

# SFP28 AND QSFP28 OVERVIEW

## OVERVIEW

The tables below list the SFP28 and QSFP28 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 SFP28 TRANSCEIVERS

Part number	Protocols	Dist	Wavelengths	Fiber	Conn	Standard / MSA	Pwr budget	FEC	Datasheet
SO-SFP28-SR	25GE	100m	1x 850nm	MM	2x LC	25GBASE-SR	1.9dB	Yes	<a href="#">Datasheet</a>
SO-SFP28-SR3	25GE	300m	1x 850nm	MM	2x LC	25GBASE-SR	1.9dB	Yes	<a href="#">Datasheet</a>
SO-SFP28-LR	25GE/CPRI-10/ 10GbE-LAN	10km	1x 1310nm	SM	2x LC	25GBASE-LR	6.3dB	Yes	<a href="#">Datasheet</a>
SO-SFP28-ER-I	25GE/CPRI-10	40km	1x 1310nm	SM	2x LC	25GBASE-ER	18dB	Yes	<a href="#">Datasheet</a>
TS2014-S30C-SO	25GE	80km	1x 1310nm	SM	2x LC	-	30dB	Yes	<a href="#">Datasheet</a>
TS2014-S30I-SO	25GE	80km	1x 1310nm	SM	2x LC	-	30dB	Yes	<a href="#">Datasheet</a>
SO-SFP28-32GFC-SD	32G FC / 25GE	100m	1x 850nm	MM	2x LC	3200-SN (FC-PI-6)	7dB / 1.9dB	Yes	<a href="#">Datasheet</a>
SO-SFP28-32GFC-LD	32G/16G/8G FC 25GE	10km	1x 1310nm	SM	2x LC	3200-SM-LC-L (FC-PI-6)	9.4dB	Yes	<a href="#">Datasheet</a>

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	Datasheet
SO-SFP28-BX10D-2733-I	25GE/CPRI-10	10km	Tx/Rx=1270/1330nm	SM	1x LC	-	11.5dB	Yes	<a href="#">Datasheet</a>
SO-SFP28-BX10D-3327-I	25GE/CPRI-10	10km	Tx/Rx=1330/1270nm	SM	1x LC	-	11.5dB	Yes	<a href="#">Datasheet</a>
SO-SFP28-BX20D-2733-I	25GE/CPRI-10	20km	Tx/Rx=1270/1330nm	SM	1x LC	-	14.0dB	Yes	<a href="#">Datasheet</a>
SO-SFP28-BX20D-3327-I	25GE/CPRI-10	20km	Tx/Rx=1330/1270nm	SM	1x LC	-	14.0dB	Yes	<a href="#">Datasheet</a>
SO-SFP28-BX40D-2731-I	25GE/CPRI-10	40km	Tx/Rx=1270/1310nm	SM	1x LC	-	19dB	Yes	<a href="#">Datasheet</a>
SO-SFP28-BX40D-3127-I	25GE/CPRI-10	40km	Tx/Rx=1310/1270nm	SM	1x LC	-	19dB	Yes	<a href="#">Datasheet</a>

## SFP28 CWDM / DWDM / LANWDM TRANSCEIVERS

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

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	Datasheet
SO-SFP28-PCUxM	25GE	0.5m – 5m	DAC, Passive	SFP28 ↔ SFP28	<a href="#">Datasheet</a>
SO-SFP28-AOCxM	25GE	1m – 30m	AOC	SFP28 ↔ SFP28	<a href="#">Datasheet</a>

## GREY QSFP28 TRANSCEIVERS

Part number	Protocols	Dist	Wavelengths	Fiber	Conn	Standard / MSA	Pwr budget	FEC	Datasheet
SO-QSFP28-SR4	100GE	100m	4x 850nm	MM	1x MPO	100GBASE-SR4	1.9dB	Yes	<a href="#">Datasheet</a>
TQ2015-M85I-SO <sup>1)</sup>	100GE	100m	4x 850nm	MM	1x MPO	100GBASE-SR4	1.9dB	Yes	<a href="#">Datasheet</a>
SO-QSFP28-SWDM4	100GE	150m	850/880/910/940nm	MM	2x LC	100G SWDM4	1.8dB	Yes	<a href="#">Datasheet</a>
TQ2016-MS2C-SO	100GE	100m	850/910nm	MM	2x LC	100G SR1.2	2.4dB	No <sup>3)</sup>	<a href="#">Datasheet</a>
SO-QSFP28-100G-DR	100GE	500m	1x 1311nm	MM	1x MPO	100G-DR	3.0dB	Yes	<a href="#">Datasheet</a>
SO-QSFP28-PSM4	100GE	2km	4x 1310nm	SM	1x MPO	100G PSM4	3.3dB	Yes	<a href="#">Datasheet</a>
SO-QSFP28-CWDM4	100GE	2km	1271/1291/1311/1331nm	SM	2x LC	100G CWDM4	5.0dB	Yes	<a href="#">Datasheet</a>
SO-QSFP28-100G-FR	100GE	2km	1x 1311nm	SM	2x LC	100G-FR	4.0dB	No <sup>3)</sup>	<a href="#">Datasheet</a>
SO-QSFP28-LR4	100GE/OTU4	10km	1296/1300/1304/1309nm	SM	2x LC	100GBASE-LR4 OTU4 411-9D1F	6.3dB	No	<a href="#">Datasheet</a>
TQ2011-SL4I-SO <sup>1)</sup>	100GE	10km	1296/1300/1304/1309nm	SM	2x LC	100GBASE-LR4	6.3dB	No	<a href="#">Datasheet</a>
SO-QSFP28-100G-LR	100GE	10km	1x 1311nm	SM	2x LC	100G-LR	6.3dB	No <sup>3)</sup>	<a href="#">Datasheet</a>
SO-QSFP28-LR4-10L	100GE	10km	1296/1300/1304/1309nm	SM	2x LC	100GBASE-LR4	6.3dB	No	<a href="#">Datasheet</a>
SO-QSFP28-LR4-20L	100GE	20km	1296/1300/1304/1309nm	SM	2x LC	100GBASE-LR4	8.5dB	No	<a href="#">Datasheet</a>
TQ2012-SL4I-SO <sup>1)</sup>	100GE	20km	1296/1300/1304/1309nm	SM	2x LC	100GBASE-LR4	11.2dB	No	<a href="#">Datasheet</a>
SO-QSFP28-LR4-20D	100GE/OTU4	20km	1296/1300/1304/1309nm	SM	2x LC	100G 4WDM-20 OTU4 411-9D1F	10.2dB	Yes	<a href="#">Datasheet</a>
TQ2023-S31C-SO	100GE	40km	1x 1311nm	SM	2x LC	100G-ER1 MSA	18.5dB	No <sup>3)</sup>	<a href="#">Datasheet</a>
SO-QSFP28-ER4	100GE	40km	1296/1300/1304/1309nm	SM	2x LC	100G 4WDM-40	18dB	Yes	<a href="#">Datasheet</a>
TQ2009-SL4E-SO <sup>2)</sup>	100GE	40km	1296/1300/1304/1309nm	SM	2x LC	100G 4WDM-40	18dB	Yes	<a href="#">Datasheet</a>
TQ2009-SL4I-SO <sup>1)</sup>	100GE	40km	1296/1300/1304/1309nm	SM	2x LC	100G 4WDM-40	18dB	Yes	<a href="#">Datasheet</a>
SO-QSFP28-ER4-OTU4	100GE	40km	1296/1300/1304/1309nm	SM	2x LC	100G 4WDM-40/ OUT4	18dB	Yes	<a href="#">Datasheet</a>
SO-QSFP28-ZR4	100GE	80km	1296/1300/1304/1309nm	SM	2x LC	100G-ZR4	31dB	Yes	<a href="#">Datasheet</a>
QSFP-100G-ZR4-SO	100GE	80km	1296/1300/1304/1309nm	SM	2x LC	100G-ZR4	31dB	Yes	<a href="#">Datasheet</a>

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.

<sup>1)</sup> Industrial temperature range (-40 to +85).

<sup>2)</sup> Industrial temperature range, see datasheet.

<sup>3)</sup> 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	Datasheet
SO-QSFP28-100G-FRx	100GE	2km	1271 – 1331nm (4ch)	SM	2x LC	100GBASE-FR	4dB	No <sup>1)</sup>	<a href="#">Datasheet</a>
SO-QSFP28-100G-LRx	100GE	10km	1271 – 1331nm (4ch)	SM	2x LC	100GBASE-LR	6.3dB	No <sup>1)</sup>	<a href="#">Datasheet</a>

<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	Datasheet
SO-QSFP28-Dxx	100GE	-	D9200 – D9590 (40ch)	SM	2x LC	-	-	No	<a href="#">Datasheet</a>
SO-QSFP28-Dxx-A	100GE	-	D9200 – D9600 (41ch)	SM	2x LC	-	-	No	<a href="#">Datasheet</a>

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	Datasheet
SO-QSFP28-50GE-BX10D-2733	50GE	10km	Tx/Rx=1270/1330nm	SM	1x LC	-	6.3dB	Yes	<a href="#">Datasheet</a>
SO-QSFP28-50GE-BX10D-3327	50GE	10km	Tx/Rx=1330/1270nm	SM	1x LC	-	6.3dB	Yes	<a href="#">Datasheet</a>
SO-QSFP28-50GE-BX40D-2930	50GE	40km	Tx/Rx=1294.40/1308.24nm	SM	1x LC	-	18.0dB	Yes	<a href="#">Datasheet</a>
SO-QSFP28-50GE-BX40D-3029	50GE	40km	Tx/Rx=1308.24/1294.40nm	SM	1x LC	-	18.0dB	Yes	<a href="#">Datasheet</a>
TQ2020-BADC-SO	100GE	10km	Tx/Rx=1271/1331nm	SM	1x LC	100G-LR	6.8dB	No <sup>1)</sup>	<a href="#">Datasheet</a>
TQ2020-BDAC-SO	100GE	10km	Tx/Rx=1331/1271nm	SM	1x LC	100G-LR	6.8dB	No <sup>1)</sup>	<a href="#">Datasheet</a>
TQ2021-BBCC-SO	100GE	20km	Tx/Rx=1291/1311nm	SM	1x LC	100G-LR1-20	10.4dB	No <sup>1)</sup>	<a href="#">Datasheet</a>
TQ2021-BCBC-SO	100GE	20km	Tx/Rx=1311/1291nm	SM	1x LC	100G-LR1-20	10.4dB	No <sup>1)</sup>	<a href="#">Datasheet</a>
TQ2024-BWVC-SO	100GE	40km	Tx/Rx=1304/1309nm	SM	1x LC	100G-ER1	18.3dB	No <sup>1)</sup>	<a href="#">Datasheet</a>
TQ2021-BVVC-SO	100GE	40km	Tx/Rx=1309/1304nm	SM	1x LC	100G-ER1	18.3dB	No <sup>1)</sup>	<a href="#">Datasheet</a>

<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	Datasheet
TQ2026-OxxC-SO	100GE	25km	228.4 - 231.4THz	SM	1x LC	-	15.0dB	No <sup>1)</sup>	<a href="#">Datasheet</a>
TQ2030-OxxC-SO	100GE	40km	228.4 - 231.4THz	SM	1x LC	-	18.5dB	No <sup>1)</sup>	<a href="#">Datasheet</a>

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

## QSFP28 CABLE ASSEMBLIES

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

## QSFP28 TO SFP28 FORM-FACTOR CONVERTERS

Part number	Protocols	Lengths	Type	Connectors	Datasheet
CVR-QSFP28-SFP28 <sup>1)</sup>	25GE	-	Passive	QSFP28 ↔ SFP28	<a href="#">Datasheet</a>
CVR-QSFP28-SFP28-D <sup>1) 2)</sup>	25GE	-	Active (built-in EEPROM)	QSFP28 ↔ SFP28	<a href="#">Datasheet</a>

<sup>1)</sup> The form-factor converter converts the QSFP28 port to an SFP28 port for 25G operation in a 100G port. Note that the standards/MSA does not include converters, meaning that the converter might not be compatible with a generic QSFP+ interface.