QSFP28 100G COHERENT DWDM SFF-8636 HIGH TX POWER

QSFP28, 100GBASE-ZR Coh 50/100GHz Tunable 120km, 30dB, SFF-8636, LC, Tx=0dBm

TQ2032-TUNX-SO

The TQ2032-TUNx-SO is a pluggable QSFP28 DWDM transceiver designed for high capacity 100 Gigabit Ethernet (100GbE) Data Center Interconnect (DCI) optical communication applications up to 120km unamplified or 300km amplified links. The TQ2032-TUNx-SO has an on-board dispersion compensation that can handle chromatic dispersion up to 2 400ps/nm (~120km), or 6 000ps/nm (~300km) with “Extended mode” over a singlemode fiber.

The transceiver utilizes a tunable DP-QPSK modulated 28 Gbps wavelength with ability to be tuned with either 50GHz or 100GHz spacing enabling up to 96 channels over a 50GHz DWDM grid system as specified in the ITU-T 694.1 standard. The media side is encoded with Staircase FEC (SC-FEC). The transceiver also includes an EDFA, enabling a Tx power of 0dBm.

The electrical signals are transmitted and received from the host via a standard 38 pin connector described in the QSFP28 MSA (SFF-8679). The electrical interface is compliant to CAUI-4 (IEEE P802.3bm Annex 83E), splitting the 100Gbps signal in to four parallel 25 Gbps NRZ streams.

The management interface specification of the module is compliant to SFF-8636. For CMIS compliant version, see p/n: TQ2031-TUNx-SO. The transceiver is also available in C-temp version covering a temperature range of 0°C to +70°C (TQ2031-TUNC-SO) and I-temp version covering -40°C to +85°C (TQ2031-TUNI-SO).

TECHNICAL DATA

Parameter	Value
Technology	DWDM QSFP28 100GBASE-ZR
Transmission media	SM (2x LC)
Typical reach, unamplified	120km[1)]
Typical reach, amplified	120km [2)]
	300km [3)]
Nominal wavelength	191.35 – 196.10 THz (96ch)
Bit rate support	103.12Gbps
Protocol support	100GbE
Dispersion tolerance	< 6.2W (TQ2032-TUNC-SO) [3)] < 6.7W (TQ2032-TUNI-SO) [3)]
Power budget	0 – 30dB
Power consumption	0°C to +70°C (TQ2032-TUNC-SO) -40°C to +85°C (TQ2032-TUNI-SO)
Operating temperature	0°C to +70°C
Storage temperature	-40°C to +85°C

Parameter	Value
Transmitter data:	
Output power per lane	Min: 0dBm [4)]
Tx output monitor range	-2dBm to +4dBm [4)]
Transmit wavelength	191.35 – 196.10 THz
Tx OSNR, in-band	39dB/12.5GHz
Tx OSNR, out-of-band	30dB/12.5GHz
Receiver data:	
Minimum input power, unamplified	-30.0dBm [4) 5) 6)]
Minimum input power, amplified	-18dBm [4)]
	-22dBm [4) 8)]
Overload (max power)	3.0dBm [4)]
OSNR Tolerance	16.5 dB/0.1nm [6)]
Wavelength range	191.35 – 196.10 THz
Misc	Remote Diagnostic Monitoring
	Flextune™
MSA compliance	SFF-8665, -8661, -8679
	SFF-8636

[1)] Limited by power budget

[2)] Limited by dispersion compensation

[3)] Extended mode, set through the host when the transceiver is in Low Power mode. The Extended mode will increase the worst-case power consumption by 0.3W.

[4)] Average power

[5)] Receiver Sensitivity at unamplified configurations; OSNR >35dB/0.1nm

[6)] 100G DQPSK SC-FEC

[7)] 100G DQPSK RS-FEC

[8)] Extended range; Rx signal input power range over which performance can be guaranteed with <1dB OSNR penalty relative to Rx OSNR tolerance limit

Media FEC	Latency [µs]
SC-FEC	17

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

ORDERING INFORMATION

Ordering code	Description
TQ2032-TUNC-SO	QSFP28, 100GBASE-ZR Coh 50/100GHz Tunable 120km, w/o TOF, 30dB, SFF-8636, LC
TQ2032-TUNI-SO	QSFP28, 100GBASE-ZR Coh 50/100GHz Tunable 80km, w/o TOF, 30dB, SFF-8636, LC, I-temp

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.