200G QSFP56 AOC
WT-FX4FNMxxx-N00

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1. Product Overview

General Description

This product is a high data rate parallel active optical cable (AOC), to overcome the bandwidth limitation of traditional copper cable. The AOC offers 4 independent data transmission channels and 4 data receiving channels via a multimode fiber cable, each capable of 50Gb/s operation. Consequently, an aggregate data rate of 200Gb/s over 70 meters transmission can be achieved by this product, to support the ultra-fast computing data exchange.

The product is designed with form factor, optical/electrical connection according to the QSFP56 Multi-Source Agreement (MSA). It has been designed to meet the harshest external operating conditions including temperature, humidity and EMI interference.

Functional Description

This product converts the parallel electrical input signals into parallel optical signals (light), by a driven Vertical Cavity Surface Emitting Laser (VCSEL) array. The light propagates through multimode fibers inside the fiber cable individually, and is captured by the photo diode array. The optical signals are converted into parallel electrical signals and outputted. Consequently, each terminal of the cable has 8 ports, 4 for data transmission and 4 for data receiving, to provide totally 200Gb/s data exchange. Figure 1 shows the functional block diagram of the parallel AOC.

Features

- QSFP56 MSA compliant
- 4 parallel lanes on 850nm center wavelength
- Compliant to IEEE 802.3cd Specification
- Up to 70m transmission on multi-mode fiber (MMF) OM3 with FEC
- Operating case temperature: 0 to 70°C
- 4x53.125Gb/s electrical interface (200GAUI-4)
- Data Rate 53.125Gbps (PAM4) per channel.
- Maximum power consumption 5W
- RoHS compliant

Applications

- Data Center Interconnect
- 200G Ethernet
- InfiniBand Interconnect
- Enterprise Networking

2. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Units	Notes
Storage Temperature	TS	-40	85	degC	
Operating Case Temperature	TOP	0	70	degC	
Power Supply Voltage	VCC	-0.5	3.6	V	
Relative Humidity (non-condensation)	RH	0	85	%	

3. Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Units	Notes
Operating Case Temperature	TOP	0		70	degC	
Power Supply Voltage	VCC	3.135	3.3	3.465	V	
Data Rate, each Lane			26.5625		GBd	PAM4
Data Rate Accuracy		-100		100	ppm	
Pre-FEC Bit Error Ratio				2.4x10-4		
Post-FEC Bit Error Ratio				1x10-12		1
Link Distance with OM3	D	0.5		70	m	2

4. Recommended Operating Conditions

Parameter	Test Point	Min	Typical	Max	Units	Notes	
Power Consumption				5	W		
Supply Current	Icc			1.52	A		
Transmitter (each Lane)	Transmitter (each Lane)	Transmitter (each Lane)	Transmitter (each Lane)	Transmitter (each Lane)	Transmitter (each Lane)	Transmitter (each Lane)	
Signaling Rate, each Lane	TP1	26.5625 ± 100 ppm	26.5625 ± 100 ppm	26.5625 ± 100 ppm	GBd		
Differential pk-pk Input Voltage Tolerance	TP1a	900			mVpp	1	
Differential Termination Mismatch	TP1			10	%		
Differential Input Return Loss	TP1	IEEE 802.3-2015 Equation (83E-5)			dB		
Differential to Common Mode Input Return Loss	TP1	IEEE 802.3-2015 Equation (83E-6)			dB		
Module Stressed Input Test	TP1a	See IEEE 802.3bs 120E.3.4.1	See IEEE 802.3bs 120E.3.4.1	See IEEE 802.3bs 120E.3.4.1		2	
Single-ended Voltage Tolerance Range (Min)	TP1a	-0.4 to 3.3	-0.4 to 3.3	-0.4 to 3.3	V		
DC Common Mode Input Voltage	TP1	-350		2850	mV	3	
Receiver (each Lane)	Receiver (each Lane)	Receiver (each Lane)	Receiver (each Lane)	Receiver (each Lane)	Receiver (each Lane)	Receiver (each Lane)	
Signaling Rate, each lane	TP4	26.5625 ± 100 ppm	26.5625 ± 100 ppm	26.5625 ± 100 ppm	GBd		
Differential Peak-to-Peak Output Voltage	TP4			900	mVpp		
Common Mode vOLTAGE		-350		2850	mV		

Parameter	Test Point	Min	Typical	Max	Units	Notes	
AC Common Mode Output Voltage, RMS	TP4			17.5	mV		
Differential Termination Mismatch	TP4			10	%		
Differential Output Return Loss	TP4	IEEE 802.3-2015 Equation (83E-2)					
Common to Differential Mode Conversion Return Loss	TP4	IEEE 802.3-2015 Equation (83E-3)					
Transition Time, 20% to 80%	TP4	9.5			ps		
Near-end Eye Symmetry Mask Width (ESMW)	TP4		0.265		UI		
Near-end Eye Height, Differential	TP4	70			mV		
Far-end Eye Symmetry Mask Width (ESMW)	TP4		0.2		UI		
Far-end Eye Height, Differential	TP4	30			mV		
Far-end Pre-cursor ISI Ratio	TP4	-4.5		2.5	%		
Common Mode Output Voltage (Vcm)	TP4	-350		2850	mV	3	

5. Recommended Operating Conditions

Parameter	Symbol	Min	Max	Units	Notes
Temperature monitors absolute error	DMI_Temp	-3	3	degC	Over operating temperature range
Supply voltage monitor absolute error	DMI _VCC	-0.1	0.1	V	Over full operating range
Channel RX power monitor absolute error	DMI_RX_Ch	-2	2	dB	1
Channel Bias current monitor	DMI_Ibias_Ch	-10%	10%	mA	
Channel TX power monitor absolute error	DMI_TX_Ch	-2	2	dB	1

6. Pin Descriptions

PIN	Logic	Symbol	Name/Description	Notes
1		GND	Ground	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	
3	CML-I	Tx2p	Transmitter Non-Inverted Data output	
4		GND	Ground	1

PIN	Logic	Symbol	Name/Description	Notes
5	CML-I	Tx4n	Transmitter Inverted Data Input	
6	CML-I	Tx4p	Transmitter Non-Inverted Data output	
7		GND	Ground	1
8	LVTLL-I	ModSelL	Module Select	
9	LVTLL-I	ResetL	Module Reset	
10		VccRx	+3.3V Power Supply Receiver	2
11	LVCMOS-I/O	SCL	2-Wire Serial Interface Clock	
12	LVCMOS-I/O	SDA	2-Wire Serial Interface Data	
13		GND	Ground	
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	
15	CML-O	Rx3n	Receiver Inverted Data Output	
16		GND	Ground	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	
18	CML-O	Rx1n	Receiver Inverted Data Output	
19		GND	Ground	1
20		GND	Ground	1
21	CML-O	Rx2n	Receiver Inverted Data Output	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	
23		GND	Ground	1
24	CML-O	Rx4n	Receiver Inverted Data Output	1
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	
26		GND	Ground	1
27	LVTTL-O	ModPrsL	Module Present	
28	LVTTL-O	IntL	Interrupt	
29		VccTx	+3.3 V Power Supply transmitter	2
30		Vcc1	+3.3 V Power Supply	2
31	LVTTL-I	LPMode	Low Power Mode	
32		GND	Ground	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	
34	CML-I	Tx3n	Transmitter Inverted Data Output	

PIN	Logic	Symbol	Name/Description	Notes
35		GND	Ground	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	
37	CML-I	Tx1n	Transmitter Inverted Data Output	
38		GND	Ground	1

7. Revision History

Version	Date	Description	Prepared by
V6	2025	Unified WincoTek datasheet format	WincoTek
V6.1	2026-10-23	Engineering and format review	WincoTek