SO-TQSFP-DD-4CC-ZR

QSFP-DD OIF 400G-ZR Ethernet Coh Tunable Flexgrid 120km LC D9128-D9612

OVERVIEW

The SO-TQSFP-DD-4CC-ZR is an QSFP-DD form-factor (type 2) DWDM transceiver for 400 Gbps Ethernet applications. The transceiver is intended for use in interconnect applications between data centers with switches, routers etc.

SO-TQSFP-DD-4CC-ZR supports both the amplified (Application Code 0x01) and the un-amplified (Application Code 0x02) use cases as defined in the OIF 400ZR specification.

The dispersion performance is in accordance with OIF 400ZR for distances up to 120km over a SingleMode (SM) fiber using a single optical carrier at 60Gbaud and 16QAM coherent modulation. The transmitter is tunable over the ITU C-Band at 100 GHz grid (75 GHz grid is optional).

The electrical interface is according to IEEE 802.3bs 400GAUI-8 enabling SO-TQSFP-DD-4CC-ZR to support 400G transport according to OIF-ZR specification. The 400GAUI-8 client/electrical interface is compatible with IEEE P802.3bs 8 lane 56G PAM-4, as used for “grey” datacenter optical transceivers, for example 400GBASE-DR4.

This transceiver provides digital diagnostic functions via a 2-wire serial interface and a management interface according to CMIS4.0.

The transceiver supports the commercial temperature range (C-temp): 0°C to 70°C (32°F to 158°F).

TECHNICAL DATA

Parameter	Value
Technology	DWDM QSFP-DD type 2
Transmission media	SM (2x LC)
Typical reach	120km
Nominal wavelengths	191.28 - 196.12THz
Interface standards	400GBASE-ZR
Protocol support	400GbE
	4x 100GbE
Power consumption	< 20 W (Class 8)
Operating temperature	0°C to +70°C
Storage temperature	-40°C to +85°C
Latency	8µs

[1] Receiver sensitivity at unamplified configurations

[2] Signal power of the channel at the OSNR performance value

[3] Input power needed to achieve post FEC BER

[4] At CFEC threshold

[5] OSNR tolerance penalty over OSNR Tolerance due to reflections and dispersion

[6] Tolerance to PMD with <0.5 dB penalty to OSNR sensitivity.

[7] Set to comply with 400G modes. Can be changed on individual modules to fully support other modes.

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

Parameter	Value
Transmitter data:	
Output power	Min: -10.0dBm
	Max: -6.0dBm
Transmit wavelengths	191.28 - 196.12THz
	in 100 (75) GHz steps
	(G.694.1)
Receiver data:	
Minimum input power	-20.0dBm [1]
	-12.0dBm [2]
Input sensitivity	-12.0dBm [3]
Overload (max power)	0 dBm [2]
OSNR tolerance	Max: 26dB/0.1nm [4]
CD tolerance	Min: 2400ps/nm
Optical path OSNR penalty tolerance	Max: 0.5dB [5]
PMD tolerance	Min: 10 ps [6]
Pre-FEC BER	$1.25x10^{-2}$
Rx_LOS Assert	-28.0dBm[7]
DDM	Yes
MSA compliance	QSFP-DD MSA
	CMIS4.0, OIF400ZR

ORDERING INFORMATION

Ordering code	Description
SO-TQSFP-DD-4CC-ZR	QSFP-DD OIF 400GZR Ethernet Coh Tunable Flexgrid 120km LC

GENERAL DEFINITIONS

Parameter	Description
Technology	Grey; Transceiver type for non-WDM applications. Electrical or optical. CWDM; Transceiver type for CWDM applications using G.694.2 channel grid. DWDM; Transceiver type for DWDM applications using G.694.1 channel grid. BiDi; Transceiver pair using two different wavelength channels operating on a single-fiber. DAC: Direct Attach Cable. Electrical cable with attached connectors. AOC: Active Optical Cable. 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 typical fiber dispersion, fiber loss and power budget properties, i.e. w/o dispersion compensation and optical amplification. Actual distance is dependent on actual optical path loss and dispersion properties.
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(s) from transmitter.
Interface standards	Referenced interface standards or MSA's, e.g. IEEE 802.3 standard for 10GbE services or 100G 4WDM-10 etc.
Power budget	Min and max power budget between Transmitter and Receiver w/o optical path penalties.
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. Standard temperature range (C-temp): 0°C to +70°C (32°F to +158°F) Extended temperature range (E-temp): typically -20°C to +75°C (-4°F to +167°F) 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 $1E^{-12}$. Note that some protocols require FEC to achieve sufficient BER.
Receiver max input power	Maximum average input power giving a BER, normally $1E^{-12}$.
DDM	Digital Diagnostic Monitoring functionality as defined in e.g. SFF-8472 MSA.