ETU-LINK

Optical Communication System

SFP+ Series

SFP+

ES3161-3LCD15

6.25Gbps 1310nm 15KM SFP+ Optical Transceiver

➢ Hot-pluggable SFP+ footprint

➢ Supports 6.144Gb/s to 11.3Gb/s bit rates

➢ Single 3.3V power supply

➢ Maximum link length of 15KM

➢ 1310nm DFB transmitter, PIN photo-detector

➢ Duplex LC connector

➢ Power dissipation < 1W

➢ Built-in digital diagnostic functions

➢ Case temperature range ：
Standard:-5to +70°C
Industrial:-40 to +85°C

Applications

➢ 6.144G /6.25G/8.5G/10GBASE-LR/LW

➢ 10G Ethernet

Standard

➢ Compliant with SFF-8472 SFP+ MSA.

➢ Compliant to SFP+ SFF-8431 and SFF-8432.

➢ RoHS Compliant.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	Ts	-40		85	ºC	
Storage Ambient Humidity	HA	5		85	%	
Power Supply Voltage	VCC	-0.5		4	V	
Signal Input Voltage		-0.3		Vcc+0.3	V	
Receiver Damage Threshold		+4			dBm	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Case Temperature	Tcase	-5		70	ºC	
Ambient Humidity	HA	5		85	%	
Power Supply Voltage	VCC	3.14	3.3	3.46	V	
Power Supply Current	ICC			450	mA	
Power Supply Noise Rejection				100	mVp-p	100Hz to1MHz
Transmission Distance				15	km	
Coupled fiber	Single mode fiber					ITU-T G.653

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Average Launched Power	PO	-6		0	dBm	Note (1)
Extinction Ratio	ER	6			dB	
Center Wavelength	λC	1300	1310	1320	nm	
Spectrum Band Width (RMS)	σ			1.0	nm	
SMSR		30			dB	

Transmitter OFF Output Power	POff			-40	dBm	
Optical Rise/Fall Time	tr/tf		100	260	ps	Note (2)
Transmitter and Dispersion Penalty	TDP			3.0	dB	
Output Eye Mask	Compliant with IEEE 0802.3ae					
Receiver						
Input Optical Wavelength	λ	1270		1610	nm	
Receiver Sensitivity				-14.4	dBm	Note (3)
Input Saturation Power (Overload)	Psat	0.5			dBm	
LOS Detect -Assert Power	PA			-19	dBm	
LOS Detect - Deassert Power	PD	-28			dBm	
LOS Detect Hysteresis	PHYS	0.5			dB	

Note：

1)   Launched power (avg.) is power coupled into a single mode fiber with master connector.（Before of Life）

2)   These are unfiltered 20-80% values.

3)   Measured with conformance test signal for BER = 10^{-12}.@6.25Gbps, PRBS=$2^{31}-1$,NRZ

Electrical Interface Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Differential line input Impedance	RIN		100		Ohm	
Differential Data Input Swing	VDT	300		700	mVp-p	
Transmit Disable Voltage	Vdis	2		Vcc	V	LVTTL
Transmit Enable Voltage	Ven	Vee		Vee+0.8	V	
Receiver						
Differential Data Output Swing	VDR	400		850	mVp-p	Note (1)
LOS Output Voltage-High	VLOSH	Vee		Vee+0.8	V	LVTTL
LOS Output Voltage-Low	VLOSL	2		VccHOST	V	

Note: Into 100Ω differential termination.

Pin Description
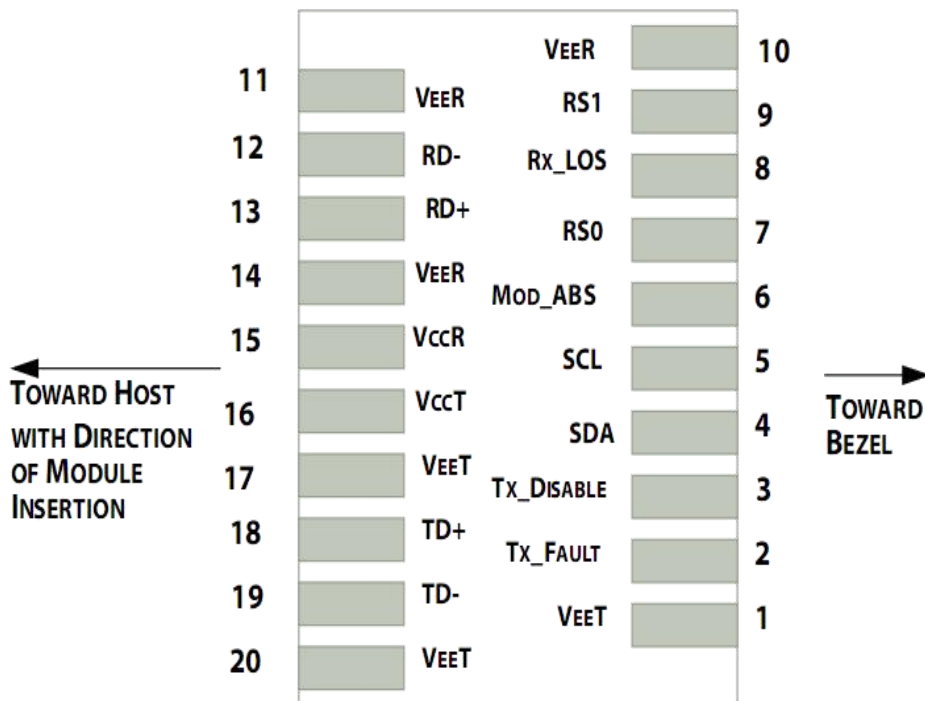
Pin out of Connector Block on Host Board

| Pin	Symbol	Name/Description	Ref.
1	V_{EET}	Transmitter Ground (Common with Receiver Ground)	1
2	T_{FAULT}	Transmitter Fault.	2
3	T_{DIS}	Transmitter Disable. Laser output disabled on high or open.	3
4	SDA	2-wire Serial Interface Data Line	4
5	SCL	2-wire Serial Interface Clock Line	4
6	MOD_ABS	Module Absent. Grounded within the module	4
7	RS0	Rate Select 0	5
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	6
9	RS1	No connection required	1
10	V_{EER}	Receiver Ground (Common with Transmitter Ground)	1
11	V_{EER}	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	V_{EER}	Receiver Ground (Common with Transmitter Ground)	1
15	V_{CCR}	Receiver Power Supply	
16	V_{CCT}	Transmitter Power Supply	
17	V_{EET}	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	V_{EET}	Transmitter Ground (Common with Receiver Ground)	1

Notes:

1) Circuit ground is internally isolated from chassis ground.

2) T_{FAULT} is an open collector/drain output, which should be pulled up with a 4.7k – 10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3V.A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.

3) Laser output disabled on T_{DIS}>2.0V or open, enabled on T_{DIS}<0.8V.

4) Should be pulled up with 4.7kΩ- 10kΩ host board to a voltage between 2.0V and 3.6V. MOD_ABS pulls line low to indicate module is plugged in.

5) Internally pulled down per SFF-8431 Rev 4.1.

6) LOS is open collector output. It should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

Recommended Interface Circuit
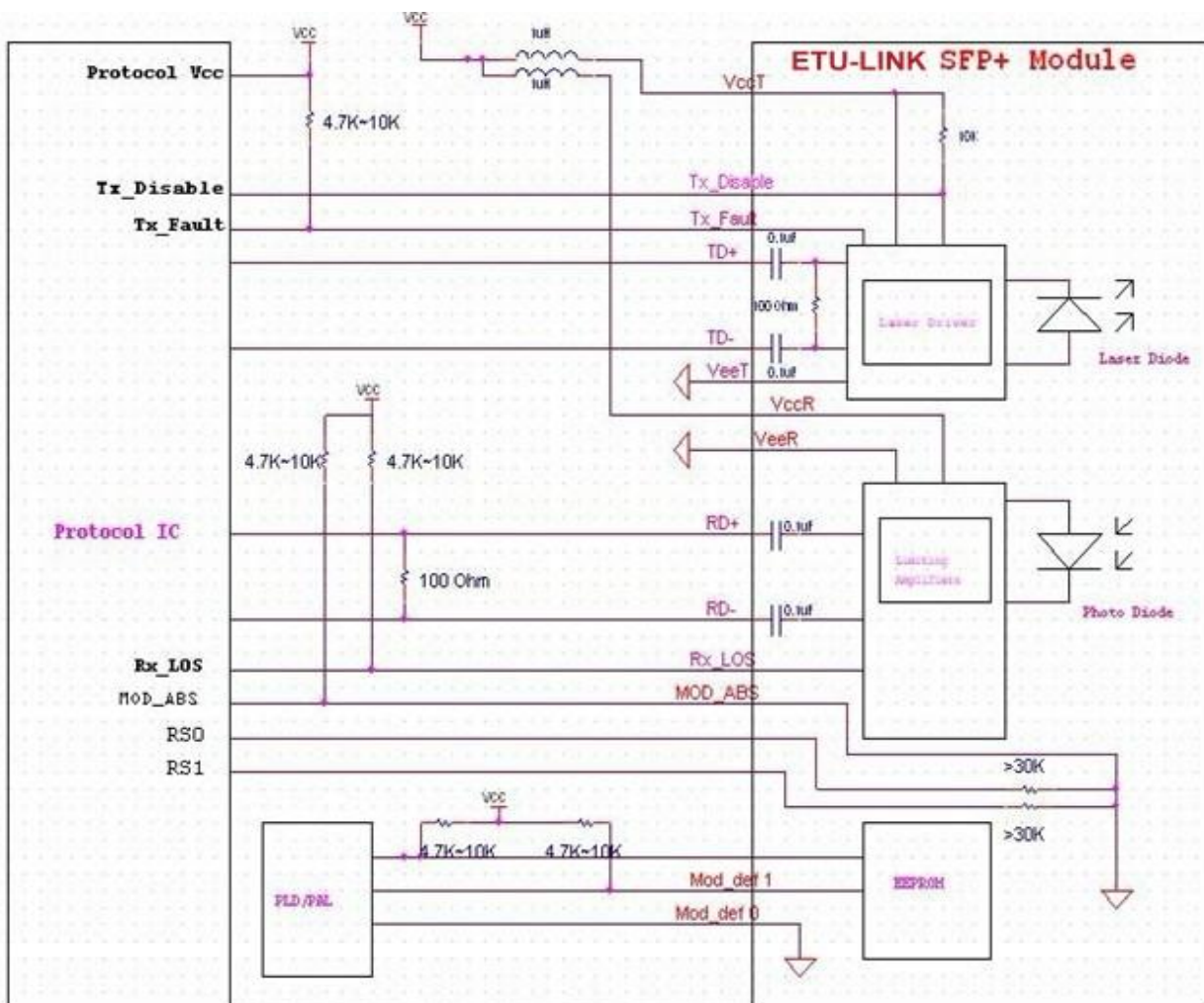
Outline Dimensions
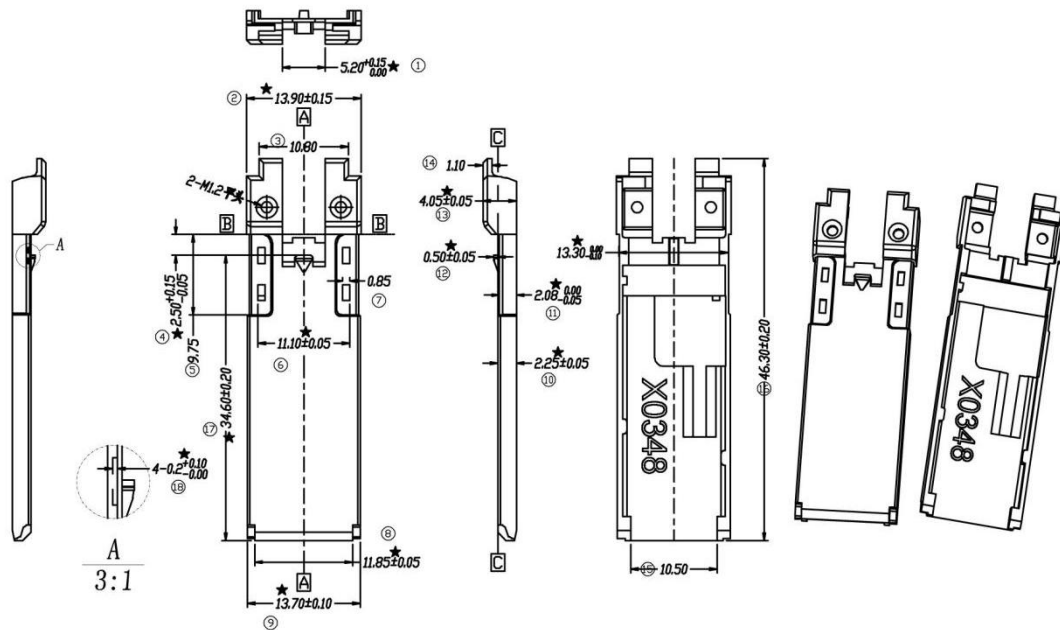
Regulatory Compliance

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	Alcatal 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.
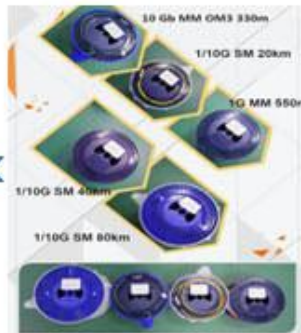

Standardized Production Line

Professional Welding

Assembling

Aging Testing

Distance Testing

Cleaning end face

Product Initial Test

Switch Testing

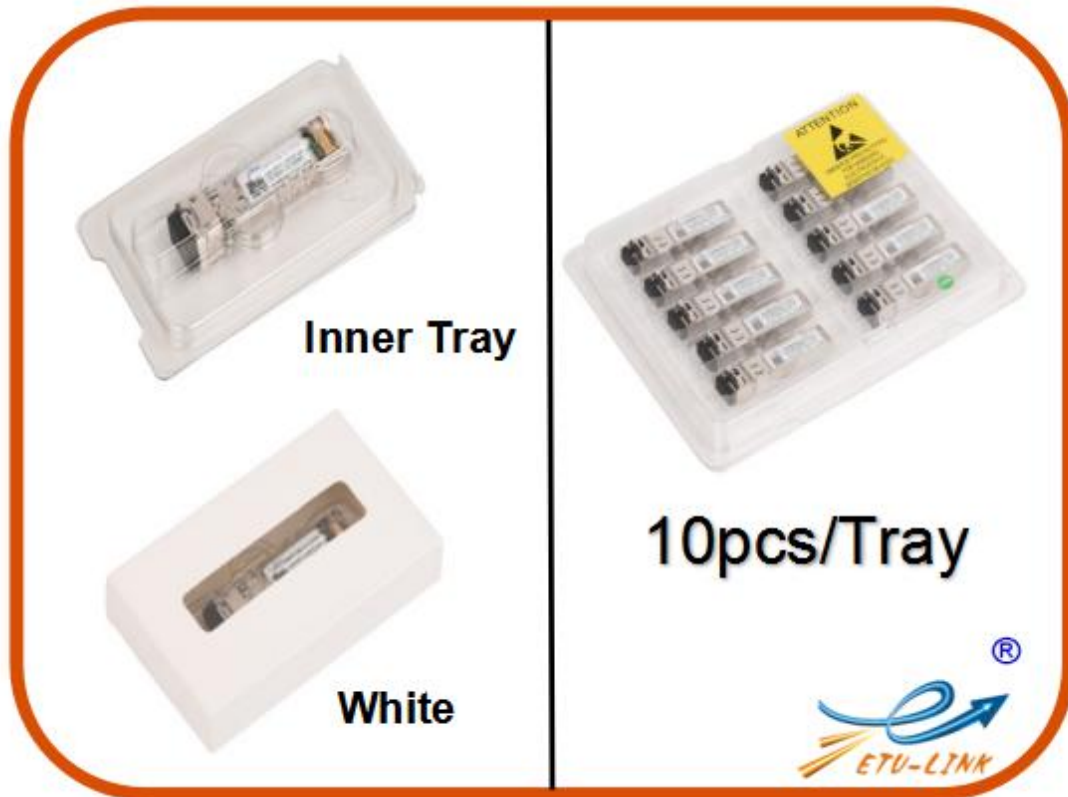Product Final Test

Packaging

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

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