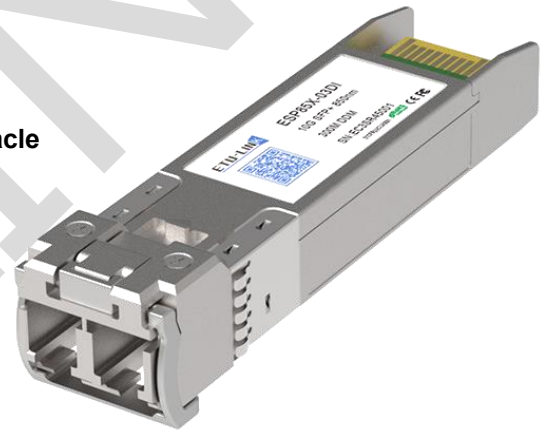


ESP8562-05D(I)

6.25Gbps SFP+ Optical Transceiver, 500M Reach

PRODUCT FEATURES

- Supports up to 6.25Gbps bit rates
- Hot-pluggable SFP+ footprint
- 850nm VCSEL laser and PIN photodiode,
- Up to 500m for OM4-MMF transmission
- Compliant with SFP+ MSA and SFF-8472 with duplex LC receptacle
- Compatible with RoHS
- Single +3.3V power supply
- Real Time Digital Diagnostic Monitoring
- Temperature Range:
 - Commercial: 0°C ~70°C
 - Industrial: -40°C ~85°C



APPLICATIONS

- 6.144Gbps Optical systems
- LTE systems
- Other Optical links

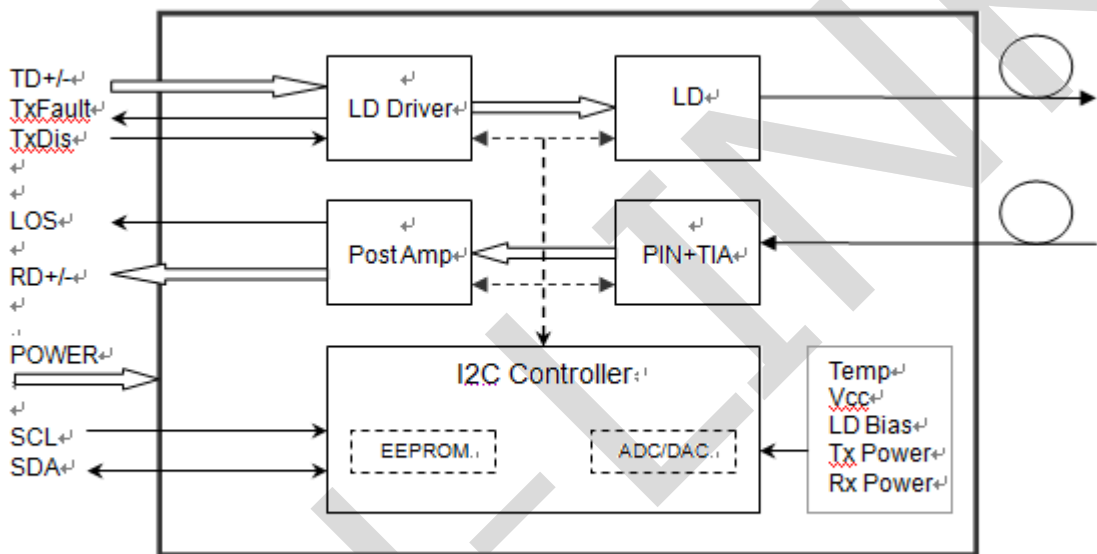
DESCRIPTIONS

The SFP+ transceivers are high performance, cost effective modules supporting data rate of 6.25Gbps.

The transceiver consists of three sections: a VCSEL laser transmitter, a PIN photodiode integrated with a trans-impedance preamplifier (TIA) and MCU control unit. All modules satisfy class I laser safety requirements.

The transceivers are compatible with SFP Multi-Source Agreement and SFF-8472 digital diagnostics functions.

Module Block Diagram



Transceiver functional diagram

Ordering Information

Part No.	Data Rate(optical)	Laser	Fiber Type	Distance	Optical Interface	Temp	DDMI	Latch Color
ESP8562-05D	6.25Gbps	VCSEL	MMF	500M	LC	0~70°C	Yes	Black
ESP8562-05DI	6.25Gbps	VCSEL	MMF	500M	LC	-40~85°C	Yes	Black

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	-0.5	4.5	V
Storage Temperature	Ts	-40	+85	°C
Operating Humidity	-	5	85	%

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Case Operating Temperature	Top	0	-	70	°C	Commercial
		-40		85		Industrial
Power Supply Voltage	V _{CC}	3.13	3.3	3.47	V	
Power Supply Current				1	W	
Transmission Distance	TD	-	-	500	m	Over MMF

Electrical 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	V _{dis}	2		V _{CC}	V	LVTTTL
Transmit Enable Voltage	V _{en}	V _{EE}		V _{EE} +0.8	V	
Receiver						
Differential Data Output Swing	VDR	400		850	mVp-p	Note (1)
LOS Output Voltage-High	V _{LOSH}	V _{EE}		V _{EE} +0.8	V	LVTTTL
LOS Output Voltage-Low	V _{LOSL}	2		V _{CC} HOS T	V	

Note: Into 100Ω differential termination.

Optical and Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter						
Centre Wavelength	λ _C	840	850	860	nm	
Spectral Width (RMS)	Δλ			0.65	nm	
Side-Mode Suppression Ratio	SMSR	-	-	-	dB	
Average Output Power	P _{out}	-6.0		-0.5	dBm	1
Extinction Ratio	ER	3.0			dB	
Data Input Swing Differential	V _{IN}	180		950	mV	2

Input Differential Impedance	Z _{IN}	90	100	110	Ω	
TX Disable	Disable		2.0		V _{cc}	V
	Enable		0		0.8	V
TX Fault	Fault		2.0		V _{cc}	V
	Normal		0		0.8	V
Receiver						
Centre Wavelength	λ _C	840	850	860	nm	
Receiver Sensitivity				-10.5	dBm	3
Receiver Overload		0.5			dBm	3
LOS De-Assert	LOS _D			-12	dBm	
LOS Assert	LOS _A	-22			dBm	
LOS Hysteresis		0.5		4	dB	
Data Output Swing Differential	V _{out}	500	700	900	mV	4
LOS	High	2.0		V _{cc}	V	
	Low			0.8	V	

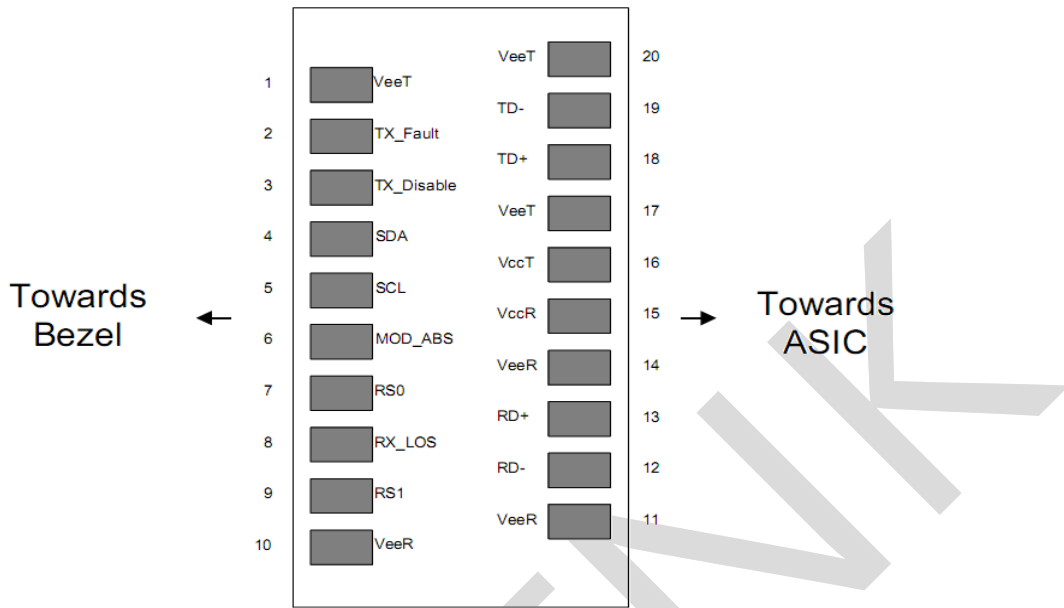
Notes:

1. The optical power is launched into MMF.
2. PECL input, internally AC-coupled and terminated.
3. Measured with a PRBS 2³¹-1 test pattern @6144Mbps, BER ≤1×10⁻¹².
4. Internally AC-coupled.

Digital Diagnostics

Parameter	Range	Accuracy	Unit	Calibration
Temperature	-40 to 85	±3	°C	Internal
Voltage	0 to V _{cc}	±3%	V	Internal
Tx Bias Current	0 to 10	±10%	mA	Internal
Tx Output Power	-6 to -0.5	±3	dB	Internal
Rx Input Power	-10.5 to 0.5	±3	dB	Internal

Pin Diagram



Pin Definitions

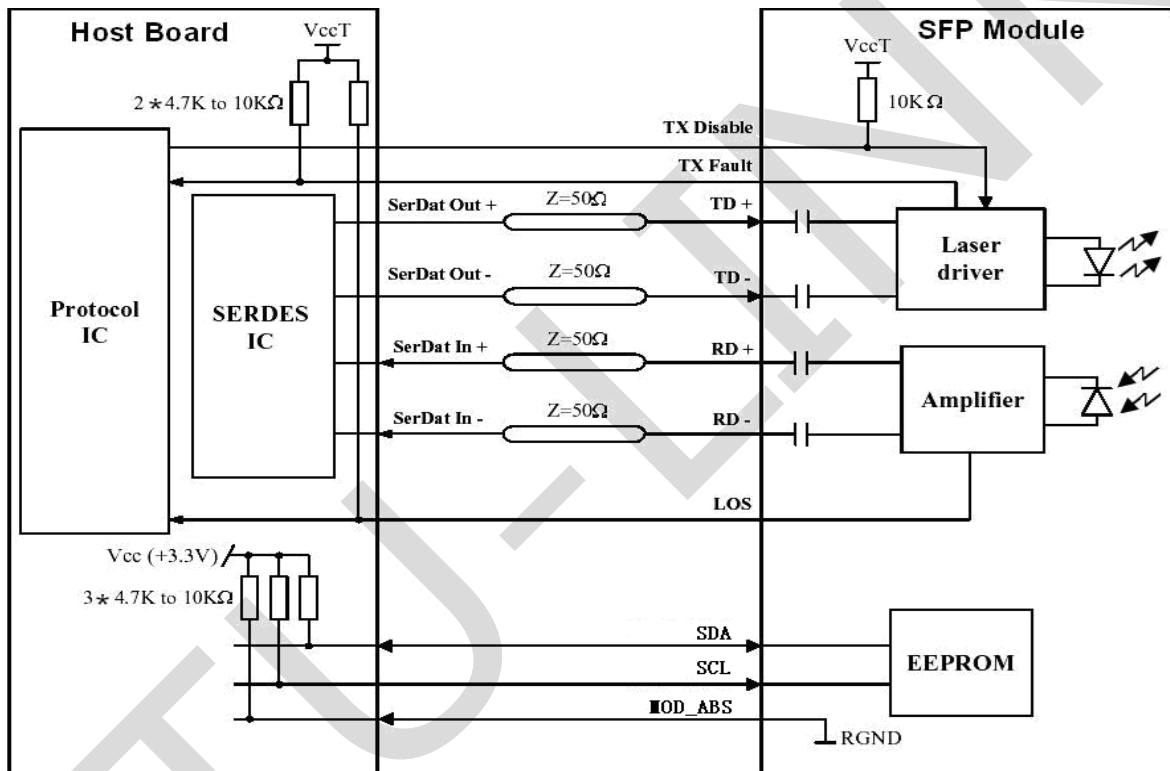
Pin	Signal Name	Description	Plug Seq.	Notes
1	V _{EET}	Transmitter Ground	1	
2	TX_FAULT	Transmitter Fault Indication	3	Note1
3	TXDISABLE	Transmitter Disable	3	Note2
4	SDA	SDA Serial Data Signal	3	
5	SCL	SCL Serial Clock Signal	3	
6	MOD_ABS	Module Absent. Grounded within the module	3	
7	RS0	Not Connected	3	
8	LOS	Loss of Signal	3	Note 3
9	RS1	Not Connected	3	
10	V _{EER}	Receiver ground	1	
11	V _{EER}	Receiver ground	1	
12	RD-	Inv. Received Data Out	3	Note 4
13	RD+	Received Data Out	3	Note 4
14	V _{EER}	Receiver ground	1	
15	V _{CCR}	Receiver Power Supply	2	
16	V _{CCT}	Transmitter Power Supply	2	
17	V _{EET}	Transmitter Ground	1	
18	TD+	Transmit Data In	3	Note 5
19	TD-	Inv. Transmit Data In	3	Note 5
20	V _{EET}	Transmitter Ground	1	

Notes:

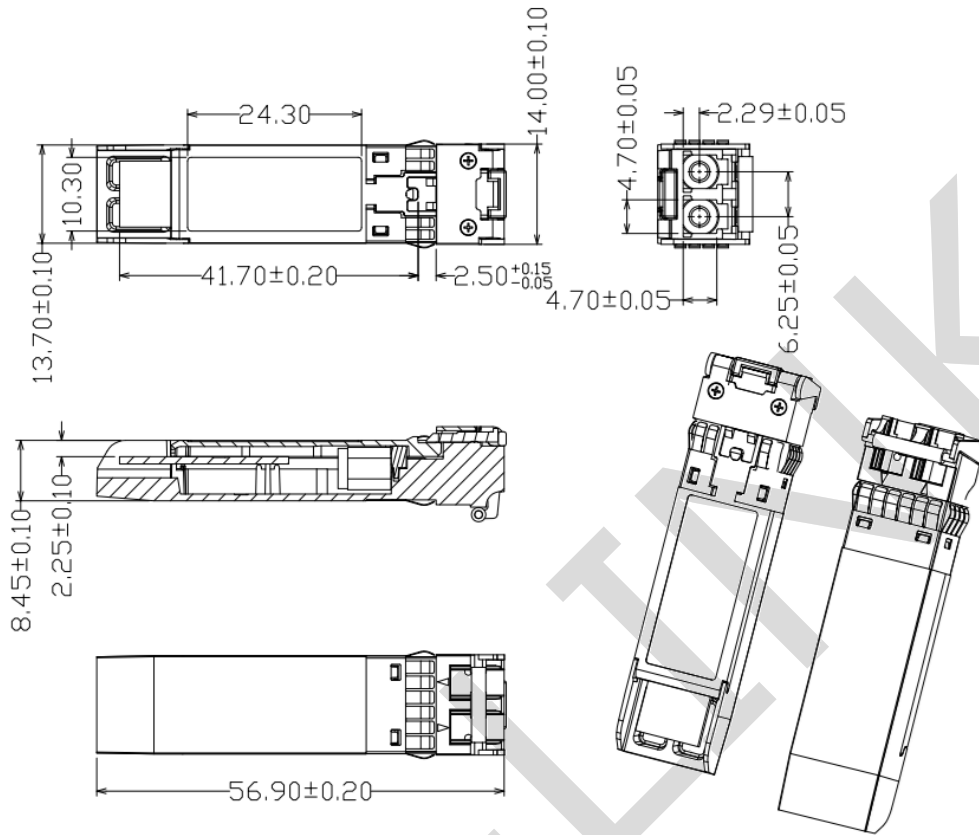
1. Circuit ground is internally isolated from chassis ground.

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 $V_{\text{cc}} + 0.3\text{V}$. 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 $<0.8\text{V}$.
 3. Laser output disabled on $T_{\text{DIS}} > 2.0\text{V}$ or open, enabled on $T_{\text{DIS}} < 0.8\text{V}$.
 4. Should be pulled up with 4.7k - 10kohms on host board to a voltage between 2.0V and 3.6V. MOD_DEF (0) pulls line low to indicate module is plugged in.
- LOS is open collector output. Should be pulled up with 4.7k – 10 kohms 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



Mechanical Diagram



Revision History

Version No.	Date	Description
1.0	Sep 12, 2016	Preliminary datasheet
2.0	October 25, 2019	Product upgrades
3.0	Aug 26, 2024	Format change

Company: ETU-Link Technology Co., LTD

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

R&D base: Floor 4, Building 4, Nanshan Yungu Phase LI, Taoyuan Community, Xili Street, Nanshan District, Shenzhen

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.

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