# PB4-S4-4103L

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## Product Overview

The PB4-S4-4103L of Small Form Factor Pluggable (SFP) transceiver module is specifically designed for high performance integrated single data link over single mode optical fiber. The high-speed laser diode and photo diode are provided as a light source and a detector, respectively. An EEPROM contained the detailed product information for the host equipment is accessed by the 2-wire serial CMOS EEPROM protocol. It complies with SFP MSA, SONET/SDH standards, Class 1 laser products, EN60825, and EN60950.

## Features

- **RoHS Compliant**
- **Operation Temperature: -40~85°C**
- **1550nm uncooled DFB LD**
- **1310nm receiver**
- **10Km link distance**(indicative only)
- **Hot pluggable**
- **Metal enclosure, low EMI**
- **Single 3.3V power supply**
- **Low Power Dissipation**

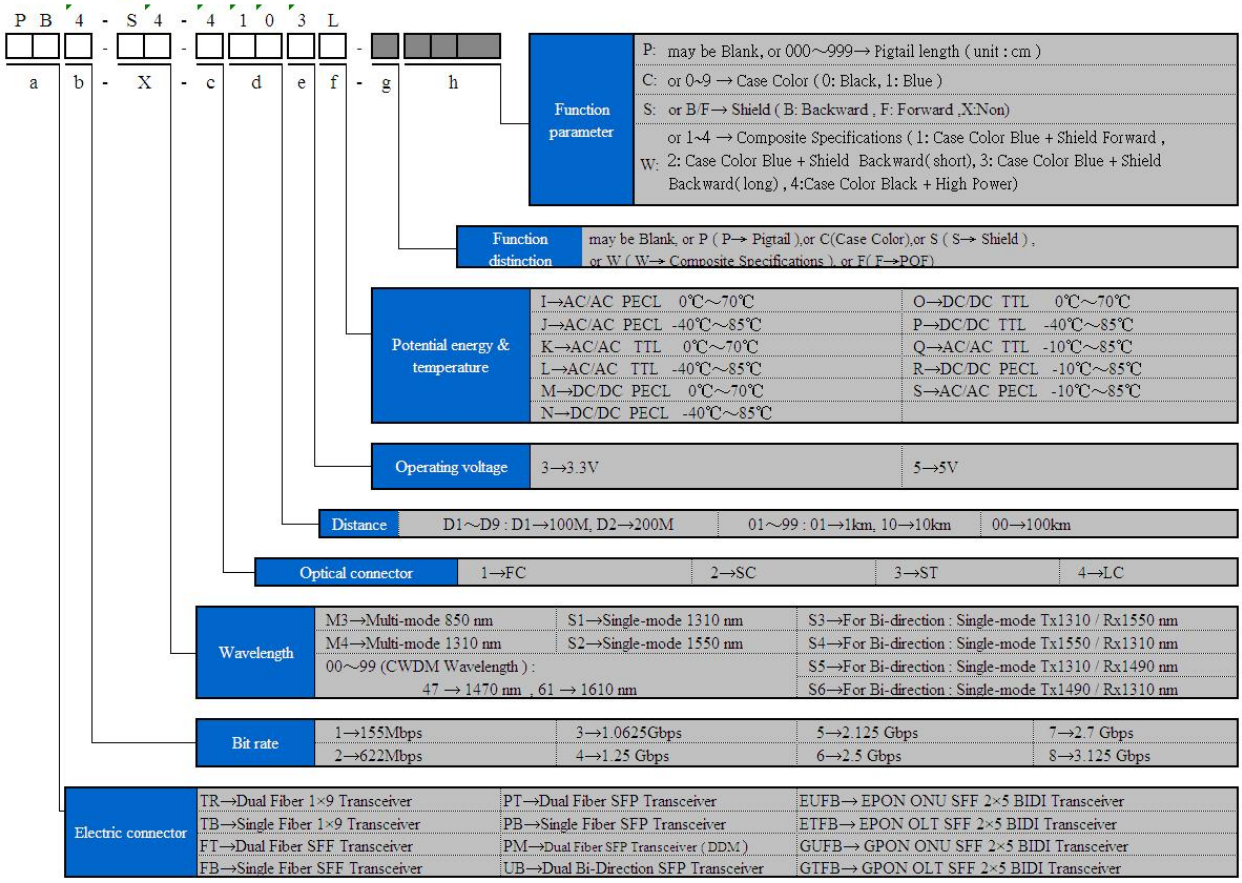
## Applications

- **Metro Access Rings**
- **Point-to-Point networking**
- **1x Fiber Channel**
- **Gigabit Ethernet**
- **Suitable for Fast Ethernet and OC3.**

## Absolute Maximum Ratings

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| Storage Temperature | $T_S$ | **-40** | | **85** | °C | |
| Supply Voltage | $V_{CC}T$<br>$V_{CC}R$ | **0** | | **5.5** | V | |
| Relative Humidity | RH | **0** | | **85** | % | |

## Ordering Information




***** Please contact us for the released types

## Recommended Operating Conditions

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| Operating Temperature | $T_{OP}$ | **-40** | | **85** | °C | Case temperature |
| Supply Voltage | $V_{CC}$T,R | **3.1** | **3.3** | **3.5** | V | |
| Supply Current | $I_{TX}$ +$I_{RX}$ | | **200** | **300** | mA | |

## Transmitter Electro-Optical Interface ($T_C$ = -40~85 ,VccT,R=3.1V<$V_{CC}$<3. 5V)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| Transmitter Differential Input Voltage | TD +/- | **400** | | **2000** | mVp-p | A |
| Optical Output Power | $P_O$ | **-9** | | **-3** | dBm | A |
| Optical Extinction Ratio | $E_R$ | **9** | | | dB | A |
| Center Wavelength | $\lambda_C$ | **1530** | **1550** | **1570** | nm | A |
| Spectral Width | $\Delta\lambda$ | | | **<1** | nm | A |
| Side Mode Suppression Ratio | SMSR | **30** | | | dB | A |
| Optical Rise / Fall Time | $t_r$ / $t_f$ | | | **0.25** | nsec | A,B |
| Tx_Fault - High | $V_{Fault\_H}$ | **2** | | **$V_{CC}$** | V | A |
| Tx_Fault - Low | $V_{Fault\_L}$ | **$V_{ee}$** | | **$V_{ee}$+0.5** | V | A |
| Tx_Disable - High | $V_{Disable\_H}$ | **2** | | **$V_{CC}$** | V | A |
| Tx_Disable - Low | $V_{Disable\_L}$ | **$V_{ee}$** | | **$V_{ee}$+0.8** | V | A |

**Notes:**

**A. All of data is measured at 1250Mbps, PRBS $2^7$-1 ,NRZ.**

**B: 20%~80%**

## Receiver Electro-Optical Interface ($T_C$ = -40~85 ,VccT,R=3.1V<$V_{CC}$<3. 5V)

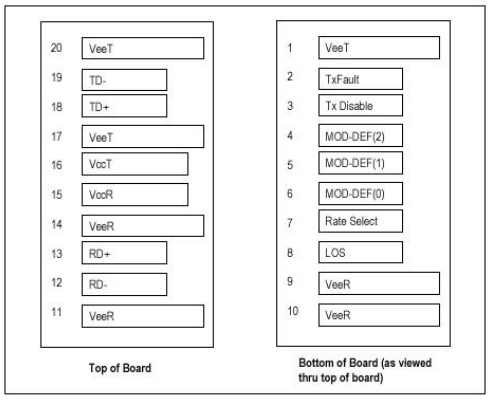
| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| Receiver Differential Output Voltage | RD +/- | **600** | **800** | | $mV_{P-P}$ | |
| Receiver Overload | $P_{IN}MAX$ | **-3** | | | dBm | A,B |
| Receiver Sensitivity | $P_{IN}MIN$ | | | **-20** | dBm | A,B |
| Operating Center Wavelength | $\lambda_c$ | **1260** | | **1360** | nm | |
| Receiver LOS Assert Level | $P_{RX\_LOS\ A}$ | **-35** | | | dBm | B |
| Receiver LOS Deassert Level | $P_{RX\_LOS\ D}$ | | | **-20.5** | dBm | B |
| Receiver Loss of Signal Hysteresis | | **0.5** | **2** | | dB | B |

**Notes:**

**A. With BER better than or equal to $1\times10^{-12}$**

**B. measured in the center of the eye opening with $2^7$ -1 PRBS, NRZ**

## Pin Description




**SFP Transceiver Electric Pad Layout**

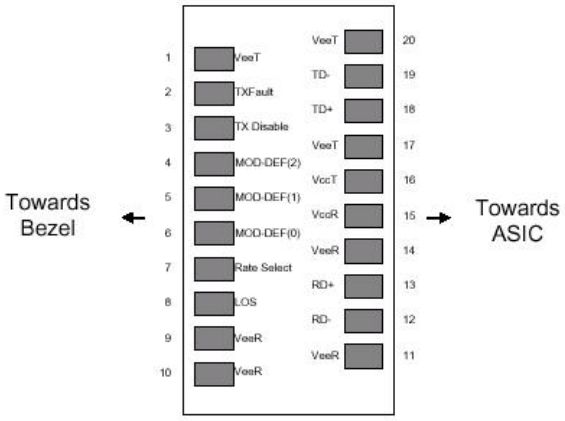



**Diagram of Host Board Connector Block Pin Numbers and Names**

| Pin No. | Pin Name | Function | Plug Seq. | Notes |
|---|---|---|---|---|
| 1 | $V_{ee}T$ | Transmitter Ground | 1 | **1** |
| 2 | TX Fault | Transmitter Fault Indication | 3 | **2** |
| 3 | TX Disable | Transmitter Disable | 3 | **3** |
| 4 | MOD_DEF 2 | Module Definition 2 | 3 | **4** |
| 5 | MOD_DEF 1 | Module Definition 1 | 3 | **4** |
| 6 | MOD_DEF 0 | Module Definition 0 | 3 | **4** |
| 7 | Rate Select | Select between full or reduced receiver bandwidth | 3 | **5** |
| 8 | LOS | Loss of Signal | 3 | **6** |
| 9 | $V_{ee}R$ | Receiver Ground | 1 | **1** |
| 10 | $V_{ee}R$ | Receiver Ground | 1 | **1** |
| 11 | $V_{ee}R$ | Receiver Ground | 1 | **1** |
| 12 | RD - | Inv. Receiver Data Out | 3 | |
| 13 | RD + | Receiver Data Out | 3 | |
| 14 | $V_{ee}R$ | Receiver Ground | 1 | **1** |
| 15 | $V_{CC}R$ | Receiver Power | 2 | |
| 16 | $V_{CC}T$ | Transmitter Power | 2 | |
| 17 | $V_{ee}T$ | Transmitter Ground | 1 | **1** |
| 18 | TD + | Transmitter Data In | 3 | |
| 19 | TD - | Inv. Transmitter Data In | 3 | |
| 20 | $V_{ee}T$ | Transmitter Ground | 1 | **1** |

Note:

1, Circuit ground is internally isolated from chassis ground

2, Open-Collector outputs, asserted when LD and/or APC function fail.

3, Disable when high voltage (>2.0V or Open)

4, Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 5.5V. MOD_DEF(0) pulls line low to indicate module is plugged in.

5, No connection required

6, LOS is open collector output. Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 5.5V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

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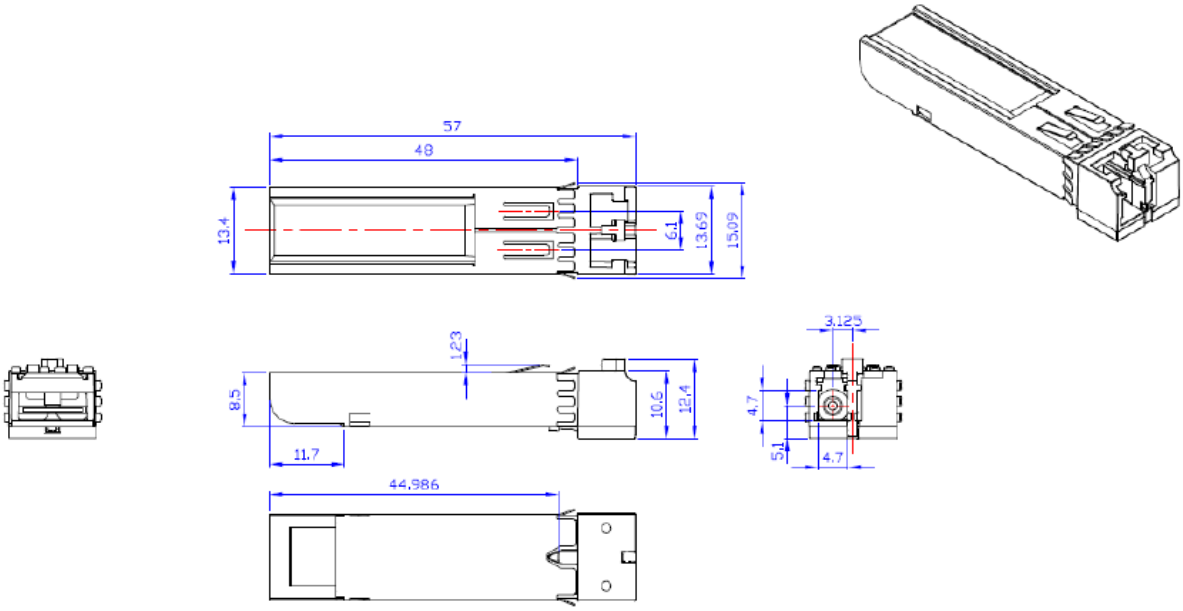
## Mechanical Dimensions (Units in mm)



## Application Circuit

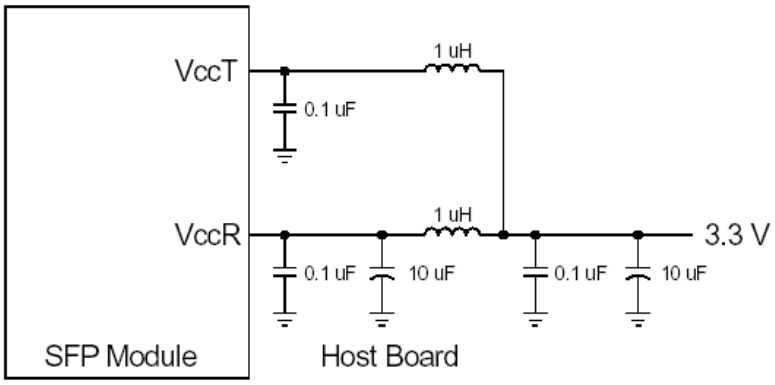



**Figure 2A. Recommended Host Board Supply Filtering Network**

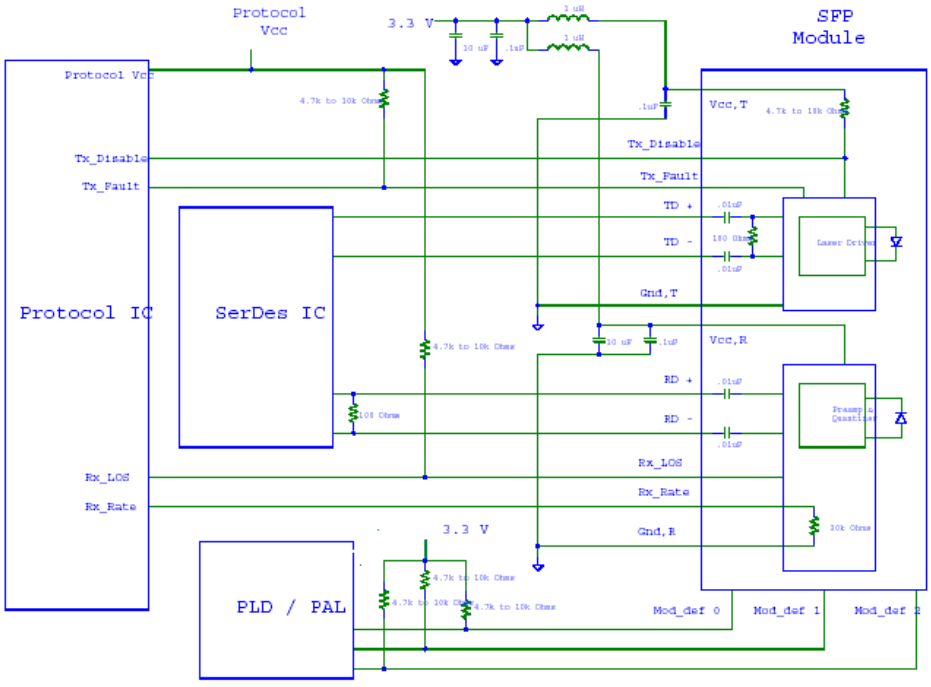



**Figure 2B. Example SFP Host Board Schematic**