200Gb/s QSFP56 SR4 70m OM3 Optical Transceiver WT-FX4FNS-N00



Product Overview 3 / Applications 5

1. Product Overview

General Description

This product is a parallel 200Gb/s Quad Small Form Factor Pluggable (QSFP56) optical module. It provides increased port density and total system cost savings. The design is compliant to IEEE802.3bs Annex120E (200GAUI-4 C2M). The QSFP56 full-duplex optical module offers 4 independent transmit and receive channels, each capable of 53.125Gb/s operation for an aggregate data rate of 200Gb/s on 70 meters of OM3 multi-mode fiber.

An optical fiber cable with an MTP/MPO-12 APC connector can be plugged into the QSFP56 SR4 module receptacle. Proper alignment is ensured by the guide pins inside the receptacle. The cable usually cannot be twisted for proper channel to channel alignment. Electrical connection is achieved through a QSFP56 MSA-compliant edge type connector.

The central wavelengths of all the 4 parallel lanes are 850nm. It contains an optical MPO-12 APC connector for the optical interface and a 38-pin connector for the electrical interface. Host FEC is required to support up to 70m OM3 multi-mode fiber transmission.

The product is designed with form factor, optical/electrical connection and digital diagnostic interface 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.

Features

- IEEE 802.3cd 200GBASE-SR4 compliant
- QSFP56 MSA compliant
- 4 parallel lanes on 850nm center wavelength
- Compliant to IEEE 802.3bs Specification
- Up to 70m transmission on OM3 multimode fiber with FEC
- Operating case temperature: 0 to 70oC
- 4x53.125Gb/s electrical interface (200GAUI-4)
- Data Rate 53.125Gbps (PAM4) per channel.
- Maximum power consumption 5W
- MPO-12 APC connector
- 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	

Parameter	Symbol	Min	Max	Units	Notes
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, each Lane						
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	Symbol	Min	Typical	Max	Units	Notes
Transmitter	Transmitter	Transmitter	Transmitter	Transmitter	Transmitter	Transmitter
Center Wavelength	λC	840	850	860	nm	
Data Rate, each Lane		26.5625 ± 100 ppm	26.5625 ± 100 ppm	26.5625 ± 100 ppm	GBd	
Modulation Format		PAM4	PAM4	PAM4		
RMS Spectral Width	Δλrms			0.6	nm	Modulated
Average Launch Power, each Lane	PAVG	-6.5		4	dBm	1
Outer Optical Modulation Amplitude (OMAouter), each Lane	POMA	-4.5		3	dBm	2
Launch Power in OMAouter minus TDECQ, each Lane		-5.9			dBm	
Transmitter and Dispersion Eye Clouser for PAM4, each Lane	TDECQ			4.5	dB	
Extinction Ratio	ER	3			dB	
Optical Return Loss Tolerance	TOL			12	dB	
Average Launch Power of OFF Transmitter, each Lane	Poff			-30	dBm	

Parameter	Symbol	Min	Typical	Max	Units	Notes
Encircled Flux		≥ 86% at 19 μm ≤ 30% at 4.5 μm	≥ 86% at 19 μm ≤ 30% at 4.5 μm	≥ 86% at 19 μm ≤ 30% at 4.5 μm		
Receiver	Receiver	Receiver	Receiver	Receiver	Receiver	Receiver
Center Wavelength	λC	840	850	860	nm	
Data Rate, each Lane		26.5625 ± 100 ppm	26.5625 ± 100 ppm	26.5625 ± 100 ppm	GBd	
Modulation Format		PAM4	PAM4	PAM4		
Damage Threshold, each Lane	THd	5			dBm	3

5. Recommended Operating Conditions

Average Receive Power, each Lane		-8.4		4	dBm	4
Receive Power (OMAouter), each Lane				3	dBm	
Receiver Sensitivity (OMAouter), each Lane	SEN			max(-6.5, SECQ - 7.9)	dBm	7
Stressed Receiver Sensitivity (OMAouter), each Lane	SRS			-3.4	dBm	5
Receiver Reflectance	RR			-12	dB	
LOS Assert	LOSA	-30			dBm	
LOS De-assert	LOSD			-12	dBm	
LOS Hysteresis	LOSH	0.5			dB	
Stressed Conditions for Stress Receiver Sensitivity (Note 7)	Stressed Conditions for Stress Receiver Sensitivity (Note 7)	Stressed Conditions for Stress Receiver Sensitivity (Note 7)	Stressed Conditions for Stress Receiver Sensitivity (Note 7)	Stressed Conditions for Stress Receiver Sensitivity (Note 7)	Stressed Conditions for Stress Receiver Sensitivity (Note 7)	Stressed Conditions for Stress Receiver Sensitivity (Note 7)
Stressed Eye Closure for PAM4 (SECQ), Lane under Test			4.5		dB	
SECQ – 10log10(Ceq)f (max), lane under test			4.5		dB	
OMAouter of each Aggressor Lane			3		dBm	

Receiver sensitivity is informative. For SECQ <= 4.5 dB, RS = max(-6.5, SECQ - 7.9) dBm. The normative requirement is stressed receiver sensitivity.

6. Recommended Operating Conditions

Parameter	Test Point	Min	Typical	Max	Units	Notes
Power Consumption				5	W	
Supply Current	Icc			1.52	A	

Parameter	Test Point	Min	Typical	Max	Units	Notes
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	
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	%	

Parameter	Test Point	Min	Typical	Max	Units	Notes
Common Mode Output Voltage (Vcm)	TP4	-350		2850	mV	3

7. 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

8. 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
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	

PIN	Logic	Symbol	Name/Description	Notes
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	
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

9. Revision History

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