Product Features

- 4 channels full-duplex transceiver modules

- Transmission data rate up to 106.25G per channel

- 4x106.25Gbps PAM4 transmitter and PAM4 receiver

- 4 channels 850nm VCSEL array

- 4 channels PIN photo detector array

- Power consumption <8W

- Hot Pluggable QSFP112 form factor and Compliant with CMIS

- Maximum link length of 50m on OM4 MMF

- Built-in digital diagnostic functions

- Operating case temperature 0℃ to +70℃

- 3.3V power supply voltage

- RoHS compliant

Application

- 400GBASE-VR4 Ethernet (PAM4)

- The transceiver is designed for Ethernet, Telecom and Infiniband use cases.

Standards

- QSFP112 MSA

- CMIS V4.0

- IEEE 802.3db

- IEEE802.3ck

Description

The 400G QSFP112 AOC is a Four-Channel, Pluggable,Parallel for 400 Gigabit Ethernet Applications. This AOC is a high performance module for short-range multi-lane data communication and interconnection applications. It integrates four data lanes in each direction with 4x53.125GBd. Each lane can operate at 106.25Gbps up to 100m using OM4 fiber with FEC. These modules are designed to operate over multimode fiber systems using a nominal wavelength of 850nm. The Common Management Interface Specification (CMIS) for QSFP modules.

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Absolute Maximum Ratings:

Parameter	Unit	Min	Max
Supply Voltage	V	-0.3	3.6
Input Voltage	V	-0.3	Vcc+0.3
Storage Temperature	℃	-20	85
Case Operating Temperature	℃	0	70
Humidity(non-condensing)	%	5	95

Recommended Operating Conditions:

Parameter	Min	Typ	Max	Unit
Supply Voltage	3.13	3.3	3.47	V
Operating Case temperature	0		70	℃
Data Rate Per Lane		106.25		Gbps
Humidity	5		85	%
Power Dissipation		7.5	8	W

Electrical Specifications:

Parameter	Unit	Min	Typ	Max
Differential input impedance	ohm	90	100	110
Differential Output impedance	ohm	90	100	110
Differential input voltage amplitude	mVp-p	400		900
Differential output voltage	mVp-p			850
Bit Error Rate	-			2.4E-4
Input Logic Level High	V	2.0		Vcc
Input Logic Level Low	V	0		0.8
Output Logic Level High	V	Vcc-0.5		Vcc
Output Logic Level Low	V	0		0.4
Input Logic Level High	V	2.0		Vcc

Note：

  1. BER=2.4E-4; PRBS31Q@53. 125GBd. Pre-FEC

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2. Differential input voltage amplitude is measured between TxnP and TxnN.

3. Differential output voltage amplitude is measured between RxnP and RxnN.

Optical Characteristics:

Parameter	Unit	Min	Typical	Max	Notes
Transmitter					
Central Wavelength	nm	842	850	948	-
RMS spectral width	nm	-	-	0.65	-
Average launch power, each lane	dBm	-4.6	-	5.5	-
Optical Modulation Amplitude (OMAouter), each lane	dBm	-2.6		4	-
Transmitter and dispersion eye closure for PAM4(TDECQ),each lane	dB			3.4	
Extinction Ratio	dB	3	-	-	-
Average launch power of OFF transmitter, each lane	dB			-30	-
Receiver					
Centre Wavelength	nm	842	850	948	-
Receiver Sensitivity in MAout	dBm			(-4.4,TEC-6.2)	1
Stressed Receiver Sensitivity in OMAout	dBm			-1.8	2
Maximum Average power at receiver , each lane input, each lane	dBm			5.5	-
Minimum Average power at receiver , each lane	dBm	-6.3			
Receiver Reflectance	dB			-15	-
LOS Assert	dBm	-15		-8.5	-
LOS De-Assert	dBm			-6.5	-
LOS Hysteresis	dB	0.5			-

Note：

1.Measured with conformance test signal at TP3 for BER = 2.4E-4 Pre-FEC.

2.These test conditions are for measuring stressed receiver sensitivity. They are not characteristics of the receiver.
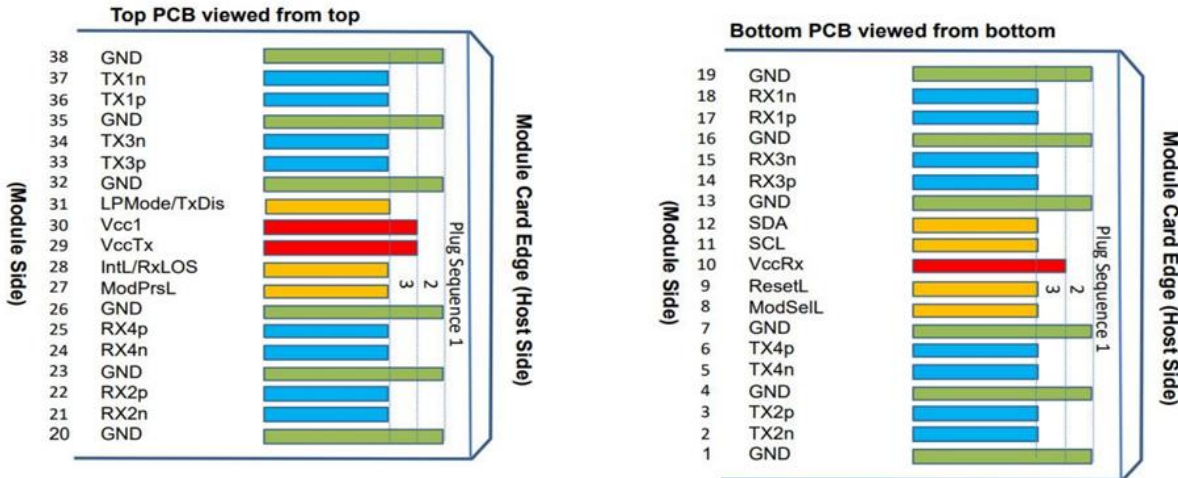
Pin Definition and Description

Table 1. Pin definition and descriptions

Pad	Logic	Symbol	Description	Plug Sequence[4]	Notes
1		GND	Ground	1	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	3	
3	CML-I	Tx2p	Transmitter Non-Inverted Data Input	3	
4		GND	Ground	1	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	3	
6	CML-I	Tx4p	Transmitter Non-Inverted Data Input	3	
7		GND	Ground	1	1
8	LVTTL-I	ModSelL	Module Select	3	
9	LVTTL-I	ResetL	Module Reset	3	
10		VccRx	+3.3V Power Supply Receiver	2	2
11	LVCMOS-I/O	SCL	TWI serial interface clock	3	
12	LVCMOS-I/O	SDA	TWI serial interface data	3	
13		GND	Ground	1	1
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	3	
15	CML-O	Rx3n	Receiver Inverted Data Output	3	
16		GND	Ground	1	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	3	
18	CML-O	Rx1n	Receiver Inverted Data Output	3	
19		GND	Ground	1	1
20		GND	Ground	1	1
21	CML-O	Rx2n	Receiver Inverted Data Output	3	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	3	
23		GND	Ground	1	1
24	CML-O	Rx4n	Receiver Inverted Data Output	3	
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	3	
26		GND	Ground	1	1
27	LVTTL-O	ModPrsL	Module Present	3	
28	LVTTL-O	IntL/ RxLOS	Interrupt/optional RxLOS	3	
29		VccTx	+3.3V Power supply transmitter	2	2
30		Vcc1	+3.3V Power supply	2	2
31	LVTTL-I	LPMode/ TxDis	Low Power mode/optional TX Disable	3	
32		GND	Ground	1	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	3	
34	CML-I	Tx3n	Transmitter Inverted Data Input	3	
35		GND	Ground	1	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	3	
37	CML-I	Tx1n	Transmitter Inverted Data Input	3	
38		GND	Ground	1	1

Note 1: QSFP112 uses common ground (GND) for all signals and supply (power). All are common within the QSFP-DD module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal-common ground plane. Each connector Gnd contact is rated for a maximum current of 500 mA.
Note 2: VccRx, Vcc1, and VccTx shall be applied concurrently. Supply requirements defined for the host side of the Host Card Edge Connector are listed in Table 13. For power classes 4 and above the module differential loading of input voltage pads must not result in exceeding contact current limits. Each connector Vcc contact is rated for a maximum current of 1500 mA.
Note 4: Plug Sequence specifies the mating sequence of the host connector and module. The sequence is 1, 2, and 3 see Figure 14 for pad locations.

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Digital Diagnostic Monitoring Functions

Parameter	Units	Min	Typ	Max	Notes
Transceiver Case Temperature	℃	-3		+3	Over operating temp
Supply voltage monitor absolute error	V	-0.1		0.1	Full operating range
Channel RX power monitor absolute error	dB	-2		+2	Per channel
Channel Bias current monitor	mA	-10%		+10%	Per channel
Channel TX power monitor absolute error	dB	-2		+2	Per channel

Mechanical Dimensions(mm)