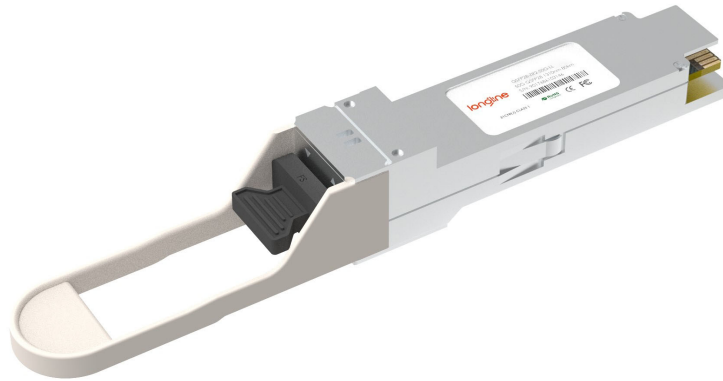


50GBASE-SR SFP56 850nm 100m DOM Transceiver

QSFP28-ZR2-50G-LL



Application

- 25G&50G BASE-SR

Standards

- SFF-8402
- SFF-8419
- SFF-8472
- OIF-CEI-04.0
- IEEE802.3cd

Features

- Supports 25.78Gb/s NRZ and 53.125Gb/s PAM4
- Hot-pluggable SFP56 Footprint
- 850nm VCSEL Laser and Pin Photo-Detector
- Internal CDR on Transmitter and Receiver Channel
- Duplex LC Connector
- Low Power Consumption < 1.5W
- Link Lengths at 25.78G NRZ and 53.125G PAM4 100m over OM4 MMF
- Single +3.3V \pm 5% Power Supply
- Operating Temperature Range: 0°C to 70°C
- Digital Monitoring SFF-8472 Compliant

Description

The 50G SR short-wavelength transceiver is designed for use in 25.78G NRZ and 53.125Gb/s PAM4 data rate over multimode fiber. The transceiver is compliant with SFF-8402, and the mechanical SFP+ plug is compatible with SFF-8432. Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472.

Product Specifications

I. Absolute Maximum Ratings

| Parameter | Symbol | Unit | Min. | Max. |
|----------------------------------|-----------------|------|------|------|
| Storage Temperature Range | T _s | °C | -40 | 85 |
| Relative Humidity | RH | % | 0 | 85 |
| Supply Voltage | V _{CC} | V | -0.3 | 4.0 |

II. Recommended Operating Conditions

| Parameter | Symbol | Unit | Min. | Typ. | Max. |
|---|-----------------|------|------|--------------|--------|
| Operating Case Temperature Range | T _c | °C | 0 | | 70 |
| Power Supply Voltage | V _{CC} | V | 3.1 | 3.3 | 3.465 |
| Bit Rate | BR | Gb/s | | 25.78/53.125 | |
| Bit Error Ratio | BER | | | | 5*1E-5 |
| Max. Supported Link Length | L | m | | | 100 |

III. Electric Characteristics

| Parameter | Symbol | Unit | Min. | Typ. | Max. | Note |
|---|-------------|----------|----------|------|--------------|------|
| Supply Voltage | V_{CC} | V | 3.1 | 3.3 | 3.465 | |
| Supply Current | I_{CC} | mA | | | 450 | |
| Transmitter | | | | | | |
| Input Differential Impedance | R_{IN} | Ω | 80 | 100 | 120 | 1 |
| Single Ended Data Input Swing | V_{IN} | mVp-p | 90 | | 500 | |
| Transmit Disable Voltage | V_{DIS} | V | 2 | | V_{CCHOST} | |
| Transmit Enable Voltage | V_{EN} | V | V_{EE} | | $V_{EE}+0.8$ | |
| Transmit Fault Assert Voltage | V_{FA} | V | 2 | | V_{CCHOST} | |
| Transmit Fault De-Assert Voltage | V_{FDA} | V | V_{EE} | | $V_{EE}+0.8$ | |
| Receiver | | | | | | |
| Single Ended Data Output Swing | V_{OD} | mVp-p | 200 | | 500 | |
| LOS Fault | V_{LOSFT} | V | 2 | | V_{CCHOST} | |
| LOS Normal | V_{LOSNR} | V | V_{EE} | | $V_{EE}+0.8$ | |

NOTE 1: Differential between TD+ / TD-

IV. Optical Characteristics

(Tested under recommended operating conditions, unless otherwise noted)

| Parameter | Symbol | Unit | 25.78Gb/s | | | 53.125Gb/s | | | Note |
|-----------|--------|------|-----------|------|------|------------|------|------|------|
| | | | Min. | Typ. | Max. | Min. | Typ. | Max. | |

Transmitter

| | | | | | | | | | |
|--|------------------|-----|------|--|-----|---------------|--|-----|--|
| Modulation Format | | | NRZ | | | PAM4 | | | |
| Nominal Wavelength | λ | nm | 840 | | 860 | 840 | | 860 | |
| RMS Spectral Width | $\Delta\lambda$ | nm | | | 0.6 | | | 0.6 | |
| Tx OMA per Lane | TxOMA | dBm | -6.4 | | 3 | -4.5 | | 3 | |
| Optical Output Power | P _{av} | dBm | -8.4 | | 2.4 | -6.5 | | 4 | |
| Extinction Ratio | ER | dB | 2 | | | 3 | | | |
| Launch Power in OMA Outer Minus TDECQ (Min) | | dBm | | | | -5.9 | | | |
| Optical Return Loss Tolerance | ORL | dB | | | 12 | | | 12 | |
| Encircled Flux | FLX | dBm | | | | >86% at 19um | | | |
| | | | | | | <30% at 4.5um | | | |
| TDECQ | | dB | | | | | | 4.5 | |
| Average Launch Power of OFF Transmitter | P _{OFF} | dBm | | | -30 | | | -30 | |

Receiver

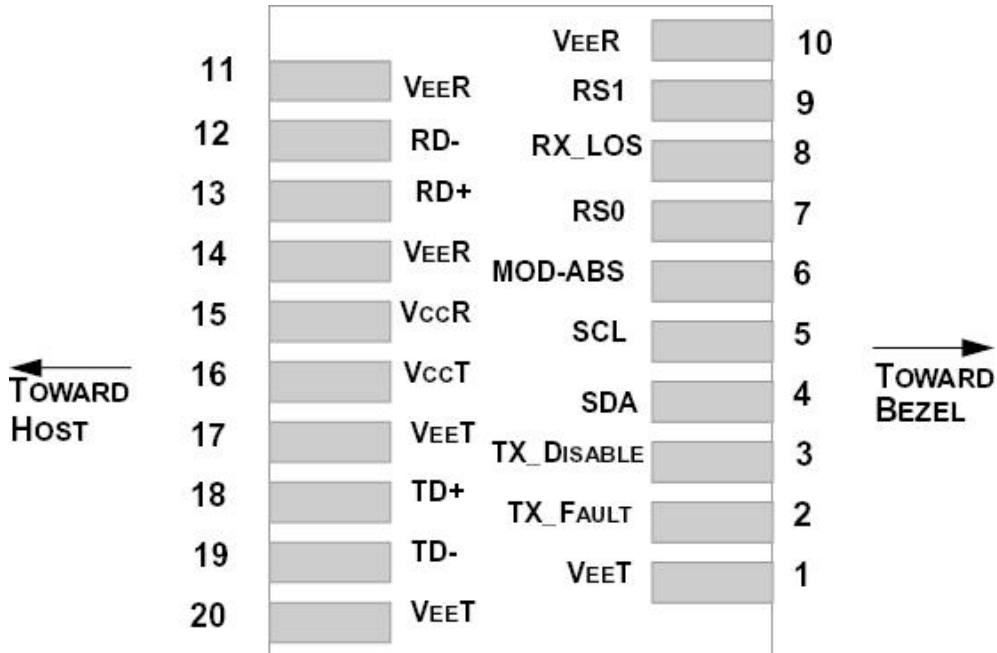
| | | | | | | | | | |
|--------------------------|-----------|-----|-----|--|-----|------|--|-----|--|
| Modulation Format | | | NRZ | | | PAM4 | | | |
| Center Wavelength | λ | nm | 840 | | 860 | 840 | | 860 | |
| Damage Threshold | DT | dBm | 3.4 | | | 5 | | | |

| Parameter | Symbol | Unit | 25.78Gb/s | | | 53.125Gb/s | | | Note |
|-----------|--------|------|-----------|------|------|------------|------|------|------|
| | | | Min. | Typ. | Max. | Min. | Typ. | Max. | |

Receiver

| | | | | | | | | | |
|---|--------------|-----|--|--|-------|--|--|------|--|
| Max. Average Receiver Power (Overload) | P_{AVG} | dBm | | | 2.4 | | | 4 | |
| Receive Power (OMAOuter) (Overload) | | dBm | | | 3 | | | 3 | |
| Stressed Receiver Sensitivity (OMA) | R_{SENSE1} | dBm | | | -5.2 | | | -3.4 | |
| Receiver Reflectance | R_{REFL} | dB | | | -12 | | | -12 | |
| Max. Receiver Sensitivity (OMAouter) | R_{SENSE2} | dBm | | | -10.3 | | | -6.5 | |

V. Pin Function Definitions



VI. Transceiver Pin Descriptions

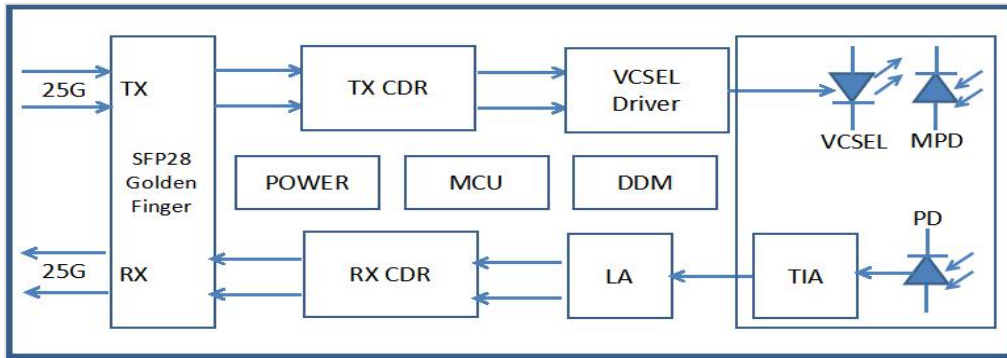
| Pin Number | Symbol | Name | Description |
|-----------------|------------|---|---|
| 1,17,20 | VeeT | Transmitter Signal Ground | These Pins Should Be Connected to Signal Ground on the Host Board. |
| 2 | TX Fault | Transmitter Fault Out (OC) | Logic "1" Output = Transmitter Fault Logic "0" Output = Normal Operation This Pin is Open Collector Compatible, and Should Be Pulled up to Host Vcc with A 10kΩ Resistor. |
| 3 | TX Disable | Transmitter Disable In (LVTTTL) | Logic"1"Input (or No Connection) = Laser off Logic"0" Input = Laser on This Pin is Internally Pulled Up to Vcct with A 10kΩ Resistor. |
| 4 | SDA | Module Definition Identifiers | Serial ID with SFF 8472 Diagnostics Module Definition Pins Should Be Pulled up to Host Vcc with 10kΩ Resistors. |
| 5 | SCL | | |
| 6 | MOD-ABS | | |
| 7 | RS0 | Receiver Rate Select (LVTTTL) Transmitter Rate Select (LVTTTL) | NA |
| 9 | RS1 | | NA |
| 8 | LOS | Loss of Signal Out (OC) | This Pin is Open Collector Compatible, and Should Be Pulled Up to Host Vcc with A 10kΩ Resistor. |
| 10,11,14 | VeeR | Receiver Signal Ground | These Pins Should Be Connected to Signal Ground on the Host Board. |
| 12 | RD- | Receiver Negative DATA Out (CML) | Light on = Logic "0" Output Receiver DATA Output is Internally AC Coupled And series terminated with a5 0Ω resistor. |
| 13 | RD+ | Receiver Positive DATA Out (CML) | Light on = Logic "1" Output Receiver Data Output is Internally Ac Coupled and Series Terminated with A 50Ω Resistor. |
| 15 | VccR | Receiver Power Supply | This Pin Should Be Connected to a Filtered +3.3V Power Supply on the Host Board.see Figure3. Recommended Power Supply Filter |

| Pin Number | Symbol | Name | Description |
|------------|--------|------------------------------------|--|
| 16 | VccT | Transmitter Power Supply | This Pin Should Be Connected to a Filtered +3.3V Power Supply on the Host Board. See Figure3. Recommended Power Supply Filter |
| 18 | TD+ | Transmitter Positive DATA In (CML) | Logic"1"Input=Light On Transmitter Data Inputs are Internally AC Coupled and Terminated with a Differential 100Ω Resistor. |
| 19 | TD- | Transmitter Negative DATA In (CML) | Logic"0"Input=Light on Transmitter Data Inputs Are Internally AC Coupled and Terminated with a Differential 100Ω Resistor. |

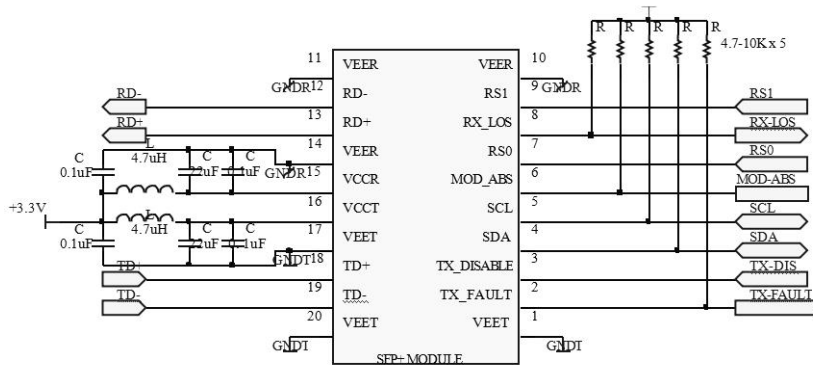
VII. Regulatory Compliance

| Feature | Test Method | Performance |
|---|---|--|
| Electrostatic Discharge (ESD) to the Electrical Pins | MIL-STD-883C Method 3015.7 | Class1 (>1500 Volts) |
| Electrostatic Discharge (ESD) Immunity | Variation of IEC 61000-4-2 | LV 4 (Air discharge: 15 KV; Contact discharge : 8 KV) |
| Electromagnetic Interference (EMI) | CISPR22 ITE Class B EN55022 Class B FCC Class B | Compliant with Standards |
| Immunity | IEC61000-4-3 Class 2 EN55024 | Typically show no measurable effect from a 3V/m field swept from 80 to 1000MHz applied to the transceiver without a chassis enclosure. |

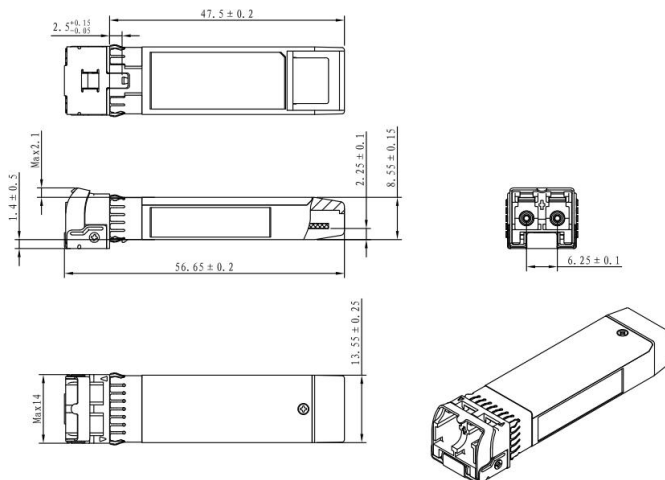
VIII. Principle diagram



IX. Typical Application Circuit



X. Package Outline



Unit: mm

Unspecified Tolerance: ±0.2mm