



## MMA1T00-VS-SKY

Mellanox® MMA1T00-VS Compatible 200GBase-SR4 QSFP56 Transceiver (MMF, 850nm, 100m, MPO, DOM)

### Product Description

This Mellanox® MMA1T00-VS compatible QSFP56 transceiver provides 200GBase-SR4 Fibre Channel throughput up to 100m over multi-mode fiber (MMF) using a wavelength of 850nm via an MPO connector. It is guaranteed to be 100% compatible with the equivalent Mellanox® 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:

- Supports SFF-8636 management interface
- Multi-mode Fiber
- MPO Connector
- Hot Pluggable
- Metal with Lower EMI
- Commercial Temperature 0 to 70 Celsius
- RoHS Compliant and Lead-Free
- Excellent ESD Protection



### Applications:

- 200GBase
- Access and Enterprise
- Ethernet

---

*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.*

---

## Absolute Maximum Ratings

| Parameter                  | Symbol           | Min. | Typ. | Max.   | Unit | Notes |
|----------------------------|------------------|------|------|--------|------|-------|
| Maximum Supply Voltage     | V <sub>cc</sub>  | 0    |      | 3.63   | V    |       |
| Storage Temperature        | T <sub>stg</sub> | -40  |      | 85     | °C   |       |
| Relative Humidity          | RH               | 5    |      | 85     | %    | 1     |
| Operating Case Temperature | T <sub>c</sub>   | 0    |      | 70     | °C   |       |
| Bit Error Ratio            | BER              |      |      | 2.4E-4 |      | 2     |

### Notes:

1. Non-condensing.
2. The typical BER is better than 1E-6 when measured with a transmitter to produce SECQ up to 3dB.

## Electrical Characteristics

| Parameter                                           | Symbol              | Min.  | Typ. | Max.  | Unit | Notes |
|-----------------------------------------------------|---------------------|-------|------|-------|------|-------|
| Module Supply Voltage                               | V <sub>cc</sub>     | 3.135 | 3.3  | 3.465 | V    |       |
| Module Supply Current                               | I <sub>cc</sub>     |       |      | 1600  | mA   |       |
| Module Power Dissipation                            | P <sub>D</sub>      |       |      | 5     | W    |       |
| Transmitter                                         |                     |       |      |       |      |       |
| Differential Data Input Voltage Peak-to-Peak Swing  | V <sub>IN,pp</sub>  |       |      | 900   | mV   |       |
| Receiver                                            |                     |       |      |       |      |       |
| Differential Data Output Voltage Peak-to-Peak Swing | V <sub>OUT,pp</sub> |       |      | 900   | mV   |       |

## Optical Characteristics

| Parameter                                                        | Symbol          | Min. | Typ.                                                              | Max.                   | Unit  | Notes |
|------------------------------------------------------------------|-----------------|------|-------------------------------------------------------------------|------------------------|-------|-------|
| <b>Transmitter</b>                                               |                 |      |                                                                   |                        |       |       |
| Signaling Rate Per Lane                                          | Rate            |      | 26.5625                                                           |                        | GBd   |       |
| Modulation Format                                                | MF              |      | PAM4                                                              |                        |       |       |
| Signaling Speed Accuracy                                         | SSA             | -100 |                                                                   | 100                    | ppm   |       |
| Center Wavelength                                                | $\lambda$       |      | 850                                                               |                        | nm    |       |
| RMS Spectral Width                                               | $\Delta\lambda$ |      |                                                                   | 0.6                    | nm    |       |
| Optical Return Loss Tolerance                                    | ORLT            |      |                                                                   | 12                     | dB    |       |
| Average Optical Power                                            | Pavg            | -6.5 |                                                                   | +4                     | dBm   |       |
| Extinction Ratio                                                 | ER              | 3    |                                                                   |                        | dB    |       |
| Optical Modulation Amplitude Per Lane                            | OMA             | -4.5 |                                                                   | +3                     | dBm   |       |
| Launch Power in OMA Outer Minus TDECQ Per Lane                   |                 | -5.9 |                                                                   |                        | dBm   |       |
| Transmitter and Dispersion Eye Closure for PAM4 (TDECQ) Per Lane | TDECQ           |      |                                                                   | 4.5                    | dB    |       |
| TDECQ – $10 \cdot \log_{10}(\text{Ceq})$ Per Lane                |                 |      |                                                                   | 4.5                    | dB    |       |
| Relative Intensity Noise                                         | RIN             |      |                                                                   | -128                   | dB/Hz |       |
| Transmitter Transition Time Per Lane                             |                 |      |                                                                   | 34                     | ps    |       |
| Laser Off Power                                                  |                 |      |                                                                   | -30                    | dBm   |       |
| Encircled Flux                                                   | EF              |      | $\geq 86\%$ at $19\mu\text{m}$<br>$\leq 30\%$ at $4.5\mu\text{m}$ |                        |       |       |
| <b>Receiver</b>                                                  |                 |      |                                                                   |                        |       |       |
| Signaling Rate Per Lane                                          | Rate            |      | 26.5625                                                           |                        | GBd   |       |
| Modulation Format                                                | MF              |      | PAM4                                                              |                        |       |       |
| Signaling Speed Accuracy                                         | SSA             | -100 |                                                                   | +100                   | ppm   |       |
| Center Wavelength                                                | $\lambda$       |      | 850                                                               |                        | nm    |       |
| Average Receive Power Per Lane                                   | Pavg            | -8.4 |                                                                   | +4                     | dBm   |       |
| Receive Power Per Lane OMA                                       | Po              |      |                                                                   | 3                      | dBm   |       |
| Receiver Reflectance                                             | RL              |      |                                                                   | -12                    | dB    |       |
| Receiver Sensitivity OMA Per Lane                                | S               |      |                                                                   | Max = (-6.5, SECQ-7.9) | dBm   | 1     |
| Damage Threshold                                                 | THd             | 5    |                                                                   |                        | dBm   |       |

### Notes:

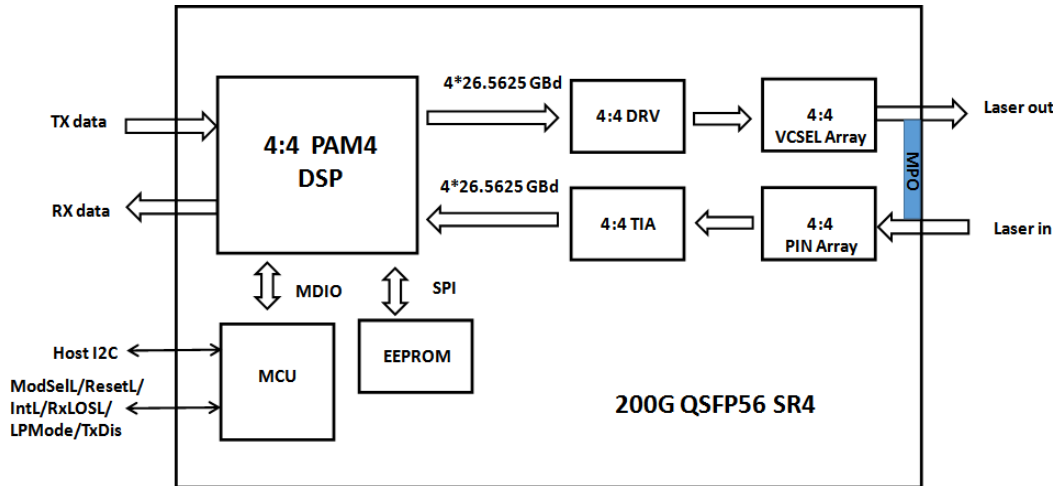
1. Receiver sensitivity is informative and defined for a transmitter with a value of SECQ up to 4.5dB.

## Pin Descriptions

| Pin | Symbol       | Description                                                                               | Notes |
|-----|--------------|-------------------------------------------------------------------------------------------|-------|
| 1   | GND          | Ground.                                                                                   | 1     |
| 2   | Tx2-         | Transmitter Inverted Data Input.                                                          |       |
| 3   | Tx2+         | Transmitter Non-Inverted Data Input.                                                      |       |
| 4   | GND          | Ground.                                                                                   | 1     |
| 5   | Tx4-         | Transmitter Inverted Data Input.                                                          |       |
| 6   | Tx4+         | Transmitter Non-Inverted Data Input.                                                      |       |
| 7   | GND          | Ground.                                                                                   |       |
| 8   | ModSelL      | Module Select.                                                                            |       |
| 9   | ResetL       | Module Reset.                                                                             |       |
| 10  | VccRx        | +3.3V Power Supply Receiver.                                                              | 2     |
| 11  | SCL          | 2-Wire Serial Interface Clock.                                                            |       |
| 12  | SDA          | 2-Wire Serial Interface Data.                                                             |       |
| 13  | GND          | Ground.                                                                                   |       |
| 14  | Rx3+         | Receiver Non-Inverted Data Output.                                                        |       |
| 15  | Rx3-         | Receiver Inverted Data Output.                                                            |       |
| 16  | GND          | Ground.                                                                                   | 1     |
| 17  | Rx1+         | Receiver Non-Inverted Data Output.                                                        |       |
| 18  | Rx1-         | Receiver Inverted Data Output.                                                            | 1     |
| 19  | GND          | Ground.                                                                                   | 1     |
| 20  | GND          | Ground.                                                                                   |       |
| 21  | Rx2-         | Receiver Inverted Data Output.                                                            |       |
| 22  | Rx2+         | Receiver Non-Inverted Data Output.                                                        |       |
| 23  | GND          | Ground.                                                                                   |       |
| 24  | Rx4-         | Receiver Inverted Data Output.                                                            |       |
| 25  | Rx4+         | Receiver Non-Inverted Data Output.                                                        |       |
| 26  | GND          | Ground.                                                                                   | 1     |
| 27  | ModPrsL      | Module Present.                                                                           |       |
| 28  | IntL/RxLOSL  | Interrupt. Optionally configurable as RxLOSL via the management interface (SFF-8636).     |       |
| 29  | VccTx        | +3.3V Power Supply Transmitter.                                                           | 2     |
| 30  | Vcc1         | +3.3V Power Supply.                                                                       | 2     |
| 31  | LPMode/TxDis | Low-Power Mode. Optionally configurable as TxDis via the management interface (SFF-8636). |       |
| 32  | GND          | Ground.                                                                                   | 1     |
| 33  | Tx3+         | Transmitter Non-Inverted Data Input.                                                      |       |
| 34  | Tx3-         | Transmitter Inverted Data Input.                                                          |       |
| 35  | GND          | Ground.                                                                                   | 1     |
| 36  | Tx1+         | Transmitter Non-Inverted Data Input.                                                      |       |
| 37  | Tx1-         | Transmitter Inverted Data Input.                                                          |       |
| 38  | GND          | Ground.                                                                                   | 1     |

**Notes:**

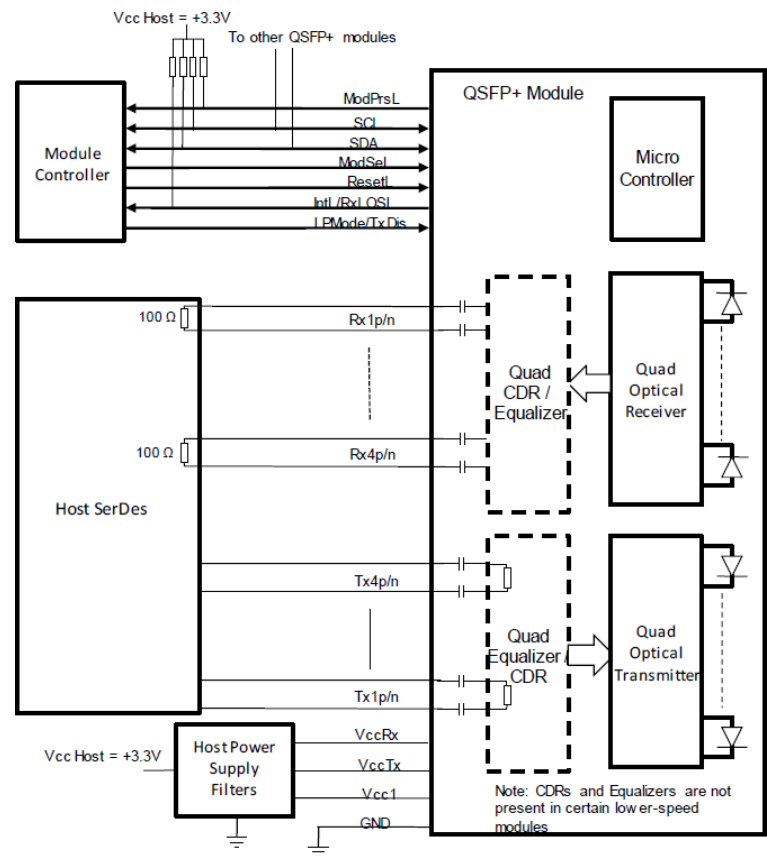
1. GND is the symbol for signal and supply (power) common for the module. All are common within the module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal-common ground plane.
2. VccRx, Vcc1, and VccTx are applied concurrently and may be internally connected within the module in any combination.

**Block Diagram of Transceiver**

**Transmitter Section:** This module converts 4-channel 53.125Gbps electrical data to 4-channel 850nm 53.125Gbps optical signals for 212Gbps optical transmission.

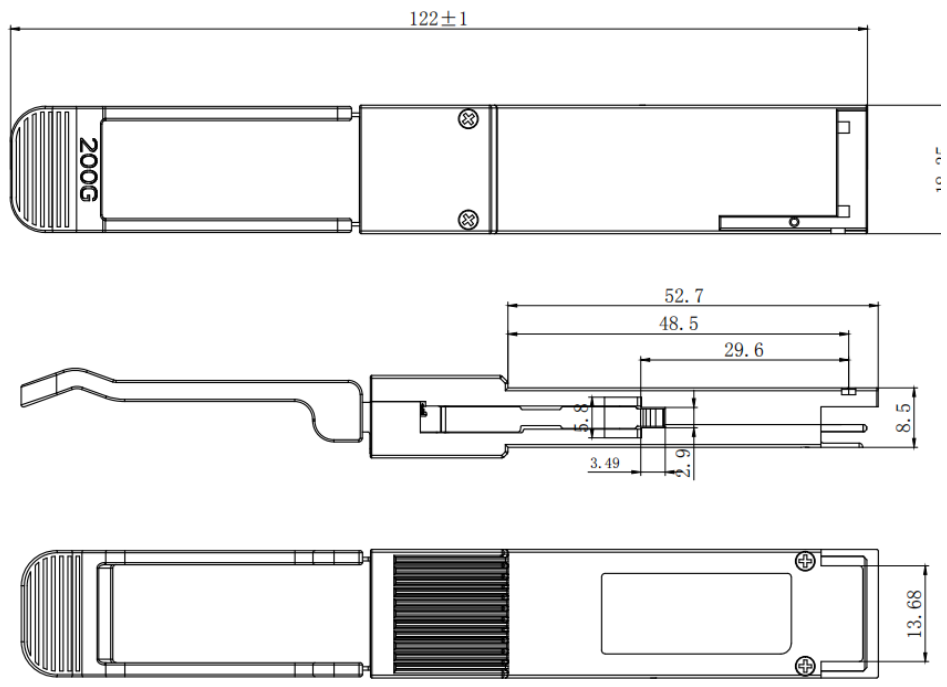
**Receiver Section:** Similarly, this module optically converts 4-channel 850nm 53.125Gbps optical signals to 4-channel electrical data output on the receiver side.

Recommended Interface Circuit



Mechanical Specifications

Unit is millimeter. All dimensions are ±0.1mm unless otherwise specified.



# 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.

