

# SO-XFP-LR-Cxx

XFP, 10GBase-LR, Multirate 9.95-11.1 Gbps, CWDM 1270nm-1610nm, SM, DDM, 10dB, 10km

## OVERVIEW

The SO-XFP-LR-Cxx series optical transceiver is designed for fiber communications application such as 10G Ethernet (10GBASE-LR), which fully compliant with the specification of SFP+ MSA SFF-8431. This module is designed for single mode fiber and operates at a nominal wavelength of CWDM wavelength. There are eighteen center wavelengths available from 1270nm to 1610nm, with each step 20nm. A guaranteed minimum optical link budget of 10 dB is offered. The module is with the SFP+ connector to allow hot plug capability. Single 3.3V power supply is needed. The optical output can be disabled by LVTTTL logic high-level input of TX\_DIS. Loss of signal (RX\_LOS) output is provided to indicate the loss of an input optical signal of receiver. This module provides digital diagnostic functions via a 2-wire serial interface as defined by the SFF-8472 specification.

## PRODUCT FEATURES

- Supports 9.95Gb/s to 11.1Gb/s bit rates
- Hot-Pluggable SFP+ footprint
- 18-Wavelength CWDM DFB transmitter from 1270nm to 1610nm, with step 20nm
- 10dB power budget, minimum
- Duplex LC connector
- Power dissipation < 1.2W
- Case operation temperature range 0°C to 70°C
- Compliant with SFP+ MSA specification SFF-8431
- Build-in digital diagnostic functions
- Compliant with SFF-8472 MSA

## APPLICATIONS

- 10GBASE-LR/LW 10G Ethernet
- 10GBASE-LR at 10.31Gbps
- 10GBASE-LW at 9.95Gbps
- Other optical links

## ORDERING INFORMATION

Part Number	Description
SO-XFP-LR-Cxx*	XFP, 10GBase-LR, Multirate 9.95-11.1 Gbps, CWDM 1270nm-1610nm, SM, DDM, 10dB, 10km

\*xx = Refers to notation for frequency data. Please see extended order information on last page for additional information.

## ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min.	Max.	Unit
Maximum Supply Voltage	$V_{cc}$	-0.5	4.0	V
Storage Temperature	$T_S$	-40	85	°C
Case Operating Temperature	$T_c$	0	70	°C

## RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min.	Typ	Max.	Unit
Operating Temperature	$T_C$	0		70	°C
Supply Voltage	$V_{cc}$	3.13	3.3	3.45	V
Supply Current	$I_{cc}$			350	mA
Data Rate		9.95		11.1	Gbps

## ELECTRICAL CHARACTERISTICS TRANSMITTER

Parameter	Symbol	Min	Typ	Max	Unit	Notes
CML Inputs(Differential)	$V_{in}$	150		1200	mVpp	After internal AC coupling.
Input Impedance (Differential)	$Z_{in}$	85	100	115	ohm	
Tx_DISABLE Input Voltage – High		2		$V_{cc}+0.3$	V	
Tx_DISABLE Input Voltage – Low		0		0.8	V	
Tx_FAULT Output Voltage -- High		2		$V_{cc}+0.3$	V	
Tx_FAULT Output Voltage -- Low		0		0.8	V	

## ELECTRICAL CHARACTERISTICS RECEIVER

Parameter	Symbol	Min	Typ	Max	Unit	Notes
CML Outputs (Differential)	$V_{out}$	350		700	mVpp	After internal AC coupling.
Output Impedance (Differential)	$Z_{out}$	85	100	115	ohm	
Rx_LOS Output Voltage – High		2		$V_{cc}+0.3$	V	
Rx_LOS Output Voltage – Low		0		0.8	V	
MOD_DEF ( 0:2 )	$V_{oH}$	2.5		$GND+0.5$	V	
	$V_{oL}$	0		0.5	V	Reference the SFF-8472 MSA.

## OPTICAL CHARACTERISTICS TRANSMITTER

Parameter	Symbol	Min.	Typ	Max.	Unit
Output Opt. Pwr: 9/125 SMF	$P_{out}$	-5		0	dBm
Optical Extinction Ratio	$ER$	3.5			dB
Optical Wavelength	$\lambda$	$\lambda_c - 5.5$	$\lambda_c$	$\lambda_c + 7.5$	nm
-20dB Spectrum Width	$\Delta\lambda$			1	nm
Transmitter and Dispersion Penalty	$TDP$			2	dB
Side Mode Suppression Ratio	$SMSR$	30			dB
Average Launch Power of OFF Transmitter	$POFF$			-30	dBm
TX Jitter Generation (peak-to-peak)	$TXj$			0.1	UI
TX Jitter Generation (RMS)	$TXj_{RMS}$			0.01	UI

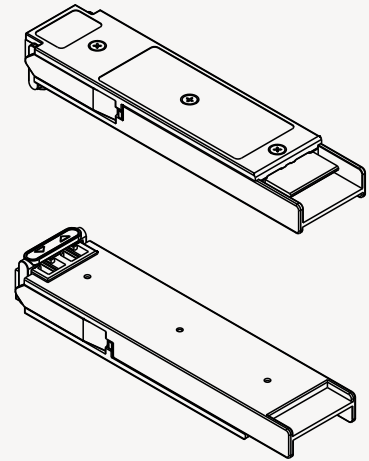
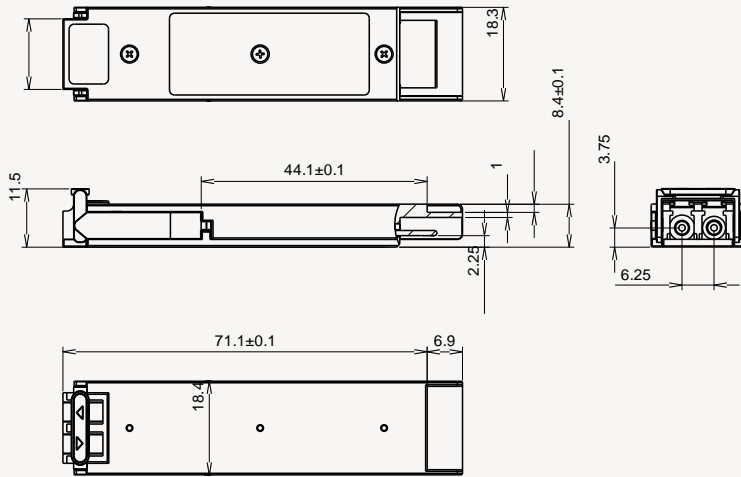
## OPTICAL CHARACTERISTICS RECEIVER

Parameter	Symbol	Min.	Typ	Max.	Unit
Receiver Sensitivity @ 10.7Gb/s	$P_{min}$			-15	dBm
Maximum Input Power	$P_{max}$	0.5			dBm
Optical Centre Wavelength	$\lambda$	1260		1620	nm
Receiver Reflectance	$R_{rf}$			-27	dB
LOS De-Assert	$LOSD$			-16	dBm
LOS Assert	$LOSA$	-28			dBm
LOS Hysteresis		1			dB

## PIN FUNCTION DEFINITIONS

PIN	Signal Name	Description	PIN	Signal Name	Description
1	$V_{EE}T$	Transmitter Ground	11	$V_{EE}R$	Receiver Ground
2	TX_Fault	Transmitter Fault Indication	12	RD-	Inv. Received Data Out
3	TX_Disable	Transmitter Disable	13	RD+	Received Data Out
4	SDA	Module Definition 2	14	$V_{EE}R$	Receiver Ground
5	SCL	Module Definition 1	15	$V_{CC}R$	Receiver Power
6	MOD_ABS	Module Definition 0	16	$V_{CC}T$	Transmitter Power
7	RS0	RX Rate Select (LVTTTL).	17	$V_{EE}T$	Transmitter Ground
8	LOS	Loss of Signal	18	TD+	Transmit Data In
9	RS1	TX Rate Select (LVTTTL).	19	TD-	Inv. Transmit Data In
10	$V_{EE}R$	Receiver Ground	20	$V_{EE}T$	Transmitter Ground

# MECHANICAL SPECIFICATIONS



## EXTENDED ORDERING INFORMATION

Part Number	Description
SO-XFP-LR-C27	XFP, 10GBase-LR, Multirate 9.95-11.1 Gbps, CWDM 1270nm, SM, DDM, 10dB, 10km
SO-XFP-LR-C29	XFP, 10GBase-LR, Multirate 9.95-11.1 Gbps, CWDM 1290nm, SM, DDM, 10dB, 10km
SO-XFP-LR-C31	XFP, 10GBase-LR, Multirate 9.95-11.1 Gbps, CWDM 1310nm, SM, DDM, 10dB, 10km
SO-XFP-LR-C33	XFP, 10GBase-LR, Multirate 9.95-11.1 Gbps, CWDM 1330nm, SM, DDM, 10dB, 10km
SO-XFP-LR-C35	XFP, 10GBase-LR, Multirate 9.95-11.1 Gbps, CWDM 1350nm, SM, DDM, 10dB, 10km
SO-XFP-LR-C37	XFP, 10GBase-LR, Multirate 9.95-11.1 Gbps, CWDM 1370nm, SM, DDM, 10dB, 10km
SO-XFP-LR-C39	XFP, 10GBase-LR, Multirate 9.95-11.1 Gbps, CWDM 1390nm, SM, DDM, 10dB, 10km
SO-XFP-LR-C41	XFP, 10GBase-LR, Multirate 9.95-11.1 Gbps, CWDM 1410nm, SM, DDM, 10dB, 10km
SO-XFP-LR-C43	XFP, 10GBase-LR, Multirate 9.95-11.1 Gbps, CWDM 1430nm, SM, DDM, 10dB, 10km
SO-XFP-LR-C45	XFP, 10GBase-LR, Multirate 9.95-11.1 Gbps, CWDM 1450nm, SM, DDM, 10dB, 10km
SO-XFP-LR-C47	XFP, 10GBase-LR, Multirate 9.95-11.1 Gbps, CWDM 1470nm, SM, DDM, 10dB, 10km
SO-XFP-LR-C49	XFP, 10GBase-LR, Multirate 9.95-11.1 Gbps, CWDM 1490nm, SM, DDM, 10dB, 10km
SO-XFP-LR-C51	XFP, 10GBase-LR, Multirate 9.95-11.1 Gbps, CWDM 1510nm, SM, DDM, 10dB, 10km
SO-XFP-LR-C53	XFP, 10GBase-LR, Multirate 9.95-11.1 Gbps, CWDM 1530nm, SM, DDM, 10dB, 10km
SO-XFP-LR-C55	XFP, 10GBase-LR, Multirate 9.95-11.1 Gbps, CWDM 1550nm, SM, DDM, 10dB, 10km
SO-XFP-LR-C57	XFP, 10GBase-LR, Multirate 9.95-11.1 Gbps, CWDM 1570nm, SM, DDM, 10dB, 10km
SO-XFP-LR-C59	XFP, 10GBase-LR, Multirate 9.95-11.1 Gbps, CWDM 1590nm, SM, DDM, 10dB, 10km
SO-XFP-LR-C61	XFP, 10GBase-LR, Multirate 9.95-11.1 Gbps, CWDM 1610nm, SM, DDM, 10dB, 10km