

# SO-SFP-10GE-ZR-Dxxxx & -Dxxxx-I

SFP+, 10G Multirate, DWDM 100GHz, DDM, 23dB, 80km, D9210-D9600 (40ch)

## OVERVIEW

The SO-SFP-10GE-ZR-Dxxxx is a versatile DWDM transceiver supporting a wide range of traffic formats ranging from 600 Mbps to 11.3 Gbps. The transceiver is provided in 40 channel versions at the 100GHz DWDM grid as specified in the ITU-T 694.1 standard.

The optical performance is in accordance with the industry ZR/ZW-standard, providing a bridgeable distance (without dispersion compensation) of up to 80km for 10GbE-LAN (10GBASE-ZR) and 10GbE-WAN (10GBASE-ZW) services. The transceiver is available in two temperature range options, one being the Industrial temperature range (I-temp): -40°C to 85°C (-40°F to 185°F).

This transceiver provides digital diagnostic functions via a 2-wire serial interface as defined by the SFF-8472 specification. The transceiver module is compliant to RoHS-6/6.

## TECHNICAL DATA

<b>Technology</b>	DWDM 100GHz SFP+												
<b>Transmission media</b>	SM (2x LC)												
<b>Typical reach</b>	80 km												
<b>Nominal wavelength</b>	192.00 - 195.95 THz (40ch)												
<b>Interface standards</b>	10GBASE-ZR 10GBASE-ZW												
<b>Bit rate range</b>	0.6 - 11.3 Gbps												
<b>Protocols</b>	<table border="0"> <tr> <td><b>Eth:</b></td> <td>10GbE-LAN 10GbE-WAN GbE</td> </tr> <tr> <td><b>OTN:</b></td> <td>OTU2e OTU2 OTU1</td> </tr> <tr> <td><b>SDH/SONET:</b></td> <td>STM-64/OC-192 STM-16/OC-48 STM-4/OC-12</td> </tr> <tr> <td><b>FC:</b></td> <td>10G FC 8G FC 4G FC 1G FC</td> </tr> <tr> <td><b>CPRI:</b></td> <td>Opt 1 (0.6144 Gbps) Opt 2 (1.2288 Gbps) Opt 3 (2.4576 Gbps) Opt 4 (3.0720 Gbps) Opt 5 (4.9152 Gbps) Opt 6 (6.1440 Gbps) Opt 7 (9.8304 Gbps) Opt 7A (8.11008 Gbps) Opt 8 (10.1376 Gbps)</td> </tr> <tr> <td><b>OBSAI:</b></td> <td>1x (0.768 Gbps) 2x (1.536 Gbps) 4x (3.0720 Gbps) 8x (6.1440 Gbps)</td> </tr> </table>	<b>Eth:</b>	10GbE-LAN 10GbE-WAN GbE	<b>OTN:</b>	OTU2e OTU2 OTU1	<b>SDH/SONET:</b>	STM-64/OC-192 STM-16/OC-48 STM-4/OC-12	<b>FC:</b>	10G FC 8G FC 4G FC 1G FC	<b>CPRI:</b>	Opt 1 (0.6144 Gbps) Opt 2 (1.2288 Gbps) Opt 3 (2.4576 Gbps) Opt 4 (3.0720 Gbps) Opt 5 (4.9152 Gbps) Opt 6 (6.1440 Gbps) Opt 7 (9.8304 Gbps) Opt 7A (8.11008 Gbps) Opt 8 (10.1376 Gbps)	<b>OBSAI:</b>	1x (0.768 Gbps) 2x (1.536 Gbps) 4x (3.0720 Gbps) 8x (6.1440 Gbps)
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<b>Power budget</b>	11.0 - 23.0 dB												
<b>Dispersion tolerance</b>	-500 to +1600 ps/nm <sup>1)</sup>												
<b>Dispersion penalty</b>	3.5 dB @ 1600 ps/nm <sup>1)</sup>												
<b>Temperature range</b>	0°C to +70°C (Dxxxx) -40°C to +85°C (Dxxxx-I)												
<b>Power consumption</b>	< 1.8W												

<b>Transmitter data</b>	<b>Output power:</b>	Min: 0.0 dBm Max: +5.0 dBm
	<b>Tx wavelength:</b>	192.00 - 195.95 THz in 100GHz steps (G.694.1)
<b>Receiver data</b>	<b>Minimum input power:</b>	-23.0 dBm <sup>1)</sup>
	<b>Max input power:</b>	-6.0 dBm
	<b>Wavelength range:</b>	1480 – 1580 nm
<b>DDM</b>		Yes
<b>MSA compliance</b>		SFF-8431 SFF-8432 SFF-8472

<sup>1)</sup> @ 10.3Gbps

### Regulatory compliance

<b>EMC CE</b>	EN 55022:2010 EN 55024:2010
<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.**

Note: 10GBASE-ZR/ZW is an industry standard defined only at 1550 nm. The standard is referred to from bridgeable distance perspective for the other wavelengths within the DWDM band.

Subject to change without notice.

For more information visit [smaroptics.com](http://smaroptics.com).

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## ORDERING INFORMATION

Part number	Freq. THz	$\lambda$ nm	Part number	Freq. THz	$\lambda$ nm
SO-SFP-10GE-ZR-D9210	192.10	1560.61	SO-SFP-10GE-ZR-D9410	194.10	1544.53
SO-SFP-10GE-ZR-D9220	192.20	1559.79	SO-SFP-10GE-ZR-D9420	194.20	1543.73
SO-SFP-10GE-ZR-D9230	192.30	1558.98	SO-SFP-10GE-ZR-D9430	194.30	1542.94
SO-SFP-10GE-ZR-D9240	192.40	1558.17	SO-SFP-10GE-ZR-D9440	194.40	1542.14
SO-SFP-10GE-ZR-D9250	192.50	1557.36	SO-SFP-10GE-ZR-D9450	194.50	1541.35
SO-SFP-10GE-ZR-D9260	192.60	1556.55	SO-SFP-10GE-ZR-D9460	194.60	1540.56
SO-SFP-10GE-ZR-D9270	192.70	1555.75	SO-SFP-10GE-ZR-D9470	194.70	1539.77
SO-SFP-10GE-ZR-D9280	192.80	1554.94	SO-SFP-10GE-ZR-D9480	194.80	1538.98
SO-SFP-10GE-ZR-D9290	192.90	1554.13	SO-SFP-10GE-ZR-D9490	194.90	1538.19
SO-SFP-10GE-ZR-D9300	193.00	1553.33	SO-SFP-10GE-ZR-D9500	195.00	1537.40
SO-SFP-10GE-ZR-D9310	193.10	1552.52	SO-SFP-10GE-ZR-D9510	195.10	1536.61
SO-SFP-10GE-ZR-D9320	193.20	1551.72	SO-SFP-10GE-ZR-D9520	195.20	1535.82
SO-SFP-10GE-ZR-D9330	193.30	1550.92	SO-SFP-10GE-ZR-D9530	195.30	1535.04
SO-SFP-10GE-ZR-D9340	193.40	1550.12	SO-SFP-10GE-ZR-D9540	195.40	1534.25
SO-SFP-10GE-ZR-D9350	193.50	1549.32	SO-SFP-10GE-ZR-D9550	195.50	1533.47
SO-SFP-10GE-ZR-D9360	193.60	1548.51	SO-SFP-10GE-ZR-D9560	195.60	1532.68
SO-SFP-10GE-ZR-D9370	193.70	1547.72	SO-SFP-10GE-ZR-D9570	195.70	1531.90
SO-SFP-10GE-ZR-D9380	193.80	1546.92	SO-SFP-10GE-ZR-D9580	195.80	1531.12
SO-SFP-10GE-ZR-D9390	193.90	1546.12	SO-SFP-10GE-ZR-D9590	195.90	1530.33
SO-SFP-10GE-ZR-D9400	194.00	1545.32	SO-SFP-10GE-ZR-D9600	196.00	1529.55

The transceiver version supporting the extended temperature range -40°C to +85°C (-40°F to +185°F) has the suffix “-I” in the part number, e.g. SO-SFP-10GE-ZR-D9210-I.

## 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. DAC: Direct Attach Cable. Electrical or 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 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 at specified BER, normally $1E^{-12}$ .
DDM:	Digital Diagnostic Monitoring functionality as defined in SFF-8472 MSA.