

### Features:

- 1.25Gbps bi-directional data links
- Up to 40km transmission on SMF
- 1310nm DFB transmitter and 1490nm PIN receiver for SPL-34-GB-BD-IDFN
- 1490nm DFB transmitter and 1310nm PIN receiver for SPL-43-GB-BD-IDFN
- SFP MSA package with single LC receptacle
- +3.3V single power supply
- Power consumption less than 1W
- Operating case temperature:  
Commercial Temp: -5~70°C  
Industry Temp: -40~+85°C
- RoHS compliance with exemptions



### Regulatory Compliance

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	IEC 61000-4-2	Compliant with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B	Compliant with standards
Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN (IEC) 60825-1,2	Compliant with Class I laser product.
RoHS	EU 2015/863	RoHS With Exemption 7C(I)

## Absolute Maximum Ratings

Table 1 - Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Storage Temperature	T <sub>s</sub>	-40	-	+85	°C	
Supply Voltage	V <sub>CC</sub>	0	-	4	V	
Operating Relative Humidity	RH	+5	-	+95	%	

## Recommended Operating Conditions

Table 2 – Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	T <sub>c</sub>	-5		70	°C	1
		-40		+85		2
Power Supply Voltage	V <sub>CC</sub>	3.13	3.3	3.47	V	
Power Dissipation	P <sub>D</sub>	-	-	1	W	
Data Rate			1.25		Gbps	

Notes:

1. Commercial Temp
2. Industry Temp

## Optical Characteristics

Table 3 – Optical Characteristics SPL-34-GB-BD-C(I)DFN

Transmitter						
Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Centre Wavelength	$\lambda_c$	1260	1310	1360	nm	
Average Output Power	P <sub>OUT</sub>	-2		+3	dBm	1
Spectral Width (-20dB)	$\Delta \lambda$			1	nm	
Extinction Ratio	EX	6			dB	
Side Mode Suppression Ratio	SMSR	30			dB	
Rise/Fall Time (20%~80%)	tr /tf			0.26	ns	
Deterministic Jitter	DJ			200	ps	
Total Jitter	TJ			385	ps	
Optical Eye Mask	IEEE 802.3 2018 1000BASE-BX10					2

Receiver						
Centre Wavelength	$\lambda_C$	1480	1490	1500	nm	
Receiver Sensitivity	$P_{IN}$			-23	dBm	3
Receiver Overload	$P_{IN}$	-3			dBm	3
LOS Assert	$LOS_A$	-35			dBm	
LOS Deassert	$LOS_D$			-24	dBm	
LOS Hysteresis		0.5		4	dB	

Notes:

1. The optical power is launched into SMF.
2. Measured with a PRBS  $2^7-1$  test pattern @1.25Gbps.
3. Measured with a PRBS  $2^7-1$  test pattern @1.25Gbps,  $BER \leq 1 \times 10^{-12}$ .

**Table 5 – Optical Characteristics: SPL-43-GB-BD-C(I)DFN**

Transmitter						
Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Centre Wavelength	$\lambda_C$	1480	1490	1500	nm	
Average Output Power	$P_{OUT}$	-2		+3	dBm	1
Average Launch Power of OFF Transmitter				-45	dBm	
Spectral Width (-20dB)	$\Delta \lambda$			1	nm	
Extinction Ratio	EX	6			dB	
Side Mode Suppression Ratio		30			dB	
Rise/Fall Time (20%~80%)	$t_r / t_f$			0.26	ns	
Deterministic Jitter	DJ			200	ps	
Total Jitter	TJ			385	ps	
Optical Eye Mask	IEEE 802.3 2018 1000BASE-BX10					2
Receiver						
Centre Wavelength	$\lambda_C$	1260	1310	1360	nm	
Receiver Sensitivity	$P_{IN}$			-23	dBm	3
Receiver Overload	$P_{IN}$	-3			dBm	3
LOS Assert	$LOS_A$	-35			dBm	
LOS Deassert	$LOS_D$			-24	dBm	
LOS Hysteresis		0.5		4	dB	

Notes:

1. The optical power is launched into SMF.
2. Measured with a PRBS  $2^7-1$  test pattern @1.25Gbps.
3. Measured with a PRBS  $2^7-1$  test pattern @1.25Gbps,  $BER \leq 1 \times 10^{-12}$ .

**Electrical Characteristics**

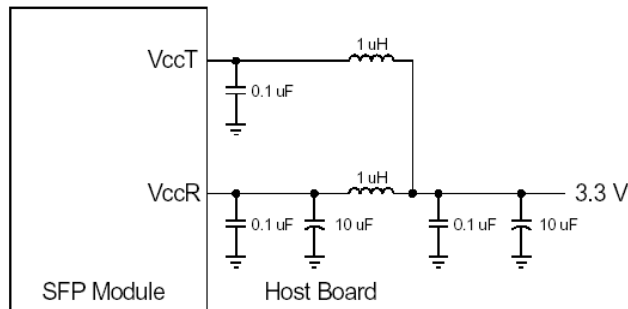
**Table 4 – Electrical Characteristics**

Transmitter						
Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Data Input Swing Differential	$V_{IN}$	500		2400	mV	1
Input Differential Impedance	$Z_{IN}$	80	100	120	$\Omega$	
Tx_DIS Disable	$V_D$	2.0		$V_{CC}$	V	
Tx_DIS Enable	$V_{EN}$	GND		GND+0.8	V	
TX_ Fault (Fault)		2.0		$V_{CC}+0.3$	V	
TX_ Fault (Normal)		0		0.8	V	
Receiver						
Data Output Swing Differential	$V_{OUT}$	370		1600	mV	1
Rx_LOS Fault	$V_{LOS-Fault}$	2.0		$V_{CC}+0.3$	V	
Rx_LOS Normal	$V_{LOS-Normal}$	GND		GND+0.8	V	

Notes:

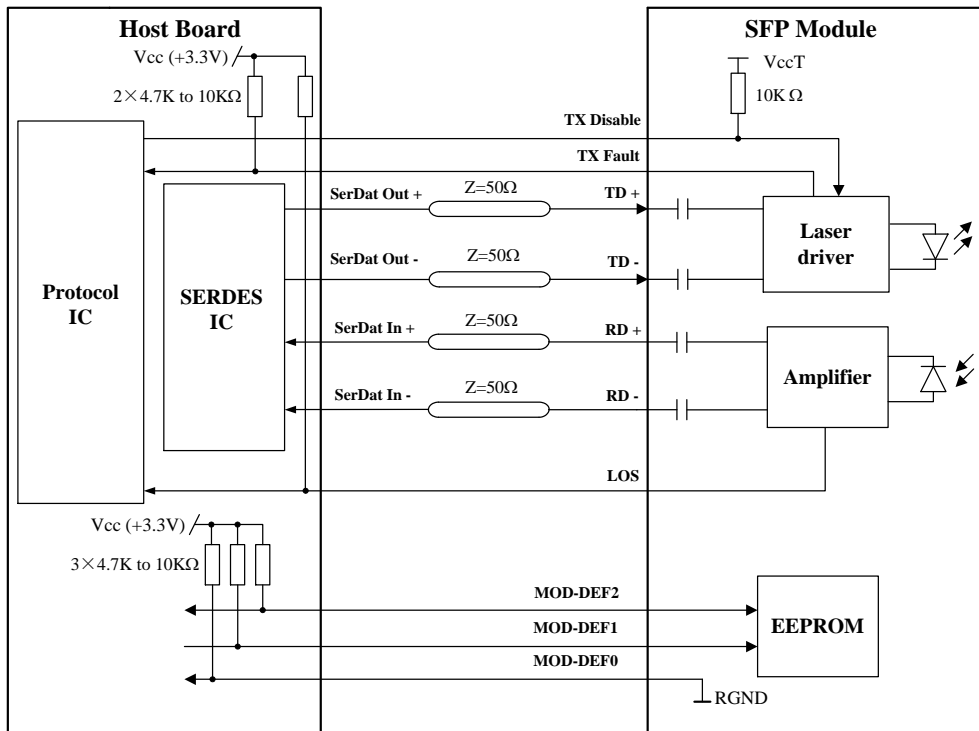
1. Internally AC couple

**Recommended Host Board Power Supply Circuit**



**Figure 1, Recommended Host Board Power Supply Circuit**

**Recommended Interface Circuit**



**Figure 2, Recommended Interface Circuit**

**Pin Definitions**

**Table 6 - Pin Function Definitions**

Pin No.	Name	Function	Plug Seq.	Notes
1	VeeT	Transmitter Ground	1	
2	TX Fault	Transmitter Fault Indication	3	Note 1
3	TX Disable	Transmitter Disable	3	Note 2
4	MOD-DEF2	Module Definition 2	3	Note 3
5	MOD-DEF1	Module Definition 1	3	Note 3
6	MOD-DEF0	Module Definition 0	3	Note 3
7	Rate Select	Not Connected	3	
8	LOS	Loss of Signal	3	Note 4
9	VeeR	Receiver Ground	1	
10	VeeR	Receiver Ground	1	
11	VeeR	Receiver Ground	1	
12	RD-	Inv. Received Data Out	3	Note 5
13	RD+	Received Data Out	3	Note 5
14	VeeR	Receiver Ground	1	
15	VccR	Receiver Power	2	
16	VccT	Transmitter Power	2	

17	VeeT	Transmitter Ground	1	
18	TD+	Transmit Data In	3	Note 6
19	TD-	Inv. Transmit Data In	3	Note 6
20	VeeT	Transmitter Ground	1	

**Notes:**

- TX Fault is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.
- TX Disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7k~10kΩ resistor. Its states are:  
 Low (0~0.8V): Transmitter on  
 (>0.8V, <2.0V): Undefined  
 High (2.0~3.465V): Transmitter Disabled  
 Open: Transmitter Disabled
- MOD-DEF 0,1,2 are the module definition pins. They should be pulled up with a 4.7k~10kΩ resistor on the host board. The pull-up voltage shall be VccT or VccR.  
 MOD-DEF 0 is grounded by the module to indicate that the module is present  
 MOD-DEF 1 is the clock line of two wires serial interface for serial ID  
 MOD-DEF 2 is the data line of two wires serial interface for serial ID
- LOS is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; logic 1 indicates loss of signal. In the low state, the output will be pulled to less than 0.8V.
- These are the differential receiver output. They are internally AC-coupled 100Ω differential lines which should be terminated with 100Ω (differential) at the user SERDES.
- These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differential termination inside the module.

**EEPROM Information**

**Table 7 - EEPROM Serial ID Memory Contents (A0h)**

Addr.	Field Size (Bytes)	Name of Field	Hex	Description
0	1	Identifier	03	SFP
1	1	Ext. Identifier	04	MOD4
2	1	Connector	07	LC
3-10	8	Transceiver	00 00 00 40 00 00 00 00	Transmitter Code
11	1	Encoding	01	8B10B
12	1	BR, nominal	0D	1.25Gbps
13	1	Reserved	00	
14	1	Length (9um)-km	28	40km
15	1	Length (9um)	FF	
16	1	Length (50um)	00	
17	1	Length (62.5um)	00	

18	1	Length (copper)	00	
19	1	Reserved	00	
20-35	16	Vendor name	53 4F 55 52 43 45 50 48 4F 54 4F 4E 49 43 53 20	“SOURCEPHOTONICS”(ASCII)
36	1	Reserved	00	
37-39	3	Vendor OUI	00 1F 22	
40-55	16	Vendor PN	xx	“SPL34(43)GBBDC(I)DFN” (ASCII)
56-59	4	Vendor rev	xx xx 20 20	ASCII( “31 30 20 20” means 1.0 revision)
60-61	2	Wavelength	05 1E/05 D2	1310/1490nm
62	1	Reserved	00	
63	1	CC BASE	xx	Check sum of bytes 0 - 62
64-65	2	Options	00 1A	LOS, TX_FAULT and TX_DISABLE
66	1	BR, max	00	
67	1	BR, min	00	
68-83	16	Vendor SN	xx	
84-91	8	Vendor date code	xx xx xx xx xx xx 20 20	Year (2 bytes), Month (2 bytes), Day (2 bytes)
92	1	Diagnostic type	58	Diagnostics(Ext.Cal)
93	1	Enhanced option	B0	Diagnostics (Optional Alarm/warning flags, Soft TX_FAULT and Soft TX_LOS monitoring)
94	1	SFF-8472	02	Diagnostics(SFF-8472 Rev 9.5)
95	1	CC EXT	xx	Check sum of bytes 64 - 94
96-255	160	Vendor specific		

**Table 8 - Monitoring Specification**

Parameter	Range	Accuracy	Calibration
Temperature (I temp)	-40 to 85°C	±3°C	External
Temperature(C temp)	-5 to 70°C	±3°C	
Voltage	2.97 to 3.63V	±3%	External
Bias Current	3 to 80mA	±10%	External
TX Power	-2 to +3dBm	±3dB	External
RX Power	-23 to -3dBm	±3dB	External

**Mechanical Diagram**

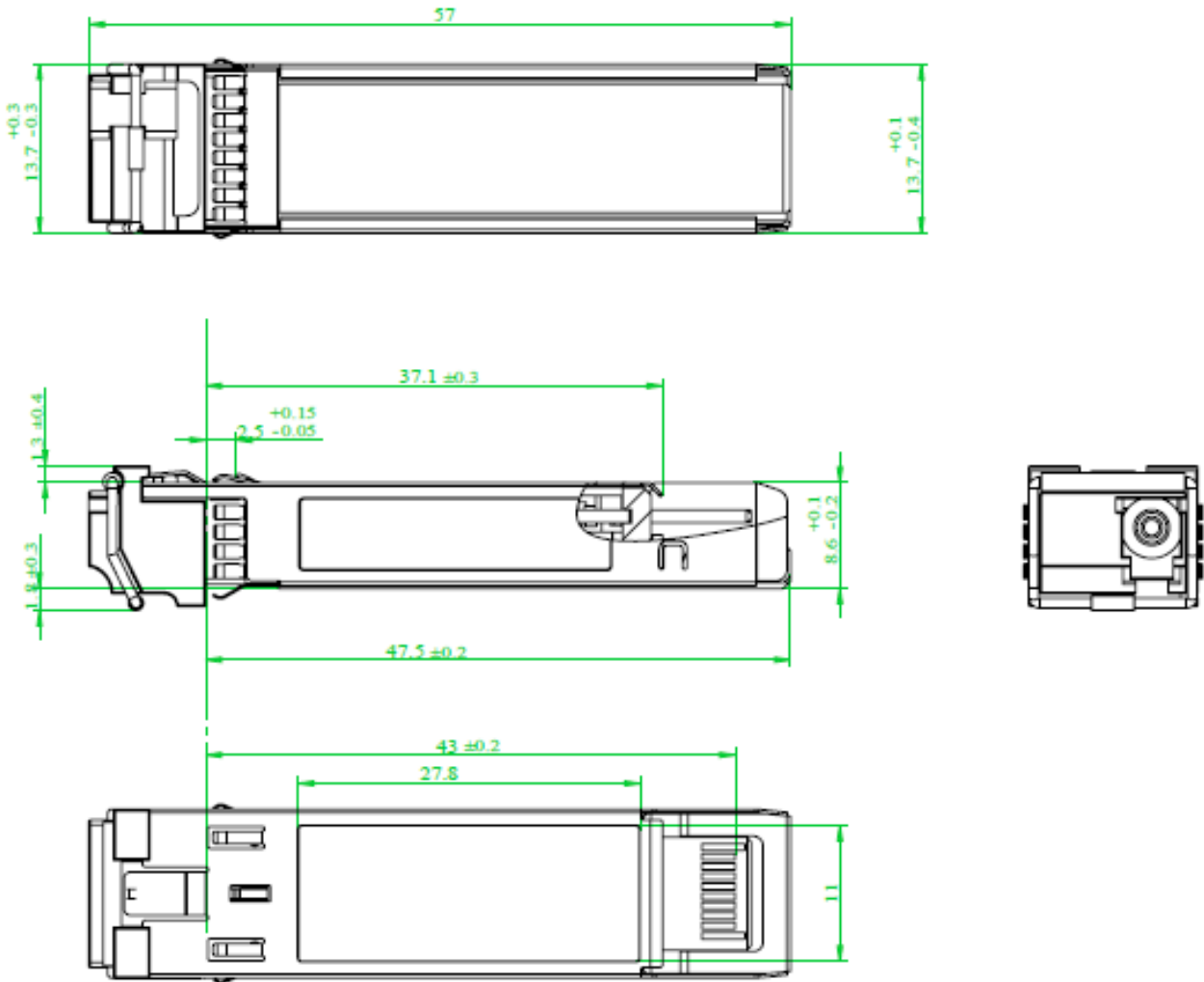


Figure 5, Mechanical Design Diagram of the SFP

**Order Information**

Table 9 – Order Information

Part No.	Application	Data Rate	Laser Source	Fiber Type
SPL-34-GB-BD-IDFN	1000BASE-BX40-U -40~85°C	1.25G	1310nm DFB Tx/ 1490nm PIN Rx	SMF
SPL-34-GB-BD-CDFN	1000BASE-BX40-U -5~70°C			
SPL-43-GB-BD-IDFN	1000BASE-BX40-D -40~85°C		1490nm DFB Tx/1310nm PIN Rx	
SPL-43-GB-BD-CDFN	1000BASE-BX40-D -5~70°C			



## Warnings

**Handling Precautions:** This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

**Laser Safety:** Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

## Legal Notice

### IMPORTANT NOTICE!

All information contained in this document is subject to change without notice, at Source Photonics' sole and absolute discretion. Source Photonics warrants performance of its products to current specifications only in accordance with the company's standard one-year warranty; however, specifications designated as "preliminary" are given to describe components only, and Source Photonics expressly disclaims any and all warranties for said products, including express, implied, and statutory warranties, warranties of merchantability, fitness for a particular purpose, and non-infringement of proprietary rights. Please refer to the company's Terms and Conditions of Sale for further warranty information.

Source Photonics assumes no liability for applications assistance, customer product design, software performance, or infringement of patents, services, or intellectual property described herein. No license, either express or implied, is granted under any patent right, copyright, or intellectual property right, and Source Photonics makes no representations or warranties that the product(s) described herein are free from patent, copyright, or intellectual property rights. Products described in this document are NOT intended for use in implantation or other life support applications where malfunction may result in injury or death to persons. Source Photonics customers using or selling products for use in such applications do so at their own risk and agree to fully defend and indemnify Source Photonics for any damages resulting from such use or sale.

© Copyright Source Photonics, Inc. 2007-2022

All Rights Reserved.

All information contained in this document is subject to change without notice. The products described in this document are NOT intended for use in implantation or other life support applications where malfunction may result in injury or death to persons.

The information contained in this document does not affect or change Source Photonics product specifications or warranties. Nothing in this document shall operate as an express or implied license or indemnity under the intellectual property rights of Source Photonics or third parties. All information contained in this document was obtained in specific environments, and is presented as an illustration. The results obtained in other operating environments may vary.

THE INFORMATION CONTAINED IN THIS DOCUMENT IS PROVIDED ON AN "AS IS" BASIS. In no event will Source Photonics be liable for damages arising directly from any use of the information contained in this document.

## Contacts

### US Headquarters

8521 Fallbrook Ave, Suite 200  
West Hills, CA 91306, USA  
Tel: +1(818) 773-9044  
Fax: +1(818) 576-9486

### China

Building #2&5, West Export Processing  
Zone No. 8 Kexin Road, Hi-Tech Zone  
Chengdu, 611731, China  
Tel: +86-28-8795-8788  
Fax: +86-28-8795-8789

### Taiwan

9F, No 81, Shui Lee Rd.  
Hsinchu, Taiwan R.O.C.  
Tel: +886-3-5169222  
Fax: +886-3-5169213

[www.sourcephotonics.com](http://www.sourcephotonics.com)