WTQ28QL002C1CN1 QSFP28 CWDM4 Transceiver

100G Multirate CWDM4 SMF 2km / Product Overview 3



Part Number	Temperature
WTQ28QL002C1CN1	0°C~+70°C

1. Product Overview

General Description

This product is a transceiver module designed for 2km optical communication applications. The design is compliant to 100GBASE CWDM4 MSA standard. The module converts 4 inputs channels (ch) of 25Gb/s electrical data to 4 CWDM optical signals, and multiplexes them into a single channel for 100Gb/s to 112Gb/s optical transmission. Reversely, on the receiver side, the module optically de-multiplexes a 100Gb/s or 112Gb/s input into 4 CWDM channels signals, and converts them to 4 channel output electrical data.

The central wavelengths of the 4 CWDM channels are 1271, 1291, 1311 and 1331 nm as members of the CWDM wavelength grid defined in ITU-T G.694.2. It contains a duplex LC connector for the optical interface and a 38-pin connector for the electrical interface. To minimize the optical dispersion in the long-haul system, single-mode fiber (SMF) has to be applied in this module. Host FEC is required to support up to 2km fiber transmission.

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.

Functional Description

Features

- QSFP28 MSA compliant
- 4 CWDM lanes MUX/DEMUX design
- Supports 103.1Gb/s to 112.2Gb/s aggregate bit rate
- 100G CWDM4 MSA Technical Spec Rev1.1
- Up to 2km transmission on single mode fiber (SMF) with FEC
- Operating case temperature: 0 to 70℃
- 4x25G electrical interface (OIF CEI-28G-VSR)
- Maximum power consumption 4.5W
- LC duplex connector
- RoHS compliant

Applications

- 4x28Gb/s Single mode OTN
- 128G Fiber Channel
- InfiniBand QDR and DDR interconnects
- Enterprise networking

2. Ordering Information

Part Number	Data Rate (Gbps)	Wavelength (nm)	Transmission Distance(m)	Temperature (oC) (Operating Case)
WTQ28QL002C1CN1	100Gb/s 112Gb/s	1270/1290/1310/1330	2km SMF	0°C~+70°C

3. 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	%	
Damage Threshold, each Lane	THd	3.5		dBm	

4. 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			25.78125	28.05	Gb/s	
Data Rate Accuracy		-100		100	ppm	
Pre-FEC Bit Error Ratio				5x10-5		
Post-FEC Bit Error Ratio				1x10-12		1
Control Input Voltage High		2		Vcc	V	
Control Input Voltage Low		0		0.8	V	
Link Distance with G.652	D	0.002		2	km	2

5. Recommended Operating Conditions

Parameter	Test Point	Min	Typical	Max	Units	Notes
Power Consumption				4.5	W	
Supply Current	Icc			1.36	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 Equation13-19	dB	

Parameter	Test Point	Min	Typical	Max	Units	Notes
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 Section13.3.11.2.1				
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
Differential Return Loss (SDD22)	TP4			See CEI-28G-VSREquation 13-19	dB	
Common Mode to Differential conversion and Differential to Common Mode conversion (SDC22, SCD22)	TP4			See CEI-28G-VSREquation 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	

6. Optical Parameters

Parameter	Symbol	Min	Min	Typical	Max	Units	Notes
Wavelength Assignment	L0	1264.5	1264.5	1271	1277.5	nm	
Wavelength Assignment	L1	1284.5	1284.5	1291	1297.5	nm	
Wavelength Assignment	L2	1304.5	1304.5	1311	1317.5	nm	
Wavelength Assignment	L3	1324.5	1324.5	1331	1337.5	nm	
Transmitter	Transmitter	Transmitter	Transmitter	Transmitter	Transmitter	Transmitter	Transmitter
Side Mode Suppression Ratio	SMSR	30	30			dB	
Total Average Launch Power	PT				8.5	dBm	

Parameter	Symbol	Min	Min	Typical	Max	Units	Notes
Average Launch Power, each Lane	PAVG	-7	-7		2.5	dBm	
Optical Modulation Amplitude (OMA), each Lane	POMA	-4.0	-4.0		2.5	dBm	1
Launch Power in OMA minus Transmitter and Dispersion Penalty (TDP), each Lane		-5.0	-5.0			dBm	
TDP, each Lane	TDP				3.0	dB	
Extinction Ratio	ER	3.5	3.5			dB	
Optical Return Loss Tolerance	TOL				20	dB	
Transmitter Reflectance	RT				-12	dB	
Average Launch Power OFF Transmitter, each Lane	Poff				-30	dBm	
Transmitter Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3}		{0.31, 0.4, 0.45, 0.34, 0.38, 0.4}	{0.31, 0.4, 0.45, 0.34, 0.38, 0.4}	{0.31, 0.4, 0.45, 0.34, 0.38, 0.4}	{0.31, 0.4, 0.45, 0.34, 0.38, 0.4}		2
Receiver	Receiver	Receiver	Receiver	Receiver	Receiver	Receiver	Receiver
Damage Threshold, each Lane	THd	3.5				dBm	3
Average Receive Power, each Lane		-11.5			2.5	dBm	
Receive Power (OMA), each Lane					2.5	dBm	
Receiver Sensitivity (OMA), each Lane	SEN				-10	dBm	for BER = 5x10-5
Stressed Receiver Sensitivity (OMA), each Lane					-7.3	dBm	4
Receiver Reflectance	RR				-26	dB	
LOS Assert	LOSA	-30				dBm	
LOS Deassert	LOSD				-15	dBm	
LOS Hysteresis	LOSH	0.5				dB	
Receiver Electrical 3 dB upper Cutoff Frequency, each Lane					31	GHz	
Conditions of Stress Receiver Sensitivity Test (Note 5)	Conditions of Stress Receiver Sensitivity Test (Note 5)	Conditions of Stress Receiver Sensitivity Test (Note 5)	Conditions of Stress Receiver Sensitivity Test (Note 5)	Conditions of Stress Receiver Sensitivity Test (Note 5)	Conditions of Stress Receiver Sensitivity Test (Note 5)	Conditions of Stress Receiver Sensitivity Test (Note 5)	Conditions of Stress Receiver Sensitivity Test (Note 5)
Vertical Eye Closure Penalty, each Lane			1.9	1.9		dB	
Stressed Eye J2 Jitter, each Lane			0.33	0.33		UI	
Stressed Eye J4 Jitter, each Lane			0.48	0.48		UI	

Parameter	Symbol	Min	Min	Typical	Max	Units	Notes
SRS eye mask definition {X1, X2, X3, Y1, Y2, Y3}		{0.39, 0.5, 0.5, 0.39, 0.39, 0.4}	{0.39, 0.5, 0.5, 0.39, 0.39, 0.4}	{0.39, 0.5, 0.5, 0.39, 0.39, 0.4}	{0.39, 0.5, 0.5, 0.39, 0.39, 0.4}		

7. Digital Diagnostics

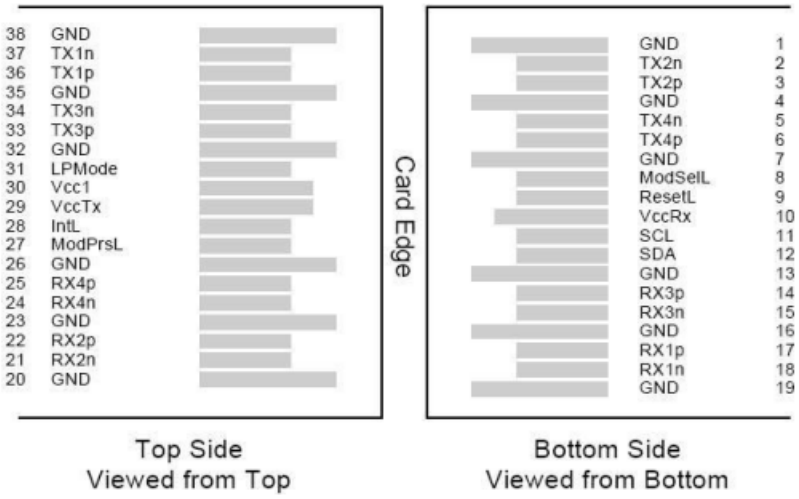
Parameter	Symbol	Min	Max	Units	Notes
Temperature monitors absolute error	DMI_Temp	-3	3	degC	Over operating temperature range
Supply voltage monitor absolute error	DMI _VCC	-0.1	0.1	V	Over full operating range
Channel RX power monitor absolute error	DMI_RX_Ch	-2	2	dB	1
Channel Bias current monitor	DMI_Ibias_Ch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

8. Pin Descriptions

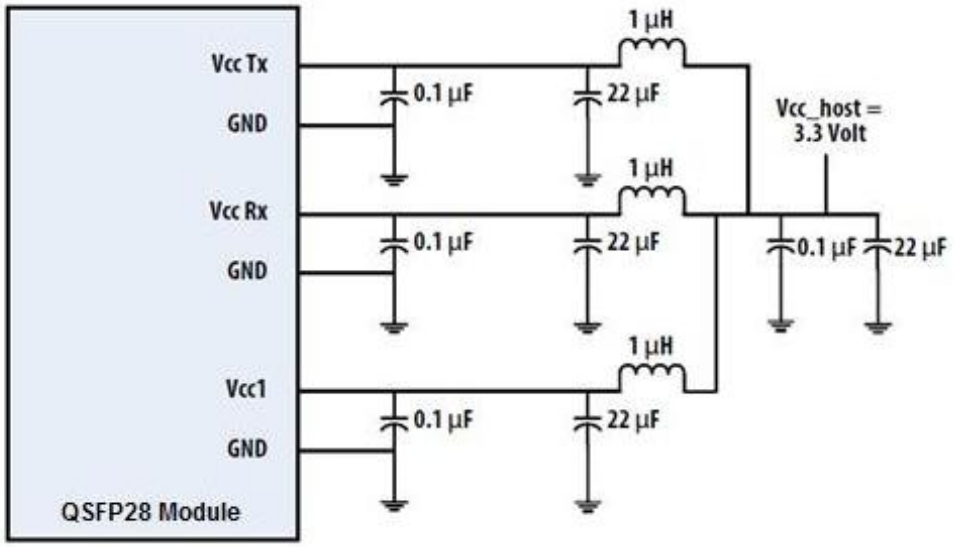
PIN	Logic	Symbol	Name/Description	Notes
1		GND	Ground	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	
3	CML-I	Tx2p	Transmitter Non-Inverted Data output	
4		GND	Ground	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	
6	CML-I	Tx4p	Transmitter Non-Inverted Data output	
7		GND	Ground	1
8	LVTLL-I	ModSelL	Module 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

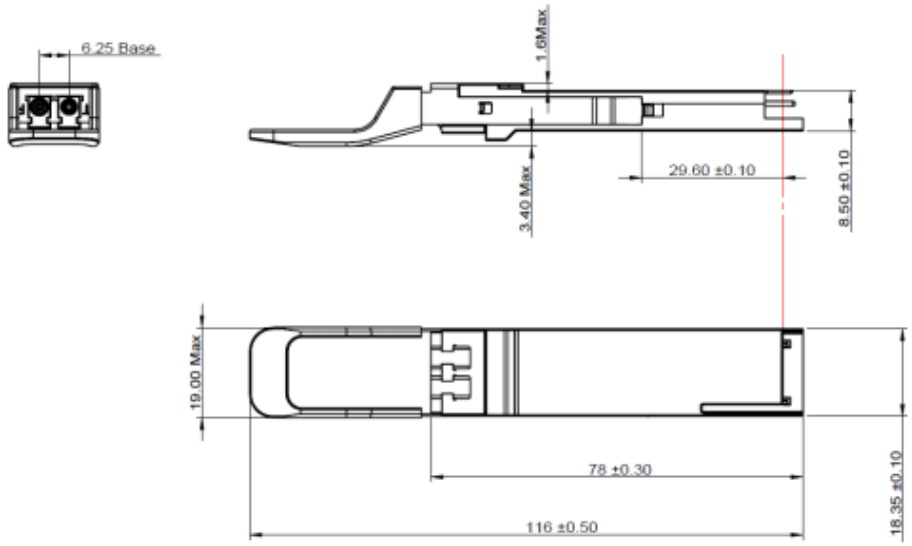
9. Pin Assignment



10. Recommended Interface Circuit



11. Mechanical Specifications



12. Revision History

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