

## 10G XFP BIDI Optical Transceiver

PN: OPP920-3327

### Product Specification

#### Features:

- ✧ Supports 9.95Gb/s to 11.3Gb/s bit rates
- ✧ Hot pluggable 30 pin connector
- ✧ Compliant with XFP MSA
- ✧ Single LC for Bi-directional Transmission
- ✧ Transmission distance of 20km over Single mode fiber
- ✧ Uncooled 1330nm DFB Laser
- ✧ 2-wire interface for management and diagnostic monitor
- ✧ Single power supply voltages : +3.3V
- ✧ Temperature range 0°C to 70°C
- ✧ Power dissipation < 1.5W
- ✧ RoHS Compliant

#### Applications:

- ✧ 10GBASE-LR/LW Ethernet
- ✧ SONET OC-192 /SDH STM-64
- ✧ 1200-SM-LL-L 10G Fibre Channel

#### Description:

OPWAY' OPP920-3327 Small Form Factor 10Gb/s (XFP) transceivers are compliant with the current XFP Multi-Source Agreement (MSA) Specification. The high performance uncooled 1330nm DFB transmitter and high sensitivity PIN receiver provide superior performance for Multiple applications up to 20km links.

● **Absolute Maximum Ratings**

| Parameter                  | Symbol          | Min  | Max  | Unit |
|----------------------------|-----------------|------|------|------|
| Storage Temperature        | T <sub>ST</sub> | -40  | +85  | °C   |
| Case Operating Temperature | T <sub>c</sub>  | 0    | +70  | °C   |
| Supply Voltage             | V <sub>CC</sub> | -0.5 | +4.0 | V    |

● **Electrical Characteristics**

| Parameter                      | Symbol                 | Min                   | Typ | Max                 | Unit | Note |
|--------------------------------|------------------------|-----------------------|-----|---------------------|------|------|
| Supply Voltage                 | V <sub>CC</sub>        | 3.13                  |     | 3.45                | V    |      |
| Supply Current                 | I <sub>CC</sub>        |                       |     | 455                 | mA   |      |
| Module total power             | P                      |                       |     | 1.5                 | W    |      |
| <b>Transmitter</b>             |                        |                       |     |                     |      |      |
| Input differential impedance   | R <sub>in</sub>        |                       | 100 |                     | Ω    | 1    |
| Differential data input swing  | V <sub>in,pp</sub>     | 100                   |     | 1000                | mV   |      |
| Transmit Disable Voltage       | V <sub>D</sub>         | 2.0                   |     | V <sub>CC</sub>     | V    |      |
| Transmit Enable Voltage        | V <sub>EN</sub>        | GND                   |     | GND+0.8             | V    |      |
| <b>Receiver</b>                |                        |                       |     |                     |      |      |
| Differential data output swing | V <sub>out,pp</sub>    | 120                   |     | 800                 | mV   |      |
| LOS Fault                      | V <sub>LOS fault</sub> | V <sub>CC</sub> – 0.5 |     | V <sub>CCHOST</sub> | V    | 2    |
| LOS Normal                     | V <sub>LOS norm</sub>  | GND                   |     | GND+0.5             | V    | 2    |

**Notes**

1. Connected directly to TX data input pins. AC coupling from pins into laser driver IC.
2. LOS is an open collector output. Should be pulled up with 4.7k – 10kΩ on the host board. Normal operation is logic 0; loss of signal is logic 1.

● **Optical Characteristics**

| Parameter                               | Symbol           | Min  | Typ  | Max   | Unit | Ref. |
|---|------------------|------|------|-------|------|------|
| <b>Transmitter</b>                      |                  |      |      |       |      |      |
| Operating Data Rate                     | BR               | 9.95 |      | 11.3  | Gb/s |      |
| Optical Wavelength                      | λ                | 1320 | 1330 | 1340  | nm   |      |
| RMS Spectral Width                      | λ <sub>RMS</sub> |      |      | 1     | nm   |      |
| Side Mode Suppression Ratio             | SMSR             | 30   |      |       | dB   |      |
| Launch Power                            | P <sub>out</sub> | -2   |      | +3    | dBm  |      |
| Average Launch power of OFF Transmitter | P <sub>OFF</sub> |      |      | -30   | dBm  |      |
| Optical Extinction Ratio                | ER               | 3.5  |      |       | dB   |      |
| <b>Receiver</b>                         |                  |      |      |       |      |      |
| Operating Data Rate                     | BR               | 9.95 |      | 11.3  | Gb/s |      |
| Optical Center Wavelength               | λ <sub>C</sub>   | 1260 | 1270 | 1280  | nm   |      |
| Receiver Sensitivity                    | Sen              |      |      | -14.5 | dBm  | 1    |
| Input Saturation Power(Overload)        | Sat              | 0    |      |       | dBm  |      |
| LOS Assert                              | LOS <sub>A</sub> | -30  |      |       | dBm  |      |
| LOS De-Assert                           | LOS <sub>D</sub> |      |      | -15   | dBm  |      |

|                |                  |     |  |  |    |  |
|----------------|------------------|-----|--|--|----|--|
| LOS Hysteresis | LOS <sub>H</sub> | 0.5 |  |  | dB |  |
|----------------|------------------|-----|--|--|----|--|

**Notes:**

1. Measured with a PRBS 2<sup>31</sup> -1 test pattern, @10.3125Gb/s, BER < 10<sup>-12</sup>.

● **Pin Assignment**

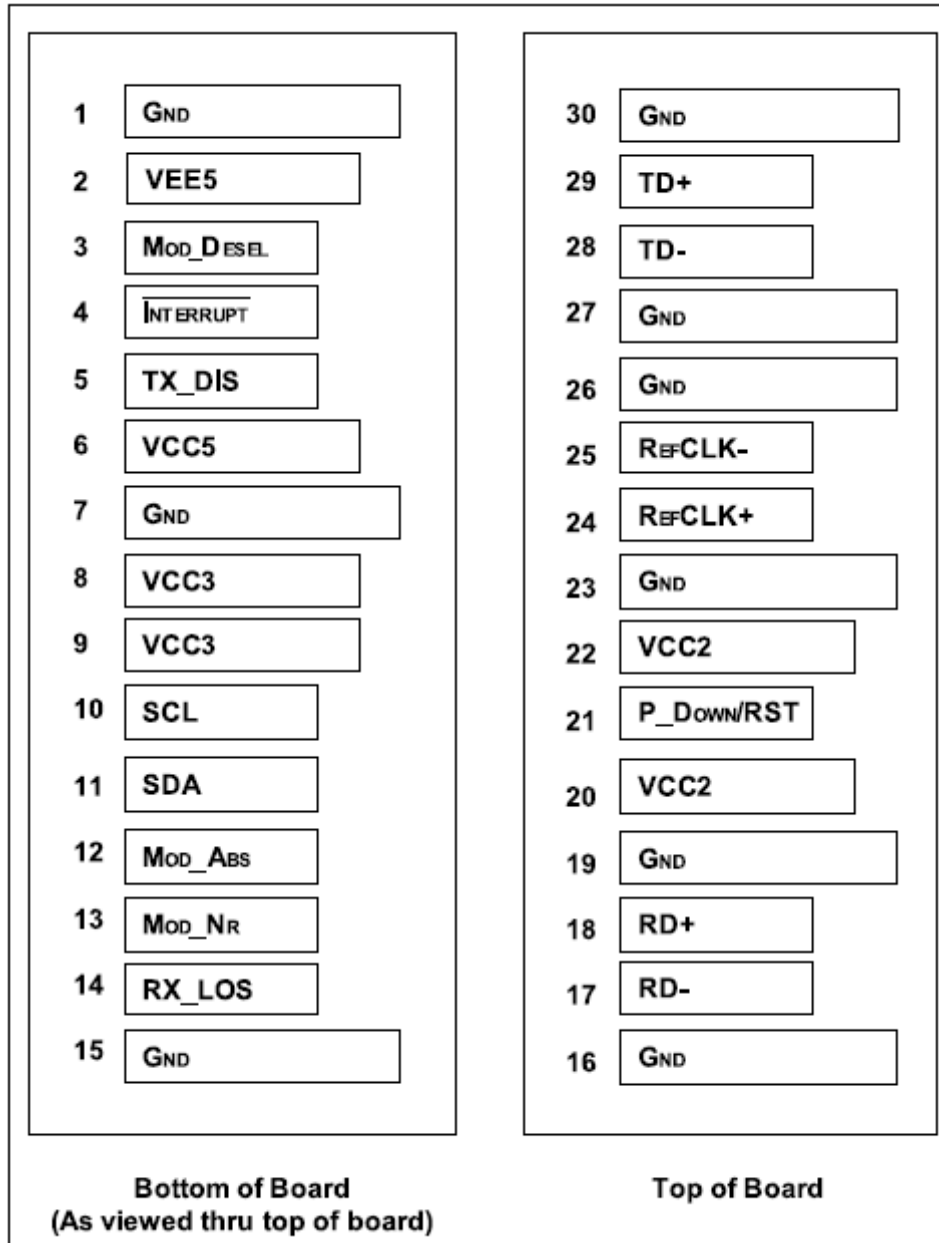


Diagram of Host Board Connector Block Pin Numbers and Names

● **Pin Function Definitions**

| Pin | Logic   | Symbol    | Name/Description   | Ref. |
|-----|---------|-----------|--|------|
| 1   |         | GND       | Module Ground  | 1    |
| 2   |         | VEE5      | Optional -5.2 Power Supply – Not required  |      |
| 3   | LVTTL-I | Mod-Desel | Module De-select; When held low allows the module to respond to 2-wire serial interface                          |      |
| 4   | LVTTL-O | Interrupt | Interrupt (bar); Indicates presence of an important condition which can be read over the serial 2-wire interface | 2    |
| 5   | LVTTL-I | TX_DIS    | Transmitter Disable; Turns off transmitter laser output  |      |

|    |            |            |   |   |
|----|------------|------------|---|---|
| 6  |            | VCC5       | +5 Power Supply   |   |
| 7  |            | GND        | Module Ground   | 1 |
| 8  |            | VCC3       | +3.3V Power Supply  |   |
| 9  |            | VCC3       | +3.3V Power Supply  |   |
| 10 | LVTTL- I/O | SCL        | 2-Wire Serial Interface Clock   | 2 |
| 11 | LVTTL- I/O | SDA        | 2-Wire Serial Interface Data Line   | 2 |
| 12 | LVTTL-O    | Mod_Abs    | Indicates Module is not present. Grounded in the Module   | 2 |
| 13 | LVTTL-O    | Mod_NR     | Module Not Ready; Indicating Module Operational Fault   | 2 |
| 14 | LVTTL-O    | RX_LOS     | Receiver Loss of Signal indicator   | 2 |
| 15 |            | GND        | Module Ground   | 1 |
| 16 |            | GND        | Module Ground   | 1 |
| 17 | CML-O      | RD-        | Receiver inverted data output   |   |
| 18 | CML-O      | RD+        | Receiver non-inverted data output   |   |
| 19 |            | GND        | Module Ground   | 1 |
| 20 |            | VCC2       | +1.8V Power Supply – Not required   |   |
| 21 | LVTTL-I    | P_Down/RST | Power down; When high, requires the module to limit power consumption to 1.5W or below. 2-Wire serial interface must be functional in the low power mode. |   |
|    |            |            | Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle.                      |   |
| 22 |            | VCC2       | +1.8V Power Supply – Not required   |   |
| 23 |            | GND        | Module Ground   | 1 |
| 24 | PECL-I     | RefCLK+    | Reference Clock non-inverted input, AC coupled on the host board – Not required   | 3 |
| 25 | PECL-I     | RefCLK-    | Reference Clock inverted input, AC coupled on the host board – Not required   | 3 |
| 26 |            | GND        | Module Ground   | 1 |
| 27 |            | GND        | Module Ground   | 1 |
| 28 | CML-I      | TD-        | Transmitter inverted data input   |   |
| 29 | CML-I      | TD+        | Transmitter non-inverted data input   |   |
| 30 |            | GND        | Module Ground   | 1 |

**Note**

1. Module circuit ground is isolated from module chassis ground within the module.
2. Open collector; should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15V and 3.45V.
3. A Reference Clock input is not required.

● **Digital Diagnostic Functions**

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

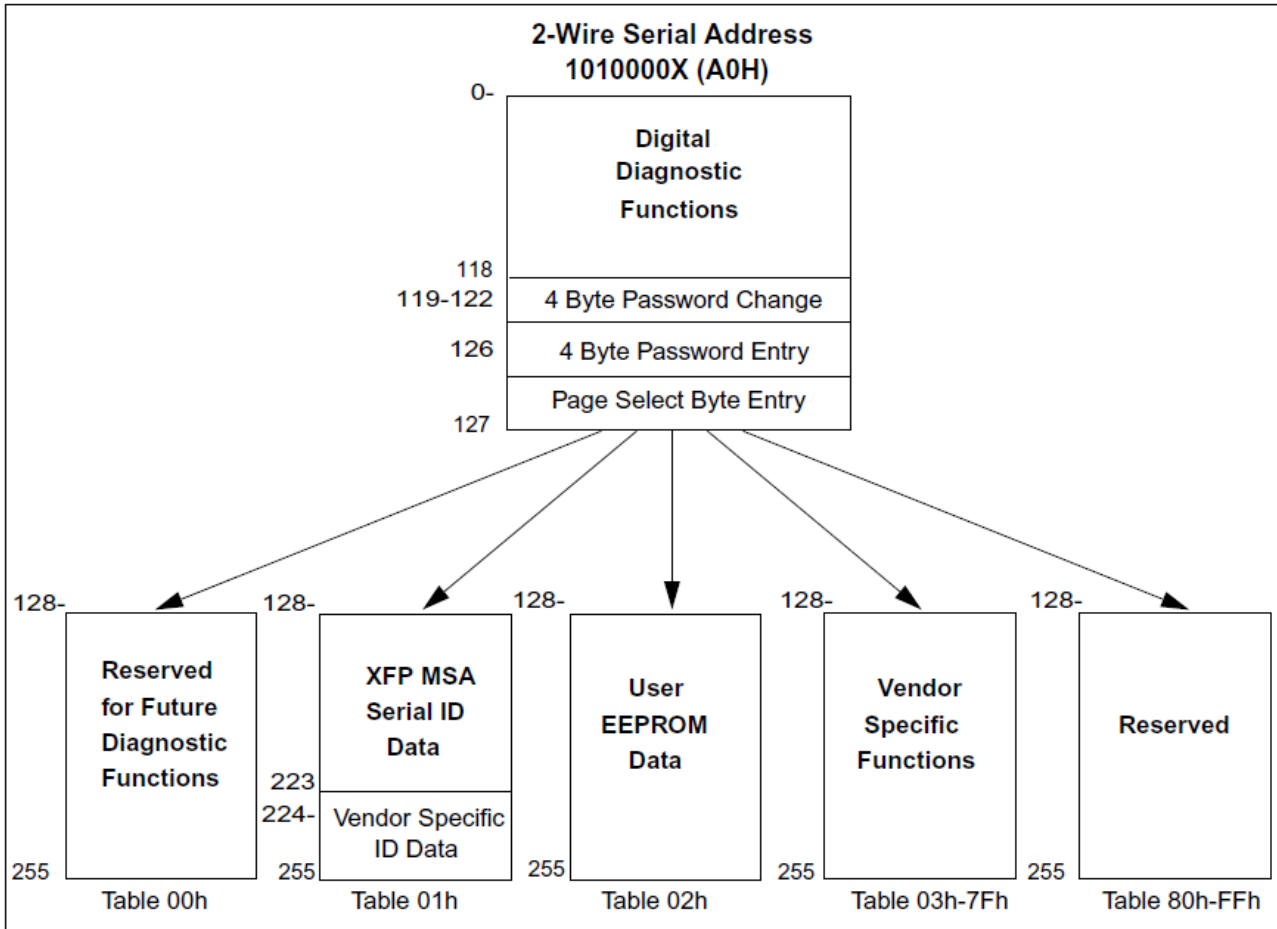
- ✓ Transceiver temperature
- ✓ Laser bias current
- ✓ Transmitted optical power
- ✓ Received optical power
- ✓ Transceiver supply voltage

It also provides a sophisticated system of alarm and warning flags, which may be used to alert end-users when particular operating parameters are outside of a factory-set normal range.

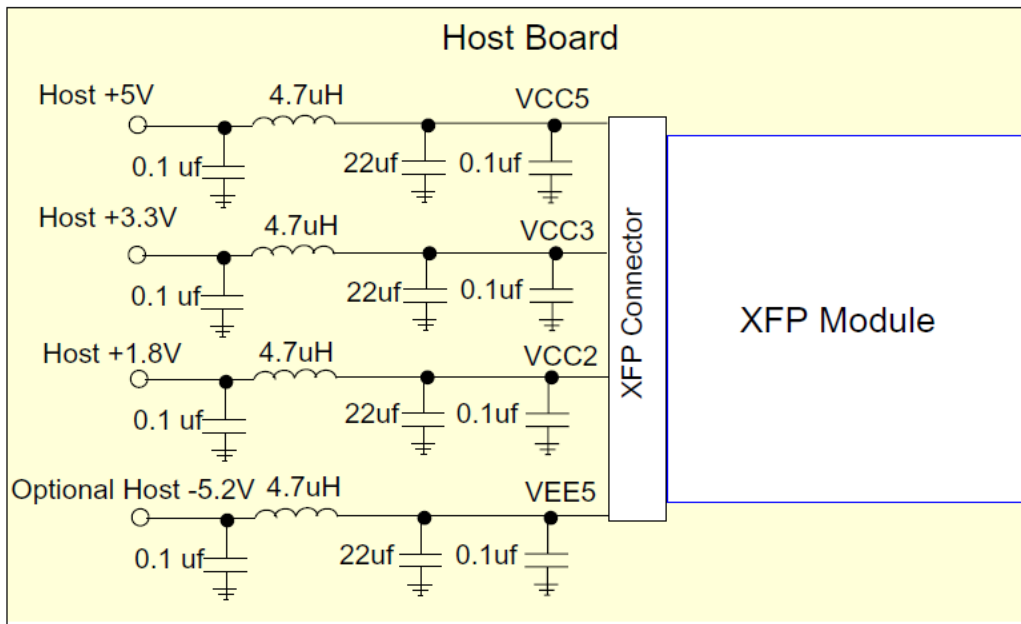
The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through the 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL pin) is generated by the

host. The positive edge clocks data into the XFP transceiver into those segments of its memory map that are not write-protected. The negative edge clocks data from the XFP transceiver. The serial data signal (SDA pin) 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 that can be addressed individually or sequentially. The 2-wire serial interface provides sequential or random access to the 8 bit parameters, addressed from 000h to the maximum address of the memory.

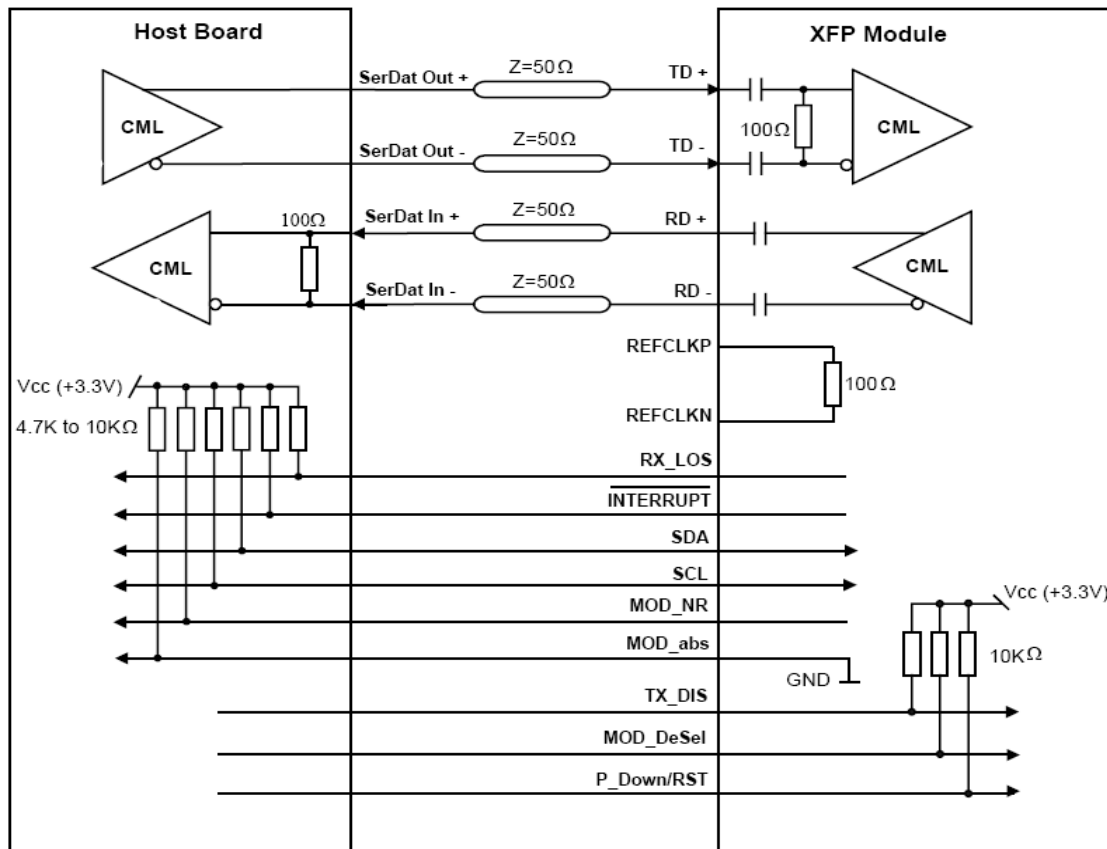
For more detailed information including memory map definitions, please see the XFP MSA Specification.



● **Recommended Circuit**

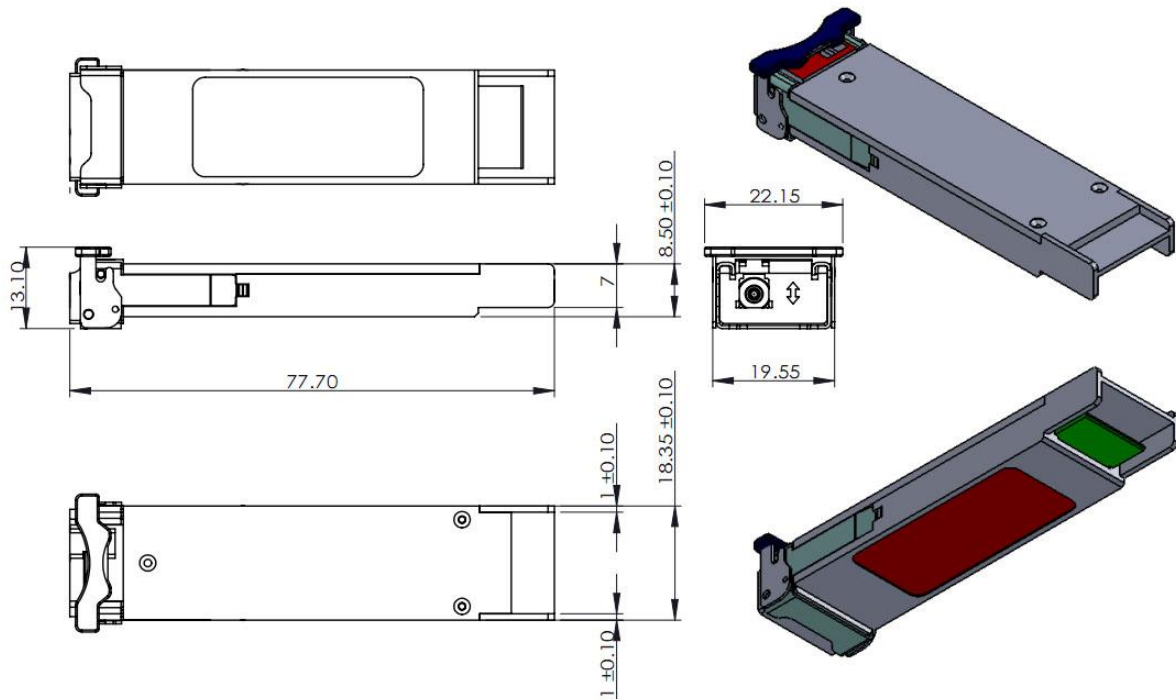


**Recommended Host Board Power Supply Circuit**



**Recommended High-speed Interface Circuit**

● **Mechanical Dimensions(Unit:mm)**



● **Document Revision**

| Version No. | Date       | Reviser | Description     |
|-------------|------------|---------|-----------------|
| V1.0        | 2023-11-16 | Kevin   | Template update |
|             |            |         |                 |
|             |            |         |                 |
|             |            |         |                 |

OPWAY reserves the right to make changes to the products or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such products or information.

Published by OPWAY Communication Inc.

Copyright © OPWAY

All Rights Reserved