RX		
Maximum Aggregate DataRate	425(OSFP) 212.5(QSFP)	Gb/s	
Maximum Data Rate perLane	53.125	Gb/s	
Standard Cable Lengths	3,5,7,10,15,20	meters	Other lengths may be available upon request
Protocols Supported	InfiniBand, Ethernet		

Electrical Interface and Pin-out	60-pin edge connector (OSFP)38-pin edge connector(QSFP56)		Pin-out as defined by OSFP Rev.5.0& QSFP SFF 8679
Standard Optical Cable Type	Multimode OM3($\leq 70\text{m}$) Multimode OM4($<100\text{m}$)		
Maximum Power Consumption per End	8(OSFP) and 4(QSFP56)	Watts	Varies without put voltage swing and pre-emphasis settings
Management Interface	Serial, I2C-based,400kHz Maximum frequency		As defined by CMIS Rev4.0

II. Force Specification

Parameter	Min.	Max.	Unit.	Comments.
ModuleInsertion		40 (OSFP) 40 (QSFP56)	Newton	
Module Extraction		30 (OSFP) 30 (QSFP56)	Newton	
Module Retention	125 (OSFP) 90 (QSFP56)		Newton	
Insertion and Removal Cycles	50		Cycle	
Cable Outer Diameter	2.9	3.1	mm	

III. Absolute Maximum Parameters

Exceeding the limits below may damage the active optical cable permanently.

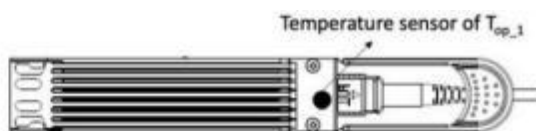
Parameter	Symbol	Min.	Typ.	Max.	Unit.	Notes
MaximumSupply Voltage	Vcc	-0.5		3.6	V	
StorageTemperature	Tsto	-40		85	°C	
CaseOperatingTemperature	Top_1	0		60	°C	1&2
	Top_2	0		70	°C	2
RelativeHumidity	RH	5		85	%	

Notes:

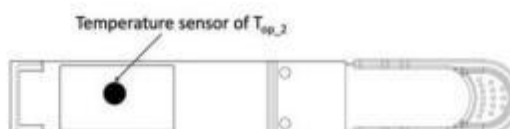
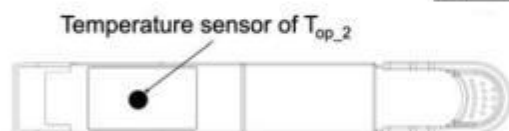
1. DDMI temperature reading is measured by the position of Top_1

2. Case operating temperature definition:

Top view of module:



Bottom view of module:



IV. Parameters

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Supply Voltage	V _{cc}	3.14		3.46	V	
Power Consumption	P _{Con}			8 (OSFP) 4(QSFP56)	W	
Bit Rate(PAM4)	BR		26.5625		GBd	1
Bit Rate(NRZ)	BR		25.78125		Gbps	
Pre-FEC Bit Error Ratio(PAM4)	BER			2.4x10 ⁻⁴		2
Post-FEC Bit Error Ratio(PAM4)	BER			10 ⁻¹²		
Pre-FEC Bit Error Ratio(NRZ)	BER			5x10 ⁻⁵		
Post-FEC Bit Error Ratio(NRZ)	BER			10 ⁻¹²		
Center Wavelength	λ_c	840		868	nm	3
Beam Divergence Angle			23		°	
Number of Lanes		8				
Management Interface		Serial,I2C-based, maximum frequency 400kHz				4
Logic Input Voltage High	V _{ih}	2		V _{cc} +0.3	V	
Logic Input Voltage Low	V _{il}	-0.3		0.8	V	

Notes:

1. Single lane
2. PRBS31Q test pattern is used.
3. As defined by IEEE Std. 802.3bs™/D3.5
4. As defined by SFF-8636

V. Electrical Characteristics for OSFP

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter at TP1a						
AC Common-mode Output Voltage(RMS)				17.5	mV	
Differential Peak-to-peak Output Voltage(Transmitterdisabled)				35	mV	
Differential Peak-to-peak Output Voltage(Transmitterenabled)				880	mV	
Eye Symmetry Mask Width	ESMW		0.22		UI	
Eye Height, Differential	EH	32			mV	
Differential Output Return Loss		SeeEq.1				
Common to differential mode conversion return loss		SeeEq.2				
Differential termination mismatch		10			%	
Transition time (20% to 80%)	Tr,Tf	10			ps	
Receiver at TP4						
Far-end Eyeheight, differential		30			mV	
Far-endpre-cursor ISI Ratio		-4.5		2.5	%	
Differential Output Return Loss		SeeEq.1				1
Common to Differential Mode Conversion Return Loss		SeeEq.2				2
Differential Termination Mismatch		10			%	
Transition Time (20% to 80%)	Tr,Tf	10			ps	
DC Common Mode Voltage		-350		2850	mV	

Notes:

$$1. \quad RLd(f) \geq \begin{cases} 9.5 - 0.37f & 0.01 \leq f < 8 \\ 4.75 - 1.4 \log_{10} \left(\frac{f}{14} \right) & 8 \leq f < 19 \end{cases} \quad (\text{dB}) \quad (\text{Eq.1})$$

where

 f is the frequency in GHz, RLd is the CAUI-4 Chip-to-module input differential return loss

$$2. \quad RLdc(f) \geq \begin{cases} 22 - 20 \left(\frac{f}{25.78} \right) & 0.01 \leq f < 12.89 \\ 15 - 6 \left(\frac{1}{25.78} \right) & 12.89 \leq f < 19 \end{cases} \quad (\text{dB}) \quad (\text{Eq.2})$$

where

 f is the frequency in GHz, $RLdc$ is the CAUI-4 Chip-to-module input differential to common mode input return loss

VI. Electrical Characteristics for QSFP

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter at TP1a						
AC Common-mode Output Voltage(RMS)				17.5	mV	
Differential Peak-to-peak Output Voltage(Transmitterdisabled)				35	mV	
Differential Peak-to-peak Output Voltage(Transmitterenabled)				880	mV	
Eye Symmetry Mask Width	ESMW		0.22		UI	
Eye Height, Differential	EH	32			mV	
Differential Output Return Loss		SeeEq.1				
Common to differential mode conversion return loss		SeeEq.2				
Differential termination mismatch		10			%	
Transition time (20% to 80%)	Tr,Tf	10			ps	
Receiver at TP4						
Far-end Eyeheight, differential		30			mV	
Far-endpre-cursor ISI Ratio		-4.5		2.5	%	
Differential Output Return Loss		SeeEq.1				1
Common to Differential Mode Conversion Return Loss		SeeEq.2				2
Differential Termination Mismatch		10			%	
Transition Time (20% to 80%)	Tr,Tf	10			ps	
DC Common Mode Voltage		-350		2850	mV	

Notes:

$$1. \quad RL_d(f) \geq \begin{cases} 9.5 - 0.37f & 0.01 \leq f < 8 \\ 4.75 - 7.4 \log_{10} \left(\frac{f}{14} \right) & 8 \leq f < 19 \end{cases} \quad (\text{dB}) \quad (\text{Eq.1})$$

where

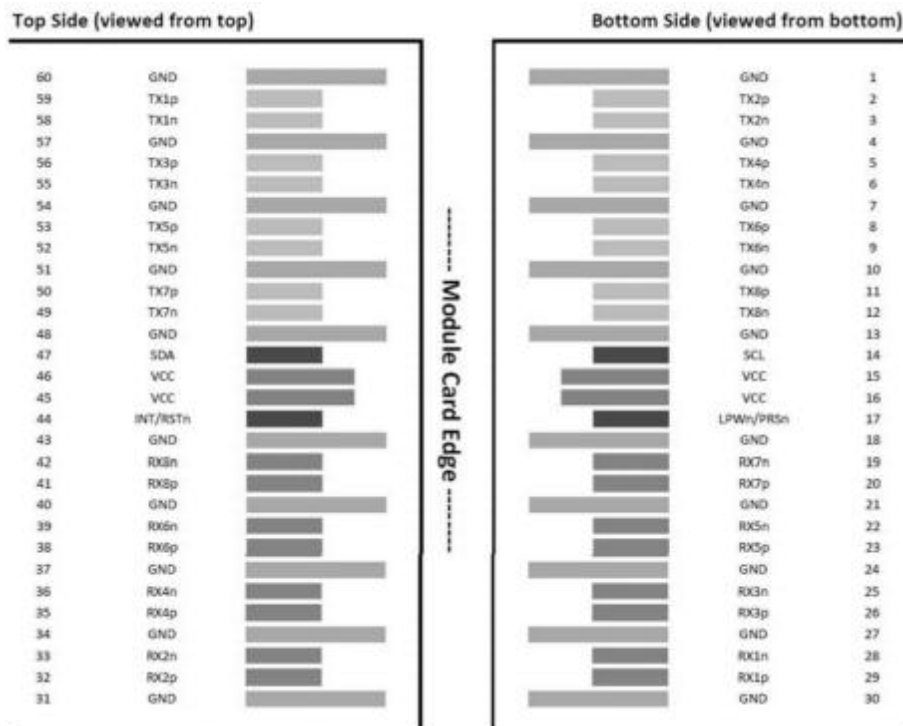
 f is the frequency in GHz, RL_d is the CAUI-4 Chip-to-module input differential return loss

$$2. \quad RL_{dc}(f) \geq \begin{cases} 22 - 20 \left(\frac{f}{25.78} \right) & 0.01 \leq f < 12.89 \\ 15 - 6 \left(\frac{f}{25.78} \right) & 12.89 \leq f < 19 \end{cases} \quad (\text{dB}) \quad (\text{Eq.2})$$

where

 f is the frequency in GHz, RL_{dc} is the CAUI-4 Chip-to-module input differential to common mode input return loss

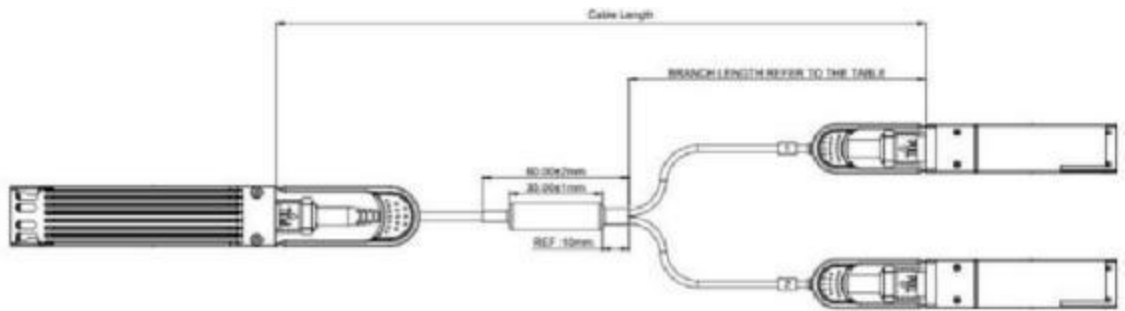
VI. Pin Descriptions (Compliant OSFP Rev. 5.0)



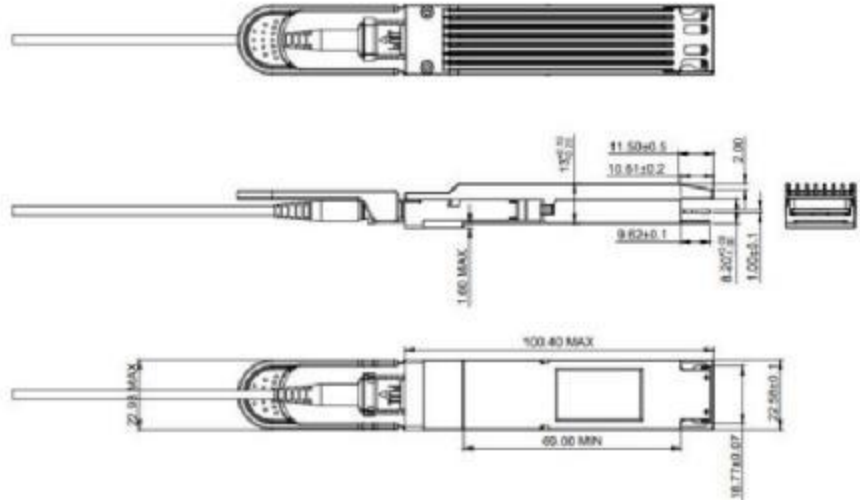
PIN	Symbol	Description	Plug Sequence
1	GND	Ground	1
2	TX2p	Transmitter DataNon-Inverted	3
3	TX2n	Transmitter Data Inverted	3
4	GND	Ground	1
5	TX4p	Transmitter Data Non-Inverted	3
6	TX4n	Transmitter Data Inverted	3
7	GND	Ground	1
8	TX6p	Transmitter Data Non-Inverted	3
9	TX6n	Transmitter Data Inverted	3
10	GND	Ground	1
11	TX8p	Transmitter Data Non-Inverted	3
12	TX8n	Transmitter Data Inverted	3
13	GND	Ground	1
14	SCL	2-wire Serial interfacec lock	3
15	VCC	+3.3V Power supply	2
16	VCC	+3.3V Power supply	2
17	LPWn/P RSn	Low-Power Mode/Module Present	3

18	GND	Ground	1
19	RX7n	Receiver Data Inverted	3
20	RX7p	Receiver Data Non-Inverted	3
21	GND	Ground	1
22	RX5n	Receiver Data Inverted	3
23	RX5p	Receiver Data Non-Inverted	3
24	GND	Ground	1
25	RX3n	Receiver Data Inverted	3
26	RX3p	Receiver Data Non-Inverted	3
27	GND	Ground	1
28	RX1n	Receiver Data Inverted	3
29	RX1p	Receiver Data Non-Inverted	3
30	GND	Ground	1
31	GND	Ground	1
32	RX2p	Receiver Data Non-Inverted	3
33	RX2n	Receiver Data Inverted	3
34	GND	Ground	1
35	RX4p	Receiver Data Non-Inverted	3
36	RX4n	Receiver Data Inverted	3
37	GND	Ground	1
38	RX6p	Receiver Data Non-Inverted	3

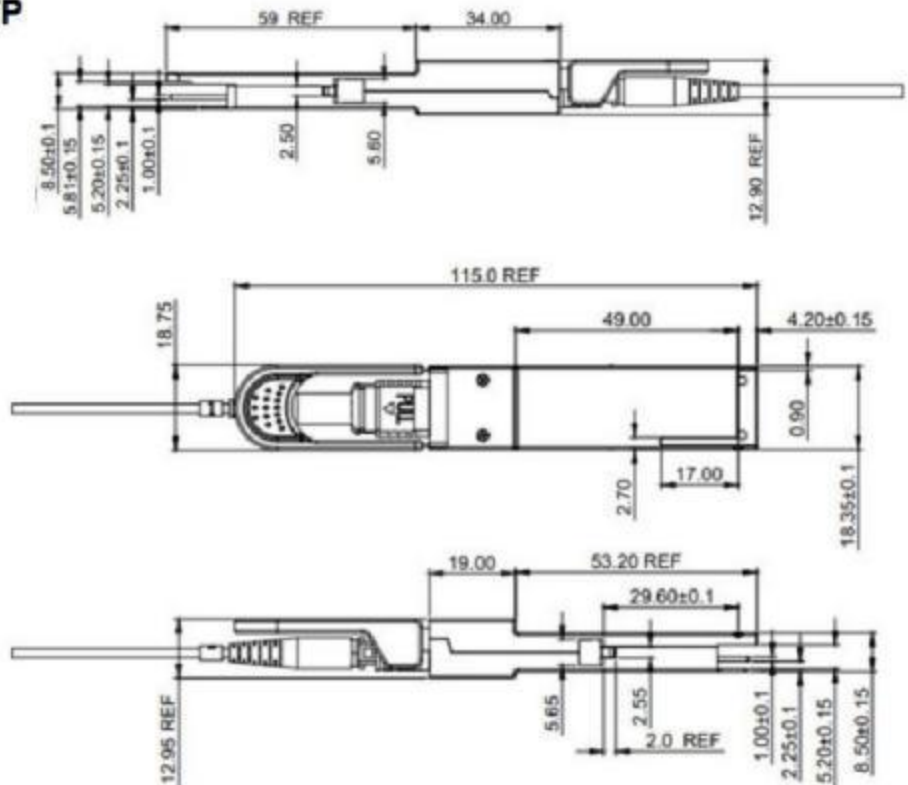
VIII. Mechanical Dimensions



OSFP:



QSFP



Order Information

Cable Type	Form Factor	Cable Length	Temp. Range	Application
AOC Breakout	OSFP to 2x QSFP56	3m	0 to 70 ° C (32 to 158。 F)	400G to 2x 200G
AOC Breakout	OSFP to 2x QSFP56	5m	0 to 70 ° C (32 to 158。 F)	400G to 2x 200G
AOC Breakout	OSFP to 2x QSFP56	10m	0 to 70 ° C (32 to 158。 F)	400G to 2x 200G
AOC Breakout	OSFP to 2x QSFP56	15m	0 to 70 ° C (32 to 158。 F)	400G to 2x 200G
AOC Breakout	OSFP to 2x QSFP56	20m	0 to 70 ° C (32 to 158。 F)	400G to 2x 200G
AOC Breakout	OSFP to 2x QSFP56	30m	0 to 70 ° C (32 to 158。 F)	400G to 2x 200G