



# ETU-LINK

## SFP+ Series

Optical Communication System

### SFP+

#### ESP8592-3AOCxx

##### 10G SFP+ to SFP+ Active Optical Cables

- Low power consumption <math><0.35\text{W}</math> per end
- Electrical interface compliant to SFF-8431
- Up to 300m on OM3 MMF
- 850nm VCSEL transmitter, PIN photo-detector receiver
- Operating case temperature 0 °C to +70°C
- 3.3V power supply voltage
- RoHS 6 compliant
- Hot Pluggable SFP+ form factor
- good EMI performance



## Applications

- 10 Gigabit Ethernet
- 1x InfiniBand QDR, DDR, SDR
- High-performance computing clusters
- 4G and 8G Fiber Channel Applications
- Servers, switches, storage, host card adapters and datacenter
- Routers

## Description

The ETU-Link SFP+ Active Optical Cables are direct-attach fiber assemblies with SFP+ connectors. They have very good power consumption performance. They are suitable for very short distances and offer a cost-effective way to connect within racks and across adjacent racks. ETU-Link SFP+ Active Optical Cables' length is up to 300 meters on OM3 MMF.

## Absolute Maximum Ratings

The operation in excess of any absolute maximum ratings might cause permanent damage to this module.

Parameter	Symbol	Min	Max	Unit	Note
Storage Temperature	TST	-20	85	degC	
Relative Humidity(non-condensing)	RH	0	85	%	
Operating Case Temperature	TOPC	0	70	degC	
Supply Voltage	VCC	-0.3	3.6	V	
Input Voltage	Vin	-0.3	Vcc+0.3	V	

## Recommended Operating Conditions and Supply

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	TOPC	0		70	degC
Power Supply Voltage	VCC	3.13	3.3	3.47	V
Data Rate	DR		10.3	11.3	Gbps
Data Speed Tolerance	$\Delta$ DR	-100		+100	ppm

## Optical Characteristics

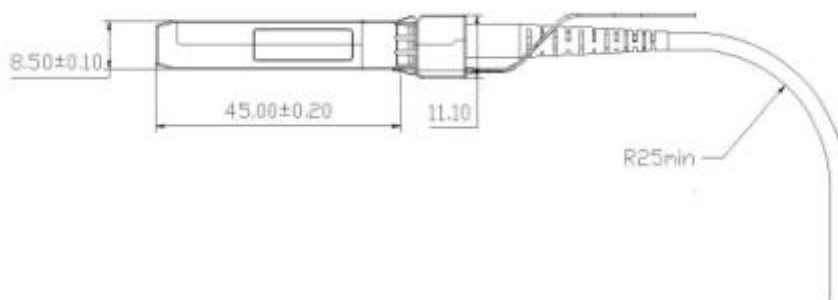
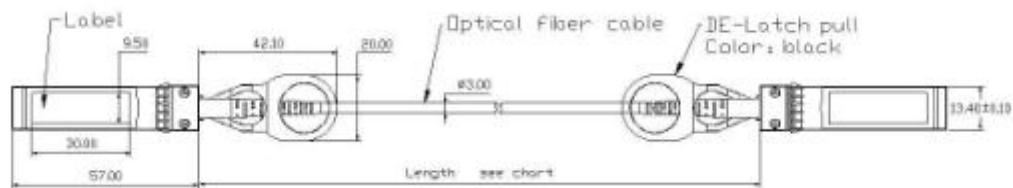
All parameters are specified under the recommended operating conditions with PRBS31 data pattern unless otherwise specified.

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
<b>Transmitter</b>						
Output Opt. Pwr	POUT	-6		-1	dBm	1
Optical Wavelength	$\lambda$	840	850	860	nm	
Optical Extinction Ratio	ER	3.0			dB	
RIN	RIN			-128	dB/Hz	
Output Eye Mask	Compliant with IEEE 0802.3ae					
<b>Receiver</b>						
Rx Sensitivity	RSENS			-10	dBm	2
Input Saturation Power (Overload)	Psat	-3			dBm	
Wavelength Range	$\lambda_c$	770	850	860	nm	
LOS De -Assert	LOSD			-14	dBm	
LOS Assert	LOSA	-30			dBm	
LOS Hysteresis		0.5			dB	

## Electrical Specifications

Parameter	Symbol	Min	Typical	Max	Unit
Differential input impedance	Z <sub>in</sub>	90	100	110	ohm
Differential Output impedance	Z <sub>out</sub>	90	100	110	ohm
Differential input voltage amplitude a Amplitude	ΔV <sub>in</sub>	100		1800	mVp-p
Differential output voltage amplitude	ΔV <sub>out</sub>	400		800	mVp-p
Bit Error Rate	BR			E-12	
Input Logic Level High	V <sub>IH</sub>	2.0		V <sub>cc</sub>	V
Input Logic Level Low	V <sub>IL</sub>	0		0.8	V

## Mechanical 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



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**



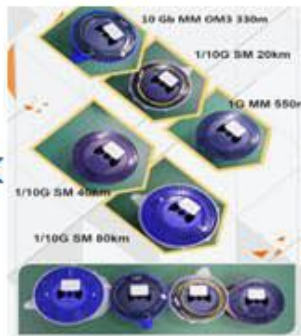
**Professional  
Welding**



**Assembling**



**Aging Testing**



**Distance Testing**



**Cleaning end face**



**Product Initial Test**



**Switch Testing**



**Product Final Test**

## Packaging

Individual package.



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