



# ETU-LINK

Optical Communication System

## XFP Series

### XFP

#### EXCxxX-3LCD20

##### 10Gbps CWDM 1270~1450nm 20KM XFP Transceiver

- 10-Wavelengths Uncooled CWDM DFB laser, From 1270nm to 1330nm, with Step 20nm
  - Supports 9.95Gbps to 11.3Gbps bit rates
  - XFP MSA Rev 4.5 Compliant
  - Maximum link length of 20KM with SMF
  - No reference clock required
  - +1.8V,+3.3V Supply Voltage
  - Low Power Dissipation 2.5W Maximum
  - XFI and line side loopback Mode Supported
  - 0°C to 70°C Operating Case Temperature
  - Diagnostic Performance Monitoring of module temperature, Supply Voltages, laser bias current, transmit optical power, and receive optical power
- RoHS6 compliant (lead free)



### Applications

- SDH STM I-64.1 at 9.953Gbps
- 10GBASE-LR/LW 10G Ethernet
- 10G Fiber Channel

### Description

ETU-Link EXCxxX-3LCD20 is compliant with the 10G Small Form-Factor Pluggable (XFP) Multi-Source Agreement (MSA), which supporting data-rate of 10.3125 Gbps (10GBASE-LR) or 9.953Gbps 10GBASE-LW), and transmission distance up to 20KM on SMF.

The transceiver module comprises a transmitter with uncooled CWDM DFB laser and a receiver with a PIN photodiode. Transmitter and receiver are separate within a wide temperature range of 0°C to +70°C and offers optimum heat dissipation and excellent electromagnetic shielding thus enabling high port densities for 10GbE systems..

## Product Selection

### EXCxxX-3LCD20

Wavelength	xx	Clasp Color Code	Wavelength	xx	Clasp Color Code
1270nm	27	Gray	1370nm	37	Green
1290nm	29	Gray	1390nm	39	Yellow
1310nm	31	Gray	1410nm	41	Orange
1330nm	33	Purple	1430nm	43	Red
1350nm	35	Blue	1450nm	45	Brown

## Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit
Maximum Supply Voltage	V <sub>CC3</sub>	-0.5		4.0	V
Storage Temperature	T <sub>S</sub>	-40		85	°C
Case Operating Temperature	T <sub>OP</sub>	-5		75	°C

## Electrical Characteristics (T<sub>OP</sub> = -5 to 75 °C, V<sub>CC3</sub> = 3.13 to 3.45 Volts)

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	V <sub>CC3</sub>	3.13		3.45	V
Supply Current	I <sub>CC3</sub>			600	mA
Module total power	P			2.0	W
<b>Transmitter</b>					
Input differential impedance	R <sub>in</sub>		100		Ω
Differential data input swing	V <sub>in,pp</sub>	120		820	mV
Transmit Disable Voltage	V <sub>D</sub>	2.0		V <sub>CC</sub>	V
Transmit Enable Voltage	V <sub>EN</sub>	GND		GND+ 0.8	V
Transmit Disable Assert Time				10	us
<b>Receiver</b>					
Differential data output swing	V <sub>out,pp</sub>	340	650	850	mV
Data output rise time	t <sub>r</sub>			38	ps
Data output fall time	t <sub>f</sub>			38	ps
LOS Fault	V <sub>LOS fault</sub>	V <sub>CC</sub> - 0.5		V <sub>CC_HOST</sub>	V

LOS Normal	$V_{LOS\ norm}$	GND		GND+0.5	V
Power Supply Rejection	PSR			See Note 7 below	

**Notes:**

- 1) Maximum total power value is specified across the full temperature and voltage range.
- 2) After internal AC coupling.
- 3) Or open circuit.
- 4) Into 100 ohms differential termination.
- 5) 20 – 80 %
- 6) Loss of Signal is open collector to be pulled up with a 4.7k – 10kohm resistor to 3.15 – 3.6V. Logic indicates normal operation; logic 1 indicates no signal detected.
- 7) Per Section 2.7.1. in the XFP MSA Specification<sup>1</sup>.

## Optical Characteristics ( $T_{OP} = -5$ to $75$ °C, $V_{CC3} = 3.13$ to $3.45$ Volts)

Parameter	Symbol	Min	Typ	Max	Unit
<b>Transmitter</b>					
Average Optical Power	$P_f$	-5.0		0.5	dBm
Optical Wavelength	$\lambda$	(X-6.5)	(X+1)	(X+6.5)	nm
Sidemode Suppression ratio	$SSR_{min}$	30			dB
Optical Extinction Ratio	ER	3.5			dB
Transmitter and Dispersion Penalty	TDP			3.2	dB
Average Launch power of OFF transmitter	$P_{OFF}$			-30	dBm
Tx Jitter	$Tx_j$				Per 802.3ae requirements
Relative Intensity Noise	RIN			-130	dB/Hz
<b>Receiver</b>					
Receiver Sensitivity	$R_{SENS1}$			-16.5	dBm
Maximum Input Power	$P_{MAX}$	+0.5			dBm
Optical Center Wavelength	$\lambda_C$	1260		1600	nm
Receiver Reflectance	$R_{rx}$			-12	dB
LOS De-Assert	$LOS_D$			-18	dBm
LOS Assert	$LOS_A$	-32			dBm
LOS Hysteresis		0.5			dB

**Notes:**

- 1) Measured with worst ER;  $BER < 10^{-12}$ ;  $2^{31} - 1$  PRBS.
- 2) Per IEEE 802.3ae. Equivalent to -13.3 dBm average power at Infinite ER.

## General Specifications

Parameter	Symbol	Min	Typ	Max	Units
Bit Rate	BR	9.95		10.5	Gb/s
Bit Error Ratio	BER			$10^{-12}$	
Max. Supported Link Length	$L_{MAX}$		10		km

### Notes:

- 1) 10GBASE-LR/LW, 1200-SM-LL-L.
- 2) Tested with a  $2^{31} - 1$  PRBS

## Environmental Specifications

EXCxxX-3LCD20 transceivers have a commercial operating case temperature range of -5°C to +75°C.

Parameter	Symbol	Min	Typ	Max	Units
Case Operating Temperature	$T_{op}$	-5		75	°C
Storage Temperature	$T_{sto}$	-40		85	°C

### Notes:

- 1) Relative Humidity 5 - 85 %
- 2) Class 1 Laser Product EN 60825-1 Compliance

## Digital Diagnostic Functions

As defined by the XFP MSA1, ETU-LINK XFP transceivers provide digital diagnostic functions via a 2-wire serial interface, which allows real-time access to the following operating parameters:

- Transceiver temperature
- Laser bias current
- Transmitted optical power
- Received optical power
- Transceiver supply voltage

It also provides a sophisticated system of alarm and warning flags, which may be used to alert end-users when particular operating parameters are outside of a factory-set normal range.

The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through the 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL pin) is generated by the host. The positive edge clocks data into the XFP transceiver into those segments of its memory map that are not write-protected.

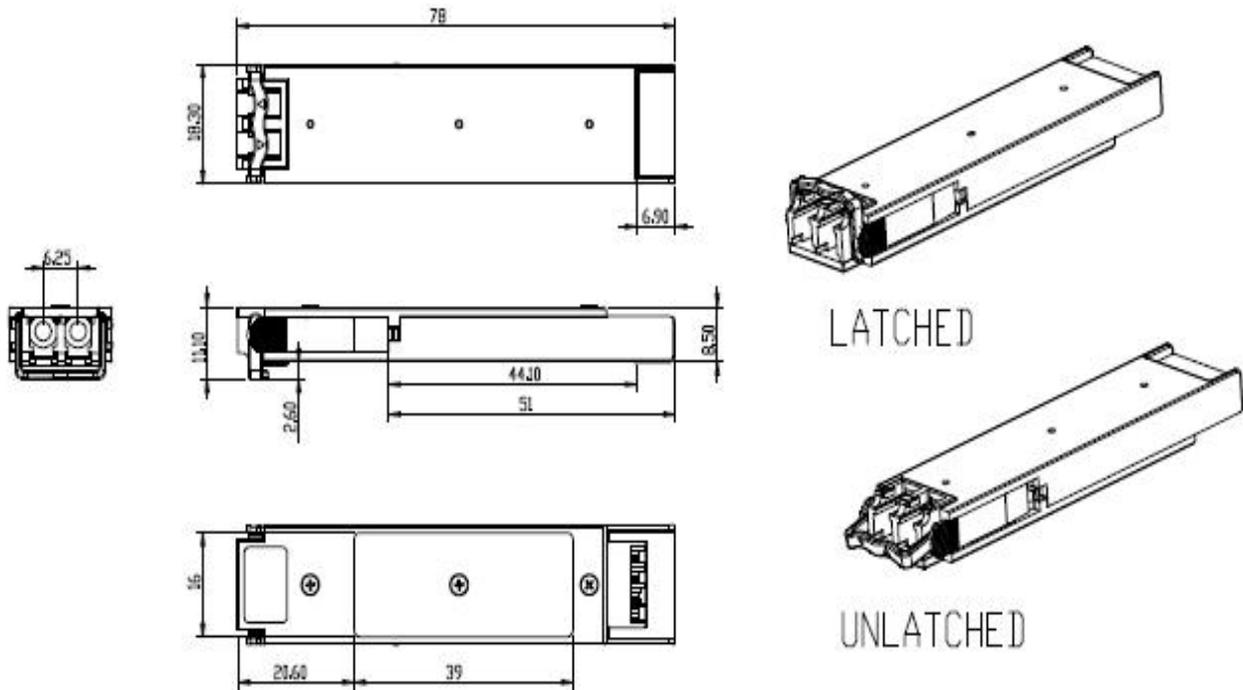
The negative edge clocks data from the XFP transceiver. The serial data signal (SDA pin) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or

sequentially. The 2-wire serial interface provides sequential or random access to the 8 bit parameters, addressed from 000h to the maximum address of the memory.

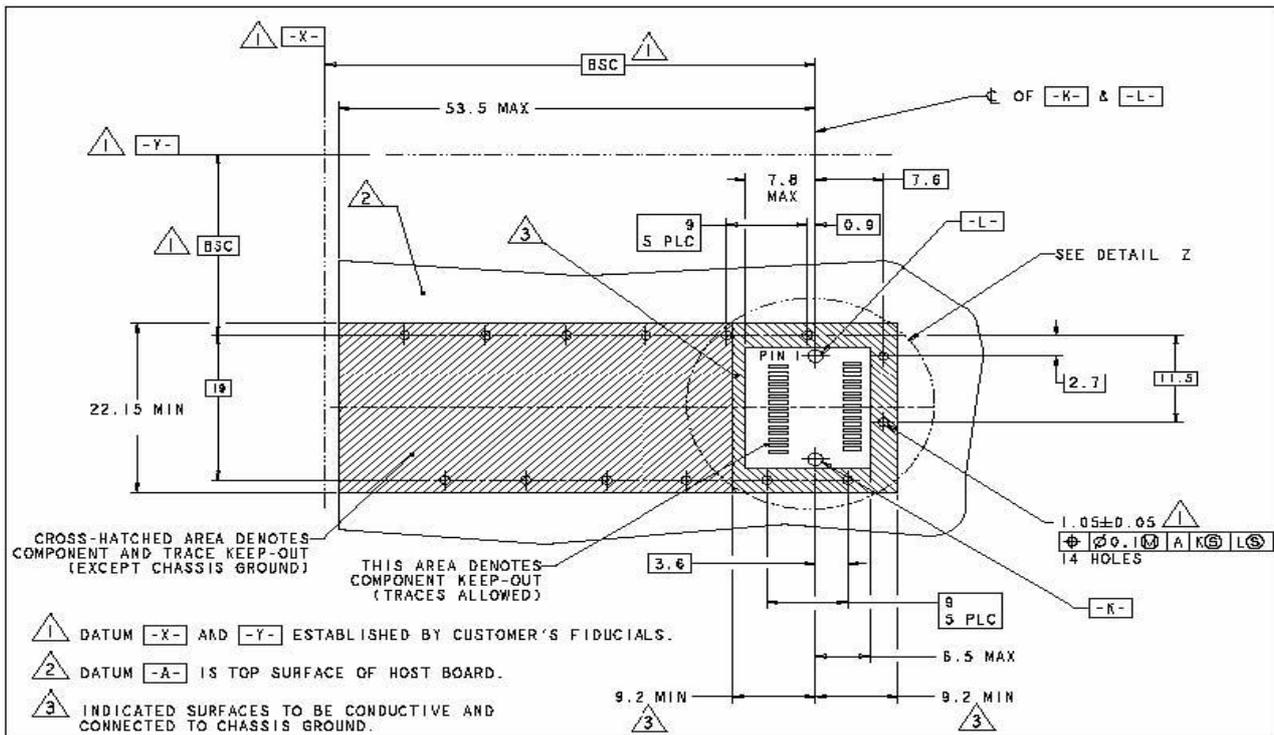
## Mechanical Specifications

ETU-LINK's XFP transceivers are compliant with the dimensions defined by the XFP Multi-Sourcing Agreement (MSA).

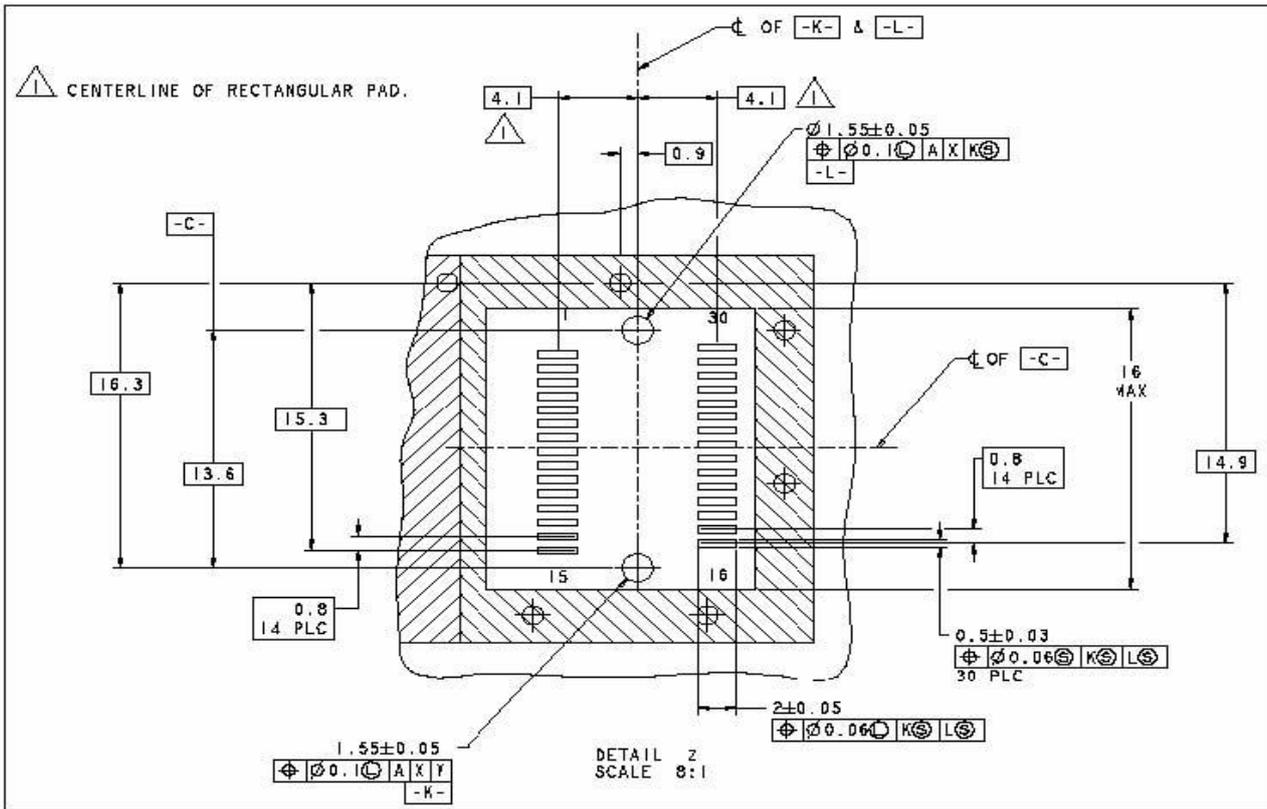
XFP Transceiver (dimensions are in mm)



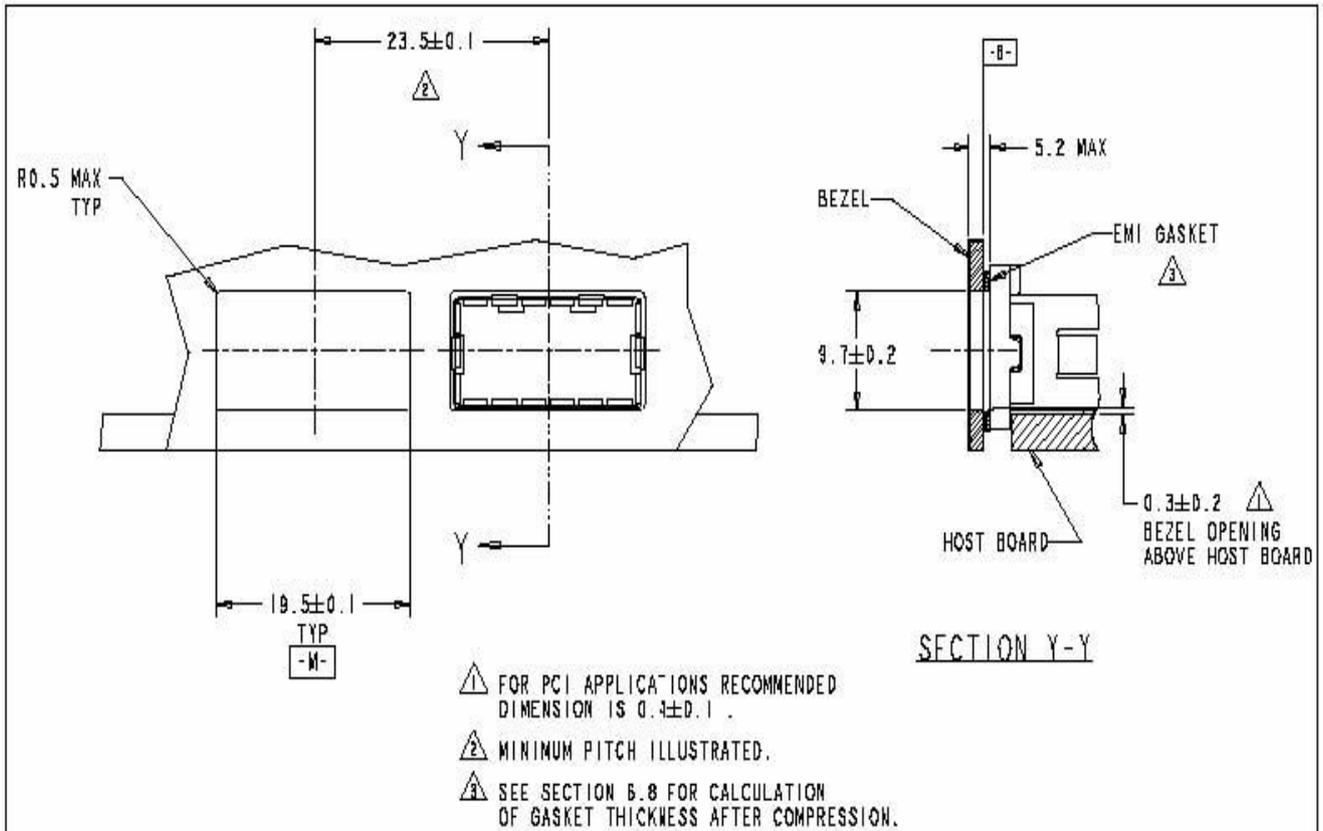
PCB Layout and Bezel Recommendations



XFP Host Board Mechanical Layout (dimensions are in mm)



XFP Detail Host Board Mechanical Layout (dimensions are in mm)



## Regulatory Compliance

Feature	Reference	Performance
Electrostatic discharge (ESD)	IEC/EN 61000-4-2	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN 55022 Class B (CISPR 22A)	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10, 1040.11 IEC/EN 60825-1, 2	Class 1 laser product
Component Recognition	IEC/EN 60950, UL	Compatible with standards
ROHS	2002/95/EC	Compatible with standards
EMC	EN61000-3	Compatible with standards

## Compatibility Test

In order to ensure the product compatibility, our products will be tested on the switch before shipment. Our modules can compatible with many mainstream brand switches, such as Cisco, Juniper, Extreme, Brocade, IBM, H3C, HP, Huawei, D-Link, Mikrotik, ZTE, TP-Link...

Our test equipment: VOLKTEK MEN-4110, HP 2530-8G, CRS226-24G-25+RM, Catalyst 2960G Series, Catalyst 3850 XS 10G SFP+, Catalyst 3750-E Series, HUAWEI S5700Series, H3C S3100V2 Series, Juniper-EX4200, etc.



Cisco Catalyst 3850



HUAWEI S5700



H3C S3100V2



HP J9264AR



Juniper EX 4200



Alcatel 6850E-U24X



Mikrotik CR5226-24G-25+RM



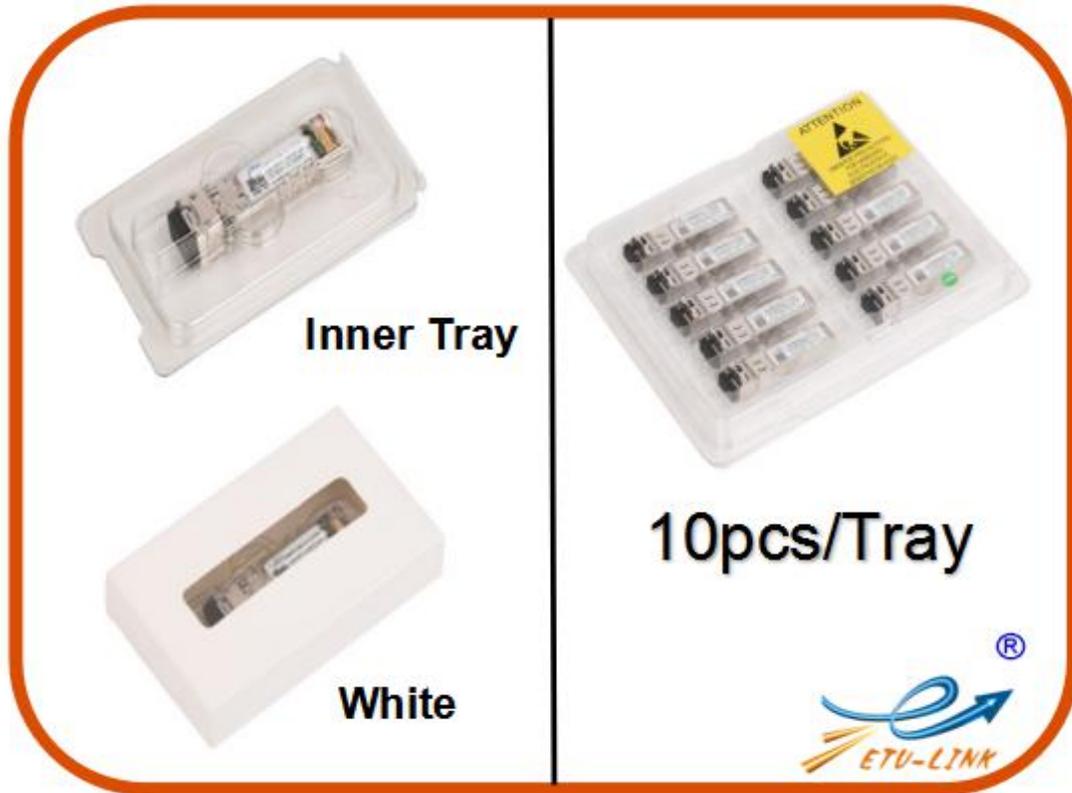
Cisco Catalyst 2960G



Volktek MEN-4110

## Packaging

ETU-Link provides two kinds of packaging, 10pcs/Tray and individual package.



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