

# SO-QSFP28-LR4-20D

QSFP28, 100G Ethernet eLR4, OTU4 411 9D1F, SM, 1296/1300/1305/1309nm, 20km, 12dB, LC

## OVERVIEW

The SO-QSFP28-LR4-20L is a QSFP28 form-factor transceiver for 100G Ethernet and OTU4 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 supports optical distances up to 20km over a SingleMode (SM) fiber.

For Ethernet services, 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). The optical parameters will provide a bit error ratio (BER) of  $5 \times 10^{-5}$ . FEC will render in the required BER of better than  $1 \times 10^{-12}$ .

SO-QSFP28-LR4-20L uses four optical channels/lanes @ 25.78 Gbps to transport the Ethernet signal and 27.95Gbps for the OTU4 signal. Digital diagnostics functions are available via an I2C interface, as specified by the QSFP28 MSA.

## TECHNICAL DATA

<b>Technology</b>	Grey QSFP28
<b>Transmission media</b>	SM (2x LC)
<b>Typical reach</b>	20 km
<b>Nominal wavelength</b>	Lane 1: 1295.56 nm Lane 2: 1300.05 nm Lane 3: 1304.58 nm Lane 4: 1309.14 nm
<b>Interface standards</b>	100GBASE eLR4 OTU4 411 9D1F
<b>Bit rate range</b>	103.12 / 111.81 Gbps <sup>1)</sup>
<b>Protocols</b>	Eth: 100GbE OTN: OTU4
<b>Power budget</b>	0 – 12.0 dB
<b>Temperature range</b>	0°C to +70°C
<b>Power consumption</b>	< 4.5 W

<b>Transmitter data</b>	Output power, tot:	Max: +10.5 dBm <sup>2)</sup>
	Output power, per lane	Min: -2.5 dBm Max: +4.5 dBm
	Tx wavelength (nm):	1294.53 – 1296.59 <sup>3)</sup> 1299.02 – 1301.09 <sup>4)</sup> 1303.54 – 1305.63 <sup>5)</sup> 1308.09 – 1310.19 <sup>6)</sup>
<b>Receiver data</b>	Minimum input power:	-14.5 dBm <sup>7)</sup>
	Overload (max power):	+4.5 dBm <sup>7)</sup>
	Wavelength range:	1294.53 – 1296.59 <sup>3)</sup> 1299.02 – 1301.09 <sup>4)</sup> 1303.54 – 1305.63 <sup>5)</sup> 1308.09 – 1310.19 <sup>6)</sup>
<b>DDM</b>	Yes	
<b>MSA compliance</b>	QSFP28 MSA	

<sup>1)</sup> Aggregated line rate (100GbE / OTU4)

<sup>2)</sup> Total power (all lanes)

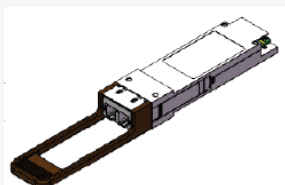
<sup>3)</sup> Lane 1

<sup>4)</sup> Lane 2

<sup>5)</sup> Lane 3

<sup>6)</sup> Lane 4

<sup>7)</sup> Per lane and @ BER 1E-5



<b>EMC CE</b>	EN 55032:2012, EN 55032:2015 EN 55024:2010, EN 55024:2010+A1
<b>UL/Safety</b>	UL 60950-1
<b>FCC</b>	47 CFR PART 15 OCT, 2013
<b>RoHS</b>	RoHS 6
<b>TUV</b>	EN 60950-1:2006+A11+A1+A12+A2 EN 60825-1:2014 EN 60825-2:2004+A1+A2

<b>Storage temp.</b>	-40°C to +85°C
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Note! See "Definitions" below.

## ORDERING INFORMATION

Part number	Description
SO-QSFP28-LR4-20D	QSFP28, 100G Ethernet eLR4, OTU4 411 9D1F, SM, 1296/1300/1305/1309nm, 20km, 12dB, LC

## DEFINITIONS

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:	DAC: Direct Attach Cable (DAC). Electrical or optical cable with attached connectors. 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. Excluding any dispersion penalty.
Dispersion tolerance/penalty:	Maximum amount of tolerated dispersion and required reduction of power budget to maintain BER better than $1E^{-12}$ . Defined at a specific bit rate.
Temperature range:	Max operating case temperature range. Standard temperature range: typically 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.
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.