

**ETU-LINK**

Optical Communication System

**SFP28 Series****SFP28****ES2Bxx2X-3LCD10****25Gb/s 10Km SFP28 BIDI Transceivers****Tx1270/1310nm / Rx1310/1270nm**

- Operating data rate up to 25.78Gbps
- Up to 10km transmission distance
- High sensitivity APD photodiode and TIA
- Rate Adaptation
- LC single connector
- Hot pluggable 20pin connector
- Low power consumption <1.2 W
- Single +3.3V±5% power supply
- Compliant with SFF-8472
- Fully RoHS Compliant
- Operating temperature range:  
Commercial: 0°C to +70°C  
Industrial: -40°C to +85°C

**Applications**

- 25GE BASE-LR Ethernet
- CPRI Option 10/eCPRI

## Description

The Transceiver is intended for 10km reach service from 24.33Gb/s to 25.78Gb/s BI-direction single mode high-speed communications equipment where low-cost, extraordinary performance and reliability are essential. It consumes low power, operates base on 3.3V DC power supply and is offered in the industrial temperature range. They are compliant with SFP28 MSA, SFF-8431 and SFF-8432.

The low jitter and low bit error rate optical assembly features a DML laser transmitter and APD/TIA receiver. It utilizes internal clock and data recovery (CDR) units on transmitter and the receiver chains for low jitter compliance. The differential AC coupled Tx and Rx data interfaces are CML compatible. The device is Class I laser safety compliant.

## Absolute Maximum Ratings

Parameter	Symbol	Unit	Min	Max
Storage Temperature Range	Ts	°C	-40	85
Relative Humidity	RH	%	0	85

## Recommended Operating Conditions

Parameter	Symbol	Unit	Min	Typ	Max
Power Supply Voltage	Vcc	V	3.14	3.3	3.46
Bit Rate	BR	Gb/s		25.78	
Bit Error Ratio	BER				5*10 <sup>-5</sup>
Max Supported Link Length	L	Km			10

## Electric Ports Definition

Parameter	Symbol	Unit	Min	Typ	Max	Note
<b>Transmitter</b>						
Input Differential Impedance	$R_{IN}$	$\Omega$		100		
Single-ended Data Input Swing	$V_{IN}$	mVp-p	90		450	
Transmit Disable Voltage	$V_{DIS}$	V	2		$V_{CCHOST}$	
Transmit Enable Voltage	$V_{EN}$	V	$V_{EE}$		$V_{EE}+0.8$	
Transmit Fault Assert Voltage	$V_{FA}$	V	2		$V_{CCHOST}$	
Transmit Fault De-Assert Voltage	$V_{FDA}$	V	$V_{EE}$		$V_{EE}+0.4$	
<b>Receiver</b>						
Single-ended Data Output Swing	$V_{OD}$	mVp-p	200		450	
LOS Fault	$V_{LOSFT}$	V	2		$V_{CCHOST}$	
LOS Normal	$V_{LOSNR}$	V	$V_{EE}$		$V_{EE}+0.4$	

## Optical Characteristics (TA and Vcc= 3.14 to 3.46V)

Parameter	Symbol	Unit	Min	Typ	Max	Note
<b>Transmitter</b>						
Center Wavelength	$\lambda$	nm	1260	1270	1280	
Center Wavelength	$\lambda$	nm	1300	1310	1320	
Average Output Power	$P_{AV}$	dBm	-4		4	
Spectral Width (-20dB)	$\sigma$	nm			1	
Extinction Ratio	ER	dB	3.5			
Side Mode Suppression Ratio	SMSR	dB	30			
Average Launch Power of OFF Transmitter	POFF	dBm			-30	
Relative Intensity Noise	RIN	dB/Hz			-128	
<b>Receiver</b>						
Center Wavelength	$\lambda_C$	nm	1300	1310	1320	
Center Wavelength	$\lambda_C$	nm	1260	1270	1280	
Receiver Sensitivity(OMA)	RSENSE	dBm			-13	1

Receiver Overload (OMA)	Pmax	dBm	2			
Receiver Reflectance		dB			-12	
LOS Assert	LOSA	dBm	-30			
LOS De-Assert LOS	LOSD	dBm			-17	
LOS Hysteresis		dB	0.5			

**Note1:** Measured at 25.78125Gb/s, ER>3.5dBm, PRBS 2<sup>31</sup>-1 and BER better than or equal to 5E-5;

## PIN Assignment

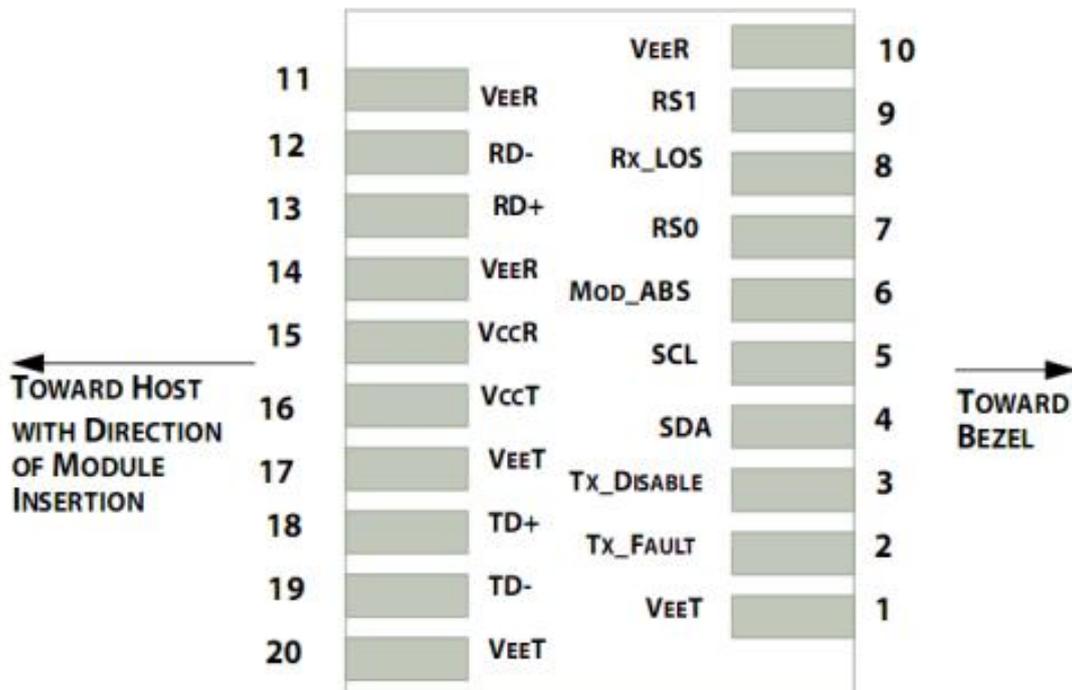


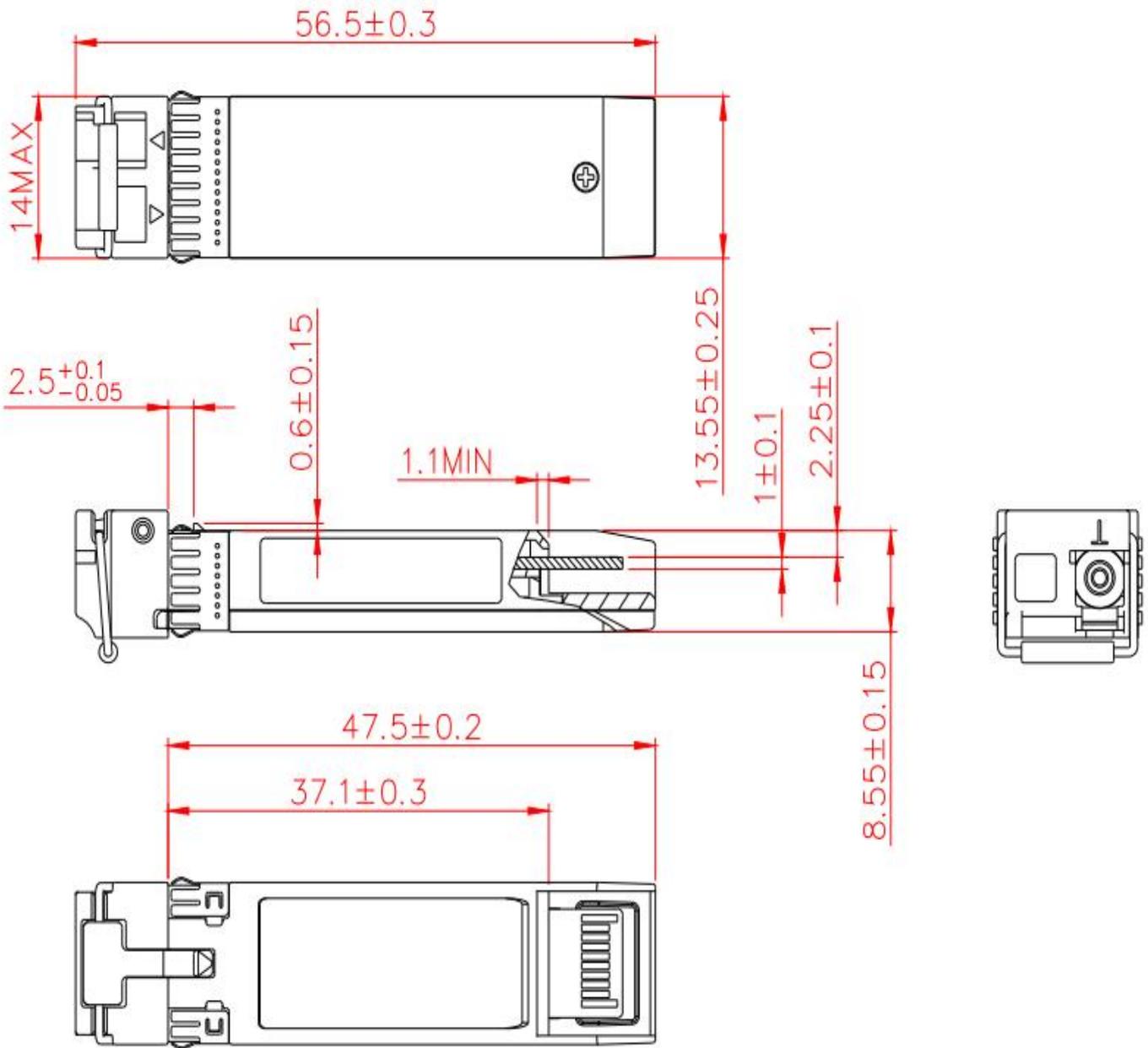
Figure 1.Pin function definitions

Table 1: Transceiver pin descriptions

Pin Number	Symbol	Name	Description
1,17,20	VeeT	Transmitter Signal Ground	Connected to signal ground on the host board.
2	TX Fault	Transmitter Fault Out (OC)	Module transmitter fault output.
3	TX Disable	Transmitter Disable In (LVTTTL)	Module transmitter disable control.
4	SDA	Module Definition Identifiers	Serial ID with SFF 8472 Diagnostics Module Definition pins should be pulled up to Host Vcc with 10 kΩ resistors.
5	SCL		
6	MOD-ABS		



## Mechanical Dimensions



## Digital Diagnostics Functions

As defined by the SFF-8472, The SFP28 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. 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 0x00h to the maximum address of the memory. For more detailed information, including memory map definitions, please refer the SFF-8472 documentation.

## Digital Diagnostic Monitor Accuracy

The following characteristics are defined over recommended operating conditions

Parameter	Accuracy	Unit
Internally measured transceiver temperature	+/-3	deg.C
Internally measured transceiver supply voltage	+/-3	%
Measured Tx bias current	+/-10	%
Measured Tx output power	+/-3	dB
Measured Rx received average optical power	+/-3	dB

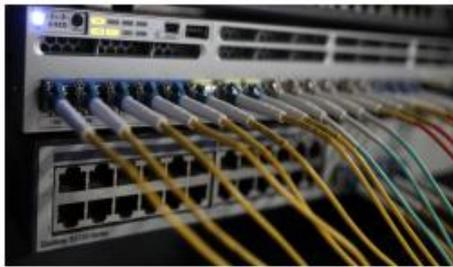
## Ordering information

Part Number	Product Description
ES2B212X-3LCD10	1270T/1310R, 25.78Gbps, LC, 10km, 0°C~+70°C, with DDM
ES2B122X-3LCD10	1310T/1270R, 25.78Gbps, LC, 10km, 0°C~+70°C, with DDM

## 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**



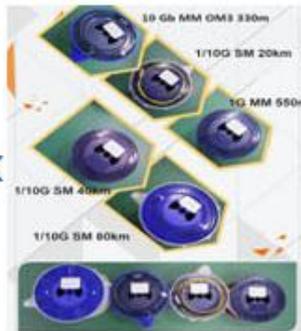
**Professional  
Welding**



**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.



Company: ETU-Link Technology Co., LTD

Address: Right side of 3rd floor, No. 102 building, Longguan expressway, Dalang street,  
Longhua District, Shenzhen city, Guangdong Province, China 518109

Tel: +86-755 2328 4603

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

Please e-mail us at [sales@etulinktechnology.com](mailto:sales@etulinktechnology.com) or call us for assistance.