SFP-D12xxL-80

Optical SFP Module

1.25Gbps SFP Transceiver DWDM 80km LC

Features

- Up to 1.25Gbps data links
- Transceiver unit with independent DWDM DFB Laser diode transmitter PIN photodiode receiver for 80km transmission
- 100GHz ITU Grid, C Band
- Compliant with SFP MSA and SFF-8472 with Duplex LC receptacle
- Digital Diagnostic Monitoring
- +3.3V single power supply
- Compatible with SONET
- Compatible with RoHS
- Operating case temperature: 0 to +70° C

Application

- C Band DWDM networks
- SONET/SDH networks
- Fiber channel
- Gigabit Ethernet

Description

The SFP transceivers are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA) and SFF-8472. The transceiver consists of five sections: the LD driver, the limiting amplifier, the digital diagnostic monitor, the DFB laser, and the PIN. The module data link up to 80KM in 9/125um single mode fiber. It offers a simple and convenient way to interface PCBs to single mode fiber optic cables in Dense Wavelength Division Multiplexing (DWDM) applications. It is a high performance, cost effective module for serial optical data communication applications.

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 the degradation of the laser. Loss of signal (LOS) output is provided to indicate the loss of an input optical signal of the receiver or the link status with the partner. The system can also get the LOS (or Link)/Disable/Fault information via I2C register access.

Wavelength 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	Max	Unit
Supply Voltage	Vcc	-0.5	4	V
Storage Temperature	Ts	-40	+85	°C
Operating Humidity	-	5	85	%

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	Tc	0		+70	°C
Power Supply Voltage	Vcc	3.13	3.3	3.47	V
Power Supply Current	Icc			500	mA
Data Rate			1.25		Gbps
Fiber Length 9/125μm core SMF		-	80	-	km

Optical and Electrical Characteristics

Electrical Characteristics						
Parameter	**Symbol**	**Min**	**Typical**	**Max**	**Unit**	**Notes**
Transmit Total Supply Current	Icc			A	mA	1
Transmit disable voltage	VIH	2		Vcc+0.3	V	
Transmit enable voltage	VIL	0		0.8	V	
Transmitter Fault Input-High	VDISL	2		Vcc+0.3	V	
Transmitter Fault Input-Low	VTxFH	0		0.8	V	
Receiver Total Supply Current	Icc			B	mA	1
LOS output high level	VLOS-H	2		Vcc+0.3	V	2
LOS output low level	VLOS-L	0		0.8	V	2

Notes:

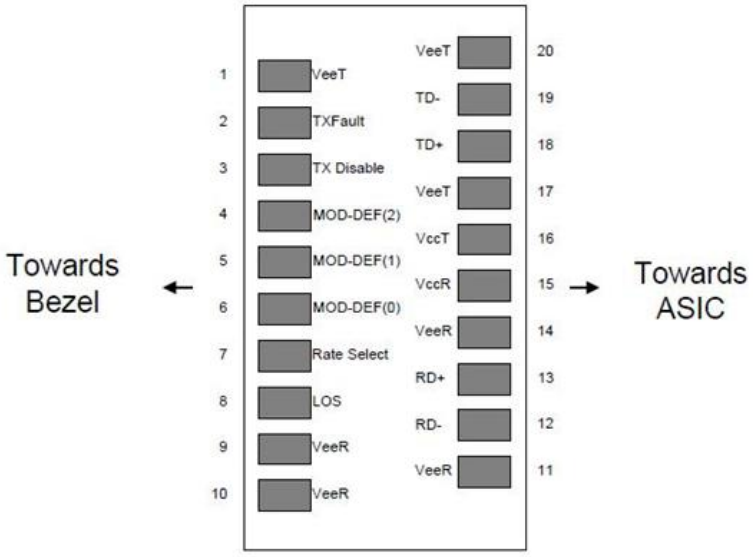
1. A (TX) + B (RX) =500mA (Not include termination circuit).
2. Loss Of Signal is LVTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

Optical transmitter Characteristics							
Parameter		**Symbol**	**Min**	**Typical**	**Max**	**Unit**	**Notes**
Launched Power (avg.)		Pout	0		4	dBm	3
Center Wavelength Spacing				100		GHz	
Operating Wavelength Range		λc	λ-100	λ	λ+100	nm	4
Spectral Width(-20dB)		∆λ			0.3	nm	
Side Mode Suppression Ratio		SMSR	30			dB	
Extinction Ratio		ER	9			dB	
Transmitter OFF Output Power		POff			-45	dBm	
Differential Line Input Impedance		RIN	90	100	110	Ohm	
Output Eye Diagram		Compliant with IEEE802.3ae eye mask					
Optical receiver Characteristics							
Parameter		**Symbol**	**Min**	**Typical**	**Max**	**Unit**	**Notes**
Receiver Sensitivity		S			-26	dBm	5
Wavelength Range		λc	1270		1610	nm	
Optical Power Input Overload		P_{in-max}	-3			dBm	
Receiver Damage Threshold					5	dBm	
LOS	Optical De-assert	Pd			-26	dBm	
	Optical Assert	Pa	-38				
LOS hysteresis			0.5	2	6	dB	

Notes:

1. Class 1 Laser Safety per FDA/CDRH and IEC-825-1 regulations.
2. “λ” specified ITU center wavelength，please the “Wavelength selection”.
3. Receiver Reflectance Measured with a PRBS 2^{23}-1 test pattern, @1250Mbps, ER=9dB, BER<10^{-12}.

Pin Descriptions

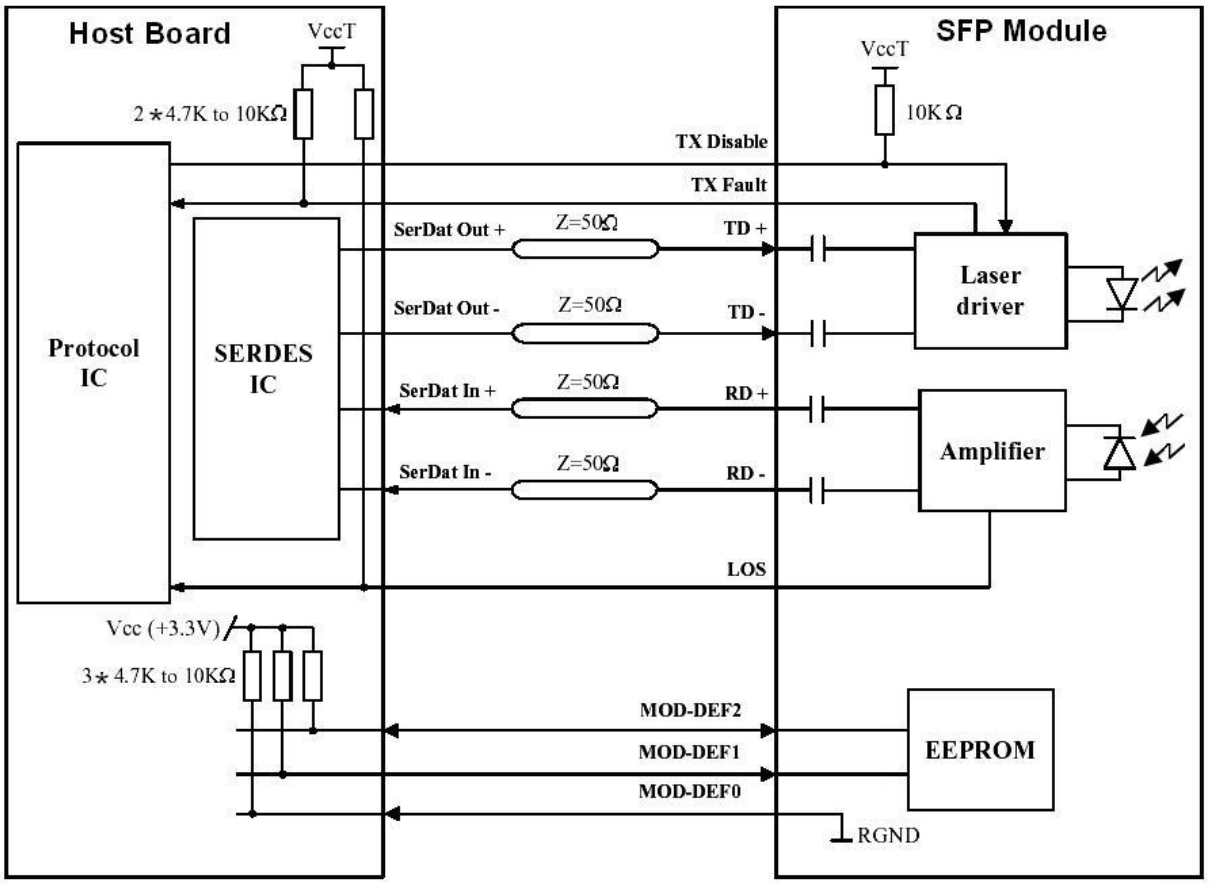


Pin	Symbol	Description	Notes
1	VeeT	Transmitter Ground (Common with Receiver Ground)	1
2	TX_Fault	Transmitter Fault, Low: normal; High: abnormal	2
3	TX_Disable	Transmitter Disable High: Transmitter off Low: Transmitter on	3
4	MOD_DEF(2)	Module Definition 2. Data line for Serial ID.	3
5	MOD_DEF(1)	Module 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. CML-O	
13	RD+	Receiver Non-inverted DATA out. AC Coupled. CML-O	
14	VeeR	Receiver Ground	1
15	VccR	Receiver Power Supply	
16	VccT	Transmitter Power Supply	
17	VeeT	Transmitter Ground	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled. CML-I	
19	TD-	Transmitter Inverted DATA in. AC Coupled. CML-I	
20	VeeT	Transmitter Ground (Common with Receiver Ground)	1

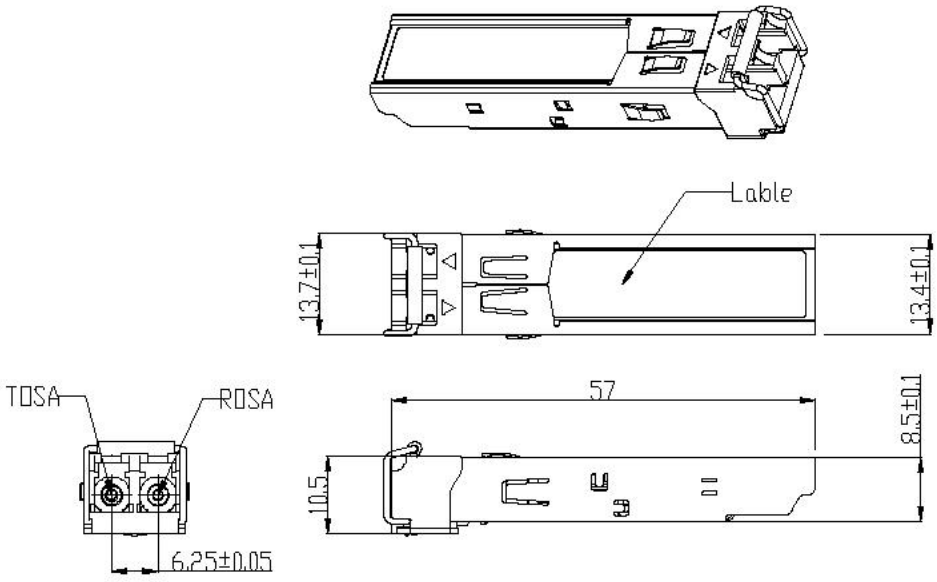
Notes:

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. 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:
   - Low (0 – 0.8V): Reduced Bandwidth
   - (>0.8, < 2.0V): Undefined
   - High (2.0 – 3.465V): Full Bandwidth
5. LOS is open collector output. It should be pulled up with 4.7kΩ – 10kΩ on host board to a typical 3.3V voltage. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

Recommended Interface Circuit



Mechanical Dimensions



Ordering information

Model No.	Product Description
SFP-D12xxL-80	1.25Gbps, DWDM, 80km, 0° C ~ +70° C, with DDM
SFP-D12xxL-80I	1.25Gbps, DWDM, 80km, -40° C ~ +85° C, with DDM
xx=17~61 (ITU Channel C-band) 62~16 (ITU Channel L-band)	

For further information, please visit our website https://www.aoatech.com