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# SFP-WB80 1.25 Gigabit Ethernet-Single Mode Transceiver

## SFP BIDI, Single LC Connector, 1510nm DFB LD for Single Mode Fiber, RoHS Compliant

RoHS

### Applications

- Gigabit Ethernet Links
- Fibre Channel Links at 1.06 Gbps
- High Speed Backplane Interconnects
- Switched Backbones

### Features

- 1510nm DFB LD
- Multi Data Rate: from 125M to 1.25Gbps, NRZ
- Single +3.3V Power Supply
- RoHS Compliant and Lead-free
- AC/AC Differential Electrical Interface
- Compliant with Multi-Source Agreement (MSA) Small Form Factor Pluggable (SFP)
- Single LC Connector
- Compliance with specifications for IEEE-802.3z Gigabit Ethernet at 1.25 Gbps
- Compliance with ANSI specifications for Fibre Channel applications at 1.06 Gbps
- Eye Safety
  Designed to meet Laser Class 1 comply with EN60825-1

### Description

The SFP-WB80 from AAXEON is the high performance and cost-effective module for serial optical data communication applications specified for single mode of multi-rate from 125M to 1.25 Gb/s. It operates with +3.3V power supply. The module is intended for single mode fiber, operates at a nominal wavelength of Tx: 1510nm / Rx: 1590nm and complies with Multi-Source Agreement (MSA) Small Form Factor Pluggable (SFP). Each module consists of a bi-directional optical subassembly that combines a transmitter with a receiver and an electrical subassembly. All of them are housed in a metal package and the combination produces a reliable component.

The module is a single fiber connector transceiver designed for use in Gigabit Ethernet applications and to provide IEEE-802.3z compliant link for 1.25Gb/s long reach applications. The characteristics are performed in accordance with Telcordia Specification GR-468-CORE.

### EMC

Most equipment utilizing high-speed transceivers will be required to meet the following requirements:

1) FCC in the United States
2) CENELEC EN55022 (CISPR 22) in Europe

To assist the customer in managing the overall equipment EMC performance, the transceivers have been designed to satisfy FCC class B limits and provide good immunity to radio-frequency electromagnetic fields.

### Eye Safety

The transceivers have been designed to meet Class 1 eye safety and comply with EN 60825-1.

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## *Product Information*

| Model Number | Operating Voltage & SD Output | Distance | Wavelength | Output Power | Sensitivity |
|---|---|---|---|---|---|
| *SFP-WB80* | *3.3V TTL AC/AC* | *80 km* | *1510 nm DFB / 1590 nm* | *-2 ~ +3 dBm* | *≦-26 dBm* |

## ABSOLUTE MAX RATINGS

| PARAMETER | SYMBOL | MIN | MAX | UNIT | NOTE |
|---|---|---|---|---|---|
| Storage Temperature | $T_S$ | -40 | 85 | ℃ | |
| Supply Voltage | $V_{CC}$ | 0 | 6 | V | |
| Data Input Voltage | --- | 0 | Vcc | V | |
| Supply Current | $I_S$ | | 300 | mA | |

## OPERATING CONDITIONS

| PARAMETER | SYMBOL | MIN. | TYP. | MAX. | UNIT | NOTE |
|---|---|---|---|---|---|---|
| Case Operating Temperature | $T_A$ | 0 | | 70 | ℃ | |
| Supply Voltage | $V_{CC}$ | 3.1 | | 3.5 | V | |
| Data Input Voltage Swing | $V_{ID}$ | 300 | | 1860 | mV | |

## ELECTRICAL CHARACTERISTICS

| PARAMETER | SYMBOL | MIN | MAX | UNIT | NOTE |
|---|---|---|---|---|---|
| **Transmitter** | | | | | |
| Transmitter Supply Current | $I_{CCT}$ | | 200 | mA | |
| Tx_ Disable Input Voltage - Low | $V_{IL}$ | 0 | 0.8 | V | |
| Tx_ Disable Input Voltage - High | $V_{IH}$ | 2.0 | Vcc | V | |
| Tx_ Fault Output Voltage - Low | $V_{OL}$ | 0 | 0.8 | V | |
| Tx_ Fault Output Voltage - High | $V_{OH}$ | 2.0 | Vcc | V | |
| **Receiver** | | | | | |
| Receiver Supply Current | $I_{CCR}$ | | 100 | mA | |
| Receiver Data Output Differential Voltage | $V_{OD}$ | 0.4 | 1.3 | V | |
| Rx_LOS Output Voltage - Low | $V_{OL}$ | 0 | 0.8 | V | |
| Rx_LOS Output Voltage - High | $V_{OH}$ | 2.0 | Vcc | V | |
| MOD_DEF (1) , MOD_DEF (2) - Low | $V_{IL}$ | -0.6 | Vcc × 0.3 | V | |
| MOD_DEF (1) , MOD_DEF (2) - High | $V_{IH}$ | Vcc × 0.7 | Vcc + 0.5 | V | |

## TRANSMITTER ELECTRO-OPTICAL CHARACTERISTICS

| PARAMETER | SYMBOL | MIN | TYP. | MAX | UNIT | NOTE |
|---|---|---|---|---|---|---|
| Optical Output Power | Po | -2 | | 3 | dBm | 1 |
| Extinction Ratio | ER | 9 | | | dB | |
| Center Wavelength | $\lambda_c$ | 1480 | 1510 | 1520 | nm | |
| Spectral Width (-20dB) | Δλ | | | 1 | nm | |
| Side Mode Suppression Ratio | SMSR | 30 | | | dB | |
| RIN | RIN | | | -120 | dB/Hz | |
| Optical Rise time (20%-80% ) | $t_r$ | | | 260 | ps | 2 |
| Optical Fall time (20%-80% ) | $t_f$ | | | 260 | ps | 2 |
| Output Eye | Compliant with IEEE802.3z/D5.0 | | | | | |

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## RECEIVER ELECTRO-OPTICAL CHARACTERISTICS

| PARAMETER | | SYMBOL | MIN | TYP. | MAX | UNIT | NOTE |
|---|---|---|---|---|---|---|---|
| Maximum Input Optical Power | | $P_{max}$ | -3 | | | dBm | 3 |
| Minimum Input Optical Power | 1.25Gb/s | $P_{min}$ | | | -26 | dBm | 3 |
| | 1.06Gb/s | | | | -26 | | 3 |
| | 622Mb/s | | | | -26 | | 4 |
| | 155Mb/s | | | | -26 | | 4 |
| | 125Mb/s | | | | -26 | | 3 |
| Operating Wavelength | | λ | 1580 | | 1620 | nm | |
| Optical Return Loss | | ORL | 14 | | | dB | |
| Receiver Electrical 3dB Upper Cutoff Frequency | | --- | | | 1500 | MHz | |
| LOS of Signal - Asserted | | $P_A$ | -40 | | | dBm | |
| LOS of Signal - Deasserted | | $P_D$ | | | -25 | dBm | |
| Loss of Signal -Hysterisis | | $P_D - P_A$ | 0.5 | | | dB | |

**Notes:**

1. Measured average power coupled into 9/125μm single mode fiber.
2. These are 20-80% values.
3. Measured with $2^7$-1 PRBS at BER<$10^{-12}$
4. Measured with $2^{23}$-1 PRBS at BER<$10^{-10}$

## TIMING CHARACTERISTICS

| PARAMETER | SYMBOL | MIN | TYP. | MAX | UNIT | NOTE |
|---|---|---|---|---|---|---|
| TX_DISABLE Assert Time | t_off | | | 10 | μs | |
| TX_DISABLE Negate Time | t_on | | | 1 | ms | |
| Time to initialize, include reset of TX_FAULT | t_init | | | 300 | ms | |
| TX_FAULT from fault to assertion | t_fault | | | 100 | μs | |
| TX_DISABLE time to start reset | t_reset | 10 | | | μs | |
| Receiver Loss of Signal Assert Time (off to on) | $t_{A,RX\_LOS}$ | | | 100 | μs | |
| Receiver Loss of Signal Assert Time (on to off) | $t_{D,RX\_LOS}$ | | | 100 | μs | |

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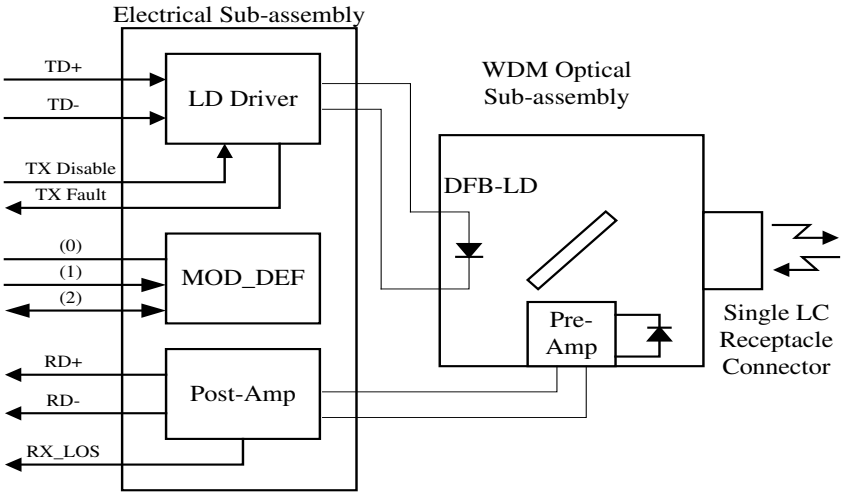
## *BLOCK DIAGRAM OF TRANSCEIVER*



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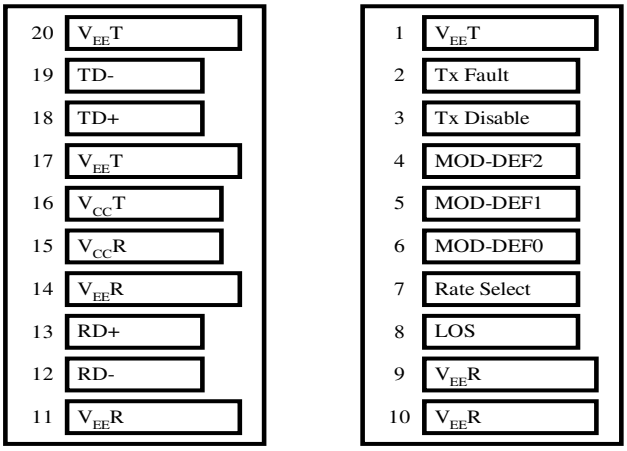
## *PIN OUT DIAGRAM OF TRANSCEIVER*




Top of Board

Buttom of Board (As Viewed through Top of Board

## *PIN OUT TABLE*

| Pin | Symbol | Functional Description |
|---|---|---|
| 1 | VeeT | Transmitter Ground |
| 2 | TX Fault | Transmitter Fault Indication |
| 3 | TX Disable | Transmitter Disable – Module disables on high or open |
| 4 | MOD-DEF(2) | Module Definition 2 – Two wire serial ID interface |
| 5 | MOD-DEF(1) | Module Definition 1 – Two wire serial ID interface |
| 6 | MOD-DEF(0) | Module Definition 0 – Grounded in module |
| 7 | Rate Select | Not Connected |
| 8 | LOS | Loss of Signal |
| 9 | VeeR | Receiver Ground |
| 10 | VeeR | Receiver Ground |
| 11 | VeeR | Receiver Ground |
| 12 | RD- | Inverse Received Data Out |
| 13 | RD+ | Received Data Out |
| 14 | VeeR | Receiver Ground |
| 15 | VccR | Receiver Power |
| 16 | VccT | Transmitter Power |
| 17 | VeeT | Transmitter Ground |
| 18 | TD+ | Transmitter Data In |
| 19 | TD- | Inverse Transmitter Data In |
| 20 | VeeT | Transmitter Ground |

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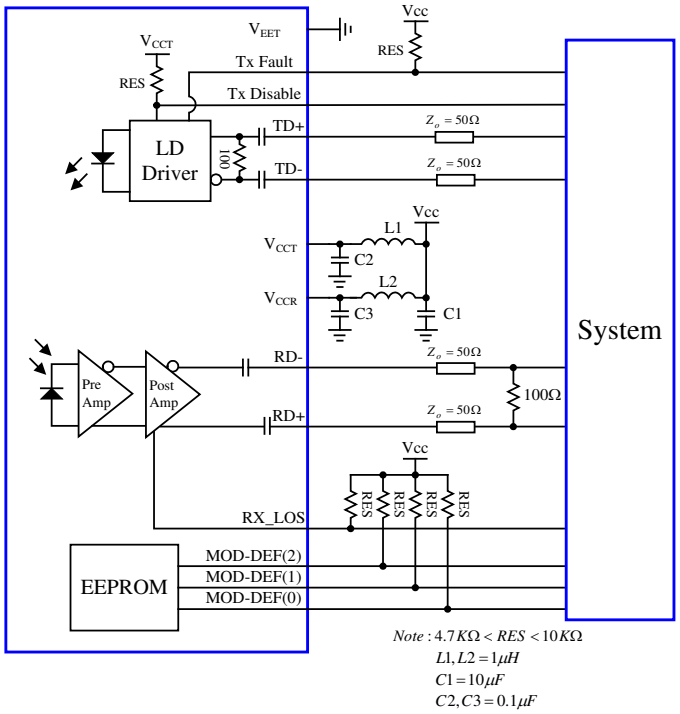
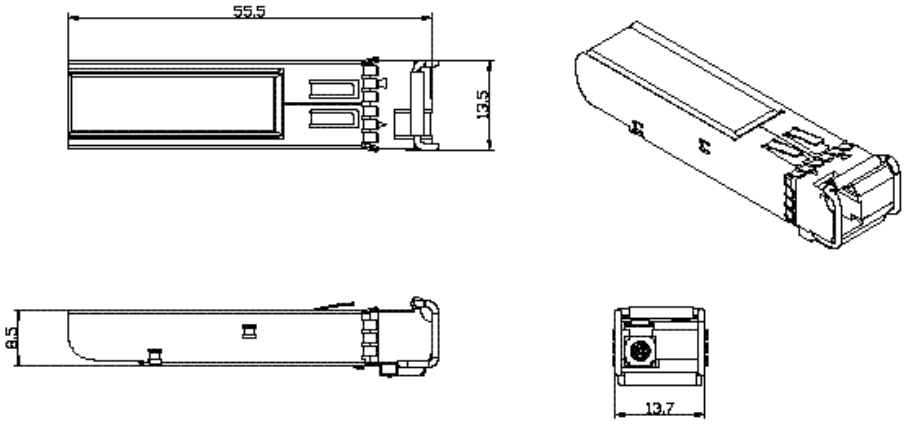
## *RECOMMENDED CIRCUIT SCHEMATIC*




*Note* : $4.7K\Omega < RES < 10K\Omega$
$L1, L2 = 1\mu H$
$C1 = 10\mu F$
$C2, C3 = 0.1\mu F$

## *MECHANICAL DIMENSIONS*

**Units in mm**




**All dimensions are ±0.2mm unless otherwise specified.**

# Assured Systems

Assured Systems is a leading technology company with over 1,500 regular clients in 80 countries, deploying over 85,000 systems to a diverse customer base in 12 years of business. We offer high-quality and innovative rugged computing, display, networking and data collection solutions to the embedded, industrial, and digital-out-of-home market sectors.

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