

# SO-TSFP-10G-ZR-DWDM-A

SFP+, 10G Multirate, DWDM, 50GHz Tunable, 23dB, 80km, D9135-D9610 (96ch)

## OVERVIEW

The SO-TSFP-10G-ZR-DWDM-A is a high performance DWDM transceiver that is tunable to 96 channels in the 50GHz C-band grid as specified in ITU-T 694.1. The distance performance is in accordance with the industry ZR/ZW-standard, providing a bridgeable distance of up to 80km (without dispersion compensation) for 10GbE-LAN (10GBASE-ZR) and 10GbE-WAN (10GBASE-ZW) services.

The mechanical characteristics are compliant with the SFP+ specification (SFF-8431 and SFF-8432). Wavelength and frequency tuning modes are supported in accordance with SFF-8690.

The transceiver supports data rates from 9.95 to 11.3 Gbps, covering a series of Ethernet, OTN, SDH/SONET and other protocols.

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 50GHz SFP+
<b>Transmission media</b>	SM (2x LC)
<b>Typical reach</b>	80 km
<b>Bit rate range</b>	9.95 - 11.3 Gbps
<b>Interface standards</b>	10GBASE-ZR 10GBASE-ZW
<b>Protocols</b>	Eth: 10GbE-LAN 10GbE-WAN
	OTN: OTU2 OTU2e
	SDH/SONET STM-64/OC-192
	FC: 10G FC
	CPRI: Opt 7 (9.8304 Gbps) Opt 8 (10.1376 Gbps)
<b>Power budget</b>	10.0 - 23.0 dB <sup>1) + 2)</sup>
<b>Dispersion tolerance</b>	-300 to +1400 ps/nm
<b>Dispersion penalty</b>	3 dB
<b>Temperature range</b>	0°C to +70°C
<b>Power consumption</b>	< 1.5W

**Note!** See "Definitions" below.

<b>Transmitter data</b>	<b>Output power:</b>	Min: -1.0 dBm Max: +3.0 dBm
	<b>Tx wavelength:</b>	191.35 - 196.10 THz in 50GHz steps, 96ch (G.694.1)
	<b>Tuning speed</b>	< 10s from any to any
<b>Receiver data</b>	<b>Min input power:</b>	-24.0 dBm <sup>1) + 2)</sup> -21.0 dBm <sup>1) + 3)</sup>
	<b>Max input power:</b>	-7.0 dBm <sup>1)</sup>
	<b>Wavelength range:</b>	1525 – 1575 nm
<b>DDM</b>		Yes
<b>MSA compliance</b>		SFF-8431 SFF-8432 SFF-8690 SFF-8472

### Regulatory compliance

<b>RoHS</b>	RoHS 6
<b>Environmental</b>	MIL-STD-883, Method 3015.4 IEC61000-4-2:Edition1 (Air Discharge)

<b>Storage temp.</b>	-40°C to +85°C
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<sup>1)</sup> @ 10.709 Gbps, 1E-12, OSNR > 35dB.

<sup>2)</sup> @ Back-to-back

<sup>3)</sup> @ -300 to +1400 ps/nm disp.

### System performance

Parameter	Min	Max	OSNR	BER	Remarks
Noise loaded	-400 ps/nm	1400 ps/nm	19 dB	1E04	10.709Gb/s, -10 to -20dBm, 0.25nm filter BW
Unamplified links	0 ps/nm	1400 ps/nm	>35 dB	1E-12	10.709Gb/s, -20dBm, 0.25nm filter BW

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.

## ORDERING INFORMATION

Part number	Description
SO-TSFP-10G-ZR-DWDM-A	SFP+, 10G Multirate 9.95-11.3Gbps, DWDM 50GHz Tunable 191.35-196.10THz (96ch), 80km, 23dB, 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. 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 at specified BER, normally $1E^{-12}$ .
DDM:	Digital Diagnostic Monitoring functionality as defined in SFF-8472 MSA.