



Features

- Simplex SC Connector, Bi-directional
- Single 3.3V Supply
- Industrial Temperature Available
- 1310nm DFB Laser transmitter,
- 1577nm APD receiver
- Compliant with IEEE 802.3-av 10/1G-PRX30
- SFP+ MSA & SFF-8431 Compliant
- Digital Diagnostic SFF-8472 Compliant
- Telcordia GR-468 Compliant
- Operating case temperature: -40~85°C
- RoHS With Exemptions

Regulatory Compliance

Table 1 – Regulatory Compliance

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1 (>500 V)
Electrostatic Discharge (ESD) at the Faceplate	IEC 61000-4-2	Compatible with Standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B	Compatible with Standards
Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2	Compatible with Class 1 Laser Product
RoHS Compliance	2011/65/EU	Compatible with Standards with 7C(1).6C, exemptions

Absolute Maximum Ratings

Table 2 – Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Storage Temperature	T _s	-40	-	+85	°C	
Operating Case Temperature	T _c	-40	-	+85	°C	
Operating Relative Humidity	RH	-	-	85	%	
Power Supply Voltage	V _{cc}	3.15		3.46	V	

Recommended Operating Conditions

Table 3 – Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Supply Voltage	V _{cc}	3.14	3.3	3.46	V	
Supply Current	I _{cc}	-	-	400	mA	
Maximum Power Dissipation	P _{vcc}	-	-	1.5	W	
Operating Temperature (Case)	T _{opr}	-40	-	85	°C	
Data Rate	DR	Tx 1.25G/Rx 10.3125			Gb/s	

Optical and Electrical Characteristics

Table 4 – Optical Characteristics

Transmitter						
Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Centre Wavelength	λ_c	1290		1330	nm	
Optical Spectrum Width (-20dB)				1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launch Power	P _{OUT}	0.62		6		1
Average Launch Power-OFF	P _{OFF}			-45	dBm	
Extinction Ratio	EX	6			dB	2
Optical Eye Mask	Compliant With IEEE Std 802.3ah™-2004					2,5
Receiver						
Operating Wavelength	λ_c	1575	1577	1580	nm	
Sensitivity	P _{SEN1}			-28.5		6
Saturation	P _{SAT}	-10			dBm	
Loss of Signal Assert	P _{LOSA}	-39	-	-	dBm	

Loss of Signal Deassert	P _{LOSD}	-	-	-29.5	dBm	
WDM Filter Isolation	ISO(1550)	35			dB	1400~1560nm
	ISO(1650)	35			dB	1600~1675nm

Notes:

1. The optical power is launched into 9/125um SMF.
2. Measured with PRBS 2⁷-1 test pattern @1.25Gbps.
3. Measured with the Bessel-Thompson filter OFF.
4. Refer to [Timing Parameter Definition in Burst Mode Sequence](#).
5. Transmitter eye mask definition {0.22UI, 0.375UI, 0.20UI, 0.20UI, 0.30UI}.
6. P_{SEN1} Measured with a PRBS2³¹-1 test pattern @10.3125Gbps, BER ≤ 10⁻³

Table 5 – Electrical Specifications and Timing

Transmitter						
Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Data Input Differential Swing	V _{IN}	200		1600	mVp-p	1
Input Differential Impedance	Z _{IN}	80	100	120	Ω	
Tx_Disable_Disbale	V _d	2.0		V _{cc}	V	2
Tx_Disable_Enable	V _{en}	0		0.8	V	
TX Fault_Fault		2	-	V _{cc} +0.3	V	
TX Fault_Normal		0	-	0.8	V	
Burst Turn On Time	T _{BURST_ON}			512	ns	4
Burst Turn Off Time	T _{BURST_OFF}			512	ns	
T_initial time	T-init			300	ms	
Receiver						
Data Output Differential Swing	V _{OUT}	340		850	mV _{P-P}	3
LOS-High Fault	T _{LOSA}	2		V _{cc} +0.3	V	
LOS-Low Normal	T _{LOSD}	0		0.8	V	
Loss_on time	T-Los_on			100	us	
Loss_off time	T-Los_off			100	us	

Notes:

1. Compatible with LVPECL/CML input, AC coupled internally. (See [Recommended Interface Circuit](#)).
2. TX_nBRST (See [Pin Function Definitions](#)).
3. CML output, AC coupled internally, guaranteed in the full range of input optical power (-10dBm to -28dBm) (See [Recommended Interface Circuit](#)).

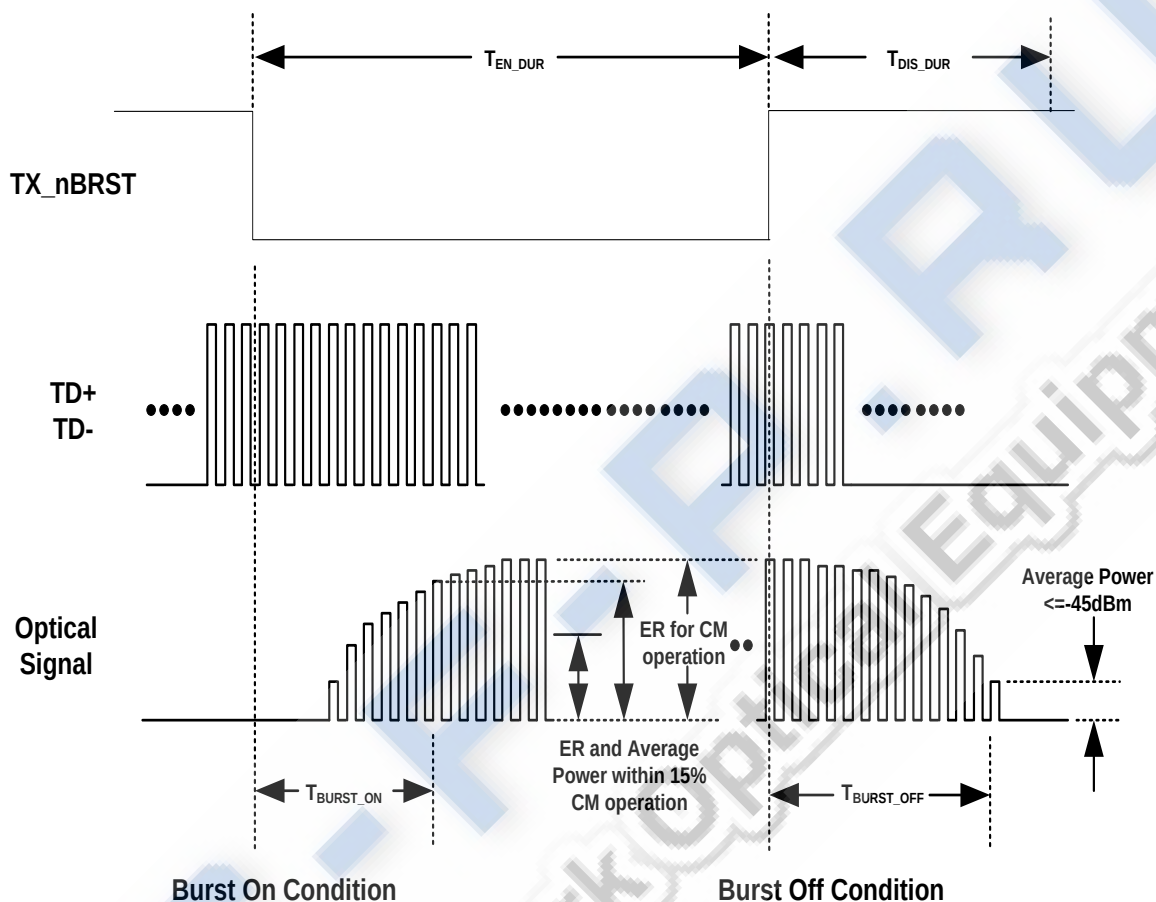


Figure 1, Timing Parameter Definition in Burst Mode Sequence

Diagnostics

Table 6– Diagnostics

Address	Parameter	Range	Accuracy	Unit	Calibration
96-97	Temperature	-40 to 85	±3	°C	Internal
98-99	Voltage	3 to 3.6	3%	V	Internal
100-101	Bias Current	0 to 100mA(Record Monitor only)	±10%	mA	Internal
102-103	Tx Power	0.62 to 6dBm	±3	dB	Internal
104-105	Rx Power	-28.5~-10dBm	±3	dB	Internal

Table 7 – EEPROM Serial ID (A0h)

Address	Name of Field	Description of Field	Hex	Notes
0	Identifier	Type of serial transceiver	03	
1	Ext. Identifier	Extended identifier of type of serial transceiver	04	
2	Connector	Code for connector type	01	
3	Transceiver	Code for electronic compatibility or optical compatibility	00	
4			00	
5			00	
6			80	
7			00	
8			00	
9			00	
10			00	
11	Encoding	Code for serial encoding algorithm	01	
12	upstream	Units of 100 MBits/sec.	0D	
13	downstream	Units of 100 MBits/sec.	67	
14	Length (9μm,km)	9/125 μm fiber, units of km	14	
15	Length (9μm)	9/125 μm fiber, units of 100 m	C8	
16	Length (50μm)	50/125 μm fiber, units of 10 m	0	
17	Length (62.5μm)	62.5/125 μm fiber, units of 10 m	0	
18	Length (Copper)	Units of meters	0	
19	Reserved	Reserved	0	
20	Vendor Name	SFP vendor name (ASCII)	53	S
21			4F	O
22			55	U
23			52	R
24			43	C
25			45	E
26			50	P
27			48	H
28			4F	O
29			54	T
30			4F	O
31			4E	N
32			49	I
33			43	C
34			53	S
35			20	[Space]

36	Reserved	Reserved	00	
37	Vendor OUI	SFP vendor IEEE company ID for	00	
38		Source Photonics Inc.	1F	
39			22	
40	Vendor P/N	SPPS37GB0X3IDFD	53	S
41			50	P
42			50	P
43			53	S
44			33	3
45			37	7
46			47	G
47			42	B
48			4F	O
49			58	X
50			33	3
51			49	I
52			44	D
53			46	F
54			44	D
55			20	
56	Vendor Rev.	Revision level for part number provide by vendor (ASCII)	41	A
57			20	[Space]
58			20	[Space]
59			20	[Space]
60	Wavelength	Wavelength	05	
61			1E	
62	Reserved	Reserved	00	
63	CC_BASE	Check code for Base ID Fields	xx	
		(addresses 0 to 62)		
64	Options	Indicates which optional transceiver signals are implemented	00	TX_Fault
65			0A	RX_Los
66	BR, max	Upper bit rate margin, unit of %	00	
67	BR, min	Lower bit rate margin, unit of %	00	
68-83	Vendor S/N	Serial number	xx	
84-91	Date Code	Vendor's manufacturing date code	xx	
92	Diagnostic Monitoring Type	Indicates which type of diagnostic monitoring is implemented in the transceiver	68	

93	Enhanced Options	Indicates which optional enhanced features are implemented in the transceiver	B0	awarning /alarming, soft TX_disab el,RX_LO S,
94	SFF-8472 Compliance	Indicates which revision of SFF-8472 the transceiver complies with	5	
95	CC_EXT	Check code for Extended ID Fields (addresses 64 to 94)	xx	
96-255	Vendor Specific	Vendor Specific EEPROM	xx	

Table 8 -EEPROM Serial ID (A2h)

Address	Size	Bits	Name of Field	Hex	Description
00~01	2	ALL	Temp High Alarm Thresholds	5F00	MSB at low address,95°C
02~03	2	ALL	Temp Low Alarm Thresholds	CE00	MSB at low address,-50°C
04~05	2	ALL	Temp High Warning Thresholds	5B00	MSB at low address,91°C
06~07	2	ALL	Temp Low Warning Thresholds	D300	MSB at low address,- 45°C
08~09	2	ALL	Voltage High Alarm Thresholds	8CA0	MSB at low address,3.6V
10~11	2	ALL	Voltage Low Alarm Thresholds	7530	MSB at low address,3.0V
12~13	2	ALL	Voltage High Warning Thresholds	88B8	MSB at low address,3.5V
14~15	2	ALL	Voltage Low Warning Thresholds	7918	MSB at low address,3.1V
16~17	2	ALL	Bias High Alarm Thresholds	D6D8	MSB at low address,110mA
18~19	2	ALL	Bias Low Alarm Thresholds	01F4	MSB at low address,1mA
20~21	2	ALL	Bias High Warning Thresholds	C350	MSB at low address,100mA
22~23	2	ALL	Bias Low Warning Thresholds	03E8	MSB at low address,2mA
24~25	2	ALL	TX Power High Alarm Thresholds	DBAA	MSB at low address,7.5dBm
26~27	2	ALL	TX Power Low Alarm Thresholds	312D	MSB at low address,1dBm
28~29	2	ALL	TX Power High Warning Thresholds	C3C6	MSB at low address,7dBm
30~31	2	ALL	TX Power Low Warning Thresholds	372D	MSB at low address,1.5dBm
32~33	2	ALL	RX Power High Alarm Thresholds	04EA	MSB at low address,-9.0dBm
34~35	2	ALL	RX Power Low Alarm Thresholds	000B	MSB at low address,-29.5dBm
36~37	2	ALL	RX Power High Warning Thresholds	03E8	MSB at low address,-10.0dBm
38~39	2	ALL	RX Power Low Warning Thresholds	000e	MSB at low address, -28.5dBm

40~55	16	ALL	Reserved	0	Reserved
56~59	4	ALL	Rx_PWR(4)	0	Single precision floating point calibration data - Rx optical power. Bit7 of byte 56 is MSB. Bit 0 of byte 59 is LSB. Rx_PWR(4) should be set to zero for “internally calibrated” devices.
60~63	4	ALL	Rx_PWR(3)	0	Single precision floating point calibration data - Rx optical power. Bit 7 of byte 60 is MSB. Bit 0 of byte 63 is LSB. Rx_PWR(3) should be set to zero for “internally calibrated” devices.
64~67	4	ALL	Rx_PWR(2)	0	Single precision floating point calibration data, Rx optical power. Bit 7 of byte 64 is MSB, bit 0 of byte 67 is LSB. Rx_PWR(2) should be set to zero for “internally calibrated” devices.
68~71	4	ALL	Rx_PWR(1)	3F800000	Single precision floating point calibration data, Rx optical power. Bit 7 of byte 68 is MSB, bit 0 of byte 71 is LSB. Rx_PWR(1) should be set to 1 for “internally calibrated” devices.
72~75	4	ALL	Rx_PWR(0)	0	Single precision floating point calibration data, Rx optical power. Bit 7 of byte 72 is MSB, bit 0 of byte 75 is LSB. Rx_PWR(0) should be set to zero for “internally calibrated” devices.
76~77	2	ALL	Tx_I(Slope)	0100	Fixed decimal (unsigned) calibration data, laser bias current. Bit 7 of byte 76 is MSB, bit 0 of byte 77 is LSB. For “internally calibrated” devices, Tx_I(Slope) should be set to 1, and useless.
78~79	2	ALL	Tx_I(Offset)	0	Fixed decimal (signed two's complement) calibration data, laser bias current. Bit 7 of byte 78 is MSB, bit 0 of byte 79 is LSB. For “internally calibrated” devices,

					Tx_I(Offset)should be set to zero , and useless.
80~81	2	ALL	Tx_PWR(Slope)	0100	Fixed decimal (unsigned) calibration data, transmitter coupled output power. Bit 7 of byte 80 is MSB, bit 0 of byte 81 is LSB.For “internally calibrated” devices, Tx_PWR(Slope) should be set to 1 , and useless.
82~83	2	ALL	Tx_PWR(Offset)	0	Fixed decimal (signed two's complement) calibration data, transmitter coupled output power. Bit 7 of byte 82 is MSB, bit 0 of byte 83 is LSB. For “internally calibrated” devices, Tx_PWR(Offset) should be set to zero , and useless.
84~85	2	ALL	T (Slope)	0100	Fixed decimal (unsigned) calibration data, internal module temperature. Bit 7 of byte 84 is MSB, bit 0 of byte 85 is LSB.For “internally calibrated” devices,T(Slope) should be set to 1 , and useless.
86~87	2	ALL	T (Offset)	0	Fixed decimal (signed two's complement) calibration data, internal module temperature. Bit 7 of byte 86 is MSB, bit 0 of byte 87 is LSB.For “internally calibrated” devices,T(Offset) should be set to zero , and useless.
88~89	2	ALL	V (Slope)	0100	Fixed decimal (unsigned) calibration data, internal module supply voltage. Bit 7 of byte 88 is MSB, bit 0 of byte 89 is LSB. For “internally calibrated” devices, V(Slope)should be set to 1 , and useless.
90~91	2	ALL	V (Offset)	0	Fixed decimal (signed two's complement) calibration data, internal module supply voltage. Bit 7 of byte 90 is MSB. Bit 0 of byte 91 is LSB. For “internally calibrated” devices, V(Offset) should be set to zero , and

					useless.
92~94	3	ALL	Reserved		Reserved
95	1	ALL	Checksum		Byte 95 contains the low order 8 bits of the sum of bytes 0 – 94.
96	1	ALL	Temperature MSB		Internally measured module temperature.
97	1	ALL	Temperature LSB		
98	1	ALL	Vcc MSB		Internally measured supply voltage in transceiver.
99	1	ALL	Vcc LSB		
100	1	ALL	TX Bias MSB		Internally measured TX Bias Current.
101	1	ALL	TX Bias LSB		
102	1	ALL	TX Power MSB		Measured TX output power.
103	1	ALL	TX Power LSB		
104	1	ALL	RX Power MSB		Measured RX input power.
105	1	ALL	RX Power LSB		Measured RX input power.
106~109	4	ALL	Reserved		Reserved
110	1	7	TX enable flag bit		
		6	Soft TX Disable		
		5	Reserved		
		4	P_DOWN_TX		
		3	P_Down_RX		
		2	TX Fault		
		1	RX_LOS		
		0	Data_Not_Ready		
111	1	ALL	Reserved		Reserved
112	1	7	Temp High Alarm		Set when internal temperature exceeds high alarm level.
		6	Temp Low Alarm		Set when internal temperature is below low alarm level.
		5	Vcc High Alarm		Set when internal supply voltage exceeds high alarm level.
		4	Vcc Low Alarm		Set when internal supply voltage is below low alarm level.
		3	TX Bias High Alarm		Set when TX Bias current exceeds high alarm level.
		2	TX Bias Low Alarm		Set when TX Bias current is below low alarm level.
		1	TX Power High Alarm		Set when TX output power exceeds

					high alarm level.
		0	TX Power Low Alarm		Set when TX output power is below low alarm level.
		7	RX Power High Alarm		Set when Received Power exceeds high alarm level.
		6	RX Power Low Alarm		Set when Received Power is below low alarm level.
		5	Reserved		Reserved
		4	Reserved		Reserved
		3	Reserved		Reserved
		2	Reserved		Reserved
		1	Reserved		Reserved
113	1	0	Reserved		Reserved
114	1	ALL	Reserved		Reserved
115	1	ALL	Reserved		Reserved
		7	Temp High Warning		Set when internal temperature exceeds high warning level.
		6	Temp Low Warning		Set when internal temperature is below low warning level.
		5	Vcc High Warning		Set when internal supply voltage exceeds high warning level.
		4	Vcc Low Warning		Set when internal supply voltage is below low warning level.
		3	TX Bias High Warning		Set when TX Bias current exceeds high warning level.
		2	TX Bias Low Warning		Set when TX Bias current is below low warning level.
		1	TX Power High Warning		Set when TX output power exceeds high warning level.
116	1	0	TX Power Low Warning		Set when TX output power is below low warning level.
		7	RX Power High Warning		Set when Received Power exceeds high warning level.
		6	RX Power Low Warning		Set when Received Power is below low warning level.
		5	Reserved		Reserved
		4	Reserved		Reserved
		3	Reserved		Reserved
		2	Reserved		Reserved
		1	Reserved		Reserved
117	1	0	Reserved		Reserved

118	1	ALL	Reserved	0	Reserved
119	1	ALL	Reserved	0	Reserved
120-127	8	ALL	Vendor Specific	X	Vendor Specific
128-255	4		Reserved	Reserved	Reserved

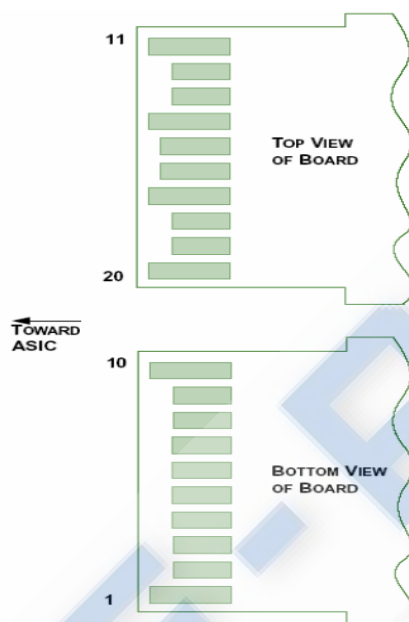
Table 9 –Pin Definition

Pin	Symbol	Name/Description
1	VeeT	Module Transmitter Ground(1)
2	TX_FAULT	Module Transmitter Fault Indication
3	TX_nBRST	Transmitter Burst Control, Module disables on high or open
4	SDA	2-Wire Serial Interface Data Line (MOD-DEF2)(2)
5	SCL	2-Wire Serial Interface Clock (MOD-DEF1)
6	MOD_ABS	Module Absent, connected to VeeT or VeeR in the module
7	TX_SD	TX Signal Detect(3)
8	RX_LOS	Receiver Loss of Signal Indication, High Active
9	NC	Not connected
10	VeeR	Module Receiver Ground
11	VeeR	Module Receiver Ground
12	RD-	Receiver Inverted Data Output
13	RD+	Receiver Non-Inverted Data Output
14	VeeR	Module Receiver Ground
15	VccR	Module Receiver 3.3V Supply
16	VccT	Module Transmitter 3.3V Supply
17	VeeT	Module Transmitter Ground
18	TD+	Transmitter Non-Inverted Data Input
19	TD-	Transmitter Inverted Data Input
20	VeeT	Module Transmitter Ground

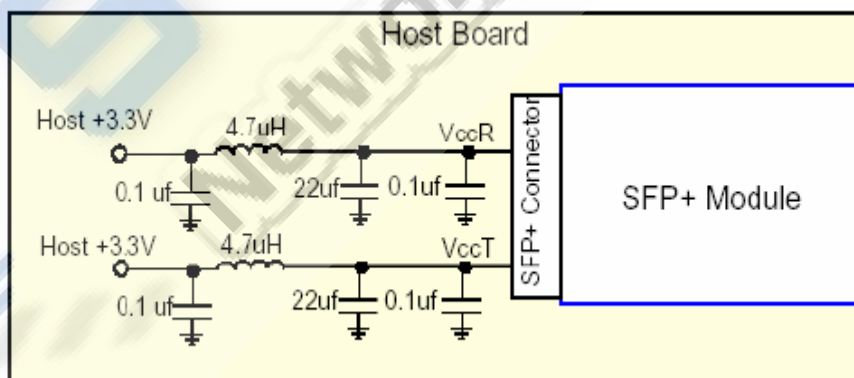
Note

1. The module ground pins, VeeR and VeeT, shall be isolated from the module case.
2. This pin is an open collector/drain input pin and shall be pulled up with 4.7K-10K ohms to VccT in the module.
3. Tx Signal Detect, Tx Active State: High.

SFP+ Module PCB Pinout



Recommended Host Board Power Supply Circuit



Recommended Interface Circuit

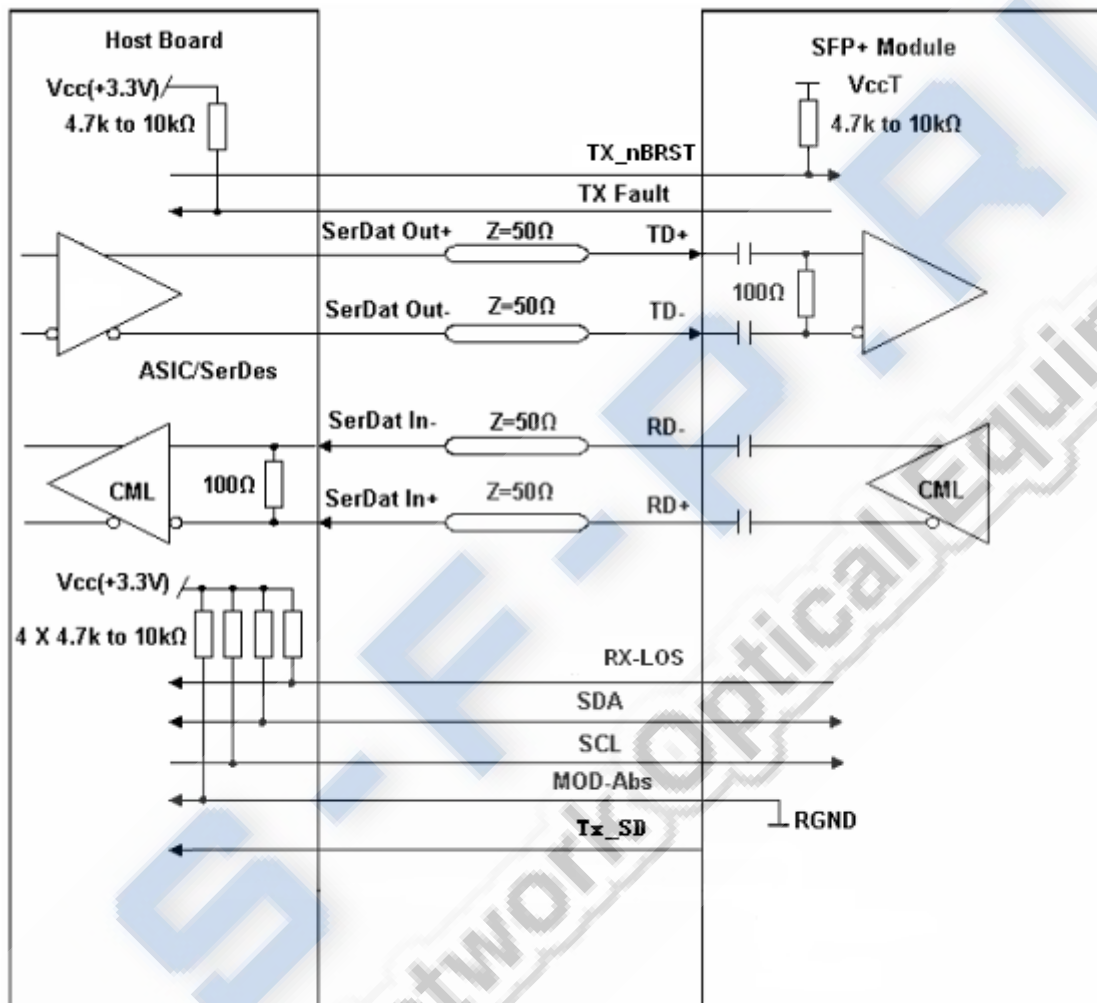


Figure 2, Recommended Interface Circuit

Mechanical Diagram

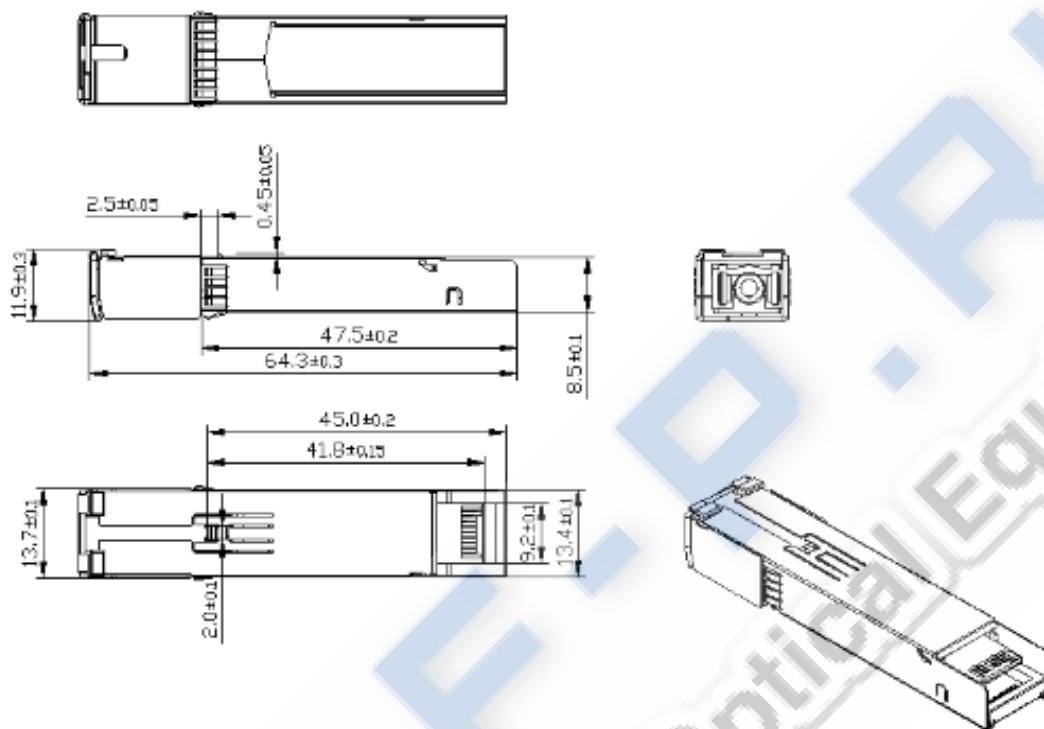


Figure 3, Mechanical Diagram

Order Information

Table 10 – Order Information

Part No.	Application	Data Rate	Laser Source	Fiber Type
SPPS-37-GBO-X3-IDFD	10/1G Base PRX30 ONU	Tx 1.25Gb/s and Rx 10.3125Gb/s asymmetric	1310nm DFB	SMF

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.

THE INFORMATION CONTAINED IN THIS DOCUMENT IS PROVIDED ON AN "AS IS" BASIS. Customer agrees that Source Photonics is not liable for any actual, consequential, exemplary, or other damages arising directly or indirectly from any use of the information contained in this document. Customer must contact Source Photonics to obtain the latest version of this publication to verify, before placing any order, that the information contained herein is current.

Contact

U.S.A. Headquarters

8521 Fallbrook Avenue
Suite 200, West Hills, CA
91304, USA
Tel: +1-818-773-9044
Fax: +1-818-773-0261

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, 300, Taiwan
R.O.C.
Tel: +886-3-5169222
Fax: +886-3-5169213

© Copyright Source Photonics, Inc. 2007~2017

All rights reserved