



## S2C47010250F000

MSA 25GBase-CWDM SFP28 Transceiver (SMF, 1470nm, 10km, LC, DOM)

### Product Description

This MSA Compliant SFP28 transceiver provides 25GBase-CWDM throughput up to 10km over single-mode fiber (SMF) using a wavelength of 1470nm via an LC connector. It is built to MSA standards and is uniquely serialized and data-traffic and application tested to ensure that they will integrate into your network seamlessly. 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:

- Up to 25.78Gbps bi-directional data links
- Built-in dual CDR with bypass function
- Electrical interface specifications per SFF-8431
- CWDM-rated EML Transmitter and APD Receiver
- Up to 10km on 9/125um SMF
- SFP28 MSA package with duplex LC connector
- Operating temperature: 0 to 70 Celsius
- Single +3.3V power supply
- 1.8W maximum power consumption
- SFF-8432 and SFF-8472 Compliance
- Class 1 Laser Safety Certified
- RoHS compliant and lead-free



### Applications:

- 25x Gigabit Ethernet over CWDM
- Access, Metro and Enterprise
- Mobile Fronthaul CPRI/OBSAI

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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.*

### Regulatory Compliance

- ESD to the Electrical PINs: compatible with MIL-STD-883E Method 3015.4.
- ESD to the LC Receptacle: compatible with IEC 61000-4-3.
- EMI/EMC: compatible with FCC Part 15 Subpart B Rules, EN55022:2010.
- Laser Eye Safety: compatible with FDA 21CFR, EN60950-1& EN (IEC) 60825-1, 2.
- RoHS: compliant with EU RoHS 2.0 directive 2015/863/EU.

### CWDM Available Wavelengths

| Wavelengths | Min.   | Typ. | Max.   |
|-------------|--------|------|--------|
| 47          | 1464.5 | 1471 | 1477.5 |
| 49          | 1484.5 | 1491 | 1497.5 |
| 51          | 1504.5 | 1511 | 1517.5 |
| 53          | 1524.5 | 1531 | 1537.5 |
| 55          | 1544.5 | 1551 | 1557.5 |

### Absolute Maximum Ratings

| Parameter                                        | Symbol | Min. | Typ.           | Max.               | Unit | Notes |
|--------------------------------------------------|--------|------|----------------|--------------------|------|-------|
| Maximum Supply Voltage                           | Vcc    | -0.5 |                | 4.0                | V    |       |
| Storage Temperature                              | Tstg   | -40  |                | 85                 | °C   |       |
| Operating Case Temperature                       | Tc     | 0    | 25             | 70                 | °C   |       |
| Relative Humidity                                | RH     | 5    |                | 95                 | %    |       |
| Data Rate                                        |        |      | 24.33<br>25.78 |                    | Gbps |       |
| Bit Error Rate                                   | BER    |      |                | $5 \times 10^{-5}$ |      | 1     |
| Supported Link Length on 9/125µm SMF @ 25.78Gbps | L      |      | 10             |                    | km   | 2     |

### Notes:

1. Tested with a PRBS 2<sup>31</sup>-1 test pattern for 25.78Gbps operation.
2. Distances are based on FC-PI-6 Rev. 3.1 and IEEE 802.3 standards.

## Electrical Characteristics

| Parameter                       |                      | Symbol                         | Min.  | Typ. | Max.     | Unit  | Notes |
|---------------------------------|----------------------|--------------------------------|-------|------|----------|-------|-------|
| Power Supply Voltage            |                      | V <sub>CC</sub>                | 3.135 | 3.3  | 3.465    | V     |       |
| Power Supply Current            |                      | I <sub>CC</sub>                |       |      | 545      | mA    |       |
| Power Dissipation               |                      | P <sub>D</sub>                 |       |      | 1800     | mW    |       |
| Transmitter                     |                      |                                |       |      |          |       |       |
| Differential Input Impedance    |                      | Z <sub>IN</sub>                |       | 100  |          | Ω     |       |
| Differential Data Input Swing   |                      | V <sub>IN,pp</sub>             | 180   |      | 700      | mVp-p |       |
| Tx_Fault                        | Transmitter Fault    | V <sub>OH</sub>                | 2.0   |      | Host_Vcc | V     |       |
|                                 | Normal Operation     | V <sub>OL</sub>                | 0     |      | 0.8      | V     |       |
| Tx_Disable                      | Transmitter Disable  | V <sub>IH</sub>                | 2.0   |      | Host_Vcc | V     |       |
|                                 | Transmitter Enable   | V <sub>IL</sub>                | 0     |      | 0.8      | V     |       |
| Receiver                        |                      |                                |       |      |          |       |       |
| Differential Output Impedance   |                      | Z <sub>OUT</sub>               |       | 100  |          | Ω     |       |
| Differential Data Output Swing  |                      | V <sub>OUT,pp</sub>            | 300   |      | 850      | mVp-p | 1     |
| Data Output Rise Time/Fall Time |                      | T <sub>r</sub> /T <sub>f</sub> | 15    |      |          | ps    | 2     |
| Rx_LOS                          | Loss of Signal (LOS) | V <sub>OH</sub>                | 2.0   |      | Host_Vcc | V     | 3     |
|                                 | Normal Operation     | V <sub>OL</sub>                | 0     |      | 0.8      | V     | 3     |

### Notes:

1. Internally AC coupled but requires an external 100Ω differential load termination.
2. 20–80 %.
3. LOS is an open collector output. Should be pulled up with 4.7kΩ on the host board.

## Optical Characteristics

| Parameter                          | Symbol           | Min.   | Typ. | Max.   | Unit | Notes |
|------------------------------------|------------------|--------|------|--------|------|-------|
| <b>Transmitter</b>                 |                  |        |      |        |      |       |
| Launch Optical Power               | P <sub>o</sub>   | 0      |      | 5      | dBm  | 1     |
| Extinction Ratio                   | ER               | 4.5    |      |        | dB   |       |
| Center Wavelength Range            | $\lambda_C$      | 1464.5 |      | 1557.5 | nm   |       |
| Transmitter and Dispersion Penalty | TDP              |        |      | 4      | dB   |       |
| Spectral Width                     | $\Delta\lambda$  |        |      | 1      | nm   | 2     |
| Optical Return Loss Tolerance      | ORLT             |        |      | 21     | dB   |       |
| Pout @Tx_Disable Asserted          | P <sub>off</sub> |        |      | -30    | dBm  |       |
| <b>Receiver</b>                    |                  |        |      |        |      |       |
| Center Wavelength                  | $\lambda_C$      | 1460   |      | 1620   | nm   |       |
| Receiver Sensitivity (Avg)         | S                |        |      | -19    | dBm  | 1     |
| Receiver Overload                  | P <sub>max</sub> | -4     |      |        | dBm  |       |
| Optical Return Loss                | ORL              | 26     |      |        | dB   |       |
| LOS De-Assert                      | LOSD             |        |      | -19    | dBm  |       |
| LOS Assert                         | LOSA             | -35    |      |        | dBm  |       |
| LOS Hysteresis                     |                  | 0.5    |      |        | dB   |       |

### Notes:

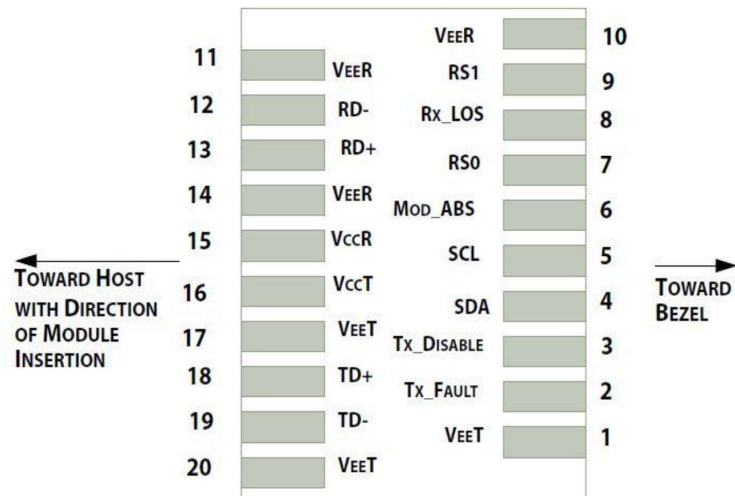
1. Class 1 Laser Safety per FDA/CDRH and EN (IEC) 60825 regulations.
2. 20dB spectral width.
3. Measured with PRBS 2<sup>31</sup>-1 at 5×10<sup>-5</sup> BER.

## Pin Descriptions

| Pin | Symbol     | Name/Descriptions                                                         | Ref. |
|-----|------------|---------------------------------------------------------------------------|------|
| 1   | VeeT       | Transmitter Ground (Common with Receiver Ground).                         | 1    |
| 2   | Tx_Fault   | Transmitter Fault. LVTTTL-O.                                              | 2    |
| 3   | Tx_Disable | Transmitter Disable. Laser output disabled on “high” or “open.” LVTTTL-I. | 3    |
| 4   | SDA        | 2-Wire Serial Interface Data. Same as MOD-DEF2 in INF-8074i. LVTTTL-I/O.  |      |
| 5   | SCL        | 2-Wire Serial Interface Data. Same as MOD-DEF2 in INF-8074i. LVTTTL-I.    |      |
| 6   | MOD_ABS    | Module Absent. Connect to VeeT or VeeR in the module.                     | 4    |
| 7   | RS0        | Rate Select 0. Not used.                                                  | 5    |
| 8   | LOS        | Loss of Signal Indication. Logic 0 indicates normal operation. LVTTTL-O.  | 2    |
| 9   | RS1        | Rate Select 1. Not used.                                                  | 5    |
| 10  | VeeR       | Receiver Ground (Common with Transmitter Ground).                         | 1    |
| 11  | VeeR       | Receiver Ground (Common with Transmitter Ground).                         | 1    |
| 12  | RD-        | Receiver Inverted Data Out. AC Coupled. CML-O.                            |      |
| 13  | RD+        | Receiver Non-Inverted Data Out. AC Coupled. CML-O.                        |      |
| 14  | VeeR       | Receiver Ground (Common with Transmitter Ground).                         | 1    |
| 15  | VccR       | Receiver Power Supply.                                                    |      |
| 16  | VccT       | Transmitter Power Supply.                                                 |      |
| 17  | VeeT       | Transmitter Ground (Common with Receiver Ground).                         | 1    |
| 18  | TD+        | Transmitter Non-Inverted Data In. AC Coupled. CML-I.                      |      |
| 19  | TD-        | Transmitter Inverted Data In. AC Coupled. CML-O.                          |      |
| 20  | VeeT       | Transmitter Ground (Common with Receiver Ground).                         | 1    |

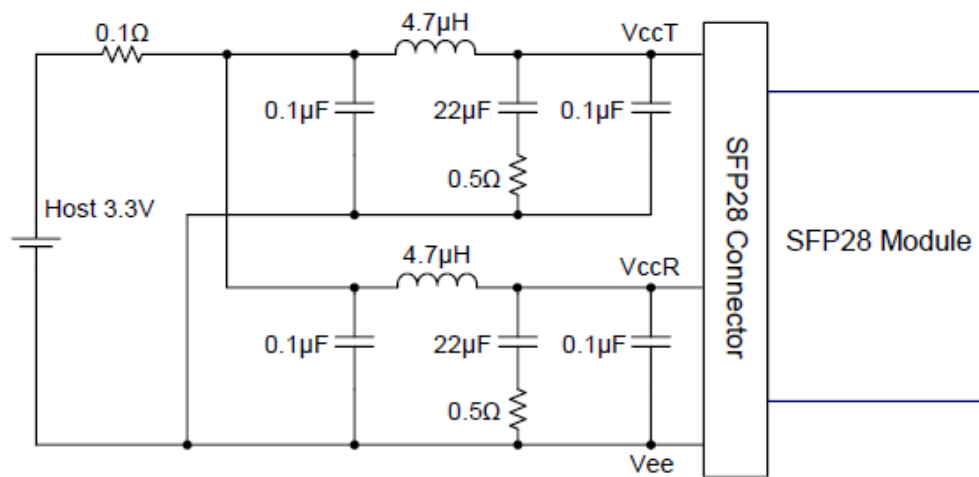
## Notes:

1. The module signal ground contacts, VeeR and VeeT, should be isolated from the module case.
2. This contact is an open collector/drain output and should be pulled up to the Host\_Vcc with the resistor in the range 4.7kΩ-10kΩ. Pull-ups can be connected to one or several power supplies; however, the host board design shall ensure that no module contract has voltage exceeding module VccT/R+0.5V.
3. Tx\_Disable is an input contact with a 4.7kΩ-10kΩ pull-up resistor to the VccT inside the module.
4. MOD\_ABS is connected to the VeeT or VeeR in the SFP+ module. The host may pull the contract up to Host\_Vcc with a resistor in the range from 4.7kΩ-10kΩ. MOD\_ABS is asserted “high” when the SFP+ module is physically absent from a host slot.
5. Internally pulled down per SFF-8431.

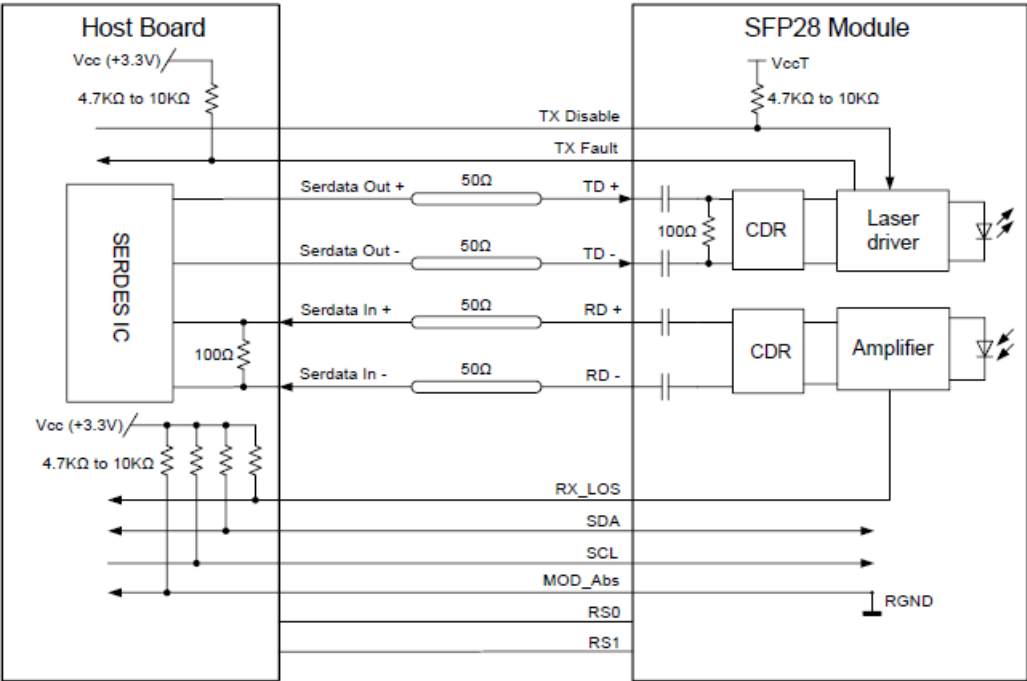


Pin-Out of Connector Block on the Host Board

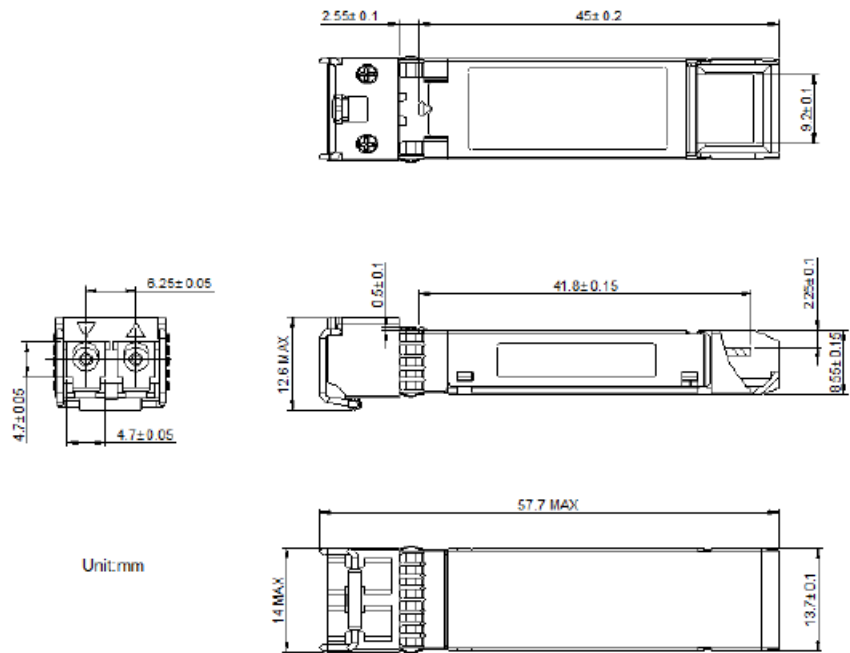
### Recommended Host Board Power Supply Filter Network



Recommended Application Interface Block Diagram



Mechanical Specifications



# 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.

