

# DAOQQxxxC10D – QSFP28 to QSFP28 Active Optical Cable

## 1 to 30m / OTN OTU4

For your product safety, please read the following information carefully before any manipulation of the cable:



### ESD

This cable is specified as ESD threshold 1kV for SFI pins and 2kV for all others electrical input pins, tested per MIL-STD-883G, Method 3015.4 / JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module.



### LASER SAFETY

This is a Class1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

## 1. Overview

DAOQQxxxC10D is a high performance Active Optical Cable (AOC) for Optical Transport Network OTU4 data links. Several cable lengths between 1 and 30m are available.

This transceiver module is compliant with the QSFP28 Multisource Agreement (MSA) and hot pluggable. Always contact Skylane Optics-commercial agents for compatibility with different equipment platforms.

## 2. Features

- QSFP28 Multi-Source Agreement compliant
- Hot pluggable QSFP28 footprint
- Supports 111.810 Gbps Data Rate
- 4× 27.9525Gbps Serial Electrical Interface (CEI-28G-VSR)
- 850nm VCSEL Technology
- Length up to 30m
- Operating temperature range 0°C to 70°C
- Digital Diagnostic Monitoring (DDM)
- Low power dissipation (< 2.5 W each terminal)
- Single +3.3V Power Supply

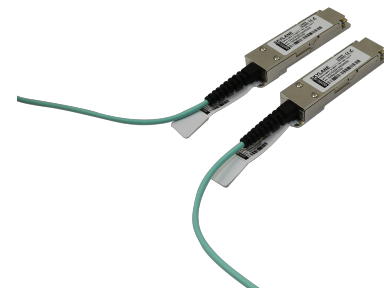


Figure 1. QSFP28 Active Optical Cable  
(non-binding illustration)

## 3. Applications

- G.709 OTU4 (111.8Gbps)

## 4. Technical Parameters

### 4.1. Recommended Operating Conditions

Parameter	Min	Typ	Max	Unit	Notes
Storage temperature	-40		85	°C	
Operating Case Temperature	0		70	°C	
Relative Humidity	15		85	%	Non condensing
Power Supply Voltage	3.135	3.3	3.465	V	
Power Supply Current			760	mA	Each terminal
Power Dissipation			2.5	W	Each terminal

### 4.2. General Specifications

Parameter	Min	Typ	Max	Unit	Notes
Data Rate, each Lane		27.9525		Gbps	
Bit Error Rate, each Lane			10 <sup>-12</sup>		1
Aggregate Data Rate		111.810		Gbps	

1. 27.9525Gbps, PRBS 2<sup>31</sup>-1

### 4.3. High-speed Electrical Interface, Host to QSFP28

Parameter	Min	Typ	Max	Unit	Notes
Differential Input Impedance		100		Ω	
Transmitter Differential Input Voltage	200		900	mV <sub>pp</sub>	
Differential Output Impedance		100		Ω	
Receiver Differential Output Voltage	400		800	mV <sub>pp</sub>	

## 5. Transceiver Electrical Pad Layout

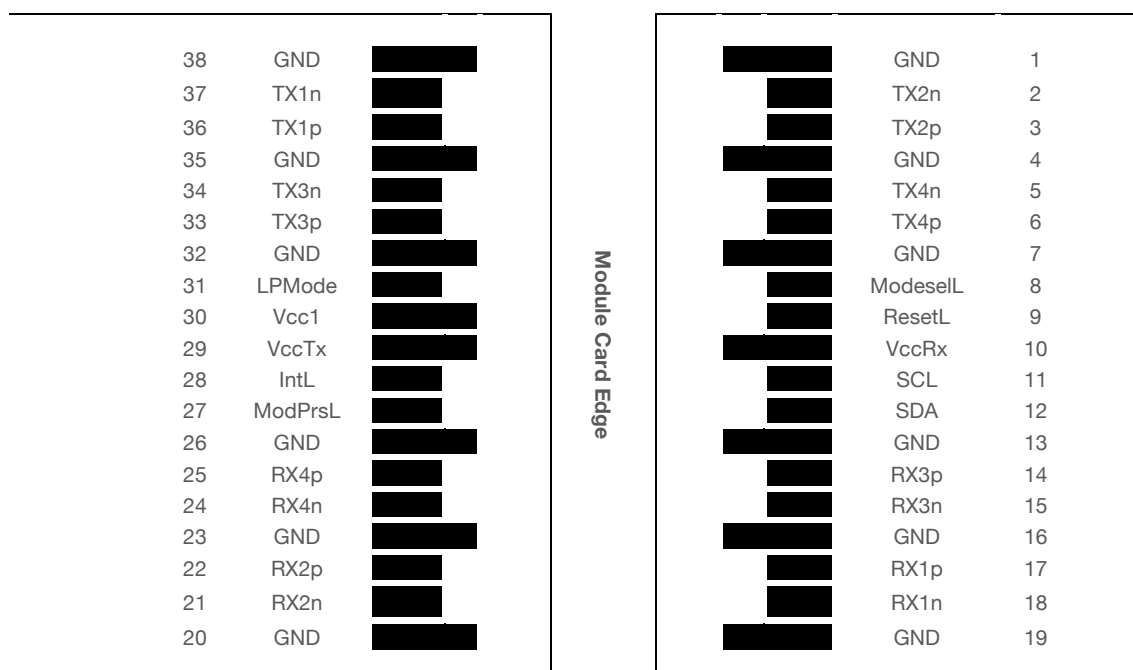


Figure 2. QSFP28 Electrical Pad Layout

## 6. Module Electrical Pin Definition

Pin	Symbol	Description	Pin	Symbol	Description
1	GND	Ground	20	GND	Ground
2	TX2n	Transmitter Inverted Data Input	21	RX2n	Receiver Inverted Data Output
3	TX2p	Transmitter Non-Inverted Data Input	22	RX2p	Receiver Non-Inverted Data Output
4	GND	Ground	23	GND	Ground
5	TX4n	Transmitter Inverted Data Input	24	RX4n	Receiver Inverted Data Output
6	TX4p	Transmitter Non-Inverted Data Input	25	RX4p	Receiver Non-Inverted Data Output
7	GND	Ground	26	GND	Ground
8	ModSelL	Module Select	27	ModPrsL	Module Present
9	ResetL	Module Reset	28	Int	Interrupt
10	VccRx	Receiver Power Supply	29	VccTx	Transmitter Power supply
11	SCL	Two-Wire Serial Interface Clock (SCL)	30	Vcc1	Power supply
12	SDA	Two-wire Serial Interface Data (SDA)	31	LPMODE	Low Power Mode
13	GND	Ground	32	GND	Ground
14	RX3p	Receiver Non-Inverted Data Output	33	TX3p	Transmitter Non-Inverted Data Input
15	RX3n	Receiver Inverted Data Output	34	TX3n	Transmitter Inverted Data Input
16	GND	Ground	35	GND	Ground
17	RX1p	Receiver Non-Inverted Data Output	36	TX1p	Transmitter Non-Inverted Data Input
18	RX1n	Receiver Inverted Data Output	37	TX1n	Transmitter Inverted Data Input
19	GND	Ground	38	GND	Ground

7. EEPROM

Memory map as per SFF-8436

2-Wire Serial  
Address :1010000x

0	ID and status	(3 Bytes)
2		
21	Interrupt Flags	(19 Bytes)
33	Module Monitors	(12 Bytes)
81	Channel Monitors	(48 Bytes)
85	Reserved	(4 Bytes)
97	Control	(12 Bytes)
99	Reserved	(2 Bytes)
106	Free Side Device and Channel Mask	(7 Bytes)
107	Reserved	(1 Byte)
111	Free Side Device and Channel Mask	(4 Bytes)
118	Reserved	(7 Bytes)
122	Password Change Entry Area (Optional)	(4 Bytes)
126	Password Entry Area (Optional)	(4 Bytes)
127	Page Select Byte	(1 Byte)

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**Page 01 (Optional)**

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**Page 03**

128	Base ID Fields (64 Bytes)	128	CC_APPS (1 Byte)	128	User EEPROM Data (128 Bytes)	128	CC_APPS (48 Bytes)						
191								Extended ID (32 Bytes)	128	AST Table Length (TL) (1 Byte)	255	175	Channel threshold (48 Bytes)
223								Vendor Specific ID (32 Bytes)	129	Application Code Entry 0 (2 Bytes)	223	225	Reserved (2 Bytes)
255		131	Application Code Entry 1 (2 Bytes)	133		241	Vendor specific Channel Control (16 Bytes)						
			Other Entries			253	Channel Monitor mask (12 Bytes)						
		255	Application Code Entry TL (2 Bytes)			255	Reserved (2 Bytes)						

Figure 3. EEPROM of a QSFP28

## 8. Ordering Information

Part Number	Description
DAOQQM01C10D	QSFP28 to QSFP28 AOC, OTN OTU4, <b>1m</b> , 0 to 70°C, DDM
DAOQQM03C10D	QSFP28 to QSFP28 AOC, OTN OTU4, <b>3m</b> , 0 to 70°C, DDM
DAOQQM05C10D	QSFP28 to QSFP28 AOC, OTN OTU4, <b>5m</b> , 0 to 70°C, DDM
DAOQQM10C10D	QSFP28 to QSFP28 AOC, OTN OTU4, <b>10m</b> , 0 to 70°C, DDM
DAOQQM15C10D	QSFP28 to QSFP28 AOC, OTN OTU4, <b>15m</b> , 0 to 70°C, DDM
DAOQQM20C10D	QSFP28 to QSFP28 AOC, OTN OTU4, <b>20m</b> , 0 to 70°C, DDM
DAOQQM30C10D	QSFP28 to QSFP28 AOC, OTN OTU4, <b>30m</b> , 0 to 70°C, DDM

## 9. Document Revision Information

Revision	Description
A	Initial release

Skylane Optics supplies a broad range of optical transceivers. Our engineers work closely with our customers to find the best solutions for every application. We are committed to provide high quality products and services to our customers.

For questions on this product please contact:  
[support@skylaneoptics.com](mailto:support@skylaneoptics.com)

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Smartly**