GB-SFP+D50-XX-80S

10Gb/s DWDM SFP+ 80km Transceiver

PRODUCT FEATURES

- Up to 11.1Gbps Data Links
- Up to 80km transmission on SMF
- DWDM EML Laser and APD receiver
- Metal enclosure, for lower EMI
- 2-wire interface for management
- 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:0°C to 70°C
- Power dissipation < 1.5W

APPLICATIONS

- 10GBASE-ZR/ZW
- 80 km 10G Fiber Channel
- 10G Ethernet with FEC

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DESCRIPTION

The GB-LINK GB-SFP+D50-XX-80S transceivers include an APD receiver and temperature stabilized 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 50GHz ITU Grid, C Band DWDM wavelength.

PRODUCT SELECTION

GB-SFP+D50-XX-80S

C-band λc Wavelength Guide Pin Descriptions

Channel	Wavelength (nm)	Frequency(THZ)	Channel	Wavelength (nm)	Frequency (THZ)
C17	1563.86	191.70	**C39**	1546.12	193.90
H17	1563.45	191.75	**H39**	1545.72	193.95
C18	1563.05	191.80	**C40**	1545.32	194.00
H18	1562.64	191.85	**H40**	1544.92	194.05
C19	1562.23	191.90	**C41**	1544.53	194.10
H19	1561.83	191.95	**H41**	1544.13	194.15
C20	1561.42	192.00	**C42**	1543.73	194.20
H20	1561.01	192.05	**H42**	1543.33	194.25
C21	1560.61	192.10	**C43**	1542.94	194.30
H21	1560.20	192.15	**H43**	1542.54	194.35
C22	1559.79	192.20	**C44**	1542.14	194.40
H22	1559.39	192.25	**H44**	1541.75	194.45
C23	1558.98	192.30	**C45**	1541.35	194.50
H23	1558.58	192.35	**H45**	1540.95	194.55
C24	1558.17	192.40	**C46**	1540.56	194.60
H24	1557.77	192.45	**H46**	1540.16	194.65
C25	1557.36	192.50	**C47**	1539.77	194.70
H25	1556.96	192.55	**H47**	1539.37	194.75
C26	1556.55	192.60	**C48**	1538.98	194.80
H26	1556.15	192.65	**H48**	1538.58	194.85
C27	1555.75	192.70	**C49**	1538.19	194.90
H27	1555.34	192.75	**H49**	1537.79	194.95
C28	1554.94	192.80	**C50**	1537.40	195.00
H28	1554.54	192.85	**H50**	1537.00	195.05

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C29	1554.13	192.90	**C51**	1536.61	195.10
H29	1553.73	192.95	**H51**	1536.22	195.15
C30	1553.33	193.00	**C52**	1535.82	195.20
H30	1552.93	193.05	**H52**	1535.43	195.25
C31	1552.52	193.10	**C53**	1535.04	195.30
H31	1552.12	193.15	**H53**	1534.64	195.35
C32	1551.72	193.20	**C54**	1534.25	195.40
H32	1551.32	193.25	**H54**	1533.86	195.45
C33	1550.92	193.30	**C55**	1533.47	195.50
H33	1550.52	193.35	**H55**	1533.07	195.55
C34	1550.12	193.40	**C56**	1532.68	195.60
H34	1549.72	193.45	**H56**	1532.29	195.65
C35	1549.32	193.50	**C57**	1531.90	195.70
H35	1548.91	193.55	**H57**	1531.51	195.75
C36	1548.51	193.60	**C58**	1531.12	195.80
H36	1548.11	193.65	**H58**	1530.72	195.85
C37	1547.72	193.70	**C59**	1530.33	195.90
H37	1547.32	193.75	**H59**	1529.94	195.95
C38	1546.92	193.80	**C60**	1529.55	196.00
H38	1546.52	193.85	**H60**	1528.16	196.05
Non-ITU	**Peak wavelength between 1528.77nm-1563.86**		**C61**	1528.77	196.10

Ⅰ. Absolute Maximum Ratings

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

II. Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Case Operating Temperature	Tcase	0	-	70	ºC	Without air flow
Power Supply Voltage	VCC	3.14	3.3	3.47	V	
Power Supply Current	ICC	-		450	mA	
Data Rate	BR		10.3125		Gbps	
Transmission Distance	TD		-	80	km	

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Coupled fiber	Single mode fiber	9/125um SMF

III. Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	NOTE
Transmitter						
Average Optical Power	Pavg	0		4	dBm	1
Optical Wavelength	λc	λc -0.1		λc +0.1	nm	
Center Wavelength Spacing			50		GHz	2
Optical Extinction Ratio	ER	6.0			dB	
Transmitter and Dispersion Peanlty	TDP			3.0	dB	
Side mode Supression ratio	SMSR	30			dB	
Average Launch Power(Laser off)	Poff			-30	dBm	
RIN	RIN			-128	dB/Hz	
Receiver						
Rx Sensitivity	RSENS			-23	dBm	3
Input Saturation Power (Overload)	Psat	-7			dBm	
Wavelength Range	λ_C	1480		1580	nm	

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

IV. Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	NOTE
Supply Voltage	Vcc	3.14	3.3	3.46	V	
Supply Current	Icc			450	mA	
Transmitter						
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	
Transmit Disable Assert Time				10	us	
Receiver						

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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.

V. Pin Descriptions

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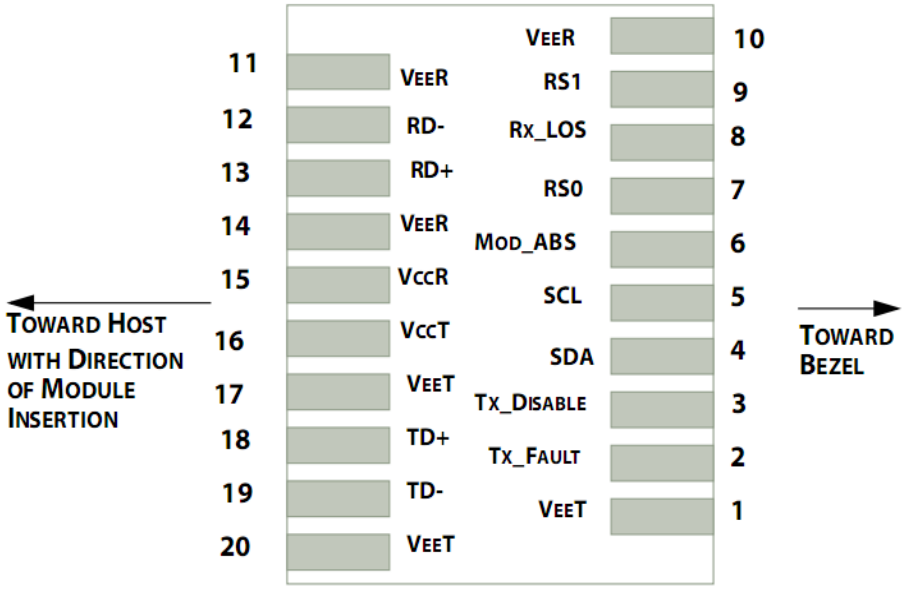

Pin out of Connector Block on Host Board

Pin	Symbol	Name/Description	NOTE
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.	

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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.

VI. Digital Diagnostic Functions

GB-LINK GB-SFP+D50-XX-80S transceivers support the 2-wire serial communication protocol as defined in the SFP+ MSA.

The standard SFP serial ID provides access to identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information.

Additionally, GB-LINK SFP+ transceivers provide a unique enhanced digital diagnostic monitoring interface, 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. It also defines a sophisticated system of alarm and warning flags, which alerts end-users when particular operating parameters are outside of a factory set normal range.

The SFP+ MSA defines a 256-byte memory map in EEPROM that is accessible over a 2-wire serial interface at the 8 bit address 1010000X (A0h). The digital diagnostic monitoring interface makes use of the 8 bit address 1010001X (A2h), so the originally defined serial ID memory map remains unchanged.

The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through a 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL, Mod Def 1) is generated by the host. The positive edge clocks data into the SFP transceiver into those segments of the E2PROM that are not write-protected. The negative edge clocks data from the SFP transceiver. The serial data signal (SDA, Mod Def 2) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words

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that can be addressed individually or sequentially.

VII. Host - Transceiver Interface Block Diagram

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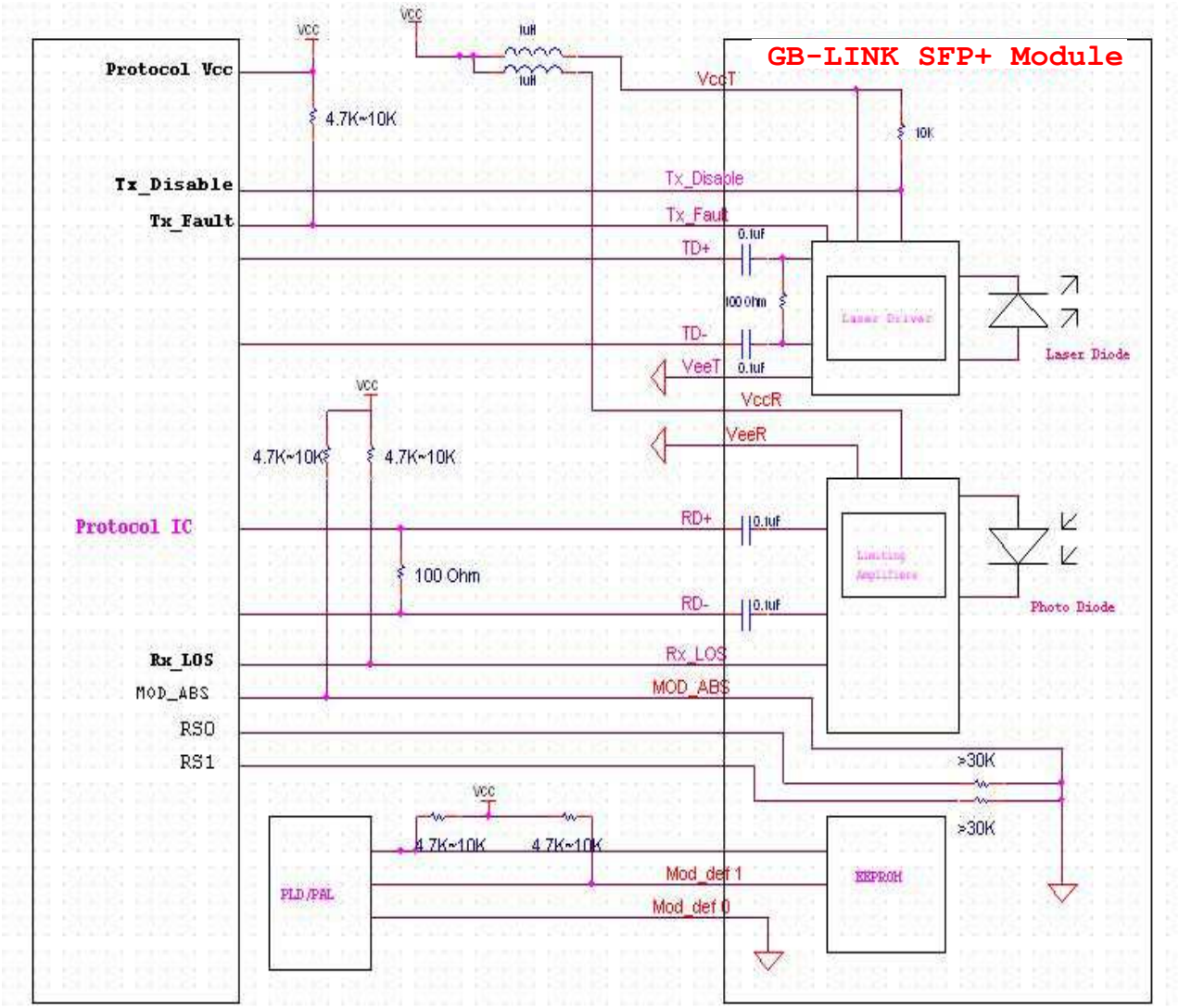

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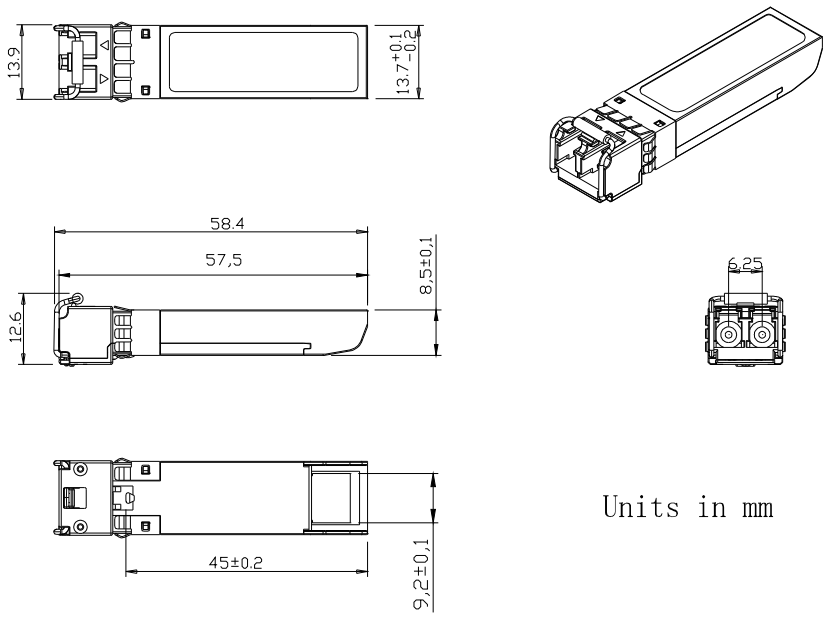
VIII. Outline Dimensions

Comply to SFF-8432 rev5.0, the improved Pluggable form factor specification.



Units in mm

IX. Regulatory Compliance

Feature	Reference	Performance
Electrostatic discharge（ESD）	IEC/EN 61000-4-2	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN 55022 Class B (CISPR 22A)	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10, 1040.11 IEC/EN 60825-1，2	Class 1 laser product
Component Recognition	IEC/EN 60950 ，UL	Compatible with standards
ROHS	2002/95/EC	Compatible with standards
EMC	EN61000-3	Compatible with standards

Appendix A. Document Revision

Version No.	Date	Description

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1.0	2010-09-01	Preliminary datasheet
2.0	2011-09-10	Update format and company's logo
3.0	2012-08-03	Update power spec 0~5 to 0~4

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