

**DATASHEET 6.9****QSFP+/28/56 AND SFP28/56 OVERVIEW****OVERVIEW**

The tables below list the QSFP+/28/56, SFP28/56 transceivers and cable assemblies currently provided in the Smartoptics portfolio and with the most characteristic parameters. Please refer to the respective datasheets for more technical information.

## GREY QSFP28 TRANSCEIVERS

Part number	Protocols	Dist	Wavelengths	Fiber	Conn	Standard / MSA	Pwr budget	FEC
SO-QSFP28-SR4	100GE	100m	4x 850nm	MM	1x MPO	100GBASE-SR4	1.9dB	Yes
TQ2015-M85I-SO <sup>1)</sup>	100GE	100m	4x 850nm	MM	1x MPO	100GBASE-SR4	1.9dB	Yes
SO-QSFP28-SWDM4	100GE	150m	850/880/910/940nm	MM	2x LC	100G SWDM4	1.8dB	Yes
TQ2016-MS2C-SO	100GE	100m	850/910nm	MM	2x LC	100G SRBD	2.4dB	No <sup>3)</sup>
SO-QSFP28-100G-DR	100GE	500m	1x 1311nm	MM	1x MPO	100G-DR	3.0dB	Yes
SO-QSFP28-PSM4	100GE	2km	4x 1310nm	SM	1x MPO	100G PSM4	3.3dB	Yes
SO-QSFP28-CWDM4	100GE	2km	1271/1291/1311/1331nm	SM	2x LC	100G CWDM4	5.0dB	Yes
SO-QSFP28-100G-FR	100GE	2km	1x 1311nm	SM	2x LC	100G-FR	4.0dB	No <sup>3)</sup>
SO-QSFP28-LR4	100GE/OTU4	10km	1296/1300/1304/1309nm	SM	2x LC	100GBASE-LR4 OTU4 4I1-9D1F	6.3dB	No
TQ2011-SL4I-SO <sup>1)</sup>	100GE	10km	1296/1300/1304/1309nm	SM	2x LC	100GBASE-LR4	6.3dB	No
SO-QSFP28-100G-LR	100GE	10km	1x 1311nm	SM	2x LC	100G-LR	6.3dB	No <sup>3)</sup>
SO-QSFP28-LR4-10L	100GE	10km	1296/1300/1304/1309nm	SM	2x LC	100GBASE-LR4	6.3dB	No
SO-QSFP28-LR4-20L	100GE	20km	1296/1300/1304/1309nm	SM	2x LC	100GBASE-LR4	8.5dB	No
TQ2012-SL4I-SO <sup>1)</sup>	100GE	20km	1296/1300/1304/1309nm	SM	2x LC	100GBASE-LR4	11.2dB	No
SO-QSFP28-LR4-20D	100GE/OTU4	20km	1296/1300/1304/1309nm	SM	2x LC	100G 4WDM-20 OTU4 4I1-9D1F	10.2dB	Yes
TQ2023-S31C-SO	100GE	40km	1x 1311nm	SM	2x LC	100G-ER1 MSA	18.5dB	No <sup>3)</sup>
SO-QSFP28-ER4	100GE	40km	1296/1300/1304/1309nm	SM	2x LC	100G 4WDM-40	18dB	Yes
TQ2009-SL4E-SO <sup>2)</sup>	100GE	40km	1296/1300/1304/1309nm	SM	2x LC	100G 4WDM-40	18dB	Yes
TQ2009-SL4I-SO <sup>1)</sup>	100GE	40km	1296/1300/1304/1309nm	SM	2x LC	100G 4WDM-40	18dB	Yes
SO-QSFP28-ER4-OTU4	100GE	40km	1296/1300/1304/1309nm	SM	2x LC	100G 4WDM-40/ OUT4	18dB	Yes
SO-QSFP28-ZR4	100GE	80km	1296/1300/1304/1309nm	SM	2x LC	100G-ZR4	31dB	Yes
QSFP-100G-ZR4-SO	100GE	80km	1296/1300/1304/1309nm	SM	2x LC	100G-ZR4	31dB	Yes

Dist: Typical distance, normally based on dispersion properties.

Pwr budget: Difference between average min Tx power and Rx sensitivity. Dispersion/path penalties not taken into account.

FEC: If FEC is required in host equipment for performance @ 100GE. The OTU4 frame includes FEC.

- 1) Industrial temperature range (-40 to +85).
- 2) Industrial temperature range, see datasheet.
- 3) This transceiver has inbuilt FEC so host system shall not activate FEC.

## CWDM QSFP28 TRANSCEIVERS

Part number	Protocols	Dist	Wavelengths	Fiber	Conn	Standard / MSA	Pwr budget	FEC
SO-QSFP28-100G-FRx	100GE	2km	1271 – 1331nm (4ch)	SM	2x LC	100GBASE-FR	4dB	No <sup>1)</sup>
SO-QSFP28-100G-LRx	100GE	10km	1271 – 1331nm (4ch)	SM	2x LC	100GBASE-LR	6.3dB	No <sup>1)</sup>

<sup>1)</sup> This transceiver has inbuilt FEC so host system shall not activate FEC.

## DWDM QSFP28 TRANSCEIVERS

Part number	Protocols	Dist	Wavelengths	Fiber	Conn	Standard / MSA	Pwr budget	FEC
SO-QSFP28-Dxx	100GE	-	D9200 – D9590 (40ch)	SM	2x LC	-	-	No
SO-QSFP28-Dxx-A	100GE	-	D9200 – D9600 (41ch)	SM	2x LC	-	-	No

These transceiver uses two PAM4 modulated sub-channels per 100GHz grid and with integrated FEC. Requires a DCP Open Line System to operate up to 80km.

## QSFP28 BiDi TRANSCEIVERS

Part number	Protocols	Dist	Wavelengths	Fiber	Conn	Standard / MSA	Pwr budget	FEC
SO-QSFP28-50GE-BX10D-2733	50GE	10km	Tx/Rx=1270/1330nm	SM	1x LC	-	6.3dB	Yes
SO-QSFP28-50GE-BX10D-3327	50GE	10km	Tx/Rx=1330/1270nm	SM	1x LC	-	6.3dB	Yes
SO-QSFP28-50GE-BX40D-2930	50GE	40km	Tx/ Rx=1294.40/1308.24nm	SM	1x LC	-	18.0dB	Yes
SO-QSFP28-50GE-BX40D-3029	50GE	40km	Tx/ Rx=1308.24/1294.40nm	SM	1x LC	-	18.0dB	Yes
TQ2020-BADC-SO	100GE	10km	Tx/Rx=1271/1331nm	SM	1x LC	100G-LR	6.8dB	No <sup>1)</sup>
TQ2020-BDAC-SO	100GE	10km	Tx/Rx=1331/1271nm	SM	1x LC	100G-LR	6.8dB	No <sup>1)</sup>
TQ2021-BBCC-SO	100GE	20km	Tx/Rx=1291/1311nm	SM	1x LC	100G LR1-20	10.4dB	No <sup>1)</sup>
TQ2021-BCBC-SO	100GE	20km	Tx/Rx=1311/1291nm	SM	1x LC	100G LR1-20	10.4dB	No <sup>1)</sup>

<sup>1)</sup>This transceiver has inbuilt FEC so host system shall not activate FEC.

## QSFP28 O-BAND DWDM TRANSCEIVERS

Part number	Protocols	Dist	Wavelengths	Fiber	Conn	Standard / MSA	Pwr budget	FEC
TQ2026-OxxC-SO	100GE	25km	228.4 - 231.4THz	SM	1x LC	-	15dB	No <sup>1)</sup>

## QSFP28 CABLE ASSEMBLIES

Part number	Protocols	Lengths	Type	Connectors
SO-QSFP28-PCUxM	100GE	0.5m – 5m	DAC, Passive	QSFP28 <=> QSFP28
SO-QSFP28-4SFP28-PCUxM	100GE	1m – 5m	DAC, Passive	QSFP28 <=> 4x SFP28
SO-QSFP28-AOCxM	100GE	1m – 50m	AOC	QSFP28 <=> QSFP28
SO-QSFP28-4XSFP28-AOCxM	100GE	1m – 70m	AOC	QSFP28 <=> 4x SFP28

## DAC SFP56 CABLE ASSEMBLIES

Part number	Protocols	Lengths	Type	Connectors
DS5001-xxxC-SO	50GE	0.5m – 3m	DAC, Passive	QSFP56 <=> QSFP56

## GREY SFP28 TRANSCEIVERS

Part number	Protocols	Dist	Wavelengths	Fiber	Conn	Standard / MSA	Pwr budget	FEC
SO-SFP28-SR	25GE	100m	1x 850nm	MM	2x LC	25GBASE-SR	1.9dB	Yes
SO-SFP28-SR3	25GE	300m	1x 850nm	MM	2x LC	25GBASE-SR	1.9dB	Yes
SO-SFP28-LR	25GE/CPRI-10/ 10GbE-LAN	10km	1x 1310nm	SM	2x LC	-	6.3dB	Yes
SO-SFP28-ER-I	25GE/CPRI-10	40km	1x 1310nm	SM	2x LC	25GBASE-ER	18dB	Yes
TS2014-S30C-SO	25GE	80km	1x 1310nm	SM	2x LC	-	30dB	Yes
TS2014-S30C-SO	25GE	80km	1x 1310nm	SM	2x LC	-	30dB	Yes
SO-SFP28-32GFC-SD	32G FC / 25GE	100m	1x 850nm	MM	2x LC	3200-SN (FC-PI-6)	7dB / 1.9dB	Yes
SO-SFP28-32GFC-LD	32G/16G/8G FC 25GE	10km	1x 1310nm	SM	2x LC	-	9.4dB	Yes

Dist: Typical distance, normally based on dispersion properties.

Pwr budget: Difference between average min Tx power and Rx sensitivity. Dispersion/path penalties not taken into account.

FEC: If FEC is required in host equipment for performance @ 32G/25GE.

## SFP28 BIDI TRANSCEIVERS

Part number	Protocols	Dist	Wavelengths	Fiber	Conn	Standard / MSA	Pwr budget	FEC
SO-SFP28-BX10D-2733-I	25GE/CPRI-10	10km	Tx/Rx=1270/1330nm	SM	1x LC	-	11.5dB	Yes
SO-SFP28-BX10D-3327-I	25GE/CPRI-10	10km	Tx/Rx=1330/1270nm	SM	1x LC	-	11.5dB	Yes
SO-SFP28-BX20D-2733-I	25GE/CPRI-10	20km	Tx/Rx=1270/1330nm	SM	1x LC	-	14.0dB	Yes
SO-SFP28-BX20D-3327-I	25GE/CPRI-10	20km	Tx/Rx=1330/1270nm	SM	1x LC	-	14.0dB	Yes
SO-SFP28-BX40D-2731-I	25GE/CPRI-10	40km	Tx/Rx=1270/1310nm	SM	1x LC	-	19dB	Yes
SO-SFP28-BX40D-3127-I	25GE/CPRI-10	40km	Tx/Rx=1310/1270nm	SM	1x LC	-	19dB	Yes

## SFP28 CWDM / DWDM / LANWDM TRANSCEIVERS

Part number	Protocols	Dist	Wavelengths	Fiber	Conn	Standard / MSA	Pwr budget	FEC
SO-SFP28-32GFC-LR10-Cxx	32G FC 25GE/10GE	10km	1271/1291/1311/1331nm (4ch)	SM	2x LC	-	9.4dB	Yes
SO-SFP28-L10-Dxxxx-I	25GE/CPRI-10	10km	D9200 – D9600 (41ch)	SM	2x LC	-	13dB	Yes
SO-SFP28-L10E-Dxxxx-I	25GE/CPRI-10	10km	D9200 – D9600 (41ch)	SM	2x LC	-	18dB	Yes
SO-SFP28-LWDM-x-E	25GE/CPRI-10	30km	1277.89 - 1309.14nm (8ch)	SM	2x LC	-	21dB	Yes
TS2016-TUNE-SO	25GE/10GE	15km	DWDM Tunable (40ch)	SM	2x LC	-	18dB	Yes

Dist: Typical distance, normally based on dispersion properties.

Pwr budget: Difference between average min Tx power and Rx sensitivity. Dispersion/path penalties not taken into account.

FEC: If FEC is required in host equipment for performance @ 25GE.

## SFP28 CABLE ASSEMBLIES

Part number	Protocols	Lengths	Type	Connectors
SO-SFP28-PCUxM	25GE	0.5m – 5m	DAC, Passive	SFP28 <=> SFP28
SO-SFP28-AOCxM	25GE	1m – 30m	AOC	SFP28 <=> SFP28

## GREY QSFP+ TRANSCEIVERS

Part number	Protocols	Dist	Wavelengths	Fiber	Conn	Standard / MSA	Pwr budget	FEC
SO-QSFP-SR4	40GE	150m	4x 850nm	MM	2x LC	40GBASE-SR4	1.9dB	No
SO-QSFP-ESR4	40GE	400m	4x 850nm	SM	1x MPO	40GBASE-eSR4	1.9dB	No
SO-QSFP-LX4 <sup>1)</sup>	40GE	2km	1271/1291/1311/1331nm	SM	2x LC	40GBASE-IR4	4.5dB	No
SO-QSFP-LX4 <sup>1)</sup>	40GE	150m	1271/1291/1311/1331nm	MM	2x LC	-	5.5dB	No
SO-QSFP-LR4-PSM	40GE, 4x 10GE	10km	4x 1310nm	SM	1x MPO	40GBASE-LR4	6.6dB	No
SO-QSFP-LR4	40GE, OTU3	10km	1271/1291/1311/1331nm	SM	2x LC	40GBASE-LR4	6.7dB	No
SO-QSFP-LR4-20	40GE	20km	1271/1291/1311/1331nm	SM	2x LC	40GBASE-LR4	10.2dB	No
SO-QSFP-ER4	40GE, OTU3	40km	1271/1291/1311/1331nm	SM	2x LC	40GBASE-ER4	18.5dB	No
SO-QSFP-IR4-PSM	40GE	2km	4x 1310nm	SM	2x LC	40GBASE-IR4	7.4dB	No

1) SO-QSFP-LX4 operates on both SM and MM fibers.

## DWDM QSFP+ TRANSCEIVERS

Part number	Protocols	Dist	Wavelengths	Fiber	Conn	Standard / MSA	Pwr budget	FEC
SO-QSFP-40G-Dxxxx	40GE	-	D9210 – D9600 (40ch)	SM	2x LC	-	11dB	Yes

## QSFP+ CABLE ASSEMBLIES

Part number	Protocols	Lengths	Type	Connectors
SO-QSFP-40G-PCUxM	40GE	0.5m – 5m	DAC, Passive	QSFP+ <=> QSFP+
SO-QSFP-4SFP-PCUxM	40GE, 10GE	1m – 3m	DAC, Passive	QSFP+ <=> 4x SFP+
SO-QSFP-40G-AOCxM	40GE	1m – 100m	AOC	QSFP+ <=> QSFP+
SO-QSFP-4X10G-AOCxM	40GE, 10GE	1m – 100m	AOC	QSFP+ <=> 4x SFP+

## GREY QSFP56 TRANSCEIVERS

Part number	Protocols	Dist	Wavelengths	Fiber	Conn	Standard / MSA	Pwr budget	FEC
SO-QSFP56-2C-2	200GE	2km	1271/1291/1311/1331nm	SM	2x LC	200G-FR4	4.8dB	Yes