

SFP

ES8524-3LCD05

2.5Gb/s SFP 850nm Multi-Mode Optical Transceiver

- Up to 2.5Gb/s data links
- 850nm VCSEL laser transmitter and PIN photo-detector
- Up to 550m on 50/125um MMF
- Hot-pluggable SFP footprint
- Duplex LC/UPC type pluggable optical interface
- Low power dissipation
- Metal enclosure, for lower EMI
- RoHS-10 compliant and lead-free
- Support Digital Diagnostic Monitoring interface
- Single +3.3V power supply
- Compliant with SFF-8472
- Case operating temperature:
 - Commercial: 0 ~ +70°C
 - Extended: -10 ~ +80°C
 - Industrial: -40 ~ +85°C



Applications

- Switch to Switch Interface
- 1xFiber/2xFiber channel Application
- Gigabit Ethernet
- Switched Backplane Applications
- Router/Server Interface
- Other Optical Links

Description

ETU 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 VCSEL laser and the PIN photo-detector. The module data link up to 550m in 50/125um multi-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.

Part Number Ordering Information

Part Number	Data Rate (Gb/s)	Wavelength (nm)	Transmission Distance(m)	Temperature (oC) (Operating Case)
ES8524-3LCD05	2.5	850	550m MMF	0~70 commercial
ES8524-3LED05	2.5	850	550m MMF	-10~80 Extended
ES8524-3LID05	2.5	850	550m MMF	-40~85 Industrial

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	TS	-40	85	oC	
Operating Case Temperature	Tcase	See order Information		oC	
Power Supply Voltage	VCC	-0.5	3.6	V	

Relative Humidity (non-condensation)	RH	5	95	%	
Damage Threshold	THd	5		dBm	

Recommended Operating Conditions and Power Supply Requirements

Optical Characteristics		Min	Typical	Max	Unit
Operating Case Temperature	TOP	See order Information			oC
Power Supply Voltage	VCC	3.135	3.3	3.465	V
Data Rate			2.5		Gb/s
Control Input Voltage High		2		Vcc	V
Control Input Voltage Low		0		0.8	V
Link Distance(50/125um OM3 Fiber)	D	See order Information			m

Pin Assignment and Pin Description

Pin Description

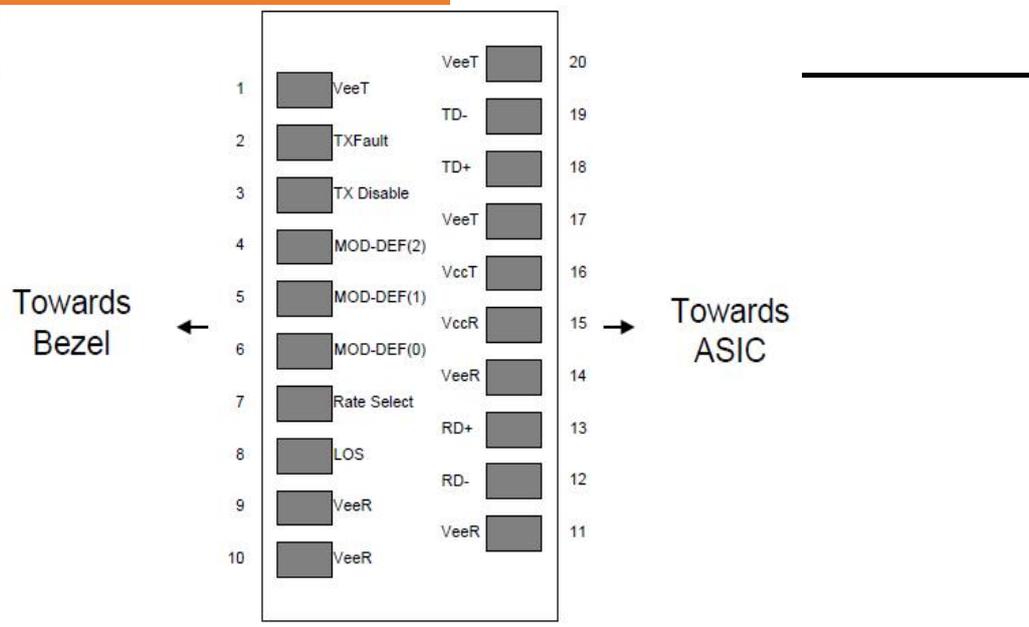


Figure1. Diagram of host board connector block pin numbers and names

PIN	Name	Name/Description	Notes
1	VEET	Transmitter Ground (Common with Receiver Ground)	1
2	TXFAULT	Transmitter Fault.	
3	TXDIS	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 TDIS >2.0V or open, enabled on TDIS <0.8V.
3. Should be pulled up with 4.7k-10k ohms 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 > 30kΩ resistor. The input states are:

- 1) Low (0 – 0.8V): Reduced Bandwidth
- 2) (>0.8, < 2.0V): Undefined
- 3) High (2.0 – 3.465V): Full Bandwidth
- 4) Open: Reduced Bandwidth
- 5. LOS is open collector output should be pulled up with 4.7k-10k ohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

Electrical Characteristics

Electrical Interface Characteristics

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

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Power Consumption	p			0.85	W	commercial
				0.90		Industrial
Supply Current	Icc			250	mA	commercial
				270		Industrial
Transmitter						
Single-ended Input Voltage Tolerance	VCC	-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

Pin Definitions

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Transmitter						
Center Wavelength	λ_C	830	850	860	nm	
Spectrum Bandwidth(RMS)	σ			0.85	nm	
Average Optical Power	PAVG	-9		-3	dBm	1
Extinction Ratio	ER	8.2			dB	
Transmitter OFF Output Power	Poff			-45	dBm	
Transmitter Eye Mask Definition		Compliant with G.957(class 1 laser safety)				
Receiver						
Center Wavelength	λ_C	770	850	860	nm	
Sensitivity (Average Power)	Sen.			-18	dBm	2
Input Saturation Power(overload)	Psat	0			dBm	
LOS Assert	LOSA	-35			dBm	3
LOS De-assert	LOSD			-19	dBm	3
LOS Hysteresis	LOSH	0.5			dB	

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

Notes:

1. Measure at 2²³-1 NRZ PRBS pattern
2. Measured with Light source 850nm, ER=8.2dB; BER =<10⁻¹² @PRBS=2²³-1 NRZ
3. When LOS de-asserted, the RX data+/- output is High-level (fixed).

Digital Diagnostic Functions

Digital Diagnostic Functions

The Digital Diagnostic Functions 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	DMI _ Temp	-3	3	degC	Over operating temp
Supply voltage monitor	DMI _ VCC	-0.15	0.15	V	Full operating range
RX power monitor	DMI _ RX	-3	3	dB	
Bias current monitor	DMI _ bias	-10%	10%	mA	
TX power monitor	DMI _ TX	-3	3	dB	

Mechanical Specifications

Mechanical Specifications

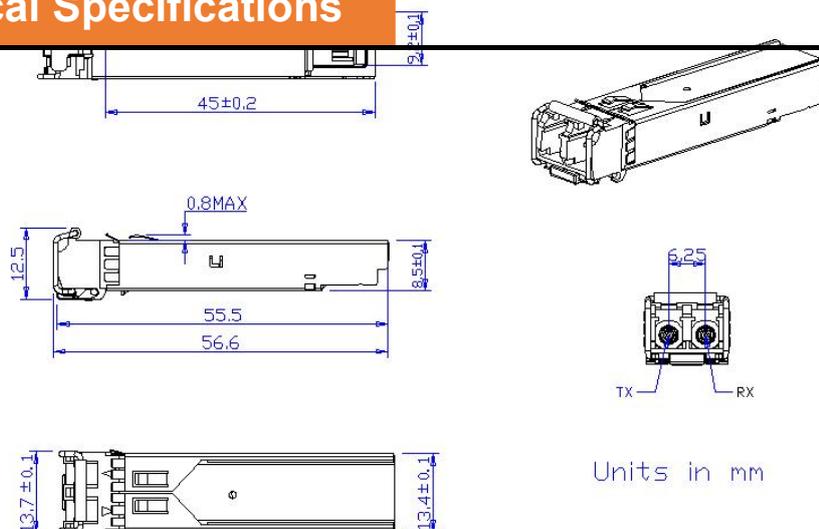


Figure2. Mechanical Outline

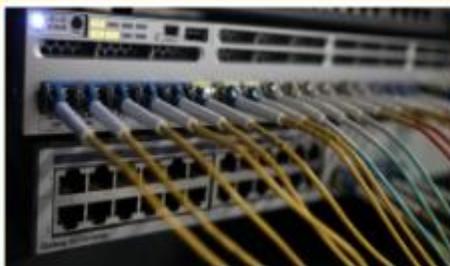
Precautions

- a. **Compatibility Test** is 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.

Compatibility Test

In order to ensure compatibility, our products will be tested on the switch before shipment. Our most popular test equipment includes stream 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

Packaging

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**



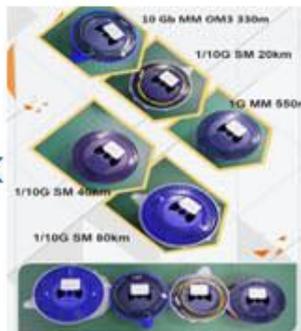
**Professional
Welding**



Assembling



Aging Testing



Distance Testing



Cleaning end face



Product Initial Test



Switch Testing

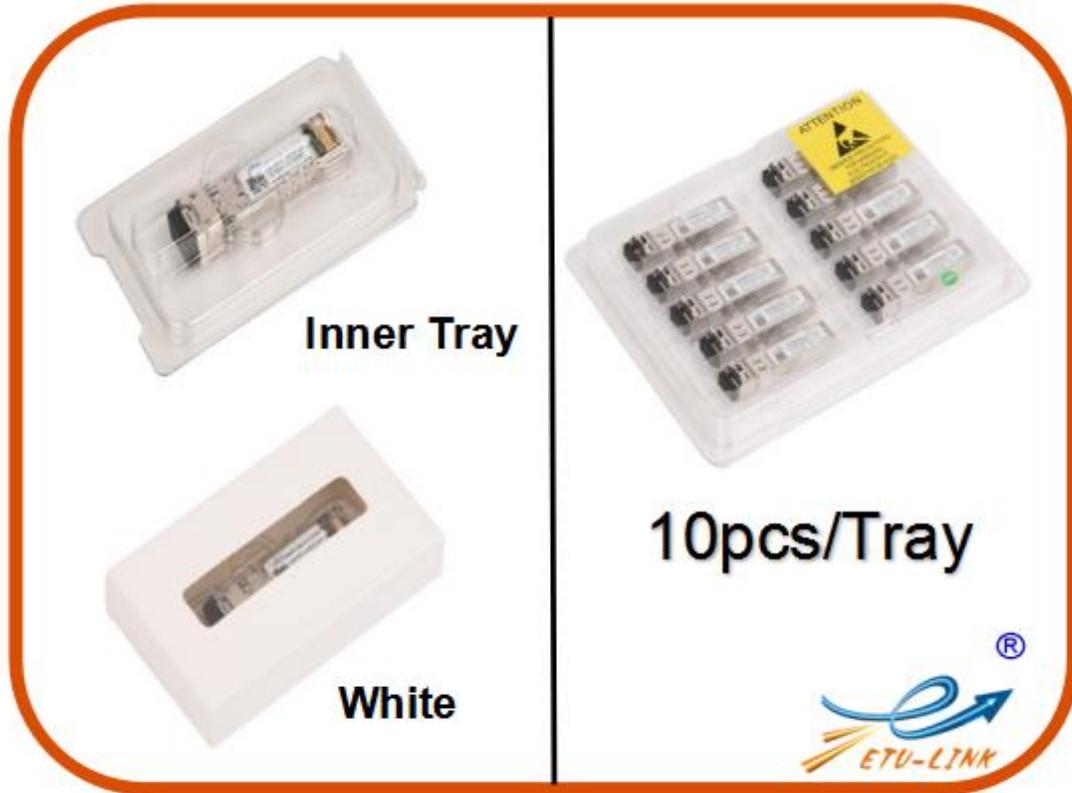


Product Final Test

Packaging

Packaging

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



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