

EOLX-PR-GETQ-30 Series

Compliant with IEEE 802.3av™-2009 10GBASE-PR-D3

Single fiber bi-directional Transceiver

10.3125Gbps upstream and 10.3125Gbps downstream

RoHS6 Compliant

Features

- ◆ XFP Package with SC Receptacle
- ◆ 10.3125 Gbps/1577 nm Continuous Mode
Transmitter with EML laser
- ◆ 1.25 Gbps/1490 nm Continuous Mode
Transmitter with DFB laser
- ◆ 10.3125Gbp/1270nm and 1.25Gbps/1310nm
High Sensitivity Burst-Mode APD-TIA TDMA
Receiver
- ◆ Supports Digital Diagnostic Monitoring Functions
- ◆ Burst mode received signal strength indication
(RSSI) output
- ◆ CML interface logic level for 10.3125Gbps data
input/output
- ◆ Operating Case Temperature
Standard: 0°C~+70°C
- ◆ Compliant with Class 1 FDA and
IEC60825-1 laser safety



Applications

- ◆ 10GBASE-PR-D3 application

Ordering information

Part No.	Input	Output	Fiber	Interface	Temperature
EOLX-PR-GETQ-30-D*note1	AC/10G&1G	DC/10G DC/1G	SMF	SC	Standard

Note1: Standard version

*The product image only for reference purpose.

Regulatory Compliance*^{Note2}

Product Certificate	Certificate Number	Applicable Standard
TUV	R50135086	EN 60950-1:2006+A11+A1+A12+A2
		EN 60825-1:2014
		EN 60825-2:2004+A1+A2
UL	E317337	UL 60950-1
		CSA C22.2 No. 60950-1-07
EMC CE	AE 50285865 0001	EN 55022:2010
		EN 55024:2010
FCC	WTF14F0514417E	47 CFR PART 15 OCT., 2013
FDA	/	CDRH 1040.10
ROHS	/	2011/65/EU

Note2: The above certificate number updated to June 2014, because some certificate will be updated every year, such as FDA and ROHS. For the latest certification information, please check with Eoptolink.

Product Description

EOLX-PR-GETQ-30 Series is a transceiver for the optical line terminal (OLT) of 10GEPON with 10.3125Gbps and 1.25Gbps in downstream and 10.3125Gbps and 1.25Gbps in upstream. EOLX-PR-GETQ-30 series is high performance module for single fiber communications by using 1577nm and 1490nm continuous-mode transmitter and 1270nm and 1310nm burst-mode receiver.

The transmitter section uses an EML 1577nm and a DFB 1490nm laser and is a class 1 laser compliant according to International Safety Standard IEC-60825-1. The receiver section uses an integrated 1270 nm to 1310nm detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T _s	-40	+85	°C
Operating Relative Humidity	Hopr	5	95	%
Optical Input Power	APD Pin		-5	dBm
Power Supply Voltage	V _{cc3}	0	3.60	V
	V _{cc5}	0	6	
ESD Voltage			1000	V

*Exceeding any one of these values may destroy the device permanently.

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	T _c	0		+70	°C
Power Supply Voltage	V _{cc3}	3.14	3.3	3.46	V
	V _{cc5}	4.75	5.0	5.25	
Power Supply Current	I _{cc3}			900	mA

	I _{cc5}			380	
Power Consumption				4	W
Relative Humidity	RH	5		95	%
Data Rate	@ Tx side		10.3125/1.25		Gbps
	@ Rx side		10.3125/1.25		

Performance Specifications

10G Transmitter – Electrical and Optical

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Electrical						
LVCML Inputs(Differential)	V _{in}	120		820	mV	
Input Impedance (Differential)	Z _{in}	85	100	115	ohm	
Tx_Disable		2		V _{cc}	V	
Tx_Enable		GND		GND+0.8	V	
Optical						
Data Rate	@Tx		10.3125		Gbps	
The type of optical			EML laser			
Centre Wavelength	λ_c	1575	1577	1580	nm	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Average Output Power	BOL	P _{out}	+2.0	+5	dBm	Note3
Side Mode Suppression Mode	SMSR	30			dB	
Extinction Ratio	ER	6			dB	Note3
RIN ₁₅ OMA				-128	dB/Hz	
Output Optical Eye	IEEE Std 802.3av Compliant					
Transmitter Reflectance				-20	dB	
Optical Output Power with Tx OFF	P _{off}			-39	dBm	
Optical Output Turn On	T _{on}			10	ms	
Optical Output Shut Off	T _{off}			10	us	

1G Transmitter – Electrical and Optical

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Electrical						
LVPECL Inputs(Differential)	V _{in}	500		2400	mV	
Input Impedance (Differential)	Z _{in}	85	100	115	ohm	
Tx_Disable		2		V _{cc}	V	
Tx_Enable		0		0.8	V	
Optical						
Data Rate	@Tx		1.25		Gbps	
The type of optical			DFB laser			

10G EPON Series

Centre Wavelength	λ_c	1480	1490	1500	nm	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Average Output Power	BOL	Pout	+2.0		+7	dBm
Side Mode Suppression Mode	SMSR	30				dB
Extinction Ratio	ER	9				dB
RIN15OMA				-115		dB/Hz
Output Optical Eye	IEEE Std 802.3ah Compliant					
Optical Output Power with TX OFF	P_off				-39	dBm
Optical Output Turn On	Ton				10	ms
Optical Output Shut Off	Toff				10	us

10G Receiver – Electrical and Optical

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Electrical						
LVCML Outputs(Differential)	Vout	340		850	mV	
Output Impedance (Differential)	Zout	85	100	115	ohm	
Rx_LOS	High	2		Vcc	V	
	Low	0		0.8	V	
Optical						
Data Rate	@Rx		10.3125		Gbps	
Centre Wavelength	λ_c	1260	1270	1280	nm	
Receiver Sensitivity	BOL			-28.0	dBm	Note4
Receiver Saturation		-6			dBm	Note4
Receiver Reflectance				-10	dB	
Rx_LOS	Assert	-44			dBm	
	De-assert			-29		

Note3: Measured with a PRBS 2³¹-1 test pattern @10.3125Gbps

Note4: Measured at BER less than 1E-3, with a 2³¹-1 NRZ PRBS @10.3125Gbps

1G Receiver – Electrical and Optical

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Electrical						
LVPECL Inputs(Differential)	Vin		750		mV	
Input Impedance (Differential)	Zin	85	100	115	ohm	
Rx_LOS	High	2		Vcc	V	
	Low	0		0.8	V	
Optical						
Data Rate	@Rx		1.25		Gbps	
Centre Wavelength	λ_c	1280	1310	1360	nm	
Receiver Sensitivity	BOL			-29.78	dBm	
Receiver Saturation		-9.38			dBm	
Receiver Reflectance				-10	dB	

Rx_LOS	Assert		-44			dBm
	De-assert				-30	

XFP Transceiver Electrical Pad Layout

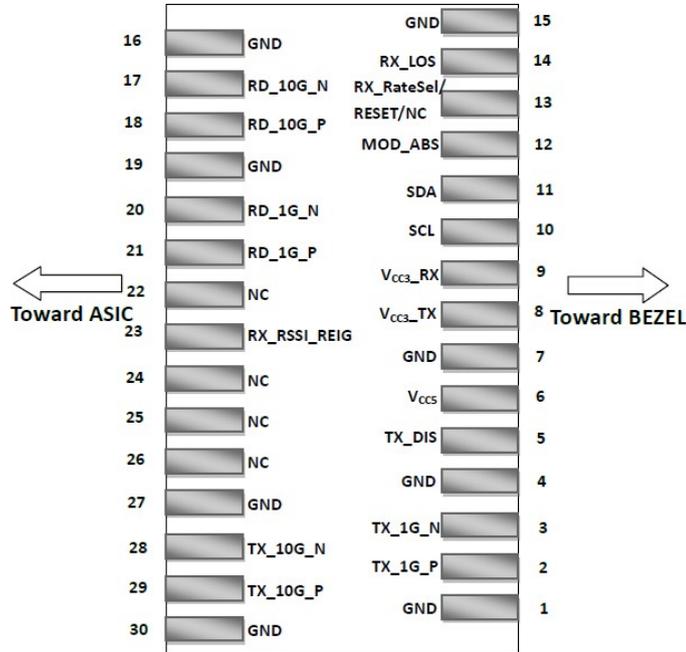


Diagram of Host Board Connector Block Pin Numbers

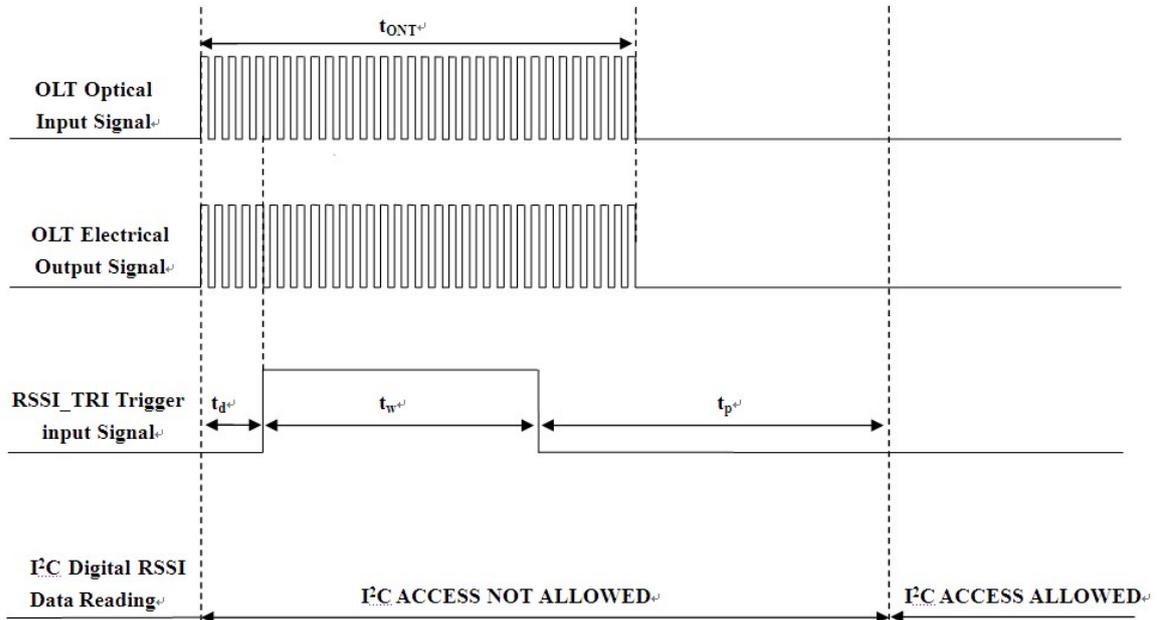
Pin Function Definitions

Below figure shows the pin information of electrical interface and mounting studs. Functions are described in the following table.

Pin Num.	Name	FUNCTION	Plug Seq.	Notes
1	GND	Module Ground.	1	
2	TX_1G_P	Different input of 1G Transmitter with AC coupled.	3	LVPECL
3	TX_1G_N		3	LVPECL
4	GND	Module Ground.	1	
5	TX_DIS	Transmitter Disable; Transmitter laser source turned off.	3	LVTTTL
6	V _{cc5}	+5 Power Supply.	2	
7	GND	Module Ground.	1	
8	V _{cc3_Tx}	+3.3V Power Supply of Transmitter.	2	
9	V _{cc3_Rx}	+3.3V Power Supply of Receiver.	2	
10	SCL	Serial 2-wire interface clock.	3	LVTTTL
11	SDA	Serial 2-wire interface data line.	3	LVTTTL
12	MOD_ABS	Module Absent; Indicates module is not present. Grounded in the module.	3	LVTTTL

13	NC/ RX_RateSel/ RESET	NC	3	LVTTTL
14	RX_LOS	Receiver Loss of Signal indicator.	3	LVTTTL
15	GND	Module Ground.	1	
16	GND	Module Ground.	1	
17	RX_10G_N	Different output of 10G Receiver with DC coupled	3	LVCML
18	RX_10G_P		3	
19	GND	Module Ground.	1	
20	RD_1G_N	Different output of 1G Receiver with DC coupled	3	LVPECL
21	RD_1G_P		3	LVPECL
22	NC		2	
23	RX_RSSI_TRIG	Received signal strength indication, sampling trigger, rising edge triggered.	3	LVTTTL
24	NC		3	
25	NC		3	
26	NC		3	
27	GND	Module Ground.	1	
28	TX_10G_N	Different input of 10G Transmitter with AC coupled.	3	LVCML
29	TX_10G_P		3	LVCML
30	GND	Module Ground.	1	

Digital RSSI Timing Characteristics



Digital RSSI Timing Specification

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Input signal width	t_{ONT}		1500		ns	
RSSI trigger width	t_w		500		ns	
RSSI trigger delay	t_d	0	300		ns	
I ² C access interval time	t_p			500	us	
RSSI monitor range		-8		-30	dBm	
RSSI accuracy				± 2	dB	

Digital Diagnostic Functions

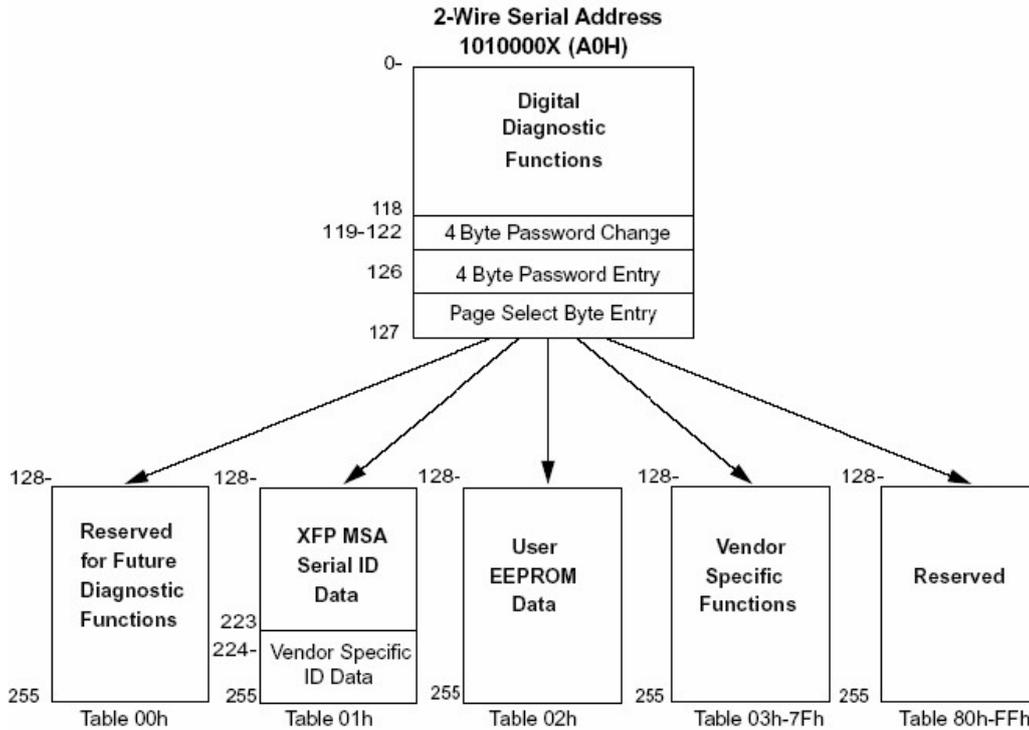
Eoptolink's EOLX-PR-GETQ-30 Small Form Factor 10Gb/s (XFP) transceivers are compliant with the current XFP Multi-Source Agreement (MSA) Specification Rev 4.5.

As defined by the XFP MSA, Eoptolink XFP transceivers provide digital diagnostic functions via a 2-wire serial interface, which allows real-time access to the following operating parameters:

- ◆ Transceiver temperature
- ◆ Laser bias current
- ◆ Transmitted optical power
- ◆ Received optical power
- ◆ Transceiver supply voltage

The structure of the memory map is shown in the following figure, which is accessible over a 2-wire serial interface at the 8-bit address 1010000X (A0h). The normal 256 byte I²C address space is divided into low and upper blocks of 128 Bytes. The lower block of 128 Bytes is always directly available and is used for the diagnostics and control function. Multiple blocks of memories are

available in the upper 128 Bytes of the address space. These are individually addressed through a table select Byte which the user enters into a location in the lower address space. Thus, there is a total available address space of $128 \times 256 = 32$ Kbytes in this upper memory space. The contents of Table 01h are listed in following table. Please refer SFF INF-8077i (Revision 4.5) for detailed information.



EEPROM Serial ID Memory Contents

Accessing Serial ID Memory uses the 2 wire serial address 1010000X (A0H). Memory Contents of Serial ID are shown in Table 1.

Table 1 Serial ID Memory Contents

Data Address	Parameter	Range	Accuracy
96 ~ 97	Temperature	-40 to 125 °C	±3°C
98 ~ 99	Vcc Voltage	0V to 6.55V	±3%
100~101	10G Tx Bias Current	0 to 262 mA	±10%
102~103	10G Tx Power	-37 to 11.2 dBm	±2dB
104~105	10G Rx Power	-40 to 8.2 dBm	±2dB
106~107	Secondary Parameter 1 ^{*(Note6)}		
108~109	Secondary Parameter 2 ^{*(Note7)}		

Note6:1G Tx Bias Current

Note7:1G Tx Power

Specification for EOLX-PR-GETQ-30-D

2 wire address 1010000X, Table 01

Data Addr	Field Size (Byte)	Name Of filed	Description of field	Coded value	Hex
BASE ID FIELDS					
128	1	Identifier	Type of serial transceiver	XFP	06
129	1	Ext.Identifier	Extended identifier of type of serial transceiver	Power Level 4 Module (>3.5W Max), Module with CDR function, TX Ref Clock Input Not Required, No CLEI code present in Table 02h	D0
130	1	Connector	Code for connector type	SC	01
131	8	Transceiver	10 Gigabit Ethernet Compliance		00
132			10 Gigabit Fibre Channel Compliance		00
133			10 Gigabit Copper Links		00
134			Lower Speed Links		00
135			SONET/SDH Codes - Interconnect		00
136			SONET/SDH Codes – Short Haul		00
137			SONET/SDH Codes – Long Haul		00
138			SONET/SDH Codes – Very Long Haul		00
139	1	Encoding	Code for serial encoding algorithm	64B/66B	80
140	1	BR, Min	Minimum bit rate, units of 100 Mbts/sec.	10.3GBits/s.	67
141	1	BR, Max	Maximum bit rate, units of 100 Mbts/sec.	10.3GBits/s.	67
142	1	Length(SMF)-km	Link length supported for SMF fiber in km	20km	14
143	1	Length (E-50µm)	Link length supported for EBW 50/125 µm fiber, units of 2 m		00
144	1	Length (50 µm)	Link length supported for 50/125 µm fiber, units of 1 m		00

10G EPON Series

145	1	Length (62.5um)	Link length supported for 62.5/125 μm fiber, units of 1 m		00
146	1	Length (Copper)	Link length supported for copper, units of 1m		00
147	1	Device Tech	Device technology	1577nm EML, No wavelength control, Uncooled transmitter device, APD detector, Transmitter not Tunable	F6
148	16	Vendor name	XFP Vendor name (ASCII)	E	45
149				o	6F
150				p	70
151				t	74
152				o	6F
153				l	6C
154				i	69
155				n	6E
156				k	6B
157				<space>	20
158				<space>	20
159				<space>	20
160				<space>	20
161				<space>	20
162				<space>	20
163				<space>	20
164	1	CDR Support	CDR Rate Support	10.3G CDR is supported, Lineside Loopback Mode not Supported, XFI Loopback Mode not Supported	40
165	3	Vendor OUI	XFP vendor IEEE company ID		0
166					0
167					0
168	16	Vendor PN	Part number provided by XFP vendor (ASCII)	E	45
169				O	4F
170				L	4C
171				X	58
172				-	2D
173				P	50
174				R	52

10G EPON Series

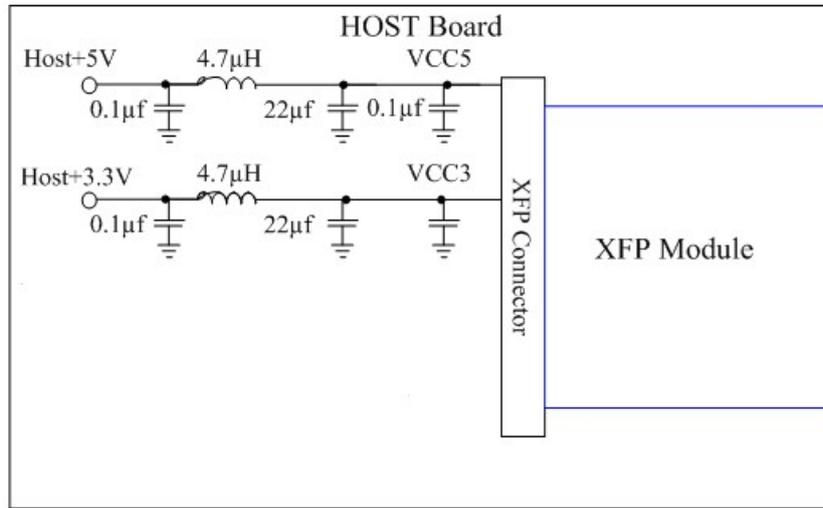
175				-	2D
176				G	47
177				E	45
178				T	54
179				Q	51
180				-	2D
181				3	33
182				0	30
183				D	44
184	2	Vendor rev	Revision level for part number provided by vendor (ASCII)	01	30
185					31
186	2	Wavelength	Nominal laser wavelength	1577nm	7B
187					34
188	2	Wavelength Tolerance	Guaranteed range of laser wavelength (+/- value) from Nominal wavelength. units of 0.005nm	2.5nm	01
189					F4
190	1	Max Case Temp	Maximum Case Temperature in Degrees C.	70 °C	46
191	1	CC_BASE	Check code for Base ID Fields (addresses 128 to 190)	Note 8	88
192				Max Power Disippation:4000(mW)	C8
193					00
194	4	Power Supply	Power supply current requirements and max power dissipation	Max current required by +5V Supply(mA):400 , Max current required by +3.3V Supply(mA): 900	89
195					00
196				x	xx
197				x	xx
198				x	xx
199				x	xx
200				x	xx
201				x	xx
202	16	Vendor SN	Serial number provided by vendor (ASCII)	x	xx
203				x	xx
204				x	xx
205				x	xx
206				x	xx
207				<Space>	20

208				<Space>	20
209				<Space>	20
210				<Space>	20
211				<Space>	20
212	8	Date code	Vendor's manufacturing date code	Year	xx
213				Year	xx
214				Month	xx
215				Month	xx
216				Day	xx
217				Day	xx
218				<Space>	20
219				<Space>	20
220	1	Diagnostic Monitoring Type	Received power measurement type	Average Power	08
221	1	Enhanced Options	Optional Soft TX_DISABLE implemented		40
222	1	Aux Monitoring	Aux A/D input 1: 1G TX bias current; Aux A/D input 2: 1G TX optical power		27
223	1	CC_EXT	Check code for the Extended ID Fields (addresses 192 to 222)	Note 9	xx
224	2	wavelength	2.5G Tx wavelength		00
225					00
226	2	wavelength	1.25G Tx wavelength	1490nm	74
227					68
228-255	28	Vendor Specific			00

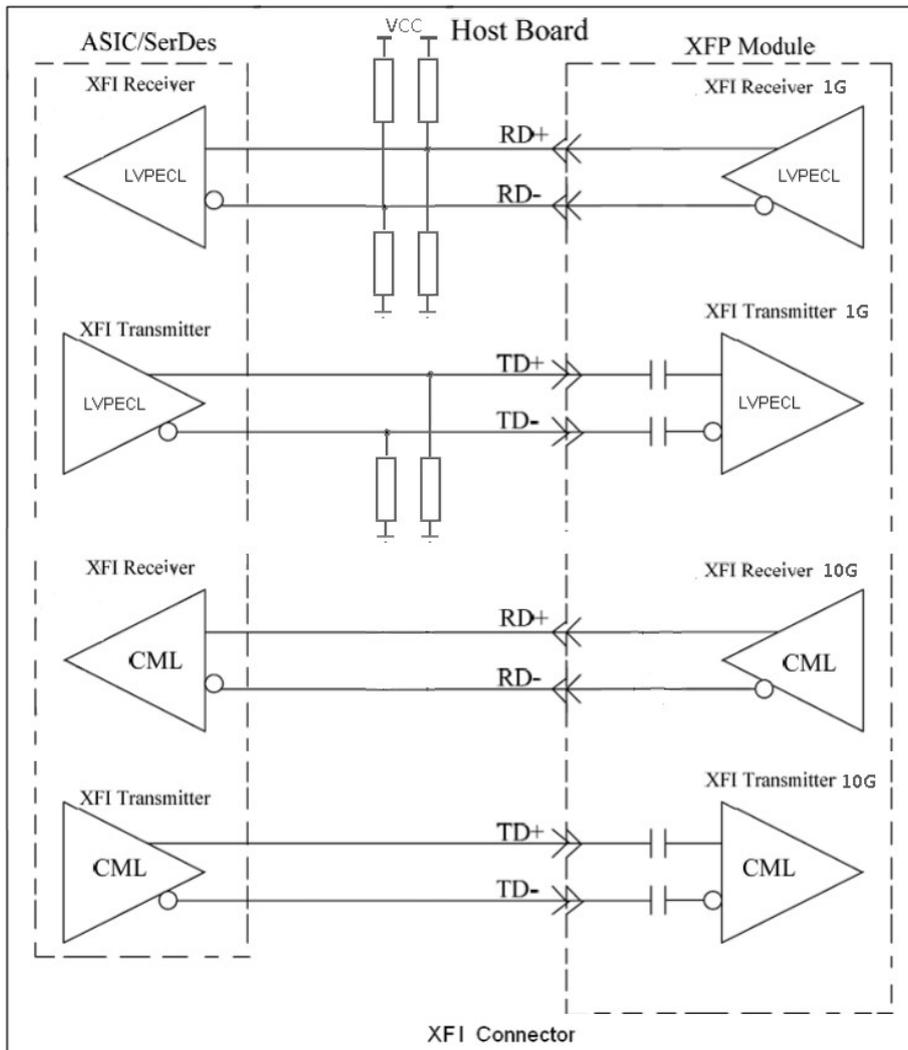
Note 8: The check code shall be the low order 8 bits of the sum of the contents of all the bytes from byte 128 to byte 190, inclusive.

Note 9: The check code shall be the low order 8 bits of the sum of the contents of all the bytes from byte 192 to byte 222, inclusive.

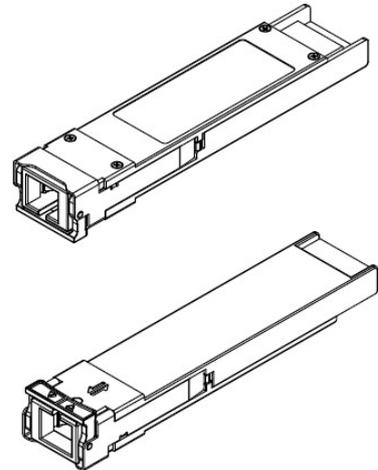
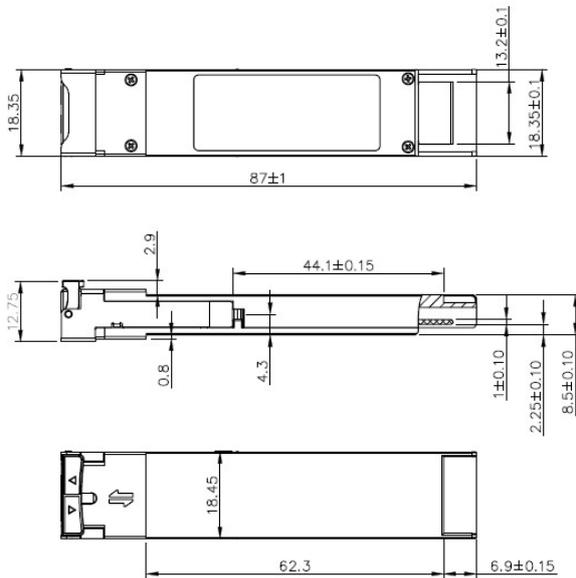
Recommended Host Board Power Supply Circuit



Recommended High-Speed Interface Circuit



Mechanical Specifications



Unremarked tolerances $\pm 0.2\text{mm}$

Eye Safety

This single-mode transceiver is a Class 1 laser product. It complies with IEC-60825 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated within the specified temperature and voltage limits. The optical ports of the module shall be terminated with an optical connector or with a dust plug.

Obtaining Document

You can visit our website: <http://www.eoptolink.com>

Or contact Eoptolink Technology Inc., Ltd. listed at the end of the documentation to get the latest document.

Revision History

Revision	Initiated	Reviewed	Approved	DCN	Release Date
V1.a	Alex	Kelly	Richard	Released.	2017-03-16

Notice:

Eoptolink reserves the right to make changes to or discontinue any optical link product or service identified in this publication, without notice, in order to improve design and/or performance. Applications that are described herein for any of the optical link products are for illustrative purposes only. Eoptolink makes no representation or warranty that such applications will be

suitable for the specified use without further testing or modification.

Contact:

Add: Floor 5 Building 2 No. 21 Gaopeng Avenue High-Tech District CHENGDU, SICHUAN 610041

P.R. CHINA

Tel: (+86) 028-85122709 ext 808 & 809

Fax: (+86) 028-85121912

Postal: 610041

E-mail: sales@eoptolink.com

<http://www.eoptolink.com>

EOP TO LINK