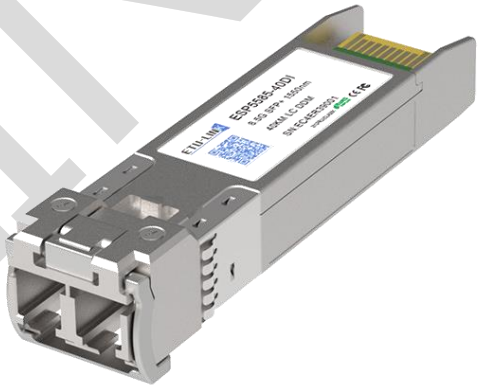
ESP5585-40D(I)

8.5Gbps 1550nm 40KM SFP+ Transceiver

PRODUCT FEATURES



- Data rate up to 8.5Gb/s
- Cooled EML transmitter and PIN receiver
- link length up to 40km
- Low Power Dissipation 1.5W Maximum
- Single 3.3V power supply
- Diagnostic Performance Monitoring of module temperature,
- supply Voltages, laser bias current, transmit optical power,
- receive optical power

  RoHS compliant and lead free
- Case operating temperature range:

  Commercial:0°C ~70°C

  Industrial: -40°C ~85°C

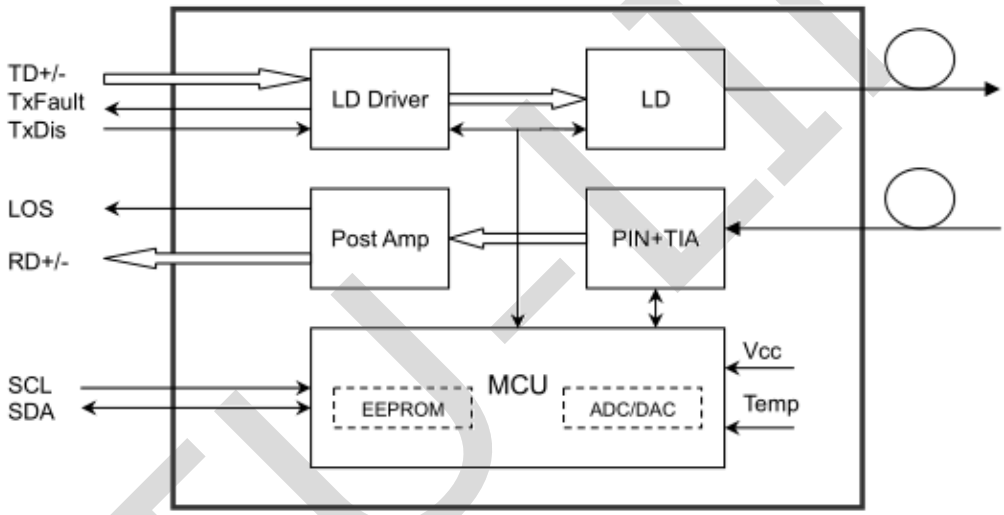
APPLICATIONS

- Tri Rate 2.125/4.25/8.5Gbs Fiber Channel

DESCRIPTIONS

ETU-Link SFP+ER Transceiver is designed for 8.5G Fiber- Channel applications. The transceiver consists of two sections: The transmitter section incorporates a cooled EML laser. And the receiver section consists of a PIN photodiode integrated with a TIA. All modules satisfy class I laser safety requirements. ETU-Link SFP+ER Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage.

Module Block Diagram



Ordering Information

Part No.	Data Rate(optical)	Laser	Fiber Type	Distance	Optical Interface	Temp	DDMI
ESDxx85-40D	8.5Gbit/s	EML	SMF	40km	LC	0~70℃	Y
ESDxx85-40DI	8.5Gbit/s	EML	SMF	40km	LC	-40~85℃	Y

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes

Maximum Supply Voltage	Vcc	-0.5		4.7	V	
Storage Temperature	TS	-40		85	°C	
Case Operating Temperature	Tcase	-5		70	°C	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Case Operating Temperature	Top	0	-	70	℃	Commercial
		-40		85		Industrial
Power Supply Voltage	VCC	3.14	3.3	3.47	V	
Power Supply Current	ICC	-		450	mA	
Data Rate	BR		8.5		Gbps	
Transmission Distance	TD		-	40	km	
Coupled fiber	Single mode fiber					9/125um SMF

Electrical Characteristics (T_{case} = -5 to70℃, VCC = 3.14 to 3.46 Volts)

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Supply Voltage	Vcc	3.14	3.3	3.46	V	
Supply Current	Icc			300	mA	
Transmitter (Module Input)						
Input differential impedance	Rin		100		Ω	1
Single ended data input swing	Vin,pp	180		700	mV	
Transmit Disable Voltage	VD	Vcc–1.3		Vcc	V	
Transmit Enable Voltage	VEN	Vee		Vee+ 0.8	V	2
Transmit Disable Assert Time				10	us	
Receiver (Module Output)						
Differential data output swing	Vout,pp	300		850	mV	3
Data output rise time	tr	28			ps	4
Data output fall time	tf	28			ps	4
LOS Fault	VLOS fault	Vcc–1.3		VccHOST	V	5
LOS Normal	VLOS norm	Vee		Vee+0.8	V	5
Power Supply Rejection	PSR	100			mVpp	6

Notes:

1. Connected directly to TX data input pins. AC coupled thereafter.
2. Or open circuit.
3. Into 100 ohms differential termination.
4. 20 – 80 %.
5. Loss of Signal is LVTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.
6. Receiver sensitivity is compliant with power supply sinusoidal modulation of 20 Hz to 1.5 MHz up to specified value applied through the

recommended power supply filtering network.

Optical and Characteristics (Tcase = -5 to70℃, VCC = 3.14 to 3.46 Volts)

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter						
Output Opt. Pwr	POUT	-1		3	dBm	1
Optical Wavelength	λ	1530	1550	1565	nm	
Wavelength Temperature Dependence			0.08	0.125	nm/°C	
Spectral Width (-20dB)	σ			1	nm	
Optical Extinction Ratio	ER	6			dB	
Transmitter and Dispersion Penalty	TDP			3.2	dB	
Optical Rise/Fall Time	tr/ tf		0.1	0.26	ns	
RIN	RIN			-128	dB/Hz	
Output Eye Mask	Compliant with FC-PI-4					
Receiver						
Rx Sensitivity	RSENS			-16.4	dBm	2
Input Saturation Power (Overload)	Psat	0.5			dBm	
Wavelength Range	λ_C	1260		1360	nm	
LOS De -Assert	LOSD			-16	dBm	
LOS Assert	LOSA	-30			dBm	
LOS Hysteresis		0.5	1.0		dB	

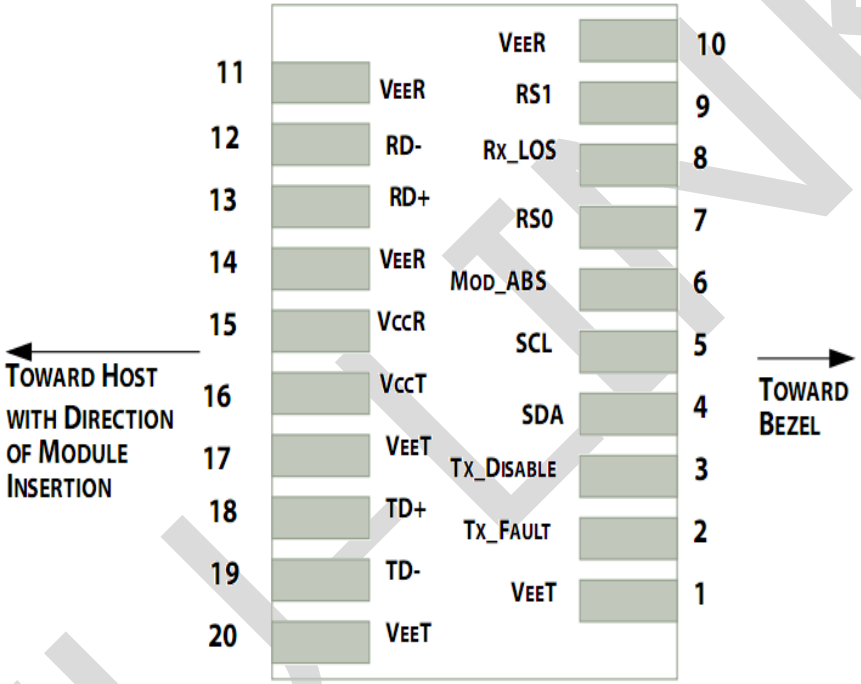
Notes:

1. High Bandwidth Mode. Class 1 Laser Safety per FDA/CDRH and EN (IEC) 60825 regulations.
2. Also specified to meet curves in FC-PI-4 Rev 8.001 Figures 21, 22, and 23, which allow trade-off between wavelength, spectral width and OMA.
3. Equivalent extinction ratio specification for Fiber Channel. Allows smaller ER at higher average power.
4. For 8.5 Gb/s operation, Jitter values for gamma T and gamma R are controlled by TDP and stressed receiver sensitivity.
5. Measured with conformance signals defined in FC-PI-4 Rev. 8.00 specifications. Value in OMA. Measured with PRBS 31-1 at 10-12 BER.

Digital Diagnostics

Parameter	Range	Accuracy	Unit	Calibration
Temperature	-40 to 85	±3	℃	Internal
Voltage	0 to Vcc	±3%	V	Internal
Tx Bias Current	0 to 100	±10%	mA	Internal
Tx Output Power	-1 to 3	±3	dB	Internal
Rx Input Power	-17 to 0.5	±3	dB	Internal

Pin Diagram



Pin Definitions

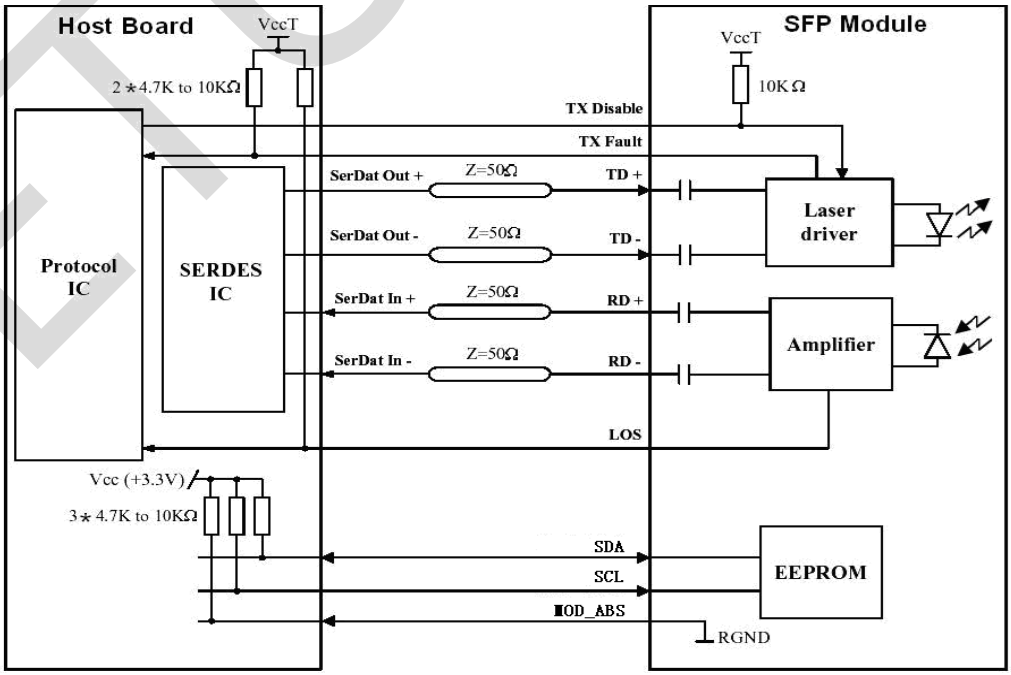
PIN #	Name	Function	Notes
1	V_{EET}	Transmitter Ground (Common with Receiver Ground)	1
2	T_{FAULT}	Transmitter Fault.	2
3	T_{DIS}	Transmitter Disable. Laser output disabled on high or open.	3
4	SDA	2-wire Serial Interface Data Line	4
5	SCL	2-wire Serial Interface Clock Line	4
6	MOD_ABS	Module Absent. 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:

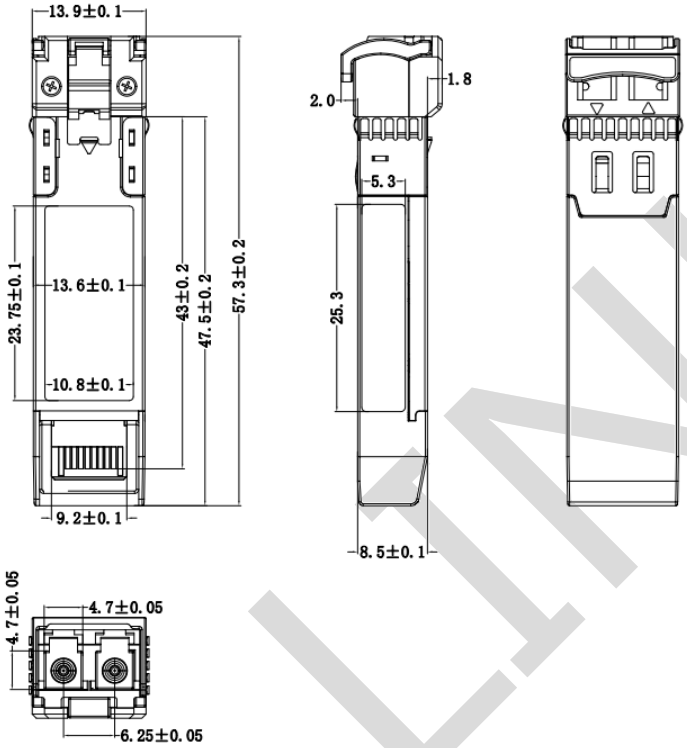
1. Circuit ground is internally isolated from chassis ground.
2. T_{FAULT} is an open collector/drain output, which should be pulled up with a 4.7k – 10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3V.A high output indicates a transmitter fault 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



Mechanical Diagram

Comply with SFF-8432 rev. 5.0, the improved Pluggable form factor specification.



Revision History

Version No.	Date	Description
1.0	February 8, 2016	Preliminary datasheet
2.0	October 11,2019	Product upgrades
2.1	Sep 02, 2024	Format change

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