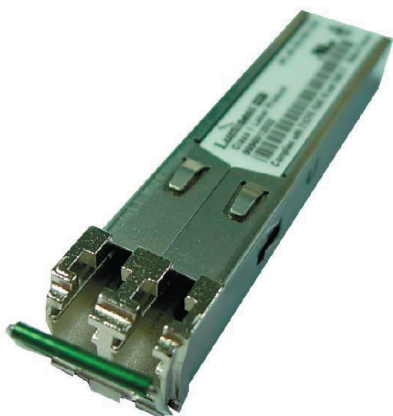


SP-GB-ZX-xxA



Features

- Data rate 1.062 to 1.25 Gb/s
- Single 3.3 V supply
- 80 km reach
- 24 dB min, 28 dB typical link budget
- 1550 nm DFB laser
- Commercial temperature available
- Industrial temperature available
- 1550 nm DFB laser
- Digital Diagnostic SFF-8472 compliant
- SFP MSA SFF-8074i compliant
- Bellcore GR-468 compliant
- TUV certificate number R50075336 0001
- Color coded bail latch tube: Green
- RoHS compliant

General Operating

| Parameter | Symbol | Min. | Typical | Max. | Unit |
|-------------------------------------|----------|-------|---------|--------|-------------------|
| Supply Voltage | V_{cc} | 3.135 | 3.3 | 3.465A | V |
| Total Current | I_{cc} | - | - | 300 | mA |
| Power Supply Rejection ^a | PSR | 100 | - | - | mV _{p-p} |
| Operating Temperature (-CDA) | T_{op} | -5 | - | 70 | °C |
| Operating Temperature (-TDA) | T_{op} | -40 | - | 85 | °C |
| Operating Temperature (-RDA) | T_{op} | -20 | - | 85 | °C |
| Storage Temperature | T_{st} | -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} | 0 | 2 | 5 | dBm |
| Average Launch Power Of Off Tx | P_{off} | - | - | -45 | dBm |
| Extinction Ratio (Dynamic) | ER | 9 | - | - | dB |
| Eye Mask | | - | - | - | 802.3z 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 | 1535 | 1550 | 1565 | nm |
| Spectral Width (20dB) | $\Delta \lambda$ | - | - | 1 | nm |
| Side Mode Suppression Ratio | SMSR | 30 | - | - | dB |
| Optical Path Penalty at 80 Km ^c | dp | - | 1 | 2 | dB |
| Relative Intensity Noise | RIN | - | - | -120 | dB/Hz |
| Reflection Toleranced ^d | rp | -24 | - | - | dB |

b) 20%-80% values

c) Measured at BER of 10^{-12} , PRBS of 27-1, at eye center

d) 1dB degradation of receiver sensitivity

SP-GB-ZX-xxA

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

| Parameter | Symbol | Min | Typical | Max | Unit |
|---------------------------------|-----------------|------|---------|------|------|
| Receive Power Low ^e | $R_{sens,low}$ | - | -26 | -24 | dBm |
| Receive Power High | $R_{sens,high}$ | -3 | 0 | - | dBm |
| Damage Threshold For Receiver | $P_{in,damage}$ | 6 | - | - | dBm |
| Wavelength ^f | λ | 1535 | 1550 | 1565 | nm |
| Maximum Reflectance Of Receiver | RX_r | - | - | -12 | dB |
| LOS Assert | | -38 | - | - | dBm |
| LOS De-assert | | - | - | -24 | dBm |
| LOS Hysteresis | | 0.5 | - | - | dB |

e) 10^{-12} at nominal wavelength

f) Operational over 1200-1625nm range

Electrical Output

| 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} | 2 | - | 100 | KHz |
| RX_LOS Voltage (High) | | 2 | - | V_{cc} | V |
| RX_LOS Voltage (Low) | | - | - | 0.8 | 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 |
| 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 |

SP-GB-ZX-xxA

Diagnostics

| Parameter | Range | Accuracy | Unit | Calibration | Formula |
|--------------------|---------------|----------|------|-------------|---|
| Temperature (-CDA) | -5 to 70 | ± 3 | ° C | Internal | $T_c(C) = T_{ad}(16 \text{ bit signed twos complement})/256$ |
| Temperature (-RDA) | -20 to 85 | ± 3 | ° C | Internal | $T_c(C) = T_{ad}(16 \text{ bit signed twos complement})/256$ |
| Temperature (-TDA) | -40 to 85 | ± 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 dB | dBm | External | $TX_PWR(\mu W) = TX_PWR_{slope} * TX_PWR_{ad}(16 \text{ bit unsigned integer}) + TX_PWR_{offset}$ |
| RX Power | -24 to -3 | ±3 dB | dBm | External | $RX_PWR(\mu W) = A_0 + A_1 * x + A_2 * x^2 + A_3 * x^3 + A_4 * x^4$ |

EEPROM Serial ID

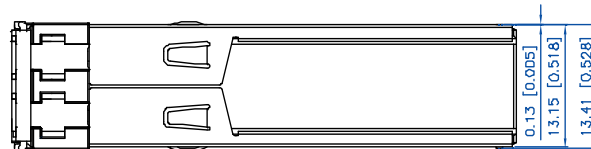
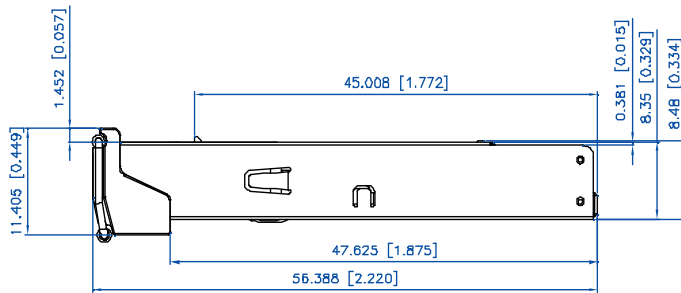
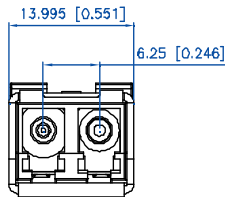
| Name of Field | Description of Field | Address | Hex | ASCII |
|---------------|---|---------|-----|-------|
| Vendor Name | SFP Vendor Name(ASCII) | 20 | 4C | L |
| | | 21 | 55 | U |
| | | 22 | 4D | M |
| | | 23 | 49 | I |
| | | 24 | 4E | N |
| | | 25 | 45 | E |
| | | 26 | 4E | N |
| | | 27 | 54 | 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 PN | Part Number in ASCII, e.g. SP-GB-ZX-CDA | 40 | 53 | S |
| | | 41 | 50 | P |
| | | 42 | 47 | G |
| | | 43 | 42 | B |
| | | 44 | 5A | Z |
| | | 45 | 58 | X |
| | | 46 | 43 | C |
| | | 47 | 44 | D |
| | | 48 | 41 | A |

SP-GB-ZX-xxA

| 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 | RZX- | 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 | TZX- | TX Data Negative |
| 20 | V _{ee} T | TX GND |

SP-GB-ZX-xxA

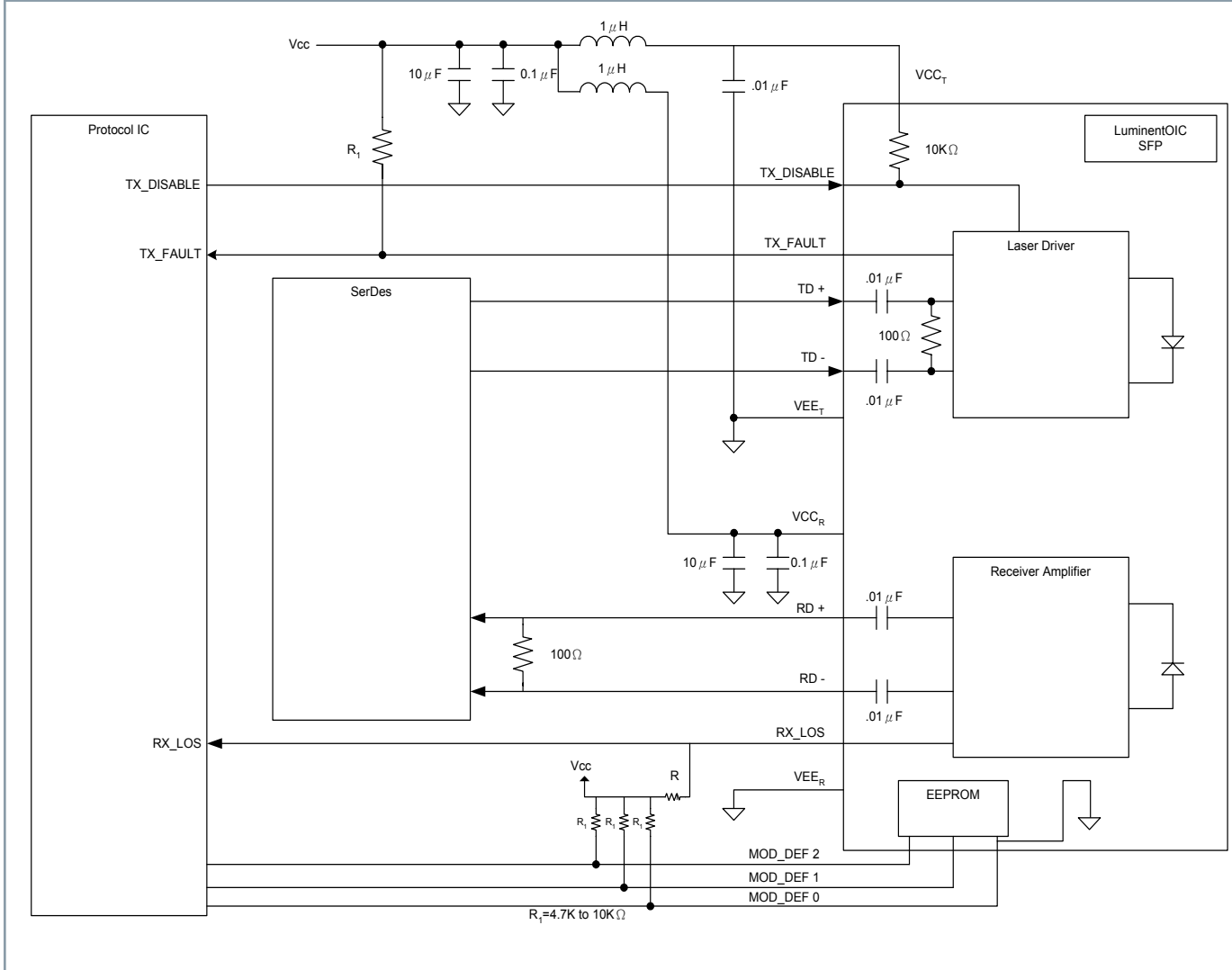
Outline Drawing



Units in mm(inches)

SP-GB-ZX-xxA

Suggested Transceiver Interface



SP-GB-ZX-xxA

Ordering Information

Available Options:

- SP-GB-ZX-CDA
- SP-GB-ZX-CNA
- SP-GB-ZX-TDA
- SP-GB-ZX-TNA
- SP-GB-ZX-RDA
- SP-GB-ZX-RNA

Part numbering Definition:

SP - GB - ZX - Temperature Diagnostic Revision

- SP = Small Form Pluggable
- GB = 1.25 Gbps
- ZX = 1550 nm, 80 km
- Operating Temperature
- C = Commercial (-5 to 70°C)
- R = Reduced (-20 to 85°C)
- T = Industrial (-40 to 85°C)
- D = Digital Diagnostic (SFF-8472)
- N = No Digital Diagnostic
- Design Revision
- 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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