# WTQ2813010C0CN1 QSFP28 PSM4 Transceiver

100Gb/s Parallel SMF 10km / Product Overview 3




| Part Number | Temperature |
|---|---|
| WTQ2813010C0CN1 | 0°C~+70°C |

## 1. Product Overview

General Description

This product is a parallel 100Gb/s Quad Small Form-factor Pluggable (QSFP28) optical module. It provides increased port density and total system cost savings. The QSFP28 full-duplex optical module offers 4 independent transmit and receive channels, each capable of 25Gb/s operation for an aggregate data rate of 100Gb/s on 10km of single mode fiber. An optical fiber ribbon cable with an MTP/MPO 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 with 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 can be managed through the I2C two-wire serial interface.

Functional Description

This product is a QSFP28 parallel single mode optical transceiver with an MTP/MPO fiber ribbon connector. The transmitter module accepts electrical input signals compatible with Common Mode Logic (CML) levels. All input data signals are differential and internally terminated. The receiver module converts parallel optical input signals via a photo detector array into parallel electrical output signals. The receiver module outputs electrical signals are also voltage compatible with Common Mode Logic (CML) levels. All data signals are differential and support a data rate up to 25Gb/s per channel. Figure 1 shows the functional block diagram of this product.

A single +3.3V power supply is required to power up the module. Both power supply pins VccTx and VccRx are internally connected and should be applied concurrently. Per MSA the module offers 7 low speed hardware control pins (including the 2-wire serial interface): ModSelL, SCL, SDA, ResetL, LPMode, ModPrsL and IntL.

### Features

- 4 independent full-duplex channels
- Up to 28Gb/s data rate per channel
- QSFP28 MSA compliant
- Compliant to IEEE 802.3bm 100GBASE PSM4
- Up to 10km reach for G.652 SMF
- Maximum power consumption 3.5W
- Single +3.3V power supply
- Operating case temperature: 0 to 70℃
- RoHS-6 compliant

### Applications

- 100G Ethernet links
- InfiniBand QDR and DDR interconnects
- Datacenter and Enterprise networking

## 2. Ordering Information

| Part Number | Data Rate (Gbps) | Wavelength (nm) | Transmission Distance(km) | Temperature (oC) (Operating Case) |
|---|---|---|---|---|
| WTQ2813010C0CN1 | 100Gb/s | 4x1310nm | 10km 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 | 4.5 | | dBm | |

## 4. Recommended Operating Conditions

| Parameter | Symbol | Min | Typical | Max | Units |
|---|---|---|---|---|---|
| Operating Case Temperature | TOP | 0 | | 70 | degC |
| Power Supply Voltage | VCC | 3.135 | 3.3 | 3.465 | V |
| Data Rate, each Lane | | | 25.78125 | | Gb/s |
| Control Input Voltage High | | 2 | | Vcc | V |
| Control Input Voltage Low | | 0 | | 0.8 | V |
| Link Distance with G.652 | D | | | 10 | km |

## 5. Recommended Operating Conditions

| Parameter | Symbol | Min | Min | Typical | Max | Units | Notes |
|---|---|---|---|---|---|---|---|
| Transmitter | Transmitter | Transmitter | Transmitter | Transmitter | Transmitter | Transmitter | Transmitter |
| Center Wavelength | λC | 1295 | 1295 | 1310 | 1325 | nm | |
| Side Mode Suppression Ratio | SMSR | 30 | 30 | | | dB | |
| Total Average Launch Power | PT | | | | 8.0 | dBm | |
| Average Launch Power, each Lane | PAVG | -5.5 | -5.5 | | 2.0 | dBm | |
| Optical Modulation Amplitude (OMA), each Lane | POMA | -3.5 | -3.5 | | 2.2 | dBm | 1 |

| Parameter | Symbol | Min | Min | Typical | Max | Units | Notes |
|---|---|---|---|---|---|---|---|
| Difference in Launch Power between any Two Lanes (OMA) | Ptx,diff | | | | 5 | dB | |
| Launch Power in OMA minus Transmitter and Dispersion Penalty (TDP), each Lane | | -4.3 | -4.3 | | | dBm | |
| TDP, each Lane | TDP | | | | 2.9 | dB | |
| Extinction Ratio | ER | 3.5 | 3.5 | | | dB | |
| Relative Intensity Noise | RIN | | | | -128 | dB/Hz | |
| 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 |
| Center Wavelength | λC | 1295 | 1310 | 1310 | 1325 | nm | |
| Damage Threshold, each Lane | THd | 4.5 | | | | dBm | 3 |
| Average Receive Power, each Lane | | -10.2 | | | 2.0 | dBm | |
| Receive Power (OMA), each Lane | | | | | 2.2 | dBm | |
| Receiver Sensitivity (OMA), each Lane | SEN1 | | | | -9.0 | dBm | 4 |
| Receiver Sensitivity (OMA), each Lane | SEN2 | | | | -12.0 | dBm | 5 |
| Receiver Reflectance | RR | | | | -26 | dB | |
| Difference in Receive Power between any Two Lanes (OMA) | Prx,diff | | | | 5.5 | dB | |
| LOS Assert | LOSA | | -20 | -20 | | dBm | |
| LOS Deassert | LOSD | | -18 | -18 | | dBm | |
| LOS Hysteresis | LOSH | 0.5 | | | | dB | |
| Receiver Electrical 3 dB upper Cutoff Frequency, each Lane | Fc | | | | 31 | GHz | |

## 6. Recommended Operating Conditions

| Parameter | Symbol | Min | Typical | Max | Units | Notes |
|---|---|---|---|---|---|---|
| Power Consumption | | | | 3.5 | W | |
| Supply Current | Icc | | | 1.1 | A | |
| Transceiver Power-on Initialization Time | | | | 2000 | ms | 1 |
| Transmitter (each Lane) | Transmitter (each Lane) | Transmitter (each Lane) | Transmitter (each Lane) | Transmitter (each Lane) | Transmitter (each Lane) | Transmitter (each Lane) |
| Single-ended Input Voltage Tolerance (Note 2) | | -0.3 | | 4.0 | V | Referred to TP1 signal common |
| AC Common Mode Input Voltage Tolerance | | 15 | | | mV | RMS |
| Differential Input Voltage Swing Threshold | | 50 | | | mVpp | LOSA Threshold |
| Differential Input Voltage Swing | Vin,pp | 190 | | 700 | mVpp | |
| Differential Input Impedance | Zin | 90 | 100 | 110 | Ohm | |
| Receiver (each Lane) | Receiver (each Lane) | Receiver (each Lane) | Receiver (each Lane) | Receiver (each Lane) | Receiver (each Lane) | Receiver (each Lane) |
| Single-ended Output Voltage | | -0.3 | | 4.0 | V | Referred to signal common |
| AC Common Mode Output Voltage | | | | 7.5 | mV | RMS |
| Differential Output Voltage Swing | Vout,pp | 300 | | 850 | mVpp | |
| Differential Output Impedance | Zout | 90 | 100 | 110 | Ohm | |

## 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 |

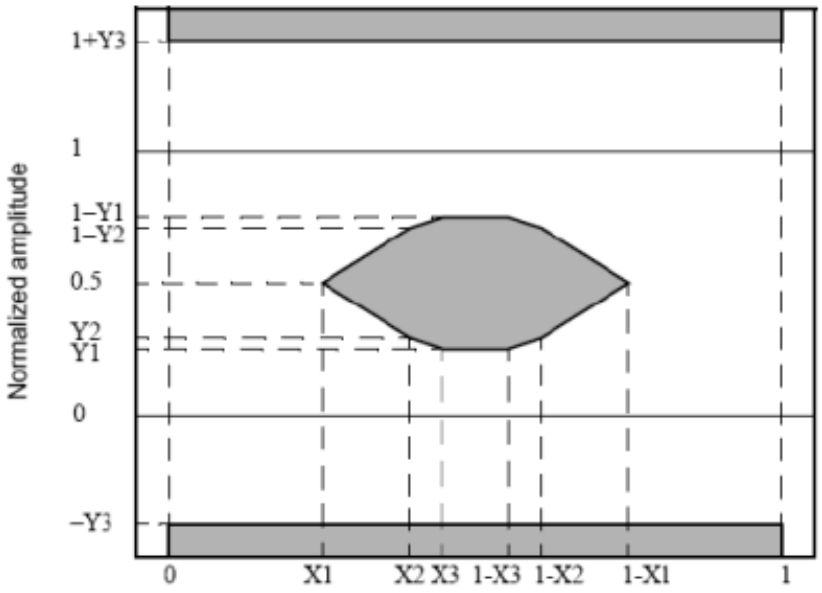
## 8. Pin Descriptions

| PIN | Logic | Symbol | Name/Description | Notes |
|---|---|---|---|---|
| 1 | | GND | Ground | 1 |

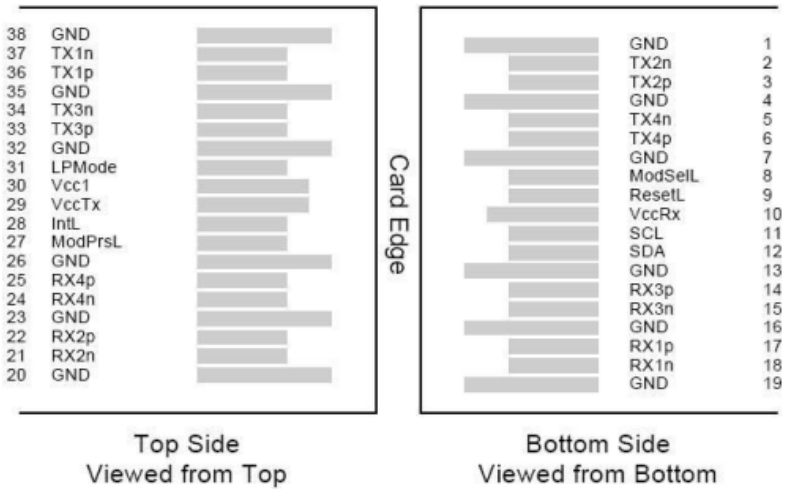
| PIN | Logic | Symbol | Name/Description | Notes |
|---|---|---|---|---|
| 2 | CML-I | Tx2n | Transmitter Inverted Data Input | |
| 3 | CML-I | Tx2p | Transmitter Non-Inverted Data output | |
| 4 | | GND | Ground | 1 |
| 5 | CML-I | Tx4n | Transmitter Inverted Data Input | |
| 6 | CML-I | Tx4p | Transmitter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

| PIN | Logic | Symbol | Name/Description | Notes |
|---|---|---|---|---|
| 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 |

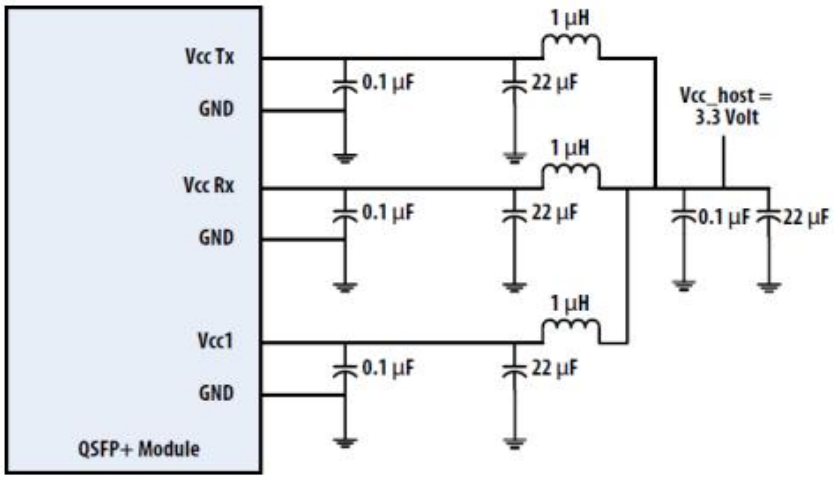
## 9. Optical Eye Mask



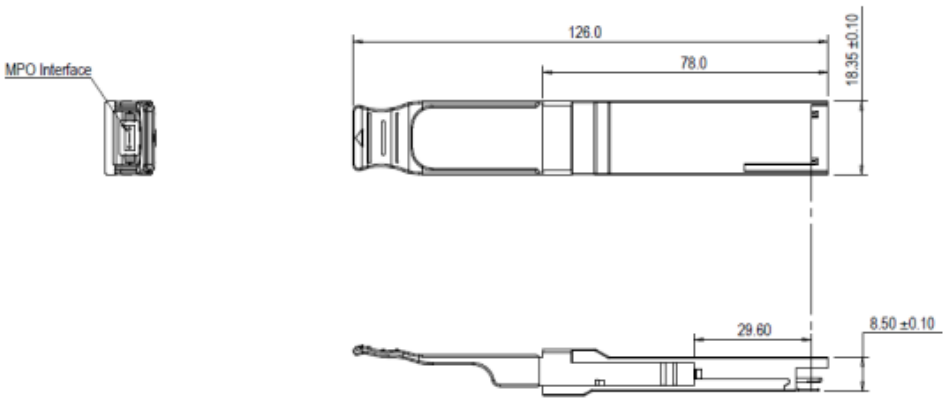

## 10. Pin Assignment



## 11. Power Supply Filtering Circuit




## 12. Mechanical Specifications




## 13. Revision History

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