

**DATASHEET 6.0**

SFP+ 10G-ER CWDM, I-temp

SFP+, 10G Multirate, CWDM, DDM, 15dB/14dB, 40km, 1470nm-1610nm (8ch), I-temp

TSP015-CxxI-SO

The TSP015-CxxI-SO is a versatile CWDM transceiver supporting a wide range of traffic formats. The distance performance is in accordance with the IEEE 802.3ae ER/EW-standard, providing a bridgeable distance of up to 40km for 10GbE-LAN (10GBASE-ER) and 10GbE-WAN (10GBASE-EW) services.

The transceiver is available in 8 CWDM wavelength versions, spanning from 1470nm to 1610nm in accordance with the G.694.2 standard. This transceiver provides digital diagnostic functions via a 2-wire serial interface as defined by the SFF-8472 specification.

The transceiver is available in industrial temperature range (I-temp): -40°C to +85°C (-4°F to +167°F).

TECHNICAL DATA

Parameter	Value
Technology	CWDM SFP+
Transmission media	SM (2x LC)
Typical reach	40km
Nominal wavelength	1470 – 1610nm (8ch)
Bit rate support	0.6Gbps to 11.3Gbps
Interface standards	10GBASE-ER, 10GBASE-EW
Protocol support	GbE, 10GbE-LAN, 10GbE-WAN OTU1, OTU2, OTU2e STM-64/OC192 STM-16/OC48, STM-4/OC12 1G, 2G, 4G, 8G, 10G FC CPRI Opt, 1, 2, 3, 4, 5, 6, 7, 7A, 8 OBSAI 1x, 2x, 4x, 8x
Power budget	5 – 14dB
Dispersion penalty	Max 3dB
Power consumption	< 2.0W
Operating temperature	-40°C to +85°C
Storage temperature	-40°C to +85°C

Parameter	Value
Transmitter data:	
Output power	Min: -2.0dBm ²⁾³⁾ Max: +4.0dBm ³⁾
Transmit wavelength	1471 to 1611nm (G.694.2)
Receiver data:	
Minimum input power	-16.0dBm
Overload (max power)	-1.0dBm
Wavelength range	1260nm – 1620nm
LOS Assert	Min -28dBm
LOS De-assert	Max -20dBm
LOS Hysteresis	Min 1dB
DDM	Yes
MSA compliance	SFF-8431, -8432, -8472

1). Average power.

2). @ 10.3Gbps, BER 1×10^{-12} , PRBS $2^{31}-1$, back-to-back.

Safety/regulatory compliance:

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

RoHS compliance

Note: IEEE 802.3ae 10GBASE-ER/EW is defined only at 1550 nm. The standard is referred to from bridgeable distance perspective for the other wavelengths within the CWDM band.

ORDERING INFORMATION

Ordering code	Description
TSP015-C47I-SO	SFP+ 10G-ER / MR CWDM 40km 1470nm I-temp
TSP015-C49I-SO	SFP+ 10G-ER / MR CWDM 40km 1490nm I-temp
TSP015-C51I-SO	SFP+ 10G-ER / MR CWDM 40km 1510nm I-temp
TSP015-C53I-SO	SFP+ 10G-ER / MR CWDM 40km 1530nm I-temp
TSP015-C55I-SO	SFP+ 10G-ER / MR CWDM 40km 1550nm I-temp
TSP015-C57I-SO	SFP+ 10G-ER / MR CWDM 40km 1570nm I-temp
TSP015-C59I-SO	SFP+ 10G-ER / MR CWDM 40km 1590nm I-temp
TSP015-C61I-SO	SFP+ 10G-ER / MR CWDM 40km 1610nm 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 $1E^{-12}$.
DDM	Digital Diagnostic Monitoring functionality as defined in SFF-8472 MSA.

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