


Specification

Active Optical Cable
400G QSFP112 Product
(Preliminary)

TQS-P16H8-XCZ##

↑ Length (meter)

Ordering Information:

Model Name	TQS-P16H8-XCZ##	Note
Voltage	3.3V	
Device type	850nm VCSEL / GaAs PIN	
Interface	CML/CML	
Temperature	0°C ~ +70°C	
Latch Color	Beige 	

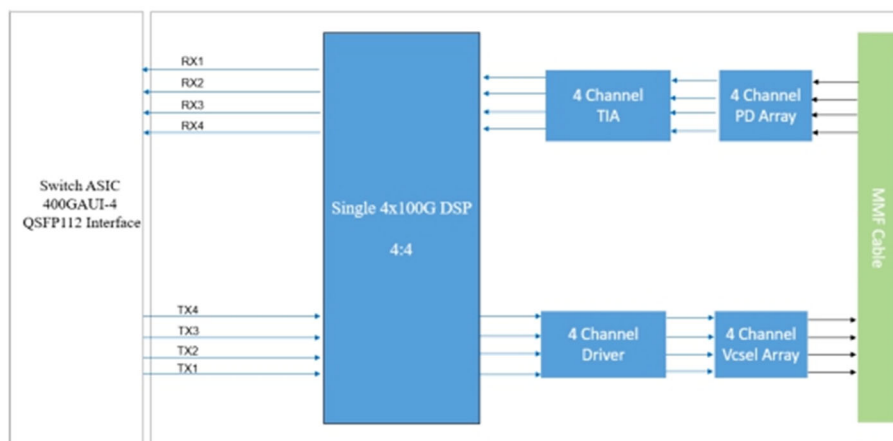
■ Features

- Hot-pluggable QSFP-DD form factor
- 4x100G PAM4 retimed 400GAUI-4 electrical interface
- Active Optical Cable
- 4 channel VCSEL arrays and 4 channels PIN photo detector arrays
- Maximum link length of 60m on OM3 or 100m on OM4
- Hot Pluggable QSFP112 form factor
- Compliant to QSFP112_MSA_Specification_Rev2.1.1
- Compliant with CMIS 5.2
- Compliant with IEEE 802.3db
- Compliant to IEEE 802.3ck
- Less than 8W per cable end in temperature range of 0 to 70°C

■ Applications

- 400GBASE-AOC 400G Ethernet
- Data center

■ Functional Block Diagram (Each End)



General Description

The TQS-P16H8-XCZ## is a QSFP112 to QSFP112 active optical cable for short-range data communication and interconnect applications. Each AOC has 4 duplex channels with 425Gbit/s aggregate bandwidth. Each channel operates with PAM4 modulation scheme at 53.125G baud rate, and up to 60m using OM3 fiber or 100m using OM4 fiber.

Absolute Maximum Rating

Parameter	Symbol	Min	Max	Unit	Note
Storage Temperature	Ts	-40	85	°C	
Case Operating Temperature	Top	0	70	°C	
Power Supply Voltage	Vcc	-0.5	3.6	V	
Relative Humidity (non-condensation)	RH	15	85	%	

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit	Note
Operating Case Temperature	Top	0	70	°C	
Relative Humidity (non-condensation)	RH	15	85	%	
Power Supply Voltage	Vcc	3.135	3.465	V	
Total Power Consumption			8	W	
Supply Current per end			2.55	A	
Bit Rate	BR		425	Gbps	
I2C Clock Frequency		0	400	KHz	

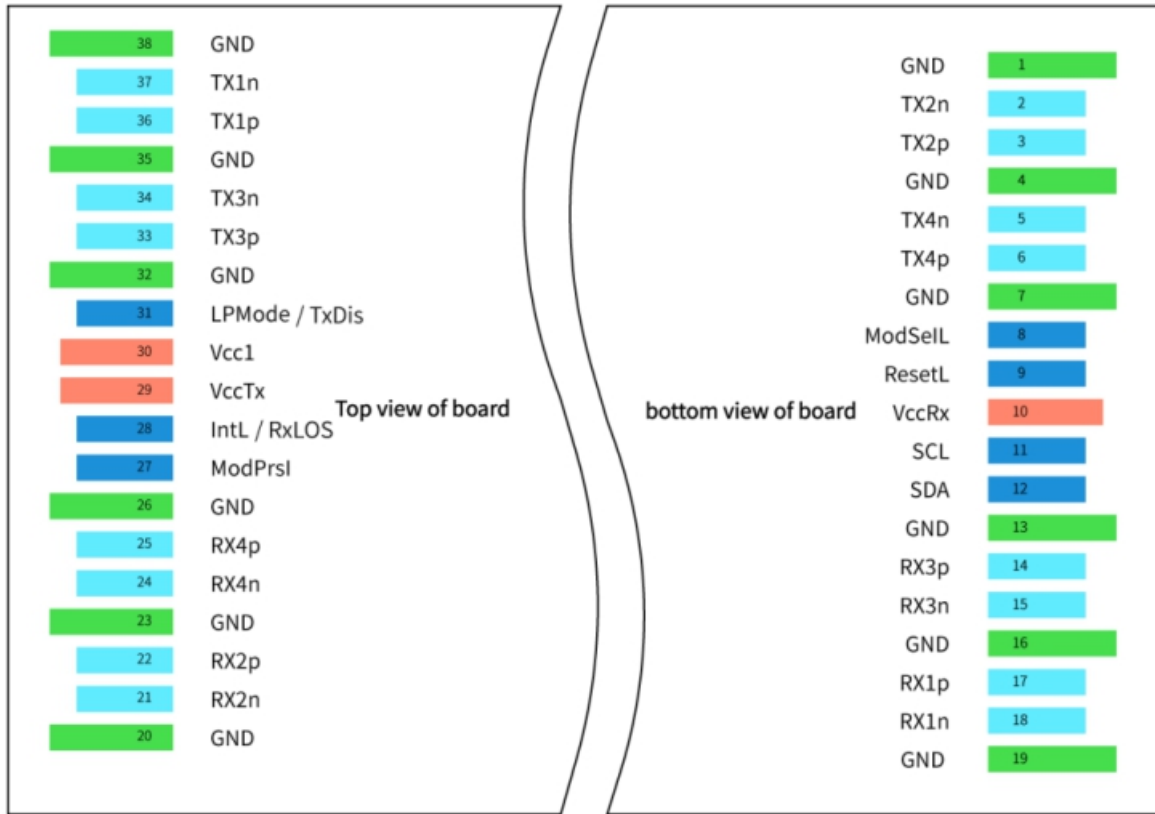
Note:

1. Under condition of 3.465V operating supply voltage, and 70°C case temperature.

Electrical Characteristics

Parameter	Min	Typ.	Max	Unit	Note
Pre FEC Bit Error Ratio			2.4E-4		
Post FEC Bit Error Ratio			1E-12		
Transmitter (each Lane)					
Differential pk-pk Input Voltage tolerance	750			mV	
Differential Termination Mismatch			10	%	
Eye height	10			mV	
Common-mode to differential-mode return loss	IEEE802.3ck Equation (120G-1)			dB	
Vertical eye closure			12	dB	
Effective return loss	7.3			dB	
Transition Time	10			ps	
Receiver (each Lane)					
Differential data output swing	300		900	mVpp	
Differential termination mismatch			10	%	
Eye height	15			mV	
Vertical eye closure			12	dB	
Common-mode to differential-mode return loss	IEEE802.3ck Equation (120G - 1)				
Effective return loss	8.5			dB	
Transition time	8.5			ps	

OSFP Module Pad Assignments and Descriptions



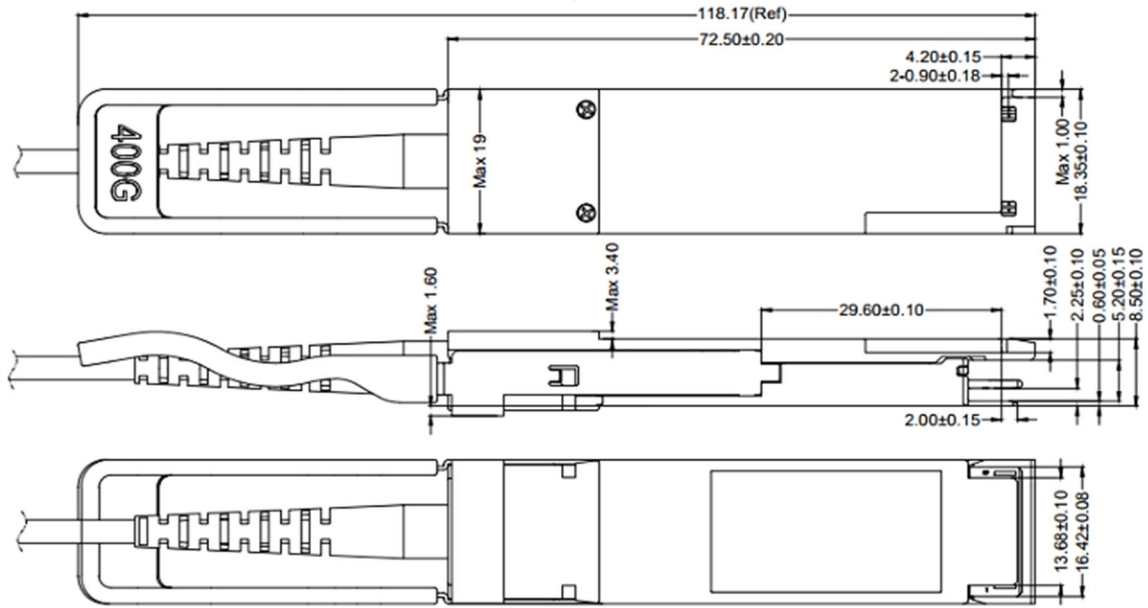
Pin	Logic	Symbol	Description	Power Seq	Notes
1	Ground		GND	1B	1
2	Tx2n	CML-I	Transmitter Inverted Data Input	3B	
3	Tx2p	CML-I	Transmitter Non-Inverted Data Input	3B	
4	Ground		GND	1B	1
5	Tx4n	CML-I	Transmitter Inverted Data Input	3B	
6	Tx4p	CML-I	Transmitter Non-Inverted Data Input	3B	
7	Ground		GND	1B	1
8	ModSelL	LVTTL-I	Module Select	3B	
9	ResetL	LVTTL-I	Module Reset	3B	
10	VccRx		+3.3V Power Supply Receiver	2B	2
11	SCL	LVC MOS-I/O	2-wire serial interface clock	3B	

12	SDA	LVC MOS-I/O	2-wire serial interface data	3B	
13	Ground		GN	1B	1
14	Rx3p	CML-O	Receiver Non-Inverted Data Output	3B	
15	Rx3n	CML-O	Receiver Inverted Data Output	3B	
16	Ground		GND	1B	1
17	Rx1p	CML-O	Receiver Non-Inverted Data Output	3B	
18	Rx1n	CML-O	Receiver Inverted Data Output	3B	
19	Ground		GND	1B	1
20	Ground		GND	1B	1
21	Rx2n	CML-O	Receiver Inverted Data Output	3B	
22	Rx2p	CML-O	Receiver Non-Inverted Data Output	3B	
23	Ground		GND	1B	1
24	Rx4n	CML-O	Receiver Inverted Data Output	3B	
25	Rx4p	CML-O	Receiver Non-Inverted Data Output	3B	
26	Ground		GND	1B	1
27	ModPrsL	LV TTL-O	Module Present	3B	
28	IntL	LV TTL-O	Interrupt	3B	
29	VccTx		+3.3V Power supply transmitter	2B	2
30	Vcc1		+3.3V Power supply	2B	2
31	LPM mode	LV TTL-I	Low Power mode	3B	
32	Ground		GND	1B	1
33	Tx3p	CML-I	Transmitter Non-Inverted Data Input	3B	
34	Tx3n	CML-I	Transmitter Inverted Data Input	3B	
35	Ground		GND	1B	1
36	Tx1p	CML-I	Transmitter Non-Inverted Data Input	3B	
37	Tx1n	CML-I	Transmitter Inverted Data Input	3B	
38	Ground		GND	1B	1

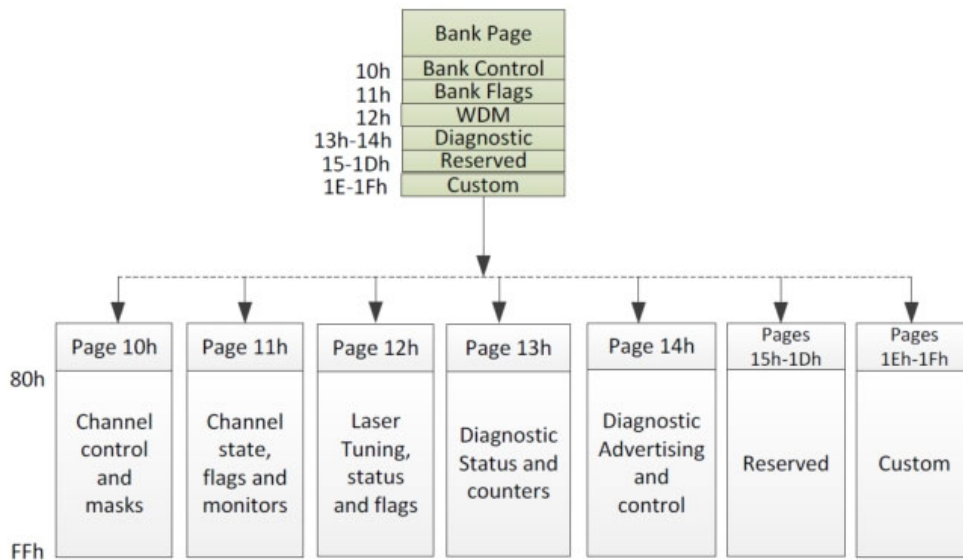
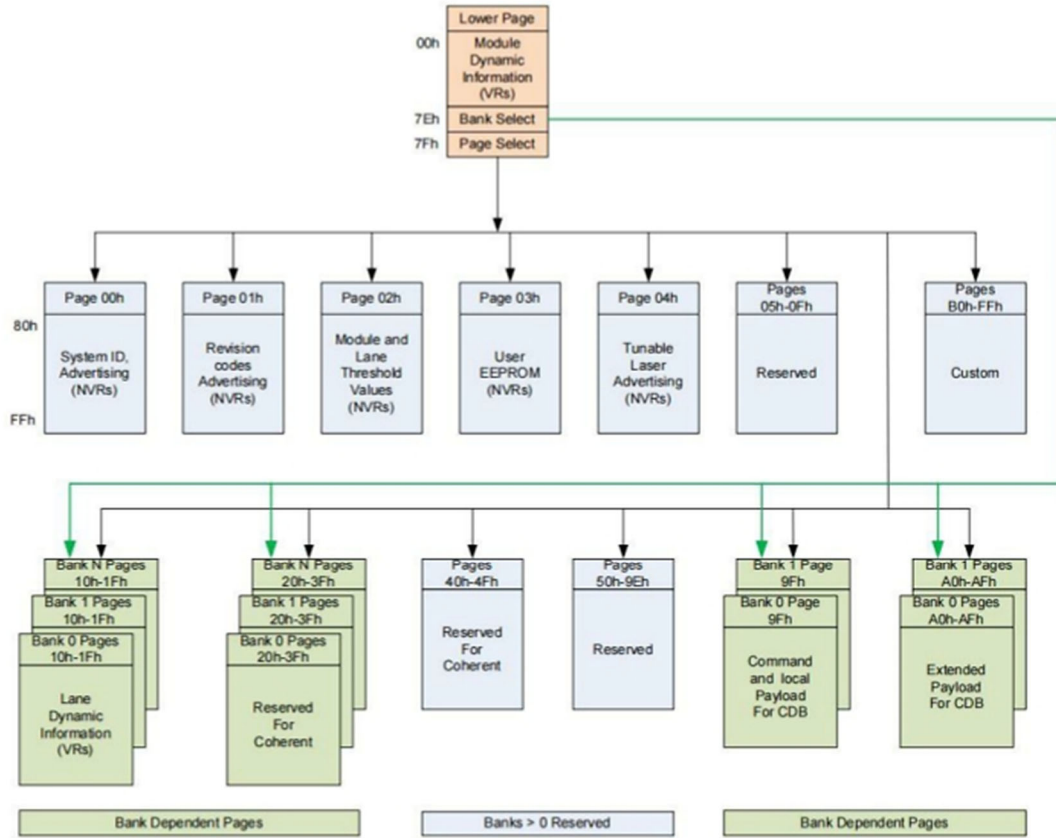
Note:

1. GND is the symbol for signal and supply (power) common for the QSFP112 module. All are common within the QSFP112 module and all voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal-common ground plane.
2. Vcc Rx, Vcc1 and VccTx are the receiver and transmitter power supplies and shall be applied concurrently. VccRx, Vcc1 and VccTx may be internally connected within the QSFP112 module in any combination. The connector pins are each rated for a maximum current of 1.5A (max. current of 2.0 A is required for high module power of 15-20W).

■ **Module Outline (Unit: mm)**



Memory Map



■ Contact Information

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■ Revision History

Date	Version	Description
04/23/2024	0.1	Preliminary release