



Datasheet

155 Mbps SFP Transceiver

SFP-O3D-XLR



Features

- 100 - 155 Mbps data rate
- 43 dB minimum link budget
- 1550 nm DFB Class 1 laser
- 150 km reach
- APD Receiver
- SFP MSA compliance (SFF-8074i)
- Digital Diagnostic (SFF-8472)
- GR-253/STM G.957 compliance
- Telecordia GR-468 compliance
- 21CFR 1040.10 and 1040.11 compliance
- Single 3.3 volts power supply
- Commercial temperature availability
- RoHS compliance

General Operating

| Parameter | Symbol | Min. | Typical | Max. | Unit |
|---|----------|-------|---------|-------|-------------------|
| Supply Voltage | V_{CC} | 3.135 | 3.3 | 3.465 | V |
| Total Current | I_{CC} | - | - | 300 | mA |
| Power Supply Noise Rejection ^a | PSR | 100 | - | - | mV _{p-p} |
| Operating Case Temperature | T_{op} | -5 | - | 70 | °C |
| Storage Temperature | T_{st} | -40 | - | 85 | °C |
| Data Rate OC-3/STM-1 | DR | - | 155 | - | Mbps |

a) 20 Hz to 155 MHz

Transmitter Specifications (Optical)

| Parameter | Symbol | Min | Typical | Max | Unit |
|--------------------------------|-----------------|---------------------|---------|-------|-------|
| Optical Power | P_{op} | 1 | - | 5 | dBm |
| Average Launch Power (Tx: Off) | P_{off} | - | - | -45 | dBm |
| Extinction Ratio | ER | 10 | - | - | dB |
| Eye Mask | - | SONET/SDH Compliant | | | |
| Optical Jitter Generation | J_{gen} | - | - | 0.002 | UI |
| Optical Rise Time ^b | t_r | - | - | 1000 | ps |
| Optical Fall Time ^b | t_f | - | - | 1000 | ps |
| Mean Wavelength | λ | 1500 | 1550 | 1580 | nm |
| Spectral Width (20 dB) | $\Delta\lambda$ | - | - | 1 | nm |
| Side Mode Suppression Ratio | SMSR | 30 | - | - | dB |
| Dispersion Penalty (150 km) | DP | - | 0.5 | 2 | dB |
| Relative Intensity Noise | RIN | - | - | -120 | dB/Hz |
| Reflection Tolerance | rp | -24 | - | - | dB |

b) 20% - 80% values


Transmitter Specifications (Electical)

| Parameter | Symbol | Min | Typical | Max | Unit |
|------------------------------------|--------------|----------|---------|----------------|----------|
| Input Differential Impedence | R_{in} | 80 | 100 | 120 | Ω |
| PECL Single-Ended Data Input Swing | $V_{in,p-p}$ | 250 | - | 1200 | mV |
| TxFault_Fault | V_{fault} | 2 | - | V_{cc} | V |
| TxFault_Normal | V_{normal} | V_{ee} | - | $V_{ee} + 0.5$ | V |
| TxDisable_Disable | V_d | 2 | - | V_{cc} | V |
| TxDisable_Enable | V_{en} | V_{ee} | - | $V_{ee} + 0.8$ | V |

Receiver Specifications (Optical)

| Parameter | Symbol | Min | Typical | Max | Unit |
|---------------------------------|-----------------|------|---------|------|------|
| Receive Power Low ^c | $R_{sens,low}$ | - | - | -42 | dBm |
| Receive Power High ^c | $R_{sens,high}$ | -10 | - | - | dBm |
| Damage Threshold for Receiver | $P_{in,damage}$ | 4 | - | - | dBm |
| Wavelength ^d | λ | 1480 | - | 1580 | nm |
| LOS Assert | LOSA | -52 | - | - | dBm |
| LOS De-assert | LOSD | - | - | -42 | dBm |
| LOS Hysteresis | HYS | 0.5 | - | - | dB |

c) at 10^{-10} BER, PRBS 223-1

d) Operational over 1200 nm to 1625 nm range

Receiver Specifications (Electrical)

| Parameter | Symbol | Min | Typical | Max | Unit |
|-------------------------------------|---------------|-----|---------|-----|------|
| PECL Single Ended Data Output Swing | $V_{out,p-p}$ | 185 | - | 800 | mV |
| Data Output Rise Time | t_r | - | - | 175 | ps |
| Data Output Fall Time | t_f | - | - | 175 | ps |

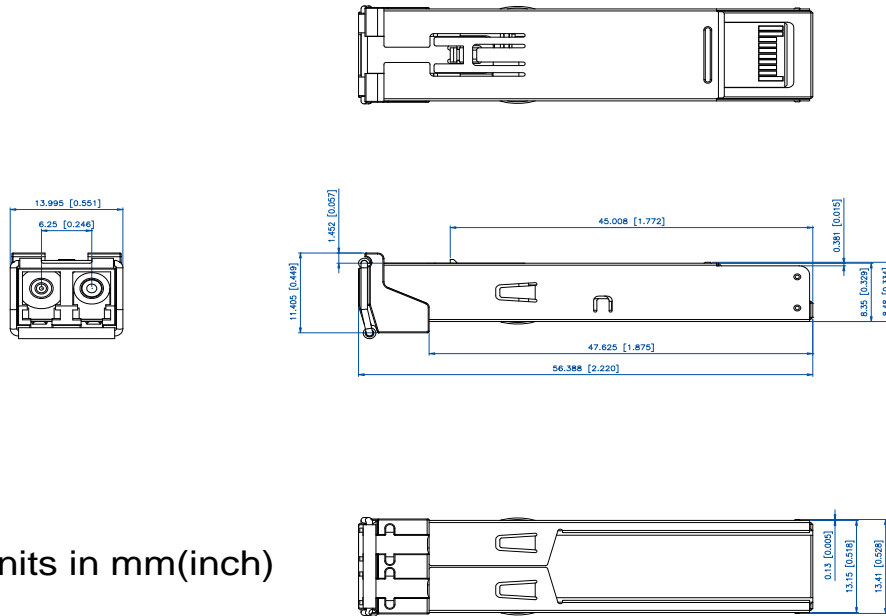
Timing and Electrical

| Parameter | Symbol | Min | Typical | Max | Unit |
|---|---------------------|----------|---------|----------------|---------|
| Tx Disable Negate Time | t_{on} | - | - | 5 | ms |
| Tx Disable Assert Time | t_{off} | - | - | 10 | μ s |
| Time To Initialize, Including Reset of Tx Fault | t_{init} | - | - | 300 | ms |
| Tx Fault Assert Time | t_{fault} | - | - | 100 | μ s |
| Tx Disable To Reset | t_{reset} | 10 | - | - | μ s |
| LOS Assert Time | t_{loss_on} | - | - | 100 | μ s |
| LOS De-assert Time | t_{loss_off} | - | - | 100 | μ s |
| Serial ID Clock Rate | f_{serial_clock} | - | - | 100 | KHz |
| RX_LOS Voltage (High) | - | 2 | - | - | V |
| RX_LOS Voltage (Low) | - | - | - | 0.8 | V |
| LOS Output Voltage-Fault | $V_{LOS\ fault}$ | 2 | - | V_{cc} | V |
| LOS Output Voltage-Normal | $V_{LOS\ normal}$ | V_{ee} | - | $V_{ee} + 0.5$ | V |
| MOD_DEF (0:2)-High | V_h | 2 | - | V_{cc} | V |
| MOD_DEF (0:2)-Low | V_l | V_{ee} | - | $V_{ee} + 0.5$ | V |


Digital Diagnostics

| Parameter | Range | Accuracy | Unit | Calibration | Formula |
|--------------|---------------|----------|------|-------------|---|
| Temperature | -5 to 70 | ± 3 | ° C | Internal | $T_c(C) = T_{ad}(16 \text{ bit signed twos complement}) / 256$ |
| Voltage | 0 to V_{CC} | 0.1 | V | Internal | $V(\text{Volts}) = V_{ad}(16 \text{ bit unsigned integer}) * 0.1$ |
| Bias Current | 0 to 120 | 5 | mA | External | $I(\text{mA}) = I_{slope} * I_{ad}(16 \text{ bit unsigned integer}) + I_{offset}$ |
| TX Power | 0 to +5 | ±3 | dBm | External | $TX_PWR(\mu W) = TX_PWR_{slope} * TX_PWR_{ad}(16 \text{ bit unsigned integer}) + TX_PWR_{offset}$ |
| RX Power | -42 to -10 | ±3 | dBm | External | $RX_PWR(\mu W) = A_0 + A_1 * x + A_2 * x^2 + A_3 * x^3 + A_4 * x^4$ |

| Pin | Function | Notes |
|-----|------------|------------------------|
| 1 | V_{eeT} | TX GND |
| 2 | TX_FAULT | Open Collector |
| 3 | TX_DISABLE | Internally Pulled High |
| 4 | MOD_DEF2 | Serial Data Input |
| 5 | MOD_DEF1 | Serial Clock Input |
| 6 | MOD_DEF0 | Internally Grounded |
| 7 | NC | Not Connected |
| 8 | LOS | Open Collector |
| 9 | V_{eeR} | RX Ground |
| 10 | V_{eeR} | RX Ground |
| 11 | V_{eeR} | RX Ground |
| 12 | RXD- | RX Data Negative |
| 13 | RXD+ | RX Data Positive |
| 14 | V_{eeR} | RX GND |
| 15 | V_{ccR} | RX Power |
| 16 | V_{ccT} | TX Power |
| 17 | V_{eeT} | TX GND |
| 18 | TXD+ | TX Data Positive |
| 19 | TXD- | TX Data Negative |
| 20 | V_{eeT} | TX GND |


Outline Drawing


Units in mm(inch)

Ordering Information

| Model | Description | Data Rate (Mbps) | Wavelength (nm) | Bail Latch Color | Distance Range (km) |
|-------------|------------------------|------------------|-----------------|------------------|---------------------|
| SFP-O3D-XLR | SFP FE/OC3 Transceiver | 100 - 155 | 1550 | Yellow | 60 - 170 |

Warnings

Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

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