# GL10-SM55ZR80x

## SFP+ 10Gb/s 1550nm 80km Transceiver

## PRODUCT FEATURES

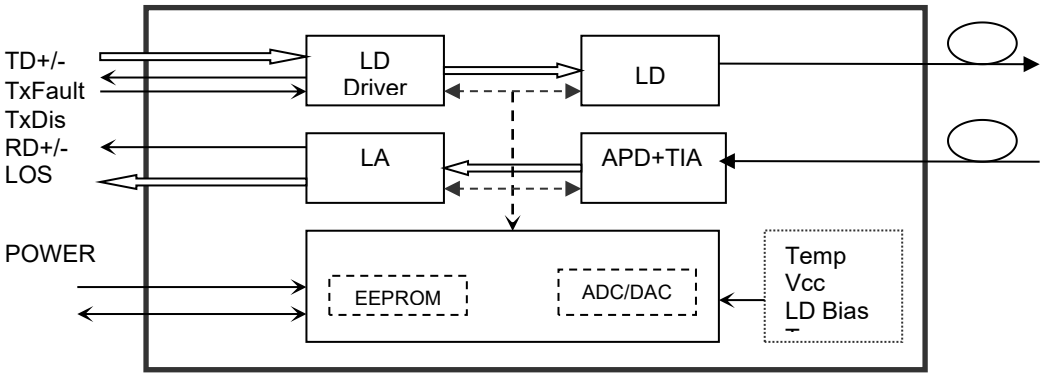
- Supports up to 11.3Gbps bit rates
- Hot-plug-gable SFP+ footprint
- Up to 80km for SMF
- Cooled EML laser and APD-TIA photo-diode,
- Compliant with SFP+ MSA and SFF-8472
- Single +3.3V power supply
- Real Time Digital Diagnostic Monitoring
- RoHS compliant
- Operating case temperature:
  Commercial: 0 to +70°C
  Industrial : -40to +85°C

## APPLICATIONS

- 10Gbps Ethernet Optical systems
- 10GBASE-ZR at 10.3125Gbps
- 10GBASE-ZW at 9.953Gbps
- LTE systems

## PRODUCT DESCRIPTION

The GL10-SM55ZR80x SFP+ transceivers are high performance,cost effective modules supporting data rate of 11.3Gbps and 80km transmission distance with SMF. The transceiver consists of three sections: a cooled EML DFB laser transmitter, a APD photo-diode integrated with a trans-impedance pre-amplifier (TIA) and MCU control unit. All modules satisfy class I laser safety requirements.




**Transceiver functional diagram**

## Ordering information

| Product part Number | Data Rate (Gbps) | Media | Wavelength (nm) | Transmission Distance(km) | Temperature Range $T_{case}$ / ℃ | |
|---|---|---|---|---|---|---|
| GL10-SM55ZR80C | 10.3 | SMF | 1550 | 80 | 0~70 | Commercial |
| GL10-SM55ZR80I | 10.3 | SMF | 1550 | 80 | -40~85 | Industrial |

## Absolute Maximum Ratings

| Parameter | Symbol | Min | Max | Unit |
|---|---|---|---|---|
| Supply Voltage | Vcc | -0.5 | 4.5 | V |
| Storage Temperature | Ts | -40 | +85 | ℃ |
| Operating Humidity | - | 5 | 85 | % |

## Recommended Operating Conditions

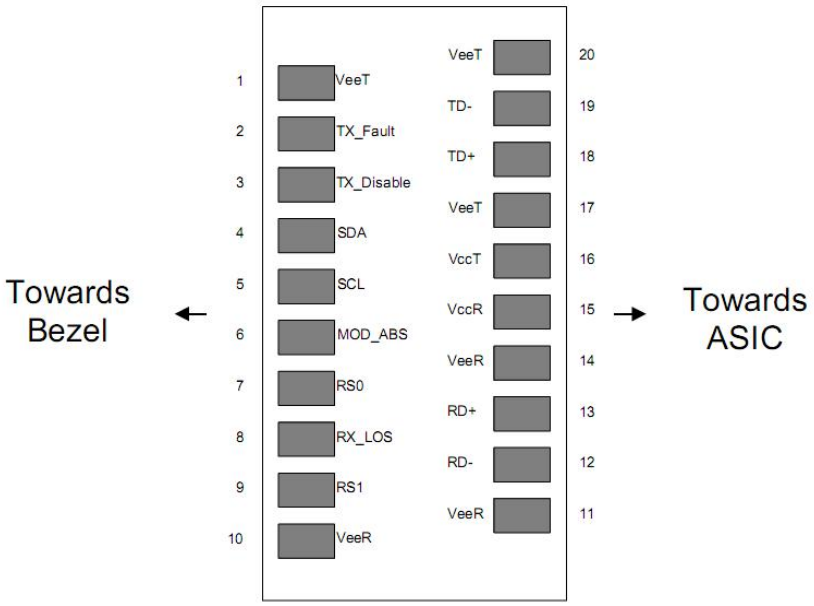
| Parameter | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| Case Operating Temperature Range | Tc | 0 | - | 70 | ℃ |
| | | -40 | - | 85 | |
| Power Supply Voltage | Vcc | 3.135 | 3.30 | 3.465 | V |
| Power Supply Current | Icc | | | 550 | mA |
| Data Rate | | | 10.3125 | 11.3 | Gbps |

# Optical and Electrical Characteristics

| Parameter | | Symbol | Min | Typical | Max | Unit | Notes |
|---|---|---|---|---|---|---|---|
| **Transmitter** | | | | | | | |
| Centre Wavelength | | λc | | 1550 | | nm | |
| Spectral Width（-20dB） | | Δλ | | | 1 | nm | |
| Side-Mode Suppression Ratio | | SMSR | 30 | - | | dB | |
| Average Output Power | | $P_{out}$ | 0 | | +5.0 | dBm | 1 |
| Extinction Ratio | | ER | 9.0 | | | dB | |
| Data Input Swing Differential | | $V_{IN}$ | 180 | | 850 | mV | 2 |
| Input Differential Impedance | | $Z_{IN}$ | 90 | 100 | 110 | Ω | |
| TX Disable | Disable | | 2.0 | | Vcc | V | |
| | Enable | | 0 | | 0.8 | V | |
| TX Fault | Fault | | 2.0 | | Vcc | V | |
| | Normal | | 0 | | 0.8 | V | |
| **Receiver** | | | | | | | |
| Centre Wavelength | | λc | 1260 | | 1620 | nm | |
| Receiver Sensitivity | | | | | -24 | dBm | 3 |
| Receiver Overload | | | -7.0 | | | dBm | 3 |
| LOS De-Assert | | $LOS_D$ | | | -26 | dBm | |
| LOS Assert | | $LOS_A$ | -35 | | | dBm | |
| LOS Hysteresis | | | 0.5 | | | dB | |
| Data Output Swing Differential | | $V_{out}$ | 300 | | 900 | mV | 4 |
| LOS | | High | 2.0 | | Vcc | V | |
| | | Low | | | 0.8 | V | |

**Notes:**
1. The optical power is launched into SMF.
2. PECL input, internally AC-coupled and terminated.
3. Measured with a PRBS $2^{31}$-1 test pattern @10312Mbps, BER ≤$1\times10^{-12}$.
4. Internally AC-coupled.

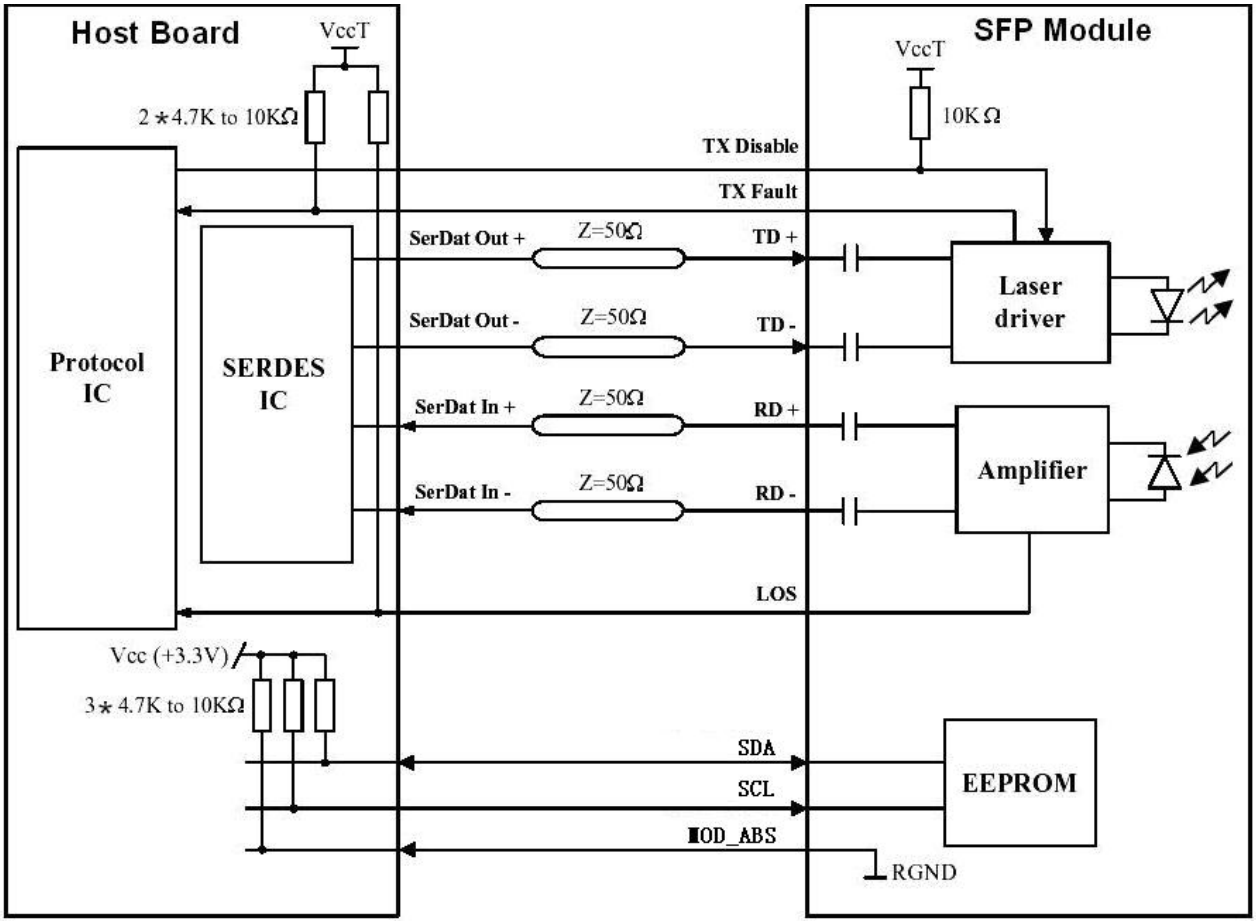
# Pin Description



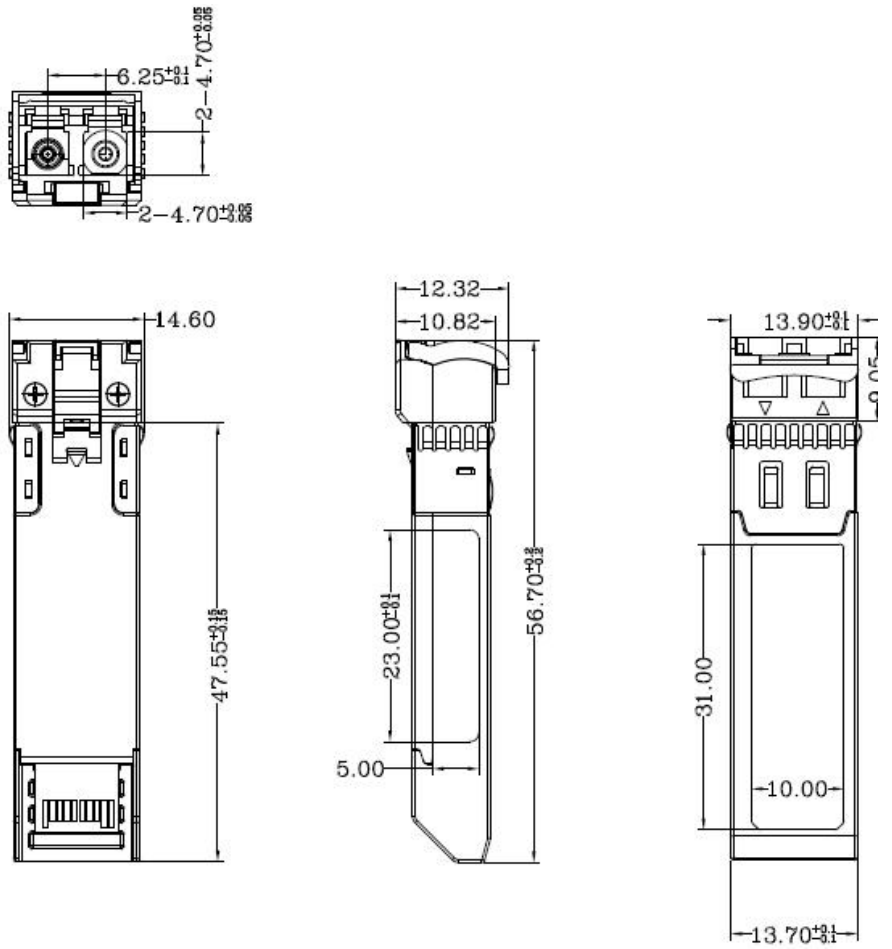

| Pin | Signal Name | Description | Plug Seq. | Notes |
|---|---|---|---|---|
| 1 | $V_{EET}$ | Transmitter Ground | 1 | |
| 2 | TX FAULT | Transmitter Fault Indication | 3 | Note 1 |
| 3 | TX DISABLE | Transmitter Disable | 3 | Note 2 |
| 4 | SDA | SDA Serial Data Signal | 3 | |
| 5 | SCL | SCL Serial Clock Signal | 3 | |
| 6 | MOD_ABS | Module Absent. Grounded within the module | 3 | |
| 7 | RS0 | Not Connected | 3 | |
| 8 | LOS | Loss of Signal | 3 | Note 3 |
| 9 | RS1 | Not Connected | 3 | |
| 10 | $V_{EER}$ | Receiver ground | 1 | |
| 11 | $V_{EER}$ | Receiver ground | 1 | |
| 12 | RD- | Inv. Received Data Out | 3 | Note 4 |
| 13 | RD+ | Received Data Out | 3 | Note 4 |
| 14 | $V_{EER}$ | Receiver ground | 1 | |
| 15 | $V_{CCR}$ | Receiver Power Supply | 2 | |
| 16 | $V_{CCT}$ | Transmitter Power Supply | 2 | |
| 17 | $V_{EET}$ | Transmitter Ground | 1 | |
| 18 | TD+ | Transmit Data In | 3 | Note 5 |
| 19 | TD- | Inv. Transmit Data In | 3 | Note 5 |
| 20 | $V_{EET}$ | Transmitter Ground | 1 | |

Notes:
Plug Seq.: Pin engagement sequence during hot plugging.
1) TX Fault is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; Logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.
2) Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
3) LOS is open collector output. Should be pulled up with 4.7k~10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.
4) RD-/+: These are the differential receiver outputs. They are internally AC-coupled 100 differential lines which should be terminated with 100Ω (differential) at the user SERDES.
5) TD-/+: These are the differential transmitter inputs. They are internally AC-coupled, differential lines with 100Ω differential termination inside the module.

## Recommended Interface Circuit



## Mechanical Dimensions




## Regulatory Compliance

| Feature | Reference | Performance |
|---|---|---|
| Electrostatic discharge（ESD） | IEC/EN 61000-4-2 | Compatible with standards |
| Electromagnetic Interference (EMI) | FCC Part 15 Class B EN 55022 Class B (CISPR 22A) | Compatible with standards |
| Laser Eye Safety | IEC/EN 60825-1, 2 | Class 1 laser product |
| ROHS | 2002/95/EC | Compatible with standards |
| EMC | EN61000-3 | Compatible with standards |