

DATASHEET 6.0

TQD014-TUNC-SO

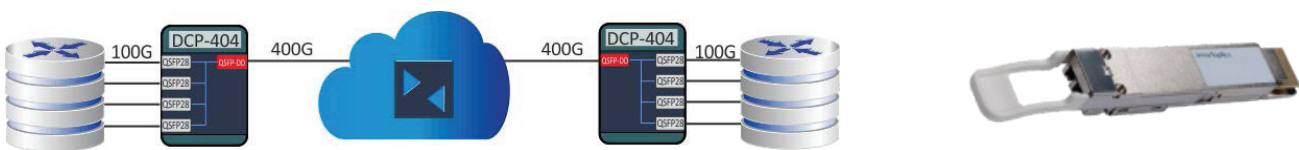
QSFP-DD, OpenZR+, Coh Tunable, High-power, CMIS5.1, LC

OVERVIEW

The TQD014-TUNC-SO is an QSFP-DD form-factor (type 2a) DWDM transceiver conforming to the OpenZR+ MSA for 100Gbps to 400Gbps Ethernet application as well as the application 100GBASE-ZR.

The output power of 0dBm unlocks the potential for the module to transmit 400G signals in already existing, 100GHz spacing, ROADM architectures.

The OpenZR+ MSA provides a flexible solution for operators having routers that not yet have migrated to 400G services. The TQD014-TUNC-SO can as an example be used in the Smartoptics DCP-404 Muxponder to combine up to 4x 100G flows to a 100G/200G/300G/400G OpenZR+ signal to be transported over an optical network.



The below table lists the OIF 400ZR and OpenZR+ modes supported by TQD014-TUNC-SO.

CMIS Application Code	Host format	Electrical interface	Payload	FEC	Modulation	Line Symbol Baud Rate	MSA format
1	400GBASE-R	1x 400GAUI-8 (8x 50G)	400G	oFEC	DP-16QAM	60.1GBd	OpenZR+ MSA
2	4x 100GBASE-R	4x 100GAUI-2 (2x 50G)	400G	oFEC	DP-16QAM	60.1GBd	OpenZR+ MSA
3	3x 100GBASE-R	3x 100GAUI-2 (2x 50G)	300G	oFEC	DP-8QAM	60.1GBd	OpenZR+ MSA
4	2x 100GBASE-R	2x 100GAUI-2 (2x 50G)	200G	oFEC	DP-QPSK	60.1GBd	OpenZR+ MSA
5	100GBASE-R	1x 100GAUI-2 (2x 50G)	100G	oFEC	DP-QPSK	30.0GBd	OpenZR+ MSA
6	100GBASE-R	1x 100GAUI-2 (2x 50G)	100G	SC-FEC	DP-QPSK	30.0GBd	100GBASE-ZR

TECHNICAL DATA

The optical characteristics are into Generic and Application code sections. The *Generic* section defines the common characteristics, independent of the selected application modes. The *Application* code section defines application code based optical characteristics.

The performance is compliant with the respective specifications but can exceed the minimum requirements on some parameters.

GENERIC

Parameter	Value	Parameter	Value
Technology	DWDM QSFP-DD type 2a	MSA	QSFP-DD MSA's, CMIS5.1, C-CMIS1.2
Transmission media	SM (2x LC)	Power consumption	< 22.5W
Nominal wavelengths	191.3 - 196.1THz (tunable) 6.25GHz	Tx Power, configurable range	-6 to +1dBm
Interface standards	OpenZR+, 100GBASE-ZR	Tx In-band OSNR	Min 43dB/0.1nm
Operating temperature	-5°C to +75°C	Tx Out-Of-Band OSNR	Min 40dB/0.1nm
Storage temperature	-40°C to +85°C	Receiver turn-up	Max 100ms from warm start Max 150s from cold start
DDM functions	Total received power	Absolute max conditions	Rx signal input power: +3dBm
	Coherent channel power		Rx total input power: +13dBm
	OSNR, eSNR, PDL, dispersion, DGD		
	Case temperature		

Safety/regulatory compliance:

TUV/UL/FDA (contact Smartoptics for latest certification information)

RoHS compliance

OPTICAL SPECIFICATION - APPLICATION CODES

The table below lists the primary optical parameters for each supported application code.

Appl mode	Line rate	Host format	Tx Power ¹⁾	Rx sens @ OSNR >35dB	Rx @ OSNR	CDC range @0.5dB OSNR penalty
1	400G	1x 400GAUI-8	0dBm	-23dBm	23.5dB@-12dBm	12 000 ps/nm
2	400G	4x 100GAUI-2	0dBm	-23dBm	23.5dB@-12dBm	12 000 ps/nm
3	300G	3x 100GAUI-2	0dBm	-26dBm	20.0dB@-12dBm	18 000 ps/nm
4	200G	2x 100GAUI-2	0dBm	-30dBm	15.0dB@-12dBm	24 000 ps/nm
5	100G	1x 100GAUI-2	0dBm	-32dBm	12.0dB@-12dBm	48 000 ps/nm
6	100G	1x 100GAUI-2	0dBm	-28dBm	15.0dB@-12dBm	40 000 ps/nm

1). The module transmit power can be provisioned up to the maximum available TX power.

ORDERING INFORMATION

Ordering code	Item Name
TQD014-TUNC-S0	QSFP-DD OpenZR+ HPow Coh-T SM CMIS5.1

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.
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.

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