

SFP+ AND QSFP+ OVERVIEW

OVERVIEW

The tables below list the SFP+ and QSFP+ 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 SFP+ TRANSCEIVERS

Part number	Protocols/Bit rate	Dist	Wavelengths	Fiber	Conn	Standard / MSA	Pwr budget	Datasheet
SO-SFP-10GE-T	10G Eth	30m	-	CAT7	RJ45	10G BASE-T	-	Datasheet
SO-SFP-10GE-SR	0.6-11.3Gbps	300m	850nm	MM	2x LC	10GBASE-SW /-SR	5.1dB	Datasheet
SO-SFP-10GE-SR-I	0.6-11.3Gbps	300m	850nm	MM	2x LC	10GBASE-SW /-SR, I-temp	5.1dB	Datasheet
SO-SFP-10GE-LRM	0.6-11.3Gbps	220m	1310nm	MM	2x LC	10GBASE-LRM	3.5dB	Datasheet
SO-SFP-10GE-LR	0.6-11.3Gbps	10km	1310nm	SM	2x LC	10GBASE-LR /-LW	6.2dB	Datasheet
SO-SFP-10GE-LR-I	0.6-11.3Gbps	10km	1310nm	SM	2x LC	10GBASE-LR /-LW, I-temp	6.2dB	Datasheet
SO-SFP-10GE-LR20	0.6-11.3Gbps	20km	1310nm	SM	2x LC	10GBASE-LR /-LW	11.4dB	Datasheet
SO-SFP-10GE-LR20-I	0.6-11.3Gbps	20km	1310nm	SM	2x LC	10GBASE-LR /-LW, I-temp	11.4dB	Datasheet
SO-SFP-10GE-LR40	0.6-11.3Gbps	40km	1310nm	SM	2x LC	10GBASE-ER /-EW	16dB	Datasheet
SO-SFP-10GE-ER	0.6-11.3Gbps	40km	1550nm	SM	2x LC	10GBASE-ER /-EW	11.1dB	Datasheet
SO-SFP-10GE-ER-I	0.6-11.3Gbps	40km	1550nm	SM	2x LC	10GBASE-ER /-EW, I-temp	11.1dB	Datasheet
SO-SFP-10GE-ZR	0.6-11.3Gbps	80km	1550nm	SM	2x LC	10GBASE-ZR /-ZW	23dB	Datasheet
SO-SFP-10GE-ZR-I	0.6-11.3Gbps	80km	1550nm	SM	2x LC	10GBASE-ZR /-ZW, I-temp	23dB	Datasheet
SO-SFP-10G-ZR100	0.6-11.3Gbps	100km	1550nm	SM	2x LC	10GBASE-ZR /-ZW	26dB	Datasheet
SO-SFP-1G-10G-SR	1GbE 10GbE-LAN/-WAN	70m	850nm	MM	2x LC	10GBASE-SR /-SW, 1000BASE-SX	7.5dB	Datasheet
SO-SFP-1G-10G-LR	1GbE 10GbE-LAN/-WAN	10km	1310nm	SM	2x LC	10GBASE-LR /-LW, 1000BASE-LX	11.5dB	Datasheet

0.6 – 11.3Gbps covers the following protocols:

10GbE-LAN, 10GbE-WAN, 1GbE, OTU2e, OTU2, OTU1, STM64/OC192, STM16/OC48, STM4/OC12, 10G FC, 8G FC, 4G FC, 1G FC, CPRI Opt 1, 2, 3, 4, 5, 6, 7, 7A, 8, OBSAI 1x, 2x, 4x, 8x

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.

Standard/MSA: Lists relevant interface standards or MSA compliance. The transceiver may support additional protocols from rate perspective.

SFP+ TRANSCEIVERS FOR FIBER CHANNEL

Part number	Protocols/Bit rate	Dist	Wavelengths	Fiber	Conn	Standard / MSA	Pwr budget	Datasheet
SO-SFP-16GFC-SD	16G/8G/4G FC	150m	850nm	MM	2x LC	-	4.2dB	Datasheet
SO-SFP-16GFC-LD	16G/8G/4G FC	10km	1310nm	SM	2x LC	FC-PI-5	6.9dB	Datasheet
SO-SFP-8GFC-SD	8G/4G/2G/1G FC 0.614 – 8.5Gbps	300m	850nm	MM	2x LC	-	5.1dB	Datasheet
SO-SFP-8GFC-L10D	8G/4G/2G/1G FC 0.614 – 8.5Gbps	10km	1310nm	SM	2x LC	FC-PI-4 800-SM-LC-L FC-PI-4 400-SM-LC-L FC-PI-4 200-SM-LC-L FC-PI-4 100-SM-LC-L	6.8dB	Datasheet
SO-SFP-16GFC-ER-Cxx	16G/8G/4G FC	40km	C47 - C55 (5ch)	SM	2x LC	1600-SM-LC-L	13dB	Datasheet
SO-SFP-16GFC-ER-Dxxxx	16G/8G/4G FC	40km	D920 – D960 (41ch)	SM	2x LC	1600-SM-LC-L	14dB	Datasheet

Subject to change without notice.

For more information visit smartoptics.com.

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CWDM SFP+ TRANSCEIVERS

Part number	Protocols/Bit rate	Dist	Wavelengths	Fiber	Conn	Standard / MSA	Pwr budget	Datasheet
SO-SFP-10GE-LR10-Cxx	0.6-11.3Gbps	10km	C27 – C61 (18ch)	SM	2x LC	10GBASE-LR /-LW	10dB	Datasheet
SO-SFP-10GE-LR40-Cxx	0.6-11.3Gbps	40km	C27 – C45 (10ch)	SM	2x LC	10GBASE-ER /-EW	14dB	Datasheet
SO-SFP-10GE-ER-Cxx	0.6-11.3Gbps	40km	C47 – C61 (8ch)	SM	2x LC	10GBASE-ER /-EW	15dB	Datasheet
SO-SFP-10GE-ER-Cxx-E	0.6-11.3Gbps	40km	C47 – C61 (8ch)	SM	2x LC	10GBASE-ER /-EW, E-temp	14dB	Datasheet
SO-SFP-10GE-LR70-Cxx	0.6-11.3Gbps	70km	C27 – C45 (10ch)	SM	2x LC	-	23dB	Datasheet
SO-SFP-10GE-ZR-Cxx	0.6-11.3Gbps	80km	C47 – C61 (8ch)	SM	2x LC	10GBASE-ZR /-ZW	23dB	Datasheet
SO-SFP-10GE-ZR-Cxx-E	0.6-11.3Gbps	80km	C47 – C61 (8ch)	SM	2x LC	10GBASE-ZR /-ZW, E-temp	23dB	Datasheet

0.6 – 11.3Gbps covers the following protocols:

10GbE-LAN, 10GbE-WAN, 1GbE, OTU2e, OTU2, OTU1, STM64/OC192, STM16/OC48, STM4/OC12, 10G FC, 8G FC, 4G FC, 1G FC, CPRI Opt 1, 2, 3, 4, 5, 6, 7, 7A, 8, OBSAI 1x, 2x, 4x, 8x

Dist: Typical distance, normally based on dispersion properties. Please note the higher intrinsic fiber attenuation in the lower CWDM band that could prevent a certain channel to bridge the distance.
Pwr budget: Difference between average min Tx power and Rx sensitivity. Dispersion/path penalties not taken into account.

Standard/MSA: Lists relevant interface standards or MSA compliance. The transceiver may support additional protocols from rate perspective.

DWDM SFP+ TRANSCEIVERS

Part number	Protocols/Bit rate	Dist	Wavelengths	Fiber	Conn	Standard / MSA	Pwr budget	Datasheet
SO-SFP-10GE-ER-Dxxxx	0.6-11.3Gbps	40km	D920-D960 (41ch)	SM	2x LC	10GBASE-ER /-EW	14dB	Datasheet
SO-SFP-10GE-ER-Dxxxx-l	0.6-11.3Gbps	40km	D920-D960 (41ch)	SM	2x LC	10GBASE-ER /-EW, I-temp	14dB	Datasheet
SO-SFP-10GE-ZR-Dxxxx	0.6-11.3Gbps	80km	D920-D960 (41ch)	SM	2x LC	10GBASE-ZR /-ZW	23dB	Datasheet
SO-SFP-10GE-ZR-Dxxxx-l	0.6-11.3Gbps	80km	D920-D960 (41ch)	SM	2x LC	10GBASE-ZR /-ZW, I-temp	23dB	Datasheet
SO-TSFP-10G-ZR-DWDM-A	9.95-11.3Gbps	80km	D9135 – D9610 (96ch)	SM	2x LC	10GBASE-ZR /-ZW	23dB	Datasheet
SO-TSFP-10G-ZR-DWDM-l	1.2-11.3Gbps	80km	D9135 – D9610 (96ch)	SM	2x LC	10GBASE-ZR /-ZW, I-temp	23dB	Datasheet

0.6 – 11.3Gbps covers the following protocols:

10GbE-LAN, 10GbE-WAN, 1GbE, OTU2e, OTU2, OTU1, STM64/OC192, STM16/OC48, STM4/OC12, 10G FC, 8G FC, 4G FC, 1G FC, CPRI Opt 1, 2, 3, 4, 5, 6, 7, 7A, 8, OBSAI 1x, 2x, 4x, 8x

9.95-11.3Gbps covers the following protocols:

10GbE-LAN, 10GbE-WAN, OTU2e, OTU2, CPRI Opt 7A, 8

1.2 – 11.3Gbps covers the following protocols:

10GbE-LAN, 10GbE-WAN, 1GbE, OTU2e, OTU2, OTU1, STM64/OC192, STM16/OC48, 10G FC, 8G FC, 4G FC, CPRI Opt 2, 3, 4, 5, 6, 7, 7A, 8, OBSAI 4x, 8x

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.

Standard/MSA: Lists corresponding interface standards or MSA compliances. For WDM-transceivers the standard reference is from distance and power budget perspective since the wavelength is not according to the standard. The transceiver may support additional protocols from rate perspective.

BiDi SFP+ TRANSCEIVERS

Part number	Protocols	Dist	Wavelengths	Fiber	Conn	Standard / MSA	Pwr budget	Datasheet
SO-SFP-10GE-BX10D-2733	0.6-11.3Gbps	10km	Tx/Rx C27/C33	SM	1x LC	10GBASE-LR /-LW	9dB	Datasheet
SO-SFP-10GE-BX10D-3327	0.6-11.3Gbps	10km	Tx/Rx=C33/C27	SM	1x LC	10GBASE-LR /-LW	9dB	Datasheet
SO-SFP-10GE-BX10D-2733-I	0.6-11.3Gbps	10km	Tx/Rx C27/C33	SM	1x LC	10GBASE-LR /-LW, I-temp	9dB	Datasheet
SO-SFP-10GE-BX10D-3327-I	0.6-11.3Gbps	10km	Tx/Rx=C33/C27	SM	1x LC	10GBASE-LR /-LW, I-temp	9dB	Datasheet
SO-SFP-10GE-BX20D-2733	0.6-11.3Gbps	20km	Tx/Rx C27/C33	SM	1x LC	10GBASE-LR /-LW	12dB	Datasheet
SO-SFP-10GE-BX20D-3327	0.6-11.3Gbps	20km	Tx/Rx=C33/C27	SM	1x LC	10GBASE-LR /-LW	12dB	Datasheet
SO-SFP-10GE-BX20D-2733-I	0.6-11.3Gbps	20km	Tx/Rx C27/C33	SM	1x LC	10GBASE-LR /-LW, I-temp	12dB	Datasheet
SO-SFP-10GE-BX20D-3327-I	0.6-11.3Gbps	20km	Tx/Rx=C33/C27	SM	1x LC	10GBASE-LR /-LW, I-temp	12dB	Datasheet
SO-SFP-10GE-BX40D-2733	0.6-11.3Gbps	40km	Tx/Rx C27/C33	SM	1x LC	10GBASE-ER /-EW	16dB	Datasheet
SO-SFP-10GE-BX40D-3327	0.6-11.3Gbps	40km	Tx/Rx=C33/C27	SM	1x LC	10GBASE-ER /-EW	16dB	Datasheet
SO-SFP-10GE-BX40D-2733-I	0.6-11.3Gbps	40km	Tx/Rx C27/C33	SM	1x LC	10GBASE-ER /-EW, I-temp	16dB	Datasheet
SO-SFP-10GE-BX40D-3327-I	0.6-11.3Gbps	40km	Tx/Rx=C33/C27	SM	1x LC	10GBASE-ER /-EW, I-temp	16dB	Datasheet
SO-SFP-10GE-BX60D-2733	0.6-11.3Gbps	60km	Tx/Rx C27/C33	SM	1x LC	10GBASE-ER /-EW	21dB	Datasheet
SO-SFP-10GE-BX60D-3327	0.6-11.3Gbps	60km	Tx/Rx=C33/C27	SM	1x LC	10GBASE-ER /-EW	21dB	Datasheet
SO-SFP-10GE-BX60D-2733-I	0.6-11.3Gbps	60km	Tx/Rx C27/C33	SM	1x LC	10GBASE-ER /-EW, I-temp	21dB	Datasheet
SO-SFP-10GE-BX60D-3327-I	0.6-11.3Gbps	60km	Tx/Rx=C33/C27	SM	1x LC	10GBASE-ER /-EW, I-temp	21dB	Datasheet
SO-SFP-10GE-BX80D-4955	9.8-11.3Gbps	80km	Tx/Rx=C49/C55	SM	1x LC	10GBASE-ZR /-ZW	22dB	Datasheet
SO-SFP-10GE-BX80D-5549	9.8-11.3Gbps	80km	Tx/Rx=C55/C49	SM	1x LC	10GBASE-ZR /-ZW	22dB	Datasheet

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Standard/MSA: Lists corresponding interface standards or MSA compliances. For WDM-transceivers the standard reference is from distance and power budget perspective since the wavelength is not according to the standard. The transceiver may support additional protocols from rate perspective.

SFP+ CABLE ASSEMBLIES

Part number	Protocols	Lengths	Type	Connectors	Datasheet
SO-SFP-10GE-CUxM	1Gbps - 10Gbps	0.5m – 7m	Passive DAC	SFP+ ↔ SFP+	Datasheet
SO-SFP-10GE-AOCxM	4Gbps - 10Gbps	1m – 100m	Active AOC	SFP+ ↔ SFP+	Datasheet

DAC: Direct Attach Cable. Coax cable with attached SFP+ transceivers at both ends.

AOC: Active Optical Cable. Fiber cable with attached SFP+ transceivers at both ends.

GREY QSFP+ TRANSCEIVERS

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

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

QSFP+ CABLE ASSEMBLIES

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

QSFP+ TO SFP+ FORM-FACTOR CONVERTERS

Part number	Protocols	Lengths	Type	Connectors	Datasheet
CVR-QSFP-SFP+ ¹⁾	10GE	-	Passive	QSFP+ ⇔ SFP+	Datasheet

1) CVR-QSFP-SFP+ converts the QSFP+ port to an SFP+ port for 10G operation in a 40G port. Note that the standards/MSA does not include converters, meaning that the converter might not be compatible with a generic QSFP+ interface.