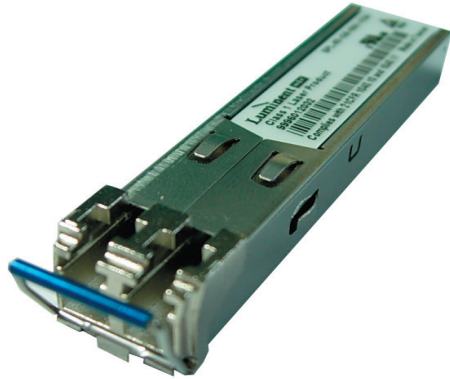


SP-GB-LX



Features

- Data Rate 1.062 to 1.25 Gb/s
- Single 3.3V Supply
- 10km Reach
- 13dB Typical Link Budget
- Commercial, Reduced and Industrial Temp. Operation
- 1310nm FP Laser
- Fibre Channel 100-SM-LC-L Compliant
- Gigabit Ethernet IEEE 802.3ah Compliant
- SFP MSA SFF-8074i Compliant
- Telcordia GR-468 Compliant
- Digital Diagnostic SFF-8472 Compliant
- Color code Bail Latch : Blue
- RoHS compliant

General Operation

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|-------------------------------------|-----------|-------|--------|-------|-------|
| Supply Voltage | V_{CC} | 3.135 | 3.3 | 3.465 | V |
| Total Current | I_{CC} | - | - | 300 | mA |
| Power Supply Rejection ^a | PSR | 100 | - | - | mVp-p |
| Operating Case Temperature (-CxA) | T_{opr} | -5 | - | 70 | °C |
| Operating Case Temperature (-RxA) | T_{opr} | -20 | - | 85 | °C |
| Operating Case Temperature (-TxA) | T_{opr} | -40 | - | 85 | °C |
| Storage Temperature | T_{stg} | -40 | - | 85 | °C |
| Data Rate GbE | DR | - | 1250 | - | Mbps |
| Data Rate FC | DR | - | 1062.5 | - | Mbps |

a) 20Hz to 155MHz

Transmitter Specifications (Optical)

| Parameter | Symbol | Min | Typical | Max | Unit |
|--------------------------------|-----------------|--------------------------------------|---------|------|-------|
| Optical Power | P_{op} | -9 | -5 | -3 | dBm |
| Average Launch Power (Tx:Off) | P_{off} | - | - | -30 | dBm |
| Extinction Ratio | ER | 9 | - | - | dB |
| Eye Mask | | IEEE 802.3ah compliant | | | |
| Total Jitter | TJ | - | - | 200 | ps |
| Optical Rise Time ^b | t_r | - | - | 260 | ps |
| Optical Fall Time ^b | t_f | - | - | 260 | ps |
| Mean Wavelength | λ | 1270 | 1310 | 1355 | nm |
| Spectral Width (RMS) | $\Delta\lambda$ | IEEE 802.3ah 1000BASE-LX10 Compliant | | | |
| Relative Intensity Noise | RIN | - | - | -120 | dB/Hz |

b) 20%-80% values

SP-GB-LX

Transmitter Specifications (Electrical)

| Parameter | Symbol | Min | Typical | Max | Unit |
|------------------------------------|---------------|----------|---------|----------------|----------|
| Input Differential Impedance | 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 |
|----------------------------------|------------------|------|---------|------|------|
| Receiver Power Low ^c | $R_{sens,low}$ | - | -24 | -22 | dBm |
| Receiver Power High ^c | $R_{sens,high}$ | -3 | 0 | - | dBm |
| Damage Threshold for Receiver | $P_{in, damage}$ | 6 | - | - | dBm |
| Wavelength ^d | λ | 1270 | - | 1355 | nm |
| Maximum Reflectance of Receiver | RX_r | - | - | -12 | dB |
| LOS Assert | - | -38 | - | - | dBm |
| LOS De-Assert | - | - | - | -22 | dBm |
| LOS Hysteresis | - | 0.5 | - | - | dB |

c) Measured at BER of 10^{-12} , PRBS of 2^7-1 , at eye center

d) Operational over 1200-1625nm 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 | - | - | 260 | ps |
| Data Output Fall Time | t_f | - | - | 260 | ps |

Timing and Electrical

| Parameter | Symbol | Min | Typical | Max | Unit |
|---|---------------------|----------|---------|----------------|---------|
| Tx Disable Negate Time | t_{on} | - | - | 1 | 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) | Rx_LOS_H | 2 | - | V_{cc} | V |
| RX_LOS Voltage (low) | Rx_LOS_L | - | - | 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 |

SP-GB-LX

Diagnostics

| Parameter | Range | Accuracy | Unit | Calibration | Formula |
|--------------------|-----------|----------|------|-------------|--|
| Temperature (-CDA) | -5 to 70 | ±3 | °C | External | $Tc(C) = Tslope * Tad(16 \text{ bit signed twos complement value}) + Toffset$ |
| Temperature (-RDA) | -20 to 85 | ±3 | °C | External | $Tc(C) = Tslope * Tad(16 \text{ bit signed twos complement value}) + Toffset$ |
| Temperature (-TDA) | -40 to 85 | ±3 | °C | External | $Tc(C) = Tslope * Tad(16 \text{ bit signed twos complement value}) + Toffset$ |
| Voltage | 0 to Vcc | 0.1 | V | External | $V(\text{Volts}) = Vslope * Vad(16 \text{ bit unsigned integer}) + Voffset$ |
| Bias Current | 0 to 120 | 5 | mA | External | $I(\text{mA}) = Islope * Iad(16 \text{ bit unsigned integer}) + Ioffset$ |
| Tx Power | -9 to -3 | ±3dB | dBm | External | $Tx_PWR(\mu W) = Tx_PWRslope * Tx_PWRad(16 \text{ bit unsigned integer}) + Tx_PWRoffset$ |
| Rx Power | -22 to -3 | ±3dB | dBm | External | $Rx_PWR(\mu W) = A0 + A1 * x + A2 * x^2 + A3 * x^3 + A4 * x^4$ |

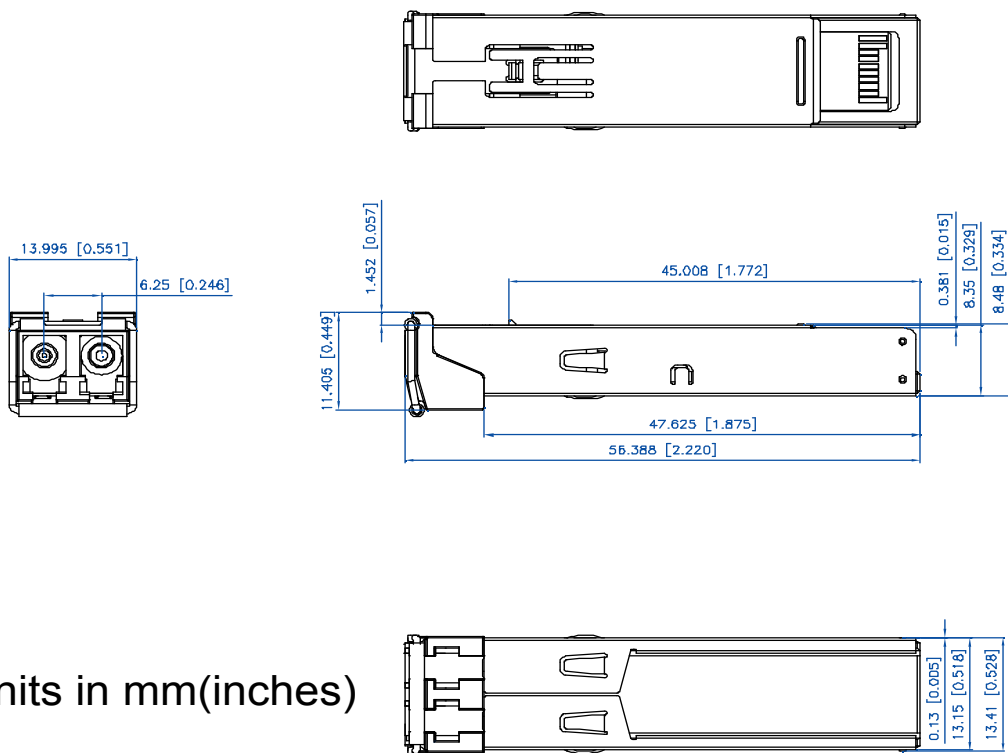
Pinout Definitions

| Pin | Function | Notes |
|-----|-------------------|------------------------|
| 1 | V _{ee} T | 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 _{ee} R | RX Ground |
| 10 | V _{ee} R | RX Ground |
| 11 | V _{ee} R | RX Ground |
| 12 | RXD- | RX Data Negative |
| 13 | RXD+ | RX Data Positive |
| 14 | V _{ee} R | RX GND |
| 15 | V _{CC} R | RX Power |
| 16 | V _{CC} T | TX Power |
| 17 | V _{ee} T | TX GND |
| 18 | TXD+ | TX Data Positive |
| 19 | TXD- | TX Data Negative |
| 20 | V _{ee} T | TX GND |

SP-GB-LX

| EEPROM Serial ID | | | | |
|------------------|--|---------|-----|-------|
| Name of Field | Description of Field | Address | Hex | ASCII |
| Vendor Name | SFP Vendor name (ASCII) | 20 | 4C | L |
| | | 21 | 55 | U |
| | | 22 | 4D | M |
| | | 23 | 49 | I |
| | | 24 | 4E | N |
| | | 25 | 45 | E |
| | | 26 | 4E | N |
| | | 27 | 54 | T |
| | | 28 | 4F | O |
| | | 29 | 49 | I |
| | | 30 | 43 | C |
| Vendor OUI | IEEE vendor OUI code for LuminentOIC Inc. | 37 | 00 | |
| | | 38 | 06 | |
| | | 39 | B5 | |
| Vendor P/N | Part number in ASCII, e.g. SP-GB-LX-CDA | 40 | 53 | S |
| | | 41 | 50 | P |
| | | 42 | 47 | G |
| | | 43 | 42 | B |
| | | 44 | 4C | L |
| | | 45 | 58 | X |
| | | 46 | 43 | C |
| | | 47 | 44 | D |
| | | 48 | 41 | A |

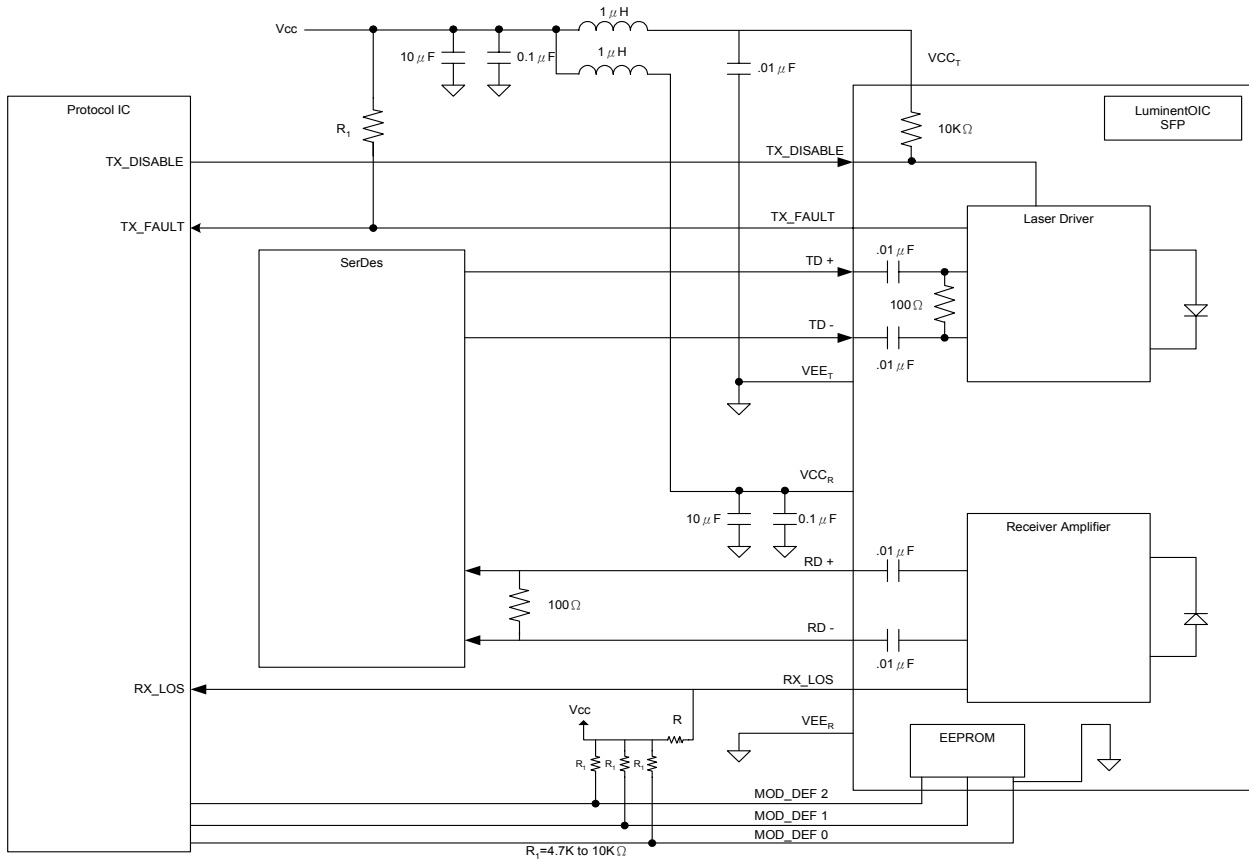
Outline Drawing



Units in mm(inches)

SP-GB-LX

Suggested Transceiver interface



SP-GB-LX

Ordering Information

Available Options:

| | |
|--------------|--------------|
| SP-GB-LX-CDA | SP-GB-LX-CNA |
| SP-GB-LX-TDA | SP-GB-LX-TNA |
| SP-GB-LX-RDA | SP-GB-LX-RNA |

Part numbering Definition:

SP - GB - LX - Temperature Diagnostic Revision

- **SP = Small Form Pluggable**
GB = 1.25Gbps
LX = IEEE 802.3 LX Interface
- **Operating Temperature**
C = Commercial temperature (-5 to 70°C)
R = Reduced Industrial (-20 to 85°C)
T = Industrial temperature (-40 to 85°C)
- **Diagnostic**
D = Digital Diagnostic (SFF-8472)
N = No Diagnostic
- **Design Revision**
A = RoHS compliant

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.

Legal Notes:

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