Rev	Date	Modified by	Description
A0	2023		

Product Specifications

1.25Gb/s Compact SFP 10km Optical Transceiver Module

PN: ECSB3412-3LCD10

Features

➢ Up to 1.25Gb/s data links
➢ 1310nm FP laser transmitter and PIN photo-detector
➢ Achieve operational compatibility with conventional SFP
➢ Up to 10km on 9/125μm SMF
➢ Hot-pluggable CSFP footprint
➢ BIDI LC/UPC type pluggable optical interface
➢ Low power dissipation
➢ RoHS-10 compliant and lead-free
➢ Support Digital Diagnostic Monitoring interface
➢ Single +3.3V power supply
➢ Compliant with SFF-8472
➢ Metal enclosure, for lower EMI
➢ Meet ESD requirements, resist 8KV direct contact voltage
➢ Case operating temperature
　Commercial: 0 ~ +70℃
　Extended: -10 ~ +80℃
　Industrial: -40 ~ +85℃

Applications

➢ Switch to Switch Interface
➢ Gigabit Ethernet
➢ Point to Point FTTH Application
➢ Switched Backplane Applications
➢ Router/Server Interface
➢ Other Optical Links

Description

The Small Form Factor Pluggable (CSFP) transceivers are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA), The transceiver consists of 2-channel Bi-directional Optical Transceiver unit with five sections: the LD driver, the limiting amplifier, the digital diagnostic monitor, the FP laser and the PIN photo-detector .The module data link up to 10km 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.

Conventional SFP will function when plugged into a C-SFP socket, at the same time no damage to C-SFP and host board if C-SFP module is plugged into a conventional SFP socket.

Absolute Maximum Ratings

It has to be noted that the operation in excess of any individual absolute maximum ratings might cause permanent damage to this module.

Parameter	Symbol	Min	Max	Unit	Notes
Storage Temperature	T_S	-40	85	℃	
Power Supply Voltage	V_{CC}	-0.3	3.6	V	
Relative Humidity (non-condensation)	RH	5	95	%	
Damage Threshold	TH_d	5		dBm	

Recommended Operating Conditions and Power Supply Requirements

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Case Temperature	T_{OP}	0		70	℃	commercial
		-10		80		extended

		-40		85		industrial
Power Supply Voltage	V_{CC}	3.135	3.3	3.465	V	
Data Rate			1.25		Gb/s	
Control Input Voltage High		2		Vcc	V	
Control Input Voltage Low		0		0.8	V	
Link Distance (SMF)	D			10	km	9/125um

Pin Assignment and Pin Description
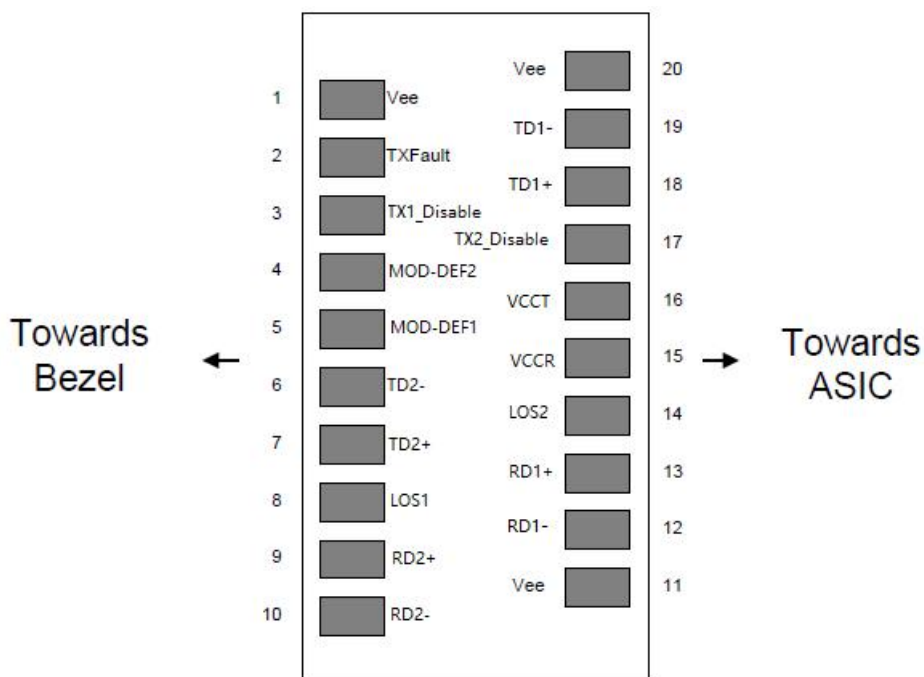
Figure1. Diagram of host board connector block pin numbers and names

PIN	Name	Name/Description	Notes
1	VEE	Transmitter Ground	VEE may be internally connected within the SFP module
2	TX FAULT	Transmitter Fault.	TX Fault is an open collector/drain output, which should be pulled up with a 4.7K–10K resistor on the host board. Note 1 for more information
3	TX1_Disable	Transmitter Disable of Ch A	Module channel A disables function
4	MOD_DEF2	Two-wires interface Data	2 wire serial ID interface, SDA

5	MOD_DEF1	Two-wires interface Clock	2 wire serial ID interface, SCL
6	TD2-	Inverted Transmit Data Input of Ch B	These are the differential transmitter puts. They are AC-coupled, differential lines with 100 differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board
7	TD2+	Transmit Data Input of Ch B	
8	LOS1	Loss of Signal of Ch A	Loss of Signal detected function. Note 2 for more information.
9	RD2+	Received Data Output of Ch B	These are the differential receiver outputs. They are AC coupled 100 differential lines which should be terminated with 100(differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board.
10	RD2-	Inverted Received Data Output of Ch B	
11	VEE	Transceiver Ground	VEE may be internally connected within the SFP module.
12	RD1-	Inverted Received Data Output of Ch A	These are the differential receiver outputs. They are AC coupled 100 differential lines which should be terminated with 100(differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board.
13	RD1+	Received Data Output of Ch A	
14	LOS2	Loss of Signal of CH B	Loss of Signal detected function. Note 2 for more information.
15	VCCR	Receiver Power	3.3V± 5%. Note 3 for more information
16	VCCT	Transmitter Power	3.3V± 5%. Note 3 for more information
17	TX2_Disable	Transmitter Disable of Ch B	Module channel B disables function
18	TD1+	Transmit Data Input of Ch A	These are the differential transmitter puts. They are AC-coupled differential lines with

| 19 | TD1- | Inverted   Transmit Data Input of Ch A | 100 differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board |
| 20 | VEE | Transceiver Ground | VEE may be internally connected within the SFP module. |

Notes:

1. When high, output indicates a laser fault of some kind either in Channel A or Channel B. The Host shall   read Channel A/B for details: TX Fault   from   channel A   if bit 2   is   set   in   [A2H:110]; TX Fault   from channel B if bit 2 is set in [B2H: 110]. Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.

2. When high, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to < 0.4V.

3. VccT VccR are the power supplies. They are defined as 3.3V ±5% at the SFP connector pin. Maximum supply current is 400Ma@3.3V. Vcc may be internally connected within the SFP transceiver module.
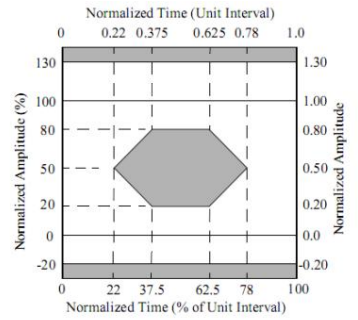
Electrical Characteristics

The following electrical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Power Consumption				1.32	W	
Supply Current	Icc			400	mA	
Transmitter						
Single-ended Input Voltage Tolerance		-0.3		4.0	V	
Differential Input Voltage Swing	Vin,pp	200		2400	mVpp	
Differential Input Impedance	Zin	90	100	110	Ohm	
Transmit Disable Assert Time				5	us	
Transmit Disable Voltage	Vdis	Vcc-1.3		Vcc	V	
Transmit Enable Voltage	Ven	Vee-0.3		0.8	V	

Receiver						
Differential Output Voltage Swing	Vout,pp	500		900	mVpp	
Differential Output Impedance	Zout	90	100	110	Ohm	
Data output rise/fall time	Tr/Tf		100		ps	20% to 80%
LOS Assert Voltage	VlosH	Vcc-1.3		Vcc	V	
LOS De-assert Voltage	VlosL	Vee-0.3		0.8	V	

Optical Characteristics

The following optical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Transmitter						
Center Wavelength	λ_C	1260	1310	1360	nm	
Spectrum Bandwidth(RMS)	σ			3.5	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Optical Power	P_{AVG}	-9		-3	dBm	1
Optical Extinction Ratio	ER	9			dB	
Transmitter OFF Output Power	POff			-45	dBm	
Transmitter Eye Mask		Compliant with 802.3z(class 1 laser safety)				2
Receiver						
Center Wavelength	λ_C	1470	1490	1510	nm	
Receiver Sensitivity (Average Power)	Sen.			-20	dBm	3
Input Saturation Power (overload)	Psat	-3			dBm	
LOS Assert	LOSA	-36			dB	4
LOS De-assert	LOSD			-21	dBm	4
LOS Hysteresis	LOSH	0.5	2	6	dBm	

Notes:

1. Measure at 2^7-1 NRZ PRBS pattern

2. Transmitter eye mask definition.

3. Measured with Light source 1310nm, ER=9dB; BER =<10^-12 @PRBS=2^7-1 NRZ

4. When LOS de-asserted, the RX data+/- output is High-level (fixed).

Digital Diagnostic Functions

The following digital diagnostic characteristics are defined over the Recommended Operating Environment unless otherwise specified. It is compliant to SFF-8472 Rev10.2 with internal calibration mode. For external calibration mode please contact our sales staff.

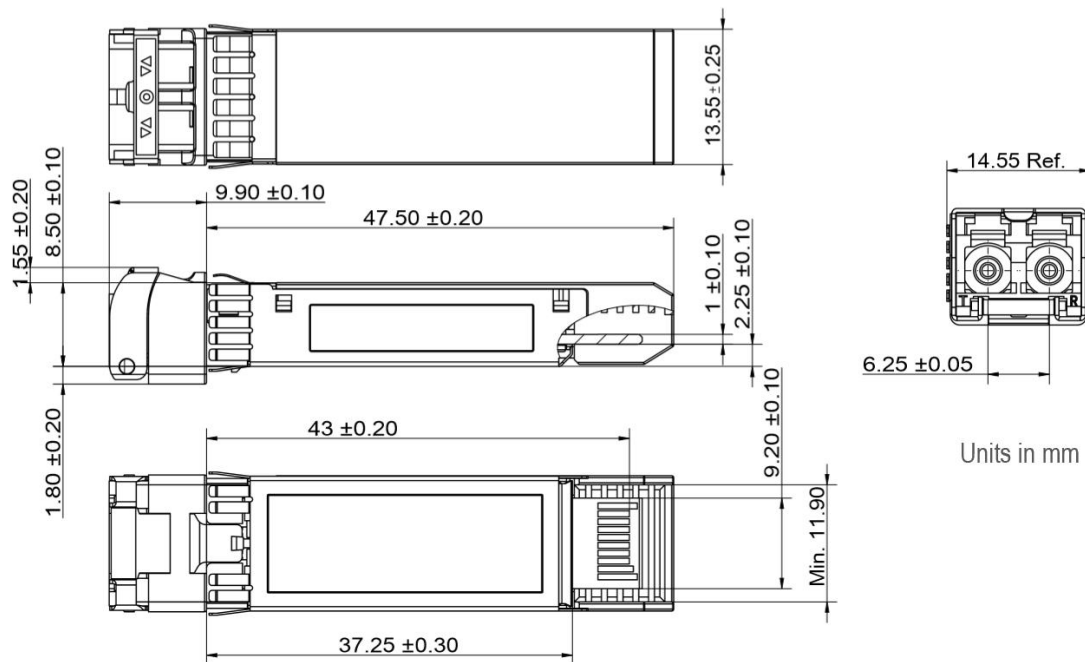| Parameter	Symbol	Min.	Max	Unit	Notes
Temperature monitor absolute error	DMI_ Temp	-3	3	degC	Over operating temp
Supply voltage monitor absolute error	DMI _VCC	-0.15	0.15	V	Full operating range
RX power monitor absolute error	DMI_RX	-3	3	dB	
Bias current monitor	DMI_ bias	-10%	10%	mA	
TX power monitor absolute error	DMI_TX	-3	3	dB	

Mechanical Dimensions

Figure2. Mechanical Outline

Precautions

a. This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment

is highly recommended. Follow guidelines according to proper ESD procedures.

b. Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

Ordering Information

Part Number	Data Rate (Gb/s)	Wavelength (nm)	Transmission Distance(km)	Temperature (°C) (Operating Case)
ECSB3412-3LCD10	1.25	1310Tx/1490nmRx	10km SMF	0~70 commercial
ECSB3412-3LED10	1.25	1310Tx/1490nmRx	10km SMF	-10~80 Extended
ECSB3412-3LID10	1.25	1310Tx/1490nmRx	10km SMF	-40~85 Industrial

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.
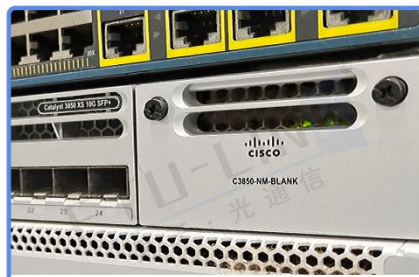

HUAWEI S6720S
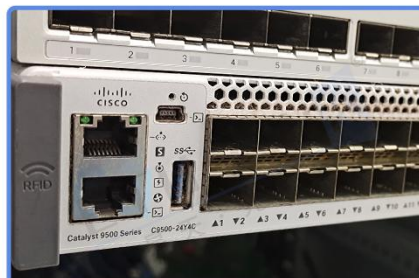
CISCO Catalyst 9500
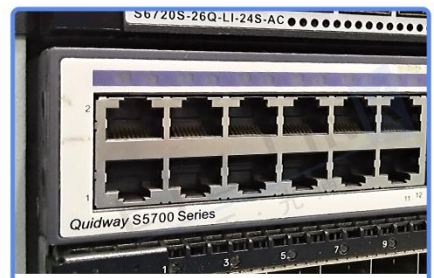

DELL S5048F

H3C S3100V2

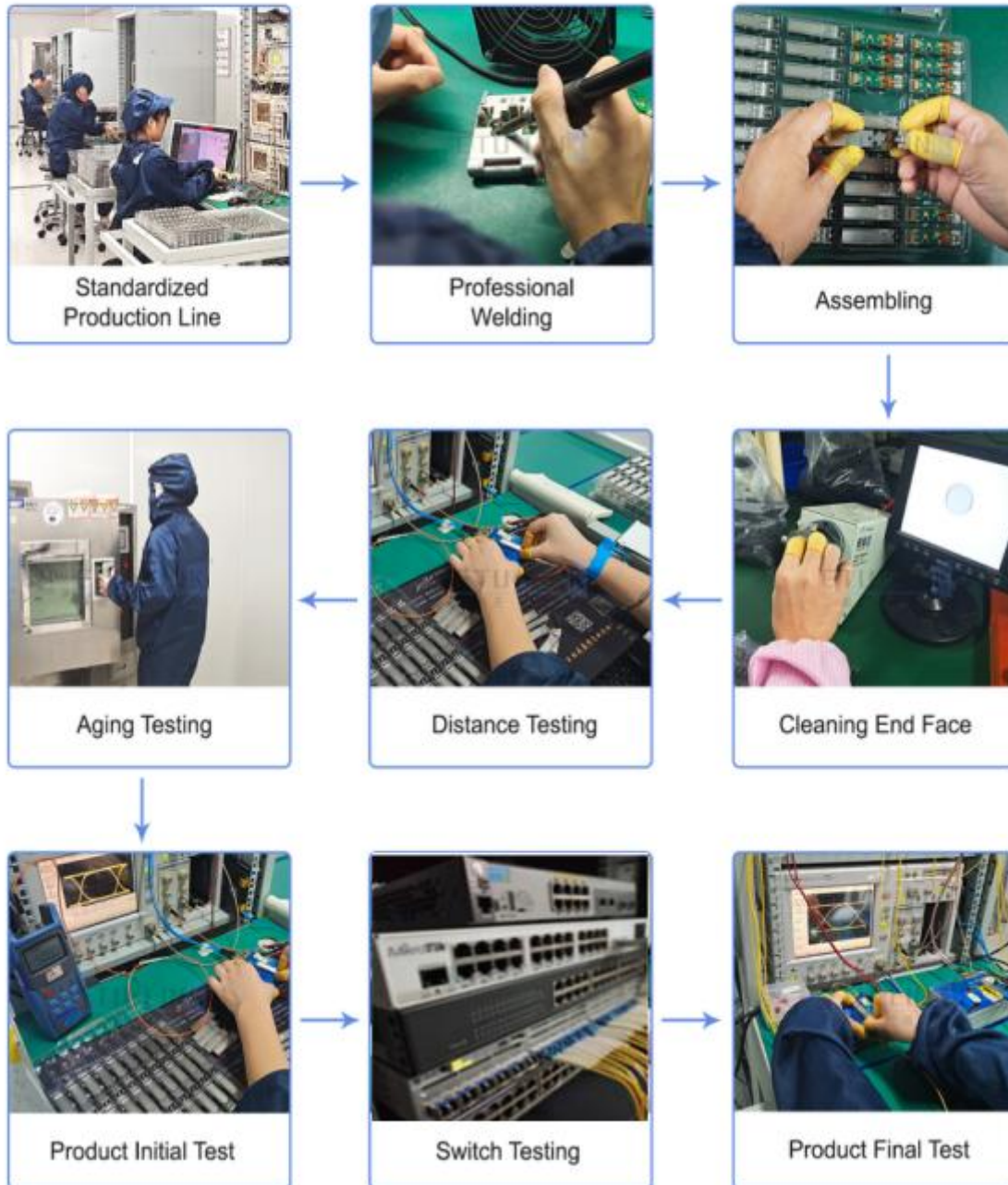CISCO C3850

Aruba 2930F

Juniper EX 4200

HP J9264A

Quidway S5700

Product Production Process

Package diagram

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

Inner Tray

Anti-static bag

White

10pcs/ Tray

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Tel: +86-755 2328 4603

Addresses and phone number also have been listed at www.etulinktechnology.com.

Please e-mail us at sales@etulinktechnology.com or call us for assistance.