


**ETU-LINK**

Optical Communication System

**SFP Series**

# SFP

## ESCxx24-3LCD80

### 2.67Gbps CWDM SFP Optical Transceiver, 80KM Reach

- Data-rate of 2.67Gbps operation
  - 18 CWDM DFB wavelengths laser and APD photodetector for 80KM transmission
  - Compliant with SFP MSA and SFF-8472 with duplex LC receptacle
  - Digital Diagnostic Monitoring:  
Internal Calibration or External Calibration
  - Compatible with RoHS
  - +3.3V single power supply
- Operating case temperature: Standard: 0 to +70°C



## Applications

- Switch to Switch Interface
- Gigabit Ethernet
- Switched Backplane Applications
- Router/Server Interface
- Other Optical Links

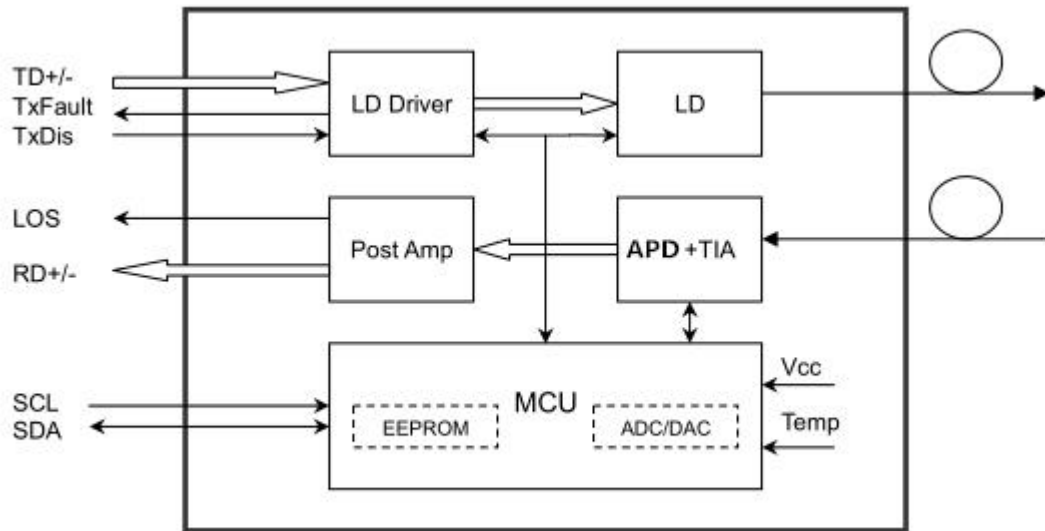
## Description

ETU-Link's ESCxx24-3LCD80 Small Form Factor Pluggable (SFP) transceivers are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA). The transceiver consists of five sections: the LD driver, the limiting amplifier, the digital diagnostic monitor, the 1XX0nm DFB laser and the APD .The module data linkup to 80KM in 9/125um single mode fiber.

The optical output can be disabled by a TTL logic high-level input of Tx Disable, and the system also can disable the module via I2C. Tx Fault is provided to indicate that degradation of the laser. Loss of signal (LOS) output is provided to indicate the loss of an input optical signal of receiver or the link status with partner. The system

can also get the LOS (or Link)/Disable/Fault information via I2C register access.

## Module Block Diagram



## Product Selection

### ESCXX24-3LCD80

Wavelength	xx	Clasp Color Code	Wavelength	xx	Clasp Color Code
1470 nm	47	Gray	1550 nm	55	Yellow
1490 nm	49	Purple	1570 nm	57	Orange
1510 nm	51	Blue	1590 nm	59	Red
1530 nm	53	Green	1610 nm	61	Brown

## Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Case Operating Temperature	Tcase	0		70	°C	
Power Supply Voltage	VCC	3.13	3.3	3.47	V	
Power Supply Current	ICC			300	mA	
Power Supply Noise Rejection				100	mVp-p	100Hz to 1MHz
Data Rate			2670		Mbps	TX Rate/RX Rate
Transmission Distance				80	KM	

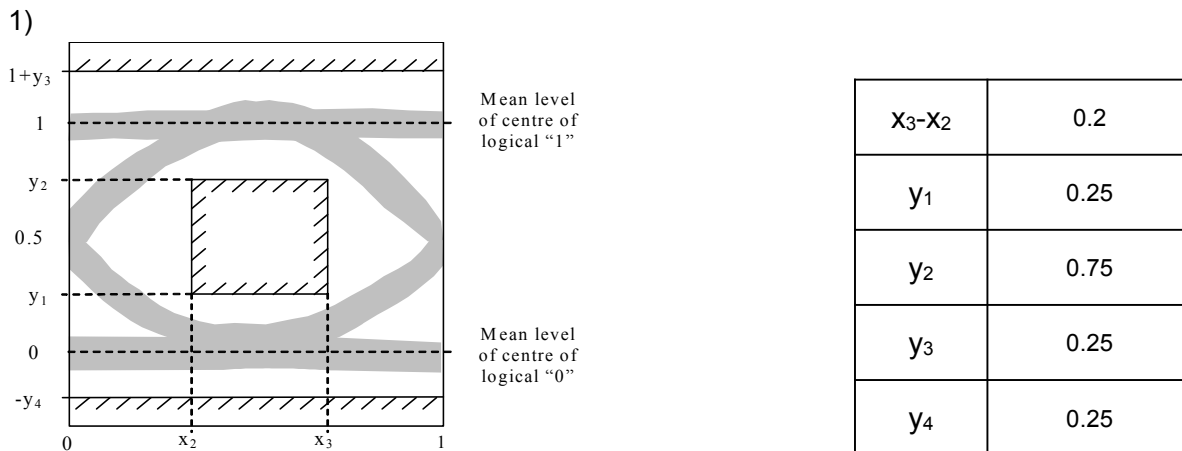
Coupled Fiber	Single mode fiber	9/125um SMF
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## Specification of Transmitter

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Average Output Power	POUT	1		5	dBm	Note (1)
Extinction Ratio	ER	9			dB	
Center Wavelength	$\lambda_C$	$(1XX0)-\Delta\lambda$	1XX0	$(1XX0)+\Delta\lambda$	nm	DFB Laser Note (2)
Side Mode Suppression Ratio	SMSR	30			dB	
Spectrum Bandwidth(-20dB)	$\sigma$			1	nm	
Transmitter OFF Output Power	POff			-45	dBm	
Differential Line Input Impedance	RIN	90	100	110	Ohm	
Output Eye Mask	Compliant with G.957 (class 1 laser safety)					Note (3)

### Notes

- 1) Measure at 2<sup>23</sup>-1 NRZ PRBS pattern
- 2) "XX" is: 47,49,51,53,55,57,59 and 61; " $\Delta\lambda$ " is 7.5
- 3) Transmitter eye mask definition



## Specification of Receiver

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Input Optical Wavelength	$\lambda_{IN}$	1270		1610	nm	APD
Receiver Sensitivity	PIN			-28	dBm	Note (1)
Input Saturation Power (Overload)	PSAT	-9			dBm	
Los Of Signal Assert	PA	-40			dBm	
Los Of Signal De-assert	PD			-30	dBm	Note (2)

LOS Hysteresis

PA-PD

0.5

2

6

dB

**Notes**

- 1) The optical power is launched into SMF.
- 2) PECL input, internally AC-coupled and terminated.
- 3) Measured with a PRBS 223-1 test pattern @2488Mbps, BER  $\leq 1 \times 10^{-12}$
- 4) AC-coupled internally.

## Electrical Interface Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
<b>Transmitter</b>						
Total Supply Current	ICC			A	mA	Note (1)
Transmitter Disable Input-High	VDISH	2		V <sub>cc</sub> +0.3	V	
Transmitter Disable Input-Low	VDISL	0		0.8	V	
Transmitter Fault Input-High	VTxFH	2		V <sub>cc</sub> +0.3	V	
Transmitter Fault Input-Low	VTxFL	0		0.8	V	
<b>Receiver</b>						
Total Supply Current	ICC			B	mA	Note (1)
LOSS Output Voltage-High	VLOSH	2		V <sub>cc</sub> +0.3	V	LVTTTL
LOSS Output Voltage-Low	VLOSL	0		0.8	V	

**Notes**

- 1) A (TX) + B (RX) = 300mA (Not include termination circuit)

## Pin Definitions

Pin	Symbol	Name/Description	NOTE
1	VEET	Transmitter Ground (Common with Receiver Ground)	1
2	TFAULT	Transmitter Fault.	
3	TDIS	Transmitter Disable. Laser output disabled on high or open.	2
4	MOD_DEF(2)	Module Definition 2. Data line for Serial ID.	3
5	MOD_DEF(1)	Module Definition 1. Clock line for Serial ID.	3
6	MOD_DEF(0)	Module Definition 0. Grounded within the module.	3
7	Rate Select	No connection required	4
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	5
9	VEER	Receiver Ground (Common with Transmitter Ground)	1

10	VEER	Receiver Ground (Common with Transmitter Ground)	1
11	VEER	Receiver Ground (Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out. AC Coupled	
13	RD+	Receiver Non-inverted DATA out. AC Coupled	
14	VEER	Receiver Ground (Common with Transmitter Ground)	1
15	VCCR	Receiver Power Supply	
16	VCCT	Transmitter Power Supply	
17	VEET	Transmitter Ground (Common with Receiver Ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	VEET	Transmitter Ground (Common with Receiver Ground)	1

#### Notes

- 1) Circuit ground is internally isolated from chassis ground.
- 2) Laser output disabled on  $T_{DIS} > 2.0V$  or open, enabled on  $T_{DIS} < 0.8V$ .
- 3) Should be pulled up with 4.7k - 10kohms on host board to a voltage between 2.0V and 3.6V. MOD\_DEF (0) pulls line low to indicate module is plugged in.
- 4) This is an optional input used to control the receiver bandwidth for compatibility with multiple data rates (most likely Fiber Channel 1x and 2x Rates). If implemented, the input will be internally pulled down with  $> 30k\Omega$  resistor. The input states are:
  - a) Low (0 – 0.8V): Reduced Bandwidth
  - b) ( $>0.8$ ,  $< 2.0V$ ): Undefined
  - c) High (2.0 – 3.465V): Full Bandwidth
  - d) Open: Reduced Bandwidth
- 5) LOS is open collector output should be pulled up with 4.7k - 10kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

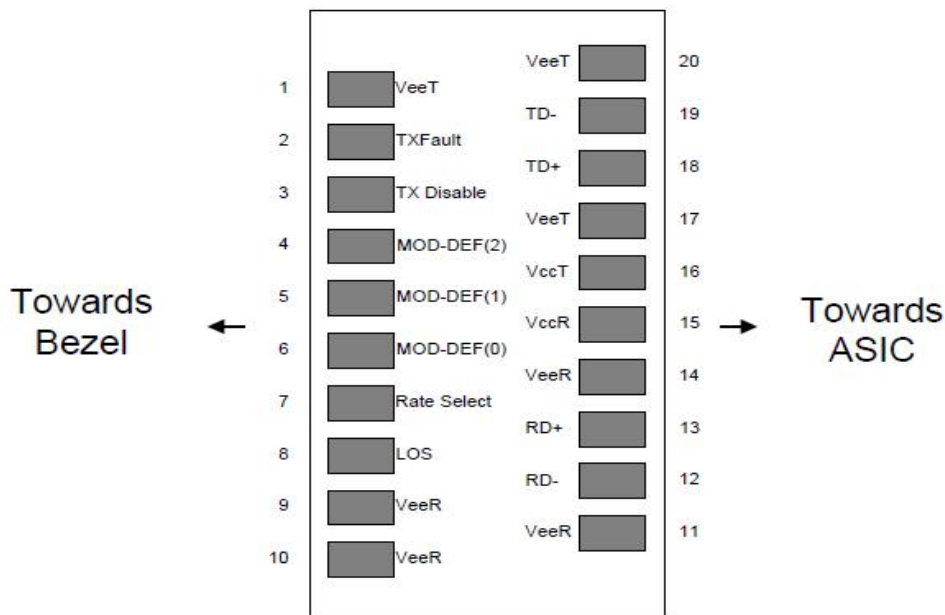


Figure2. Pin out of Connector Block on Host Board

## Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	Ts	-40		85	°C	
Relative Humidity	RH	5		95	%	
Power Supply Voltage	Vcc	-0.5		4	V	
Signal Input Voltage		-0.3		Vcc+0.3	V	
Receiver Damage Threshold		+6			dBm	

## Digital Diagnostic Functions

ETU-LINK ESCXX24-3LCD80 transceivers support the 2-wire serial communication protocol as defined in the SFP MSA. It is very closely related to the E2PROM defined in the GBIC standard, with the same electrical specifications.

The standard SFP serial ID provides access to identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information.

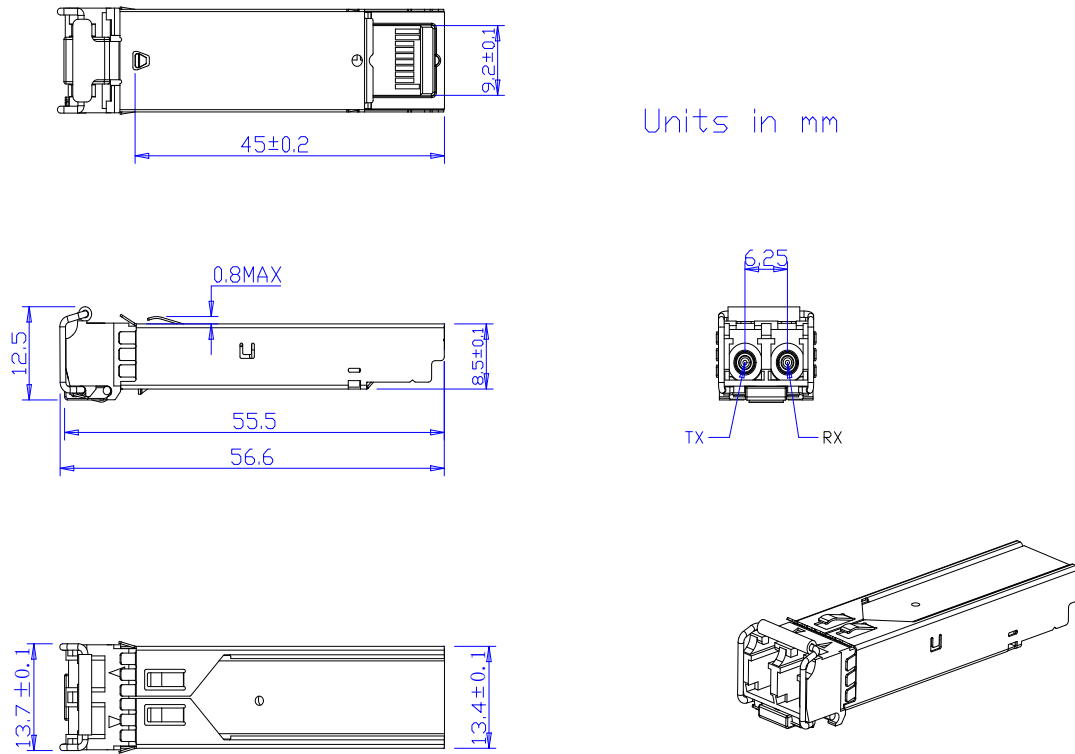
Additionally, ETU-LINK SFP transceivers provide a unique enhanced digital diagnostic monitoring interface, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current transmitted optical power, and received optical power and transceiver supply voltage. It also defines a sophisticated system of alarm and warning flags, which alerts end-users when particular operating parameters are outside of a factory set normal range.

The SFP MSA defines a 256-byte memory map in E2PROM that is accessible over a 2-wire serial interface at the 8 bit address 1010000X (A0h). The digital diagnostic monitoring interface makes use of the 8 bit address 1010001X (A2h), so the originally defined serial ID memory map remains unchanged. The interface is identical to, and is thus fully backward compatible with both the GBIC Specification and the SFP Multi Source Agreement.

The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through a 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL, Mod Def 1) is generated by the host. The positive edge clocks data into the SFP transceiver into those segments of the E2PROM that are not write-protected. The negative edge clocks data from the SFP transceiver. The serial data signal (SDA, Mod Def 2) 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.

Digital diagnostics for the ESCXX24-3LCD80 are internally calibrated by default

## Mechanical Specifications



## 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**

## Product Production Process



# Quality Assurance

Continuous introduction of new equipment, produced by strict standards, strict quality inspection, to guarantee the high quality standard of each product.



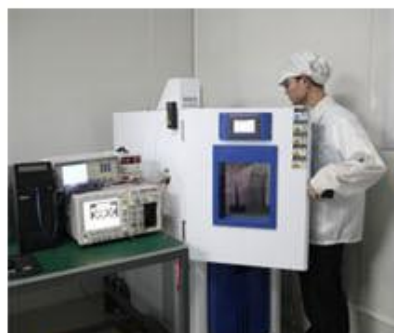
**Standardized  
Production Line**



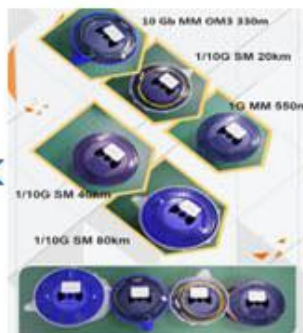
**Professional  
Welding**



**Assembling**



**Aging Testing**



**Distance Testing**



**Cleaning end face**



**Product Initial Test**



**Switch Testing**



**Product Final Test**

## Packaging

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



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Addresses and phone number also have been listed at [www.etulinktechnology.com](http://www.etulinktechnology.com).

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