

# SO-XFP-LR & -LR-I

XFP, 10G Multirate, 1310nm, SM, DDM, 8.5dB, 10km

## OVERVIEW

The SO-XFP-LR is a versatile 1310nm transceiver for SingleMode fiber supporting a wide range of traffic formats. The optical performance is in accordance with the IEEE 802.3ae standard, providing a bridgeable distance of up to 10km for 10GbE-LAN (10GBASE-LR) and 10GbE-WAN (10GBASE-LW) services. It is also in compliance with SDH/SONET as well as Fiberchannel interface standards.

This transceiver provides digital diagnostic functions via a 2-wire serial interface as defined by the SFF-8472 specification. 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).

## TECHNICAL DATA

|                            |   |
|----------------------------|---|
| <b>Technology</b>          | Grey XFP  |
| <b>Transmission media</b>  | SM (2x LC)  |
| <b>Typical reach</b>       | 10 km   |
| <b>Nominal wavelength</b>  | 1310 nm   |
| <b>Interface standards</b> | 10GBASE-LR<br>10GBASE-LW<br>OC-192 SR-1<br>STM I-64.1<br>10GFC 1200-SM-LL-L   |
| <b>Bit rate range</b>      | 9.95 - 11.1 Gbps  |
| <b>Protocols</b>           | Eth: 10GbE-LAN<br>10GbE-WAN<br>OTN: OTU2e<br>OTU2<br>SDH/SONET: STM-64/OC-192<br>FC: 10G FC<br>CPRI: Opt 8 (10.1376 Gbps) |
| <b>Power budget</b>        | 0 – 8.5 dB  |
| <b>Temperature range</b>   | 0°C to +70°C (LR)<br>-40°C to +85°C (LR-I)  |
| <b>Power consumption</b>   | < 1.0W  |

|                         |                       |                               |
|-------------------------|-----------------------|-------------------------------|
| <b>Transmitter data</b> | Output power:         | Min: -6.0 dBm<br>Max: 0.0 dBm |
|                         | Tx wavelength:        | Min: 1290 nm<br>Max: 1330 nm  |
| <b>Receiver data</b>    | Minimum input power:  | -14.5 dBm <sup>1)</sup>       |
|                         | Overload (max power): | +0.5 dBm                      |
|                         | Wavelength range:     | 1270 - 1600 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<br>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<br>EN 60825-1:2014<br>EN 60825-2:2004+A1+A2 |

|                      |                |
|----------------------|----------------|
| <b>Storage temp.</b> | -40°C to +85°C |
|----------------------|----------------|

Note! See "Definitions" below.

## ORDERING INFORMATION

| Part number | Description  |
|-------------|--|
| SO-XFP-LR   | XFP, 10G Multirate, 1310nm, SM, DDM, 8.5dB, 10km         |
| SO-SFP-LR-I | XFP, 10G Multirate, 1310nm, SM, DDM, 8.5dB, 10km, I-temp |

## DEFINITIONS

|                               |  |
|-------------------------------|--|
| Technology:                   | Grey; Transceiver type for non-WDM applications. Electrical or optical.<br>CWDM; Transceiver type for CWDM applications using G.694.2 channel grid.<br>DWDM; Transceiver type for DWDM applications using G.694.1 channel grid.<br>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.<br>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.<br>Standard temperature range: Typically 0°C to +70°C (32°F to +158°F)<br>Extended temperature range (E-temp): Typically -20°C to +75°C (-4°F to +167°F)<br>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.  |