



## SBD54080GE0DL24

Huawei® 02311DDB Compatible 1000Base-BX SFP Transceiver (SMF, 1570nmTx/1490nmRx, 80km, LC, DOM)

### Product Description

This Huawei® 02311DDB compatible SFP transceiver provides 1000Base-BX throughput up to 80km over single-mode fiber (SMF) using a wavelength of 1570nmTx/1490nmRx via an LC connector. It is guaranteed to be 100% compatible with the equivalent Huawei® transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. Digital optical monitoring (DOM) support is also present to allow access to real-time operating parameters. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

Skylane's transceivers are RoHS compliant and lead-free.

### Features:

- SFF-8472 and MSA Compliant
- Single-mode fiber
- Duplex LC Connector
- Commercial Temperature 0 to 70 Celsius
- Support Hot Pluggable
- Single 3.3V power supply
- RoHS compliant and Lead-Free
- Metal with lower EMI



### Applications:

- 1000Base-BX Ethernet
- Access (FTTx) and Enterprise
- 1x Fibre Channel

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*For your product safety, please read the following information carefully before any manipulation of the transceiver:*



#### ESD

This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all others electrical input pins, tested per MIL-STD-883G, Method 3015.4 / JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module.



#### LASER SAFETY

This is a Class1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

*The optical ports of the module need to be terminated with an optical connector or with a dust plug in order to avoid contamination.*

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## Absolute Maximum Ratings

| Parameter                   |     | Symbol           | Min. | Typ.  | Max. | Unit | Notes |
|-----------------------------|-----|------------------|------|-------|------|------|-------|
| Maximum Supply Voltage      |     | V <sub>cc</sub>  | -0.5 |       | 3.6  | V    |       |
| Storage Temperature         |     | T <sub>stg</sub> | -40  |       | 85   | °C   |       |
| Operating Case Temperature  |     | T <sub>c</sub>   | 0    |       | 70   | °C   |       |
| Operating Relative Humidity |     | RH               | 5    |       | 85   | %    |       |
| 9µm Core Diameter SMF       |     | L                |      | 80    |      | km   |       |
| Data Rate                   | GBE |                  |      | 1.25  |      | Gbps |       |
|                             | FC  |                  |      | 1.063 |      |      |       |

## Electrical Characteristics

| Parameter                     |         | Symbol | Min. | Typ. | Max.    | Unit  | Notes |
|-------------------------------|---------|--------|------|------|---------|-------|-------|
| Supply Voltage                |         | Vcc    | 3.15 | 3.3  | 3.47    | V     |       |
| Power Supply Current          |         | Icc    |      |      | 300     | mA    |       |
| Transmitter                   |         |        |      |      |         |       |       |
| Differential LVPECL Inputs    |         | VIN    | 400  |      | 1800    | mVp-p | 1     |
| Differential Input Impedance  |         | ZIN    | 90   | 100  | 110     | Ω     | 2     |
| Tx_Disable                    | Disable |        | 2    |      | Vcc+0.3 | V     |       |
|                               | Enable  |        | 0    |      | 0.8     | V     |       |
| Tx_Fault                      | Fault   |        | 2    |      | Vcc+0.3 | V     |       |
|                               | Normal  |        | 0    |      | 0.8     | V     |       |
| Receiver                      |         |        |      |      |         |       |       |
| Differential LVPECL Outputs   |         | VOUT   | 400  |      | 2000    | mVp-p | 3     |
| Differential Output Impedance |         | ZOUT   | 90   | 100  | 110     | Ω     |       |
| Tx_Disable Assert Time        |         | T_off  |      |      | 10      | us    |       |
| Rx_LOS                        | LOS     |        | 2    |      | Vcc+0.3 | V     |       |
|                               | Normal  |        | 0    |      | 0.8     | V     |       |
| MOD_DEF(0.2)                  |         | VOH    | 2.5  |      | Vcc+0.3 | V     | 4     |
|                               |         | VOL    | 0    |      | 0.5     | V     |       |

## Notes:

1. AC coupled inputs. LVPECL logic. Internally AC coupled.
2. R<sub>in</sub>>100kΩ @DC.
3. AC coupled outputs. LVPECL logic. Internally AC coupled.
4. With Serial ID.

## Optical Characteristics

| Parameter                   | Symbol                    | Min. | Typ.       | Max. | Unit | Notes |
|-----------------------------|---------------------------|------|------------|------|------|-------|
| Data Rate                   |                           |      | 1.063/1.25 |      | Gbps |       |
| Transmitter                 |                           |      |            |      |      |       |
| Center Wavelength           | $\lambda_C$               | 1550 | 1570       | 1590 | nm   |       |
| Spectral Width (-20dB)      | $\Delta\lambda$           |      |            | 1    | nm   |       |
| Average Output Power        | POUT                      | 0    |            | 5    | dBm  | 1     |
| Side-Mode Suppression Ratio | SMSR                      | 30   |            |      | dB   |       |
| Extinction Ratio            | ER                        | 9    |            |      | dB   |       |
| Rise/Fall Time (20-80%)     | Tr/Tf                     |      |            | 0.26 | ns   |       |
| POUT @Tx_Disable Asserted   | POUT                      |      |            | -35  | dBm  |       |
| Output Optical Eye          | Compliant with IEEE 802.3 |      |            |      |      | 2     |
| Receiver                    |                           |      |            |      |      |       |
| Center Wavelength           | $\lambda_C$               | 1470 | 1490       | 1510 | nm   |       |
| Receiver Sensitivity        | Pmin                      |      |            | -24  | dBm  | 3     |
| Receiver Overload           | Pmax                      | -3   |            |      | dBm  |       |
| LOS De-Assert               | LOSD                      |      |            | -25  | dBm  |       |
| LOS Assert                  | LOSA                      | -35  |            |      | dBm  |       |
| LOS Hysteresis              |                           | 0.5  |            |      | dB   | 3     |

### Notes:

1. Output power is power coupled into a 9/125 $\mu$ m single-mode fiber.
2. Filtered, measured with a PRBS 2<sup>7</sup>-1 test pattern @1.25Gbps.
3. Minimum average optical power is measured at BER less than 1E<sup>-12</sup>, with 1.25Gbps, 2<sup>7</sup>-1 PRBS and ER=9dB.

## Pin Descriptions

| Pin | Symbol      | Name/Description                                          | Plug Sequence | Notes |
|-----|-------------|-----------------------------------------------------------|---------------|-------|
| 1   | VeeT        | Transmitter Ground.                                       | 1             | 5     |
| 2   | Tx_Fault    | Transmitter Fault Indication.                             | 3             | 1     |
| 3   | Tx_Disable  | Transmitter Disable. Module disables on “high” or “open.” | 3             | 2     |
| 4   | MOD-DEF2    | Module Definition 2. 2-Wire Serial ID Interface.          | 3             | 3     |
| 5   | MOD-DEF1    | Module Definition 1. 2-Wire Serial ID Interface.          | 3             | 3     |
| 6   | MOD-DEF0    | Module Definition 0. Grounded within the module.          | 3             | 3     |
| 7   | Rate Select | Not Connected. Function not available.                    | 3             |       |
| 8   | LOS         | Loss of Signal.                                           | 3             | 4     |
| 9   | VeeR        | Receiver Ground.                                          | 1             | 5     |
| 10  | VeeR        | Receiver Ground.                                          | 1             | 5     |
| 11  | VeeR        | Receiver Ground.                                          | 1             | 5     |
| 12  | RD-         | Inverse Received Data out.                                | 3             | 6     |
| 13  | RD+         | Received Data out.                                        | 3             | 7     |
| 14  | VeeR        | Receiver Ground.                                          | 1             | 5     |
| 15  | VccR        | 3.3 ± 5% Receiver Power.                                  | 2             | 7     |
| 16  | VccT        | 3.3 ± 5% Transmitter Power.                               | 2             | 7     |
| 17  | VeeT        | Transmitter Ground.                                       | 1             | 5     |
| 18  | TD+         | Transmitter Data In.                                      | 3             | 8     |
| 19  | TD-         | Inverse Transmitter Data In.                              | 3             | 8     |
| 20  | VeeT        | Transmitter Ground.                                       | 1             | 5     |

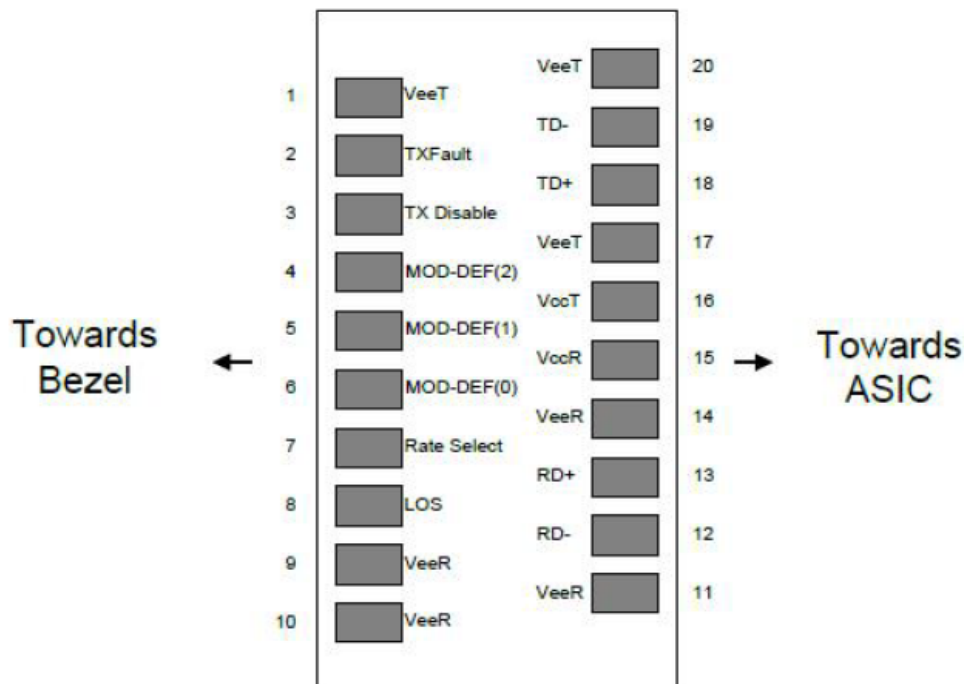
## Notes:

1. Tx\_Fault is an open collector/drain output, which should be pulled up with a 4.7kΩ to 10kΩ resistor on the host board. Pull-up voltage between 2.0V and VccT/R+0.3V. When “high,” output indicates a laser fault of some kind. “Low” indicates normal operation. In the “low” state, the output will be pulled to <0.8V.
2. Tx\_Disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7kΩ to 10kΩ resistor. Its states are:
  - Low (0V – 0.8V): Transmitter On.
  - (>0.8V and <2.0V): Undefined.
  - High (2.0V – 3.465V): Transmitter Disabled.
  - Open: Transmitter Disabled.
3. MOD-DEF0, 1, 2. These are the module definition pins. They should be pulled up with a 4.7kΩ to 10kΩ resistor on the host board. The pull-up voltage shall be VccT or VccR.
  - MOD-DEF0 is grounded by the module to indicate that the module is present.
  - MOD-DEF1 is the clock line of 2-wire serial interface for optional serial ID.

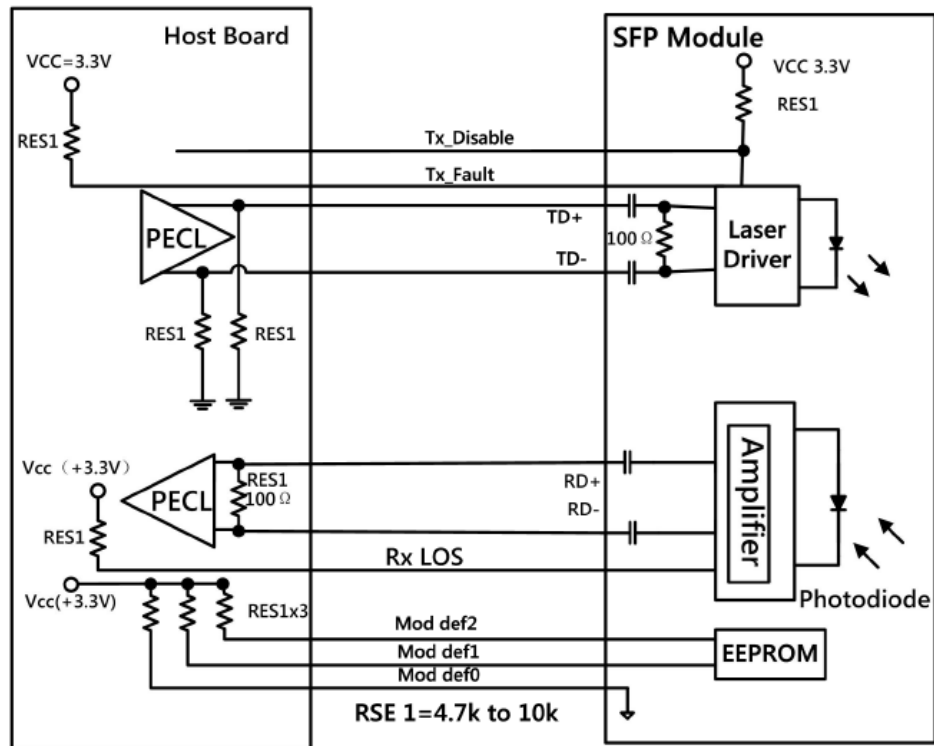
MOD-DEF2 is the data line of 2-wire serial interface for optional serial ID.

4. LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7kΩ to 10kΩ resistor. Pull-up voltage between 2.0V and  $V_{CC}/R + 0.3V$ . When “high,” this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). “Low” indicates normal operation. In the “low” state, the output will be pulled to <0.8V.
5. VeeR and VeeT may be internally connected within the SFP module.
6. RD-/+ : these are the differential receiver outputs. They are AC coupled 100Ω differential lines which should be terminated with 100Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board. The voltage swing on these lines will be between 400mV and 2000mV differential (200mV –1000mV single-ended) when properly terminated.
7. VccR and VccT are the receiver and transmitter power supplies. They are defined as  $3.3V \pm 5\%$  at the SFP connector pin. Maximum supply current is 300mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than 1Ω should be used in order to maintain the required voltage at the SFP input pin with 3.3V supply voltage. When the recommended supply-filtering network is used, hot plugging of the SFP transceiver module will result in an inrush current of no more than 30mA greater than the steady state value. VccR and VccT may be internally connected within the SFP transceiver module.
8. TD-/+ : these are the differential transmitter inputs. They are AC-coupled, differential lines with 100 differential terminations inside the module. The AC coupling is done inside the module and is thus not required on the host board. The inputs will accept differential swings of 400mV-2000mV (200mV-1000mV single-ended).

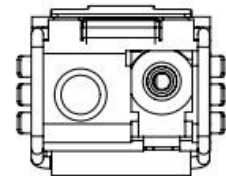
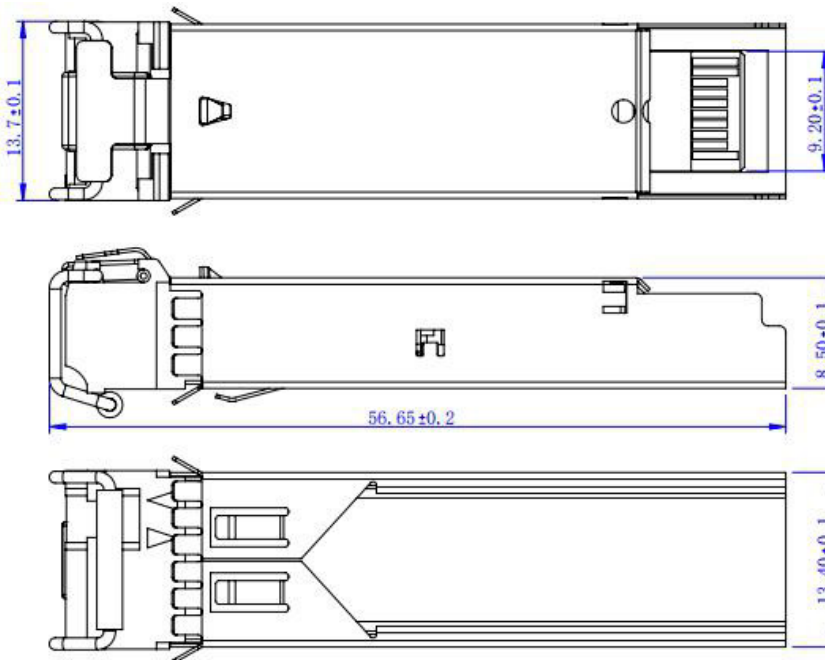
## Pin-Out Connectors



### Recommended Circuit Schematic



## Mechanical Specifications



Unit:mm

# About Skylane Optics

Skylane is a leading provider of transceivers for optical communication.

We offer an extensive portfolio for the enterprise, access, datacenter and metropolitan fiber optical market as well as for smart home applications and home networks.

We cover the European, South American and North American market with a strong partner network and have offices in Belgium, Brazil, Sweden and USA.

Our offerings are characterized by high quality and performance. In combination with our strong technical support, we enable our customers to build cost optimized network solutions.

We offer an extensive range of high-quality products including transceivers (Optical and copper), Active Optical Cable (AOC), Direct Attach Cable (DAC), Mux/Demux, Coding Box.

