WTQ100-SR-BIDI-100C 100G QSFP28 SR BiDi Optical Transceiver

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1. Product Overview

General Description

This product can support 100Gb/s bit rates. It is a parallel Quad Small Form-factor Pluggable (QSFP28) Bi-Direction optical module. The module integrates four host electrical data into two optical lanes (by Dual Wavelength VCSEL Bi-Directional Optical Interface, 850nm and 900nm) to allow optical communication over a 2-fiber duplex LC optical multi-mode fiber. Reversely, on the receiver side, the module de-multiplexes 2 sets of optical input signal and converts them to 4 channels of electrical data.

An optical fiber ribbon cable with an LC connector can be plugged into the QSFP28 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 an MSA-compliant 38-pin edge type connector.

The module operates by a single +3.3V power supply. LVCMOS/LVTTL global control signals, such as Module Present, Reset, Interrupt and Low Power Mode, are available with the modules. A 2-wire serial interface is available to send and receive more complex control signals, and to receive digital diagnostic information. Individual channels can be addressed and unused channels can be shut down for maximum design flexibility.

The product is designed with form factor, optical/electrical connection and digital diagnostic interface according to the QSFP28 Multi-Source Agreement (MSA). It has been designed to meet the harshest external operating conditions including temperature, humidity and EMI interference. The module offers very high functionality and feature integration, accessible via a two-wire serial interface.

Features

- QSFP28 MSA compliant
- Support 100GE aggregate bit rates
- Support KP4 FEC @ 100G data rate
- Two independent full-duplex channels
- Up to 100m OM4 MMF transmission
- Operating case temperature:
- 0 to 70°C @ 100G
- Single 3.3V power supply
- Maximum power consumption 4W
- LC optical connector
- RoHS-6 compliant

Applications

- Data Center
- InfiniBand HDR
- 100G Ethernet

2. Recommended Operating Conditions

Parameter	Parameter	Symbol	Min	Typical	Max	Units	Notes
Operating Case Temperature	Operating Case Temperature	TOP	10		70	degC	
Power Supply Voltage	Power Supply Voltage	VCC	3.135	3.3	3.465	V	

Parameter	Parameter	Symbol	Min	Typical	Max	Units	Notes
Data Rate Accuracy	Data Rate Accuracy		-100		100	ppm	
Pre-FEC Bit Error Ratio	Pre-FEC Bit Error Ratio				2.4x10-4		
Post-FEC Bit Error Ratio	Post-FEC Bit Error Ratio				1x10-12		1
Control Input Voltage High	Control Input Voltage High		2		Vcc	V	
Control Input Voltage Low	Control Input Voltage Low		0		0.8	V	
Link Distance	OM3	D1			70	m	2
Link Distance	OM4	D2			100	m	2
Link Distance	OM5	D3			150	m	2

3. Recommended Operating Conditions

Parameter	Test Point	Min	Typical	Max	Units	Notes
Power Consumption				4	W	
Supply Current	Icc			1.21	A	
Transmitter (each Lane)	Transmitter (each Lane)	Transmitter (each Lane)	Transmitter (each Lane)	Transmitter (each Lane)	Transmitter (each Lane)	Transmitter (each Lane)
Overload Differential Voltage pk-pk	TP1a	900			mV	
Common Mode Voltage (Vcm)	TP1	-350		2850	mV	1
Differential Termination Resistance Mismatch	TP1			10	%	At 1MHz
Differential Return Loss (SDD11)	TP1			See CEI- 28G-VSR Equation 13-19	dB	
Common Mode to Differential conversion and Differential to Common Mode conversion (SDC11, SCD11)	TP1			See CEI- 28G-VSR Equation 13-20	dB	
Stressed Input Test	TP1a	See CEI- 28G-VSR Section 13.3.11.2.1				
Receiver (each Lane)	Receiver (each Lane)	Receiver (each Lane)	Receiver (each Lane)	Receiver (each Lane)	Receiver (each Lane)	Receiver (each Lane)
Differential Voltage, pk-pk	TP4			900	mV	
Common Mode Voltage (Vcm)	TP4	-350		2850	mV	1
Common Mode Noise, RMS	TP4			17.5	mV	
Differential Termination Resistance Mismatch	TP4			10	%	At 1MHz

Parameter	Test Point	Min	Typical	Max	Units	Notes
Differential Return Loss (SDD22)	TP4			See CEI- 28G-VSR Equation 13-19	dB	
Common Mode to Differential conversion and Differential to Common Mode conversion (SDC22, SCD22)	TP4			See CEI- 28G-VSR Equation 13-21	dB	
Common Mode Return Loss (SCC22)	TP4			-2	dB	2
Transition Time, 20 to 80%	TP4	9.5			ps	
Vertical Eye Closure (VEC)	TP4			5.5	dB	
Eye Width at 10-15 probability (EW15)	TP4	0.57			UI	
Eye Height at 10-15 probability (EH15)	TP4	228			mV	

4. 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	-0.15	0.15	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	Ch1~Ch4
Channel TX power monitor absolute error	DMI_TX_Ch	-2	2	dB	1

5. Optical Parameters

Parameter	Symbol	KP4 FEC Mode	KP4 FEC Mode	KP4 FEC Mode	Unit	Notes
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter	Transmitter	Transmitter	Transmitter	Transmitter	Transmitter	Transmitter
Center Wavelength Line0	λC	844		863	nm	
Center Wavelength Line1	λC	900		918	nm	
RMS Spectral Width	Δλrms			λ1: 0.6 λ2: 0.65	nm	
Average Launch Power, each Lane	PAVG	-6.2		4	dBm	
Optical Modulation Amplitude (OMA), each Lane	POMA	-4.2		3	dBm	1
Peak Power, each lane				--	dBm	

Parameter	Symbol	KP4 FEC Mode	KP4 FEC Mode	KP4 FEC Mode	Unit	Notes
Launch power in OMA minus TDP, each lane		-5.6			dBm	
TDECQ, each lane				4.5	dB	
Extinction Ratio	ER	3.0			dB	
Transmitter transition time, each lane (max)				31	ps	
RIN12 OMA				-128	dB/Hz	
Optical Return Loss Tolerance	TOL			12	dB	
Average Launch Power OFF Transmitter, each Lane	Poff			-30	dBm	
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		2
Signaling rate, each lane		26.5625± 100ppm	26.5625± 100ppm	26.5625± 100ppm	GBd	
Center Wavelength Lane0	λC	844	850	863	nm	
Center Wavelength Lane1	λC	900	910	918	nm	
Damage Threshold, each Lane	THd	5			dBm	3
Average Receive Power, each lane		-8.2			dBm	4
Average power at receiver input, each lane (overload)				4	dBm	
Receiver Reflectance	RR			-12	dB	
Stressed receiver sensitivity in OMA, Lane2				-3.5	dBm	5
Receiver sensitivity OMA outer), each lane				Max (- 6.6, SECQ – 8) as per IEEE cl 150	dBm	
LOS Assert	LOSA	-30		-14.2	dBm	
LOS Deassert	LOSD			-11.2	dBm	
LOS Hysteresis	LOSH	0.5			dB	

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. Additional Specifications

Stressed eye closure (SECq), each lane	4.5	dB
OMA of each aggressor, each lane	3	dBm

8. Revision History

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