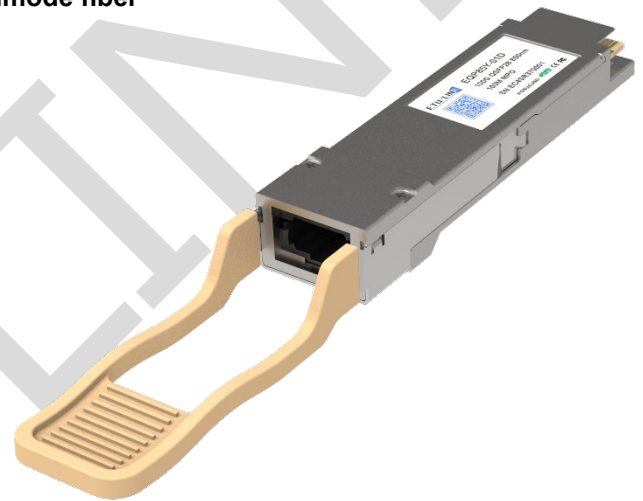


EQP85Y-01D

100Gbps QSFP28 SR4 850nm 100m MPO with DDM Transceiver

PRODUCT FEATURES

- **Up to 27.952 Gbps Data rate per channel**
- **Maximum link length of 100m links on OM3 multimode fiber**
- **High Reliability 850nm VCSEL technology**
- **Electrically hot-pluggable**
- **Digital diagnostic SFF-8436 compliant**
- **Compliant with QSFP28 MSA**
- **Case operating temperature range:0°C to 70°C**
- **Power dissipation < 2.5 W**



APPLICATIONS

- **Data center**
- **Infiniband QDR**
- **Fiber channel**

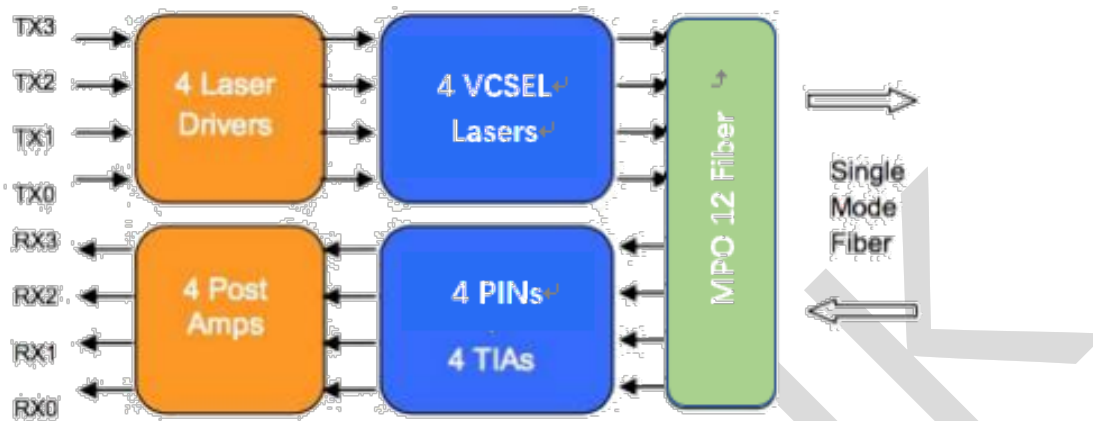
DESCRIPTIONS

ETU-LINK EQP85Y-01D are designed for use in 100 Gigabit per second links over multimode fiber. They are compliant with the QSFP28 MSA and IEEE 802.3bm

The optical transmitter portion of the transceiver incorporates a 4-channel VCSEL (Vertical Cavity Surface Emitting Laser) array, a 4-channel input buffer and laser driver, diagnostic monitors, control and bias blocks. For module control, the control interface incorporates a Two Wire Serial interface of clock and data signals. Diagnostic monitors for VCSEL bias, module temperature, transmitted optical power, received optical power and supply voltage are implemented and results are available through the TWS interface. Alarm and warning thresholds are established for the monitored attributes. Flags are set and interrupts generated when the attributes are outside the thresholds. Flags are also set and interrupts generated for loss of input signal (LOS) and transmitter fault conditions. All flags are latched and will remain set even if the condition initiating the latch clears and operation resumes. All interrupts can be masked and flags are reset by reading the appropriate flag register. The optical output will squelch for loss of input signal unless squelch is disabled. Fault detection or channel deactivation through the TWS interface will disable the channel. Status, alarm/warning and fault information are available via the TWS interface.

The optical receiver portion of the transceiver incorporates a 4-channel PIN photodiode array, a 4-channel TIA array, a 4 channel output buffer, diagnostic monitors, and control and bias blocks. Diagnostic monitors for optical input power are implemented and results are available through the TWS interface. Alarm and warning thresholds are established for the monitored attributes. Flags are set and interrupts generated when the attributes are outside the thresholds. Flags are also set and interrupts generated for loss of optical input signal (LOS). All flags are latched and will remain set even if the condition initiating the flag clears and operation resumes. All interrupts can be masked and flags are reset upon reading the appropriate flag register. The electrical output will squelch for loss of input signal (unless squelch is disabled) and channel de-activation through TWS interface. Status and alarm/warning information are available via the TWS interface.

Module Block Diagram



Ordering Information

| Part No. | Data Rate(Gbps) | Laser | Fiber Type | Distance | Optical Interface | Temp | DDMI | Latch Color |
|------------|-----------------|-------|------------|----------|-------------------|--------|------|-------------|
| EQP85Y-01D | 103.125 | VCSEL | MMF | 100M | MPO | 0~70°C | YES | White |

Absolute Maximum Ratings

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|----------------------|--------|---------|------|---------|------|------|
| Storage Temperature | Ts | -40 | - | 85 | °C | |
| Relative Humidity | RH | 5 | - | 95 | % | |
| Power Supply Voltage | VCC | -0.3 | - | 4 | V | |
| Signal Input Voltage | | Vcc-0.3 | - | Vcc+0.3 | V | |

Recommended Operating Conditions

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|----------------------------|--------|------|----------|------|------|------------------|
| Case Operating Temperature | Tcase | 0 | - | 70 | °C | Without air flow |
| Power Supply Voltage | VCC | 3.14 | 3.3 | 3.46 | V | |
| Power Supply Current | ICC | - | | 750 | mA | |
| Data Rate | BR | | 25.78125 | | Gbps | Each channel |
| Transmission Distance | TD | | - | 100 | m | OM3 MMF |

Electrical Characteristics

| Parameter | Symbol | Min | Typ | Max | Unit | Note |
|--------------------------------------|---------|------|-----|------|----------|------|
| Supply Voltage | Vcc | 3.14 | 3.3 | 3.46 | V | |
| Supply Current | Icc | | | 750 | mA | |
| Transmitter | | | | | | |
| Input differential impedance | Rin | | 100 | | Ω | 1 |
| Differential data input swing | Vin,pp | 180 | | 1000 | mV | |
| Single ended input voltage tolerance | VinT | -0.3 | | 4.0 | V | |
| Receiver | | | | | | |
| Differential data output swing | Vout,pp | 300 | | 850 | mV | 2 |
| Single-ended output voltage | | -0.3 | | 4.0 | V | |

Notes:

- 1) Connected directly to TX data input pins. AC coupled thereafter.
- 2) Into 100 Ω ohms differential termination.

Optical and Characteristics

| Parameter | Symbol | Min | Type | Max | Unit | Note |
|--|-----------------------------|------|------|-------|------|------|
| Transmitter | | | | | | |
| Center Wavelength | λ_0 | 840 | | 860 | nm | |
| Average Launch Power each lane | | -8.4 | | 2.4 | dBm | |
| Spectral Width (RMS) | σ | | | 0.6 | nm | |
| Optical Extinction Ratio | ER | 2 | | | dB | |
| Transmitter and Dispersion Penalty each lane | TDP | | | 4.3 | dB | |
| Optical Return Loss Tolerance | ORL | | | 12 | dB | |
| Output Eye Mask | Compliant with IEEE 802.3bm | | | | | |
| Receiver | | | | | | |
| Receiver Wavelength | λ_{in} | 840 | | 860 | nm | |
| Rx Sensitivity per lane | RSENS | | | -10.3 | dBm | 1 |
| Input Saturation Power (Overload) | Psat | 2.4 | | | dBm | |
| Receiver Reflectance | Rr | | | -12 | dB | |

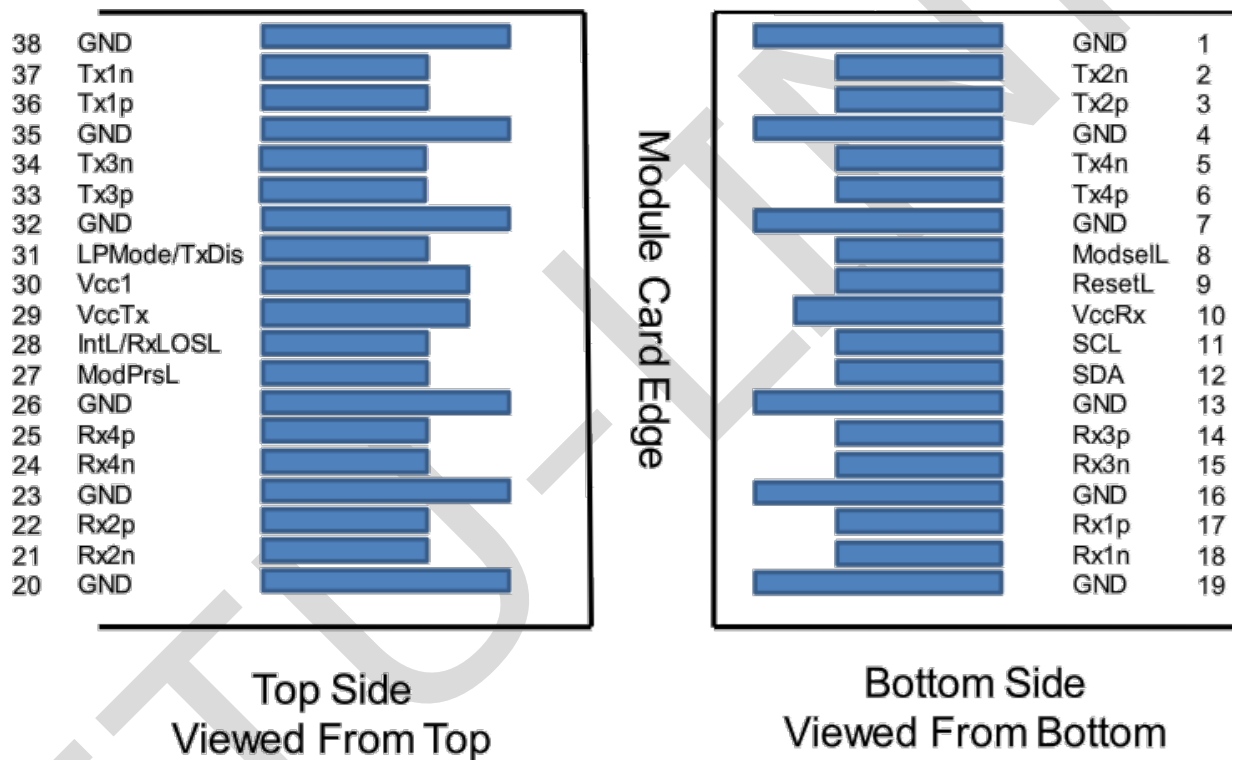
Notes:

- 1) Measured with a PRBS 231-1 test pattern, @25.78Gb/s, BER<5.0*10⁻⁵

Digital Diagnostics

| Parameter | Range | Accuracy | Unit | Calibration |
|-----------------|--------------|----------|------|-------------|
| Temperature | 0 to 70 | ±3 | °C | commercial |
| Voltage | 0 to Vcc | ±3% | V | commercial |
| Tx Bias Current | 0 to 10 | ±10% | mA | commercial |
| Tx Output Power | -8.4 to 2.4 | ±3 | dB | commercial |
| Rx Input Power | -10.3 to 2.4 | ±3 | dB | commercial |

Pin Diagram



Pin Definitions

| Pin | Symbol | Name/Description | Note |
|-----|--------|--|------|
| 1 | GND | Transmitter Ground (Common with Receiver Ground) | 1 |
| 2 | Tx2n | Transmitter Inverted Data Input | |
| 3 | Tx2p | Transmitter Non-Inverted Data output | |
| 4 | GND | Transmitter Ground (Common with Receiver Ground) | 1 |
| 5 | Tx4n | Transmitter Inverted Data Input | |

| | | | |
|----|---------|--|---|
| 6 | Tx4p | Transmitter Non-Inverted Data output | |
| 7 | GND | Transmitter Ground (Common with Receiver Ground) | 1 |
| 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 | Transmitter Ground (Common with Receiver Ground) | |
| 14 | Rx3p | Receiver Non-Inverted Data Output | |
| 15 | Rx3n | Receiver Inverted Data Output | |
| 16 | GND | Transmitter Ground (Common with Receiver Ground) | 1 |
| 17 | Rx1p | Receiver Non-Inverted Data Output | |
| 18 | Rx1n | Receiver Inverted Data Output | |
| 19 | GND | Transmitter Ground (Common with Receiver Ground) | 1 |
| 20 | GND | Transmitter Ground (Common with Receiver Ground) | 1 |
| 21 | Rx2n | Receiver Inverted Data Output | |
| 22 | Rx2p | Receiver Non-Inverted Data Output | |
| 23 | GND | Transmitter Ground (Common with Receiver Ground) | 1 |
| 24 | Rx4n | Receiver Inverted Data Output | 1 |
| 25 | Rx4p | Receiver Non-Inverted Data Output | |
| 26 | GND | Transmitter Ground (Common with Receiver Ground) | 1 |
| 27 | ModPrsl | Module Present | |
| 28 | IntL | Interrupt | |
| 29 | VccTx | 3.3V power supply transmitter | 2 |
| 30 | Vcc1 | 3.3V power supply | 2 |
| 31 | LPMode | Low Power Mode □not connect | |
| 32 | GND | Transmitter Ground (Common with Receiver Ground) | 1 |
| 33 | Tx3p | Transmitter Non-Inverted Data Input | |
| 34 | Tx3n | Transmitter Inverted Data Output | |
| 35 | GND | Transmitter Ground (Common with Receiver Ground) | 1 |
| 36 | Tx1p | Transmitter Non-Inverted Data Input | |
| 37 | Tx1n | Transmitter Inverted Data Output | |
| 38 | GND | Transmitter Ground (Common with Receiver Ground) | 1 |

Notes:

- 1) GND is the symbol for signal and supply (power) common for QSFP28 modules. All are common within the QSFP28 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 the receiving and transmission power suppliers and shall be applied concurrently. Recommended host board

power supply filtering is shown below. Vcc Rx, Vcc1 and Vcc Tx may be internally connected within the QSFP28 transceiver module in any combination. The connector pins are each rated for a maximum current of 500mA.

Recommended Interface Circuit

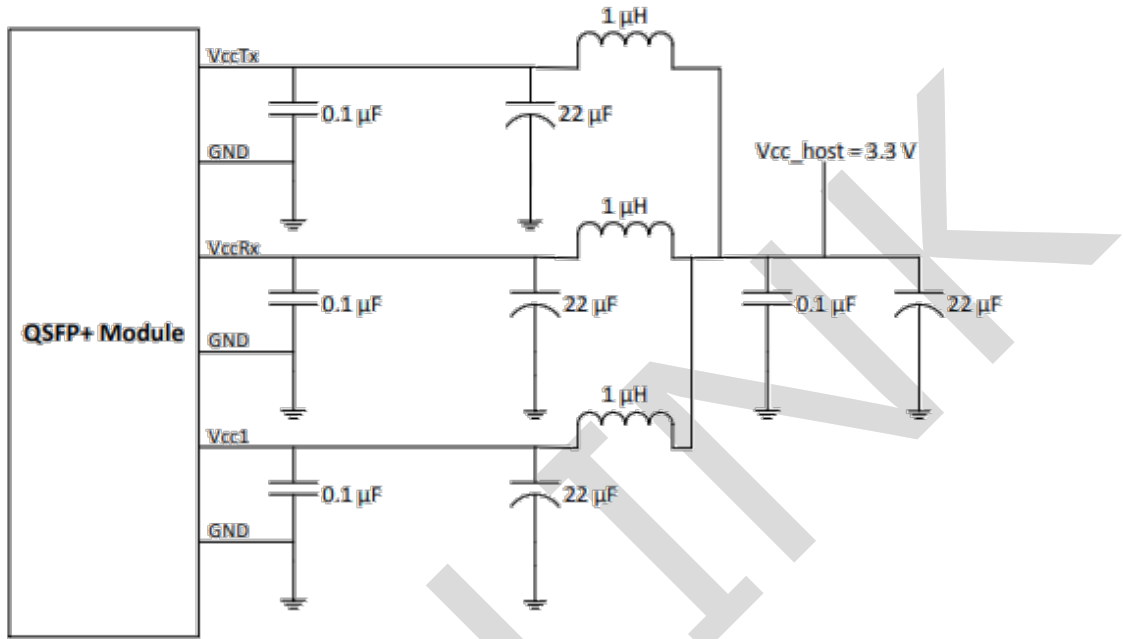
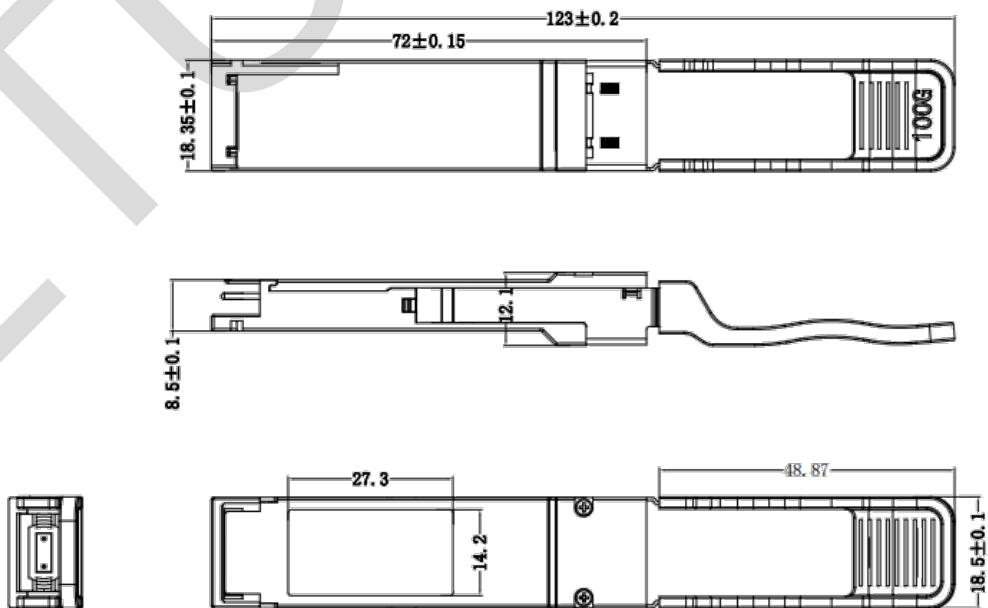


FIGURE 5-4 RECOMMENDED HOST BOARD POWER SUPPLY FILTERING

Mechanical Diagram



Revision History

| Version No. | Date | Description |
|-------------|-------------------|-----------------------|
| 1.0 | February 18, 2020 | Preliminary datasheet |
| 1.1 | July 26, 2024 | Format change |

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