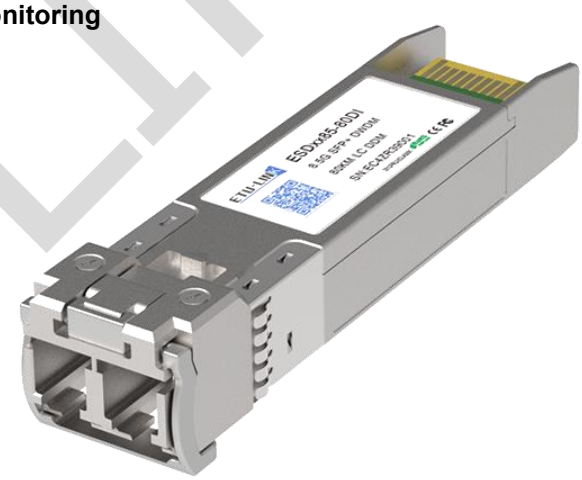
ESDxx85-80D(I)

8.5Gbps DWDM 80KM SFP+ Transceiver

PRODUCT FEATURES



- **Up to 8.5Gbps Data Links**
- **Up to 80km transmission on SMF**
- **DWDM EML Laser and APD receiver**
- **Metal enclosure, for lower EMI**
- **2-wire interface with integrated Digital Diagnostic monitoring**
- **Hot-pluggable SFP+ footprint**
- **Specifications compliant with SFF 8472**
- **Compliant with SFP+ MSA with LC connector**
- **Single 3.3V power supply**
- **Case operating temperature range:**
  Commercial:0°C ~70°C
  Industrial: -40°C ~85°C
- **Power dissipation < 1.5W**

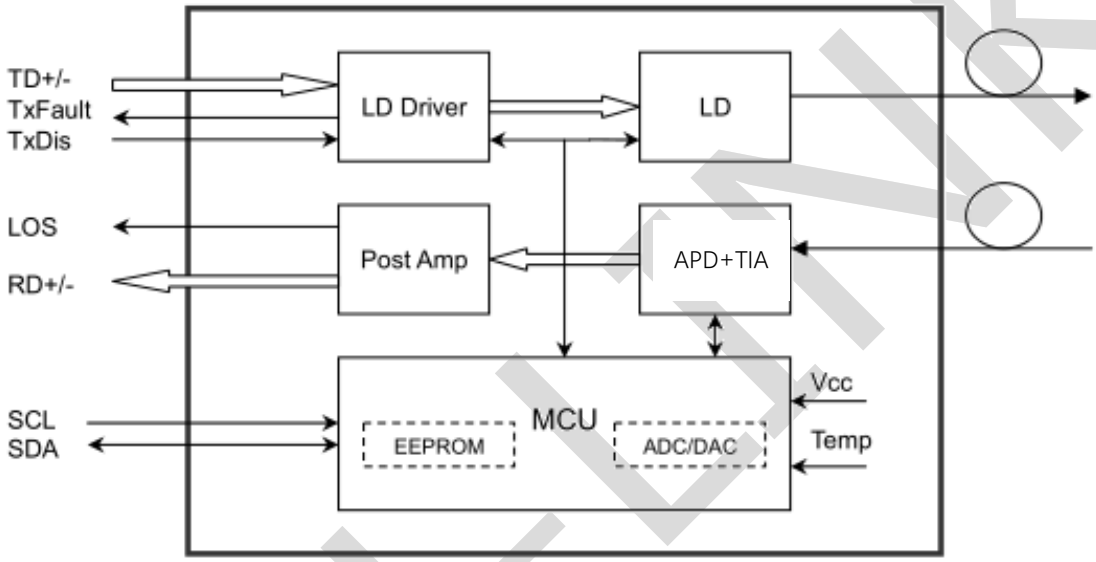
APPLICATIONS

- **8.5GBASE-ZR/ZW**
- **80 km 8.5G Fiber Channel**
- **8.5G Ethernet with FEC**

DESCRIPTIONS

The ETU-Link ESDxx85-80D(I) transceivers include an APD diode and temperature stabilized DFB-EML transmitter. Digital diagnostic functions are available via an I2C.This module is designed for single mode fiber and operates at a nominal wavelength of 100GHz ITU Grid, C Band DWDM wavelength.

Module Block Diagram



Ordering Information

Part No.	Data Rate(optical)	Laser	Fiber Type	Distance	Optical Interface	Temp	DDMI
ESDxx85-80D	8.5Gbit/s	EML	SMF	80km	LC	0~70℃	Y
ESDxx85-80DI	8.5Gbit/s	EML	SMF	80km	LC	-40~85℃	Y

Product Selection

Channel	Wavelength (nm)	Frequency (THZ)	Channel	Wavelength (nm)	Frequency (THZ)
C17	1563.86	191.70	C39	1546.12	193.90
C18	1563.05	191.80	C40	1545.32	194.00

C19	1562.23	191.90	C41	1544.53	194.10
C20	1561.42	192.00	C42	1543.73	194.20
C21	1560.61	192.10	C43	1542.94	194.30
C22	1559.79	192.20	C44	1542.14	194.40
C23	1558.98	192.30	C45	1541.35	194.50
C24	1558.17	192.40	C46	1540.56	194.60
C25	1557.36	192.50	C47	1539.77	194.70
C26	1556.55	192.60	C48	1538.98	194.80
C27	1555.75	192.70	C49	1538.19	194.90
C28	1554.94	192.80	C50	1537.40	195.00
C29	1554.13	192.90	C51	1536.61	195.10
C30	1553.33	193.00	C52	1535.82	195.20
C31	1552.52	193.10	C53	1535.04	195.30
C32	1551.72	193.20	C54	1534.25	195.40
C33	1550.92	193.30	C55	1533.47	195.50
C34	1550.12	193.40	C56	1532.68	195.60
C35	1549.32	193.50	C57	1531.90	195.70
C36	1548.51	193.60	C58	1531.12	195.80
C37	1547.72	193.70	C59	1530.33	195.90
C38	1546.92	193.80	C60	1529.55	196.00
Non-ITU	Peak wavelength between 1528.77nm-1563.86		C61	1528.77	196.10

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Storage Temperature	Ts	-40	-	85	ºC	
Relative Humidity	RH	5	-	95	%	
Power Supply Voltage	VCC	-0.3	-	4	V	
Signal Input Voltage		Vcc-0.3	-	Vcc+0.3	V	

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		-	80	km	
Coupled fiber	Single mode fiber					9/125um SMF

Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Supply Voltage	Vcc	3.14	3.3	3.46	V	
Supply Current	Icc			450	mA	
Transmitter (Module Input)						
Input differential impedance	ohm		100		Ω	1
Differential data input swing	Vin,pp	120		820	mV	
Transmit Disable Voltage	VD	Vcc–1.3		Vcc	V	
Transmit Enable Voltage	VEN	Vee		Vee+ 0.8	V	2
TX_FAULT Voltage-High		Vcc–1.3		Vcc	V	
TX_FAULT Voltage-Low		Vee		Vee+ 0.8	V	
Receiver (Module Output)						
Differential data output swing	Vout,pp	350		850	mV	3
Data output rise time	tr	30			ps	4
Data output fall time	tf	30			ps	4
LOS De-assert		Vcc–1.3		VccHOST	V	5
LOS Assert		Vee		Vee+0.8	V	5

Notes:

1.Connected directly to TX data input pins. AC coupled thereafter.

2.Or open circuit.

3.Into 100 ohms differential termination.

4.These are unfiltered 20-80% values

5.Loss of Signal is LVTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Transmitter						
Average Optical Power	Pout	0		4	dBm	1
Optical Wavelength	λc	λc-0.1		λc+0.1	nm	
Center Wavelength Spacing			100		GHz	2
Optical Extinction Ratio	ER	6.0			dB	
Transmitter and Dispersion Penalty	TDP			3.0	dB	
Side mode Suppression ratio	SMSR	30			dB	
Average Launch Power	Poff			-30	dBm	
Output Eye Mask	Compliant with FC-PI-4					
Receiver						
Rx Sensitivity	RSENS			-23	dBm	3
Input Saturation Power (Overload)	Psat	-6			dBm	
Wavelength Range	λ_C	1480		1580	nm	
LOS De-Assert	LOSD			-26	dBm	
LOS Assert	LOSA	-32			dBm	
LOS Hysteresis		0.5			dB	

Notes:

1.Output power is power coupled into a 9/125 mm single-mode fiber.

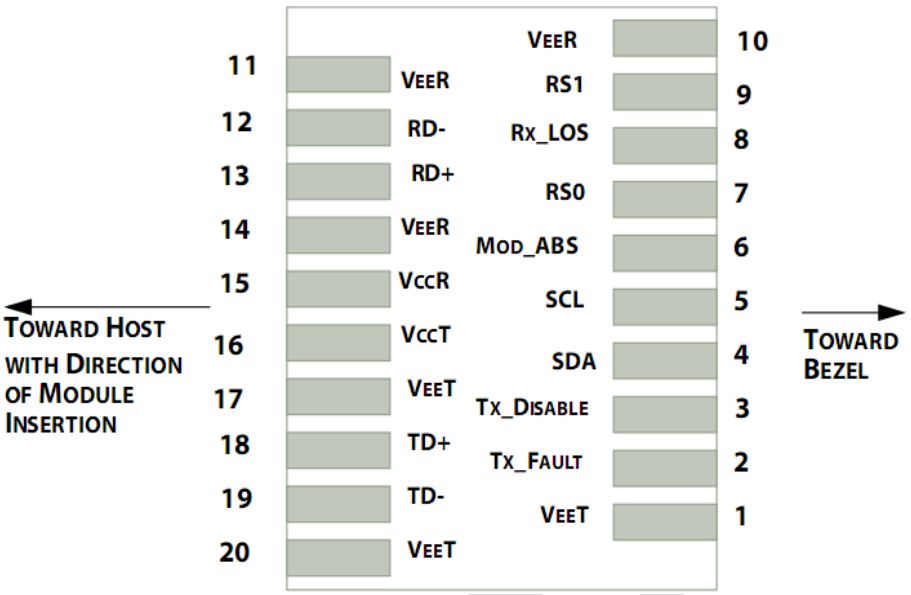
2.Corresponds to approximately 0.8 nm.

3.Measured with a PRBS 2^{31}-1 test pattern, @10.325Gb/s, BER<10^{-12}.

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	0 to 4	±3	dB	Internal
Rx Input Power	-24 to -5	±3	dB	Internal

Pin Diagram



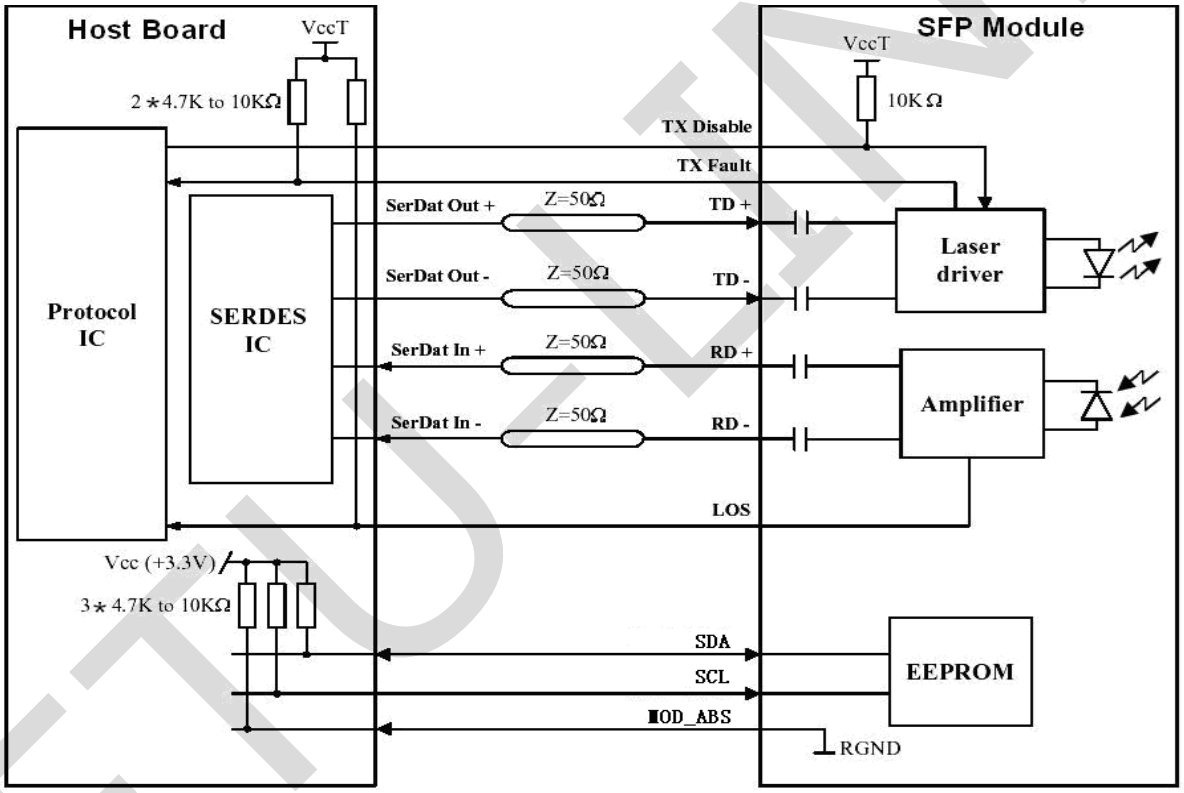
Pin Definitions

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

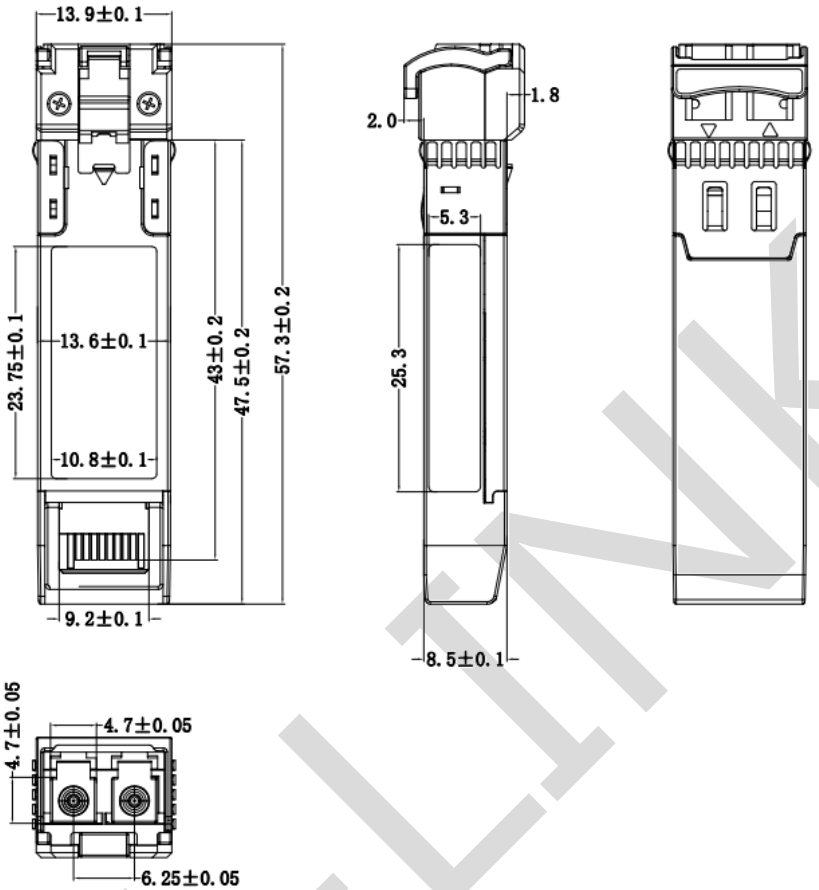
Notes:

1. Circuit ground is internally isolated from chassis ground.
2. TFAULT 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 TDIS>2.0V or open, enabled on TDIS<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



Revision History

Version No.	Date	Description
1.0	May 15, 2016	Preliminary datasheet
2.0	October 11,2019	Product upgrades
2.1	Sep 12, 2024	Format change

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