

**DATASHEET 6.0**

# SFP28 ZR 80km

**SFP28, 25G Ethernet ZR, 1300nm, SM, 80km, 30dB, LC, C-temp, I-temp**

## TS2014-S30x-SO

The TS2014-S30x-SO is an SFP+ form-factor transceiver for 25Gbps Ethernet applications. It is intended for use in interconnect applications between data centers with switches, routers, storage equipment etc. The optical performance supports distances up to 80km over a SingleMode (SM) fiber.

TS2014-S30x-SO uses a single 1300nm channel to transport a 25G Ethernet signal. As stipulated by the 25G Ethernet standards, Forward Error Correction (FEC) is required to be implemented by the host equipment to ensure reliable system operation. The optical parameters below will provide a bit error ratio (BER) of  $5 \times 10^{-5}$  for 25G Ethernet. FEC will provide the required quality for secure service.

The electrical interface is according to 25GAUI specifications per IEEE 802.3cc.

TS2014-S30x-SO is provided in a C-temp version (TS2014-S30C-SO) and an I-temp version (TS2014-S30I-SO).

Digital diagnostics functions are available via an I2C interface, as specified by the SFF-8472 MSA.

## TECHNICAL DATA

Parameter	Value
Technology	Grey SFP28
Transmission media	SM (2x LC)
Typical reach	80km
Nominal wavelength	1x 1300.05nm
Bit rate support	25.78Gbps
Protocol support	25GE
Power budget	13 – 30.2dB
Dispersion penalty	< 3.0dB
Power consumption	< 2.5W @ 0°C to +70°C < 3.5W @ -40°C to +85°C
Operating temperature	0°C to +70°C (TS2014-S30C-SO) -40°C to +85°C (TS2014-S30I-SO)
Storage temperature	-40°C to +85°C

- 1). Average power, (min) is informative and not the principal indicator of signal strength. A received power below this value cannot be compliant; however, a value above this does not ensure compliance.
- 2). Typical value, specified as an indicator of strength. Varies between individual components
- 3). at 25.78Gbps (25GE) and BER 5x10<sup>-5</sup>

Parameter	Value
<b>Transmitter data:</b>	
Output power	Min: +2.0dBm <sup>1)</sup> Max: +7.0dBm
Output power, OMA	Min: +3.7dBm Max: +7.8dBm
ER	8dB
Transmit wavelength	1299.02 – 1301.09nm
<b>Receiver data:</b>	
Receiver sensitivity, OMA	-26.5dBm <sup>2)</sup>
Receiver Sensitivity	-31dBm <sup>1)</sup>
Minimum input power, typical	-28.1dBm <sup>1) 2)</sup>
Overload (max power)	-6.0dBm
Wavelength range	1299.02 – 1301.09nm
LOS De-assert	Max -29.5dBm
LOS Assert	Min -40dBm
LOS Hysteresis	Min 0.5dB
DDM	Yes
MSA compliance	SFF-8402, SFF-8472 SFF-8419



### Safety/regulatory compliance:

TUV/UL/FDA (contact Smartoptics for latest certification information)

RoHS compliance

## ORDERING INFORMATION

Ordering number	Description
TS2014-S30C-SO	SFP28, 25G ZR, 1300.05nm, SM, 80km, 30dB, LC
TS2014-S30I-SO	SFP28, 25G ZR, 1300.05nm, SM, 80km, 30dB, LC, I-temp

## GENERAL DEFINITIONS

Parameter	Description
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 cable with attached connectors. AOC: Active Optical Cable. 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 typical fiber dispersion, fiber loss and power budget properties, i.e. w/o dispersion compensation and optical amplification. Actual distance is dependent on actual optical path loss and dispersion properties.
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(s) from transmitter.
Interface standards	Referenced interface standards or MSA's, e.g. IEEE 802.3 standard for 10GbE services or 100G 4WDM-10 etc.
Power budget	Min and max power budget between Transmitter and Receiver w/o optical path penalties.
Dispersion tolerance/penalty	Maximum amount of tolerated dispersion and required reduction of power budget to maintain stipulated Bit Error Rate (BER) and at a given bit rate.
Temperature range	Max operating case temperature range. Standard temperature range (C-temp): 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. Will vary over temperature.
Transmitter Output power	Average output power. Provided in min and max values.
Receiver minimum input power	Minimum average input power at specified BER, normally $1E^{-12}$ . Note that some protocols require FEC to achieve sufficient BER.
Receiver max input power	Maximum average input power giving a BER, normally $1E^{-12}$ .
Optical modulation Amplitude, OMA	Optical Modulation Amplitude is a parameter that, in certain standards, specifies the output power and receiver sensitivity. To measure the OMA, an oscilloscope with a baud rate corresponding to the transceiver is required. Thus, this parameter cannot be measured using an ordinary optical power meter.
DDM	Digital Diagnostic Monitoring functionality as defined in e.g. SFF-8472 MSA.

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