# SO-QSFP28-CWDM4

QSFP28, 100G Ethernet, CWDM4, SM, DDM, 5dB, 2km

## OVERVIEW

The SO-QSFP28-CWDM4 is a QSFP28 form-factor transceiver for 100 Gbps Ethernet applications. It is intended for use in inter- and intra-connect applications within and between data centers between switches, routers, storage equipment etc. The optical performance is based on the 100G CWDM4 MSA industry standard with an optical performance enabling distances of up to 2km over a SingleMode (SM) fiber.

As stipulated in the CWDM4 MSA, Forward Error Correction (FEC) is required to be implemented by the host in order to ensure reliable system operation. The FEC type shall be as defined in IEEE802.3bj, i.e. Reed Solomon RS(528,514) for SR4'based transceivers. The optical parameters will provide a bit error ratio (BER) of 5 x $10^{-5}$. FEC will render in the required BER of better than 1 x $10^{-12}$.

SO-QSFP28-CWDM4 uses four CWDM channels/lanes @ 25.78 Gbps to transport the Ethernet signal.
Digital diagnostics functions (DDM) are available via an I2C interface, as specified by the QSFP28 MSA.

## TECHNICAL DATA

| Parameter | Value |
|---|---|
| Technology | Grey QSFP28 |
| Transmission media | SM (2x LC) |
| Typical reach | 2km |
| Nominal wavelength | Lane 1: 1271nm |
| | Lane 2: 1291nm |
| | Lane 3: 1311nm |
| | Lane 4: 1331nm |
| Interface standards | 100GBASE-CWDM4 |
| Bit rate support | 103.12 Gbps [1] |
| | 25.78 Gbps [2] |
| Protocol support | 100GbE |
| Power budget | 0 – 5dB |
| Optical path penalty | 3dB |
| Power consumption | < 3.5W |
| Operating temperature | 0°C to +70°C |
| Storage temperature | -40°C to +85°C |

[1] Aggregated line rate 100GbE

[2] Per lane

[3] Average power

[4] Specified at BER 5x$10^{-5}$

| Parameter | Value |
|---|---|
| **Transmitter data:** | |
| Output power, total | Max +8.5dBm [3] |
| Output power, per lane | Min: -6.5dBm [3] |
| | Max: +2.5dBm [3] |
| Transmit wavelength | 1264.5 – 1277.5nm |
| | 1284.5 – 1279.5nm |
| | 1304.5 – 1317.5nm |
| | 1324.5 – 1337.5nm |
| **Receiver data:** | |
| Minimum input power | -11.5 dBm [2] [3] [4] |
| Overload (max power) | +2.5 dBm [2] [3] [4] |
| Wavelength range | 1264.5 – 1277.5nm |
| | 1284.5 – 1279.5nm |
| | 1304.5 – 1317.5nm |
| | 1324.5 – 1337.5nm |
| DDM | Yes |
| MSA compliance | QSFP28 MSA |
| | CWDM4 MSA |

| Safety/regulatory compliance: |
|---|
| TUV/UL/FDA (contact Smartoptics for latest certification information) |
| RoHS compliance |

## ORDERING INFORMATION

| Ordering number | Description |
|---|---|
| SO-QSFP28-CWDM4 | QSFP28, 100G Ethernet, CWDM4, SM, DDM, 5dB, 2km |

## GENERAL DEFINITIONS

| | |
|---|---|
| Technology: | Grey; Transceiver type for non-WDM applications. Electrical or optical.<br>CWDM; Transceiver type for CWDM applications using G.694.2 channel grid.<br>DWDM; Transceiver type for DWDM applications using G.694.1 channel grid.<br>BiDi; Transceiver pair using two different wavelength channels operating on a single-fiber.<br>DAC: Direct Attach Cable (DAC). Electrical or optical cable with attached connectors. |
| Transmission Media: | Type of fiber, e.g. Multimode (MM) or Singlemode (SM). Number of and connector type within brackets (e.g. 2x LC, 1x MPO). |
| Typical reach: | Nominal distance performance based on dispersion and power budget properties, i.e. w/o dispersion compensation and optical amplification. |
| Bit rate range: | Supported bit rate range in Gigabit or Megabit per second (Gbps or Mbps). |
| Protocols: | Protocols within supported bit rate range. |
| Nominal wavelength: | Typical wavelength from transmitter. |
| Interface standards: | Referenced interface standards e.g. IEEE 802.3 standard for 10GbE services. |
| Power budget: | Min and max power budget between Transmitter and Receiver. |
| Dispersion tolerance/penalty: | Maximum amount of tolerated dispersion and required reduction of power budget to maintain stipulated Bit Error Rate (BER) and at a given bit rate. |
| Temperature range: | Max operating case temperature range.<br>Commercial temperature range (C-temp): 0°C to +70°C (32°F to +158°F)<br>Extended temperature range (E-temp): typically -20°C to +75°C (-4°F to +167°F)<br>Industrial temperature range (I-temp): -40°C to +85°C (-40°F to +185°F) |
| Power consumption: | Worst case power consumption. Will vary over temperature. |
| Transmitter Output power: | Average output power. Provided in min and max values. |
| Receiver minimum input power: | Minimum average input power at specified BER, normally $1E^{-12}$. |
| Receiver max input power: | Maximum average input power giving a BER, normally $1E^{-12}$. |
| DDM: | Digital Diagnostic Monitoring functionality as defined in SFF-8472 MSA. |